

Metasys Site Management Portal Help



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Welcome

Welcome to the Metasys Site Management Portal (SMP) Help. This help file contains information on how to use the Metasys SMP user interface software. This section provides links to the major sections of the help file. For information about the components that make up a Metasys system, see [System overview](#).

Note: Throughout this help file, the term SMP refers to the user interface of the online Metasys engines and servers as well as the offline SCT, unless otherwise indicated.

Summary of Changes

The following information is new or revised at Release 11.0:

- Removed content about Basic Access, which was removed as a user access type at Release 11.0.
- Removed content about the RADIUS account user, which is no longer supported at Release 11.0 and does not comply with the FIPS 140-2 feature.
- Added the new [SA Bus Integration Object](#) for SNCs.
- Added a new object type for integrations called Network Port, a requirement for complying with the BACnet standard specifications. These integrations are now Network Port objects: BACnet IP, Field Bus MSTP, SA Bus, Ethernet IP Datalink, and IP Field Controller. Also because of this change, the following attribute tables were modified: [MS/TP Field Bus Integration Attributes](#), [SA Bus Integration Attributes](#), [Ethernet IP Datalink Attributes](#),
- Added information about a new user access type called [API Access](#).
- Added new attribute called FIPS Compliance Status to [ADS Device Object](#) for supporting FIPS 140-2.
- Added two new USB Port Enabled attributes to [Engine Device Object](#).

Getting Started

The [Site Management Portal User Interface](#) enables you to set up and maintain your building management system by interacting with Metasys engines and Metasys servers to perform functions such as:

- Navigating a site that includes: [Navigating to an Item](#), [Modifying an Item](#), and [Commanding Items](#).
- Creating a [calendar](#) and [exception schedules](#) for events and holidays.
- Creating [trends](#), [alarms](#), or [totalizations](#) extensions on points.
- Creating [reports](#) to monitor data about your system.
- Customizing the navigation tree with a [user view](#).
- Creating graphical displays using the [User Graphics Tool \(UGT\)](#) and [Graphics+](#).

System overview

The major components of the Metasys system are:

ADS/ADX: The Application and Data Server (ADS) is a software package that you can use to monitor and control the entire Metasys system. The ADS also serves as a long-term storage device for alarm and event messages, trend data, and user transactions. For customers with large facilities, the Extended Application and Data Server (ADX) is available to provide extended user

access and historical data storage capabilities. You can use an ADS/ADX to access the user interface and to serve as the location for user graphics. The ADS/ADX typically coordinates multiple user access from web browsers to the network. Hereafter, the term Metasys Server applies to either the ADS or the ADX.

You can also install the ADX in a split configuration with the ADX software/user interface on one computer (the web/application server computer) and the historical trend data on another computer (the database server computer).

OAS: The Open Application Server was introduced in Metasys Release 10.1. You can use an OAS as the point of access into a building automation system (BAS) and to archive historical and configuration data for a site. You can use an OAS as the supervisory device for 200 or fewer field devices through BACnet/IP or Remote Field Bus protocols. As a Site Director, an OAS can also support two child NxE or SNx devices. The OAS is an ideal solution to add the Metasys UI to an engine-only site. Hereafter, the term Metasys Server also applies to the OAS.

Network Engine: The network engine is a family of devices that supervise lower-level field controllers over the Metasys BAS. Network engines include the Network Automation Engines (NAEs), Network Integration Engines (NIEs), Network Control Engines (NCEs), Series of Network Controllers (SNCs), and Series of Network Engines (SNEs):

- The **NAE** and **SNE** are Ethernet-based supervisory engines that monitor and supervise networks of field-level building automation devices that typically control HVAC equipment, lighting, security, fire, and building access. The features of NAEs and SNEs include alarm and event management, trending, archiving, energy management, scheduling, and password protection through their embedded Site Management Portal. Different models and options support various communications protocols, including BACnet® over IP, BACnet MS/TP, Johnson Controls® N2 Bus, LonWorks, Modbus®, M-Bus, and KNX. The NAE55 and SNE2200x Series support a comprehensive set of supervisory features and functions for large facilities and technically advanced buildings and complexes. The NAE35, NAE45, SNE1050x, and SNE1100x Series support the same features and functions of the NAE55 and SNE2200x engines, but are designed for smaller buildings (or small areas of larger buildings) and enable the wider distribution of supervisory functions in larger facilities. Lastly, the NAE85 supports large BACnet/IP integrations with over 10,000 objects.
- The secure **NAE-S** is a hardened, secure version of the standard Network Automation Engine (NAE) 55 supervisory engine that uses embedded encryption technology to protect and secure the building management system at the endpoint. The engine meets the *Federal Information Processing Standard (FIPS 140-2)*, *Security Level 2*, that specifies the use of a cryptographic module and a tamper-proof housing. The engine is also Common Criteria certified.
- The **NCE** and **SNC** combine the network supervisor capabilities and IP network connectivity of a network engine with the Input/Output (I/O) point connectivity and direct digital control capabilities of a field controller. The NCE and SNC are a cost-effective solution designed for central plants and large built-up air handler applications. All NCE and SNC models include IP Ethernet network connectivity, the Site Management Portal, and the network supervisory functions featured on network automation engines. Some NCE and SNC models include an onboard display with keypad. The NCE and SNC support a wide variety of building networks such as BACnet/IP, BACnet MS/TP, Johnson Controls N2 Bus, LonWorks, Modbus, M-Bus, and KNX.

- The **NIEx5** is an Ethernet-based, supervisory engine for integration of Metasys N1 Networks. The NIEx5, which includes the NIE55 and NIE85, is a specialized version of the NAE and is designed to provide for the migration of existing N1 networks into the Metasys system. The NIEx5 has the same Site Management Portal as the NAE. Unlike the NAE, the NIEx5 does not support integration of BACnet MS/TP or BACnet/IP, N2, and LonWorks networks. Two models of the NIEx5 are available. The NIE55 supports smaller N1 networks, while the NIE85 supports larger N1 integrations. The NIE55 and NIE85 engines were retired at Metasys system Release 9.0.
- The **NIEx9** is an Ethernet-based, supervisory engine for integration of building control devices that communicate over the Modbus®, MBus, or KNX protocol. The NIEx9 also communicates over the BACnet MS/TP, BACnet/IP, N2, or LonWorks networks. This specialized version of the NIE is designed to provide for the migration of these existing third-party networks into the current generation Metasys system. The NIEx9 provides the same Site Management Portal UI as the NAE or NIE. Several models are available: NIE29, NIE39, NIE49, NIE59, and NIE89. The NIE29, NIE39, and NIE49 engines were retired at Metasys system Release 9.0.7.

SCT: You can use the System Configuration Tool in all phases of engineering, installing, and commissioning of devices that make up the Metasys system. You can use the SCT offline to create archive databases that can be downloaded to an Engine or Server. You can also use the SCT to upload and archive databases that were created or edited online from an Engine or Server. With the SCT, you can view and configure multiple sites in one archive.

SCT no longer requires the Site Director to be of an equivalent release version as the tool. You can use the SCT also to maintain a variety of engines from Release 5.2 and later. The Site Director must now be at an equivalent or greater release version than the highest versioned engine. For example, if you have a 10.1 engine and an 8.0 engine in the archive, the Site Director needs to be at Release 10.1 or later.

The SCT has the same look and feel as the Engine and Server Site Management Portal.

Metasys system configuration requires that you define a single device as the Site Director. The Site Director device may be a network engine or server, and its primary role is to coordinate multiple-user access from the web browser to the network. If a Metasys server exists in the system, it is defined as the Site Director automatically. When communicating directly to Metasys servers or network engines, you are in the online mode.

- ① **Note:** In order to use HTTPS communications between Metasys SMP and SCT, you must have SCT Release 11.1 or later, SMP Release 8.1 or later, and the latest version of Launcher installed.

Related Documentation

Use the following table to find information available outside this Help system:

Table 1: Related Documentation

For More Information On	See Document
Metasys System	<i>Metasys System Configuration Guide (LIT-12011832)</i>
Metasys System terms and acronyms	<i>Metasys System Extended Architecture Glossary Technical Bulletin (LIT-1201612)</i>
How to use the Metasys Launcher	<i>Launcher Help (LIT-12011742)</i>
Network information including Internet security risks	<i>Network and IT Guidance Technical Bulletin (LIT-12011279)</i>
How to use the Open Application Server (OAS)	<i>Open Application Server Help Guide (LIT-12013243)</i>

Table 1: Related Documentation

For More Information On	See Document
ADS or ADX installation and upgrade	<i>Metasys Server Installation and Upgrade Instructions Wizard (LIT-12012162)</i>
How to install an OAS	<i>OAS Installation Guide (LIT-12013222)</i>
SCT installation and upgrade	<i>SCT Installation and Upgrade Instruction (LIT-12012067)</i>
Configuration of an ADS/ADX within the Metasys System. Also includes information on configuration of repositories, time synchronization, printing, and dial-up connections.	<i>ADS/ADX Commissioning Guide (LIT-1201645)</i>
How to set up time management on the Metasys System	<i>ADS/ADX Commissioning Guide (LIT-1201645)</i> <i>NAE Commissioning Guide (LIT-1201519)</i>
How to configure the split ADX	<i>ADS/ADX Commissioning Guide (LIT-1201645)</i>
License information for the Metasys System	<i>Metasys System Extended Architecture License Information (Part No. 24-10067-1)</i>
Licensing for the ADS/ADX, Export Utility, and Advanced Graphics Application software	<i>Software Manager Help (LIT-12012389)</i>
Installation of Export Utility software	<i>Export Utility Installation Instructions (LIT-12011527)</i>
Use of the Export Utility to extract historical data to formats such as Microsoft Excel® and Access	<i>Export Utility Help (LIT-120952)</i>
Installation of the Advanced Graphics Application and SVG Viewer	<i>Advanced Graphics Application Installation Instructions (LIT-12011525)</i>
Configuration and use of the Advanced Graphics Application to create graphics with dynamic capabilities	<i>Advanced Graphics Application Help (LIT-1201850)</i>
Installation of the Graphic Generation Tool	<i>Graphic Generation Tool Installation Instructions (LIT-12011685)</i>
Configuration and use of the Graphic Generation Tool to create Graphics+ files	<i>Graphic Generation Tool Help (LIT-12011697)</i>
Use of Graphics+ files at the Site Director	<i>Graphics+ Runtime Help (LIT-12011708)</i>
Use of the SCT regarding offline archive databases setup and basic setup of an N2 network online	<i>Metasys SCT Help (LIT-12011964)</i>
How to create and edit users and roles, configure user profiles, assign system access permissions, assign all items navigation view permissions, and unlock user accounts	<i>Security Administrator System Technical Bulletin (LIT-1201528)</i>
Metasys for Validated Environments (MVE), Extended Architecture	<i>Metasys for Validated Environments, Extended Architecture Technical Bulletin (LIT-12011327)</i>
How to install the NAE55 and NIE55	<i>NAE55/NIE55 Installation Instructions (Part No. 24-10051-0)</i>
How to install the Secure NAE-S	<i>NAE55-S Installation Instructions (Part No. 24-10051-108)</i>

Table 1: Related Documentation

For More Information On	See Document
How to install the NAE35 and the NAE45	<i>NAE35/NAE45 Installation Instructions (Part No. 24-10050-6)</i>
How to install the Nx85	<i>NxE85 Installation Instructions (LIT-12011530)</i>
How to install the SNE1050, SNE1100, and SNE2200 network engines	<i>SNE Installation Guide (Part No. 24-10143-01647)</i>
How to install the SNC1612 and SNC2515 network engines	<i>SNC Installation Guide (Part No. 24-10143-01892)</i>
How to commission the LCS85	<i>LCS85 Commissioning Guide (LIT-12011568)</i>
How to commission the NAE	<i>NAE Commissioning Guide (LIT-1201519)</i>
How to commission the SNE	<i>SNE Commissioning Guide (LIT-12013352)</i>
How to commission the SNC	<i>SNC Commissioning Guide (LIT-12013295)</i>
How to set up and commission an NAE85/NIE85	<i>NxE85 Commissioning Guide (LIT-12011044)</i>
How to install and use the NAE/NIE Update Tool	<i>NAE/NIE Update Tool Technical Bulletin (LIT-12011524)</i>
How to install and Use the NAE Configuration Tool	<i>NxE Information and Configuration Tool Technical Bulletin (LIT-1201990)</i>
NAE55 Compliance with ANSI/ASHRAE Standard 135-2008, BACnet Protocol	<i>NAE/NCE Protocol Implementation Conformance Statement Technical Bulletin (LIT-1201532)</i> This document includes the PICS and BIBBs for the NAE55.
NIE Compliance with ANSI/ASHRAE Standard 135-2008, BACnet Protocol	<i>NIE Series Protocol Implementation Conformance Statement Technical Bulletin (LIT-1201672)</i> This document includes the PICS and BIBBs for the NIE.
How to use web service technology for secure access to the Metasys System	<i>Metasys System Extended Architecture Secure Data Access DLL Technical Bulletin (LIT-1201663)</i>
Concepts and procedures to perform an N1 Migration with an NIE	<i>N1 Migration with NIE Technical Bulletin (LIT-1201535)</i>
How to integrate an N2 network in the Metasys System with the NAE	<i>N2 Integration with the NAE Technical Bulletin (LIT-1201683)</i>
How to set up an NAE55 as a BACnet System Integrator in a Metasys System network	<i>BACnet Controller Integration with NAE/NCE Technical Bulletin (LIT-1201531)</i>
How to set up an NAE as a LonWorks Network Integrator	<i>LONWORKS Network Integration with NAE and LCS Technical Bulletin (LIT-1201668)</i>
The operation of and setting up Metasys System Demand Limiting and Load Rolling	<i>DLLR Technical Bulletin (LIT-12011288)</i>
Metasys Advanced Reporting System and Energy Essentials	<i>Metasys Advanced Reporting System Help (LIT-12011312)</i>
How to install the Metasys Advanced Reporting System	<i>Metasys Server Installation and Upgrade Instructions (LIT-12012162)</i>

Table 1: Related Documentation

For More Information On	See Document
How to install Energy Essentials	<i>Energy Essentials Installation Instructions (LIT-12011539)</i>
How to configure the Metasys Advanced Reporting System	<i>ADS/ADX Commissioning Guide (LIT-1201645)</i>
How to configure Microsoft SQL Server Report Services to work with the Metasys Advanced Reporting System	<i>ADS/ADX Commissioning Guide (LIT-1201645)</i>
MS/TP communications and field controllers	<i>MS/TP Communications Bus Technical Bulletin (LIT-12011034)</i>

Site Management Portal User Interface

You can interact with the entire Metasys system from any location running a supported web browser. Use either Windows Internet Explorer version 11, Microsoft Edge version 44 or later, Apple Safari® version 11.0 or later, or Google Chrome™ version 78.0 or later. Other browsers, such as Mozilla® Firefox®, may also be used but are not fully supported.

Note: In Internet Explorer 11, select the option **Display all websites in Compatibility View**, found under **Tools > Compatibility View Settings**, to ensure that websites appear and function correctly.

You use the [Launcher](#) application to reach the login screen for the Site Management Portal UI. If the Launcher is not already installed on your machine, you are prompted to install it when you attempt to log in the SMP using the web browser.

After you log in to the Metasys system, you are able to perform the following operations:

- [navigate to an item in the system](#)
- [create user views](#)
- [view summary definitions and tailored summaries](#)
- [manage alarms and events](#)
- [record and display trend data](#)
- [work with items to monitor and command systems and points](#)
- [edit and modify items](#)
- [schedule activities](#)
- [create and view graphics](#)
- [create, simulate, and activate control system logic](#)

Site Management Portal User Interface Concepts

User Interface Object Icons and Class IDs

The SMP user interface shows object icons in the All Items tree based on class IDs and use cases. For example, some class IDs display differently if the device is a Site Director. If a class ID does not have a designated icon, the default icon is used. The following table contains all class ID icons.

Table 2: User Interface Object Icons


Icon	Object	Class ID
	Default	NA

Table 2: User Interface Object Icons







	BACnet Analog Input	0
	N2 Analog Input	147
	XL5K Analog Input	202
	Lon Analog Input	351
	N1 Analog Input	417
	VND Analog Input	428
	BACnet Analog Input Mapper	500
	Analog Input Mapper	599
	BACnet Analog Output	1
	N2 Analog Output	149
	XL5K Analog Output	203
	Lon Analog Output	352
	N1 Analog Output	419
	VND Analog Output	429
	BACnet Analog Output Mapper	501
	Analog Output Mapper	600
	BACnet Analog Value	2
	JCI Analog Value	165
	BACnet Analog Value Mapper	502
	Analog Value Mapper	601
	BACnet Binary Input	3
	N2 Binary Input	148
	XL5K Binary Input	204
	Lon Binary Input	353
	N1 Binary Input	418
	VND Binary Input	430
	BACnet Binary Input Mapper	503
	Binary Input Mapper	602
	BACnet Binary Output	4
	N2 Binary Output	150
	XL5K Binary Output	205
	Lon Binary Output	354
	N1 Binary Output	420
	VND Binary Output	431
	BACnet Binary Output Mapper	504
	Binary Output Mapper	603
	BACnet Binary Value	5
	Binary Value	168
	BACnet Binary Value Mapper	505

Table 2: User Interface Object Icons










	BACnet Calendar	6
	JCI Calendar	161
	N1 Calendar	423
	Calendar Mapper	762
	BACnet Event Enrollment	9
	JCI Event Enrollment	190
	BACnet Event Enrollment Mapper	509
	BACnet File	10
	Resource File	357
	BACnet File Mapper	510
	File	554
	BACnet Group	11
	JCI Group	191
	BACnet Group Mapper	511
	BACnet Loop	12
	Proportional, Integral, and Derivative Loop	252
	JCI Loop	264
	BACnet Program	516
	BACnet Multistate Input	13
	N2 Multistate Input	151
	XL5K Multistate Input	206
	LON Multistate Input	355
	N1 Multistate Input	421
	VND Multistate Input	432
	BACnet Multistate Input Mapper	513
	JCI Multistate Input Mapper	605
	BACnet Multistate Output	13
	XL5K Multistate Output	207
	LON Multistate Output	356
	N1 Multistate Output	422
	VND Multistate Output	433
	BACnet Multistate Output Mapper	514
	BACnet Notification	15
	JCI Notification	313
	BACnet Notification Mapper	515
	JCI Notification Mapper	763
	BACnet Schedule	16
	JCI Schedule	263
	BACnet Schedule Mapper	517
	JCI Schedule Mapper	761

Table 2: User Interface Object Icons

	BACnet Multistate Value	19
	JCI Multistate Value	141
	BACnet Multistate Value Mapper	519
	JCI Multistate Mapper	606
	BACnet Accumulator	23
	N2 Program Control	153
	XL5K Program Control	208
	Flex Accumulator	209
	BACnet Accumulator Mapper	220
	N1 Program Control	245
	BACnet PE	129
	Subscription Server	135
	Subscription Client	661
	DLLR	137
	IEIEJ Electric Demand Monitoring	214
	IEIEJ Electric Demand Control	215
	IEIEJ Generic Load Control	216
	BACnet Load Control	225
	BACnet Electric Demand Control	228
	BACnet Generic Load Control	245
	Load	138
	Multiple Control	144
	BACnet Command	507
	Interlock	146
	Trend	155
	BACnet Trend Log	520
	Trend Mapper	760
	Analog Alarm	156
	Multistate Alarm	172
	Optimal Start	174

Table 2: User Interface Object Icons













	Container	176
	User View Folder	2000
	Controller Folder Template	2006
	SCT Summary Definition Folder	2011
	Container	176
	Container	176
	Reference	176
	Global Data	177
	Signal Select	178
	Pulse Meter	181
	BACnet Pulse Converter	221
	N50 (NAE55)	185
	NAE 45	192
	NAE 35	193
	BACnet Router	219
	Gateway	282
	N50 Integration (NIE)	358
	NAE 35	613
	Site Director N50	185
	Site Director NAE 45	192
	Site Director NAE 35	193
	Site Director BACnet Router	219
	Site Director Gateway	282
	Site Director N50 Integration (NIE55)	358
	Site Director NAE 35	613
	SNC	448
	SNE1100x	871
	SNE1050x	872
	SNE110L x	873
	SNE2200x	877
	Site Director SNC	448

Table 2: User Interface Object Icons










	Site Director SNE1100x	871
	Site Director SNE1050x	872
	Site Director SNE110Lx	873
	Site Director SNE2200x	877
	Programming	450
	Local Application	236
	Local Hardware IO	449
	Auto Shutdown	186
	Field Bus	195
	SA Bus	196
	XL5K Integration	200
	WRS Class	210
	N2 Integration	290
	MSTP Integration	307
	N1 Integration	346
	LON Integration	349
	Field Device	197
	XL5K Controller	201
	Controller	278
	NCM	347
	LON Controller	350
	VND Controller	427
	BACnet Device	508
	REM Device	597
	RIOM Device	598
	Fire Control Device	199
	Wireless Receiver	211
	Fire Control Device	N/A
	Wireless Sensor	212

Table 2: User Interface Object Icons


















	Supervisor Status Primitive	213
	Net Sensor Device	627
	IEIEJ Electric Demand Monitoring	214
	BACnet Electric Demand Monitoring	227
	BACnet Trend Log Multiple	224
	Trend Log Multiple	300
	Solar Clock	249
	Diagnostic	255
	Analog Totalization	274
	Runtime Totalization	275
	Event Totalization	276
	ODS Workstation	283
	OAS Workstation	393
	ADS Workstation	425
	ADS Lite E	752
	ADS Lite A	753
	Initial Device Configuration	2004
	Site Director ODS Workstation	283
	Site Director OAS Workstation	393
	Site Director ADS Workstation	425
	Site Director ADS Lite E	752
	Site Director ADS Lite A	753
	Site	286
	Ethernet IP	292
	Data Broadcast	319
	System Class	336
	BACnet IP Integration	343
	Graphic	344
	Trend Study	345

Table 2: User Interface Object Icons





















	Navigation Tree	348
	P2000 Server	377
	P2000 Host Engine	N/A
	P2000 Panel	378
	P2000 Portal	379
	P2000 Door	380
	P2000 Report	N/A
	Standards Table	585
	BACnet Averaging	518
	Averaging	677
	BACnet Life Safety Point	521
	BACnet Life Safety Zone	522
	Input Float Block	526
	Output Float Block	527
	Input Enumeration Block	528
	Output Enumeration Block	529
	Input Boolean Block	530
	Output Boolean Block	531
	Summer Winter Compensation Primitive	532
	Control Activity	536
	Float Constant	551
	Boolean Constant	552
	Control Point	555

Table 2: User Interface Object Icons





	Sensor Primitive	556
	Comparison	560
	Math Primitive	/561
	ABH Primitive	563
	DP Primitive	564
	Enth Primitive	565
	RH Primitive	566
	WB Primitive	567
	Flow	570
	Enumeration Constant	568
	Sequence	575
	Variable Speed Drive	632
	NCE	651
	Site Director NCE	651
	Summary Definition	699
	Xaml Graphic	717
	Legacy Equipment	805
	Space	806
	Equipment Definition	807
	BACnet Character String	820
	BACnet Integer	825
	BACnet Positive Integer	828
	Archive Object	2000

Table 2: User Interface Object Icons

	Controller Template	2008
	SCT Summary Definition	2010

Launcher

About this task:

The Metasys system relies on a private internal Java Runtime Engine (JRE) that is installed when you download the Launcher application. This private JRE is not exposed to the same security risks as the public version of the JRE.

The Launcher manages a list of all supervisory engines, Metasys Servers, and SCT computers at your facility. You can also add the Metasys UI, Metasys Advanced Reporting System, and any web address to its managed list of websites. You can access any release of the Metasys system with the Launcher, but opening the SMP or SCT UI at Release 5.2 or earlier requires the public JRE on the client computer. To install the Launcher application:

1. Open your web browser and enter the URL for the Site Management Portal. Examples:

`https://MAIN-ADX/metasys`

`https://main-adx.my-domain.com`

`https://10.10.15.100/metasys`

- ① **Note:** If your site has self-signed certificate and you attempt to install the Launcher application through the HTTPS site, a security certificate error appears. Continue to the website in order to continue installing the Launcher application.

The Windows Launcher Download screen appears.

2. Click **Full Launcher Installer** to access SMP or SCT, which allows you to run or download the Launcher installation file.
3. Click **Run** to start the installer. For more details, refer to the *Launcher Installation Instructions (LIT-12011783)*.
4. After installation, close the web browser. By default, the Launcher screen appears after installation.
5. Refer to the *Adding a New SMP or SCT Device Profile* and *Adding a New Other Profile* sections of *Launcher Help (LIT-12011742)* for instructions on how to manage a list of all engines, Metasys Servers, ODS, SCT, Metasys Advanced Reporting System, or any generic website links that require a login.

Login

- ① **Note:** We strongly advise that you do not access the Metasys Site Management Portal UI from a computer running a server-class operating system. By default, Windows Internet Explorer Enhanced Security Configuration is enabled on server-class operating systems and may block the Launcher download page from which you install the Launcher application for access to the Site Management Portal. Open the Site Management Portal UI from a computer that is not running a server-class OS.

The Metasys system supports Active Directory service and SSO. When you launch the device that is configured as the Site Director of the extended Metasys network, three possible login scenarios occur:

- If the Active Directory service feature is disabled, the Metasys login screen appears. Enter your Metasys user name and password to gain access to the Metasys Site Management Portal (SMP) user interface.
- If the Active Directory service and SSO features are enabled and you are logged in to your Windows desktop as an Active Directory service user with access to the Metasys system, the login screen does not appear and you automatically have access to the Metasys SMP user interface.
- If the Active Directory service feature is enabled, but you are not logged in to your Windows desktop as an Active Directory service user with access to the Metasys system (or if the Active Directory service feature is enabled and SSO is disabled), the login screen appears. From that screen, you can access the Metasys system by entering your Metasys user name and password, and by selecting **Metasys Local** from the **Login To** drop-down menu; or by entering an Active Directory service user name and password, and by selecting the **Active Directory** service domain from the **Login To** drop-down menu.

The first time you log in to the site or engine and after you change the default password, the Metasys Terms and Conditions appear. Scroll through and read the entire Terms and Conditions text. If you agree with the terms, click **Accept** at the end of the text. If you do not agree, click **Cancel** to return to the login screen.

- Note:** If the Site Director is not available, you may want to directly connect to a network engine. In this scenario, Active Directory service login is not supported (both automatic login and user name/password login), and you must use a Metasys user name and password to connect. The security configuration for a network engine may be set up differently than in the Site Director.

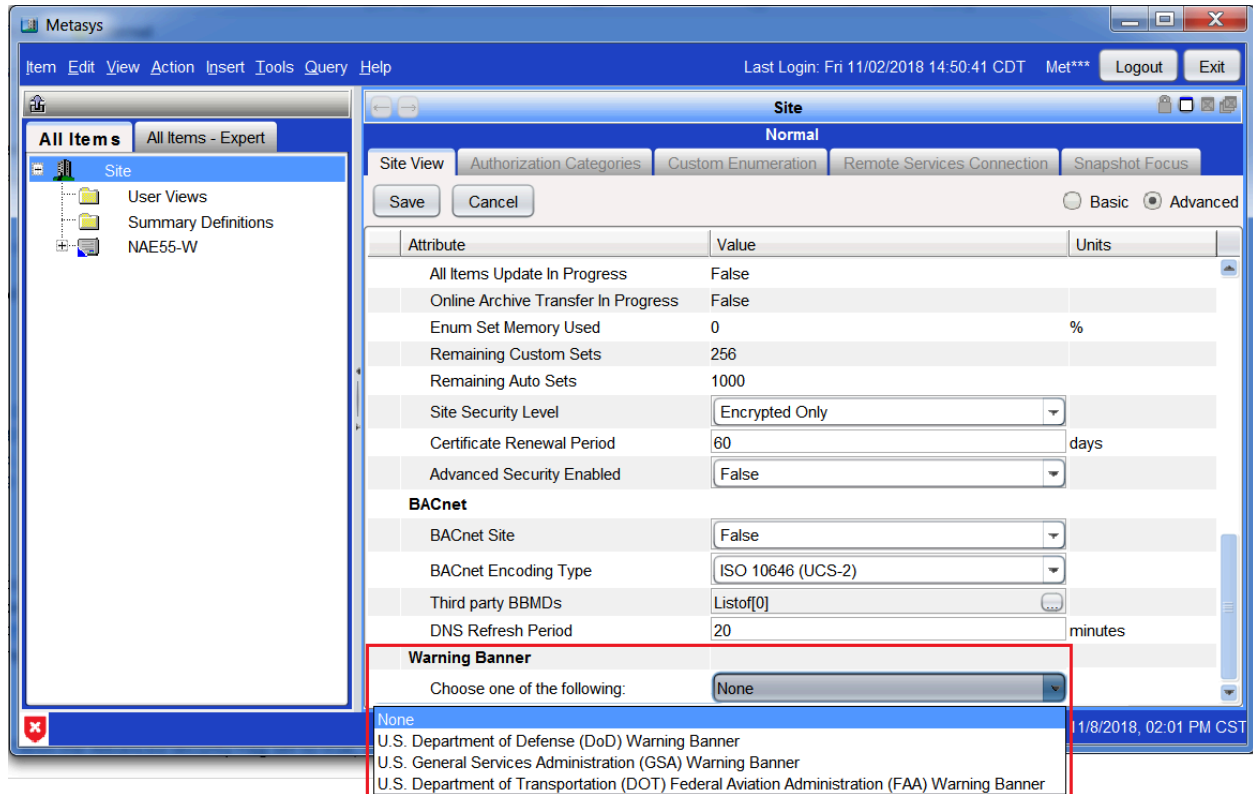
For information about setting up the default login domain in the SMP UI for sites that use Active Directory accounts, refer to the *Selecting a Default Domain for Active Directory Service - Users* section in the *Security Administrator System Technical Bulletin (LIT-1201528)*.

Warning Banner

After Metasys installation, you can use the SMP UI to enable a Warning Banner option at the Site object. The Warning Banner is a special login feature that consists of a text window that appears to the SMP user. The information in the text window is customized for the United States government agency where the Metasys system is installed. The user must read and accept the conditions set forth in the Warning Banner before logging in.

You have the choice of three different warning banners: U.S. Department of Defense (DoD), U.S. General Services Administration (GSA), or U.S. Department of Transportation (DOT) Federal Aviation Administration (FAA). The default selection is None. The following figure shows the Warning Banner selection in the UI.

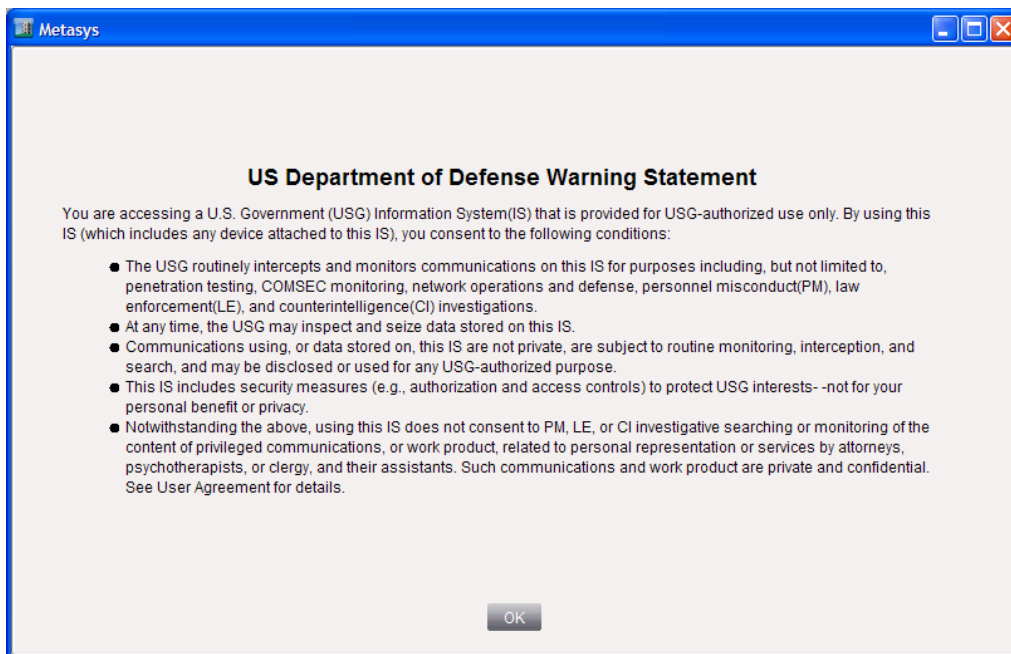
Figure 1: Warning Banner Selection



Warning Banner Example

The figure below shows the banner that appears each time you access the Site Management Portal if the DoD banner type is selected on the Site object.

Figure 2: United States DoD Warning Statement



For this example, the statement contains information critical to any Metasys user accessing the BAS at a Department of Defense facility. You must click **OK** to consent to the statement before reaching the login screen. The standard Metasys system login screen appears after you click **OK**. If the Active Directory service and SSO features are enabled, Active Directory logs you in without asking for the user name and password.

When the Metasys system login screen appears, you have up to 30 seconds to log in. If 30 seconds pass with no login activity, the login screen clears and the warning banner screen returns. The banner also reappears after you log out of the Metasys system or the system logs you out because of user inactivity.

Record of User Access with IP Address

The Audit Viewer in the Metasys software records each change that occurs in the Metasys system. The User column in the Audit Viewer records the name of each user who logged in (authorized user) or tried to log in (unauthorized user). The Post Value column records the IP address of the client computer used to access the Metasys system. See the following table.

Figure 3: Users and IP Addresses Recorded by Audit Viewer

When	User	Description	Post Value
6/10/2011 10:34:38 AM CDT	MetasysSysAgent	User Login Successful	127.0.0.1
6/10/2011 12:52:26 PM CDT		Startup	
6/10/2011 12:52:26 PM CDT	IntraComputer	User Password Changed	I... IntraComputer
6/10/2011 01:02:54 PM CDT	MetasysSysAgent	User accepts Terms and Con...	
6/10/2011 01:19:43 PM CDT		Startup	
6/10/2011 01:16:31 PM CDT	MetasysSysAgent	User Login Successful	10.9.117.195
6/10/2011 01:02:47 PM CDT	MetasysSysAgent	User Login Successful	
6/10/2011 01:42:34 PM CDT	MetasysSysAgent	User Login Successful	
6/11/2011 12:03:54 AM CDT	IntraComputer	User Password Changed	I... IntraComputer
6/13/2011 12:00:18 AM CDT	IntraComputer	User Password Changed	I... IntraComputer
6/14/2011 10:38:00 AM CDT	MetasysSysAgent	User Logout	
6/14/2011 10:38:51 AM CDT	Metasysysa	User Login Failed	10.9.117.195
6/14/2011 10:48:11 AM CDT	MetasysSysAgent	User Property Changed	
6/14/2011 10:48:42 AM CDT	MetasysSysAgent	User Logout	
6/14/2011 10:51:12 AM CDT	MetasysSysAgent	User Logout	
6/14/2011 10:51:56 AM CDT	MetasysSysAgent	User Login Successful	10.9.117.195
6/14/2011 10:49:17 AM CDT	MetasysSysAgent	User Login Successful	10.9.117.195

Metasys Modes

Metasys software can operate in different modes: online using the Site Management Portal UI or offline using the SCT UI. When you are connected to the network engine or Metasys Server, you can perform online mode operational activities such as monitoring and commanding. When you are connected to the SCT only, you can perform offline mode system configuration tasks such as configuring point objects and features.

Online Mode

When you are connected to the network engine or Metasys Server, you can perform online operational activities such as monitoring and commanding equipment. You can also perform online database configuration activities, such as defining field controllers or adding points. This function is referred to as online mode or Site Management Portal (SMP) mode. The online mode is available to users with the access type of Standard Access. See the [Access Types](#) section.

Any changes you make to the system configuration are made online to the system and need to be uploaded to be stored in the archive database.

Offline Mode

You can use SCT to configure servers and network engines without connecting to the live Metasys system server and network engines. This function is called offline (or system configuration) mode. In offline mode, use SCT to set up the system database. Then, load configuration changes created in offline mode to the network engine for the settings to take effect.

Two features are available only with SCT: ActionQ and Manage Archive. You can add servers and network engines in offline mode only.


The offline mode is available to users with the Access Type of Standard Access. See the [Access Types](#) section.

Access Types

Metasys system administrators determine the type of access a user has to the Metasys system through user accounts in the Security Administrator tool. The three access types are Standard Access, API Access, and Tenant Access.

Standard Access

Standard Access allows the Metasys local system user or Active Directory service user to access all authorized features of the online Site Management Portal (SMP) UI and the SCT. Users who were assigned Basic Access accounts with previous releases of the SMP UI are converted to Standard Access user accounts during the archive upgrade process.

 **Note:** If you want to use the Metasys Advanced Reporting System, you must have Standard Access with the Advanced Reporting privilege.

API Access

With Application Programming Interface (API) Access, users can retrieve information from the Metasys system network. Use API Access to read and write Metasys system data from a custom application with the same high level of security as when you access system data through the SMP UI. To perform a data request using a custom application, you need an API Access account and the appropriate network and application privileges. The API type access works with public APIs. However, an API user has limited access capabilities on the Metasys SMP UI and Metasys UI. Therefore, if you need the full capabilities of either UI, define a Standard Access user.

Tenant Access

Tenant Access allows the local system user or Active Directory service user to access all authorized features of the Metasys UI. Tenant Access users can log on the Metasys UI, but do **not** have log on privileges to the SMP UI.

Authorized Menu Items

Access to particular menu items depends not only on the mode of operation, but also on the defined System Security and Authorization (Access Control) that provides users with appropriate levels of access to the Metasys system. Use the Security Administrator System to set Authorization and System Security.

In each menu table, a check in the Authorization Required column means you must be authorized to perform that action for that particular item.

Screen Layout and Frames

The screen contains four frames and provides a consistent look and feel in every **mode** (online, or offline). Your access to certain features depends on the mode in which you are operating and your assigned **access type** and privileges.

- ① **Note:** If the navigation frame or a display frame is active, the header bar of the active frame or pane is highlighted. The Menu and Status frames are not highlighted even when you click in them.

Figure 4: Site Management Portal (SMP) UI Screen Frames

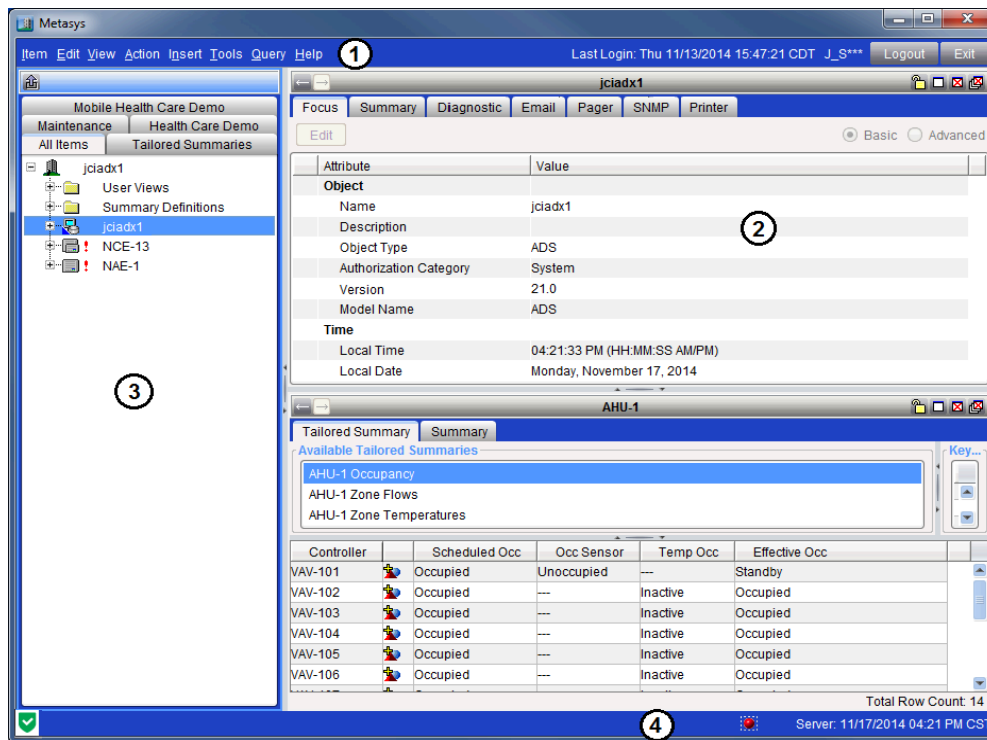


Table 3: Site Management Portal (SMP) UI Screen Frames



Number	Name	Description
1	Menu	Displays the menu bar and the first three characters of the logged-in user name. Active Directory service user names display as the fully qualified user name (for example, user@engineering.jci.com). Logging Out or exit from the system using buttons in the menu frame.
2	Display	Presents data or information in the user-selected Panel Layout . The top display panel shows information about the Site Director named jciadx1 (the device is selected in the navigation tree and the name of the device appears at the top of the Display Panel). The bottom Display Panel contains a Tailored Summary showing the occupancy schedule for AHU-1. See the Display Frame Layout section for more information on the Display Frame.

Table 3: Site Management Portal (SMP) UI Screen Frames

Number	Name	Description
3	Navigation	Displays navigation trees that organize items in the system. The All Items tree generates automatically when you configure the system database. You can create one or several user navigation trees (also referred to as user views) for defining your own navigation concept. For more information on the navigation tree, see the Navigation Tree section.
4	Status	Displays information about current user actions and the current time/ time zone of the server that you are logged into (supervisory device or Site Director). Status bar icons indicate system status. In the screen above, the status bar indicates that all alarms are snoozed.

Navigation Tree


The navigation frame can display several navigation trees in online mode. The All Items tree is generated during system configuration and represents the network layout of your system. You can add additional [user-defined navigation trees](#) (also referred to as user views) that provide navigation capabilities for viewing particular parts of your system.

-  **Note:** The Equipment folder and Facility Graphics folder only appear in the All Items tree in SCT. Equipment objects and Metasys UI graphics are not displayed in SMP.
-  **Note:** The navigation trees that appear for a particular user, including the All Items tree, are defined by the system administrator when the user's access permissions are created.

Navigation trees support standard browsing concepts such as the plus sign (+) for expanding [items](#) in the tree and the minus sign (-) for collapsing or hiding items in the tree. The maximum number of items that you can nest under an item in the All Items tree is 7. User-defined trees have no restrictions on the number of nested items.

To see more details on an item in the navigation tree, drag and drop the item or double-click the item in the navigation tree. The navigation frame also supports scroll bars and both right-click and left-click options.

You can display user views as either a set of tabs (default) or a drop-down list. This interface helps with large jobs that have many user views, as the tabs can occupy a large percentage of the viewable navigation screen area. Configure the default navigation display in the General Display Settings on the Display Settings Tab of the Metasys Preferences.

Click the **Detach** icon  to detach the navigation [frame](#). You can minimize and maximize the navigation frame, but if you click the **X** button, the frame is restored to its default position.

Items

The Metasys system uses the term **item** as a generic reference to an object or selection in the navigation tree. Items in the All Items navigation tree include the site, devices, control systems (logic), graphics, objects, integrations, schedules, files, trend studies, field points, [user-defined navigation trees](#), and other system data. Each item can have another item under it, and so on as the system hierarchy continues. Items have right-click [pop-up menus](#) that provide commanding and viewing options. A symbol represents each item in the navigation tree, and [status symbols](#) indicate the status of each item.

Status Indicators

Status indicators show the status of items in the system on the user interface. For example, these status indicators appear in the navigation tree, in a column on Summary views, and in a column on the Global Search Viewer's Search Results table. Also, a connection status indicator appears on the

SMP login screen and Main screen to denote the current security level of the certificate. If you place the cursor over the icon, a tooltip appears to further describe the certificate. The following table shows examples of the status indicators and the [mode](#) in which they may appear.

① **Note:** In Simulation mode, status indicators only appear in the Summary views in the display frame. The indicators do not appear in the navigation tree in this mode.

Notes:

- If the items under an item have different states, the parent item displays only the icon for the state of highest priority of Unreliable Alarm, Alarm, and Warning states. Unreliable Alarm is the highest priority, followed by Alarm and Warning.
- In rare instances, a network engine may appear online in the navigation map, but is actually offline to the Site Director. To confirm the offline status, open the engine's focus window; the window shows a gray screen with the text **Item Not Found**. If the engine is offline, the engine and the Site Director may no longer be paired. See [Pair Network Engine with Site Director](#) for steps on how to force a re-pairing of the devices.

Table 4: Status Indicators











Indicator	Indicator Description	Status	Mode
	Red exclamation point	Alarm: Item (or an item under this item in the tree) is in an alarm state.	Online
	Blue exclamation point	Warning: Item (or an item under this item in the tree) is in a warning state or cannot be found on the network.	Online
	Red exclamation point and red question mark	Unreliable Alarm: Item (or an item under this item in the tree) may be in alarm, which is an unreliable state. ① Note: The Unreliable Alarm icon appears when the alarm state of the object is Unreliable, and only applies to objects that have alarming defined through an alarm extension, intrinsic alarming, or an event enrollment object. If the object's Reliability attribute causes its Status to be Unreliable, but the object does not have alarming defined, its Alarm State is Normal and the icon is not shown.	Online
	Red X	Offline: Item is offline ① Notes: <ul style="list-style-type: none"> • Field devices with the Disable Automatic Alarming attribute set to True display a red X when they are offline. See the appropriate object in the Object Help for details on this attribute. • When a SA Bus device, for example, an IOM or sensor, goes offline, an alarm is generated and the device is identified in the Site Management Portal (SMP) UI by the red exclamation point instead of the red X. 	Online

Table 4: Status Indicators

Indicator	Indicator Description	Status	Mode
	Blue X	Communications Error: Unable to read item status - error occurred when attempting to retrieve the item's current state.	Online
	Green arrow	Item has been edited since it was last loaded to the Engine.	Offline
	Key with slash mark	Network engine is not paired with the Site Director.	Online
	Green shield with check mark	Security level between the client computer and the Metasys Server or network engine is encrypted and trusted.	Online Offline
	Orange shield with exclamation point	Security level between the client computer and the Metasys Server or network engine is encrypted, but not trusted.	Online Offline
	Red shield with X symbol	Security level between the client computer and the Metasys Server or network engine cannot be verified because the certificate has expired, is not valid, or is not present. However, if the client computer is using Launcher 1.6 and the Metasys Server or network engine is at Release 8.1, communication is still encrypted.	Online Offline

User-Defined Navigation Trees

User-defined navigation trees (also referred to as user views, user navigation views, and user-defined trees) allow you to organize items and folders for specific users or functions.

Unlicensed Items Trees

An unlicensed items tree appears and becomes the default tree if your Metasys system contains unlicensed Metasys Server software. If you license the software and refresh the tabs, the unlicensed items tree disappears.

Panel Layout

The Display Frame can be divided into up to four display panels. When viewing an item in a display panel, the name, status, and default attribute (usually the present value) of the item you display appear at the top of the display panel. Each display panel can contain different tabs, depending on the item selected from the navigation tree, and each tab shows different information. Dynamic attributes displayed in a panel automatically refresh when changes are detected.

The default display panel is the first empty panel or last unlocked panel if all displayed panels are filled. Display panels are locked while in Edit mode, or may be locked using the Lock button of the selected display panel. If all available panels are locked, you cannot display an additional item in any of the display panels.

You can resize each display panel by dragging its borders, or using an available splitter bar. With some items, an Edit button appears (except in Simulation mode), allowing you to edit the item's configuration attributes.

You can drag and drop items into a display panel and navigate among them using the Back and Forward display panel [buttons](#). The display panel holds a maximum history of five items.

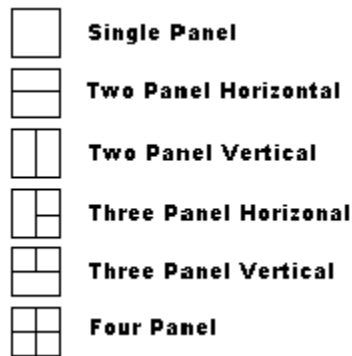
If you run any of the predefined [reports](#) found in the Query Menu, the result of the query appears in an available panel in a spreadsheet format. Sort the report results by clicking the column heading, and resize columns by dragging column borders. When you scroll down through the column, the headers remain visible.

The data presented in a report comes from a snapshot of the system at the time you request the report. The displayed data does not automatically refresh and does not support an Edit mode. You can manually refresh the report through the Action Menu.

Display Frame Layout

The user interface allows you to define your own display frame layout. Six options are available:

Figure 5: Panel Layout Options



To change the way the panels are arranged, see [Changing the Display Panel Layout](#). If you have a multi-panel display and you change to a layout with fewer panels, the locked items/newest items in the view stay, depending on how many panes are available in the new layout. The other panels close, and they do not reappear if you switch back to the multi-pane view.

To resize the panels, drag the borders of the panel until it reaches the desired size. To make one panel (in a multi-panel arrangement), take up the entire Display frame temporarily, click the [maximize button](#). To restore a maximized panel in a multi-pane view, click the restore button. A panel can also be maximized/restored by double-clicking its header bar.

Display Panel Tabs

Each display panel contains tabs that vary depending on the item displayed.

For example, most of the point objects, such as the OAT contain the following tabs:

Table 5: Tabs

Tab	Description
Alarm	Becomes available when you define an Alarm Extension for a point. The New and Delete buttons allow you to add or delete Alarm Extensions for the point. The Basic and Advanced radio buttons allow you to filter the attribute display in this tab. The Edit button allows you to change configurable attributes.
Focus	Becomes available when you define a point object. The Focus tab shows operation attributes available for the object type to which the object belongs. Note that the Basic and Advanced radio buttons allow you to filter the attribute display in this tab. The Edit button allows you to change configurable attributes.
Hardware	Becomes available when you define a point object that has a reference to a physical input or output. The Hardware tab shows hardware-related attributes available for the object type to which the point object belongs.

Table 5: Tabs

Tab	Description
BACnet Alarm	Becomes available when you define a BACnet intrinsic alarm for a point. The Intrinsic Alarming Defined attribute is explained in Trend Extension Attributes section. The BACnet Alarm tab shows BACnet Alarm-related attributes available for the object type to which the point object belongs. The Basic and Advanced radio buttons allow you to filter the attribute display in this tab. The Edit button allows you to change configurable attributes.
Totalization	Becomes available when you create a Totalizer Extension . New and Delete buttons allow you to add or delete Totalization Extensions for the point. The Edit button allows you to change configurable attributes.
Trend	Becomes available when you create a Trend Extension for a point object. New and Delete buttons allow you to add or delete Trend Extensions for the point. The Chart view allows you to view data samples in a graphical format and retrieve new trend data. The Table view of the Trend Extension allows you to view the trend's data samples in a table format. The Definition view of the Trend Extension allows you to view and edit the attributes of the trend extension object.
Averaging	Becomes available when you create an Averaging Extension for a point object. The New button allows you to add Averaging Extensions for the point.
Load	Becomes available when you create a Load Extension for a point object. The New button allows you to add Load Extensions for the point.

Other items may contain fewer or more tabs. For example, the item representing a network engine or Metasys Server contains the following tabs:









- Focus
- Summary
- Diagnostic
- Communication
- Network
- Email (disabled in the ADS/ADX at Release 10.1 and later, but enabled in Metasys UI)
- Pager (removed from the ADS/ADX at Release 10.1 and later)
- SNMP (disabled in the ADS/ADX at Release 10.1, but enabled in Metasys UI)
- Alarm
- Trend
- Syslog (disabled in the ADS/ADX at Release 10.1 and later, but enabled in Metasys UI)
- Printer (disabled in the ADS/ADX at Release 10.1 and later, but enabled in Metasys UI)

For information on the tabs available in the system, see the [Object and Feature Tabs](#) section.

Display Panel Buttons

Table 6 shows the display panel buttons.

Table 6: Display Panel Buttons

Button	Description
	Allows you to edit attributes for the displayed item. The values you can edit vary depending on the displayed item. Click Save to save your changes. Note: <ul style="list-style-type: none"> This button does not appear in Simulation mode. This button appears dimmed if the user has Standard Access mode, but does not have Modify Items permission for the object being viewed. The term edit refers to changing items using the Edit button. See the Modify section. The term modify refers to changing items using the Modify menu item and the Modify dialog box. See the Modify Dialog section.
	Displays the content previously displayed in that panel. Each panel can have a display history of up to five items.
	Displays the content of the next panel saved in the history.
	Locks the selected display panel (prevents another item from being dropped in this panel and overwriting it). A locked panel can be resized. This button toggles between locked and unlocked.
	Maximizes the active panel to the full size of the Display Frame. You can also maximize the pane by double-clicking the header bar. The other panels reappear if you click the restore button.
	Restores the panels to their original size and position. You can also restore the pane by double-clicking the header bar.
	Closes just the currently displayed view in the display panel.
	Closes all of the views in the display panel (including views stored in history).
<input checked="" type="radio"/> Basic	Displays commonly used information about the displayed item.
<input type="radio"/> Advanced	Displays all the information the system contains pertaining to the displayed item.

Tailored Summaries

Tailored Summaries appear in the display frame, and allow you to view, command, and modify large quantities of similar data in a tabular format. Tailored summaries are essentially summary views of Metasys system items. For more information on this feature, see the *Tailored Summaries* section in the *Metasys SCT Help (LIT-12011964)*.

Alarms Window

The Alarms Window (also referred to as Metasys - Events or Alarm Bar) displays the newest, highest priority alarm message. Only alarms defined in the Fault Ack Required and Normal Ack Required attributes of the [alarm extensions](#) or the BACnet alarm definitions are eligible to appear in the Alarms Window. In addition, only those alarms for which you have the Manage Item Events category-based permission appear in the Alarms Window. The alarm message includes the name of the item in alarm, the current status, date and time when the alarm occurred, [alarm priority](#), the present value of the item, and a description related to the alarm condition (if applicable). The color

of the Alarms Window is based on the Alarm's Priority level and is configured on the [Alarm Settings Tab](#) of the Metasys Preferences.

The number of alarm messages that require acknowledgment appear above the View Item button. Use the Alarms Window [buttons](#) to perform actions related to the displayed alarm message. For more information on alarms and events, see [Alarm and Event Management](#). When no alarm messages need acknowledgement (or all alarms are snoozed), the Alarms Window disappears. No matter which mode the system is in, you can minimize the window and the mode automatically restores itself if a new alarm occurs.

In an Engine that is not the Site Director, alarm and event messages that are acknowledged or discarded at the Engine do not appear acknowledged or discarded in the Metasys Server.

To enable or disable the display of the Alarms Window, see [Enabling or Disabling Alarm Pop-ups](#).

To have an audible sound notify users of changes occurring in the Alarms Window, on the **Tools** menu, click **Administrator**, select the **Enable Audible Alarm** check box, and click **OK**. However, a user with administrator rights must use the Security Administrator Tool to set this property for any Active Directory service users who were added to the Metasys system. Make sure the Windows operating system audio controls are not muted and the volume is loud enough to hear. An audible alarm sounds as long as an alarm is detected (if alarms are not snoozed or at least one unacknowledged alarm is pending for the logged-in user). The alarm sound interval (15 seconds by default) is configurable from the [Preferences](#) dialog box.

The Alarms Window does not appear when you are using the SCT in offline (configuration) [mode](#).

The current navigation view does not limit or affect the Alarm notification, only the user's permissions for managing item events can. Therefore, it is possible for a user to receive an alarm for an item that does not exist in the currently displayed navigation view.

Alarms Window Buttons

The Alarms Window (also referred to as Metasys - Events or Alarm Bar) contains buttons to acknowledge, snooze, view, and discard alarm messages.

Table 7: Alarms Window Buttons



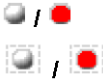
Button Text	Description
Ack	Acknowledges events and stops the event from appearing on the Alarms Window.
Snooze	Sends the currently displayed alarm message away for 5 minutes, allowing any pending next highest events to appear in the Alarms Window. After 5 minutes, the alarm appears in the Alarms Window again (if it is the highest priority event). To change the amount of time the Alarms Window snoozes, see Engine Device Object .
Snooze All	Puts the entire Alarms Window to sleep for 5 minutes. For the next 5 minutes, the Alarms Window disappears, even if high priority alarms or events occur. To change the amount of time the Alarms Window snoozes, see Engine Device Object .
View Item	Shows the Focus tab of the object in alarm in the Display Frame.
View Graphic	Displays the graphic associated with the alarm extension of the item in alarm in the available display frame. This button appears only if a graphic has been defined for the object.
Discard	Deletes the alarm with acknowledgment.
Minimize	Minimizes the Alarms Window to the Windows task bar. If a new alarm occurs, the Alarms Window appears again as the top window.

For more information on alarm and event management, see the [Alarm and Event Management](#) section.

Status Bar Icons

Icons in the Status bar indicate system activity (Table 8).

Table 8: Status Bar Icons/Text

Icon/ Text	Description
	This icon appears if the Metasys software is sending or receiving view data to or from the Metasys Server or Engine.
	This icon appears when diagnostic information for the Metasys system user interface is available. If you click this icon, the User Interface Diagnostics window appears.
	This icon appears white if no events are currently in the Alarms Window . When this icon is flashing red, the Alarms Window contains events. If you click the icon, the Alarms Window appears in front of the other windows. A dashed box appears around this icon when the alarm pop-ups are disabled. If you click the icon, alarm pop-ups are automatically re-enabled, and the Alarms Window appears if applicable.
Time Zone/ Date/ Time	The status bar of the Site Management Portal (SMP) UI displays the date, time, and time zone of the device to which you are logged in. Due to the time it takes to retrieve the time from the device, the status bar time may lag slightly behind the device's actual time. If the device reports an unsupported time zone, the SMP UI defaults to Coordinated Universal Time (UTC).

User Interface Diagnostics Window

The User Interface Diagnostics window reports conditions within the system that may affect the operation of the user interface, but which require no immediate user acknowledgment or action. When the Metasys system logs a diagnostic message to the UI Diagnostics window, it includes the time when the condition was detected. Diagnostic messages are logged to the UI Diagnostics window for various reasons, including the following:

- An attempt to connect to a device on the Metasys network failed.
- The device you are logged into is temporarily busy and cannot provide updated data.
- The data provided by the device is in an invalid format such as non-XML.
- An unexpected event occurred in the user interface.

When the system detects any of the preceding conditions, a new diagnostic message appears at the bottom of the message list. Whenever the UI Diagnostics window is open (even if cleared), an [icon](#) appears in the status bar. When the user clicks the UI Diagnostics icon, the UI Diagnostics window moves to the front of all other windows. If the UI Diagnostics window is closed, it opens automatically when a new diagnostics message is logged. Click **Clear** to clear the window contents without closing the window.

Click **Close** to close the window.

Viewing Item Data

Item data is the information associated with an [item](#) such as the attributes of an object. Access the information associated with an item by viewing it in a [display frame](#). See the [Displaying Information About an Item](#) section for more information.

Reports

Use the predefined report feature to query a single network engine, multiple network engines, or the entire site (all network engines on the site) for alarm, offline, disabled, override, trouble, and

out of service conditions. To generate a report, select one or multiple network engines or the site in the navigation tree and select a report from the [Query Menu](#). The query executes for the selected network engines or site. When you select multiple network engines or the site in the navigation tree, the report feature queries each supervisory device and combines the results in one report.

These predefined reports (alarm, offline, disabled, override, trouble, and out of service) are different from the Scheduled Reports option available in the Query menu. For information on scheduled reports, see the [Scheduled Reports](#) section. For information on the Global Search and Object List options, see the [Global Search](#) section.

The query produces a report in the display panel. The report shows the time the query was initiated, the report status, and the report results. The stop button allows you to cancel a running query at any time. The Copy button allows you to copy the report content to the clipboard. The following figure shows an example of an Offline Report. See the [Running Reports](#) topic for information on how to run a query.

Figure 6: Offline Report Screen

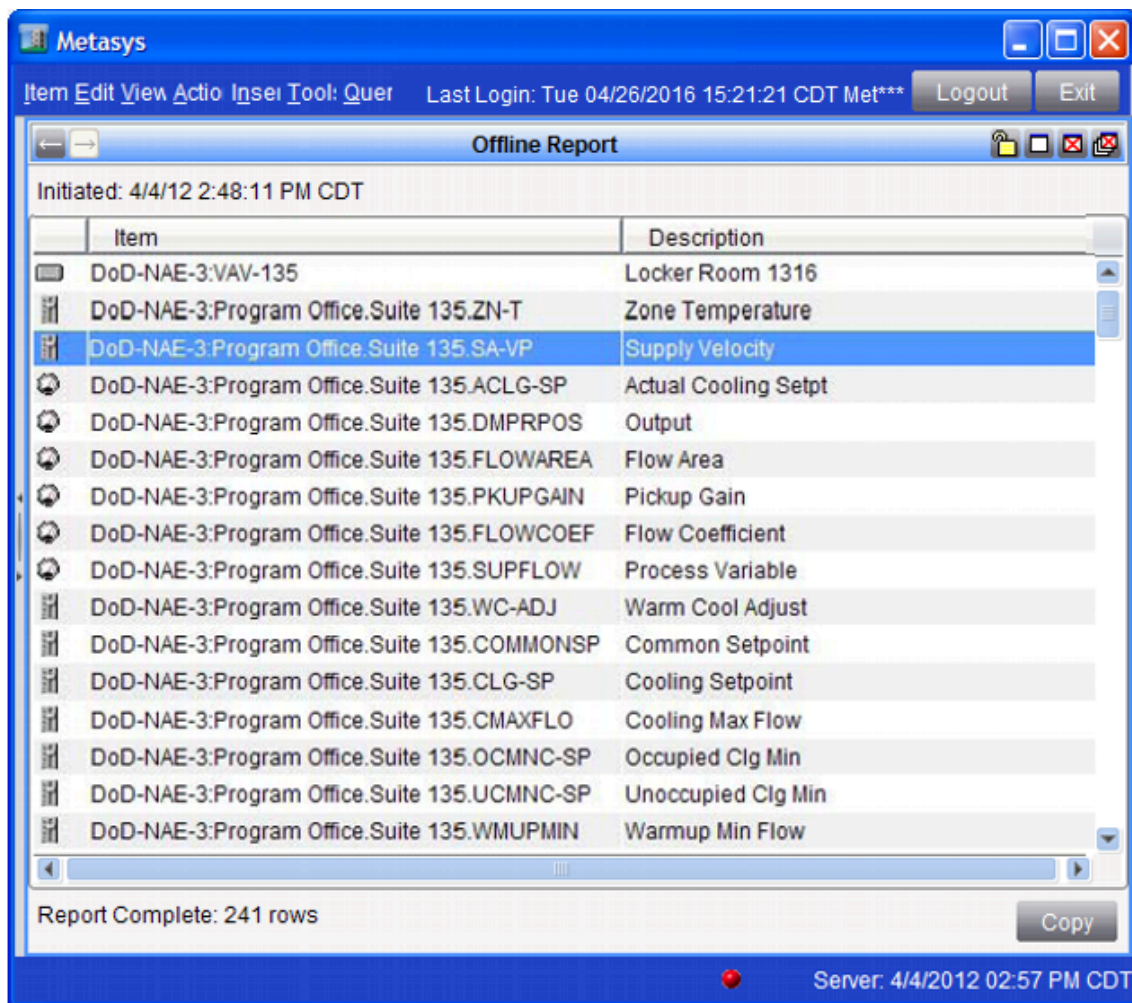


Table 9 describes the information provided by each report.

Table 9: Report Types and Descriptions

Report	Description
Alarm	Lists all items in alarm state in the selected site or devices. For each item in alarm state, the report displays the item type icon, item name, item description, alarm type, and the value of the item when it entered alarm state.
Offline	Lists all items in offline state in the selected site or devices. For each offline item, the report displays the item type icon, item name, and item description.
Disabled	Lists all disabled items in the selected site or devices. For each disabled item, the report displays the item type icon, item name, and item description.
Dormant User Account	Lists all user accounts for the system by supervisory device. This applies to Local Metasys User accounts and Active Directory accounts. For each account, the device name, account name, user name, role, account type, last successful login, days since last login, status, is dormant, days dormant, and dormant event sent are displayed. Distinguishes among accounts that have not attempted access in previous x number of days, accounts that have never been used, and accounts that have never successfully accessed the Metasys device, additionally showing which of these accounts are disabled. ① Note: Any devices that are not responding or are at a release prior to 8.0 are not included in the report and are noted at the bottom of the report dialog box.
Operator Override	Lists all items currently overridden by the operator. For each overridden item, the report displays the item type icon, item name, status, item description, and the current value of the item. See the status column to determine whether an operator overridden item should be released.
Out of Service	Lists all items that have the Out of Service attribute set to True. For each out of service item, the report displays the item type icon, item name, and item description. All BACnet point objects have this property (for all integrations) as well as the BACnet Loop, Program, and Schedule objects.
Supervisory Override	Lists all items currently overridden by the supervisory device. For each overridden item, the report displays the item type icon, item name, status, item description, and the current value of the item. See the status column to determine whether a supervisory overridden item should be released.
Trouble	Lists all items that have the Trouble attribute set to True . For each item in trouble state, the report displays the item type icon, item name, and item description. Usually, Binary Input and Binary Output points have this property. It is mostly used in Fire and Security applications but may be used when the Binary Output command does not match the feedback. (The Binary Input feature is integration dependent.)

Commands

Use commands to force an item to perform a specific action. For example, ON and OFF commands for a [binary output](#) make a fan run or stop, and the Enable and Disable commands in the [Trend extension](#) start and stop the collection of samples.

For information on which commands an item supports, see the appropriate topic in the [Object Help](#).

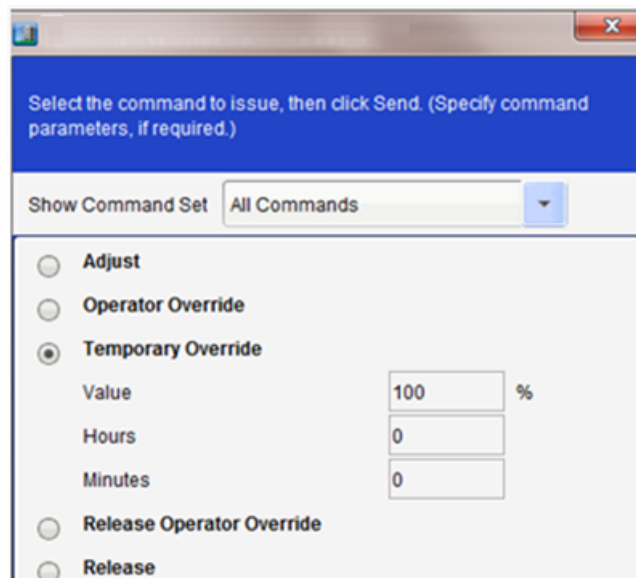
For information on how to send a command to a single item, see [Commanding an Item](#) in the [Commands Dialog](#) section.

For information on sending a command to multiple items, see [Commanding Multiple Items \(Global Command\)](#) in the [Commands Dialog](#) section.

Temporary Override

Temporary Override allows the operator to override a point for a specified time. After the specified time period passes, the Override is automatically released. The Temporary Override command supports N2, LON, and VND integration objects.

Figure 7: Temporary Override Command Window



Note: The command duration can range from 1 minute to 100 hours, 59 minutes.

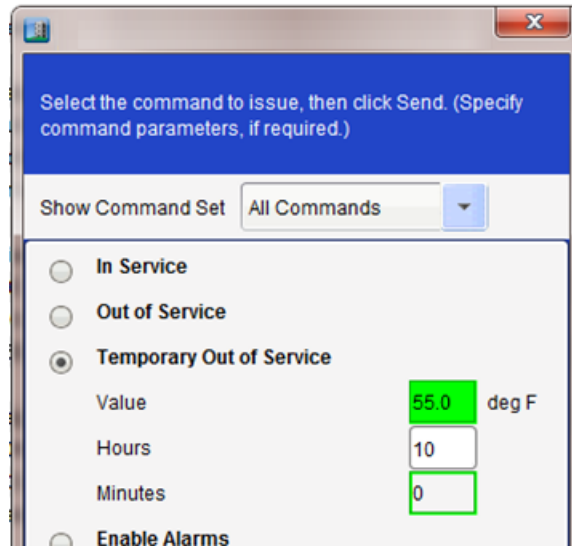
Table 10: Temporary Override Supported Objects

Local	BACnet	MSTP	N2	LON	VND
AV	AO	AO	AO	AO	AO
BV	BO	BO	BO	BO	BO
MSV	AV	AV	MSO	MSO	
	BV	BV			
	MSO	MSV			MSO
	MSV				

Temporary Out of Service

Temporary Out of Service commands allow the operator to take an object temporarily out of service. After the specified time period passes, the Out of Service is automatically released. The Temporary Out of Service commands support N2, LON, and VND integration objects.

Figure 8: Temporary Out of Service Command Window



Note: The command duration can range from 1 minute to 100 hours, 59 minutes.

Table 11: Temporary Out of Service Supported Objects

BACnet	MSTP	N2	LON	VND
AI	AI	AI	AI	AI
BI	BI	BI	BI	BI
MSI		MSI	MSI	MSI

Drag and Drop

You can drag items into various content areas of the SMP. The following table summarizes the source items and their destinations.

Table 12: Drag and Drop

Source Location	Types of Items Valid for Destination To Drop To	Notes
Navigation Trees All Items Tree, All Items Tree - Expert, Unlicensed Item Tree, User Views	<ul style="list-style-type: none"> • Attribute Reference field: fully qualified reference • Global Search – Search Locations: Various • Global Search – Search Results: Various ① Note: Dragging an item in to the search Results table adds the item to the table. You can then save the results as an Object List for scheduled reports. • Interlock Object • Interlock Object Action Tables • Interlock Definition Table • List of Attribute Reference field: fully qualified reference • List of Object Reference field: fully qualified reference • Multiple Command Object (MCO) Action Tables: Various • Object Reference field: fully qualified reference 	If the view has an edit mode, the view must be in edit mode in order to drag an item into a field.
Global Search Viewer	<ul style="list-style-type: none"> • Search Locations field: Various ① Note: Dragging an item in to the search locations field adds the item to the locations for the search query. • Search Results table: Various ① Note: Dragging an item in to the search Results table adds the item. You can then save the results as an Object List for scheduled reports. • Tailored Summary Viewer: Global Search Results Object 	

Pop-up Menu

Pop-up menus provide an efficient way to quickly access important [item](#) information. Pop-up menus are also referred to as right-click menus. To access pop-up menus, [right-click](#) an item in the Navigation Tree. Content of the menu depends on the type of selected item and your level of authorization. For example, point object pop-up menus usually show the options View, Command, Modify, and Show Extensions. For Engines, pop-up menus usually show View, Event Viewer, Audit Viewer, Command, Modify, Show Extensions, Alarm Report, Offline Report, Disabled Report, Operator Override Report, Supervisory Override Report, Trouble Report, Out of Service Report, and Remove from Site.

Timed Inactivity Logout

Timed logout automatically logs you out of the Metasys system after a predefined time of inactivity. The system closes open databases, discards unsaved changes and view settings, and logs out the user. Users who logged in with a Metasys user name and users who were automatically logged in using Active Directory service, see the login screen at timed logout. If this system has the Warning Banner option selected, the custom warning banner screen appears at timed logout.

If you are an Active Directory service user and want to access the Metasys system again through automatic login, close the login screen and navigate to the Metasys URL. Otherwise, you can enter your Active Directory service user name and password and select your Active Directory service domain at the login screen to regain access to the Metasys system. Use the Security Administrator System to set this and other security features.

When the Warning Banner screen appears at timed logout, you must click **OK** to consent to the statement before returning to the login screen. The login screen waits 30 seconds for you to enter your credentials. If 30 seconds pass with no login activity, the login screen clears and the Warning Banner screen returns.

Electronic Signatures and Annotations for MVE Only

MVE sites have settings in the [Site Object](#) for enabling annotation and electronic signature functionality. You can set the MVE site to require only annotations, only electronic signatures, both annotations and signatures, or neither annotations nor signatures. Non-MVE sites may optionally define and use annotations; however, electronic signatures are specific to MVE sites.

When enabled, electronic signatures challenge users whenever they attempt to make a change to the system. Before the system performs the user's request, they must supply a signature and state a reason for the change. The mechanism the Metasys system uses for expressing that signature is a reauthentication challenge, in which users must reenter the password they used to log in to the Metasys system using either their Metasys password or their Active Directory service password. This process is recognized as an electronic signature.

In addition to collecting the electronic signature, the Metasys system may also require the user to enter or select an annotation. Annotations are statements that further describe the change being requested. After the password is verified and an annotation is selected, the user request is performed.

You can configure electronic signatures and annotations at the device and object levels. You cannot delete annotations on an MVE site. For information on enabling these settings, see [Configuring Annotation and Electronic Signature Requirements in the Site Object in MVE](#). For additional information, refer to the *Metasys for Validated Environments, Extended Architecture Technical Bulletin (LIT-12011327)*.

Site Management Portal User Interface Steps

Changing the Display Panel Layout

To change the Display Panel layout, on the **View** menu, select **Panel Layout** and choose one of the six [layouts](#).

Acknowledging, Snoozing, and Discarding Events

To acknowledge, snooze, and discard events, click the appropriate button on the [Alarms Window](#) (also referred to as Metasys - Events or Alarm Bar).

Notes:

- You also can view the item or associated graphic.
- You also may use the [Event Viewer](#) to view and take action on events. See [Alarm and Event Management](#) for more information about the Alarm and Event feature.

Enabling or Disabling Alarm Pop-ups

The Alarms Window is also referred to as Metasys - Events or Alarm Bar.

To enable the alarm pop-ups feature of the Alarms Window, on the **View** menu, select the **Enable Alarm Pop-Ups** check box.

To disable the alarm pop-up windows feature of the Alarms Window, on the **View** menu, remove the selection from the **Enable Alarm Pop-Ups** check box.

Notes:

- You can perform this task only if you have permission to disable the alarm pop-ups feature.
- A dashed box appears around the alarm status bar icon when the alarm pop-up windows are disabled. If you click the icon, alarm pop-ups are automatically re-enabled, and the Alarms Window appears if applicable.
- By default, alarm pop-up windows are enabled every time you log into the system. However, if you want to disable the Alarm Window from appearing every time you log in, set the **Enable alarm pop-ups on login** attribute to **False**. This setting is located under **Tools > Configure Preferences > Display Settings** tab, User Preferences section. You can perform this task only if you have permission to change User Preferences. For more information, see [Display Settings Tab](#).

Running Reports

About this task:

Follow the steps in this procedure to run one of the predefined reports (alarm, offline, disabled, operator override, supervisory override, trouble, and out of service). To schedule a report on a Metasys Server, see [Creating a New Scheduled Report](#) in the [Scheduled Reports](#) section.

To run a [report](#):

1. Select the single supervisory device (Engine or Metasys Server), multiple supervisory devices, or the entire site in the navigation tree that you want to query.
2. On the menu bar, click **Query** and select the type of report you want to run (Alarm Report, Offline Report, Disabled Report, Dormant User Account Report, Operator Override Report, Supervisory Override Report, Trouble Report, or Out of Service Report). The Report Viewer appears in the default display panel.
Note: If you did not select a supervisory device or site, a message box appears. Click **OK**, select a supervisory device or site, and repeat step 2.
3. View the results of the report.

Print

1. Select the [navigation tree](#) or [display panel](#) you wish to print.
Note: You must select either the navigation tree or a display panel to enable Print. If you selected a display panel, the entire contents of the visible display panel prints out. If you selected the navigation tree, all visible parts of the tree print out (even parts of the tree that you need to scroll to view). Collapsed parts of the tree (not visible in the tree) do not print. You cannot print the contents of the Alarms Window.
2. Select **Page Setup** from the Item menu if you wish to change the paper, orientation, or margin size. Click **OK** when done.
3. Select **Print Preview** from the Item menu to see what the printout looks like. Click **Print** or click **OK**.
4. On the **Item** menu, select **Print**.

Note: If the panel you selected is not printable, Print is disabled.

Configuring Annotation and Electronic Signature Requirements in the Site Object in MVE

For sites with MVE installed, configure the following attributes in the [Site Object](#) for MVE annotations and electronic signatures:

- Annotation Include
- Annotation Exclude
- Annotation Alarm Priority Threshold
- Signature Include
- Signature Exclude
- Signature Alarm Priority Threshold

These settings appear only on MVE sites. See the [Site Object](#) section for details on these attributes.

You can require annotations, electronic signatures, both, or neither on an MVE site. Non-MVE sites may optionally define and use annotations; however, electronic signatures are specific to MVE sites. For information on annotation and electronic signature preferences, see [Annotation Settings Tab](#) and [Electronic Signature Settings Tab](#) in the [Preferences](#) section. Also see [Audit Message Annotations](#) in [Audit Trail](#) for information on the fields in an annotation.

For additional information, refer to the *Metasys for Validated Environments, Extended Architecture Technical Bulletin (LIT-12011327)*.

Working with Items

In addition to the procedures in this section, see also [Creating items](#) and [Exiting](#).

Navigating to an Item

To navigate to and select an item, click the plus (+) and minus (-) signs in the [Navigation Tree](#) to expand and collapse folders until the desired item appears on the tree.

Note: Use the Ctrl or Shift key to select multiple items.

Note: For information about how to display information about the item, see the [Displaying Information About an Item](#) section.

Displaying Information About an Item

To display information about an item you selected in the navigation tree:

Do one of the following and click the desired [tab](#):

- Drag and drop the item from the navigation tree into a [display panel](#).
- Select an item in the navigation tree, open the View Menu, and click **Selected Item**. The data displays in the default display frame.
- Double-click the item in the navigation tree; it displays in the default display panel.
- Right-click an item in the navigation tree or a feature in the display panel (such as Global Search or a Tailored Summary) and select **View**.

Notes:

- When you display information in a panel that already contains data, the older data is replaced and added to the panel history. To access up to five previously displayed items in the panel history, click the [back button](#) in the display panel.

- If all available panels are locked and you try to display information about an item, a message appears stating that all panels are locked. Click **OK** and unlock a panel to display other item information.

Modify

About this task:

The term modify refers to changing items using the Modify menu item and the Modify dialog box. See the [Modify Dialog](#) section.

To edit the attributes of an item:

1. View the details of the item in a [display panel](#).
2. Select an item tab (for example, Focus).
 - ① **Note:** Some items contain an Advanced radio button. If you select this button, additional attributes appear.
3. Click **Edit**.
4. Edit the attributes as needed.
 - ① **Note:** If you place your cursor over an edit field, the ToolTip provides information about the valid format or range for that value. ToolTips also appear for strings.
5. Click **Save**.
For information on using the Modify dialog box to modify single or multiple items, see the [Modify Dialog](#) section.

Commanding Items

To send a command to an item in a graphic, see the [User Graphics Tool \(UGT\)](#) section.

To send a command to a single item, see [Commanding an Item](#) in the [Commands Dialog](#) section.

To send a command to multiple items, see [Commanding Multiple Items \(Global Command\)](#) in the [Commands Dialog](#) section.

Annotating Objects/Items

About this task:

This feature allows you to enter follow-up comments for actions taken on this object or item, such as what the user did to fix a problem, what was fixed, or when an override was released.

To annotate objects/items:

1. Select the object/item to annotate in the navigation tree (All Items or User view).
 - ① **Note:** You cannot add an annotation for a folder.
2. On the **Action** menu, select **Add Annotation**.
3. Select or type annotation text. Annotation text can be from 1 to 255 characters.
 - ① **Note:** The Predefined Annotations List on the Add Annotation dialog box contains annotations saved in your system preferences. If you have not defined annotations in your system preferences, the drop-down list is empty.
4. Click **OK** to save the annotation.
See [Configuring Annotation and Electronic Signature Requirements in the Site Object in MVE](#).

Viewing Annotations for Objects/Items

1. Select the object/item to view in the navigation tree (All Items or User view).
 - ① **Note:** Folders cannot have annotations.

2. On the **Action** menu, select **View Annotations**.
See [Configuring Annotation and Electronic Signature Requirements in the Site Object in MVE](#).

Deleting Objects or Items

About this task:

To delete objects or items:

1. Select the object or item you want to delete in the All Items tree. This option is not available in user views.
2. On the **Edit** menu, select **Delete Items**.

Notes:

- You cannot select an object or item in the display frame and delete it from the system. You can only delete objects or items by selecting them in the navigation tree.
- After deleting objects or items in the online mode, perform an upload to store the updated system configuration in the archive. Perform a download of your site to verify that the changes are visible online.
- After deleting objects or items in SCT, perform a download to update the online configuration of the device.

Logging Out

Save your changes before you log out. Logging out closes the Alarms window and all other open windows except the login screen and Help. If your system is configured with a timed logout, the system times out after a specific period of [inactivity](#). For more information on exiting, see [Exiting](#).

To log out, click the **Logout** button in the [menu bar](#).

If you are an Active Directory service user who accessed the Metasys system by using an automatic login and want to access the Metasys system again in the same manner, close the login screen and navigate to the Metasys URL. Alternatively, you can regain access to the Metasys system by entering your Active Directory service user name and password and selecting your Active Directory service domain at the login screen.

- ❗ **Note:** If you are editing an item in a display panel, the Metasys software cancels the logout process and notifies you that you cannot exit or log out while in Edit mode. You must exit Edit mode by saving or canceling your changes before you can log out of the application.

Exiting

Save changes before exiting. Exiting closes all open windows (except the Help) associated with the session, including the Alarms Window and login screen. For more information on logging out, see the [Logging Out](#) topic.

To exit, click the **Exit** button in the menu bar.

- ❗ **Note:** If you are currently editing an item in a display panel, the Metasys software cancels the exit process and notifies you that you cannot exit or log out while in Edit mode. You must exit Edit mode by saving or canceling your changes before you can exit the application.

Working in the SMP UI

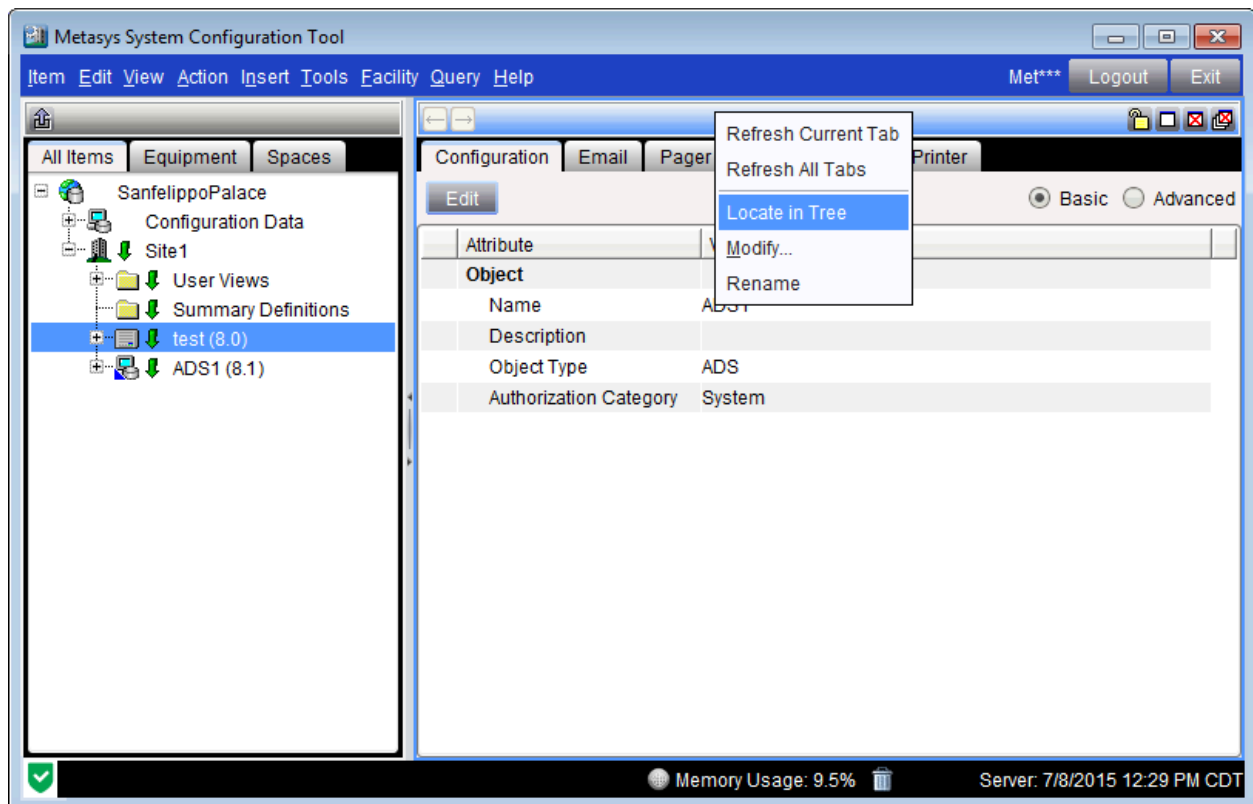
Objects in the SMP user interface are now easily searchable in the navigation trees through the **Locate in Tree** feature. The **Locate in Tree** feature displays the expanded Equipment, Spaces, or All Items tree location for an object selected from the focus window.

To use this search feature, right-click one of the following object name locations and select **Locate in Tree**:

- **Global Search** table rows

- An object's **Summary** tab table rows
- An object's Focus window title bar

Figure 9: Locate in Tree Option



Note: Locate in Tree search feature is not compatible with User Views and the Unlicensed Item trees.

Wizards

Wizards make complex tasks easy and guide you through creating and configuring objects and features. A wizard typically consists of a series of steps, each corresponding to a screen presented to the user.

A wizard may appear when you select an option from the Insert menu and when you prompt certain actions such as copying and pasting an item in the [Navigation Tree](#). For example, a wizard appears when you select **Object** from the Insert menu. Wizards that are available in different modes (for example, any combination of online or offline) appear the same.

Wizards Concepts

Types of Wizards

The following table lists the wizards in the system.

Table 13: Types of Wizards

Integration	Global Data Object
Program Object	Group Object
Analog Value Object	Interlock

Table 13: Types of Wizards

Accumulator Object	Loop Object
Auto Shutdown Object	Multistate Value Object
Binary Value Object	Multiple Command Object
Calendar Object	Notification Class Object
Demand Limiting/Load Rolling (DLLR) Object	Optimal Start Object
Data Broadcast Object	Pulse Meter Object
Electric Demand Control Object	Schedule Object
Electric Demand Monitoring Object	Signal Select Object
Field Device	Solar Clock Object
Field Point	Graphic
Folder	New User View
Event Enrollment Object	Summary Definition Wizard
Generator Load Control Object	Passthru Wizard

Wizard Navigation Buttons

The buttons in Table 14 are common to most of the wizards and allow you to move through wizard screens.

Table 14: Common Wizard Navigation Buttons

Button	Description
Cancel	Closes the wizard without saving any data. This button is always active.
< Back	Takes you back one screen in the wizard. This may not be the last screen viewed, since you can move between screens. This button is active on all screens except the first.
Next >	Takes you to the next screen in the wizard. If the current screen requires user input or you are on the last screen in the wizard, the Next button is disabled.
Last	If available, presents a summary screen for the wizard. If your input is required in any previous screen, the Last button is disabled. The Last button takes the user to the last wizard screen, which is the summary screen. Once the summary screen is displayed, the Last button is replaced by the Finish button.
Finish	Exits the wizard and saves the data. Selecting Finish is the normal method of exiting a completed wizard. If any prior screens require your input, this button is disabled. If a wizard has a summary screen, the Finish button is not available until the summary screen is displayed.

Wizards Steps

Using Wizards

Browse the following Menu Topic chapters for more information on using wizards, including:

- selections for accessing each wizard
- descriptions
- tips
- related information

Creating Items with Wizards

About this task:

1. Select the item to create. The corresponding wizard appears. If more than one type of item is available, select the desired type. Click **Next**.
 - Select **Action menu > Show Extensions** to launch the [Extension Wizard](#) to create extensions to objects that support them.
 - Select **Insert menu > Integration, Field Device, Field Point, Folder, Control System, Object, Graphic, Trend Study, User View, or Summary Definition** to launch their respective wizards.
2. Complete the information on the wizard screens, using the [navigation buttons](#) to move through the screens. The screens vary depending on the item you are creating. See the [Using Wizards](#) section for information specific to each wizard.
 - ① **Note:** All items appear in the wizard, not just valid destinations. When you click an item that is not a valid destination for the item being added, an error message appears on the right side of the wizard and the Next button is disabled.
3. Select **Finish** on the summary page to create the item. If an error occurs, a message displays and the wizard returns to the summary page. If the item supports extensions, the [Extension Wizard](#) displays after the item is successfully created.

Item Menu

The Item menu functions are used to select views to print. Three options are available: **Page Setup**, **Print Preview**, and **Print (Ctrl P)**.

Page Setup

1. Select the [navigation tree](#) or [display panel](#) you wish to print.
 - ① **Note:** You must select either the navigation tree or a display panel to enable Print. If you selected a display panel, the entire contents of the visible display panel prints out. If you selected the navigation tree, all visible parts of the tree print out (even parts of the tree that you need to scroll to view). Collapsed parts of the tree (not visible in the tree) do not print. You cannot print the contents of the Alarms Window.
2. Select **Page Setup** from the Item menu if you wish to change the paper, orientation, or margin size. Click **OK** when done.

Print Preview

1. Select the [navigation tree](#) or [display panel](#) you wish to print.
 - ① **Note:** You must select either the navigation tree or a display panel to enable Print. If you selected a display panel, the entire contents of the visible display panel prints out. If you selected the navigation tree, all visible parts of the tree print out (even parts of the tree that you need to scroll to view). Collapsed parts of the tree (not visible in the tree) do not print. You cannot print the contents of the Alarms Window.
2. Select **Page Setup** from the Item menu if you wish to change the paper, orientation, or margin size. Click **OK** when done.
3. Select **Print Preview** from the Item menu to see what the printout looks like.
4. Click **Print** or click **OK**.

Print

1. Select the [navigation tree](#) or [display panel](#) you wish to print.
 - ① **Note:** You must select either the navigation tree or a display panel to enable Print. If you selected a display panel, the entire contents of the visible display panel prints out. If you selected the navigation tree, all visible parts of the tree print out (even parts of the tree that you need to scroll to view). Collapsed parts of the tree (not visible in the tree) do not print. You cannot print the contents of the Alarms Window.
2. Select **Page Setup** from the Item menu if you wish to change the paper, orientation, or margin size. Click **OK** when done.
3. Select **Print Preview** from the Item menu to see what the printout looks like. Click **Print** or click **OK**.
4. On the **Item** menu, select **Print**.
 - ① **Note:** If the panel you selected is not printable, Print is disabled.

Edit Menu

The **Edit** menu is used to delete objects from your All Items tree.

Delete Items

Menu Selection: **Edit > Delete Items**

Deletes one or more items selected in the All Items tree from the site.

- ① **Note:** The Edit menu or **Right-click > Delete** functions are not used to delete items from a User View while the User View Editor is open. Using either function permanently deletes selected items from the archive.

For details on deleting items, see [Deleting Objects or Items](#).

Deleting Objects or Items

About this task:

To delete objects or items:

1. Select the object or item you want to delete in the All Items tree. This option is not available in user views.
2. On the **Edit** menu, select **Delete Items**.

Notes:

- You cannot select an object or item in the display frame and delete it from the system. You can only delete objects or items by selecting them in the navigation tree.
- After deleting objects or items in the online mode, perform an upload to store the updated system configuration in the archive. Perform a download of your site to verify that the changes are visible online.
- After deleting objects or items in SCT, perform a download to update the online configuration of the device.

View Menu

Click the menu item in the following table for its description.

Table 15: SMP View Menu

Menu Item				
Selected Item	Event Viewer	Trend Viewer	Extended Labels	Enable Alarm Pop-Ups
	Audit Viewer	Tailored Summary Viewer	Validation Labels/Settings ¹	Panel Layout
		Scheduled Reports ²		Single Panel
		Change Results Viewer		Two Panel Horizontal
				Two Panel Vertical
				Three Panel Horizontal
				Three Panel Vertical
				Four Panel

¹ This selection is Validation Labels in the SMP UI (MVE only) and Validation Settings in the SCT UI.

² Available on the Metasys Server only.

Launching the Event Viewer

1. Select **Event Viewer** from the View menu.
 - ⓘ **Note:** If you **do not** have an Engine or Metasys Server selected or if you have multiple items selected, a Device Selection dialog box appears.
2. Select the device containing the [event repositories](#) with the event messages that you want to display in the Event Viewer.
3. Click **OK**. The Event Viewer appears in the display frame and displays the event messages from the event repository of the selected device. See [Event Viewer and Event Messages](#) for details.
 - ⓘ **Note:** Alternatively, you can right-click the desired device in the navigation frame and select **Event Viewer** from the menu that appears.

Event Viewer and Event Messages

The Event Viewer displays the event messages from the event repository of the currently selected device in your system and allows you to acknowledge and discard the event messages. See [Launching the Event Viewer](#).

ⓘ **Note:** In an Engine that is not the Site Director, acknowledged or discarded alarm and event messages do not appear acknowledged or discarded in the Metasys Server.

You can only view the event messages from one event repository of one device at a time. The window displays 1,000 messages per page.

If you are viewing the contents of a local Engine event repository, the event messages shown come from that Engine only.

If you are viewing the contents of a local Engine event repository of an Engine device designated as the Site Director, the event messages shown come from that Engine local event repository only.

If you are viewing the contents of a Metasys Server event repository, the event messages shown come from that Metasys Server event repository only. A Metasys Server event repository may contain event messages that have been routed from other Engine or Metasys Server devices but does not display the contents of multiple repositories.

- ① **Note:** You can define an event repository as a [Default Destination](#) so it receives event messages from other event repositories. You can forward event messages from one Metasys Server event repository to other Metasys Server event repositories. See [ADS Event Message Forwarding](#).

When viewing a Metasys Server, the system applies a standard filter to the Event Viewer when it is first opened. This filter allows you to see all events that you have permission to view.

You can use custom filters when viewing the Metasys Server to narrow the list of events to only those that meet specific criteria. Custom filters query the entire Metasys Server database, not just the list of events that appears on the screen. You can filter events by any combination of Date/Time, Priority Range, Alarm Type, Authorization Category, Requires Acknowledgment, User, Acknowledged, and/or Discarded. New events appear in the list only if they meet all criteria specified in the filter. You cannot save custom filters.

You can print the event messages displayed in the Event Viewer at any printer connected to the computer running the web-based Metasys user interface. For information on how to do this, see [Printing the Event Messages Displayed in the Event Viewer](#).

For information on the Alarms Window, see [Alarms Window](#).

The following table describes the format of the event message (and corresponding buttons and fields) as displayed in the Event Viewer.

Table 16: Event Message Format

Item/ Column	Description
Selected device (Engines only)	Indicates the device for which the Event Viewer is displayed. The device name appears on the left side of the Event Viewer above the table only for Engine devices. This field corresponds to the selection made in the Device Selection Dialog box. See Launching the Event Viewer .
Event Count (Engines only)	Indicates the number of event messages that currently appear in the Event Viewer. The Event Count appears on the right side of the Event Viewer above the table only for Engine devices.
Standard Filter radio button (Metasys Server only)	Indicates that standard filtering is applied to the Event Viewer for the selected Metasys Server. This filter information appears on the right side of the Event Viewer above the table. The count of entries that apply to this filter appears in parentheses next to the radio button.
Custom Filter radio button (Metasys Server only)	Indicates that custom filtering is applied to the Event Viewer for the selected Metasys Server. This filter information appears on the right side of the Event Viewer above the table. The count of entries that apply to this filter appears in parentheses next to the radio button.

Table 16: Event Message Format









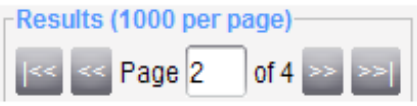
Item/ Column	Description
Custom Filter table (Metasys Server only)	<p>Allows you to apply custom filtering to the Event Viewer when the Custom Filter radio button is selected. This table appears but is not active when the Standard Filter radio button is selected. You may need to adjust the slider bar to show the Custom Filter table.</p> <p>The buttons for this table are:</p> <ul style="list-style-type: none"> • Add - adds a filter using the Add Filter dialog box • Remove - removes the selected filter • Apply - queries the Metasys Server database and displays the resultant event messages <p>See Creating a Custom Filter for the Event Viewer (Metasys Server Only).</p>
Status icons	<p>Displays an icon indicating the status of the event message:</p> <p> - event message is new (that is, the message has occurred in the system within the new entry timeframe)</p> <p> Note: See Display Settings Tab in the Preferences section for information on changing the amount of time event messages are considered new using the New entry timeframe preference (default value = 15 minutes).</p> <p> - event message does not require acknowledgment. A red X through this icon indicates that the message has been discarded.</p> <p> - event message requires acknowledgment. A red X through this icon indicates that the message has been discarded.</p> <p> - event message has one annotation</p> <p> - event message has more than one annotation</p> <p> - event message has an associated graphic</p> <p> - event message has an electronic signature</p>
Type	<p>Displays the status of the item associated with the event message:</p> <ul style="list-style-type: none"> • Normal • Low Warning/High Warning/Warning • Low Alarm/High Alarm/Alarm • Trouble • Status • Offline • Unreliable • [Blank] - none of the above status types apply.
Priority	<p>Indicates the priority of the event. See Event Priority. A lower priority number indicates event messages of higher importance.</p>
When	<p>Displays the date and time that the event message was generated. The date and time format is defined by the Language selected in the User Profile (User Profile tab of the Security Administrator System).</p>

Table 16: Event Message Format

Item/ Column	Description
Item	Displays the Name of the item that generated the event message. An item name is the label displayed for the selected item in the All Items navigation tree (for example, AV1, NAE2, or Schedule1). Be sure you define relatively unique item names if you plan to use printed lists of the event messages of the Event Viewer.
Value	Displays the Present Value and engineering units, if applicable, of the associated item at the time the event message was generated.
Description	Displays the text defined by the Description attribute for the item that generated the event message. Be sure you define relatively unique descriptions if you plan to use printed lists of the event messages of the Event Viewer.
Alarm Message Text	Displays the text defined by the Alarm Message Text attribute of the alarm extension for the state of the item associated with the event message, if applicable.
▲ ▼	Specifies the column of data used to sort the event messages currently displayed in the Event Viewer (ascending or descending order).
Paging Controls (Metasys Server only)	<p>Allows you to navigate through the pages of event messages in the Event Viewer. Use the buttons to go to the first page, previous page, next page, or last page. Type a page number in the text box and press the enter key to jump directly to a specific page.</p> 
Ack button	Acknowledges the selected event messages. See Acknowledging Event Messages .
Discard button	<p>Removes the selected event messages from the Event Viewer. See Discarding Event Messages.</p> <p>① Note: In an Engine that is not the Site Director, acknowledged or discarded alarm and event messages do not appear acknowledged or discarded in the Metasys Server.</p>
Copy button	<p>Copies the selected events to the Clipboard for pasting into other applications such as Microsoft Excel or Word.</p> <p>If nothing is selected in the Event Viewer when you click this button, all entries copy to the Clipboard. You can also use Ctrl+A to select all and Ctrl+C to copy to Clipboard.</p>

Alarm and Event Management

The alarm and event feature provides event management for the Metasys system. This feature allows you to configure the detection of alarm conditions and the routing of event messages to destinations such as an email account or pager for acknowledgment. The [Alarms Window](#) displays event messages in a [prioritized](#) order and allows you to respond to the alarms. The [Event Viewer](#) provides the functionality to retrieve and examine event messages stored in an [event repository](#).

For information on alarm and event management for Metasys systems integrated with BACnet devices, see the [Alarm and Event Management for Metasys Systems Integrated with BACnet Devices](#) topics.

Alarm and Event Management Concepts

Alarm and Event Management Overview

An event is a notification of a state change of an [item](#) in the system. When a value in an FAC, Engine, or Metasys Server deviates from its normal operating condition, such as exceeding a high limit or failing to respond to a command within a specified time period, the system detects a change of state and the FAC, Engine, or Metasys Server generates an event message.

When an FAC generates an event message, it temporarily stores the event message in its Event Log. It also immediately forwards the event message to the Engine or configured Metasys Server to which it is connected. When an Engine generates an event message, it temporarily stores the message in its local event repository. When a Metasys Server generates an event message, it permanently stores the message in its event repository. You can send event messages stored in the local event repository of an Engine to the event repository of a Metasys Server for permanent storage by defining a Metasys Server event repository as the [default destination](#). Also, you can route event messages to other destinations such as a pager or an email account. For more information, see the [Event Repositories](#) and [Event Message Routing, Filtering, and Destinations](#) sections.

For sites with Metasys for Validated Environments Installed (MVE) installed, configure the following attributes in the [Site Object](#):

- Annotation Include
- Annotation Exclude
- Annotation Alarm Priority Threshold
- Signature Include
- Signature Exclude
- Signature Alarm Priority Threshold

These settings apply only to MVE sites and enable the MVE required annotations and electronic signature for event messages. You can apply these settings at the site level or down to the object level as needed. You can define the settings to require an electronic signature, an annotation, neither, or both. When both options are required and a user acknowledges or discards an event message, they are prompted to reauthenticate and enter a reason and annotation for the action. The user's login name, date and time of signature, and the reason for signature are saved as part of the annotation. You cannot delete annotations on an MVE site.

Non-MVE sites may optionally define and use annotations; however, electronic signatures are specific to MVE sites.

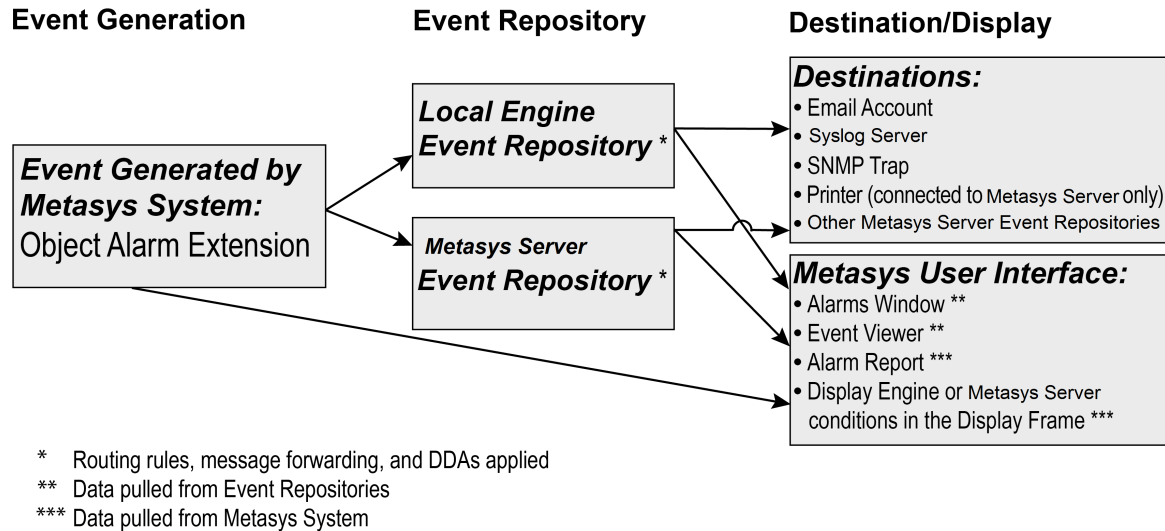
See [Configuring Annotation and Electronic Signature Requirements in the Site Object in MVE](#) in the [Site Management Portal User Interface](#) section. For additional information, refer to the *Metasys for Validated Environments, Extended Architecture Technical Bulletin (LIT-12011327)*.

The [Alarms Window](#) and [Event Viewer](#) allow you to examine and respond to event messages. The Alarms Window displays event messages one at a time in a [prioritized](#) order and allows you to respond to the newest alarm first. The Event Viewer displays all of the event messages stored in the event repository of the currently selected device. In addition, [Alarm Reports](#) allow you to query for alarm conditions in the Metasys system online and provide a list of items that are currently in an alarm condition.

ⓘ Note: The current navigation view does not limit or affect the alarm notification; only the user's permissions for managing item events can. Therefore, a user may receive an alarm for an item that does not exist in the currently displayed navigation view.

The following figure shows the flow of event messages through the Metasys system.

Figure 10: Event Message Flow



For information on how to configure and route event messages for Metasys systems integrated with BACnet devices, see [Alarm and Event Management for Metasys Systems Integrated with BACnet Devices](#).

Alarm Extensions

Using object [alarm extension](#) is a very easy method for configuring the detection of alarm conditions. To configure the values that determine alarm condition detection, use the [Alarm Extension Wizard](#) that appears after creating an object using the [Object](#). You also can add alarm extensions after you create an object by selecting it in the navigation tree and selecting **Show Extensions** from the [Action Menu](#).

Use alarm extensions to define the values for the high/low warning and high/low alarm conditions for [Analog Input Object](#), [Analog Output Object](#), and [Analog Value Object](#). For a complete list of Analog Alarm extension attributes, see [Analog Alarm Attributes](#).

Also, use alarm extensions to define the values for the alarm and trouble conditions for [Binary Input Object](#), [Binary Output Object](#), [Binary Value Object](#), [Multistate Input Object](#), [Multistate Output Object](#), and [Multistate Value Object](#). For a complete list of Multistate Alarm extension attributes, see [Multistate Alarm Attributes](#).

In addition, you can use alarm extensions to define the following conditions:

- alarm state parameters such as Event Enable, Delay Time, and Report Delay
- alarm setup parameters such as Acknowledgment Required, Alarm Message Text, and associated Graphics

Devices with the Disable Automatic Alarming attribute set to True do not produce an alarm but indicate they are offline in the navigation tree with a red X. See the appropriate object in the [Object Help](#) for details on this attribute. This attribute does not affect alarm extensions.

The Enable Alarms and Disable Alarms commands affect any and all alarm extensions defined for an object.

For more details on configuring alarm extensions, see [Creating Extensions](#), [Alarm Extensions](#), and the Help section for the selected [object](#).

After using alarm extensions to configure the detection of alarm conditions, you must configure the routing, filtering, and format of event messages from Engine or Metasys Server to the desired

destinations. For more information on filtering or routing events messages, click one of the following section names:

- [Event Message Routing, Filtering, and Destinations](#)
- [Configuring Destination Delivery Agents \(DDAs\)](#)
- [Applying Filters for Routing Event Messages to Destinations](#)
- [Configuring Event Message Format](#)

For information on AO/BO feedback, see [AO/BO Feedback](#).

Event Repositories

The Metasys system has three event repositories for storing event messages.

Table 17: Event Repositories

Type	Description
Local (Engine) Event Repository	<ul style="list-style-type: none"> • Provides temporary storage for event messages on the Engine. • Allows the event messages stored in the local Engine event repository to appear in the Event Viewer and Alarms Window. • Sends event messages from the local Engine event repository to the defined Default Destination.
ADS Event Repository	<ul style="list-style-type: none"> • Provides permanent storage for event messages on the Metasys Server platform. • Event messages generated on a Metasys Server platform are placed directly into the Metasys Server event repository. • Allows the event messages stored in the Metasys Server event repository to appear in the Event Viewer and Alarms Window. • Receives event messages from multiple local Engine event repositories and provides permanent storage for the event messages. The Metasys Server event repository is usually defined as the Default Destination for event messages from local Engine event repositories. • Provides the option to send event messages from a single Metasys Server event repository to one or more Metasys Server event repositories for permanent storage. See the Configuring an ADS Event Repository section for details.
FACs Event Log	<ul style="list-style-type: none"> • Event logs are only viewable in the CCT. Configure the Advanced tab to work with FACs to record events using events logs. Refer to <i>Working with the Advanced Tab</i> in the CCT Help (LIT-12011147). • The CCT can be set up to send event notifications from the FAC event logs to other devices. Refer to <i>Setting up Device Notification</i> in the CCT Help (LIT-12011147).

For information on configuring the event repositories, click one of the following section names:

- [Configuring an Engine Event Repository](#)
- [Configuring an ADS Event Repository](#)

A Database Timeout Error can occur when viewing events if the repository contains too many events to be filtered before the system times out (typically, one million events). To prevent this error, on a regular basis you should backup and purge event records from the repository (JCIEvents) using the Metasys Database Manager.

Default Destination

You can define an ADS [repository](#) as a Default Destination for each Engine where event messages are sent under certain conditions and permanently stored:

- If the Default Destination is a Metasys Server that has a LAN connection (as defined by the [Engine Device Object](#)'s Connection Type attribute or the [Site Object](#)'s Default ADS Connection Type attribute), event messages generated by the Engine are sent to the Metasys Server as they occur.
- If the Default Destination is a Metasys Server that has a Dial connection, event messages generated by the Engine are sent to the Metasys Server when the local event repository is 90% full (Engine object's Alarm Repository Size attribute), at the user-defined time (Engine object's Delivery Time attribute), or when the event priority exceeds the user-defined level (Engine object's Priority Threshold attribute).

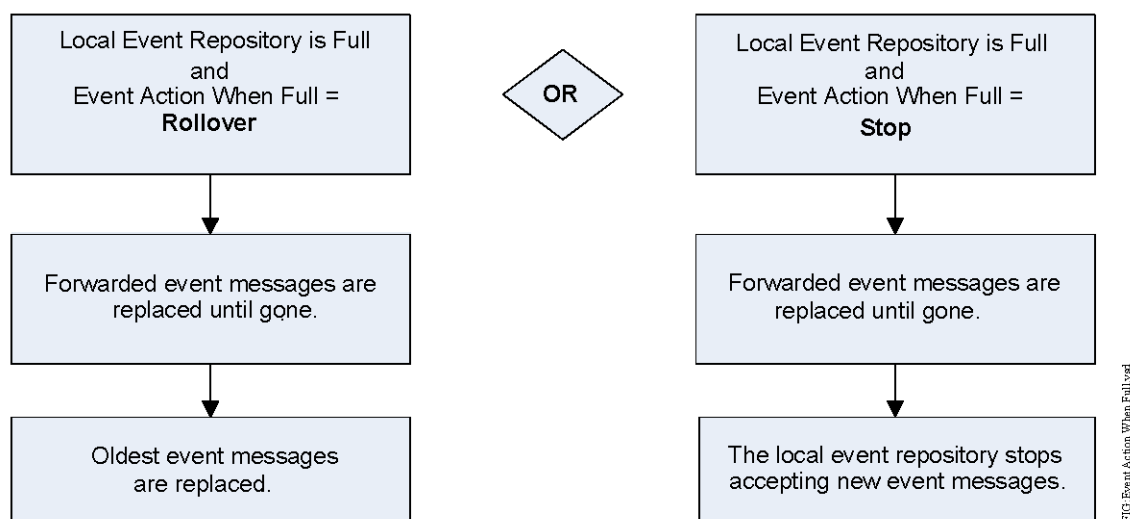
See the [Site Object](#), [Engine Device Object](#), and Connection Type sections for information on these attributes.

For information on how to define a Default Destination, see the [Configuring an Engine Event Repository](#) section.

If you have not defined a Default Destination when the Engine local event repository is 100% full, the local event repository either replaces the oldest messages (rollover) with new messages or stops recording events according to the Event Action When Full attribute configuration.

Event message rollover begins or replacement stops only when the total number of nonforwarded event messages reaches the size defined by the Event Repository Size attribute. In other words, once the local event repository reaches the defined size, new event messages continue to enter the local event repository replacing forwarded messages until all forwarded messages are gone. The following figure illustrates the Event Action When Full when set to Rollover or when set to Stop.

Figure 11: Event Action When Full



If you have defined a Default Destination and the Event Action When Full attribute is set to Stop, the event messages do not stop rolling over as long as forwarding is successful. This situation occurs because event messages are forwarded to the Default Destination when new event messages are received, and the forwarded messages are automatically replaced. The local event repository does not fill up with nonforwarded event messages and, therefore, does not stop accepting new event messages.

If an event repository is full when a new event occurs, the following rules apply:

1. Events forwarded to an ADS Event Repository are always removed before events – not forwarded.
2. The lowest priority event with the oldest time stamp and Acknowledge Required set to false is replaced first.
3. If the event about to be created is of higher priority than at least one event in the repository, the event with the oldest time stamp and lowest priority is replaced.
4. If all events are of the same priority, the event with the oldest time stamp is replaced.
5. If the event about to be created is of a lower priority than all other events in the Event Repository, no event is replaced and the new event is discarded. In this situation, the new event does not cause the Alarm Window to appear, or any other DDA action to take place.

Notes:

- The local repository for alarms in the Engine is set to rollover at 1000 alarms automatically if the alarms meet the above requirements.
- You can define only one ADS Repository as the Default Destination for an Engine; however, different Engines can have different ADS Repositories defined as their Default Destination.

You can forward event messages from one Metasys Server to other Metasys Servers on the same site. For details, see the [Configuring an ADS Event Repository](#) section.

Event Message Annotations

An annotation is a textual string associated with an [event message](#). All acknowledgments add an annotation to an event message. In addition, you can add annotations to an event message (in the ADS event repository only). You cannot edit an existing annotation. Instead, add a new annotation to the event message. You can also define custom annotations. See [Adding Annotations](#), [Viewing Annotations](#), and [Creating Annotations](#).


Note: On an Engine, you can view annotations but you cannot add them.

The following table describes the fields of an annotation dialog box.

Table 18: Annotation Dialog Box Fields

Field	Description
User	When viewing annotations: The User field appears under the Annotation Information section that displays the user ID of the person that added the annotation.
Date and Time	When adding annotations: Displays the date and time the event message was generated. When viewing annotations: The first Date and Time field displays the date and time the event message was generated. The Date and Time field appearing under the Annotation Information section displays the date and time the annotation was added to the event message. The date and time format is defined by the Language selected in the User Profile (User Profile tab of the Security Administrator System).
Item Reference	Indicates the complete Item Reference defined for the item that generated the event message.
Description	Displays the text defined by the Description attribute of the item that generated the event message.

Table 18: Annotation Dialog Box Fields

Field	Description
Annotation	Allows you to select from a list of predefined annotations or add a text string (annotation) of 1–255 characters that may be used to describe any operational tasks that should be performed to respond to the cause or condition that prompted the generation of the event message.
Navigation Controls	Allows you to navigate through the annotations, if the event message has multiple annotations associated with it. Use the buttons to go to the first annotation, previous annotation, next annotation, or last annotation. The text box displays the number of the annotation being viewed. The Annotations feature automatically assigns a number to each annotation created. For example, if the event message has three annotations, the number appearing in this section can be 1, 2, or 3 depending on the annotation being viewed. Type a number in the text box and press the Enter key to jump directly to a specific annotation. 

ADS Event Message Forwarding

You can forward event messages from one Metasys Server to another Metasys Server on the same site. You also can forward event messages from a Metasys Server on one site to a Metasys Server defined as the Site Director on another site. After forwarding event messages from one site to another, you can configure the Site Director of the receiving site to forward the messages to the other Metasys Server on that site as desired.

See [Configuring an ADS Event Repository](#) for information on how to forward event messages from one Metasys Server to another Metasys Server.

Notes:

- When you forward event messages, the messages are sent (copied) to the ADS repository defined as the [Default Destination](#). The event messages are not removed from the ADS repository that sent the messages.
- Use message forwarding for notification purposes, not as a backup or archiving method. Use standard SQL practices for backup, archiving, or replication purposes.

Event Message Routing, Filtering, and Destinations

The Metasys system alarm and event feature allows you to route Engine generated event messages to different devices that are defined as destinations. For each Engine, you can configure the routing and filtering of event messages using DDAs. Supported destinations include pagers, printers, email, and Network Management Systems that use SNMP traps. You can define DDAs by displaying the Engine and clicking on the desired DDA tab.

For each Engine, you can configure the routing and filtering of event messages using the following DDAs:

- [Email](#)
- [Pager](#) (not supported on network engines updated with Release 9.0.7 or later)
- [SNMP Trap](#)
- Serial Printer [for details on serial printer DDAs, refer to the *NAE Commissioning Guide (LIT-1201519)*].

Note: The serial printer DDA is supported on only a few engine models at certain releases. Also, this DDA is enabled using Remote Desktop of a Site Director Engine, and no attributes/tabs appear in the UI. Lastly, the serial printer DDA is not available on the NAE35, NAE45, NCE25, or NIE59. For further information, refer to the *NAE Commissioning Guide (LIT-1201519)*.

When configuring any of these DDAs, you can apply filters for routing specific event messages and define the format in which the event messages are displayed at the destination. See [Configuring Destination Delivery Agents \(DDAs\)](#) for information on how to route event messages to destinations. See [Configuring Event Message Format](#) to define the message delivery format.

Use filters to determine which event messages get routed to the defined Destination, such as a pager or email account. For example, define a filter to route only the event messages that require acknowledgment by selecting Acknowledge Required == true.

For more information on filters, click the following section names:

- [Filtering Operators](#)
- [Filtering Options](#)
- [Filtering Examples](#)
- [Applying Filters for Routing Event Messages to Destinations](#)

See the [Event Message Routing Sample Scenario](#) section for a sample event message routing scenario.

Filtering Operators

The following table describes the Boolean operators used to configure the filters for routing event messages to destinations.

Table 19: Operators

Operator	Meaning
==	Equal To
!=	Not Equal To
<	Less Than
<=	Less Than or Equal To
>	Greater Than
>=	Greater Than or Equal To

Note: If you define multiple filters for a destination, the DDA combines all the criteria with an AND condition (all filter criteria must be met).

For more information on filters, click one of the following section names:

- [Filtering Options](#)
- [Filtering Examples](#)
- [Applying Filters for Routing Event Messages to Destinations](#)

Filtering Options

You can apply filters to define which event messages are sent to specific destinations. For information on how to apply filters to event messages, see [Applying Filters for Routing Event Messages to Destinations](#). Use the following table as a guide to defining filters.

Note: If you define multiple filters for a destination, the DDA combines all the criteria with an AND condition (all filter criteria must be met).

Table 20: Filters

Item	Operator	Value
Authorization Category	==, !=	HVAC, Fire, Security, Services, Administrative, General, Lighting, Refrigeration, Critical Environment, Air Quality, Power, Energy, System, or Custom Value
Acknowledge Required	==, !=	true, false
Current Status	==, !=	Normal, Fault, Off Normal, High Limit, Low Limit, Low Warning, High Warning, Low Alarm, High Alarm, Alarm, Trouble, Status, Offline, Shutdown, Unreliable, Online, Unknown Previous State
Previous Status (status prior to the event)	==, !=	Normal, Fault, Off Normal, High Limit, Low Limit, Low Warning, High Warning, Low Alarm, High Alarm, Alarm, Trouble, Status, Offline, Shutdown, Unreliable, Online, Unknown Previous State
Priority	==, !=, <, <=, >, >=	Range 0-255 See Event Priority .
Start Day of Week	==, !=, <, <=, >, >=	Monday through Sunday
Start Time	==, !=, <, <=, >, >=	The Time format is defined by the Language selected in the User Profile (User Profile tab of the Security Administrator System). Example: HH:MM:SS AM/PM format (12:15:00 PM) for English Language selection
End Day of Week	==, !=, <, <=, >, >=	Monday through Sunday
End Time	==, !=, <, <=, >, >=	The Time format is defined by the Language selected in the User Profile (User Profile tab of the Security Administrator System). Example: HH:MM:SS AM/PM format (12:15:00 PM) for English Language selection

For more information on filters, click the following section names:

- [Filtering Operators](#)
- [Filtering Examples](#)
- [Applying Filters for Routing Event Messages to Destinations](#)

Filtering Examples

The following table provides examples of filters used by DDAs for routing event messages.

Table 21: Filtering Examples

Example	Meaning
Authorization Category != HVAC	The DDA routes all event messages to the defined destination except those from the HVAC category.
Acknowledge Required == true	The DDA routes only the event messages that require acknowledgment to the defined destination.
Current Status == Alarm	The DDA routes all event messages that were generated by objects in Alarm status to the defined destination.
Previous Status != Unknown Previous State	The DDA routes all event messages to the defined destination except those that were generated by objects in the unknown previous state.
Priority <= 200	The DDA routes all event messages with an Event Priority equal to or less than 200 to the defined destination. See Event Priority .
Start Day of Week >= Friday and Start Time >= 05:00:00 PM and End Day of Week <= Monday and End Time <= 06:00:00 AM	The DDA routes all event messages generated from 5:00:00 PM on Friday through 6:00:00 AM on Monday. The Time format is defined by the Language selected in the User Profile (User Profile tab of the Security Administrator System).

Applying Multiple Filters Example:

If you define multiple filters for a destination, the DDA combines all the criteria with an AND condition (all filter criteria must be met).

If you want to define a set of filters for sending all High Alarm messages for your HVAC systems that have been defined with event priorities belonging to the Property Safety Group (Priority 40–79) and require acknowledgment at an email destination, apply all the following filters under the Email tab of the Engine.

- Authorization Category == HVAC
- Current Status == High Alarm
- Priority >= 40
- Priority <= 79
- Acknowledge Required == true

For more information on filters, click the following section names:

- [Filtering Operators](#)
- [Filtering Options](#)
- [Applying Filters for Routing Event Messages to Destinations](#)

Email

You can configure email addresses as destinations for event messages. The Email DDA supports standard SMTP. You can also send encrypted email messages.

Note: Beginning at Metasys Release 10.1, the Email DDA is no longer enabled for the Metasys Server, but you can use the Remote Notifications feature in Metasys UI to provide equivalent functionality. For details, refer to *Metasys UI Help (LIT-12011953)*.

For information on how to configure an email destination, see [Configuring Destination Delivery Agents \(DDAs\)](#). For information on sending encrypted email messages, see [Configuring Encrypted Email](#).

For additional information, see one of the following sections:

- [Email Tab](#) in the [Object and Feature Tabs](#)
- [Engine Device Object](#)
- [Configuring Event Message Format](#) to configure how the event message appears at the email destination

Email Addresses in the Destination Configuration

The Email Addresses attribute on the Email tab in the Destination Configuration of the device specifies the email address of one or more recipients to receive alarm notification through email. Click the **Add** button (>>) next to the Email Address attribute to select email addresses defined by the user accounts in the Security Administrator system.

You must use valid email addresses, which are set up on an email server, for the device to successfully send the alarms through email.

Figure 12: Email Addresses Dialog Box

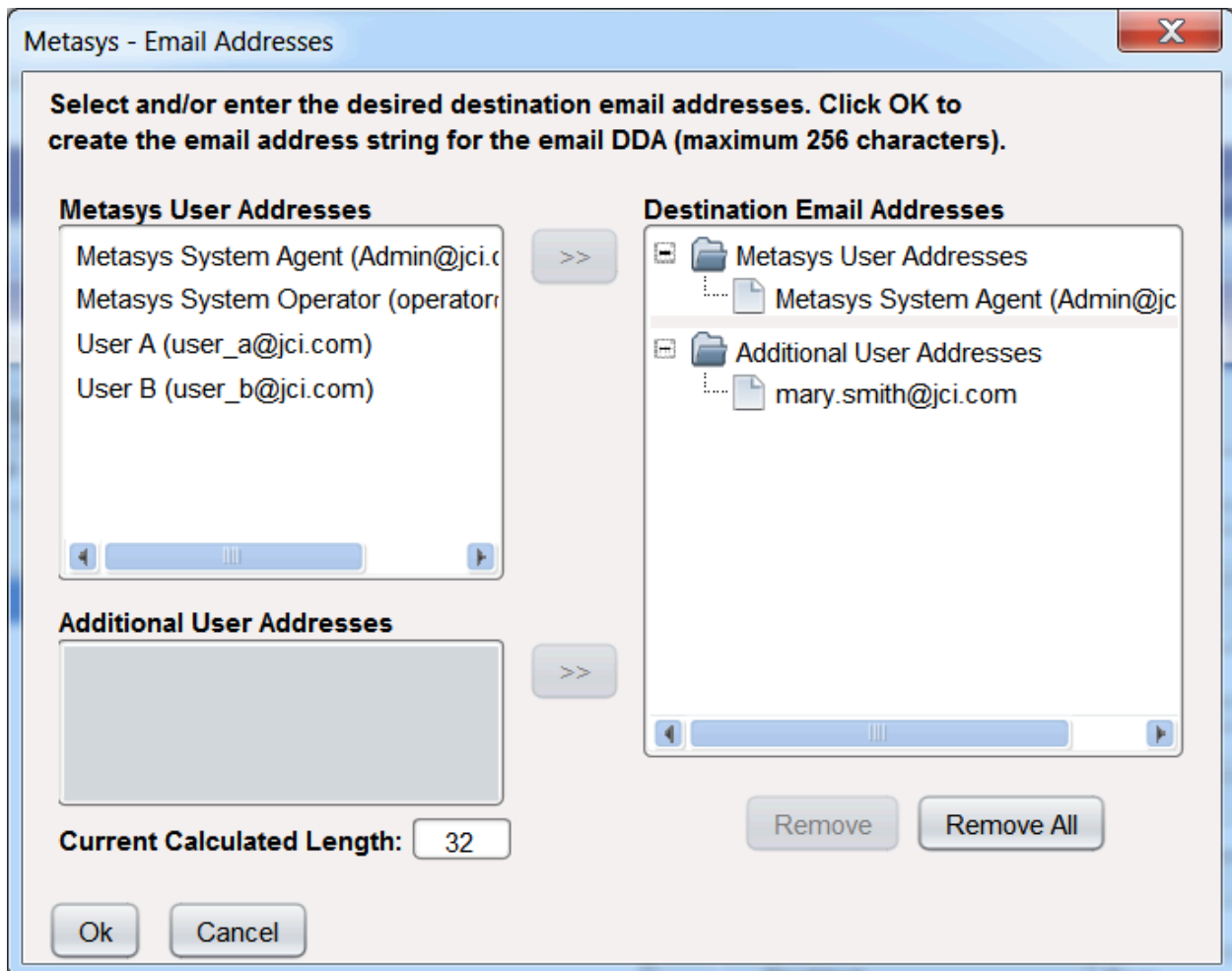



Table 22: Email Addresses Dialog Box Components

Field	Description
Metasys User Addresses	Displays the users defined in the Security Administrator System and their email addresses. This information appears only for the device that you are currently accessing.
Additional User Addresses	Allows you to enter email addresses not appearing in the Metasys User Addresses list. When entering more than one email address, separate the addresses with a comma (John.Smith@jci.com,Jane.Smith@jci.com).
Destination Email Addresses	Displays the Metasys User Addresses and Additional User Addresses that you selected or entered from the Metasys User Addresses and Additional User Addresses lists. You can expand or collapse the Metasys User Addresses folder and Additional User Addresses folder by clicking the + or - sign or by double-clicking the folders. If you right-click the Metasys User Addresses folder or Additional User Addresses folder, the following menu options appear: <ul style="list-style-type: none"> • Sort-by Name: Displays the users in alphabetical order by name. This option is available only for the Metasys User Addresses folder. • Sort-by Email: Displays the email addresses in alphabetical order. • Remove All: Removes all users and email addresses from the selected list.
 Add Button	For the button next to the Metasys User Addresses list, adds the selected users and their email addresses to the Destination Email Addresses list. For the button next to the Additional User Addresses lists, adds the email addresses entered to the Destination Email Addresses list.
Current Calculated Length	Displays the number of characters in the email address string. This number is calculated after clicking the Add button next to either the Metasys User Addresses list or the Additional User Addresses list. The maximum number of characters allowed for the email address string is 256.
Remove	Removes the selected user and email address from the Destination Email Addresses list. You also can select a user or email address, right-click, and select Remove .
Remove All	Removes all users and email addresses from the Destination Email Addresses list.

Pager

You can configure one or more pagers as destinations for event messages from older network engines. Newer network engines that run a Linux operating system do not support pagers. The Pager DDA supports standard TAP.

For information on how to configure a pager destination, see [Configuring Destination Delivery Agents \(DDAs\)](#). For additional information, see the following:

- [Pager Tab](#) in the [Object and Feature Tabs](#)

- [Engine Device Object](#)
- [Configuring Event Message Format](#) to configure how the event message appears at the pager destination. The event message format for pagers is very brief to conform to pager space limitations.

Troubleshooting Tip:

Occasionally, a pager message may contain extraneous junk characters. These characters may come from the paging service, appear as a result of interference, or appear when the pager battery is low. Often, cycling power to the modem and waiting for 10 seconds, or disconnecting the modem then reconnecting may solve the issue.

Printer

On the Metasys Server platform, you can define any printer supported by Windows software as a destination for event messages, and a single DDA can print alarms on multiple printers. Printers connected to the Metasys Server by parallel port or USB are supported, as well as IP-based network printers (if printers are set up with an IP address).

Note: Beginning at Metasys Release 10.1, the Printer DDA is no longer enabled for the Metasys Server, but you can use the Remote Notifications feature in Metasys UI to provide equivalent functionality. For details, refer to *Metasys UI Help (LIT-12011953)*.

To set up a printer on a split ADX, the printer must be accessible from the web/application server computer, as opposed to the database server computer.

You can configure the Metasys Server Printer DDA for single line printing for a tractor feed printer (also known as tractor feed printing, line printing, and dot matrix printer support). To set up a printer for single line printing for a tractor feed printer (no form feed/tractor printing mode), set the [ADS Device Object](#) Printer tab Line Out attribute to 0. By setting this attribute to 0, when an alarm is sent to the tractor feed printer, it prints the alarm text and then advances a single line, thus waiting to print the next alarm.

Notes:

- When using a tractor feed printer (without any form feeds), the Timeout, Printing Priority Threshold, Orientation, Font Face, and Font Size attributes are not used and any values set for them are ignored. You can set the Orientation, Font Face, Font Size, and line wrapping at the printer itself.
- Tractor feed printing is only intended for tractor feed printers. You may encounter abnormal behavior if you set the Line Out attribute to 0 for other type of printers, such as deskjet and laserjet printers.

For information on how to configure a printer destination on a Metasys Server, see [Configuring Destination Delivery Agents \(DDAs\)](#).

For information on how to configure a printer destination on a Metasys Server, refer to the *Configuring Destination Delivery Agents (DDAs)* section in the *Metasys SMP Help (LIT-1201793)*.

For additional information on Metasys Server Printer DDAs see the following:

- [Printer Tab](#) in the [Object and Feature Tabs](#)
- [Engine Device Object](#) or [ADS Device Object](#)
- [Configuring Event Message Format](#) to configure how the event message appears at the printer destination

On older releases of the NAE55/NIE55 and NAE85/NIE85 platform, you can use the Serial Printer DDA on the Site Director Engine to print event messages. This DDA is enabled using Remote Desktop and no attributes/tabs appear in the UI. This DDA is not available on the NAE35, NAE45, or NIE59. Refer to the *NAE Commissioning Guide (LIT-1201519)* for details on this DDA.

SNMP Trap

You can configure a SNMP Trap as a destination for event messages. The SNMP Trap DDA supports SNMP Versions 1, 2C, and 3.

Note: Beginning at Metasys Release 10.1, the SNMP DDA is no longer enabled for the Metasys Server, but you can use the Remote Notifications feature in Metasys UI to provide equivalent functionality. For details, refer to *Metasys UI Help (LIT-12011953)*.

For information on how to configure an SNMP Trap destination, see [Configuring Destination Delivery Agents \(DDAs\)](#).

For additional information, see the following:

- [SNMP Tab](#) in the [Object and Feature Tabs](#)
- [Engine Device Object](#) or [ADS Device Object](#)
- [Configuring Event Message Format](#) to configure how the event message appears at the SNMP Trap destination

Syslog

New at Release 8.0, you can configure a syslog destination that forwards all system events and audits to your syslog server.

Note: Beginning at Metasys Release 10.1, the Syslog DDA is no longer enabled for the Metasys Server, but you can use the Remote Notifications feature in Metasys UI to provide equivalent functionality. For details, refer to *Metasys UI Help (LIT-12011953)*.

The Metasys system provides the optional capability of sending its configured audit log entries and alarm notifications to an external, industry-standard Syslog server, conforming to Internet published RFC 3164. The Syslog option provides positive indication of each field possible in the Metasys event and audit entries, replacing any blank field with the single character dash (-). Individual fields of each Metasys message are sent to the Syslog server separated by the vertical bar symbol (|), ensuring the integrity of all data sent to the Syslog server.

After the Syslog DDA is configured, all messages sent to the local Repository are also sent immediately to the configured Syslog server. You can apply forensic analysis on the consolidation of all electronic audit and event information at the Syslog server.

For information on how to configure a syslog destination, see [Configuring Destination Delivery Agents \(DDAs\)](#) For additional information, see the following:

- [Syslog Tab](#) in the [Object and Feature Tabs](#) section
- [Engine Device Object](#)
- [Configuring Event Message Format](#) to configure how the event message appears at the syslog server

Event Message Routing Sample Scenario

An Engine is configured to route all event messages to John Smith's (Building Operations Engineer) email address and a set of selected event messages to his manager's (Building Operations Manager) pager.

The following configuration is required to make this scenario work:

Make sure the Engine is configured properly and the engine model supports the event message routing method you are using. Older network engines may work but newer network engines that run a Linux operating system do not support some event message routing devices. See the [Related Documentation](#) table and the [Engine Device Object](#) section for information.

Make sure that object alarm extensions are configured for each object in the Engine that you want to detect alarm conditions. See the [Alarm Extensions](#) section for information.

Define an email destination for John Smith’s (Building Operations Engineer) email address. See [Event Message Routing, Filtering, and Destinations, Email](#), and [Configuring Destination Delivery Agents \(DDAs\)](#).

Define a pager destination for John’s manager’s (Building Operations Manager) pager. See [Event Message Routing, Filtering, and Destinations, Pager](#), and [Configuring Destination Delivery Agents \(DDAs\)](#). Make sure you have defined the pager filters correctly.

Once the Engine detects an alarm condition and generates an event message, the Email DDA routes all unfiltered event messages to John Smith’s email address. The Pager DDA only routes the event messages that pass the defined pager filters to John’s manager’s pager.

Event Priority

Indicates the importance of the event message and determines when the event message is displayed. Displaying the priority of the event messages in the Event Viewer allows the user to acknowledge event messages of higher importance before event messages of lower importance. The priority number associated with the event message falls within a range of 0–255. Event messages with a lower priority number are of a higher importance or are more critical than event messages with a higher priority number. You can route event messages based on priority.

Notes:

- Use a consistent priority scheme to make sorting event messages based on priority in the Event Viewer easier.
- You can specify alarm notification sounds based on alarm priorities. See [Alarm Settings Tab](#).

Life Safety Group (Priority 0–39)

Table 23: Life Safety

Priority	Recommended Use
5	Automatic Fire Alarm
8	Life Safety Process Alarm
11	Manual Fire Alarm
14	Other Higher Priority Life Safety
19	Medical Alarm
22	Hold Up and Duress Alarm
25	Panic Alarm
28	Life Safety Pre-Alarm Alert
31	Other Lower Priority Life Safety

Property Safety Group (Priority 40–79)

Table 24: Property Safety Group

Priority	Recommended Use
45	Burglar Alarm and Forced Door Alarm
48	Security Alarm
51	Other Higher Priority Property Safety
60	Watchman Tour Alarm
63	Property Process Alarm
66	Door Held Open Alarm
69	Other Lower Priority Property Safety

Supervisory and Trouble Group (Priority 80–139)

Table 25: Supervisory and Trouble Group

Priority	Recommended Use
85	Fire Supervision (Tamper)
88	Security Supervision (Tamper)
91	Other Supervisory
100	Fire Trouble (Equipment Failure)
103	Security and Burglar Trouble (Equipment Failure)
106	Communication Equipment Failure Trouble
109	Process Trouble
112	Energy Alarm
115	Other Failure
124	Communication Equipment Warning Trouble
127	Early Warning Alert
130	Energy Warning
133	Other Warning

Other Group (Priority 140–255)

Table 26: Other Group

Priority	Recommended Use
145	Equipment and Industrial Supervision
148	Comfort Alarm
151	Miscellaneous Higher Priority Alerts
160	System Events
163	Miscellaneous Higher Priority Events
172	Life Safety Return to Normal
179	Property Safety Return to Normal
186	Supervisory and Trouble Return to Normal
189	Miscellaneous Return to Normal
198	System Status Active
201	Comfort Warning
204	Miscellaneous Lower Priority Events
213	System Status Normal
216	Comfort Normal
219	Test and Diagnostic Events
222	Miscellaneous

Alarm and Event Steps

Configuring an Engine Event Repository

About this task:

To configure the local Engine Event Repository and the Default Destination:

1. View an Engine device. See [Viewing Item Data](#) for information on how to display an item.
2. Select the **Focus** tab and click the **Advanced** radio button to display additional item information.
3. Select **Edit**.
4. Scroll down to the Alarms and Site sections.
5. Edit the attributes in these sections. Use the following table as a guide. See [Engine Device Object](#) for information about the attributes. The NAE Device attributes table contains Default Value and Values/Options/Range information for the attributes. Click the attribute names in the table for descriptions.

Table 27: Repository Configuration

To Do This:	Edit This Engine Device Object Attribute:
Change the size of the local Engine repository	Alarm Repository Size
Change the snooze time for the Alarms Window	Alarm Snooze Time
Forward acknowledged and discarded alarms and events from an NxE to the Metasys Server repository	Ack Forward Enable
Designate an ADS repository as a Default Destination	ADS Repository
Indicate the type of connection used by the Metasys Server	ADS Connection Type
Define a time to deliver event messages to the Metasys Server	ADS Delivery Time
Define the event message priority that triggers delivery to the Metasys Server	ADS Priority Threshold

❗ **Note:** You can define only one repository as the [Default Destination](#) for an Engine. See [Event Repositories](#) for more information.

6. Click **Save**.

❗ **Note:** If you want to define all local Engine repositories for the entire site at one time instead of individually, select the Site in the navigation tree and edit the following [Site Object](#) attributes (the Site attributes table contains Default Value and Values/Options/Range information for the attributes):

- Default ADS Repository
- Default ADS Connection Type
- Default ADS Delivery Time
- Default ADS Priority Threshold

Configuring an ADS Event Repository

About this task:

To configure an ADS Event Repository for forwarding event messages from one Metasys Server to other Metasys Servers:

1. View the Metasys Server. See [Viewing Item Data](#) for information on how to display an item.
2. Select the **Focus** tab and click the **Advanced** radio button to display additional item information.
3. Select **Edit**.
4. Scroll down to the Repository Storage section.
5. Edit the Metasys Server's Device Object's **ADS Repositories** attribute. See the Metasys Server attributes table (Table 112) for more information on this attribute or other Metasys Server attributes, including their Default Value and Values/Options/Range information.
6. Click **Save**.

Configuring Destination Delivery Agents (DDAs)

About this task:

To provide consistency and easy configuration of DDAs, each DDA tab in the Metasys system user interface contains the same layout. Follow the instructions in this section when configuring any DDA. See [Event Message Routing, Filtering, and Destinations](#) for more information on DDAs.

- ❗ **Note:** Beginning at Metasys Release 10.1, the Email, SNMP, Syslog, and Printer DDAs are no longer enabled for the Metasys Server, but you can use the Remote Notifications feature in Metasys UI to provide equivalent functionality. For details, refer to *Metasys UI Help (LIT-12011953)*.

On the NAE85/NIE85 platform and on some older releases of the NAE55/NIE55, you can use the Serial Printer DDA on the Site Director Engine to print event messages. This DDA is enabled using Remote Desktop, and no attributes/tabs appear in the UI. This DDA is only available on some network engines. Refer to the *NAE Commissioning Guide (LIT-1201519)* for details on this DDA.

To configure DDAs for routing event messages:

1. View an Engine. See [Viewing Item Data](#) for information on how to display an item.
 2. Select the tab for the desired destination type.
 3. Select **Edit**.
 4. Edit the attributes in the Shared Configuration section.

❗ **Note:**

 - See the specific DDA tab in the [Object and Feature Tabs](#) for information on configuring attributes. Also, see the [Engine Device Object](#) or the [ADS Device Object](#) section for information on configuring Engine or Metasys Server attributes, respectively.
 5. In the Destinations section, select **New** to add a destination or click an existing destination.
 6. Edit the parameters in the Destinations section. See the following:
 - [Email](#)
 - [Pager](#)
 - [SNMP Trap](#)
 - [Syslog](#)
- ❗ **Note:** See the specific DDA tab in the [Object and Feature Tabs](#) for information on configuring attributes. Also, see the [Engine Device Object](#) section for information on configuring Engine attributes.

- Repeat Step 5 and 6 above if you want to configure this device to send event messages to more than one destination of that type. Add the number of destinations. For example, to send event messages to two different pagers, create two separate destinations on the Pager tab.

Notes:

- See [Applying Filters for Routing Event Messages to Destinations](#) for information on how to apply filters to route particular event messages to destinations.
- See [Configuring Event Message Format](#) for information on how to configure event message format.

- To remove a destination, select the destination and click **Delete**.

- Click **Save**.

Configuring Encrypted Email

By default, Metasys software encrypts your user name and password as they are entered into the SMP UI, but the software does not automatically encrypt email messages. This feature allows Engines to send email to email servers over a secure channel (secure socket layer [SSL]). The entire email payload is encrypted, and allows our software to communicate to email servers that require SSL connections.

Consider these points when using email encryption:

- The SMTP port is different when using secure socket layer connections. This port is typically 465.
- To maximize efficiency when using this feature, set up mailing groups instead of individual users in the destination field to minimize the number of users to which the machine has to send email. This setup allows you to create different email groups and customize the type of messages that each user receives.

You can configure encrypted email in three ways:

- [Configuring Encrypted Email with No Authentication Required](#)
- [Configuring Encrypted Email with SMTP Authentication](#)
- [Configuring Encrypted Email with POP-Before-SMTP Authentication](#)

Configuring Encrypted Email with No Authentication Required

About this task:

Note: Encrypted Email with No Authentication Required functions only when Anonymous Authentication is enabled on the mail server.

- View an Engine. See [Viewing Item Data](#) for information on how to display an item.
- Click the **Email** tab.
- Click **Edit**.
- Edit the Attributes in the Shared Configuration as shown in Table 28.

Table 28: Attributes for No Authentication Required

Attribute	Selection
SMTP Server Host	mail.yourdomain.com or yourdomain.com
SMTP Port	465
Authentication Type	None
SSL Email Enabled	True
SSL Email Ignoring Errors	False

5. Verify that the email was sent correctly.

Configuring Encrypted Email with SMTP Authentication

1. View an Engine. See [Viewing Item Data](#) for information on how to display an item.
2. Click the **Email** tab.
3. Click **Edit**.
4. Edit the Attributes in the Shared Configuration as shown in Table 29.

Table 29: Attributes for SMTP Authentication

Attribute	Selection
SMTP Server Host	mail.yourdomain.com or yourdomain.com
SMTP Port	465
Authentication Type	SMTP
SSL Email Enabled	True
SSL Email Ignoring Errors	False

5. Verify that the email was sent correctly.

Configuring Encrypted Email with POP-Before-SMTP Authentication

About this task:

Notes:

- When SSL Email is enabled and you use POP-before-SMTP Authentication, the Metasys system uses port 995 to communicate to the mail server. Ensure that the mail server you are connecting to uses port 995 for secure socket layer connections for POP3 access.
- When SSL Email is not enabled and you use POP-before-SMTP Authentication, the Metasys system uses port 110 to communicate to the mail server. Ensure that the mail server you are connecting to uses port 110 for non-encrypted POP3 access.

1. View an Engine. See [Viewing Item Data](#) for information on how to display an item.
2. Click the **Email** tab.
3. Click **Edit**.
4. Edit the Attributes in the Shared Configuration as shown in Table 30.

Table 30: Attributes for POP-Before-SMTP Authentication

Attribute	Selection
SMTP Server Host	mail.yourdomain.com or yourdomain.com
SMTP Port	465
Authentication Type	POP-before-SMTP
POP Server Hostname	yourdomain.com or pop.yourdomain.com
SSL Email Enabled	True
SSL Email Ignoring Errors	False

5. Verify that the email was sent successfully.

Applying Filters for Routing Event Messages to Destinations

1. View an Engine device object. See [Viewing Item Data](#) for information on how to display an item.
2. Select the tab for the destination type (for example, Pager).

3. Select **Edit**.
4. Select a destination in the Destinations section.
5. Select **New** in the Filters section. The Filter dialog box appears.
6. Select a filter type from the Item drop-down menu. For more information and examples on filtering, see [Event Message Routing, Filtering, and Destinations](#).
7. Select the [operator](#) from the drop-down menu.
8. Select a value from the drop-down menu or type the value in the text box.
9. Click **OK**.
10. Repeat step Step 4 through step Step 9 to add more filters to that destination.
 - ① **Note:** If you define multiple filters for a destination, the DDA combines all the criteria with an AND condition (all filter criteria must be met).
11. Make changes to filters using the drop-down menus or text boxes.
12. To remove a filter, select a filter and click **Delete**.
13. Click **Save**.

Configuring Event Message Format

1. View an Engine. See [Viewing Item Data](#) for information on how to display an item.
2. Select the tab for the destination type.
3. Select **Edit**.
4. Select a destination in the Destinations section.
5. Select the check boxes in the Format section to define which attribute information is included in the event message when delivered to that destination.
 - ① **Note:** For example, select **Value and Units** if you only want to display the Value and Units portion of the event message at the destination.
6. Click **Save**.

Acknowledging Event Messages

1. [Launch the Event Viewer](#).
2. Select one or more event messages.
 - ① **Note:** Use the Ctrl or Shift key to select multiple messages.
3. Click **Ack**.

Notes:

- Alternatively, you can right-click and select **Ack** or you can acknowledge event messages in the [Alarms Window](#). See [Acknowledging, Snoozing, and Discarding Events](#) for details.
- In an Engine that is not the Site Director, acknowledged or discarded alarm and event messages do not appear acknowledged or discarded in the Metasys Server.
- All acknowledgments add an annotation to the event message. See [Event Message Annotations](#).
- An electronic signature and/or annotation may be required when acknowledging an event.

Discarding Event Messages

1. [Launch the Event Viewer](#).
2. Select one or more event messages.

① **Note:** Use the Ctrl or Shift key to select multiple messages.

3. Click **Discard**.

Notes:

- Alternatively, you can right-click and select **Discard** or you can discard event messages in the [Alarms Window](#). See [Acknowledging, Snoozing, and Discarding Events](#) for details.
- In an Engine that is not the Site Director, acknowledged or discarded alarm and event messages do not appear acknowledged or discarded in the Metasys Server.
- An electronic signature or annotation may be required when discarding an event.

Sorting the Event Message List

About this task:

① **Note:** When you sort the event message list, only those messages currently displayed on the screen sort. This feature does not sort all messages if you have multiple pages of event messages.

1. [Launch the Event Viewer](#).
2. Click the header of the column you want to use for sorting. An up or down arrow appears in the header of that column. Click the arrow to change the sorting order and the table reorganizes.

Creating a Custom Filter for the Event Viewer (Metasys Server Only)

1. [Launch the Event Viewer](#).
2. Click **Custom Filter**.
3. Click **Add**.
4. Select the criteria and the associated values for the filter and click **OK**. All criteria added to the custom filter table will make up the rules of the filter.
5. Click **Apply** to get the results of the custom filter.
6. To view the data without the custom filter, click **Standard Filter**.

Printing the Event Messages Displayed in the Event Viewer

1. [Launch the Event Viewer](#).
2. Click anywhere in the Event Viewer.
3. Select **Print** from the [Item Menu](#). The event messages are printed in the order they appear in the Event Viewer.

Launching the Focus View of the Item That Generated the Event Message

1. [Launch the Event Viewer](#).
2. Select an event message and choose **Selected Item** from the View menu, or right-click and select **View Item**.

Notes:

- Some items, such as site level items, do not support this option because they do not have viewable information.
- Alternatively, you can launch the Focus view of the item that generated the event message in the [Alarms Window](#) by clicking on the [View Item button](#). See [Acknowledging, Snoozing, and Discarding Events](#) for details.

Launching a Graphic Associated with an Event Message

1. [Launch the Event Viewer.](#)
2. Double-click the graphic icon of an event message.
 - ① **Note:** Alternatively, you can launch a graphic associated with an event message in the [Alarms Window](#) by clicking the [View Graphic](#) button. See [Acknowledging, Snoozing, and Discarding Events](#) for details.

Adding Annotations

About this task:

The annotation feature is not available on the local Engine event repository. You can add annotations to the ADS event repository only.

1. [Launch the Event Viewer.](#)
2. Click the event message.
3. Select **Add Annotation** from the Actions menu or right-click and select **Add Annotation**. The Add Annotation dialog box appears.
 - ① **Note:** The drop-down field on the Add Annotation dialog box contains predefined annotations from your system preferences. If you have not defined annotations in your system preferences, the drop-down list is empty.
4. Type the desired text in the message box.
5. Click **OK**.

Creating Annotations

1. Select the **Annotation Settings** tab on the Metasys Preferences screen.
2. Enter annotation text. The text can be from 1 to 255 characters in length.
3. Click **Add** to save the new annotation.
 - ① **Note:** The annotations you create appear in the drop-down list on the Add Annotations dialog box. If you do not create any annotations, this list is blank.

Viewing Annotations

About this task:

You can view annotations from both the ADS and Engine event repositories.

1. [Launch the Event Viewer.](#)
2. Click the event message.
3. Select **View Annotations** from the Actions menu or right-click and select **View Annotations**. The View Annotations dialog box appears.
 - ① **Note:** Alternatively, you can double-click the annotation icon in the first column of the Event Viewer for an event message.
4. View the message. If multiple messages exist, use the navigation buttons to browse between event messages or to the first and last event message.
5. Click **OK**.

Result

- ① **Note:** A signed book icon is displayed in the event's associated Acknowledgment Annotation dialog box.

Alarm and Event Management for Metasys Systems Integrated with BACnet Devices

The Metasys system provides the option to use the [Alarm and Event Management](#) feature when integrating with BACnet devices (including the N30). You can send event messages generated by the engines, Metasys Servers, or FACs to BACnet devices. This alarming method uses the [Notification Class Object](#) and [Event Enrollment](#) or objects with [intrinsic alarming](#) to detect alarm conditions and route event messages from the Metasys system to BACnet devices.

Note: Event Enrollment objects are not supported by any field controllers.

For the alarm and event feature steps, see the Alarm and Event Management [Alarm and Event Steps](#) section.

For details on the attributes appearing on the BACnet Alarms tab, see [BACnet Alarm Tab](#) in the [Object and Feature Tabs](#) section.

For information on the BACnet IP Integration object, see the [BACnet IP Integration Object](#).

For information on alarm and event management for the Metasys system, see [Alarm and Event Management](#).

Alarm and Event Management for Metasys Systems Integrated with BACnet

Metasys/BACnet Alarming Overview

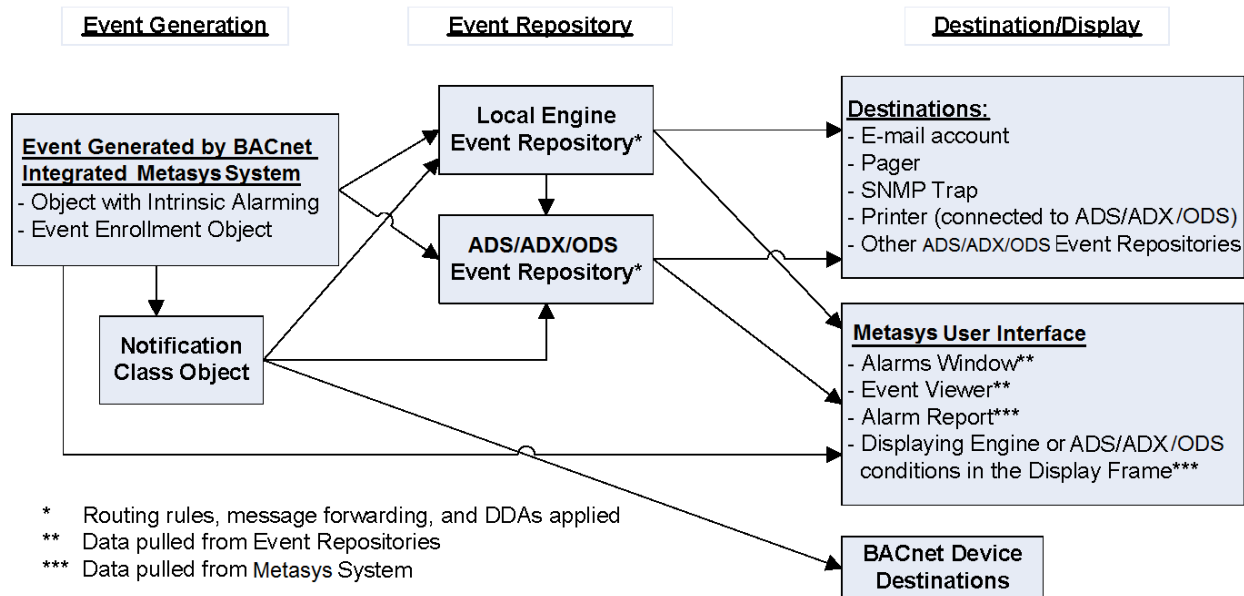
The Metasys system provides the functionality to use the [Alarm and Event](#) feature when integrating with BACnet devices (including the N30). You can configure the engines, Metasys Servers, or FACs to BACnet devices to comply with the standard BACnet alarm and event services such as [intrinsic alarming](#), [Event Enrollment object alarming](#), and alarm routing using the [Notification Class Object](#). These optional alarming methods allow you to send alarm and event messages from the Metasys system to BACnet devices.

To use the alarm and event feature for Metasys systems that integrate BACnet devices, configure the Notification Class object, then reference that Notification Class object from the [Event Enrollment Object](#) or from an object with intrinsic alarming. The Notification Class object routes event messages from Event Enrollment objects or objects with intrinsic alarming to one or more BACnet device. Intrinsic alarming attributes, Event Enrollment objects, and Notification Class objects are fully compliant with the BACnet standard specifications and should be used if you want your Metasys system to send event messages to BACnet devices.

Event Messages routed through the Notification Class object to the Metasys system's event repositories can use the Alarm and Event features such as the [Event Viewer](#), [Alarms Window](#), [Alarm Reports](#), and [DDAs](#). To enable this functionality, you must set the Route to Metasys attribute to true in the Notification Class objects used. See [Configuring Metasys/BACnet Integration Alarming](#). See the Alarm and Event Management [Alarm and Event Steps](#) section for more information on the alarm and event feature.

The following figure shows the flow of event messages routed by the Notification Class object.

Figure 13: Event Message Flow



For details on configuring the detection of alarm conditions, the routing event messages to destinations, and the filtering and message formatting options, click one of the following:

- [Notification Class object and its attributes](#)
- [Event Enrollment object alarming](#)
- [intrinsic alarming](#)
- [event routing, filtering, and destinations](#)
- [event message format](#)

The [alarm extensions](#) method of alarming is easier to configure and provides greater flexibility and functionality for standard Metasys applications. Use alarm extensions for alarming if your system does not require integration with BACnet devices.

BACnet Intrinsic Alarming

Intrinsic alarming is fully compliant with the BACnet standard specifications and should only be used when integrating with BACnet devices. Intrinsic alarming allows you to configure the detection of alarm conditions and the generation of event messages based on attributes (properties) within an object that is compliant with the standard BACnet objects, such as the High/Low alarm limits for analog objects and the alarm state for binary objects. The [Notification Class Object](#) routes the event message.

By default, objects do not have intrinsic alarming; however, you can add intrinsic alarming to an object by setting its **Intrinsic Alarming Defined** attribute to True. Also, you can add intrinsic alarming when you create an object, or you can add intrinsic alarming to an existing object. You can remove intrinsic alarming from an existing object by changing its **Intrinsic Alarming Defined** attribute to False. The **Intrinsic Alarming Defined** attribute is located under the BACnet heading in the Insert Object wizard and in the object's Focus view, which is accessible when you select the **Advanced** option for the display. When you set the **Intrinsic Alarming Defined** attribute to True, the BACnet Alarm tab appears the next time you view the object. The default alarming settings (for example, high and low limits) are used until you change the settings on the BACnet Alarm tab. When you set the **Intrinsic Alarming Defined** attribute to False, all intrinsic alarm settings configured through the BACnet Alarm tab are discarded and the alarming settings return to their

default values. For more information on configuring intrinsic alarming in an object, see [Configuring Metasys/BACnet Integration Alarming](#).

Intrinsic alarming is only available for your Metasys system if you set the BACnet Site attribute to True in the Site object. See the [Site Object](#) for information on configuring the BACnet Site attribute.

To view the BACnet intrinsic alarming attributes of existing Metasys objects after they have been configured, [view the object](#) and click the BACnet Alarm tab. You can add alarm extensions to objects supporting intrinsic alarming.

The following Metasys objects are compliant with the standard BACnet objects and support BACnet intrinsic alarming:

- [Accumulator Object](#)
- [Analog Input Object](#)
- [Analog Output Object](#)
- [Analog Value Object](#)
- [Binary Input Object](#)
- [Binary Output Object](#)
- [Binary Value Object](#)
- [Multistate Input Object](#)
- [Multistate Output Object](#)
- [Multistate Value Object](#)

After configuring one or more objects with intrinsic alarming, you must configure at least one Notification Class object to define the routing of event messages to BACnet device destinations. Then, you must reference the desired Notification Class object from the objects with intrinsic alarming. If you want the Notification Class object to route the event messages created by the objects with intrinsic alarming to the Metasys [Alarm and Event Management](#) feature, set the Notification Class object's Route to Metasys attribute to true.

In addition, you can add object [alarm extensions](#) to objects with intrinsic alarming if you want to route event messages to both BACnet device destinations and Metasys DDAs. For more information on DDAs, see [Event Message Routing, Filtering, and Destinations](#).

The Enable Alarms and Disable Alarms commands for objects using intrinsic alarming edit the Event Enable flags under Alarm State to prevent alarms.

You can configure intrinsic alarming online at the Site Management Portal (SMP) UI or offline in the SCT. Intrinsic alarms for objects in an FAC can be defined using CCT or SMP, but not SCT. If defined with SMP, you must specify if the intrinsic alarm is to Use Remote Alarming as defined in the object's Focus tab. If true, the intrinsic alarm parameters are stored in the FAC. If false, the parameters are stored in the Engine.

Note: The BACnet IP Integration mapper objects Loop and Load Control do not support intrinsic alarming parameters stored in the Engine. When Intrinsic Alarming Defined is set to true on these objects, then Use Remote Alarming must also be set to true, and any intrinsic alarming parameters must be stored and provided by the field device.

For details on the attributes appearing on the BACnet Alarms tab, see [BACnet Alarm Tab](#) in the [Object and Feature Tabs](#) section.

BACnet Event Enrollment Object Alarming

The [Event Enrollment Object](#) is fully compliant with the BACnet standard specifications and should only be used when integrating with BACnet devices. The Event Enrollment object monitors the value of a single attribute and generates event messages based on the defined alarm conditions.

You can create an Event Enrollment object using the [Insert Object Wizard](#) and configure its attributes, or you can [view](#) an existing Event Enrollment object and edit its attributes. Event Enrollment objects are not supported by any field controllers. Based on the defined event type, the Event Enrollment object generates event messages for different conditions monitored in the referenced object. See the Event Type attribute of the [Event Enrollment Object](#) and the [Event Enrollment Configuration Examples](#) for more information.

① **Note:** Event Enrollment alarming is only available for your Metasys system if you set the BACnet Site attribute to **True** in the Site object. See the [Site Object](#) for information on configuring the BACnet Site attribute.

After configuring one or more Event Enrollment objects, you must configure at least one [Notification Class Object](#) to define the routing of event messages to BACnet device destinations. Then you must reference the desired Notification Class object from the Event Enrollment objects. If you want the Notification Class object to route the event messages created by the Event Enrollment objects to the Metasys [Alarm and Event Management](#) feature, set the Notification Class object's Route to Metasys attribute to true.

You can add object [alarm extensions](#) to Event Enrollment objects if you want to route event messages to Metasys DDAs. For more information on DDAs, see [Event Message Routing, Filtering, and Destinations](#).

The Enable Alarms and Disable Alarms commands for the Event Enrollment object alarming edit the Event Enable flags under Alarm State to prevent alarms.

Click one of the following for more information:

- [Event Enrollment Object](#) and its attributes
- [event types](#) used by the Event Enrollment Object (Event Type attribute)
- [Event Enrollment Configuration Examples](#)

Event Enrollment Configuration Examples

The alarm conditions monitored by the [Event Enrollment Object](#) are defined by the selected event type. Click the event types in the following list for configuration examples:

- [Event Enrollment Configuration Example - Change of Bitstring](#)
- • [Event Enrollment Configuration Example - Change of Character String](#)
- [Event Enrollment Configuration Example - Change of State](#)
- [Event Enrollment Configuration Example - Change of Value](#)
- [Event Enrollment Configuration Example - Command Failure](#)
- • [Event Enrollment Configuration Example - Double Out of Range](#)
- [Event Enrollment Configuration Example - Floating Limit](#)
- [Event Enrollment Configuration Example - Out of Range](#)
- • [Event Enrollment Configuration Example - Signed Out of Range](#)
- • [Event Enrollment Configuration Example - Unsigned Out of Range](#)
- • [Event Enrollment Configuration Example - Unsigned Range](#)

A table is provided for each example that describes the required attributes under both the Configuration and Event tabs of the Event Enrollment object when you are inserting the new object.

Event Enrollment Configuration Example - Change of Bitstring

The following table is an example of how to configure an [Event Enrollment Object](#) using the Change of Bitstring event type. In this example, the Event Enrollment object references Status flags of an [Analog Value Object](#). An event message is generated as defined by its Event Enable attribute when

either the **In Alarm** or **Fault** attribute changes to True for a time period longer than the defined Delay Time. For more information about this event type, see [Event Type](#).

Table 31: Change in Bitstring Example

Tab	Attribute	Value
Focus	Event Enable	To Off Normal
	Notify Type	Event
	Event Message Texts Config	[1]: Change in Status Detected
	Input Reference	AV1 Status Flags
	Delay Time (seconds)	10
Event	Mask	In Alarm - selected (true) Fault - selected (true) Overridden - not selected (false) Out of Service - not selected (false)
	Values	In Alarm - selected (true) Fault - selected (true) Overridden - not selected (false) Out of Service - not selected (false)

Event Enrollment Configuration Example - Change of Character String

- The following table is an example of how to configure an [Event Enrollment Object](#) using the Change of Character String event type. In this example, the Event Enrollment object references the Present Value attribute of a Character String object. An event message is generated as defined by its Event Enable attribute when the Character String's Present Value attribute partially matches one of the List of Values for a time period longer than the defined Delay Time. For more information about this event type, see [Event Type](#).

Table 32: Change in Character String Example

Tab	Attribute	Value
Focus	Event Enable	To Off Normal
	Notify Type	Event
	Event Message Texts Config	[1]: Change in Object String Detected
	Input Reference	CharString1 Present Value
	Delay Time (seconds)	120
Event	List of Values	Security Breach Power Failure

Event Enrollment Configuration Example - Change of State

The following table is an example of how to configure an [Event Enrollment Object](#) using the Change of State event type. In this example, the Event Enrollment object references the Reliability attribute of a [Multistate Value Object](#). An Event message is generated as defined by its Event Enable attribute when the state of the MV's Reliability attribute changes to Unreliable for a time period longer than the defined Delay Time. For more information about this event type, see [Event Type](#).

Table 33: Change of State Example

Tab	Attribute	Value
Focus	Event Enable	To Off Normal
	Notify Type	Event
	Event Message Texts Config	[1]: Point is now Unreliable
	Input Reference	MV1 Reliability
	Delay Time (seconds)	0
Event	Event Type	Change of state
	Value	Unreliable

Event Enrollment Configuration Example - Change of Value

The following table is an example of how to configure an [Event Enrollment Object](#) using the Change of Value event type. In this example, the Event Enrollment object references the Present Value attribute of an [Analog Input Object](#). An event message is generated as defined by its Event Enable attribute when the value of the ZN-T's Present Value attribute changes by more than the specified COV Increment for a time period longer than the defined Delay Time. For more information about this event type, see [Event Type](#).

Table 34: Change in Value Example

Tab	Attribute	Value
Focus	Event Enable	To Off Normal
	Notify Type	Event
	Event Message Texts Config	[1]: NW Conf. Room Temp
	Input Reference	ZN-T Present Value
	Delay Time (seconds)	120
Event	Event Type	Change of value
	COV Increment	3.0

Event Enrollment Configuration Example - Command Failure

The following table is an example of how to configure an [Event Enrollment Object](#) using the Command Failure event type. In this example, the Event Enrollment object references the Present Value attribute of a [Binary Input Object](#). An alarm message is generated as defined by its Event Enable attribute when a command to SA_F's Present Value attribute is not reflected by the Input Reference (SA_FLOW) after the defined Delay Time has expired. For more information about this event type, see [Event Type](#).

Table 35: Change in Command Failure Example

Tab	Attribute	Value
Focus	Event Enable	To Off Normal
	Notify Type	Alarm
	Event Message Texts Config	[1]: Supply Fan Command Failure
	Input Reference	SA_FLOW Present Value
	Delay Time (seconds)	60
Event	Command Target	SA_F Present Value

Event Enrollment Configuration Example - Double Out of Range

- The following table is an example of how to configure an [Event Enrollment Object](#) using the Double Out of Range event type. In this example, the Event Enrollment object references the Present Value attribute of a large [Analog Value Object](#). An event message is generated as defined by its Event Enable attribute when the value of the large AV's Present Value attribute goes outside the user-defined low limit/high limit range for a time period longer than the defined Delay Time. Only double data types are supported. For more information about this event type, see [Event Type](#).

Table 36: Double Out of Range Example

Tab	Attribute	Value
Focus	Event Enable	To Off Normal
	Notify Type	Event
	Event Message Texts Config	[1]: Room Temp Out of Range
	Input Reference	LAV1 Present Value
	Delay Time (seconds)	300
Event	Low Limit	66.0
	High Limit	74.0
	Deadband	2.0

Event Enrollment Configuration Example - Floating Limit

The following table is an example of how to configure an [Event Enrollment Object](#) using the Floating Limit event type. In this example, the Event Enrollment object references the Present Value of an [Analog Input Object](#). An alarm message is generated as defined by its Event Enable attribute when the value of the AI's Present Value attribute exceeds the defined setpoint (ZNT-SP) plus the high or minus the low differential limit values for a time period longer than the defined Delay Time. For more information about this event type, see [Event Type](#).

Table 37: Floating Limit Example

Tab	Attribute	Value
Focus	Event Enable	To Off Normal
	Notify Type	Alarm
	Event Message Texts Config	[1]: Room Temp Limit Exceeded
	Input Reference	AI1 Present Value
	Delay Time (seconds)	300
Event	Setpoint Reference	ZNT-SP Present Value
	Low Differential Limit	3.0
	High Differential Limit	4.0
	Deadband	1.5

Event Enrollment Configuration Example - Out of Range

The following table is an example of how to configure an [Event Enrollment Object](#) using the Out of Range event type. In this example, the Event Enrollment object references the Present Value attribute of an [Analog Input Object](#). An event message is generated as defined by its Event Enable attribute when the value of the AI's Present Value attribute goes outside the user-defined low limit/high limit range for a time period longer than the defined Delay Time. For more information about this event type, see [Event Type](#).

Table 38: Floating Limit Example

Tab	Attribute	Value
Focus	Event Enable	To Off Normal
	Notify Type	Event
	Event Message Texts Config	[1]: Room Temp Out of Range
	Input Reference	AI1 Present Value
	Delay Time (seconds)	300
Event	Low Limit	66.0
	High Limit	74.0
	Deadband	2.0

Event Enrollment Configuration Example - Signed Out of Range

- The following table is an example of how to configure an [Event Enrollment Object](#) using the Signed
- Out of Range event type. In this example, the Event Enrollment object references the Scale as
- Integer attribute of an [Accumulator Object](#). An event message is generated as defined by its Event
- Enable attribute when the value of the ACM's Scale as Integer attribute goes outside the user-
- defined low limit/high limit range for a time period longer than the defined Delay Time. For more
- information about this event type, see [Event Type](#).

Table 39: Signed Out of Range Example

Tab	Attribute	Value
Focus	Event Enable	To Off Normal
	Notify Type	Event
	Event Message Texts Config	[1]: Scale as Integer is Out of Range
	Input Reference	ACM1 Scale as Integer
	Delay Time (seconds)	120
Event	Low Limit	-2
	High Limit	7
	Deadband	5

Event Enrollment Configuration Example - Unsigned Out of Range

- The following table is an example of how to configure an [Event Enrollment Object](#) using the Unsigned Out of Range event type. In this example, the Event Enrollment object references the Pulse Rate attribute of an [Accumulator Object](#). An event message is generated as defined by its Event Enable attribute when the value of the Accumulator's Pulse Rate goes outside the user-defined low limit/high limit range for a time period longer than the defined Delay Time. Only positive values are supported. For more information about this event type, see [Event Type](#).

Table 40: Unsigned Out of Range Example

Tab	Attribute	Value
Focus	Event Enable	To Off Normal
	Notify Type	Event
	Event Message Texts Config	[1]: Significant pulse rate change detected
	Input Reference	ACM1 Pulse Rate
	Delay Time (seconds)	120
Event	Low Limit	10
	High Limit	500
	Deadband	10

Event Enrollment Configuration Example - Unsigned Range

- The following table is an example of how to configure an [Event Enrollment Object](#) using the Unsigned Range event type. In this example, the Event Enrollment object references the Present Value attribute of an [Accumulator Object](#). An event message is generated as defined by its Event Enable attribute when the value of the Accumulator's Present Value goes outside the user-defined low limit/high limit range for a time period longer than the defined Delay Time. For more information about this event type, see [Event Type](#).

Table 41: Unsigned Range Example

Tab	Attribute	Value
Focus	Event Enable	To Off Normal
	Notify Type	Event
	Event Message Texts Config	[1]: A potential excessive use fee
	Input Reference	ACM1 Present Value
	Delay Time (seconds)	120
Event	Low Limit	10000
	High Limit	18000

Alarm and Event Management for Metasys Systems Integrated with BACnet

Configuring Metasys/BACnet Integration Alarming

About this task:

The [BACnet Intrinsic Alarming](#) and [BACnet Event Enrollment Object Alarming](#) routing services are fully compliant with the BACnet standard specifications and should only be used when integrating your Metasys system with BACnet devices.

You can configure intrinsic alarming online at the SMP UI or offline in the SCT. Intrinsic alarming for FAC objects can be defined with the SMP or offline with CCT.

To configure Metasys/BACnet integration alarming:

1. Set the BACnet Site attribute to true in each [Site Object](#) representing a site that you want to use Metasys/BACnet Integration alarming.
2. For each NAE in the site using alarming integration, configure one or more Notification Class objects for routing event messages from Event Enrollment objects and/or objects with intrinsic alarming to BACnet device destinations. Be sure you reference the BACnet devices by adding them to the [Recipient List](#) of the Notification Class object. Identify a BACnet device by using either its network address or BACnet device identifier (OID).

Notes:

- If you want to display alarm and event data from BACnet device destinations on the Metasys system [Alarms Window](#) and [Event Viewer](#), set the [Notification Class Object's](#) Route to Metasys attribute to true. The BACnet device must specify the NAE as a recipient for their alarms. To make the NAE an alarm recipient, configure a Notification Class object on the BACnet device. Alarms and acknowledgements from the BACnet device are incorporated into the Metasys alarming system. To route BACnet alarms from the N30 to the NAE, the N30 must be configured to use BACnet alarm routing. For information on how to configure the N30 to use BACnet alarm routing, refer to the documentation of the BACnet device you are integrating.
 - When the NAE receives an alarm from an NAE, it can be sent from the DDAs on the receiving NAE but cannot be routed again from that NAE. If the alarms need to be routed from the NAE device, they should set the Use Remote Alarming to False for objects in the FAC.
3. Configure one or more [Event Enrollment Object](#) or objects that supports intrinsic alarming using the [Object](#). See [BACnet Intrinsic Alarming](#) for a list of objects that support intrinsic alarming.

Result

- ① **Note:** For both types of these alarm generating objects, you must configure the Event Enrollment object's Notification Object Reference attribute to reference the Notification Class Object created in Step Step 2. This reference represents the instance number of the Notification Class (value of its Object Identifier attribute). The Notification Class object and the alarming object must exist on the same device.

See [BACnet Intrinsic Alarming](#) for more information on intrinsic alarming.

See [BACnet Event Enrollment Object Alarming](#) for information on Event Enrollment alarming.

For more information on BACnet IP Integration, see the [BACnet IP Integration Object](#) and the [Related Documentation](#) table.

Launching the Audit Viewer

1. Select **Audit Viewer** from the [View Menu](#). If you have more than one Engine or Metasys Server on the site, a Device Selection dialog box appears.
2. Select the device containing the audit repository with the audit messages that you want to display in the Audit Viewer.
3. Click **OK**. The Audit Viewer appears in the display frame and displays the audit messages from the audit repository of the selected device. See [Audit Message and Audit Viewer](#) for details.

Result

- ① **Note:** Alternatively, you can right-click the desired device in the navigation frame and select **Audit Viewer** from the menu that appears.

Audit Trail

The Audit Trail feature generates audit messages and stores them in [Audit Repositories](#). An audit message contains information about a significant event on the BAS. For audit purposes, a [significant event](#) is an action or occurrence on the system that should be recorded for later analysis of building operations. A new audit message is generated for each significant event on the BAS. The [Audit Message and Audit Viewer](#) displays the audit messages stored in an audit repository. You can access the Audit Viewer from the [View Menu](#) of the Metasys user interface in online [mode](#).

The Audit Trail provides a historical record of the audited events, such as creating or deleting [items](#), that have occurred within the system. By viewing audit messages, you can examine and analyze the actions that occurred in the system.

Audit Trail Concepts

Audit Trail Overview

The Audit Trail feature initiates an audit message when the system detects an [audited event](#) such as a user logging in or logging out of the Metasys system, commanding an item, or changing the configuration of a device. An [audit message](#) is stored in the [Audit Repositories](#) of the device that generated the audit message. When the local audit repository is full, you can send its audit messages to an ADS (ADX) repository defined as the [Default Destination](#) for permanent storage.

The [Audit Message and Audit Viewer](#) allows you to view audit messages stored in the audit repository of the selected device. You can determine how to [sort](#) and filter the audit messages that appear in the Audit Viewer as well as forward them to the defined default destination. You can add annotations to audit messages and view them when displayed on a Metasys Server. You can also define customized annotations and add these custom annotations to audit messages.

For sites with MVE installed, configure the following attributes in the [Site Object](#):

- Annotation Include
- Annotation Exclude
- Signature Include
- Signature Exclude

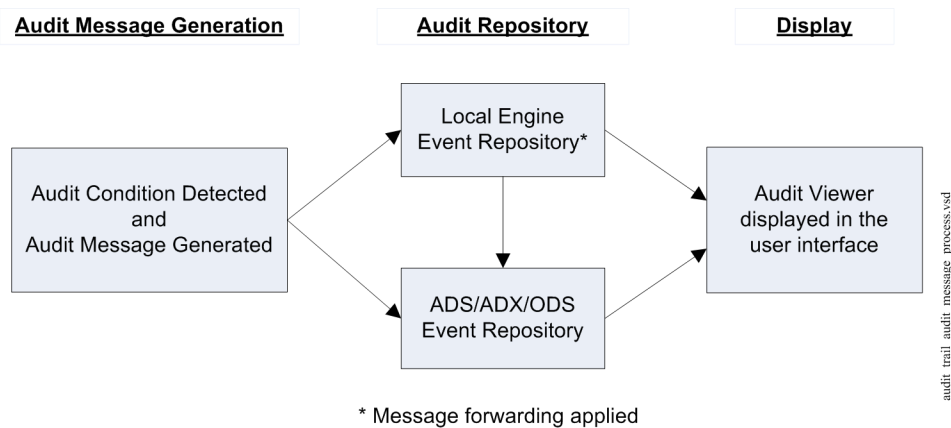
These settings are used by MVE sites to enable the MVE desired annotations and electronic signature for audit messages. You can apply these settings at the site level or down to the object level as needed. You can set the MVE site to require only annotations, only electronic signatures, both annotations and signatures, or neither annotations nor signatures. Non-MVE sites may optionally define and use annotations; however, electronic signatures are specific to MVE sites.

When both annotations and signatures are required, and a user acknowledges or discards an audit message, they are prompted to reauthenticate and enter a reason and annotation for the action. The user's login name, date and time of signature, and the reason for signature are saved as part of the annotation. You cannot delete annotations on an MVE site.

See [Configuring Annotation and Electronic Signature Requirements in the Site Object in MVE](#) in the [Site Management Portal User Interface](#) section. For additional information, refer to the *Metasys for Validated Environments, Extended Architecture Technical Bulletin (LIT-12011327)*.

Figure 14 shows the flow of audit messages through the Metasys system.

Figure 14: Audit Message Process



Audited Events

Audited events are significant events occurring in the system that trigger the Audit Trail feature to generate an audit message. The following table lists the features and corresponding actions that initiate the generation of audit messages. The following table also lists Audit Classes (Set 568) in which the actions belong. Click the feature name for more information about that feature.

- ① **Note:** Do not confuse audited events with those associated with alarming. See [Alarm and Event Management](#) for details on alarming.

Table 42: Audited Events

Feature	Action Causing Audit Message
ActionQ	Queues each command issued, enabled, disabled, or deleted (Audit Class = User Action)
Alarm and Event Management	<p>By default, the Metasys Server does not create an audit entry when you discard an event that originates on the Metasys Server through the Alarms Window, Event Viewer, or a BACnet device (Audit Class = User Action). To capture audit entries for these events would create an undue number of entries in the database.</p> <p>① Notes:</p> <ul style="list-style-type: none"> • Engines do not create an audit entry when you discard events that originate on the engine. For details on changing this setting, refer to <i>Creating Audit Entries for Discarded Events</i> in the <i>NAE Commissioning Guide (LIT-1201519)</i>. • Error messages returned by the Email DDA logged in the Audit Viewer appear in English only.
Audit Trail	<ul style="list-style-type: none"> • each command issued to clear the Audit Repository. See Clearing the Audit Repository. (Audit Class = User Action) • each command issued to discard an audit message or a group of audit messages. (Audit Class = User Action) • each command issued to change the Enabled Audit Level attribute in the Engine Device Object or ADS Device Object based on a system event, a user changing the time of day, or a user command. <p>See Configuring the Engine Audit Repository. (Audit Class = User Action, Non-critical System Event, Critical System Event, Application, or Diagnostic)</p>
Trend Extensions Trend Studies	<ul style="list-style-type: none"> • each new trend extension created (Audit Class = User Action) • each change to the trend routing configuration (Audit Class = User Action) • each command issued to the trend extension (Audit Class = User Action) • each change to trend views such as creating, deleting, or editing a trend view (Audit Class = User Action) • each change to the Engine and Metasys Server configuration (Audit Class = User Action)
Scheduling	<ul style="list-style-type: none"> • each item added to or removed from the schedule (Audit Class = User Action) • each change to the key item or its scheduled attribute (Audit Class = User Action) • each change to the effective period (Audit Class = User Action) • each time the schedule is enabled or disabled (Audit Class = User Action or Application)

Table 42: Audited Events

Feature	Action Causing Audit Message
System Security	<ul style="list-style-type: none"> • each successful and failed log in and log out attempt (Audit Class = User Action) • each administrative action (Audit Class = User Action) • each authentication failure (Audit Class = Application) • each authorization failure (Audit Class = Application)
User Graphics Tool (UGT)	each command (Audit Class = User Action)
Navigation Tree and Other Features	<ul style="list-style-type: none"> • each user command (Audit Class = User Action) • each change in item configuration such as adding, deleting, and editing an item (Audit Class = User Action) • each controller upload, download, synchronization, and reset occurring in online mode. Audit messages are not generated for those actions in the SCT offline mode. (Audit Class = User Action, Application, Non-critical System Event, Critical System Event)

Audit Repositories

The following table describes the two types of audit repositories for storing audit messages in the Metasys system. The ADS Audit Repository applies to either Metasys Server: ADS or ADX.

Table 43: Audit Repositories

Type	Description
Local (Engine) Audit Repository	<ul style="list-style-type: none"> • Provides temporary storage for audit messages on the Engine. • Allows the audit messages stored in the Engine local audit repository to be displayed in the Audit Viewer. • Forwards audit messages from the Engine local audit repository to the Default Destination. See Default Destination and Message Forwarding.
ADS Audit Repository	<ul style="list-style-type: none"> • Provides permanent storage for audit messages on the Metasys Server platform. • Places audit messages generated on a Metasys Server platform directly into the ADS audit repository. • Receives audit messages from multiple Engine local audit repositories and provides permanent storage for the audit messages. The ADS audit repository is usually defined as the default destination for audit messages from Engine local audit repositories. • Allows the audit messages stored in the ADS audit repository to be displayed in the Audit Viewer.

For information on configuring the Engine local audit repository and the default destination, click one of the following:

- [Configuring the Engine Audit Repository](#)
- [Forwarding Audit Messages to the Default Destination](#)

A Database Timeout Error can occur when viewing audit messages if the repository contains too many unfiltered audit messages before the system times out (typically, one million messages). To prevent this error, back up and purge audit message records from the repository (JCIAuditTrails) using the Metasys Database Manager on a regular basis.

Default Destination and Message Forwarding

The Default Destination defines where audit messages are sent when the Engine local audit repository is full, at a user-defined time (ADS Delivery Time attribute of Engine device), or when a user clicks the **Forward Messages** button in the Audit Viewer. Configure an ADS Audit Repository as the Default Destination to permanently store audit messages. For information on how to define a default destination, see [Configuring the Engine Audit Repository](#).

When the Dial-Up Audit Forwarding Threshold is reached, all non-forwarded audits in the Local Audit Repository are forwarded to the defined ADS Repository.

To generate an alarm message when a Rollover or Stop condition occurs, set the Audit Generate Alarm When Full attribute in the Engine device to True. See [Configuring the Engine Audit Repository](#) and [Audit Repositories](#).

You can forward audit messages to the Default Destination from the Engine local audit repository by clicking the **Forward Messages** button in the Audit Viewer. See [Forwarding Audit Messages to the Default Destination](#).

Notes:

- You cannot forward audit messages from an ADS audit repository to another ADS audit repository.
- You can define only one ADS audit repository as the Default Destination for messages from an Engine local audit repository; however, different Engines can have different ADS repositories defined as their Default Destination.

If you have not defined a Default Destination when the Engine local audit repository is 100% full, the local audit repository either replaces the oldest messages (rollover) with new messages or stops recording audits according to the Audit Action When Full attribute configuration.

Audit message rollover begins or replacement stops only when the total number of non-forwarded audit messages reaches the size defined by the Audit Repository Size attribute. In other words, once the local audit repository reaches the defined size, new audit messages continue to enter the local audit repository replacing forwarded messages until all forwarded messages are gone. The following figure illustrates the Audit Action When Full when set to Rollover or when set to Stop.

Figure 15: Audit Action When Full

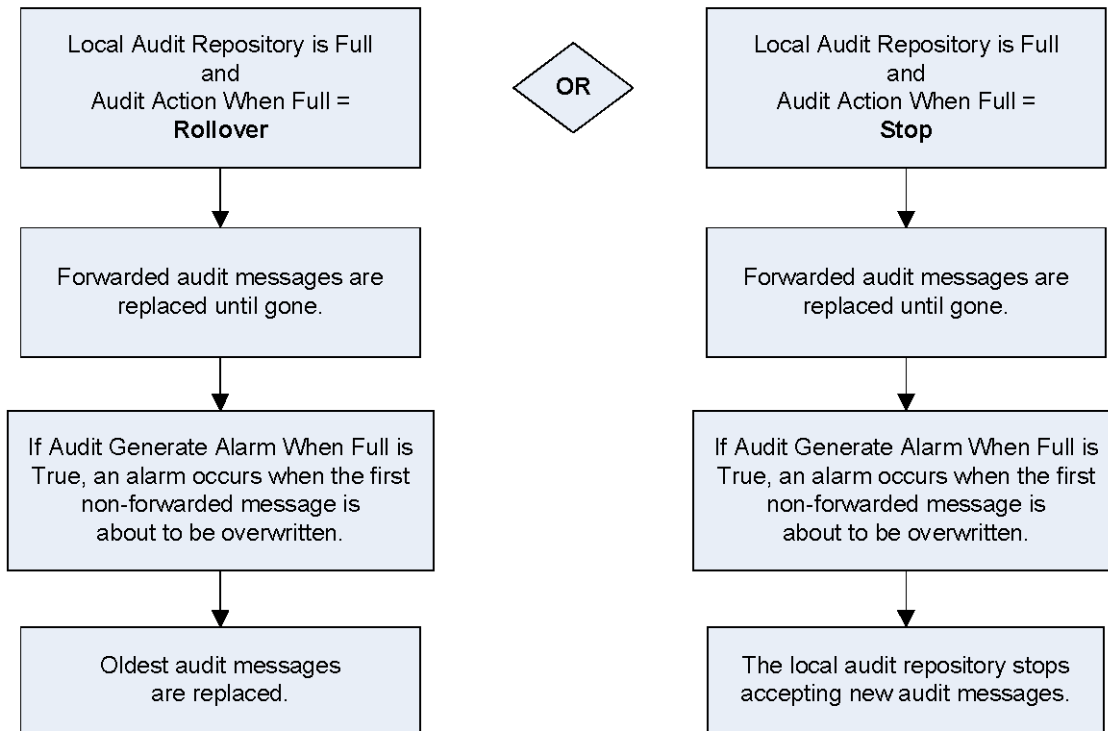


FIG - Audit Action When Full.vst

If you have defined a Default Destination, the Dial-Up Audit Forwarding Threshold attribute is set to any percentage other than 100%, and the Audit Action When Full attribute is set to Stop; then the audit messages do not stop rolling over as long as forwarding is successful. This situation occurs because audit messages are forwarded to the Default Destination when new audit messages are received, and the forwarded messages are automatically replaced. The local audit repository does not fill up with non-forwarded audit messages and, therefore, no alarm is generated.

Audit Message and Audit Viewer

The Audit Trail feature generates a new audit message for each significant event occurring on the system that contains data associated with the event. See [Audited Events](#). The Audit Viewer displays the audit messages residing in the [Audit Repositories](#) of the currently selected device and is accessible from the [View Menu](#) of the Metasys user interface in online [mode](#). The window displays 1,000 audit messages per page for a Metasys Server. Engines are limited to a maximum of 500 audit messages per page. See [Launching the Audit Viewer](#).

You can only view the audit messages from one audit repository of one device at a time:

- If you are viewing the contents of an Engine local audit repository, the audit messages displayed come from that Engine only.
- If you are viewing the contents of a Engine local audit repository of an Engine device designated as the Site Director, the audit messages displayed come from that Engine local audit repository only.
- If you are viewing the contents of an ADS audit repository, the audit messages displayed come from that ADS audit repository only. An ADS audit repository may contain audit messages that have been routed from other Engine or Metasys Server devices, but the repository does not display the contents of multiple repositories.

Note: You can define an audit repository as a Default Destination, so it receives audit messages from other audit repositories. See [Default Destination and Message Forwarding](#).

When viewing a Metasys Server device, a standard filter is applied to the Audit Viewer when it is first opened. This filter allows you to see all audit messages.

You can also use custom filters when viewing the Metasys Server to narrow the list of audit messages to only those that meet specific criteria. Custom filters query the entire Metasys Server database, not just the list of audit messages that appears on the screen. You can filter audit messages by any combination of Date/Time, User, Class Level, Action Type, and/or Discarded. New audit messages appear in the list only if they meet all criteria specified in the filter. Custom filters cannot be saved.

The following table describes the format of the audit message (and corresponding buttons and fields) as displayed in the Audit Viewer.

Table 44: Audit Viewer



Item/Column	Description
Selected Device	Indicates the device for which the Audit Viewer is displayed. The device name appears on the left side of the Audit Viewer above the table. This field corresponds to the selection made in the Device Selection Dialog box. See Launching the Audit Viewer .
Audit Count (Engines Only)	Indicates the number of audit messages that currently appear in the Audit Viewer. The Audit Count appears on the right side of the Audit Viewer above the table only for Engine devices.
Standard Filter Radio Button (Metasys Server Only)	Indicates that standard filtering is applied to the Audit Viewer for the selected Metasys Server. This filter information appears on the right side of the Audit Viewer above the table. The count of entries that apply to this filter appears in parentheses next to the radio button.
Custom Filter Radio Button (Metasys Server Only)	Indicates that custom filtering is applied to the Audit Viewer for the selected Metasys Server. This filter information appears on the right side of the Audit Viewer above the table. The count of entries that apply to this filter appears in parentheses next to the radio button.
Custom Filter Table (Metasys Server Only)	Allows you to apply custom filtering to the Audit Viewer when the Custom Filter radio button is selected. This table appears but is not active when the Standard Filter radio button is selected. You may need to adjust the slider bar to show the Custom Filter table. The buttons for this table are: <ul style="list-style-type: none"> •  - adds a filter using the Add Filter dialog box •  - removes the selected filter • Apply - queries the Metasys Server database and displays the resultant audit messages See Creating a Custom Filter within the Audit Viewer (Metasys Server Only) .

Table 44: Audit Viewer






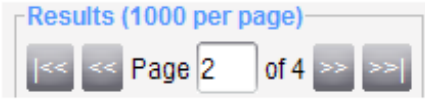
Item/Column	Description
Status Icons	<p>Displays an icon indicating the status of the audit message:</p> <ul style="list-style-type: none">  - audit message is new (that is, the message has occurred in the system within the new entry timeframe) ① Note: See Display Settings Tab in the Preferences section for information on changing the amount of time audit messages are considered new using the New entry time frame preference (default value = 15 minutes).  - audit message has one annotation  - audit message has more than one annotation  - audit message has an electronic signature
When	Displays the date and time that the audit message was generated. The date and time format is defined by the Language selected in the User Profile (User Profile tab section of the Security Administrator System).
Item	Displays the name of the item that generated the audit message. An item name is the label displayed for the selected item in the All Items navigation tree (for example, AV1, NAE2, or Schedule1). Be sure you define unique item names.
Class Level	Indicates the class in which the audit message belongs. For more information on Class Level, see the Enabled Audit Level attribute in the Engine Device Object or ADS Device Object .
Origin Application	Indicates the application that performed the action that generated the audit message. For example, the origin application may be the Alarm and Event, Trend, or Security feature.
User	Indicates the user associated with the action that initiated the audit message (for example, the person who changed a setpoint). The generic user called jci is used to identify a user on a different computer who uploaded or downloaded a database archive with SCT.
Action Type	Indicates the type of action that initiated the audit message.
Description	<p>Provides the description of the action that generated the audit message. For example, Enabled appears in this column if you send an Enable command to an item. The description appearing in this column comes from the State, Mode, and Type Sets associated with the time that generated the audit message.</p> <p>① Note: If the Class Level is Non-Critical System Error or Diagnostics and the Action Type is Error, then the associated error string appears. If the Action Type is Command and there is no further definition of the type of command (for example, Operator Override, Adjust, etc.), then Description will show the value of the new command (for example, On or Off).</p>
Previous Value	Indicates the value and engineering units, if applicable, of the item before performing the action that generated the audit message.

Table 44: Audit Viewer

Item/Column	Description
Post Value	Indicates the value and engineering units, if applicable, of the item after performing the action that generated the audit message. ⓘ Note: If the Action Type is Command and there is no further definition of the type of command (for example, Operator Override, Adjust, etc.), then the actual Post Value is shown in the Description column. If the Description is a User Login Successful or Failed, then the Post Value shows the IP address of the client computer from which the login attempt was made.
Status	Indicates the status of the item at the time the audit message was generated.
	Specifies the column of data used to sort the audit messages in the current Audit Viewer (ascending or descending order).
Paging Controls (Metasys Server Only)	Allows you to navigate through the pages of audit messages in the Audit Viewer. Use the buttons to go to the first page, previous page, next page, or last page. Type a page number in the text box and press the enter key to jump directly to a specific page. 
Forward Messages Button	Sends audit messages from the Engine local audit repository to the Default Destination. See Forwarding Audit Messages to the Default Destination .
Discard Button	Removes the selected audit messages from the Audit Viewer. See Discarding Audit Messages .
Copy Button	Copies the selected audit messages to the Clipboard for pasting into other applications such as Microsoft Excel or Word. When you click this button with nothing selected in the audit viewer, all entries are copied to the clipboard. ⓘ Note: You can also use Ctrl+A to select all entries and Ctrl+C to copy to the clipboard.


Audit Message Annotations

An annotation is a textual string associated with an audit message. You can view or add annotations from the ADS (ADX) audit repository only. You cannot edit an existing annotation. Instead, add a new annotation to the audit message. You can also define custom annotations. See [Adding Annotations](#), [Viewing Annotations](#), and [Creating Annotations](#).

ⓘ **Note:** The annotation feature is not available on the Engine local audit repository.

The following table describes the fields of an annotation.

Table 45: Audit Message Annotations

Field	Description
User	When adding annotations, indicates the user ID of the person associated with the action that generated the audit message. When viewing annotations, the first User field displayed indicates the user ID of the person associated with the action that generated the audit message. The User field displayed under the Annotation Information section indicates the user ID of the person that added the annotation.
Date and Time	When adding annotations, indicates the date and time the audit message was generated. When viewing annotations, the first Date and Time field displayed indicates the date and time the audit message was generated. The Date and Time field displayed under the Annotation Information section indicates the date and time the annotation was added to the audit message. The date and time format is defined by the language selected in the User Profile (User Profile tab section of the Security Administrator System).
Item Reference	Indicates the complete Item Reference of the item associated with the audit message.
Description	Provides the description of the action that generated the audit message. For example, Enabled appears in this field if you send an Enable command to an item. The descriptions come from the State, Mode, and Type Sets associated with the item that generated the audit message. Note: If the Class level is Non-Critical System Error or Diagnostics and the Action Type is Error, then an associated error string appears.
Annotation	Allows you to select from a list of predefined annotations or add or view a text string (annotation) of up to 254 characters describing the associated audit message.
Navigation Controls	If the audit message has multiple annotations associated with it, allows you to navigate through the annotations. Use the buttons to go to the first annotation, previous annotation, next annotation, or last annotation. The text box displays the number of the annotation being viewed. The Annotations feature automatically assigns a number to each annotation created. For example, if the audit message has three annotations, the number being displayed in this section can be 1, 2, or 3 depending on the annotation being viewed. Type a number in the text box and press the enter key to jump directly to a specific annotation. 

Audit Trail Steps

Configuring the Engine Audit Repository

About this task:

To configure the Engine Audit Repository and the Default Destination:

1. View the Engine device. See [Displaying Information About an Item](#) for information on how to display an item.

2. Select the **Focus** tab, and click the **Advanced** radio button to display additional item information.
3. Select **Edit**.
4. Scroll down to the Audit Trail and Site sections.
5. Edit the attributes in these sections. Use the table below as a guide. See the [Engine Device Object](#) chapter for information about the attributes. The Engine Device attributes table contains Default Value and Values/Options/Range information for the attributes. Click the attribute names in the table for descriptions.

Table 46: Configuring the Engine Audit Repository

To Do This:	Edit This Engine Attribute:
Change the size of the Engine local audit repository.	Audit Repository Size
Designate a Metasys Server repository as a Default Destination.	ADS Repository
Define a time to deliver audit messages to the Metasys Server.	ADS Delivery Time
Define how full the audit repository must be before forwarding audit messages to the Metasys Server.	Dial-Up Audit Forwarding Threshold
Define if the Audit Trail feature overwrites existing audit messages or stops generating audit messages when the audit repository is full. ⓘ Note: This action is only valid when the device is not set to forward data to a Metasys Server. The stop/rollover option only applies when there is no forwarding to an external repository.	Audit Action When Full
Define if the Audit Trail feature should generate an alarm when the audit repository is full.	Audit Generate Alarm When Full
Define which level of audit messages get added to the audit repository.	Enabled Audit Level

- ⓘ **Note:** You can define only one repository as the [Default Destination](#) for audit messages from an Engine audit repository. See [Audit Repositories](#) for more information.
6. Click **Save**.
 - ⓘ **Note:** If you want to define all Engine local repositories for the entire site instead of individually, select the Site in the navigation tree and edit the following [Site Object](#) attributes. The Site object attributes table contains Default Value and Values/Options/Range information for the following attributes:
 - Default ADS Repository
 - Default ADS Delivery Time

Enabling Advanced Auditing

About this task:

The Equipment Activity widget captures audits of commands performed by Schedule objects, Multiple Command objects, and Interlock objects that are tied to equipment configured to the Metasys UI. To use this feature, you must make sure that the Engine object is at Metasys Release 8.0 or later and the **Enable Application Generated Audits** attribute is set to **True**.

1. In SMP, open the Engine object's Focus tab.

2. Select **Advanced**.
3. Click **Edit**.
4. Under the **Audit Trail** section, change the Enable Application Generated Audits value to **True**.
5. Click **Save**.

Adding Annotations

About this task:

Note: You can add annotations from the Metasys Server only. Annotations are not forwarded between Metasys Servers.

1. [Launch the Audit Viewer](#) by selecting the Metasys Server from the Device Selection Dialog box.
2. Right-click the audit message, and select **Add Annotation** from the menu. Alternatively, you can select **Add Annotation** from the Actions menu. The Add Annotation dialog box appears.

Note: The drop-down list on the Add Annotation dialog box contains predefined annotations from your system preferences. If you have not defined annotations in your system preferences, the drop-down list is empty. See [Annotation Settings Tab in Preferences](#).

3. Type the desired text in the message box.
4. Click **OK**.

Viewing Annotations

About this task:

Note: You can view annotations from the Metasys Server only.

To view annotations:

1. [Launch the Audit Viewer](#) by selecting the desired Metasys Server from the Device Selection dialog box.
2. Double-click the annotation [icon](#) in the first column of the Audit Viewer for the audit message. The View Annotations dialog box appears.

Notes:

- To indicate that an audit message was electronically signed, a signed book icon appears in the first column of the Audit Viewer on a validated ADX on an MVE system.
- Alternatively, you can select **View Annotations** from the Actions menu or right-click the audit message and select **View Annotations** from the menu.

3. View the message.
4. Click **OK**.

Creating Annotations

1. Select the **Annotation Settings** tab on the Metasys Preferences screen.
2. Enter annotation text. The text can be from 1 to 254 characters in length.
3. Click **Add** to save the annotation settings.

Note: The annotations you create appear in the drop-down list on the Add Annotations dialog box. If you do not create any annotations, this list is blank.

Sorting the Audit Message List

1. [Launch the Audit Viewer](#).
2. Click the header of the column in which you want to use as the sorting criteria. An up or down arrow appears in the header of the column. Click on the arrow to change the sorting order, and the table reorganizes.

Creating a Custom Filter within the Audit Viewer (Metasys Server Only)

1. [Launch the Audit Viewer](#).
2. Click the **Custom Filter** radio button.
3. Click the **Add** button.
4. Select the criteria and the associated values for the filter and click **OK**. All criteria added to the custom filter table make up the rules of the filter.
5. Click **Apply** to get the results of the custom filter.
6. To view the data without the custom filter, click the **Standard Filter** radio button.

Clearing the Audit Repository

1. [Launch the Audit Viewer](#) by selecting the desired Engine or Metasys Server from the Device Selection dialog box.
2. Click anywhere in the Audit Viewer.
3. Click **Clear**. All audit messages stored in that Audit Repository are cleared.

Notes:

- If you want to permanently store audit messages, click the **Forward Messages** button before clicking **Clear**.
- For a validated ADX on an MVE system, an electronic signature with annotation is required before clearing the audit repository.

Discarding Audit Messages

1. [Launch the Audit Viewer](#).
2. Select one or more audit messages.
 - ① **Note:** For a validated ADX on an MVE system, an electronic signature with annotation is required before discarding an audit message.
3. Click **Discard**.
 - ① **Note:** When you discard audit messages from the repository, they are not automatically discarded from the originating device.

Forwarding Audit Messages to the Default Destination

1. [Launch the Audit Viewer](#).
2. Click **Forward Messages**. The messages are forwarded from the local audit repository to the defined Default Destination.

Launching the Focus View of the Item That Generated the Audit Message

1. [Launch the Audit Viewer](#).
2. Select an audit message and choose **Selected Item** from the View menu.

Result

- ① **Note:** Some items, such as site level items, do not support this option because they do not have viewable information.

Trend Viewer

Trend Viewer Overview

The Trend Viewer has three different views: [Trend Viewer Chart View](#), [Trend Viewer Table View](#) and [Trend Viewer Definition View](#). The Chart View and Table View allow you to see trend data in a variety of different formats. The Definition View allows you to configure how the data appears within the views.

The Trend Viewer can display the data for up to 10 trends. Although you can select up to 32 items to include in the Trend Viewer, you are limited to showing the data for a maximum of 10 trends in the Chart or Table views. The Trend Viewer lists the included items in the Chart Legend (Chart View), and in the Trend Items table (Definition View). Use the Chart Legend check boxes to choose which items should be shown or hidden. You can also display multiple Trend Viewers in the display panels of the user interface.




As you add items to the Trend Viewer, the trends for the new items are automatically shown up to the maximum number of 10. Once 10 items are shown, you are unable to choose additional trends to show until you hide one or more of the currently displayed trends. You can hide a trend by clearing the check box on the Chart Legend.

- ① **Note:** Changes you make to the Trend Viewer, such as changes to how the chart appears, are only maintained while you are logged in to the Metasys system user interface. Changes apply to all new instances of Trend Viewer, within your user session. Changes do not affect existing Trend Viewers, Trend Study views, or Trend Extension views.

Views

There are three views in the Trend Viewer: Chart View, Table View, and Definition View.

Table 47: Views

Button	View	Description
	Chart View	Allows you to view trend data in a chart format.
	Table View	Allows you to view trend data in a table format.
	Definition View	Allows you to view the trend viewer setup and display options.

Trend Viewer Chart View

The Chart view allows you to view data samples in a graphical format and retrieve new trend data. You can zoom, unzoom, and pan within the chart. You can also specify the X-axis and Y-axis ranges. You can change the Y-axis type to view the chart using stacked Y-axis or a single Y-axis.

Table 48: Chart View













Button	Name	Description
	Update	Retrieves the most recent data samples for the displayed trends.
 (Zoom)  (Normal)	Zoom	<p>Toggles the mouse behavior for the chart between zoom mode and normal mode.</p> <p>While in zoom mode:</p> <ul style="list-style-type: none"> • drag the mouse over an area of the chart to zoom in on that area. • click Zoom to exit zoom mode and restore the mouse to normal mode. • left-click to zoom out one level. <p>When you exit zoom mode, the chart remains at the current zoom level. Use the Restore button to fully zoom out on the chart.</p> <p>Notes:</p> <ul style="list-style-type: none"> • You cannot pan while the mouse is in zoom mode. • You can also zoom and unzoom in normal mode by using the Shift key and the mouse. To zoom, hold the Shift key down while dragging the mouse across the chart. To zoom out one level, left-click the mouse while holding the shift key down.
	Restore	Allows you to return to an unzoomed view and switches the mouse back to normal mode if the chart's zoom mode is active.
	Pan	Allows you to pan the view of the chart vertically or horizontally by dragging the mouse across a zoomed chart. Panning is not available for unzoomed charts or when zoom mode is active. To pan left or right, drag the mouse over the X-axis. To pan up or down, drag the mouse over the Y-axis.
	Points Line	Displays the data using lines and point markers. This is the default.
	Area	Displays the data using an area chart.
	Bar	<p>Displays the data using a bar chart.</p> <p>Note: Only use the bar chart when the number of data samples can reasonably be expected to display as bars. If too many data samples exist when you click this option, the display becomes unstable and fails to properly update the screen. To recover, select any other display option.</p>
	Points	Displays the data using markers with no lines.
	Line	Displays the data using lines with no markers.
	Stacked Y-axis	Displays the data in a separate Y-axis for each trend.
	Single Y-axis	Displays the trend data using a single Y-axis.

Chart Right-Click Menu

You can access a right-click menu from the Chart view. Place your cursor in the chart and right-click in the panel to display the menu.

Table 49: Chart Right-Click Menu

Menu Item	Description
Background Color	Opens the Select A Color dialog box and allows you to configure the background color of the chart.
Y-axis Scale	Displays the Y-axis scale Range Configuration dialog box.
X-axis Scale	Displays the X-axis Range Configuration dialog box.
Gridlines	Allows you to select what type of gridlines appear on the chart. You can choose: None, X and Y, X Only, and Y Only.
Chart Type	Allows you to select which type of chart to display. You can choose: Points Line, Area, Bar, Points, and Line.
Stacked Y-axis	Displays the chart on a stacked Y-axis when check box is selected.

Chart Legend

The Chart Legend appears below the graphical charting area. The Chart Legend displays the list of trend items for the Trend Viewer in a table, and includes information about each item. Log events are also included.

Table 50: Legend










Button/Field	Name	Description
	Select All	Selects the maximum number (10) of trend items for display in the chart.
	Remove All Selections	Deselects all trend items in the chart Legend.
	Add	Opens the Select Item dialog box and allows you to add trend items to the Trend Viewer. ① Note: All items and navigation trees appear in the Select Item window; however, you can only select trends. All other items appear dimmed.
	Remove	Allows you to remove trend items from the Trend Viewer.
	Show	Indicates if the data for the trend item appears in the Chart. When checked, the data appears on the chart and in the table. When unchecked, the data does not appear in the chart or table.
	Historical Trend Icon	Indicates the trend was selected from the ADS Historical Database folder.
	Marker	Indicates the appearance of the marker style and color for the trend item on the Chart.
	Color Palette	Opens the Select a Color dialog box. Allows you to change the color used to chart the trend data.
	Log Event	Indicates a change in trend log status. Possible indicators shown vertically along the red line include: Log Disabled, Log Purged, Log Enabled, Log Interrupted, Time Change, Read Error

Table 50: Legend

Button/Field	Name	Description
	Name	Displays the trend item name based on the Name attribute.
	Reference	Displays the trend item's full reference.

Chart Legend Right-Click Menu




You can right-click an item in the Chart Legend to access item-specific menu options. The right-click menu content is based on the type of item you click on. For example, if you right-click a trend item from a historical database, you can only Refresh the Trend Viewer.

Trend Viewer Table View

The Table view of the Trend Viewer allows you to view data for the selected trends in a table format. You can copy the trend data to the clipboard for pasting into other applications such as Microsoft Excel.

Note: The Historical Trend Icon appears in the Table View column headings when applicable.

Table 51: Table View

Button	Name	Description
	Update	Updates the data samples with new trend data immediately.
	Add	Allows you to add additional trend items to the Trend Viewer.
	Copy to Clipboard	Allows you to copy selected trend data to the system clipboard for pasting into other applications such as Microsoft Excel. You can also use Ctrl + C to copy data to the clipboard.

Trend Viewer Definition View

The Definition view of the Trend Viewer allows you to view and edit the Trend Viewer setup and charting options.




Table 52: Definition View

Section	Description
General	<p>Allows you to edit the refresh rate and display precision.</p> <ul style="list-style-type: none"> • Refresh Rate: specifies the amount of time, in seconds, for automatic refresh of data. You must configure this attribute with a value of 0 seconds, 60 seconds, or greater than 60 seconds. Values 1 to 59 are invalid and not allowed. 0 means manual refresh. If the refresh rate is 0, click the Update button to display new data. • Display Precision: specifies the decimal point rounding and the number of decimal places used to format real values that do not report a display precision. If the value reports a display precision, this Trend Viewer attribute is ignored in favor of the value's native display precision.
Range Start and Range End	<p>Specifies the Start Time and End Time for the Trend Viewer.</p> <ul style="list-style-type: none"> • Date: Displays the dates for the Viewer Range. • Time: Displays the times for the Viewer Range.
Chart Display	<p>Allows you to add gridlines, stack the Y-axis, and choose the chart style for the Trend Viewer.</p>

Definition View Trend Items Table

The Trend Items table appears at the bottom of the Definition view. The table displays the list of the Trend Viewer's trend items.

Table 53: Definition View Trend Items Table

Button	Name	Description
	Historical Trend Icon	Indicates the trend was selected from the ADS Historical Database folder.
	Add	Opens the Select Item dialog box and allows you to add trend items to the Trend Viewer.
	Remove	Allows you to remove a trend item from the Trend Viewer.
	Name	Displays the name of the trend item.
	Reference	Displays the trend item's reference information.
	Plotting Style	<p>Allows you to select the plotting method for the trend item.</p> <ul style="list-style-type: none"> • Continuous - straight line between data samples. Continuous plotting connects samples with the shortest possible line, giving an appearance of a set of diagonal ramps as samples change value. • Discrete - line stays at the same value until the next data sample is taken (good for binary data). Discrete plotting has 90-degree angles at the time when samples change value. The chart appears to be a series of steps.

Trend Viewer Steps

Selecting Trend Items

To select trend items for initial display in the Trend Viewer, click an individual item in the navigation tree (select items that have trend extensions). Use the Ctrl or Shift keys to select multiple items.

You can also select items from the [Global Search](#) Viewer. In the Global Search Viewer, you can select trend extensions or items with trend extensions. Once the Trend Viewer is displayed, you can add additional trend items by selecting trend extensions or historical trend items in the Select Item dialog box.

- ① **Note:** If you selected an item from the navigation tree that does not have a trend extension, the Name column in the Legend and Trend Items Table states No Trend Defined.

Launching the Trend Viewer

1. Select one or more trend items. See [Selecting Trend Items](#).
2. From the View menu, select **Trend Viewer**. The Trend Viewer appears with data for the selected items (if available).

- ① **Note:** If the chart appears to flicker, you have too many trend samples in the Trend Viewer. Reduce the number of displayed trends or change the trending date/time range to display fewer samples, and performance will improve. See [Removing Trends from the Trend Viewer](#).

Changing Views

To change views in the Trend Viewer, click the Chart, Table, or Definition view buttons.

Editing the Chart View

Changing the Chart Type

To change the chart type in the Chart view, click one of the chart buttons (such as points, line, or area).

Configuring the X-axis

About this task:

To configure the X-axis in the Chart view:

1. Place your cursor on the chart and right-click.
2. Select the **X-axis Scale**. The **Range Configuration** dialog box appears.
3. Specify whether to **Use Automatic Range Calculation**. The automatic range is determined automatically based on the setup in the **Definition View**.

- ① **Note:** When you select **Use Automatic Range Calculation**, you do not fill in the Range fields.

4. Specify the **Start Time**, **Start Date**, **End Time**, and **End Date**.
5. Click **OK**.

Result

- ① **Note:** You can also configure the X-axis range by changing the start and end dates and times in the Definition View. See [Editing the Definition View](#).

Configuring the Y-axis

About this task:

To configure the Y-axis in the Chart view:

1. Place your cursor on the chart and right-click.
2. Select the **Y-axis Scale** menu item. The **Range Configuration** dialog box appears.

3. If you are using stacked Y-axis, choose the trend item to which the Y-axis range should be applied.
4. Specify whether to **Use Automatic Range Calculation**. The Range is determined automatically based on the trend items.
 - ❶ **Note:** When you select **Use Automatic Range Calculation**, you do not fill in the Range fields.
5. Specify the minimum and maximum values for the Y-axis.
 - ❶ **Note:** When you use stacked Y-axis, click **Apply** to apply the changes to a specific trend item. You can continue setting the ranges for other trend items in the Range Configuration dialog box.
6. Click **OK**.

Changing the Background Color

About this task:

To change the background color in the Chart View:

1. Place your cursor in the chart view and right-click.
2. Select the **Background Color** menu item. The **Select a Color** dialog box appears.
3. Select a new background color.
4. Click **OK**.

Changing the Color for Charted Data

About this task:

To change the color used to plot the data for a trend item:

1. Click the **Color Palette** icon in the **Marker** column in the **Chart Legend** for the desired trend item. The **Select a Color** dialog box appears.

Figure 16: Color Palette Icon



2. Select a color.
3. Click **OK**. The color appears on all chart styles (not just the charts using Markers).

Zooming

About this task:

To zoom in the Chart view:

1. Click **Zoom** to switch the mouse to zoom mode for the chart.
2. Click and drag your cursor over the area to zoom.
 - ❶ **Note:** Left-click within the chart to zoom out one level. To exit zoom mode while retaining the current zoom level, click **Zoom**. To exit zoom mode and restore the chart to an unzoomed state, click **Restore**.

Working with the Table View

Selecting Trend Data

To select trend data, click an individual row in the Table view or use the Ctrl and/or Shift keys to select multiple rows.

To select all of the trend data, click **Select All**.

- ① **Note:** You also can click and drag your cursor over rows in the table to select items that appear consecutively.

Sorting Trend Data

To sort search the trend data in the Table view, click the heading of the desired column. The column sorts and a small red triangle appears indicating the order of the sort (ascending or descending). Click the column heading again to change the sort order.

Reordering Columns

To reorder the columns in the Table view, drag the heading of the column to the desired location.

Copying Trend Data to the Clipboard

About this task:

To copy trend data in the Table View to the system clipboard:

1. Select the desired trend data according to [Selecting Trend Data](#) section.
2. Click **Copy to Clipboard**.
 - ① **Note:** You can also use standard keyboard shortcuts to select and copy the data (Ctrl + A to Select All, Ctrl + C to Copy).
3. Open the program to paste the results (for example, Microsoft Excel).
4. Paste the results according to the program's conventions (generally **Edit** > **Paste** or Ctrl + V).

Editing the Definition View

Configuring Trend Attributes

To configure the Trend Viewer attributes, edit the values and selections using the text boxes, drop-down menus, and calendars. See the [Trend Viewer Definition View](#) section.


Changing the Plotting Style

About this task:

To change the plotting style in Definition view:

1. In the **Trend Items** table, click the drop-down list in the **Plotting Style** column.
2. Select either **Continuous** or **Discrete**.

Expanding and Collapsing the Legend and Trend Items Table

To expand and collapse the Legend and Trend Items table in the Chart and Definition view, click one of the arrows  located on the splitter bar to show and hide the table. Continue to click the arrows until the desired display is achieved.

- ① **Note:** You can also drag the splitter bar to resize the Legend and Trend Items table areas.

Adding Trends

About this task:

To add trends to the Trend Viewer in the Chart, Table, and Definition views:

1. Click the **Add** icon. The **Select Item** dialog box appears.
2. Select one or more items (Ctrl or Shift).
 - ① **Note:** All non-trend items appear dimmed. If everything appears dimmed in the **Select Item** dialog box, check to see if you have at least one object with a Trend Extension and/or that Engine devices from other sites are storing samples in the Metasys Server (if applicable).
3. Click **OK**.

Result

- ① **Note:** You can use the **Select Item** dialog box to select historical trends from a Metasys Server.

At Release 8.0 and later, trends can be added to the chart and definition views of the Trend Viewer through drag and drop functionality.

To Add Trends from the Global Search Viewer

1. Click **View > Panel Layout** and select the **Two Panel** option. In one of the panels, open the Trend view. In the second panel, open the global search.
2. Perform a global search for trends on the site.
3. Select trends from the global search results.

- ① **Note:** To mass select trends in the search results hold **Ctrl** and click or hold **Shift** and click.

4. Drag the select trends to the Trend Viewer.

To Add Trends from the All Items Tree

1. Select a device from the All Items Tree.
 - ① **Note:** To mass select device hold **Shift** and click.
2. Drag the selected devices from the All Items Tree to the Trend Viewer window. All trends associated with the device will populate in the Trend Viewer window.

Removing Trends from the Trend Viewer

1. Select one trend item from either the [Chart Legend](#) or [Definition View Trend Items Table](#).
2. Click the **Remove** icon. The Remove confirmation dialog box appears. Click **Yes**.

Changing the Gridlines

To change the gridlines in the Chart view, right-click > Gridlines > and select type.

To change the gridlines in the Definition view, click the Gridlines drop-down list and select type.

Printing Trend Viewer Information

To print Trend Viewer information, follow the printing instructions in the [Printing Specific Help Topics](#) section.

Tailored Summary Viewer

Use the Tailored Summary Viewer to view and modify large quantities of similar data in a tabular format.

The Tailored Summary Viewer uses Summary Definitions (**Insert > Summary Definition**) in the SMP to define how the similar data is displayed.

You can use one of the following two workflows for the Tailored Summary Viewer:

- In the All Items Tree, select the desired objects. Click **View > Tailored Summary Viewer**. In the SMP, you can select the Summary Definition to define what and how the information for the selected objects is displayed.
- Click **Query > Global Search**. Select the search location, enter the desired criteria, and click **Search**. From the search results, select the desired objects. In the SMP, you can select the Summary Definition to define what and how the information for the selected objects is displayed.

In SMP, you can use the **Tailored Summary Viewer** to view and modify large quantities of data. Once data appears in a **Tailored Summary View**, you can select data in the view, right-click the data you want to modify, and select the **Modify** function to edit the data pertinent information. After you make modifications to data in the viewer, you must right-click the header of the view to refresh the screen.

 **Note:** The display limitation for Tailored Summaries is 100 rows and 7 columns.

Using a Tailored Summary

About this task:


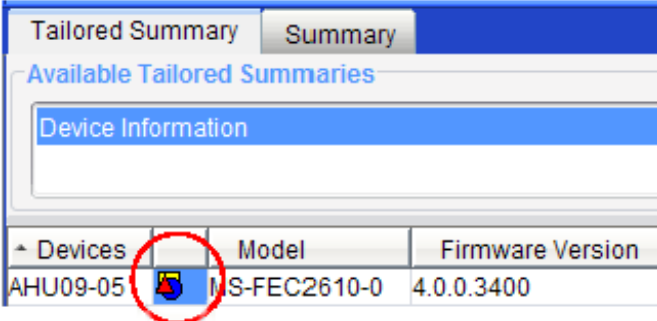



-  **Note:** You can perform this task in the online Site Management Portal UI for the Site Director.
1. View the Tailored Summary as described in the [Viewing a Tailored Summary](#) section.
 2. Work with the **Tailored Summary table** and **Key Data table** as outlined in the following table:

Table 54: Working with Tailored Summaries

Type of Table	Available Operations
Tailored Summary table	To issue commands, select one or more items (that is, select the table cells), then right-click and select Command . To command all items in a column, right-click the column header and select Command . For example, use this process to send an operator override command to multiple items.
	To make modifications, select one or more items, then right-click and select Modify . To modify all items in a column, right-click the column header and select Modify . See the Modify Dialog section for details. For example, use this process to change the Authorization Category for multiple items.
	To view an item, select an item and right-click and select View . The item appears in the display panel.
	To resize a column, place the cursor between the column headers so that the cursor is a double-sided arrow. Click and drag the column to the desired width.
	To sort the column data alphanumerically, click a column header. Click the column header again to sort in the reverse order.
	To rearrange the order of the columns while viewing the Tailored Summary, select a column header and use drag-and-drop to move it to the desired location.
	To keep a snapshot of the Tailored Summary's data for later comparison, select and copy the table data. Then paste it into a program such as Microsoft Excel®. Use the keyboard shortcuts Ctrl+A, Ctrl+C, and Ctrl+V.
	To view a graphic associated with field controller, double-click the graphic icon that appears in the second column of the table (by default). The graphic appears in the display panel.

Table 54: Working with Tailored Summaries

Type of Table	Available Operations						
	<p>To link a graphic to multiple field controllers, select the field controllers, then right-click and select Modify. The Global Modify dialog box appears. Edit the Graphic and Graphic Alias attributes as desired and click Send. This procedure applies only to field controllers. See Performing a Global Modify in the Modify Dialog section for details.</p> <p>Figure 17: Viewing a Graphic from a Tailored Summary</p>  <p>The screenshot shows a software interface with two tabs: 'Tailored Summary' and 'Summary'. Below the tabs is a section titled 'Available Tailored Summaries' containing a list item 'Device Information'. At the bottom, there is a table with the following data:</p> <table border="1"> <thead> <tr> <th>Devices</th> <th>Model</th> <th>Firmware Version</th> </tr> </thead> <tbody> <tr> <td>AHU09-05 </td> <td>MS-FEC2610-0</td> <td>4.0.0.3400</td> </tr> </tbody> </table>	Devices	Model	Firmware Version	AHU09-05 	MS-FEC2610-0	4.0.0.3400
Devices	Model	Firmware Version					
AHU09-05 	MS-FEC2610-0	4.0.0.3400					
<p>Key Data table</p>	<p>To issue a command, select one item and right-click and select Command.</p> <p>To make modifications to an item, select one item and right-click and select Modify. See the Modify Dialog section for details.</p> <p>To view an item, select one item and right-click and select View. The item appears in the display panel.</p> <p>To resize a column, place the cursor between the column headers so that the cursor has double-sided arrows (↔). Click and drag the column to the desired width.</p> <p>To rearrange the order of the columns, select a column header and use drag-and-drop functionality to move it to the desired location.</p> <p>To view a graphic associated with a field controller, double-click the graphic icon that appears in the first column of the table (by default). The graphic appears in the display panel.</p> <p>To link a graphic to a field controller, select the field controller, then right-click and select Modify. The Modify dialog box appears. Edit the Graphic and Graphic Alias attributes as desired and click Send. This procedure applies only to field controllers. See the Modify Dialog section for details.</p> <p>① Note: You cannot perform global commands/modifications or sort the data in the Key Data table.</p>						

Summary Definitions Library

You can access a set of pre-built Summary Definitions through the Johnson Controls License Portal. You can download the Summary Definitions when you download the SCT software, or as a separate download. To download the Summary Definitions to your computer, log on to the License Portal, click the Download icon for the System Configuration tool, select the **SCT Summary Definitions** check box, and then click **Download**. To use the pre-built Summary Definitions, import the pre-built Summary Definition files into your site. For details, see [Importing a Summary Definition](#).

We designed the pre-built Summary Definitions to meet the needs of the users based on common tasks and functions. The Summary Definitions fit into the following main categories: Configuration, Diagnostics, and Monitoring (HVAC). The Site Administrators are the intended audience for the Device and Network Diagnostics definitions. Service Professionals will find the links to graphics and Key Point definitions in the Mechanical Equipment definitions especially useful.

The following table lists and describes the pre-built definitions, including the definition name, default columns (in English only), and overview description indicating typical rows, key data, and other useful information. Click an attribute under Default Columns to view its description.

Table 55: Pre-Built Tailored Summary Library

Summary Definition Name	Description	Default Columns
<p>Config - Analog Alarms Main</p>	<p>Displays analog alarm configuration data. The typical rows for this Summary Definition include any key analog points (for example, key zone or discharge air temperatures, key static pressures, and so on) that have alarm, trend, and averaging extensions.</p> <p>① Note: The Name attribute of alarm, trend, or averaging extensions must be unique across all extensions on the item (that is, the alarm and trend item extensions cannot both have a Name attribute of Present Value). You can modify the Name attributes from the Tailored Summary view using the Global Modify feature. See the Modify Dialog section.</p> <p>This Summary Definition is typically used in a user view with the following Summary Definitions:</p> <ul style="list-style-type: none"> • Monitoring - Alarm History • Monitoring - Analog Points • Config - Analog Points • Config - Trends 	<ul style="list-style-type: none"> • Present Value • Alarm Priority • Differential • Low Alarm Limit • High Alarm Limit • Alarm Ack Required • Normal Ack Required
<p>Config - Analog Alarms Refs</p>	<p>Displays the Setpoint and Occupancy References in the alarm extension. These points are used to configure the behavior of a Room Control Module symbol.</p> <p>This Summary Definition is typically used in a user view with the following Summary Definitions:</p> <ul style="list-style-type: none"> • Monitoring - Alarm History • Monitoring - Analog Points • Config - Analog Alarms Main • Config - Analog Alarms Warning • Config - Trends 	<ul style="list-style-type: none"> • Present Value • Unoccupied State • Occupancy Reference • Cooling Setpoint Reference • Heating Setpoint Reference

Table 55: Pre-Built Tailored Summary Library

Summary Definition Name	Description	Default Columns
<p>Config - Analog Alarms Warning</p>	<p>Displays the warning alarm configuration data. The typical rows for this Summary Definition include any key analog points (for example, key zone or discharge air temperatures, key static pressures, and so on) that have alarm, trend, and averaging extensions.</p> <p>① Note: The Name attribute of alarm, trend, or averaging extensions must be unique across all extensions on the item (that is, the alarm and trend item extensions cannot both have a Name attribute of Present Value). You can modify the Name attributes from the Tailored Summary view using the Global Modify feature. See the Modify Dialog section.</p> <p>This Summary Definition is typically used in a user view with the following Summary Definitions:</p> <ul style="list-style-type: none"> • Monitoring - Alarm History • Monitoring - Analog Points • Config - Analog Points • Config - Trends 	<ul style="list-style-type: none"> • Present Value • Warning Priority • Low Warning Offset • High Warning Offset • Warning Reference • Warning Ack Required • Report Delay
<p>Config - Analog Points</p>	<p>Displays the key attributes of an analog point that may require modifying using the Global Modify feature or commanding using a Global Command (see Modify Dialog and Commands Dialog). The typical rows are any key analog points (for example, key zone or discharge air temperatures, key static pressures, and so on). This Summary Definition is typically used in a user view with the following Summary Definitions:</p> <ul style="list-style-type: none"> • Monitoring - Alarm History • Monitoring - Analog Points • Config - Analog Alarms Main • Config - Analog Alarms Warning • Config - Trends • Config - BACnet Point Info 	<ul style="list-style-type: none"> • Present Value • Device Type • Min Value • Max Value • COV Increment • Out of Service • Relinquish Default

Table 55: Pre-Built Tailored Summary Library

Summary Definition Name	Description	Default Columns
Config - BACnet Controller Info	<p>Displays the key network configuration attributes of any FEC controllers.</p> <p>① Note: You can use the Global Modify feature to add an associated graphic to all the device objects. See the Modify Dialog section.</p> <p>This Summary Definition is typically used in a user view with the following Summary Definitions:</p> <ul style="list-style-type: none"> • Config - FEC Controllers • Diag - FEC Controllers 	<ul style="list-style-type: none"> • BACnet Object Name • Model Name • Description • Object Identifier • Instance Number
Config - BACnet Engine Info	<p>Displays the key BACnet configuration attributes of any NxEs.</p> <p>This Summary Definition is typically used in a user view with the following Summary Definitions:</p> <ul style="list-style-type: none"> • Config - Engine Summary • Config - Engine Network Info • Diag - Engines 	<ul style="list-style-type: none"> • BACnet Object Name • Model Name • Network Address • BACnet IP Port • Object Identifier
Config - BACnet Point Info	<p>Displays the key BACnet configuration attributes of any points on an FEC controller.</p> <p>This Summary Definition is typically used in a user view with the following Summary Definitions:</p> <ul style="list-style-type: none"> • Monitoring - Alarm History • Monitoring - Analog Points • Config - Analog Alarms Main • Config - Analog Alarms Warning • Config - Trends 	<ul style="list-style-type: none"> • Present Value • BACnet Object Name • Object Identifier • Intrinsic Alarm Defining
Config - Binary Output Points	<p>Displays binary output configuration data. The typical rows are any key output points (for example, fans or pump commands). You can modify the attributes from the Tailored Summary view using the Global Modify feature. See the Modify Dialog section.</p> <p>This Summary Definition is typically used in a user view with the following Summary Definition:</p> <ul style="list-style-type: none"> • Config - BACnet Point Information 	<ul style="list-style-type: none"> • Present Value • Min On Time • Min Off Time • Heavy Equip Delay • Out of Service • Relinquish Default • Device Type

Table 55: Pre-Built Tailored Summary Library

Summary Definition Name	Description	Default Columns
Config - Engines Network Info	<p>Displays the key network configuration attributes of any NxEs.</p> <p>This Summary Definition is typically used in a user view with the following Summary Definitions:</p> <ul style="list-style-type: none"> • Config - Engine Summary • Config - BACnet Engine Info • Diag - Engines 	<ul style="list-style-type: none"> • Model Name • Status • Version • JCI IP Address • IP Mask • Ethernet MAC Address • DHCP Enabled
Config - Engine Summary	<p>Displays the key configuration attributes of any NxEs.</p> <p>This Summary Definition is typically used in a user view with the following Summary Definitions:</p> <ul style="list-style-type: none"> • Config - Engine Network Info • Config - BACnet Engine Info • Diag - Engines 	<ul style="list-style-type: none"> • Description • Model • Status • Last Archive • Local Time • Local Date
Config - FEC Controllers	<p>Displays the key network configuration attributes of any FEC controllers.</p> <p> ⓘ Note: You can use the Global Modify feature to add an associated graphic to all the device objects. See the Modify Dialog section.</p> <p>This Summary Definition is typically used in a user view with the following Summary Definitions:</p> <ul style="list-style-type: none"> • Config - BACnet Controller Info • Diag - FEC Controllers 	<ul style="list-style-type: none"> • Model • Status • Description • Version • Address • Trunk Number • Auto Alarm
Config - LON Controllers	<p>Displays the key network configuration attributes of any LonWorks controllers.</p> <p> ⓘ Note: You can use the Global Modify feature to add an associated graphic to all the device objects. See the Modify Dialog section.</p>	<ul style="list-style-type: none"> • Status • Description • Neuron ID • Program ID • DSN 1 • XIF Present • Message Entry Count

Table 55: Pre-Built Tailored Summary Library

Summary Definition Name	Description	Default Columns
Config - LON Points	Displays the key configuration attributes of any points in a LonWorks based controller.	<ul style="list-style-type: none"> • Present Value • Interface Value • Field Units • Manual Control • Update Interval • Target Reference • Priority
Config - Multistate Value Alarms	<p>Displays multistate alarm configuration data. The typical rows are any key multistate points (for example, modes of operation, fan status, and so on) that have alarm, trend, and averaging extensions.</p> <p>① Note: The Name attribute of alarm, trend, or averaging extensions must be unique across all extensions on the item (that is, the alarm and trend item extensions cannot both have a Name attribute of Present Value). You can modify the Name attributes from the Tailored Summary view using the Global Modify feature. See the Modify Dialog section.</p> <p>This Summary Definition is typically used in a user view with the following Summary Definitions:</p> <ul style="list-style-type: none"> • Monitoring - Alarm History • Config - Trends 	<ul style="list-style-type: none"> • Present Value • Normal State • Alarm Priority • Capture Changes • Report Delay • Report Delay Active • Alarm Message Text
Config - N2 Controllers	<p>Displays the key network configuration attributes of any N2 controllers.</p> <p>① Note: You can use the Global Modify feature to add an associated graphic to all the device objects. See the Modify Dialog section.</p>	<ul style="list-style-type: none"> • Status • Description • Controller Type • Trunk Number • Auto Alarm • Item Reference • Version
Config - NCM Info	Displays the key configuration attributes of any NCM. The NCMs are integrated with an NIE.	<ul style="list-style-type: none"> • Name • Status • Gate Number • Network Name • Node Number • Object Count • Poll Delay

Table 55: Pre-Built Tailored Summary Library

Summary Definition Name	Description	Default Columns
Config - Schedules	<p>Displays the key configuration information and current status about the listed schedule objects. You can use the Global Command feature to enable or disable all the schedules in the Tailored Summary view. See the Commands Dialog section. You also can use this Summary Definition for features other than schedules.</p>	<ul style="list-style-type: none"> • Description • Present Value • Enabled • Item Reference • Authorization Category
Config - TEC Controllers	<p>Displays the key network configuration attributes of any TEC controllers.</p> <p>① Note: You can use the Global Modify feature to add an associated graphic to all the device objects. See the Modify Dialog section.</p> <p>This Summary Definition is typically used in a user view with the following Summary Definition:</p> <ul style="list-style-type: none"> • Config - BACnet Controller Info 	<ul style="list-style-type: none"> • Model • Status • Version • Auto Alarm
Config - Trends	<p>Displays the trend extension configuration data. The typical rows are any key analog points (for example, Energy Essentials meter points, key zone or discharge air temperatures, key static pressures, and so on) that have trend and averaging extensions.</p> <p>① Note: The Name attribute of alarm, trend, or averaging extensions must be unique across all extensions on the item (that is, the alarm and trend item extensions cannot both have a Name attribute of Present Value). You can modify the Name attributes from the Tailored Summary view using the Global Modify feature. See the Modify Dialog section.</p> <p>This Summary Definition is typically used in a user view with the following Summary Definitions:</p> <ul style="list-style-type: none"> • Monitoring - Alarm History • Monitoring - Analog Points • Config - Analog Points • Config - Analog Alarms Main 	<ul style="list-style-type: none"> • Present Value • Description • Buffer State • Enable • Repository Enabled • Sample Interval • Transfer Setpoint

Table 55: Pre-Built Tailored Summary Library

Summary Definition Name	Description	Default Columns
Diag - Engines	<p>Displays the key diagnostic attributes of any NxEs. This Summary Definition is typically used in a user view with the following Summary Definitions:</p> <ul style="list-style-type: none"> • Config - Engine Summary • Config - BACnet Engine Info • Config - Engine Network Info 	<ul style="list-style-type: none"> • CPU Usage • Battery Condition • % Flash Utilized • Estimated Flash Available • % Memory Utilized • Object Count • Board Temperature
Diag - FEC Controllers	<p>Displays the key diagnostic attributes of any FEC controllers.</p> <p>① Note: You can use the Global Modify feature to add an associated graphic to all the device objects. See the Modify Dialog section.</p> <p>This Summary Definition is typically used in a user view with the following Summary Definitions:</p> <ul style="list-style-type: none"> • Config - FEC Controllers • Config - BACnet Controller Info 	<ul style="list-style-type: none"> • Model • Status • Memory Usage • CPU Usage • Object Count • Object Memory Usage • Flash Usage
Diag - LON Trunks	<p>Displays the key diagnostic attributes of this communication trunk's Diagnostic tab.</p> <p>① Note: You can use the Global Command feature to send Clear Statistics and Latch Statistics from the Tailored Summary view to capture the most current diagnostic information. See the Commands Dialog section.</p>	<ul style="list-style-type: none"> • Lost Messages • Missed Messages • Transmit Errors • Transmits Per Minute • Transaction Timeouts
Diag - MSTP Trunks	<p>Displays the key diagnostic attributes of this communication trunk's Diagnostic tab.</p> <p>① Note: You can use the Global Command feature to send Clear Statistics and Latch Statistics from the Tailored Summary view to capture the most current diagnostic information. See the Commands Dialog section.</p>	<ul style="list-style-type: none"> • Bus Health Index • Bus Performance Index • Data CRC Errors • Framing Errors • Token Loop Time • Lost Token • Buffer Overflows

Table 55: Pre-Built Tailored Summary Library

Summary Definition Name	Description	Default Columns
Diag - N2 Trunks	<p>Displays the key diagnostic attributes of this communication trunk's Diagnostic tab.</p> <p>① Note: You can use the Global Command feature to send Clear Statistics and Latch Statistics from the Tailored Summary view to capture the most current diagnostic information. See the Commands Dialog section.</p>	<ul style="list-style-type: none"> • Command Count • Message Timeouts • Acknowledgement Errors (NAK Errors) • Offline Occurrences • Poll Scan Time • Retries • Transmits Per Minute
Diag - VAV Box Error Analysis	<p>Displays the occupied zone temperature status (ZNT-State) value along with the absolute error values from all of the possible output controllers (for example, CLG-ABSERROR, HTG-ABSERROR, or SAFLOW-ABSERROR). Allows you to easily compare EWMA to identify devices with poor relative performance.</p> <p>The rows for this Summary Definition are the VAV controllers associated with an air handling system. The absolute error columns indicate all the possible values available. We recommend you remove columns not needed for your specific application.</p> <p>① Note: Depending on the module instance used by your application, the attributes used for each column may differ. Refer to the <i>Output Controller</i> chapter of the <i>Controller Tool Help (LIT-1201147)</i> for details.</p> <p>When using this Summary Definition, first observe the value in the Current State column. Then refer to the other columns as appropriate. For example, if the Current State column indicates that cooling is taking place, refer to the cooling error columns for more details on the cooling process.</p> <p>This Summary Definition is typically packaged in a user view with the following Summary Definitions:</p> <ul style="list-style-type: none"> • Monitoring - VMA1600 Overview • Monitoring - VMA1600 Flow • Diagnostic - VAV Box Effort Analysis • Configuration - FEC Controllers 	<ul style="list-style-type: none"> • Description • Current State (ZNT-State) • Zone Temp Prmy Clg Error • Zone Temp Box Htg Error • Box Htg Output Error • Supp Htg Output Error • Supply Flow Error

Table 55: Pre-Built Tailored Summary Library

Summary Definition Name	Description	Default Columns
<p>Diag - VAV Box Effort Analysis</p>	<p>Displays the occupied zone temperature status (ZNT-State) value along with the absolute effort values from all of the possible output controllers (for example, CLG-ABSEFFORT, HTG-ABSEFFORT, or SAFLOW-ABSEFFORT). Allows you to easily compare EWMA's to identify devices with poor relative performance.</p> <p>The rows for this Summary Definition are the VAV controllers associated with an air handling system. The absolute error columns indicate all possible values available. We recommend you remove columns not needed for your specific application. Keep in mind that only one absolute error column is active at any point in time based on the present value of ZNT-State.</p> <p>① Note: Depending on the module instance used by your application, the attributes used for each column may differ. Refer to the <i>Output Controller</i> chapter of the <i>Controller Tool Help (LIT-12011147)</i> for details.</p> <p>This Summary Definition is typically packaged in a user view with the following Summary Definitions:</p> <ul style="list-style-type: none"> • Monitoring - VMA 1600 Overview • Monitoring - VMA1600 Flow • Diag - VAV Box Error Analysis • Config - FEC Controllers 	<ul style="list-style-type: none"> • Description • Current State (ZNT-State) • Zone Temp Prmy Clg Effort • Zone Temp Box Htg Effort • Box Htg Output Effort • Supp Htg Output Effort • Supply Flow Effort
<p>Monitoring - AHUs</p>	<p>Displays the key point information based on standard naming conventions for a Mixed Air Single Duct systems. The rows for this Summary Definition are FEC or TEC Series controllers.</p> <p>① Note: You can use the Global Modify feature to add an associated graphic to all the device objects. See the Modify Dialog section.</p> <p>Key data from the associated central plant systems or weather data is typically added to unique instances of this Summary Definition.</p>	<ul style="list-style-type: none"> • Supply Fan Status • Return Fan Status • Mixed Air Temp • Zone Temp • Discharge Temp • Cooling Command • Heating Output

Table 55: Pre-Built Tailored Summary Library

Summary Definition Name	Description	Default Columns
Monitoring - Alarm History	<p>Displays the current key status information of analog points along with the date and time that the last alarm and return to normal transitions occurred. The typical rows for this Summary Definition include any key analog points (for example, key zone or discharge air temperatures, key static pressures, and so on) that have alarm, trend, and averaging extensions.</p> <p>Note: The Name attribute of alarm, trend, or averaging extensions must be unique across all extensions on the item (that is, the alarm and trend item extensions cannot both have a Name attribute of Present Value). You can modify the Name attributes from the Tailored Summary view using the Global Modify feature. See the Modify Dialog section.</p> <p>This Summary Definition is typically used in a user view with the following Summary Definitions:</p> <ul style="list-style-type: none"> • Monitoring - Analog Points • Config - Analog Points • Config - Analog Alarms Main • Config - Analog Alarms Warning • Config - Trends 	<ul style="list-style-type: none"> • Present Values • Alarm Ack Pending • Alarm Ack Required • Late Alarm Date • Back to Normal Date • Last Alarm Time • Back to Normal Time

Table 55: Pre-Built Tailored Summary Library

Summary Definition Name	Description	Default Columns
Monitoring - Analog Points	<p>Displays the minimum/maximum/average values from the averaging extension and the key description attributes for the item’s Focus tab. The typical rows for this Summary Definition include any key analog points (for example, key zone or discharge air temperatures, key static pressures, and so on) that have alarm, trend, and averaging extensions.</p> <p>① Note: The Name attribute of alarm, trend, or averaging extensions must be unique across all extensions on the item (that is, the alarm and trend item extensions cannot both have a Name attribute of Present Value). You can modify the Name attributes from the Tailored Summary view using the Global Modify feature. See the Modify Dialog section.</p> <p>This Summary Definition is typically used in a user view with the following Summary Definitions:</p> <ul style="list-style-type: none"> • Monitoring - Alarm History • Config - Analog Points • Config - Analog Alarms Main • Config - Analog Alarms Warning • Config - Trends 	<ul style="list-style-type: none"> • Present Value • Averaging Value • Min Value • Max Value • Reliability • Item Reference
Monitoring - VMA1400 Flow	<p>Displays the key flow setup and monitoring information for a typical single duct, pressure-independent VAV Box application. The rows for this Summary Definition are VMA14 controllers that are associated with an air handling system.</p> <p>① Note: You can use the Global Modify feature to add an associated graphic to all the device objects. See the Modify Dialog section.</p> <p>Key data from the associated air handling system is typically added to unique instances of this Summary Definition.</p> <p>This Summary Definition is typically used in a user view with the following Summary Definition:</p> <ul style="list-style-type: none"> • Config - VMA 1400 Overview 	<ul style="list-style-type: none"> • Box Area • Pickup Gain • Flow • Cooling Max Flow Setpoint • Cooling Min Flow Setpoint • Heating Flow Setpoint

Table 55: Pre-Built Tailored Summary Library

Summary Definition Name	Description	Default Columns
Monitoring - VMA1600 Flow	<p>Displays the key flow setup and monitoring information for a typical single duct, pressure-independent VAV Box application. The rows for this Summary Definition are VMA16 controllers that are associated with an air handling system.</p> <p>① Note: You can use the Global Modify feature to add an associated graphic to all the device objects. See the Modify Dialog section.</p> <p>Key data from the associated air handling system is typically added to unique instances of this Summary Definition.</p> <p>This Summary Definition is typically used in a user view with the following Summary Definition:</p> <ul style="list-style-type: none"> • Config - VMA 1600 Overview 	<ul style="list-style-type: none"> • Box Area • Pickup Gain • Flow • Cooling Max Flow Setpoint • Cooling Min Flow Setpoint • Heating Flow Setpoint

Table 55: Pre-Built Tailored Summary Library

Summary Definition Name	Description	Default Columns
Monitoring - VMA1400 Overview	<p>Displays the key point information for a typical single duct, pressure-independent VAV Box application. The rows for this Summary Definition are VMA14 controllers that are associated with an air handling system.</p> <p>① Note: You can use the Global Modify feature to add an associated graphic to all the device objects. See the Modify Dialog section.</p> <p>Key data from the associated air handling system is typically added to unique instances of this Summary Definition.</p> <p>This Summary Definition is typically used in a user view with the following Summary Definition:</p> <ul style="list-style-type: none"> • Config - VMA 1400 Flow 	<ul style="list-style-type: none"> • Zone Temperature • Supply Temperature • Setpoint • Flow • Flow Setpoint
Monitoring - VMA1600 Overview	<p>Displays the key point information for a typical single duct, pressure-independent VAV Box application. The rows for this Summary Definition are VMA16 controllers that are associated with an air handling system.</p> <p>① Note: You can use the Global Modify feature to add an associated graphic to all the device objects. See the Modify Dialog section.</p> <p>Key data from the associated air handling system is typically added to unique instances of this Summary Definition.</p> <p>This Summary Definition is typically used in a user view with the following Summary Definition:</p> <ul style="list-style-type: none"> • Config - VMA 1600 Flow 	<ul style="list-style-type: none"> • Zone Temperature • Supply Temperature • Setpoint • Flow • Flow Setpoint • Damper Output • Heating Output

Tailored Summary Viewer User Interfaces in SMP

Tailored Summary Definition Editor

On a Site Director, the Summary Definition Editor allows you to define and edit an SCT Summary Definition object. The SCT Summary Definition Editor appears when you view an SCT Summary Definition object. In the SMP user interface, you view large quantities of live data in a tabular format. SCT Summary Definition objects always reside on a Site Director in the **Configuration Data > SCT Summary Definitions** folder of the All Items tree (that is, you cannot put a SCT Summary Definition object in another location).

Summary Definition Tab

The Summary Definition Editor's Summary Definition tab allows you to define the table that appears in the Tailored Summary Viewer.

Figure 18: Summary Definition Editor - Summary Definition Tab

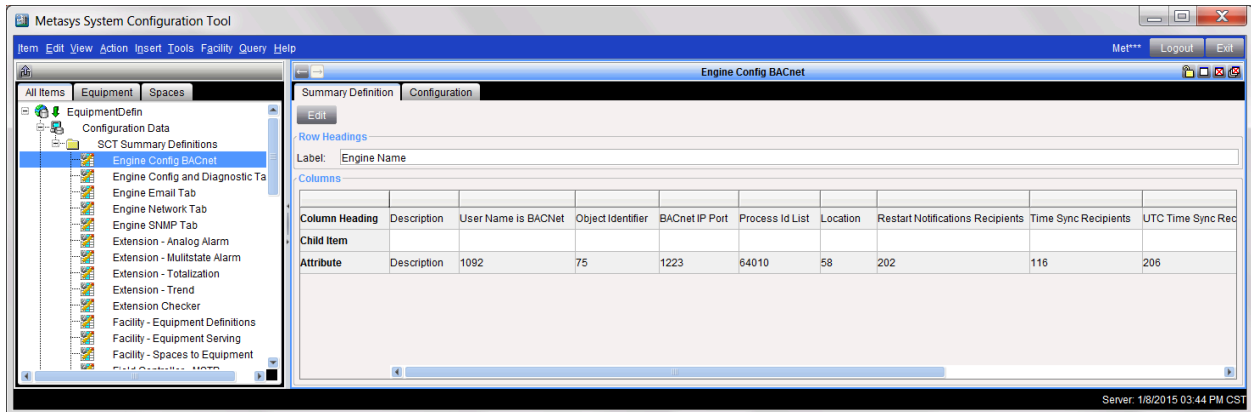


Table 56: Summary Definition Editor - Summary Definition Tab

Button/Field	Description
Label	Defines the label to display in the first column (that is, the row header column) in a Tailored Summary. The label is limited to a maximum of 50 characters. This field also can be left blank.
Add/Plus	Allows you to add a column at the end of the column configuration table. To select a column, click the column heading. ① Note: One column is created by default when you create the definition. You must define a minimum of at least one column. The display limitation for Tailored Summaries is 100 rows and 7 columns. You may not see optimal performance when tables exceed this recommendation.
Remove/Minus	Allows you to remove the currently selected column from the column configuration table. To select a column, click the column's header. ① Note: One column is created by default when you create the definition. You must define a minimum of at least one column, and if there is only one column, you cannot delete it.

Table 56: Summary Definition Editor - Summary Definition Tab

Button/Field	Description
Column Configuration Table	<p>Lets you configure the columns that appear in the Tailored Summary:</p> <ul style="list-style-type: none"> • Column Heading - Defines the name of the column heading. The name can have a maximum of 50 characters. • Child Item - Indicates the item for which the column data is retrieved based on its item name attribute. You can use the Select Item dialog box to pick a name, or type in the text box. The name must match a user-specified pattern (such as ZN-* or ZN-T, Zone-T). You can define an unlimited number of wildcards. The first item found that matches this item name pattern appears in the Tailored Summary view column. To display an attribute of the row item, leave this field blank. Otherwise, specify the name of the child item to display. <ul style="list-style-type: none"> ① Note: To mass search child-item strings, separate your search criteria with commas. For example, ::classid:156,172,155. • Attribute - Defines the attribute information for the column. To display the default attribute, no change is required (that is, leave the Attribute box set to Default). The attributes are grouped into categories for easy selection. To specify an attribute, select a category in the Attribute Filter section of the Select Column Attribute dialog box, and then select the desired attribute from the list. • User Definable Attributes <ul style="list-style-type: none"> ① Note: To change the order of the columns, select a column and drag it to the desired placement. ① Note: When you display a Tailored Summary, the system searches for data within all levels of a field device (VMA, for example). For all other objects (NAE, for example), the system searches for data only one level down (no subsequent levels).

Table 56: Summary Definition Editor - Summary Definition Tab

Button/Field	Description
Browse (Child Item)	<p>Opens the Select Item dialog box where you can specify the item name.</p> <p>① Note: This dialog box provides an easy way to fill in the item name of a child item. It does not mean that the selected item displays in that column.</p>
Browse (Attribute)	<p>Opens the Select Column Attribute dialog box where you can select the attribute to display in the column of the table. This process is necessary only when selecting an attribute other than the default attribute.</p> <p>This dialog box has two list boxes to aid in selection:</p> <ul style="list-style-type: none"> • Attribute Filter - Allows you to filter the items appearing in the Attribute list using common attribute categories. If you filter on Alarms, for example, the supported alarm attributes appear in the list for selection. • Attribute - Lists the available attributes for selection. <p>① Note: To display the default attribute of the row item, leave the Attribute box set to Default (Attribute Filter: Common Attributes and Attribute: Default).</p>

Summary Definition Configuration Tab

The Summary Definition Configuration tab allows you to edit the configuration data for the Summary Definition.

Table 57: Tailored Summary Definition - Configuration Tab

Attribute	Description
Name	Allows you to enter a name for the Summary Definition object. There is a plain text limit of 400 characters.
Description	Allows you to enter a description of the Summary Definition object. There is a plain text limit of 40 characters.
Object Type	Indicates the Object Type.
Authorization Category	Lets you choose the Authorization Category for the Summary Definition object. The default Authorization Category for the Summary Definition object is General.

Summary Definition Wizard Descriptions

Use the Create New Summary Definition Wizard to create a Summary Definition object from scratch. Access this wizard using the Summary Definition option on the Insert menu.

Table 58: Create New Summary Definition Wizard

Screen	Description
Destination	Displays the save location of the new Summary Definition. You can only save files in the Configuration Data > Summary Definitions folder.
Identifier	Specifies a name for the Summary Definition object. A maximum of 32 characters.

Table 58: Create New Summary Definition Wizard

Screen	Description
Configure	Defines the data of the Summary Definition and Configuration tabs.
Summary	Displays the summary data of the Summary Definition object.

Tailored Summary Viewer Workflows

The following tables are high-level workflows for creating and using Summary Definitions in the Tailored Summary Viewer. These workflows assume a desired Summary Definition exists.

Table 59: Tailored Summary Viewer Workflow - Using the All Items Tree

Step	Description
1	In the All Items tree, select the objects you would like the Summary Definition to apply to in the Tailored Summary Viewer.
2	Click View > Tailored Summary Viewer. The Tailored Summary Viewer appears. Select a Summary Definition to apply to the objects.
3	Select a Summary Definition to apply to the objects.

Table 60: Tailored Summary Viewer Workflow - Using Query > Global Search

Step	Description
1	Click Query > Global Search . The Global Search Viewer appears.
2	Click Add to select the Search Locations. You can select multiple locations.
3	Enter the search criteria. You can enter an object name, object type, include child objects, and include search locations in the search criteria. For more information, see Global Search .
4	Click Search .
5	Select the rows you would like the Summary Definition to apply to in the Tailored Summary Viewer.
6	Click View > Tailored Summary Viewer . The Tailored Summary Viewer appears.
7	Select a Summary Definition to apply to the objects.

Column Attributes for Summary Definitions

When creating or editing a Summary Definition, the Select Column Attribute dialog box allows you to select the attributes to display in the Tailored Summary Viewer.

The following table lists examples of the attributes available for display in the Tailored Summary feature according to the attribute filter. Click an attribute in the table to view its description. For information on other attributes that do not appear in this table, search within this Help system PDF by holding down **Ctrl + F**, or see the Index.

Table 61: Example Column Attributes for Summary Definitions

Attribute Filter	Example Attributes
BACnet	<ul style="list-style-type: none"> BACnet IP Port Instance Number Intrinsic Alarming Defined Object Name
Common Attributes	<ul style="list-style-type: none"> Authorization Category

Table 61: Example Column Attributes for Summary Definitions

Attribute Filter	Example Attributes
Field Devices (General)	<ul style="list-style-type: none"> • Disable Automatic Alarming
Field Devices (LON)	<ul style="list-style-type: none"> • DSN1 • Neuron ID • Program ID • XIF Present
Field Devices (MSTP)	<ul style="list-style-type: none"> • Memory Usage • Object Count • Trunk Number
Field Devices (N1)	<ul style="list-style-type: none"> • Device Status • NCM Name • Object Count • Poll Delay
Field Points (N2)	<ul style="list-style-type: none"> • Controller Type • Trunk Number
Field Points (General)	<ul style="list-style-type: none"> • Device Type • Max Value • Min Value • Out of Service
Field Points (LON)	<ul style="list-style-type: none"> • Command Status Mapping Table • Interface Value • Target Reference • Update Interval
Field Points (N1)	<ul style="list-style-type: none"> • Feedback • Setpoint
Integrations (MSTP)	<ul style="list-style-type: none"> • APDU Retries • Buffer Overflow • Bus Health Index • Bus Performance Index
Integrations (LON)	<ul style="list-style-type: none"> • Missed Messages • Transmit Errors • Transaction Timeouts • Transmits Per Minute
Integrations (N2)	<ul style="list-style-type: none"> • Command Count
Space	<ul style="list-style-type: none"> • Served By • Type

Table 61: Example Column Attributes for Summary Definitions

Attribute Filter	Example Attributes
Supervisory Devices	<ul style="list-style-type: none"> • ADS Repository • JCI IP Address • Model Name • Object Count
Trends	<ul style="list-style-type: none"> • Buffer State • Enable • Sample Interval • Transfer Setpoint

Defining User Views with Summary Definitions

1. Create a user view or edit an existing one (for example, an HVAC user view).
2. Add a folder to the user view to hold the Summary Definitions. For example, add a Summary Definitions folder, or a folder named according to function (such as VAV Boxes - VMA1400s, Key Point Information, Engines, or MSTP Trunk Diagnostics).
3. Drag the definitions from the Summary Definitions folder in the All Items tree to the folder you created in the user view (or use the user view editor's add reference option).
4. Drag the items to reference (for example, supervisory devices or points) from the All Items tree or from the global search results table to the folder in the user view (or use the user view editor's add reference option).
5. Save the user view.

Defining Key Data

About this task:

Notes:

- You can perform this task in SCT or the online Site Management Portal UI for the Site Director.
 - See the [Focus Tab](#) and [Summary Definition Object](#) sections for information on the Key Data attribute of the Summary Definition.
1. In the Summary Definitions folder of the All Items tree, right-click the Summary Definition and click **View**. The Summary Definition appears in the display panel.
 2. On the Focus tab, click **Edit**.
 3. In the Key Data list box, click the browse button. The Modify List dialog box appears.
 4. Add Key Data as follows:
 - a. Click **Add**. An undefined item appears in the list.
 - b. Click the **Browse** button of the item. The Select Item dialog box appears.
 - c. Select an item.
 - d. Click **OK**.
- Notes:**
- You also can type in the text box and use wildcards (asterisks * only) to search for the item within the user view folder.
 - You can define up to four Key Data items.
5. Select an item and click **Remove** to delete the item from the Key Data list.

6. Select an item and click **Move Up** or **Move Down** to rearrange the order the items appear in the list.
7. Click **OK**.
8. Click **Save**.

Viewing a Tailored Summary

About this task:

Note: You can perform this task in the online Site Management Portal UI for the Site Director.

1. Click the desired user view tab in the navigation pane.
2. Double-click the user view folder containing the Summary Definitions and referenced items (for example, the Summary Definitions folder). The Tailored Summary appears in the display panel. See the [Viewing a Tailored Summary](#) section for a description of the Tailored Summary View user interface.

Note: If the user view does not contain a Summary Definition, only the standard Summary appears.

3. Click the Tailored Summary you want to view from the Available Tailored Summaries list box if more than one Summary Definition appears in the list. By default, the first authorized Summary Definition in the list is automatically selected.
4. View the key data and the table data.
5. Use the right-click menu options to command, modify, or otherwise work with the data. See [Using a Tailored Summary](#).

Tailored Summary Troubleshooting

Table 62: Tailored Summary Troubleshooting

Problem	Solution
In the Tailored Summary view, the child item does not display data from an object after editing its Object Name attribute.	If you change the Object Name attribute of an object after configuring the Summary Definition object, the link to the Child Item breaks. Change the Child Item wildcards in the Summary Definition object to match the new Object Name attribute.
With a Release 5.0 NAE45 Site Director, points in a Tailored Summary display slowly and may time out.	This issue was resolved in Release 5.1. If this delay is problematic, we recommend you upgrade to Release 5.1 or later.
When running a Tailored Summary, user views with large point counts display red Xs.	On a summary view with more than 500 objects from a single NxE, you may occasionally see red Xs if the device is busy. As the view continues to update data, the red Xs disappear.

Scheduled Reports Viewer

You can access the Scheduled Reports Viewer from the View Menu. The Scheduled Reports Viewer has three main screens/tabs.

Table 63: Scheduled Reports Viewer Tabs

Tab	Description
Actions in Progress	Allows you to monitor, enable/disable, reschedule, delete, and reschedule reports that are in progress or pending.
Scheduled Actions	Allows you to enable/disable, delete, edit, and run upcoming scheduled reports.
Completed Actions	Allows you to view the status of completed reports, reschedule reports, delete the status entries from the screen, and view the content Scheduled Report output file.

Change Results Viewer

The Change Results Viewer allows you to view, save, and print the results of global commands and global modifications sent using the Global Commands and Global Modify features. See the [Commands Dialog](#) and [Modify Dialog](#) sections for information on these features.

Change Results Viewer Concepts

Change Results Viewer Overview

The Change Results Viewer displays the result entries for the global commands and global modifications sent during the current user session. You can access the Change Results Viewer by selecting **Change Results** from the View Menu.

- ① **Note:** The Change Results Viewer screen is available for global commands and global modifications only. Single object commands and modifications do not appear in the Change Results Viewer.

Figure 19: Change Results Viewer Screen

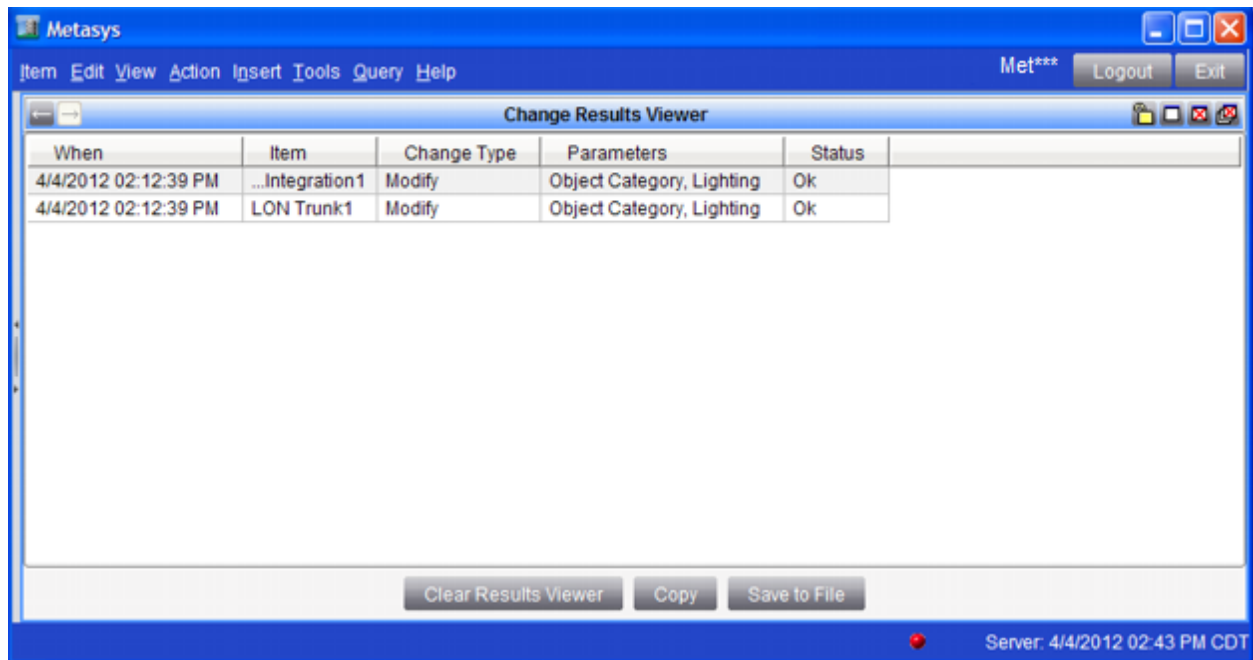


Table 64: Change Results Viewer Screen Components

Column/Button	Description
Change Results Table	<p>Displays the results of all global commands/modifications sent during the current user session.</p> <p>If you select an item in the table and place your cursor over it within each column, tooltips appear providing more information, if available.</p> <p>Any data that does not fit within the columns is identified by an ellipsis (. . .). You can resize the column or place your cursor over the table cell to see its tooltip text.</p> <p>If you send another global command/modification at a later time during the current user session, the result entries are added to any existing result entries from prior commands/modifications sent during the session.</p> <p>The most recent entry appears at the top of this table by default. If desired, you can sort the results.</p> <p>See the Working with the Change Results Viewer section for more information on manipulating and using the table data.</p>
When	Displays the date and time the command/modification was sent.
Item	Displays the name of the object to which the command/modification was sent. The object's full reference identifier appears in a tooltip when you place the cursor over the name.
Change Type	Displays the type of command/modification sent.
Parameters	Displays the list of parameters for the command/modification that was sent. For example, for a Release command, an attribute and priority such as Present Value, 15 (Scheduling) appear in the Parameters column.
Status	<p>Displays the status of the command/modification that was sent (for example, OK or an explanation of failure).</p> <p>Notes:</p> <ul style="list-style-type: none"> An OK status for a command indicates the supervisory device validated and accepted the command, but does not necessarily indicate the command executed successfully. There may be cases where the command is accepted, but fails execution. For example, a Route command to a trend extension may be accepted by the supervisory device with a status of OK; but if the actual routing of the trend data fails due to the ADS offline or other error, the failure is noted in the Audit log at that point in time. An OK status for a modification indicates the modification executed successfully.
Clear Results Viewer	Deletes all the entries from the Change Results Viewer and adds an entry to indicate when it cleared those entries.
Copy	Copies the selected change results to the Clipboard for pasting into other applications such as Microsoft Excel® or Word®.
Save to File	Saves the current content of the change results table to a text file.

Change Results Viewer Steps

Working with the Change Results Viewer

Displaying the Change Results Viewer

To display the Change Results Viewer, select **Change Results** from the **View** menu. The Change Results Viewer appears in the display panel.

- ① **Note:** If no global commands/modifications were issued during the current user session, the Change Results Viewer appears with a message stating `No global commands or modifications have been issued within the current session.`

Selecting Entries in the Change Results Viewer

To select entries in the Change Results Viewer, click an individual entry in the change results table or use the Ctrl or Shift keys when clicking to select multiple entries.

- ① **Note:** You also can click and drag your cursor over entries in the change results table to select entries that appear consecutively. With an entry in the change results table selected, you can press Ctrl+A to select all entries.

Sorting Change Results in the Change Results Viewer

To sort change results in the Change Results Viewer, click the heading of the desired column in the change results table. The results sort and a small arrow appears indicating the order of the sort (ascending or descending). Click the column heading again to change the sort order.

Reordering Columns in the Change Results Viewer

To reorder the columns in the Change Results Viewer, drag the heading of the column to the desired location.

Printing the Change Results

To print the contents of the Change Results Viewer, follow the [Print](#) instructions in the [Site Management Portal User Interface](#) section.

Saving Change Results to File

About this task:

To save the contents of the Change Results Viewer to a file:

1. Click **Save to File**. The Save dialog box appears.
2. Specify the desired location to save the results.
 - ① **Note:** The default name for the text file is `ChangeResultsLog.txt`. You can change the name as you wish to further identify these results, or to prevent overwriting previously saved results.
3. Click **Save**.

Copying Change Results to the Clipboard

About this task:

To copy change results in the Change Results Viewer to the clipboard:

1. Select the desired results according to the [Selecting Entries in the Change Results Viewer](#) section.
2. Click **Copy**.
 - ① **Note:** You also can use Ctrl+C to copy the data.
3. Open the program to paste the results (for example, Microsoft Excel or Word).
4. Paste the results according the program's conventions (generally, Edit > Paste or Ctrl+V).

Clearing the Change Results Viewer

About this task:

If the size of the results log becomes too large, the Global Command or Global Modify feature prompts you to clear the change results.

To clear all change results in the Change Results Viewer:

1. Click **Clear Results Viewer**. A dialog box appears asking if you want to permanently clear all command results.
2. Click **Yes**.

Extended Labels

Menu Selection: **View > Extended Labels** (select the check box)

Toggles the display of the item labels in the All Items navigation tree or user navigation tree from standard to extended. An extended label shows the BACnet object name that was defined when the object was initially created in braces next to the standard label. This is the name used in the object's Fully Qualified Reference. The Metasys object name may be the same as the BACnet object name, or it may have been edited as a label that is more recognizable to the user.

Example:

Standard Label = N2 Trunk1

Extended Label = N2 Trunk1{N2-1}

Validation Labels/Settings

Menu Selection: **View > Validation Labels > Validation Settings** (in the SCT UI) (select the check box)

In the SCT, this setting toggles the display of the item labels in the All Items navigation tree or user navigation tree to show extra label information for MVE. When selected, this menu item also displays the Validation Settings attribute section for objects on the Focus/Configuration tab.

This setting has no effect in the online UI (the validation labels are always visible).

Enable Alarm Pop-Ups

Menu Selection: **View > Enable Alarm Pop-Ups** (select the check box to enable/disable alarm pop-ups)

For the current user session, this item determines if the pop-up Alarms Window (also referred to as Metasys - Events or Alarm Bar) automatically displays when an alarm is detected.

Clicking the alarm icon in the status bar re-enables alarm pop-ups and displays the current alarm, if any.

If you disable the alarm pop-up window and you have the audible alarm option enabled, the audible alarm sounds when an alarm is detected. See the [Alarms Window](#) section in the [Site Management Portal User Interface](#).

Panel Layout

The Display Frame can be divided into up to four display panels. When viewing an item in a display panel, the name, status, and default attribute (usually the present value) of the item you display appear at the top of the display panel. Each display panel can contain different tabs, depending on the item selected from the navigation tree, and each tab shows different information. Dynamic attributes displayed in a panel automatically refresh when changes are detected.

The default display panel is the first empty panel or last unlocked panel if all displayed panels are filled. Display panels are locked while in Edit mode, or may be locked using the Lock button of the selected display panel. If all available panels are locked, you cannot display an additional item in any of the display panels.

You can resize each display panel by dragging its borders, or using an available splitter bar. With some items, an Edit button appears (except in Simulation mode), allowing you to edit the item's configuration attributes.

You can drag and drop items into a display panel and navigate among them using the Back and Forward display panel [buttons](#). The display panel holds a maximum history of five items.

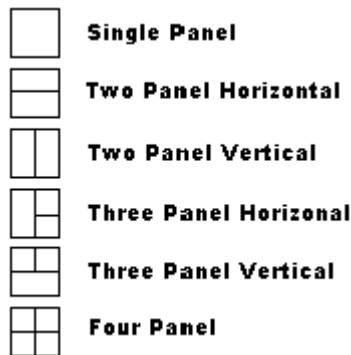
If you run any of the predefined [reports](#) found in the Query Menu, the result of the query appears in an available panel in a spreadsheet format. Sort the report results by clicking the column heading, and resize columns by dragging column borders. When you scroll down through the column, the headers remain visible.

The data presented in a report comes from a snapshot of the system at the time you request the report. The displayed data does not automatically refresh and does not support an Edit mode. You can manually refresh the report through the Action Menu.

Display Frame Layout

The user interface allows you to define your own display frame layout. Six options are available:

Figure 20: Panel Layout Options



To change the way the panels are arranged, see [Changing the Display Panel Layout](#). If you have a multi-panel display and you change to a layout with fewer panels, the locked items/newest items in the view stay, depending on how many panes are available in the new layout. The other panels close, and they do not reappear if you switch back to the multi-pane view.

To resize the panels, drag the borders of the panel until it reaches the desired size. To make one panel (in a multi-panel arrangement), take up the entire Display frame temporarily, click the [maximize button](#). To restore a maximized panel in a multi-pane view, click the restore button. A panel can also be maximized/restored by double-clicking its header bar.

Display Panel Tabs

Each display panel contains tabs that vary depending on the item displayed.

For example, most of the point objects, such as the OAT contain the following tabs:

Table 65: Tabs

Tab	Description
Alarm	Becomes available when you define an Alarm Extension for a point. The New and Delete buttons allow you to add or delete Alarm Extensions for the point. The Basic and Advanced radio buttons allow you to filter the attribute display in this tab. The Edit button allows you to change configurable attributes.
Focus	Becomes available when you define a point object. The Focus tab shows operation attributes available for the object type to which the object belongs. Note that the Basic and Advanced radio buttons allow you to filter the attribute display in this tab. The Edit button allows you to change configurable attributes.
Hardware	Becomes available when you define a point object that has a reference to a physical input or output. The Hardware tab shows hardware-related attributes available for the object type to which the point object belongs.
BACnet Alarm	Becomes available when you define a BACnet intrinsic alarm for a point. The Intrinsic Alarming Defined attribute is explained in Trend Extension Attributes section. The BACnet Alarm tab shows BACnet Alarm-related attributes available for the object type to which the point object belongs. The Basic and Advanced radio buttons allow you to filter the attribute display in this tab. The Edit button allows you to change configurable attributes.
Totalization	Becomes available when you create a Totalizator Extension . New and Delete buttons allow you to add or delete Totalization Extensions for the point. The Edit button allows you to change configurable attributes.
Trend	Becomes available when you create a Trend Extension for a point object. New and Delete buttons allow you to add or delete Trend Extensions for the point. The Chart view allows you to view data samples in a graphical format and retrieve new trend data. The Table view of the Trend Extension allows you to view the trend's data samples in a table format. The Definition view of the Trend Extension allows you to view and edit the attributes of the trend extension object.
Averaging	Becomes available when you create an Averaging Extension for a point object. The New button allows you to add Averaging Extensions for the point.
Load	Becomes available when you create a Load Extension for a point object. The New button allows you to add Load Extensions for the point.

Other items may contain fewer or more tabs. For example, the item representing a network engine or Metasys Server contains the following tabs:

- Focus
- Summary
- Diagnostic
- Communication
- Network
- Email (disabled in the ADS/ADX at Release 10.1 and later, but enabled in Metasys UI)
- Pager (removed from the ADS/ADX at Release 10.1 and later)
- SNMP (disabled in the ADS/ADX at Release 10.1, but enabled in Metasys UI)
- Alarm
- Trend









- Syslog (disabled in the ADS/ADX at Release 10.1 and later, but enabled in Metasys UI)
- Printer (disabled in the ADS/ADX at Release 10.1 and later, but enabled in Metasys UI)

For information on the tabs available in the system, see the [Object and Feature Tabs](#) section.

Display Panel Buttons

Table 66 shows the display panel buttons.

Table 66: Display Panel Buttons

Button	Description
	Allows you to edit attributes for the displayed item. The values you can edit vary depending on the displayed item. Click Save to save your changes. Note: <ul style="list-style-type: none"> • This button does not appear in Simulation mode. • This button appears dimmed if the user has Standard Access mode, but does not have Modify Items permission for the object being viewed. • The term edit refers to changing items using the Edit button. See the Modify section. The term modify refers to changing items using the Modify menu item and the Modify dialog box. See the Modify Dialog section.
	Displays the content previously displayed in that panel. Each panel can have a display history of up to five items.
	Displays the content of the next panel saved in the history.
	Locks the selected display panel (prevents another item from being dropped in this panel and overwriting it). A locked panel can be resized. This button toggles between locked and unlocked.
	Maximizes the active panel to the full size of the Display Frame. You can also maximize the pane by double-clicking the header bar. The other panels reappear if you click the restore button.
	Restores the panels to their original size and position. You can also restore the pane by double-clicking the header bar.
	Closes just the currently displayed view in the display panel.
	Closes all of the views in the display panel (including views stored in history).
<input checked="" type="radio"/> Basic	Displays commonly used information about the displayed item.
<input type="radio"/> Advanced	Displays all the information the system contains pertaining to the displayed item.

Action Menu

In addition to the four [modes](#) of operation that determine the items appearing in menus, the Action menu is context-specific. Different item-specific options appear in the Action menu based on what is currently selected in the navigation tree. Also, different feature-specific options appear in the Action menu based on the active [panel](#) or feature displayed in the selected [display panel](#).

- ① **Note:** The options available in the Action Menu are also available from the Right-click functionality.

The following table lists the menu items for the Action menu. For details on which options appear with certain items or features selected, see:

- [Action Menu - Item Specific](#)
- [Action Menu - Feature Specific](#)

Click one of the following menu items for a description of the menu item.

Table 67: SMP Action Menu

Menu Item		
Command ¹	Show Extensions	Refresh All Tabs
Modify ²	View Annotations ³	Ack
Locate in Tree	Add Annotation ³	Discard
Import Definition ⁴	Refresh	Import Integration
Export Definition ⁴	Refresh Current Tab	Remove From Site

- 1 The commands in the Command dialog require authorization.
 2 The attributes in the [Modify](#) dialog require authorization.
 3 Available on the Metasys Server only.
 4 Available for the Summary Definitions folder in the All Items tree.

Action Menu - Feature Specific

The following table describes the different menu items that appear in the Action menu based on the active panel or feature displayed in the selected display panel. Click each active panel or feature for a description. For more information on the modes of operation, see [Metasys Modes](#).

- ① **Note:** The Refresh, Refresh Current Tab, and Refresh All Tabs menu items appear in the Action menu for all other features or active panels.

Table 68: Action Menu - Feature Specific

Active Panel/Feature	Content
Event Viewer	<ul style="list-style-type: none"> • Refresh • Add Annotation (available on the Metasys Server only.) • View Annotations (available on the Metasys Server only.) • Ack • Discard
Audit Viewer	<ul style="list-style-type: none"> • Refresh • Add Annotation (available on the Metasys Server only.) • View Annotations (available on the Metasys Server only.) • Clear Audit Log
Scheduled Reports (available on the Metasys Server only.)	<ul style="list-style-type: none"> • Refresh

Table 68: Action Menu - Feature Specific

Active Panel/Feature	Content
<p>Tailored Summary Viewer The menu options available are item-specific (that is, they depend on the type of item selected in the Summary Definitions and Key Data tables).</p>	<ul style="list-style-type: none"> • Command • Modify • Add Annotation (available on the Metasys Server only.) • View Annotations (available on the Metasys Server only.) • Show Extensions • Remove From Site (available for a network engine only). • Import Integration (available for a Tailored Summary with trunk/integration data. For example, trunk diagnostics).
<p>Trend Viewer</p>	<ul style="list-style-type: none"> • Refresh • Command
<p>Global Search</p>	<ul style="list-style-type: none"> • Refresh
<p>Change Results Viewer</p>	<p>No Action menu options for this feature.</p>

Action Menu - Item Specific

The following table describes the different menu items that appear in the Action menu based on what is currently selected in the navigation tree. Click each item for a description. For more information on the modes of operation, see [Metasys Modes](#).

Note: The Refresh Current Tab and Refresh All Tabs menu items appear in the Action menu for all of these items.

Table 69: Action Menu - Item Specific

Item	Contents In Mode		
	Online (Standard Access)	Offline (SCT)	Simulation
ADS Device Object	<ul style="list-style-type: none"> • Command • Modify • Add Annotation • View Annotations • Remove From Site 	<ul style="list-style-type: none"> • Modify • Rename 	
Integration	<ul style="list-style-type: none"> • Command • Modify • Add Annotation • View Annotations • Show Extensions • Import Integration 	<ul style="list-style-type: none"> • Modify • Show Extensions • Import Integration • Export .caf files on a MSTP Field Bus integration 	<ul style="list-style-type: none"> • Command • Show Extensions
Site Object	<ul style="list-style-type: none"> • Command • Add Annotation • View Annotations 	<ul style="list-style-type: none"> • Site Discovery 	<ul style="list-style-type: none"> • Command
Supervisory Device (Network Engine)	<ul style="list-style-type: none"> • Command • Modify • Add Annotation • View Annotations • Show Extensions • Remove From Site 	<ul style="list-style-type: none"> • Modify • Show Extensions • Start Simulation • Rename 	<ul style="list-style-type: none"> • Command • Show Extensions
All Other Objects	<ul style="list-style-type: none"> • Command • Modify • Add Annotation • View Annotations • Show Extensions 	<ul style="list-style-type: none"> • Modify • Show Extensions 	<ul style="list-style-type: none"> • Command • Show Extensions

Commands

Use commands to force an item to perform a specific action. For example, ON and OFF commands for a [binary output](#) make a fan run or stop, and the Enable and Disable commands in the [Trend extension](#) start and stop the collection of samples.

For information on which commands an item supports, see the appropriate topic in the [Object Help](#).

For information on how to send a command to a single item, see [Commanding an Item](#) in the [Commands Dialog](#) section.

For information on sending a command to multiple items, see [Commanding Multiple Items \(Global Command\)](#) in the [Commands Dialog](#) section.

Commands Dialog

The Commands dialog box allows you to send a command to a single item (single command feature) or to multiple items at once (global commands feature). You can open the Global Search Viewer or a Tailored Summary, for example, in a display panel and select one or more items from the table to command. For example, you could send a command to open all the reheat valves on VAV boxes so the balancer can balance the hot water system in your facility.

The single command feature uses the Commands dialog box. The global commands feature uses the Global Commands dialog box for sending commands and uses the Change Results Viewer for viewing, saving, and printing the sent global commands.

For information on the Change Results Viewer and how to use it, see the [Change Results Viewer](#) section. The Change Results Viewer is used by both the Global Modify and the Global Commands features.

See [Using Global Commands with the Global Search](#) in this section for steps on using the Global Search and Global Commands features together.

Commands Dialog Concepts

Commands Overview

You can send a command by selecting one or more Metasys system objects (items) in the navigation tree or in the display panel. For example, you can open the Global Search Viewer in a display panel and select one or multiple items from the Search Results table to command. See [Commanding Objects in the Search Results Table](#) in the [Global Search](#) section.

For the global commands feature, the Change Results Viewer displays the results of all global commands sent during the current user session. The viewer includes information such as change type, time, status, item name, and parameter. You can save the results to a text file or print the results if you wish to review them at a later time. The Change Results Viewer provides the option to copy one or more result entries to the clipboard for pasting into Microsoft Excel or Word or other applications. You also can sort the results table data in ascending or descending order, and resize and reorganize the columns to suit your needs.

Once you log out of the Metasys system, the current user session closes and the items in the Change Results Viewer are permanently cleared.

See the [Commands Dialog Box](#), [Global Commands Dialog Box](#), and [Change Results Viewer](#) sections.

Commands Dialog Box

The Commands dialog box allows you to configure and send a command to a single item in the Metasys system. You can access the Commands dialog box from the [Action Menu](#) by selecting **Command**. You also can access the Commands dialog box from the right-click menu (in supported views).


 **Note:** Commands issued through the Commands dialog box are not shown in the [Change Results Viewer](#).

Figure 21: Global Commands Dialog Box - Commands Tab

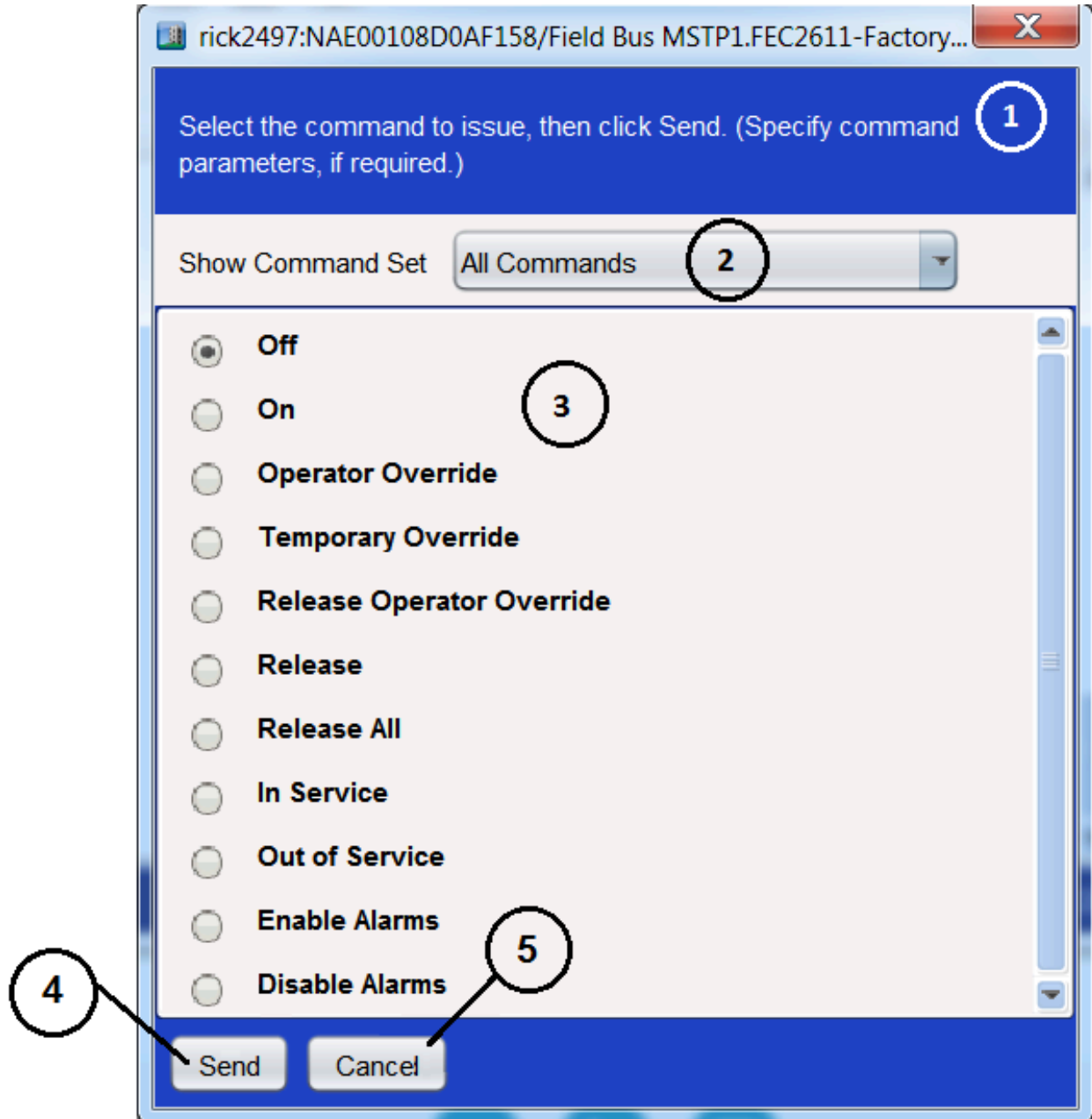


Table 70: Commands Dialog Box Components

Callout	Screen Area/Item	Description
1	Instructions Area	Provides tips to help you send a command.
2	Show Command Set Drop-Down Menu	<p>Allows you to filter the commands list by:</p> <ul style="list-style-type: none"> • All Commands: Shows all commands for the item. • Primary Commands: Shows the commonly used commands for the item. The Preliminary Commands selection shows only the Archive, Reset Device, and Route Samples commands. • Secondary Commands: Shows the less commonly used commands for the item. The Secondary Commands selection shows only the Change Audit Enabled Class Level and Update Flash Usage commands. <p> ⓘ Note: User Preferences determines the default setting.</p>
3	Commands List	Displays the list of commands available for the selected item. Unauthorized commands are either grayed out (disabled) or not shown (hidden), depending on user preference settings. The default is grayed out. For commands that require parameter values, the fields appear after selecting the command.
4	Send	Sends the selected command to the object/item. All commands are sent at the default priority for the command.
5	Cancel	Closes the Commands dialog box without sending the command.

Global Commands Dialog Box

The Global Commands dialog box allows you to configure and send a command to multiple items in the Metasys system. You can access the Global Commands dialog box from the [Action Menu](#) by selecting **Command**. However, you must have more than one object selected in the navigation tree or the display panel to open the Global Commands dialog box. You also can access the Global Commands dialog box from the right-click menu (in supported views).

Figure 22: Global Commands Dialog Box - Commands Tab

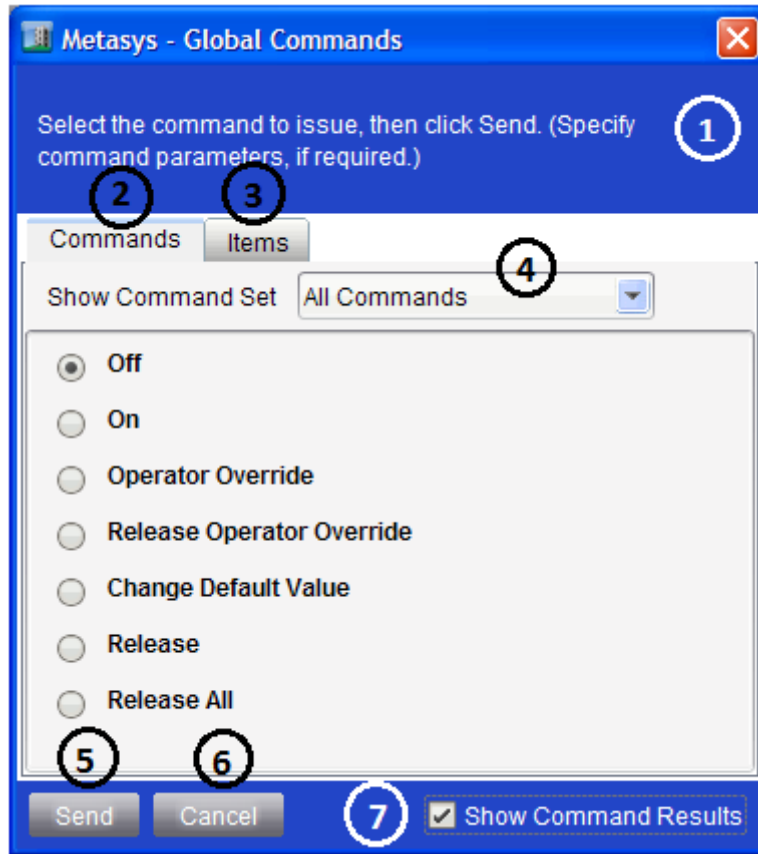


Figure 23: Global Commands Dialog Box - Items Tab

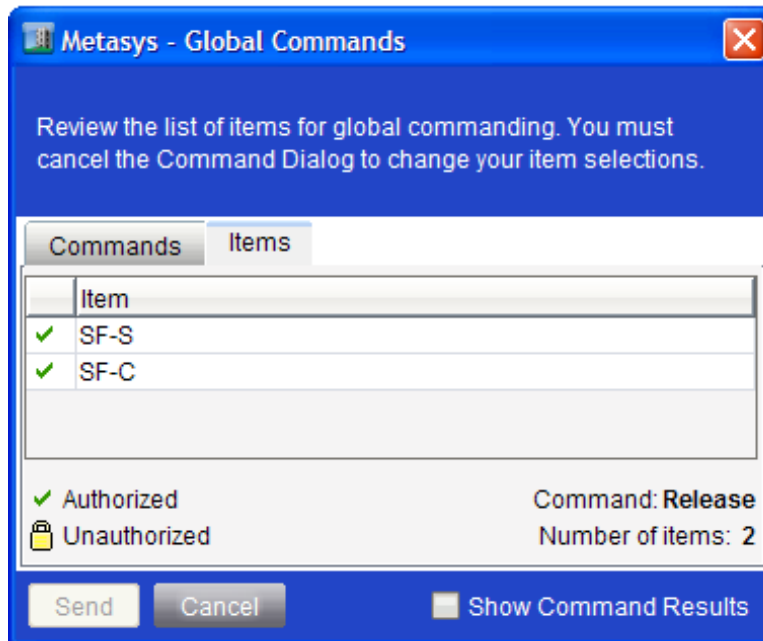


Table 71: Global Commands Dialog Box Components

Callout	Screen Area/Item	Description
1	Instructions Area	Provides tips to help you send a global command.
2	Commands Tab: Commands List	Displays the list of commands available for the selected items. Unauthorized commands are either grayed out (disabled) or not shown (hidden), depending on user preference settings. The default is grayed out. For commands that require parameter values, the fields appear after selecting the command.
3	Items Tab	Lists the selected items in table format and indicates: <ul style="list-style-type: none"> • if you are authorized/unauthorized to send the command to the items • the command to be sent • the number of items to be commanded
4	Commands Tab: Show Command Set Drop-Down Menu	Allows you to filter the commands list by: <ul style="list-style-type: none"> • All Commands: Shows all commands for the item. • Primary Commands: Shows the commonly used commands for the item. The Primary Commands selection shows only the Off, On, Operator Override, Release Operator Override, and Change Default Value commands. • Secondary Commands: Shows the less commonly used commands for the item. The Secondary Commands selection shows only the Release and Release All commands. <p> ⓘ Note: User Preferences determines the default setting.</p>
5	Send	Sends the selected command to the objects listed in the Items tab. All commands are sent at the default priority for the command.
6	Cancel	Closes the Global Commands dialog box without sending the command.
7	Show Command Results	When selected, displays the Change Results Viewer in the display panel after clicking Send .

Global Command Support

The following table lists the objects that can be commanded using the global command feature, and the available commands.

Table 72: Global Command Support

Object ¹	Commands
Accumulator Object	<ul style="list-style-type: none"> • Present Value
Alarm Extensions	<ul style="list-style-type: none"> • Enable • Disable • Cancel Delay Time • Cancel Report Delay
Analog Input Object	<ul style="list-style-type: none"> • In Service • Out of Service • Temporary Out of Service • Enable Alarms • Disable Alarms
Analog Output Object	<ul style="list-style-type: none"> • Release All • Release • Operator Override • Release Operator Override • Temporary Override • Adjust • Setpoint (N2 AO only) • Enable Alarms • Disable Alarms • In Service • Out of Service
Analog Value Object	<ul style="list-style-type: none"> • Release All • Release • Operator Override • Release Operator Override • Temporary Override • Adjust • Change Default Value (MS/TP only) • Enable Alarms • Disable Alarms
Binary Input Object	<ul style="list-style-type: none"> • In Service • Out of Service • Temporary Out of Service • Enable Alarms • Disable Alarms

Table 72: Global Command Support

Object ¹	Commands
Binary Output Object	<ul style="list-style-type: none"> • Release All • Release • Operator Override • Temporary Override • Release Operator Override • In Service • Out of Service • Enable Alarms • Disable Alarms • State Commands²
Binary Value Object	<ul style="list-style-type: none"> • Release All • Release • Operator Override • Release Operator Override • Temporary Override • State Commands² • Change Default Value (MS/TP only) • Enable Alarms • Disable Alarms
Engine Device Object	<ul style="list-style-type: none"> • Apply Staged Files • Cancel Staged Files • Archive • Reset Device • Change Audit Enabled Class Level • Update Flash Usage • Route Samples • Rediscover Text Strings
Global Data Object	<ul style="list-style-type: none"> • Enable • Disable
Integration Objects ³	<ul style="list-style-type: none"> • Activate Provisioning • Analyze Field Bus • Clear Statistics • Latch Statistics • Refresh Provisioning Discovery • Sync Field Device Time(s)

Table 72: Global Command Support

Object ¹	Commands
Load Extensions	<ul style="list-style-type: none">• Unlock• Lock• Shed• Release Load• Comfort Override• Release Comfort Override• Enable• Disable
Multiple Command Object	<ul style="list-style-type: none">• Release All• Release• Operator Override• Release Operator Override• State Commands⁴• Enable• Disable
Multistate Input Object	<ul style="list-style-type: none">• In Service• Out of Service• Temporary Out of Service• Enable Alarms• Disable Alarms
Multistate Output Object	<ul style="list-style-type: none">• Release All• Release• Operator Override• Release Operator Override• Temporary Override• State Commands⁴• Enable Alarms• Disable Alarms

Table 72: Global Command Support

Object ¹	Commands
Multistate Value Object	<ul style="list-style-type: none"> • Release All • Release • Operator Override • Release Operator Override • Temporary Override • State Commands⁴ MSV Mapper (MS/TP FEC MSV only): • Set State Command • Change Default Value • Enable Alarms • Disable Alarms
Optimal Start Object	<ul style="list-style-type: none"> • Enable • Disable
Schedule Object ⁵	<ul style="list-style-type: none"> • Enable • Disable
Trend Extensions	<ul style="list-style-type: none"> • Clear • Execute • Enable • Disable • Route
Totalization Extensions	<ul style="list-style-type: none"> • Reset • Enable • Disable

- 1 You must select and command similar object types. For example, you cannot send a command to both alarm extensions and trend extensions at once. You need to command the alarm extensions and trend extensions separately.
- 2 For binary objects, state commands display as the generic State0 and State1 commands if the States Text attribute is different. If the States Text attribute is the same, then the specific states text is used (for example, On or Off).
- 3 Integrations include BACnet Protocol Eng, Eth IP DataLink, Field Bus MSTP, SA Bus, N2 Trunk, VND, Wireless Supervisor, BACnet, and N1 Migration.
- 4 For multistate objects, state commands display as the generic State0 and State1 commands if the States Text attribute is different. If the States Text attribute is the same, then the specific states text is used (for example, On, Off, or Auto). In addition, you can command multistate items together only when the number of states matches.
- 5 This works only for schedules in the NxE, not the FAC.

Commands Dialog Steps

Commanding an Item

About this task:

To send a command to an item in a graphic, see the [User Graphics Tool \(UGT\)](#) section. To send a command to an item in a Graphics+ graphic, see the [Graphics+](#) section. To send a command to multiple items, see the [Commanding Multiple Items \(Global Command\)](#) section.

To command an item:

1. Select the item to command in the navigation tree or in the display panel.
2. From the [Action Menu](#), select Command, or right-click and select **Command**.

3. Filter the list of commands using the Show Command Set drop-down menu, if desired.
4. Select the command to issue.
 - ① **Note:** After selecting one of the available commands, you may be prompted to specify additional parameters for the command.
5. Click **Send**.
 - ① **Note:** If an error occurs while sending the command, the dialog box remains open.

Commanding Multiple Items (Global Command)

About this task:

This procedure sends a command to more than one item. For information on sending a command to a single item, see [Commands](#) in the [Site Management Portal User Interface](#) section.

To command multiple items (send a Global Command):

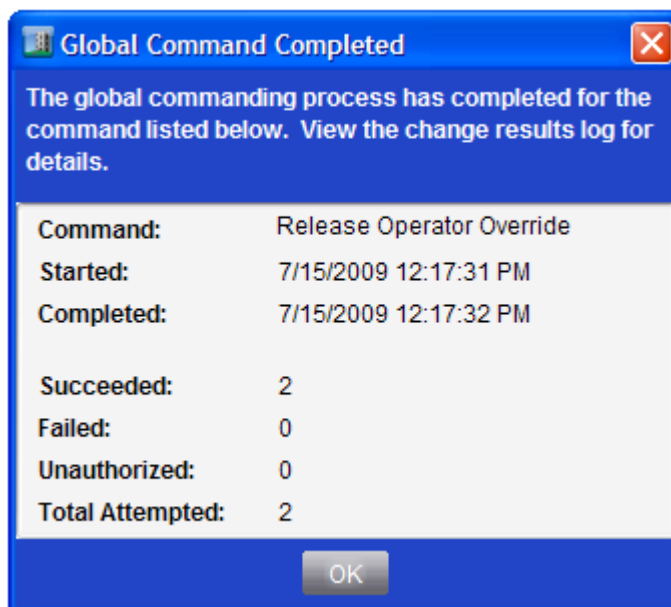
1. Select the desired, compatible objects in the navigation tree or in the display panel. Hold the Ctrl or Shift keys when clicking to select multiple items in the navigation tree, or use the selection conventions of the feature displayed in the display panel. For example, see [Commanding Objects in the Search Results Table](#) in the [Global Search](#) section.
 - ① **Note:** You must select and command similar object types. For example, you cannot send a command to both alarm extensions and trend extensions at once. You need to command the alarm extensions and trend extensions separately.
2. From the [Action Menu](#), select **Command**, or right-click and select **Command**. If you selected objects from the navigation tree, a Preparing Data box appears stating the authorization information for the selected objects is being retrieved. The Global Commands dialog box appears.
 - Notes:**
 - If you click Cancel on the Preparing Data box, both it and the Global Commands dialog box close without issuing commands.
 - If no commands are available for the selected objects or if you have selected incompatible object types, a dialog box appears stating so. Click OK. The Commands dialog box does not open. Go back to Step 1.
3. On the Commands tab, filter the list of commands using the Show Command Set drop-down menu, if desired.
4. On the Commands tab, select the command to send to the objects.
 - ① **Note:** After selecting one of the available commands, you may be prompted to specify additional parameters for the command.
5. On the Items tab, review the list of objects to command.
 - ① **Note:** To change the objects in this list, click **Cancel** and go back to Step 1.
6. Select the **Show Command Results** check box to display the Change Results Viewer after issuing the command.
7. Click **Send**. The command is sent to the selected objects and the Change Results Viewer appears if you selected the Show Command Results check box.

- ① **Note:** If you are not authorized to send a global command to one or more objects, a dialog box appears stating the command will not be sent to unauthorized objects. Click **Yes** to continue to send the command to the authorized objects. Click **No** to return to the Command dialog box without sending the command to any objects. Click **Cancel** to close the Command dialog box without sending the command to any objects. Your system access and category-based privileges set in the Security Administrator System determine your authorization.

After the command has been sent to all selected items, the Global Command Completed dialog box appears indicating:

- the command sent
- the date/time the command started and completed
- the number of successful/failed commands
- if any commands were not sent because they were unauthorized
- the total commands attempted

Figure 24: Global Command Completed Dialog Box



8. Click **OK**.

Result

See [Working with the Change Results Viewer](#) in the [Change Results Viewer](#) section.

Using Global Commands with the Global Search

About this task:

To use Global Commands with the Global Search:

1. Perform a global search according to the [Performing a Global Search](#) procedure in the [Global Search](#) section. For example, search for alarms that you plan to command.
2. Save the object list if this is a common search (for example, you plan to command the alarms or review their status often). See [Working with Search Results](#) and [Saving an Object List](#) in the [Global Search](#) section.

3. Select the items in search results table and send a global command (for example, enable or disable alarms) according to the instructions in the [Commanding Multiple Items \(Global Command\)](#) section.

Result

- ① **Note:** In addition to these options, you can perform a global modification on items in the object list. Select and right-click the items, and modify them as desired. See the [Modify Dialog](#) section.

Modify

About this task:

The term modify refers to changing items using the Modify menu item and the Modify dialog box. See the [Modify Dialog](#) section.

To edit the attributes of an item:

1. View the details of the item in a [display panel](#).
2. Select an item tab (for example, Focus).
 - ① **Note:** Some items contain an Advanced radio button. If you select this button, additional attributes appear.
3. Click **Edit**.
4. Edit the attributes as needed.
 - ① **Note:** If you place your cursor over an edit field, the ToolTip provides information about the valid format or range for that value. ToolTips also appear for strings.
5. Click **Save**.

For information on using the Modify dialog box to modify single or multiple items, see the [Modify Dialog](#) section.

Modify Dialog

- ① **Note:** The term edit refers to changing items using the Edit button. See the [Modify](#) section. The term modify refers to changing items using the Modify menu item and the Modify dialog box as described in this section.

The Modify dialog box allows you to modify attributes of a single item (single modify feature) or multiple items at once (global modify feature). For example, you can open the Global Search Viewer or a Tailored Summary in a display panel and select one or more items from the table to modify; or you could send a modification to change the Authorization Category of all VAV boxes in your facility from General to HVAC. Only attributes common to all items being modified appear in the Global Modify dialog box.

The single modify feature uses the Modify dialog box. The global modify feature uses the Global Modify dialog box for sending modifications and uses the Change Results Viewer for viewing, saving, and printing the sent global modifications.

For information on the Change Results Viewer and how to use it, see the [Change Results Viewer](#) section. The Change Results Viewer is used by both the Global Modify and the Global Commands features.

See [Using Global Modify with Global Search](#) in this section for steps on using the Global Search and Global Modify features together.

Single and Global Item Modify Concepts

Modify Dialog Box

The Modify dialog box allows you to modify attributes of a single item in the Metasys system. You can access the Modify dialog box for the selected item by selecting the **Modify** menu option from the Action Menu or the right-click menu. The attributes shown in the modify box are different for different object types.

Figure 25: Modify Dialog Box

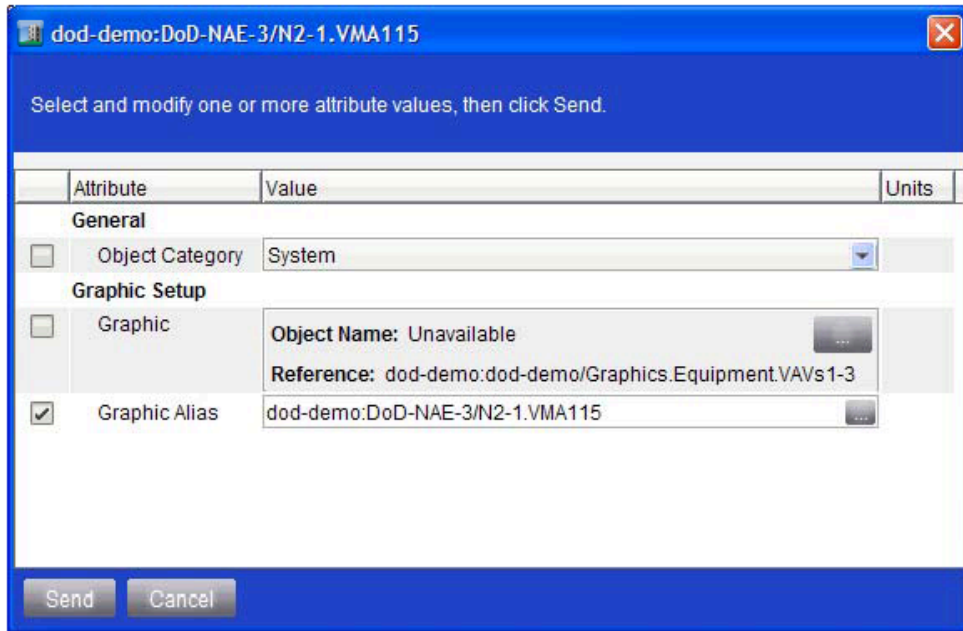


Table 73: Modify Dialog Box Components

Screen Area/Item	Description
Instructions Area	Provides tips to help you send a modification.
Attributes Table	Displays the list of attributes available to modify for the selected item. Unauthorized modifications are disabled. Attribute value fields appear after the attribute name. The check box next to an attribute is automatically selected when you make a modification in its value field. Modifications are sent for only the selected (checked) attributes.
Send	Sends the selected modifications to the object/item.
Cancel	Closes the Modify dialog box without sending the changes.

Global Modify Dialog Box

The Global Modify dialog box allows you to modify common attributes of multiple items in the Metasys system. You can access the Global Modify dialog box for the selected items by selecting the Modify menu option from the Action Menu or the right-click menu.

Figure 26: Global Modify Dialog Box - Attributes Tab

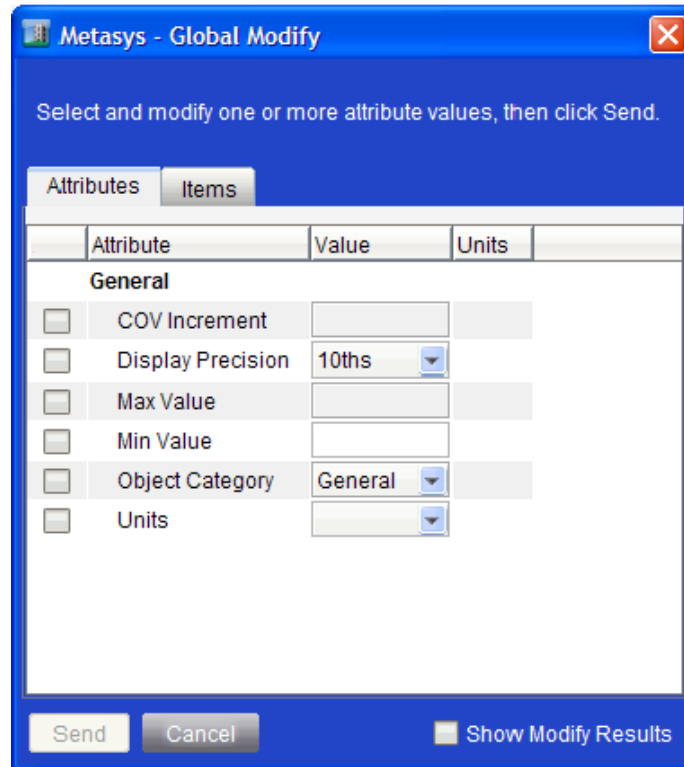


Figure 27: Global Modify Dialog Box - Items Tab

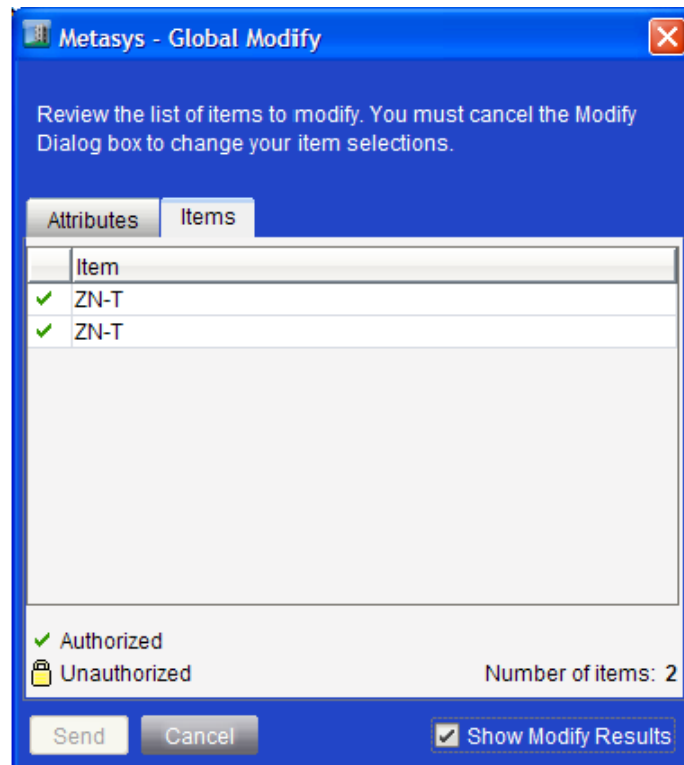


Table 74: Global Modify Dialog Box Components

Screen Area/Item	Description
Instructions Area	Provides tips to help you send global modifications.
Attributes Tab	Displays the list of common attributes available to modify for the selected items. Unauthorized modifications are disabled. Attribute value fields appear after the attribute name. The check box next to an attribute is automatically selected when you make a modification in its value field. Modifications are sent for only the selected (checked) attributes.
Items Tab	Lists the selected items in table format and indicates: <ul style="list-style-type: none"> • if you are authorized/unauthorized to modify the items • the number of items to be modified
Send	Sends the selected modification to the objects/items listed in the Items tab.
Cancel	Closes the Global Modify dialog box without sending the changes.
Show Modify Results	Displays the Change Results Viewer in the display panel after clicking Send (when this box is checked).

Modify Attributes

The following table lists the attribute groupings and examples of the attributes available for modification.

 **Note:** You can easily enter each controller's Fully Qualified Reference (FQR) by entering an asterisk (*) in the Graphic Alias field.

Table 75: Modify Attributes

Attribute Grouping	Example Attributes
General	<ul style="list-style-type: none"> • Change of Value (COV) Increment • Display Precision • Authorization Category • Units
BACnet Intrinsic Alarming	<ul style="list-style-type: none"> • BACnet Deadband • High Limit • Low Limit
Alarm Values	<ul style="list-style-type: none"> • Differential • High Alarm Limit • Low Alarm Limit
Alarm Setup	<ul style="list-style-type: none"> • Alarm Ack Required • Alarm Message Text • Alarm Priority • Event Enable
Graphic Setup	<ul style="list-style-type: none"> • Graphic • Graphic Alias

Modify Dialog Steps

Modifying a Single Item

About this task:

This procedure is for modifying a single item. To modify multiple items, see [Performing a Global Modify](#). For information on editing an item using the Edit button in the display panel, see the [Modify](#) section.

You can modify an item from the navigation tree, display panel view (for example, Tailored Summary view), or Global Search Results table.

To modify a single item:

1. Select and right-click a single item in the navigation tree, display panel view, or global search results. Select the **Modify** menu item. Or, select a single item and select the **Modify** command from the **Action** menu. The Modify dialog box appears.
2. Make changes to one or more attributes as desired.
3. Click **Send**.

Performing a Global Modify

About this task:

This procedure is for modifying more than one item in a single operation. To modify a single item, see [Modifying a Single Item](#). For information on editing an item using the Edit button in the display panel, see the [Modify](#) section.

You can globally modify items online and in the SCT. You can perform a global modification on items from the navigation tree, display panel view (for example, Tailored Summary view), or Global Search Results table.

- ① **Note:** Once sent, you cannot undo a global modification; however, you can send another global modification to readjust values as needed.

To perform a Global Modify:

1. Select multiple items in the navigation tree, display panel view, or global search results. Right-click the items and select the **Modify** menu item. The Global Modify dialog box appears.
 - ① **Note:** The Items tab lists the selected items and your permissions to modify them.
2. On the Attributes tab, make changes to one or more attributes as desired.
 - ① **Note:** You can easily enter each controller's Fully Qualified Reference (FQR) by entering an asterisk (*) in the Graphic Alias field.
3. Select the **Show Modify Results** check box to display the results of the modifications, if desired.
4. Click **Send**. If you selected to view results, the Change Results Viewer appears in a display panel. The Change Results Viewer has options to copy the results, save the results to a file, and clear the results.

Notes:

- If you are not authorized to send a global modification to one or more objects, a dialog box appears stating the modification can not be sent to unauthorized objects. Click **Yes** to continue to send the modification to the authorized objects. Click **No** to return to the Modify dialog box without sending the modification to any objects. Click **Cancel** to close the Modify dialog box without sending the modification to any objects. Your system access and category-based privileges set in the Security Administrator System determine your authorization.

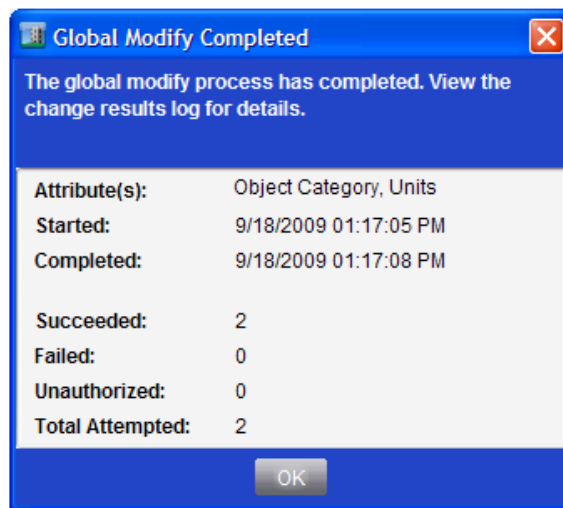
- On a Metasys for Validated Environments (MVE) site, you are prompted to authorize this action (only once) with the defined annotation and/or electronic signature requirements.

① **Note:** If you are not authorized to send a global modification to one or more objects, a dialog box appears stating the modification can not be sent to unauthorized objects. Click **Yes** to continue to send the modification to the authorized objects. Click **No** to return to the Modify dialog box without sending the modification to any objects. Click **Cancel** to close the Modify dialog box without sending the modification to any objects. Your system access and category-based privileges set in the Security Administrator System determine your authorization.

After the modification has been sent to all selected items, the Global Modify Completed dialog box appears indicating:

- the attributes that were modified (appears in a comma delimited list)
- the date/time the modification started and completed
- the number of successful/failed modifications
- if any modifications were not sent because they were unauthorized
- the total modifications attempted

Figure 28: Global Modify Completed Dialog Box



① **Note:** The **Succeeded** value in the Global Modify Completed window reflects the number of objects modified, **not** the number of object attributes modified.

5. Click **OK**.

Result

See [Working with the Change Results Viewer](#) in the [Change Results Viewer](#) section.

Using Global Modify with Global Search

About this task:

To use Global Modify with Global Search:

1. Perform a global search according to the [Performing a Global Search](#) procedure in the [Global Search](#) section. For example, search for alarms that you plan to modify.
2. Save the object list if this is a common search (for example, you plan to modify the alarms or review their status often). See [Working with Search Results](#) in the [Global Search](#) section.

3. Select the items in the search results and send a global modify according to the instructions in the [Performing a Global Modify](#) section.

Result

- ① **Note:** In addition to these options, you can perform a global command on items in the search results. Select and right-click the items, and command them as desired. See the [Commands Dialog](#) section.

Import Definition

Menu Selection: **Action > Import Definition**

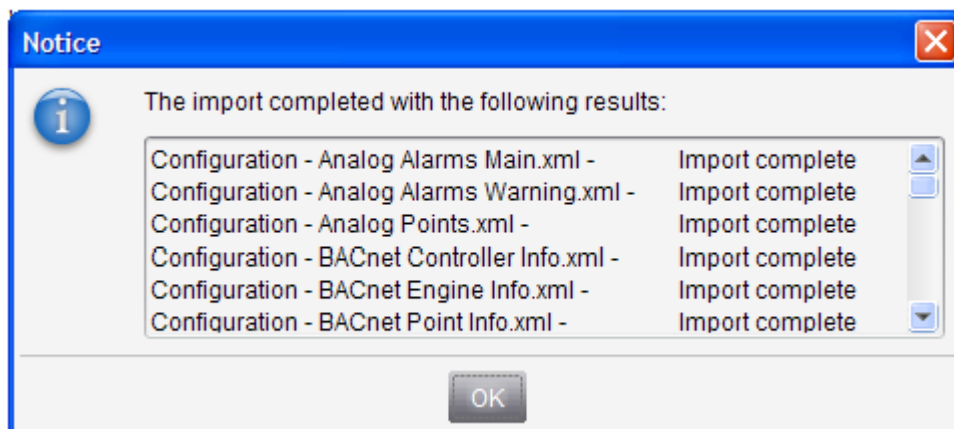
Imports the pre-built summary definition that is stored on the computer and is only available when the Summary Definitions folder is selected in the All Items tree. After importing a [definition](#), the imported Summary Definitions appear in the Summary Definitions folder in the All Items tree.

- ① **Note:** You also can import Summary Definitions that were previously exported. Refer to the [Exporting a Summary Definition](#) section in the *Metasys SCT Help (LIT-12011964)* for more information.

Importing a Summary Definition

1. In the All Items tree, right-click the **Summary Definitions** folder and then click **Import Definition**.
2. Browse to the location on the computer where the Summary Definitions are stored.
 - ① **Note:** You can download a set of pre-built Summary Definitions from the Johnson Controls License Portal and save these files to your computer. You also can import previously exported Summary Definitions. See the [Exporting a Summary Definition](#) section.
3. Select one or more Summary Definitions to import.
4. Click **Import**. The Notice dialog box appears, indicating the results of the import after all imports complete.

Figure 29: Notice Dialog Box



5. Click **OK**. The imported Summary Definitions appear in the Summary Definitions folder in the All Items tree.

Locate in Tree

Menu Selection: **Action > Locate in Tree**

Displays the expanded Equipment, Spaces, or All Items tree location for an object selected from the focus window. Locate in Tree is particularly useful in SMP when you are working with multiple focus windows and mapped points and need to locate where those points are located in the All Items tree.

Note: Locate in Tree is not compatible with either User Views or the Unlicensed Item trees.

Export Definition

Menu Selection: **Action > Export Definition**

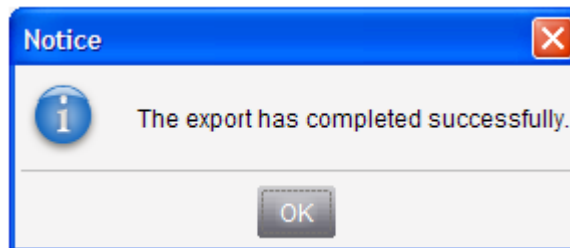
Exports the summary definition that is stored in the Summary Definitions folder in the All Items tree to a location on the computer. You can now share the Summary Definition with others and import it to other sites as desired.

Note: If you import the Summary Definition to another site, you may need to update the key data references. Refer to the *Importing a Summary Definition* section in the *Metasys SCT Help (LIT-12011964)* for more information.

Exporting a Summary Definition

1. In the Summary Definitions folder of the All Items tree, right-click the Summary Definition and select **Export Definition**. The Export dialog box appears.
2. Browse to the location on the computer to store the Summary Definition.
3. Click **Export**. The Notice dialog box appears, indicating the results of the export.

Figure 30: Notice Dialog Box



4. Click **OK**.

Result

Note: You can now share the Summary Definition with others and import it to other sites as desired. If you import the Summary Definition to another site, you may need to update the key data references.

View Annotations

Menu Selection: **Action > View Annotations**

Displays the existing annotations for the selected item in the [Audit Viewer](#), [Event Viewer](#), Tailored Summary, Global Search results, Navigation Tree, and so on.

Add Annotation

Menu Selection: **Action > Add Annotations**

Adds an annotation for the selected item in the [Audit Viewer](#), [Event Viewer](#), Tailored Summary, Global Search results, Navigation Tree, and so on.

Viewing Extensions

About this task:

To view extensions:

1. Drag and drop the object into the [Panel Layout](#).
2. Click the tab along the top for the desired extension.

Extension Wizard

Menu Selection: **Actions** > **Show Extensions** (menu option is available only when an item that supports extensions is selected)

Adds features, such as trending, alarming, averaging, loading and totalization, to an item. Extension types include:

- **Resource File**—Adds a resource file to a field device or integration, if supported.
- **Trend**—Adds trending capabilities to an item.
- **Totalization**—Adds totalization capabilities to an item.
 - ① **Note:** Select either the **Event Totalization** or **Runtime Totalization** radio button if they appear on the right side of the Select Attribute screen of this wizard. If these selections do not appear, the attribute you selected uses Analog Totalization.
- **Alarm**—Adds attributes for generating alarm and event messages to an item. See the [Alarm and Event Management](#) feature for information.
- **Averaging**—Adds averaging capabilities to an item.
- **Load**—Adds the load capability of the Energy Management feature. You can add only one load extension to an object.

See the [Extensions](#) section.

Extensions

Extensions add features, such as trending, alarming, and totalization, to an item.

Click one of the following for more information on extensions:

- For information on searching for extensions, see the [Global Search](#) section.
- For information on commanding extensions, see [Commanding Extensions](#).
- For more information on managing extension attributes as part of a tailored summary, see the [Summary Definition Object](#) section.

Alarm Extensions

Alarm extensions monitor an attribute of an object and send alarms using the Alarm and Event Management feature. There are two types of alarm extensions, [Analog Alarm](#) and [Multistate Alarm](#). Use the Analog Alarm extension to monitor attributes with real values. Use the Multistate Alarm extension to monitor attributes with True or False, or Multistate data types.

For general information on Metasys system objects, see the [Object Help](#) section.

Alarm Extensions Concepts

Analog Alarm Extension

The Analog Alarm extension adds the alarming capability for attributes with real values, such as the Present Value of an [Analog Input Object](#). This extension detects an alarm based on up to four limits and can be configured to report that alarm. It also sets the Alarm State attribute of the object to which it is added. The Analog Alarm Extension is also used with the Graphic Setting Preferences, which are used to establish color choices for alarm conditions in graphics.

For example, you can configure the Analog Alarm extension to issue an alarm if the temperature in a room falls below 15.6 °C (60 °F).

Multistate Alarm Extension

The Multistate Alarm extension adds the alarming capability for an attribute with True or False, or Multistate data types, such as the Present Value of a [Binary Input Object](#).

The Multistate Alarm extension detects the alarm with respect to a difference from a defined normal state and sets the Alarm State attribute of the object to which it is added. In addition, you can configure the Multistate Alarm extension to report alarms and True or False and/or Multistate events.

Normal State

Normal state occurs when the alarm extension is in an acceptable, expected condition, as indicated by the attribute point to which it is added.

Warning State

Warning state occurs when the analog alarm extension transitions from Normal into the high or low warning conditions.

Alarm State

Alarm state occurs when the extension transitions into the high alarm, low alarm, or unreliable conditions.

AO/BO Feedback

The Alarm extensions provide feedback in points to prevent the detection of alarm conditions that are really false alarms. For the Analog Alarm Extension, this feedback is done through the configuration of the Setpoint Reference attribute. For the Multistate Alarm Extension, this feedback is done through the configuration of the Command Reference attribute. When you reference other attributes using the Setpoint Reference or Command Reference attributes, the alarm analysis works differently.

Analog Points:

For example, add an Analog Alarm extension to an Analog Input Object (zone temperature). Define the Present Value of the Analog Input Object as the Input Reference and define the Define the Present Value of an Analog Output Object (setpoint) as the Setpoint Reference of the Analog Alarm extension.

If you edit the Setpoint (Define the Present Value attribute of the Analog Output Object), the Warning Reference attribute of the Analog Alarm extension of the Zone Temperature Analog Input Object changes to the same value. The Reference Delay Time of the Analog Alarm extension resets at this same time and prevents a false alarm condition from being detected.

Binary or Multistate Points:

For example, add a Multistate Alarm extension to a Binary Input Object or Multistate Input Object. Define the Present Value of a Binary Input (fan status) or Multistate Input as the Input Reference; then define the Present Value of a Binary Output Object (command state) or Multistate Output Object as the Command Reference of the Multistate Alarm extension.

If you edit the Command State (Present Value attribute of the Binary Output Object or Multistate Output Object), the Normal State attribute of the Multistate Alarm extension of the Fan Status Binary Input Object or Multistate Input Object changes to the same value. The Reference Delay Time of the Multistate Alarm extension resets at this same time, preventing a false alarm condition from being detected.

Delay Timer Interaction

There are two timers used to delay the analysis or reporting of an alarm. These timers are used to allow normal functions to occur before an object's behavior appears abnormal and generates an alarm. The first timer is the **Alarm State: Reference Delay Timer**, which allows a preset amount of time to pass between commanding an object and making sure that the commanded object has obeyed the command before considering an alarm condition to be present. The second timer is the **Alarm State: Report Delay Timer**, which prevents the analysis of an object's condition until the preset time has passed after that object has appeared to obey a command.

The length of the reference delay time is a combination of the reference delay time and the report delay time settings. If you change the warning reference, both delays go active; and if the reference delay time is greater than or equal to the report delay time, then the total delay is the sum of both timer settings. However, if the reference delay time is less than the report delay time, then the delay is equal to the report delay time setting.

The delay timers of the alarm extensions interact as follows:

- ① **Note:** If no Warning Limits are defined, the Reference Delay Time and Reference Delay Timer Active attributes do not apply.

Figure 31: Delay Timer Interaction

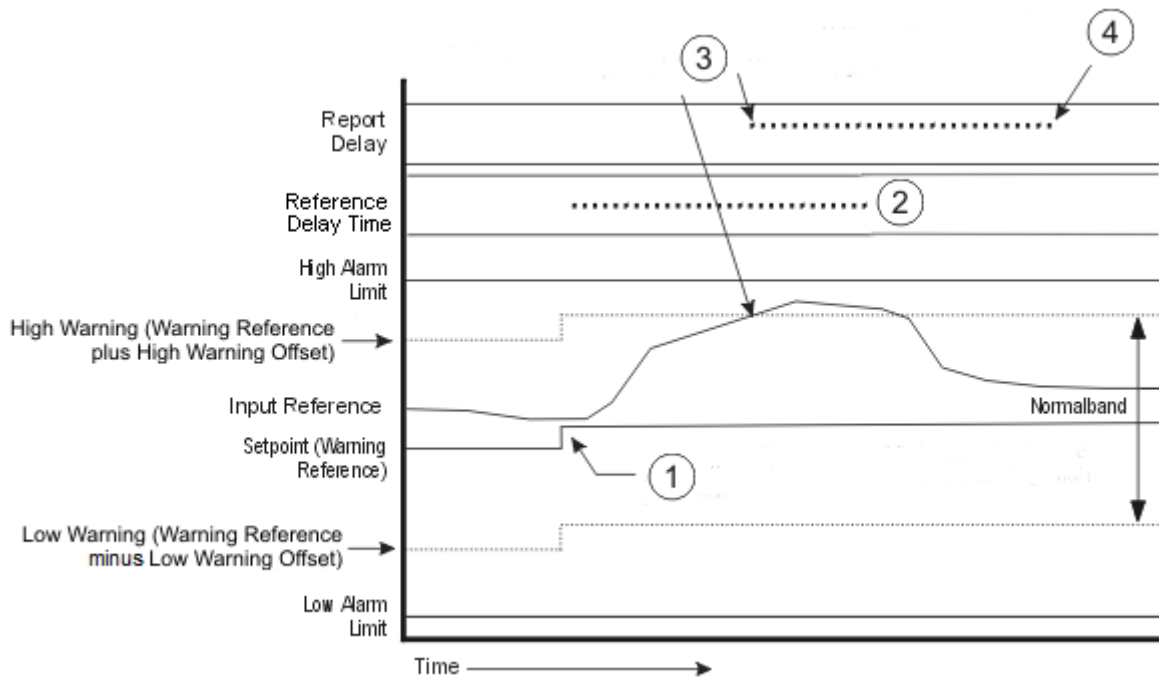


Table 76: Delay Timer Interaction Description

Callout	Name	User Action
1	Warning reference command	Commands the Warning reference to change, moves the setpoint and the corresponding High and Low warnings.

Table 76: Delay Timer Interaction Description

2	Reference Delay Timer	Timer starts when the Warning Reference changes.
3	Report Delay Interval	Interval starts if high or low warning is exceeded. The delay is applied on both the entrance into the alarm condition and the exit out of the alarm condition.
4	After Report Delay Interval	Input reference is analyzed for alarm conditions.

See the [Multistate Alarm Delay Examples](#) section.

See the [Analog Alarm Attributes](#) and the [Multistate Alarm Attributes](#) for more information.

Multistate Alarm Delay Examples

About this task:

When attaching alarm extensions to Binary objects, we recommend that the Alarm extension be attached to a [Binary Input Object](#) (BI). When the [Binary Output Object](#) (BO) is commanded On, the command is seen by the command reference of the BI and triggers the Alarm State: Reference Delay Timer, which changes the Normal state of the associated BI. The Reference: Input of the BI should change to match the new Normal state during the time set by the Alarm State: Reference Delay Timer. If it does not, the BI immediately goes into Alarm upon expiration of the Reference Delay Time. If the BI Reference: Input changes to match the new Normal state, then the Alarm State: Report Delay Timer starts. The Alarm State: Report Delay time does not delay delivery of a previously generated report. It delays the analysis of the BI object for an alarm condition until the Report Delay time has passed. Once the Report Delay time passes, the BI is analyzed for Alarm conditions.

For example, with a BO controlling a fan and a BI with an Alarm Extension set using the BO as an Input reference, two possible conditions are affected by the Alarm State delay timers:

1. **Fan On and Operating Normally**—In the following figure, a fan has been commanded On and is operating normally. In this case, when the BO commands the Fan On, the Normal State of the BI changes to On and the Reference Delay Time starts. Within the interval set by the Reference Delay Time, the Input Reference of the BI changes to On and the Report Delay time starts. After the Reference Delay Time and Report Delay Time have passed, the BI is analyzed for Alarm conditions.

Figure 32: Fan On and Operating Normally

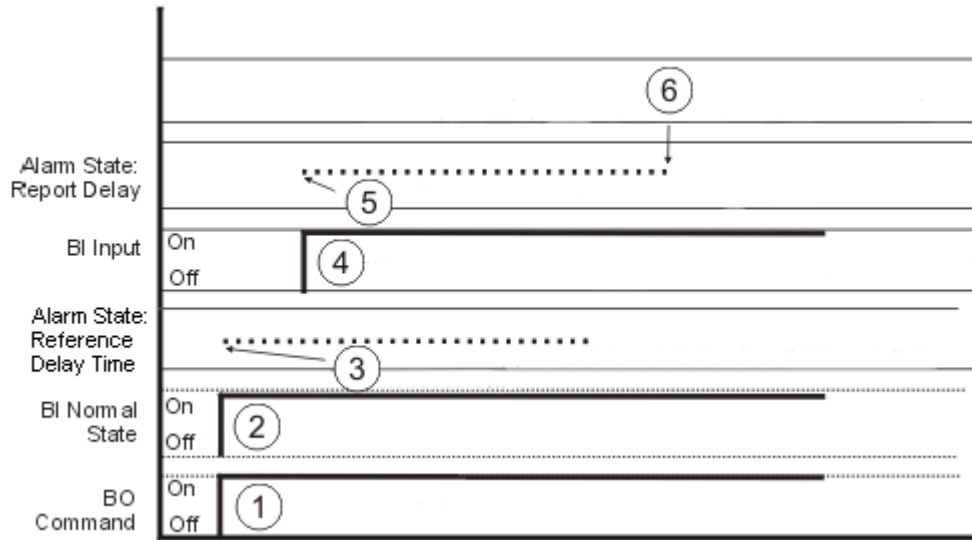


Table 77: Fan On and Operating Normally Example Description

Callout	Name	User Action
1	BO Command	Fan is commanded On from BO.
2	BI Normal State	BI Normal State switches to On.
3	Alarm State: Reference Delay Timer	Reference Delay Timer interval starts when BI Normal State switches to On.
4	BI Input	BI Input switches On during the Reference Delay Timer interval.
5	Alarm State: Report Delay	Report Delay interval starts when BI Input switches to On.
6	After Report Delay Interval	BI is analyzed for alarm conditions.

- Fan Is Commanded On but the Fan Is Not Working**—In the following figure, the fan is commanded on but does not turn on due to a problem. In this case, the BO commands the Fan On, the Normal State of the BI changes to On, and the Reference Delay Time starts. However, the Input Reference of the BI never changes to On because the Fan does not turn on. Therefore, the Alarm State: Report Delay Timer never starts. After the interval set by the Alarm State: Reference Delay Time, the BI goes into an Alarm condition.

Figure 33: Fan Is Commanded On but the Fan Is Not Working

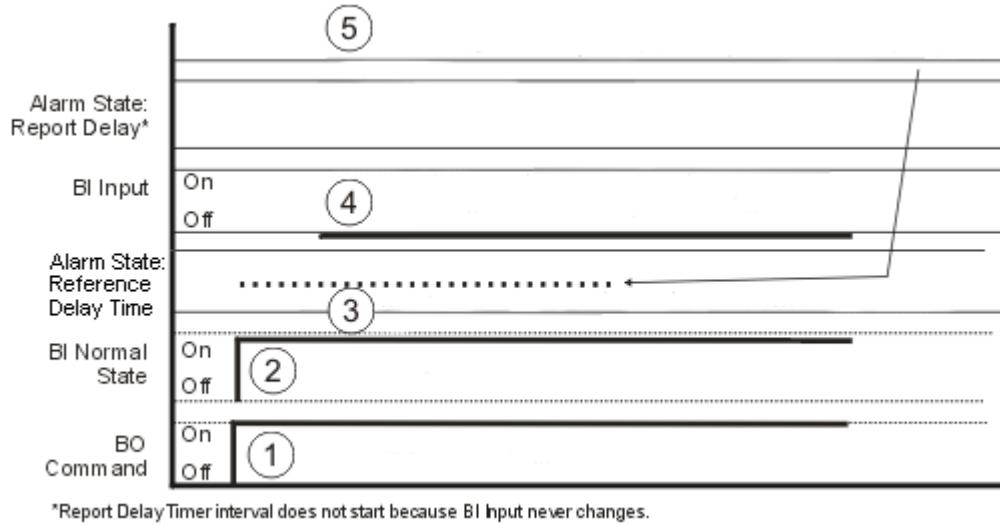


Table 78: Fan Is Commanded On but the Fan Is Not Working Description

Callout	Name	User Action
1	BO Command	Fan is commanded On from BO.
2	BI Normal State	BI Normal State switches to On.
3	Alarm State: Reference Delay Timer	Reference Delay Timer interval starts when BI Normal State switches to On.
4	BI Input	BI Input does not turn On during the Reference Delay Timer interval due to problem with Fan.
5	Alarm State: Report Delay	After Reference Delay Timer interval. BI is analyzed and goes into Alarm.

Analog Alarm Attributes

The [Analog Alarm Extension](#) contains attributes common to Metasys system objects. For details, see [Common Object Attributes](#).

The following table lists the attributes specific to the Analog Alarm extension. The list of Attribute names are displayed in the Focus Window of the Site Management Portal view of the Alarm Extension. Click the attribute name in the table for a description of the attribute.

Notes:

- In the **Notes** column, letters indicate the following: C - Configurable, D - Default Attribute for Display, N - Value Not Required, R - Affected by Extension's Reliability, W - Writable.
- In the **SUM** (Tailored Summary Pick) column, attributes marked with an X can be used in the Tailored Summary User View. See the [Defining User Views with Summary Definitions](#) section for information about recommended groupings of Summary Definitions in a Tailored Summary.
- In the **MOD** (Global Modify) column, attributes marked with an X can be mass edited from a Tailored Summary or Global Search Results.

- In the **SCT** (SCT Configuration Attribute) column, attributes marked with an X are viewable in the SCT Alarm Extension Focus Window.

Table 79: Analog Alarm Attributes (SUM=Tailored Summary; MOD=Global Modify; SCT=SCT Configurable)

Attribute Name	Notes	Initial Value	Values/ Options/ Range	Description	SUM	MOD	SCT
Alarm Ack Pending		False	Ack not pending, Ack pending	Indicates that an event concerning a transition into the Alarm state is waiting for acknowledgment.	X		
Alarm Ack Required	C,W	False	Ack not required, Ack required	Indicates that a transition into the Alarm state created a message that requires acknowledgment.	X	X	X
Alarm Date				Indicates the last date this extension transitioned into the Alarm state. Each time this transition occurs, a message is created and this date is updated.	X		
Alarm Message Text	C,N,W			Indicates the text you assigned to give further information in the event of an alarm. Only status changes to an alarm state add the alarm message text reference.	X	X	X
Alarm Priority	C,W	70		Indicates the priority assigned to the Alarm state.	X	X	X
Alarm Time				Indicates the last time this extension transitioned into the Alarm state. Each time this transition occurs, a message is created and this time is updated.	X		
Cooling Setpoint	C,N,W	Null		Indicates the actual monitored Cooling Setpoint value based on the Setpoint Reference mapping. You can either define the Cooling Setpoint and High Alarm Limit or the Setpoint Reference.			
Cooling Setpoint Reference	C,W	Null		When specified, indicates the Above Setpoint limit. You must define both the Cooling Setpoint Reference and Heating Setpoint Reference, or leave both blank. If the Cooling Setpoint Reference is defined, the High Warning Offset is added to the Cooling Setpoint Reference value to calculate the High Warning Limit. The Heating and Cooling Setpoint References are typically mapped to the Actual Heating and Cooling Setpoints created for all FEC based VAV and Terminal Unit control applications. The High and Low Warning Offsets are added to these references to calculate the High and Low Warning Limits. These reference points are used in conjunction with the Room Control Module Graphics Symbol to provide indication of above and below setpoint conditions.	X	X	X
Date				Indicates the date of the last change in the Present Value or Reliability reported by this extension.			

Table 79: Analog Alarm Attributes (SUM=Tailored Summary; MOD=Global Modify; SCT=SCT Configurable)

Attribute Name	Notes	Initial Value	Values/ Options/ Range	Description	SUM	MOD	SCT
Description	C,W		Maximum 40 characters before Release 8.0. Maximum 64 characters at Release 8.0 and later.	Identifies the alarm extension in detail.			X
Differential	C,W	0.00	Positive value	Specifies a deadband range used for analog object state transitions from High Alarm Limit, Low Alarm Limit, High Warning Offset, and Low Warning Offset. If the Differential is applied to an object in High Alarm, the object remains in the state until it changes to a value less than the High Alarm Limit minus the value of the Differential. When the Cooling Setpoint and the Heating Setpoint are configured, the Differential specifies: <ul style="list-style-type: none"> The deadband range for transitions to the Above and Below Setpoint states. The deadband range for transitions from Above and Below Setpoint states to return to a Normal state. In this case, half of the value specified for the Differential is used. This allows the value to return to normal in cases where the control algorithm controls to a value close to the setpoint, but may not achieve or cross the setpoint. 	X	X	X
Enabled	W	True		Indicates whether the alarm extension is enabled.			X
Error Log				Indicates the reliability of the following references: <ul style="list-style-type: none"> Input Ref Status Warning Ref Status Setpoint Ref Status Cooling Setpoint Ref Status Heating Setpoint Ref Status Occupancy Ref Status If a reference is not defined, the value will be <code>No Input</code> .			
Event Enable	C,W	True		Determines if an alarm condition is reported back to the event viewer and if alarm pop-ups are created.		X	X

Table 79: Analog Alarm Attributes (SUM=Tailored Summary; MOD=Global Modify; SCT=SCT Configurable)

Attribute Name	Notes	Initial Value	Values/ Options/ Range	Description	SUM	MOD	SCT
Graphic	C,N,W	Null	Object Type = Graphic	Indicates the graphic associated with the extension. Do not set the Graphic attribute for an alarm extension to an aliased graphic. Aliased graphics do not display properly when displayed from the Alarms Window or Event Viewer.		X	X
Graphic Alias	C,W		Maximum 256 characters	Indicates a portion of the graphic's item reference, up to and including the name of the folder containing this extension or the controller containing this extension.		X	X
Heating Setpoint	C,N,W	Null		The Heating and Cooling Setpoint References are typically mapped to the Actual Heating and Cooling Setpoints created for all FEC-based VAV and Terminal Unit control applications. The High and Low Warning Offsets are added to these references to calculate the High and Low Warning Limits. These reference points are used in conjunction with the Room Control Module Graphics Symbol to provide indication of above and below setpoint conditions. You can either define the Cooling Setpoint and Low Alarm Limit or the Setpoint Reference.			
Heating Setpoint Reference	C,W	Null		Indicates the value of the Below Setpoint limit. You must define both the Cooling Setpoint Reference and Heating Setpoint Reference, or leave both blank.	X	X	X
High Alarm Limit	C,N,W			Specifies the actual High Alarm Limit. If blank, the limit is not used.			
High Alarm Limit		Null		Specifies the actual High Alarm Limit. If blank, the limit is not used.	X	X	X
High Warning Offset	C,N,W		Positive value	Indicates the value added to the Warning Reference or Setpoint Reference variable to determine the actual High Warning Limit. If blank, the offset is not used and warning analysis is disabled. Both the High Warning Offset and Low Warning Offset must be defined, or both must be blank.	X	X	X
Input				Indicates the last value received from the Input Reference.			
Input Reference	C			Specifies the object and attribute monitored by this alarm extension. The reliability of the Input Reference is monitored and sets the Reliability attribute of this extension. It also can be reported in an alarm message.			

Table 79: Analog Alarm Attributes (SUM=Tailored Summary; MOD=Global Modify; SCT=SCT Configurable)

Attribute Name	Notes	Initial Value	Values/ Options/ Range	Description	SUM	MOD	SCT
Item Reference				Specifies the name of the alarm that the alarm extension is referencing.			
Low Alarm Limit	C,N,W			Specifies the actual Low Alarm Limit. If blank, the limit is not used.	X	X	X
Low Warning Offset	C,N,W		Positive value	Indicates the value subtracted from the Warning Reference or Setpoint Reference variable to determine the actual Low Warning limit. If blank, the offset is not used and warning analysis is disabled. Both the High Warning Offset and Low Warning Offset must be defined, or both must be blank.	X	X	X
Name	C,W		Maximum 400 characters	Name of the alarm extension attribute.		X	X
Normal Ack Pending		False	Ack not pending, Ack pending	Indicates if an event in transition to the Normal state is awaiting acknowledgment.	X		
Normal Ack Required	C,W	False	Ack not required, Ack required	Indicates that a transition into the Normal state created a message that requires acknowledgment.	X	X	X
Normal Date				Indicates the last date this extension transitioned into the Normal state.	X		
Normal Priority	C,W	200		Indicates the priority assigned to the Normal state.	X	X	X
Normal Time				Indicates the last time this extension transitioned into the Normal state. Each time this transition occurs, a message is created and this time is updated.	X		
Object Identifier				Specifies an internal identifier assigned to the alarm extension.			X
Object Name				Identifies the name of the object associated with the alarm extension.			
Object Type		Analog Alarm		Identifies the type of alarm extension.			X
Occupancy Reference	C,W	Null		When mapped, the Occupancy Reference provides a specific graphic preference color indication of a zone's occupancy status. When the reference is in an unoccupied state, warning states are not displayed; only alarm states are displayed. This capability is typically used in conjunction with the Room Status symbol graphic floorplan.	X	X	X
Present Value	D,R	Normal	Normal, Low Warning, High Warning, Low Alarm, High Alarm	Represents the current value of the extension.			

Table 79: Analog Alarm Attributes (SUM=Tailored Summary; MOD=Global Modify; SCT=SCT Configurable)

Attribute Name	Notes	Initial Value	Values/ Options/ Range	Description	SUM	MOD	SCT
Reference Delay Time	C,W	0	0 to 65,535 seconds	Specifies the amount of time that the Input has to move within the Warning Limits after a Warning Reference change before the object reports the warning. The Normal state is reported until the Reference Delay Time expires. If the Reference Delay Time is changed, any current timer is canceled and reset to the new Reference Delay Time.	X	X	X
Reference Delay Timer Active		False		The Reference Delay Timer Active is True while the alarm extension waits for the Input value to respond to the Warning Reference change.	X		X
Reliability		Input Unreliable	Uses Reliability (Set 503).	<p>Indicates the Reliability of the Analog Alarm extension. Reliability changes in response to communication errors between the Analog Alarm extension and the Input Reference or Setpoint Reference. When the Analog Alarm extension is unreliable due to communication problems, any further execution of the main logic of the Analog Alarm extension is cancelled and no report is issued.</p> <p>The reliability also indicates when the Input or Setpoint Reference becomes unreliable. When reliability changes due to the Input being unreliable, an event is issued if reporting is enabled. The exception is Comm Loss reliability, which results in the same behavior as the communication problems described above.</p> <p>If a Setpoint Reference, High Alarm Limit, and Low Alarm Limit are defined, and the value of the setpoint is outside of the range defined by the limits, then the Analog Alarm becomes unreliable and an event message is generated (if reporting is enabled).</p>			
Report Delay	C,W	0	0 to 65,535 seconds	Indicates the number of seconds that the extension waits before generating a warning or alarm after the Input value moves outside of the Heating or Cooling Setpoint or warning limit. After this time, the Input value is reevaluated. If the value is still outside the limit, a report generates. Report Delay applies only to changes from the Normal state to the Alarm state. High or Low Alarms returning to the Normal state are reported immediately.	X	X	X

Table 79: Analog Alarm Attributes (SUM=Tailored Summary; MOD=Global Modify; SCT=SCT Configurable)

Attribute Name	Notes	Initial Value	Values/ Options/ Range	Description	SUM	MOD	SCT
Report Delay Active	C,W	False		The Report Delay Active is True while the alarm extension waits for the alarm or warning to stabilize.	X		
Setpoint Reference	C,W	Null		A Setpoint Reference or Warning Reference is established for controllers that only provide a Single Setpoint value. The value established by either one of these references is used in conjunction with the High Warning Offset and Low Warning Offset to establish the High Alarm Warning Limit and Low Alarm Warning Limit.	X	X	X
Status				The Common Object Attributes section details this attribute. Of the three states that can be assumed by this attribute (Disabled, Unreliable, and Normal), two of these, Disabled and Normal, are managed outside the scope of this extension. A complete list of relevant states follows (listed in hierarchical order from highest to lowest): <ul style="list-style-type: none"> • Disabled: Enabled attribute value is False. • Unreliable: Reliability attribute is not reliable. • Normal: Expected operating condition. 			
Time				Indicates the time of the last change in the Present Value or Reliability reported by this extension.			
Version				Specifies the version number for the alarm extension.			
Unoccupied State	C,W	1	Set re-directed to Unoccupied_Set Attribute	Indicates the value of the Occupancy Reference (if defined) that is considered the Unoccupied State.	X	X	X
Unoccupied State Set				Indicates the set used to select the Unoccupied State. If Occupancy Reference is defined, the Unoccupied State Set uses the same value.			
Username is BACnet Object Name		False		Controls whether the object's User Name attribute is also the Object Name attribute. The Object Name attribute is not writable, so the only way to change the Object Name attribute is to edit the User Name attribute and set the User Name Is BACnet Obj Name attribute to True.			X
Warning Ack Pending		False	Ack not pending, Ack pending	Indicates whether an event concerning a transition into the Warning state is waiting for acknowledgment.	X		
Warning Ack Required	C,W	False	Ack not required, Ack required	Indicates whether a transition into the Warning state creates a message that requires acknowledgment.	X	X	X

Table 79: Analog Alarm Attributes (SUM=Tailored Summary; MOD=Global Modify; SCT=SCT Configurable)

Attribute Name	Notes	Initial Value	Values/ Options/ Range	Description	SUM	MOD	SCT
Warning Date				Indicates the last date this extension transitioned into the Warning state. Each time this transition occurs, a message is created and this date is updated.	X		
Warning Priority	C,W	120		Indicates the priority assigned to the Warning state.	X	X	X
Warning Reference	C,W	0.00		A Setpoint Reference or Warning Reference is established for controllers that only provide a Single Setpoint value. The value established by either one of these references is used in conjunction with the High Warning Offset and Low Warning Offset to establish the High and Low Warning limits.	X	X	X
Warning Time				Indicates the last time this extension transitioned into the Warning state. Each time this transition occurs, a message is created and this time is updated.	X		

Analog Alarm Extension Examples

The Analog Alarm extension adds the alarming capability for attributes with real values, such as the Present Value of an Analog Input Object. This extension detects an alarm in two different modes: the Single Setpoint method, or the Cooling/Heating Setpoint Method.

Single Setpoint Mode

The **Single Setpoint Mode** uses up to four configurable limits to report an alarm. This method also sets the Alarm State attribute of the object to which it is added. You can configure Single Setpoint Mode using either a mapped setpoint reference or a fixed number set in the warning reference. For example, you can configure the Analog Alarm extension to issue an alarm if the temperature in a room falls below 15.6 °C (60 °F).

The Analog Alarm Object determines its new alarm state based upon receipt of a change. The new alarm state is based on the following:

- Newly reported value and reliability
- Current alarm state (present value)
- Differential
- Defined alarm and warning limits. Once you set the High and Low Alarm Limits, the High Warning Limit is calculated by adding the High Warning Offset to the Cooling Setpoint Reference Value. The Low Warning Limit is calculated by subtracting the Low Warning Offset from the Heating Setpoint Reference Value.
- Value reported by the Setpoint Reference (if defined) written to Warning Reference Value
- Delay Timer Active
- Reference Delay Timer Active

Figure 34: Single Setpoint Mode

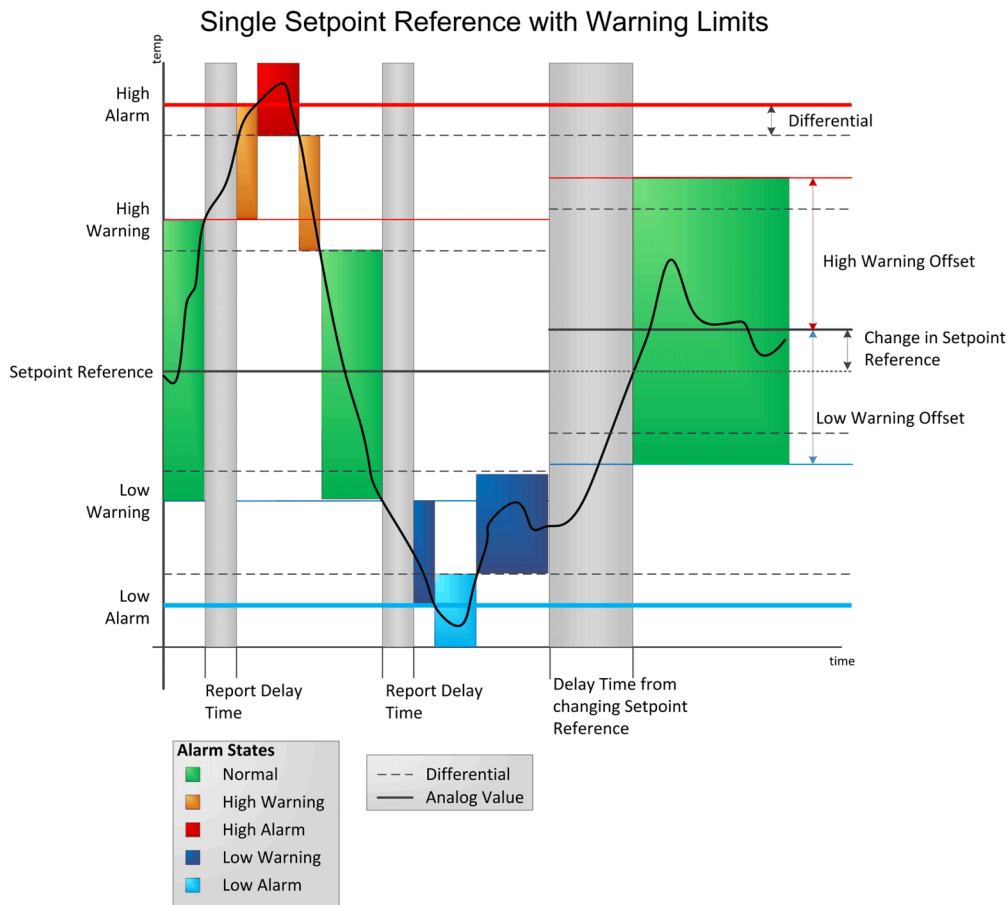


Figure 34 shows the Present Value of the Analog Alarm as it changes.

The Delay Time period begins when the Warning Reference changes. The Input Value is not calculated during this time. The Input is normal at the end of the Reference Delay Time, so the Present Value stays normal.

The Report Delay period begins when the Present Value transitions to any state from the Normal state, or the value of the Command Reference changes. Transitions to and from states other than Normal are reported immediately.

Cooling/Heating Setpoint Mode

Using the [Cooling/Heating Setpoint Mode](#), the object calculates up to seven different statuses based on the Cooling Setpoint Reference and the Heating Setpoint Reference. You can also define an optional Occupancy Reference to suppress the status of the extension and display an unoccupied status indication color unless there is a high or low alarm.

Figure 35: Cooling/Heating Setpoint Mode

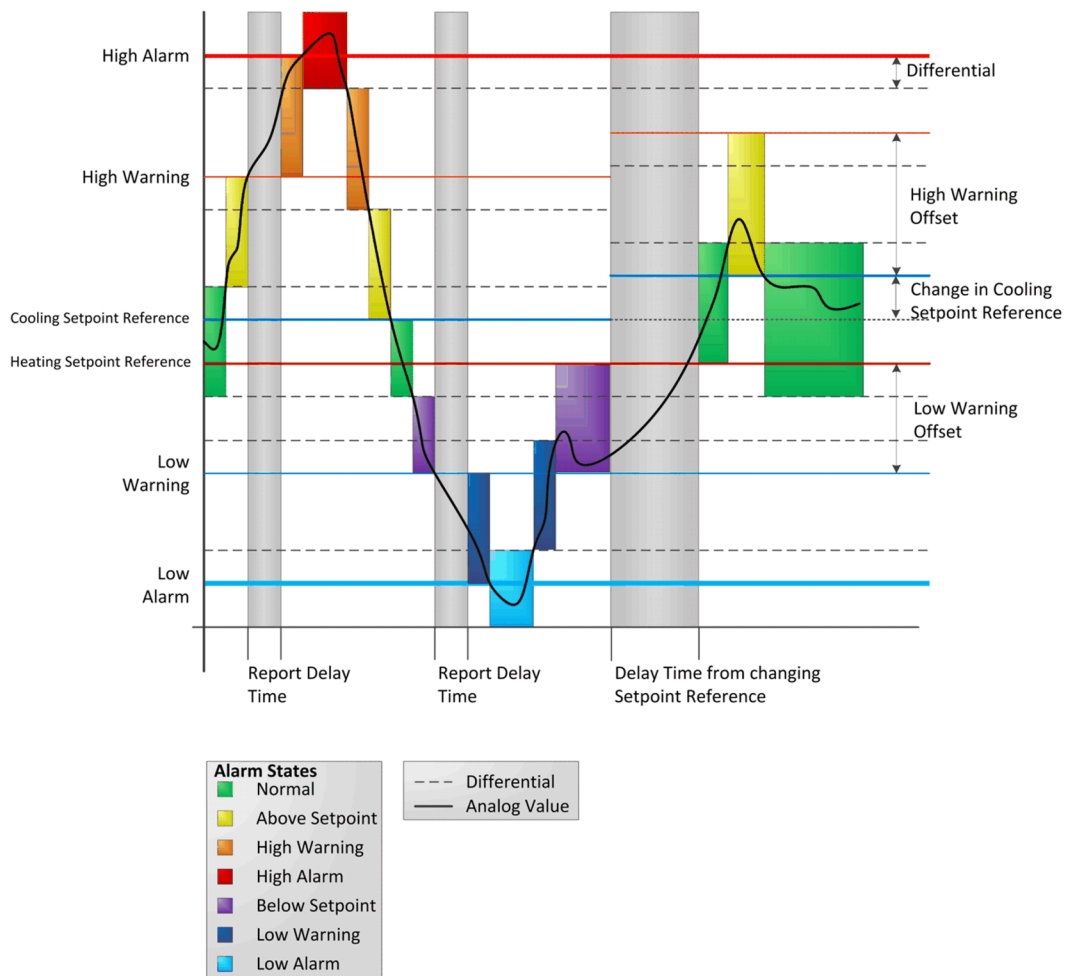


Figure 35 shows the Present Value of the Analog Alarm as it changes.

The Delay Time period starts when the Cooling Setpoint Reference or Heating Setpoint Reference value changes. Since the Input is in Low Warning state at the end of the Reference Delay Time, the Present Value is in a Low Warning state.

The Report Delay period starts when the Present Value transitions to any Alarm or Warning state from a Normal, Above Setpoint, or Below Setpoint state, or if the value of the Command Reference changes. All other State Transitions are reported immediately.

Multistate Alarm Attributes

The [Multistate Alarm Extension](#) contains attributes common to Metasys system objects. For details, see the [Common Object Attributes](#).

The following table lists the attributes specific to the Multistate Alarm extension. Click the attribute name in the table for a description of the attribute.

Note: In the Notes column, letters indicate the following: C - Configurable, D - Default Attribute for Display, N - Value Not Required, R - Affected by Extension's Reliability, W - Writable.

Table 80: Multistate Alarm Attributes

Attribute Name	Notes	Initial Value	Values/Options/Range	Description
Alarm Ack Pending		False	Ack not pending, Ack pending	Indicates that an event concerning a transition into the Alarm state is waiting to be acknowledged.
Alarm Ack Required	C,W	False	Ack not required, Ack required	Indicates that a transition into the Alarm state created a message that requires acknowledgment.
Alarm Date				Indicates the last date this extension transitioned into the Alarm state. Each time this transition occurs, a message is created and this date is updated.
Alarm Message Text	C,N,W			Indicates the text you assigned to give further information in the event of an alarm. Only status changes to an alarm state cause the alarm message text reference to be added.
Alarm Priority	C,W	70	See Event Priority .	Indicates the priority assigned to the Alarm state.
Alarm Time				Indicates the last time this extension transitioned into the Alarm state. Each time this transition occurs, a message is created and this time is updated.
Alarm Values	C,W			Associates an alarm state with a specific priority and text. Multiple states can be defined for each alarm, but each state must be unique and no state can be set to the current alarm extension normal state. The text and priority are customizable. Alarm Priority and Alarm Message Text are used as defaults when custom text and priority values are not defined.
Capture Changes		False		If True, this attribute forces an event notification to be generated for each change of the object input state. If the input goes from one alarm state to another alarm state or back to normal, an event notification is generated.
Command Reference	C,W			<p>If specified, the value of this referenced attribute is treated as the normal state by the alarm extension. The normal state then follows a feedback value.</p> <p>For example, define the Present Value of a Binary Input Object (fan status) as the Input Reference and define the Present Value of a Binary Output Object (command state) as the Command Reference.</p> <p>For more information on how this attribute works with regard to AO/BO point feedback, see AO/BO Feedback.</p>
Date				Indicates the date of the last reported condition.
Event Enable	C,W	True		Indicates that this value must be True for the extension to report a warning message.
Graphic	C,N,W	Null	Object Type = Graphic	<p>Indicates the graphic associated with the extension.</p> <p>Do not set the Graphic attribute for an alarm extension to an aliased graphic. Aliased graphics do not display properly when displayed from the Alarms Window or Event Viewer.</p>

Table 80: Multistate Alarm Attributes

Attribute Name	Notes	Initial Value	Values/Options/Range	Description
Graphic Alias	C,W		Maximum 256 characters	Indicates a portion of the graphic's item reference, up to and including the name of the folder containing this extension or the controller containing this extension.
Input			Derived from Input Reference, the object to which the Multistate Alarm extension has been attached.	Indicates the multistate value processed for alarms by the extension as defined by the Input Reference. The value of the Input is compared to the Normal State.
Input Reference	C			Specifies the object and attribute monitored by this alarm extension. The last value received from Input Reference is written to the Input attribute. The reliability of the Input Reference is monitored and sets the Reliability attribute to this extension. It is also reported in an alarm message.
Normal Ack Pending		False	Ack not pending, Ack pending	Indicates whether an event concerning a transition into the Alarm state is waiting to be acknowledged.
Normal Ack Required	C,W	False	Ack not required, Ack required	Indicates whether a transition into the Normal state creates a message that requires acknowledgement.
Normal Date				Indicates the last date this extension transitioned into the Normal state. Each time this transition occurs, a message is created and this date is updated.
Normal Priority	C,W	200	See Event Priority .	Indicates the priority assigned to the Normal state.
Normal Time				Indicates the last time this extension transitioned into the Normal state. Each time this transition occurs a message is created and this time is updated.
Normal State	C,W	State 0	Derived from Input Reference, the object to which the Multistate Alarm extension has been attached.	Indicates the attribute value to which the Input is compared. If the Input value is different from the Normal State, an alarm state occurs.
Present Value	D,R	Normal	Normal, Alarm, Hold	Represents the current value of the extension.
Reference Delay Time	C,W	0	0-65,535 seconds	When a Binary Output Object (BO) (supply fan command) is commanded On, the Normal State for the associated Binary Input Object (BI) (supply fan status) alarm extension is also On. After the Reference Delay Time, the current state of the BI is compared to the Normal State. If the BI is still Off, an alarm is detected. The Reference Delay Time is also used when the BO is commanded Off. Specifies the feedback delay in seconds. The purpose of the Reference Delay Time is to allow time for equipment to start or stop before the status is compared to the command.
Reference Delay Timer Active		False		The Reference Delay Timer Active is True while the alarm extension waits for the equipment to start or stop.

Table 80: Multistate Alarm Attributes

Attribute Name	Notes	Initial Value	Values/Options/Range	Description
Reliability		Input Unreliable	Uses Reliability (Set 503).	Indicates the reliability of the Multistate Alarm extension. Reliability changes due to communication errors between the Multistate Alarm extension and the Input Reference or Command Reference. When the Multiple Alarm extension is unreliable due to communication problems, any further execution of the main logic of the Multistate Alarm extension is canceled and no report is issued. The reliability also indicates when the Input or Command Reference becomes unreliable. When reliability changes due to the Input being unreliable, an event is issued if reporting is enabled. The only exception is Comm Loss reliability, which results in the same behavior as the communication problems described above.
Report Delay	C,W	0	0-65,535 seconds	Indicates the delay between detecting an alarm and actually reporting the alarm. The purpose of this delay is to make sure that the alarm is stable. If a status feedback device is fluctuating, an alarm is detected numerous times. The alarm must be True at the end of the duration of the Report Delay before the alarm is reported.
Report Delay Active	C,W	False		The Reference Delay Timer Active is True while the alarm extension waits for the equipment to start or stop.
Status				The Common Object Attributes section details this attribute. A list of relevant states follows (listed in hierarchical order from highest to lowest): Disabled: Enabled attribute value is False. Unreliable: Reliability attribute is not reliable. Normal: Expected operating condition.
Time				Indicates the time of the last reported condition.

Alarm Commands

The following table lists the commands supported by the Alarm Extensions feature.

Table 81: Alarm Extension Commands

Command Name	Parameters	Description
Cancel Delay Time	None	Cancels Reference Delay Timer, if active. A warning occurs if the delay time on an Alarm extension is canceled in this state.
Cancel Report Delay	None	Cancels the Report Delay Timer, if active. A warning occurs if the delay time on an Alarm extension is canceled in this state.

Totalization Extensions

Totalization Extensions track an attribute over time. There are three types of totalization extensions:

- [Analog Totalization](#) - Tracks and records analog attribute values over time.
- [Event Totalization](#) - Tracks the number of events/transitions of an attribute over time.

- [Runtime Totalization](#) - Tracks the total time that an attribute resides in a specified state.

For more information on managing time in the Metasys system, see the NAE and ADS commissioning documents listed in the table in the [Welcome](#) section.

Totalization Extensions Concepts

Analog Totalization

The Analog Totalization extension tracks and records the usage of any consumable monitored through an analog attribute. Some examples of consumables include electricity, gas, steam, and chilled water.

These three essential parameters determine the Analog Totalization extension's mode of operation:

- the Input Reference to be monitored
- the Timebase on which the computation is based
- the Low CutOff Value that the input must meet or exceed

Use the Analog Totalization extension to determine the usage of the given consumable. For example, you can determine the amount of gas or steam used by the facility for a given month. Also, use Analog Totalization to determine how many kilowatt/hours were used in a week or to totalize a calculated value (for example, degree days).

For general information on Metasys system objects, see the [Object Help](#) section.

For detailed information on the Analog Totalization extension, see [Analog Totalization Attributes](#).

Event Totalization

The Event Totalization extension tracks the number of binary events or pulses over time, meaning it counts the number of transitions that occur at an input reference. Unlike other types of totalization, event totalization increases the value each time the event occurs, instead of calculating the value once each minute.

These three essential parameters determine the mode of operation for the Event Totalization extension:

- the monitored Input Reference
- the types of recorded Transitions or events
- the recorded Value Per Pulse (event)

You can use this extension to determine the number of changes in an input value, which may be helpful for maintaining and monitoring equipment. For example, use Event Totalization to determine how many times a motor started, how often a sensor was in alarm, or how many cars entered a parking lot.

For detailed information on the Event Totalization extension, see [Event Totalization Attributes](#).

Runtime Totalization

The Runtime Totalization extension tracks the time that elapses while a designated input, such as a binary or multistate value, matches a specified state.

These two essential parameters determine the Runtime Totalization extension's mode of operation:

- the monitored Input Reference
- the Reference (state) that identifies active runtime

Use this extension to track the amount of time that a piece of equipment, such as a fan or a pump, is operational. This extension also determines the amount of time that a point is in alarm or the runtime of fixed loads (such as lighting) for energy consumption and tenant billing.

For detailed information on the Runtime Totalization extension, see [Runtime Totalization Attributes](#).

Analog Totalization Attributes

The [Analog Totalization](#) extension contains attributes common to Metasys system objects. For details, see [Common Object Attributes](#).

The following table lists the attributes specific to the Analog Totalization extension. Click the attribute name in the table for a description of the attribute.

Note: In the Notes column, letters indicate the following: C - Configurable, D - Default Attribute for Display, N - Value Not Required, R - Affected by Extension's Reliability, W - Writable.

Table 82: Analog Totalization Extension Attributes

Attribute Name	Notes	Initial Value	Values/Options/Range	Description
Display Precision	C,W	10ths	Uses Display Precision (Set 0)	Indicates the rounded position and the number of decimal places to display for this extension.
Executing		Active	Active Totalize Limit Inactive	Reflects the status of this extension. Active: The extension is calculating and has not reached the Totalize Limit. Totalize Limit: The extension has reached the limit and has stopped calculating because Rollover is set to False. Inactive: The extension is unreliable or disabled and is not calculating.
Input Reference	C			Specifies the object and attribute monitored by this extension. If this attribute is unreliable or falls below the Low CutOff Value, totalization is temporarily suspended.
Low CutOff Value	C,W			Specifies the object and attribute monitored by this extension. If this attribute is unreliable or falls below the Low CutOff Value, totalization is temporarily suspended.
Present Value	C,D,R,W			Represents the current value of the extension.
Reliability		Reliable	Uses Reliability (Set 503)	Represents the reliability of the Present Value. If the Input Reference becomes unreliable, the totalization extension monitoring the input becomes unreliable.
Reset (This attribute does not appear in a view, but may be scheduled, trended, and so on.)	W	False	False True	Forces the extension into a reset condition. (Terminates any ongoing calculations, restores the Present Value to initial state, and, for each triggerable attribute, forces a COV report.) This attribute does not appear in a view, but may be scheduled, trended, and so on.
Reset Date				Represents the date of the last Reset condition of the extension.
Reset Time				Represents the time of the last Reset condition of the extension.
Rollover	C,W	False	False True	Defines the special action that the totalization extension must take when the Present Value reaches the Totalize Limit value. If the Rollover attribute is set to False, the Analog Totalization extension ceases further operation when the Present Value equals or exceeds the Totalize Limit value. If it is True, it resets the present Value to 0.0 and resumes a new cycle of totalization.
Rollover Count		0	0-4,294,967,295	When the Rollover attribute is True, this value increases each time Present Value reaches a value equal to or greater than the Totalize Limit value.

Table 82: Analog Totalization Extension Attributes

Attribute Name	Notes	Initial Value	Values/Options/Range	Description
Scale Factor	C,W	1.0	Minimum Value > 0	Indicates the value used to scale the totalized value to either a larger or smaller value than otherwise results.
Timebase	C,W	Hours	Seconds Minutes Hours	Establishes the time frame on which the calculated totalization value is based.
Totalize Limit	C,N,W		Limit > 0	Defines a threshold value that the Present Value must meet or exceed for the totalization extension to take special action. When the Rollover attribute is set to False, the totalization process ceases further operation. When it is set to True, Present Value is cleared to 0, and the totalization process starts over.
Units	C,W		IP SI	Indicates the measurement units of this extension.
Value Before Reset				Indicates the value of the Present Value at the time of the last reset operation.

Event Totalization Attributes

The [Event Totalization](#) extension contains attributes common to Metasys system objects. For details, see [Common Object Attributes](#).

The following table lists the attributes specific to the Event Totalization extension. Click the attribute name in the table for a description of the attribute. Letters in the Notes column indicate the following: C - Configurable, D - Default Attribute for Display, N - Value Not Required, R - Affected by Extension's Reliability, W - Writable.

Table 83: Event Totalization Attributes

Attribute Name	Notes	Initial Value	Values/Options/Range	Description
Display Precision	C,W	1s	Uses Display Precision (Set 0).	Indicates the rounded position and the number of decimal places to display for this extension.
Executing		Active	Active Totalize Limit Inactive	Reflects the status of this extension. Active: The extension is calculating and has not reached the Totalize Limit. Totalize Limit: The extension has reached the limit and has stopped calculating because Rollover is set to False. Inactive: The extension is unreliable or disabled and is not calculating.
Input Reference	C			Specifies the object and attribute totalized by this extension. If this attribute is unreliable, totalization is temporarily suspended.
Present Value	C,D,R,W			Represents the current value of the extension.
Reference	C,W	State 0	States Text attribute identifies the enumeration set for this attribute.	Defines the value that the extension processes for totalization, as defined in the Input Reference attribute.
Reliability		Reliable	Uses Reliability (Set 503).	Represents the reliability of the Present Value. If the Input Reference becomes unreliable, the totalization extension monitoring the input becomes unreliable.

Table 83: Event Totalization Attributes

Attribute Name	Notes	Initial Value	Values/Options/Range	Description
Reset (This attribute does not appear in a view, but may be scheduled and trended.)	W	False	False True	Forces the extension into a reset condition. (Terminates any ongoing calculations, restores the Present Value to initial state, and, for each triggerable attribute, forces a COV report.) This attribute does not appear in a view, but may be scheduled, trended, and so on.
Reset Date				Represents the date of the last Reset condition of the extension.
Reset Time				Represents the time of the last Reset condition of the extension.
Rollover	C,W	False	False True	Defines the special action that the totalization extension takes when the Present Value reaches the Totalize Limit value. If the Rollover attribute is set to False, the Runtime Totalization extension ceases further operation when the Present Value equals or exceeds the Totalize Limit value. If the attribute is set to True, it resets the present Value to 0.0 and resume a new cycle of totalization.
Rollover Count	R,W	0	0-4,294,967,295	When the Rollover attribute is True, this value increases each time Present Value reaches a value equal to or greater than the Totalize Limit value.
Scale Factor	C,W	1.0	Minimum Value > 0	Indicates the value that is used to scale the totalized value to either a larger or smaller value than would otherwise result.
States Text (This attribute does not appear in a view, but may be scheduled and trended.)	C,W	States		Indicates the displayed strings for the Present Value. This attribute does not appear in a view, but may be scheduled, trended, and so on.
Totalize Limit	C,N,W			Defines a threshold value that the Present Value must meet or exceed for the totalization extension to take special action. When the Rollover attribute is set to False, the totalization process ceases further operation. When it is set to True, Present Value is cleared to 0, and the totalization process starts over.
Transition	C,W	Entering State	Entering State Count All	Describes the behaviors of the transitions to be counted. If the value is 0, the system counts the transition of entering a given reference. If the value is 1, the system counts all state transitions.
Units	C,W		IP SI	Indicates the measurement units of this extension. IP=Imperial units; SI=International System of Units.
Value Before Reset				Indicates the value of the Present Value at the time of the last reset operation.
Value Per Pulse	C,W	1		Indicates the unit value of the Input Reference for pulse totalization. For the event totalization, the value is 1.

Runtime Totalization Attributes

The [Runtime Totalization](#) extension contains attributes common to Metasys system objects. For details, see [Common Object Attributes](#).

The following table lists the attributes specific to the Runtime Totalization extension. Click the attribute name in the table for a description of the attribute.

- ① **Note:** In the Notes column, letters indicate the following: C - Configurable, D - Default Attribute for Display, N - Value Not Required, R - Affected by Extension's Reliability, W - Writable.

Table 84: Runtime Totalization Attributes

Attribute Name	Notes	Initial Value	Values/Options/Range	Description
Display Precision	C,W	10ths	Uses Display Precision (Set 0).	Indicates the rounded position and the number of decimal places to display for this extension.
Executing		Active	Active Totalize Limit Inactive	Indicates the execution status of this extension: Active: The extension is calculating and has not reached the Totalize Limit. Totalize Limit: The extension has reached the limit and has stopped calculating because Rollover is set to False. Inactive: The extension is unreliable or disabled and is not calculating.
Input Reference	C			Specifies the object and attribute totalized by this extension. If this attribute is unreliable or changes from the Reference (state) to another state, totalization is temporarily suspended.
Present Value	C,D,R,W			Represents the current value of the extension.
Reference	C,W	State 1	States Test attribute identifies the enumeration set for this attribute.	Defines the value that is processed for totalization by the extension as defined in the Input Reference attribute.
Reliability		Reliable	Uses Reliability (Set 503).	Represents the reliability of the Present Value. If the Input Reference becomes unreliable, the totalization extension monitoring the input becomes unreliable.
Reset (This attribute does not appear in a view, but may be scheduled, trended, and so on.)	W	False	False True	Forces the extension into a reset condition. (Terminates any ongoing calculations, restores the Present Value to initial state, and, for each triggerable attribute, forces a COV report.) This attribute does not appear in a view, but may be scheduled, trended, and so on.
Reset Date				Represents the date of the last Reset condition of the extension.
Reset Time				Represents the time of the last Reset condition of the extension.
Rollover	C,W	False	False True	Defines the special action that the totalization extension takes when the Present Value reaches the Totalize Limit value. If the Rollover attribute is set to False, the Runtime Totalization extension ceases further operation when the Present Value equals or exceeds the Totalize Limit value. If it is True, it resets the present Value to 0.0 and resumes a new cycle of totalization.
Rollover Count	R,W	0	0-4,294,967,295	When the Rollover attribute is True, this value is incremented each time the Present Value reaches a value equal to or greater than the Totalize Limit value.
States Text (This attribute does not appear in a view, but may be scheduled, trended, and so on.)	C,W	States		Indicates the displayed strings for the Present Value. This attribute does not appear in a view, but may be scheduled, trended, and so on.

Table 84: Runtime Totalization Attributes

Attribute Name	Notes	Initial Value	Values/Options/Range	Description
Timebase	C,W	Hours	Seconds, minutes, hours, days	Establishes the time frame on which the calculated totalization value is based.
Totalize Limit	C,N,W	Hours		Defines a threshold value that the Present Value must meet or exceed for the totalization extension to take special action. When the Rollover attribute is set to False, the totalization process ceases further operation. When it is set to True, Present Value is cleared to 0, and the totalization process starts over.
Units	C,W	No Units		Indicates the measurement units of the Present Value, Totalize Limit, and Value Before Reset attributes.
Value Before Reset				Indicates the value of the Present Value at the time of the last reset operation.

Totalization Commands

The following table lists the commands supported by the [Totalization Extensions](#). Click the command name for a description of the command.

Table 85: Totalization Commands

Command Name	Parameters	Description
Disable	None	Locks out all outputs and prevents functionality of the Totalization extension and temporarily suspends totalization.
Enable	None	Forces a Reset on the Totalization extension and returns it to normal operation.
Reset	None	Terminates any ongoing calculations, restores the present value to its initial state, creates a reset date and time stamp, and, for each triggerable attribute, forces a COV report.
Reset Rollover	Access level = Supervise	Resets the Rollover Count attribute.

Trend Extensions

The Trend Extension monitors and records the changes in the behavior of an individual attribute over time, thereby assisting you with diagnosing various system-wide behavioral characteristics. The Trend extension collects sample values at timed intervals or only upon changes in the given value. Trend data is still collected if the object is unreliable. The Trend extension continues to log data using the previous value preceded by **???**, which indicates an unreliable status.

For example, use a Trend extension to collect data from the Analog Input object of a controller on the N2 Bus, which reports information such as outdoor air temperature or room air temperature.

Trend extensions are different from [Trend Studies](#) because Trend Studies query both the ADS and Engine for historical data. Trend Extensions query only the Engine.

- ① **Note:** Although multiple trend extensions can be added to an object on an NxE, these extensions are combined as a single trend if sent to a Historical Data Repository. This may not yield the expected result. To use multiple trends on a single object in a Historical Data Repository, create duplicate AV or BV objects that map to the point in question, then create a new trend on the parallel AV or BV.




For trend performance information, refer to the *Metasys System Configuration Guide (LIT-12011832)*.

Trend Extensions Concepts

Views

There are three views in the Trend Extension: Chart View, Table View, and Definition View.

Table 86: Views

Button	View	Description
	Chart View	Allows you to view trend data in a chart format.
	Table View	Allows you to view trend data in a table format.
	Definition View	Allows you to view the trend extension attributes.

Trend Extension Chart View

The Chart view allows you to view data samples in a graphical format and retrieve new trend data. You can zoom, unzoom, and pan within the Chart view. You can also specify the X-axis and Y-axis ranges.

Table 87: Chart View







Button	Name	Description
	Update	<p>When initially displayed, the Trend Extension view shows the data samples currently in the local trend buffer. Click Update to retrieve and display new data samples (for example, any trend buffer data later than the currently displayed samples). The Update button adds the new samples to the display without removing the old samples.</p> <p>① Note: Gaps may appear in the data if the trend buffer has rolled over since the last update. If you wish to clear the Trend Extension view and re-display only those samples currently in the trend buffer, use the Refresh Current Tab menu option (right-click or Action menu).</p>
 (Zoom)  (Normal)	Zoom	<p>Toggles the mouse behavior for the chart between zoom mode and normal mode.</p> <p>While in zoom mode:</p> <ul style="list-style-type: none"> • drag the mouse over an area of the chart to zoom in on that area. • click Zoom to exit zoom mode and restore the mouse to normal mode. • left-click to zoom out one level. <p>When you exit zoom mode, the chart remains at the current zoom level. Use the Restore button to fully zoom out on the chart.</p> <p>① Note:</p> <ul style="list-style-type: none"> • You cannot pan while the mouse is in zoom mode. • You can also zoom and unzoom in normal mode by using the Shift key and the mouse. To zoom, hold the Shift key down while dragging the mouse across the chart. To zoom out one level, left-click the mouse while holding the shift key down.
	Restore	Allows you to return to an unzoomed view and switches the mouse back to normal mode if the chart's zoom mode is active.
	Pan	Allows you to pan the view of the chart vertically or horizontally by dragging the mouse across a zoomed chart. Panning is not available for unzoomed charts or when zoom mode is active. To pan left or right, drag the mouse over the X-axis. To pan up or down, drag the mouse over the Y-axis.
	Points Line	Displays the data using lines and point markers. This is the default.
	Area	Displays the data using an area chart.

Table 87: Chart View




Button	Name	Description
	Bar	Displays the data using a bar chart. ① Note: Only use the bar chart when the number of data samples can reasonably be expected to display as bars. If too many data samples exist when you click this option, the display becomes unstable and fails to properly update the screen. To recover, select any other display option.
	Points	Displays the data using markers, with no lines.
	Line	Displays the data using lines, with no markers.

Chart Right-Click Menu

You can access a right-click menu from the Chart view. Place your cursor in the chart and right-click in the panel to display the menu.



Table 88: Chart View Right-Click Menu

Menu Item	Description
Background Color	Opens the Select a Color dialog box and allows you to configure the background color.
Gridlines	Allows you to select what type of gridlines to appear on the chart. You can choose: None, X and Y, X Only, and Y Only.
Chart Type	Allows you to select what type of chart to display. You can choose: Points Line, Area, Bar, Points, and Line.

Trend Extension Table View

The Table view of the Trend extension allows you to view the trend's data samples in a table format. You can copy the trend data to the clipboard for pasting into Microsoft Excel or other applications.

Table 89: Table View

Button/Field	Name	Description
	Update	When initially displayed, the Trend Extension view shows the data samples currently in the local trend buffer. Click Update button to retrieve and display new data samples (for example, any trend buffer data later than the currently displayed samples). The Update button adds the new samples to the display without removing the old samples. ⓘ Note: Gaps may appear in the data if the trend buffer has rolled over since the last update. If you wish to clear the Trend Extension view and re-display only those samples currently in the trend buffer, use the Refresh Current tab menu option (right-click or Action menu).
	Copy to Clipboard	Allows you to copy selected trend data to the system clipboard for pasting into Microsoft Excel or other applications. You can also use Ctrl + C to copy data.

Trend Extension Definition View

The Definition view of the Trend Extension allows you to view and edit the attributes of the trend extension object. For more information on the Definition view attributes, see the [Trend Extension Attributes](#) section.

Trend Buffer

The trend buffers reside in the NAE and store the trend samples for the NAE. The number of samples stored in each individual trend buffer is user-configurable (see [Trend Extension Attributes](#)). When the buffer gets full, you can choose to have the new trends overwrite the old ones or to have the trending stop. Whether the trends are overwritten or trending stops, you can configure the system to issue an alarm when the buffer gets full. You can also configure to transfer samples to a configured ADS.

Table 90 shows the relationship between the buffer size and the sample interval. Determine the sample interval, in seconds, by converting minutes to seconds. Determine the buffer size by examining the interval, in seconds, against the desired time period size to retain data.

Table 90: Buffer Size and Sample Interval Relationship

Interval (Min.)	Interval (Sec.)	Buffer for Previous Time Period							
		1 Hr.	2 Hrs.	4 Hrs.	8 Hrs.	16 Hrs.	1 Day	2 Days	3 Days
1	60	60	120	240	480	960	1,440	2,880	4,320
2	120	30	60	120	240	480	720	1,440	2,160
5	300	12	24	48	96	192	288	576	864
10	600	6	12	24	48	96	144	288	432
15	900	4	8	16	32	64	96	192	288
30	1,800	2	4	8	16	32	48	96	144

Table 90: Buffer Size and Sample Interval Relationship

Interval (Min.)	Interval (Sec.)	Buffer for Previous Time Period							
		1 Hr.	2 Hrs.	4 Hrs.	8 Hrs.	16 Hrs.	1 Day	2 Days	3 Days
60	3,600	1	2	4	8	16	24	48	72
120	7,200		1	2	4	8	12	24	36

Trend Sampling

Trend sampling for the trend buffer occurs periodically (samples taken after a set time expires) if you set the Sample Interval to a value higher than zero. To sample based on COV reporting of the object, set the Sample Interval attribute to zero. You can stop or start sampling manually (using the Enable or Disable command) or control the start and stop with [Interlocking a Trend Extension](#) or scheduling. With interlocking, the trend samples are taken when a defined event occurs. If you use the scheduling feature, trend samples are taken at certain times on certain days.

Trend Extension Attributes

[Alarm Extensions](#) contains attributes common to Metasys system objects. For details, see [Common Object Attributes](#).

The following table lists the attributes specific to the Trend extension. Click the attribute name in the table for a description of the attribute.

Note: In the Notes column, letters indicate the following: C - Configurable, D - Default Attribute for Display, N - Value Not Required, R - Affected by Extension’s Reliability, W - Writable.

Table 91: Trend Extension Attributes

Attribute Name	Notes	Initial Value	Values/Options/Range	Description
Acked Transitions	C,W	False, False, False		Conveys three separate flags that each indicate if the most recent To Offnormal, To Fault, or To Normal event transitions have been acknowledged (if the transition requires acknowledgement).
Buffer Size	C	144	1-5,000	Specifies the maximum number of records the buffer may hold.
Buffer State		Operational	Operational, Buffer Full	Indicates whether the buffer is full or operational when the Stop When Full attribute is set to False.
Client COV Increment	C,W			Specifies the increment used to determine that a change of value occurred (when this trend object collects data by COV). If the referenced object and attribute support COV reporting, then this attribute may have a Null value. In this case, the value of the trended object for COV increment is used. This value only applies to trended values of the real value (floating point) type.
COV Resubsc Interval	C,W	3,600	Units = Seconds	Specifies the number of seconds between COV resubscriptions (when this trend object collects data by COV). This attribute is only used when the trended object is a BACnet Integration point on the IP network. The Subscribe COV requests specify twice during this interval for the actual subscription. The first subscription is issued when the trend object begins operation or when enabled.
Enable	C,W	False		Indicates and controls whether logging is enabled (True or False).

Table 91: Trend Extension Attributes

Attribute Name	Notes	Initial Value	Values/Options/Range	Description
Event Enable	C,W	True, False		Determines whether notifications are enabled for To Fault and To Normal events. A To Normal transition occurs when the value of the Records Since Notify attribute is equal to or greater than the value of the Notify Threshold attribute. A To Fault transition occurs when an attempted COV subscription fails. The To Normal transition must be enabled and set by default. The Read and Write methods ensure this value cannot be set to False.
Event State			Normal, Fault	Determines whether an active event state is associated with this extension. The value is set to Normal when there is no intrinsic alarming defined for this object. If intrinsic alarming is enabled (Enable Intrinsic Alarms = True), then this value is either Normal or Fault (problem occurred with the object subscribing for Change of Value [COV]s). This attribute appears on the view when the site is defined as a BACnet site.
Event Time Stamps				Conveys the times of the last event notifications for To Offnormal, To Fault, and To Normal events. Time stamps of type Time or Date have FF if no event notification of that type has generated since the object was created.
Input Reference	C			Defines the attribute of the object being sampled. This attribute is used for consistent references to an object or attribute. The Input Reference and the name of the object and attribute you want to trend must match exactly.
Intrinsic Alarming Defined	C,W	False		Enables (True) or disables (False) BACnet intrinsic alarming for this object. When disabled, writing to any of the intrinsic alarming attributes returns a Write_Access_Denied error. When disabled, reading the intrinsic alarming attributes returns the default value of each attribute.
Last Notify Record		0		Indicates the sequence number associated with the most recently collected record whose collection triggered a notification (that is, it caused the value of the Records Since Notify attribute to be equal to or greater than the value of the Notify Threshold attribute). If no notification has occurred since logging began, the value of this attribute is 0.
Logging Type		Polled	Polled, COV, Trigger	Specifies the method for which the referenced property is logged (Polled, Change of Value [COV], or Trigger).
Log Interval	C,W	60,000	Units = 100ths of a second	Specifies the periodic time in seconds for which the referenced property is logged.

Table 91: Trend Extension Attributes

Attribute Name	Notes	Initial Value	Values/Options/Range	Description
Notification Class	C,W	1		<p>Specifies the notification class used for handling and generating event notifications for this object. Notification occurs based on the value of the Records Since Notification attribute. The Notification Class attribute implicitly refers to a Notification Class object that has a Notification Class property with the same value. If the class number references a non-existent Notification object, no Notification occurs.</p> <p>When the Notification Class attribute is written online, the Notification Object Reference is updated to the Object Reference of the Notification Class object with that instance number, if found. If the Notification Class object for a Johnson Controls proprietary object is not found, the reference is left blank.</p> <p>If both the Notification Object Reference and the Notification Class attributes are written simultaneously online (or both are configured and downloaded), the Notification Class attribute value is set to the value that was written to the Notification Object Reference, and the Notification Class value in the write message is ignored.</p>
Notification Object Reference	C,W		Limited to Notification Class on the same device.	<p>Specifies the Notification Class object used to route alarms for the object being configured (through tree selection). When the Notification Object Reference is written, the value of the Notification Class attribute is updated to reflect the referenced object's instance number. The value of the Notification Object Reference attribute is restricted to Notification Class objects on the same device as the alarming object. Validation only occurs during a write, not during a create (the download does not fail).</p>
Notify Threshold	C,W	130 (90% of Buffer Size)		Indicates when notification occurs based on the value of the Records Since Notification attribute.
Notify Type	C,W	Events		Conveys if the notifications generated by the object are Events or Alarms. This attribute is required if the object supports intrinsic reporting.
Record Count	C,D,W	0	0-5,000	<p>Represents the number of samples recorded since the creation of the trend extension or the last time the buffer was cleared, when the Stop When Full attribute is set to True.</p> <p>Represents the position of the next sample recorded, when the Stop When Full attribute is set to False.</p> <p>A value of zero for this attribute deletes all records in the log buffer and resets Samples Not Sent to ADS and Total Record Count to zero. If the buffer overflows, the Record Count resets to zero.</p>
Records Since Notify		0		Indicates the number of records collected since the last notification occurred or since logging began if no notification occurred.

Table 91: Trend Extension Attributes

Attribute Name	Notes	Initial Value	Values/Options/Range	Description
Reliability		Reliable	Uses Reliability (Set 503).	Represents the reliability of the Present Value. If the Input Reference becomes unreliable, the trend extension monitoring the input becomes unreliable.
Repository Enabled	C,W	False		Enables transferring of the trend sample data to the Metasys Server when this attribute is set to True and the buffer fills to the level specified by the Transfer Setpoint attribute. If you create multiple trend extensions on a single point and send it to a Historical Data Repository, then setting Repository Enabled to true causes the Trend Viewer and/or Trend Study to display a combination of 15-minute and 1-minute samples. If Repository Enabled is set to False, then the Trend viewer displays only the data from the selected Trend Extension. To use multiple trends on a single object in a Historical Data Repository, create duplicate AV or BV objects that map to the point in question, then create a new trend on the parallel AV or BV.
Sample Interval	C,W	600	0-604,800 Units = Seconds	Specifies the periodic time in seconds for which the referenced property is logged. If this attribute is zero, samples are recorded using COV reporting. Notes: <ul style="list-style-type: none"> • If you want to take samples on a COV, set the value of this attribute to 0 seconds. • If you are not sampling on a COV, configure the Sample Interval at 60 seconds or higher to prevent loss of trend data and reduction in performance of the network engine and Metasys Server devices that receive samples from the configured trend.
Samples Not Sent to ADS		0	0-5,000	Represents the total number of samples requiring delivery to the Metasys Server repository during the next transfer.
Start Time	C,W			Specifies the time and date to enable logging when the Enable attribute is set to True. If the Start Time contains any wildcard values, then the conditions to enable logging based on time are ignored. When the Trend object is inactive due to the current time being outside of the Start Time or Stop Time, the Status attribute reflects this state (assuming it is the highest priority status). If you define a Stop Time that is before the Start Time, the Trend object is disabled.

Table 91: Trend Extension Attributes

Attribute Name	Notes	Initial Value	Values/Options/Range	Description
Status Flags				<p>Indicates the general status of the object in BACnet terms and contains four independent states.</p> <p>The four flags are:</p> <p>In Alarm—False if the Event State attribute value is Normal; otherwise, the In Alarm flag is True. (Set only by BACnet Intrinsic Alarming.)</p> <p>Fault—True (1) if the Reliability attribute is not reliable; otherwise, the Fault flag is False.</p> <p>Overridden—Overridden flag is True if the Present Value is overridden from the hardware source level.</p> <p>Out of Service—Out of Service flag is True if the Out of Service attribute value is True; otherwise, the Out of Service flag is False.</p>
Stop Time	C,W			<p>Specifies the time and date to disable logging. If the Stop Time contains any wildcard values, then the conditions to disable logging based on time are ignored. Logging is disabled if the Stop Time is prior to the Start Time. When the Trend object is inactive due to the current time being outside of the Start Time or Stop Time, the Status attribute reflects this state (assuming it is the highest priority status). A change in the active/inactive state due to the Start Time/Stop Time value has no impact on the Enable attribute. If the Trend object was disabled due to the Stop Time, the Trend object attempts to send the trend samples to the server. If you define a Stop Time that is before the Start Time, the Trend object is disabled.</p>
Stop When Full	C,W	False		<p>When set to False, logging continues. If the Repository Enabled attribute is set to False, the previously recorded samples are overwritten. If the Repository Enabled attribute is set to True and the buffer fills to the level specified by the Transfer Setpoint attribute, the previously recorded samples are sent to the Metasys Server. The buffer must be cleared for logging to continue.</p> <p>Specifies whether logging ceases when the buffer is full. When set to True, logging ceases and all accumulated samples remain in the buffer.</p>
Total Record Count				<p>Represents the total number of records collected by the Trend Extension since creation. When the value of Total Record Count reaches its maximum possible value of 0xFFFFFFFF, the next value it takes is zero. Once this value has wrapped to zero, its semantic value (the total number of records collected) is lost, but its use in generating notifications remains.</p>

Table 91: Trend Extension Attributes

Attribute Name	Notes	Initial Value	Values/Options/Range	Description
Transfer Setpoint	C,W	130 (90% of Buffer Size)	1-5,000	Represents the amount of buffer memory (in number of samples) that must fill before the trend extension requests a transfer of the current samples to the Metasys Server for permanent storage. The value cannot be greater than the buffer size when Repository Enabled is true.
Trigger	C,W			Causes the collection of data when changed from False to True, Enable is set to True, and the trend is within the Start/Stop times. When data collection completes, this attribute resets to False. This attribute does not trigger Johnson Controls COVs.

Trend Extension Commands

The following table lists the commands supported by [Trend Extensions](#). Click the command name for a description of the command.

Table 92: Trend Extension Commands

Command Name	Parameters	Description
Clear	None	Clears all samples in the buffer.
Disable	None	Stops collection of samples.
Enable	None	Resumes collection of samples.
Execute	None	Takes a single sample.
Route	None	Routes all trends that have not been previously sent to the Metasys Server, if defined.

Load Extensions

The Energy Management feature consists of two major components: one DLLR object, and one or more Load extensions. A Load extension is added to an output object (only one load extension for each object) to specify that the object should be controlled by Energy Management. Each Load extension object is configured with the load (energy) rating of its output and the attribute value or state to write to its output object when the Load object is shed.

The DLLR object determines how much energy needs to be reduced, based on its configuration and the energy rate from a meter, if the demand limiting strategy is defined. The DLLR object orders as many Loads as needed to shed to reduce the energy usage by the required amount. The Loads can be on the same supervisory device as the DLLR object, or on another supervisory device, but must be within the same site. Each shed Load writes its configured Output Shed Command attribute value to the Present Value attribute of its output, which decreases energy usage.

For information on the features and operation of DLLR, refer to the *DLLR Technical Bulletin (LIT-12011288)*.

The [Demand Limiting/Load Rolling \(DLLR\) Object](#) chapter contains information relevant to the DLLR Object.

Load Extension Attributes

Three types of Load Extension objects are available: Binary, Multistate, and Analog. The following table describes the attributes of these objects.

Note: In the Notes column, letters indicate the following: C - Configurable, D - Default Attribute for Display, N - Value Not Required, W - Writable.

Table 93: Load Extension Attributes

Attribute Name	Notes	Initial Value	Values/Options/Range	Description
Active Timer		None	Active Timer set	Indicates which Load timer is in effect: Minimum Shed, Maximum Shed, Minimum Release, or None. The Time Remaining attribute indicates how much time remains for the active timer.
Actual Shed Level		0		Indicates the level of power shed when a shed request is active. When the Present Value attribute value is Shed Compliant, the Actual Shed Level equals the value of the Shed Levels array element; otherwise, it equals zero.
Alarm Reference for Ineligibility	C,N,W			Prevents the Load from being shed if the reference is in alarm. This is an optional reference to an object that can be set to any object, including the output object. For example, if the referenced object is a room temperature sensor, and the object goes into alarm (a room becomes too warm), it prevents the supply fan (the Load object) from being shed. If the Load object is already shed when the referenced object goes into alarm, the shed expires as it would normally but cannot be shed again until the referenced object exits the alarm state.
Comfort Override	C,W	Inactive	Comfort Override set	<p>Configures the Comfort Override command behavior for this load. From time to time, you may need to override a load to turn on lights in a normally empty conference room or provide more airflow to a zone. The Comfort Override command is meant for this purpose. You can issue this command directly from DLLR's Load Summary to release loads if they are shed, and prevent them from being shed. The load cannot be shed again until the Release Comfort Override is issued.</p> <p>This attribute can be set to the following values:</p> <p>Inactive—No comfort override is in effect.</p> <p>Override And Release Immediately—Comfort overrides the Load immediately and prevents it from being shed. If the Load is currently shed, the output write is immediately released.</p> <p>Override But Release After Timer Expires—Comfort overrides the Load immediately and prevents it from being shed. If the Load is currently shed, the output write is released after the Load's Minimum Shed Time expires. If the Minimum Shed Time has already expired when the command is issued, the output write is immediately released.</p> <p>This attribute is synchronized to the Comfort Override/Release Comfort commands.</p>
Current Available Energy Savings				Indicates how much energy would be saved if the Load were shed now.
Display Precision	C,W	10ths	Uses Display Precision (Set 0).	Indicates the rounded position and the number of decimal places to display for this extension.
Display Reference	C,W		Synchronized to the output object's Display Precision.	Indicates the current display precision of the load's output object.

Table 93: Load Extension Attributes

Attribute Name	Notes	Initial Value	Values/Options/Range	Description
Duty Window	W	0	1-65,535	Indicates the time window for determining shed compliance.
Eligibility			Load Eligibility set	Indicates to DLLR whether the Load can be shed and identifies for which strategy or strategies (DL, LR, or both) the Load can be shed.
Event State			Normal, Fault	Determines whether an active event state is associated with this extension. The value is set to Normal when there is no intrinsic alarming defined for this object. If intrinsic alarming is enabled (Enable Intrinsic Alarms = True), then this value is either Normal or Fault (problem occurred with the object subscribing for COVs). This attribute appears on the view when the site is defined as a BACnet site.
Expected Shed Level		0		Indicates the level of power that the Load object expects to shed when a shed request is active or pending. When the Present Value attribute value is Shed Request Pending or Shed Compliant, the Expected Shed Level equals the value of the Shed Levels array element; otherwise, the value of the Expected Shed Level equals zero.
Input Reference	C			Specifies the object and attribute monitored by this extension. The reliability of the Input Reference is monitored and sets the Reliability attribute of this extension.
Last Shed Date				Indicates the date on which the Load was last shed (since download).
Last Shed Time				Indicates the date on which the Load was last shed (since download).
Load Locked	W	False		Specifies whether the Load is locked. A Load that is locked while released cannot be shed until the Load lock is released. A Load that is locked while shed remains shed until the Load lock is released. This attribute is synchronized with the Lock/Unlock commands.
Load Priority	C,W	10	1-10	Indicates how critical the Load's output is and determines the order in which loads are shed. You can define up to 10 load priorities: Priority 1 through Priority 10. Loads at Priority 10 are first to shed; loads at Priority 1 are the last to shed. The configured Load Priority is shown with the load on the Load Summary of the DLLR object. The shedding order is from top to bottom as listed in the Load Summary when the Load Priority column is sorted with the lowest priority loads listed first. ① Note: Even though the capacity for 10 priority levels is provided, you can implement fewer than 10 levels; in an example with, Priority 1 through Priority 4, Priority 4 loads shed first, and Priority 1 loads shed last.
Load Rating	C,W			See Load Rating.
Enabled	W	True		Indicates whether the Load object responds to shed requests.

Table 93: Load Extension Attributes

Attribute Name	Notes	Initial Value	Values/Options/Range	Description
Maximum Shed Time	C,N,W	15	1-65,535 Undefined = 65,535 Units = Minutes	Specifies the maximum number of minutes that a load can be shed before it is automatically released. If the Maximum Shed Time value is not defined, the default value of 65,535 is used. The range is 0 to 65,535 minutes. It is possible for the Load to be released before this time. A Load does not remain shed longer than the maximum shed time unless the load has been locked shed.
Minimum Release Time	C,W	5	1-65,535 Units = Minutes	Specifies the minimum number of minutes that a load must be released from shed before it can be shed again. Although DLLR does not shed a load before this time expires, a load can be manually shed before this value expires.
Minimum Shed Time	C,W	5	1-65,535 Units = Minutes	Specifies the minimum number of minutes that a load must be shed before it can be automatically released. A load can be manually released before this value expires.
On Release	C,W	Release Immediately	Comfort Override Type set	Specifies how soon the Load should be released when a Release Load command is issued or when the Shed command attribute is set to Release. If this attribute is set to Release Immediately, the load releases immediately even if its Minimum Shed Timer is active. If this attribute is set to Release After Timer Expires, the load remains shed until the Minimum Shed Time expires. If a release is issued but the Load remains shed until the Minimum Shed Time expires, the Load's Shed Status attribute indicates this using one of the following states. The state that is used depends on whether the Load was shed for demand limiting or load rolling. Shed For DL —Release Issued Shed For LR —Release Issued
Output Shed Command			Set is specified by output's States Text attribute.	The state that is written to the output's Present Value attribute when the Load is shed. DLLR does not shed the Load if the output's Present Value equals the Output Shed Command value, as no energy would be saved.
Present Value		Inactive	Uses BACnet Shed State set.	Indicates the current Load shedding state of the Load object.
Rate Units	C,W	kW	Units set	Specifies the energy units used for the Load Rating Energy Savings display.
Reliability		Reliable	Uses Reliability (Set 503).	Represents the reliability of the Present Value. If the Input Reference goes unreliable, the extension monitoring the input goes unreliable.

Table 93: Load Extension Attributes

Attribute Name	Notes	Initial Value	Values/Options/Range	Description
Requested Shed Level	W	0	1-65,535	Controls the desired level of Load shedding for one shed. Specifying a value greater than the value configured in the Shed Levels attribute sheds to the Shed Levels value. Specifying a value less than the value configured in the Shed Levels attribute (such as zero) cancels a shed. The DLLR object writes this attribute to one and sheds the Load object. Once the shed completes, the Load object resets this value to zero. If the Load object sheds through a non-BACnet method, such as the Shed command, the Load sets this attribute to one and returns it to zero after the shed completes.
Shed Command	W	None	Shed Command set	Indicates the current shed/release state of the Load. This attribute also offers the option of shedding or releasing a Load. Release —Releases the Load. The On Release attribute determines when the Load is released. If the Load is already released, there is no change. Shed —Immediately sheds a released Load regardless of its Minimum On Time. If the Load is already shed, there is no change.
Shed Duration	W	0	1-65,535	Indicates the number of minutes to shed the Load. Writing this attribute to a value less than the current time minus the Start Time attribute value cancels a shed. The DLLR object sets this attribute to shed the load. After the shed completes, the Load sets it to zero. If the Load object sheds through a non-BACnet method, such as the Shed command or Shed Command attribute, it sets this value to the Max Shed Time and returns it to zero when the shed completes. If no Max Shed Time is defined, the Load sets this value to its maximum value (0xFFFF), which is the maximum number of minutes that a Load can shed without being locked shed.
Shed Level Descriptions		Shed All Load	Uses Shed Level Descriptions set.	Provides a description of the shed level supported by the Load object.
Shed Levels	C,W	1	1-65,535	Specifies the shed levels used for the Requested Shed Level attribute. Set this attribute to a value of one (1) for the DLLR to automatically shed the Load. If this attribute is set to another value, the DLLR does not shed or release the Load; although the Load can be shed and released manually or by another feature, the Load is automatically released upon expiration of its Maximum Shed Time, unless the Load is Locked Shed.
Shed Status		Released	Shed Status set	Indicates if the Load is shed or released, and, if shed, which strategy was used to shed the Load (DL or LR).
Shed Ineligibility			Load Ineligibility set	Indicates whether a load is eligible to be shed at the current time, and, if ineligible, the cause of ineligibility.

Table 93: Load Extension Attributes

Attribute Name	Notes	Initial Value	Values/Options/Range	Description
Shed Strategy	C,W	0	Shed Strategy set	Indicates which strategy is permitted to shed the Load (DL, LR, or both).
Time Remaining	C,W			Indicates how much longer a Load timer is in effect. The Active Timer attribute indicates which timer is in effect.
Start Time	W		BACnet Date Time structure	Indicates the date and time that the Load sheds. Writing this attribute to a wildcard releases a shed load. The DLLR object sets this attribute to shed the Load. Once the shed completes, the Load object sets the value to date and time wildcards (NONE_FFFF). If the Load object sheds through a non-BACnet method, such as the Shed command, it sets this attribute to the current time, and returns it to NONE_FFFF after the shed completes.
Status Flags		False, False, False, False	In Alarm, Fault, Overridden, Out of Service	Indicates the general status of the object in BACnet terms and contains four independent states. The four flags are: In Alarm —False if the Event State attribute value is Normal; otherwise, the In Alarm flag is True. (Set only by BACnet Intrinsic Alarming.) Fault —True (1) if the Reliability attribute is not reliable; otherwise, the Fault flag is False. Overridden —Overridden flag is True if the Present Value is overridden from the hardware source level. Out of Service —Out of Service flag is True if the Out of Service attribute value is True; otherwise, the Out of Service flag is False.
Units	C,W		IP SI	Indicates the measurement units of this extension.

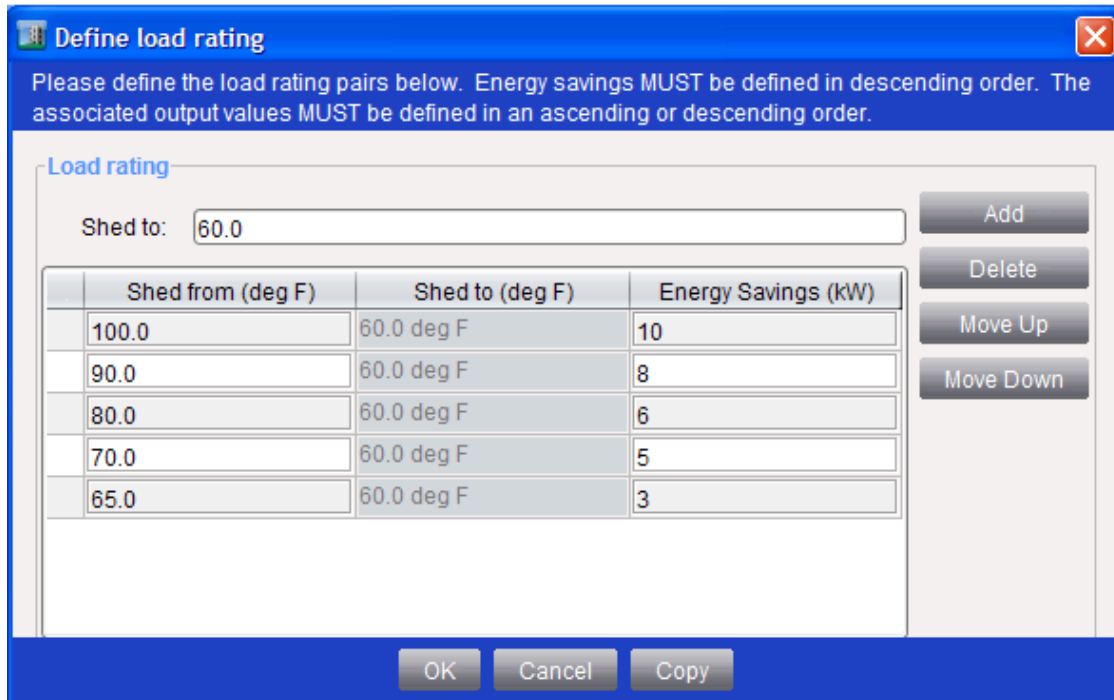
Load Rating

Defines how much energy is saved when the Load is shed. This attribute specifies the information that DLLR needs to control the load. This includes a **Shed to** value, which is the value to which DLLR commands the output when the load is shed. Also required is at least one **Shed from/Energy Savings** pair, which indicates the amount of energy that would be saved when the output is commanded from the Shed From value to the Shed to value. For binary outputs, only one Shed From/Energy Savings pair is needed, since it can have only two possible states (Shed To and Shed From). For multistate and analog output objects, there can be multiple Shed From/Energy Savings pairs, since they can have many possible values, and differing amounts of energy might be saved depending on the value the output had when the shed occurred. The option for adding multiple load ratings helps improve the accuracy of the shed process.

- ① **Note:** Enter Energy Savings amounts in decreasing order, with the highest amount listed first. Enter the same Shed to value in all rows.

Consider an example of a fan that should be shed to 60%. The first Shed from entry is 100%, because the most energy would be saved when shedding from this state. The second Shed from entry is 90%, the third entry is 80%, and so on. The entries might look like this:

Figure 36: Define Load Rating



Also, consider an example of a three-speed fan that can have the following states: High, Medium, Low, and Off. The operator decides to set the fan to Low when the Load is shed. In this case, the first Shed from entry is High because the most energy would be saved when shedding from this state. The second Shed from entry is Medium. A Shed from entry for Off is not required because no energy is saved by shedding from Off to Low. The entries might look like this:

Table 94: Load Rating Entries

Shed From	Shed To	Energy Savings
High	Low	5.0 kW
Medium	Low	3.2 kW

Load Commanding

Objects with a Load extension and intended for use with the DLLR feature permit the following operator or scheduled commands.

Table 95: Commands Available to Load Objects

Command	Parameters	Description
Shed	Type Percent, Level, or Amount Value New shed value	Sheds the load immediately. The output is written at priority 13 (LR) if the Shed Strategy is set to Load Rolling Only. Otherwise, it is written at priority 11 (DL). When this command is issued, the output is commanded regardless of whether DLLR is in Shed or Monitor Only mode. Select only the Level command and use the default value of 1. The Percent and Amount command options are intended for future use.
Release Load	None	Releases the load, which releases the command at the priority at which it was previously written by the shed command (11 or 13). The On Release attribute defined in the Load object determines whether the release occurs immediately when the command is issued, or waits for the Minimum Shed timer to expire.
Comfort Override	Release Immediately Release After Timer Expires	Releases a shed load that is resulting in occupant discomfort. This command releases the shed and prevents a future shed until the Release Comfort Override command is issued. You can either select to release the load immediately when the command is issued, or only after the Minimum Shed Timer expires. If no parameter is selected, the default is to release the load immediately.
Release Comfort Override	None	Releases the Comfort Override command and allows the load to be shed.
Lock	None	Locks the load in its current shed or released state. The load remains in this state until an Unlock (or Disable) command is issued.
Unlock	None	Releases a Lock command. If the load was locked shed and its Maximum Shed Time expired, it now releases.
Disable	None	Disables the load, which causes it to release its output command immediately if it is shed, and clears any Lock or Comfort Override commands that have been issued. While disabled, the load is not eligible to be shed.
Enable	None	Enables the load, which permits it to be controlled by DLLR.

Load Command Interactions

Table 96 illustrates command interactions that pertain to Load objects.

Table 96: Load Command Interactions

Load Command(s) Currently in Effect	Load Command Not Allowed	Explanation
Shed	Shed	Load cannot be shed because it is already shed.
Shed + Locked	Comfort Override or Release Load	Lock must be removed with Unlock command.
Comfort Override	Shed	Comfort Override must be released with Release Comfort Override command.
Released + Locked	Shed	Lock must be removed with Unlock command.
Released + Locked and Comfort Override	Shed	Comfort Override must be released with Release Comfort Override command. Lock must be removed with Unlock command.

Resource File Extensions

The Resource File extension represents an actual physical file that gets placed in the System Configuration Tool's database or in the file system ([Flash Memory](#) of an Engine device). The resource file is an extension of another object called the parent object. The parent objects for Resource File extensions can be field devices.

After completing the [Field Device](#), the wizard prompts you to add a resource file extension. The resource file extension allows you to define the attributes that represent a defined resource file and allows you to populate resource files for integrations. For example, you can define a set of resource files to support communication with field devices. The resource file notifies its parent object when any changes are made to the extension.

Note: When using an HVAC PRO file as a resource file, be sure you use the long print file format because it provides the Metasys system with more information than the short print file format. For example, the long print file format imports the units of measure while the short print file format uses defaults based on the HVAC PRO units setting. For analog values, it uses the default units of Deg F or Deg C (based on the Metric versus Imperial units specified in the PRN file). If you use a short form PRN file, the User Interface displays a warning message stating that you have selected a short format PRN file that does not contain the unit's information. The warning message indicates the Metasys system is using the default setting that may not match the original units.

For more information on resource file extensions, see [Resource File Attributes](#).

Resource File Attributes

[Resource File Extensions](#) contain attributes common to Metasys system objects. For details, see [Common Object Attributes](#).

The following table lists the attributes specific to the Resource File extension. Click the attribute name in the table for a description of the attribute. Attributes marked with the letter C are configurable, and attributes marked with the letter W are writable.

Table 97: Resource File Attributes

Attribute Name	Notes	Initial Value	Values/Options/Range	Description
Date	C			Indicates the modified date as read from the selected file.
File Name	C		Category = File	See the File Name section.
File Size	C	0	Units = Bytes	Indicates the size, in bytes, as read from the selected file.

Table 97: Resource File Attributes

Attribute Name	Notes	Initial Value	Values/Options/Range	Description
Information	C,W		Size = 80 Category = Default	Indicates the text you assigned to provide further information about the resource file. This attribute can be written to from an integration server after reading the resource file.
Time	C			Indicates the modified time as read from the selected file.

File Name

The following table indicates the file containing resources located within the host computer.

Table 98: Resource File - File Name Elements

Element Name	Initial Value	Values/Options/Range	Description
Exportable	False	Available in a future release	Indicates whether you can export the file. If True, you can export the file. If False, you cannot export the file. This element of the File Name attribute is to be available in a future release.
Object References			Indicates the object references embedded in the file.
References	False		Indicates whether the file has references. If True, the file has references. If False, the file has no references.
Relative Path		Size = 100 Category = Default	Indicates the file name of the file relative to the directory containing the MOI file for the device.

Averaging Extensions

The Averaging extension calculates the average, minimum, and maximum value of an attribute over a specific interval (for example, space temperature over 24 hours). The extension is able to sample Boolean, Integer, Unsigned, Enumerated, or Float attribute value types for any extendable objects within a BACnet device.

For more information on averaging extensions, see [Averaging Attributes](#).

Averaging Attributes

Averaging Extensions contain attributes common to Metasys system objects. For details, see [Common Object Attributes](#).

The following table lists the attributes specific to the Averaging extension. Click the attribute name in the table for a description of the attribute.

- Note:** In the Notes column, letters indicate the following: C - Configurable, D - Default Attribute for Display, N - Value Not Required, R - Affected by Extension's Reliability, W - Writable.

Table 99: Averaging Extension Attributes

Attribute Name	Notes	Initial Value	Values/Options/Range	Description
Input Reference	C			Defines the object and attribute pair to be sampled. The sampled object must be on the same device as the Averaging object.
Max Value Timestamp		Invalid DateTime	If Average Value, Minimum Value, or Maximum Value is Unreliable, the timestamp is Undefined.	Indicates the date and time that the Maximum Value has changed in the sampling buffer.
Min Value Timestamp		Invalid DateTime	If Average Value, Minimum Value, or Maximum Value is Unreliable, the timestamp is Undefined.	Indicates the date and time that the Minimum Value has changed in the sampling buffer.
Object Property Ref				Designates the particular object and attribute referenced by the Averaging object. This is a BACnet Device Property Reference structure type attribute that specifies bind information from the object/attribute defined by the Input Reference attribute. The binding information consists of the Device Identifier, Object Identifier, Array Index, and Property Identifier of the trended property. An on-box object returns nothing for the Device Identifier. The Device Object configures this attribute during object creation. Changing Object Property Ref may change Input Ref, and changing Input Ref may change Object Property Ref. Since Object Property Ref is based on Input Ref, and Input Ref does not support Array Index, Object Property Ref does not support Array Index either.
Valid Samples				Indicates the number of samples in the sampling buffer that are valid. A sample is marked invalid if a read error occurs when reading requested attributes from the host object. The number of invalid samples can be determined by subtracting Valid Samples from Attempted Samples. If the difference is greater than zero, it indicates an error during sample collection. After Attempted Samples, Window Samples, or Window Interval is written, until a sample is taken, this attribute is set to zero.
If any of these variables are Unreliable and a BACnet read is performed on the following three attributes, the values returned are NaN for Average Value, -INF for Minimum Value, and INF for Maximum Value. If these values are Unreliable and a BACnet read is not performed, the attributes return zero.				
Average Value	D,R	NaN	Units of the extended attribute	Indicates the sum of all valid samples in the sampling buffer divided by the number of samples in the buffer. This attribute is set to NaN with its Reliability set to Unreliable until a sample is taken and Attempted Samples, Window Samples, or Window Interval is written.
Maximum Value	R	-INF	Units of the extended attribute	Indicates the highest value of the valid samples in the buffer. After Attempted Samples, Window Samples, or Window Interval is written, until a sample is taken, this attribute is set to -INF with its Reliability set to Unreliable.

Table 99: Averaging Extension Attributes

Attribute Name	Notes	Initial Value	Values/Options/Range	Description
Minimum Value	R	INF	Units of the extended attribute	Indicates the lowest value of the valid samples in the buffer. After Attempted Samples, Window Samples, or Window Interval is written, until a sample is taken, this attribute is set to -INF with its Reliability set to Unreliable.
If any of the following three attributes are written or changed, all samples in the sampling buffer become invalid (set to zero, NaN, -INF, or INF), which makes them Undefined for the UI.				
Attempted Samples	W		The only acceptable value that can be written to this property is zero using the Clear command.	Indicates the total number of samples in the buffer. The only acceptable number that can be written to this attribute is zero. After Window Samples or Window Interval is written, until a sample is taken, this attribute is set to zero.
Window Interval	C,W	3,600	Units = seconds Range: 900-360,060	Indicates the period of time in seconds over which the Minimum Value, Maximum Value, and Average Value are calculated. Samples are taken at a specific sample rate, which cannot be less than 4 seconds. The sample rate is calculated by dividing the Window Interval by the number of samples as defined in the Window Samples attribute. The default value is 3,600 seconds.
Window Samples	C,W	15	Range: 2-200	Indicates the sum of all valid samples in the sampling buffer divided by the number of samples in the buffer. This attribute is set to NaN with its Reliability set to Unreliable until a sample is taken and Attempted Samples, Window Samples, or Window Interval is written.
The following four attributes do not appear in a view, but may be scheduled, trended, and so on.				
COV Increment	C,W	0.01	Any value > 0 Floating point value of the Display Precision.	This attribute does not appear in a view, but may be scheduled, trended, and so on. Specifies the minimum change in Present Value required for the object to report a change in the Average Value, Minimum Value, and Maximum Value attributes.
Display Precision	C,W	100ths	Uses Display Precision (Set 0).	Defines the decimal rounding and the decimal places to display for the Present Value and associated attributes. Average Value, Minimum Value, and Maximum Value use the same display precision. This attribute does not appear in a view, but may be scheduled, trended, and so on.
Reliability		Reliable	Uses Reliability (Set 503).	Indicates whether the Average Value, Minimum Value, and Maximum Value attributes are Unreliable. After Attempted Samples, Window Samples, or Window Interval is written, until a sample is taken, this attribute is set to Unreliable. This attribute does not appear in a view, but may be scheduled, trended, and so on.
Units		No Units	Units of the extended attribute	Indicates the units of the mapped attribute of the extended object. Average Value, Minimum Value, and Maximum Value use the same units. This attribute does not appear in a view, but may be scheduled, trended, and so on.

Averaging Commands

The following table lists the commands supported by the [Averaging Extensions](#). Click the command name for a description of the command.

Table 100: Averaging Extension Commands

Command Name	Parameters	Description
Enable	None	Clears the sampling buffer and restarts the sampling process. This command has the same effect as the Clear command.
Disable	None	Stops the sampling process.
Clear	None	Writes zero to the Attempted Samples attribute, clears the sampling buffer, and restarts the sampling process. This command has the same effect as the Enable command.

Extensions Steps

Creating Extensions

About this task:

To create extensions:

1. Select the item from the Navigation Tree and select **Show Extensions** from the **Action** menu.
 - ① **Note:** Alternatively, you can create extensions when prompted upon completion of a wizard, or when the item is in the [Panel Layout](#) by selecting the tab for the extension and clicking new.
2. Select **New** for the type of extension that you want to create. The corresponding [Extension Wizard](#) appears.
3. Select the attribute that you want to associate with the item.
4. Complete the information on the wizard screens. The screens vary depending on the type of extension you are creating.
5. Select **Finish** on the summary page to create the extension.

Editing Extensions

About this task:

To edit extensions:

1. [View the extension](#).
2. Select the tab for the extension.
3. Select the extension you want to edit.
 - ① **Note:** For trend extensions, make sure you select the **Definition View** button to display the trend's attributes.
4. Click **Edit**.
5. Make your changes.
6. Click **Save**.

Copying and Pasting Extensions

About this task:

- ① **Note:** You can perform this procedure only in the System Configuration Tool ([Offline Mode](#)). You must first create extensions before you can copy and paste them from one item to another. See [Creating Extensions](#) for details on how to create extensions.

To copy and paste existing extensions:

1. Select the item from the Navigation Tree that contains the existing extensions that you want to copy, and select **Show Extensions** from the **Action** menu. The Extension wizard appears.

- ① **Note:** Alternatively, you can right-click the item in the navigation tree and select **Show Extensions** from the menu that appears.

2. Select the check box for one or more of the existing extensions that you want to copy.
3. Click **Copy Checked Extensions**.
4. Click **Done**.
5. Select the item from the navigation tree that you want to receive the copied extensions, and select **Paste** from the **Edit Menu**.

- ① **Note:** Alternatively, you can right-click the item in the navigation tree and select **Edit > Paste** from the menu that appears.

When you paste an extension, the extension retains the name of the copied extension and appends it with a number.

Deleting Extensions

About this task:

For a trend extension that is configured to automatically transfer data to a Metasys Server (Repository Enabled = True), be sure to route unforwarded data to the Metasys Server before deleting the trend extension. If you do not, unforwarded trend data is lost.

1. To delete extensions (using the [Navigation Tree](#)):
 - a. Select the item from the navigation tree and select **Show Extensions** from the Action menu.
 - b. Select the check box of the extension you want to delete.
 - c. Click **Delete**.
2. To delete extensions (when the item is in the [Panel Layout](#)):
 - a. [View the extension](#).
 - b. Select the tab for the extension.
 - c. Select the extension.
 - d. Click **Delete**.

Searching for Extensions

You can search for Alarm, Trend, or Totalization extensions using the [Global Search](#) feature. This allows you to find up to 100 extension objects and view their current values.

Commanding Extensions

You can command Alarm, Trend, or Totalization extensions from an Extension View or from the Global Search Viewer. You can also command Trend extensions from a Trend Viewer or Trend Study view.

Single Extension

About this task:

To command a single extension object:

1. Right-click the extension object you wish to command.
2. Select **Commands** from the right-click menu. The Commands dialog box appears.
3. Choose the command to send.
4. Click **Send**.

Result

See the [Commands Dialog](#) section for more information.

Multiple Extension

About this task:

To command multiple extension objects together (Global Commanding):

1. Use the Global Search feature to find the extension objects (Alarm, Trend, or Totalization). You may also open a saved Object List containing extension objects. See [Interlocking a Trend Extension](#) for more information.
2. Select the extensions you wish to command (must be of the same type).
3. Select **Commands** from the **Action** menu. The Global Commands dialog box appears.
4. Choose the command to send.
5. Click **Send**.

Result

See the [Commands Dialog](#) section for more information.

Interlocking a Trend Extension

About this task:

To interlock a Trend Extension:

1. Create a trend extension. See the [Creating Extensions](#) and the [Trend Extensions](#) sections for information.
2. Create an [Insert Object - Interlock](#) that references the trend extension. See the [Insert Object - Interlock](#) section.

Discard

Menu Selection: **Action > Discard**

Discards the selected events currently displayed in the [Event Viewer](#). Discards selected entries from the audit log when the [Audit Viewer](#) is displayed.

Refresh

Menu Selection: **Action > Refresh**

Refreshes the data displayed in the active [frame or panel](#) in the Event Viewer, Audit Viewer, Trend Viewer, and Scheduled Reports.

Refresh Current Tab

Menu Selection: **Action > Refresh Current Tab**

Refreshes the data displayed in the current tab of the active [frame or panel](#).

Refresh All Tabs

Menu Selection: **Action** > **Refresh All Tabs**

Refreshes the data displayed in all tabs of the active [display panel](#) or the navigation frame.

Ack

Menu Selection: **Action** > **Ack**

Acknowledges the selected event(s) currently displayed in the [Event Viewer](#).

Import Integration

Menu Selection: **Action** > **Import Integration**

This command is only available when an Integration under an engine is selected in the All Items tree. After adding an [Integration](#), you can select the integration in the navigation tree and use this menu selection to add existing devices and points under the integration.

Remove From Site

Menu Selection: **Action** > **Remove From Site**

Removes (deletes) the selected engine or Metasys Server from the site. The selected engine or Metasys Server must be offline to use this option. You also can remove a device from the site in a Tailored Summary with Engine device data.

Insert Menu

Click one of the following menu items for a description of the menu item. For more information on the modes of operation, see [Metasys Modes](#).

Table 101: SMP Insert Menu

Menu Item	
Integration	Graphic
Field Device	Trend Study
Field Point	User View
Folder	Summary Definition Wizard
Control System	
Object	

Site

Menu Selection: **Insert > Site**

Inserts a site into the archive database in the SCT.

- ✓ **Tip:** The **Create Device?** dialog box appears after inserting a site that asks if you want to create a device in the site. To invoke the Insert Device wizard, select **Supervisory Device**, then click **OK**. To invoke the Insert Metasys Server wizard, select **Metasys Server**, then click **OK**. If you do not want to add a device at this time, select **None**, then click **OK**.

Site Object

The Site object defines the attributes that represent the characteristics of a site. If the Site object exists on a device, that device is considered a Site Director. Starting at Release 10.0, you can no longer configure a connection to a cloud-based platform with the attributes in the Remote Services Connection tab of the Site object. The tab still appears, but you should no longer define its attributes.

Notes:

- In SCT, a Site object may exist without a Site Director. In this case, you can open the edit window and make changes to the custom authorization category; however, you cannot save any changes until you add a Site Director.
- When you promote or demote a Site Director offline in SCT, the custom categories are rebuilt using their default settings.
- If you need to change the name of the Site object, make sure you first close all user views. This action ensures that all object references throughout the site reflect the new Site object name.

Site Attributes

This object contains attributes common to many Metasys system objects. These common attributes are described in the [Common Object Attributes](#) section. This section includes attributes of the Focus/Configuration tab, the Diagnostics tab (if applicable), and any other tab specific only to this object. See the [Object and Feature Tabs](#) section for information on the attributes that appear on the other tabs of this object (for example, the Hardware and Options tab appear on point objects).

For information on the Custom Enumeration tab, see [User Defined Enumeration Editor Tab](#).

- ① **Note:** In the Notes column, attributes marked with the letter C are configurable, and attributes marked with the letter W are writable.

Table 102: Site Object Attributes - Site View Tab

Attribute Name	Notes	Initial Value	Description
Advanced Security Enabled	C,W	True	<p>Indicates whether the site uses the advanced security settings. This attribute provides an improved layer of security between Metasys Site Directors and devices. With this attribute set to true, backward-compatible methods of communication between the Site Director and its network engines are disabled, which means a Site Director at Release 10.0 or later discards all communication attempts from network engines prior to Release 10.0.</p> <p>This attribute, which SCT sets to True for any site archive that is created at, or upgraded to, Release 10.1, applies to the entire site. Therefore, if you have any network engine on the site that is running a Metasys release prior to Release 10.0, change Advanced Security Enabled for the Site object to False.</p> <p>If you change this attribute from False to True, a user message appears to indicate that all network engines prior to Release 10.0 remain online, but are disconnected from the site because they no longer communicate with the Site Director.</p> <p>If this message appears, click OK to continue and set the attribute to True, or Cancel to keep the attribute set to False.</p>
All Items Update in Progress	C,W	False	<p>Indicates when the cache update completes after executing an Update All Items Cache command. Starting at Release 5.0, the All Items navigation tree in the Metasys UI depends on the data cached in the Site Director, which is called the All Items cache. The All Items cache automatically updates for engines at Release 5.0 or later. The cache does not automatically update for engines at a release prior to 5.0 after making changes when the UI is logged directly into the engine (that is, not through the Site Director), or when downloading an engine from the SCT (not through the Site Director). For these scenarios, you must use the Update All Items Cache command to update the All Items cache on the Site Director. This attribute appears only in the online UI.</p>
Annotation Alarm Priority Threshold	C,W	140	<p>Specifies the value that represents the range of alarm priority thresholds. The default value is 140. This attribute is checked when determining whether an event requires annotation on an ADX MVE installation. If the Event Priority value is below the threshold, annotation is required. This attribute appears only when you have MVE installed.</p> <p>For more information, refer to <i>Metasys for Validated Environments, Extended Architecture Technical Bulletin (LIT-12011327)</i>.</p>
Annotation Exclude	C,W		<p>Specifies a list of editable reference strings (fully qualified references) that allow wild card notation at any location in the string. If an item reference appears in this attribute, an event for this item does not require an annotation on an ADX MVE installation. This attribute appears only when you have MVE installed.</p> <p>For more information, refer to the <i>Metasys for Validated Environments, Extended Architecture Technical Bulletin (LIT-12011327)</i>.</p>
Annotation Include	C,W		<p>Specifies a list of editable reference strings (fully qualified references) that allow wild card notation at any location in the string. If an item reference appears in this attribute, an event for this item requires an annotation on an ADX MVE installation. This attribute appears only when you have MVE installed.</p> <p>For more information, refer to the <i>Metasys for Validated Environments, Extended Architecture Technical Bulletin (LIT-12011327)</i>.</p>

Table 102: Site Object Attributes - Site View Tab

Attribute Name	Notes	Initial Value	Description
BACnet Encoding Type	C,W	ISO 10646 (UCS-2)	<p>Specifies the type of string encoding to use in BACnet messages. Unicode should be specified unless third-party BACnet devices are employed on the site. In this case, specify the BACnet encoding type supported by the third-party BACnet devices. This attribute is automatically distributed to the site devices.</p> <p>① Note: When a site is upgraded to Release 10.1 with SCT 13.2, and the BACnet Encoding Type for the Site object is automatically changed to ISO 10646 UTF-8 during the archive upgrade process. If you require UCS-2 as the BACnet Encoding Type, make sure you set this attribute back to UCS-2 after the archive upgrade is complete.</p> <p>For information on how to set up an NAE as a BACnet system integrator in a Metasys system network, see the <i>BACnet® Controller Integration with NAE/NCE Technical Bulletin (LIT-1201531)</i>.</p>
BACnet Site	C,W	False	<p>Specifies whether specific information from the BACnet device for each Metasys object is shown in the UI. When true, BACnet information integrates into the UI for objects. When false, the information is omitted. Internally, the BACnet protocol is used at a certain level regardless of this attribute. This attribute is distributed automatically to site devices.</p> <p>For information on how to set up an NAE as a BACnet system integrator in a Metasys system network, see the <i>BACnet® Controller Integration with NAE/NCE Technical Bulletin (LIT-1201531)</i>.</p>
Broadcast Disabled	C,W	False	<p>Specifies if broadcast messages are sent by the device. When false (default value) or no Broadcast Management object exists, the device sends broadcast messages as defined by BACnet communication. When the Broadcast Management object is configured and this attribute is true, the device does not send network broadcast messages. This attribute appears only in the Snapshot Focus view on a Site Director engine.</p>
Certificate Renewal Period	C,W	60	<p>Regulates when certificate expiration reminders begin. It specifies the number of days prior to security certificate expiration before the operator is notified daily that a certificate is about to expire. For example, if you use the default period of 60 days, and a server certificate on a network engine expires on January 1, beginning on November 1, an event requiring acknowledge is sent to the Site Director once a day or until the self-signed certificate is renewed or a new trusted certificate is installed.</p> <p>The Certificate Renewal Period applies only to engines at Release 8.1 or later, and is synchronized to all affected child network engines. A change to the Certificate Renewal Period may take up to five minutes to synchronize with all network engines.</p> <p>For more information about certificate management, see <i>Metasys SCT Help (LIT-12011964)</i> and <i>Network and IT Guidance Technical Bulletin (LIT-12011279)</i>.</p>
Default Language	C,W		<p>Specifies the site's default language. All devices on the site have a dictionary using this language. This attribute appears only in the Snapshot Focus view on a Site Director engine.</p>
DNS Refresh Period	C,W	20	<p>Specifies the time in minutes between DNS lookups to update the IP address of a BACnet Broadcast Management Device (BBMD) referenced by host name. If an IP address is changed within a DNS server, the BBMD system automatically obtains the new IP address upon the expiration of this period. A value of 0 is used to disable periodic DNS lookups.</p>

Table 102: Site Object Attributes - Site View Tab

Attribute Name	Notes	Initial Value	Description
Default ADS Priority Threshold	C,W	255	Allows you to specify the priority of an event that triggers the Engine to connect (dial-up or LAN connection) to the defined Metasys server and deliver the event messages from the Engine local event repository to the event repository of that Metasys server. This attribute is used for Alarm and Event Management only. For example, a value of 20 for this attribute means that any event having a priority of 20 or higher (1 is highest) forces a connection to the Metasys server and forwards event messages from the Engine local event repository to the event repository of that Metasys server.
Default ADS Connection Type	C,W	LAN	Specifies whether the Metasys server (identified in the Default ADS Repository attribute) is connected through a LAN or dial-up connection. This attribute is distributed automatically to the site devices.
Default ADS Delivery Time	C,W	12:15 AM	Specifies the time of day when a connection should be established to the Metasys server (identified by the Default ADS Repository attribute). A connection is attempted at least daily at the specified time to deliver audit, alarm, and trend data to the Metasys server. This attribute is distributed automatically to the site devices. All Metasys devices that are part of the Site use the time zone they are located in.
Default ADS Repository	C,W	0.0.0.0	Specifies the resolvable host name or IP address of a Metasys server. The Metasys server is the device to which local audit, alarm, and trend data is delivered. Repository refers to the files in the Metasys server in which this data is stored. A host name may be specified only if a DNS server is available to the device. This attribute is distributed automatically to the site devices. The Default ADS Repository of the Site is intentionally left blank and must be updated by the user (online or offline). If the user does not populate the Default ADS value and leaves the Default ADS Repository value for all devices at 0.0.0.0, the Metasys server does not receive any audit, alarm, or trend data. The SCT does not automatically populate the Default ADS Repository value because of the many different possibilities that could exist during archive creation, including multiple Metasys server on a site or no Metasys server for a site. In these cases, it would not be immediately clear which Metasys server should be the Default Metasys server under the Site object.
Default Time Zone	C,W	Central Time (US and Canada)	Specifies the site's default time zone. The Site object determines and updates the UTC offset from this value. Once set in the Site object, the time zone is propagated to the other devices on the site. All Metasys devices that are part of the Site use the time zone of the Site Director, even if some of those devices are physically located in a different time zone.

Table 102: Site Object Attributes - Site View Tab

Attribute Name	Notes	Initial Value	Description
Device Time Servers	C,W		<p>This attribute is used only for Windows time synchronization. Leave this attribute blank if you are not using Windows time synchronization. Specifies a list of resolvable host names or IP addresses of Simple Network Time Protocol (SNTP) server devices that the devices on the site (except the Site Director) use as their time server. Do not use an SNTP server name that has a dash (-) as its last character (for example, SNTP_Server-).</p> <p>Periodically, each device on the site (except the Site Director) attempts to sync time from an SNTP server from this list. Contact with an SNTP server is attempted one at a time in list order until one successful contact is made.</p> <p>A host name may be specified only if a DNS server is available to the site server. If the site server is also an SNTP time server, the site server may be specified in this attribute. This attribute is distributed automatically to the site devices.</p> <p>The NxE or Metasys server designated as the Site Director is the device time server for the site and provides the time management for all other engines/servers on the site.</p> <p>The Engine accepts BACnet Time Sync messages only if no SNTP server is defined for that Engine.</p>
Dynamic Broadcast Management		False (SMP) True (SCT)	<p>Configures the Metasys system with BBMDs automatically when a Metasys system includes more than one IP subnet so that BACnet protocol broadcasts reach all Metasys system devices. When set to True, Dynamic Broadcast Management determines the number of IP subnets and ensures that each IP subnet has exactly one BBMD. The feature uses the Third Party BBMDs List attribute in the Site object when determining the list of devices to be BBMDs. As devices are added or removed from the site, the selection of broadcast management devices occurs automatically.</p> <p>① Note: Do not edit the BBMD Broadcast Distribution Table in the Ethernet IP Datalink network port object if Dynamic Broadcast Management is set to True.</p> <p>When Dynamic Broadcast Management is set to False, the BBMD Broadcast Distribution Table in the Ethernet IP Datalink network port object is used to determine BBMD devices. Do not use the Third Party BBMDs List attribute in the Site object. At Release 11.0, you can edit the BBMD Broadcast Distribution Table with the option of specifying an IP address or a host name.</p>
Enum Set Memory Used		0	Indicates amount of memory used by the created auto and custom sets.
File Name	C,W		Specifies an XML file containing site organization data within the file system of the host computer. This attribute appears only in the Snapshot Focus view on a Site Director engine.
Multicast Group Address	C,W	224.0.1.1	Specifies the IP address used to multicast the SNTP message. The RFC-2030 defined standard address is 224.0.1.1. The address is configurable to allow site-specific use.
Multicast Heartbeat Interval	C,W	5	Specifies the number of minutes between forcing a multicast time synchronization message.
Multicast TLL	C,W	1	Specifies the Time-to-Live for a multicast message. The value indicates the number of router hops allowed before the message is not sent. Routers must be configured to pass multicast messages to allow the time sync message to pass.
Multicast UDP Port	C,W	123	Specifies the UDP port on which multicast time synchronization polls and listens for messages. The RFC-2030 defined standard port is 123.

Table 102: Site Object Attributes - Site View Tab

Attribute Name	Notes	Initial Value	Description
Online Archive Transfer in Progress		False	Indicates whether the Metasys Server is currently archiving changes to its database as a result of a network engine download from SCT. This attribute changes to True during the archive process, then changes to False after the archive update is complete.
Poll Rate	C,W	Fast	Specifies the frequency at which the Site Director checks its communication status with site devices. This setting affects the detection time of offline NxEs, and the amount of network bandwidth needed to support this detection. At the default setting Fast, the detection time is short, but the network bandwidth use is high. At a Slow setting, the detection time is longer, but network bandwidth use is low. The calculated Detection Interval is shown in the NxE. This setting only affects communications with devices at Release 5.2 or later.
Remaining Auto Sets		1000	Indicates the number of remaining auto sets available.
Remaining Custom Sets		256	Indicates the number of remaining custom sets available.
Security Level	C,W	Medium (1)	Specifies the security level to be used by this device. This attribute is distributed to the site's devices automatically. This attribute appears only in the Snapshot Focus view on a Site Director engine. Valid options include: Low [0]: Login required. Medium [1]: Low plus authorization. High [2]: Medium plus signatures.
Signature Alarm Priority Threshold	C,W	140	Specifies the value that represents the range of alarm priority thresholds. The default value is 140. This attribute is checked when determining whether an event requires electronic signature on an ADX MVE installation. If the Event Priority value is below the threshold, a signature is required. This attribute appears only when you have MVE installed. For more information, refer to the <i>Metasys for Validated Environments, Extended Architecture Technical Bulletin (LIT-12011327)</i> .
Signature Exclude	C,W		Specifies a list of editable reference strings (fully qualified references) that allow wild card notation at any location in the string. If an item reference appears in this attribute, an event for this item does not require a signature on an ADX MVE installation. This attribute appears only when you have MVE installed. For more information, refer to the <i>Metasys for Validated Environments, Extended Architecture Technical Bulletin (LIT-12011327)</i> .
Signature Include	C,W		Specifies a list of editable reference strings (fully qualified references) that allow wild card notation at any location in the string. If an item reference appears in this attribute, an event for this item requires a signature on an ADX MVE installation. This attribute appears only when you have MVE installed. For more information, refer to the <i>Metasys for Validated Environments, Extended Architecture Technical Bulletin (LIT-12011327)</i> .
Site Director Reference			Specifies the object name of the Site Director for the site. If the site has more than one Site Director, the attribute becomes a selection list from which you can change the Site Director Reference. When you change the Site Director, a message appears to request you to log in to the new Site Director.

Table 102: Site Object Attributes - Site View Tab

Attribute Name	Notes	Initial Value	Description
Site Security Level	C,W	Encrypted Only	Selects whether encrypted only communication or encrypted and trusted communication is enabled between the Metasys server and its network engines. Do not set this attribute to Encrypted and Trusted until all network engines reporting to the Site Director have been downloaded with trusted certificates. If the site has one or more network engines with self-signed certificates only, but not trusted certificates, set this attribute to Encrypted Only .
Site Time Servers	C,W		<p>Specifies a list of resolvable host names or IP addresses of SNTP server devices that the Site Director uses as its time server. Periodically, the Site Director attempts to sync time from an SNTP server from this list. Contact with an SNTP server is attempted one at a time in list order until one successful contact is made. A host name may be specified only if a DNS server is available to the site server. Important items:</p> <ul style="list-style-type: none"> - The Site Director provides the time management for the site. - On the NAE35/NAE45/NCE25, only the first listed address is used. - An error message appears when you have configured one or more Site Time Servers and attempt to change the time and date using the Set Time and Set Date commands. - The Engine accepts BACnet Time Sync messages only if no SNTP server is defined for that Engine. - The Site Time Servers attribute must be set to an SNTP server to facilitate synchronization when in Multicast mode. Only the first Site Time Server is used if more than one is specified in Multicast mode. - When the Time Sync Method is set to Windows, also set the Internet Time Server in the Windows operating system of the Site Director to match the IP Address specified for the Site Time Server. In Control Panel of the Site Director, search for Date and Time. On the Date and Time dialog box, click the Internet Time tab. Click Change Settings and enter in the Server field the same IP address that you defined in the Site Time Server attribute. Click OK to apply the change.

Table 102: Site Object Attributes - Site View Tab

Attribute Name	Notes	Initial Value	Description
Third Party BBMDs	C,W		<p>The Third Party BBMDs attribute is used by the Dynamic Broadcast Management feature to help determine the placement of BBMDs. BBMDs are used in the BACnet protocol to eliminate broadcast messages sent across multiple subnets on an IP network. A single device on each subnet, referred to as the BBMD, receives messages from other BBMDs and broadcasts them locally on its own subnet.</p> <p>If one or more third-party BBMDs exist, this attribute should specify the complete list of IP addresses of third-party BBMDs and Metasys system devices that should act as a BBMD. Each IP subnet should have exactly one BBMD, either a third-party or Metasys system device. To function properly, each third-party BBMD must be configured with the list of all other BBMDs within the system as well.</p> <p>If the Metasys system does not include any third-party BBMDs, then this attribute typically should be left empty. A possible exception would be if you want to designate a particular Metasys system device as a BBMD, then that device could be added to the Third Party BBMD list. If no device is specified by this attribute for an IP subnet, the Dynamic Broadcast Management feature automatically assigns a Metasys system device. Do not specify more than one Metasys system device per IP subnet.</p> <p>The devices are configured in the Third Party BBMD list in the following ways:</p> <ul style="list-style-type: none"> - Address-UDP Port: Use the BACnet UDP Port address. The default is 47808. - Address-IP: Use the IP address of the device. - IP Broadcast Mask: Use the BACnet Broadcast Mask as defined by BACnet standard 135-2004, section J.4.3.2. Specify 255.255.255.255 if messages should be directly sent to remote BBMDs using a unicast IP address or broadcast messages are not allowed through the IP router to the remote subnet. Otherwise, specify the subnet mask of the remote subnet if broadcast messages are allowed through the IP router to a remote subnet. <p>In most cases, IP routers do not allow broadcast messages to be passed to a remote subnet; therefore, the mask should be set to 255.255.255.255. If the IT department knows that broadcast messages are allowed to the remote subnet, then set the mask to the subnet mask that the BBMD resides upon.</p>
Time Sync Method	C,W	Windows	Determines which mode is used to synchronize time. The available modes are Windows or Multicast. Windows mode uses the Microsoft W32Time service. Multicast mode uses a specific implementation of the standard SNTP, which includes periodic multicasting of system time to maintain better time synchronization across devices.
Time Sync Period	C,W	1 hour	Specifies the interval at which the Site Director polls the defined site time server (STS) (for example, the Atomic clock) for the time. We recommend leaving the default value for this attribute. This attribute applies only to the Engine.
Warning Banner	C,W	False	Enables a special login feature that displays a warning statement each time you access the Site Management Portal. The banner appears for logging into the Site Director and any of its child devices. Select one of the following warning banners: U.S. Department of Defense (DoD), U.S. General Services Administration (GSA), U.S. Department of Transportation (DOT) Federal Aviation Administration (FAA), or None (no banner; default).

Table 103: Configuring Metasys System Devices in the Third Party BBMD List

Field	Description
Address-UDP Port	Use the BACnet UDP Port address. The default is 47808.
Address-IP	Use the IP address of the device.
IP Broadcast Mask	Use the Broadcast Mask of the Metasys system device. ► Important: This is not the subnet mask for Metasys system devices. Metasys system devices automatically use 255.255.255.255 for the broadcast mask.

Note: The changes made to labels on Authorization Category in the Site object are shown in the Security Administrator screens. Refer to the *Authorization Category Assignment* section of the *Security Administrator System Technical Bulletin (LIT-1201528)* for more information on changing Object Categories labels and how these changes affect the UI.

Table 104: Site Object Attributes - Object Categories Tab

Authorization Category	Display Text
Standard Object Categories (Standard Object strings cannot be modified.)	
HVAC	HVAC
Fire	Fire
Security	Security
Services	Services
Administrative	Administrative
General	General
Lighting	Lighting
Refrigeration	Refrigeration
Critical Environment	Critical Environment
Air Quality	Air Quality
Power	Power
Energy	Energy
System	System
Custom Object Categories (Display text can be modified).	
Custom 1 - Custom 150 Note: Devices at a release earlier than 5.2 are limited to 12 categories.	Custom 1 - Custom 150 (default)

Site Commands

The following table lists the commands supported by the [Site Object](#).

Table 105: Site Object Commands

Command Name	Parameters	Description
Set Date	Day of Week/ Month/Year	Sets the current date for the Site object.
Set Time	Hour:Minute: AM/PM	Sets the current time for the Site object.
Update Broadcast Management	None	Requests the system to select broadcast management devices over the Metasys network based on the Third Party BBMDs List attribute for determining BBMD devices.

Supervisory Device

Menu Selection: **Insert > Supervisory Device**

Inserts a supervisory device into the archive database with SCT, including the following network engines: NAE35, NIE39, NAE45, NAE451L, NIE49, NAE55, NIE59, NAE85, NIE89, NCE25, NIE29, NIE55, NIE85, SNE10/SNE11/SNE22, and SNC16/SNC25. You can insert a device at a previous Metasys system release with SCT, beginning with Release 5.2 and later. The SNE and SNC devices are only available to SMP at Release 10.1 or later, and SCT Release 13.2 and later.

Note: The NAE451L and SNE110Lx network engines are available only to select regions of Australia, China, Hong Kong, India, Indonesia, Japan, Korea, Malaysia, New Zealand, Philippines, Singapore, Taiwan, Thailand, Vietnam, and select branches.

On the Configure screen of this wizard, click any tabs that may appear for further device configuration.

Engine Device Object

The Engine object defines the attributes that represent the externally visible characteristics of a NAE/NIEx5/NIEx9/NCE or SNE/SNC controller. One Engine Device object exists per controller. The Johnson Controls Engine object functions differently from the BACnet Device object.

Notes:

- In this chapter, Engines applies to all models of network engines, including the following:
 - Network Control Engines: NCE25
 - Network Automation Engines (small-capacity): NAE35 and NAE45
 - Network Automation Engines (large-capacity): NAE55 and NAE85
 - Network Integration Engines (small-capacity): NIE29, NIE39, NIE49
 - Network Integration Engines (large-capacity): NIE59, NIE89
 - Series of Network Controllers: SNC16 and SNC25
 - Series of Network Engines: SNE10, SNE11, and SNE22
- The Object Type for this object is labeled **Device** in the software.
- If you open the Focus window for an Engine object but the window indicates the engine is unreachable, you may need to pair the engine to the Site Director. For details, see [Pair Network Engine with Site Director](#).
- For SNE and SNC engines upgraded to Release 11.0, you cannot change the Computer Name and JCI IP Address at the same time. If you need to change both of these attributes, change one at a time. The engine resets after each operation.
- Also, for SNE and SNC engines upgraded to Release 11.0, two USB Control attributes protect the two USB ports on the engine from intrusion. Before you can use the USB ports, you need to set the USB Port 1 Enabled and USB Port 2 Enabled attributes under the Focus window to True. See [Engine Attributes](#).

This object allows you to see data about the controller, such as the IP address and the current date and time.

For general information on Metasys system objects, see the [Object Help](#) section.

Engine Concepts

Flash Memory

A type of nonvolatile memory within the Engine device. The Engine stores the [operating system](#), [software](#), and [archive](#) within this memory. This memory is not used during normal operation of the

Engine device, except when a new graphic is added and the new image is uploaded and stored. The flash memory is mostly used during shutdown and system restart.

Operating System

- Engines use a Microsoft Windows Embedded or Linux operating system (specific operating system depends on the model), which is shipped preinstalled on the Engine or can be updated after the engine is installed. In general, the operating system cannot be modified by adding or deleting programs or drivers, although provisions are made to install factory-authorized patches and upgrades.

Software

The software is the Johnson Controls programs used in the Engine, also preinstalled at the factory. This includes graphics, trending, logic, alarm, and other programs. Provisions are made for both the software and the operating system to be upgraded at the job site when new revisions of Metasys Engine software are available.

Database

The database is the collection of objects and their parameters as defined by the user. Each database is unique to the job. A database can be created or edited (with appropriate user authority) either online using the Site Management Portal UI, or offline using SCT. SCT can also be used to download a database or upload and create a backup copy of the database.

Archive

A copy of the database, called the archive, is kept in each Engine's flash memory. This happens automatically once a day or on operator command. Following restoration of power loss to an Engine, the archive is copied into main memory to restore normal operation.

Background File Transfer

Network engine models at Metasys Release 10.1 or later support the Background File Transfer feature. When you use SCT 13.2 or later to perform a download to the NAE55-2, NAE55-3, SNE, and SNC models, you use the Background File Transfer feature. Background File Transfer permits you to download a new image and database to a network engine while the engine is still running and controlling the building. With previous releases, the engine was offline and inaccessible during this process. The Background File Transfer feature is part of the **Manage Archive Wizard > Download To Device** option in SCT.

The two background file transfer types offered in SCT are:

Code and Configuration: download and activate operating system, archive database, security database, and HTTPS certificates. This file transfer type re-provisions the Flash memory of the engine, including the operating system, application software, and device configuration.

Configuration only: download and activate archive database, security database, and HTTPS certificates. This file transfer type updates the device configuration only, including the archive and security databases, or certificates.

You can choose when to activate the downloaded files. If you activate the files immediately, the files activate after the download completes. If you do not activate immediately, the files go into a staged state in which the files are ready to deploy, but not until you are ready. The Staged Files attribute of a network engine contains information about which files are downloaded but not yet applied. Eventually, you can issue an Apply Staged Files command with the SMP UI to manually activate the files you transferred. For more details about Background File Transfer, refer to *Metasys SCT Help (LIT-12011964)*.

Engine Attributes

This object contains attributes common to many Metasys system objects. These common attributes are described in the [Common Object Attributes](#) section. This section includes attributes of the Focus/Configuration tab, the Diagnostics tab (if applicable), and any other tab specific only to this

object. See the [Object and Feature Tabs](#) section for information on the attributes that appear on the other tabs of this object (for example, the Hardware and Options tab appear on point objects).

① **Note:** In the Notes column, letters indicate the following: C - Configurable, D - Default Attribute for Display, N - Value Not Required, Q - BACnet Required, W - Writable.

When you promote or demote a network engine Site Director online using the Site Management Portal UI, you are prompted for the user credentials of the Site Director you specified. These user credentials are authenticated before the promotion or demotion is permitted.

Table 106: Engine Device Object Attributes - Focus/Configuration Tab

Attribute Name	Notes	Description
Ack Forward Enable	C,W	<p>Specifies whether all events acknowledged or discarded at a network engine are forwarded to the ADS repository if an ADS Repository is configured. What is included are:</p> <ul style="list-style-type: none"> • Events and BACnet intrinsic alarm notifications generated by the engine and acknowledged by a user logged into the engine SMP. • BACnet intrinsic alarm notifications received by an engine that are acknowledged at a BACnet device and acknowledged by the engine without a user ID and forwarded to the repository. <p>Acknowledgments are not forwarded to an ADS repository on a dial-up connection.</p> <p>When you acknowledge BACnet event notifications, events are annotated with the source or device of the acknowledgment and your user name as who acknowledged the event. If an event notification from an engine is acknowledged at a third-party BACnet workstation, the event annotation at both the engine and the site include the source of the annotation. If, however, an event notification from a third-party device is acknowledged from a third-party workstation, any engine that also receives the event notification does not include a source for the acknowledgment. When that event acknowledgment is forwarded to the Site Director, the user is specified as MetasysSysAgent.</p> <p>When this attribute is not enabled, events acknowledged at engines are:</p> <ul style="list-style-type: none"> • not forwarded to the ADS repository. All events must be acknowledged at the Site Director. • locally acknowledged at the engine. This acknowledgment includes sending a BACnet alarm acknowledgment for alarm notifications received by an engine. <p>Regardless of whether this attribute is enabled, when events are acknowledged or discarded at the Site Director, the Site Director attempts to forward the acknowledgment and discards it to the engine that initiated the event.</p> <p>The Ack Forward Enable attribute must always be false on Engines configured for validated environments, that is, whenever signatures are required when acknowledging events.</p> <p>The behavior for Ack Forwarding is not well defined when an Engine is configured both as a site device and as a BACnet integrated device at the same site. Although an Engine can be configured both as a site device and as a BACnet integration device, this configuration is not recommended.</p>

Table 106: Engine Device Object Attributes - Focus/Configuration Tab

Attribute Name	Notes	Description
ADS Connection Type	C,N,W	Specifies whether the Metasys Server (defined in the ADS Repository attribute) is connected through a LAN or dial-up connection. If a value is specified, it overrides the value of the Default ADS Connection Type attribute. If no value is specified, the value of the Default ADS Connection Type attribute is used (Default ADS Connection Type is a site level setting sent to the site's devices). ADS Connection Type is ignored if no Metasys Server is defined for this site.
ADS Delivery Time	C,N,W	Specifies the time of day when a connection should be established to the Metasys Server (determined by the ADS Repository attribute). A connection is attempted at a minimum of once a day at the specified time to deliver audit, alarm, and trend data to the Metasys Server. If a value is specified, it overrides the value of the Default ADS Delivery Time attribute. If no value is specified, the value of the Default ADS Delivery Time attribute is used (Default ADS Delivery Time is a site level setting sent out to the site's devices). ADS Delivery Time is ignored if no Metasys Server is defined for this site.
ADS Priority Threshold	C,W	Specifies the priority of an event that triggers the Engine to connect (dial or LAN connection) to the defined Metasys Server and delivers the event messages from the Engine local event repository to the ADS event repository without waiting for the ADS Delivery Time. The ADS Priority Threshold attribute is used for alarm and event management only. For example, a value of 20 for this attribute means that any event having a priority of 20 or higher (events of higher alarm priority have lower alarm priority numbers) forces a connection to the Metasys Server and forwards event messages from the Engine local event repository to the repository of the Metasys Server.

Table 106: Engine Device Object Attributes - Focus/Configuration Tab

Attribute Name	Notes	Description
ADS Repository	C,N,W	<p>Specifies the ADS Repository device. This device is the Metasys Server computer that receives all audit, alarm, and trend data from a network engine. Repository refers to the three files in the Metasys Server that store this data. If a value is specified, it overrides the value of the Default ADS Repository attribute of the site. If no value is specified, the value of the Default ADS Repository attribute is used (Default ADS Repository is a site level setting sent to the site's devices). When you save a change to the ADS Repository value, no authentication between the network engine and the Metasys Server is required. This is normal operation.</p> <p>① Note: If the Engine uses a dial-up connection to transmit data to the Metasys Server, then the ADS Repository must be the first IP address listed in the range specified when configuring the Metasys Server to Allow Incoming Connections (see External Modem Config section of the Communications tab).</p> <p>The Default ADS Repository of the Site is intentionally left blank and must be updated by the user (online or offline). If the user does not populate the Default ADS value and leaves the Default ADS Repository value for all devices at 0.0.0.0, the Metasys Server does not receive any audit, alarm, or trend data. The SCT does not automatically populate the Default ADS Repository value because of the many different possibilities that could exist during archive creation, including multiple Metasys Servers on a site or no Metasys Server for a site. In these cases, it is not immediately clear which Metasys Server should be the Default ADS under the Site object.</p>
Alarm Repository Size	C,W	Specifies the maximum number of alarms that can be maintained on the local device.
Alarm Snooze Time	C,W	Specifies the amount of time to delay after an operator temporarily ignores, or snoozes an alarm before re-announcing the alarm.
Align Intervals		Specifies whether clock-aligned periodic time synchronization is enabled. If periodic time synchronization is enabled and the time synchronization interval is a factor of an hour or a day (that is, the value divides without remainder), then the beginning of the period specified for time synchronization aligns to the hour or day, respectively.

Table 106: Engine Device Object Attributes - Focus/Configuration Tab

Attribute Name	Notes	Description
APDU Retries	C,W	Indicates the maximum number of times that an Application Layer Protocol Data Unit (APDU) (as specified by the BACnet device) is retransmitted. If the device does not perform retries, it is set to zero. If the value is greater than zero, a nonzero value appears in the APDU Timeout attribute. If you write the value of this attribute, you must reset the Engine for the new settings to take effect. Recommended settings: high or medium sensitivity: 4; low sensitivity: 5. ① Note: If you change the value of this attribute, you must reset the network engine for the new settings to take effect.
APDU Segment Timeout	C,W	Indicates the amount of time in milliseconds between retransmission of an APDU segment. Recommended settings: high sensitivity: 4000 ms; medium sensitivity: 10000 ms; low sensitivity: 20000 ms. ① Note: If you change the value of this attribute, you must reset the network engine for the new settings to take effect.
APDU Timeout	C,W	Indicates the amount of time in milliseconds between retransmissions of an APDU requiring acknowledgment for which no acknowledgment has been received. Recommended settings: high sensitivity: 6000 ms; medium sensitivity: 10000 ms; low sensitivity: 20000 ms. ① Note: If you change the value of this attribute, you must reset the network engine for the new settings to take effect.
Appl SW Version		Identifies the version of the application software installed in the device. The content of this string is locally defined (date-and-time stamp, a programmer's name, a host file version number, and so on).
Archive Date		Indicates the date of the last successful archive of object instances. The value of this attribute is valid when a valid archive exists and during the archive download process. The value of this attribute is *.*.*.* at all other times.
Audit Action When Full	C,W	Specifies the operation of the audit trail feature when the audit repository is full. If the value is Stop, additional audit entries are discarded. If the value is Rollover, additional audit entries replace the oldest audit entries.
Audit Generate Alarm When Full	C,W	Specifies whether an alarm is generated when the audit repository is full.
Audit Repository Size	C,W	Specifies the maximum number of audit trail entries that can be maintained on the local device.
Backup And Restore State		Describes the current state of the engine during the BACnet backup or restore process. Possible values include Idle (normal operation), Start, Downloading, Provisioning, Staged, Activation, and Resetting.
Backup Fail Timeout	C,W	Specifies how long in seconds that the engine waits for the BACnet backup or restore process to complete before timing out and ending the process. Default is 120 seconds.

Table 106: Engine Device Object Attributes - Focus/Configuration Tab

Attribute Name	Notes	Description
Backup Preparation Time		Specifies how long in seconds that the engine remains unresponsive after starting the BACnet backup procedure and before timing out and ending the process. Value is fixed at 60 seconds.
BACnet Communications Password	C,W	Provides password protection of BACnet services, such as DeviceCommunicationControl and ReinitializeDevice. Third-party workstations may use these services and must provide the password for the Engine to execute the services. This attribute is user configurable if the BACnet Site attribute in the Site object is set to True. Specify a value for the BACnet Communication Password (maximum 20 characters) before using any BACnet services. This password is saved in encrypted form within the engine and within the engine's archive in SCT. Third-party workstations cannot read or write this password.
BACnet UDP Port	C,W	Specifies the UDP port number used to communicate with other BACnet devices over the IP network. This value allows multiple BACnet networks on a single IP network and prevents communication between the multiple BACnet networks. If you write the value of this attribute, you must reset the Engine for the new settings to take effect. ① Note: If you write the value of this attribute, you must reset the Engine for the new settings to take effect.
BIOS Version		Specifies the BIOS version in the Engine. The format of the basic input/output system (BIOS) version is <V><major release>.<minor release>. For example: V2.02. This attribute is present only for NxE engines at Release 9.0 and earlier that use a Windows Embedded operating system. It is blank or does not appear for newer engines. For NAE55/NIE55, if the BIOS version is earlier than V2.02, update the BIOS using the BIOS Update Utility. This update significantly improves overall product performance. For information on the BIOS Update Utility, refer to the <i>BIOS Update Utility Technical Bulletin (Part No. 24-10110-42)</i> .
Configuration Files		Identifies the files within the image of the engine that you can back up.
Database Revision		Specifies a logical revision number for the device's database. Database Revision is incremented when an object is created or deleted, an object name changes, or a restore is performed.
Device Addr Binding	W	Contains a list of BACnet Object Identifiers of an Engine Device object and a BACnet device address in the form of a BACnet Address. Entries in the list identify the actual device addresses that are used when accessing the remote device via a BACnet service request. The list may be empty if no device identifier-device address bindings are currently known to the device.

Table 106: Engine Device Object Attributes - Focus/Configuration Tab

Attribute Name	Notes	Description
Device Object Identifier		Identifies a numeric code assigned to the engine. The identifier must be unique across the entire Metasys network. This attribute appears in the Focus and Configuration tabs.
Dial-up Audit Forwarding Threshold	C,W	Specifies the size limit of the audit repository (as a percent of the audit repository size) at which the network engine attempts to deliver audit entries to the Metasys Server when the engine has a dial-up connection. (For engines connected over a LAN, audit entries are delivered immediately.) This attribute applies only if a Metasys Server is configured as the Site Director for the network engine. When this threshold is reached, all audits in the Local Audit Repository that have not been forwarded are forwarded to the defined ADS Repository. The default is 80%, and to ensure good performance, you should not change to a lesser number.
DST Status		Indicates whether daylight saving time is in effect (True) or not (False) at the device's location.
Duplicate References		Lists references that are duplicated in the system. Entries in this list are object references that exist on more than one device within the system.
Enable Application Generated Audits	C,W	Enables audits of system commands. ① Note: If Display Object Generated Objects is set to true, these audits appear in the audit viewer of the Engine or Metasys Server, increasing the number of audits generated.
Enabled Audit Level	C,W	Specifies which level of audit entries are added to the Audit Repository. Only audit entries of type Level 1 through (and including) the specified level are included. All other levels are not stored in the audit trail. Level 1 and Level 2 audit entries are always stored in the audit trail. <ul style="list-style-type: none"> • Level 1 and 2 (1): Stores all user action and system error audit messages. • Level 3 (2): Stores application audit messages in addition to Level 1 and 2 auditing. • Level 4 (3): Stores system audit messages in addition to Level 3 auditing. • Level 5 (4): Stores diagnostic audit messages in addition to Level 4 auditing.
Event Action When Full	C,W	Specifies the operation of the Alarm and Event Management feature when the event repository is full. If the value is Stop, additional event entries are discarded. If the value is Rollover, additional event entries replace the oldest event entries.
Firmware Version		Represents the release of firmware installed in the main code section of the device. The first digit in the revision number is advanced on major releases. The second digit is advanced on minor releases. This attribute is in contrast to the Staged Firmware Version attribute, which indicates the engine's firmware version that is currently staged in the engine.

Table 106: Engine Device Object Attributes - Focus/Configuration Tab

Attribute Name	Notes	Description
IEIEJ Function A List	C,W	Provides a list of structures with the following elements: Network Number, Device ID High Limit, and Device ID Low Limit. The first set of Who-Is messages is broadcast once the device reaches the Enable Field Commands phase of startup. At this time, a timer starts running that calls a method to send the Who-Is messages at the period specified by IEIEJ Function A Period.
IEIEJ Function A Period	C,W	Sets the period at which the IEIEJ Function A List sends the Who-Is message broadcasts. Clearing the value of this property disables the function A feature. Each destination is guaranteed to get a Who-Is message within the period specified by this property; however, if the list contains multiple destinations, the object attempts to spread out the Who-Is messages so that they are not all sent out at the same instant.
Internode Comm Timer	C,W	Controls the frequency of communication with remote Ethernet devices. This value is used by the Ethernet IP Datalink object. Among other communications, this attribute defines the frequency of the heartbeat to monitored devices (monitored at a rate of two times the Internode Comm Timer). Recommended settings: high sensitivity: 20 seconds; medium sensitivity: 120 seconds; low sensitivity: 240 seconds. ① Note: If you change the value of this attribute, you must reset the network engine for the new settings to take effect.
Interval Offset	C,W	Specifies the offset, in minutes, from the beginning of the period defined for time synchronization until the actual time synchronization requests are set. Interval Offset has no effect when Align Intervals is False.
Is Validated	C	Enables the MVE feature at the engine, which includes reauthentication with electronic signature and required annotation when the user makes a change to the system, such as commanding an object, acknowledging an alarm, or changing the value of an attribute. This attribute can be set to True for MVE sites only. This attribute is writable only with the SCT, and is read-only online.
JCI Exception Schedule	C,W	Indicates how long exception schedules are kept after the exception date has expired. The default value is Auto Delete 31 days, which is the same behavior prior to this release. New options are Auto Delete 7 days and Manual Delete. Notes: <ul style="list-style-type: none"> The Engine (using SCT and online UI) and FAC (at CCT) allows selections for Manual Delete, Auto Delete 31 days, and Auto Delete 7 days. Manual Delete is needed for locations like Japan where the local standards state that only the BACnet workstation can delete exception schedules.

Table 106: Engine Device Object Attributes - Focus/Configuration Tab

Attribute Name	Notes	Description
Last Restart Reason		<p>Indicates the reasons for the last device restart. The possible reasons are:</p> <ul style="list-style-type: none"> • UNKNOWN: The device cannot determine the cause of the last reset. This may occur due to a startup error, shutdown error, crash, or pushing the hardware reset button. The state is UNKNOWN if the device is powered without the battery or if the Device Manager service is stopped. • COLDSTART: A ReinitializeDevice request was received with a Reinitialized State of Device of COLDSTART or the device was made to COLDSTART through the user interface. • WARMSTART: A ReinitializeDevice request was received with a Reinitialized State of Device of WARMSTART or the device was made to WARMSTART by some other means. WARMSTART also occurs after a download from SCT. • DETECTED_POWER_LOST: The device detected that incoming power was lost. This state occurs as the result of a normal power down (with battery). • DETECTED_POWERED_OFF: The device detected that its power switch was turned off. • HARDWARE_WATCHDOG: The hardware watchdog timer reset the device. • SOFTWARE_WATCHDOG: The software watchdog timer reset the device. This state is reported when Device Manager cannot communicate with the control engine for any reason. • SUSPENDED: The device was suspended. How the device was suspended or what it means to be suspended is a local matter.
Last Restore Time		<p>The time at which the engine was last restored. Clicking the down arrow exposes date and time details.</p>
Local Date		<p>Indicates the date to the best of the device’s knowledge. The Date type is a series of four one-number elements. The first number is the year (for example, 2005); the second number is the month (1..12, 1=January); the third is the day of month (1..31). To maintain compatibility with BACnet protocol, a fourth number contains the day of week (1=Monday). A value of FF * (asterisk) in any of the elements indicates the value is not specified.</p>

Table 106: Engine Device Object Attributes - Focus/Configuration Tab

Attribute Name	Notes	Description
Local Site Director	C,W	<p>Specifies a resolvable host name or IP address of the Site Director. A host name may be specified only if a DNS server or other means of name resolution is available to the device. A Site Director may have more than one host name. The host name specified here must be resolvable to an IP address on the LAN or WAN on which the site's devices exist.</p> <p>The Local Site Director attribute is based on the Computer Name attribute, not the Name attribute. When you change the Site Director device's Computer Name attribute, its Local Site Director attribute automatically changes to match its Computer Name. When you change a non-Site Director device's Computer Name, its Local Site Director attribute remains unchanged.</p> <p>① Note: When you promote or demote a Site Director online in SMP, you may be prompted for the user credentials of the Site Director you specified. Enter these user credentials for validation before the promotion or demotion is permitted.</p> <p>For information designating an Engine as the Site Director, refer to the <i>NAE Commissioning Guide (LIT-1201519)</i>.</p>
Local Time		<p>Indicates the time of day to the best of the device's knowledge. The Time type is a series of four one-number elements. The first number is the hour (0..23); the second number is the minute (0..59); and the third number is the seconds (0..59). A fourth number has been added to maintain compatibility with BACnet protocol and contains the hundredths of second (0..99). A value of * (asterisk) for any number indicates the value is unspecified. This value would be used, for example, when the hundredths value is not important.</p>
Location	C,W	Indicates the physical location of the device.
Max APDU Length	C	Indicates the maximum number of bytes that may be contained in a single, indivisible application layer protocol data unit.
Max Message Buffer	C,W	Specifies the largest piece of data that can be sent to a device at one time, excluding all communications headers. Some applications need to perform segmentation of data outside the communications system. This value is used to size the data in those situations.
Max Segments Accepted		Indicates the maximum number of segments of an APDU accepted by the device.
Model Name		Indicates the device model, the hardware revision associated with the firmware, and the code file name used to download the device.

Table 106: Engine Device Object Attributes - Focus/Configuration Tab

Attribute Name	Notes	Description
Network Address	C,W	<p>Specifies the BACnet network address. A change to this attribute takes effect after the next Engine restart (cold or warm). If you write the value of this attribute, you must reset the Engine for the new settings to take effect.</p> <p>① Note: If you write the value of this attribute, you must reset the Engine for the new settings to take effect.</p>
OS Version		<p>Indicates the version number of the operating system in use by the Engine. This attribute is present only for engines that are running the Linux operating system.</p>
Power Consecutive Sample	C,W	<p>Specifies the number of consecutive AC line status samples (indicate a power loss) must be received before the device concludes that a power failure has occurred. When the device concludes that power has failed, the device begins an orderly shutdown process. The process used for determining whether a power failure has occurred protects the device from shutting down during short power failures or certain brownout conditions. Using default values, a power failure of less than 5 seconds does not prompt a device shutdown.</p> <p>① Note: If you change the Power Consecutive Sample value on a network engine with Metasys Release 9.0.7 firmware, you must restart the engine before the new setting takes effect. A restart is not necessary for engines that are running a different releases.</p>
Power Sampling Interval	C,W	<p>Specifies the period at which the AC line status is sampled to determine whether a power failure has occurred. This attribute is used in conjunction with the Power Consecutive Samples attribute.</p> <p>① Note: If you change the Power Sampling Interval value on a network engine with Metasys Release 9.0.7 firmware, you must restart the engine before the new setting takes effect. A restart is not necessary for engines that are running a different release.</p>
Process ID List	C,W	<p>Contains a list of unsigned 32-bit numbers used to compare the Process ID sent with the BACnet events. If the event Process ID is not found on this list, then the event is ignored. An empty list or a list containing only one entry with the value of zero allows all events to be processed.</p>
Process Unmapped Objects Alarms		<p>Specifies whether the engine should process alarms that originate from unmapped objects. This attribute applies only to the ODS and is fixed at False for all other devices.</p>

Table 106: Engine Device Object Attributes - Focus/Configuration Tab

Attribute Name	Notes	Description
Protocol Obj Support		Indicates which standard BACnet object types the device's protocol implementation supports. This attribute is a bit string that uses the Object Type (Set 508). Each bit represents a BACnet object type in that set. For example, bit 0 represents the BACnet AI object type, whereas bit 17 represents the BACnet schedule object type. If the bit is true (1), the object type is supported. If the bit is false (0), the object type is not supported. The BACnet object types supported can vary between device models.
Protocol Revision		Indicates the minor revision level of the BACnet standard the device supports.
Protocol Ser Support		Indicates which standard BACnet protocol services the device's protocol implementation supports. For more information on the Protocol Implementation Conformance Statement (PICS) and BACnet Interoperability Building Blocks (BIBBs) of the Engine, see Related Documentation . This object now supports both the BACnet UTCTimeSynchronization message and the BACnet TimeSynchronization message (non-UTC version). Third-party devices now have the ability to send the TimeSynchronization message to an Engine. This attribute is a bit string that uses the Protocol Ser Support (Set 136). Each bit represents a BACnet service in that set. For example, bit 0 represents the Acknowledge Alarm service, whereas bit 12 represents the Read Property service. If the bit is true (1), the service is supported. If the bit is false (0), the service is not supported.
Protocol Version		Represents the BACnet protocol the device supports. Initial releases are Version 1; subsequent releases increase the number by one.
Restart Notification Recipients	C,W	Controls the restrictions on which devices, if any, are notified when a restart occurs. The value of this attribute is a list of BACnetRecipients. When the length of this list is empty, the device cannot send a device restart notification. The default value of this property is a single entry representing a broadcast on the local network. If the list has one or more entry, the device sends a restart notification, but only to the devices or addresses listed.
Restore Preparation Time		Specifies how long in seconds that the engine remains unresponsive after starting the BACnet restore procedure and before timing out and stopping the process. Value is fixed at 60 seconds.
Restore Completion Time		Specifies how long in seconds that the engine remains unresponsive after ending the BACnet restore procedure and before timing out and stopping the process. Value is fixed at 600 seconds.

Table 106: Engine Device Object Attributes - Focus/Configuration Tab

Attribute Name	Notes	Description
Segmentation		Indicates if the device supports segmentation of messages and (if so) if it supports segmented transmission, reception, or both.
Site Director Online		Indicates the communication status of this device with the Site Director. This value is kept current by a command sent by the Data Refresh COV Monitor task whenever the status changes. The COV Monitor task performs this check every 80 seconds. This attribute is triggered so it can be used for an alarm.
Staged Files		List of staged files that are set for activation at a later time. For example, if the code and archive database are set for later activation, this field would read Code, Archive Database . If this attribute is empty, no files are currently staged. Possible values: Code, Archive Database, Security Database, HTTPS Certificates.
Staged Firmware Version	D	Indicates the engine firmware version that is staged for later activation. If this field is empty, no firmware files are currently staged. This attribute is in contrast to the Firmware Version attribute, which indicates the engine's firmware version that is currently active.
System Status	D	Reflects the current physical and logical state of the device.
Time of Device Restart		Indicates the time at which the device was restarted.
Time Sync Recipients	C, W	Lists one or more BACnet recipients to which the engine can issue a Time Synchronization request. If the list is empty, the engine cannot send a Time Synchronization request to a BACnet recipient. The attribute requires several other parameters that define each recipient, such as its device ID, IP address information, or broadcast type and information.
Time Synchronization Interval	C,W	Specifies the periodic interval, in minutes, at which TimeSynchronization and UTCTimeSynchronization requests are sent. When set to zero, then periodic time synchronization is disabled.
Time Zone	C,W	The current time zone in use at the location of the Engine.
Unbound References		Lists references that are not bound in the system. This attribute indicates that a process cannot find an object either because the device on which the object is located is offline, the object has been deleted, or the object reference is incorrect.
USB Port 1 Enabled	C,W	Specifies whether USB Port 1 on the SNE or SNC network engine is enabled. This attribute applies only to the SNE and SNC models. For enhanced security, the USB port is set to Disabled by default. Before using the USB port, change this attribute to Enabled.

Table 106: Engine Device Object Attributes - Focus/Configuration Tab

Attribute Name	Notes	Description
USB Port 2 Enabled	C,W	Specifies whether USB Port 2 on the SNE or SNC network engine is enabled. This attribute applies only to the SNE and SNC models. For enhanced security, the USB port is set to Disabled by default. Before using the USB port, change this attribute to Enabled.
UTC Time Synchronization Recipients	C,W	Lists one or more BACnet recipients to which the engine can issue a UTC Time Synchronization request. If the list is empty, the engine cannot send a UTC Time Synchronization request to a BACnet recipient. The attribute requires the following parameters that define each recipient: ID (Device ID), Address (IP Address, Network Number, UDP Port), and Broadcast (Broadcast Type, Network Number, UDP Port). Three broadcast types are available: local, remote, and global.
Vendor ID		Distinguishes proprietary extensions to the protocol using a unique vendor identification code assigned by ASHRAE. The Johnson Controls Vendor ID is 5.
Vendor Name		Identifies the manufacturer of the device.
Version		Indicates the version number of the firmware image in the Engine.

Table 107: Engine Device Object Attributes - Diagnostic Tab

Attribute Name	Flags	Description
Audit Rate		Specifies the number of audit messages destined for the Metasys server in the last hour (for diagnostic purposes). The value of this attribute updates every 5 minutes.
Audits Lost		Specifies the total number of audits that were not forwarded to the configured repository and were deleted from the Engine's local repository. This count does not persist through an Engine reset. The count reflects the number of lost audits since the last reset.
Average Intermittent Failure Period		Specifies the average number of seconds that devices in the transport layer are offline (for diagnostic purposes). Only times less than one minute are used in this average, to eliminate device resets. Ideally, this number should be zero, indicating there are no failures.
BACnet Broadcast Receive Rate		Indicates the number of BACnet broadcast messages received by the device in the previous minute. BACnet broadcast messages are generated as part of the normal BACnet operation, but are also generated when a BACnet device searches for another device that does not exist, such as when a device has objects with references to other nonexistent objects (called unbound references). This number increases when the number of unbound references increases on network connected devices. If this number gets too high, it indicates possible performance problems.

Table 107: Engine Device Object Attributes - Diagnostic Tab

Attribute Name	Flags	Description
BACnet Routed Messages Rate		Indicates the number of BACnet messages received by the device on the IP network in the previous minute. If this number is high, it indicates that the performance of the MS/TP field bus network is affected by broadcast transmit traffic. This attribute appears only in the Snapshot Focus view.
Battery Condition		<p>Specifies the current battery condition. It is updated every 60 seconds. For the NAE55/NIE55, a value of Fault implies the battery is missing or defective and a value of OK implies there is no known problem with the battery.</p> <p>For the NCE25/NAE35/NAE45, the values are:</p> <ul style="list-style-type: none"> • Good - Battery is operating at normal specifications. Provided the battery is fully charged, it should supply backup power to the engine three times a day for 6 minutes each time. • Service - Battery useful life is predicted to end soon. We recommend you replace the battery. Backup power lasts less than 72 hours. • Replace - Battery useful life is over. Replace the battery. Backup power may fail if the battery is not charged fully. • Defective - Battery is either missing, disconnected, incorrectly installed, or the battery is internally shorted or otherwise defective. Take corrective action. Backup power is not provided for any duration. <p>After a line power failure, the battery is used to supply power to the device so the device can perform an orderly shutdown without losing data. After the device shutdown process finishes, the device discontinues its use of battery power. Valid data is provided only on the Engine hardware.</p> <p>① Note: The SNC and SNE engines do not have this attribute because these models use a supercapacitor, not a battery.</p>
Battery Charging		<p>Specifies the current battery charging state in an NCE25/NAE35/NAE45. A value of False indicates the battery contains at least 80% of full charge capacity and is not currently recharging. A value of True indicates the battery contains less than 80% of full charge capacity and is currently charging. If the Battery Charging value is True and the battery is charging, the battery stops charging when it is 100% charged.</p> <p>Trend this attribute value to determine the current battery charge cycle time. In Simulation, this attribute is False.</p> <p>① Note: The SNC and SNE engines do not have this attribute because these models use a supercapacitor, not a battery.</p>

Table 107: Engine Device Object Attributes - Diagnostic Tab

Attribute Name	Flags	Description
Board Temperature		Specifies the current printed wire board (PWB) temperature in degrees Celsius. It is updated every 60 seconds. It is obtained from a temperature sensor built onto the PWB. The device is designed to run reliably with a PWB temperature at or below 67 degrees Celsius. If this temperature is exceeded, appropriate measures should be taken to cool the device. ④ Note: The SNC and SNE engines do not have this attribute.
COV Rcv Rate		Specifies the number of COV messages the Engine receives from other supervisory devices or field controllers per minute. This attribute value updates every minute. Each COV message represents one object reporting a value change.
COV Tx Rate		Specifies the number of COV messages the Engine sends to other supervisory devices per minute. This attribute updates every minute. Each COV message represents one object reporting a value.
CPU Temperature		Specifies the current CPU temperature in degrees Celsius for a network engine. The value, obtained from a temperature sensor built into the CPU, is updated every 60 seconds. For NxEs and NCEs, set an alarm for the CPU temperature at 70°C; for SNCs and SNEs, set an alarm for the CPU temperature at 88°C. If the temperature reaches these limits, take appropriate measures to cool the device.
CPU Usage		Specifies a running average of CPU usage over the last 50 minutes. The value is updated every 30 seconds. The running average is calculated by adding or subtracting 1% of the difference between the current and average CPU usage. The value may not be meaningful until 50 minutes after a system restart. A value of 0% means the CPU is 100% idle. A value of 100% means the CPU is 0% idle. A value of 50% or less is considered OK, although other performance indicators should also be assessed.
Data Collection Rate		Indicates the data value collection rate of the Ready Time Series Data feature. It represents the rate of data values collected, not the rate of data values delivered to the clients. The feature buffers data values when the data collection rate is within the maximum expected rate (83,333 data values per minute) and the client is unknown or offline. In the event of a remote connection failure, a minimum of 60 hours of data is buffered locally for automatic delivery when the error condition is resolved. This feature is only used by a Site Director and is updated every minute. ④ Note: Starting at Release 10.0, the remote services connection to a cloud-based platform is no longer available, so this attribute does not function.

Table 107: Engine Device Object Attributes - Diagnostic Tab

Attribute Name	Flags	Description
Data Usage		<p>Indicates the number of data values currently locally stored by the Metasys Ready Time Series Data feature as a percentage of the maximum allowed. Typically, data samples are routinely delivered to an online client and the data usage remains small. When the client is unknown or offline, data values continue to accumulate in local storage until limits are reached. This feature is used by a Site Director and is updated every minute.</p> <p>① Note: Starting at Release 10.0, the remote services connection to a cloud-based platform is no longer available, so this attribute does not function.</p>
Detection Interval		Indicates the time, in seconds, determined by the HTTP transport mechanism based on the Poll Rate and Network Tolerance settings. This value determines how fast a site detects a device going offline.
Duplicate References		Lists references that are duplicated in the system. Entries in this list are object references that exist on more than one device within the system.
Estimated Flash Available		Specifies the estimated flash memory available within the device for use by the user's database and applications. This value can be used to determine whether additional use of flash can be accommodated; however, other performance indicators should also be assessed. This property's value is calculated at the same time as the Flash Usage attribute. A negative value suggests that the flash usage should be reduced. Also, a negative value can affect system reliability now or in future releases of software.
Event Rate		Specifies the number of event messages destined for the Metasys server in the last hour (for diagnostic purposes). The value of this attribute updates every 5 minutes.
Events Lost		Specifies the total number of events which failed to be forwarded to the configured repository and which were deleted from the Engine's local repository. This count does not persist through an Engine reset, and reflects the number of lost events since the last reset.
Flash Usage		Specifies the estimated percent of flash memory currently in use. The percentage is based on the portion of flash that is designated for use by the user's database. The value is updated on device startup, after a database archive, sync or download from the SCT (offline mode), and by manual command (Update Flash Usage). A value greater than 100% can affect system reliability now or in future software releases. No restrictions are in place to prohibit use of flash over 100%. If you are simulating an NAE/NIE, your computer's hard disk must be formatted for NTFS. If your computer's hard disk is formatted to use FAT32 (32-bit File Allocation Table), the simulated value for the Flash Usage attribute is not accurate.

Table 107: Engine Device Object Attributes - Diagnostic Tab

Attribute Name	Flags	Description
Maximum Intermittent Failure Period		Specifies the maximum number of seconds a device was offline at the transport layer (for diagnostic purposes). Only times under one minute are recorded, to eliminate device resets. The value of this attribute does not match the offline times determined from generated alarms. Ideally, this number should be zero, indicating there are no failures.
Memory Usage		Specifies the percent of system RAM that is currently in use. It is calculated as follows: Total commit charge x 100 Display Precision = 0.01 COV Increment = 0.1
Network Tolerance	C,W	Sets the timeout tolerance of the flexible polling feature (that is, changes the lower level communication timeouts). When edited by a user, this attribute is sent to the HTTP transport layer and determines how long the device waits to connect, send, and wait to receive HTTP Post responses. The setting options are LOW, MEDIUM, and HIGH. LOW is the default and matches the current behavior. The MEDIUM or HIGH setting increases the tolerance by adding longer timeouts and more retries and should be used for poor network connections. Note that it takes longer to detect an offline device as the tolerance gets higher.
Object Count		Indicates the number (count) of all of the object instances within the device. Objects of all classes are included.
Object Memory Usage		Specifies the percent of the object database that is currently in use. Each object created consumes memory within the object database. This attribute can be used to help determine the device's capacity for additional objects; however, other performance indicators should also be assessed. Generally, the number of objects you define determines the object memory usage. This attribute is valid on the Engine hardware. ① Note: If you have a large number of objects, the object memory usage increases and the archive.moi file size increases also. The archive.moi file is stored in flash memory. Also, an attempt to create an object known to require X bytes of object database may fail even if more than X bytes are available in the object database. This is because the object database is composed of multiple blocks. If the free space of each block is fewer than X bytes, the request for X bytes fails even though the sum total of free space from all blocks is greater than X bytes.
Pager Dial-up Status		Specifies the current status of the pager dial-up connection. Available only in network engines at Release 9.0 and earlier that use a Windows Embedded operating system.

Table 107: Engine Device Object Attributes - Diagnostic Tab

Attribute Name	Flags	Description
Registration Usage		<p>Indicates the number of registrations used by the Metasys Ready Time Series Data feature. It is the total usage of all clients of this feature. Each registration is a sign-up for an attribute of an object. The feature supports up to 1,000 registrations per fully loaded field bus per site device. This feature is only used by a Site Director and is updated every minute.</p> <p>① Note: Starting at Release 10.0, the remote services connection to a cloud-based platform is no longer available, so this attribute does not function.</p>
Repository Status		<p>Indicates the status of the communication between the device and the trend log sample repository (for diagnostic purposes). This attribute uses the Repository Status set.</p> <p>Uses Repository Status set:</p> <p>0 = Offline 1 = OK 2 = Undefined 3 = Dialup 4 = RAP 5 = Incompatible Release</p>
Samples Lost		<p>Specifies the number of trend samples lost because the Metasys server did not retrieve them fast enough (for diagnostic purposes). This value resets only when the device restarts.</p>
Sample Rate		<p>Specifies the number of trend samples destined for the Metasys server in the last hour (for diagnostic purposes). The value of this attribute updates every 5 minutes.</p> <p>① Note: The sample rate at the Engine is calculated based on the actual raw samples taken by every trend object. The sample rate at the Metasys Server is calculated once every poll cycle and is based on the number of samples received from all the Engines and the time it took to poll them. Most Engines do not forward all the samples taken between polls because the Metasys Server transfer setpoint is usually not set to 1 (that is, forward on every sample). The result is that the sample rate at the Metasys Server is less than the sum of the samples taken at all the Engines. The total Metasys Server sample rate is 60,000 and the total Engine sample rate is larger than 100,000.</p>
Time Between Buffer Reads		<p>Indicates the time, in minutes, between Engine trend consolidation buffer readings from the Metasys server (for diagnostic purposes).</p>
Transfer Buffer Full		<p>Indicates the percentage full of the Engine trend consolidation buffer (for diagnostic purposes).</p>

Table 107: Engine Device Object Attributes - Diagnostic Tab

Attribute Name	Flags	Description
Transport Failure Rate		Specifies the number of transport failures per day (for diagnostic purposes). This number represents how often HTTP posts from this engine failed when they were sent to another device that is considered online. Failures include the inability to open the connection, to send the message, or to receive the reply. This value represents failures over the last 24 hours and is updated hourly, but does not correlate directly to the number of offline alarms generated by your system. Ideally, this number should be zero, indicating there are no failures.
Unbound References		Lists references that are not bound in the system. This attribute indicates that a process cannot find an object either because the device on which the object is located is offline, the object has been deleted, or the object reference is incorrect.

Table 108: Engine Device Object Attributes - Communications Tab

Attribute Name	Flags	Initial Value	Values/Options/Range
① Note: The Communications tab is only present for older network engines that have gray exteriors. The tab has three different configurations: Serial Port Cable Config, Internal Modem Config, and External Modem Config. Each configuration has the same set of attributes, which are described in this table.			
Allow Incoming Connections	C,W	True	Whether the communications port is enabled to accept an incoming call from another device.
Baud Rate	C,W	115200	The configured baud rate set for the communications port.
Enabled	C,W	True	Whether the communications port is enabled to initiate a call to another device.
Extra Initialization Commands	C,W		An optional list of modem initialization commands, such as characters and symbols, necessary to establish a reliable connection.
Maximum Baud Rate	C,W	115200	The maximum configured baud rate set for the communications port.
Wait for Dial Tone Before Dialing	C,W	False	Whether the network engine should wait for the dial tone before attempting to place a call.

Table 109: Engine Device Object Attributes - Network Tab

Attribute Name	Flags	Initial Value	Values/Options/Range
Allow Http	C,W	True	<p>Available at network engines at Release 8.1 or later. It determines whether the operating system firewall in the network engine blocks incoming traffic over the HTTP port (port 80). If the attribute is set to True, all incoming traffic over port 80 at the network engine is allowed; if set to False, all incoming traffic over port 80 at the network engine is blocked. Changing this attribute does not interfere with NAE Update Tool operations.</p> <p>You can set this attribute independently on each network engine, and can modify it using a schedule or other control action. You can configure a tailored summary to view the value of the attribute on all network engines at the site. You can also use the mass editing capability in SCT to modify the attribute across multiple devices.</p> <p>To provide the highest level of security, it is recommended that you set this attribute to False. However, if the network engine is a Site Director and has one or more child engines reporting to it that have not been upgraded to Release 8.1 or later, set the attribute to True. For a list of the tools and utilities that require port 80, refer to the <i>Allow Http</i> section of the <i>NAE Commissioning Guide (LIT-1201519)</i>.</p>
Completion Domains	C,W		<p>Specifies a domain name that is appended to the computer name of a network engine to help the engine broadcast over the building network. For example, if you specify a completion name of mycorp.com and the name of the network engine is NAE-1, the engine is identified on the network as NAE-1.mycorp.com. Use this attribute for network engines that have difficulty communicating with their site director.</p> <p>If DHCP is enabled on the engine, the DHCP server populates the list of completion domains automatically. In this case, if you manually delete a domain from the list, it is readded when you save the change.</p> <p>① Note: Depending on the model of the network engine, the full list of configured completion domains may not appear under the drop-down box in View mode. In this case, switch to Edit mode to view the full list of completion domains.</p>

Table 109: Engine Device Object Attributes - Network Tab

Attribute Name	Flags	Initial Value	Values/Options/Range
Computer Name	C,W		<p>Identifies the network engine to the Metasys network. Changing the Computer Name online breaks any existing references between the NAE object and other objects on the site, and may break the existing network connection to other devices on the network. We do not recommend changing the Computer Name online. Instead, change the Computer Name attribute offline with the SCT by right-clicking the NAE in the navigation tree and selecting Rename. Both the Computer Name and Name attributes are changed to the new name you select. The Item Reference then updates to show the new Computer Name.</p> <p>Notes:</p> <ul style="list-style-type: none"> • If you change the value of this attribute, a confirmation message appears informing you that the Engine must be reset before the new name can be applied. • The Computer Name must not consist of all numbers. For example, a computer name of N1234 is acceptable but 1234 is not.
DHCP Enabled	C,W	True	<p>True = DHCP enabled; network engine requests IP address from DHCP server; if no server is present, APIPA addressing is used. False = DHCP disabled; network engine uses a static IP address.</p>
DNS Server IP Addresses	C,W		List of IP addresses.
Domain Name	C,W		① Note: If you change the value of this attribute, the Engine automatically resets.
Ethernet 1 Speed			The current connection speed of the network engine on the first Ethernet port. Only SNC and SNE engines have this attribute. The attribute shows Not Connected if no connection is present.
Ethernet 2 Speed			The current connection speed of the network engine on the second Ethernet port. Only the SNC has two Ethernet ports and therefore has this attribute. The attribute shows Not Connected if no connection is present.
Ethernet MAC Address			The MAC address of the network engine.
JCI IP Address	C,W		The currently assigned IP address of the network engine.
IP Mask	C,W		The currently assigned IP mask of the network engine.
IP Router Address	C,W		The currently assigned IP router that the network engine is using.

Table 109: Engine Device Object Attributes - Network Tab

Attribute Name	Flags	Initial Value	Values/Options/Range
Obtain DNS Address Automatically	C,W	True (1)	Whether the DNS IP address is populated automatically.
Routing Mode	C,W	Disabled	The current state of the BACnet routing mode. Options are Disabled, Enabled, Enabled Without Broadcast.

Table 110: Engine Device Object Attributes - Hardware Tab

Attribute Name	Flags	Initial Value	Values/Options/Range
① Note: The Hardware tab is present only for SNC network engines.			
Application Class Set Version		64	Indicates the version of the application class set for the SNC.
Control Sequence In Test	C,W	0	Indicates the number assigned to the control sequence in testing mode.
Controller Number		999	Indicates the unique address of the field controller as set by the rotary switch block on the engine.
Device Model Class Set Version		65	Indicates the version of the device model class set for the SNC.
Pcode			Indicates the product code number of the SNC (for example, M4-SNC25150-0).
Startup OFF State Auto Release Time	C,W	0	Indicates the amount of time a BO is held in the OFF state at the priority set by the Startup OFF State Command Priority setting at field controller startup. This instance only applies to BO objects that have their Startup OFF State Enable parameter set to TRUE. The default value is 0. A value of 0 disables this parameter. The range is 0 to 3600 seconds.
Startup OFF State Command Priority	C,W	9	Indicates the priority at which a BO is held in the OFF state for the Startup OFF State Auto Release Time at field controller startup. This instance only applies to BO objects that have their Startup OFF State Enable parameter set to TRUE. The default value is 9. Priority 6 is not a valid selection. The range is 1 to 16.

Engine Commands

The following table lists the commands supported by the Engine Device Object.

Table 111: Engine Device Object Commands

Command Name	Parameters	Description
Activate Changes	Value	<p>Activates the pending attribute changes to network ports of the network engine. The command activates all pending changes to all network ports on the engine; individual ports cannot be activated separately. Also, this command is offered only when the staging area in the engine has files that are waiting for activation, which is indicated when the Changes Pending attribute of one or more integration objects is set to True. After you issue this command, the Changes Pending attributes of the integration objects in the engine are set to False. Command options: Update Changes Pending Attributes Except Network Number and Update All Changes Pending Attributes and Restart Device.</p> <p>① Note: This command is only available for network engines at Release 11.0 or later.</p>
Apply Staged Files	None	<p>Activates all staged files in the engine. The command is offered only when the staging area has files for the selected engine. If code is in staging, the engine switches over to the re-provisioned, inactive partition. After activation, the staging area is empty.</p> <p>① Note: This command is only available for network engines at Release 10.1 or later.</p>
Archive	None	Archives the object instances to the nonvolatile memory.
Cancel Staged Files	None	<p>Flushes all staged files in the engine. The command is offered only when the selected engine has staged files. After you issue this command to cancel the staged files, the Apply Staged Files command is no longer available until after you issue another staged download from SCT.</p> <p>① Note: This command is only available for network engines at Release 10.1 or later.</p>
Change Audit Enabled Class Level	Value	Changes the Audit Enabled Class Level attribute. Integer range is 1-4.

Table 111: Engine Device Object Commands

Command Name	Parameters	Description
Rediscover Text Strings	None	<p>Requests the system to rediscover text strings for some binary and multistate BACnet integrated objects. In some cases, the Site Director can lose text strings when online configuration changes are made. When this occurs, the words Text not found appear in the Site Management Portal, Ready Access Portal, and Advanced Reporting. The following configuration changes (and other variations) can cause this:</p> <ul style="list-style-type: none"> • If a child NxE contains user defined enumerations, and then its site director is re-imaged or downloaded without previously uploading. • If an NxE contains user defined enumerations, and then its Local Site Director is changed to any device other than itself. <p>To correct from these situations, issue the Rediscover Text Strings command to the NxE containing the objects that are displaying the errors.</p> <p>① Note: After you send this command to a site director, also send it to all child devices with custom text strings that include a BACnet Integration.</p>
Reset Device	None	<p>Initiates an orderly reset that saves recent changes to the engine archive database to Flash memory and restarts the engine operating system. When the engine requires a reset, the title bar of the object in the Display panel displays Reset Needed.</p>
Route Samples	None	<p>Forwards all trend samples from the engine to the ADS Repository, which is most often the Site Director. Issue this command before you upgrade an engine to ensure that the Site Director has all possible samples. Wait about 5 minutes for all samples to be forwarded.</p>
Update Flash Usage	None	<p>Commands the engine to recalculate the Flash Usage value recorded under the Diagnostic tab of the network engine. This value is an estimated percent of flash memory currently in use.</p>

Metasys Server

Menu Selection: **Insert > Metasys Server**

Inserts a Metasys server at any supported release into the archive database with SCT, including the following servers: ADS/ADX, ADS-L-A, ADS-L-E, OAS, and ODS).

- ① **Note:** Some products or models mentioned in this document are available only to specific markets. Refer to the *Application and Data Server (ADS) Lite for Europe (E) Product Bulletin (LIT-12011690)* and the *Application and Data Server (ADS) Lite for Asia (A) System Product Bulletin (LIT-12011694)* for availability.

✓ **Tip:**

- The first Metasys server you add to the site becomes the Site Director. The Site Director coordinates all Web browser communication to the Metasys network. You can only have one Site Director per site. Any subsequent Metasys servers are primarily used for archiving historical data.
- On the Configure screen, select each tab for further configuration options.

ADS Device Object

The ADS Device object defines the attributes that represent the externally visible characteristics of a Metasys Server. One ADS Device object exists per Metasys Server. This object allows you to see data about the Metasys Server, such as the name of the current POP server host name or information on printer destinations.

ADS Concepts

ADS Attributes

This section describes the attributes that are under the Focus/Configuration and Diagnostics tabs of the ADS device object. However, starting at Release 10.1, the Edit button for the other tabs that appear (Email, SNMP, Syslog, and Printer) is disabled. The following text appears in the window when you click any of these tabs:

This feature is now only available on the Metasys UI

For more information on Metasys UI, refer to *Metasys UI Help (LIT-12011953)*.

The ADS object also contains attributes common to many Metasys system objects. These common attributes are not described here but are covered in the [Common Object Attributes](#) section.

i **Note:** In the Notes column, attributes marked with the letter C are configurable, and attributes marked with the letter W are writable.

Table 112: ADS Device Object Attributes - Focus/Configuration Tab

Attribute Name	Notes	Values/Options/ Range	Description
ADS Repositories	C,W		Lists the Metasys Server host names or IP addresses to which incoming trend and Alarm/Event data forwards. A Metasys Server cannot have its own host name or IP address in this field. Refer to the <i>ADS/ADX Commissioning Guide (LIT-1201645)</i> for details on configuring repositories.
ADS Repositories Status	C,W	Offline, OK	Indicates the status of the devices listed in the ADS Repositories attribute. i Note: When forwarding data to a secondary Metasys Server (that is, data forwarded to a Metasys Server is forwarded to another Metasys Server), the status does not calculate. This attribute shows only the status for the initial forward.
Alarm Snooze Time	C,W	0-75 Units = Minutes	Specifies the amount of time to delay before re-announcing an alarm.

Table 112: ADS Device Object Attributes - Focus/Configuration Tab

Attribute Name	Notes	Values/Options/ Range	Description
Enabled Audit Level	C,W	See the attribute description for details on the Enabled Audit Level. Range = 1–4 with 5 Audit Levels Level 1 (N/A) User Action Level 2 (1) Critical System Events Level 3 (2) Application Level 4 (3) Non-critical System Events Level 5 (4) Diagnostic	Specifies which level of audit entries are added to the audit repository. Only audit entries of type Level 1 through and including the specified level are included. All other levels are not stored in the audit trail. Level 1 and Level 2 audit entries are always stored in the audit trail. <ul style="list-style-type: none"> • Level 1 and 2 (1): Stores all user action and system error audit messages. • Level 3 (2): Stores application audit messages in addition to Level 1 and 2 auditing. • Level 4 (3): Stores system audit messages in addition to Level 3 auditing. • Level 5 (4): Stores diagnostic audit messages in addition to Level 4 auditing
FIPS Compliance Status			Specifies whether the Metasys Server is FIPS compliant: Compliant (Licensed), Compliant (Unlicensed), or Non-Compliant (Unlicensed). FIPS compliance involves three steps: purchasing a Metasys FIPS license, enabling FIPS in the server's operating system, and installing the Metasys FIPS feature. If you complete the first two steps, but do not install the FIPS feature, the value of this attribute is Non-Compliant (Licensed).
Host Name			Indicates the host name of the NxE whose value appears in the Transfer Buffer Full Worst NxE attribute.

Table 112: ADS Device Object Attributes - Focus/Configuration Tab

Attribute Name	Notes	Values/Options/ Range	Description
JCI IP Address	C,W		<p>Represents the IP address of this Metasys Server. The IP address identifies the Metasys Server on the network and assists in the routing of messages. Each Metasys Server must have a unique IP address for the network to operate properly. A write to this attribute is ignored because configuration is completed through the Windows network configuration. A read of this attribute returns either the user-specified value or the value determined from DHCP.</p> <p>Certain IP addresses are invalid and cannot be written successfully. The network address portion of the IP address is computed by including all bits in which the corresponding bit from the IP mask is 1. The device address portion of the IP address is computed by including all bits in which the corresponding bit from the IP mask is 0. Neither the network address nor device address can be all zero bits or all one bits. For example, if the IP mask is 255.255.0.0, the following IP addresses are invalid: 0.0.100.100 and 100.100.0.0.</p> <p>The JCI IP Address attribute can be set explicitly, or it may be automatically set using the DHCP server. Using the DHCP server, you can change this attribute even if you set it up explicitly. See the DHCP Enabled attribute.</p> <p>Note: This attribute only appears in the ADS object in the SCT and is used by the SCT during a download or upload of the Metasys Server database.</p>
Local Data			Displays the date on the Metasys Server.
Local Time			Displays the time on the Metasys Server.
Model Name			Contains the name of the device model. In this case, it is ADS.

Table 112: ADS Device Object Attributes - Focus/Configuration Tab

Attribute Name	Notes	Values/Options/ Range	Description
Number of NxEs Reporting			Specifies the number of NxE devices that registered this Metasys Server as their trend repository. For an ODS or OAS, this number is always one count higher than the actual number of NxEs reporting because the ODS and OAS also have a trend repository that is included in the count.
Sample Rate		Units = Per Hour See attribute description for calculation details.	Specifies the number of trend samples destined for the Metasys server in the last hour (for diagnostic purposes). The value of this attribute updates every 5 minutes.
Service Time		Units = Seconds	Displays the amount of time in seconds that it takes for the ADS/ADX device to poll all NxEs on the site for trend samples.
Transfer Buffer Full Worst NxE		Units = %	Indicates the buffer fullness, in percent, of the NxE with the fullest trend buffer of the trend poll cycle.

Table 113: ADS Device Object Attributes - Diagnostic Tab

Attribute Name	Flags	Values/Options/ Range	Description
Average Intermittent Failure Period		IP address and Value Units = seconds	Specifies the average number of seconds devices in the transport layer are offline (for diagnostic purposes). Only time periods less than 1 minute are used in this average, to eliminate device resets. Ideally, this number should be zero, indicating there are no failures.
Data Collection Rate		Units = Per Minute Maximum value = 83333	Indicates the data value collection rate of the Ready Time Series Data feature. It represents the rate of data values collected, not the rate of data values delivered to the clients. The feature buffers data values when the data collection rate is within the maximum expected rate (83,333 data values per minute) and the client is unknown or offline. In the event of a remote connection failure, a minimum of 60 hours of data is buffered locally for automatic delivery when the error condition is resolved. This feature is only used by a Site Director and is updated every minute.
Data Usage		Units = %	Indicates the number of data values currently locally stored by the Ready Time Series Data feature as a percentage of the maximum allowed. Typically, data samples are routinely delivered to an online client and the data usage remains small. When the client is unknown or offline, data values continue to accumulate in local storage until limits are reached. This feature is used by a Site Director and is updated every minute. For the ADS, data values are accumulated in memory and stored in batches in a disk-based queue limited to 10,000 entries. This attribute is based on the worst case queue usage of all clients of this feature.

Table 113: ADS Device Object Attributes - Diagnostic Tab

Attribute Name	Flags	Values/Options/Range	Description
Incoming Audit Rate		Units = Per Hour	Specifies the average rate of audits, per hour, received from other devices (NxEs or ADS/ADXs) during the previous hour. The value of this attribute updates every 5 minutes. This rate only includes audits generated by devices at Release 5.2 or later.
Incoming Event Rate		Units = Per Hour	Specifies the average rate of events, per hour, received from other devices (NxEs or ADS/ADXs) during the previous hour. The value of this attribute updates every 5 minutes. This rate only includes events generated by devices at Release 5.2 or later.
Maximum Intermittent Failure Period		IP address and Value Units = seconds	Specifies the maximum number of seconds a device was offline at the transport layer (for diagnostic purposes). Only time period under 1 minute are recorded, to eliminate device resets. The value of this attribute does not match the offline time period determined from generated alarms. Ideally, this number should be zero, indicating there are no failures.
Outgoing Event Rate		Units = Per Hour	Specifies the average rate of events per hour, sent to other repositories (ADS/ADXs). This value of this attribute updates every 5 minutes. This rate only includes events generated by devices at Release 5.2 or later.

Table 113: ADS Device Object Attributes - Diagnostic Tab

Attribute Name	Flags	Values/Options/ Range	Description
Registration Usage		Units = None	This attribute indicates the number of registrations used by the Metasys Ready Time Series Data feature. It is the total usage of all clients of this feature. Each registration is a sign-up for an attribute of an object. The feature supports up to 1,000 registrations per fully loaded field bus per site device. This feature is only used by a Site Director and is updated every minute.
Transport Failure Rate		IP address and Value Units = Failures Per Day	Specifies the number of transport failures per day (for diagnostic purposes). This number represents how often HTTP posts from this server failed when they were sent to another device that is considered online. Failures include the inability to open the connection, to send the message, or to receive the reply. This value represents failures over the last 24 hours and is updated hourly, but does not correlate directly to the number of offline alarms generated by your system. Ideally, this number should be zero, indicating there are no failures.

ADS Commands

The following table lists the commands supported by the ADS Device Object.

Table 114: ADS Device Object Commands

Command Name	Parameters	Description
Rediscover Text Strings	None	Resets the States Text across the server by rediscovering text strings from all mapped BACnet objects. When the Rediscover Text Strings command is sent from the Site Director device UI to another supervisory device and the UI is running on the supervisory device, you must close and restart the UI on the supervisory device in order for the text to appear correctly.

ADS Features

The ADS (including the ADX) is a Metasys Server that runs on a computer platform and is installed within the Metasys network. With an ADS, you can provide a location to install the SCT and a location to send trend logs (Trend Studies), event logs (Alarm and Event Management), and audit trails (Audit Trail). The ADS can also be configured to take the role of the Site Director to coordinate system access and present data to the user in a web browser running on the same computer or connected over the LAN, WAN, Internet, or telephone line through a dial-up connection.

① Notes:

- Online/offline modes as explained here do not apply to the ADS. However, the ADS can be online and offline in the same sense as any other device on the network can be connected or disconnected from the network.
- You may need to change the Windows Defender tool settings on your operating system (OS) when using an ADS. Windows Defender is a spyware identification and removal application that is part of the OS. For Windows 10, Windows 8.1, and Windows 8, this application is **on** by default. For Windows Server 2016, and Windows Server 2012 R2, and Windows Server 2012, this application is **off** by default. Windows Defender scans the OS for spyware every night at 2 A.M. If you expect heavy use of the ADS at this time (for example, due to trend collection), reschedule the scan to a time when the ADS is not as active.
- You may need to change the Disk Defragmentation settings on your OS when using an ADS. Disk Defragmentation is scheduled to run by default every Wednesday at 1 A.M. If you expect heavy use of the ADS at this time (for example, due to trend collection), reschedule the scan to a time when the ADS is not as active.

Trend Repository Database

The trend repository database resides within the server that stores the trend data. For more information, click one of the following:

- [Trend Studies](#)
- [Trend Extensions](#)

Event Repository Database

The event repository database resides within the server that stores the event data. For more information, see the [Alarm and Event Management](#) section.

Audit Repository Database

The audit repository database resides within the server that stores the audit data. For more information, see the [Audit Trail](#) section.

ADS Computer Name

For information on ADS computer name guidelines and changing the computer name, refer to the *Appendix: Changing the ADS or ADX Name and the Computer Name in the ADS/ADX Commissioning Guide (LIT-1201645)*.

Integration

Menu Selection: **Insert > Integration**

Integrates the following types of buses or networks into the network engine:

- **BACnet IP** - Inserts a BACnet IP integration into the network engine.
- **Field Bus MSTP** - Inserts an MS/TP network integration for the network engine.
- **SA Bus** - Specifies the SA Bus under the Local Hardware IO folder of an SNC. The SA Bus is prebuilt for the SNC; it is not manually defined.
- **LON Trunk** - Inserts a LonWorks network into the network engine. The LON trunk integration is **not** available for network engines updated to Release 9.0.7, but is available on many network engines at Release 10.0 or later.
- **N1 Migration** - Inserts an N1 Migration trunk into the NIE55.

❗ **Note:** Be sure to configure the Network Name attribute of the N1 Migration. Once you insert the N1 Migration, you cannot edit the Network Name attribute. The workaround is to delete the existing N1 Migration and insert a new N1 Migration ensuring you enter the desired Network Name before completing the Insert Integration wizard.

- **N2 Trunk** - Inserts an N2 trunk into the network engine.
- **VND Integration** - Inserts a vendor integration into the network engine.
- **Wireless Supervisor** - Inserts a Wireless Sensor System integration into the system. (You can have only one Wireless Integration per network engine.) The Wireless Supervisor integration is **not** available for network engines updated to Release 9.0.7 or later.
- **XL5K Integration** - Inserts a Honeywell® Excel 5000 (XL-5000) network integration for the NIEx5. (You can have only one XL5K Integration object per NIEx5.) - Inserts a Honeywell Excel 5000 (XL-5000) network integration for the NIEx5. (You can have only one XL5K Integration object per NIEx5.) The XL5K integration is **not** available for network engines updated to Release 9.0.7 or later.

✓ **Tip:** Select the Hardware tab (if it appears) on the Configure screen for further configuration.

After adding an integration, you can select the integration in the navigation tree and click **Action > Import Integration to** add existing devices and points under the integration.

See one of the following sections for more information:

- [BACnet IP Integration Object](#)
- [MS/TP Field Bus Integration Object](#)
- [SA Bus Integration Object](#)
- [LON Integration Object](#)
- [N1 Migration Object](#)
- [N2 Master Datalink Object \(N2 Trunk\)](#)
- [Generic Integration Object](#)
- [VND Integration Object](#)
- [Wireless Receiver Supervisor Object](#)
- [XL5K Integration Object](#)

BACnet IP Integration Object

The BACnet IP Integration object manages the communication with a BACnet/IP network. All integrated BACnet devices and objects appear under the BACnet IP Integration object in the [Navigation Tree](#).

The BACnet IP Integration object serves as the root for all integrated BACnet/IP Field Controller objects on an Ethernet trunk. The BACnet IP Integration object is a direct child of a supervisory controller and integrates BACnet/IP devices using the Ethernet trunk.

For general information on Metasys system objects, see the [Object Help](#) section.

For detailed information on the BACnet IP Integration object, see [BACnet IP Integration Attributes](#).

BACnet IP Integration Attributes

This object contains attributes common to many Metasys system objects. These common attributes are described in the [Common Object Attributes](#) section. This section includes attributes of the Focus/Configuration tab and the Diagnostics tab. See the [Object and Feature Tabs](#) section for

information on the attributes that appear on the other tabs of this object (for example, the Hardware and Options tab appear on point objects).

- ① **Note:** In the Notes column, attributes marked with the letter C are configurable, attributes marked with an N are not required, and attributes marked with the letter W are writable.

Table 115: BACnet IP Integration Attributes - Focus/Configuration Tab

Attribute Name	Notes	Values/Options/Range	Description
Alarm State			Indicates the current status of the object. The expected state is Normal.
APDU Retries	C,W		Indicates the maximum number of times the device can retransmit a data frame. If the device does not perform retries, it has a value of 0. If this value is greater than 0, a non-zero value appears in the APDU Segment Timeout attribute. Recommended settings: high sensitivity: 3 (default); medium sensitivity: 4; low sensitivity: 5. ① Note: If you change the value of this attribute, you must reset the network engine for the new settings to take effect. Also, this attribute is only visible in Snapshot Focus view.
APDU Timeout	C,W		Indicates the amount of time in milliseconds between retransmissions of a complete data frame requiring acknowledgment for which no acknowledgment has been received. This attribute applies to smaller data messages where the entire message fits within a single frame on the IP network. Recommended settings: high sensitivity: 6000 ms; medium sensitivity: 12000 ms (default); low sensitivity: 20000 ms. ① Note: If you change the value of this attribute, you must reset the network engine for the new settings to take effect. Also, this attribute is only visible in Snapshot Focus view.
APDU Segment Timeout	C,W		Indicates the amount of time in milliseconds between retransmissions of a data frame segment requiring acknowledgment for which no acknowledgment has been received. This value is not 0 if the device supports segmentation of transmitted data frames. Recommended settings: high sensitivity: 8000 ms; medium sensitivity: 11000 ms (default); low sensitivity: 20000 ms. ① Note: If you change the value of this attribute, you must reset the network engine for the new settings to take effect. Also, this attribute is only visible in Snapshot Focus view.
Count			Indicates the number of BACnet objects defined for this integration.

Table 115: BACnet IP Integration Attributes - Focus/Configuration Tab

Attribute Name	Notes	Values/Options/Range	Description
Device Discovery Range	C,W	Structure elements: <ul style="list-style-type: none"> • network number (see attribute description) • high limit device instance (Range: 1-4,194,302) • low limit device instance (Range: 1-4,194,302) 	Contains the destinations for the Who-Is message sent during the device autodiscovery process. When the list is empty, the object sends a global broadcast in the form of the Who-Is. Adding entries to the list limits the scope of the Who-Is broadcast to only the networks and device instance ranges specified. Multiple entries to this list cause the object to send multiple Who-Is messages sequentially. The following are device discovery range network numbers to use (broadcast type:network numbers): Local: 0 (locked for editing) Global: 65,535 (locked for editing) Remote: 1 to 65,345 (editable)
Discover All as General BACnet Device	C,W	Default is False for all engines and OAS Default is True for ODS	Toggles the integration between pure BACnet mode and BACnet with proprietary messaging. When set to True, proprietary messaging is disabled. This may be useful for special cases where customers do not want Private Transfer messages on the BACnet/IP trunk. This attribute must be set before devices are added to the Integration. Also, if you used device discovery prior to the change, restart the supervisory device to complete the change in the attribute value. You can do this after the change or after you have added devices to the integration. The default value is False. ⓘ Note: When this attribute is True, proprietary Objects, Attributes, and Services on Johnson Controls devices (such as FECs, FACs, and VMAs) are not available.
Internode Comm Timer	C,W		Controls the frequency of communication with MS/TP devices. Among other communications, this attribute defines the frequency of the heartbeat to monitored devices (monitored at a rate of two times the Internode Comm Timer). Recommended settings: high sensitivity: 30 seconds medium sensitivity: 120 seconds (default); low sensitivity: 240 seconds. ⓘ Note: If you change the value of this attribute, you must reset the network engine for the new settings to take effect. Also, this attribute is only visible in Snapshot Focus view.

Table 115: BACnet IP Integration Attributes - Focus/Configuration Tab

Attribute Name	Notes	Values/Options/Range	Description
JCI Network Port APDU Retries	C,W		<p>Indicates the maximum number of times the device can retransmit a data frame. If the device does not perform retries, it has a value of 0. If this value is greater than 0, a non-zero value appears in the JCI Network Port APDU Segment Timeout attribute. Recommended settings: high sensitivity: 3 (default); medium sensitivity: 4; low sensitivity: 5.</p> <p> ⓘ Note: If you change the value of this attribute, you must reset the network engine for the new settings to take effect. Also, this attribute is only visible in Snapshot Focus view.</p>
JCI Network Port APDU Timeout	C,W		<p>Indicates the amount of time in milliseconds between retransmissions of a complete data frame requiring acknowledgment for which no acknowledgment has been received. This attribute applies to smaller data messages where the entire message fits within a single frame on the IP network. Recommended settings: high sensitivity: 6000 ms; medium sensitivity: 12000 ms (default); low sensitivity: 20000 ms.</p> <p> ⓘ Note: If you change the value of this attribute, you must reset the network engine for the new settings to take effect. Also, this attribute is only visible in Snapshot Focus view.</p>
JCI Network Port APDU Segment Timeout	C,W		<p>Indicates the amount of time in milliseconds between retransmissions of a data frame segment requiring acknowledgment for which no acknowledgment has been received. This value is not 0 if the device supports segmentation of transmitted data frames. Recommended settings: high sensitivity: 8000 ms; medium sensitivity: 11000 ms (default); low sensitivity: 20000 ms.</p> <p> ⓘ Note: If you change the value of this attribute, you must reset the network engine for the new settings to take effect. Also, this attribute is only visible in Snapshot Focus view.</p>
JCI Network Port Type			<p>Specifies the Network Port type: BACnet IP Integration Port.</p>
Page Size	C,W	10-65,535 Default=1,000	<p>Determines how many points are discovered per page.</p>
Pending Network Number		1001	<p>Specifies the network number that is assigned to the integration when the user sends the Activate Changes command to the engine. This command has two options; select the Update All Changes Pending Attributes and Restart Device option.</p>

Table 115: BACnet IP Integration Attributes - Focus/Configuration Tab

Attribute Name	Notes	Values/Options/Range	Description
Periodic Update	C,W	0-65,535 Units = seconds Default = 60	Specifies how frequently integrated BACnet objects update their attribute values. Every period, the BACnet IP Integration object prompts each integrated BACnet object that needs to update its attribute values. Also see the Execution Time attribute. Default=60.
Poll Delay	C,W	Milliseconds 10-50	Specifies the time in milliseconds between BACnet object polls for attribute values. The polls start at the time specified in the Periodic Update attribute. As the Poll Delay increases, the overall time in the Execution Time attribute increases. It is useful to specify a Poll Delay on sites where the rate of reading the remote objects causes too high a burden on the Metasys network or third-party device. The initial value of the Poll Delay attribute is blank (zero). Recommended setting: high sensitivity: 20 seconds; medium sensitivity: 60 seconds; low sensitivity: 120 seconds.
Preserve Discovered Devices	C,W	Default = True	Controls the behavior when field device discovery is started. When this value is True (default), any devices which were previously discovered or already mapped remain in the list of discovered devices, without any attempt to reestablish communication with them. If this value is False, an attempt is made to reestablish communication with all devices, and devices which do not respond are not shown in the list of discovered devices. Set this value to False to rediscover devices which have been re-addressed on the network.
Requested Vendor ID	C,N,W	0-65,535	Specifies a Vendor ID when discovering new devices to limit the device list displayed to that specified Vendor ID. The default value of this attribute is Null (stored as zero) which allows all vendors to be discovered and displayed. The current list of Vendor IDs can be viewed at http://www.bacnet.org/VendorID/BACnet%20Vendor%20IDs.htm . ① Note: If you do not want to display devices already discovered or mapped, then set Preserve Discovered Devices to False.

Table 116: BACnet IP Integration Attributes - Diagnostic Tab

Attribute Name	Notes	Description
Duplicate Device Identifier		Lists any duplicate BACnet Device Object Identifiers found after you perform an auto-discovery of BACnet/IP devices. The list contains the instance number of the BACnet Device Object Identifier and the network address (represented in hex notation) of each device with the same identifier instance number as another device on the network. The devices in this list are not included in the list of auto-discovered devices in the integration tree under the Engineering tab of the BACnet IP Integration object. The physical locations of BACnet/IP devices with duplicate device identifiers must be determined, and their object identifiers changed to make them unique network-wide.
Execution Timer		Records the amount of time taken for the last periodic update of all integrated BACnet objects. You can use the value for this attribute to tune the Periodic Update attribute. If the Execution Time is greater than the Periodic Update, this indicates that the attribute values of integrated BACnet objects are constantly being updated over the network. Range: 0 to 4,294,967,295 Units = seconds
Polled Object Count		Indicates the number of mapped BACnet objects currently being polled on a periodic basis. The polling is limited to those mapped BACnet objects currently being accessed either by a feature or by the UI. The Instance Number is typically smaller than the total Count.

BACnet IP Integration Object Commands

The following table lists the commands supported by the BACnet IP Integration Object.

Table 117: BACnet IP Integration Object Commands

Command Name	Parameters	Description
Sync Field Device Times	None	Sends a high-priority time synchronization command to all child BACnet IP Integration devices, based on each device mapper object's Manual Time Sync Type attribute. If the Manual Time Sync Type is set to: <ul style="list-style-type: none"> • UTC: UTC time synchronization message is sent. • Local: a local time synchronization message is sent. • None: no message is sent. • Auto: the mapper object's Protocol Services Supported attribute is used to determine which type of time sync is supported, and if: utcTimeSynchronization is set, the code functions as if Time Sync Type is set to UTC. utcTimeSynchronization is not set and timeSynchronization is set, local time is sent. neither utcTimeSynchronization nor timeSynchronization is set, no time is sent.

MS/TP Field Bus Integration Object

The MS/TP Field Bus Integration is the root for all Field Devices and BACnet objects on the MS/TP Field Bus in the Metasys system. When you add a Field Bus integration to an NAE or NIE9, you create an MS/TP communication link on a specified hardware port. The MS/TP Field Bus Integration object offers diagnostic data related to the MS/TP network. After you create a Field Bus integration, you can use the Insert Field Device and Insert Field Point wizards within SMP to add BACnet devices and associated BACnet objects to the trunk. The integration wizards support both manual object creation and automatic Device and Point discovery. The Field Bus integration supports third-party BACnet MS/TP devices and all FEC family BACnet MS/TP devices.

- **Important:** When you add an MS/TP Field Bus Integration on an OAS for Remote Field Bus, do not select a **Trunk Number** value of 1 or 2. The OAS reserves these trunks for the USB ports.

MS/TP Field Bus Integration Attributes

The MS/TP Field Bus Integration object contains attributes common to many Metasys system objects. You can find a description of these common attributes in the [Common Object Attributes](#) section. This section includes attributes of the Focus/Configuration and Diagnostics tabs.

- ① **Note:** In the Notes column, attributes that are marked with a letter C are configurable, attributes marked with the letter W are writable, and attributes marked with the letter N indicate values not required.

Table 118: MS/TP Field Bus Integration Attributes - Focus/Configuration Tab

Attribute Name	Notes	Description
Alarm State		Indicates the current status of the object. The expected state is Normal.
APDU Length	W	Indicates the maximum number of octets that may be contained in a single indivisible application on this port. Supports up to 65535. This value must be greater than 50. This attribute appears only in the Snapshot Focus view of the object.
APDU Retries	C,W	Indicates the maximum number of times the device can retransmit a data frame. If the device does not perform retries, it has a value of 0. If this value is greater than 0, a non-zero value appears in the APDU Segment Timeout attribute. Recommended settings: high or medium sensitivity: 3 (default); low sensitivity: 5. ① Note: If you change the value of this attribute, you must reset the network engine for the new settings to take effect.
APDU Timeout	C,W	Indicates the amount of time in milliseconds between retransmissions of a complete data frame requiring acknowledgment for which no acknowledgment has been received. This attribute applies to smaller data messages where the entire message fits within a single frame on the MS/TP bus. Recommended settings: high sensitivity: 6000 ms; medium sensitivity: 12000 ms (default); low sensitivity: 30000 ms. The default number is 12000ms. ① Note: If you change the value of this attribute, you must reset the network engine for the new settings to take effect.

Table 118: MS/TP Field Bus Integration Attributes - Focus/Configuration Tab

Attribute Name	Notes	Description
APDU Segment Timeout	C,W	<p>Indicates the amount of time in milliseconds between retransmissions of a data frame segment requiring acknowledgment for which no acknowledgment has been received. This value is not 0 if the device supports segmentation of transmitted data frames. Recommended settings: high sensitivity: 8000 ms; medium sensitivity: 11000 ms (default); low sensitivity: 29000 ms. The default number is 11000ms.</p> <p>① Note: If you change the value of this attribute, you must reset the network engine for the new settings to take effect.</p>
Changes Pending		Indicates whether an object configuration change has not yet been activated. If this attribute is True, reset the engine or issue an Activate Changes command to the network engine.
Command	W	Describes an attribute that initiates specific functionality dependent upon the enumerated value written to it. In addition to basic defined commands described by BACnet PR18, there may also be vendor specific commands. Currently, only discarding of pending changes is supported. The default value for this attribute is Idle.
Count		Contains the number of FEC series and non-FEC series BACnet objects mapped on the field bus.
Device Discovery Range	C,W	Specifies the destinations for the messages sent during the device auto discovery process. This list is empty by default. When the list is empty, a global broadcast message is sent. Adding entries to the list limits the scope of the broadcast message to only the specified networks and device instance ranges. If multiple entries appear in the list, the messages are sent sequentially. This attribute appears only in the Snapshot Focus tab.
Discover All As General BACnet Device	C,W	Toggles the integration between pure BACnet mode and BACnet with proprietary messaging. When set to True, proprietary messaging is disabled. This may be useful for special cases where customers do not want Private Transfer messages on the BACnet trunk. Note that when this attribute is True, proprietary Objects, Attributes, and Services on Johnson Controls devices (such as Field Equipment Controllers (FECs), Advanced Application Field Equipment Controllers (FACs), and VAV Modular Assemblies (VMAs)) are not available. This attribute must be set before devices are added to the Integration. If you change the value, restart the supervisory device to make the change effective. You can restart immediately or after you have completed the mapping process. The default value is False.
Execution Priority	C,W	Indicates the order in which any given object within a group of objects is allowed to run or change data within a system. This attribute should not be changed for this object. This attribute appears only in the Snapshot Focus tab.

Table 118: MS/TP Field Bus Integration Attributes - Focus/Configuration Tab

Attribute Name	Notes	Description
Internode Comm Timer	C,W	<p>Controls the frequency of communication with MS/TP devices. Among other communications, this attribute defines the frequency of the heartbeat to monitored devices (monitored at a rate of two times the Internode Comm Timer). Recommended settings: high sensitivity: 30 seconds; medium sensitivity: 120 seconds (default); low sensitivity: 240 seconds.</p> <p>① Note: If you change the value of this attribute, you must reset the network engine for the new settings to take effect.</p>
JCI Network Port APDU Retries	C,W	<p>Indicates the maximum number of times the device can retransmit a data frame. If the device does not perform retries, it has a value of 0. If this value is greater than 0, a non-zero value appears in the JCI Network Port APDU Segment Timeout attribute. Recommended settings: high or medium sensitivity: 3 (default); low sensitivity: 5.</p> <p>① Note: If you change the value of this attribute, you must reset the network engine for the new settings to take effect.</p>
JCI Network Port APDU Timeout	C,W	<p>Indicates the amount of time in milliseconds between retransmissions of a complete data frame requiring acknowledgment for which no acknowledgment has been received. This attribute applies to smaller data messages where the entire message fits within a single frame on the MS/TP bus. Recommended settings: high sensitivity: 6000 ms; medium sensitivity: 12000 ms (default); low sensitivity: 30000 ms. The default number is 12000ms.</p> <p>① Note: If you change the value of this attribute, you must reset the network engine for the new settings to take effect.</p>
JCI Network Port APDU Segment Timeout	C,W	<p>Indicates the amount of time in milliseconds between retransmissions of a data frame segment requiring acknowledgment for which no acknowledgment has been received. This value is not 0 if the device supports segmentation of transmitted data frames. Recommended settings: high sensitivity: 8000 ms; medium sensitivity: 11000 ms (default); low sensitivity: 29000 ms. The default number is 11000ms.</p> <p>① Note: If you change the value of this attribute, you must reset the network engine for the new settings to take effect.</p>
Max APDU Length	C,W	<p>Indicates the maximum number of bytes that may be contained in a single, indivisible application layer protocol data unit. This value should not be changed during normal installation or operation. The default value is 1476 bytes.</p> <p>If you write the value of this attribute, you must issue a Reset Device command to the network engine for the new settings to take effect.</p>

Table 118: MS/TP Field Bus Integration Attributes - Focus/Configuration Tab

Attribute Name	Notes	Description
Max Info Frames	C,W	<p>Specifies the maximum number of information frames the node may send before it passes the token. This attribute is present if the device is a node on an MS/TP network. If Max Info Frames is not writable or otherwise user configurable, its value is one. If you change this value, you must activate it with the Activate Changes > Update Changes Pending Attributes Except Network Number command to the Engine. The pending value is updated immediately but it is not applied until you activate the change.</p> <p>① Note: If the device is an MS/TP master node, both the Max Info Frames and Max Master attributes are required.</p>
Max Master	C,W	<p>Specifies the highest possible address for devices on this network and is less than or equal to 127 (default). This attribute is present if the device is a bus supervisor device on an MS/TP network. Typically this address is kept at 127 to allow other devices on the bus to use any of the lower valid addresses.</p>
Out of Service		<p>Indicates whether the field bus is out of service. This value is always false.</p>
Page Size	C,W	<p>Determines how many points are discovered per page. The default value is 1,000.</p>
Periodic Update	C,W	<p>Specifies how frequently integrated BACnet objects that do not support COV subscription update their attribute values. Every period, the MS/TP Field Bus Integration object prompts each integrated BACnet object that needs to update its attribute values. This attribute applies only to non-FEC series devices. See the Poll Delay attribute description for information on how these attributes interact. The default value is 20 seconds.</p>
Poll Delay	C,W	<p>Specifies the time in milliseconds between BACnet object polls for attribute values. The polls start at the time specified in the Periodic Update attribute. As the poll delay increases, the overall time in the Execution Time attribute increases.</p> <p>It is useful to specify a Poll Delay on sites where the rate of reading the remote objects causes too high of a burden on the Metasys network or third-party device. The initial value of the Poll Delay attribute is blank (zero).</p>
Preserve Discovered Devices	C,W	<p>Controls the behavior when field device discovery is started. This attribute exists for historical reasons and is ignored by the MS/TP Field Bus Integration object for FEC series or non-FEC series devices. The value of the attribute is shown in the snapshot view. If an auto discovery has been completed since the last device restart, a complete new auto discovery is performed for all FEC Series or non-FEC Series devices for each subsequent auto discovery in which Restart is selected. The default is True.</p>
Reliability		<p>Indicates the current reliability of the integration. The normal state is Reliable.</p>

Table 118: MS/TP Field Bus Integration Attributes - Focus/Configuration Tab

Attribute Name	Notes	Description
Requested Vendor ID	C,N	<p>Used as a filter when discovering new devices to limit the device list to whatever is specified as the Vendor ID value. The default value of this attribute is Null (stored as zero), which allows all vendors to be discovered and displayed. Note that this filter applies only to non-Johnson Controls devices. Johnson Controls devices are always included in the discovered device list.</p> <p>The current list of Vendor IDs can be viewed at http://www.bacnet.org/VendorID/BACnet%20Vendor%20IDs.htm.</p> <p>① Note: If you do not want to display devices already discovered or mapped, then set Preserve Discovered Devices to False.</p>
Status Flags		<p>Indicates the general status of the object in BACnet terms and contains four independent states.</p> <p>The four selections are:</p> <p>In Alarm—False if the Event State attribute value is Normal; otherwise, the In Alarm flag is True. (Set only by BACnet Intrinsic Alarming.)</p> <p>Fault—True (1) if the Reliability attribute is not reliable; otherwise, the Fault flag is False.</p> <p>Overridden—Overridden flag is True if the Present Value is overridden from the hardware source level.</p> <p>Out of Service—Out of Service flag is True if the Out of Service attribute value is True; otherwise, the Out of Service flag is False.</p>
Synchronize Time	C,W	<p>Broadcasts time synchronization to all devices on the field bus when the field device comes online or when the time changes by a significant amount. When changed from false to true, a time synchronization is sent immediately to all devices on the field bus. The default is True.</p>
Synchronize Time Zone	C,W	<p>Enables and disables time zone synchronization messages to devices (such as FACs) on a trunk that support real-time clock capabilities. When this attribute is set to True (default), time zone synchronization messages are broadcast to devices on the field bus. The broadcast occurs either when individual devices come online or to all devices when any of the time zone related attributes change (Default Time Zone, UTC Offset, Standard Time Offset, Daylight Savings Time Offset, Standard Time Start, and Daylight Savings Time Start). When changed from false to true, time zone synchronization is automatically sent to all devices on the field bus.</p>

Table 119: MS/TP Field Bus Integration Attributes - Diagnostic Tab

Attribute Name	Description
Active Baud Rate	Displays the actual data rate on the wire for transmitting and receiving. When set to Auto, the port is waiting to synchronize with the network.
Broadcast Receive Rate	Indicates the number of BACnet broadcast messages received on the MS/TP field bus network of the device in the last minute. If this number is high, it indicates that the performance of the specific MS/TP field bus network is affected by broadcast receive traffic.
Broadcast Receives	Indicates the number of broadcast messages received.
Broadcast Transmit Rate	Indicates the number of BACnet broadcast messages transmitted on the MS/TP field bus network for the device in the last minute. If this number is high, it indicates that the performance for the specific MS/TP field bus network is affected by broadcast transmit traffic.
Broadcast Transmits	Indicates the number of broadcast message transmissions.
Buffer Overflows	Indicates the number of data frames lost at this MS/TP device because there was no buffer available to which to save it. This number includes outgoing and incoming messages.
Bus Analysis Date	Displays the date when the last full MS/TP field bus scan finished. The Analyze Field Bus command initiates the network scan.
Bus Analysis Time	Displays the time when the last full MS/TP field bus scan finished. The Analyze Field Bus command initiates the network scan.
Bus Analysis Progress	Indicates the progress of the full MS/TP field bus scan initiated by the Analyze Field Bus command.
Bus Device Configuration List	Lists MS/TP devices that either have been detected on the FC bus or have been configured on field devices existing under the MS/TP Field Bus Integration Object. The Bus Device Configuration List provides configuration information for each device, including which devices are responding, which devices may have been configured incorrectly, and the addresses of all devices. Only bus supervisor devices provide all this information. This object creates the list when you issue an Analyze Field Bus command.
Bus Health Index	Indicates the overall health of the MS/TP field bus based on the number of errors occurring at the network engine. The most desirable value is 0. The higher the number, the worse the bus health/higher the number of errors. The Bus Health Index is re-evaluated every 30 seconds and gradually returns to zero if no new errors occur. This object derives the value for the Bus Health Index from periodically reading the Header CRC Errors, Data CRC Errors, Framing Errors, and Lost Token attribute values to create a moving average of total errors. The Weighted Bus Health Constant attribute determines the responsiveness of the Bus Health Index.

Table 119: MS/TP Field Bus Integration Attributes - Diagnostic Tab

Attribute Name	Description
Bus Performance Index	<p>Indicates the responsiveness of the bus supervisor device on the MS/TP field bus. The most desirable value is 1. Values from 2.5 to 6 are marginal and updates to devices on the bus may be slow. If the value is greater than 6, the performance is poor and may indicate offline conditions.</p> <p>The device derives the value for the Bus Performance Index by comparing the measured token loop time at the network engine and the predicted token loop time calculated when the MS/TP Field Bus Integration object is first created or when the network engine device count changes. This object uses the difference as input for determining the weighted moving average of the token loop time. The Weighted Bus Performance Constant attribute determines the responsiveness of the Bus Performance Index.</p>
Bytes In	Indicates the number of data bytes received by this device. This number includes all messages from all devices.
Bytes Out	Indicates the number of data bytes sent by this device. This number includes all messages to all devices.
Data CRC Errors	<p>Counts errors detected in the data portion of data frames sent to the device. Many data frames are used only for protocol control and do not contain a data portion, and thus cannot have Data CRC Errors. The Header CRC Errors check must be successful before the device attempts a Data CRC check. This attribute supplies an error count for the Bus Health Index attribute.</p>
Data Expecting Reply Frames Rxed	Displays the number of data frames received by the device that require an immediate reply. This value includes proprietary frames that have been received and are expecting a reply.
Data Expecting Reply Frames Txed	<p>Displays the number of data frames sent by the device that requires an immediate reply from the destination device.</p> <p>This value includes proprietary frames that have been sent and are expecting a reply.</p>
Data Not Expecting Reply Frames Rxed	Displays the number of data frames received by this item that do not require an immediate reply. This value includes proprietary frames that have been received and are not expecting a reply.
Data Not Expecting Reply Frames Txed	Displays the number of data frames sent by the device that do not require an immediate reply. This value includes proprietary frames that have been sent and received a reply.
Duplicate Device Identifiers	<p>Lists any duplicate object identifiers found after an auto-discovery of MS/TP BACnet devices finishes. If any devices are listed, then the list of automatically discovered devices may be incomplete. The list contains the instance number of the Object Identifier and the network address (represented in hex notation) of each device with the same identifier instance number as another device on the same bus. MS/TP devices with duplicate device identifiers may be integrated without problem, but should be physically located and their object identifiers changed to make them unique network-wide.</p>

Table 119: MS/TP Field Bus Integration Attributes - Diagnostic Tab

Attribute Name	Description
Execution Time	Records the amount of time taken for the last periodic update of all referenced mapped BACnet objects. The value for this attribute can be used to tune the Periodic Update attribute. If the Execution Time is greater than the Periodic Update, attribute values of referenced BACnet objects are constantly being updated over the network. This attribute applies only to non-FEC series devices. See the Poll Delay attribute description for information on how these attributes interact.
Framing Errors	Counts the number of errors detected in the individual data bytes received by the device. A framing error occurs when the device receives a stop bit in the wrong state. This attribute supplies an error count for the Bus Health Index attribute. Framing errors are usually caused by electrical noise on the bus, message collisions, incorrect baud rate settings, bus wiring or termination errors, or devices that are not operating within the BACnet specified timing. Framing errors generally cause CRC errors since the frame has been corrupted.
Header CRC Errors	Counts the number of errors detected in the header portion of frames received by the device. Many frames are only used for protocol control and only contain a header portion. This attribute supplies an error count for the Bus Health Index attribute.
Internal Errors	Indicates the number of internal MS/TP driver operation errors resulting from an incorrect state, insufficient memory, errors from the serial port driver, incorrect internal state transitions, and other error states.
Logging Object Reference	Indicates the object (by way of the BACnet Object Identifier) that acquires, presents, and stores the Logging Record data (that is, snapshot) from the underlying system. When the object specified in the Logging Object Reference field issues the Get Monitor Data command, the Logging Record is acquired and updated.
Lost Token	Indicates the number of times the device detects a lost token. A lost token indicates that the bus encountered a serious network disruption. Serious disruption may occur when the bus first starts up or when wiring changes are made. This attribute supplies an error count for the Bus Health Index attribute.
Max Output Queue Used	Displays the largest number of outgoing frames the device has held in a queue for transmission. The largest possible value for this attribute depends on the capabilities of the engine. Generally, the maximum value is reached during device startup, but is not reached during normal operation.
Maximum Token Loop Time	Indicates the maximum time in milliseconds last seen at the device for the token to complete one circuit of the MS/TP field bus (go from the originating bus supervisor device through several other devices and return to the original bus supervisor device). The value is reset when the statistics are cleared. Maximum loop time is closely associated with the worst-case performance encountered since the last time the value was reset.

Table 119: MS/TP Field Bus Integration Attributes - Diagnostic Tab

Attribute Name	Description
Overrun Errors	Displays the number of times the MS/TP port hardware loses received data because the device is too slow in reading the data. An overrun error occurs when the hardware receives a byte before it moves the prior byte to a buffer.
PFM Frames Rxed	Displays the number of Poll For Master (PFM) frames received by the device. On a clean network, this should only count the first PFM frame received when the device (or another with a MAC address below that of the device) comes online. These frames are used to discover other devices on the network and should be seldom received.
PFM Frames Txed	Displays the number of PFM frames sent by the device. In normal operation on a clean network, only the bus supervisor (MAC address 0) and the highest numbered master device on the network should be sending PFM frames. These frames are used to discover other devices on the network.
Packets Timed Out	Counts the number of data frames expected by the device that did not arrive within the time allowed.
Packets Too Long	Counts any attempts to transmit or receive a data frame that is longer than allowed by the device or by MS/TP.
Polled Object Count	Indicates the number of mapped BACnet objects that are currently polled on a periodic basis. This attribute applies only to non-FEC series devices.
Port Status	Indicates the state of the port.
Predicted Token Loop	Indicates the theoretical time in milliseconds needed for the token to complete one circuit of the MS/TP field bus. The object derives this value from the defined bus baud rate, number of devices on the bus, and an estimate of the type and amount of messages transmitted on the bus during this time. This object compares the value of this attribute with that of the Token Loop Time attribute to help calculate the value of the Bus Performance Index attribute.
Reply Postponed Frames Rxed	Counts the number of data frames sent at the device that requires an immediate reply where the destination device requests additional time to prepare the reply. This may happen normally if the reply involves a large amount of data. It may also indicate that a device on the network is overloaded.
Reply Postponed Frames Txed	Counts the number of data frames received at the device that requires an immediate reply where this device requests additional time to prepare the reply. This may happen normally if the reply involves a large amount of data. It may also indicate that this device is overloaded.
Reply to PFM Frames Rxed	Counts the number of Reply to PFM frames the device receives. On a clean network in normal operation, the device receives only one Reply to PFM frame when either the device comes online or the next higher numbered device comes online during normal operation. These frames announce the presence of this device on the network.

Table 119: MS/TP Field Bus Integration Attributes - Diagnostic Tab

Attribute Name	Description
Reply to PFM Frames Txed	Counts the number of Reply to PFM frames the device transmits. On a clean network during normal operation, only one Reply to PFM frame needs to be sent when the device first comes online. These frames are used to announce the presence of other devices on the network.
Reply Too Slow Application Errors	Counts the number of data frames received at this device that requires an immediate reply where the device cannot assemble reply data within the time allowed and cannot internally detect the need for additional time. These errors generally indicate an overloaded device if they occur frequently.
Reply Too Slow Datalink Errors	Counts the number of data packets sent by the device that requires an immediate reply from the destination device, but do not receive any reply within the time allowed. This number does not include Reply Postponed responses. The affected frames likely require a retry and bus performance is reduced when this happens.
Reset Date	Contains the date of the last Clear Statistics command (when the statistics for the device were last reset).
Reset Time	Contains the time of the last Clear Statistics command (when the statistics for the device were last reset).
Retries	Displays the number of times the device tried to pass a token as the next node did not start using it within the time allowed by BACnet protocol.
Test Request Frames Rxed	Displays the number of Test Request Frames the device receives. Test Request Frames are a normal part of bus analysis, but should not be received during normal operation. A Test Response Frame should be sent in reply to each Test Request Frame received.
Test Request Frames Txed	Displays the number of Test Request Frames the device transmits. Test Request Frames are a normal part of bus analysis, but should not be sent during normal operation. A Test Response Frame should be received in response to each test Request Frame sent to an online device. Test Request Frames may also be sent to offline devices where no response is received.
Test Response Frames Rxed	Displays the number of Test Response Frames the device receives. Test Response Frames are a normal part of bus analysis, but should not be received during normal operation. A Test Response Frame should be received in response to each test Request Frame sent to an online device.
Test Response Frames Txed	Displays the number of Test Response Frames transmitted by this MS/TP port. Test Response Frames are a normal part of bus analysis, but should not be sent during normal operation. A Test Response Frame should be sent in response to each test Request Frame received.

Table 119: MS/TP Field Bus Integration Attributes - Diagnostic Tab

Attribute Name	Description
Token Frames Rxed	Displays the number of Token Frames the device receives. In MS/TP, each master device passes a logical token to the next device during normal operation. Only the master device currently holding the token is allowed to initiate a message; thus, the number of Token Frames sent or received should be large. Normally the number of Token Frames received should be almost the same as the number of Token Frames transmitted.
Token Frames Txed	Displays the number of Token Frames the device transmits. In MS/TP, each master device passes a logical token to the next device during normal operation. Only the master device currently holding the token is allowed to initiate a message, thus the number of Token Frames sent or received should be large. Normally the number of Token Frames received should be almost the same as the number of Token Frames transmitted.
Token Loop Time	Indicates how much time passes between the periods when the device allows initiation of messages on the network. This time is a strong indicator of network performance and is associated strongly with the amount of traffic or errors on the network. Shorter time period indicate a more responsive network. Longer time period indicate an increasingly busy and slow network. The object compares the value of this attribute with that of the Predicted Token Loop Time attribute to help calculate the value of the Bus Performance Index attribute.
Unexpected Frames Rxed	Displays the number of data frames of an illegal type that the device receives. During normal operation, only certain kinds of MS/TP data frames are allowed to be sent during each phase of operation. If the device receives some other kind of data frame (other than the allowed types for the current phase of operation), the device counts the data frame as an Unexpected Frame. The device may often detect Unexpected Frames when connecting running devices to a live MS/TP bus.
Weighted Bus Health Constant	Determines the responsiveness of the Bus Health Index. The default value is 0.50.
Weighted Bus Performance Constant	Determines the responsiveness of the Bus Performance Index. The default value is 0.50.

Table 120: MS/TP Field Bus Integration Attributes - Hardware Tab

Attribute Name	Flags	Initial Value	Values/Options/Range	
Baud Rate Selection	C,W	38400	Indicates the baud rate of the network engine FC bus.	
			Baud Rate	Description
			Auto	Use baud rate of running network. This value is the recommended setting for everything on the FC bus except the bus supervisor port. See Active Baud Rate.
			1200	Use 1200 baud only. This value is not recommended and may not be allowed on some devices.
			9600	Use 9600 baud only. This value is the lowest standard MS/TP baud rate.
			19200	Use 19200 baud only. This value is not recommended.
			38400	Use 38400 baud only. This value is the recommended baud rate for bus supervisor ports.
		76800	Use 76800 baud only.	
Configured Network Number	C,W	2000	Contains the network number of the MS/TP bus used for BACnet message addressing. A value of 0 indicates a local network (the device is not intended as a router). Do not change this number after you start device mapping or discovery because it may invalidate the devices that have been found.	
Trunk Number		1	Displays the trunk number where the field bus is located.	

MS/TP Field Bus Integration Commands

The following table lists the commands supported by the [MS/TP Field Bus Integration Object](#).

Table 121: MS/TP Field Bus Integration Commands

Command Name	Parameters	Description
Analyze Field Bus	None	Scans the entire MS/TP field bus (addresses 0–254) and compiles a list of all devices on the bus. The Analyze Field Bus command also provides configuration information for each device that responds. The data collected helps to determine devices that may be configured incorrectly and thus affect the bus performance. Because of the high bus traffic load created by the scan, this command should not be used on a regular basis. This command is primarily intended for use during commissioning. Track the progress of this analysis in the Bus Analysis Progress attribute. The results of this command appear in the Bus Device Configuration List attribute. The date and time of the last completed scan appear in the Bus Analysis Date attribute and Bus Analysis Time attribute, respectively. See MS/TP Field Bus Integration Attributes for more information about these attributes.
Clear Statistics	None	Clears the statistics for the integrated MS/TP network.
Latch Statistics	None	Updates the displayed statistics with the current values.
Sync Field Device Time(s)	None	Sends a high-priority time synchronization command to all child BACnet Integration devices, based on each device mapper object's Manual Time Sync Type attribute. If the Manual Time Sync Type is set to: <ul style="list-style-type: none"> • UTC: UTC time synchronization message is sent. • Local: a local time synchronization message is sent. • None: no message is sent. • Auto: the mapper object's Protocol Services Supported attribute is used to determine which type of time sync is supported, and if: <ul style="list-style-type: none"> - utcTimeSynchronization is set, the code functions as if Time Sync Type is set to UTC. - utcTimeSynchronization is not set and timeSynchronization is set, local time is sent. - neither utcTimeSynchronization nor timeSynchronization is set, no time is sent.

SA Bus Integration Object

The SA Bus integration is a private bus on the SNC engine over which sensors, smart actuators, and I/O modules communicate to the SNC. Unlike the MS/TP Field Bus, the SA Bus integration is automatically created under the Local Hardware IO object of an SNC engine. All points defined on this proprietary SA Bus are listed under the SA Bus integration.

The SA Bus integration object offers provisioning and diagnostic data related to the SA Bus network. The SA Bus Provisioning tab reports the current firmware versions of the connected SA Bus devices, and whether any devices have new firmware waiting for them on the SNC. If a pending firmware change is present, System Status indicates Waiting for Activation. To provision the new firmware, you issue an Active Provisioning command to the SA Bus.

When the SNC application is started, the SNC downloads the necessary objects to the IOM and the IOM transitions from Instances Deleted to Operational.

SA Bus Integration Attributes

The SA Bus Integration object contains attributes common to many Metasys system objects. You can find a description of these common attributes in the [Common Object Attributes](#) section. This section includes attributes of the Focus/Configuration, Provisioning, and Diagnostics tabs.

Note: In the Notes column, attributes that are marked with a letter C are configurable, attributes marked with the letter W are writable, and attributes marked with the letter N indicate values not required.

Table 122: SA Bus Integration Attributes - Focus/Configuration Tab

Attribute Name	Notes	Description
Alarm State		Indicates the current status of the object. The expected state is Normal.
Object Name	C, W	Identifies a name for the SA Bus object.
Object Identifier		Specifies an internal identifier assigned to the SA Bus.
Username is BACnet Object Name	C, W	Controls whether the object's User Name attribute is also the Object Name attribute. The Object Name attribute is not writable, so the only way to change the Object Name attribute is to edit the User Name attribute and set the User Name Is BACnet Obj Name attribute to True.
Version		Specifies the version number for the SA Bus.

Table 123: SA Bus Integration Attributes - Provisioning Tab

Attribute Name	Description
Provisioning Status	Lists the current status of equipment controllers defined on the SA Bus of an SNC. Information presented includes Model, Address, System Status, State, and Progress. When the SNC application is started, the System Status changes from Instances Deleted to Operational. The System Status attribute is polled once every 60 seconds, so a refresh in status may not be immediate.
Provisioning Files	Lists the current status of provisioned files for the equipment controllers defined on the SA Bus of an SNC. Information presented includes Model, Address, File Name, Current Version, Staged Version, and Available Version.

Table 124: SA Bus Integration Attributes - Diagnostic Tab

Attribute Name	Description
Active Baud Rate	Displays the actual data rate on the wire for transmitting and receiving. When set to Auto, the port is waiting to synchronize with the network.
Broadcast Receive Rate	Indicates the number of BACnet broadcast messages received on the MS/TP field bus network of the device in the last minute. If this number is high, the performance of the specific MS/TP field bus network is affected by broadcast receive traffic.
Broadcast Receives	Indicates the number of broadcast messages received.
Broadcast Transmit Rate	Indicates the number of BACnet broadcast messages transmitted on the MS/TP field bus network for the device in the last minute. If this number is high, the performance for the specific MS/TP field bus network is affected by broadcast transmit traffic.
Broadcast Transmits	Indicates the number of broadcast message transmissions.
Buffer Overflows	Indicates the number of data frames lost at this MS/TP device because there was no buffer available to which to save it. This number includes outgoing and incoming messages.
Bus Analysis Date	Displays the date when the last full MS/TP field bus scan finished. The Analyze Field Bus command initiates the network scan.
Bus Analysis Time	Displays the time when the last full MS/TP field bus scan finished. The Analyze Field Bus command initiates the network scan.
Bus Analysis Progress	Indicates the progress of the full MS/TP field bus scan initiated by the Analyze Field Bus command.
Bus Device Configuration List	<p>Lists MS/TP devices that either have been detected on the SA Bus or have been configured on field devices existing under the MS/TP Field Bus Integration Object.</p> <p>The Bus Device Configuration List provides configuration information for each device, including which devices are responding, which devices may have been configured incorrectly, and the addresses of all devices. Only bus supervisor devices provide all this information. This object creates the list when you issue an Analyze Field Bus command.</p>
Bus Health Index	<p>Indicates the overall health of the MS/TP field bus based on the number of errors occurring at the network engine. The most desirable value is 0. The higher the number, the worse the bus health/higher the number of errors. The Bus Health Index is re-evaluated every 30 seconds and gradually returns to zero if no new errors occur.</p> <p>This object derives the value for the Bus Health Index from periodically reading the Header CRC Errors, Data CRC Errors, Framing Errors, and Lost Token attribute values to create a moving average of total errors. The Weighted Bus Health Constant attribute determines the responsiveness of the Bus Health Index.</p>

Table 124: SA Bus Integration Attributes - Diagnostic Tab

Attribute Name	Description
Bus Performance Index	<p>Indicates the responsiveness of the bus supervisor device on the MS/TP field bus. The most desirable value is 1. Values from 2.5 to 6 are marginal and updates to devices on the bus may be slow. If the value is greater than 6, the performance is poor and may indicate offline conditions.</p> <p>The device derives the value for the Bus Performance Index by comparing the measured token loop time at the network engine and the predicted token loop time calculated when the MS/TP Field Bus Integration object is first created or when the network engine device count changes. This object uses the difference as input for determining the weighted moving average of the token loop time. The Weighted Bus Performance Constant attribute determines the responsiveness of the Bus Performance Index.</p>
Bytes In	Indicates the number of data bytes received by this device. This number includes all messages from all devices.
Bytes Out	Indicates the number of data bytes sent by this device. This number includes all messages to all devices.
Data CRC Errors	<p>Counts errors detected in the data portion of data frames sent to the device. Many data frames are used only for protocol control and do not contain a data portion, and thus cannot have Data CRC Errors. The Header CRC Errors check must be successful before the device attempts a Data CRC check. This attribute supplies an error count for the Bus Health Index attribute.</p>
Data Expecting Reply Frames Rxed	Displays the number of data frames received by the device that require an immediate reply. This value includes proprietary frames that have been received and are expecting a reply.
Data Expecting Reply Frames Txed	<p>Displays the number of data frames sent by the device that requires an immediate reply from the destination device.</p> <p>This value includes proprietary frames that have been sent and are expecting a reply.</p>
Data Not Expecting Reply Frames Rxed	Displays the number of data frames received by this item that do not require an immediate reply. This value includes proprietary frames that have been received and are not expecting a reply.
Data Not Expecting Reply Frames Txed	Displays the number of data frames sent by the device that do not require an immediate reply. This value includes proprietary frames that have been sent and received a reply.
Duplicate Device Identifiers	<p>Lists any duplicate object identifiers found after an auto-discovery of MS/TP BACnet devices finishes. If any devices are listed, then the list of automatically discovered devices may be incomplete. The list contains the instance number of the Object Identifier and the network address (represented in hex notation) of each device with the same identifier instance number as another device on the same bus. MS/TP devices with duplicate device identifiers may be integrated without problem, but should be physically located and their object identifiers changed to make them unique network-wide.</p>

Table 124: SA Bus Integration Attributes - Diagnostic Tab

Attribute Name	Description
Execution Time	Records the amount of time taken for the last periodic update of all referenced mapped BACnet objects. The value for this attribute can be used to tune the Periodic Update attribute. If the Execution Time is greater than the Periodic Update, attribute values of referenced BACnet objects are constantly being updated over the network. This attribute applies only to non-FEC series devices. See the Poll Delay attribute description for information on how these attributes interact.
Framing Errors	Counts the number of errors detected in the individual data bytes received by the device. A framing error occurs when the device receives a stop bit in the wrong state. This attribute supplies an error count for the Bus Health Index attribute. Framing errors are usually caused by electrical noise on the bus, message collisions, incorrect baud rate settings, bus wiring or termination errors, or devices that are not operating within the BACnet specified timing. Framing errors generally cause CRC errors since the frame has been corrupted.
Header CRC Errors	Counts the number of errors detected in the header portion of frames received by the device. Many frames are only used for protocol control and only contain a header portion. This attribute supplies an error count for the Bus Health Index attribute.
Internal Errors	Indicates the number of internal MS/TP driver operation errors resulting from an incorrect state, insufficient memory, errors from the serial port driver, incorrect internal state transitions, and other error states.
Logging Object Reference	Indicates the object (by way of the BACnet Object Identifier) that acquires, presents, and stores the Logging Record data (that is, snapshot) from the underlying system. When the object specified in the Logging Object Reference field issues the Get Monitor Data command, the Logging Record is acquired and updated.
Lost Token	Indicates the number of times the device detects a lost token. A lost token indicates that the bus encountered a serious network disruption. Serious disruption may occur when the bus first starts up or when wiring changes are made. This attribute supplies an error count for the Bus Health Index attribute.
Max Output Queue Used	Displays the largest number of outgoing frames the device has held in a queue for transmission. The largest possible value for this attribute depends on the capabilities of the engine. Generally, the maximum value is reached during device startup, but is not reached during normal operation.
Maximum Token Loop Time	Indicates the maximum time in milliseconds last seen at the device for the token to complete one circuit of the MS/TP field bus (go from the originating bus supervisor device through several other devices and return to the original bus supervisor device). The value is reset when the statistics are cleared. Maximum loop time is closely associated with the worst-case performance encountered since the last time the value was reset.

Table 124: SA Bus Integration Attributes - Diagnostic Tab

Attribute Name	Description
Overrun Errors	Displays the number of times the MS/TP port hardware loses received data because the device is too slow in reading the data. An overrun error occurs when the hardware receives a byte before it moves the prior byte to a buffer.
Packets Timed Out	Counts the number of data frames expected by the device that did not arrive within the time allowed.
Packets Too Long	Counts any attempts to transmit or receive a data frame that is longer than allowed by the device or by MS/TP.
PFM Frames Rxed	Displays the number of Poll For Master (PFM) frames received by the device. On a clean network, this should only count the first PFM frame received when the device (or another with a MAC address below that of the device) comes online. These frames are used to discover other devices on the network and should be seldom received.
PFM Frames Txed	Displays the number of PFM frames sent by the device. In normal operation on a clean network, only the bus supervisor (MAC address 0) and the highest numbered master device on the network should be sending PFM frames. These frames are used to discover other devices on the network.
Polled Object Count	Indicates the number of mapped BACnet objects that are currently polled on a periodic basis. This attribute applies only to non-FEC series devices.
Port Status	Indicates the state of the port (Active or Inactive).
Predicted Token Loop	Indicates the theoretical time in milliseconds needed for the token to complete one circuit of the MS/TP field bus. The object derives this value from the defined bus baud rate, number of devices on the bus, and an estimate of the type and amount of messages transmitted on the bus during this time. This object compares the value of this attribute with that of the Token Loop Time attribute to help calculate the value of the Bus Performance Index attribute.
Reply Postponed Frames Rxed	Counts the number of data frames sent to the device that require an immediate reply of which the destination device requests additional time to prepare the reply (hence, a postponement). This delay may occur if the reply involves a large amount of data or the device is overloaded.
Reply Postponed Frames Txed	Counts the number of data frames received at the device that requires an immediate reply of which the device requests additional time to prepare the reply (hence, a postponement). This delay may occur if the reply involves a large amount of data or the device is overloaded.
Reply to PFM Frames Rxed	Counts the number of Reply to PFM frames the device receives. On a clean network in normal operation, the device receives only one Reply to PFM frame when either the device comes online or the next higher numbered device comes online during normal operation. These frames announce the presence of this device on the network.

Table 124: SA Bus Integration Attributes - Diagnostic Tab

Attribute Name	Description
Reply to PFM Frames Txed	Counts the number of Reply to PFM frames the device transmits. On a clean network during normal operation, only one Reply to PFM frame needs to be sent when the device first comes online. These frames are used to announce the presence of other devices on the network.
Reply Too Slow Application Errors	Counts the number of data frames received at this device that requires an immediate reply where the device cannot assemble reply data within the time allowed and cannot internally detect the need for additional time. If these errors occur frequently, the device could be overloaded.
Reply Too Slow Datalink Errors	Counts the number of data packets sent by the device that requires an immediate reply from the destination device, but do not receive any reply within the time allowed. This number does not include Reply Postponed responses. The affected frames likely require a retry. Bus performance is reduced when this happens.
Reset Date	Specifies the date of the last Clear Statistics command (when the statistics for the device were last reset).
Reset Time	Specifies the time of the last Clear Statistics command (when the statistics for the device were last reset).
Retries	Displays the number of times the device tried to pass a token as the next node did not start using it within the time allowed by BACnet protocol.
Test Request Frames Rxed	Displays the number of Test Request Frames the device receives. Test Request Frames are a normal part of bus analysis, but should not be received during normal operation. A Test Response Frame should be sent in reply to each Test Request Frame received.
Test Request Frames Txed	Displays the number of Test Request Frames the device transmits. Test Request Frames are a normal part of bus analysis, but should not be sent during normal operation. A Test Response Frame should be received in response to each test Request Frame sent to an online device. Test Request Frames may also be sent to offline devices where no response is received.
Test Response Frames Rxed	Displays the number of Test Response Frames the device receives. Test Response Frames are a normal part of bus analysis, but should not be received during normal operation. A Test Response Frame should be received in response to each test Request Frame sent to an online device.
Test Response Frames Txed	Displays the number of Test Response Frames transmitted by this MS/TP port. Test Response Frames are a normal part of bus analysis, but should not be sent during normal operation. A Test Response Frame should be sent in response to each test Request Frame received.

Table 124: SA Bus Integration Attributes - Diagnostic Tab

Attribute Name	Description
Token Frames Rxed	Displays the number of Token Frames the device receives. In MS/TP, each master device passes a logical token to the next device during normal operation. Only the master device currently holding the token is allowed to initiate a message; thus, the number of Token Frames sent or received should be large. Normally the number of Token Frames received should be almost the same as the number of Token Frames transmitted.
Token Frames Txed	Displays the number of Token Frames the device transmits. In MS/TP, each master device passes a logical token to the next device during normal operation. Only the master device currently holding the token is allowed to initiate a message, thus the number of Token Frames sent or received should be large. Normally the number of Token Frames received should be almost the same as the number of Token Frames transmitted.
Token Loop Time	Indicates how much time passes between the periods when the device allows initiation of messages on the network. This time is a strong indicator of network performance and is associated strongly with the amount of traffic or errors on the network. Shorter time period indicate a more responsive network. Longer time period indicate an increasingly busy and slow network. The object compares the value of this attribute with that of the Predicted Token Loop Time attribute to help calculate the value of the Bus Performance Index attribute.
Unexpect Frames Rxed	Displays the number of data frames of an illegal type that the device receives. During normal operation, only certain kinds of MS/TP data frames are allowed to be sent during each phase of operation. If the device receives some other kind of data frame (other than the allowed types for the current phase of operation), the device counts the data frame as an Unexpected Frame. The device may often detect Unexpected Frames when connecting running devices to a live MS/TP bus.
Weighted Bus Health Constant	Determines the responsiveness of the Bus Health Index. The default value is 0.50.
Weighted Bus Performance Constant	Determines the responsiveness of the Bus Performance Index. The default value is 0.50.

Table 125: SA Bus Integration Attributes - Hardware Tab

Attribute Name	Initial Value	Values/Options/Range
APDU Retries	3	Indicates the maximum number of times the device can retransmit a data frame. This attribute is fixed at 3.
APDU Segment Timeout	4000	Indicates the amount of time in milliseconds between retransmissions of a data frame segment requiring acknowledgment for which no acknowledgment has been received. This attribute is fixed at 4000 ms.

Table 125: SA Bus Integration Attributes - Hardware Tab

Attribute Name	Initial Value	Values/Options/Range
APDU Timeout	6000	Indicates the amount of time in milliseconds between retransmissions of a complete data frame requiring acknowledgment for which no acknowledgment has been received. This attribute is fixed at 6000 ms.
Baud Rate Selection	38400	Indicates the baud rate of the network engine SA Bus. This attribute is fixed at 38400 baud.
Configured Network Number	65000	Contains the network number of the SA bus used for BACnet message addressing. A value of 0 indicates a local network (the device is not intended as a router).
JCI MAC Address	0	Contains the unique hardware number that identifies the SA Bus within a network.
Max APDU Length	1476	Indicates the maximum number of bytes that may be contained in a single, indivisible application layer protocol data unit.
Max Master	127	Specifies the highest possible address for devices on this network and is less than or equal to 127 (default). This attribute is present if the device is a bus supervisor device on an MS/TP network. Typically this address is kept at 127 to allow other devices on the bus to use any of the lower valid addresses.

SA Bus Integration Commands

The following table lists the commands supported by the [SA Bus Integration Object](#).

Table 126: SA Bus Integration Commands

Command Name	Parameters	Description
Activate Provisioning	None	Requests the SNC to provision the new firmware that is pending in its memory. This process activates the firmware. You can monitor the status of this action under the Progress column of the Provisioning tab.
Clear Statistics	None	Clears the statistics for the integrated SA Bus.
Latch Statistics	None	Updates the displayed SA Bus statistics with the current values.
Refresh Provisioning Discovery	None	Refreshes the SA Bus Provisioning view on the SA Bus of the SNC. Send this command if an SA Bus device that is connected to the SNC is not showing up in the SA Bus Provisioning view. The command takes several minutes as the SNC searches for devices over its SA Bus. Found devices are added to the Provisioning view. For example, use this command to locate an IOM that is stuck in a boot-code-only mode because of some type of failed provisioning cycle. For most cases, the Refresh Provisioning Discovery command is rarely needed.

LON Integration Object

The LON Integration object defines LonWorks network integration for the NAE. The object contains pertinent attributes and holds a list of LonWorks network-related configuration resource files.

Note: The LON trunk integration is **not** available for network engines updated to Release 9.0.7.

LON Integration Attributes

This object contains attributes common to many Metasys system objects. These common attributes are described in the [Common Object Attributes](#) section. This section includes attributes of the Focus/Configuration tab, the Diagnostics tab (if applicable), and any other tab specific only to this object. See the [Object and Feature Tabs](#) section for information on the attributes that appear on the other tabs of this object (for example, the Hardware and Options tab appear on point objects).

Table 127: LON Integration Attributes - Diagnostic Tab

Attribute Name	Data Type	Description
Bind Retry Count	Number	Indicates the number of objects for which the Lon Integration code is still verifying with the field controller that it has the correct type information.
Count	Number	Displays the number of LonWorks network point object defined for the trunk.
Device Offline Polling Cycle Time	Number	Indicates how often all offline devices are polled.
Device Online Polling Cycle Time	Number	Indicates how often all online devices are polled.
Error Log	One value from a set	Shows the error log according to the last standard LonWorks network Query Status message.
LON Integration DLL Date	Date	Displays the current date stamp on the LonIntegration.DLL.
LON Integration DLL Size	Number	Displays the current size of the LonIntegration.DLL.
LON Integration DLL Time	Time	Displays the current time stamp on the LonIntegration.DLL.
Lost Messages	Number	Shows the number messages lost according to the last standard LonWorks network Query Status message.
Missed Messages	Number	Shows the number messages missed according to the last standard LonWorks network Query Status message.
Neuron Model	One state from a set	Shows the Neuron model according to the last standard LonWorks network Query Status message.
Node State	One state from a set	Shows the state of the node according to the last standard LonWorks network Query Status message.
Offline	True or False	Displays the offline or online status of connected hardware. The LonWorks network server updates this attribute value.
Permanent Status Item Count	Number	Displays the number of items polled as a result of COV signups.
Point Scan Time	Number	Displays the calculated number of seconds the server takes to read all defined points.
Priority 1 Poll Item	Number	Displays the number of items in the Priority 1 list.

Table 127: LON Integration Attributes - Diagnostic Tab

Attribute Name	Data Type	Description
Priority 2 Poll Item	Number	Displays the number of items in the Priority 2 list.
Priority 3 Poll Item	Number	Displays the number of items in the Priority 3 list.
Priority 1 Poll Time	Number	Indicates how often the items in the Priority 1 list are polled.
Priority 2 Poll Time	Number	Indicates how often the items in the Priority 2 list are polled.
Priority 3 Poll Time	Number	Indicates how often the items in the Priority 3 list are polled.
Receive Transaction Full	Number	Shows the number of times the transaction full message appeared in the last standard LonWorks network Query Status message.
Reset Cause	One cause from a set	Shows the cause of the last reset according to the last standard LonWorks network Query Status message.
Reset Date	Date	Contains the date stamp of the last local Neuron statistics reset command.
Reset Time	Time	Contains the time stamp of the last local Neuron statistics reset command.
Status Cache Hits	Number	Displays the number of READATTRIBUTE calls that occurred while the object was already being polled.
Status Cache Misses	Number	Displays the number of READATTRIBUTE calls that occurred while the object was not being polled.
Temporary Status Item Count	Number	Displays the number of items polled as a result of READATTRIBUTE calls.
Transaction Timeouts	Number	Shows the timeouts that appeared in the last standard LonWorks network Query Status message.
Transmit Errors	Number	Shows the number of transmit errors that appeared in the last standard LonWorks network Query Status message.
Transmits Per Minute	Number	Displays the calculated number of transmissions per minute.
Version Number	Number	Shows the version number according to the last standard LonWorks network Query Status message.
XIF Present	True or False	Indicates whether the XIF is present. The XIF is a resource file required for the NAE to understand a particular device type. This attribute is not used in the SCT.

LON Integration Commands

The following table lists the commands supported by the [LON Integration Object](#).

Table 128: LON Integration Object Commands

Command Name	Parameters	Description
Clear Statistics	None	Resets the statistics for the integrated LonWorks network. The contents of the Query Status message reflect these statistics: <ul style="list-style-type: none"> • Transmit Errors • Transaction Timeouts • Receive Transaction Full • Lost Messages • Missed Messages • Reset Cause • Node State • Version Number • Error Log • Neuron Model
Disable	None	Disables the entire LonWorks network integration. No requests are made to the field trunk and no data broadcasts to the network are processed.
Enable	None	Allows the integration to function normally.
Latch Statistics	None	Updates the displayed statistics with the current values. The following attributes reflect the statistics: <ul style="list-style-type: none"> • Transmit Errors • Transaction Timeouts • Receive Transaction Full • Lost Messages • Missed Messages • Reset Cause • Node State • Version Number • Error Log • Neuron Model

N1 Migration Object

Note: This object is for use with the N1Ex5 only. For more information on N1 migration, see the [Related Documentation](#) table in the [Welcome](#) section.

The N1 Migration object contains all the necessary information to communicate with points on an existing Metasys network. Add the new Metasys system hosting the migration server to the existing Metasys network as an OWS at a fixed IP Address. All existing Metasys networks are defined as N1 Migration objects in the host NIE. Many of the existing point objects are defined as mapped devices to the NIE.

Note: The N1 Migration object is **not** available for network engines updated to Release 9.0.7 or later.

N1 Migration Concepts

Migration Overview

When you add a new Metasys system N1 Migration object, the N1 migration component establishes communication with the N1 network. The N1 Migration object is only an object on the new Metasys system controller to which it was added.

After the N1 Migration object establishes communication with the existing Metasys system, the N1 Migration object creates 2 new calendars that are a portal to the existing NCM calendar. (See [Today's Schedule](#) in the [Scheduling](#) section.) One calendar is a list of alternates, and one calendar is a list of holidays.

Note: An Ethernet connection is the only method for the NIE to connect to the N1 network. ARCnet jobs must use an Ethernet router.

See the [N1 Migration Attributes](#) section for more information on N1 migration attributes.

Mapped Points

Existing features of the Metasys system are supported by moving their functionality to the host NIE. These features are: trend, totalization, point history, and scheduling. When possible, existing objects maintain their configuration parameters in the new Metasys system. For example, alarm limits, alarm state, and units. The table below lists points specific to the Metasys system.

Table 129: Mapped Points

Existing Metasys System Object	New Metasys System Mapped Object
Accumulator Object	N1 Pulse Counter Object
Analog Input	Analog Input Object
Analog Output	Analog Output Object
Analog Data	Analog Output Object
Binary Input	Binary Input Object
Binary Output	Binary Output Object
Binary Data	Binary Output Object
Control System	Generic Integration Object (GIO)
Multistate Input	Multistate Input Object
Multistate Output	Multistate Output Object
Multistate Data	Multistate Output Object

Multiple NIEs

Migration can be split across multiple NIEs with the following constraints:

- Only one N1 Migration object can exist per NIE per N1 network.
- Multiple NIEs can reference the same N1 network.
- Only one NCM object can exist per NCM per N1 Migration object.
- Multiple NCM objects can reference the same NCM as long as they exist on different NIEs.
- Only one point object can exist per NIE per N1 object.
- Multiple point objects can reference the same N1 object as long as they exist on different NIEs.

N1 Migration Attributes

This object contains attributes common to many Metasys system objects. These common attributes are described in the [Common Object Attributes](#) section. This section includes attributes of the Focus/Configuration tab, the Diagnostics tab (if applicable), and any other tab specific only to this object. See the [Object and Feature Tabs](#) section for information on the attributes that appear on the other tabs of this object (for example, the Hardware and Options tab appear on point objects).

Note: In the Notes column, attributes that are marked with a letter C are configurable and attributes marked with the letter W are writable.

Table 130: N1 Migration Object Attributes - Focus/Configuration Tab

Attribute Name	Notes	Description
Broadcast Address	C,W	Edits the address to use directed broadcasts. The user typically does not edit this attribute.
Connected Status		Displays if the NIE communicated with the Metasys N1 network for the object mapping service and UI service. This attribute drives the status of the object.
Device Name	C,W	Displays the defined case-insensitive device name. The device name is required for the existing Metasys system to detect the On-Line status and Off-Line status of the NIE. This attribute must match the name of the NIE in the existing N1 network.
Discovery IP Address	C,W	Displays the defined NCM IP address of the existing Metasys system. Use for self discovery of the existing Metasys system. You need at least 1 NCM in the existing N1 network that the NIE can talk to, to find the other N1 devices and get N1 points.
Discovery Gate Address	C,W	Displays the defined NCM Gate address on the existing Metasys system. Use for self discovery of the existing Metasys system. You need at least 1 NCM in the existing N1 network that the NIE can talk to, to find the other N1 devices and get N1 points.
Discovery Node Number	C,W	Displays the defined NCM Node address on the existing Metasys system. Use for self discovery of the existing Metasys system. You need at least 1 NCM in the existing N1 network that the NIE can talk to, to find the other N1 devices and get N1 points.
Duty-Standby	C,W	Displays whether the existing Metasys system is a Duty/Standby network. The NIE has to know if the existing N1 network is a Duty/Standby.
Enable Polling	C,W	When True, this attribute causes the integration in the NIE to place any system into a 20 second fast polling table being viewed. This attribute also places a system into this table on an object's Focus view. This provides faster updates to objects being viewed in any Metasys system UI. When viewing points from several systems, the Service Time for the NCM increases. Take care when enabling this fast polling feature as it may affect the service times. Note: To prevent delays in event reporting due to the fast scan operation, follow the existing report routing guidelines. Note: Do not set this attribute to True when for NIEs used with validated environments (that is, when Trend data must be collected within 2 minutes).
Gate Number	C,W	Displays how the NIE is defined in the existing N1 network. This attribute is read from the NCM.

Table 130: N1 Migration Object Attributes - Focus/Configuration Tab

Attribute Name	Notes	Description
Message Timeout	C,W	Displays the reply timeout in seconds. The reply timeout is how long the NIE waits for a reply from an NCM. The user typically does not edit this attribute.
Migrate Object Configuration	C,W	When True, this attribute displays the basic object configuration from the existing Metasys system object used to write basic configurations for newer Metasys objects. For example, units or descriptor. This attribute (when True) tells the new Metasys system to bring alarm setup information from the existing N1 network and creates Alarm Extensions (Analog Alarm and Multistate Alarm) for new objects that are added.
Migrate Schedules	C,W	Displays the attached existing Metasys system schedules used to create the newer Metasys system Schedule. The schedules that appear in the new Metasys systems are portals to the schedules in the existing N1 network. Schedules appear in the new format and offer the same functionality. Changes made to the schedules in the new Metasys system are also made to the N1 schedules in the NCM.
Migrate Totalization Configuration	C,W	Displays the totalization configuration from the existing Metasys system object used to create the newer Metasys system Totalization Extensions when an existing object is mapped to a newer object.
Migrate Trend Configuration	C,W	Displays the trend configuration from the existing Metasys system object used to create the newer Metasys system Trend Extension when an existing object is mapped to a newer object. This attribute creates one or more trend extensions for existing N1 network trends.
Network Name	C	Displays the defined network name. ① Note: Be sure to configure the Network Name attribute of the N1 Migration. Once you insert the N1 Migration, you cannot edit the Network Name attribute. The workaround is to delete the existing N1 Migration and insert a new N1 Migration ensuring you enter the desired Network Name before completing the Insert Integration wizard.
Note Number	C,W	Displays how the NIE is defined in the existing N1 network.
Poll Delay	C,W	Displays the polling time for non-triggerable attributes in milliseconds. The poll delay is the time between NIE polls to the N1 network points.
Retry Counter Limit	C,W	Contains the number of retry attempts made. The NIE waits for the Message Timeout, then retries sending messages the number of times defined in this attribute.
Retry Wait Timer	C,W	Contains the time between communication retries (in seconds). This attribute is the time the NIE waits for a low-level Ack from the NCM. The user typically does not edit this attribute.
Synchronize Time	C,W	Displays whether the NIE is the master time keeper for the existing N1 network system. Time updates are sent to the existing system once daily and when the time changes.
UDP Port	C,W	Displays the UDP Port as defined in the existing Metasys system.

N2 Master Datalink Object (N2 Trunk)

The N2 Master Datalink object creates the communication link between the N2 controllers and the supervisory controller. The N2 Master Datalink object is the root for all N2 objects in the Metasys

system. When you add an N2 Trunk to an engine, you establish communication with the specific N2 controller network. The N2 Master Datalink object offers diagnostic data related to the N2 controller network. This object allows you to see N2 Bus communication statistics.

Note: The Object Type for this object is labelled **N2 Trunk** in the software.

N2 Master Datalink (N2 Trunk) Attributes

This object contains attributes common to many Metasys system objects. These common attributes are described in the [Common Object Attributes](#) section. This section includes attributes of the Focus/Configuration tab, the Diagnostics tab (if applicable), and any other tab specific only to this object. See the [Object and Feature Tabs](#) section for information on the attributes that appear on the other tabs of this object (for example, the Hardware and Options tab appear on point objects). The writable attributes in the N2 Master Datalink object are writable only if the UDP Port attribute is not zero. If the UDP Port attribute is zero and you attempt to write these attributes, an error message appears.

Table 131: N2 Master Datalink Object Attributes - Diagnostic Tab

Attribute Name	Values/Options/Range	Description
Buffer Overflow		Indicates the number of input buffer overflows.
Checksum Errors	0 to 4,294,967,295	Indicates the number of checksum errors.
Command Count		Indicates the number of N2 user or process commands.
Count	0 to 65,535	Specifies the number of N2 point objects defined for this trunk.
COV-COS Count	0 to 4,294,967,295	Indicates the number of Changes of Value/Changes-of-State since the last reset.
Data CRC Errors		Indicates the number of System 9100 checksum errors.
Framing Errors		Indicates the number of UART framing errors.
Hardware Overflows		Indicates the number of UART hardware overruns.
HP Point Scan Time	0 to 65,535 Seconds	Indicates the calculated number of seconds the N2 master takes to scan high priority N2 point objects, such as those used in alarming and interlocks.
LP Point Scan Time	0 to 65,535 Seconds	Indicates the calculated number of seconds the N2 master takes to scan low priority N2 point objects (all N2 point objects that do not fall in the high priority category).
Message Receives	0 to 4,294,967,295	Indicates the number of messages received from the N2 controllers.
Message Transmits	0 to 4,294,967,295	Indicates the number of message transmissions to the N2 controllers.
NAK Errors	0 to 4,294,967,295	Indicates the number of negative acknowledge errors. A NAK is returned by an N2 device to indicate that it received and decoded a command correctly, but the command did not make sense or could not be carried out. An example of a NAK is an attempt to read an Analog Input beyond the range of the device.

Table 131: N2 Master Datalink Object Attributes - Diagnostic Tab

Attribute Name	Values/Options/Range	Description
Offline Occurrences	0 to 4,294,967,295	Indicates the number of offline occurrences by the N2 controllers.
Offline Polls	0 to 4,294,967,295	Indicates the number of offline polls to the N2 devices.
Online Polls	0 to 4,294,967,295	Indicates the number of online polls to the N2 devices.
Parity Errors		Indicates the number of messages that contain invalid hexadecimal characters (hexadecimal characters are 1-9 and A-F).
Poll Scan Times	0 to 65,535 Seconds	Indicates the calculated number of seconds the N2 master takes to poll all defined N2 devices.
Reset Date		Indicates the date of the Clear Statistics command.
Reset Time		Indicates the time of the Clear Statistics command.
Retry Attempts	0 to 4,294,967,295	Indicates the number of message retry attempts.
Transmits Per Minute	65,535	Indicates the calculated number of message transmissions per minute.
VMA BAC Errors	0 to 4,294,967,295	Indicates the number of VMA BACnet errors
VMA COV Errors	0 to 4,294,967,295	Indicates the number of VMA Change-of-Value errors.
VMA FMT Errors	0 to 4,294,967,295	Indicates the number of VMA Format errors.

N2 Master Datalink (N2 Trunk) Commands

The table below lists the commands supported by the [N2 Master Datalink Object \(N2 Trunk\)](#).

Table 132: N2 Master Datalink Object Commands

Command Name	Parameters	Description
Clear Statistics	None	Allows the user to clear the N2 statistics.
Latch Statistics	None	Updates the displayed statistics with the current values.

Generic Integration Object

The GIO is a single software representation of the hardware/internal data points from a device that has been integrated into your Metasys network. One GIO can represent one or more control strategies (for example, temperature control or static pressure control). Up to 256 data points can become attributes of the GIO and each attribute of the GIO works with Metasys features, such as historical data management, alarm and event handling, and basic monitoring and commanding capabilities.

You can map data points to the GIO in either [online](#) or [offline mode](#). When you map the data points, you define their label, units, display precision, category, and whether or not the data point should be commandable. You can command points from the GIO using [Generic Integration Attributes](#) commands.

The GIO is useful when you have multiple hardware/internal data points from an integrated device and it logically makes sense to view them as a single entity rather than individual Metasys objects (that is, AI, BI, AO, BO, and so on). While you may be able to browse to each device, there may only be a few data points you need to see on a regular basis. The GIO lets you group the data points you need to see in one place and organize them in the following categories:

- inputs

- outputs
- parameters

When the GIO appears in Metasys software, the attributes are organized by tabs bearing the names of the three categories (Input Category, Output Category, and Parameter Category tabs). Each tab includes the status, description, and value of the items in that category.

Note: Currently, the GIO supports [N1 Migration Object](#) and [LON Integration Object](#). You can no longer manually add a GIO to a LON trunk; however, the GIO is still supported in existing databases, even after upgrading to the next software release.

For general information on Metasys system objects, see [Common Object Attributes](#).

Generic Integration Concepts

N1 Integration and the GIO

For N1 integration, use the Control System object from your existing Metasys network. Hardware and internal points are already defined in the Control System object so there is one to one mapping between a Control System object and the GIO. N1 point mapping is one to one and the Metasys system restricts which characteristics of the GIO (for example, label, display precision) can be edited once they are added to the system.

LonWorks Network Integration

Note: You can no longer manually add a GIO to a LON trunk; however, the GIO is still supported in existing databases, even after upgrading to the next software release.

In LonWorks network integration, the GIO presents multiple LonWorks network variables (with their individual data elements) and/or NexSys controller points of an integrated LonWorks network controller as a single Metasys object. During the configuration of a GIO for an integrated LonWorks network controller, the user is presented with the internal network variables and NexSys controller points in a tree structure which then allows the user to add these data points as attributes of the GIO object. The characteristics of the GIO attributes (label, units, display precision, field units, category) and the commandability of the GIO attributes can be edited.

Generic Integration Attributes

This object contains attributes common to many Metasys system objects. These common attributes are described in the [Common Object Attributes](#) section.

Note: In the Notes column, attributes that are marked with a letter C are configurable, attributes marked with the letter W are writable, attributes marked with the letter D are default display attributes, and attributes marked with the letter N indicate values not required.

Table 133: Generic Integration Object (GIO) Attributes

Attribute Name	Notes	Description
Display Reference	N	Represents the label of the Display Attribute. The Display Reference is not stored in the object, but read when requested.
Offline	W	Indicates whether the Present Value is offline.
Overridden	W	Indicates whether the Present Value is in override.
Present Value	DW	Indicates the current value of the object in the defined units.
Reliability	W	Indicates whether the Present Value is unreliable.
Target Reference		Identifies the source that provides the data elements linked to the individual attributes of the GIO.

Table 133: Generic Integration Object (GIO) Attributes

Attribute Name	Notes	Description																		
Attribute Info	C,W	<p>Contains a list of structures that store data about each attribute defined within a GIO. The elements listed in this table appear as columns on the Hardware tab of the Configure screen of the Insert Point Wizard - GIO.</p> <p>Table 134: Hardware Tab Configuration Columns</p> <table border="1"> <thead> <tr> <th>Element Name</th> <th>Description</th> </tr> </thead> <tbody> <tr> <td>Adjust Allowed</td> <td>Indicates whether or not this attribute supports the Adjust command.</td> </tr> <tr> <td>Category</td> <td>Specifies the attribute category (input, output, or parameter). 0 - Input, 1 - Output, 2 - Parameter</td> </tr> <tr> <td>Display Precision</td> <td>Specifies the display precision for an attribute with a real value (floating point).</td> </tr> <tr> <td>Element Ref</td> <td>Specifies the element within the target reference associated with this attribute to provide it data for value/status/reliability.</td> </tr> <tr> <td>Field Units</td> <td>Represents the units that can be used for the attribute. Uses Unit Set (Set 869)</td> </tr> <tr> <td>Label</td> <td>Contains the user label for the attribute name. This is the name used whenever you view the attribute in Metasys software.</td> </tr> <tr> <td>Override Allowed</td> <td>Indicates whether or not this attribute supports the Override command.</td> </tr> <tr> <td>Units or Enum Set</td> <td>Specifies the units for an attribute that is a real value (floating point). If an attribute is one value from a set, this attribute sets the states text from the sets listed in the Alphabetical Set List. Use Unit Set (Set 869) to set the units of a real value.</td> </tr> </tbody> </table>	Element Name	Description	Adjust Allowed	Indicates whether or not this attribute supports the Adjust command.	Category	Specifies the attribute category (input, output, or parameter). 0 - Input, 1 - Output, 2 - Parameter	Display Precision	Specifies the display precision for an attribute with a real value (floating point).	Element Ref	Specifies the element within the target reference associated with this attribute to provide it data for value/status/reliability.	Field Units	Represents the units that can be used for the attribute. Uses Unit Set (Set 869)	Label	Contains the user label for the attribute name. This is the name used whenever you view the attribute in Metasys software.	Override Allowed	Indicates whether or not this attribute supports the Override command.	Units or Enum Set	Specifies the units for an attribute that is a real value (floating point). If an attribute is one value from a set, this attribute sets the states text from the sets listed in the Alphabetical Set List. Use Unit Set (Set 869) to set the units of a real value.
Element Name	Description																			
Adjust Allowed	Indicates whether or not this attribute supports the Adjust command.																			
Category	Specifies the attribute category (input, output, or parameter). 0 - Input, 1 - Output, 2 - Parameter																			
Display Precision	Specifies the display precision for an attribute with a real value (floating point).																			
Element Ref	Specifies the element within the target reference associated with this attribute to provide it data for value/status/reliability.																			
Field Units	Represents the units that can be used for the attribute. Uses Unit Set (Set 869)																			
Label	Contains the user label for the attribute name. This is the name used whenever you view the attribute in Metasys software.																			
Override Allowed	Indicates whether or not this attribute supports the Override command.																			
Units or Enum Set	Specifies the units for an attribute that is a real value (floating point). If an attribute is one value from a set, this attribute sets the states text from the sets listed in the Alphabetical Set List. Use Unit Set (Set 869) to set the units of a real value.																			
Display Attribute	C	Specifies the attribute that represents the value of the GIO. The value of this attribute is used as the Present Value of the GIO. For example, for a GIO representing a temperature control strategy, you might choose the attribute representing room temperature to be the Display attribute. Then, the room temperature appears as the GIO Present Value.																		

Table 133: Generic Integration Object (GIO) Attributes

Attribute Name	Notes	Description
Remote Object Name	C,W	Contains the name of the object in the format of system.object.
GIO 1 Attr. . .GIO 256 Attr	W	Represents user-definable attributes that can be part of a GIO. Each attribute represents a potential entry in the Attribute Info attribute which in turn represents a physical or logical piece of data within an integrated device. These attributes only appear on the Hardware tab of the Configure screen of the Insert Point Wizard - GIO.

Generic Integration Commands

The table below shows the command supported by the [Generic Integration Object](#).

Table 135: GIO Commands

Command Name	Parameters	Description
Attribute Command	None	Allows you to select one of the user-definable attributes of the GIO. When you select an attribute and click the ellipses button, the Attribute Commands available for that attribute appear. This allows you to command individual attributes represented by the GIO.

GIO Command Details

Attribute Commands

Attribute commands are commands you can issue from the GIO to individual attributes of the GIO. To access the attribute commands, do one of the following:

- In the navigation tree, right click on the GIO object and select Commands then select an attribute for the GIO Attribute Command, and click the ellipsis button.
- In a category view for the GIO (in the [display frame](#)), right-click on the attribute you want to command, and select Commands.

The attribute commands that appear are based on the data type of the attribute and whether Override Allowed and Adjust Allowed are True or False. See Table 133 for more information about these elements.

Table 136: Attribute Commands

Command	Notes
Adjust ¹	Real values only (floating points)
Operator Override ²	
Release Operator Override	
Change Units	All values but True/False
Change Name	
Change Display Precision	Real values only (floating points)
State0...StateN	Two state or multistate values

Table 136: Attribute Commands

Command	Notes
True	True/False only
False	True/False only

- 1 Adjust Allowed must be True.
- 2 Override Allowed must be True.

VND Integration Object

The VND (Vendor) Integration object defines a vendor integration for the NAE.

VND Integration Attributes

This object contains attributes common to many Metasys system objects. These common attributes are described in the [Common Object Attributes](#) section. This section includes attributes of the Focus/Configuration tab, the Diagnostics tab (if applicable), and any other tab specific only to this object. See the [Object and Feature Tabs](#) section for information on the attributes that appear on the other tabs of this object (for example, the Hardware and Options tab appear on point objects).

- Note:** In the Notes column, attributes that are marked with a letter C are configurable and attributes marked with the letter W are writable.

Table 137: VND Integration Attributes - Focus/Configuration Tab

Attribute Name	Notes	Initial Value	Description
Enabled	C,W	True	If True, allows the use of the vendor integration. If False, prevents the use of the vendor integration.
Offline		True	Displays the offline or online status of connected hardware.

Table 138: VND Integration Attributes - Diagnostic Tab

Attribute Name	Notes	Initial Value	Description
Count	W	0	Displays the number of vendor device and point objects defined for the trunk. This count does not include extensions.
Errors In	W	0	Indicates the number of field communication errors (bad format, for example) received. The Clear Statistics command resets this value.
Errors Out	W	0	Indicates the number of field communication attempts that failed. The Clear Statistics command resets this value.
Function Time Exceeded		0	Indicates the number of functions to the Vendor DLL that took longer than 100 milliseconds to execute. The Clear Statistics command resets this value.
Message Receives		0	Indicates the number of messages received field devices. This value resets to zero at midnight. The Latch Statistics command updates this value.
Message Transmits		0	Indicates the number of messages sent to field devices. This value resets to zero at midnight. The Latch Statistics command updates this value.

Table 138: VND Integration Attributes - Diagnostic Tab

Attribute Name	Notes	Initial Value	Description
Permanent Status Item Count		0	Displays the number of items polled as a result of COV signups.
Priority 1 Poll Time		0	Indicates how often the items in the Priority 1 list are polled. Units = Seconds
Reset Date			Contains the date stamp of the last Clear Statistics command.
Reset Time			Contains the time stamp of the last Clear Statistics command.
Temporary Status Item Count		0	Displays the number of items polled.
Transmits In		0	Indicates the rate of transmissions received by the integration.
Transmits Out		0	Indicates the rate of transmissions sent by the integration.

VND Integration Commands

The table below lists the commands supported by the [VND Integration Object](#).

Table 139: VND Integration Object Commands

Command Name	Description
Clear Statistics	Resets the statistics for the integrated vendor network.
Disable	Disables the entire vendor network integration. No requests are made to the field trunk and no data broadcasts to the network are processed.
Enable	Allows the integration to function normally.
Latch Statistics	Updates the displayed statistics with the current values.

Wireless Receiver Supervisor Object

The Wireless Receiver Supervisor object is the root of the Wireless Sensor integration. The Wireless Sensor integration allows the NAE to communicate with the wireless sensing system over the Ethernet network. The Wireless sensing system consists of wireless receivers and wireless sensors.

Each integrated wireless field device ([Wireless Receiver Object](#)) and field point object ([Wireless Sensor Object](#)) appears under the Wireless Receiver Supervisor object in the [Navigation Tree](#). Only one Wireless Receiver Supervisor object can be configured in each NAE or NIE9.

Note: The Wireless Receiver Supervisor object is **not** available for network engines updated to Release 9.0.7 and later.

Wireless Receiver Supervisor Attributes

This object contains attributes common to many Metasys system objects. These common attributes are described in the [Common Object Attributes](#) section. This section includes attributes of the Focus/Configuration tab, the Diagnostics tab (if applicable), and any other tab specific only to this object. See the [Object and Feature Tabs](#) section for information on the attributes that appear on the other tabs of this object (for example, the Hardware and Options tab appear on point objects).

Note: In the Notes column, attributes that are marked with a letter C are configurable and attributes marked with the letter W are writable.

Table 140: Wireless Receiver Supervisor Object Attributes - Focus/Configuration Tab

Attribute Name	Notes	Description
UDP Port -- Setup	W C	Indicates the UDP Port on the NAE used to communicate to the Ethernet to RS-485 converter. The port must be 1024 or higher, but cannot be equal to the BACnet UDP Port, the N2 Trunk UDP Port, or 9999.
Retries -- Setup	W	Displays the number of times the device tried to pass a token as the next node did not start using it within the time allowed by the protocol.
Poll Delay -- Setup	W	Specifies the time in milliseconds between BACnet object polls for attribute values. The polls start at the time specified in the Periodic Update attribute. As the poll delay increases, the overall time in the Execution Time attribute increases. It is useful to specify a Poll Delay on sites where the rate of reading the remote objects causes too high of a burden on the Metasys network or third-party device. The initial value of the Poll Delay attribute is blank (zero).
Message Timeout -- Setup	W C	Specifies the delay in milliseconds between the last character going out and the first character received. Note: The Message Timeout attribute is writable only if is not zero. If User Datagram Protocol (UDP) Port is zero and you attempt to write Message Timeout, an error message appears.
Low Battery -- Status		Indicates if any wireless sensors defined as children of the Wireless Receiver Objects have a low battery. The Low Battery status is an advanced warning that can occur many days before a wireless sensor ceases to function. You can configure an alarm for this attribute to allow the building operator time to locate the sensor and change the battery.
Alarm State -- Status		The Alarm State attribute indicates that the object transitioned into alarm or unreliable conditions. This attribute does not appear in the SCT UI.

Wireless Receiver Supervisor Commands

The table below lists the commands supported by the [Wireless Receiver Supervisor Object](#).

Command Name	Description
Clear Statistics	Resets all the attributes containing diagnostic statistics for this Wireless Receiver Supervisor and all its Wireless Receiver Objects and Wireless Sensor Objects.

XL5K Integration Object

The XL5K Integration object defines Honeywell Excel 5000 (XL-5000) network integration for the NIEx5. The object contains pertinent communications attributes and statistics. Only one XL5K Integration object can be configured in each NIE.

Note: The XL5K Integration object is **not** available for network engines updated to Release 9.0.7 or later.

XL5K Integration Attributes

This object contains attributes common to many Metasys system objects. These common attributes are described in the [Common Object Attributes](#) section. This section includes attributes of the Focus/Configuration tab, the Diagnostics tab (if applicable), and any other tab specific only to this object. See the [Object and Feature Tabs](#) section for information on the attributes that appear on the other tabs of this object (for example, the Hardware and Options tab appear on point objects).

Note: In the Notes column, attributes that are marked with a letter C are configurable and attributes marked with the letter W are writable.

Table 141: XL5K Integration Attributes - Focus/Configuration Tab

Attribute Name	Notes	Initial Value	Description
Enabled	C,W	True	If True, allows integration between the XL5K system and the Metasys system extended architecture.
Offline		False	Indicates the offline/online state of the connected hardware.

Table 142: XL5K Integration Attributes - Diagnostic Tab

Attribute Name	Data Type	Description
Count	Number	Indicates the number of scannable points for all XL5K Controller objects defined for this object.
Point Scan Time	Number	Indicates the total amount of time to scan for point data.
Reset Date	Date	Indicates the date of the last Clear Statistics command or due to automatic midnight rollover.
Reset Time	Time	Indicates the time of the last Clear Statistics command or 12:00:00 if due to automatic midnight rollover.
Transaction Timeout	Number	Indicates the number of transmissions (packets) since the last Clear Statistics command where no response data was obtained and the transmission was retried.
Transmit Error	Number	Indicates the number of transmissions (packets) since the last Clear Statistics command that have errors (for example, bad data was returned).
Transmits Per Minute	Number	Indicates the calculated number of transmissions per minute.
Transmits Today	Number	Indicates the number of transmissions (packets) since midnight.

XL5K Integration Commands

The table below lists the commands supported by the [XL5K Integration Object](#).

Table 143: XL5K Integration Commands

Command Name	Parameters
Clear Statistics	None
Disable	None
Enable	None
Latch Statistics	None

Field Device

About this task:

Menu Selection: **Insert > Field Device**

Inserts one of the following types of field device objects under the selected integration:

- BACnet Integration
- MS/TP Field Bus Integration

- LonWorks Network Integration (LON Trunk)
- N2 Integration (N2 Trunk)
- VND Controller (Vendor)
- Wireless Supervisor Integration
- XL5K (Excel 5000/XL-5000) Integration

To insert a field device select the menu selection:

1. In the Destination selection, select the parent item for your new item.
2. In the Definition selection:
 - a. Select Assisted Device Definition and click the Invoke Auto Discovery button to discover existing controllers or devices on the network. This is available in the Site Management Portal (SMP) only.
3. In the Identifier selection, enter a unique identifier.
4. In the Configure selection, click any tabs that may appear for further device configuration.
5. Click **Finish** to confirm the field device configuration.

- ① **Note:** In the wizard Auto Detect Utility window, if **Results are from a previous discovery** appears next to the Close button, the displayed results are from the last time a discovery was run. These cached results may not reflect all items currently on the network. To clear the old results and perform a new auto discovery, click **Restart**. Click any column header to sort discovered devices.

See one of the following sections for more information:

- [BACnet IP Integration Object](#)
- [MS/TP Field Bus Integration Object](#)
- [N2 Master Datalink Object \(N2 Trunk\)](#)
- [LON Integration Object](#)
- [N1 Migration Object](#)
- [VND Controller](#)
- [Wireless Receiver Object](#)
- [XL5K Integration Object](#)

BACnet Protocol Engine Object

The BACnet Protocol Engine object maintains diagnostic statistics on communications with the BACnet devices on the network.

BACnet Protocol Engine Attributes

This object contains attributes common to many Metasys system objects. These common attributes are described in the [Common Object Attributes](#) section. This section includes attributes of the Focus/Configuration tab and the Diagnostics tab. See the [Object and Feature Tabs](#) section for information on the attributes that appear on the other tabs of this object (for example, the Hardware and Options tab appear on point objects).

- ① **Note:** In the Notes column, attributes that are marked with a letter C are configurable and attributes marked with the letter W are writable.

Table 144: BACnet Protocol Engine Object Attributes - Focus/Configuration Tab

Attribute Name	Notes	Initial Value	Description
Alarm State		Offline	Indicates that the object transitioned into alarm or unreliable conditions. This attribute appears only in the Snapshot Focus tab.
Enabled	C,W	True	If True, allows integration between the Metasys system and the IP field controller.
Graphic Alias	C,W		Indicates a portion of the graphic's item reference, up to and including the name of the folder containing this object or the controller containing this point.
Item Reference			Contains a unique reference name for the object that is the full path name of the object through the All Items navigation tree using the unique identifier you specified when you manually created the object.
Poll Delay	C,W	120	Specifies the time in milliseconds between BACnet object polls for attribute values. The polls start at the time specified in the Periodic Update attribute. As the Poll Delay increases, the overall time in the Execution Time attribute increases. It is useful to specify a Poll Delay on sites where the rate of reading the remote objects causes too high a burden on the Metasys network or third-party device. Recommended setting: high sensitivity: 20 seconds; medium sensitivity: 60 seconds; low sensitivity: 120 seconds (default).
Version		1.0	Displays the version number of the object software code.

Table 145: BACnet Protocol Engine Attributes - Diagnostic Tab

Attribute Name	Notes	Description
Abort Rcv		Contains the number of abort messages received. Aborts occur in response to a number of situations, such as communication or memory problems.
Abort Tx		Contains the number of abort messages sent.
Ack Rcv		Contains the number of complex acknowledgment messages received.
Ack Tx		Contains the number of complex acknowledgment messages sent.
Allocated Record Count		Indicates the number of state machines that have been allocated.
Clear Statistics	W	Clears the statistics for the integrated BACnet Protocol network.
Conf Req Rcv		Contains the number of confirmed request messages received.
Conf Req Tx		Contains the number of confirmed request messages sent.
Error Rcv		Contains the number of error messages received. An example of an error is an attempt to write to a read-only attribute.

Table 145: BACnet Protocol Engine Attributes - Diagnostic Tab

Attribute Name	Notes	Description
Error Tx		Contains the number of error messages sent.
Latch Statistics	W	Updates the displayed statistics with the current values.
Local Abort Tx		Contains the number of application layer abort messages generated locally (for example, messages that used up all allowed retries and did not get an acknowledge from the remote device).
Net Messages Rcv		Contains the number of messages received at the network layer.
Net Messages Tx		Contains the number of messages transmitted at the network layer.
Net Rejects Rcv		Contains the number of reject messages received at the network layer.
Net Routed Messages		Contains the number of messages routed through the network layer from one network (for example, IP) to another (for example, MS/TP).
Net Routes Busy		Contains the number of messages not sent because the network route is busy or not initialized.
Net Unknown Message Rcv		Contains the number of unknown messages received at the network layer.
Net Unknown Routes		Contains the number of messages not sent due to unknown route information.
Peak Pending Queue Count		Indicates the largest number of client requests that were queued for transmission.
Peak Unknown Queue Count		Indicates the largest number of client requests the unknown queue contained at one time.
Pending Queue Count		Indicates the number of client requests currently queued for transmission.
Rcv Messages Discarded		Indicates the number of messages received from the network that were not processed due to lack of resources or because there were too many requests for the Metasys Engine to process.
Rcv Message Rate		Indicates the number of messages received in the last minute.
Rcv Record Count		Indicates the number of active state machines currently in use for receipt of requests from other BACnet devices (that is, the number of requests being processed at this moment).
Record Count		Indicates the number of active state machines holding information on pending messages.
Reject Rcv		Contains the number of reject messages received. Rejects occur in response to a variety of communication problems much like aborts and errors.
Reject Tx		Contains the number of reject messages sent.

Table 145: BACnet Protocol Engine Attributes - Diagnostic Tab

Attribute Name	Notes	Description
Req Retries Tx		Contains the number of confirmed request messages re-sent due to timeout.
Reset Date		Indicates the date of the last Clear Statistic command.
Reset Time		Indicates the time of the last Clear Statistic command.
Seg Ack Rcv		Contains the number of segmented complex acknowledgement messages received.
Seg Ack Tx		Contains the number of segmented complex acknowledgement messages sent.
Seg Conf Req Rcv		Contains the number of segmented confirmed request messages received.
Seg Conf Req Tx		Contains the number of segmented confirmed request messages sent.
Seg Retries Tx		Contains the number of segmented confirmed request messages re-sent due to timeout.
Segment Ack Rcv		Contains the number of segment acknowledgment messages received.
Segment Ack Tx		Contains the number of segment acknowledgment messages sent.
Segment Rcv		Contains the number of segment messages received.
Segment Tx		Contains the number of segment messages sent.
Simple Ack Rcv		Contains the number of simple acknowledgment messages received.
Simple Ack Tx		Contains the number of simple acknowledgment messages sent.
Transaction Timeouts		Indicates the number of MS/TP Postpone messages sent due to a late reply to a received Confirmed Request message (that is, this device's applications could not process the request before a low-level MS/TP answer was required).
Transmits Per Minute		Displays the calculated number of transmissions per minute.
Tx Messages Discarded		Indicates the number of client requests aborted due to lack of resources. Usually, this situation occurs due to memory issues in the controller.
Tx Record Count		Indicates the number of active state machines currently in use for transmission of client requests.
Unconfirmed Rcv		Contains the number of unconfirmed messages received.
Unconfirmed Tx		Contains the number of unconfirmed messages sent.
Unknown Queue Count		Indicates the number of current client requests that need network address resolution.

BACnet Protocol Engine Commands

The following table lists the commands supported by the [BACnet Protocol Engine Object](#).

Table 146: BACnet Protocol Engine Commands

Command Name	Parameters	Description
Clear Statistics	None	Resets all of the attributes containing diagnostic statistics.
Latch Statistics	None	Updates the displayed statistics with the current values.

BACnet Device Object

The BACnet Device object defines a standardized BACnet object with attributes that represent the external, visible characteristics of a device. Only one device object exists in each BACnet Device.

Notes:

- The Johnson Controls network engine device object includes attributes and methods not required by the BACnet Device object. For information on the network engine device object, see the [Engine Device Object](#) section.
- The Object Type for this object is labeled Non-FEC BACnet Device in the software.

BACnet Device Attributes

This object contains attributes common to many Metasys system objects. These common attributes are described in the [Common Object Attributes](#) section. This section includes attributes of the Focus/Configuration tab, the Diagnostics tab (if applicable), and any other tab specific only to this object. See the [Object and Feature Tabs](#) section for information on the attributes that appear on the other tabs of this object (for example, the Hardware and Options tab appear on point objects).

Note: In the Notes column, attributes that are marked with a letter C are configurable, attributes marked with the letter W are writable, and attributes marked with the letter D indicate the default attribute for the display.

Table 147: BACnet Device Attributes - Focus/Configuration Tab

Attribute Name	Notes	Initial Value	Description
Alarm State			Indicates the current state of the object.
Align Intervals	W	False	Specifies whether clock-aligned periodic time synchronization is enabled. If periodic time synchronization is enabled and the time synchronization interval is a factor of an hour or a day (that is, the value divides without remainder), then the beginning of the period specified for time synchronization aligns to the hour or day, respectively.
APDU Retries	W	3	Indicates the maximum number of times that an Application Protocol Data Unit (APDU) is retransmitted. The default value is 3. If this device does not perform retries, then this attribute is zero. If the value of this attribute is greater than zero, a nonzero value is placed in the Device object APDU Timeout attribute.
APDU Segment Timeout	W	4,000	Indicates the amount of time in milliseconds between retransmissions of an APDU segment. This value is nonzero if APDU Retries is nonzero. The APDU Segment Timeout attribute is present if segmentation of any kind is supported. In order to achieve reliable communication, the values of the APDU Segment Timeout attributes of the Device objects of all intercommunicating devices should contain the same value. Note: If segmentation of any kind is supported, this attribute is required.

Table 147: BACnet Device Attributes - Focus/Configuration Tab

Attribute Name	Notes	Initial Value	Description
APDU Timeout		See next column	Indicates the amount of time in milliseconds between retransmissions of an APDU requiring acknowledgement for which no acknowledgement has been received. This value is nonzero if APDU Retries is nonzero. In order to achieve reliable communication, the values of the APDU Timeout attributes of the Device objects of all intercommunicating devices should contain the same value. The default is 6,000 milliseconds for devices that permit modification of this attribute. The default value is 60,000 milliseconds for all other devices.
Active COV Subscriptions			Contains a list of BACnet COV Subscriptions, each of which consists of a Recipient, a Monitored Property Reference, an Issue Confirmed Notifications flag, a Time Remaining value, and an optional COV Increment. This attribute provides a network-visible indication of those COV subscriptions active at any given time. Whenever a COV Subscription is created with the Subscribe COV or Subscribe COV Property service, a new entry is added to the Active COV Subscriptions list. Similarly, whenever a COV Subscription is terminated, the corresponding entry is removed from the Active COV Subscriptions list. ⓘ Note: If the device supports execution of either Subscribe COV or Subscribe COV Property service, this attribute is required.
Alarm State			Indicates the current status of the object. The expected state is Normal.
Appl SW Version			Identifies the version of the application software installed in the device. The content of this string is locally defined (date-and-time stamp, a programmer's name, a host file version number, and so on).
Backup Fail Timeout ¹	W	120	Indicates the number of seconds that the device being backed up or restored waits before unilaterally ending the backup or restore procedure. This attribute is writable (the device performing the backup, or the operator, configures this with an appropriate timeout). Units = Seconds
Configuration Files			Identifies the files within the device that determine what device image can be backed up. The contents of this attribute are only required to be valid during the backup procedure. If the device supports the BACnet backup and restore procedure, this attribute is supported. ⓘ Note: If the device supports the backup and restore procedures, the Configuration Files and Last Restore Time attributes are required.
Database Revision			Specifies a logical revision number for the device's database. Database Revision is incremented when an object is created or deleted, an object name changes, or a restore is performed.
Description	W		Contains a string of printable characters used to describe the application being run by the device or other descriptive information. Unrestricted range.
Device Addr Binding	W		Contains a list of BACnet Object Identifiers of a BACnet Device object and a BACnet device address in the form of a BACnet Address. Entries in the list identify the actual device addresses that are used when accessing the remote device through a BACnet service request. The list may be empty if no device identifier-device address bindings are currently known to the device.

Table 147: BACnet Device Attributes - Focus/Configuration Tab

Attribute Name	Notes	Initial Value	Description
DST Status	W		Indicates whether daylight saving time (DST) time is in effect (True) or not (False). True, False
Graphic	C,W		Indicates the graphic associated with the object.
Graphic Alias	C,W		Indicates a portion of the graphic's item reference, up to and including the name of the folder containing this object or the controller containing this point. Maximum 256 characters
Interval Offset	C,W	0	Specifies the offset, in minutes, from the beginning of the period defined for time synchronization until the actual time synchronization requests are set. Interval Offset has no effect when Align Intervals is False. Units = Minutes
Last Restore Time			Specifies when the device's image was last restored. If the device supports the BACnet backup and restore procedures, this attribute is supported. ⓘ Note: If the device supports the backup and restore procedures, the Configuration Files and Last Restore Time attributes are required.
List of Session Keys			Contains a list of the cryptographic keys used to communicate with other security-conscious BACnet Devices. This attribute is not readable or writable by any device except a device designated the Key Server. A session key consists of a 56-bit encryption key and a BACnet Address of the peer with which secure communications is requested.
Local Date	W		Indicates the date. If the device has no knowledge of time or date, Local Date is omitted.
Local Time	W		Indicates the time of day. If the device has no knowledge of time or date, Local Time is omitted.
Location	W		Indicates the physical location of the device.
Manual Time Sync Type	C,W	Automatic	Configures the type of BACnet Time Synchronization to send to a BACnet device. <ul style="list-style-type: none"> • UTC: UTC time synchronization message is sent. • Local: A local time synchronization message is sent. • None: No message is sent. • Auto: The mapper object's Protocol Services Supported attribute is used to determine which type of time sync is supported, and if: <ul style="list-style-type: none"> • utcTimeSynchronization is set, the code functions as if Time Sync Type is set to UTC. • utcTimeSynchronization is not set and timeSynchronization is set, local time is set. • neither utcTimeSynchronization nor timeSynchronization is set, an error is returned.
Max APDU Length			Specifies the maximum number of octets contained in a single, indivisible application layer protocol unit. Underlying data link technology constrains the value of this attribute. Greater or equal to 50
Max Info Frames		10 (FEC) 20 (NxE)	Specifies the maximum number of information frames the node may send before it passes the token. This attribute is present if the device is a node on an MS/TP network. If Max Info Frames is not writable or otherwise user configurable, its value is one. ⓘ Note: If the device is an MS/TP master node, both the Max Info Frames and Max Master attributes are required.

Table 147: BACnet Device Attributes - Focus/Configuration Tab

Attribute Name	Notes	Initial Value	Description
Max Master		127	Specifies the highest possible address for master nodes and is less than or equal to 127. This is present if the device is a master node on an MS/TP network. If Max Master is not writable through BACnet services, its value is 127. i Note: If the device is an MS/TP master node, both the Max Info Frames and Max Master attributes are required.
Max Segments Accepted			Indicates the maximum number of segments of an Application Protocol Data Unit (APDU) accepted by the device.
Model Name			Contains a name assigned by the vendor to represent the model of the device.
Offline		False	Displays the offline or online status of connected hardware.
Profile Name			Contains a string of characters that represents the name of the object profile to which the object conforms. A profile name must begin with a vendor identifier code in base-10 integer format, followed by a dash. The vendor identifier code indicates the organization that administers the remaining characters of the profile name, and publishes and maintains the profile document identified by the profile name. The vendor identifier does not need to match the vendor identifier of the device in which the object resides.
Protocol Obj Support			Indicates which standardized object types the device's protocol implementation supports. This attribute reflects the minimum set of object types, but implementation often supports additional standard and non-standard object types with their own set of attributes. (The list of attributes supported for a particular object may be acquired by use of the Read Property Multiple service with an attribute reference of All.)
Protocol Revision			Indicates the minor revision level of the BACnet standard. This starts at 1 and increases for each subsequent release. If the Protocol Version attribute changes, this number reverts to zero. This attribute is required for all devices with BACnet Protocol Version 1, Protocol Revision 1 and above. If this attribute is not present, the device is Protocol Version 1, Protocol Revision 0.
Protocol Ser Support			Indicates which standardized protocol services the device's protocol implementation supports. This attribute reflects the minimum set of services, but implementation often supports additional standardized services.
Protocol Version			Represents the BACnet protocol the device supports. Initial releases are Version 1; subsequent releases increase the number by one.
Restart Notification Recipients	C,W		Controls the restrictions on which devices, if any, are notified when a restart occurs. The value of this attribute is a list of BACnet Recipients. When the length of this list is empty, the device cannot send a device restart notification. The default value of this property is a single entry representing a broadcast on the local network. If the list has one or more entry, the device sends a restart notification, but only to the devices or addresses listed.
Segmentation			Indicates if the BACnet device supports segmentation of messages. If so, it supports segmented transmission, reception, or both. Segmented Both, Segmented Transmit, Segmented Receive, No Segmentation
System Status	D		Reflects the current physical and logical state of the device. Operational, Operational Read Only, Download Required, Download in Progress, Nonoperational, Backup in Progress

Table 147: BACnet Device Attributes - Focus/Configuration Tab

Attribute Name	Notes	Initial Value	Description
Time Synchronization Interval	C,W	0	Specifies the periodic interval, in minutes, at which TimeSynchronization and UTCTimeSynchronization requests are sent. When set to zero, then periodic time synchronization is disabled.
Time Sync Recipients	W		Controls the restrictions placed on a device's use of the Time Synchronization service. If the list is of length zero, a device is prohibited from automatically sending a Time Synchronization request. If the list is of length one or more, a device automatically sends a Time Synchronization request but only to the devices or addresses listed. If it is present, this attribute is writable. If the PICS indicates that this device is a Time Master, then Time Synchronization Recipients is present. ① Note: If PICS indicates the device is a Time Master, this is required. If present, this attribute is writable.
UTC Offset	W		Indicates the number of minutes offset between local standard time and UTC. The time zones to the west of the zero degree meridian are positive and those to the east are negative. Subtract the value of the UTC Offset from the UTC received in the UTC Time Synchronization service requests to calculate the correct local standard time. Range: -1440 though +1440
UTC Time Synchronization Recipients	C,W		Lists one or more BACnet recipients to which the device can issue a UTC Time Synchronization request. If the list is empty, the device cannot send a UTC Time Synchronization request to a BACnet recipient. The attribute requires several other parameters that define each recipient, such as its device ID, IP address information, or broadcast type and information.
VT Classes Supported			Contains a list of BACnet Video Terminal (VT) Classes that indicate a particular set of terminal characteristics. A device often supports multiple types of behaviors for differing types of terminals or differing types of operator interface programs. If either VT Classes Supported or Active VT Sessions is present, then both are present. Both are required if support of VT Services is indicated in the PICS. ① Note: If either Video Terminal (VT) Classes Supported or Active VT Sessions is present, both are present. If the Protocol Implementation Conformance Statement (PICS) indicates support for VT Services, both of these attributes are present.
Vendor ID			Distinguishes proprietary extensions to the protocol with a unique ASHRAE vendor ID code.
Vendor Name			Identifies the manufacturer of the device.

1 If the device supports the backup and restore procedures, this attribute must be present and writable.

BACnet Device Object Commands

The following table lists the commands supported by the BACnet Device Object.

Table 148: BACnet Device Object Commands

Command Name	Parameters	Description
Rediscover Text Strings	None	Resets the States Text across a supervisory device by rediscovering text strings from all mapped BACnet objects. ① Note: When the Rediscover Text Strings command is sent from the Site Director device UI to another supervisory device and the UI is running on the supervisory device, you must close and restart the UI on the supervisory device in order for the text to appear correctly.
Reset Field Device	Type: Cold Start or Warmstart Password	Resets the BACnet device.
Sync Field Device Times	None	Sends a high-priority time synchronization command to child devices, based on the device mapper object's Manual Time Sync Type.

IP Field Controller Object

The IP Field Controller object defines a standardized BACnet object with attributes that represent the external, visible characteristics of a device. Only one Device object exists in each IP Field Controller. The IP Field Controller object appears as a child of a BACnet Integration object.

IP Field Controller Object Attributes

This object contains attributes common to many Metasys system objects. These common attributes are described in the [Common Object Attributes](#) section. This section includes attributes of the Focus/Configuration tab and the Diagnostics tab. See the [Object and Feature Tabs](#) section for information on the attributes that appear on the other tabs of this object (for example, the Hardware and Options tab appear on point objects).

① **Note:** In the Notes column, attributes marked with the letter C are configurable, and attributes marked with the letter W are writable.

Table 149: IP Field Controller Object Attributes - Focus/Configuration Tab

Attribute Name	Notes	Initial Value	Description
JCI System Status		Operational	Reflects the current status of the system.
Alarm State		Offline	Indicates that the object transitioned into alarm or unreliable conditions.
Enabled	C,W	True	If True, allows integration between the Metasys system and the IP field controller.
In Test		False	Displays True when a Control Sequence in the device is currently in a test mode. When True, the device is marked offline, although communication with the device is acceptable.
Offline		True	Indicates whether the IP field controller is offline.
Vendor Name	W		Identifies the manufacturer of the device.
Model Name	W		Indicates the product code for the device.
Startup Code Version			Specifies the version of the Startup code running in the controller. The Startup code is responsible for initial power up operations.
Fixed Boot Version			Indicates the version of the Boot code in the field device. The Boot code is responsible for loading the Main code.
Pcode			Displays the device orderable product code.

Table 149: IP Field Controller Object Attributes - Focus/Configuration Tab

Attribute Name	Notes	Initial Value	Description
Location	W		Indicates the physical location of the device.
COV Min Send Time		15 seconds	Configures the object to send COV messages on a periodic basis instead of on every change of value that exceeds the COV Increment.
Local Time	W	*.*.*.0 (HH:MM:SS AM/PM)	Indicates the time of day. If the device has no knowledge of time or date, Local Time is omitted.
Local Date	W	Unspecified	Indicates the date. If the device has no knowledge of time or date, Local Date is omitted.
UTC Offset	C	0 minutes	Indicates the number of minutes offset between local standard time and UTC. The time zones to the west of the zero degree meridian are positive and those to the east are negative. Subtract the value of the UTC Offset from the UTC received in the UTC Time Synchronization service requests to calculate the correct local standard time.
DST Status		False	Indicates whether daylight saving time (DST) time is in effect (True) or not (False).
Graphic	C,W	Object Name: Reference:	Indicates the graphic associated with the object.
Graphic Alias	C,W		Indicates a portion of the graphic's item reference, up to and including the name of the folder containing this object or the controller containing this point.
Item Reference			Contains a unique reference name for the object that is the full path name of the object through the All Items navigation tree using the unique identifier you specified when you manually created the object.
Version		1.0	Displays the version number of the object software code.

Table 150: IP Field Controller Object Attributes - Diagnostic Tab

Attribute Name	Initial Value	Description
CPU Usage	0.0%	Specifies a running average of CPU usage over the last 50 minutes. The value is updated every 30 seconds. The running average is calculated by adding or subtracting 1% of the difference between the current and average CPU usage. The value may not be meaningful until 50 minutes after a system restart. A value of 0% means the CPU is 100% idle. A value of 100% means the CPU is 0% idle. A value of 50% or less is considered OK, although other performance indicators should also be assessed. Under device simulation, the value is 0.
Flash Usage	0.0%	Specifies the estimated percent of flash memory currently in use. The percentage is based on the portion of flash that is designated for use by the user's database. The value is updated on device startup, after a database archive, sync or download from the SCT (offline mode), and by manual command (Update Flash Usage). A value greater than 100% can affect system reliability now or in future software releases. No restrictions are in place to prohibit use of flash over 100%.

Table 150: IP Field Controller Object Attributes - Diagnostic Tab

Attribute Name	Initial Value	Description
Memory Usage	0.0%	Specifies the percent of system RAM that is currently in use. It is calculated as follows: Total commit charge x 100 Display Precision = 0.01 COV Increment = 0.1
Object Memory Usage	0.0%	Specifies the percent of the object database that is currently in use. Each object created consumes memory within the object database. This attribute can be used to help determine the device's capacity for additional objects; however, other performance indicators should also be assessed. Generally, the number of objects you define determines the object memory usage. This attribute is valid on the Engine hardware and under device simulation. ① Note: If you have a large number of objects, the object memory usage increases and the archive.moi file size increases also. The archive.moi file is stored in flash memory. Also, an attempt to create an object known to require X bytes of object database may fail even if more than X bytes are available in the object database. This is because the object database is composed of multiple blocks. If the free space of each block is fewer than X bytes, the request for X bytes fails even though the sum total of free space from all blocks is greater than X bytes.
Object Count	0	Indicates the number (count) of all of the object instances within the device. Objects of all classes are included.
Has Unbound References	False	Lists references that are not bound in the system. This attribute indicates that a process cannot find an object either because the device on which the object is located is offline, the object has been deleted, or the object reference is incorrect.

Ethernet IP Datalink Object

The Ethernet IP Datalink object manages the Ethernet communications bus and the messages transmitted on it. By working with this object, you can access Ethernet card statistics.

For general information on Metasys system objects, see the [Object Help](#) section.

Ethernet IP Datalink Attributes

This object contains attributes common to many Metasys system objects. These common attributes are described in the [Common Object Attributes](#) section. This section includes attributes of the Focus/Configuration tab and the Diagnostics tab. The set of attributes varies based on the version of the network engine. For example, a network engine at Release 11.0 on a BACnet site has a set of Status and BACnet attributes that do not apply to a network engine at Release 10.1 or earlier. Attributes that are marked with a letter **C** are configurable and attributes marked with the letter **W** are writable.

Table 151: Ethernet IP Datalink Attributes - Focus/Configuration Tab

Attribute Name	Notes	Initial Value	Description
Address Length		6	Indicates the number of octets for the device address (Data Link Address).
APDU Length or Max APDU Length	C,W	1024	Indicates the maximum number of bytes that may be contained in a single, indivisible application layer protocol data unit (APDU). Units = bytes ① Note: If you write the value of this attribute, you must reset the Engine for the new settings to take effect.
APDU Retries	C,W	4	Indicates the maximum number of times that an APDU is retransmitted. If the device does not perform retries, it is set to zero. If this value is greater than zero, a non-zero value appears in the APDU Timeout attribute.
APDU Segment Timeout	C,W	10000	Indicates the amount of time in milliseconds between retransmission of an APDU segment. This value is non-zero if the device supports segmentation of transmitted APDUs. Units = milliseconds ① Note: At Metasys Release 10.0 and later the default value is 10,000. In earlier releases, the default value is 4,000.
APDU Timeout	C,W	10000	Indicates the amount of time in milliseconds between retransmissions of an APDU requiring acknowledgment for which no acknowledgment has been received. Units = milliseconds 1,000–65,535 ① Note: At Metasys Release 10.0 and later the default value is 10,000. In earlier releases, the default value is 6,000.
BACnet IP Mode		BBMD IP Mode	Indicates whether the network port object is in use by the BBMD. Possible values: Normal IP Mode or BBMD IP Mode.
BACnet IP UDP Port		47808	Indicates the IP UDP Port number that the device uses to transmit and receive messages.
BACnet UDP Port		47808	Indicates the UDP Port number that the device uses to transmit and receive messages.
BBMD Accept F.D. Registrations	C,W	False	Determines whether a BBMD is allowed to register foreign devices, either True or False. If you change this value, you must activate it with the Activate Changes > Update Changes Pending Attributes Except Network Number command to the Engine. The change is updated immediately online but it is not fully applied until you activate the change.
BBMD Broadcast Distribution Table	C,W		Specifies a list of BBMDs on the building network by IP address or hostname. The hostname must be in the DNS table of the DNS server in order to be resolved. If you change this value, you must activate it with the Activate Changes > Update Changes Pending Attributes Except Network Number command to the Engine. ① Note: Do not edit this table if Dynamic Broadcast Management is set to False in the Site object.

Table 151: Ethernet IP Datalink Attributes - Focus/Configuration Tab

Attribute Name	Notes	Initial Value	Description
BBMD Foreign Device Table			Specifies a list of any foreign devices registered with the BBMD and described in the sequence of IP address, time to live, and remaining time to live.
Broadcast Address			Indicates the address used when sending broadcast messages. Maximum length = 6 octets
Changes Pending		False	Indicates whether a change to a network port object attribute has yet to be activated. Possible values: True or False. If True, issue an Activate Changes command to the network engine.
Command		Idle	Indicates the BACnet command specific to the network port object. Possible values: Idle or Discard Changes. Discard Changes discards any pending changes to the network port object.
Configured Network Number	C,W	1001	Indicates the BACnet network number configured for the data link.
Device Address			Indicates the address of the device (Data Link Address). Maximum length = 6 octets
DNS Refresh Period	C,W	20	Specifies the time in minutes between DNS lookups to update the IP address of a BACnet Broadcast Management Device (BBMD) referenced by host name. If an IP address is changed within a DNS server, the BBMD system automatically obtains the new IP address upon the expiration of this period. A value of 0 is used to disable periodic DNS lookups.
Internode Comm Timer	C,W	120	Controls the frequency of communication with IP devices over the Ethernet. Among other communications, this attribute defines the frequency of the heartbeat to monitored devices (monitored at a rate of two times the Internode Comm Timer). Recommended settings: high sensitivity: 30 seconds; medium sensitivity: 120 seconds (default); low sensitivity: 240 seconds. <i>ⓘ</i> Note: If you change the value of this attribute, you must reset the network engine for the new settings to take effect.
IP Address			Indicates the currently assigned IP address of the network engine.
IP Default Gateway			Indicates the IP address of the network engine's default gateway.
IP DHCP Enable			Indicates whether the network engine is set for DHCP or static IP address assignment. Possible values: True or False.
IP DNS Server	C,W		Lists the DNS server(s) assigned to the network engine.
IP Subnet Mask			Indicates the currently assigned IP subnet mask address of the network engine.

Table 151: Ethernet IP Datalink Attributes - Focus/Configuration Tab

Attribute Name	Notes	Initial Value	Description
JCI Network Port APDU Retries	C,W	4	Indicates the maximum number of times that an APDU is retransmitted. If the device does not perform retries, it is set to zero. If this value is greater than zero, a non-zero value appears in the APDU Timeout attribute.
JCI Network Port APDU Segment Timeout	C,W	10000	Indicates the amount of time in milliseconds between retransmission of an APDU segment. This value is non-zero if the device supports segmentation of transmitted APDUs. Units = milliseconds
JCI Network Port APDU Timeout	C,W	10000	Indicates the amount of time in milliseconds between retransmissions of an APDU requiring acknowledgment for which no acknowledgment has been received. Units = milliseconds 1,000–65,535
JCI Network Port Type			Indicates the type of port in use by the network engine.
Link Speed			Indicates the Ethernet link speed of the network engine. Possible values: 1.0E8, 1.0E7, or 1.0E6.
MAC Address			Contains the unique hardware number that identifies the network engine within a network.
Network Number Quality			Describes how the network number was acquired. Possible values: Network Number Configured (always for NAE or SNx), Network Number Learned/Configured, Network Number Learned, Network Number Unknown.
Network Type			Indicates the type of network that the network engine is using. Example: BACnet/IP over IPv4
Out of Service			De-couples the object from the physical input. When Out of Service is True, the object decouples the Present Value and Reliability from the hardware. The Reliability is writable when Out Of Service is True. When de-coupled, the Present Value can be changed to simulate specific conditions or for test purposes. Additionally, the Out of Service state of the Status Flags attribute is set to True and the Fault state is decoupled from the physical input when Out of Service is True.
Pending Network Number		1001	Indicates the BACnet network number that is currently pending for configuring the datalink object. Once you issue an Activate Changes command to the engine, the Configured Network Number is set to the Pending Network Number.
Protocol Level			Indicates the protocol level of the engine. Example: BACnet application

Table 151: Ethernet IP Datalink Attributes - Focus/Configuration Tab

Attribute Name	Notes	Initial Value	Description
Reliability			Indicates the current reliability of the integration. The normal state is Reliable.
Status Flags			Indicates the general status of the object in BACnet terms and contains four independent states. The four selections are: In Alarm —False if the Event State attribute value is Normal; otherwise, the In Alarm flag is True. (Set only by BACnet Intrinsic Alarming.) Fault —True (1) if the Reliability attribute is not reliable; otherwise, the Fault flag is False. Overridden —Overridden flag is True if the Present Value is overridden from the hardware source level. Out of Service —Out of Service flag is True if the Out of Service attribute value is True; otherwise, the Out of Service flag is False.

Table 152: Ethernet IP Datalink Attributes - Diagnostic Tab

Attribute Name	Data Type	Description
Broadcast Receives	Number	Indicates the number of broadcast messages received.
Broadcast Transmits	Number	Indicates the number of broadcast message transmissions.
Discarded Frames	Number	Indicates the count of received messages discarded due to critical low resources (that is, the System Memory Resource, Object Engine Queue Resource, or Protocol Engine Input Queue Resource).
Message Receives	Number	Indicates the number of messages received.
Message Transmits	Number	Indicates the number of message transmissions.
Reset Date	Date	Indicates the date of the last Clear Statistics command.
Reset Time	Time	Indicates the time of the last Clear Statistics command.
Retry Attempts	Number	Indicates the number of retry attempts.
Transmit Failures	Number	Indicates the number of message transmit failures.

MS/TP Field Device Object

The MS/TP Field Device object is used to represent FEC family MS/TP devices on the MS/TP Field bus. The MS/TP Field Device object appears as a child of an MS/TP Field Bus Integration object.

Note: The Object Type for this object is labeled **FEC Family BACnet Device** in the software.

Supported Controllers

The Field Device object supports these MS/TP controllers:

- CGMs
- CVMs
- VMA16s
- IOMs
- FECs
- FACs

MS/TP Field Device Attributes

This object contains attributes common to many Metasys system objects. These common attributes are described in the [Common Object Attributes](#) section. This section includes attributes of the Focus/Configuration tab, the Diagnostics tab (if applicable), and any other tab specific only to this object. See the [Object and Feature Tabs](#) section for information on the attributes that appear on the other tabs of this object (for example, the Hardware and Options tab appear on point objects).

i Note: In the notes column, attributes that are marked with a letter C are configurable, attributes marked with the letter W are writable, and attributes marked with the letter D indicates the default attribute for the display.

Table 153: MS/TP Field Device Object Attributes - Focus/Configuration Tab

Attribute Name	Notes	Initial Value	Description
Alarm State			Indicates the current state of the object.
COV Min Send Time	W	15	Configures the object to send COV messages on a periodic basis instead of on every change of value that exceeds the COV Increment.
Enabled	CW	True	If True, allows communication between the Metasys system and the MS/TP controller.
End of Line		False	Indicates whether the device is at the end of the bus.
Fixed Boot Version			Indicates the version of the Boot code in the field device. The Boot code is responsible for loading the Main code.
Graphic	CW		Indicates the graphic associated with the object.
Graphic Alias	CW		Indicates a portion of the graphic's item reference, up to and including the name of the folder containing this object or the controller containing this point.
In Test			Displays True when a Control Sequence in the device is currently in a test mode. When True, the device is marked offline, although communication with the device is acceptable.
JCI System Status			Reflects the current status of the system.
Location			Indicates the physical location of the device.

Table 153: MS/TP Field Device Object Attributes - Focus/Configuration Tab

Attribute Name	Notes	Initial Value	Description
Manual Time Sync Type	CW	Automatic	<p>Configures the type of BACnet Time Synchronization to send to a BACnet device.</p> <ul style="list-style-type: none"> • UTC: UTC time synchronization message is sent. • Local: A local time synchronization message is sent. • None: No message is sent. • Auto: The mapper object's Protocol Services Supported attribute is used to determine which type of time sync is supported, and if: <ul style="list-style-type: none"> - utcTimeSynchronization is set, the code functions as if Time Sync Type is set to UTC. - utcTimeSynchronization is not set and timeSynchronization is set, local time is set. - neither utcTimeSynchronization nor timeSynchronization is set, an error is returned.
Model Name			Indicates the product code for the device.
Offline			Indicates whether the MS/TP controller is offline.
Pcode			Displays the device orderable product code.
Present Value	D	Online	Indicates the current status of communication with the field device (Online, Offline, or Comm Disabled). A status of Comm Disabled indicates that the field device has been disabled. A status of Offline indicates that either communication problems exist, or the field device is currently in test mode.
Protocol Obj Supported			Indicates which standardized object types the device's protocol implementation supports. Protocol Conformance Class reflects the minimum set of object types, but implementation often supports additional standard and non-standard object types with their own set of attributes. (The list of attributes supported for a particular object may be acquired by use of the ReadPropertyMultiple Web method with an attribute reference of All.)

Table 153: MS/TP Field Device Object Attributes - Focus/Configuration Tab

Attribute Name	Notes	Initial Value	Description
Protocol Ser Supported			Indicates which standardized protocol services the device's protocol implementation supports. Protocol Conformance Class reflects the minimum set of services, but implementation often supports additional standardized services.
Startup Code Version			Specifies the version of the Startup code running in the controller. The Startup code is responsible for initial power up operations.
Vendor ID			Identifies the unique manufacturer's identifier, as defined by ASHRAE. For Johnson Controls, this value is 5.
Vendor Name			Identifies the manufacturer of the device (should be Johnson Controls).

Table 154: MS/TP Field Device Object Attributes - Diagnostic Tab

Attribute Name	Notes	Initial Value	Values/Options/Range
CPU Usage			Specifies a running average of CPU use. The value is updated every minute.
Flash Usage			Specifies the estimated percent of flash memory currently in use. The percentage is based on the portion of flash that is designated for use by the user's database. A value greater than 100% can affect system reliability now or in future software releases. There are no restrictions in place to prohibit use of flash over 100%.
Has Unbound References			Indicates that a process cannot find an object either because the device on which the object is located is offline, the object has been deleted, or the object reference is incorrect.
Memory Usage			Specifies the percent of field device RAM currently in use.

Table 154: MS/TP Field Device Object Attributes - Diagnostic Tab

Attribute Name	Notes	Initial Value	Values/Options/Range
Object Count			Indicates the number (count) of all of the object instances within the device. Objects of all types are included.
Object Memory Usage			Specifies the percent of the object database that is currently in use. Each object created consumes memory within the object database. This attribute can be used to help determine the device's capacity for additional objects; however, other performance indicators should also be assessed. Also, an attempt to create an object known to require X bytes of object database may fail even if more than X bytes are available in the object database. This is because the object database is composed of multiple blocks. A free space block of at least X contiguous bytes available for allocation may not exist, even if the total free space is more than X bytes.

LON Controller Object

The LON Controller object defines attributes that represent the external, visible characteristics of a device residing on a LonWorks network.

- ① **Note:** The LON Controller object is **not** available for network engines updated to Release 9.0.7 or later.

LON Controller Attributes

This object contains attributes common to many Metasys system objects. These common attributes are described in the [Common Object Attributes](#) section. This section includes attributes of the Focus/Configuration tab, the Diagnostics tab (if applicable), and any other tab specific only to this object. See the [Object and Feature Tabs](#) section for information on the attributes that appear on the other tabs of this object (for example, the Hardware and Options tab appear on point objects).

- ① **Note:** In the Notes column, attributes marked with the letter C are configurable and attributes marked with the letter W are writable.

Table 155: LON Controller Object Attributes - Focus/Configuration Tab

Attribute Name	Notes	Initial Value	Description
Enabled	C,W	True	If True, allows integration between the Metasys system and the LON controller.
Graphic	C,W		Indicates the graphic associated with the object.
Graphic Alias	C,W		Indicates a portion of the graphic's item reference, up to and including the name of the folder containing this object or the controller containing this point.
Offline		False	Displays the offline or online status of connected hardware. The LonWorks network server updates this attribute value.

Table 155: LON Controller Object Attributes - Focus/Configuration Tab

Attribute Name	Notes	Initial Value	Description
Present Value		Offline	Displays the communication status of the object.
XIF Present			Indicates whether a XIF file matching this controller's Program ID was found.

Table 156: LON Controller Object Attributes - Diagnostic Tab

Attribute Name	Notes	Initial Value	Description
Command Count			Displays the total number of commands sent to this controller.
Error Log		NOERROR	Shows the error log according to the last standard LonWorks network Query Status message.
Lost Message		0	Shows the number messages lost according to the last standard LonWorks network Query Status message.
Missed Messages			Shows the number messages missed according to the last standard LonWorks network Query Status message.
Neuron Model		Neuron_3150	Shows the Neuron model according to the last standard LonWorks network Query Status message.
Node State			Shows the state of the node according to the last standard LonWorks network Query Status message.
Offline Poll Count		0	Displays the total number of times this controller was sent a poll while offline.
Receive Transaction Full		0	Shows the number of times the transaction full message appeared in the last standard LonWorks network Query Status message.
Reset Cause		Clear	Shows the cause of the last reset according to the last standard LonWorks network Query Status message.
Reset Date			Contains the date stamp of the last local Neuron statistics reset command.
Reset Time			Contains the time stamp of the last local Neuron statistics reset command.
Total Messages to Device		0	Displays the total number of messages sent to this controller.
Total Single Message Failures		0	Displays the total number of failures for single messages sent to this controller.
Transaction Timeouts		0	Shows the timeouts that appeared in the last standard LonWorks network Query Status message.

Table 156: LON Controller Object Attributes - Diagnostic Tab

Attribute Name	Notes	Initial Value	Description
Transmit Errors		0	Shows the number of transmit errors that appeared in the last standard LonWorks network Query Status message.
Version Number		0	Shows the version number according to the last standard LonWorks network Query Status message.

LON Controller Commands

The following table lists the commands supported by the [LON Controller Object](#).

Table 157: LON Controller Commands

Command Name	Parameters	Description
Clear Statistics	None	Resets the statistics for the integrated LonWorks network. The contents of the Query Status message reflect these statistics: <ul style="list-style-type: none"> • Transmit Errors • Transaction Timeouts • Receive Transaction Full • Lost Message • Reset Cause • Node State • Version Number • Error Log • Neuron Model
Disable	None	Disables the entire LonWorks network integration. No requests are made to the field trunk and no data broadcasts to the network are processed.
Enable	None	Allows the integration to function normally.
Latch Statistics	None	Resets the statistics for the integrated LonWorks network. The contents of the Query Status message reflect these statistics: <ul style="list-style-type: none"> • Transmit Errors • Transaction Timeouts • Receive Transaction Full • Lost Message • Reset Cause • Node State • Version Number • Error Log • Neuron Model

N2 Controller Object

The N2 Controller object defines a physical device such as a DX-9100, VMA, or UNT controller on the N2 Bus of the NAE and is required for mapping data from the controller into the system. The N2 Controller object monitors the device and reports online/offline transitions. This object also allows you to access information about the N2 controllers.

N2 Controller Concepts

Supported Controllers

This table lists all N2 controllers supported by the system.

Metasys Integrator units, VAV, UNT, and AHU controllers are supported at all revision levels.

Table 158: Supported Controllers

Device/ Controller Type	Revision	Protocol Type	Comments
DR-9100	Rev 1.x - 2.x	Sys91	Room Controller
DR-9101	Rev 2.x	Sys91	Room Controller
DC-9100	Rev 1.x - 2.x	Sys91	Plant Controller
DO-9100	Rev 1.x	Sys91	Digital Optimizer
DX-9100 (V.1)	Rev 1.x	Sys91	Digital Controller
DX-9100 (V.2)	Rev 2.x	Sys91	Digital Controller
TC-9100 TC-9102 TC-9109	Rev 1.x - 3.x	Sys91	Temperature Controller
XT-9100	Rev 1.x	Sys91	Extension Module
XTM-101	Rev 1.x	Sys91	Extension Module
XTM-105	Rev 1.x	Sys91	Extension Module
XTM-905	Rev 1.x	Sys91	Extension Module
LCP-100	Revs all	Sys91	Lab and Central Plant Controller
Metasys Integrator Unit	Revs all	N2 Open	Metasys Integrator Unit
UNT	Revs all	N2 Open	Unitary Controller
VAV	Revs all	N2 Open	Variable Air Volume Controller
AHU	Revs all	N2 Open	Air Handling Unit Controller
PHX	Revs all	N2 Open	Phoenix Interface Module
VMA (VMA14)	Revs all	N2B	VAV Modular Assembly
VND		N2 Open	Metasys Compatible Vendor Devices (by others)
ILC		N2 Other	Intelligent Lighting Controller

N2 Controller Attributes

This object contains attributes common to many Metasys system objects. These common attributes are described in the [Common Object Attributes](#) section. This section includes attributes of the Focus/Configuration tab, the Diagnostics tab (if applicable), and any other tab specific only to this object. See the [Object and Feature Tabs](#) section for information on the attributes that appear on the other tabs of this object (for example, the Hardware and Options tab appear on point objects).

- ① **Note:** In the Notes column, letters indicate the following: C - Configurable, D - Default Attribute for Display, N - Value Not Required, R - Affected by Extension's Reliability, W - Writable.

Table 159: N2 Controller Object Attributes - Focus/Configuration Tab

Attribute Name	Notes	Description
Graphic	C,N,W	Indicates the graphic associated with the N2 controller.
Graphic Alias	C,W	Indicates a portion of the graphic's item reference, up to and including the name of the folder containing this N2 controller.
Offline		Indicates if the NAE is or is not currently communicating with this N2 controller.
Present Value	D	Represents the current communication state of the object.

N2 Controller Commands

The table below lists the commands supported by the [N2 Controller Object](#).

Table 160: N2 Controller Commands

Command Name	Description
Disable	Puts the controller offline and leaves it offline (Comm. Disabled).
Enable	Brings the controller from the offline state to the online state (Comm. Enabled).

VND Controller

The VND (Vendor) Controller object defines a physical vendor device on a bus of the NAE and is required for mapping data from the controller into the system.

VND Controller Attributes

This object contains attributes common to many Metasys system objects. These common attributes are described in the [Common Object Attributes](#) section. This section includes attributes of the Focus/Configuration tab, the Diagnostics tab (if applicable), and any other tab specific only to this object. See the [Object and Feature Tabs](#) section for information on the attributes that appear on the other tabs of this object (for example, the Hardware and Options tab appear on point objects).

- ① **Note:** In the Notes column, letters indicate the following: C - Configurable, D - Default Attribute for Display, N - Value Not Required, R - Affected by Extension's Reliability, W - Writable.

Table 161: VND Controller Attributes - Focus/Configuration Tab

Attribute Name	Note	Initial Value	Values/Options/Range	Attribute Description
Enabled	C,W	True		If True, allows communication to the vendor device. If False, prevents communication to the vendor device.
Graphic	C,N,W	Null	Object Type = Graphic	Indicates the graphic associated with the vendor device.
Graphic Alias	C,W		Maximum 256 characters	Indicates a portion of the graphic's item reference, up to and including the name of the folder containing this vendor device.
Offline		True		Displays the offline or online status of connected hardware.
Present Value	D		Offline, Online, Pass Through, Comm Disabled, Comm Enabled	Represents the current communication state of the object.

Table 162: VND Controller Attributes - Diagnostic Tab

Attribute Name	Notes ¹	Initial Value	Values/Options/Range	Attribute Description
Count		0		Displays the number of point objects defined for the vendor device.
Errors In		0		Indicates the number of field communication errors (bad format, for example) received. The Clear Statistics command resets this value.
Errors Out		0		Indicates the number of field communication attempts that failed. The Clear Statistics command resets this value.
Message Receives		0		Indicates the number of messages received by the vendor device. This value resets to zero at midnight. The Latch Statistics command updates this value.
Message Transmits		0		Indicates the number of messages sent to the vendor device. This value resets to zero at midnight. The Latch Statistics command updates this value.
Reset Date				Contains the date stamp of the last Clear Statistics command.
Reset Time				Contains the time stamp of the last Clear Statistics command.
Transmits In		0		Indicates the rate of transmissions received by the vendor device.
Transmits Out		0		Indicates the rate of transmissions sent by the vendor device.

¹ C - Configurable, W - Writable

VND Controller Commands

The table below lists the commands supported by the [VND Controller](#).

Table 163: VND Controller Object Commands

Command Name	Parameters	Description
Clear Statistics	None	Resets the statistics for the vendor device.
Disable	None	Disables the vendor device.
Enable	None	Allows the vendor device to function normally.
Latch Statistics	None	Updates the displayed statistics with the current values.

Wireless Receiver Object

The Wireless Receiver object is the field device of the Wireless Sensor integration. The Wireless Receiver object establishes communication with the wireless receiver hardware.

All integrated wireless field devices (Wireless Receiver objects) and field point objects ([Wireless Sensor Object](#)) appear under the [Wireless Receiver Supervisor Object](#) in the [Navigation Tree](#).

Note: The Wireless Receiver object **not** available for network engines updated to Release 9.0.7 or later.

Wireless Receiver Attributes

This object contains attributes common to many Metasys system objects. These common attributes are described in the [Common Object Attributes](#) section. This section includes attributes of the Focus/Configuration tab, the Diagnostics tab (if applicable), and any other tab specific only to this

object. See the [Object and Feature Tabs](#) section for information on the attributes that appear on the other tabs of this object (for example, the Hardware and Options tab appear on point objects).

- ① **Note:** In the Notes column, letters indicate the following: C - Configurable, D - Default Attribute for Display, N - Value Not Required, R - Affected by Extension's Reliability, W - Writable.

Table 164: Wireless Receiver Object Attributes - Focus/Configuration Tab

Attribute Name	Notes	Initial Value	Values/Options/Range	Attribute Description
Disable Automatic Alarming	C,W	False	False True	Specifies whether automatic online/offline device event reporting is disabled (True) or enabled (False). This attribute only applies to the device and not to the device's mapped objects. Devices with the Disable Automatic Alarming attribute set to True suppress the alarm event but still indicate they are offline in the navigation tree with a red X. Alarm extensions are not affected by this attribute.
Graphic	C,W			Indicates the graphic associated with the object.
Graphic Alias	C,W		Maximum 256 characters	Indicates a portion of the graphic's item reference, up to and including the name of the folder containing this object or the controller containing this point.
Host Name				Indicates the host name of the wireless receiver. When a host name is given, the system attempts to resolve the Host Name and IP Address using DNS/DHCP (assuming that the installer assigned a host name to the wireless receiver and enabled DHCP). If the device can be located using the ping hostname command, the system can resolve the host name to an IP address. After resolving the host name, the system updates the IP address.
IP Address	C,W	0.0.0.0	xxx.x.x.xxx	Indicates the IP Address of the wireless receiver.

Table 164: Wireless Receiver Object Attributes - Focus/Configuration Tab

Attribute Name	Notes	Initial Value	Values/Options/Range	Attribute Description
Low Battery				Indicates if any wireless sensors defined as children of the Wireless Receiver object have a low battery. The Low Battery status is an advanced warning that can occur many days before a wireless sensor ceases to function. You can configure an alarm for this attribute to allow the building operator time to locate the sensor and change the battery.
Max Data Life	C,W	150	Range = 120-480 seconds	Indicates the maximum amount of time in seconds that the wireless receiver module waits for a transmission from a wireless sensor before generating a report that tells the NAE that the Wireless Sensor Object is unreliable due to Data Life Timeout.
Network Address	C		Range = 1-50	Indicates the network address of the wireless receiver. You can define only up to 50 wireless receivers per Wireless Receiver Supervisor Object.
Present Value			Uses Controller Status (Set 43).	Indicates the online/offline state of the wireless receiver.

Table 165: Wireless Receiver Object Attributes - Diagnostic Tab

Attribute Name	Notes ¹	Initial Value	Values/Options/Range	Attribute Description
Date of Manufacture			mmyy	Indicates the date the wireless receiver was manufactured.
Firmware Version				Indicates the firmware version of the wireless receiver.
Hardware Version				Indicates the hardware version of the wireless receiver.

¹ C - Configurable, W - Writable

Wireless Sensor Object

There is a Wireless Sensor object in the field point object for each wireless temperature sensor mapped to the NAE. The Wireless Sensor object receives communications from the wireless sensor.

All integrated wireless field points (Wireless Sensor objects) appear under the [Wireless Receiver Objects](#) (field devices), which appear under the [Wireless Receiver Supervisor Object](#) in the [Navigation Tree](#).

Note: The Wireless Sensor object is **not** available for network engines updated to Release 9.0.7 or later.

Wireless Sensor Attributes

This object contains attributes common to many Metasys system objects. These common attributes are described in the [Common Object Attributes](#) section. This section includes attributes of the Focus/Configuration tab, the Diagnostics tab (if applicable), and any other tab specific only to this object. See the [Object and Feature Tabs](#) section for information on the attributes that appear on the other tabs of this object (for example, the Hardware and Options tab appear on point objects).

- Note:** In the Notes column, letters indicate the following: C - Configurable, D - Default Attribute for Display, N - Value Not Required, R - Affected by Extension's Reliability, W - Writable.

Table 166: Wireless Sensor Object Attributes - Focus/Configuration Tab

Attribute Name	Notes	Initial Value	Values/Options/Range	Attribute Description
Low Battery			Reliability from the Reliability attribute.	Indicates if any wireless sensors defined as children of the Wireless Receiver Objects have a low battery. The Low Battery status is an advanced warning that can occur many days before a wireless sensor ceases to function. You can configure an alarm for this attribute to allow the building operator time to locate the sensor and change the battery. The sensor sends a low battery signal when there is 30 days of battery life left.
Max Value	C,W	3.0	Range = -10 to 100 Units from the Units attribute.	Indicates the maximum value allowed for the Setpoint. This is the value of the Setpoint attribute when the Setpoint adjust dial on the wireless sensor is in the fully clockwise position. If the Min Value is greater than the Max Value, the Setpoint is forced to the Min Value. Otherwise, these attributes are all used to compute the Setpoint with the following formula: $SP = [(Max\ Value - Min\ Value) \times (dial\ position \times 0.01)] + Min\ Value$
Min Value		-3.0	Range = -10 to 100 Units from the Units attribute.	Indicates the minimum value allowed for the Setpoint. This is the value of the Setpoint attribute when the Setpoint adjust dial on the wireless sensor is in the fully counterclockwise position. If the Min Value is greater than the Max Value, the Setpoint is forced to the Min Value. Otherwise, these attributes are all used to compute the Setpoint with the following formula: $SP = [(Max\ Value - Min\ Value) \times (dial\ position \times 0.01)] + Min\ Value$
Occupancy Request	C,W			Represents an object reference to the Binary Value object that represents the BV 0 Occupancy Request object of the Zone Sensor device.
Occupancy Status			Uses Unocc Occ (Set 106).	Changes to Occupied after pushing the Temporary Occupied button on the Transmitter, if supported by that model. The Occupied state is held for the minutes defined by the Occupancy Time attribute, or until cancelled by a release command.
Occupancy Time	C,W	2	Range = 2-240 minutes	Indicates the time in minutes that the Occupied Output (if defined) is overridden to the Occupied state after pushing the Temporary Occupied button on the Transmitter.

Table 166: Wireless Sensor Object Attributes - Focus/Configuration Tab

Attribute Name	Notes	Initial Value	Values/Options/Range	Attribute Description
Occupied Output	C,N,W			<p>Provides an optional reference to a binary object located anywhere on the Metasys network. The binary object is commanded to Occupied/Unoccupied when the Occupancy Status attribute changes states.</p> <p>The Present Value attribute of the referenced object at the Priority Scheduling optimal start (OST) priority writes to the output commands. The Present Value attribute of the referenced object at the Priority Scheduling OST priority writes the None Data Type value to the release commands.</p> <p>These operations assume that the referenced object is an output object that has a Present Value that can be written to. Keep this in mind when mapping objects from controllers. You would normally map these points as input points (AI, BI, MSI), but for proper operation you must map the points as output points (AO, BO, MSO).</p>
Offset	C,W	0	Range = +/- 3 degrees Units from the Units attribute.	Indicates the offset value that is added to the zone temperature reading before updating the Present Value, forcing the Present Value to match a calibrated temperature measured at the wireless sensor.
Present Value			Units from the Units attribute and reliability from the Reliability attribute.	Indicates the zone temperature reading at the wireless sensor.
Property Code	C,W	1	Range = 1-31	Indicates the Property Code address of the wireless sensor. This setting must match the Property Code address switch setting of the wireless temperature sensor.
Reliability Action	C,W	None	Uses Reliability Action (Set 14).	Indicates the action taken on the three output references (Zone Temp Output, Setpoint Output, and Occupied Output) when the wireless sensor object goes Unreliable. The actions are No Action or Release commands.
Setpoint			Units from the Units attribute and reliability from the Reliability attribute.	<p>Indicates the Setpoint based on three variables: the Setpoint Adjustment reading (the setpoint adjust dial position) at the wireless sensor, the Min Value, and the Max Value.</p> <p>The wireless sensor model determines the Setpoint Adjustment. Options include:</p> <ul style="list-style-type: none"> - None - Warmer/Cooler (Range = +/- 5 Deg F) - Remote Setpoint (Range = 55 to 85 Deg F/13 to 29 Deg C) <p>If the Min Value is greater than the Max Value, the Setpoint is forced to the Min Value. Otherwise, these attributes are all used to compute the Setpoint with the following formula:</p> $SP = [(Max\ Value - Min\ Value) \times (dial\ position \times 0.01)] + Min\ Value$

Table 166: Wireless Sensor Object Attributes - Focus/Configuration Tab

Attribute Name	Notes	Initial Value	Values/Options/Range	Attribute Description
Setpoint Output	C,N,W			<p>Provides an optional reference to a temperature Setpoint object located anywhere on the Metasys network. The temperature Setpoint object is commanded when the wireless sensor reports an updated Setpoint value.</p> <p>The Present Value attribute of the referenced object at the Priority Scheduling OST priority writes to the output commands.</p> <p>The Present Value attribute of the referenced object at the Priority Scheduling OST priority writes the None Data Type value to the release commands.</p> <p>These operations assume that the referenced object is an output object that has a Present Value that can be written to. Keep this in mind when mapping objects from controllers. You would normally map these points as input points (AI, BI, MSI), but for proper operation you must map the points as output points (AO, BO, MSO).</p>
Time Remaining			Units = Minutes	Indicates the time remaining before the Occupied Output (if defined) is released from the Occupied state.
Transmitter Id	C,W	0	Range = 1-511	Indicates the sensor transmitter Id address of the wireless sensor. This setting must match the transmitter Id address switch setting of the wireless sensor.
Units	C,W	Deg F	Uses Unit Set (Set 869).	Indicates the engineering units displayed on the user interface (Deg F or Deg C). All temperature and Setpoint values convert to the proper units.
Zone Temp Output	C,N,W			<p>Provides an optional reference to a temperature input object located anywhere on the Metasys network. The temperature input object is commanded when the wireless sensor reports an updated Present Value.</p> <p>The Present Value attribute of the referenced object at the Priority Scheduling OST priority writes to the output commands and writes the None Data Type value to the release commands.</p> <p>These operations assume that the referenced object is an output object that has a Present Value that can be written to. Keep this in mind when mapping objects from controllers. You would normally map these points as input points (AI, BI, MSI), but for proper operation, you must map the points as output points (AO, BO, MSO).</p>

Table 167: Wireless Sensor Object Attributes - Diagnostic Tab

Attribute Name	Initial Value	Values/Options/Range	Attribute Description
Missed Transmissions			Indicates the number of wireless sensor transmissions missed by the wireless receiver. The Wireless Receiver Supervisor Object's Clear Statistics command resets this attribute.
RF Quality			Indicates the signal quality level with respect to unwanted wireless noise or interference. This attribute displays a number from 0 to 100. A number less than 50 indicates too much interference.
Rx Data Life Errors			Indicates the diagnostic measure of the number of Data Life detected by the receiver module. Data Life errors occur when a wireless sensor does not report its status to the wireless receiver before the Max Data Life timer expires. The Wireless Receiver Supervisor Object's Clear Statistics command resets this attribute.
Signal Strength		Units = Percent	Indicates the wireless signal strength of the wireless sensor as recorded by the wireless receiver module.

Wireless Sensor Commands

The table below lists the commands supported by the [Wireless Sensor Object](#).

Table 168: Wireless Sensor Object Commands

Command Name	Parameters	Description
Release	None	Releases the effects of the Temporary Occupancy button pressed at the wireless sensor. This command resets the Time Remaining attribute and releases any defined outputs.

XL5K Controller Object

The XL5K Controller object (Honeywell Excel 5000 [XL-5000]) maps a C-Bus field device to the Metasys system. The object contains pertinent addressing information.

Note: The XL5K Controller object is **not** available for network engines updated to Release 9.0.7 and later.

XL5K Controller Attributes

This object contains attributes common to many Metasys system objects. These common attributes are described in the [Common Object Attributes](#) section. This section includes attributes of the Focus/Configuration tab, the Diagnostics tab (if applicable), and any other tab specific only to this object. See the [Object and Feature Tabs](#) section for information on the attributes that appear on the other tabs of this object (for example, the Hardware and Options tab appear on point objects).

Note: In the Notes column, letters indicate the following: C - Configurable, D - Default Attribute for Display, N - Value Not Required, R - Affected by Extension's Reliability, W - Writable.

Table 169: XL5K Controller Attributes - Focus/Configuration Tab

Attribute Name	Notes	Initial Value	Values/Options/Ranges	Attribute Description
Enabled	C,W	True		If True, allows the controller to be integrated into the Metasys system extended architecture.
Graphic	C,W			Indicates the graphic associated with the object.

Table 169: XL5K Controller Attributes - Focus/Configuration Tab

Attribute Name	Notes	Initial Value	Values/ Options/ Ranges	Attribute Description
Graphic Alias	C,W		Maximum 256 characters	Indicates a portion of the graphic's item reference, up to and including the name of the folder containing this object or the controller containing this point.
Offline				Indicates the offline/online state of the connected hardware.
Present Value		0 (Offline)	Uses Controller Status	Indicates the communication status of the device.

Table 170: XL5K Controller Attributes - Diagnostic Tab

Attribute Name	Initial Value	Values/Options/Ranges	Attribute Description
Error Percent			Indicates the computed error rate for communications to the device using the following equation: (Errors Today + Retries Today) / Number of Packets Today.
Errors Today			Indicates the number of transmissions (packets) since midnight that had errors (for example, the data was returned, but the data contained errors).
Packets Today			Indicates the number of transmissions (packets) since midnight.
Point Scan Time			Indicates the total amount of time to scan for point data from this controller.
Retries Today			Indicates the number of transmissions (packets) since midnight where no response data was obtained, causing the transmission to be retried.
Transmits Per Minute			Indicates the calculated number of transmissions per minute.

XL5K Controller Commands

The table below lists the commands supported by the [XL5K Controller Object](#).

Table 171: XL5K Controller Commands

Command Name	Parameters	
Clear Statistics	None	Resets the statistics for the integrated XL-5000 network.
Disable	None	Disables the XL-5000 controller integration. No requests are made to the field trunk for that controller and all packets received from the Honeywell field device are ignored.
Enable	None	Allows the integration to function normally.
Latch Statistics	None	Updates the displayed statistics with the current values.

Field Point

Menu Selection: **Insert > Field Point**

Inserts one of the following types of field points into a field device under an integration:

- • **N2 Trunk**
Analog Input Object (AI), Analog Output Object (AO), Accumulator Object, Binary Input Object (BI), Binary Output Object (BO), Multistate Input Object (MI), Multistate Output Object (MO)
 - • **BACnet**
All field points listed for the N2 trunk plus Analog Value Object (AV), Averaging Extensions, Binary Value Object (BV), Calendar Object, Electric Demand Control Object, Electric Demand Monitoring Object, Event Enrollment Object, Generator Load Control Object, Group Object, Life Safety Point Object, Life Safety Zone Object, Multistate Value Object (MV), Notification Class Object, Schedule Object, Trend Log
 - • **IP Field Controller**
Analog Input Object (AI), Analog Output Object (AO), Analog Value Object (AV), Accumulator Object, Binary Input Object (BI), Binary Output Object (BO), Binary Value Object (BV), Calendar Object, Multistate Value Object (MV), Notification Class Object, Schedule Object, Trend Log
 - • **MS/TP Field Bus Integration**
Analog Input Object (AI), Analog Output Object (AO), Analog Value Object (AV), Accumulator Object, Binary Input Object (BI), Binary Output Object (BO), Binary Value Object (BV), Calendar Object, Multistate Value Object (MV), Notification Class Object, Schedule Object, Trend Log
 - • **LON Trunk**
Analog Input Object (AI), Analog Output Object (AO), Accumulator Object, Binary Input Object (BI), Binary Output Object (BO), Multistate Input Object (MI), Multistate Output Object (MO), Generic Integration Object (GIO)
 - **Note:** You can no longer manually add a GIO to a LON trunk; however, the GIO is still supported in existing databases, even after upgrading to the next software release.
 - • **N1 Migration**
All field points listed for the N2 trunk plus Generic Integration Object (GIO) and N1 PID Loop Object.
 - • **VND Integration (Vendor)**
Analog Input Object (AI), Analog Output Object (AO), Accumulator Object, Binary Input Object (BI), Binary Output Object (BO), Multistate Input Object (MI), Multistate Output Object (MO)
 - • **Wireless Supervisor Integration**
Wireless Sensor Object
 - • **XL5K (Excel 5000/XL-5000) Integration**
XL5K Integration Object
- ✓ **Tip:** On the Select Definition Mode screen, select Assisted Point Definition to automatically discover existing points on the network. Or on the Select Definition Mode screen, select Manual Point Definition.

- ✓ **Tip:** Specifying the Instance Number for a field device point is different depending on if you are defining the point online or offline with SCT. If you are inserting the point online, you specify the Instance Number on the Select Data Source screen. If you are inserting the point offline with SCT, the Select Data Source screen is blank, and you define the Instance Number on the Configure screen under the Hardware tab, which is two screens later in the Insert Point wizard.
- ✓ **Tip:** When adding a LonWorks point manually, the Target Reference appears blank. Manually type the path for the Target Reference (path into the controller for the data being mapped by the object) in the text box on the Select Data Source screen.
- ✓ **Tip:** Select the Hardware tab on the Configure screen for further configuration.

See one of the following sections for more information:

- [Related Documentation](#)
- [N2 Master Datalink Object \(N2 Trunk\)](#)
- [BACnet IP Integration Object](#)
- [MS/TP Field Bus Integration Object](#)
- [LON Integration Object](#)
- [N1 Migration Object](#)
- [VND Integration Object](#)
- [Wireless Sensor Object](#)
- [XL5K Integration Object](#)

Analog Input Object

The AI object processes data from a physical analog input point that resides on a field device and presents the data to the Metasys system in a consistent format that is independent of the source. Analog Input Objects appear under the field device object in the All Items navigation tree.

When the source of the data is an analog input in an N2 controller on the N2 Trunk, a Network Communication Module (NCM) on an integrated N1 network, or an integrated BACnet device, the Analog Input Object exchanges data with the **native** analog object in the source to synchronize attribute data that are common to both. The source is identified under the hardware tab of the Analog Input Object.

For general information on Metasys system objects, see [Common Object Attributes](#).

Analog Input Attributes

This object contains attributes common to many Metasys system objects. This section includes attributes of the Focus/Configuration tab. See the [Object and Feature Tabs](#) section for information on the attributes that appear on the other tabs of this object (for example, the Hardware and Options tab appear on point objects).

- ① **Note:** In the Notes and BACnet Notes columns, letters indicate the following: B - Exposed as standard BACnet property, C - Configurable, D - Default Attribute for Display, N - Value Not Required, R - Affected by Extension's Reliability, W - Writable.

Table 172: Analog Input Object Attributes - Focus/Configuration Tab

Attribute Name	Notes	BACnet Notes	Initial Value	Descriptions
COV Increment	C,W	B,W	0.1	Defines the minimum change in the Present Value required for the object to report a change to other feature objects. For MS/TP Analog Inputs, COV Increment may not be writable, based on its configuration.
Device Type	C,N,W	C,N,W	Null	Contains a description of the physical device connected to the object.
Display Precision	C,W	C,W	10ths	Defines the decimal rounding and the decimal places to display for the Present Value and associated attributes.
Intrinsic Alarming Defined	C		False	Enables the BACnet Intrinsic Alarming feature in the object and the definition of related attributes. For detailed information, see BACnet Intrinsic Alarming .
Max Value	C,W	B,W	1.7E38	Defines the highest reliable value (in engineering units) for the Present Value.
Min Value	C,W	B,W	-1.7E38	Defines the lowest reliable value (in engineering units) for the Present Value.
Out of Service	C,W	B,W	False	De-couples the object from the physical input. When Out of Service is True, the object de-couples the Present Value and Reliability from the hardware. The Reliability is writable when Out Of Service is True. When de-coupled, the Present Value can be changed to simulate specific conditions or for test purposes. Additionally, the Out of Service state of the Status Flags attribute is set to True and the Fault state is decoupled from the physical input when Out of Service is True.
Out of Service Expiration Time			Unspecified	Holds the time and date of when the Temporary Out-of-Service command last issued expires. The time and date to expire is calculated by adding the duration specified for the Temporary Out of Service command to the current time. Once the current time becomes equal to the time mentioned in this attribute, the Out of Service attribute is set to False.
Present Value	DNRW	DNRW		Indicates the current value of the analog input object in the defined Units. When Out of Service is True, this attribute is writable.
Reliability	W	B,W	Reliable	Indicates whether the Present Value is unreliable. Examples: Reliable - No detectable faults Unreliable High - Present Value is greater than the Max Value. Unreliable Low - Present Value is less than the Min Value. When Out of Service is True, the Reliability attribute may be written directly.
Resolution		B		Indicates the smallest possible change in Present Value (in engineering units) and is equal to the Display Precision. This attribute has the data type required by the standard BACnet property.

Table 172: Analog Input Object Attributes - Focus/Configuration Tab

Attribute Name	Notes	BACnet Notes	Initial Value	Descriptions
Status Flags		B	False, False, False, False	Indicates the general status of the Analog Input object in BACnet terms and contains four independent states. The four flags are: In Alarm - False if the Event State attribute value is Normal; otherwise, the In Alarm flag is True. (Set only by BACnet Intrinsic Alarming.) Fault - True (1) if the Reliability attribute is not reliable; otherwise, the Fault flag is False. Overridden - Overridden flag is True if the Present Value is overridden at the hardware source level. Out of Service - Out of Service flag is True if the Out of Service attribute value is True; otherwise, the Out of Service flag is False.
Units	C,W	W	Deg F	Indicates the engineering measurement units used by the object.
Update Interval		B	0	Indicates the time period (in hundredths of a second) between updates to Present Value when the input is not overridden or out of service.
Use COV Min Send Time	W		False	Configures the MS/TP Analog Input object to send COV messages on a periodic basis instead of on every change of value that exceeds the COV Increment. This attribute is typically set to True for objects with values that fluctuate greatly, such as air pressure, to decrease the number of COV messages. The change of value still must exceed the COV Increment to be reported. This attribute is available only on Metasys system field devices, such as the MS/TP field devices.
Use Remote Alarming		B,C,W	False	When the attribute Intrinsic Alarming Defined is set to True, determines where alarms for the object originate. If the remote integrated object contains attributes for originating alarms, then Use Remote Alarming defaults to True, causing the local mapper object to accept alarms from the remote integrated object that are routed to the NxE. If the remote integrated object does not contain attributes for originating alarms, then Use Remote Alarming defaults to False causing the local mapper object to originate alarms. When Use Remote Alarming is false, any alarms from the remote integrated object are ignored at the NxE. If the value of Use Remote Alarming is changed, a restart of the NxE may be required to assure correct operation. This attribute applies only to BACnet integrations.

Analog Input Commands

The table below lists the commands supported by the Analog Input Object.

Table 173: Analog Input Commands

Command Name	Parameters	Description
Disable Alarms	None	Disables all types of alarming: alarm extensions, BACnet intrinsic alarming, and BACnet Event Enrollment objects.
Enable Alarms	None	Enables all types of alarming: alarm extensions, BACnet intrinsic alarming, and BACnet Event Enrollment objects.
In Service	None	<p>Cancels the affect of an Out of Service command and returns the Out of Service attribute to False. The Present Value and Reliability will revert back to the values obtained from the physical input.</p> <p>① Note: For BACnet objects, this command is dependent on the ability to write the Out Of Service attribute of the BACnet Analog Input object in the remote BACnet device. Objects in the N30, for example, do not support this command.</p>
Out of Service	The value to be written to the Present Value attribute.	<p>Allows a user to override the object’s hardware input for simulation or other purposes. The Out Of Service command will change the Out of Service attribute to True, write the Present Value to the value of the command parameter and write the Reliability attribute to Reliable. The Present Value and Reliability will no longer track the physical input. When an Out Of Service command is issued, the Nx E does not communicate subsequent changes (operator or system) to the field device.</p> <p>Notes:</p> <ul style="list-style-type: none"> • For BACnet objects, this command is dependent on the ability to write the Out Of Service attribute of the BACnet Analog Input object in the remote BACnet device. Objects in the N30, for example, do not support this command. • For integrated N2 objects, this command is dependent on the ability to set the AI point in the N2 controller to an override state. System 91 controllers, for example, do not support this command.
Temporary Out of Service	The value to be written to the Present Value attribute, along with the hours and minutes that the out of service state is temporarily active.	Allows a user to temporarily override the object’s hardware input for simulation or other purposes for a specified period of time stated in hours and minutes. This command has the same function as an Out of Service command but with the time element.

Analog Output Object

The AO object's attributes represent the external, visible characteristics of an analog output. This object integrates N1, N2, and BACnet controllers into supervisory controllers, resulting in:

- a consistent interface to point objects for all controller types, so they appear as a homogenous set to the user interface
- flexibility in point mapping
- permanent update of setpoints in controllers. The user has the ability to write to the permanent memory of some controllers.
- support for all Metasys controllers
- For example, this object allows you to command a damper to a given position from a supervisory controller.

For general information on Metasys system objects, see [Common Object Attributes](#).

Analog Output Attributes

This object contains attributes common to many Metasys system objects. This section includes attributes of the Focus/Configuration tab, the Diagnostics tab (if applicable), and any other tab specific only to this object. See the [Object and Feature Tabs](#) section for information on the attributes that appear on the other tabs of this object (for example, the Hardware and Options tab appear on point objects).

Note: In the Notes and BACnet Notes columns, letters indicate the following: B - Exposed as standard BACnet property, C - Configurable, D - Default Attribute for Display, N - Value Not Required, R - Affected by Extension's Reliability, W - Writable.

Table 174: Analog Output Object Attributes - Focus/Configuration Tab

Attribute Name	Notes	BACnet Notes	Initial Value	Values/Options/Range	Description
COV Increment	C,W	B,W	0.1	Any value > 0	Specifies the minimum change in Present Value required for the object to report a change. For MS/TP Analog Outputs, COV Increment may not be writable, based on its configuration.
Current Command Priority		B		1 - 16	Indicates the command priority currently assigned to the object. A blank in this field indicates the object is not under any command.
Device Type	C,W	W	Null	Limit: 20 characters	Contains a description of the physical device connected to the object.
Display Precision	C,W	C,W	10ths		Defines the decimal rounding and the decimal places to display of the Present Value and associated attributes.
Intrinsic Alarming Defined	C		False		Enables the BACnet Intrinsic Alarming feature in the object and the definition of related attributes. For detailed information, see BACnet Intrinsic Alarming .
Max Value	C,W	B,W	100.0	This attribute is not Writable for a PAO.	Defines the highest reliable value (in engineering units) for the Present Value.
Min Value	C,W	B,W	0.0	This attribute is not Writable for a PAO.	Defines the lowest reliable value (in engineering units) for the Present Value.

Table 174: Analog Output Object Attributes - Focus/Configuration Tab

Attribute Name	Notes	BACnet Notes	Initial Value	Values/Options/Range	Description
Out of Service	C,W	B,W			Used to de-couple the object from the physical output. When Out of Service is True, the object de-couples the Present Value and Reliability from the hardware. The Reliability is writable when Out Of Service is True. When de-coupled, the Present Value can be changed to simulate specific conditions or for test purposes. Additionally, the Out of Service state of the Status Flag attribute is set to True and the Fault state is decoupled from the physical input when Out of Service is True.
Present Value	DNRW	B,W	0.0		Indicates the current value of the Analog Output object in the defined Units. When Out of Service is True, this attribute is writable.
Priority Array					Lists values of the object in level of importance.
Reliability	W	B,W	0	No Fault Detected (Reliable), Open Loop, Shorted Loop, No Output, Unreliable Other	Indicates whether the Present Value is unreliable. Examples: Reliable - No detectable faults Unreliable High - Present Value is greater than the Max Value. Unreliable Low - Present Value is less than the Min Value. When Out of Service is True, the Reliability attribute may be written directly.
Resolution		B	0.1		Indicates the smallest possible change in Present Value (in engineering units) and is equal to the Display Precision. This attribute has the data type required by the standard BACnet property.
Status Flags		B	False, False, False, False	In Alarm, Fault, Overridden, Out of Service	Indicates the general status of the Analog Output object in BACnet terms and contains four independent states. The four flags are: In Alarm - False if the Event State attribute value is Normal; otherwise, the In Alarm flag is True. (Set only by BACnet Intrinsic Alarming.) Fault - True (1) if the Reliability attribute is not reliable; otherwise, the Fault flag is False. Overridden - Overridden flag is True if the Present Value is overridden at the hardware source level. Out of Service - Out of Service flag is True if the Out of Service attribute value is True; otherwise, the Out of Service flag is False.
Units	C,W	W	%	This attribute is not Writable for a PAO.	Indicates the engineering measurements units used by the object.

Table 174: Analog Output Object Attributes - Focus/Configuration Tab

Attribute Name	Notes	BACnet Notes	Initial Value	Values/Options/Range	Description
Use COV Min Send Time	W		False		Configures the object to send COV messages on a periodic basis instead of on every change of value that exceeds the COV Increment. This attribute is typically set to True for objects with values that fluctuate greatly, such as air pressure, to decrease the number of COV messages. The change of value still must exceed the COV Increment to be reported. This attribute is available only on Metasys system field devices, such as the MS/TP field devices.
Use Remote Alarming		B,C,W	False		When the attribute Intrinsic Alarming Defined is set to True, determines where alarms for the object originate. If the remote integrated object contains attributes for originating alarms, then Use Remote Alarming defaults to True, causing the local mapper object to accept alarms from the remote integrated object that are routed to the NxE. If the remote integrated object does not contain attributes for originating alarms, then Use Remote Alarming defaults to False causing the local mapper object to originate alarms. When Use Remote Alarming is false, any alarms from the remote integrated object are ignored at the NxE. If the value of Use Remote Alarming is changed, a restart of the NxE may be required to assure correct operation. This attribute applies only to BACnet integrations.

Analog Output Commands

The table below lists the commands supported by the [Analog Output Object](#).

For the Release Operator Override, Release, and Release All commands, if all Command Priorities have been released and a Relinquish Default is not defined, the supervisory controller gives control to the actual hardware. The Setpoint command is supported by N2 protocol only. Note that this command does not work on new controllers.

Table 175: Analog Output Commands

Command Name	Parameters	Description
Adjust	The value to be written to the Present Value. The value must be less than Max Present Value and greater than Min Present Value.	<p>Releases Command Priorities 9 through 15 (Scheduling) and then writes to the Present Value at the Default (16) command priority. The value must be less than Max Present value and greater than Min Present Value.</p> <p>► Important: Be aware that an operator Adjust command releases the actions of any processes running to the object in the network engine or FEC controllers that use Priorities 9 through 16. Consider this behavior when creating control strategies.</p> <p>If Local Control is True, this command is rejected. The command is only sent when one of the following conditions is met:</p> <ul style="list-style-type: none"> • NOT Local Control and NOT Out Of Service, or
Disable Alarms	None	Disables all types of alarming: alarm extensions, BACnet intrinsic alarming, and BACnet Event Enrollment objects.
Enable Alarms	None	Enables all types of alarming: alarm extensions, BACnet intrinsic alarming, and BACnet Event Enrollment objects.
In Service	None	<p>Cancels the affect of an Out of Service command and returns the Out of Service attribute to False. The Present Value and Reliability will revert back to the values obtained from the physical hardware output.</p> <p>ⓘ Note: For BACnet objects, support of this command is dependent on the ability to write the Out Of Service attribute.</p>
Operator Override	The value to be written to the Present Value.	<p>Updates the Present Value at Command Priority Operator Override (8).</p> <p>The Operator Override command sends the specified command to the internal network engine object, which is then only sent to the field device when not Out Of Service.</p>

Table 175: Analog Output Commands

Command Name	Parameters	Description
Out of Service	None	<p>Allows a user to override the object’s hardware output for simulation or other purposes. The Out of Service command changes the Out of Service attribute to True. The Present Value and Reliability no longer track the physical output. No commands are sent to the actual hardware. When the Out of Service attribute is set to False, the current Present Value is sent to the actual hardware.</p> <p>When an Out Of Service command is issued, the network engine does not communicate subsequent changes (operator or system) to the field device.</p> <p>For BACnet objects, support of this command is dependent on the ability to write the Out Of Service attribute.</p>
Release Operator Override	None	Releases Command Priority Operator Override (8) from Present Value.
Release	Attribute name Command priority	Releases the identified Command Priority from the specified attribute and allows the next highest priority to control it.
Release All	Attribute name	<p>Releases Command Priorities 3 through 16 (Default), from the specified, writable attribute. Command Priorities 1 and 2 remain.</p> <p>► Important: The Release All command may not cause an immediate return to automatic operation. The Release All command clears all command priorities, including those that come from applications and features. When this happens, the output point goes to its Relinquish Default condition. In some cases, the application or feature may have sent a command that does not match Relinquish Default. In this instance, the output point does not end in the state that the applications or features intended. This situation can cause unexpected operation to occur; for example, a space could overcool or overheat, a fan might run longer than expected, and so on. If an operator has overridden an input, use the Release Operator Override command.</p>
Setpoint	None	Writes the value to the permanent memory of the field device and may change the Present Value if there is no override.
Temporary Override	The value to be written to the Present Value attribute, in addition to the duration of the override in hours and minutes.	Overrides a point temporarily for a specified period of time. After the specified time period passes, the Override is automatically released.

Analog Value Object

Menu Selection: *Insert > Object > AV*

Analog Value (AV) objects have similar software characteristics and capabilities to [Analog Input Objects](#); however, Analog Value objects are not associated with any physical hardware and are the result of a control process or operator entry. This object allows you to hold an analog value for other objects to reference. For example, an [LON Integration Object](#) can reference and base its operation on an analog value such as Outdoor Air Temperature Low Limit.

For general information on Metasys objects, see [Common Object Attributes](#).

Analog Value Attributes

This object contains attributes common to many Metasys system objects. This section includes attributes of the Focus/Configuration tab. See the [Object and Feature Tabs](#) section for information on the attributes that appear on the other tabs of this object (for example, the Hardware and Options tab appear on point objects).

Note: In the Notes and BACnet Notes columns, letters indicate the following: B - Exposed as standard BACnet property, C - Configurable, D - Default Attribute for Display, N - Value Not Required, R - Affected by Extension's Reliability, W - Writable.

Table 176: Analog Value Object Attributes - Focus/Configuration Tab

Attribute Name	Notes	BACnet Notes	Initial Value	Values/Options/Range	Description
Connected To Internal Application		B, W	No	No or Yes	Indicates whether the object is connected to an internal application.
COV Increment	C,W	B,W	0.01	Any value > 0	Defines the minimum change in the Present Value required for the object to report a change. The COV Increment attribute is required if the object supports COV reporting.
Current Command Priority		B		1 - 16	Indicates the command priority currently assigned to the object. A blank in this field indicates the object is not under any command.
Display Precision	C,W	C,W	10ths		Defines the decimal rounding and the decimal places to display of the Present Value and associated attributes.
Failsoft Currently Active				Yes or No	Specifies whether the Failsoft feature is currently overriding the input value to a reliable default. If No, Failsoft is disabled or, if Failsoft is enabled, the value is reliable. If Yes, Failsoft is enabled and the value is unreliable. This attribute is only used if Property Ref Value is defined to reference an application.
Intrinsic Alarming Defined	C		False		Enables the BACnet Intrinsic Alarming feature in the object and the definition of related attributes. For detailed information, see BACnet Intrinsic Alarming .

Table 176: Analog Value Object Attributes - Focus/Configuration Tab

Attribute Name	Notes	BACnet Notes	Initial Value	Values/Options/ Range	Description
Max Value	C,W	B,W	1.7E38	This value is not writable for FEC objects. This value is writable if the AV is the ZN-SP on a Net Sensor. This method is the only way to set the range for the Net Sensor.	Defines the highest reliable value (in engineering units) for the Present Value. This value is not writable for Analog Value objects in the FEC. This value is writable if the AV is the ZN-SP on a Net Sensor. This method is the only way to set the range for the Net Sensor.
Min Value	C,W	B,W	-1.7E38	This value is not writable for FEC objects. This value is writable if the AV is the ZN-SP on a Net Sensor. This method is the only way to set the range for the Net Sensor.	Defines the lowest reliable value (in engineering units) for the Present Value. This value is not writable for Analog Value objects in the FEC. This value is writable if the AV is the ZN-SP on a Net Sensor. This method is the only way to set the range for the Net Sensor.
Monitor Only				False	Defines the behavior of the object as an input or output. If you do not specify a Property Ref Value, the attribute is set to False. This attribute appears only in the Snapshot Focus view.
Out of Service		W	False	Always False	This attribute is always False for this object due to the absence of hardware.
Present Value	D,R,W	D,R,W			Indicates the current value of the analog value. Present Value is optionally commandable. The optional Priority Array must be present for Present Value to be commandable. Values written to Present Value are compared with the Min Value and Max Value attributes and set the Reliability.
Priority Array					Contains prioritized commands in effect for the object. The highest priority command is sent to the Present Value attribute.
Property Ref Value	N			Object Name, Reference, Attribute	Specifies an object and attribute (usually from an application) for which the AV object is providing the standard interface. The object and attribute contained in this attribute must be a local object and is often a non-BACnet data source and destination. When this property is not defined, the Monitor Only property is set to False. This attribute appears only in the Snapshot Focus view.
Referenced Reliability				No Input	Specifies the current reliability of the value sent to or from the object/attribute referenced by Property Ref Value. This attribute is only used if Property Ref Value is defined to reference an application.

Table 176: Analog Value Object Attributes - Focus/Configuration Tab

Attribute Name	Notes	BACnet Notes	Initial Value	Values/Options/Range	Description
Referenced Value					Specifies the current value sent to or from the object/attribute referenced by Property Ref Value. This attribute is only used if Property Ref Value is defined to reference an application.
Referenced Value COS Count	W		0		Counts how many times the Present Value and Reliability have changed. If the Monitor Only attribute is True, the count is how many times the Property Ref Value has updated the AV. If Monitor Only is False, the count is how many times Property Ref Value has updated the AV. This attribute helps to diagnose excessive changes that can cause logic to execute taking up too much bandwidth. Reset the count by entering 0 for this attribute. This attribute is only used if Property Ref Value is defined to reference an application.
Reliability	W	B,W	Reliable	See the attribute description for details on Reliability. No Fault Detected (Reliable), Over Range, Under Range, Unreliable Other	Indicates whether the Present Value is unreliable. Examples: Reliable - No detectable faults Unreliable High - Present Value is greater than the Max Value. Unreliable Low - Present Value is less than the Min Value. When Out of Service is True, the Reliability attribute may be written directly.
Status Flags		B	False, False, False, False	See the attribute description for details on Status Flags. In Alarm, Fault, Overridden, Out of Service	Indicates the general status of the Analog Input object in BACnet terms and contains four independent states. The four flags are: In Alarm - False if the Event State attribute value is Normal; otherwise, the In Alarm flag is True. (Set only by BACnet Intrinsic Alarming.) Fault - True (1) if the Reliability attribute is not reliable; otherwise, the Fault flag is False. Overridden - Overridden flag is True if the Present Value is overridden at the hardware source level. Out of Service - Out of Service flag is True if the Out of Service attribute value is True; otherwise, the Out of Service flag is False.

Table 176: Analog Value Object Attributes - Focus/Configuration Tab

Attribute Name	Notes	BACnet Notes	Initial Value	Values/Options/Range	Description
Units	W	W	Blank		Reflects the Units attribute of the object referenced by the Present Value Reference attribute.
Use Remote Alarming		B,C,W	False		When the attribute Intrinsic Alarming Defined is set to True, determines where alarms for the object originate. If the remote integrated object contains attributes for originating alarms, then Use Remote Alarming defaults to True, causing the local mapper object to accept alarms from the remote integrated object that are routed to the network engine. If the remote integrated object does not contain attributes for originating alarms, then Use Remote Alarming defaults to False causing the local mapper object to originate alarms. When Use Remote Alarming is false, any alarms from the remote integrated object are ignored at the network engine. If the value of Use Remote Alarming is changed, a restart of the network engine may be required to assure correct operation. This attribute applies only to BACnet integrations.

Analog Value Commands

The table below lists the commands supported by the Analog Value Object.

Table 177: Analog Value Object Commands

Command	Parameters	Description
Adjust	None	The value to be written to the Present Value attribute. The value must be less than Max Present value and greater than Min Present Value.
Disable Alarms	None	Disables all types of alarming: alarm extensions, BACnet intrinsic alarming, and BACnet Event Enrollment objects.
Enable Alarms	None	Enables all types of alarming: alarm extensions, BACnet intrinsic alarming, and BACnet Event Enrollment objects.
Operator Override	None	The value to be written to the Present Value attribute.
Release Operator Override	None	Releases Command Priority Operator Override (8) from Present Value.
Release	None	Releases the identified command priority from the specified, writable attribute, and allows it to be controlled by the next highest priority.

Table 177: Analog Value Object Commands

Command	Parameters	Description
Release All	None	Releases Command Priorities 3 through 16 from the specified, writable attribute. Command Priorities 1 (Manual Emergency) and 2 (Fire Application) remain. ► Important: The Release All command may not cause an immediate return to automatic operation. The Release All command clears all command priorities, including those that come from applications and features. When this happens, the output point goes to its Relinquish Default condition. In some cases, the application or feature may have sent a command that does not match Relinquish Default. In this instance, the output point does not end in the state that the applications or features intended. This situation can cause unexpected operation to occur; for example, a space could overcool or overheat, a fan might run longer than expected, and so on. Also, if an operator has overridden an input, use the Release Operator Override command.
Temporary Override	The value to be written to the Present Value attribute, in addition to the duration of the override in hours and minutes.	Overrides a point temporarily for a specified period of time. After the specified time period passes, the Override is automatically released.

Accumulator Object

Menu Selection: *Insert > Object > Accumulator*

The accumulator object allows you to count pulses, which are often provided by energy meters. The accumulator objects can feed their Present Values to the Pulse Meter Object.

ⓘ Note: The Accumulator's Interface Value updates when the hardware is read by the Pulse Meter Object or when the hardware's current value changes.

The following table describes the types of accumulator objects and how to add them to the Metasys system. The Integration (Device) Type column indicates the type of integration and device in which the accumulator object resides.

Table 178: Accumulator Types

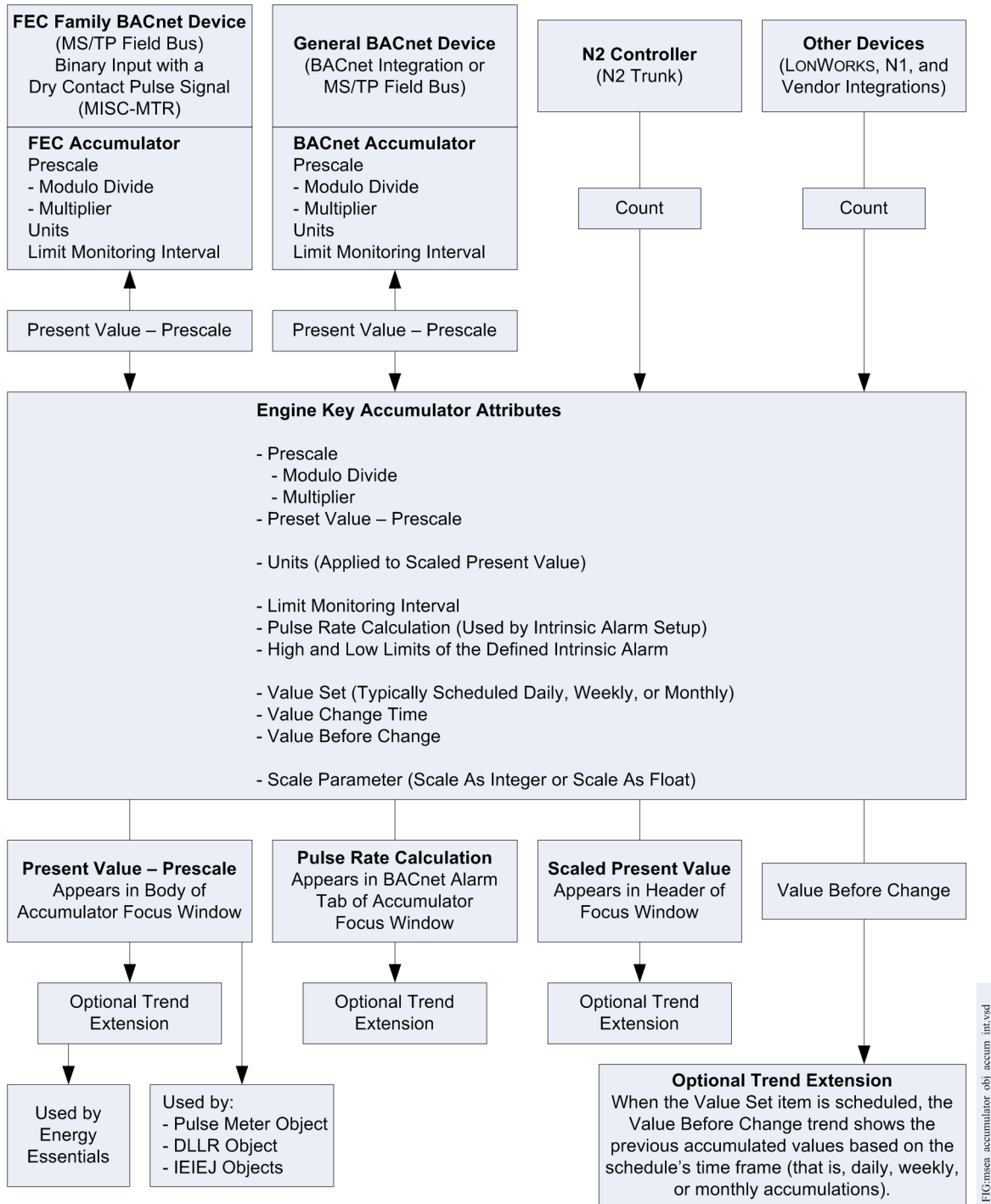
Integration (Device) Type	Description	Steps and Tips
IP BACnet Integration (BACnet Device)	<p>Provides integration of BACnet controllers with supervisory controllers through a BACnet accumulator mapper. This object provides information on the UI (including Present Value and Scale) from a BACnet integration with an accumulator that exists in a BACnet device.</p> <p>① Note: A BACnet accumulator is mapped at the engine through the Insert Point wizard.</p>	<p>To add an accumulator from a BACnet device on an IP BACnet integration:</p> <ol style="list-style-type: none"> 1. From the SMP UI or SCT UI, add a BACnet integration. 2. Add a BACnet device type compatible with the field device that contains an accumulator. 3. Map the accumulator at the engine (that is, add the Accumulator point to the mapped BACnet device using the Insert Point wizard).
MS/TP Field Bus (BACnet Device)	<p>Provides integration of BACnet controllers with supervisory controllers through a BACnet accumulator mapper. This object provides information on the UI (including Present Value and Scale) from a BACnet Integration with an accumulator that exists in a BACnet device.</p> <p>① Note: A BACnet accumulator is mapped at the engine through the Insert Point wizard.</p>	<p>To add an accumulator from a BACnet device on an MS/TP field bus:</p> <ol style="list-style-type: none"> 1. From the SMP UI or SCT UI, add an MS/TP field bus. 2. Add a BACnet device type compatible with the field device that contains an accumulator. 3. Map the accumulator at the engine (that is, add the Accumulator point to the mapped BACnet device using the Insert Point wizard).
MS/TP Field Bus (FEC Family BACnet Device)	<p>Provides integration of pulse meters integrated to the Dry Contact Pulse (MISC-MTR) binary input of an FEC family BACnet device. CCT creates an Accumulator object for the pulse meter input of the FEC family BACnet device. This FEC accumulator is shadowed by the engine.</p> <p>① Note: An FEC accumulator object is mapped at the engine through the Insert Point wizard.</p>	<p>To add an accumulator from an FEC family BACnet device on an MS/TP field bus:</p> <ol style="list-style-type: none"> 1. From the SMP UI or SCT UI, add an MS/TP field bus. 2. Add an FEC family BACnet device compatible with the field device that contains a visible accumulator (defined by CCT). 3. Map the accumulator at the engine (that is, add the Accumulator point to the mapped field device using the Insert Point wizard).

Table 178: Accumulator Types

Integration (Device) Type	Description	Steps and Tips
<p>N2 Trunk (N2 Device)</p>	<p>Provides integration of the wide variety of N2 controller binary input/pulse counters, resulting in a consistent interface for point mapping any N2 controller types.</p> <p>① Note: An N2 accumulator or pulse counter is mapped at the engine through the Insert Point wizard.</p>	<p>To add an accumulator from an N2 device on an N2 trunk:</p> <ol style="list-style-type: none"> From the SMP UI or SCT UI, add an N2 trunk. Add an N2 device type compatible with the field device. Map the accumulator (Accumulator or Pulse Counter type) at the engine (that is, add the Accumulator point to the N2 device using the Insert Point wizard). Define the Rollover Limit: <p>① Note:</p> <p>You must set the rollover limit in the N2 accumulator to match the rollover limit of the N2 field device selected. For example, AHU or UNT devices have a rollover limit of 4,294,967,295. A DX-9100 CNT point has a rollover limit set by the GX-9100 configuration tool. An XT-9100 or XTM CNT point has a rollover limit set by either the GX-9100 configuration tool or XTM configuration tool.</p> <p>Map BI7 or BI8 for an AHU, BI4 for a UNT or VAV, or ADI network point types for a DX-9100 or XTM.</p>
<p>Other Integrations (For Example, LonWorks, N1, VND, and XL5K Devices)</p>	<p>Allows you to monitor the increasing pulse count from any attribute that has an incrementing value. This provides greater flexibility for creating accumulator objects.</p> <p>① Note: An object with an attribute that has an incrementing value is mapped at the engine through the Insert Object wizard.</p>	<p>To add an accumulator from a device on other integrations:</p> <ol style="list-style-type: none"> From the SMP UI or SCT UI, add the desired integration. Add a device type compatible with the field device. Map the accumulator at the engine (that is, add the Accumulator object using the Insert Object wizard). Reference a value that continually counts up until the value wraps back to zero when it passes the Rollover Limit value defined in the accumulator object.

The following figure illustrates the interaction between the different types of accumulators and the accumulator in the engine, showing the key attributes and functionality.

Figure 37: Accumulator Interaction



An FEC family BACnet device that resides on the MS/TP field bus has a binary input with a Dry Contact Pulse signal (MISC-MTR) created in CCT. This provides an FEC accumulator. A BACnet device that resides on either the BACnet integration or the MS/TP field bus has an accumulator. Both the FEC accumulator and BACnet accumulators have BACnet Prescale, Units, and Limit Monitoring

Interval attributes that interact with the accumulator in the engine through the prescaled Present Value.

An N2 controller resides on the N2 trunk, and has an attribute that counts. Similarly, other devices that reside on other integrations (for example, a LonWorks device on a LonWorks integration) that have attributes that count may take advantage of the accumulator functionality. The accumulator in the engine uses the count value.

The accumulator in the engine uses the prescaled Present Value or counts from the devices with the key engine accumulator attributes listed in the figure. For details on the calculations used by and functionality of these attributes, see the [Accumulator Attributes](#) section.

The accumulator's prescaled Present Value is used by the Pulse Meter, DLLR, or IEIEJ objects. You can trend the prescaled Present Value, which may then be used by Energy Essentials. You also can trend the accumulator's Pulse Rate, Scaled Present Value, or Value Before Change attributes.

Note: The prescaled Present Value, as well as its associated commands and attributes (Preset Value, Value Before Change, Max Value, Value Set), do not necessarily have the same units as Scaled Present Value or the Units attribute.

The header of the focus window shows the Scaled Present Value after the scale factor has been applied to the Present Value, as well as the units that apply to the Scaled Present Value.

Accumulator Attributes

This object contains attributes common to many Metasys system objects. This section includes attributes of the Focus/Configuration tab, the Diagnostics tab (if applicable), and any other tab specific only to this object. See the [Object and Feature Tabs](#) section for information on the attributes that appear on the other tabs of this object (for example, the Hardware and Options tab appear on point objects).

Notes for Anti Spike:

- Any mapper object used to deliver a raw count value to the Accumulator must provide an unreliable value during startup if the value was not updated from the field controller at the time it is read by the accumulator. For example, a LON counter mapped as an AI point object reports as unreliable until it reads a value from the field controller. If the LON counter is mapped as an AO point object, it reports as reliable even if the value is not initialized, causing improper values to be recorded at the accumulator. This may occur regardless of the value of Anti Spike.
- Any mapper object used to deliver a raw count value to the accumulator must be allowed to count up without disruption from manual commands, schedules, interlocks, or any other function that may change its value outside the normal counting process. Any such changes may cause the Accumulator to record improper values regardless of the value of Anti Spike.
- When replacing the input device, set Anti Spike to True before the replacement is brought online for the first time. This setting prevents the accumulator value from spiking upward due to an uncontrolled count value change at the input device. Failure to set Anti Spike to True can upset the accumulator value. You can use a manual preset to restore the correct value after the new device is online.

Note: In the **Integration Type** column, devices include: BACnet (Third-Party BACnet device), FEC (FEC family BACnet device), N2, and Other (for example, LonWorks, N1, VND, and XL5K). In the **Notes** column, letters indicate the following: B - Exposed as standard BACnet property, C - Configurable, D - Default Attribute for Display, N - Value Not Required, R - Affected by Extension's Reliability, W - Writable.

Table 179: Accumulator Object Attributes - Focus/Configuration Tab

Attribute Name	Integration Type	Notes	Description
Anti Spike	N2 Other	C,W	<p>When True, causes the object to use the first good input count value received after previously being unreliable as strictly an initial value. Any archived or last known value for input count is ignored. If the input device resets or loses power, uncontrolled changes to the input count value are filtered out and do not result in a spike in accumulator values. Use this setting in cases where the input device is not known to preserve its count value over a power loss (for example, in a LonWorks integration an LN-PRG20 GPI, and in an N2 integration a UNT).</p> <p>When False, causes the object to use the first good input device count value received after previously being unreliable as a valid change from the archived or last known value for input count. This means the first good input device value is used to catch up on any counts that were missed while the input device was unable to communicate due to either an NAE restart or communication loss.</p> <p>Do not set this value to False unless the input device is known to preserve its count value during a power loss (for example, in an N2 integration, an XTM-105 with a XPB-821 or in a LonWorks integration LN-PRG300-2, LNPRG400-2, LN-PTRG500-2, LN-PRG600, or in a vendor integration BTR Netcom GmbH device LC14 [Model # 11045013-US], an IDEC SX5L-SBCN081, or a WATANBE Electric Industry WRBC-DI16F-A002).</p>
Device Type	All	C,N,W	Contains a description of the physical device connected to the object.
Display Precision	All	C,W	Determines how many decimal places to display in the Scaled Present Value.
Input Ref	Other	C	Identifies the attribute reference to the object property that is the pulse count input for the Accumulator object (for the Other integrations type: LonWorks , N1, VND, and XL5K, for example). This must be a continuously increasing positive numeric attribute of another object, such as the present value of a totalization extension to an analog meter.
Interface Value	N2		Indicates current value from the hardware interface. This attribute is the same as input count, but is specific to the N2 accumulator.
Internal Units	All	C,W	Contains the engineering units for the Present Value, Value Set, Max Value, and Value Before Change attribute.
Intrinsic Alarming Defined	All	C,W	Indicates whether intrinsic alarming is enabled when the site is defined as a BACnet site. When intrinsic alarming is defined for accumulators on the MS/TP field bus, the pulse rate of the accumulated point can be monitored. For detailed information, see BACnet Intrinsic Alarming .
JCI Logging Object Reference	All	C,W	Indicates the object (Johnson Controls proprietary reference) that resides in the same device as the Accumulator object which, when it acquires Logging Record data from the Accumulator object, causes the Accumulator object to acquire, present, and store the Logging Record data (that is, snapshot) from the underlying system. When the object specified by the Logging Object Reference issues the Get Monitor Data command, the Logging Record is acquired and updated.
Limit Monitoring Interval	All	C,W	Specifies the monitoring period in seconds for determining the Pulse Rate. The Pulse Rate is the number of pulses received during the previous Limit Monitoring Interval period.
Logging Object Reference	All		Indicates the object (Johnson Controls proprietary reference) that resides in the same device as the Accumulator object which, when it acquires Logging Record data from the Accumulator object, causes the Accumulator object to acquire, present, and store the Logging Record data (that is, snapshot) from the underlying system. When the object specified by the Logging Object Reference issues the Get Monitor Data command, the Logging Record is acquired and updated.

Table 179: Accumulator Object Attributes - Focus/Configuration Tab

Attribute Name	Integration Type	Notes	Description
Logging Record	All		<p>Specifies a list of values to acquire, save, and return when read by other objects or devices.</p> <ul style="list-style-type: none"> • Timestamp - Indicates the value of the Present Value attribute.timestamp - Indicates the local date and time when the data was acquired. • Present Value - Indicates the value of the Present Value attribute. • Accumulated Value - Indicates the short-term accumulated value of the counter. The algorithm used to calculate the accumulated value is a function of the value of accumulator status. If this is the initial read, the value returned is zero. • Accumulator Status - Indicates the reliability of the data in this list of values. The accumulator status values include: <ul style="list-style-type: none"> - Normal - Indicates that no event affecting the reliability of the data has occurred during the period from the preceding to the current qualified reads of the Logging Record attribute (Accumulated Value = current Present Value - previous Present Value). - Starting - Indicates that the data of the Logging Record attribute is either the first data acquired since startup by the object identified by Logging Object (that is, timestamp has no wildcard values) or that no data has been acquired since startup by the object identified by Logging Object (that is, timestamp has all wildcard values). - Recovered - Indicates that one or more writes to Value Set or changes to Value Before Change occurred since the Logging Record was acquired by the object identified by Logging Object (Accumulated Value = [current Present Value - Value Set] + [Value Before Change - previous Present Value]). - Abnormal - Indicates that the accumulation has been carried out, but some unrecoverable event such as the clock's time changing a significant amount since the Logging Record was acquired by the object identified by Logging Object. - Failed - Indicates that the accumulation value is not reliable due to some problem.
Max Value	All	C,W	<p>Indicates the maximum value allowed for the Present Value. The Present Value is not allowed to exceed this value, and wraps back to zero when this value is passed. Accumulation does not stop.</p> <p>If the present value of the Accumulator object is being trended and its data is sent to the ADS repository, change this value to 32,767 so that the historian database (JCIHistorianDB) can properly store its value.</p>
Out of Service	All	W	<p>When set to True, indicates that the object is not tracking pulse count or rate.</p> <p>Used to de-couple the object from the physical input. When Out of Service is True, the object de-couples the Present Value and Reliability from the hardware. The Reliability is writable when Out Of Service is True. When de-coupled, the Present Value can be changed to simulate specific conditions or for test purposes.</p> <p>When the Accumulator object is placed Out of Service, the current value of the Present Value is saved. While Out of Service, an N2, FEC, or Other Accumulator continues to track the count of this saved value in the background, thereby ensuring that no counts are lost. When placed back in service, this new count is copied to the Present Value attribute.</p> <p>A third-party BACnet accumulator behaves according to the design of the third-party vendor.</p>

Table 179: Accumulator Object Attributes - Focus/Configuration Tab

Attribute Name	Integration Type	Notes	Description
Periodic Update	FEC N2 Other	C,W	<p>This attribute only appears in the snapshot view of the mapper object and on the Engineering tab of the integration. This attribute applies to all integrations, except for BACnet integrations. Represents the time, in seconds, between successive COV messages issued by the local Accumulator object at a field device, or updates made to the Accumulator object on the UI.</p> <p>The field device Accumulator object pushes its Present Value count up to the Supervisory controller through the COV mechanism. By requiring a minimum time between successive COVs, the Update Interval ensures that the integration does not get flooded with COVs from the Accumulator.</p> <p>This attribute only appears in the snapshot view of the mapper object and on the Engineering tab of the integration.</p>
Prescale	All	C,W	<p>Indicates the coefficients used to convert the accumulated pulses into the Present Value. This attribute uses moduloDivide integer division (where 5/2 is 2). The algorithm used is:</p> $\text{Present Value} = (\text{prescale.multiplier} \times \text{accumulated-pulses}) / \text{prescale.moduloDivide}.$
Present Value	All	NW	<p>Allows you to reset the Present Value. This command writes a supplied value to the Value Set attribute. The Present Value attribute then gains its value from the value written to the Value Set attribute. The Value Before Change takes on the previous value of the Present Value attribute (that is, the original value before the write processed), and the Value Change Time is set to the current date and time. This preserves the Present Value before the command took place. Use this command to change Present Value if the Accumulator object is in or out of service.</p>
Reliability	All	W	<p>Indicates whether the Present Value is reliable and why. You can write to Reliability when it is out of service.</p>
Rollover Limit	N2 Other	C,W	<p>Represents the actual rollover value of the input pulse counter. This attribute applies to N2 and Other Accumulators. This value is used to compute a change rate, which is added to the Accumulator property to calculate the Pulse Rate and Present Value.</p> <p>You must set the rollover limit in the N2 accumulator to match the rollover limit of the N2 field device selected. For example, AHU or UNT devices have a rollover limit of 4,294,967,295. A DX-9100 CNT point has a rollover limit set by the GX-9100 configuration tool. An XT-9100 or XTM CNT point has a rollover limit set by either the GX-9100 configuration tool or XTM configuration tool.</p>
Scale	All		<p>This BACnet property does not appear in a view in the Metasys system. Indicates the conversion factor to be multiplied with the value of the Present Value attribute to provide a Scaled Present Value in the units indicated by the Units attribute. By default, the Present Value and Scaled Present Value are equal. These values remain equal if you do not use the accumulator's Scale attribute.</p> <p>This attribute does not appear in a view; it is a BACnet property.</p>
Scale As Float	All	C,N,W	<p>Indicates the floating conversion factor to be multiplied with the value of the Present Value attribute to calculate the Scaled Present Value for the chosen units. If set to zero (the default value), the Scale As Integer value is used and Scale As Float is ignored.</p>
Scale As Integer	All	C,N,W	<p>Indicates the power of ten to be multiplied with the value of the Present Value attribute to get Scaled Present Value. This attribute only applies if Scale As Float is zero. For example, when Scale As Integer is set to two, the Present Value is multiplied by 100; while setting Scale As Integer to -1 multiplies the Present Value by 0.1. When zero (the default value), the Present Value and Scaled Present Value are equal (see Scaled Present Value).</p>

Table 179: Accumulator Object Attributes - Focus/Configuration Tab

Attribute Name	Integration Type	Notes	Description
Scaled Present Value	All		Indicates the value of the Present Value attribute conversion. The Present Value is multiplied by the Scale as Float value when that attribute contains a value (not zero). Otherwise, the Present Value is multiplied by 10 to the power of the Scale As Integer value (for example, if Scale As Integer is 3, it is multiplied by 1,000 and if Scale As Integer is -2, it is multiplied by 0.01). This is the actual value of the object. ⁸
Status Flag	All		Indicates the general status of the Accumulator object in BACnet terms and contains four independent states. The states are: In Alarm - False if the Event State attribute value is Normal; otherwise, the In Alarm flag is True. Fault - True if the Reliability attribute is not reliable; otherwise, the Fault flag is False. Overridden - Overridden flag is always False. Out of Service - Out of Service flag is True if the Out of Service attribute value is True; otherwise, the Out of Service flag is False.
Units	All	C,W	Contains the engineering units for the Scaled Present Value attribute.
Use Remote Alarming	BACnet	C,W	When the attribute Intrinsic Alarming Defined is set to True, determines where alarms for the object originate. If the remote integrated object contains attributes for originating alarms, then Use Remote Alarming defaults to True, causing the local mapper object to accept alarms from the remote integrated object that are routed to the NxE. If the remote integrated object does not contain attributes for originating alarms, then Use Remote Alarming defaults to False causing the local mapper object to originate alarms. When Use Remote Alarming is false, any alarms from the remote integrated object are ignored at the NxE. If the value of Use Remote Alarming is changed, a restart of the NxE may be required to assure correct operation.
Value Before Change	All		Indicates the Present Value prior to the last write to the Value Set property or Present Value command.
Value Change Time	All		Indicates the time of the last change to the Value Before Change attribute or Preset Value command.
Value Set	All	W	Allows you to reset the Present Value. The Present Value attribute gains its value from the value written to the Value Set attribute. The Value Before Change takes on the previous value of the Present Value attribute (that is, the original value before the write processed), and the Value Change Time is set to the current date and time. You also can use the Preset Value command to change Present Value if the Accumulator object is in or out of service.

Accumulator Commands

The table below lists the commands supported by the [Accumulator Object](#).

Table 180: Accumulator Object Commands

Command Name	Parameters	Description
Disable Alarms	None	Disables all types of alarming: alarm extensions, BACnet intrinsic alarming, and BACnet Event Enrollment objects.
Enable Alarms	None	Enables all types of alarming: alarm extensions, BACnet intrinsic alarming, and BACnet Event Enrollment objects.

Table 180: Accumulator Object Commands

Command Name	Parameters	Description
Get Monitor Data	None	<p>The Accumulator object and the object specified by the Logging Object Reference must reference one another for the Get Monitor Data command to work.</p> <ul style="list-style-type: none"> On the Action Tables tab of the object specified by the Logging Object Reference, the Accumulator object must be set to receive the Get Monitor Data command. In the JCI Logging Object Reference field of the Accumulator object, the object issuing the Get Monitor Data command must be selected. When the JCI Logging Object Reference is specified, the Logging Object Reference takes on the object type and instance of the specified object. <p>The object specified by the Logging Object Reference can be a Multiple Command object or an Interlock object. Both are capable of issuing the Get Monitor Data command.</p> <p>Acquires and updates the Logging Record when the object specified by the Logging Object Reference issues the Get Monitor Data command.</p>
In Service	None	<p>A third-party BACnet accumulator behaves according to the design of the third-party vendor. Cancels the effect of an Out of Service write or command. The Present Value and Reliability revert to the values obtained from the physical input. The Present Value attribute continues to receive inputs from the hardware input while in the Out of Service state and continues to increment its count internally. When the Out of Service is cancelled, the Present Value attribute of the N2, FEC, or Other Accumulator updates with this new internal count.</p>

Table 180: Accumulator Object Commands

Command Name	Parameters	Description
Out of Service	The value to be written to the Present Value attribute.	Allows a user to override the object's hardware input for simulation or other purposes. The Out Of Service command writes the Present Value to the value of the command parameter and writes the Reliability attribute to Reliable. The Present Value and Reliability no longer track the physical input, but the N2, FEC, or Other Accumulator continues to track pulses while out of service. When placed back in service, the Present Value resumes counting pulses. When an Out Of Service command is issued, the NxE does not communicate subsequent changes (operator or system) to the field device. A third-party BACnet accumulator behaves according to the design of the third-party vendor.
Preset Counter	The value to be written to the N2 device accumulator or pulse counter hardware point.	Allows you to set the value to write to the N2 device accumulator or pulse counter hardware point. You cannot adjust this attribute for a UNT or AHU. This attribute may be used with DX-9100, XTM, or XT hardware.
Present Value	The value to be written to the Value Set attribute.	Allows you to reset the Present Value. This command writes a supplied value to the Value Set attribute. The Present Value attribute then gains its value from the value written to the Value Set attribute. The Value Before Change takes on the previous value of the Present Value attribute (that is, the original value before the write processed), and the Value Change Time is set to the current date and time. This preserves the Present Value before the command took place. Use this command to change Present Value if the Accumulator object is in or out of service.

Binary Input Object

The BI object's attributes represent the external, visible characteristics of a binary input. As a binary input, this object can be in either an Active or Inactive state. The Polarity attribute allows for normally open relays that are Active when energized and normally closed relays that are Inactive when energized.

The Binary Input object integrates N1, N2, and BACnet controllers into supervisory controllers, resulting in:

- a consistent interface to point objects for all controller types, so they appear as a homogenous set to the user interface
- flexibility in point mapping
- support for all Metasys controllers. See the [N2 Controller Object](#) section.

For example, this object allows you to map a fan status into a supervisory controller.

For general information on Metasys system objects, see [Common Object Attributes](#).

Binary Input Concepts

BACnet Polarity Relationships

The relationship between the Present Value of an object and the physical state of the object is determined by the Polarity attribute.

The table below describes this relationship as defined by BACnet standards. Johnson Controls Polarity is always Normal. Johnson Controls N2 protocol does not support changes to the Polarity attribute.

Table 181: BACnet Polarity Relationships

Present Value	Polarity	Physical State of the Hardware Input	Physical State of the Monitored Device
Inactive	Normal	Off or Inactive	not running
Active	Normal	On or Active	running
Inactive	Reverse	On or Active	not running
Active	Reverse	Off or Inactive	running

Binary Input Attributes

This object contains attributes common to many Metasys system objects. This section includes attributes of the Focus/Configuration tab, the Diagnostics tab (if applicable), and any other tab specific only to this object. See the [Object and Feature Tabs](#) section for information on the attributes that appear on the other tabs of this object (for example, the Hardware and Options tab appear on point objects).

- ① **Note:** In the Notes and BACnet Notes columns, letters indicate the following: B - Exposed as standard BACnet property, C - Configurable, D - Default Attribute for Display, N - Value Not Required, R - Affected by Extension's Reliability, W - Writable.

Table 182: Binary Input Object Attributes - Focus/Configuration Tab

Attribute Name	Notes	BACnet Notes	Initial Value	Values/Options/Range	Description
Active Text		B		Limit: 20 characters	Characterizes the intended effect of the Active state of Present Value from the viewpoint of the operator. The content of this string is a local matter but is intended to represent a readable description of the Active state. For example, if the physical input is a switch contact, then the Active Text attribute is assigned a value such as Fan 1 On. If either the Active Text or the Inactive Text attribute is present, both of them are present. If either Inactive Text or Active Text is present, both are present.
Active Time Reset	W	B, W			Represents the last date and time Elapsed Active Time was set to a zero value. If either Elapsed Active Time or Time of Active Time Reset is present, all are present. If either Elapsed Active Time or Time of Active Time Reset is present, both are present.

Table 182: Binary Input Object Attributes - Focus/Configuration Tab

Attribute Name	Notes	BACnet Notes	Initial Value	Values/Options/Range	Description
COS Count	W	B		0-4,294,967,295	Represents the number of times the Present Value attribute changes state since the COS Count attribute was most recently set to zero. A change of state is any event that alters Present Value. This attribute persists in the archive. If Change of State Time, Change of State Count, or Time of State Count Reset is present, all are present.
COS Time		B			Represents the date and time at which the most recent change of state occurred. A change of state is any event that alters the Present Value attribute. When Out of Service is False, a change to the Polarity attribute alters Present Value and is considered a change of state. When Out of Service is True, changes to Polarity do not cause changes of state. If Change of State Time, Change of State Count, or Time of State Count Reset is present, all are present.
Device Type	C,W	B,W	Null	Limit: 20 characters	Contains a description of the physical device connected to the object.
Elapsed Active Time		B	Null	0-4,294,967,295 Units = seconds	Represents the accumulated number of seconds Present Value is Active since the Elapsed Active Time attribute was most recently set to zero. This attribute value updates automatically a minimum of once a day.
Inactive Text		B		Limit: 20 characters	Characterizes the intended effect of the Inactive state of Present Value attribute from the viewpoint of the operator. The content of this string is a local matter, but it is intended to represent a readable description of the Inactive state. For example, if the physical input is connected to a switch contact, then the Inactive Text attribute is assigned a value such as Fan 1 Off. If either the Inactive Text or Active Text attribute is present, both are present. If either Elapsed Active Time or Time of Active Time Reset is present, both are present.
Intrinsic Alarming Defined	C		False		Enables the BACnet Intrinsic Alarming feature in the object and the definition of related attributes. For detailed information, see BACnet Intrinsic Alarming .

Table 182: Binary Input Object Attributes - Focus/Configuration Tab

Attribute Name	Notes	BACnet Notes	Initial Value	Values/Options/Range	Description
Out of Service	C,W	B,W	False		Indicates (when True) that the Present Value and Reliability attributes are decoupled from the physical input to the object and their values may be changed for simulation or testing purposes. Functions that depend on the values of the Present Value or Reliability attributes continue to respond to changes while Out of Service is True, as if those changes had come from the physical input. Additionally, the Out of Service state of the Status Flags attribute is set to True and the Fault state is decoupled from the physical input when Out of Service is True.
Polarity		B,W		Normal, Reverse	Indicates the relationship between the physical state of the input and the logical state represented by Present Value. The Johnson Controls N2 Polarity attribute is always Normal.
Present Value	DNRW	B,W	0		Indicates the current value of the binary input. Polarity determines the relationship between Present Value and the state of the input. When Out of Service is True, Present Value is writable.
Reliability	W	B,W	Reliable	No Fault Detected (Reliable), No Sensor, Open Loop, Shorted Loop, Unreliable Other, Communication Failure	Indicates if the Present Value is unreliable. Examples: Reliable - No detectable faults Communication Failure - Communication to the sensor or device reading the sensor has failed. When Out of Service is True, the Reliability attribute may be written directly.
State Count Reset	W	B, W			Represents the date and time the COS Count attribute was most recently set to a zero value. If COS Time or Changeof State Count is present, both are present. If Change of State Time, Change of State Count, or Time of State Count Reset is present, all are present.
States Text	C,W		Off On		Indicates the displayed strings for the Present Value.
States Text Error Status	One state from a set		OK	Out of Memory, OK	Out of Memory: Indicates that memory overrun has been encountered while adding custom enumeration for state text from field device to the user dictionary. OK: Indicates that an addition of custom enumeration for state text from the field device to user dictionary is successful and state text from the device can be used.

Table 182: Binary Input Object Attributes - Focus/Configuration Tab

Attribute Name	Notes	BACnet Notes	Initial Value	Values/Options/Range	Description
Status Flags		B	False, False, False, False	In Alarm, Fault, Overridden, Out of Service	Indicates the general status of the input object in BACnet terms and contains four independent states. The four flags are: In Alarm - False if the Event State attribute value is Normal; otherwise, the In Alarm flag is True. (Set only by BACnet Intrinsic Alarming.) Fault - True (1) if the Reliability attribute is not reliable; otherwise, the Fault flag is False. Overridden - Overridden flag is True if the Present Value is overridden from the hardware source level. Out of Service - Out of Service flag is True if the Out of Service attribute value is True; otherwise, the Out of Service flag is False.
Use Remote Alarming		B,C,W	False		When the attribute Intrinsic Alarming Defined is set to True, determines where alarms for the object originate. If the remote integrated object contains attributes for originating alarms, then Use Remote Alarming defaults to True, causing the local mapper object to accept alarms from the remote integrated object that are routed to the NxE. If the remote integrated object does not contain attributes for originating alarms, then Use Remote Alarming defaults to False causing the local mapper object to originate alarms. When Use Remote Alarming is false, any alarms from the remote integrated object are ignored at the NxE. If the value of Use Remote Alarming is changed, a restart of the NxE may be required to assure correct operation. This attribute applies only to BACnet integrations.

Binary Input Commands

The table below lists the commands supported by the [Binary Input Object](#).

Table 183: Binary Input Commands

Command Name	Number of Parameters	Description
Disable Alarms	None	Disables all types of alarming: alarm extensions, BACnet intrinsic alarming, and BACnet Event Enrollment objects.
Enable Alarms	None	Enables all types of alarming: alarm extensions, BACnet intrinsic alarming, and BACnet Event Enrollment objects.

Table 183: Binary Input Commands

Command Name	Number of Parameters	Description
In Service	None	<p>Cancels the affect of an Out of Service command and returns the Out of Service attribute to False. The Present Value and Reliability reverts to the values obtained from the physical input.</p> <p>ⓘ Note: For BACnet objects, support of this command is dependent on the ability to write the Out Of Service attribute.</p>
Out of Service	The value to be written to the Present Value.	<p>Allows a user to override the object’s hardware input for simulation or other purposes. The Out of Service command changes the Out of Service attribute to True, writes the Present Value to the value of the command parameter, and writes the Reliability attribute to Reliable. The Present Value and Reliability no longer track the physical input. When an Out Of Service command is issued, the NxE does not communicate subsequent changes (operator or system) to the field device.</p> <p>ⓘ Note: For BACnet objects, support of this command is dependent on the ability to write the Out Of Service attribute.</p>
Temporary Out of Service	The value to be written to the Present Value attribute, along with the hours and minutes that the out of service state is temporarily active.	<p>Allows a user to temporarily override the object’s hardware input for simulation or other purposes for a specified period of time stated in hours and minutes. This command has the same function as an Out of Service command but with the time element.</p>

Binary Output Object

The BO object’s attributes represent the external, visible characteristics of a binary output. As a binary output, this object can be in either an Active or Inactive state. The Polarity attribute allows for normally open relays that are Active when energized and normally closed relays that are Inactive when energized. This object integrates N1, N2, and BACnet controllers into supervisory controllers, resulting in:

- a consistent interface to point objects for all controller types, so they appear as a homogenous set to the user interface
- flexibility in point mapping
- support for all Metasys controllers. See [N2 Controller Object](#).

For example, this object allows you to start or stop a fan from a supervisory controller.

For general information on Metasys system objects, see [Common Object Attributes](#).

Binary Output Concepts

BACnet Polarity Relationships

The relationship between the Present Value of an object and the physical state of the object is determined by the Polarity attribute.

Note: The table below describes this relationship as defined by BACnet standards. Johnson Controls Polarity is always Normal. Johnson Controls does not support changes to the Polarity attribute.

Table 184: BACnet Polarity Relationships

Present Value	Polarity	Physical State of the Hardware Input	Physical State of the Monitored Device
Inactive	Normal	Off or Inactive	not running
Active	Normal	On or Active	running
Inactive	Reverse	On or Active	not running
Active	Reverse	Off or Inactive	running

Binary Output Attributes

This object contains attributes common to many Metasys system objects. This section includes attributes of the Focus/Configuration tab, the Diagnostics tab (if applicable), and any other tab specific only to this object. See the [Object and Feature Tabs](#) section for information on the attributes that appear on the other tabs of this object (for example, the Hardware and Options tab appear on point objects).

Note: In the Notes and BACnet Notes columns, letters indicate the following: B - Exposed as standard BACnet property, C - Configurable, D - Default Attribute for Display, N - Value Not Required, R - Affected by Extension's Reliability, W - Writable.

Table 185: Binary Output Object Attributes - Focus/Configuration Tab

Attribute Name	Notes	BACnet Notes	Values/Options/Range	Description
Active Text			Limit: 20 characters	Characterizes the intended effect of the Active state of Present Value from the viewpoint of the operator. The content of this string is a local matter but is intended to represent a readable description of the Active state. For example, if the physical output is a switch contact, then the Active Text attribute is assigned a value such as Fan 1 On. If either the Active Text or the Inactive Text attribute is present, both of them are present.
Active Time Reset	W	B, W		Represents the last date and time Elapsed Active Time set to a zero value. If either Elapsed Active Time or Active Time Reset is present, both are present.
COS Count	W		0-4,294,967,295	Represents the number of times the Present Value attribute changed state since the COS Count attribute was last set to zero. A change of state is any event that alters Present Value. This attribute persists in the archive.
COS Time				Represents the date and time at which the most recent change of state occurred. A change of state is any event that alters the Present Value attribute. When Out of Service is False, a change to the Polarity attribute alters Present Value and is considered a change of state. Changes to Polarity do not cause changes of state.
Device Type	C,W	W	Limit: 20 characters	Contains a description of the physical device connected to the object.

Table 185: Binary Output Object Attributes - Focus/Configuration Tab

Attribute Name	Notes	BACnet Notes	Values/Options/Range	Description
Elapsed Active Time			0-4,294,967,295 Units = seconds	Represents the accumulated number of seconds Present Value is Active since the Elapsed Active Time attribute was last set to zero. This attribute value updates automatically a minimum of once a day.
Heavy Equip Delay	C,W	Not supported	Range: 0-255 Seconds	Indicates the amount of time that this output point adds to the Accumulated Delay attribute of the Heavy Equipment Controller (HEC) object when this point is started. The next output point is delayed by that amount of time of the HEC Accumulated Delay is not already decremented to zero. The NAE device's five internal Heavy Equipment Controller objects (see HED Controller) time their delays independently of one another. For example, HED 1 and HED 4 can count down their delays at the same time.
HED Controller	C,W	Not supported	1-5	Identifies the Heavy Equipment Controller (HEC) object managing the delays. The NAE device has five internal Heavy Equipment Controller objects for use by BO and Multistate Output (MO) objects. The BO and MO objects reference the heavy equipment delay (HED) controller objects by number (1-5). All BO and MO objects on an NAE share the five internal HED controller objects. For example, if BO1 and MO3 on NAE-1 reference HED controller 1, they are using the same HED controller.
Inactive Text			Limit: 20 characters	Characterizes the intended effect of the Inactive state of Present Value attribute from the viewpoint of the operator. The content of this string is a local matter, but it is intended to represent a readable description of the Inactive state. For example, if the physical output is connected to a switch contact, then the Inactive Text attribute is assigned a value such as Fan 1 Off. If either the Inactive Text or Active Text attribute is present, then both are present.
Intrinsic Alarming Defined	C	Not supported	False True	Enables the definition of the intrinsic alarm related attributes. For detailed information, see BACnet Intrinsic Alarming .
Min Off Time	C,W	W	0-604,800 Units = seconds	Represents the fewest number of seconds Present Value remains in the Inactive state after entering the Inactive state.
Min On Time	C,W	W	0-604,800 Units = seconds	Represents the fewest number of seconds Present Value remains in the Active state after entering the Active state.
Out of Service		W	False True	Used to decouple the object from the physical output. When out of service is True, the object will decouple Present Value and Reliability from the hardware. The Reliability will be writable when Out Of Service is True. Not all devices support setting this attribute to True.

Table 185: Binary Output Object Attributes - Focus/Configuration Tab

Attribute Name	Notes	BACnet Notes	Values/Options/Range	Description
Polarity			Normal, Reverse	Indicates the relationship between the physical state of the output and the logical state represented by Present Value. If the Polarity attribute is Normal, then the Active state of the Present Value attribute is also the Active or On state of the physical output as long as Out of Service is False. If the Polarity attribute is Reverse, then the Active state of the Present Value attribute is in the Inactive or Off state of the physical output as long as Out of Service is False. If Out of Service is False for a constant physical output state, a change in the Polarity attribute produces a change in Present Value. If Out of Service is True, the Polarity attribute has no effect on Present Value. The N2 Polarity attribute is always Normal.
Present Value	D,R,W	D,R,W	Inactive, Active States Text attribute identifies the value set for this attribute.	Indicates the current value of the binary output. Polarity determines the relationship between Present Value and the state of the output.
Priority Array				Lists values of the object in level of importance.
Reliability			No Fault Detected (Reliable), No Output, Open Loop, Shorted Loop, Unreliable Other, Communication Failure	Indicates whether the Present Value is unreliable and why. When Out of Service is True, the Reliability may be written directly.
State Count Reset	W	B, W		Represents the date and time the COS Count attribute was last set to a zero value. If the COS Time, Change of State Count, or State Count Reset attribute is present, all of these attributes are present.
States Text	C,W			Indicates the displayed strings for the Present Value.
States Text Error Status	One state from a set		Out of Memory, OK	Out of Memory: Indicates that memory overrun has been encountered while adding custom enumeration for state text from field device to the user dictionary. OK: Indicates that an addition of custom enumeration for state text from the field device to user dictionary is successful and state text from the device can be used.

Table 185: Binary Output Object Attributes - Focus/Configuration Tab

Attribute Name	Notes	BACnet Notes	Values/Options/Range	Description
Status Flags			In Alarm, Fault, Overridden, Out of Service	<p>Represents four true or false flags that indicate the general health of an analog output. Three flags are associated with the values of other attributes of the object.</p> <p>The four flags are:</p> <p>In Alarm - In Alarm flag is False (0) if the Event State attribute value is Normal; otherwise, the In Alarm flag is True (1).</p> <p>Fault - Fault flag is True (1) if the Reliability attribute is not reliable; otherwise, the Fault flag is False (0).</p> <p>Overridden - Overridden flag is Logical 1 if the Present Value is decoupled from the hardware output because operator intervention provided a different value or local override is active.</p> <p>Out of Service - Out of Service flag is True if the Out of Service attribute value is True; otherwise, the Out of Service flag is False.</p>
Use Remote Alarming		B,C,W		<p>When the attribute Intrinsic Alarming Defined is set to True, determines where alarms for the object originate. If the remote integrated object contains attributes for originating alarms, then Use Remote Alarming defaults to True, causing the local mapper object to accept alarms from the remote integrated object that are routed to the NxE. If the remote integrated object does not contain attributes for originating alarms, then Use Remote Alarming defaults to False causing the local mapper object to originate alarms.</p> <p>When Use Remote Alarming is false, any alarms from the remote integrated object are ignored at the NxE. If the value of Use Remote Alarming is changed, a restart of the NxE may be required to assure correct operation. This attribute applies only to BACnet integrations.</p>

Binary Output Commands

The table below lists the commands supported by the [Binary Output Object](#).

- ① **Note:** For the Release Operator Override, Release, and Release All commands, if all Command Priorities have been released and a Relinquish Default is not defined, the supervisory controller gives control over to the actual hardware.

Table 186: Binary Output Commands

Command Name	Parameters	Description
Disable Alarms	None	Disables all types of alarming: alarm extensions, BACnet intrinsic alarming, and BACnet Event Enrollment objects.
Enable Alarms	None	Enables all types of alarming: alarm extensions, BACnet intrinsic alarming, and BACnet Event Enrollment objects.

Table 186: Binary Output Commands

Command Name	Parameters	Description
In Service	None	<p>Cancels the affect of an Out of Service command and returns the Out of Service attribute to False. The Present Value and Reliability will revert back to the values obtained from the physical hardware output.</p> <p>① Note: For BACnet objects, support of this command is dependent on the ability to write the Out Of Service attribute.</p>
Operator Override	The value to be written to the Present Value.	<p>Updates the Present Value at Command Priority equal to Operator Override (8). The Operator Override command sends the specified command to the internal NxE object, which is then only sent to the field device when one of the following conditions is met:</p> <ul style="list-style-type: none"> • NOT Local Control and NOT Out Of Service, or • NOT Local Control and after issuing the In Service command.
Out of Service	None	<p>Allows a user to override the object’s hardware output for simulation or other purposes. The Out of Service command changes the Out of Service attribute to True. The Present Value and Reliability no longer track the physical output. No commands are sent to the actual hardware. When the Out of Service attribute is set to False, the current Present Value is sent to the actual hardware.</p> <p>When an Out Of Service command is issued, the NxE does not communicate subsequent changes (operator or system) to the field device. For BACnet objects, support of this command is dependent on the ability to write the Out Of Service attribute.</p>
Release Operator Override	None	Releases Command Priority Operator Override (8) from Present Value.
Release	<ol style="list-style-type: none"> 1. Attribute name 2. Command priority 	Releases the identified command priority from the specified, writable attribute, and allows it to be controlled by the next highest priority.

Table 186: Binary Output Commands

Command Name	Parameters	Description
Release All	Attribute name	<p>Releases Command Priorities 3 through 16 (Default) from the specified, writable attribute. Command Priorities 1 and 2 remain.</p> <p>► Important:</p> <p>The Release All command may not cause an immediate return to automatic operation. The Release All command clears all command priorities, including those that come from applications and features. When this happens, the output point goes to its Relinquish Default condition. In some cases, the application or feature may have sent a command that does not match Relinquish Default. In this instance, the output point does not end in the state that the applications or features intended. This situation can cause unexpected operation to occur; for example, a space might overcool or overheat, a fan might run longer than expected, and so on.</p> <p>If an operator has overridden an input, use the Release Operator Override command.</p>
State0 ... State1	None	<p>Releases Command Priorities 9 through 15 (Scheduling) and then writes to the Present Value at the Default (16) command priority. If this is the highest, it is sent to the controller. The state command names and number of commands are dependent on the States Text attribute.</p> <p>► Important: Be aware that an operator state command releases the actions of any processes running to the object in the NxE or FEC controllers that use Priorities 9 through 16. Consider this behavior when creating control strategies.</p> <p>If Local Control is True, this command is rejected.</p>
Temporary Override	The value to be written to the Present Value attribute, in addition to the duration of the override in hours and minutes.	<p>Overrides a point temporarily for a specified period of time. After the specified time period passes, the Override is automatically released.</p>

Binary Value Object

Menu Selection: *Insert > Object > BV*

BV objects have similar software characteristics and capabilities to a [Binary Input Object](#); however, Binary Value objects are not associated with any physical hardware and are the result of a control process or operator entry. This object allows you to hold a binary value for other objects to

reference. For example, an [Interlock](#) can reference and base its operation on a binary value such as duty/standby.

For general information on Metasys system objects, see [Common Object Attributes](#).

Binary Value Attributes

This object contains attributes common to many Metasys system objects. This section includes attributes of the Focus/Configuration tab. See the [Object and Feature Tabs](#) section for information on the attributes that appear on the other tabs of this object (for example, the Hardware and Options tab appear on point objects).

Note: In the Notes and BACnet Notes columns, letters indicate the following: B - Exposed as standard BACnet property, C - Configurable, D - Default Attribute for Display, N - Value Not Required, R - Affected by Extension's Reliability, W - Writable.

Table 187: Binary Value Object Attributes - Focus/Configuration Tab

Attribute Name	Notes	BACnet Notes	Initial Value	Values/Options/Range	Description
Active Text				Limit: 20 characters	Characterizes the intended effect of the Active state of Present Value from the viewpoint of the operator. The content of this string is a local matter but is intended to represent a readable description of the Active state. If either the Active Text or the Inactive Text attribute is present, both of them are present. If either Inactive Text or Active Text is present, both are present.
Active Time Reset	W	B, W			Represents the last date and time Elapsed Active Time set to a zero value. If either Elapsed Active Time or Time of Active Time Reset is present, both are present.
Connected To Internal Application		B, W	No	No or Yes	Indicates whether the object is connected to an internal application.
COS Count	W		0	0-4,294,967,295	This attribute is persisted in the archive. Represents the number of times the Present Value attribute changed state since the COS Count attribute was last set to zero. A change of state is any event that alters Present Value. This attribute persists in the archive. If Change of State Time, Change of State Count, or State Count Reset is present, all are present.
COS Time			Null		Represents the date and time at which the most recent change of state occurred. A change of state is any event that alters the logical state of Binary Value. If Change of State Time, Change of State Count, or State Count Reset is present, all are present.
Elapsed Active Time			Null	0-4,294,967,295 Units = seconds	Represents the accumulated number of seconds Present Value is Active since the Elapsed Active Time attribute was last set to zero. This attribute value updates automatically a minimum of once a day. If either Elapsed Active Time or Active Time Reset is present, both are present.

Table 187: Binary Value Object Attributes - Focus/Configuration Tab

Attribute Name	Notes	BACnet Notes	Initial Value	Values/Options/Range	Description
Failsoft Currently Active				Yes or No	Specifies whether the Failsoft feature is currently overriding the input value to a reliable default. If No, Failsoft is disabled or, if Failsoft is enabled, the value is reliable. If Yes, Failsoft is enabled and the value is unreliable. This attribute is only used if Property Ref Value is defined to reference an application.
Inactive Time				Limit: 20 characters	Characterizes the intended effect of the Inactive state of Present Value attribute from the viewpoint of the operator. The content of this string is a local matter, but it is intended to represent a readable description of the Inactive state. If either the Inactive Text or Active Text attribute is present, both are present. If either Inactive Text or Active Text is present, both are present.
Intrinsic Alarming	C	Not supported	False	False True	Enables (True) or disables (False) BACnet intrinsic alarming for this object. When disabled, writing to any of the intrinsic alarming attributes returns a Write_Access_Denied error. When disabled, reading the intrinsic alarming attributes returns the default value of each attribute. For detailed information, see BACnet Intrinsic Alarming .
Min Off Time	C,W	W	0	0-4,294,967,295 Units = seconds	Represents the least number of seconds Present Value remains in the Inactive state after entering the Inactive state.
Min On Time	C,W	W	0	0-4,294,967,295 Units = seconds	Represents the least number of seconds Present Value remains in the Active state after entering the Active state.
Monitor Only				False	Defines the behavior of the object as an input or output. If you do not specify a Property Ref Value, the attribute is set to False. This attribute appears only in the Snapshot Focus view.
Out of Service		W	False	Always False	Indicates the offline/online state of the connected hardware. This attribute exists for compatibility with BACnet protocol and indicates whether the physical input that the object represents is in service. When out of service, the physical input is not coupled to changes in the Present Value. The object does not send commands to the hardware. This attribute is always False due to the absence of hardware.
Present Value	D,R,W	D,R,W		Inactive, Active States Text attribute identifies the value set for this attribute.	Indicates the current value of the binary value. When Out of Service is True, Present Value is writable. Present Value is optionally commandable. If Present Value is commandable, Priority Array and Relinquish Default are both present. Present Value is commandable; it is also writable. This attribute is writable when Out of Service is True.

Table 187: Binary Value Object Attributes - Focus/Configuration Tab

Attribute Name	Notes	BACnet Notes	Initial Value	Values/Options/ Range	Description
Priority Array					Lists values of the object in level of importance. If Priority Array or Relinquish Default is present, both are present. If Present Value is commandable, Priority Array and Relinquish Default are both present and Present Value is writable.
Property Ref Value	N			Object Name, Reference, Attribute	Specifies an object and attribute (usually from an application) for which the BV object is providing the standard interface. The object and attribute contained in this attribute must be a local object and is often a non-BACnet data source and destination. When this property is not defined, the Monitor Only property is set to False. This attribute appears only in the Snapshot Focus view.
Referenced Reliability				No Input	Specifies the current reliability of the value sent to or from the object/attribute referenced by Property Ref Value. This attribute is only used if Property Ref Value is defined to reference an application.
Referenced Value					Specifies the current value sent to or from the object/attribute referenced by Property Ref Value. This attribute is only used if Property Ref Value is defined to reference an application.
Referenced Value COS Count	W		0		Counts how many times the Present Value and Reliability have changed. If the Monitor Only attribute is True, the count is how many times the Property Ref Value has updated the BV. If Monitor Only is False, the count is how many times Property Ref Value has updated the BV. This attribute helps to diagnose excessive changes that can cause logic to execute taking up too much bandwidth. Reset the count by entering 0 for this attribute. This attribute is only used if Property Ref Value is defined to reference an application.
Reliability	W	W	Reliable	No Fault Detected (Reliable), Unreliable Other, Communication Failure	Indicates whether the Present Value is unreliable and why.
State Count Reset	W	B, W			Represents the date and time the COS Count attribute was last set to a zero value. If COS Time, Change of State Count, or Time of State Count Reset is present, all are present. If Change of State Time, Change of State Count, or State Count Reset is present, all are present.
States Text	C,W		Inactive, Active		Indicates the displayed strings for the Present Value. For BACnet compliant objects, if no States Text is specified when the object is created, the Inactive Text and Active Text are used to derive the equivalent States Text if possible.

Table 187: Binary Value Object Attributes - Focus/Configuration Tab

Attribute Name	Notes	BACnet Notes	Initial Value	Values/Options/Range	Description
States Text Error Status			OK	Out of Memory, OK	Out of Memory: Indicates that memory overrun has been encountered while adding custom enumeration for state text from field device to the user dictionary. OK: Indicates that an addition of custom enumeration for state text from the field device to user dictionary is successful and state text from the device can be used.
Status Flag				In Alarm, Fault, Overridden, Out of Service	Contains four true or false flags that indicate the general health of the object. Three of the four flags are associated with the values of other attributes within the same object. By reading these attributes, you can achieve a clearer picture of the object status. The four flags are: In Alarm - In Alarm flag is False (0) if the Event State attribute value is Normal; otherwise, the In Alarm flag is True (1). Fault - Fault flag is True (1) if the Reliability attribute is not reliable; otherwise, the Fault flag is False (0). Overridden - Overridden flag is Logical 1 if the Present Value has been overridden by some mechanism local to the BACnet device or because operator intervention provided a different value. Out of Service - Out of Service flag is True if the Out of Service attribute value is True; otherwise, the Out of Service flag is False.
Use Remote Alarming		B,C,W	False		When the attribute Intrinsic Alarming Defined is set to True, determines where alarms for the object originate. If the remote integrated object contains attributes for originating alarms, then Use Remote Alarming defaults to True, causing the local mapper object to accept alarms from the remote integrated object that are routed to the NxE. If the remote integrated object does not contain attributes for originating alarms, then Use Remote Alarming defaults to False causing the local mapper object to originate alarms. When Use Remote Alarming is false, any alarms from the remote integrated object are ignored at the NxE. If the value of Use Remote Alarming is changed, a restart of the NxE may be required to assure correct operation. This attribute applies only to BACnet integrations.

Binary Value Commands

The table below lists the commands supported by the [Binary Value Object](#).

Table 188: Binary Value Commands

Command Name	Parameters	Description
Disable Alarms	None	Disables all types of alarming: alarm extensions, BACnet intrinsic alarming, and BACnet Event Enrollment objects.
Enable Alarms	None	Enables all types of alarming: alarm extensions, BACnet intrinsic alarming, and BACnet Event Enrollment objects.
Operator Override	The value to be written to the Present Value attribute.	Updates the Present Value at Command Priority Operator Override (8). The Operator Override command sends the specified command to the internal NxE object, which is then only sent to the field device when one of the following conditions is met: <ul style="list-style-type: none"> • NOT Local Control and NOT Out Of Service, or • NOT Local Control and after issuing the In Service command.
Release Operator Override	None	Releases Command Priority Operator Override (8) from Present Value.
Release	<ol style="list-style-type: none"> 1. Attribute name 2. Command priority 	Releases the identified command priority from the specified, writable attribute, and allows it to be controlled by the next highest priority.
Release All	Attribute name	Releases Command Priorities 3 through 16 from the specified, writable attribute. Command Priorities 1 (Manual Emergency) and 2 (Fire Application) remain. <ul style="list-style-type: none"> ➤ Important: The Release All command may not cause an immediate return to automatic operation. The Release All command clears all command priorities, including those that come from applications and features. When this happens, the output point goes to its Relinquish Default condition. In some cases, the application or feature may have sent a command that does not match Relinquish Default. In this instance, the output point does not end in the state that the applications or features intended. This situation can cause unexpected operation to occur; for example, a space could overcool or overheat, a fan might run longer than expected, and so on. If an operator has overridden an input, use the Release Operator Override command.
State0	None	Releases Command Priorities 9 through 15 (Scheduling) and then writes to the Present Value at the Default (16) command priority. <ul style="list-style-type: none"> ➤ Important: Be aware that an operator state command releases the actions of any processes running to the object in the NxE or FEC controllers that use Priorities 9 through 16. Consider this behavior when creating control strategies.

Table 188: Binary Value Commands

Command Name	Parameters	Description
State1	None	Releases Command Priorities 9 through 15 (Scheduling) and then writes to the Present Value at the Default (16) command priority. ► Important: Be aware that an operator state command releases the actions of any processes running to the object in the NxE or FEC controllers that use Priorities 9 through 16. Consider this behavior when creating control strategies.
Temporary Override	The value to be written to the Present Value attribute, in addition to the duration of the override in hours and minutes.	Overrides a point temporarily for a specified period of time. After the specified time period passes, the Override is automatically released.

Calendar Object

Menu Selection: *Insert > Object > Calendar*

The Calendar object is used behind the scenes by the Scheduling feature by maintaining a list of dates designated as exceptions to the normal schedule. Exception Schedule days are days when you do not want the Schedule to operate, such as holidays. They can be defined as specific dates or ranges of dates. Typically, a Schedule object references a Calendar object, which lists the days the weekly schedule should not operate. A Schedule object working from a chosen Calendar reads the Present Value of the Calendar object, which indicates if the current day is within the Date List (Entry Detail) of the Calendar.

A different set of activities from those in the weekly schedule can be defined in the Schedule object to occur on these exception days. Multiple Schedule objects can reference a single Calendar object so that only the Calendar object needs to be changed to affect all schedules.

This object allows you to accommodate for a special day or days, like a holiday, in which the building controls should run differently from usual, in accordance with the change in the number of people and the amount of activity in the building.

When you create a Calendar object at a BACnet client and map the object to a network engine, a new Calendar object is created under that folder in the navigation tree.

For general information on Metasys system objects, see [Common Object Attributes](#).

For more information on the Scheduling feature and how to create a calendar, see [Scheduling](#). For more information on Global Calendars, see [Global Calendar](#). For detailed information on the Calendar object, see the following table.

Calendar Attributes

This object contains attributes common to many Metasys system objects. This section includes attributes of the Focus/Configuration tab, the Diagnostics tab (if applicable), and any other tab specific only to this object. See the [Object and Feature Tabs](#) section for information on the attributes that appear on the other tabs of this object (for example, the Hardware and Options tab appear on point objects).

Click the attribute name in the table for a description of the attribute.

- ⓘ Note:** In the Notes and BACnet Notes columns, attributes marked with the letter C are configurable, attributes marked with the letter D are the default for display, and attributes marked with the letter W are writable.

Table 189: Calendar Attributes - Calendar Tab

Attribute Name	Notes	BACnet Notes	Initial Value	Description
Date List (Entry Detail)	C,W	W		Lists dates defined as entries to the Calendar object. Each entry is either an individual date, range of dates, or month/week-of-month/day-of-week specification. If the current date matches any calendar entry, the Present Value is set to True. Also, individual fields of an entry can be left unspecified, thus acting as wildcards, or include all options. If a device allows writing to Date List, all date choices are permitted.
Global Calendar Object Reference	C,W	W		Specifies a globally referenced calendar (if any) used as the master calendar for the site. Specifying a global calendar allows a site to synchronize many calendars so that only a single calendar (master calendar) needs to be changed. If you are using calendar references, you usually set up field controllers that reference a calendar on the engine, and engines that reference a calendar on a single supervisory engine, which is designated as the master calendar.
Global Calendar Update				Specifies a time and date when the local calendar date list was last updated from the master calendar. If no calendar is referenced by the device, then the global calendar update remains unspecified. Note: If a calendar references a master calendar, the date list is not writable and the Edit button within the SMP UI is unavailable.
Present Value	D	D	False	Indicates the current value of the Calendar. Present Value is True if the current date is in the Date List (Entry Detail) and False if the current date is not in the Date List.

Scheduling

The scheduling feature allows you to automate routine functions such as changing the operating mode of a room from occupied to unoccupied for heating or cooling needs and helping perform energy optimization strategies. Each schedule consists of a list of weekly scheduled events as well as a list of exception events. Each event consists of a value to write to a list of Scheduled Items at a particular time. The event by default ends at midnight unless ended earlier. The scheduling feature's user interface provides a graphical view for configuring the schedule and displaying when events are scheduled to occur.

Scheduling Concepts

Calendar

The [Calendar Object](#) resides in an Engine or FAC and is the internal basis for the calendar functionality of the scheduling feature. [Create a Calendar](#) and use it to define a list of holidays or special events that can be used in multiple schedule objects to define different events that need to occur. The schedule executes an exception schedule based on the list of dates defined in the calendar. For example, use a calendar to define different building operations on days such as holidays when the building is not occupied.

A [schedule](#) can reference calendars on any Engine or FAC on the site.






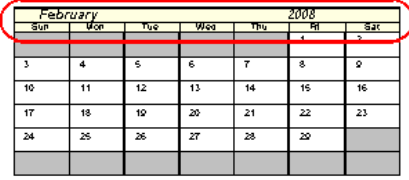
Use the calendar feature to:

- [create new calendars](#) You cannot create a new Calendar in an FAC from SMP or CCT.

- edit existing calendars
- [copy and paste](#) a calendar to another device or item (offline mode), only in the NAE
- [toggle](#) the calendar view between a graphical, one-month view, or 12-month view
- [enable or disable](#) a calendar
- [reference a global calendar](#)

The following table describes the functions of the Calendar View's buttons.

Table 190: Calendar Button Functions

Button	Function
	Opens Edit mode
	Shows the Date, Date Range, and Week and Day details of the calendar entries and allows you to create new entries or edit existing entries when in Edit mode.
	Increases or decreases the currently displayed year by one year.
	Increases or decreases the currently displayed month by one month.
	Returns the display to the current month.
	Toggles the calendar display between the 1-month view and 12-month view.

Schedule

The [Schedule Object](#) resides in an Engine or FAC and is the internal basis for the Scheduling feature. [Create a Schedule](#) and use the Scheduling feature to define the items and times when the Schedule writes values to the referenced attributes of the [Scheduled Items](#). Each schedule includes the following:

- a view of today's schedule that shows what actions the schedule is currently configured to perform today, including the Default Schedule Command. This view is not available in the SCT.
- a [weekly schedule](#) that uses events for each day (Monday through Sunday) to configure the times when the Schedule writes values to its referenced attributes (Scheduled Items)
- an [exception schedule](#) that uses events to configure exceptions to the weekly schedule (optional)
- a list of items that the schedule controls (referenced by the schedule, called [Scheduled Items](#)) (optional)
- an [effective period](#) that optionally allows you to activate or inactivate the schedule for a selected period of time

Use the scheduling feature to:

- [create new schedules](#) You cannot create a new Schedule in an FAC from SMP or CCT.
- edit existing schedules
- [add references to items for scheduling](#) to a schedule using a navigation tree of the site

- [delete references to items for scheduling](#) from a schedule
- [copy and paste](#) a schedule to another device or item (offline mode), only in Engines
- [enable or disable](#) a schedule, not in an FAC
- [change the effective period](#) of a Schedule
- provide day and time inputs within control logic

The following tables describe the functions of the Schedule View's buttons and attributes and right-click menu.

Table 191: Schedule Button Functions

Button	Function
Edit	Opens Edit mode
Effective Period	Click the Browse icon to open the Effective Period dialog box which allows you to specify the From and To values for the effective period.
Schedule Output Type	Binary, Analog, Multistate, Derived from Values — each of these choices brings up unique choices in the Default Schedule Command and State Text fields.
Default Schedule Command	Binary: Release option or a choice of Off and On Analog: Release option or a choice to input a number Multistate: Release option or a choice of State 0 to State 31 Derived from Values: Release option or a choice of Off and On ① Note: If the Default Schedule Command is set to Release, the scheduling feature's control over the scheduled items ends. Release should only be used for the Default Schedule Command if the scheduled items support the Release command.
States Text	Allows you to specify the state of the selected event, which is unique for each Schedule Output Type.
Display Mode	Allows you to toggle between views: Today's Schedule, Weekly Schedule, Exception Schedule, or Scheduled Items.

Table 192: Schedule Right-click Menu (this menu is accessible only when Edit mode is used)

Menu Option	Description
Display Mode - Weekly Schedule	
Binary	The States Text selection controls the right-click menu. For example, select between Off and On, Off and Reset, Absent and Present, Active and Inactive, or Alarm and Normal.
Add Event(s)	Opens the Define New Event(s) dialog box and allows you to add an event to the schedule.
End Event	Allows you to specify an event end time. The end time corresponds to the location of your mouse cursor when you opened the menu. Drag the end of the event to adjust the end time.
Analog	Right-click and select Add Event(s), or select an event, right-click, and select Modify Selected Event(s). Add Event(s) allows you to specify the Day or Days, Hours, Minutes and Value of a new event. Modify Selected Event(s) allows you to modify the Hours, Minutes, and Value of an existing event.

Table 192: Schedule Right-click Menu (this menu is accessible only when Edit mode is used)

Menu Option	Description
Add Event(s)	Opens the Define New Event(s) dialog box and allows you to add an event to the schedule.
End Event	Allows you to specify an event end time. The end time corresponds to the location of your mouse cursor when you opened the menu. Drag the end of the event to adjust the end time.
Multistate	The States Text selection controls the right-click menu. For example, toggle between Not Operating, Normal Start, Heating, Cooling, Fan Only, or Minimum DAT Control.
Modify Selected Event(s)	Opens the Modify Event(s) dialog box and allows you change the times and value of the selected event. You can also double-click an event to access the Modify Event(s) dialog box.
Delete Selected Event(s)	Deletes the selected event.
Display Mode - Scheduled Items	
All Scheduled Output Types	Choose between Make Key Item or Remove Item.

Today's Schedule

The scheduling feature includes a view called Today's Schedule. Today's Schedule is a read-only view that shows the schedule timeline for the current day. The timeline displays the projected schedule output that is written to the scheduled objects for the current day, combining the default Schedule Command with events from both the Weekly Schedule and Exception Schedule. Today's Schedule also displays a table of times and values, which details the changes in the schedule's output for the current day.

Weekly Schedule

The scheduling feature has a weekly schedule that provides a schedule for each day of the week, Monday through Sunday. Each daily schedule begins at 00:00 and ends at 23:59. Each day consists of events that initiate the writing of values to the referenced attributes of the scheduled items based on the day of the week. For example, you can schedule a fan to start at 7:00 and stop at 22:00 on Mondays.

To edit the weekly schedule, double-click or right-click the weekly schedule. Right-clicking brings up the context menu (see Table 192).

Exception Schedule

The exception schedule provides a list of exceptions to the [weekly schedule](#). Exceptions define a different set of events that supersede the events for particular days in the weekly schedule. An exception can be defined for a date, a date range, a week and day, or a reference to a Calendar. The following table contains information on the four types of exceptions. Wild cards can also be used to define exceptions; see [Wildcards](#) for more information.

Table 193: Exception Types

Exception Type	Description
Date	Occurs on a specific date.
Date Range	Occurs during a range of dates.

Table 193: Exception Types

Exception Type	Description
Week and Day	Occurs on certain weekdays during certain weeks of certain months. For example, the second Tuesday in any month or any Wednesday in June.
Calendar Reference	Occurs during all dates selected in the referenced calendar . Associating an exception with a calendar allows you to reference a large number of dates.

Note: The N1 exception schedule only supports the Date exception. For example, to schedule the same exception 3 days in a row using an N1 Exception schedule requires the use of three separate date exception entries. Date range, week and day, and calendar reference exceptions are not supported.

Each exception can have one or more events that run during the exception time period. Recall the example in the [Schedule](#) topic where you scheduled a fan to start at 7:00 and stop at 22:00 on all Mondays. You can create a date type exception to this weekly schedule if you want the fan to start and stop at different times on a certain day. For example, you can create an exception for Monday, May 26, and define an Off event at the start of the day (00:00), an On event at 9:00 in the morning (instead of 7:00), and another Off event at 17:00 in the evening (instead of 22:00). If you do not define the Off event at 00:00, the Weekly Schedule takes effect between 00:00 and 09:00, and the fan turns on at 07:00 as originally scheduled.

You can assign a **precedence** level (1–16, where 1 receives the highest precedence) to each exception, regardless of type, to determine the order of execution. If you define two or more exceptions for the same date, the exception with the highest precedence executes. For example, an exception with a precedence of 2 executes over an exception with a precedence of 8 if they are both defined for the same date.

If all exceptions for the same date have the same precedence, the exception that appears first in the exception list executes first; therefore, if you have multiple exceptions defined for one day, the exceptions apply by precedence level and then by the order of the items in the exception list.

Double clicking the exception schedule allows you to edit the exception schedule.

The JCI Exception Schedule attribute for the engine object (also an FAC mapped to an engine) allows you to set how long exception schedules are kept after the exception date has expired. The default value is Auto Delete 31 days. Two options, Auto Delete 7 days and Manual Delete are available for this attribute. See the JCI Exception Schedule attribute configuration in the [Engine Device Object](#) section for more information.

Note: Manual Delete is needed for locations like Japan where the local standards state that only the BACnet workstation can delete exception schedules.

Events

An event describes the time when the scheduling feature writes user-defined values to the referenced item attributes ([Scheduled Items](#)). [Weekly schedules](#) and [exception schedules](#) use an event to define when the scheduling feature should change its output.

Each day of a weekly schedule and each exception day of an exception schedule has its own set of events. Days can have multiple events (for example, a start event and a stop event). When the time defined by an event arrives, the scheduling feature writes the value for the defined event to the referenced attribute of each item in the list of scheduled items. Unless specified to end earlier, all events end at midnight. If an event is ended before midnight, and no other events are scheduled, the scheduling feature writes the Default Schedule Command to the referenced item attributes. If the Default Schedule Command is set to Release, the scheduling feature's control over the scheduled items ends. Values are sent to the referenced attributes at priority 15.

- ① **Note:** Release should only be used for the Default Schedule Command if the scheduled items support the Release command.

Scheduled Items

Scheduled items are the objects and attributes that the event values are written to. A schedule can operate with an empty Scheduled Items list. The scheduling feature writes the defined value to the scheduled items at the time defined by an event. Schedules defined in an NAE can reference any item that can be mapped into an Engine or Metasys Server. Schedules defined in an FAC can reference items only within that FAC, even if those items are not mapped to an Engine. [Adding items to a schedule](#) involves selecting the item and then selecting the attribute of the item that you want the schedule to change. At the times defined by an event, the schedule writes the defined values to the scheduled attribute associated with each referenced item.

When there are no events active in the weekly schedule or exceptions, the schedule writes the Default Schedule Command to the referenced attributes. If the Default Schedule Command is set to Release, the schedule's control over the scheduled items ends.

- ① **Note:** Release should only be used for the Default Schedule Command if the scheduled items support the Release command.

The table of scheduled items provides the Status Log entry for each scheduled item. The status log indicates any errors that occurred when the scheduling feature attempted to write values to the scheduled items.

A single schedule can only apply values of one data type to all items in its list of scheduled items; therefore, the first item in the Scheduled Items list becomes the key item. The key item determines the data type of the values that the schedule writes to the attributes of all scheduled items.

See the following example scenario for a description of how scheduled items work.

Example Scenario

If you use CCT and create a MASD air handling system in a field controller, you can select the OCC-SCHEDULE multi-state value as the scheduled item. The state selection modes for this item include Occupied, Unoccupied, and Standby. The application automatically manages the setpoint and logic changes when the unit switches between Occupied and Unoccupied.

Dates - Calendar Entry and Exception Schedule

You can use the following date formats for defining exceptions to the weekly schedules using [calendar](#) entries or [exception schedules](#):

- [Date](#)
- [Date Range](#)
- [Week and Day](#)

BACnet Clarification for Date Entries

ASHRAE has published a BACnet addendum 135-2008H Part 8 to clarify what is allowed in the format of calendar entries for single dates and range of date formats in the Calendar object and the exception schedule (the dates you want the Schedule to operate in a special way, such as holidays). If the BACnet Compatible attribute in the Device object is set to True, these BACnet rules are enforced.

For a Calendar object Date entry, the entry can be either a specific date or a date pattern:

- a specific date has all fields filled with specific values, including the Day of Week
- a date pattern has some fields filled with odd, even, last, or the **any** wildcard

For a Calendar object Date Range entry, the new rules restrict each part (start date and end date) to be one of the following:

- a fully specified date (all fields defined)

- a completely unspecified date (no fields defined - all fields use the **any wildcards**, which means the Start Date is **immediate** or the End Date is **never**)

① **Note:** For Date Range, the Metasys system currently allows partial wildcard fields for the start and end dates, which leads to unpredictable operation in some cases. Therefore, to avoid undesired results, do not use partial wildcard fields for the start date or end date. The examples in Table 194 illustrate valid date range entries and their meanings. The examples in Table 195 show three **invalid** date range entries. Be sure to follow the new BACnet rules to avoid these kinds of entries.

Table 194: Valid Wildcard Date Range Examples

Example	Duration	Month	Day	Year	Day of Week	Meaning
1	From	Aug	30	2015	Sunday	Starts on Sunday, August 30, 2015 and continues indefinitely.
	To	any	any	any	any	
2	From	any	any	any	any	Continues until Saturday, July 4, 2015
	To	Jul	4	2015	Saturday	
3	From	Jan	1	2015	Thursday	Starts on Thursday, January 1, 2015 and ends on Thursday, April 30, 2015
	To	April	30	2015	Thursday	

Table 195: Invalid Wildcard Date Range Examples

Example	Duration	Month	Day	Year	Day of Week
1	From	any	3	any	any
	To	any	6	any	any
2	From	any	any	any	Saturday
	To	any	any	any	Sunday
3	From	May	any	2014	Saturday
	To	September	any	2014	Sunday

① **Note:** No partial wildcard (any) fields for start date or end date are allowed in order to eliminate cases that could not be clearly interpreted and implemented.

Date and Date Range

You can use a single date or a range of dates when defining exceptions to a weekly schedule. The following table describes the options available for defining a single date or a range of dates entry for a calendar or exception schedule.

Table 196: Date and Date Range Format

Menu	Date	Date Range
Month	any January through December Odd (odd numbered months) Even (even numbered months)	any January through December
Day	any 1 through 31 Last (the last day of the month) Even (even numbered months) Odd (odd numbered months)	any Last (the last day of the month) 1 through 31
Year	any 2006–2048	any 2006–2048
Day of Week	any Monday through Sunday	any Monday through Sunday

- ✓ **Tip:** If you specify a single date (that is, you define the specific day, month, and year), the system figures out the Day of Week for you. For example, if you enter July 9, 2015 and leave the Day of Week entry as **any**, the system fills in **Thursday**. Also see [Data Consistency Checking](#).
- ① **Note:** For exception schedule entries, you also need to define the Precedence at which the schedule executes the exception schedule.

Week and Day

You can use a week and day entry when defining exceptions to the weekly schedule. The following table describes the options available for defining a week and day calendar or exception schedule entry (for example, the Saturday of the first week in May). A mixture of **any** and specified entries is allowed. Week and day entries apply to all years.

Table 197: Week and Day Format

Menu	Options
Month	any, January through December, Odd (odd numbered months), Even (even numbered months)
Week of Month	any 1 = Days 1 through 7 2 = Days 8 through 14 3 = Days 15 through 21 4 = Days 22 through 28 5 = Days 29 through 31 6 or last = Last seven days of the month
Day of Week	any, Monday through Sunday

- ① **Note:** For exception schedule entries, you also need to define the Precedence at which the schedule executes the exception schedule.

Wildcards

You can use wildcards to define date entry calendar or exception schedule exceptions. You can also program special dates, such as even or odd months, or the last day of the month. Wildcards are the fields of an exception schedule or calendar entry date specified by the **any** selection. For example, an exception date of December 25, any year, and any day of week means the events defined in the exception schedule occur on December 25 of every year regardless of the events defined in the weekly schedule. To use wildcards, select **any** from the drop-down menu of the Exception Detail or Calendar Entry dialog box.

For exceptions, the wildcard part of the date appears as **any** in the list of exceptions. For example, **December 25, any year Precedence 8** appears in the list of exceptions after saving the selections described in the following table for a single Date entry.

Table 198: Schedule Wildcard Example - Single Date

Parameter	Value
Month	December
Day	25
Year	any
Day of Week	any
Precedence	8

For calendars, the wildcard part of the date appears as **any** in the calendar entries list. For example, **Month = February, Day = 2, Year = any** appears in the calendar entries list after saving the selections described in the following table for a single Date entry.

Table 199: Calendar Wildcard Example - Single Date

Parameter	Value
Month	February
Day	2
Year	any
Day of Week	any

You can use wildcards for the following types of exceptions and calendar entries:

- [Date](#)
- [Date Range](#) (all Start Date or End Date fields must be set to any)
- [Week and Day](#)

Wildcards - Date

For a single date, a [wildcard](#) opens a particular field to the full range of possible values for that field. The following table describes the meaning for each type of unspecified wildcard or special date field.

Table 200: Unspecified Wildcard Date Field Meanings

Unspecified Field	Meaning
Month	Any = every month Odd = only odd numbered months (1, 3, 5, 7, 9, 11) Even = only even numbered months (2, 4, 6, 8, 10, 12)
Day of Month	Any = every day of the month (unless limited by Day of Week entry) 6 or Last = last day of the month Odd = only odd numbered days of the month (1, 3, 5, 7, 9, 11, and so on) Even = only even numbered days of the month (2, 4, 6, 8, 10, 12, and so on)
Year	Any = every year
Day of Week	Any = every day of the week, unless a particular day of the month is specified by the Day of Month field

The following table shows some sample wildcard dates or special dates and their meanings.

Table 201: Sample Wildcard Date Meanings

Month	Day of Month	Year	Day of Week	Meaning
any	01	any	any	The first day of every month, every year
Mar	05	any	any	March 5 of every year
Mar	any	2010	any	Every day in March 2010
any	any	any	any	Every day
any	any	any	Friday	Every Friday
any	any	2010	Friday	Every Friday in 2010
Mar	any	2010	Friday	Every Friday in March of 2010
Mar	12	2010	Friday	Only on Friday, March 12, 2010

Table 201: Sample Wildcard Date Meanings

Month	Day of Month	Year	Day of Week	Meaning
Apr	13	any	Monday	Every April 13 that occurs on a Monday
Even	2	2010	any	The second of every even numbered month in 2010: February 2, April 2, June 2, August 2, and so on
any	last	2010	any	The last day of every month in 2010
May	odd	any	any	Every odd numbered day in May
May	even	any	any	Every even numbered day in May

Wildcards - Date Range

For a range of dates, the start date and end date can be fully specified dates (all fields defined) or completely unspecified dates (all fields use **any**). If the start date is a fully specified date, then the end date can be a completely unspecified date (all fields use **any wildcards**). If the start date is a completely unspecified date (all fields use **any wildcards**), then the end date must be a fully specified date. The Day of Week must be set to match the day of the week for all specified dates. See Table 194 for an example.

Wildcards - Week and Day

You can use **wildcards** for Week and Day entries. The Week and Day selection identifies a month, a week of the month, and a day of the week. The possible selections include **any** as the week of the month (that is, the entire month), 1 (Days 1-7), 2 (Days 8-14), 3 (Days 15-21), 4 (Days 22-28), 5 (Days 29-31), and 6 or last (the last seven days). The following table shows some sample wildcard week and day exceptions.

Table 202: Sample Wildcard Week and Day Exceptions

Month	Week of Month	Day of Week	Meaning
any	any	any	Every day of the year
any	1 Days 1-7	Monday	Monday of the first week of every month
Jan	any	Tuesday	Every Tuesday in January
Feb	2 Days 8-14	any	Every day of the week in the second week of February
any	any	Wednesday	Wednesday of every week of every month
Mar	any	any	Every day of every week in March
any	3 Days 15-21	any	Every day of the third week of every month
Apr	4 Days 22-28	Thursday	Thursday in the fourth week of April
any	5 Days 29-31	any	29th, 30th, and 31st (as applicable) of every month
Jun	6 or Last Last seven days	Saturday	Saturday in the last seven days of June

Effective Period

The effective period defines the active or inactive date range for a schedule (weekly and exception schedule) using the date range rules. In Edit mode, the **Browse** icon opens the Effective Period dialog box. By default, a schedule is always active.

For example, you can create two schedules with the same items/objects and configure one for the heating season and the other for the cooling season. Then you can [define the effective period](#) of the heating schedule from October through March and the cooling schedule from April through September of each year.

Trend Scheduling

Use the Schedule feature to configure time and day periods for recording trend data for object trend extensions. In the schedule, add the trend extension to the Scheduled Items list and select the desired trend extension attribute. Make sure the trend extension is the Key Item in the Scheduled Items list. Then use the weekly schedule to define the days and times you want to record trend data for the selected object trend extension.

For more information on trend extensions and trending, see the examples below and click one of the following:

- [Extensions](#)
- [Trend Extensions](#)
- [Trend Studies](#)

For instructions on how to schedule a trend extension, see [Scheduling a Trend Extension](#).

Example 1:

To collect trend samples starting at 6:00 AM Monday through Friday and at 8:00 AM on Saturday and Sunday, and stopping trend collection at 8:00 PM on all days, configure a schedule as follows:

In the Scheduled Items list, add the desired object trend extension and select the trend extension's Enabled attribute as the Scheduled Attribute. Make sure the trend extension is the key item.

On the Weekly Schedule tab, set the Default Schedule Command to False and configure the event to begin and end according to the following table:

Table 203: Example 1 - Event Configuration

Time	Value
Monday - Friday 6:00 AM - 8:00 PM (06:00 - 20:00)	True
Saturday - Sunday 8:00 AM - 8:00 PM (08:00 - 20:00)	True

Example 2:

You may want to define how many trend samples are collected during specific periods of time. You can use a shorter trend sampling interval to collect more trend samples during the day when there is more activity in the building, and use a longer trend sampling interval to collect fewer trend samples at night when there is less activity in the building.

To take samples every 60 seconds from 6:00 AM to 6:00 PM Monday through Friday, every 600 seconds from 6:01 PM to 5:59 AM Monday through Friday, and every 600 seconds from 12:00 Midnight to 11:59 PM on Saturday and Sunday, configure a schedule as follows:

In the Scheduled Items list, add the desired object trend extension and select the trend extension's Sample Interval attribute as the Scheduled Attribute. Make sure the trend extension is the key item.

On the Weekly Schedule tab, set the Default Schedule Command to 600 seconds and configure the event to start and end according to the following table:

Table 204: Example 2 - Event Configuration

Time	Value
Monday - Friday 6:00 AM - 6:00 PM (06:00 - 18:00)	60 (seconds)

Fast Clock

A device that includes schedules activates the fast clock feature when the current date and time are changed in the device, the device restarts following a power failure or reset, or the device is put into simulation mode. The fast clock feature ensures the schedule and its associated scheduled items are in the correct state based on day and time of the device.

The fast clock evaluates the events scheduled for the current day from midnight to the current time, to find the last scheduled time and value for the current day. If the fast clock does not find any scheduled events, then the value associated with the latest time for the current day is used. Then the fast clock writes this value to all scheduled attributes of all items referenced by the schedule's list of [scheduled items](#).

Data Consistency Checking

The exception schedule or calendar verifies the existence of exception and calendar dates and that the start date of a date range occurs earlier than the end date for schedules and calendars **when**:

- Exception and calendar dates have all four fields defined and do not use wildcards (Month, Day of Month, Year, and Day of Week). For example, if you entered Monday, January 10, 2010, in the Exception Detail or Calendar Entry Detail dialog box, a warning message appears because January 10, 2010, is not a Monday.
- Exception and calendar dates have Month, Day of Month, and Year defined and use a wildcard for the Day of Week field. For example, if you entered February 29, 2010, and **any** in the Day of Week field of the Exception Detail or Calendar Entry Detail dialog box, a warning message appears because there is no 29th day in February, 2010.
- Exception and calendar date ranges have all fields of both the start and end dates defined. For example, if you entered a start date of Tuesday, July 2, 2010, and an end date of Monday, July 6, 2010, in the Exception Detail or Calendar Entry Detail dialog box, a warning message appears because July 2, 2010, is not a Tuesday.
- Exception and calendar date ranges have Month, Day of Month, and Year defined and use a wildcard for the Day of Week field for both the start and end dates. For example, if you entered a start date of August 27, 2010, and **any** in the Day of Week field, and an end date of August 6, 2010, and **any** in the Day of Week field in the Exception Detail or Calendar Entry Detail dialog box, a warning message appears because the end date occurs before the start date.

Because the [Schedule](#) can reference [Calendars](#) residing in another device, the scheduling feature performs the following calendar reference verification:

If a schedule references a calendar in another device and that device goes offline, the schedule assumes that while the device is offline, the calendar's Present Value does not change. For example, a schedule residing on NAE1 refers to a calendar residing on NAE2 and the [Calendar Object](#)'s Present Value attribute is True; however, if NAE2 is offline at midnight, the schedule assumes the calendar's Present Value changes to False at midnight. This means that the exception schedule is not active.

If a schedule refers to a calendar and that calendar is deleted, the schedule assumes the Calendar object Present Value is False and the exception schedule is not active.

When the date changes, the daily schedule ends and the Schedule object executes the next day's regular schedule, exception schedule, or Default Schedule Command.

Global Calendar

About this task:

The Global Calendar allows you to make facility-wide changes to calendars, such as defining holidays. These changes are tedious if you need to edit many calendars. To solve this problem, you can reference a Global Calendar object in each FAC or NxE. When you edit the values of the Global Calendar object, the dates automatically download into all the local calendars.

- Note:** If a local calendar references a global calendar, the local calendar date list is not writable and the Edit button is unavailable. However, if a local calendar writes to a BACnet attribute, the calendar may be edited. In this case, do not write to the local calendar date list, because this overrides the dates in the global calendar.

To reference a Global Calendar object:

1. In the Configuration tab, click the **Browse** icon to choose the Global Calendar Object Reference. (See [Creating a Schedule or Calendar](#).)

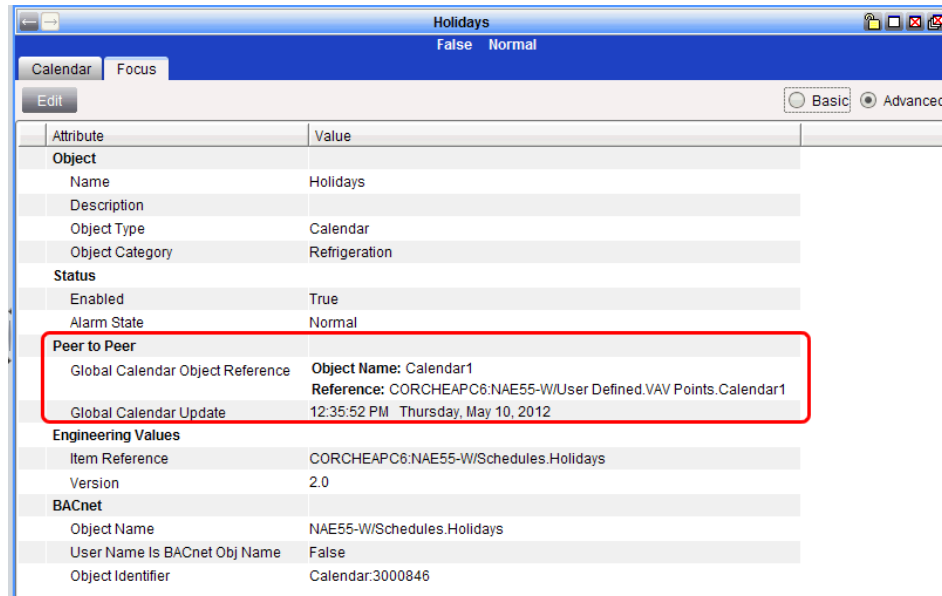
Figure 38: Global Calendar Object Reference - Configuration Tab

The screenshot shows the 'Insert Object Wizard' window in the 'Configure' tab. The 'Peer to Peer' section is highlighted with a red box. The 'Global Calendar Object Reference' field is set to 'Object Name: ...' and 'Reference:'. The 'BACnet' section shows 'Object Identifier' as 'Calendar:0' and 'User Name Is BACnet Obj Name' as 'False'.

Attribute	Value	Units
Object		
Name	Calendar2	
Description		
Object Type	Calendar	
Object Category	General	
Enabled	True	
Peer to Peer		
Global Calendar Object Reference	Object Name: ...	
	Reference:	
BACnet		
Object Identifier	Calendar:0	
User Name Is BACnet Obj Name	False	

2. In the Advanced Focus tab, click **Edit**, then click the **Browse** icon to choose the Global Calendar Object Reference. (See [Editing the Attributes of a Schedule or Calendar](#).)
3. Click Save. The Configuration tab adds the date and time of the last Global Calendar Update.

Figure 39: Global Calendar Update



Scheduling Steps

Creating a Schedule or Calendar

About this task:

Note:

- The procedure for creating a schedule or a calendar in offline mode (using SCT) is the same as the online procedure using the [Object](#). See [Metasys Modes](#) for more information about the modes of operation.
- You cannot create schedules or calendars in an FAC from SCT or SMP.

1. From the Insert menu, select Object. The Insert Object [Wizards](#) appears.
2. Select Schedule or Calendar and follow the Insert Object Wizard instructions.

- Note:** Add extensions to the schedule or calendar at the wizard prompt, if desired. See [Extensions](#).

Displaying an Existing Schedule or Calendar

To display an existing schedule or calendar, drag and drop the item from the navigation tree into a display frame or double-click the item in the navigation tree.

- Note:** Alternatively, you can right-click the item and select View from the menu that appears.

Displaying Scheduled Events

1. [Display a Schedule](#).
2. From the **Display Mode** drop down menu, select the view you want to see (Today's Schedule, Weekly Schedule, Exception Schedule, or Scheduled Items).
3. Place the cursor over a leading or trailing edge of a time bar segment. The time-of-day appears in 24-hour format in a small pop-up window.

Adding Weekly Scheduled Events

1. [Display a Schedule](#).

2. From the **Display Mode** drop down menu, select **Weekly Schedule**.
3. Click **Edit**.
4. Click the new (green plus) button or double-click a time bar segment and the **Define New Event(s)** dialog box appears.
 - ① **Note:** Alternatively, you can right-click a time bar segment and select **Add Event(s)**. The **Define New Event(s)** dialog box allows you to define the new event for multiple days.
5. Select one or more days, the starting time (hour and minute), and a value for the event using the check boxes and drop-down menus and click **OK**.
6. Repeat Step 4 and Step 5 as necessary.
7. To specify an event end time, make sure no event is selected, right-click where you want the event to end and select **End Event** from the pop-up menu. Drag the end of the event to adjust the end time.
8. Click **Save**.
 - ① **Note:** Once you click **Save**, the schedule object goes into effect and writes the new value to the scheduled items if necessary.

Editing Scheduled Events

1. [Display a Schedule](#).
2. From the **Display Mode** drop-down menu, select **Weekly Schedule**.
3. Click **Edit**.
4. Double-click the time bar segment. The **Modify Event(s)** dialog box appears.
 - ① **Note:** Alternatively, you can select and right-click the event on the time bar and select **Modify Selected Event(s)** from the menu.
5. Adjust the starting time (hour and minute) and value as desired for the event using the check boxes and drop-down menus and click **OK**.
 - ① **Note:**
 - You can also change the value of an event by selecting and right-clicking the event and selecting a value from the menu, if the value type is Boolean (True/False), binary, or multistate with less than eight states.
 - To specify an event end time, make sure no event is selected, right-click where you want the event to end, and select **End Event** from the pop-up menu. Once you specify an end time, you can drag the tail edge right or left to adjust the end time.
 - You can adjust start times and end times of events by dragging the edges of the time bar segment to the right or left. When adjusting a time, a small pop-up window shows the digital time of day based on a 24-hour clock, and adjusts in 5-minute increments.
 - You cannot drag the end of an event that ends at midnight. To do this, first right-click and select the **End Event**. Once the event ends prior to midnight, you can then drag to adjust the end time.
 - If you have a gap in the schedule between two events, you can drag the edge of one to meet the edge of the other. Once you do, the events become locked together so that the second begins as soon as the first ends, the begin/end points move together, and the gap is removed from the schedule.
6. Repeat Step 4 and Step 5 as necessary.
7. Click **Save**.

- ① **Note:** Once you click **Save**, the schedule object goes into effect and writes the new value to the scheduled object if necessary.

Deleting Scheduled Events

1. [Display a Schedule](#).
2. From the **Display Mode** drop down menu, select **Weekly Schedule**.
3. Click **Edit**.
4. Select the event on the time bar and click the delete (red minus) button (or press the Delete key).

- ① **Note:** Alternatively, you can select and right-click the event on the time bar and select **Delete Selected Event(s)** from the menu.

5. Repeat Step 4 as necessary.
6. Click **Save**.

Adding Exception Schedules

About this task:

To add [exception schedules](#):

1. [Display a Schedule](#).
2. From the **Display Mode** drop down menu, select **Exception Schedule**.
3. Click **Edit**.
4. Click the new (green plus) button to add exception schedules. The **Exception Detail** dialog box appears. You can add exception schedules to the list using one of the following exception types:

- [Date/Date Range](#)
- [Week and Day](#)
- [Calendar Reference](#)

5. Select the radio button next to the type of exception. Depending on the type of exception date selected, a different set of drop-down menu options appears. The Calendar Reference exception type has a **Browse** icon that brings up a dialog box for selecting a calendar.

- ① **Note:** When mapping a schedule into the Metasys system from a third-party BACnet device, you must also map any calendar objects referenced by the schedule (that is, calendar exceptions) in order to properly view and edit them in the schedule exception list.

6. Make your selections from the drop-down menus or for the **Calendar Reference**, click the **Browse** icon and select a calendar from the **Select Items** dialog box and click **OK**.
7. Click **OK** on the **Exception Detail** dialog box.
8. Select the exception schedule in the exception list.
9. Click the new event (green plus) button above the time bar or right-click the time bar and select **Add Event(s)**. The **Define New Event(s)** dialog box appears.
10. Select the starting time (hour and minute), and a value for the event using the check boxes and drop-down menus and click **OK**.
11. To specify an event end time, make sure no event is selected, right-click where you want the event to end and select End Event from the pop-up menu. Drag the end of the event to adjust the end time.
12. Repeat Step 4 through Step 11 as necessary.
13. Click **Save**.

- ① **Note:** Once you click **Save**, the schedule object goes into effect and writes the new value to the scheduled items if necessary.

Editing Exception Schedules

1. [Display a Schedule.](#)
2. From the **Display Mode** drop-down menu, select **Exception Schedule**.
3. Click **Edit**.
4. Double-click the exception schedule. The **Exception Details** dialog box appears.
5. Make your modifications using the drop-down menus or for the calendar reference, click the **Browse** icon and select a calendar from the **Select Items** dialog box and click **OK**.
6. Click **OK** on the **Exception Details** dialog box.
7. Select the exception schedule in the exception list.
8. Select and right-click the event in the time bar and select **Modify Selected Event(s)** from the menu. The **Modify Event(s)** dialog box appears.
 - ① **Note:** Alternatively, you can double-click an event to open the **Modify Event(s)** dialog box.
9. Select the starting time (hour and minute), and a value for the event using the check boxes and drop-down menus and click **OK**.
10. Repeat Step 4 through Step 9 as necessary.
 - ① **Note:** To change the value of an event, select and right-click an event and select a value from the menu.
11. Adjust the start and end times of events by dragging the edge of the event to the right or left.
12. Click **Save**.
 - ① **Note:** Once you click **Save**, the schedule object goes into effect and writes the new value to the scheduled object if necessary.

Removing Exception Schedules

1. [Display a Schedule.](#)
2. From the **Display Mode** drop down menu, select **Exception Schedule**.
3. Click **Edit**.
4. Select the exception in the exception list.
5. Click the delete (red minus) button (or press the Delete key).
6. Click **Save**.

Adding Scheduled Items

1. [Display a Schedule.](#)
2. From the **Display Mode** drop-down menu, select **Scheduled Items**.
3. Click **Edit**.
4. Click the add (green plus) button.
5. Select one or more items from the **Select Item** dialog box and click **OK**.
 - ① **Note:** To select multiple items, use the Control or Shift key.
6. The system automatically chooses the default attribute for each item you selected. To choose a different attribute, click the **Browse** icon and select the attribute that you want to schedule.
7. Click **Save**.

- ❗ **Note:** The first item in the list of scheduled items (Table of Scheduled Items) determines the data type used when the schedule writes values to the attributes of the scheduled item.

Editing Scheduled Items

1. [Display a Schedule.](#)
2. From the **Display Mode** drop-down menu, select **Scheduled Items**.
3. Click **Edit**.
4. Right-click the item name and select an option from the pop-up menu. For example, select make key item to promote the selected item to the [key item](#) of the schedule. When you add a key item, or choose the **Make Key Item** menu option for an item, the **States Text** (or **Display Units**) is updated to match the key item.
 - **Important:** When you add the first item to the **Scheduled Items** list, or if you promote an item to key item, the values in the scheduled events change to a default value if they are incompatible with the new key item. The default for numeric values is 0 or 0.0. The default for attributes that support multiple values is the first value available in the set of possible values (for example, False or Off). After changing the key item, we strongly recommend reviewing and adjusting the values for all events in the schedule as necessary.
5. The system automatically chooses the default attribute for each item you selected. To choose a different attribute, click the **Browse** icon and select the attribute that you want to schedule. For example, selecting **Present Value** means that the schedule writes a value to the Present Value attribute of that item.
6. Click **Save**.

Removing Scheduled Items

1. [Display a Schedule.](#)
2. From the **Display Mode** drop-down menu, select **Scheduled Items**.
3. Click **Edit**.
4. Select the item name.
5. Click the remove (red minus) button or right-click and select remove object from the pop-up menu.

Editing the Effective Period of a Schedule

1. [Display a Schedule.](#)
2. On the Schedule tab, click Edit.
3. Click the **Browse** icon of the Effective Period attribute. The Effective Period dialog box appears.
4. Select the start and end dates using the drop-down menus.
5. Click Apply.
6. Click OK.
7. Click Save.

Creating a New Calendar Entry

1. [Display a Calendar.](#)
2. Click **Edit**.
3. Click **Entry Detail**. The **Calendar Entry Detail** dialog box appears.
4. Click **New**.

5. Select the **Date**, **Date Range**, or **Week and Day** radio button. Depending on the type of entry selected, a different set of drop-down menu options appears.
6. Make your selections.
7. Click **Apply**.
8. Click **OK**.
9. Click **Save**.

Note:

- Alternatively, create date and date range calendar entries visually by selecting an individual calendar date or by selecting and dragging the mouse over a range of dates.
- Wildcard date entries appear with a contrasting blue background on the calendar and have an asterisk next to the date. Once you create a wildcard entry, visually selecting and deselecting it does not change the entry. To edit the entry, click **Entry Detail** on the calendar display frame.

Editing a Calendar Entry

1. [Display a Calendar](#).
2. Click **Edit**.
3. Click **Entry Detail**. The **Calendar Entry Detail** dialog box appears.
4. Select the entry from the calendar entries list.
5. Use the drop-down menus to edit the entry.
6. Click **Apply**.
7. Click **OK**.
8. Click **Save**.

Note:

- Alternatively, edit **Date** and **Date Range** calendar entries visually by selecting an individual calendar date or by selecting and dragging the mouse over a range of dates.
- Wildcard date entries appear with a contrasting blue background on the calendar and have an asterisk next to the date. Once you create a wildcard entry, visually selecting and deselecting it does not change the entry. To edit the entry, click **Entry Detail** on the calendar display frame.

Deleting a Calendar Entry

1. [Display a Calendar](#).
2. Click **Edit**.
3. Click **Entry Detail**. The **Calendar Entry Detail** dialog box appears.
4. Select the entry from the **Calendar Entries** list.
5. Click **Delete**.
6. Click **OK**.
7. Click **Save**.

- Note:** Alternatively, you can delete calendar entries visually by selecting the individual calendar date a second time or by selecting and dragging the mouse over the range of dates a second time. This method cancels the selection, thus deleting the entry.

Toggling Between Calendar Views

About this task:

① **Note:** The cursor turns into a hand when you place it over the header area of a calendar.

1. [Display a Calendar](#).
2. Place the cursor over the header of a calendar until it changes shape from an arrow to a hand and click. The view switches between 1-month and 12-month view.

Editing the Attributes of a Schedule or Calendar

1. [Display a Schedule or Calendar](#).
2. Select the **Focus tab**.
3. Click **Edit**.
4. Make your modifications using the drop-down menus and text boxes. See the [Schedule Object](#) or [Calendar Object](#) for details about the attributes of these items. Select the **Advanced** radio button if needed.

① **Note:** Selecting false in the **Enabled** drop-down menu of the **Schedule** disables (turns off) the schedule.

5. Click **Save**.

Copying and Pasting a Schedule or Calendar (Offline Mode Only)

About this task:

① **Note:**

- This procedure is available only in [offline mode](#) (SCT).
 - This function is not available for schedules/calendars in an FAC.
1. In offline mode, select the schedule or calendar from the navigation tree.
 2. Select **Copy** from the **Edit** menu.
 3. Select the desired destination for the copied schedule or calendar in the navigation tree.
 4. Select **Paste** from the **Edit** menu. The **Paste Object Wizard** appears.
 5. Edit the name of the schedule or calendar as desired and click **Paste**.

Deleting a Schedule or Calendar

1. Select the schedule or calendar you want to delete in the navigation tree.
2. Select **Delete Items** from the **Edit** menu, or press the Delete key.

Scheduling a Trend Extension

About this task:

① **Note:** See the [Trend Scheduling](#) topic for information and examples on scheduling trend extensions.

1. [Create a Schedule](#) or [display](#) the desired Schedule.
2. In the **Scheduled Items** list, add the desired object trend extension and the desired scheduled attribute. Follow the steps in the [Adding Scheduled Items](#) procedure. Make sure the trend extension is the key item. See [Trend Extensions](#) for information on the trend extension attributes you want to schedule.
3. On the **Weekly Schedule** tab, configure the events as desired. Follow the steps in the [Adding Weekly Scheduled Events](#) and [Editing Scheduled Events](#) procedures to schedule specific days and times to perform the defined trending capability.
4. Click **Save**.

Scheduling the Enabled Audit Level

About this task:

To schedule the Enabled Audit Level based on **time** using the Scheduling feature:

1. [Create a Schedule](#) or [display](#) the desired Schedule.
2. In the **Scheduled Items** tab, add the desired Engine or Metasys Server and select the **Enabled Audit Level** attribute. Follow the steps in the [Adding Scheduled Items](#) procedure.
3. On the **Weekly Schedule** tab, configure the events as desired. Follow the steps in the [Adding Weekly Scheduled Events](#) and [Editing Scheduled Events](#) procedures to schedule specific days and times to change the Enabled Audit Level. See the [Engine Device Object](#) or [ADS Device Object](#)'s Enabled Audit Level attribute description for information on the levels you want to schedule.
4. Click **Save**.

Copying Events within the Weekly Schedule

About this task:

To copy the events from one day in the Weekly Schedule to one or more days in the same Weekly Schedule:

1. With the **Weekly Schedule** in Edit mode, left-click and highlight the name of the day whose events you want to copy.
2. Right-click the highlighted day and select **Copy** from the pop-up menu.
3. Left-click to highlight the name of the day (or days) where you want to copy the schedule.
 - ① **Note:** You can select multiple days by holding the Control or Shift key while selecting days.
4. Right-click the highlighted name of any target day and select **Paste** from the pop-up menu. The copied schedule overwrites the schedule for the selected days.

Event Enrollment Object

Menu Selection: *Insert > Object > Event Enrollment*

The Event Enrollment object's attributes represent and contain information for managing events. Events are changes in the value or state of an object that meet specific criteria. The Event Enrollment object defines the event criteria and provides a connection between an event and a notification message sent to recipients. A recipient device is enrolled for notification if:

- it is one of the recipients in a [Notification Class Object](#) referenced by the Event Enrollment object
- a Notification Class object is not referenced and it is the recipient of the Event Enrollment object

When you create an Event Enrollment object at a network engine using a BACnet client, a new Event Enrollment object is created under that folder in the navigation tree.

Event Enrollment Concepts

Event Relationships

Event Types, Event States, and Event Parameters are interrelated attributes.

- ① **Note:** Any Event Type generates a Fault Event State if the object referenced in the Object Property Reference becomes unreliable and the Object Property Ref attribute is linked to Reliability.

Table 205: Event Relationships

Event Type	Event State	Event Parameters
Change of Bitstring	Normal Offnormal	Time Delay Bitmask List of Bitstring Values
Change of Character String	Normal Offnormal	Time Delay List of Values
Change of State	Normal Offnormal	Time Delay List of Values
Change of Value (COV)	Normal	Time Delay Bitmask COV Increment ① Note: Only one of either the Bitmask or the COV Increment property is used.
Command Failure	Normal Offnormal	Time Delay Feedback Property Reference
Double Out of Range	Normal High Limit Low Limit	Time Delay Low Limit High Limit Deadband
Floating Limit	Normal High Limit Low Limit	Time Delay Setpoint Reference Low Diff Limit Hi Diff Limit Deadband
Out of Range	Normal High Limit Low Limit	Time Delay Low Limit High Limit Deadband
Signed Out of Range	Normal High Limit Low Limit	Time Delay Low Limit High Limit Deadband
Unsigned Out of Range	Normal High Limit Low Limit	Time Delay Low Limit High Limit Deadband
Unsigned Range	Normal High Limit Low Limit	Time Delay Low Limit High Limit

Event Parameters

The table below lists the parameters in the Event Parameters attribute. For a description of the algorithms to which these parameters apply, refer to *ANSI/ASHRAE BACnet Standard 135 - 1995*.

Table 206: Event Parameters

Parameter	Description
Bitmask	This parameter applies to the Change of Bitstring event algorithm and the Change of Value event algorithm in the special case where the referenced attribute is a Bit String data type. It represents a bitmask that is used to indicate which bits in the referenced attribute are monitored by the algorithm. A value of one in a bit position indicates that the bit in this position in the referenced attribute is monitored by the algorithm. A value of zero in a bit position indicates that the bit in this position in the referenced attribute is not significant for the purpose of detecting this Change of Bitstring or Change of Value.
Deadband High Diff Limit Low Diff Limit High Limit Low Limit	These parameters apply to these event algorithms: Signed Out of Range, Unsigned Out of Range, Unsigned Range, Floating Limit, Out of Range, Double Out of Range. The only exception is that Deadband does not apply to Unsigned Range.
Feedback Property Reference	This parameter (BACnet Object Property Reference) applies to the Command Failure algorithm. Feedback Property Reference identifies the object and attribute that provides the feedback to ensure that the commanded attribute changes value. This attribute may reference only object properties that have lists of true and false values.
List of Bitstring Values	This is a list that applies to the Change of Bitstring event algorithm. This list defines the set of states for which the referenced attribute is Offnormal. Only the bits indicated by the Bitmask are significant. If the value of the referenced attribute changes to one of the values in the List of Bitstring Values, then the Event State attribute of the Event Enrollment object makes a transition To Offnormal and sends the appropriate notifications.
List of Values	This is a list of BACnet Property States that applies to the Change of State event algorithm. This event algorithm applies to referenced properties that have discrete or lists of values. The List of Values is a subset of the possible values that the attribute may have. If the value of the referenced attribute changes to one of the values in the List of Values, then the Event State attribute of the Event Enrollment object makes a transition to To Offnormal and sends the appropriate notifications.
COV Increment	This parameter applies to the Change of Value event algorithm. It represents the increment by which the referenced attribute must change in order for the event to occur.
Setpoint Reference	This parameter (BACnet Object Property Reference), applies to the Floating Limit event algorithm. Setpoint Reference indicates the setpoint reference for the reference attribute interval.

Table 206: Event Parameters

Parameter	Description
Time Delay	This parameter applies to all event types and represents the seconds that the conditions monitored by the event algorithm persist before an event notification is issued.
Referenced Property Increment	This parameter represents the increment by which the referenced property must change for an event to occur.

Event Type

Indicates the type of event algorithm used to detect events and report to enrolled devices. See the BACnet standard for more information on algorithms. See [Event Relationships](#) for more information on the event types.

The table below describes the event types with their respective data types.

Table 207: Event Types

Event Type	Data Type ¹	Description
Change of Bitstring	Bitstring	Generates an off-normal transition when the value of the referenced property is equal to one of the user-defined Bitstring Values (List Elements after applying the Bitmask) and the values are equal for the amount of seconds defined by the Time Delay parameter. The Bitmask defines the bits important for monitoring.
Change of Character String	String	Generates an off-normal transition when the value of the referenced property is equal to one of the values in the List of Values (List Elements) and the values are equal for the number of seconds defined by the Time Delay parameter.
Change of State	Bool, Byte, Enum, Long, Short, Ulong, Ushort	Generates an off-normal transition when the value of the referenced property is equal to one of the values in the List of Values (List Elements) and the values are equal for the number of seconds defined by the Time Delay parameter.
Change of Value	Bitstring, Float	Generates a normal transition when the value of the referenced property changes by an amount equal to or greater than the referenced property increment (Change of Value [COV] Increment) for the number of seconds defined by the Time Delay parameter.
Command Failure	Bool, Byte, Double, Enum, Float, Long, Short, Ulong, Ushort	Generates an off-normal transition if the values of the referenced property and the Feedback Reference are not equal for a time greater than the number of seconds defined by the Time Delay parameter.

Table 207: Event Types

Event Type	Data Type ¹	Description
Double Out of Range	Double	<p>Generates a transition to high limit alarm if the value of the referenced property is higher than the range of values determined by the High Limit for a time greater than the number of seconds defined by the Time Delay parameter. This event type accepts a double data type.</p> <p>Generates a transition to low limit alarm if the value of the referenced property is lower than the range of values determined by the Low Limit for a time greater than the number of seconds defined by the Time Delay parameter. This event type accepts a double data type.</p>
Floating Limit	Float	<p>Generates a transition to high limit alarm if the value of the referenced property is higher than the range of values determined by the current values of the Setpoint Reference, High Limit, Low Limit, and Deadband for a time greater than the number of seconds defined by the Time Delay parameter.</p> <p>Generates a transition to low limit alarm if the value of the referenced property is lower than the range of values determined by the current values of the Setpoint Reference, High Limit, Low Limit, and Deadband for a time greater than the number of seconds defined by the Time Delay parameter.</p>
Out of Range	Float	<p>Generates a transition to high limit alarm if the value of the referenced property is higher than the range of values determined by the current values of the High Limit and Deadband for a time greater than the number of seconds defined by the Time Delay parameter. The high limit value may be True, False, or an analog value.</p> <p>Generates a transition to low limit alarm if the value of the referenced property is lower than the range of values determined by the current values of the Low Limit and Deadband for a time greater than the number of seconds defined by the Time Delay parameter. The low limit value may be True, False, or an analog value.</p>
Signed Out of Range	Float (positive or negative)	<p>Generates a transition to high limit alarm if the value of the referenced property is higher than the range of values determined by the current values of the High Limit and Deadband for a time greater than the number of seconds defined by the Time Delay parameter.</p> <p>Generates a transition to low limit alarm if the value of the referenced property is lower than the range of values determined by the current values of the Low Limit and Deadband for a time greater than the number of seconds defined by the Time Delay parameter.</p>

Table 207: Event Types

Event Type	Data Type ¹	Description
Unsigned Out of Range	Float	Generates a transition to high limit alarm if the value of the referenced property is higher than the range of values determined by the current values of the High Limit and Deadband for a time greater than the number of seconds defined by the Time Delay parameter. Generates a transition to low limit alarm if the value of the referenced property is lower than the range of values determined by the current values of the Low Limit and Deadband for a time greater than the number of seconds defined by the Time Delay parameter.
Unsigned Range	Byte, Ulong, Ushort	Generates a transition to high limit alarm if the value of the reference property is higher than the range of values determined by the High Limit for a time greater than the number of seconds defined by the Time Delay parameter. Generates a transition to low limit alarm if the value of the reference property is lower than the range of values determined by the Low Limit for a time greater than the number of seconds defined by the Time Delay parameter.

¹ Bitstring, Bool=boolean (true/false), Byte, Double, Enum (enumerated), Float (floating point), Long, Short, String, Ulong (unsigned long), Ushort (unsigned short). Also see Table 321.

Event Enrollment Attributes

This object contains attributes common to many Metasys system objects. This section includes attributes of the Focus/Configuration tab, the Diagnostics tab (if applicable), and any other tab specific only to this object. See the [Object and Feature Tabs](#) section for information on the attributes that appear on the other tabs of this object (for example, the Hardware and Options tab appear on point objects).

Note: In the Notes and BACnet Notes columns, attributes marked with the letter C are configurable, and attributes marked with the letter W are writable.

Table 208: Event Enrollment Object Attributes - Focus/Configuration Tab

Attribute Name	Notes	BACnet Notes	Description
Acked Transitions			Conveys three separate flags that each indicate if the most recent To Offnormal, To Fault, and To Normal event transitions have been acknowledged (if the transition requires acknowledgement).
Alarm Message Text	C,W		Contains the user-defined text included with the event notification. Starting at Release 10.0, this attribute is replaced by Event Message Texts Config . The value of this attribute is kept in sync with the first element of the Event Message Texts Config attribute. Any modification to either one changes the other. Also, for upgraded systems that use Alarm Message Text, any text in this field is moved to the first element of the Event Message Texts Config field.
Event Detection Enable			Indicates if event detection and reporting is enabled for the Event Enrollment object. This is a read-only attribute that is always set to True.

Table 208: Event Enrollment Object Attributes - Focus/Configuration Tab

Attribute Name	Notes	BACnet Notes	Description
Event Enable	C,W	W	Conveys three flags that determine if notifications are enabled for To Offnormal, To Fault, and To Normal transitions. When a flag is set, this means that the corresponding transition causes notification to be sent to all enrolled devices. When a flag is cleared, this means that the corresponding transition is not reported. The object's Event State continuously updates, regardless of the value of the Event Enable attribute.
Event Message Texts			An array of three character strings that holds the message texts that identify the last state of the Event Enrollment object. The states in sequential order are: TO_OFF_NORMAL, TO_FAULT, and TO_NORMAL. If a particular event is yet to occur, the respective entry in the array is blank (null).
Event Message Texts Config			An array of three character strings that defines the message texts used to identify the last state of the Event Enrollment object. The states in sequential order are: TO_OFF_NORMAL, TO_FAULT, and TO_NORMAL, which you may customize by entering text in each field. The first element of this attribute is kept in sync with the Alarm Message Text attribute so that any modification to either one changes the other. Starting at Release 10.0, use this attribute instead of Alarm Message Text.
Event State			Indicates the current state of the event. The permitted values for Event State are specific to the Event Type. The value of Event State is independent of the Event Enable flags.
Event Time Stamps			Conveys the times of the last event notifications for To Offnormal, To Fault, and To Normal events.
Execution Priority	C,W	C,W	Indicates the relative importance of performing the function of the object within the device.
Graphic	C,W	C,W	Indicates the graphic associated with the object.
Graphic Alias	C,W	C,W	Indicates a portion of the graphic's item reference, up to and including the name of the folder containing this object or the controller containing this point.
Notification Object Reference	C,W	W	Specifies the notification class used when handling and generating event notifications for the object. This attribute implicitly refers to the Notification Class Object that has a Notification Class attribute of the same value. ① Note: The Notification Class attribute is used if the Recipient attribute is not used. As best practice, use the Notification Class attribute.
Notify Type	C,W	W	Conveys if the notifications generated by the object are Events or Alarms.
Reliability	W	W	Specifies the current reliability of the event enrollment object. Possible values: No Fault Detected (reliable), Communication Failure, and Configuration Error.

Table 209: Event Enrollment Object Attributes - Event Tab

Attribute Name	Flags	BACnet Notes	Values/Options/Range
Event Parameters	C,W	W	Determines the method used to monitor the referenced object. This attribute provides the parameter values used for the algorithm.

Table 210: Event Types

Event Type	Description
Change of Bitstring	Generates an off-normal transition when the value of the referenced property is equal to one of the user-defined Bitstring Values (List Elements after applying the Bitmask) and the values are equal for the amount of seconds defined by the Time Delay attribute you're using. The Bitmask defines the bits important for monitoring.
Change of Character String	Generates an off-normal transition when the value of the referenced property includes one of the values in the List of Values (List Elements) and the values are equal for the number of seconds defined by the Time Delay parameter.
Change of State	Generates an off-normal transition when the value of the referenced property (Input Reference) is equal to one of the values in the List of Values (List Elements) and the values are equal for the number of seconds defined by the Time Delay attribute of the object you're using.
Change of Value	Generates a normal transition when the value of the referenced property (Input Reference) changes by an amount equal to or greater than the referenced property increment (Change of Value [COV] Increment) for the number of seconds defined by the Time Delay attribute of the object you're using.
Command Failure	Generates an off-normal transition if the values of the referenced property (Input Reference) and the Feedback Reference are not equal for a time greater than the number of seconds defined by the Time Delay attribute of the object you're using.
Double Out of Range	Generates a transition to high limit alarm if the value of the referenced property is higher than the High Limit for a time greater than the number of seconds defined by the Time Delay parameter. This event type accepts a double data type. Generates a transition to low limit alarm if the value of the referenced property is lower than the Low Limit for a time greater than the number of seconds defined by the Time Delay parameter. This event type accepts a double data type.
Floating Limit	Generates a transition to high limit alarm if the value of the referenced property is higher than the range of values determined by the current values of the Setpoint Reference, High Limit and Deadband for a time greater than the number of seconds defined by the Time Delay parameter. Generates a transition to low limit alarm if the value of the referenced property is lower than the range of values determined by the current values of the Setpoint Reference, Low Limit, and Deadband for a time greater than the number of seconds defined by the Time Delay parameter.
Out of Range	Generates a transition to high limit alarm if the value of the referenced property is higher than the range of values determined by the current values of the High Limit and Deadband for a time greater than the number of seconds defined by the Time Delay parameter. Generates a transition to low limit alarm if the value of the referenced property is lower than the range of values determined by the current values of the Low Limit and Deadband for a time greater than the number of seconds defined by the Time Delay parameter.

Table 210: Event Types

Event Type	Description
Signed Out of Range	Generates a transition to high limit alarm if the value of the referenced property is higher than the range of values determined by the current values of the High Limit and Deadband for a time greater than the number of seconds defined by the Time Delay parameter. Generates a transition to low limit alarm if the value of the referenced property is lower than the range of values determined by the current values of the Low Limit and Deadband for a time greater than the number of seconds defined by the Time Delay parameter.
Unsigned Range	Generates a transition to high limit alarm if the value of the reference property is higher than the range of values determined by the High Limit for a time greater than the number of seconds defined by the Time Delay parameter. Generates a transition to low limit alarm if the value of the reference property is lower than the range of values determined by the Low Limit for a time greater than the number of seconds defined by the Time Delay parameter.

Event Enrollment Commands

The table below lists the commands supported by the [Event Enrollment Object](#).

Table 211: Event Enrollment Commands

Command Name	Parameters	BACnet Support	Description
Disable	None	No	Prevents distribution of event notifications.
Enable	None	No	Allows distribution of event notifications.

Group Object

Menu Selection: *Insert > Object > Group*

Notes:

- Click the Add button to select the items belonging to this group from the Select Item dialog box.
- Click the item in the group list and use the up and down arrows to move the item in the list.
- Click the item in the group list and click Remove to remove the item from the group.
- Do not add a Group object to an equipment definition for the Metasys UI. The Metasys UI does not support the Group object.

The Group object's attributes represent a collection of other objects and one or more of their attributes. This object provides the user with the ability to customize the organization of objects within the site. The Group object simplifies the exchange of information between objects by calling all members of the group at once. A group consists of any combination of object types. For example, you can use the Group object to monitor the temperature in different rooms throughout a floor of a building.

For general information on Metasys system objects, see [Common Object Attributes](#).

For detailed information on the Group object, see [Group Attributes](#).

Group Attributes

This object contains attributes common to many Metasys system objects. This section includes attributes of the Focus/Configuration tab, the Diagnostics tab (if applicable), and any other tab specific only to this object. See the [Object and Feature Tabs](#) section for information on the attributes that appear on the other tabs of this object (for example, the Hardware and Options tab appear on point objects).

Click the attribute name in the table for a description of the attribute.

Note: In the Notes columns, attributes marked with the letter C are configurable, and attributes marked with the letter W are writable. For more information about attribute characteristics, see [Attributes](#).

Table 212: Group Object Attributes - Group Tab

Attribute Name	Notes	BACnet Notes	Initial Value	Description
List of Group Members	C,W	W		Contains the references (Input References) that define the members of the group. These group members are referenced during a transaction. The list of group members consists of two parts: <ul style="list-style-type: none">• Object ID• Element All members of the group are objects that reside in the same device that maintains the Group object. Nesting is not allowed. This attribute is only shown in the Snapshot view.
Present Value				Lists the values of all the attributes specified in the List of Group Members. This is a read-only attribute; it cannot be used to write a set of values to the members of the group. The Present Value list reconstructs each time the attribute is read by fetching the member attributes. This attribute is only shown in the Snapshot view.

IEIEJ BACnet System Objects

IEIEJ BACnet System Objects comply to the Institute of Electrical Installation Engineers of Japan (IEIEJ) Standard Protocol based on BACnet specifications. Use these objects to comply with these guidelines.

For more information on IEIEJ BACnet System Objects, click one of the following:

- [Electric Demand Monitoring Object](#)
- [Generator Load Control Object](#)
- [Electric Demand Control Object](#)

IEIEJ BACnet System Object Descriptions

Electric Demand Monitoring Object

Menu Selection: **Insert > Object > Electric Demand Monitoring**

The Electric Demand Monitoring Object is a specialized object that monitors the power consumption in a fixed 30-minute window. This object uses an Accumulator or Analog Input and calculates the demand every minute. The object calculates a projected demand for the end of the 30-minute window, and compares that demand value to the target demand. If the projected demand value exceeds the target demand value, the object triggers an alarm notification. The default view of the object is a graph of the demand values.

Note: In the Notes column, letters indicate the following: A - Archive, C - Configurable, D - Default Attribute, F - PMI Refreshing R - Associate with Reliability, W - Writable.

Note: In the BACnet Notes column, letters indicate the following: O - BACnet optional property, P - BACnet proprietary property, Q- BACnet required property.

Table 213: Electric Demand Monitoring Object Attributes

Attribute Name	Notes	BACnet Notes	Initial Value	Values\Options \Range	Description
Present Value	D,F,R	Q	1	1=Normal 2=Alarm Level 1 3=Alarm Level 2	For the Electric Demand Monitoring object, the Present Value displays the present demand alarm level. There are three states: - Normal State (no alarm generated) - Alarm level 1 - Alarm level 2
Contract Receiving Power	W,C,A	Q	0	0.0 kW to 99999.9 kW	This attribute represents the electric power contracted from a power company as a value of electric energy of 60 minutes.
Alarm Value of Power	W,C,A	Q	0	0.0 kW to 99999.9 kW	This attribute shows the alarm value of electric power as a value of electric energy of 60 minutes. If this value is exceeded, the Present Value becomes 3 and generates alarm level 2.
Target Value of Power	W,C,A	Q	0	0.0 kW to 99999.9 kW	This attribute shows the electric power that can be supplied by a generator as a value of electric energy of 60 minutes. If this value is exceeded, the Present Value becomes 2 and generates demand alarm level 1.
Units	W,C,A	Q	kW	Default - kW	This attribute represents the engineering unit of all real type properties that show electric energy.
JCI List of Pulse Counter Reference	C,A	O	Null	Pulse Attributes reference PV of (AI, AV, or Accumulator)	This attribute indicates the references to electric power Pulse input devices. This reference can be either an Accumulator, an AV, or an N2 Pulse Counter object.

Table 213: Electric Demand Monitoring Object Attributes

Time Synchronization Mode	W,C,A	P	Internal Normal	1=External 2=Internal Normal (0 min, 30min) 3=Internal Custom (arbitrary)	This displays three modes: External: If the external signal is Pulse type, the demand interval stops and starts whenever a Pulse is received. If the external signal is Analog, the demand interval stops and starts when the value changes (increments or decrements). Internal Normal: When the time is XX:00:00 and XX:30:00, demand timing will stop and start. Internal Custom: Demand interval begins after startup of an NAE, the addition of the object, or when a demand reset command is issued. The demand interval stops and starts 30 minutes from the starting time. For example, if it stops and starts at XX:12:03, then it will stop and start next at XX:42:03.
Time to Mask	W,C,A	P	5	0 min to 25 min	This attribute indicates the time that is not treated as an alarm even if the measured value exceeds an Alarm Value of Power or Target Value of Power after starting the demand monitoring of a 30-minute-period.
EOI Object	C,A	P			If operating in External mode, refer to the AI, AV, or BI object to input the external interval signal. Only this property is configurable.
Input Mode	W,C,A	P	Pulse	1=Pulse(PI) 2=Analog(AI or AV)	This attribute switches the reference input signal between Pulse signal such as PI, and Analog signal such as AI and AV. When input mode is Analog, any change of value is an EOI. In Pulse mode (typically BI), only transitions to True are EOI pulses.
JPN Rate Constant	W,C,A	P	50,000	0 to 50,000	The numeric value that is input onto a Pulse object is the electric energy. Set a constant to multiply.
Pulse Constant	W,C,A	P	100	0 to 50,000	The numeric value that is input onto a Pulse object is the electric energy. Set a constant to multiply.
Rollover Limit			0		This attribute specifies the highest counter value before the Pulse Counter rolls over to zero.
Reliability Time Interval		Q	1	0 min to 30 min	For the Electric Demand Monitoring (EDM) object, power usage is calculated from the difference between one minute previous and the value of JCI List of Pulse Counter Reference . If the difference in usage is zero, recognize it as an input error and set the status to unreliable. However, even when the object is normal, this property remains active, because the reliability check is masked if the power usage is low and the difference in usage is zero. In addition, EDM is unreliable if the mask time is set with this property, because the difference in calculation is reset in a 30 minute period. If it is unreliable at the start of 30 minutes, EDM becomes unreliable. That is, it is unmasked at the start time, for example HH:00 or HH:30, and becomes unreliable.

Electric Demand Control Object

Menu Selection: **Insert > Object > Electric Demand Control**

The Electric Demand Control Object interacts with the [Electric Demand Monitoring Object](#) to control electrical loads so the actual demand stays below the target demand. The **Present Value** is a value that indicates the level of shed activity needed to stay within the target demand. External logic must be used to interpret this value and to switch on/off loads.

Note: In the notes column, letters indicate the following: A - Archive, B - BACnet Array, C - Configurable, D - Default Attribute, F - PM Refresh, O - BACnet Optional, Q - BACnet Required, R - Associate with Reliability, W - Writable.

Table 214: Electric Demand Control Object Attributes

Attribute Name	Notes	Initial Value	Values/Options/Range	Description
Present Value	W,D,R,F,Q	1		See the Present Value attribute in Generator Load Control
Control Type	W,C,A	Time Ctrl	Control_Type_Enum_Set (New Define)	See the Control Type attribute in Generator Load Control .
JCI Demand Monitoring Object Reference	C,A	NULL		This attribute refers to the Electric Demand Monitoring object reference. The Electric Demand Control object is unreliable if the input source object is unreliable, or if the reference is offline and data acquisition with BACnet cannot be performed.
Priority For Writing	W,C,A,O		Low Limit = 3 High Limit = 16	This attribute defines the priority when instructed to inject or trip by demand control based on this object. It is a 1 to 16 unsigned integer, with 1 being the highest priority, and 16 being the lowest priority.

Table 214: Electric Demand Control Object Attributes

Level Value		ALL 0		<p>This attribute represents the level of available electric power of a generator, measured in a 60 minute period. It defines the load capacity to be decreased when a device at a specified level is turned off.</p> <p>Although the Level Value attribute is an array of 16 values, only the values 1, 2, 3, 9, 15, and 16 are configurable.</p> <p>Level Value: Control Status of Register Points Device</p> <p>1: All levels recovered (all demand controlled devices are ON).</p> <p>2: Level 2 devices are turned OFF. All other devices are ON.</p> <p>3: Level 2 and 3 devices are turned OFF. All other devices are ON.</p> <p><4-8>:n/a</p> <p>9: Devices at level 1 to 9 are turned OFF. All other devices are ON.</p> <p><10-14>:n/a</p> <p>15: Devices at level 1 to 15 are turned OFF. All other devices are ON.</p> <p>16: All levels are turned OFF (all demand controlled devices are OFF).</p>
Transition Interval	W,C,A	30	Units = seconds	See the Transition Interval attribute in Table 215.

Generator Load Control Object

Menu Selection: **Insert > Object > Generator Load Control**

This object is similar to the [Electric Demand Control Object](#) but specifically controls the loads on a backup generator. A given generator can supply a fixed maximum amount of power. A reference to the current load on the generator and the value of the maximum generator output are configured in the object. The **Present Value** is a value that indicates the level of shed activity needed so the demand does not exceed the maximum power output of the generator. External logic must be used to interpret this value and switch on/off loads.

ⓘ Note: In the Notes column, letters indicate the following: A - Archive, B - BACnet Array, C - Configurable, D - Default Attribute, F - PM Refresh, O - BACnet Optional, Q - BACnet Required, R - Associate with Reliability, W - Writable.

Table 215: Generator Load Control Object Attributes

Attribute	Notes	Initial Value	Values \Options \Range	Description
Present Value	W,D,R,F,Q	1	(from Standard object)	For the Generator Load Control and Electric Demand Control objects, the Present Value attribute ranges from 1 to 16. Level 1 represents all level release; 16 is the highest level and 2 is the lowest level. When the Present Value increases from 2 to 16, turn ON control to selected facilities. When the Present Value decreases from 16 to 2, turn OFF control to selected facilities. This value presets to 1 when monitoring starts.

Table 215: Generator Load Control Object Attributes

Control Type	W,C,A	Time Ctrl	Control_Type_Enum_Set (New Define)	This attribute provides the means for determining the Present Value . Time Control refers to the value of the Adjust Value of Load property, and determines the Present Value . Value Control refers to the values of Adjust Value of Load property, and determines the Present Value .
Adjust Value of Load	Q	0	Units = kW	This attribute expresses the value of electric power that can be supplied by a generator minus the current electric power consumed by a generator in kW units.
Priority for Writing	W,C,A,Q	11	Low Limit = 3 High Limit = 16	This attribute defines the priority when instructed to start or stop by demand control based on this object. It is a 1 to 16 unsigned integer, with 1 being the highest priority, and 16 being the minimum priority.
Target Value to Supply	W,C,A,Q	0	Units = kW	This attribute shows the electric power that can be supplied by a generator.
JCI Control Start Reference	C,A	NULL		This attribute refers to the power voltage of a generator. The Present Value of BI or BV is configured as an object or a property to be set. If the object referred to is not reliable, or the reference of the input object is offline, the Generator Load Control object is unreliable.
JCI Current Consumed WH Reference	C,A	NULL		This attribute refers to the power consumption of a generator. The Present Value of AI or AV is configured as an object and a property to be set. If the object is not reliable, or the reference of the input object is offline, the Generator Load Control object is unreliable.
Sampling Interval	W,C,A	5	Units = seconds	This attribute refers to the interval of time in seconds needed to determine the Present Value . The values of Sampling Interval and Consecutive Samples should be configured in consideration of the update time (polling period) of the object that is set as the reference input. If the object reaches the value that is set in Consecutive Samples , the Present Value is obtained.

Table 215: Generator Load Control Object Attributes

Transition Interval	W,C,A,O	60	Units = seconds	This attribute is the interval of time in seconds needed to determine when the Present Value can be increased by one level in Value Control . The values of Transition Interval are configured in consideration of the update time (ramping period - how fast the Present Value can be ramped up from one level to another) of the load controlled by the object. This interval only applies to values that are positively increasing. If the Present Value of the object is decreasing, this interval does not apply. When the Present Value is changed to a positive direction such as from 1 to 4, the Present Value should ramp up one level at a time to prevent generator failure because of overload. This property defines an interval to decide when the next increase occurs. For example, if Generator Load Control (GLC) changes the Present Value from 1 to 2, then once the Time Transition Interval expires, GLC changes the Present Value to 3, and so on, until it reaches the desired level. While in transition, the desired level can change and the ramping can be adjusted to the new level.
Consecutive Samples	W,C,A	6		See the Sampling Interval attribute for details.
Recovery Power Offset	W,C,A	0	Units = kW	This attribute represents the offset that counts toward the determining conditions for performing applying control (decrement of level).
Level Value		ALL 0		<p>This attribute represents the level of available electric power of a generator, measured in a 60 minute period. It defines the load capacity to be decreased when a device at a specified level is turned off.</p> <p>Although the Level Value attribute is an array of 16 values, only the values 1, 2, 3, 9, 15, and 16 are configurable.</p> <p>Level Value: Control Status of Register Points Device</p> <p>1: All levels recovered (all demand controlled devices are OFF).</p> <p>2: Level 2 devices are turned ON. All other devices are OFF.</p> <p>3: Level 2 and 3 devices are turned ON. All other devices are OFF.</p> <p><4-8>:n/a</p> <p>9: Devices at level 1 to 9 are turned OFF. All other devices are OFF.</p> <p><10-14>:n/a</p> <p>15: Devices at level 1 to 15 are turned ON. All other devices are OFF.</p> <p>16: All levels are recovered (all demand controlled devices are ON).</p>

Life Safety Point Object

The Life Safety Point object's attributes represent the state of smoke detectors, fire detectors, security alarms, and similar devices. As a Life Safety Point, the state of this object can be one of 24 states.

The Life Safety Point object is a standardized object that represents a BACnet Safety Point Object as defined in the 2008 BACnet specification.

Life Safety Point Attributes

This object contains attributes common to many Metasys system objects. These common attributes are described in the [Common Object Attributes](#) section. This section includes attributes of the Focus/Configuration tab, the Diagnostics tab (if applicable), and any other tab specific only to this object. See the [Object and Feature Tabs](#) section for information on the attributes that appear on the other tabs of this object (for example, the Hardware and Options tab appear on point objects).

Note: In the BACnet Notes column, letters indicate the following: B - Exposed as standard BACnet property, O - BACnet optional property, P - BACnet proprietary property, Q- BACnet required property.

Table 216: Life Safety Point Object Attributes - Focus/Configuration Tab

Attribute Name	BACnet Notes	Values/Options/Range	Description
Accepted Modes	Q	Uses BAC LifSfty Mode (BACnet Lifesafety Mode) (Set 189).	Specifies all the values the Life Safety Mode attribute accepts when written.
Direct Reading	O	Units = Redirected to Units attribute	Indicates an analog quantity that reflects the measured or calculated reading from an initiating device.
Event State		Uses BAC Event State (Set 5).	Indicates if an active event state is associated with the object. If the object supports intrinsic reporting, this attribute indicates the event state of the object. If not, the attribute is Normal.
Life Safety Mode	W,Q	Uses BAC LifSfty Mode (BACnet Lifesafety Mode) (Set 189).	Specifies the operating mode of the Life Safety Point object. The Life Safety Point object generates Change-of-Life-Safety event notifications for any mode transition if the flags in the Event Enable attribute are set.
Maintenance Required	O	Uses BAC LifSfty Maint (BACnet Lifesafety Maintained) (Set 187).	Indicates that maintenance is required for the life safety point. This may indicate periodic maintenance or parameter-determined maintenance, such as a dirtiness value for an associated detector.
Operation Expected	Q	Uses BAC LifSfty Oper (Set 190).	Specifies the next operation expected by this object to handle a specific life safety situation.
Out of Service	B,C,W		Indicates (when True) that the Present Value and Reliability attributes are decoupled from the physical input to the object and their values may be changed for simulation or testing purposes. Functions that depend on the values of the Present Value or Reliability attributes continue to respond to changes while Out of Service is True, as if those changes had come from the physical input. Additionally, the Out of Service state of the Status Flags attribute is set to True and the Fault state is decoupled from the physical input when Out of Service is True.
Present Value	W,D,R,Q	Uses BAC LifSfty State (BACnet Lifesafety State) (Set 186).	Indicates the current value of the Life Safety Point object in the defined Units. When Out of Service is True, this attribute is writable.
Reliability	B,W	Uses Reliability (Set 503)	Indicates whether the Present Value is unreliable. When Out of Service is True, the Reliability attribute may be written directly.
Setting	O	Units = No Unit	Specifies the next operation expected by this object to handle a specific life safety situation.

Table 216: Life Safety Point Object Attributes - Focus/Configuration Tab

Attribute Name	BACnet Notes	Values/Options/Range	Description
Silenced	Q	Uses BAC LifSfty SilState (BACnet Life Safety Silent State) (Set 188).	Indicates whether the most recently occurring transition for this object produced an audible or visual indication that has been silenced by the recipient of a Life Safety Operation service request or a local process.
Tracking Value	O	Uses BAC LifSfty State (BACnet Lifesafety State) (Set 186).	Reflects the non-latched state of the Life Safety Point object. This attribute continuously tracks changes in the latched state of the object.
Units	O	Uses Unit Set (Set 869)	Indicates the units of the quantity represented by Direct Reading.

Life Safety Point Commands

The table below lists the commands supported by the [Life Safety Point Object](#).

Table 217: Life Safety Point Commands

Command Name	Number of Parameters	Description
In Service	None	<p>Cancels the affect of an Out of Service command and returns the Out of Service attribute to False. Present Value and Reliability revert back to the values obtained from the physical input.</p> <p>① Note: For BACnet objects, support of this command is dependent on the ability to write the Out Of Service attribute.</p>
Out of Service	The value to be written to the Present Value.	<p>Allows a user to override the object's hardware input for simulation or other purposes. The Out of Service command changes the Out of Service attribute to True, writes the Present Value to the value of the command parameter, and writes the Reliability attribute to Reliable. Present Value and Reliability no longer track the physical input. When an Out Of Service command is issued, the NxE does not communicate subsequent changes (operator or system) to the field device.</p> <p>① Note: For BACnet objects, support of this command is dependent on the ability to write the Out Of Service attribute.</p>

Life Safety Zone Object

The Life Safety Zone object represents a grouping of Life Safety Points. The Life Safety Zone can also represent a grouping of Life Safety Zones.

The Life Safety Zone object is a standardized object that represents a BACnet Safety Zone Object as defined in the 2008 BACnet specification.

Life Safety Zone Attributes

This object contains attributes common to many Metasys system objects. These common attributes are described in the [Common Object Attributes](#) section. This section includes attributes of the Focus/Configuration tab, the Diagnostics tab (if applicable), and any other tab specific only to this object. See the [Object and Feature Tabs](#) section for information on the attributes that appear on the other tabs of this object (for example, the Hardware and Options tab appear on point objects).

Note: In the BACnet Notes column, letters indicate the following: B - Exposed as Standard BACnet Property, C - Configurable, D - Default Attribute for Display, N - Value Not Required, O - BACnet Optional, Q - BACnet Required, R - Affected by Object Reliability, W - Writable

Table 218: Life Safety Zone Object Attributes - Focus/Configuration Tab

Attribute Name	BACnet Notes	Values/Options/Range	Description
Accepted Modes	Q	Uses BAC LifSfty Mode (BACnet Lifesafety Mode) (Set 189).	Specifies all the values the Life Safety Mode attribute accepts when written.
Event State	B	Uses BAC Event State (Set 5).	Indicates if an active event state is associated with the object. If the object supports intrinsic reporting, this attribute indicates the event state of the object. If not, the attribute is Normal.
Life Safety Mode	W,Q	Uses BAC LifSfty Mode (BACnet Lifesafety Mode) (Set 189).	Specifies the operating mode of the Life Safety Point object. The Life Safety Point object generates Change-of-Life-Safety event notifications for any mode transition if the flags in the Event Enable attribute are set.
Maintenance Required	O	Uses BAC LifSfty Maint (BACnet Lifesafety Maintained) (Set 187).	Indicates that maintenance is required for the life safety point. This may indicate periodic maintenance or parameter-determined maintenance, such as a dirtiness value for an associated detector.
Operation Expected	Q	Uses BAC LifSfty Oper (Set 190).	Specifies the next operation expected by this object to handle a specific life safety situation.
Out of Service	B,C,W		Indicates (when True) that the Present Value and Reliability attributes are decoupled from the physical input to the object and their values may be changed for simulation or testing purposes. Functions that depend on the values of the Present Value or Reliability attributes continue to respond to changes while Out of Service is True, as if those changes had come from the physical input. Additionally, the Out of Service state of the Status Flags attribute is set to True and the Fault state is decoupled from the physical input when Out of Service is True.
Present Value	W,D,R,Q	Uses BAC LifSfty State (BACnet Lifesafety State) (Set 186).	Indicates the current value of the Life Safety Zone object. When Out of Service is True, this attribute is writable.
Reliability	B,W	Uses Reliability (Set 503)	Indicates whether the Present Value is unreliable.
Silenced		Uses BAC LifSfty SilState (BACnet Life Safety Silent State) (Set 188).	Indicates whether the most recently occurring transition for this object produced an audible or visual indication that has been silenced by the recipient of a Life Safety Operation service request or a local process.
Tracking Values	O	Uses BAC LifSfty State (BACnet Lifesafety State) (Set 186).	Reflects the non-latched state of the Life Safety Zone object. This attribute continuously tracks changes in the latched state of the object.

Table 219: Life Safety Zone Object Attributes - Members Tab

Attribute Name	Data Type	BACnet Notes	Description
Member Of	List of	O	Indicates the Life Safety Zone objects of which this Life Safety Point is considered to be a zone member. Each object in the Member Of list is a Life Safety Zone object.
Zone Members	List of	Q	Indicates which Life Safety Point and Life Safety Zone objects are members of the zone represented by this object.

Life Safety Zone Commands

The table below lists the commands supported by the [Life Safety Zone Object](#).

Table 220: Binary Input Commands

Command Name	Number of Parameters	Description
In Service		<p>Cancels the affect of an Out of Service command and returns the Out of Service attribute to False. Present Value and Reliability revert back to the values obtained from the physical input.</p> <p> ⓘ Note: For BACnet objects, support of this command is dependent on the ability to write the Out Of Service attribute.</p>
Out of Service	The value to be written to the Operation Expected.	<p>Allows a user to override the object’s hardware input for simulation or other purposes. The Out of Service command changes the Out of Service attribute to True, writes the Present Value to the value of the command parameter, and writes the Reliability attribute to Reliable. Present Value and Reliability no longer track the physical input.</p> <p>When an Out Of Service command is issued, the NxE does not communicate subsequent changes (operator or system) to the field device.</p> <p> ⓘ Note: For BACnet objects, support of this command is dependent on the ability to write the Out Of Service attribute.</p>

Loop Object

Menu Selection: **Insert > Object > Loop**

The Loop object allows a third-party BACnet workstation to represent a control loop in a standard way. If you use the Site Management Portal as the primary mechanisms to view system information, you do not need to use the Loop object.

The Loop object represents the key information from a PID logic module. The object does not execute the PID algorithm but simply allows you to represent the key parameters of a PID logic module in a Focus tab view.

The Loop object uses the data provided by mapped field points to execute the BACnet intrinsic alarming algorithm. First, create a folder and map the field points representing the loop information. Then use the Insert Object wizard to add the Loop object to the same folder and configure references to the mapped points representing the loop information. The Loop object

reads the information indicated by the references, and presents the values received in the Focus tab of the Loop object.

The behavior of the Loop object's intrinsic alarming algorithm is as follows:

- The loop object generates a TO OFFNORMAL event when the difference between the Setpoint Value and the Controlled Variable Value remain outside the band defined by the Error Limit and the Time Delay has been exceeded.
- The loop object generates a TO NORMAL event when the difference between the Setpoint Value and the Controlled Variable Value is within the band defined by the Error Limit.

Note: You must configure references to the BACnet required properties to successfully create the Loop object. These references appear red in the wizard until configured. You may optionally configure references for the BACnet optional properties. If you do not define the optional references for some reason, the Loop object responds to a read for the corresponding value with an Unknown Property error. These BACnet required and optional properties are noted with footnotes in the attribute table. See [Loop Attributes](#).

Loop Attributes

This object contains attributes common to many Metasys system objects. These common attributes are described in the [Common Object Attributes](#) section. This section includes attributes of the Focus/Configuration tab, the Diagnostics tab (if applicable), and any other tab specific only to this object. See the [Object and Feature Tabs](#) section for information on the attributes that appear on the other tabs of this object (for example, the Hardware and Options tab appear on point objects).

Note: In the Notes column, letters for the attributes indicate the following: C - Configurable, N - Value Not Required, W - Writable.

Table 221: Loop Attributes - Focus/Configuration Tab

Attribute Name	Notes	Values/Options/Range	Description
Action	C,W	Direct Reverse	Indicates whether the loop is direct or reverse acting.
Alarm State		Uses BACEventState set.	Indicates whether the object has an active alarm state associated with it. The intrinsic alarming algorithm determines the Alarm State value.
Bias			Indicates the bias value used by the loop algorithm. If the Bias Reference does not contain a value, a read of the Bias attribute returns an Unknown Property error.
Bias Reference ¹	C,N,W		Provides the object reference for the Bias attribute. The Loop object reads and signs up for changes in the Present Value attribute of the object referenced by the Bias Reference. The value received is stored as the Bias.
Controlled Var Variable		Restricted to field mapper points.	Reflects the Present Value of the field point mapper defined by the Controlled Variable Reference.
Controlled Variable Reference ²	C,W		Defines the field point mapper that represents the source of the input to the control loop.
COV Increment			Defines the minimum change in the Present Value required for the object to report a change to other feature objects.
Derivative Constant			Indicates the value of the derivative gain parameter used by the loop algorithm. If the Derivative Constant Reference does not contain a value, a read of the Derivative Constant attribute returns an Unknown Property error.

Table 221: Loop Attributes - Focus/Configuration Tab

Attribute Name	Notes	Values/Options/Range	Description
Derivative Constant Reference ¹	C,N,W		Provides the object reference for the Derivative Constant attribute. The Loop object reads and signs up for changes in the Present Value attribute of the object referenced by the Derivative Constant Reference. The value received is stored as the Derivative Constant.
Display Precision	C,W	Uses Display Precision set.	Indicates the rounded position and the number of decimal places to display for this object.
Integral Constant			Indicates the value of the integral gain parameter used by the loop algorithm. If the Integral Constant Reference does not contain a value, a read of the Integral Constant attribute returns an Unknown Property error.
Integral Constant Reference ¹	C,N,W		Provides the object reference for the Integral Constant attribute. The Loop object reads and signs up for changes in the Present Value attribute of the object referenced by the Integral Constant Reference. The value received is stored as the Integral Constant.
JCI Out of Service Reference	C,W		Provides the object reference for the JCI Out of Service attribute. The Loop object reads and signs up for changes in the Present Value attribute of the object referenced by the JCI Out of Service Reference. The reference must be a BI, BO, or BV object. When the state of the JCI Out of ServiceReference is True, the PID loop algorithm is placed out of service.
JCI Out of Service Value Reference	C,W		Provides the object reference for the JCI Out of Service Value Reference attribute. The Loop object reads and signs up for changes in the Present Value attribute of the object referenced by the JCI Out of Service ValueReference. The reference must be an AI, AO, or AV object. When the Loop object is out of service, its Present Value assumes the value of this referenced object.
Manipulated Variable Reference ²	C,W	Restricted to field points.	Defines the field point mapper that represents the destination of the output of the control loop.
Manual Tuning	C	False	Controls whether the gain values of the PID Loop object can be changed. These values include Proportional Constant, Derivative Constant, Integral Constant, Bias, Maximum Output, and Minimum Output. When the value of this attribute is False, these referenced values cannot be changed.
Max Output			Indicates the maximum value of the output (Present Value) as limited by the PID loop algorithm. This value is normally used to prevent the algorithm from controlling beyond the range of the controlled device, and to prevent integral term wind up. If the Maximum Output Reference does not contain a value, a read of the Max Output attribute returns an Unknown Property error.

Table 221: Loop Attributes - Focus/Configuration Tab

Attribute Name	Notes	Values/Options/Range	Description
Maximum Output Reference ¹	C,N,W		Provides the object reference for the Max Output attribute. The Loop object reads and signs up for changes in the Present Value attribute of the object referenced by the Maximum Output Reference. The value received is stored as the Max Output.
Min Output			Indicates the minimum value of the output (Present Value) as limited by the PID loop algorithm. This value is normally used to prevent the algorithm from controlling beyond the range of the controlled device, and to prevent integral term wind up. If the Minimum Output Reference does not contain a value, a read of the Min Output attribute returns an Unknown Property error.
Minimum Output Reference ¹	C,N,W		Provides the object reference for the Min Output attribute. The Loop object reads and signs up for changes in the Present Value attribute of the object referenced by the Minimum Output Reference. The value received is stored as the Min Output.
Present Value			Indicates the current output value of the loop algorithm.
Present Value Reference	C,W	Restricted to field points.	Provides the object reference for the Present Value attribute. The Loop object reads and signs up for changes in the Present Value attribute of the object referenced by the Present Value Reference. The value received is stored as the Present Value.
Proportional Const			Indicates the value of the proportional gain parameter used by the loop algorithm. If the Proportional Constant Reference does not contain a value, a read of the Proportional Const attribute returns an Unknown Property error.
Proportional Constant Reference ¹	C,N,W		Provides the object reference for the Proportional Const attribute. The Loop object reads and signs up for changes in the Present Value attribute of the object referenced by the Proportional Constant Reference. The value received is stored as the Proportional Const.
Reliability		Uses Reliability set.	Reflects the Reliability attribute of the object referenced by the Present Value Reference attribute, providing an indication of whether the Present Value of the loop in question is reliable. This attribute may have a value of Reliable or Open when the field point mapper's Reliability is Reliable or Open. This attribute may have a value of Unreliable when the field point mapper's Reliability is a value other than Reliable or Open.
Setpoint			Reflects the Present Value of the field point mapper defined by the Setpoint Variable Reference.
Setpoint Variable Reference ²	C,W		Defines the field point mapper that represents the setpoint for the control loop.

Table 221: Loop Attributes - Focus/Configuration Tab

Attribute Name	Notes	Values/Options/Range	Description
Units		Uses Units set.	Reflects the Units attribute of the object referenced by the Present Value Reference attribute.
Update Interval		Units = milliseconds	Indicates the time period, in milliseconds, between updates to the Present Value attribute.

- 1 You may optionally configure a reference for this BACnet optional property. If you do not define the optional reference for some reason, the Loop object responds to a read for the corresponding value with an Unknown Property error.
- 2 You must configure references to this BACnet required property to successfully create the Loop object. This reference appears red in the wizard until configured.

Loop Commands

The table below lists the commands supported by the [Loop Object](#).

Table 222: Loop Commands

Command Name	Parameters	Description
Disable Alarms	None	Disables all types of alarming: alarm extensions, BACnet intrinsic alarming, and BACnet Event Enrollment objects. This command restores the previous Event Enable values.
Enable Alarms	None	Enables all types of alarming: alarm extensions, BACnet intrinsic alarming, and BACnet Event Enrollment objects. This command sets the Event Enable values to False, False, False.
In Service	None	Places the PID loop object algorithm in service.
Manual Tuning	None	Enables or disables the ability to change gain values of the PID Loop object, including Proportional Constant, Derivative Constant, Integral Constant, Bias, Maximum Output, and Minimum Output.
Out of Service	Real value	Places the PID loop object algorithm out of service. The value specified in the command is written to the JCI Out of Service Value Reference. The Present Value of the Loop object assumes the value of the JCI Out of Service Value Reference while out of service.

Multistate Input Object

The Multistate Input object's Present Value attribute represents results of an algorithmic process within the device in which the object resides. For example, the Present Value of the Multistate Input object could be either the result of a combination of multiple binary inputs, the threshold of one or more analog inputs, or the result of a mathematical computation. Present Value is an integer representing the state of the object. The State Text attribute associates a description with this state.

- ⓘ Note:** Do not confuse the Present Value state with the Event State attribute, which reflects the Offnormal state of the Multistate Input.

The Multistate Input object integrates N1, N2, and BACnet controllers with supervisory controllers, resulting in:

- a consistent interface to point objects for all controller types
- flexibility in point mapping
- support for Metasys N2 controllers. See the [N2 Controller Object](#).

For example, this object allows you to display the speeds of a multispeed fan at a supervisory controller.

For general information on Metasys system objects, see [Common Object Attributes](#).

Multistate Input Attributes

This object contains attributes common to many Metasys system objects. This section includes attributes of the Focus/Configuration tab, the Diagnostics tab (if applicable), and any other tab specific only to this object. See the [Object and Feature Tabs](#) section for information on the attributes that appear on the other tabs of this object (for example, the Hardware and Options tab appear on point objects).

Click the attribute name in the table for a description of the attribute.

Note: In the Notes and BACnet Notes columns, letters indicate the following: B - Exposed as standard BACnet property, C - Configurable, D - Default Attribute for Display, N - Value Not Required, R - Affected by Object's Reliability, W - Writable.

Table 223: Multistate Input Object Attributes - Focus/Configuration Tab

Attribute Name	Notes	BACnet Notes	Initial Value	Values/Options/Range	Description
Current Command Priority		B		1 - 16	Indicates the command priority currently assigned to the object. A blank in this field indicates the object is not under any command.
Device Type	C,W	W	Null	Limit: 20 characters	Contains a description of the physical device connected to the object.
Intrinsic Alarming Defined	C	Not Supported	False	False True	Enables the BACnet Intrinsic Alarming feature in the object and the definition of related attributes. For detailed information, see BACnet Intrinsic Alarming .
Number of States	C,W	W	4	Minimum Value = 2 Maximum Value = 16	Defines the number of states Present Value can have.
Out of Service	C,W	W	False	False True	Used to decouple the object from the physical input that feeds its Present Value and Reliability. When out of service is True, the object does not read the Present Value and Reliability from the hardware. In addition, the Reliability attribute and the corresponding state of the Fault flag of the Status Flags attribute is decoupled from the input when Out of Service is True. While the Out of Service attribute is True, Present Value and Reliability may be changed to any value either as a means of simulating specific fixed conditions or for testing purposes. Other functions that depend on the state of the Present Value or Reliability attributes respond to changes made to these attributes while Out of Service is True, as if those changes had occurred in the input.
Present Value	D,N,R,W	D,N,R,W		States Text attribute identifies the value set for this attribute.	Reflects the current value of the input as one of n states, where n is the number of states defined in the Number of States attribute. When Out of Service is True, Present Value is writable. This attribute is required to be writable if Out of Service is True.

Table 223: Multistate Input Object Attributes - Focus/Configuration Tab

Attribute Name	Notes	BACnet Notes	Initial Value	Values/Options/Range	Description
Reliability	W	W		No Fault Detected (Reliable), No Sensor, Over Range, Under Range, Open Loop, Shorted Loop, Multi State Fault, Unreliable Other Uses Reliability (Set 503).	Indicates if the Present Value is unreliable and why. When Out of Service is True, the Reliability may be written directly.
State Text					Represents descriptions of all possible states of Present Value. The number of descriptions matches the number of states defined in Number of States. Present Value (an integer) serves as an index into this attribute.
States Text	C,W	C	Off Low Med Hi		Indicates the displayed strings for the Present Value.
States Text Error Status			OK	Out of Memory: Indicates that memory overrun occurred while the system was adding custom enumeration for state text from the field device to the user dictionary. OK: the addition of custom enumeration for state text from the field device to the user dictionary is successful, and state text from the device can be used.	Specifies the status of States Text on the supervisory device. This attribute cannot be archived or configured.

Table 223: Multistate Input Object Attributes - Focus/Configuration Tab

Attribute Name	Notes	BACnet Notes	Initial Value	Values/Options/Range	Description
Status Flags				In Alarm, Fault, Overridden, Out of Service Uses BAC Status Flags (Set 9).	<p>Contains four true or false flags that indicate the general health of the object. Three of the four flags are associated with the values of other attributes within the same object. By reading these attributes, you get a clearer picture of the object status. The four flags are:</p> <p>In Alarm - In Alarm flag is False (0) if the Event State attribute value is Normal; otherwise the In Alarm flag is True (1).</p> <p>Fault - Fault flag is True (1) if the Reliability attribute is not reliable; otherwise the Fault flag is False (0).</p> <p>Overridden - Overridden flag is Logical 1 if the Present Value is decoupled from the hardware output because operator intervention provided a different value.</p> <p>Out of Service - Out of Service flag is True if the Out of Service attribute value is True; otherwise the Out of Service flag is False.</p>
Use Remote Alarming		B,C,W	False		<p>When the attribute Intrinsic Alarming Defined is set to True, determines where alarms for the object originate. If the remote integrated object contains attributes for originating alarms, then Use Remote Alarming defaults to True, causing the local mapper object to accept alarms from the remote integrated object that are routed to the NxE. If the remote integrated object does not contain attributes for originating alarms, then Use Remote Alarming defaults to False causing the local mapper object to originate alarms. When Use Remote Alarming is false, any alarms from the remote integrated object are ignored at the NxE. If the value of Use Remote Alarming is changed, a restart of the NxE may be required to assure correct operation. This attribute applies only to BACnet integrations.</p>

Multistate Input Commands

The table below lists the commands supported by the [Multistate Input Object](#).

Table 224: Multistate Input Object Commands

Command Name	Parameters	Description
Disable Alarms	None	Disables all types of alarming: alarm extensions, BACnet intrinsic alarming, and BACnet Event Enrollment objects.
Enable Alarms	None	Enables all types of alarming: alarm extensions, BACnet intrinsic alarming, and BACnet Event Enrollment objects.

Table 224: Multistate Input Object Commands

Command Name	Parameters	Description
In Service	None	<p>This command cancels the effect of an Out of Service (Command) command and returns the Out of Service attribute to False. The Present Value and Reliability will revert back to the values obtained from the physical input.</p> <p>① Note: For BACnet objects, support of this command is dependent on the ability to write the Out Of Service attribute.</p>
Out of Service (Command)	The value to be written to the Present Value attribute.	<p>This command allows a user to override the object's hardware input. The Out Of Service command changes the Out of Service attribute to True, writes the Present Value to the value of the command parameter and writes the Reliability attribute to Reliable. The Present Value and Reliability will no longer track the physical input. When an Out Of Service command is issued, the NxE does not communicate subsequent changes (operator or system) to the field device. For BACnet objects, support of this command is dependent on the ability to write the Out Of Service attribute.</p>
Temporary Out of Service	The value to be written to the Present Value attribute, along with the hours and minutes that the out of service state is temporarily active.	<p>Allows a user to temporarily override the object's hardware input for simulation or other purposes for a specified period of time stated in hours and minutes. This command has the same function as an Out of Service command but with the time element.</p>

Multistate Output Object

The Multistate Output object's attributes represent the desired state of one or more physical outputs or processes of the device in which the object resides. The actual functions associated with

a particular state are determined locally (not part of protocol). Present Value represents the state with a number, and State Text associates a description with each state.

The Multistate Output object integrates N1, N2, and BACnet controllers with supervisory controllers, resulting in:

- a consistent interface to point objects for all controller types
- flexibility in point mapping
- support for Metasys controllers

For example, this object allows you to command the modes of an access control device from a supervisory controller.

Note: The N1 migration Multiple Command object maps to this Multistate Output object.

For general information on Metasys system objects, see [Common Object Attributes](#).

Multistate Output Attributes

This object contains attributes common to many Metasys system objects. This section includes attributes of the Focus/Configuration tab, the Diagnostics tab (if applicable), and any other tab specific only to this object. See the [Object and Feature Tabs](#) section for information on the attributes that appear on the other tabs of this object (for example, the Hardware and Options tab appear on point objects).

Click the attribute name in the table for a description of the attribute.

Note: In the notes and BACnet notes columns, letters indicate the following: B - Exposed as standard BACnet property, C - Configurable, D - Default Attribute for Display, N - Value Not Required, R - Affected by Object's Reliability, W - Writable.

Table 225: Multistate Output Object Attributes - Focus/Configuration Tab

Attribute Name	Notes	BACnet Notes	Initial Value	Values/Options/Range	Description
Current Command Priority		B		1 - 16	Indicates the command priority currently assigned to the object. A blank in this field indicates the object is not under any command.
Device Type	C,W	W		Limit: 20 characters	Contains a description of the physical device connected to the object.
Heavy Equip Delay	C,W	Not supported	0	Range: 0-255 Seconds	Indicates the amount of time that this output point adds to the Accumulated Delay attribute of the Heavy Equipment Controller object when this point is started. The next output point is delayed by that amount of time of the HEC Accumulated Delay is not already decremented to zero. The NAE device's five internal Heavy Equipment Controller objects (see HED Controller) time their delays independently of one another. For example, HED 1 and HED 4 can count down their delays at the same time.

Table 225: Multistate Output Object Attributes - Focus/Configuration Tab

Attribute Name	Notes	BACnet Notes	Initial Value	Values/Options/Range	Description
HED Controller	C,W	Not supported		1-5	Identifies the Heavy Equipment Controller object managing the delays. The NAE device has five internal Heavy Equipment Controller objects for use by Binary Output and Multistate Output objects. The BO and MO objects reference the HED controller objects by number (1-5). All BO and MO objects on an NAE share the five internal HED controller objects. For example, if BO1 and MO3 on NAE-1 reference HED controller 1, they are using the same HED controller. Also see Heavy Equip Delay.
Intrinsic Alarming Defined	C	Not supported	False	False True	Enables the definition of the intrinsic alarm related attributes. For detailed information, see BACnet Intrinsic Alarming .
Number of States	C,W	W	4	2-16	Defines the number of states possible for Present Value.
Out of Service	C,W	W		False True	Used to decouple the object from the physical output. When Out of Service is True, the object decouples Present Value and Reliability from the hardware. The Reliability will be writable when Out Of Service is True. Not all devices support setting this attribute to True.
Present Value	D,R,W	D,R,W		States Text attribute identifies the value set for this attribute.	Indicates the current value of the output as one of n states, where n is the number of states defined in Number of States.
Priority Array					Lists object commands in level of importance.
Reliability			Reliable	No Fault Detected (Reliable), Open Loop, Shorted Loop, No Output, Unreliable Other Uses Reliability (Set 503).	Indicates if the Present Value is unreliable and why. When Out of Service is True, the Reliability may be written directly.
State Text			Off Low Med Hi		Represents descriptions of all possible states of Present Value. The number of descriptions matches the number of states defined in Number of States. Present Value (an integer) serves as an index into this attribute.
States Text	C,W	C,W	Off Low Med Hi		Indicates the displayed strings for the Present Value.

Table 225: Multistate Output Object Attributes - Focus/Configuration Tab

Attribute Name	Notes	BACnet Notes	Initial Value	Values/Options/Range	Description
States Text Error Status			OK	<p>Out of Memory: Indicates that memory overrun occurred while the systems was adding custom enumeration for state text from the field device to the user dictionary.</p> <p>OK: The addition of custom enumeration for state text from the field device to the user dictionary is successful, and state text from the device can be used.</p>	Specifies the status of States Text on the supervisory device. This attribute cannot be archived or configured.

Table 225: Multistate Output Object Attributes - Focus/Configuration Tab

Attribute Name	Notes	BACnet Notes	Initial Value	Values/Options/Range	Description
Status Flags				In Alarm, Fault, Overridden, Out of Service Uses BAC Status Flags (Set 9).	Contains four true or false flags that indicate the general health of the object. Three of the four flags are associated with the values of other attributes within the same object. By reading these attributes, you get a clearer picture of the object status. The four flags are: In Alarm - In Alarm flag is False (0) if the Event State attribute value is Normal; otherwise, the In Alarm flag is True (1). Fault - Fault flag is True (1) if the Reliability attribute is not reliable; otherwise, the Fault flag is False (0). Overridden - Overridden flag is Logical 1 if the Present Value is decoupled from the hardware output because operator intervention provided a different value or local override is active. Out of Service - Out of Service flag is True if the Out of Service attribute value is True; otherwise, the Out of Service flag is False.
Use Remote Alarming		B,C,W	False		When the attribute Intrinsic Alarming Defined is set to True, determines where alarms for the object originate. If the remote integrated object contains attributes for originating alarms, then Use Remote Alarming defaults to True, causing the local mapper object to accept alarms from the remote integrated object that are routed to the NxE. If the remote integrated object does not contain attributes for originating alarms, then Use Remote Alarming defaults to False causing the local mapper object to originate alarms. When Use Remote Alarming is false, any alarms from the remote integrated object are ignored at the NxE. If the value of Use Remote Alarming is changed, a restart of the NxE may be required to assure correct operation. This attribute applies only to BACnet integrations.

Multistate Output Commands

The table below lists the commands supported by the [Multistate Output Object](#).

Table 226: Multistate Output Object Commands

Command Name	Parameters	Description
Disable Alarms	None	Disables all types of alarming: alarm extensions, BACnet intrinsic alarming, and BACnet Event Enrollment objects.
Enable Alarms	None	Enables all types of alarming: alarm extensions, BACnet intrinsic alarming, and BACnet Event Enrollment objects.

Table 226: Multistate Output Object Commands

Command Name	Parameters	Description
In Service	None	<p>Cancels the effect of an Out of Service command and returns the Out of Service attribute to False. The Present Value and Reliability will revert back to the values obtained from the physical hardware output.</p> <p>④ Note: For BACnet objects, support of this command is dependent on the ability to write the Out Of Service attribute.</p>
Operator Override	The value to be written to the Present Value attribute.	<p>Updates the Present Value at Command Priority Operator Override (8).</p> <p>The Operator Override command sends the specified command to the internal NxE object, which is then only sent to the field device when one of the following conditions is met: a) NOT Local Control and NOT Out Of Service, or b) NOT Local Control and after issuing the In Service command.</p>
Out of Service	None	<p>Overrides the object's hardware output. The Out of Service command changes the Out of Service attribute to True. The Present Value and Reliability no longer track the physical output. No commands are sent to the actual hardware. When the Out of Service attribute is set to False, the current Present Value is sent to the actual hardware.</p> <p>When an Out Of Service command is issued, the NxE does not communicate subsequent changes (operator or system) to the field device.</p> <p>For BACnet objects, support of this command depends on the ability to write the Out Of Service attribute.</p>
Release Operator Override	None	Releases Command Priority Operator Override (8) from Present Value.
Release	<ol style="list-style-type: none"> 1. Attribute name 2. Command priority 	Releases the identified command priority from the specified, writable attribute, and allows it to be controlled by the next highest priority.

Table 226: Multistate Output Object Commands

Command Name	Parameters	Description
Release All	Attribute name	<p>Releases Command Priorities 3 through 16 (Default) from the specified, writable attribute. Command Priorities 1 and 2 remain.</p> <p>► Important: The Release All command may not cause an immediate return to automatic operation. The Release All command clears all command priorities, including those that come from applications and features. When this release happens, the output point goes to its Relinquish Default condition. In some cases, the application or feature may have sent a command that does not match Relinquish Default. In this instance, the output point does not end in the state that the applications or features intended. This situation can cause unexpected operation to occur; for example, a space might overcool or overheat, a fan might run longer than expected, and so on. If an operator has overridden an input, use the Release Operator Override command.</p>
State0 ... StateN	None	<p>Releases Command Priorities 9 through 15 (Scheduling) and then writes to the Present Value at the Default (16) command priority. If this is the highest priority, it is sent to the controller. Both the state command names and the number of commands are dependent on the States Text and Number of States attributes.</p> <p>► Important: Be aware that an operator state command releases the actions of any processes running to the object in the NxE or FEC controllers that use Priorities 9 through 16. Consider this behavior when creating control strategies.</p> <p>If Local Control is True, this command is rejected.</p>
Temporary Override	The value to be written to the Present Value attribute, in addition to the duration of the override in hours and minutes.	<p>Overrides a point temporarily for a specified period of time. After the specified time period passes, the Override is automatically released.</p>

① **Note:** For the Override Release, Release, and Release All commands, if all Command Priorities have been released and a Relinquish Default is not defined, the supervisory controller gives control over to the actual hardware.

Multistate Value Object

The Multistate Value object's attributes represent the desired state of one or more physical outputs or processes of the device in which the object resides. The actual functions associated with a particular state are determined locally (not part of protocol). Present Value represents the state with a number and State Text associates a description with each state.

Multistate Value objects have similar software characteristics and capabilities to a [Multistate Input Object](#); however, Multistate Value objects are not associated with any physical hardware and are the result of a control process or operator entry.

The Multistate Value object provides a means to map up to 32 different states to an object.

This object allows you to hold a multistate value for other objects to reference. For example, a specific multistate value can be available for the Interlock object to reference and to base its operation on this value.

For general information on Metasys system objects, see [Common Object Attributes](#).

Multistate Value Attributes

This object contains attributes common to many Metasys system objects. This section includes attributes of the Focus/Configuration tab. See the [Object and Feature Tabs](#) section for information on the attributes that appear on the other tabs of this object (for example, the Hardware and Options tab appear on point objects).

Click the attribute name in the table for a description of the attribute.

Note: In the Notes and BACnet Notes columns, letters indicate the following: B - Exposed as standard BACnet property, C - Configurable, D - Default Attribute for Display, N - Value Not Required, R - Affected by Object's Reliability, W - Writable.

Table 227: Multistate Value Object Attributes - Focus/Configuration Tab

Attribute Name	Notes	BACnet Notes	Initial Value	Values/Options/Range	Description
Connected To Internal Application		B,W	No	No or Yes	Indicates whether the object is connected to an internal application.
Current Command Priority		B		1 - 16	Indicates the command priority currently assigned to the object. A blank in this field indicates the object is not under any command.
Failsoft Currently Active				Yes or No	Specifies whether the Failsoft feature is currently overriding the input value to a reliable default. If No, Failsoft is disabled or, if Failsoft is enabled, the value is reliable. If Yes, Failsoft is enabled and the value is unreliable. This attribute is only used if Property Ref Value is defined to reference an application.
Intrinsic Alarming Defined	C	Not supported	False	False True	Enables the BACnet Intrinsic Alarming feature in the object and the definition of related attributes. For detailed information, see BACnet Intrinsic Alarming .
Monitor Only				False	Defines the behavior of the object as an input or output. If you do not specify a Property Ref Value, the attribute is set to False. This attribute appears only in the Snapshot Focus view.
Number of States	C,W	W	4	2 to 32	Defines the number of states possible for Present Value. This attribute is not writable through the MS/TP integration. You must configure this attribute through CCT.

Table 227: Multistate Value Object Attributes - Focus/Configuration Tab

Attribute Name	Notes	BACnet Notes	Initial Value	Values/Options/Range	Description
Out of Service			False	Always False	Indicates the offline/online state of the connected hardware. This attribute exists for compatibility with BACnet protocol and indicates whether the physical input that the object represents is in service. When out of service, the object does not read the hardware. This attribute is always False.
Present Value	D,R,W	D,R,W		States Text attribute identifies the value set for this attribute.	Reflects the current value of the multistate value object as one of <i>n</i> states, where <i>n</i> is the number of states defined in the Number of States attribute. The Present Value is equal to the last value corresponding to the States Text attribute. Present Value is optionally commandable. If Present Value is commandable for a given object instance, then Priority Array and Relinquish Default are also present for that instance. If Out of Service is true, Present Value is writable. Note: If Present Value is commandable, then it must be writable. If Out of Service is True, this attribute is True.
Priority Array				If Present Value is commandable, this attribute is present.	Contains prioritized commands that are in effect for this object. See the BACnet standard for a description of the prioritization mechanism. If either Priority Array or Relinquish Default is present, both are present. If Present Value is commandable, Priority Array and Relinquish Default are both present.
Property Ref Value	N			Object Name, Reference, Attribute	Specifies an object and attribute (usually from an application) for which the MV object is providing the standard interface. The object and attribute contained in this attribute must be a local object and is often a non-BACnet data source and destination. When this property is not defined, the Monitor Only property is set to False. This attribute appears only in the Snapshot Focus view.
Referenced Reliability				No Input	Specifies the current reliability of the value sent to or from the object/attribute referenced by Property Ref Value. This attribute is only used if Property Ref Value is defined to reference an application.
Referenced Value					Specifies the current value sent to or from the object/attribute referenced by Property Ref Value. This attribute is only used if Property Ref Value is defined to reference an application.
Referenced Value COS Count	W		0		Counts how many times the Present Value and Reliability have changed. This attribute helps to diagnose excessive changes that can cause logic to execute taking up too much bandwidth. Reset the count by entering 0 for this attribute. This attribute is only used if Property Ref Value is defined to reference an application.

Table 227: Multistate Value Object Attributes - Focus/Configuration Tab

Attribute Name	Notes	BACnet Notes	Initial Value	Values/Options/Range	Description
Reliability	W	W	Reliable	No Fault Detected (Reliable), Multistate Fault, Unreliable Other Uses Reliability (Set 503).	Indicates whether the Present Value is reliable and why. If Fault Values is present, Reliability is also present. A To Fault event generates under these conditions: Reliability is not equal to No Fault Detected, and the To Fault flag is enabled in Event Enable. The Reliability attribute is always present in NAE implementations.
State Text					Represents descriptions of all possible states of Present Value. The number of descriptions matches the number of states defined in Number of States. Present Value (an integer) serves as an index into this attribute.
States Text	C,W	C,W			Indicates the displayed strings for the Present Value.
States Text Error Status			OK	Out of Memory: Indicates that memory overrun has been encountered while adding custom enumeration for state text from field device to the user dictionary. OK: Indicates that an addition of custom enumeration for state text from the field device to user dictionary is successful and state text from the device can be used.	This attribute shows the status of States Text on the supervisory device. This attribute is not archivable or configurable.

Table 227: Multistate Value Object Attributes - Focus/Configuration Tab

Attribute Name	Notes	BACnet Notes	Initial Value	Values/Options/Range	Description
Status Flags				In Alarm, Fault, Overridden, Out of Service Uses BAC Status Flags (Set 9).	Contains four true or false flags that indicate the general health of the object. Three of the four flags are associated with the values of other attributes within the same object. By reading these attributes, you get a clearer picture of the object status. The four flags are: In Alarm - In Alarm flag is False (0) if the Event State attribute value is Normal; otherwise, the In Alarm flag is True (1). Fault - Fault flag is True (1) if the Reliability attribute is not reliable; otherwise, the Fault flag is False (0). Overridden - Overridden flag is Logical 1 if the Present Value has been overridden by some mechanism local to the BACnet device or because the operator provided a different value. Out of Service - Out of Service flag is True if the Out of Service attribute value is True; otherwise, the Out of Service flag is False.
Use Remote Alarming		B,C,W	False		When the attribute Intrinsic Alarming Defined is set to True, determines where alarms for the object originate. If the remote integrated object contains attributes for originating alarms, then Use Remote Alarming defaults to True, causing the local mapper object to accept alarms from the remote integrated object that are routed to the NxE. If the remote integrated object does not contain attributes for originating alarms, then Use Remote Alarming defaults to False causing the local mapper object to originate alarms. When Use Remote Alarming is false, any alarms from the remote integrated object are ignored at the NxE. If the value of Use Remote Alarming is changed, a restart of the NxE may be required to assure correct operation. This attribute applies only to BACnet integrations.

Multistate Value Commands

The table below lists the commands supported by the [Multistate Value Object](#).

Table 228: Multistate Value Object Commands

Command Name	Parameters	Description
Disable Alarms	None	Disables all types of alarming: alarm extensions, BACnet intrinsic alarming, and BACnet Event Enrollment objects.
Enable Alarms	None	Enables all types of alarming: alarm extensions, BACnet intrinsic alarming, and BACnet Event Enrollment objects.

Table 228: Multistate Value Object Commands

Command Name	Parameters	Description
Operator Override	State0-StateN	Updates the Present Value at Command Priority Operator Override (8). The Operator Override command sends the specified command to the internal NxE object, which is then only sent to the field device when one of the following conditions is met: a) NOT Local Control and NOT Out Of Service, or b) NOT Local Control and after issuing the In Service command.
Release Operator Override	None	Releases Command Priority Operator Override (8) from Present Value.
Release	<ol style="list-style-type: none"> 1. Attribute name 2. Command priority 	Releases the identified command priority from the specified, writable attribute, and allows it to be controlled by the next highest priority.
Release All	Attribute name	<p>► Important: The Release All command may not cause an immediate return to automatic operation. The Release All command clears all command priorities, including those that come from applications and features. When this happens, the output point goes to its Relinquish Default condition. In some cases, the application or feature may have sent a command that does not match Relinquish Default. In this instance, the output point does not end in the state that the applications or features intended. This situation can cause unexpected operation to occur; for example, a space could over-cool or overheat, a fan might run longer than expected, and so on. If an operator has overridden an input, use the Release Operator Override command.</p> <p>Releases Command Priorities 3 through 15 from the specified, writable attribute. Command Priorities 1 (Manual Emergency) and 2 (Fire Application) remain.</p>

Table 228: Multistate Value Object Commands

Command Name	Parameters	Description
State0 ... StateN	None ① Note: The MS/TP Multistate Value supports an equivalent Set State command which takes State0-StateN as parameters.	<p>► Important: Be aware that an operator state command releases the actions of any processes running to the object in the NxE or FEC controllers that use Priorities 9 through 16. Consider this behavior when creating control strategies.</p> <p>Releases Command Priorities 9 through 15 (Scheduling) and then writes to the Present Value at the Default (16) command priority. The state command names and number of commands are dependent on the States Text and Number of States attributes.</p>
Temporary Override	The value to be written to the Present Value attribute, in addition to the duration of the override in hours and minutes.	Overrides a point temporarily for a specified period of time. After the specified time period passes, the Override is automatically released.

Notification Class Object

Menu Selection: *Insert > Object > Notification*

① Notes:

- On the Configure screen, click the Recipient List tab for further configuration.
- Click the Add button to add a BACnet device as a recipient item to the list. The Notification Recipient dialog box appears. See the Tips for the Notification Recipient section that follows.
- Click the check box next to an item in the list and click Remove if you want to remove the item from the list.
- Click the check box next to an item in the list and click Details to view that item's Notification Recipient dialog box information.
- Select an item in the list and use the up and down arrows to change the order of the item in the list.

Tips for the Notification Recipient:

- To send a notification to a specific BACnet device, select the OID radio button and enter the object identifier for that device in the Device OID box. Enter the Process ID.
- To send a notification to a specific address, select the Address radio button and enter the IP Address, Network Number, UDP Port, and Process ID. See the Recipient List attribute of the Notification Class object for details.
- Select the check boxes for the days that the notifications should be sent. To define the times when the notification is active, slide the arrows on the time bar to define Start and Stop times.

The Notification Class object provides a means to send alarm messages (Event Notification Messages) that are generated by other objects to any BACnet device. Typically, it is used to route alarm messages to third-party BACnet devices. Notification Classes are useful for event-initiating

objects that have identical needs in terms of how their notifications should be handled, what the destinations for their notifications should be, and how they should be acknowledged.

When you create a Notification Class object at a BACnet client and map the object to a network engine, a folder called Notification is created and a new Notification Class object is created under that folder in the navigation tree.

For more information about the wizard used to insert a Notification Class object, see [Insert Object - Notification](#). For general information on Metasys system objects, see [Common Object Attributes](#).

Notification Class Concepts

Notification Class

A notification class defines how event notifications are prioritized according To Offnormal, To Fault, and To Normal events; whether these categories of events require acknowledgment (nearly always, by a human operator); and what destination devices or processes receive notifications.

Prioritization

Prioritization provides a means to ensure that alarms or event notifications with critical time considerations are not unnecessarily delayed. Priorities may be assigned To Offnormal, To Fault, and To Normal events individually within a notification class.

Acknowledgment

Acknowledgment provides assurance that a notification has been acted upon by some other agent, rather than received correctly by another device. In most cases, acknowledgments come from human operators. To Offnormal, To Fault, and To Normal events may, or may not, require individual acknowledgment within a notification class.

Destinations

You can send event notifications to multiple destinations or to different destinations based on the time of day or day of week. Notification Classes specify a list of destinations, each of which is qualified by time, day of week, and type of handling. The [Recipient List](#) attribute describes how the destination parameters relate to the Notification Class object. If an event that uses a Notification Class object occurs, the day is one of the days of the week that is valid for a given destination, and the time is within the window specified in the destination, then a notification is sent to the destination defined in the Recipient List. You can qualify destinations by any combination of the three event transitions: To Offnormal, To Fault, and To Normal.

The destination also defines the recipient device that receives the notification. The recipient device is specified by either its unique Device Object Identifier or by its Network Address and MAC Address. In the latter case, a unicast address or a broadcast, local/remote, or global address is used. The destination information specifies whether the notification is sent using a confirmed or unconfirmed event notification.

The Ack Required attribute of the Notification Class object and the type of event transition determine whether the event notification message requires acknowledgment.

Notification Class Attributes

This object contains attributes common to many Metasys system objects. These common attributes are described in the [Common Object Attributes](#) section. This section includes attributes of the Focus/Configuration tab, the Diagnostics tab (if applicable), and any other tab specific only to this object. See the [Object and Feature Tabs](#) section for information on the attributes that appear on the other tabs of this object (for example, the Hardware and Options tab appear on point objects).

Click the attribute name in the table for a description of the attribute.


 **Note:** In the notes and BACnet notes columns, attributes marked with the letter C are configurable, and attributes marked with the letter W are writable.

Table 229: Notification Class Object Attributes - Focus/Configuration Tab

Attribute Name	Notes	BACnet Notes	Initial Value	Values/Options/Range	Description
Ack Required	C,W	W	False, False, False	To Offnormal To Fault To Normal Uses BAC Event Bits (Set 525).	Conveys three separate flags that represent whether acknowledgement is required in notifications generated for To Offnormal, To Fault, and To Normal event transitions, respectively.
Notification Class Object				0 to 4,294,967,295	Indicates the numeric value of this notification class and equals the instance number of the Notification Class object. Event initiating objects use this number to reference a specific Notification Class object.
Priority	C,W	W	120 200 70	To Offnormal To Normal To Fault Range = 0 to 255	Conveys the priority to be used for event notifications for To Offnormal, To Fault, and To Normal events, respectively. A lower number indicates a higher priority.
Route to Metasys	C,W	Not supported	True	True, False	Determines whether or not the Notification Class object routes alarms to the Metasys alarming system.
Send Notifications to Supervisor	C,W	Not supported	True	True, False	Determines whether or not the Notification Class object routes alarms to the supervisory device.

Table 230: Notification Class Object Attributes - Recipient List Tab

Attribute Name	Data Type	Notes	BACnet Notes	Initial Value	Values/Options/Range
Recipient List	List of value sets	C,W	W		See Recipient List . Uses BAC Day Bitset (Set 176), Recipient Choice (Set 526), and BAC Event Bits (Set 525).

Recipient List

Conveys a list of one or more recipient destinations to which notifications are sent when event-initiating objects using this class detect the occurrence of an event. Each destination structure contains the following:

- **From Time, To Time (Start and Stop Times)** - The window of time (inclusive) during which the destination may be used. To specify all times, use 00:00:00 for Start Time and 23:59:59 for Stop Time.
- **IP Address** - The 4 byte IP Address of the destination if routing by IP address. This value is ignored when Network Number is set to 65,535. When set to 255.255.255.255 IP Address or the broadcast IP Address, notifications are broadcast based on the Network Number. A value of 0 sends a local broadcast. A value of 1–65,534 sends a remote broadcast.
- **Issue Confirmed Notifications (Confirmed, Unconfirmed)** - Indicates whether to send Confirmed or Unconfirmed event notifications through radio button selection. This selection is ignored when using global broadcast notifications.
- **MSTP Address** - The MS/TP address of the destination if routing by MS/TP address.

- **Network Number** - The network number for the destination if routing by IP or MS/TP address: 0 designates the address of the local network 1–65,534 identifies a destination address on the specified network 65,535 specifies the use of global broadcast notification (note that the IP Address is not used and the notifications are unconfirmed)
- **Process Identifier** - The process ID within the recipient device that receives the event notification messages.
- **Recipient (Device Object ID)** - The destination devices to receive event notification messages.
- **Recipient Choice (Object ID or Address)** - The choice of whether to use an Object Identifier or the Address of the destination to route the notifications. If set to Address, the notification is sent either to the specified address or broadcast. See IP Address and Network Number descriptions for details.
- **Transitions (Off Normal, Fault, Normal)** - Three flags which indicate the types of transitions (To Offnormal, To Fault, or To Normal) sent to the destination.
- **UDP Port Number** - The UDP Port number used to send the notification message to the destination if routing by address. When the port is set to 0, this value when written is replaced with the port used by the supervisory device on the IP network.
- **Valid Days** - The days of the week on which notifications may be sent to this destination during the value of From Time, To Time (Start and Stop Times).

Notification Class Commands

The table below lists the commands supported by the [Notification Class Object](#).

Table 231: Notification Class Object Commands

Command Name	Parameters	BACnet Supported
Add Recipient	See Recipient List .	Yes
Disable	0	No
Enable	0	No
Remove Recipient	See Recipient List .	Yes Only supported by the BACnet Notification Class.

Schedule Object

The Schedule object works behind the scenes of the Scheduling feature. The Schedule object updates attribute values of objects according to the time of day. These times can be specified for days of the week and as exceptions.

When you create a Schedule object at a BACnet client and map the object to a network engine, a folder called Schedule is created and a new Schedule object is created under that folder in the navigation tree.

Schedule Object Attributes

The display of the Schedule object uses two tabs, the [Schedule Object Schedule Tab](#) and the [Schedule Object Focus/Configuration Tab](#). If you add extensions, see [Extensions](#) for information on the extension tabs.

Schedule Object Features

Table 232 shows the icon of the Schedule object. The key words are included in the table to help users who may search the help system using a description of the icon to find this chapter.

Table 232: Schedule Object Icon

Icon	Key Words
	Stopwatch, Pocket Watch, Clock

Schedule Object Schedule Tab

Table 233: Operation and Display Attributes

Attribute	Description
Effective Period	The Effective Period attribute defines the range of dates within which the Schedule object is active. By default, these dates are unspecified, causing the Schedule object to be active for all days. When the Schedule is not within the Effective Period, the Schedule is considered Inactive and the Schedule's status is set to Inactive. Wildcard may be used in the date fields.
Schedule Output Type	<p>Schedule Output Type Options</p> <ul style="list-style-type: none"> • Binary: Select this option to set the schedule's Value type to Binary (one of two states, such as Off and On). • Analog: Select this option to set the schedule's Value type to Analog (for example, 72.0). • Multistate: Select this option to set the schedule's Value type to Multistate (one of a set of states, such as Off, Low, Medium, and High). • Derived from Key Item: Select this option to set the schedule's Value type to match the Value type of the attribute scheduled for the Key Item. For example, all values are Boolean (True/False) if the Key Item's Enabled attribute is scheduled. • Derived from Value: This type is only set by the system - it cannot be manually selected. This type indicates that the current schedule type matches preexisting values.
Default Schedule Command	<p>The Default Schedule Command attribute indicates the command of the Schedule object when no event is in effect, due to no scheduled command or a conscious gap in the schedule. The Default Schedule Command is executed every midnight unless another event is in place to begin at midnight.</p> <p>The Default Schedule Command also supports the Release command. The Release command releases the Scheduling function's control of the scheduled objects. Setting the Default Schedule Command to Release is the only available method to release the schedule's control of scheduled objects through the Schedule object. Release should only be used for the Schedule Default Command if the scheduled items support the Release command.</p>

Table 233: Operation and Display Attributes

Attribute	Description
States Text	The States Text attribute indicates the displayed strings for the Present Value when the Schedule Output Type is either binary or multistate. This attribute allows you to change what states the Schedule's Present Value displays if you want it to be different from the key item.
Display Units	The Display Units attribute indicates the displayed units of the Present Value when the Schedule Output Type is analog. This attribute allows you to change the units displayed with the Schedule's Present Value if you want them to be different from the key item.

Display Mode

The Display Mode drop-down menu allows you to select what is displayed in the lower panel of the Schedule Tab.

Table 234: Display Mode

Attribute	Description
Today's Schedule	<p>Contains the schedule timeline for the current day. The timeline displays the projected schedule output that will be written to the scheduled objects for the current day, combining the default Schedule Command with events from both the Weekly Schedule and Exception Schedule. Today's Schedule also displays a table of times and values, which details the changes in the schedule's output for the current day.</p> <p>ⓘ Note: Today's Schedule does not display in the SCT. It also does not display for mapped third-party schedules.</p>
Weekly Schedule	<p>Contains a timeline of events for each day of the week - Monday, Tuesday, . . . Sunday. Each event has a time and value that the Schedule writes to the scheduled objects. An event ends at midnight, but it can be ended earlier by specifying an end time or by scheduling another event to start. Events in the Exception Schedule override times and values in this Weekly Schedule. If the Weekly Schedule has no events defined on a particular day and time, and there are also no exception events scheduled, the Default Schedule Command takes effect.</p> <p>ⓘ Note: Weekly Schedule does not display for third-party schedules that do not support a weekly schedule.</p>

Table 234: Display Mode

Attribute	Description
Exception Schedule	<p>Contains a list of exceptions to the weekly schedule. The times and values in the exception replace anything that is in the weekly schedule. If more than one exception is scheduled on the same day, the highest priority (precedence) exception takes effect. If all exceptions are of the same precedence, they are executed in time order. Exceptions override the Weekly Schedule only when events are scheduled for the exception. Any time that an exception event is not in effect, such as when an event is ended before midnight (or no exception events are defined), the Weekly Schedule takes effect. If the Weekly Schedule also has no scheduled events at that time, the Default Schedule Command takes effect.</p> <p>Notes:</p> <ul style="list-style-type: none"> • Schedule an exception for the full time period that you want to override the object. For example, if you want a piece of equipment to be On between 09:00 and 18:00 and Off at other times, define an Off event at 00:00, an On event at 09:00, and an Off event at 18:00. If you do not define an Off event at 00:00, the period between 00:00 and 09:00 is not included in the Exception, and either the Weekly Schedule or Default Schedule Command takes effect. • By default, exception schedules which have already occurred are deleted after 31 days. You can disable automatic deletion of exception schedules or change the number of days until the exception schedules are deleted to 7 days by configuring the JCI Exception Schedule attribute. For more information, see JCI Exception Schedule in the Engine Device Object section. • Exception Schedule does not display for third-party schedules that do not support exceptions.
Scheduled Items	<p>Contains the list of items to be commanded by the schedule object. If empty, the Schedule does not directly command objects but its Present Value can still be used as an input to other logic, such as an Interlock or Control System. The online display also includes a Status Log that shows the status of the schedule's attempts to control each of the scheduled items. If no objects are scheduled, the Schedule Output Type determines what type of command may be scheduled.</p>

Schedule Object Focus/Configuration Tab

The online UI displays the Focus tab. The SCT displays the Configuration tab.

Table 235: Object Attributes

Name	<p>The Name attribute contains a freely definable user-friendly Name for the object that is independent of the Item Reference or the location of the object in the physical network. The Name is used as the label in the All Items navigation tree. The Name is shown in alarm reports, the event and audit viewers, and in summaries. The Name does not need to be unique to the site.</p> <p>The Name defaults to the object identifier you used during manual object creation, but can be edited later. For integrated BACnet objects, the name defaults to the BACnet Object Name in the remote BACnet device. For integrated N1 network objects, the name defaults to the System.Object Name in the NCM.</p> <p>Example: ConferenceCenter-Room2-LightingSchedule</p> <p>The Name attribute allows up to 400 characters, but 40 or less is best for the display layout.</p> <p>Name is a common object attribute; for more information, see Common Object Attributes.</p>
Description	<p>The Description attribute contains a user-defined description of the object. The Description attribute allows up to 40 characters before Release 8.0 and up to 64 characters at Release 8.0 and later, but is not required.</p> <p>Description is a common object attribute; for more information, see Common Object Attributes.</p>
Object Type	<p>stops the object from commanding the referenced attributes. The Object Type attribute indicates the type of object as displayed in the Metasys software and as exposed to a BACnet network. The Object type of the Schedule object is Schedule. The Schedule object is a standard BACnet schedule object and conforms to the BACnet protocol 135-2004 specification. Object Type is a common object attribute; for more information, see Common Object Attributes.</p>
Authorization Category	<p>The Authorization Category attribute classifies the object by the category of system or equipment that it monitors to aid in the determination of user access privileges and alarm routing.</p> <p>Examples: HVAC, Fire, Security</p>

Table 236: Status Attributes

Enabled	<p>Setting the Enabled attribute to False stops the object from updating its Present Value and</p>
Status Flags	<ul style="list-style-type: none"> • In Alarm: This flag is always False for the Schedule object. • Fault: False means that the Reliability attribute is reliable, otherwise the flag is True. • Overridden: This flag is always False for the Schedule object. • Out of Service: True means that the Out of Service attribute is also True, otherwise the flag is False.

Table 236: Status Attributes

Reliability	The Reliability attribute indicates the reliability of the object. If there are data type mismatches in the weekly schedule, exception schedules, or Default Schedule Command, the object reports that it is unreliable. This attribute does not appear in the SCT.
Out of Service	When True, the object no longer updates the Present Value itself. This attribute does not appear in the SCT. ① Note: Disabling the object does not impact the ability to put the Schedule Out Of Service and write to its Present Value and thus to its Outputs.
Error Status	The Error Status attribute indicates whether the Present Value was successfully written to the list of property values in the Scheduled Items list. The Error Status displays Ok if the object was able to send its latest Present Value to every object in the Scheduled Items list. Otherwise, the Error Status displays the error of the first failed command. See the status log in the Scheduled Items view for the status for each attempted command. This attribute does not appear in the SCT, and does not appear for mapped third-party schedules.
Alarm State	The Alarm State attribute indicates that the object transitioned into alarm or unreliable conditions. This attribute does not appear in the SCT.

Table 237: Engineering Values Attributes

Item Reference	The Item Reference attribute contains a unique reference name for the object that is the full path name of the object through the All Items navigation tree using the unique identifier you specified when you manually created the object. Item Reference is a common object attribute; for more information, see Common Object Attributes .
Version	The Version attribute displays the version number of the object software code. Version is a common object attribute; for more information, see Common Object Attributes .

Table 238: Execution Attributes

Execution Priority	The Execution Priority attribute indicates the relative importance of performing the function of the object within the device.
Priority for Writing	The Priority for Writing attribute defines the priority at which the referenced attributes are commanded. Seven is the highest priority and 16 is the lowest supported by the Schedule object, with the default of 15. ① Note: We do not recommend using priorities 7 or 8 as they may interfere with the operator override functionality.

Schedule Commands

Table 239: Schedule Commands

Command Name	Number of Parameters	Description
Disable	None	The Disable command stops all future scheduled events. Neither the Weekly Schedule nor the Exception Schedule run again until the Schedule object is re-enabled. While disabled, the status log in the Scheduled Items view lists the object as disabled. The schedule remains disabled until re-enabled.
Enable	None	The Enable command allows the Schedule object to resume normal scheduling operation. The Schedule object starts the schedule as soon as it is enabled. When it is re-enabled, the Schedule object writes its current value to the scheduled items.

Folder

Menu Selection: **Insert > Folder**

Inserts a folder into the navigation tree of the system for grouping and categorizing items and information in the navigation tree.

Note: Do not create an Equipment folder or Facility Graphics folder manually. The Metasys UI and SCT save configuration information into folders with these names, and they are created automatically if required. Equipment objects and Metasys UI graphics are not viewable in SMP.

Program Object

Menu Selection: **Insert > Program Object**

Inserts a program control system into the site. See [Logic Connector Tool \(LCT\)](#) for more information on program control systems and the Logic Connector Tool.

Program Object

The Program object (previously the Control System object) stores information needed for the user-defined control strategies created (graphically) with the [Logic Connector Tool \(LCT\)](#). The Control System object application now includes BACnet command object functionality and appears as the Program object in the Metasys software. The Program object attributes allow manipulation of the LCT application.

For general information on Metasys system objects, see [Common Object Attributes](#).

Program Attributes

This object contains attributes common to many Metasys system objects. These common attributes are described in the [Common Object Attributes](#) section. This section includes attributes of the Focus/Configuration tab, the Diagnostics tab (if applicable), and any other tab specific only to this object. See the [Object and Feature Tabs](#) section for information on the attributes that appear on the other tabs of this object (for example, the Hardware and Options tab appear on point objects).

Click the attribute name in the table for a description of the attribute.

Note: In the notes column, attributes marked with the letter C are configurable, and attributes marked with the letter W are writable. For more information about attribute characteristics, see [Attributes](#).

Table 240: Program Attributes - Focus/Configuration Tab

Attribute Name	Notes	Initial Value	Values/Options/Range
Description of Halt			
Enabled	C,W		
Instance Of			
Program Change	W	Ready	0 = Ready 1 = Load 2 = Run 3 = Halt 4 = Restart 5 = Unload
Program Location			
Program State			0 = Idle 1 = Loading 2 = Running 3 = Waiting 4 = Halted 5 = Unloading
Reason for Halt			0 = Normal 1 = Load Failed 2 = Internal 3 = Program 4 = Other
Reliability			Uses Reliability set.

Logic Connector Tool (LCT)

Use the Logic Connector Tool to create the logic within a control system using a graphical presentation. The control logic may include [System Blocks](#) and [Logic Blocks](#). The [Edit Mode](#) allows you to edit logic, and the [View Mode](#) allows viewing and limited commanding capabilities. When running the LCT on the SCT (Metasys system in offline mode), commanding is disabled.

The Logic Connector Tool allows control system viewing and editing through any browser logged in to any online or configuration server with access to a [Program \(Control System\) Object](#) and Metasys system.

Logic runs approximately every 5 seconds. It is important that control applications that require particular timing use internal logic to determine time between executions.

Note: You cannot insert logic on a *Metasys* server.

Logic Connector Tool Concepts

Logic Connector Tool Workspace

The Logic Connector Tool runs inside an active display panel. The workspace for the [Program \(Control System\) Object](#) defaults to a white background. You have the option to add a lined or dotted grid to the workspace using the appropriate buttons on the [Toolbar](#). The workspace displays all building blocks and the connections between them, and serves as the destination for dragged and dropped blocks.

LCT Modes

The Logic Connector Tool runs in either [Edit Mode](#) or [View Mode](#).

You can generate logic and make logic changes when you are using Metasys in offline mode (using the SCT) or online mode. (See [Metasys Modes](#).) After generating logic or making any changes to

existing logic in offline mode, download the database to the online device to ensure the latest information is used.

Edit Mode

Access Edit mode by clicking the Edit mode button (see [Toolbar](#)). You must be in Edit mode to edit logic or create logic. The LCT opens in View mode.

In Edit mode, you have access to all toolbar items, System blocks, and Logic blocks.

Right-clicking in Edit mode brings up basic choices such as cut, copy, paste, delete, duplicate, hide, label, zoom, and connect, depending on the type of item you select.

Note: Do not start labels with a number and then follow it with any of these characters: \$. - ,
For mouse shortcuts in Edit mode, see [Mouse Shortcuts: Edit Mode](#).

View Mode

The Logic Connector Tool displays in the View mode when you are browsing a site running Metasys software in offline mode (using the SCT) or online mode. (See [Metasys Modes](#).) See [Errors in View Mode](#).

In View mode, you have access only to a limited number of items on the toolbar. The System and Logic blocks do not appear in this mode. The LCT opens in View mode. You must enter the [Edit Mode](#) to edit any of the control system logic.

The View mode allows you to edit attributes (from the Configuration tab) and send commands to any of the input reference blocks in the diagram.

Dynamic values display on the connection line between two logic blocks. Values refresh every 15 seconds unless you click the Refresh button on the [Toolbar](#). Click the Trace mode icon on the toolbar and the tool displays online values, but hides logical connections between blocks. If you click a block, the tool traces all connections to and from that block (from the first input to the last output).

Right-clicking in View mode has no effect.

For mouse shortcuts in View mode, see [Mouse Shortcuts: View Mode](#).

Toolbar

The Logic Connector Tool uses the toolbar described here:

Note: When using a zoom tool in View mode, if you click outside of the display panel containing the logic system, the zoom level automatically changes back to the default.

Table 241: LCT Toolbar





Icon (Standard Windows Icons not Shown)	Command	Visible In		Action
		Edit Mode	View Mode	
	Edit Mode		X	Changes the control system to Edit mode.
	Refresh		X	Refreshes the values for control system components.
	Save	X		Saves the logic system and changes it to View mode. If there are unconnected points, the logic system warns to fix them prior to a save.
	Cancel	X		Cancels current changes and returns to View mode.

Table 241: LCT Toolbar






















Icon (Standard Windows Icons not Shown)	Command	Visible In		Action
		Edit Mode	View Mode	
	Print	X	X	Print dialog appears
	Print Preview	X	X	Print Preview dialog appears
	Cut	X		Cuts an item of the control system.
	Copy	X		Copies an item in the control system.
	Paste	X		Pastes a cut or copied item into the logic system.
	Undo	X		Undoes the previous action (except for a save) for up to 4 actions.
	Redo	X		Redoes the previous undone action (for up to 4 actions).
	No Grid	X		Removes the grid from the diagram.
	Lines Grid	X		Displays a line grid behind the diagram.
	Points Grid	X		Displays a point grid behind the diagram.
	Select	X	X	Turns the cursor into a selection cursor.
	Text	X		Turns the cursor into a text cursor that allows you to create a text box.
	Pan	X	X	Turns the cursor into a hand that allows you to pan over the diagram by dragging.
	Zoom	X	X	Zooms a selected area.
	Interactive Zoom	X	X	Zooms in and out on a diagram when you hold the mouse down.
	Zoom - Fit Window	X	X	Zooms the diagram to fit within the window.
	Trace Mode		X	Removes all the connection lines in the diagram. Live values remain.
	Selective Zoom	X	X	Allows you to select the percentage zoom applied to the diagram.
	Logic Checker	X		Checks the control system logic and places a balloon with an icon over unconnected points. See the Logic Checker section.

Table 241: LCT Toolbar

Icon (Standard Windows Icons not Shown)	Command	Visible In		Action
		Edit Mode	View Mode	
	Sequence (Show Sequence Order)	X		Shows the logical sequence order of the connected blocks. A value of -1 indicates that logic does not execute on the block.
	Overview	X	X	Shows an overview of the entire control system.

Logic

Logic contains the following components:

- [System Blocks](#) that reference another control system
- [Logic Blocks](#) that represent functions performed on objects
- [Math Category](#) between the Logic blocks

Once a logic process completes, it runs again in approximately 5 seconds. For example, if a logic process starts at 10:00:00 and completes at 10:00:04, it runs again at 10:00:09. It is important that control applications that require particular timing use internal logic to determine time between execution.

If your logic references multiple Engines or multiple Metasys servers, and one device needs to be downloaded, upload all Engines and Metasys servers prior to making changes in SCT. This procedure ensures your logic works consistently.

System Blocks

System blocks support drag and drop functionality. When you deposit a System block onto the workspace, a configuration [wizard](#) guides you through the configuration of the control system. System blocks are useful when you have complex logic because they allow you to nest one control system in another control system. When you create a System block, the Metasys software creates a [Program \(Control System\) Object](#) under the first Program object in the navigation tree.

See [Adding Items to Logic](#).

Logic Blocks

Logic blocks support drag and drop functionality. If the list of Logic blocks is too long to fit into the Logic block list area, use the scroll bar to expose additional blocks.

Logic blocks are not visible on the navigation tree. If the LCT window is not large enough to show all the logic blocks, you cannot scroll down to see the hidden blocks. To make sure you see them all, enlarge the panel displaying the logic by dragging the borders or reducing the number of panels.

See the following table for a list of Logic blocks.

Table 242: Logic Blocks

Logic Block Name	Description
Math	Performs mathematical functions on one or more inputs, producing a single output. 1–8 inputs
Bool	Performs Boolean functions on 2–8 inputs, producing a single output. This category also includes the Latch function.
Statistical	Performs statistical functions on 2–8 inputs producing a single output.
Selector	Performs multiplexing for 2–8 inputs, producing a single output. Based on the current mode assigned to each input, the selector chooses which input to pass through to the output.
Control	Performs control functions on three inputs, producing a single output.
Psychro (Psychrometric)	Performs psychrometric functions on the defined inputs, producing a single output.
Attributes	Gives the user the ability to expose values from within their control logic, either as an input or output. These blocks are considered attributes of the Program (Control System) Object in which they are included, and may be viewed or configured from the standard Focus view. A control system is limited to a combination of 24 inputs and 24 outputs. See the Program (Control System) Object for more information.
Constant	Passes a constant value to building block inputs.
Calculation	Controls the amount an output can change per control system execution or extrapolates an output using two inputs for reference.
Timing	Passes its input to its output at the next execution of the control system (every 5 seconds). Timing blocks are used to break up feedback loops. The Timing category also includes the Time and Timer blocks.

Math Category

Math blocks perform calculations on input. See the following table for details.

Table 243: Math Blocks

Block	Math Type	Inputs
*	Multiply	2–8
+	Add	2–8
X/Y	Divide	2
X-Y	Subtract	2
Neg	Negative	1
Abs	Absolute	1
Sqr	Square Root	1
Cos	Cosine	1
Sin	Sine	1
Tan	Tangent	1
ATan	Arc Tangent	1
ACos	Arc Cosine	1

Table 243: Math Blocks

Block	Math Type	Inputs
ASin	Arc Sine	1
Exp	Exponent	1
LN	Natural Log	1
LOG	Log	1
X^Y	X^Y	2

The number of inputs to a Math logic block depends on the number of inputs supported by the type of math function. The Logic Connector Tool allows you to add multiple connections to the output of the block.

- ⓘ **Note:** Trigonometry blocks (SIN, COS, TAN, ASIN, ACOS, ATAN) perform calculations based on radians only.

See [Editing Blocks in Edit Mode](#) for information on editing Math blocks.

Bool Category

Bool blocks apply Boolean functions to input. The number of inputs to a Bool logic block depends on the number of inputs supported by the type of Boolean function. The Logic Connector Tool allows you to add multiple connections to the output of the block.

Table 244: Bool Blocks

Bool Type	Inputs
AND	2-8
OR	2-8
XOR	2
NOT	1
LTCH	See LTCH (Latch) for details.

See [Editing Blocks in Edit Mode](#) for information on editing Bool blocks.

LTCH (Latch)

The Latch block holds a binary value until you command it to reset. Latch blocks help capture rapidly changing binary states that might otherwise be missed. The Input of the Latch block is a binary attribute, sampled every time the logic system runs (every 5 seconds). Use an [Attribute Reference](#) block to create the Input for Latch.

Reset determines if the Output of the block changes with a change in the value of the Input. When Reset is True, the Output of the Latch block stays its original value, even if the Input changes value. Reset is also a binary attribute. To change the value of Reset, double-click the binary attribute block in [View Mode](#) and issue an Inactive or Active command.

This table translates the value of the Input or Reset binary attribute into True and False values for the Latch block:

Table 245: Latch Blocks

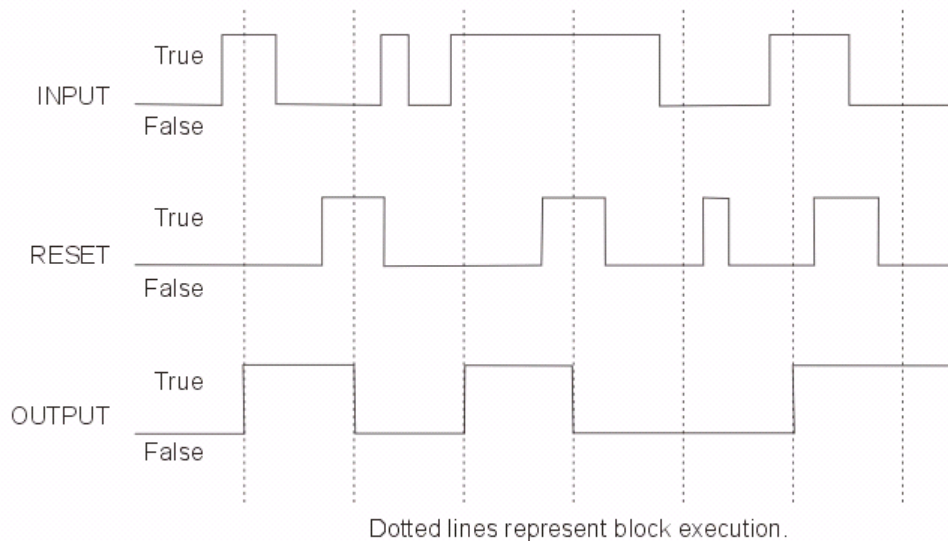
Binary Attribute Value	Command/State	True or False
1.0	Active	True
0.0	Inactive	False

The following table and figure summarize the operation of the Latch block:

Table 246: Latch Block Operation

Input	Reset	Output
Goes from False to True	False	True Even if the Input goes to False, the Output stays True as long as Reset is False.
Goes from False to True	True	False
Goes from True to False	False	True Even if the Input goes to True, the Output stays False as long as Reset is False.
Goes from True to False	True	False

Figure 40: Latch Block Example



Statistical Category

Statistical blocks perform statistics on input. The number of inputs to a Statistical logic block depends on the number of inputs supported by the type of statistic. The Logic Connector Tool allows you to add multiple connections to the output of the block.

Table 247: Statistical Block Connections

Statistical Type	Inputs
AVG	2-8
MAX	2-8
MIN	2-8

See [Editing Blocks in Edit Mode](#) for information on editing Statistical blocks.

Selector Category

Selector logic blocks (Mux) have 2-8 inputs, one mode input, and one output. Depending on the current value of the mode input, the Selector chooses which input passes through to the output. The Logic Connector Tool allows you to add multiple connections to the output of the block.

See [Editing Blocks in Edit Mode](#) for information on editing Selector blocks.

Control Category

Most control logic blocks have three inputs, and you can add multiple connections to the output of the block. The blocks compare input number 1 with input number 2 using the differential (input number 3). The type of control depends on the statistical type. The Sequencer functions differently. See [SEQ \(Sequencer\)](#) for details.

Table 248: Control Blocks

Block	Statistical Type	Inputs
X>Y	greater than	3
X<Y	less than	3
X<=Y	less than or equal	3
X>=Y	greater than or equal	3
<>	not equal	3
=	equal	3
SEQ	Sequencer	See SEQ (Sequencer) for details.

See [Editing Blocks in Edit Mode](#) for information on editing Compare blocks.

SEQ (Sequencer)

Sequencer blocks activate devices in a sequential order based on the rank of the device and whether the device is enabled. Lower ranked devices are activated before higher ranked devices, and higher ranked devices are deactivated before lower ranked devices.

The Input value at which the sequencer activates or deactivates each device is based on the make and break limits configured for the Sequencer. See [Editing SEQ \(Sequencer\) Blocks](#) for information on configuring the make and break limits. The defaults for a 3-stage Sequencer with a range of 0-100 are the following:

Table 249: SEQ (Sequencer Blocks)

	Make Limits (Activation Points)	Break Limits (Deactivation Points)
Stage 1	33	1
Stage 2	67	34
Stage 3	99	68

Sequencer blocks can output a value for minimum of 2 and maximum of 8 devices. The following table describes the components of a Sequencer block:

Table 250: Sequencer Block Components

Component	Description
Input	Determines the number of activated stages.
Instant Shutdown	Determines if the Sequencer is enabled or disabled. Use a binary object attribute (1.0=Enabled, 0.0=Disabled).

Table 250: Sequencer Block Components

Component	Description
Rotate Now	Activates reordering of output sequence. The manner in which the outputs Device 1 Output through Device 8 Output are reordered for activation is based on a combination of two factors: the ranking defined for each device, and whether the device is enabled. All enabled outputs are scheduled for output selection prior to disabled outputs. And, within each of these categories (enabled and disabled outputs), the selections are ordered beginning with the lowest ranked and proceeding on through to the highest ranked output. Unlike all other reordering scenarios, the issue of whether or not a device is currently active is not taken into account in this situation. Use a binary object attribute (1.0=Rotate now, 0.0=Do not rotate now).
Device 1-8 Enable	Establishes whether or not the output is enabled. Use a binary object attribute (1.0=Enabled, 0.0=Disabled).
Device 1-8 Rank	Establishes the order in which device outputs are activated. Use an analog object attribute (reference block) or a Constant block.

Table 251: Sequencer Block Example

Binary Attribute Value	Command/State	True or False
1.0	Active	True
0.0	Inactive	False

See [Editing SEQ \(Sequencer\) Blocks](#) for information on editing Sequencer blocks.

Psychrometric Category

Psychrometric logic blocks have 2 inputs, and you can add multiple connections to the output of the block.

Table 252: Psychrometric Blocks

Symbols	Description	Upper Input	Lower Input
EN-DP (EnDp)	Enthalpy - Dew Point	DB	DP
EN-RH (EnRh)	Enthalpy - Relative Humidity	DB	RH
RH-DP (RhDp)	Relative Humidity - Dew Point	DB	DP
RH-WB (RhWb)	Relative Humidity - Wet Bulb	DB	WB
WB-DP (WbDp)	Wet Bulb - Dew Point	DB	DP
WB-RH (WbRh)	Wet Bulb - Relative Humidity	DB	RH
ABH	Absolute Humidity	DB	RH
DP	Dew Point	DB	RH

See [Editing Blocks in Edit Mode](#) for information on editing Psychrometric blocks.

Attributes Category

Attribute blocks let you expose values in your logic and configure inputs and outputs. Control systems can contain a maximum of 24 inputs and 24 outputs.

Input and Output Attributes

In [View Mode](#), a double-click on an Attribute Input or Output block has no effect. In the [Edit Mode](#), when you drag and drop an attribute block from the palette, configuration wizards launch to help you configure the attribute.

Attributes support a maximum of 24 input or 24 output blocks of Numeric, Enum, or Bool. Attributes expose values at different stages of the Metasys system for a user to see at a glance or connect to/from.

See [Editing Blocks in Edit Mode](#) for information on editing Attribute blocks.

Note: Once an attribute is configured as Numeric, Enum, or Boolean, it **cannot** be changed.

Attribute Reference

After inserting an attribute reference (Input Ref or Output Ref), you can edit which object/attribute is being referenced. See [Editing Blocks in Edit Mode](#). If you double-click in View mode, a Command dialog box appears for Input refs only.

Constant Category

Constant logic blocks can have multiple connections to the output of the block. Constant logic blocks can be any one of the following:

Table 253: Constant Blocks

Block	Statistical Type
Enum	Enumeration
Float	Float
Rel.	Release Note: Sends the Release command at a specific priority based on the connection.

See [Editing Blocks in Edit Mode](#) for information on editing Constant blocks.

Calculation Category

RL (Rate Limiter)

The Rate Limiter block controls the rate at which its Output changes with variations in its Input value. If rate limiting is disabled, this block passes the value of the Input to the Output. If rate limiting is enabled, this block limits changes to its Output to an increment determined by the Step Equation, executed according to the rate limit. This table describes the components of the Rate Limiter block:

Table 254: RL (Rate Limiter Blocks)

Symbol	Description
IN	Input
EN	Enabled Enables rate limiting. Use a binary object attribute reference for EN: 0 = Disabled (Inactive command) 1 = Enabled (Active command)

Rate Limiter blocks use the Step Equation to determine the maximum increment (step) the Output can change to match the Input if the two differ. The Step Equation recalculates the step every time system logic executes (every 5 seconds).

The Step Equation looks like this:

$$\text{Step} = \text{Rate Limit}/60,000 * \text{Actual Period}$$

Where:

Rate Limit:	Rate per minute to increase or decrease the Output until it matches the Input
Actual Period:	Time in milliseconds since the last execution of the block. The system logic and Step Equation execute every 5 seconds (5,000 milliseconds).

For example, if the Rate Limiter block is set up like this:

Rate Limit = 10

Actual Period = 5,000 (milliseconds)

The Step Equation looks like this:

Step = $10/60,000 * 5,000$

Step = 0.8

So, the maximum increment the Output can change on its way to match the Input is 0.8.

See [Editing Blocks in Edit Mode](#) for information on editing Rate Limiter blocks.

Span

The Span block applies a range and extrapolated values to an input to produce an output. This table describes the Span block components:

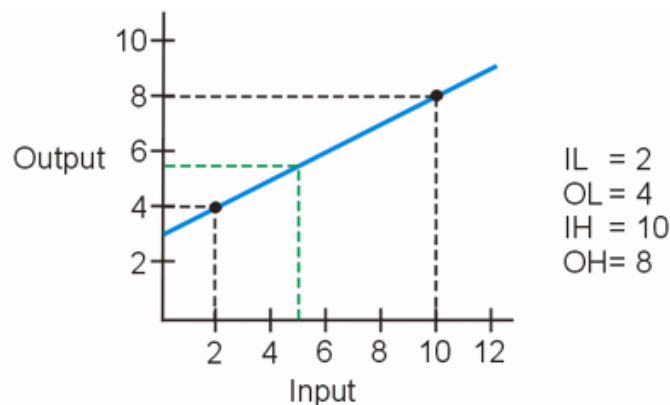
Table 255: Span Blocks

Symbol	Description
IN	Input
IL	Input Low
OL	Output Low
IH	Input High
OH	Output High

The Span block creates a linear relationship between the low input/output and high input/output pair. If the Input for the Span block falls between the low and high input, the Output of the Span block is found on the line between the low and high pairs.

The following example shows a graphical picture of how the Span block works:

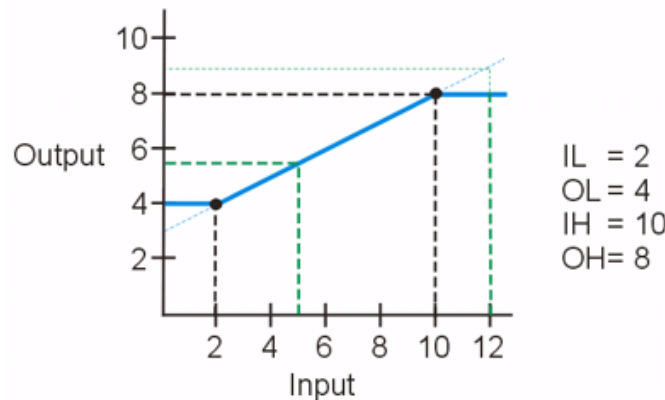
Figure 41: Span Block Example 1



The line connecting the low and high pairs (blue line) represents the linear relationship between them. When you enter an Input for the Span block, the logic finds where the line crosses that input and provides the corresponding output. (The output must lie on the thick blue line.) Using the figure above, if you enter 5 for the Span block Input, the block would find 5 on the Input axis and provide an output of 5.5 because that is where the line crosses an Input value of 5. (The green line shows this relationship.)

If the Span block is set up to Clamp (see [Editing Span Blocks](#)) the value of the Output, the Output of the block is restricted to the range between (and including) the low and high Output you enter for the block. Range clamping is the default setting. For example, assume you are using the values in the figure below and have clamping set to True. If you enter an Input of 5, you still generate an Output of 5.5, because the original line crosses an Input of 5 at 5.5, which is between 4 and 8 (low and high output). If you enter an Input of 12, you generate an Output of 8, because where the original line crosses an Input of 12 is higher than the high output (see where thin blue and thin green lines intersect). If clamping is True for both high and low, the output must lie on the newly drawn thick blue line.

Figure 42: Span Block Example 2



The Span block works for the reverse span as well (if the Output High is lower than the Output Low). See [Editing Blocks in Edit Mode](#) for information on editing Span blocks.

Timing Category

Delay blocks have one input and one output and are commonly used to break up feedback loops.

The Timing category also includes the [TMR \(Timer\)](#) and [Time](#) blocks.

See [Editing Blocks in Edit Mode](#) for information on editing Timing blocks.

TMR (Timer)

This table describes the components of the TMR blocks:

Table 256: TMR (Timer) Blocks

Output	Description
IN	Input
RS	Reset. Cancels the timer. Reset does not apply to Minimum On or Minimum Off timers. Use a binary object attribute for Reset (1.0=Reset Active, 0.0=Reset Inactive).

The LCT contains five different types of timers. Each type uses a Duration (how long the timer is active) and unique functions to generate an Output. The different types of timers are listed below. Click the name of the timer for a description and figure of timer operation.

- [Pulse Timer Function](#)
- [On Delay Timer Function](#)
- [Off Delay Timer Function](#)
- [Minimum On Timer Function](#)
- [Minimum Off Timer Function](#)

For information on setting Duration and the type of Timer, see [Editing Timing Blocks](#).

Pulse Timer Function

The following table and figures illustrate the function of the Pulse timer.

Table 257: Pulse Timer Function

Feature	Description
Activation	Goes active if the Input goes from low to high in two consecutive executions (logic executes every 5 seconds. The Pulse timer remains active for the amount of time specified in Duration, then goes to inactive. High to low transitions do not activate this timer.
Output	Stays high as long as the timer is active. After the Duration expires, the Output goes low at the next logic execution.
Reset	Cancels timer activity and makes the output low. If the Reset goes from high to low, the timer re-evaluates the Input at the next low to high transition.
Example	Captures a short pulse on a binary input and keeps the Output True long enough so that the logic can react to it.

Figure 43: Pulse Timer Example 1

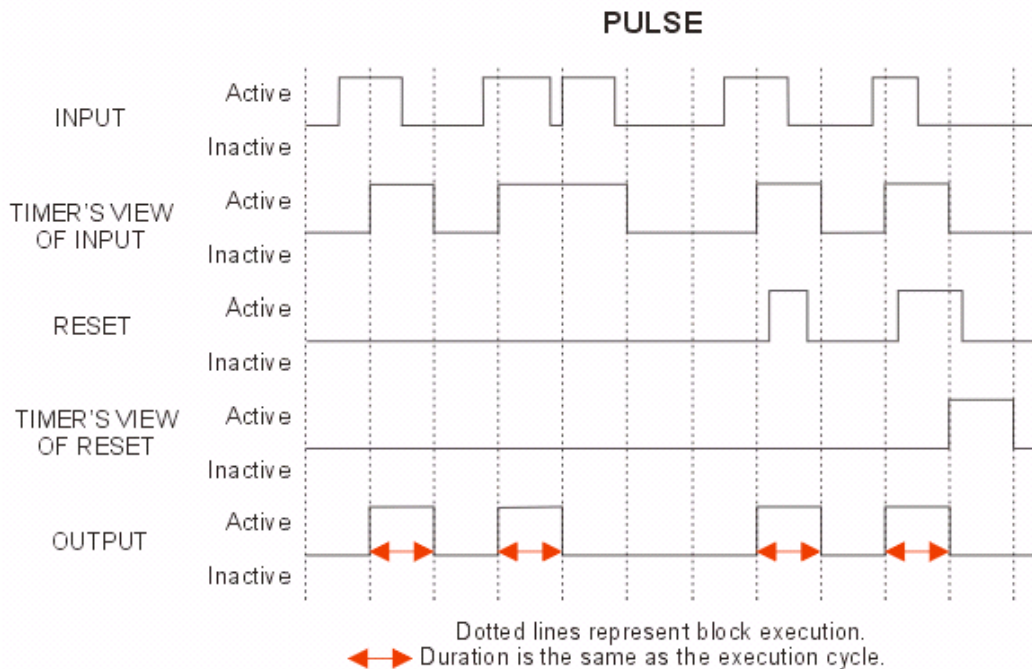
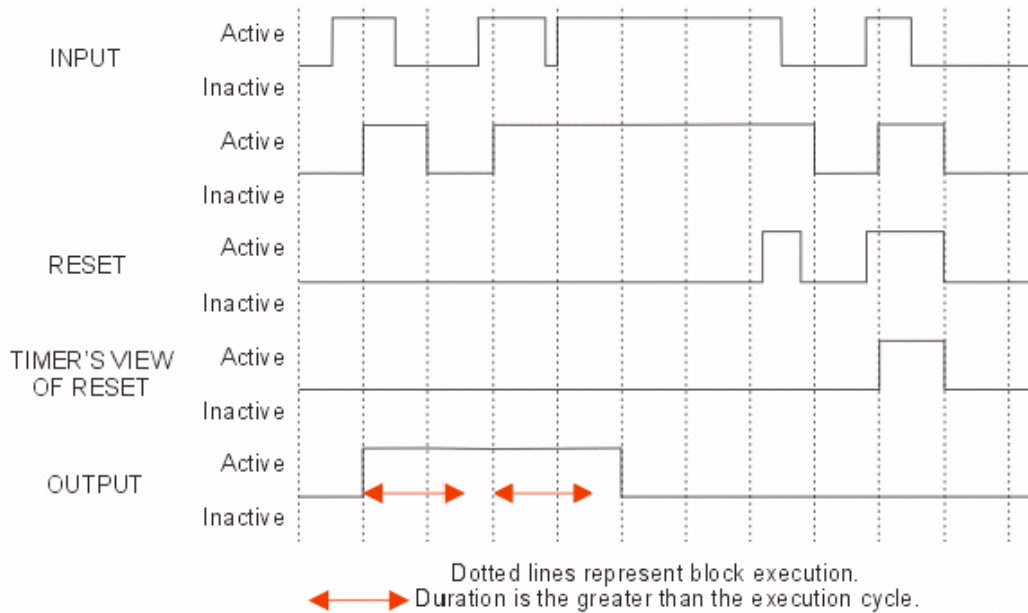


Figure 44: Pulse Timer Example 2



On Delay Timer Function

The following table and figures illustrate the function of the On Delay timer.

Table 258: On Delay Timer Function

Feature	Description
Activation	Goes inactive in a low to high Input transition, depending on the state of the input during the duration period. If the Input returns to a low state (inactive), the timing cycle is canceled and the Output remains inactive. If the Input remains in a high state, the Output goes to the high state at the next execution of logic. In a high to low Input transition, the Output becomes inactive the next time the logic executes (logic executes every 5 seconds).
Output	See row above.
Reset	Cancels timer activity and makes the output inactive. If the Reset goes from active to inactive, the timer re-evaluates the Input at the next low to high transition.
Example	Delays the supply fan start 20 seconds after the return fan starts.

Figure 45: On Delay Timer Example 1

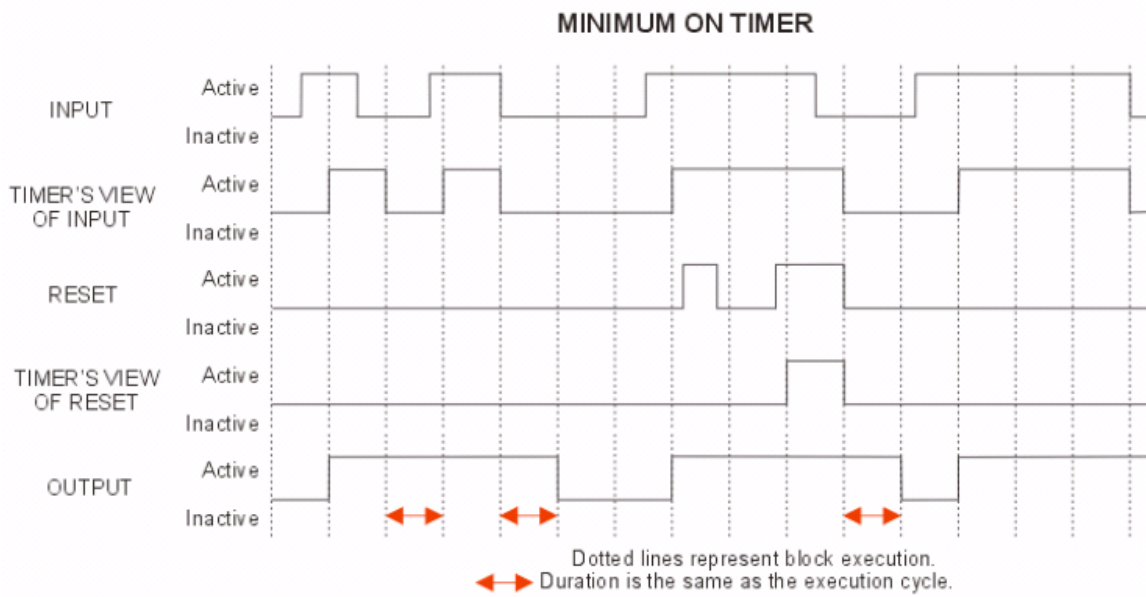
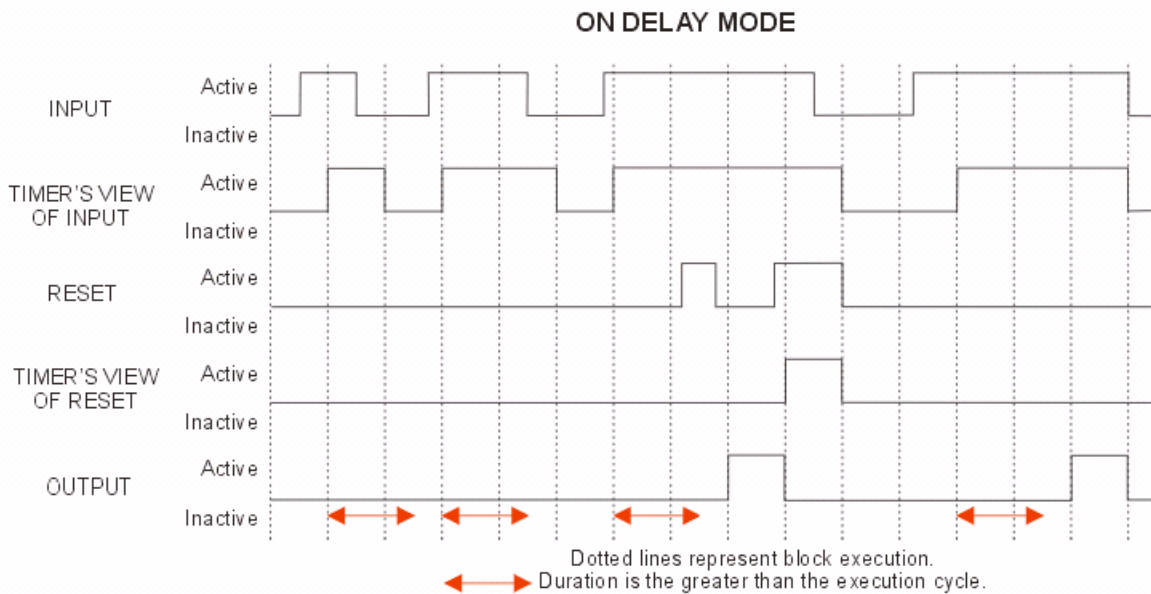


Figure 46: On Delay Timer Example 2



Off Delay Timer Function

The following table and figures illustrate the function of the Off Delay timer.

Table 259: Off Delay Timer Function

Feature	Description
Activation	In a low to high Input transition, the Output becomes active the next time the logic executes (logic executes every 5 seconds). Goes inactive in a high to low Input transition, depending on the state of the input during the duration period. If the Input returns to a high state (active), the timing cycle is canceled and the Output remains active. If the Input remains in a low state, the Output goes to the low state at the next execution of logic.
Output	See row above.
Reset	Cancel timer activity and makes the output inactive. If the Reset goes from active to inactive, the timer re-evaluates the Input at the next low to high transition.
Example	Keeps the fan running to purge the coils after a heating or cooling system is turned off. Off Delay is useful when your building contains electrical heat and/or DX cooling.

Figure 47: Off Delay Mode Example 1

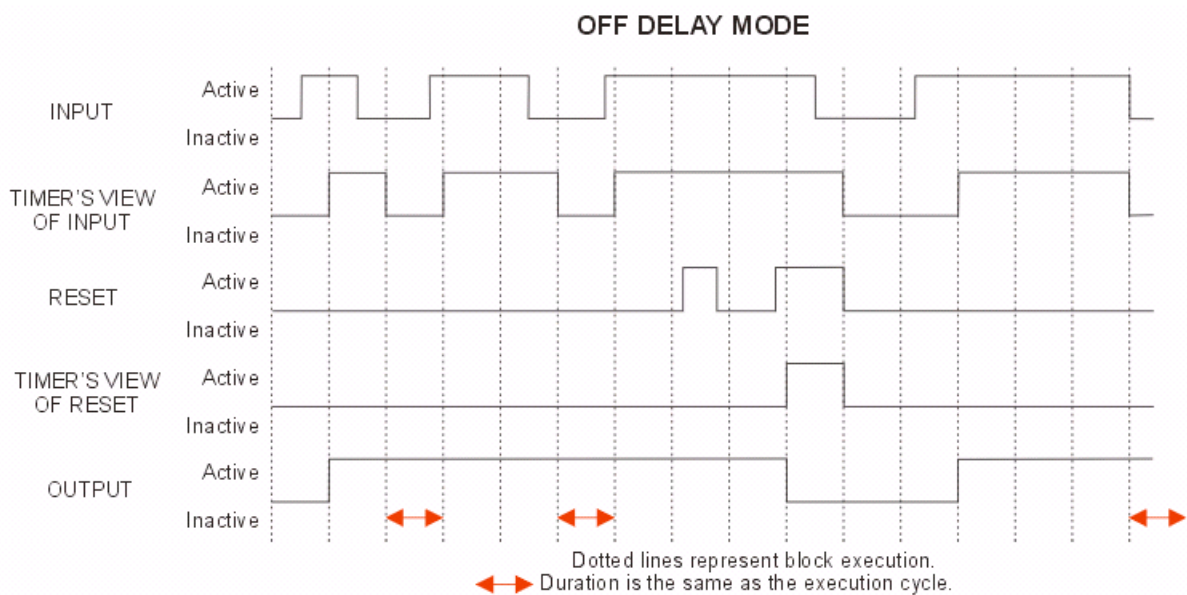
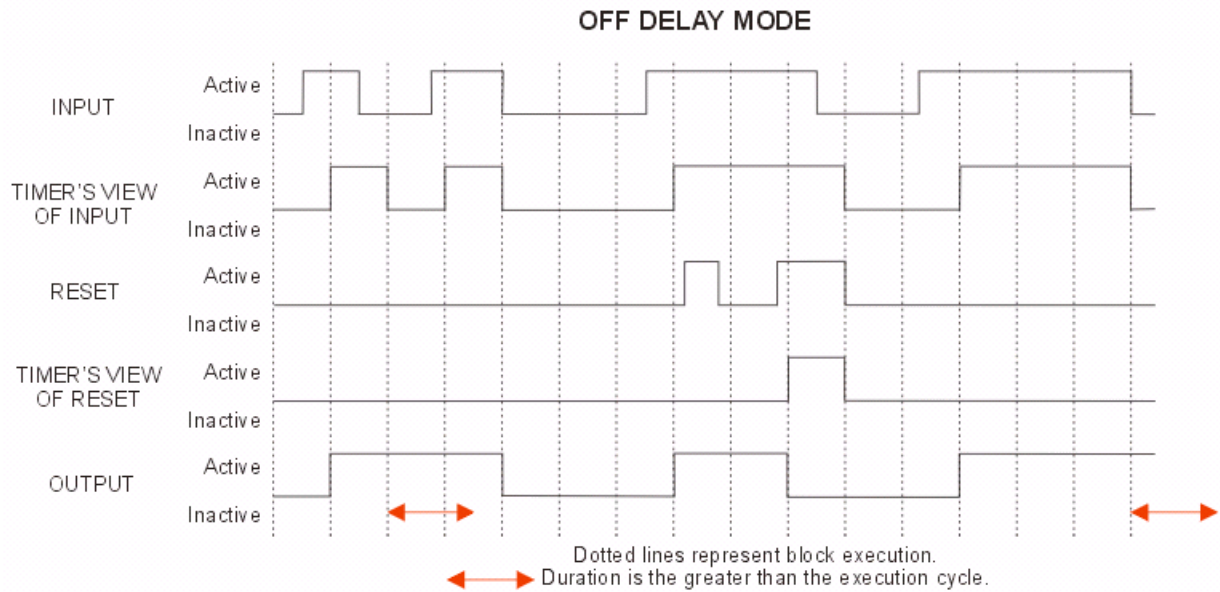


Figure 48: Off Delay Mode Example 2



Minimum On Timer Function

The following table and figures illustrate the function of the Minimum On timer.

Table 260: Minimum On Timer Function

Feature	Description
Activation	See row below.
Output	Goes active when there is a low to high Input transition when the timer executes (logic executes every 5 seconds). The Output remains active until the time specified in Duration passes AND the Input returns to inactive.
Reset	Has no effect on Minimum On timer.
Example	Keeps a chiller running for a minimum time after startup to stabilize equipment.

Figure 49: Minimum On Timer Example 1

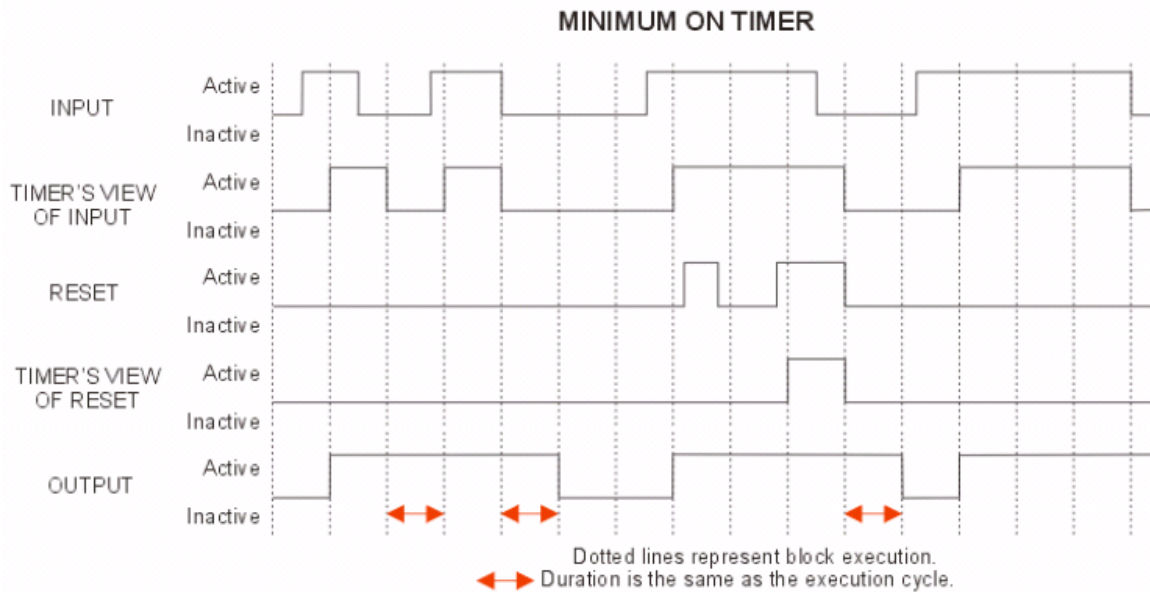
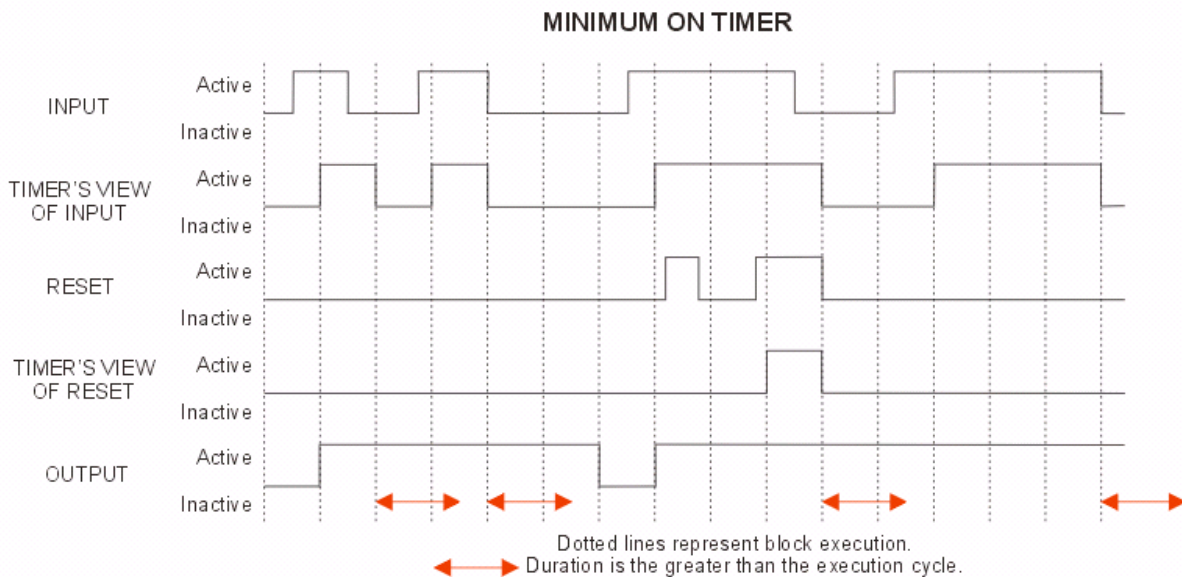


Figure 50: Minimum On Timer Example 2



Minimum Off Timer Function

The following table and figures illustrate the function of the Minimum Off timer.

Table 261: Minimum Off Timer Function

Feature	Description
Activation	See row below.
Output	Goes inactive when there is a high to low Input transition when the timer executes (logic executes every 5 seconds). The Output remains inactive until the time specified in Duration passes AND the Input returns to active.

Table 261: Minimum Off Timer Function

Feature	Description
Reset	Has no effect on Minimum Off timer.
Example	Keeps a chiller off from a minimum time after shutdown to equalize refrigerant.

Figure 51: Minimum Off Timer Example 1

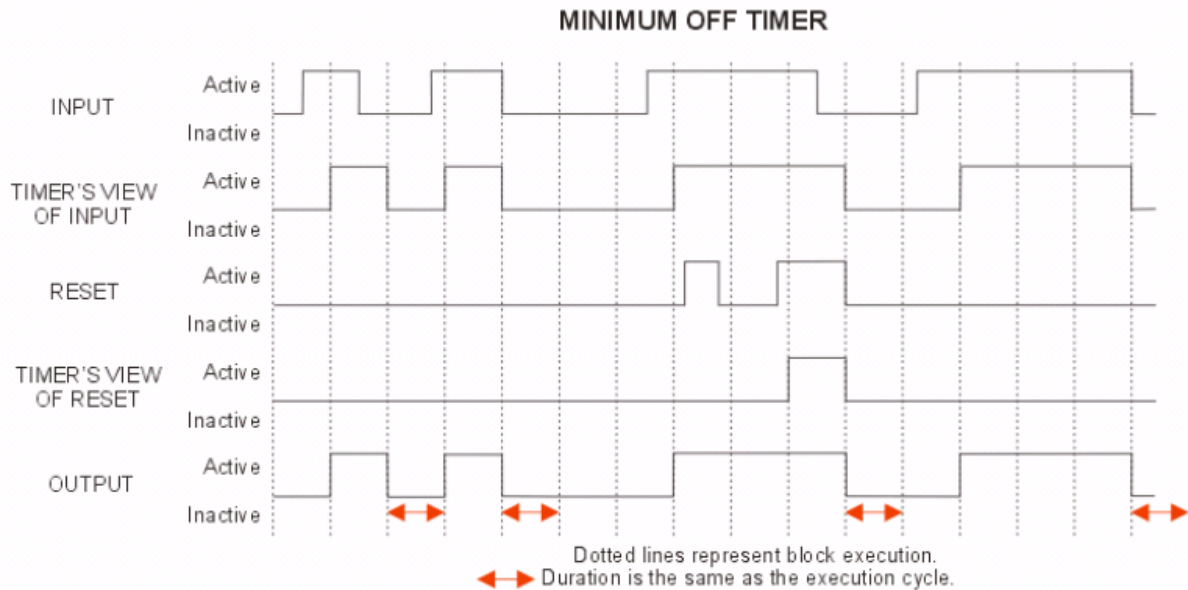
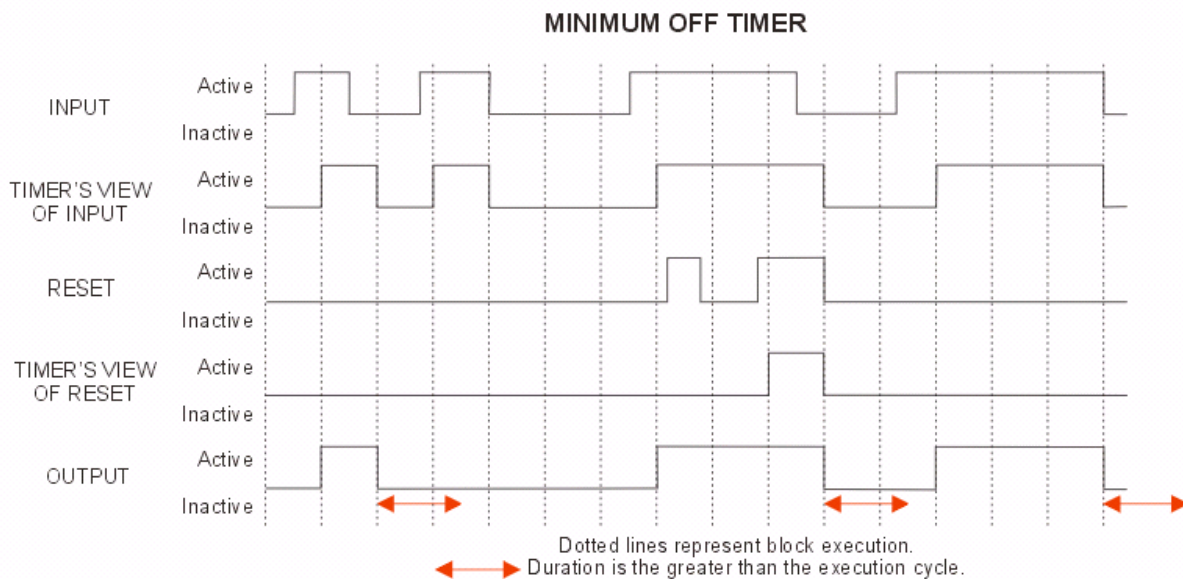


Figure 52: Minimum Off Timer Example 2



Time

A Time block has no configurable input because it extracts time and date information from the network. Network time/date is set at the Site Director. The outputs of a Time block are six time/date values:

Table 262: Time Blocks

Output	Description	Format
HH	Hour	0-23 (24-hour time)
MM	Minute	0-59
YR	Year	four-digit year
MO	Month	1-12
DA	Day	1-31
DOW	Day of the Week	1=Monday 2=Tuesday 3=Wednesday 4=Thursday 5=Friday 6=Saturday 7=Sunday

Connections

Connection lines connect blocks in the logic. The LCT does not do a datatype check; that is, you can connect Boolean and Constant values, and any other combination. But, the tool does not allow inputs to connect to inputs, or outputs to outputs. The tool determines the connection line routing, and the only way to change the routing is to move the blocks or use the hide feature.

Control Systems

Control systems are collections of subsystems, [Logic Blocks](#), or combinations of both that may be connected together.

General Logic Connector Tool Rules

Table 263: General LCT Rules

What Are You Doing?	What Components Are You Using?	These Rules Apply:	
Moving, Sizing, Typing	All blocks	<ul style="list-style-type: none"> • Left-click to drag and drop blocks • Block size is fixed • Font size and type are fixed 	
Connecting	System blocks	Attribute Properties: <ul style="list-style-type: none"> • Read Only • Writable • Prioritized Write 	Connection Type Allowed: <ul style="list-style-type: none"> • Output • Input or Output • Input, Output, or Both
Connecting	Math, Bool, Statistical, Selector, Control, Psychrometric, Calculation	All inputs should be connected for these Logic blocks. If you attempt to save logic that is missing inputs, an error message displays. You may save anyway or supply inputs where necessary. We do not recommend saving with missing inputs. In the Edit view, blocks with missing inputs have red input points. When the inputs are connected, the connection point turns blue.	

Logic Checker

The Logic Checker is not the same logic check run with a LCT save. It must be selected from the [Toolbar](#). The Logic Checker scans the control system logic and reports any configuration issues it finds.

Table 264: Logic Checker

Condition	Message Text	Message Text Position
An output is not connected.	Missing Output Connection	Top-center of the block
An input is not connected.	Missing Input Connection	Top-center of the block
A feedback loop exists in the logic.	Feedback Loop Is Present	Top-center of a connection in the loop
An attribute is not connected.	Attribute Is Not Connected	Top-center of the attribute
Duplicate attribute name is defined.	Duplicate Attribute Name	Top-center of the attribute

Errors in View Mode

While in [View Mode](#), the tool displays the status of [System Blocks](#), references ([Attribute Reference](#)), and [Math Category](#). If any connection is unreliable, the tool inserts a red circle at the center of the connection. If you place your cursor over the circle, the error condition appears as transparent text over the block. For example, the error could be a write or offline error.

Printing

The Logic Connector Tool supports printing of the following paper sizes in either landscape or portrait orientation:

- Letter (8.5 x 11 in)
- Folio (8.5 x 13 in)
- Legal (8.5 x 14 in)
- Tabloid (11 x 17 in)
- A1
- A2
- A3
- A4
- A5

The Logic Connector Tool supports printing of just the existing control system.

Mouse Shortcuts

Use mouse shortcuts to speed up LCT use.

Mouse Shortcuts: Edit Mode

The following table lists the mouse shortcuts you can use in the [Edit Mode](#) of the LCT.

Table 265: Edit Mode Mouse Shortcuts

Component	Single Left-Click	Double Left-Click	Right-Click
System Block	Select	Lets you edit the block (Editing System Blocks).	Cut, Copy, Paste, Duplicate, Delete
Math Block	Select	Lets you edit the block (Editing Math Blocks).	Cut, Copy, Paste, Duplicate, Delete
Bool Block	Select	Lets you edit the block (Editing Bool Blocks) (except for LTCH blocks).	Cut, Copy, Paste, Duplicate, Delete
Statistical Block	Select	Lets you edit the block (Editing Statistical Blocks).	Cut, Copy, Paste, Duplicate, Delete
Selector Block	Select	Lets you edit the block (Editing Selector Blocks).	Cut, Copy, Paste, Duplicate, Delete
Control Block	Select	Lets you edit the block (Editing Control Blocks).	Cut, Copy, Paste, Duplicate, Delete
Psychrometric Block	Select	Lets you edit the block (Editing Psychrometric Blocks).	Cut, Copy, Paste, Duplicate, Delete
Attribute Block	Select	Lets you edit the block (Editing Attribute Blocks: Input and Output).	Cut, Copy, Paste, Duplicate, Delete
Attribute Reference Block	Select	Lets you edit the block (Editing Attribute Reference Blocks).	Cut, Copy, Paste, Duplicate, Delete
Constant Block	Select	Lets you edit the block (Editing Constant Blocks).	Cut, Copy, Paste, Duplicate, Delete, Label

Table 265: Edit Mode Mouse Shortcuts

Component	Single Left-Click	Double Left-Click	Right-Click
Calculation Block	Select	Lets you edit the block (Editing Calculation Blocks).	Cut, Copy, Paste, Duplicate, Delete
Timing Block	Select	Lets you edit the block (Editing Timing Blocks) (except for Time blocks).	Cut, Copy, Paste, Duplicate, Delete
Connection: Prioritized	Select	Calls up a box to set connection priority.	Hide, Delete
Connection: Non-Prioritized	Select	Has no action.	Hide, Delete
Text Block	Select	Opens the box for editing.	Cut, Copy, Paste, Duplicate, Delete, Properties
Workspace	Select (drag to lasso items)	Releases a connection if one is in progress.	Cut, Copy, Paste, Duplicate, Delete, Connect, Zoom (with subcategories)

Mouse Shortcuts: View Mode

The following table lists the mouse shortcuts you can use in the [View Mode](#) of the LCT.

Table 266: View Mode Mouse Shortcuts

Component	Single Left-Click	Double Left-Click	Right-Click
System Block	Select	-	-
Math Block	Select	-	-
Bool Block	Select	-	-
Statistical Block	Select	-	-
Selector Block	Select	-	-
Control Block	Select	-	-
Psychrometric Block	Select	-	-
Attribute Block	Select	-	-
Attribute Reference Block	Select	-	-
Constant Block	Select	-	-
Timing Block	Select	-	-
Calculation Block	Select	-	-
Connection	Select	-	-
Text Block	-	-	-

Logic Connector Tool Steps

Generating a Logic System (Overview)

About this task:

To generate a complete logic system:

1. On the **Insert** Menu, select **Control System**. The **Insert System wizard** appears.

2. Follow the instructions. The [Program \(Control System\) Object](#) appears in the [Navigation Tree](#).
3. Drag the program/control system to the workspace. The **LCT** opens in [View Mode](#).
4. Change to Edit mode ([Changing LCT Modes](#)) to add or edit items in the workspace.
5. Add symbol blocks ([Adding Items to Logic](#)) and add text blocks ([Adding Text Blocks](#)) to the workspace.
6. Connect the blocks ([Connecting Blocks](#)).
7. Edit blocks ([Editing Blocks in Edit Mode](#)).
8. Save the program/control system ([Saving a Control System](#)).
9. Download the program/control system to the online controller, if you created or edited the logic in [offline mode](#) (using the SCT).

Result



Note:

- You must create a unique name for each program/control system created under the same folder. You can create programs/control systems with the same names as long as they are stored in different folders.
- When defining logic with scientific notation where the number of digits to the left of the decimal point is large, the system extends the range of values displayed without scientific notation to include all values with an absolute value less than 10 million and greater than or equal to one millionth ($0.000001 \leq |value| < 10,000,000.0$).

Changing LCT Modes

To change from [View Mode](#) to Edit Mode, click the Edit mode button on the [Toolbar](#).

To change from [Edit Mode](#) to View Mode, click the Cancel or Save button on the [Toolbar](#).

Viewing Existing Logic

1. Browse to either an archive database or an online controller.
2. Drag and drop the desired [Program \(Control System\) Object](#) from the tree structure to the workspace. The Logic Connector Tool opens in [View Mode](#).

Adding Items to Logic

Drag and Drop

About this task:

To add items to a control system using the drag and drop method:

1. In the [Edit Mode](#) of the LCT, left-click and drag an item from the left side of the tool view and drop it in the workspace.

Notes:

- If the item is a [System block](#), a configuration wizard appears. Answer the questions to set up the new object/system or create a reference to an object or control system.
 - There is not interaction between the user navigation tree and logic.
2. Edit the block to match your needs. See [Editing Blocks in Edit Mode](#).

Copy and Paste

About this task:



Note: You can copy and paste existing objects into the workspace from the workspace only.

To add items to a control system using the copy and paste method:

1. Right-click an existing object and select **Copy**.
2. Right-click in the workspace and **Paste** the object.
 - ① **Note:** The copy and paste method supports copying and pasting of multiple blocks. To copy and paste more than one block, hold down the Shift key while selecting blocks with the cursor or use the select tool to lasso the blocks.

Connecting Blocks

1. Make sure the Logic Connector Tool is running in [Edit Mode](#).
2. Place the cursor over the starting connection point until it changes shape from an arrow to a magic wand and click the point.
3. Click the ending connection point.

Notes:

- If the connection is valid, the cursor is a magic wand. If the connection is not valid, a circle with an X through it appears, and the tool does not connect the points.
 - After you successfully connect two points, the line between them turns blue until you click somewhere else in the workspace.
 - You do not need to click the exact connection point. If you click in the block, the tool automatically creates a connection to/from the nearest block's connection point. To cancel the connection after clicking the first block, click anywhere in the workspace.
4. The **Priority Connection** dialog box appears. Choose a priority from 1–16 (1 is the highest priority).
 - ① **Note:** To change the priority at a later time, you must delete the connection and reinsert it.

Re-Routing a Connection

1. Make sure the LCT is running in [Edit Mode](#).
2. Place the cursor over an existing end connection point until the cursor changes into a cursor with lines protruding from the tip.
 - ① **Note:** You may only move the destination point. To completely change the connection, see [Deleting Connections](#).
3. Click the connection point. The tool removes the connection.
4. Click a new connection point. The tool creates the newly routed connection.

Hiding Output Connections

1. Make sure the LCT is running in [Edit Mode](#).
2. Place the cursor over the output connection point and right-click and a menu appears.
3. Select **Hide** from the menu. The tool removes all connections from the output and replaces the lines with numbered symbolic representations of the connections.
4. To see the connections again, right-click the starting connection point and select **Unhide**.
 - ① **Note:**
Double-click the hidden connection to label it. If multiple connections are from the same hidden input, it is shown as **Label: number** where number is the number of connections.

Do not start labels with a number and then follow it with any of these characters: \$. - ,

Deleting Connections

1. Make sure the LCT is running in [Edit Mode](#).
2. Select the connection and right-click.
3. Select **Delete** from the menu.

Result

OR

1. Select the connection.
2. Press the Delete key on the keyboard.

Editing Blocks in Edit Mode

About this task:

To edit blocks in Edit mode:

1. Enter [Edit Mode \(Changing LCT Modes\)](#).
2. See one of the following sections for information on the block you are editing.

Editing System Blocks

About this task:

To edit [System Blocks](#) in Edit mode:

1. Double-click a System block. The **Expose Attributes** dialog box appears.
2. Configure the inputs, outputs, and attributes of the subsystem.

Note:

- Select the **Add** button to add an attribute to configure. To remove attributes from the System, select the check box next to one or more attributes and click the **Remove** button.
- To view the control system for the System block, drag and drop the control system from the [Navigation Tree](#) to the [Panel Layout](#).
- If you click **Cancel** to disregard your changes to the System block the changes are not saved, as expected. However, if you once again edit the same System block, and an error prompt appears stating `An error occurred. Object does not exist`, simply try these steps again. The error does not reoccur with the second attempt.

Editing Math Blocks

About this task:

To edit [Math](#) blocks in Edit mode:

1. Double-click a Math block. The configuration dialog box appears.
2. Edit the fields and configure the number of inputs based on the selected type of logic.

Table 267: Math Block Configuration

Field	Description
Input	The number of inputs depends on the type of Math block you use. You cannot reduce the input count lower than the number of current connections.
OK	Accepts changes.
Cancel	Cancels changes.

Editing Bool Blocks

About this task:

- ① **Note:** **LTCH (Latch)** blocks are not editable.

To edit **Bool** blocks in Edit mode:

1. Double-click a Bool block. The configuration dialog box appears.
2. Edit the fields and configure the number of inputs based on the selected type of Boolean logic.

Table 268: Bool Block Configuration

Field	Description
Input	The number of inputs depends on the type of Bool block you use. You cannot reduce the input count lower than the number of current connections.
OK	Accepts changes.
Cancel	Cancels changes.

Editing Statistical Blocks

About this task:

To edit **Statistical** blocks in Edit mode:

1. Double-click a Statistical block. The configuration dialog box appears.
2. Edit the fields and configure the type of statistical block and number of inputs.

Table 269: Statistical Block Configuration

Field	Description
Type	Allows you to switch between the statistical types.
Input	You cannot reduce the input count lower than the number of current connections.
OK	Accepts changes.
Cancel	Cancels changes.

Editing Selector Blocks

About this task:

To edit **Selector** blocks in Edit mode:

1. Double-click a Selector (Mux) block. The **Selector Edit** dialog box appears.
2. Edit the fields and configure the number of inputs, the enumeration set, and the mode for each input.

Table 270: Selector Block Configuration

Field	Description
Input	The number of inputs determines the list of inputs.
Enum Category	Filters the enumeration set list based on the chosen category.
Enum Set	When Enum Set changes, all modes are reset.

Table 270: Selector Block Configuration

Field	Description
Input 1 Mode(s)	Click the button and a dialog box appears that allows you to select which modes associate with each input. In the dialog box, select the check box next to the desired mode(s). If a mode is already assigned to another input, the mode appears dimmed. Select Default to select all modes for an input that are not currently selected by any other input.
Input 2 Mode(s)	Click the button and a dialog box appears that allows you to select which modes associate with each input. In the dialog box, select the check box next to the desired mode(s). If a mode is already assigned to another input, the mode appears dimmed. Select Default to select all modes for an input that are not currently selected by any other input. There is one of these per input (2-8).
OK	Accepts changes.
Cancel	Cancels changes.

Editing Control Blocks

About this task:

To edit [Control](#) blocks in Edit mode:

1. Double-click a Control block. The configuration dialog box appears.
 - ① **Note:** See [Editing SEQ \(Sequencer\) Blocks](#) for Sequencer configuration information.
2. Edit the fields to configure the type of comparison.

Table 271: Control Block Configuration

Field	Description
Type	The Type of comparison performed by the block. This field defaults to what was dragged over, but may be changed.
OK	Accepts changes.
Cancel	Cancels changes.

Editing SEQ (Sequencer) Blocks

About this task:

To edit [SEQ \(Sequencer\)](#) blocks in Edit mode:

1. Double-click a Sequencer block. The Sequencer dialog box appears.
2. Edit the fields to configure the sequencer.

Table 272: SEQ (Sequencer) Block Configuration

Field	Description
Outputs	Determines the number of binary outputs for the block.
Min On Time	Specifies the minimum time an output must be on before being deactivated to an off condition. When an output is activated, a timer starts. Until the timer reaches the minimum time, the output cannot be deactivated. However, an Instant Shutdown or a Rotate Now command is applied immediately, and overrides the Min On Time value.

Table 272: SEQ (Sequencer) Block Configuration

Field	Description
Min Off Time	Specifies the minimum time an output must be off before being reactivated to an on condition. When an output is deactivated, a timer starts. Until the timer reaches the minimum time, the output cannot be activated. However, an Instant Shutdown or a Rotate Now command is applied immediately, and overrides the Min Off Time value.
Interstage On Delay	Defines the minimum time that must elapse between the sequential activation of Sequencer stages.
Interstage Off Delay	Defines the minimum time that must elapse between sequential deactivation of Sequencer stages.
Make/Break Limits	<p>The box next to Make/Break indicates if Proactive is selected and, when you click, launches the Make/Break Dialog box.</p> <p>In the Make/Break Dialog box:</p> <ul style="list-style-type: none"> • Default check box: Disables all make/break limit text boxes and uses the default values. The default values are set so that each device is on for a proportional amount of time. If you do not select Default, you must enter at least one set of values for a stage. • Proactive check box: Disables the Stage 1 make/break limit boxes (because that stage is always on) and shifts all the make/break limits down one stage. • Make Limit: Turns on the stage when the input value to the block reaches this limit. • Break Limit: Turns off the stage when the input value to the block decreases to this value. <p>Make/Break Limit Rules:</p> <ul style="list-style-type: none"> • The current stage make limit must be less than the next stage make limit. • The current stage break limit must be less than the current stage make limit, <ul style="list-style-type: none"> • OR <ul style="list-style-type: none"> the current stage make limit must be greater than the current stage break limit. • The current stage break limit must be less than the next stage break limit.
OK	Accepts changes.
Cancel	Cancels changes.

Editing Psychrometric Blocks

About this task:

To edit [Psychrometric](#) blocks in Edit mode:

1. Double-click a Psychrometric block. The configuration dialog box appears.
2. Edit the fields and configure the elevation based on the selected logic type.

① **Note:** If you double-click an ABH or DP block, the Unit Type field does not appear.

Table 273: Psychrometric Block Configuration

Field	Description
Elevation	Allows you to configure the current elevation of the site (in feet or meters).
Unit Type	Allows you to choose International System of Units (SI) or Imperial (IP) units. Units for Unit Type SI are kilograms of water per kilogram of dry air. Units for Unit Type IP are pounds per cubic foot.
OK	Accepts changes.
Cancel	Cancels changes.

Editing Attribute Blocks: Input and Output

About this task:

To edit [Attribute](#) blocks in Edit mode:

1. Double-click an attribute block.
2. Edit the fields and configure the input/output (see [Editing Attribute Inputs](#) and [Editing Attribute Outputs](#)).

Editing Attribute Inputs

Table 274: Attribute Input

Field	Description
Name	Name of the input
Units	The units for the output. This field only appears for floating inputs.
Display Precision	Tells the Metasys software what precision to use when formatting data. This field only appears for floating inputs. ① Note: Display Precision is used in the Focus view of data, not the graphical view.
Enum Category	Set category determined by the user interface (either Two State or Multi State). This field only appears for Enum inputs.
Enum Set	Set determined by the category selected in Enum Category. This field only appears for Enum inputs.
Trigger	This is checked if you want the attribute to trigger the control system to execute if its value changes by more than the defined increment.
OK	Accepts changes.
Cancel	Cancels changes.

Editing Attribute Outputs

Table 275: Attribute Output

Field	Description
Name	Name of the output
Units	The units for the output
Display Precision	Tells the Metasys software what precision to use when formatting data. This field only appears for floating outputs. ① Note: Display Precision is used in the Focus view of data, not the graphical view.

Table 275: Attribute Output

Field	Description
Enum Category	Set category determined by the user interface (either Two State or Multi State). This field only appears for Enum outputs.
Enum Set	Set determined by the category selected in Enum Category. This field only appears for Enum outputs.
OK	Accepts changes.
Cancel	Cancels changes.

Editing Attribute Reference Blocks

About this task:

To edit [Attribute Reference](#) blocks in Edit mode:

1. Double-click an Attribute Reference block. The Attribute Reference Edit dialog box appears.
2. Edit the fields and configure the object or attribute to which the block refers ([Editing Attribute Reference Inputs](#) or [Editing Attribute Reference Outputs](#)).

Editing Attribute Reference Inputs

Table 276: Attribute Reference Input

Field	Description
Label	Enter a label here for the block. ① Note: Do not start labels with a number and then follow it with any of these characters: \$. - ,
Object	Browses to the object to which the reference is linked. Leaving this field blank leaves a placeholder for a future reference. The dragged object's name appears in this field and the object's attributes appear in the drop-down list in the attribute field.
Attribute	The attribute to which the reference is linked. When you are configuring for an Input reference, the drop-down list contains numeric attributes only.
Units	Units for the attribute
Trigger	This is checked if you want the attribute to trigger the control system to execute immediately instead of waiting for the next control system scan if the value changes by more than the defined increment. Otherwise, the control system executes normally.
Increment	Sets the increment.
OK	Accepts changes.
Cancel	Cancels changes.

Editing Attribute Reference Outputs

Table 277: Attribute Reference Output

Field	Description
Label	Enter a label here for the block. Note: Do not start labels with a number and then follow it with any of these characters: \$. - ,
Object	Browses to the object to which the reference is linked. Leaving this field blank leaves a placeholder for a future reference. The dragged object's name appears in this field and the object's attributes appear in the drop-down list in the attribute field.
Attribute	The attribute to which the reference is linked. When you are configuring an Output reference, the drop-down list contains numeric, writable attributes only.
OK	Accepts changes.
Cancel	Cancels changes.

Editing Constant Blocks

About this task:

To edit [Constant Category](#) blocks in Edit mode:

1. Double-click a Constant block. One of two dialog boxes appears depending on the type of constant you select.
Note: There are no configurable parameters for the Rel. (Release) constant. When you double-click, nothing happens.
2. Edit fields and configure the constant value ([Editing Constant Enum](#), [Editing Constant Float](#)).

Editing Constant Enum

Table 278: Constant Enum

Callout	Description
Enum Category	Set category determined by the user interface (either Two State or Multi State).
Enum Set	Set determined by the category selected in Enum Category.
Enum	Set state determined by the set and set category.
OK	Accepts changes.
Cancel	Cancels changes.

Editing Constant Float

Table 279: Constant Float

Callout	Description
Value	The value of the float.
Units	The units used by the float.
OK	Accepts changes.
Cancel	Cancels changes.

Editing Calculation Blocks

Editing RL (Rate Limiter) Blocks

About this task:

To edit [RL \(Rate Limiter\)](#) blocks in Edit mode:

1. Double-click a Rate Limiter block. The RL dialog box appears.
2. Edit the Rate Limit and Startup Value for the RL block.

Table 280: RL (Rate Limiter) Block Configuration

Field	Description
Rate Limit	Specifies the rate per minute to increase/decrease the Output until it matches the Input.
Startup Value	Specifies the value the rate limiter block will start at when the engine is restarted and block enable is true.
OK	Accepts changes.
Cancel	Cancels changes.

Editing Span Blocks

About this task:


To edit [Span](#) blocks in Edit mode:

1. Double-click a Span block. The Span dialog box appears.
2. Edit the fields to enable or disable clamping.

Table 281: Span Block Configuration

Field	Description
Clamp High	Selects whether (True) or not (False) to clamp the Output at the Output High (OH). For more information on clamping, see Span .
Clamp Low	Selects whether (True) or not (False) to clamp the Output at the Output Low (OL). For more information on clamping, see Span .
OK	Accepts changes.
Cancel	Cancels changes.

Editing Timing Blocks

 **Note:** [Time](#) (logic) blocks are not editable.

Editing Delay Blocks

About this task:

To edit [Timing Category](#) blocks in Edit mode:

1. Double-click a Delay block. The Delay dialog box appears.
2. Edit the field to configure the delay.

Table 282: Delay Block Configuration

Field	Description
Startup Value	Displays the initial value of the Delay block.
OK	Accepts changes.
Cancel	Cancels changes.

Editing TMR (Timer) Blocks

About this task:

To edit [TMR \(Timer\)](#) blocks in Edit mode:

1. Double-click a Timer block. The TMR dialog box appears.
2. Edit the timing functions of the block.

Table 283: TMR (Timer) Block Configuration

Field	Description
Duration	Specifies the length of the timer function in seconds. The range is 5–86,400 seconds.
Setup	Determines the type of timer you use: <ul style="list-style-type: none">• Pulse• On Delay• Off Delay• Minimum On• Minimum Off
OK	Accepts changes.
Cancel	Cancels changes.

Adding Text Blocks

1. Click the **Text** icon on the [Toolbar](#).
2. Click the workspace to select a location for the text. The text block appears.
3. Select the Select icon on the toolbar.
4. Double-click the text block to display the text editor. Edit the text and click **OK**.
5. Select the text block and drag the sides to resize the block.

Notes:

- To edit the text, double-click the block. The block opens for editing.
- To change the text properties, right-click the text block and select Properties from the menu. You can change the font (type, size, bold, italic, bold italic), text color, background color, and border visibility/color.
- Colon (:) and quote (") characters cannot be entered by the user in this field.

Running the Logic Checker

About this task:

To run the [Logic Checker](#):

1. Select the **Logic Checker** icon from the [Toolbar](#).
2. If the Logic Checker does not detect errors, a **No Warnings Found** dialog box appears. Click **OK** to return to the logic.
3. If the Logic Checker detects errors, a **Configuration Warnings Were Found** dialog box appears. After you click **OK**, the tool returns you to the logic with Information symbols over the warning elements.

- ① **Note:** The Information symbols remain unless you ignore them and save the logic or fix the errors and run the Logic Checker successfully.

Saving a Control System

To save a control system, click Save on the [Toolbar](#). The LCT scans for logic errors.

Notes:

- The logic check done with the Save command is not the same as the [Logic Checker](#) run from the toolbar.
- If inputs are missing, an error message appears asking if you want to continue with the save. Click No to return to the logic. Click Yes to save anyway. We do not recommend saving with errors.

Printing a Control System

To print a control system, click the print icon on the [Toolbar](#).

Object

The Insert Object wizard inserts one of the following object types.

Auto Shutdown Object

Menu Selection: *Insert > Object > Auto Shutdown*

Note: On the Configure screen, click the [...] button to select an object from the Select Item dialog box. Then select the desired Control attribute from the drop-down menu.

When a selected multistate control point is in a specified shutdown state, the Auto Shutdown object suppresses alarm reporting from a list of dependent objects to prevent nuisance alarms. The Auto Shutdown object accomplishes this by sending an enable/disable command to each of the dependent object's Alarm objects, based on the control point's current state (the value of the Control attribute) and the defined shutdown state. For BACnet intrinsic alarming and Event Enrollment objects, these commands set and reset the BACnet Alarm Event Enable property flags (To Off Normal, To Fault, and To Normal) that cause or prevent alarms. A startup delay is provided so that points are not released immediately from shutdown.

An example of a use for the Auto Shutdown object is to prevent alarms set to monitor the discharge air temperature of a fan when that fan is turned off. When the fan is turned off, the fan state value is sent to the Auto Shutdown object. The Auto Shutdown object then evaluates the current state of the point against the Shutdown State defined in the Auto Shutdown object. If the current point state matches the Shutdown State, the Auto Shutdown object sends a Disable command to the Alarm object of every referenced dependent object in the Dependents list.

Consequently, when the fan is turned back on, the Auto Shutdown object again evaluates the current state and, if the current state does not match the Shutdown State, starts the Startup Delay timer. Once the timer expires, the Auto Shutdown object sends an Enable command to the Alarm object of every referenced dependent object in the Dependents list.

Note: Changing the Dependents or Shutdown State attribute causes an immediate reevaluation of the current state. However, changes to the Startup Delay time do not take effect until the next change in the control point state.

Auto Shutdown Attributes

This object contains attributes common to many Metasys system objects. These additional common object attributes are described in the [Common Object Attributes](#) section.

Note: In the Notes column, letters indicate the following: C - Configurable, R - Affected by Extension's Reliability, and W - Writable.

Table 284: Auto Shutdown Attributes - Focus/Configuration Tab

Attribute Name	Notes	Initial Value	Values/Options/Range	Description
Control	C			Determines, in conjunction with the Shutdown State, if an alarm shutdown should occur. This is the current state of the references control point.
Dependents	C,W		Number of Entries = 1-32	Uses each dependent object identified in this list of object references to locate the Alarm object that is to have its alarm reporting controlled by the control point.
Enabled		True		Indicates whether the Auto Shutdown object is enabled (True) or disabled (False).
Execution Priority	C,W	Normal		Indicates the relative importance of performing the function of the object within the device.
Present Value	R	Off	On = 1 Off = 0	

Table 284: Auto Shutdown Attributes - Focus/Configuration Tab

Attribute Name	Notes	Initial Value	Values/Options/Range	Description
Reliability		Input Unreliable	Various	Reflects the reliability of the control point. When the control point is not reliable, the Reliability attribute becomes Input Unreliable.
Shutdown State	C,W		Uses the value set of the control point once the Auto Shutdown object reads the control point value.	Determines the definition of the shutdown state. When the control point goes to the state defined as the shutdown state, Auto Shutdown disables alarms from the point.
Startup Delay	C,W	5	Units = Minutes	Represents the time in minutes that must elapse before alarm reporting is re-enabled, once the control point changes from the Shutdown State to any other state.
States Text				Indicates the displayed strings for the Present Value.

Auto Shutdown Commands

The table below lists the commands supported by the [Auto Shutdown Object](#).

Table 285: Auto Shutdown Commands

Command Name	Parameters	Description
Disable	None	Disables all types of alarming: alarm extensions, BACnet intrinsic alarming, and BACnet Event Enrollment objects.
Enable	None	Enables all types of alarming: alarm extensions, BACnet intrinsic alarming, and BACnet Event Enrollment objects.

Data Broadcast Object

Menu Selection: **Insert > Object > Data Broadcast**

Note: On the Configure screen, click the [...] button to select the input reference object from the Select Item dialog box. Then select the desired attribute to reference from the drop-down menu.

The Data Broadcast object provides a means of sharing globally useful data with third-party BACnet devices. The data value from an object/attribute to be shared is referenced by this object. Typically, this data may be the outdoor air temperature, or a value indicating whether a building is occupied. The Data Broadcast then broadcasts an [Unconfirmed COV Notification](#) message containing the referenced data value when it changes.

On a site containing only Metasys devices, the Data Broadcast object is not useful, and should not be created.

As the number of these objects on a site increases, the network performance may suffer due to excessive broadcasts. Therefore, use Data Broadcast objects only when necessary.

Data Broadcast Concepts

Unconfirmed COV Notification

Unconfirmed COV Notification is a BACnet service that can be used to distribute object attributes of wide interest to many devices simultaneously without a subscription.

Data Broadcast Attributes

This object contains attributes common to many Metasys system objects. These common attributes are described in the [Common Object Attributes](#) section. This section includes attributes of the Focus/Configuration tab, the Diagnostics tab (if applicable), and any other tab specific only to this object. See the [Object and Feature Tabs](#) section for information on the attributes that appear on the other tabs of this object (for example, the Hardware and Options tab appear on point objects).

Table 286: Data Broadcast Object Attributes - Focus/Configuration Tab

Attribute Name	Notes	Initial Value	Values/Options/Range	Description
COV Period	C,N,W	Null	Units = seconds Range = 30–86,400	Broadcasts an Unconfirmed COV on a periodic basis. When set to a value from 30 to 86,400, this object issues an Unconfirmed COV containing the attribute value and status flags at least once every period. This broadcast occurs even when the value remains unchanged. If an actual change of value occurs during the period and a COV is sent, the timer for the periodic COV resets. To disable the periodic broadcast feature, clear the value from the COV Period and save the change. The null entry represents not sending period
Input Reference	C	Null		Specifies the object and attribute value that is monitored for COVs. This object's attribute value, if reliable, is then broadcast in an Unconfirmed COV Notification message.
Message Transmits		0		Provides a count of the number of Unconfirmed COV Notification messages that have been sent by the Data Broadcast object. After reaching 4,294,967,295, the value rolls over to 0 and the count continues.
Reliability		Input Unreliable		Specifies the reliability of the Data Broadcast object. The reliability changes to Input Unreliable when errors with the Input Reference occur.

Data Broadcast Commands

The following table lists the commands supported by the [Data Broadcast Object](#).

Table 287: Data Broadcast Commands

Command Name	Parameters	Description
Disable	None	Locks all outputs and prevents the object from broadcasting any messages.
Enable	None	Specifies that the Data Broadcast object broadcasts Unconfirmed COV Notification messages when the Input Reference changes.

Demand Limiting/Load Rolling (DLLR) Object

Menu Selection: *Insert > Object > DLLR*

The Demand Limiting feature helps you save money by limiting peak energy usage. The Load Rolling feature helps save money by reducing overall energy consumption. The DL portion of DLLR selectively turns off (sheds) equipment, such as fans and lights, or adjusts setpoints to limit energy use during peak times. The LR portion acts continuously to maintain a specified energy reduction by shedding unnecessary loads. A facility can implement either one or both of these strategies.

The DLLR object represents the attributes, commands, and reports that define the DLLR functionality. For information on the features and operation of DLLR, refer to the *DLLR Technical Bulletin (LIT-12011288)*.


DLLR Object Attributes

The DLLR object is divided into three tabs, the Focus/Configuration Tab, the Profile Tab, and the Load Summary Tab. If you add extensions to this object, see [Extensions](#) for descriptions of the extension tabs.

DLLR Object Features

DLLR Object Icon

Table 288: DLLR Object Icon

Icon	Key Words
	Gears, Spinning gears

Focus/Configuration Tab

Object Attributes

Name

The Name attribute contains a freely definable user-friendly name for the object that is independent of the Item Reference or the location of the object in the physical network. The Name is used as the label in the All Items navigation tree. The Name is shown in alarm reports, the event and audit viewers, and in summaries. The Name **does not** need to be unique to the site.

The Name defaults to the object identifier you used during manual object creation but can be edited later.

Description

The Description attribute contains a user-defined description of the object.

Object Type

The Object Type attribute indicates the Object Type as displayed in the Metasys software and as exposed to a BACnet network.

Example: DLLR (Demand Limiting Load Rolling).

AuthorizationCategory

The AuthorizationCategory classifies the object by the category of system or equipment that it monitors to aid in the determination of user access privileges and alarm routing.

Examples: Energy, HVAC, Fire, Security

Status Attributes

Enabled

The Enabled attribute provides a mechanism to stop DLLR operation. When disabled, DLLR releases all shed loads except those that are locked shed. Also, DLLR does not perform any calculations, report alarms, or issue any commands to any loads when disabled. DLLR attributes can be changed, but no actions are taken until DLLR is enabled.

When enabled, DLLR operation starts again. If Shed mode is active, the configured DLLR strategies begin shedding loads as needed. If Monitor Only mode is configured, simulated load shedding begins.

Alarm State

Indicates the current Warning or Alarm state of an object. This attribute is set by an Alarm Extension associated with the object.

DLLR Status

The DLLR Status attribute indicates the current DLLR status. The statuses include:

- Normal - no errors or problems in the DLLR object
- LR cannot meet target - the Load Rolling algorithm was unable to shed enough loads to meet its target.
- DL cannot meet target - the Demand Limiting algorithm was unable to shed enough loads to meet its target.
- Meter Off Normal - a meter is defined, but it is offline or its value is not reliable.
- EOI Off Normal - an EOI attribute is defined, but it is offline or its value is not reliable. This also indicates that the EOI Attribute is replaced with the fixed window algorithm.
- Disabled - the DLLR object is not being used to shed (or simulate the shedding of) loads.
- No meter defined for DL - a meter is not currently defined for DL; a requirement if the Shed Strategy includes Demand Limiting.

Meter Status

The Meter Status attribute indicates the status of the meter, if the meter is defined. The meter status includes:

- Undefined
- Normal
- Off Normal

EOI Status

The EOI Status attribute indicates the status of the EOI object, if the EOI object is defined. The EOI Status attribute uses the same status set as [Meter Status](#).

Operational Data Attributes

Energy Rate

The Energy Rate attribute displays the current rate from the meter, if a meter is defined.

Interval Demand

The Interval Demand attribute displays the average energy demand over the current interval.

Amount Shed

The Amount Shed attribute indicates how much energy is currently shed. It is the default attribute of the DLLR object and is displayed near the top of the DLLR object window.

Calculated Demand

When DLLR is in Monitor Only mode, the Calculated Demand attribute indicates the energy rate when DLLR is in Shed mode (energy rate - amount shed). This attribute is blank when DLLR is in Shed mode.

Setup Attributes

Mode

The Mode attribute controls whether DLLR is actively shedding Loads (Shed mode) or is simulating Load shedding (Monitor Only mode). The mode pertains to both the Demand Limiting and Load Rolling strategies simultaneously. The Modes include:

- Monitor Only - simulated shedding occurs, where loads appear shed but output points are not actually commanded or turned off.
- Shed - true shedding occurs where output points are commanded.

Shed Strategy

The Shed Strategy attribute allows you to specify which shedding strategy the DLLR uses. The Shed Strategies include:

- Demand Limiting and Load Rolling
- Demand Limiting Only
- Load Rolling Only (default)

Meter Object

The Meter Object identifies the Metasys object (for example, Pulse Meter, AI, AV) that is used for the energy rate if the Demand Limiting strategy is configured. If only the Load Rolling strategy is used, a meter is not required.

The Meter Object should be defined on the same supervisory controller as the DLLR Object. Do not use an N1 Integration object for the meter unless you can guarantee that the NCM Service Time is always less than 60 seconds because the DLLR algorithm requires an updated meter value every minute.

DLLR Startup Behavior

The DLLR Startup Behavior attribute selects which mode the feature is set to whenever the supervisory controller is restarted or its database is downloaded. Two selections are offered:

- **Startup in Monitor Only mode** - DLLR starts in Monitor Only mode, even if it had been commanded or configured to Shed mode before the restart or download. Also, if the DLLR object was disabled while in Shed mode, it reverts to Monitor Only mode when enabled.
- **Startup in last commanded mode** - DLLR starts in the mode that was active at the time the controller was restarted or its database downloaded.

Regardless of the selection, the following also apply:

- Any Comfort Override commands that were in place before the startup are persisted.
- Any previous Shed commands are not automatically persisted to loads on startup. DLLR evaluates the current situation and completes all calculations before issuing any new Shed commands to loads.
- When DLLR starts issuing Shed commands to loads, it resumes where it left off with the first eligible, lowest-priority load.

Monitor Mode Release

The Monitor Mode Release attribute allows you to specify the load output release behavior when DLLR is commanded to Monitor Only mode from Shed mode. If set to Release immediately, the outputs of loads that are not locked are immediately released regardless of whether their Minimum Shed Time has expired. If set to Release After Min Shed Time, the outputs of loads that are not locked are released only after their Minimum Shed Time expires. Possible behaviors include:

- Release Immediately
- Release After Min Shed Time

Profile Tracking Period

The Profile Tracking Period attribute determines the time period for the Current Profile and Previous Profile attributes in the Profile tab. This is customarily set to the utility's billing period. If you change the Profile Tracking Period, the Current Profile is copied to the Previous Profile, and a new Current Profile is started. When Manual is selected, the Current Profile and Previous Profile are only changed when the user commands the DLLR object to Reset Profile. Possible settings include:

- Manual
- Hourly
- Daily
- Weekly
- Monthly

Table 289 describes when the start and end times are set based on the tracking period.

Table 289: Profile Tracking Periods

Profile Tracking Period	Start Time	End Time
Hourly	At the top of the current hour Example: 08:00:00 A.M.	60 minutes from the current hour Example: 09:00:00 A.M.
Daily	12:00:00 A.M. current day	12:00:00 A.M. next day
Weekly	12:00:00 A.M. Monday of current week	12:00:00 A.M. Monday of next week
Monthly	12:00:00 A.M. first day of current month	12:00:00 A.M. first day next month
Manual	The moment when the Reset Profile command is issued.	Always Not Specified

There are three exceptions to when the Start Times and End Times can vary from what is shown in Table 289. The Start Times and End Times differ when:

- a Reset Profile command is issued to the DLLR object while in Shed or Monitor Only mode
- a Reset Initialization Parameters command is issued to the DLLR object while in Monitor Only mode
- the controller is downloaded or reset

Note: The Start Times and End Times are not reset when DLLR changes from Monitor Only mode to Shed mode. Also, when the DLLR object is disabled, the current profile is copied to the previous profile, the current profile values are all set to 0, and the times are all set to undefined.

Stop DLLR Audits in Monitor Only Mode

The Stop DLLR Audits in Monitor Only Mode attribute specifies whether an audit entry is created each time a load is shed or released when DLLR is in Monitor Only mode and the NAE's Enabled Audit Level is set to 3 or 4. (When DLLR is in Active mode, an audit entry is always created to record that event.) The default is False, but if you set it to True, no audit entries are created in Monitor Only mode.

Demand Limiting Attributes

Active Demand Limit

The Active Demand Limit attribute always displays the actual demand target being used by the demand limiting strategy. If a ramp down is in progress, it displays the ramp down value; otherwise, it displays the Current Demand limit.

DL Tariff Targets

The DL Tariff Targets attribute is the list of energy targets for the Demand Limiting strategy. Each target consists of a target value and an entry from the Target Description set identifying the type of target, such as On-Peak. If the Demand Limiting strategy is used, there must be at least one target defined. Only one target is active at any time. The [Active DL Target](#) attribute specifies which target is currently active. The Target Description set includes:

- Continuous
- Off-Peak
- On-Peak
- Semi-Peak
- Shoulder
- Summer Off-Peak
- Summer On-Peak
- Winter Off-Peak
- Winter On-Peak
- Summer Semi-Peak
- Winter Semi-Peak
- Summer Shoulder
- Winter Shoulder

Active DL Target

The Active DL Target specifies which of the defined Demand Limiting targets is currently active. When this attribute changes, the [Active DL Target Changed](#) attribute indicates True until the start of the next interval. This attribute uses the Target Description enumeration set.

Current Demand Limit

The Current Demand Limit attribute represents the demand limiting target that is set by the user (DL Tariff Targets indexed by Active DL Target). This attribute defines the maximum allowed average demand during the current elapsing interval, and allows you to change the value of the demand limiting target. To change the value of the demand limiting target, write a new value to this attribute.

Algorithm

The Algorithm attribute specifies which algorithm is used for the Demand Limiting strategy (Fixed Window or Sliding Window). In most cases, the Sliding Window Algorithm is required by North American utilities, while the Fixed Window Algorithm is used by European utilities.

Demand Interval Length

The Demand Interval Length attribute specifies the length in minutes of an interval for the Demand Limiting strategy. This value is normally obtained from the energy utility. The DLLR Interval Lengths set specifies the possible interval lengths (15, 30, or 60).

Current Amount Shed by DL

The Current Amount Shed by DL attribute displays how much energy is currently shed for the Demand Limiting strategy. When Shed Strategy is set to Demand Limiting and Load Rolling, this attribute indicates how much of the Amount Shed is due to Demand Limiting alone.

Sliding Window Alg (Algorithm) Attributes

Unc (Uncontrolled) Interval Demand

The Uncontrolled Interval Demand attribute displays the average uncontrolled energy demand (interval demand plus amount shed) over the current interval. It indicates what the demand would be if the DLLR object had not shed any loads.

Ramp Down In Progress

The Ramp Down In Progress attribute indicates whether a target ramp down is in progress.

Fixed Window Alg (Algorithm) Attributes

Profile Limit

The Profile Limit attribute displays the current value of the Demand Limit profile, which is the current demand limit adjusted by the safety factor for this minute.

EOI Attribute

The EOI attribute is a reference to the Metasys object (for example, BI, BV) supplying the EOI pulse, which is used for the Fixed Window algorithm only. The EOI pulse is used to synchronize DLLR's demand interval to the utility's demand interval. If this is not specified, DLLR performs its own interval timing, which is not as accurate.

This EOI attribute can be any binary type object, as long as the following requirements are met:

- A permanent communication path must exist between this attribute and the DLLR object; therefore, the EOI point and DLLR object should reside on the same supervisory controller.
- The attribute must be a numerical attribute, in which a change from 0 to 1 indicates the end of interval and the beginning of the next interval. The EOI Status attribute is set to Off Normal when the object supplying the EOI pulse becomes offline or unreliable to the DLLR object.

Load Rolling Attributes

LR Tariff Targets

The LR Tariff Targets attribute lists the energy targets for the Load Rolling strategy. Each target consists of a target value and an entry from the Target Description set identifying the type of target, such as On-Peak. If the Load Rolling strategy is used, there must be at least one target defined. Only one target is active at a time. The [Active LR Target](#) attribute specifies which LR Target is currently active. The Target Description set includes:

- Continuous
- Off-Peak
- On-Peak
- Semi-Peak
- Shoulder
- Summer Off-Peak
- Summer On-Peak
- Winter Off-Peak
- Winter On-Peak
- Summer Semi-Peak

- Winter Semi-Peak
- Summer Shoulder
- Winter Shoulder

Active LR Target

The Active LR Target attribute specifies which of the defined Load Rolling targets is currently active. When this attribute changes, the [Active LR Target Changed](#) attribute indicates True until the start of the next interval if demand limiting is configured, or the next minute if load rolling only is configured. This attribute uses the Target Description enumeration set.

Current LR Target

The Current LR Target attribute represents the load rolling target that is set by the user (LR Tariff Targets indexed by Active LR Target). This target defines the amount of energy that should be shed each minute for the load rolling strategy. You can change the value of the load rolling target by writing to this attribute.

Current Amount Shed by LR

The Current Amount Shed by LR attribute indicates how much energy is currently shed for the Load Rolling strategy. When Shed Strategy is set to Demand Limiting and Load Rolling, this attribute indicates how much of the Amount Shed is due to Load Rolling alone.

Display Attributes

Rate Units

The Rate Units attribute specifies the energy units used for instantaneous energy demand attributes and referenced in the DLLR Profile and Load Summary (for example, kW). If a meter is defined, the Rate Units attribute indicates the units of the meter.

Consumption Units

The Consumption Units attribute specifies the consumption energy units (for example, kWh).

Display Precision

The Display Precision attribute defines the decimal display precision for all real values (floating values) in the DLLR object.

Advanced Operational Data Attributes

Minutes Since Meter Failure

If the Meter is offline or unreliable, the Minutes Since Meter Failure attribute indicates the number of minutes (up to the interval length) since the meter was last reliable.

Advanced Demand Limiting Attributes

Unreliable Meter Options

The Unreliable Meter Options attribute allows you to specify what should happen to Demand Limiting if the meter becomes unreliable or goes offline. These options are as follows:

- **Stop Shedding** - no more shedding occurs until the meter is again reliable. Currently, shed loads continue to be shed until their Max Shed Time expires.
- **Maintain the Current Shed Rate** - as loads are released, DLLR sheds other Loads to maintain the current amount of shed load.
- **Use Unreliable Meter Shed Rate** - sheds or releases loads as needed to maintain the amount of load specified in the [Unreliable Meter Shed Rate](#).

The second and third options cause Demand Limiting to act similarly to the Load Rolling strategy. If the Demand Limiting strategy is not defined, an offline or unreliable meter prompts no actions.

Also, when the meter goes offline or unreliable, DLLR sets its Meter Status attribute to **Off Normal** and continuously updates its Minutes Since Meter Failure attribute (up to the interval length) until the meter is again reliable. The Minutes Since Meter Failure value is listed under the Operational Data section of the DLLR object - Advanced view.

Unreliable Meter Shed Rate

The Unreliable Meter Shed Rate attribute specifies how much load the DLLR object should keep shed if the meter goes unreliable, provided the Use Unreliable Meter Shed Rate option is selected for the Unreliable Meter Options attribute.

DL to Shed

The DL to Shed attribute indicates how much energy needs to be shed to meet the current Demand Limit target for this minute. A negative value indicates how much energy can be released this minute.

DL Not Shed

The DL not Shed attribute indicates how much energy was unable to be shed (this minute) to meet the current Demand Limit target for this minute. A positive value indicates a potential problem that Demand Limiting might not be able to meet its target during this interval.

Current Amount Eligible to be Shed by DL

The Current Amount Eligible to be Shed by DL attribute represents the amount of energy available for Demand Limiting to shed at this moment. It does not include the energy of loads already shed.

Active DL Target Changed

The Active DL Target Changed attribute displays True when the Active DL Target value is changed. It remains True until the start of the next interval, when it is reset to False. This attribute allows an alarm to be raised when the DL target changes.

Sliding Window Alg (Algorithm) Advanced Attributes

Target Ramp Down Enabled

The Target Ramp Down Enabled attribute specifies whether a target reduction causes an incremental ramp down over the course of one interval, as opposed to an immediate target drop that could result in major immediate Load shedding.

Sensitivity

The Sensitivity attribute specifies the level of aggression for shedding Loads when using the Sliding Window algorithm. A High sensitivity sheds more loads sooner than a Low sensitivity.

- **Low setting** - allows you to start shedding loads later and shedding loads over a shorter period of time. This setting reduces the amount of equipment that is turned off; however, it increases the possibility of exceeding the target.
- **Medium setting** - (default) allows you to start shedding slightly earlier than a low setting and later than a high setting. This setting turns off equipment earlier than with a low setting, but does not have to turn off as much equipment at once as with the high setting.
- **High setting** - allows you to begin shedding sooner into the demand peak. This setting decreases the possibility of exceeding the target; however, it increases the amount of equipment that is turned off.

Smoothed ABS Error

The smoothed absolute error is based on the forecast error and is used to provide a safety margin to prevent the interval demand from exceeding the target. It equals the average percentage of variation in the uncontrolled energy rate.

Error Limit

The Error Limit attribute limits the Smoothed ABS Error to a percentage of the Active Demand Limit. It can be used to reduce the size of the safety margin to avoid unnecessary overshedding. This value should be changed with care, since it increases the possibility of exceeding the demand limit target. The default value is 10%.

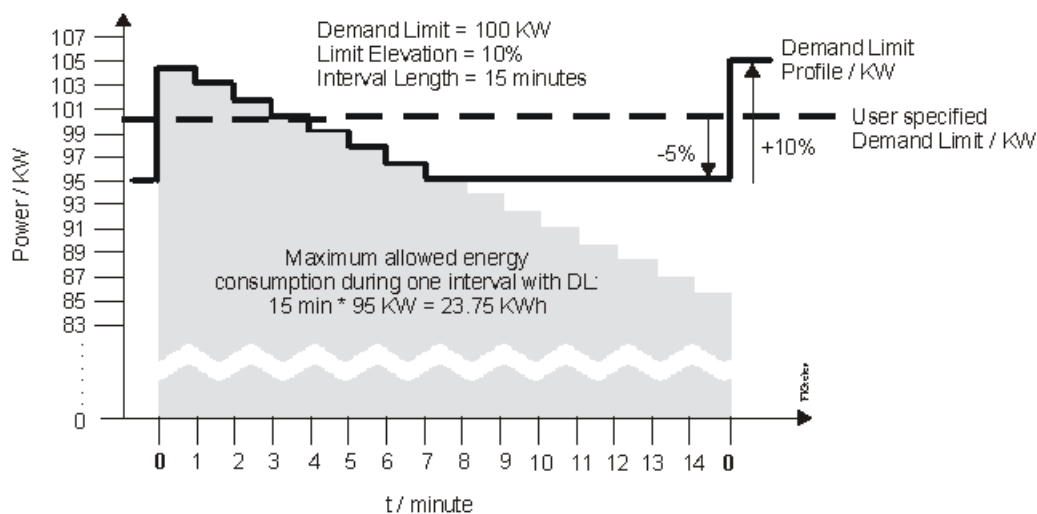
Fixed Window Alg (Algorithm) Advanced Attributes

Limit Elevation

The Limit Elevation attribute indicates the amount (in percent) by which the demand limit is increased at the beginning of the next interval to obtain the starting value of the demand limit profile. A high value may result in increased shedding toward the end of an interval. Changing this interval affects the next interval, not the current interval.

As shown in Figure , the demand limit profile specifies for each minute the maximum allowed average power during the whole interval. If too much energy is consumed during the first half of the interval, because the limit elevation allowed this consumption, then more loads are shed during the second half of the interval, even though the actual metered power is then below the demand limit profile. In other words, the net effect of limit elevation is to defer aggressive load shedding to the second half of the fixed demand interval.

Figure 53: Use of Limit Elevation on a Demand Limit Profile



Active Elevation

The Active Elevation attribute indicates the amount (in percent) by which the demand limit was increased during the elapsing interval to obtain the starting value of the demand limit profile. The Active Elevation represents the Limit Elevation that is used for the current interval.

Time Until EOI

The Time Until EOI attribute indicates the number of minutes until the expected end of the interval.

Time Since EOI

The Time Since EOI attribute indicates the number of minutes since the latest EOI.

Energy Since EOI

The Energy Since EOI indicates the consumed energy since the latest EOI.

Demand Since EOI

The Demand Since EOI indicates the average power since the latest EOI.

Max Allowed Peak Until EOI

The Max Allowed Peak Until EOI attribute indicates the maximum allowed average power until the next EOI.

Advanced Load Rolling Attributes

LR to Shed

The LR to Shed attribute indicates how much energy needs to be shed to meet the current Load Rolling target for this minute.

LR Not Shed

The LR not Shed attribute indicates how much energy was unable to be shed (this minute) to meet the current Load Rolling target for this minute. A non-zero value indicates an error situation in which Load Rolling was unable to meet its target this minute.

Active LR Target Changed

The Active LR Target Changed attribute displays True when the Active LR Target value is changed. It is set to False at the start of the next interval if demand limiting is configured, or at the start of the next minute if load rolling only is configured. This attribute allows the DLLR object to raise an alarm when the LR target changes.

Control Attributes

Allow Reset in Shed Mode

The Allow Reset in Shed Mode attribute controls whether the Reset Initialization Parameters command can be issued while DLLR is in Shed mode. When True, the Reset Initialization Parameters command can be issued once if DLLR is in Shed mode. As soon as the command is issued, this attribute is automatically reset to False and must be manually set to True before the command can be issued again in Shed mode.

Profile Tab

The DLLR Object Profile indicates energy usage for the current and previous tracking periods. The current Energy Rate and Active Demand Limit values are also shown. The profile includes the following parameters:

How Daylight Saving Time Affects Start Times and End Times

If daylight saving time is used at your facility, the Profile reacts accordingly. For example, when daylight saving time begins, the system clock on the supervisory controller advances from 1:59 A.M. to 3:00 A.M. If an hourly tracking period is used, the Profile starts a new tracking period at that moment, setting the Current Start Time to 3:00 A.M. and the Current End Time to 4:00 A.M. The Profile also changes the Previous Start Time to 1:00 A.M. and the Previous End Time to 3:00 A.M. The previous profile indicates that 2 hours have elapsed, but contains only 1 hour of energy data.

When daylight saving time ends, the system clock on the supervisory controller changes from 1:59 A.M. to 1:00 A.M. In this scenario, the system does not reach 2:00 A.M. until 2 hours after 1:00 A.M. The current profile contains 2 hours of profile data, even though the Current Start Time is 1:00 A.M. and the Current End Time is 2:00 A.M.

Whereas start/end date and times are not affected when the other tracking periods are used (daily, weekly, monthly, or manual), the period in which daylight saving time begins always contains 1 hour of data fewer than in a standard period. The period in which daylight saving time ends always contains 1 hour of data more than a standard period.

Start Time

Start Time indicates when the DLLR Object starts to record demand profile data.

The Start Time depends on the situation. For example, at startup, the Start Time is set to when the controller was restarted. If the [Profile Tracking Period](#) has expired, Start Time is set to when the next tracking period begins.

The Start Time is also reset if the Profile Tracking Period is changed, a Reset Profile command is issued to the DLLR object while in Shed or Monitor Only mode, a Reset Initialization Parameters command is issued to the DLLR object while in Monitor Only mode, or the controller is downloaded. Note that the Start Time is not reset when DLLR changes from Monitor Only mode to Shed mode.

See the [How Daylight Saving Time Affects Start Times and End Times](#) section.

End Time

The End Time for current profile indicates the predicted end time. The End Time for the previous profile indicates the actual end time. If the [Profile Tracking Period](#) is set to Manual, the End Time indicates Unspecified for the Current Profile.

See the [How Daylight Saving Time Affects Start Times and End Times](#) section.

Energy Consumption

Energy indicates the calculated total energy consumption.

Peak Interval Demand

Peak Interval Demand indicates the total Peak Interval Demand with date and time.

Peak

Peak indicates the highest measured energy demand.

Projected Peak

Projected Peak indicates the highest energy demand that would have occurred if DLLR had not been enabled and had not shed any loads.

Targets

The Targets list the Energy Consumption, Peak Interval Demand, Peak, and Projected Peak for each target that is active during the current profile tracking period. Only configured targets are listed.

Load Summary Tab

In the Runtime view, the Load Summary provides real-time information about each load associated with the DLLR object, as well as the Energy Rate and Current LR Target values. By default, all of the loads associated with this DLLR object are displayed in the order in which they were added to the object. They are sorted by priority, starting with the lowest Shed priority (10) at the top of the list. This matches the order in which DLLR seeks eligible loads to shed. Clicking on column headers allows you to sort the information. Reordering is available for all columns except Status and Load Rating.

Note: The entry **Unspecified** in the Last Shed Time column means that the load has never been shed or has not been shed since the last controller download.

The Load Summary is automatically refreshed at the standard UI refresh rate. You can command one or more loads directly from the Load Summary by selecting them and right-clicking the mouse to display the appropriate command window. Right-clicking a single load also allows you to command the output or navigate to the output's focus view.

The Setup option on the Load Summary changes the view to allow editing of some of the fields.

When the Setup view for the Load Summary is displayed, the Associate Load(s) button is used to add new loads to the table. The Remove Load(s) button removes loads from the table. The MultiEdit button edits more than one load at a time when several loads are highlighted.







Energy Rate and Current LR Target

The top portion of the Load Summary indicates current values for the Energy Rate and Current LR Target.

Status

Status displays an icon to indicate the current status of the load. Table 290 provides icon descriptions.

Table 290: Load Summary Icons and Their Status

Status Icon ¹	Load Status
	Load appears to be offline; system is awaiting confirmation.
	Load is offline.
	Load is disabled.
	Load is shed.
	Load is locked.
	Load is in comfort override.
<no icon>	Load is released.

¹ Positioning the mouse on an icon in the Status column displays a tooltip.

Point Name and Point Reference

The Point Name and Point Reference fields display in colors that indicate the load output's current condition. Table 291 describes the default colors.

Table 291: Default Coloration of Point Name and Point Reference Fields

Condition of Output	Point Name and Point Reference Field Color ¹
Normal	White
Overridden	Orange
Offline	Black
Trouble/Warning	Yellow
Alarm	Red

¹ The actual colors used are set in the Status Colors section of **Metasys Preferences > Graphic Settings**. For details, refer to the *ADS/ADX Commissioning Guide (LIT-1201645)* or *NAE Commissioning Guide (LIT-1201519)*.

Load Priority

The priority of the load affects the order in which it is shed. Priority 10 loads are the lowest priority and are shed first. Priority 1 loads are not shed unless no higher priority loads are available for shedding.

Shed Strategy

Shed Strategy indicates whether the load can be shed for Demand Limiting, Load Rolling, or both.

Minimum Shed Time

Minimum Shed Time specifies the minimum number of minutes that a load must be shed before it can be automatically released. A load can be manually released before this value expires. The range is 0 to 65,535 minutes.

Maximum Shed Time

Maximum Shed Time (optional) specifies the maximum number of minutes that a load can be shed before it is automatically released. If the Maximum Shed Time value is not defined, the default value of 65,535 is used. The range is 0 to 65,535 minutes.

Minimum Release Time

Minimum Release Time specifies the minimum number of minutes that a load must be released from shed before it can be shed again. Although DLLR does not shed a load before this time expires, a load can be manually shed before this value expires. The range is 0 to 65,535 minutes.

Load Rating

Load Rating indicates how much energy is saved when the load is shed. This is specified in the same units as the Rate Units.

Output Present Value

The Output Present Value indicates the current value of the load's output.

Ineligibility

Ineligibility indicates the reason that the load cannot be shed at this time. This field is blank if the load is eligible to be shed.

Active Timer

The Active Timer displays the shed or release timer if one is in effect.

Time Remaining

The Time Remaining displays the minutes remaining if a shed or release timer is in effect.

Last Shed Time

The Last Shed Time displays the last time that the load was shed.

DLLR Object Commands

After a DLLR Object is defined, an authorized user can issue one of several commands (see [DLLR Object Commanding](#)). Metasys objects with a Load extension are intended for use with the DLLR feature permit operator or scheduled commands.

DLLR Object Commanding

After a DLLR object is defined, an authorized user can issue one of several commands to the object.

Table 292: Commands Available to DLLR Objects

Command	Parameters	Description
Set Mode	Monitor Only Shed	Selects between Monitor Only mode and Shed mode for the Demand Limiting and Load Rolling strategies. The selected mode applies to both strategies; in other words, you cannot put DL in Monitor Only mode and keep LR in Shed mode.
Set Target	Type Demand Limiting Load Rolling Target Level ¹ Value New value	Sets the active Target Level used for either the Demand Limiting or Load Rolling strategy. Optionally, you can specify a new value for the target and select a Target Description. The Target Description is an element of the DL Targets and LR Targets attributes, which describes the purpose of the target. Examples include Continuous, Off-Peak, On-Peak, and Semi-Peak. You also can: <ul style="list-style-type: none"> • Change the value of the current target by writing to the Current Demand Limit and Current LR Target attributes. • Set which target is active using the Active DL Target and Active LR Target attributes.
Reset Profile	None	Copies the current DLLR profile to the previous DLLR profile and starts a new, current profile. Use this command if DLLR's Profile Tracking Period is set to Manual. It is not necessary to use this command if a definitive tracking period is selected, such as Monthly, because DLLR resets the profile automatically.
Reset Interval	None	Restarts the Demand Limiting calculations associated with the current interval - Fixed Window Algorithm only. You can specify a new start of a demand interval for the Demand Limiting strategy. If you are using the Fixed Window Algorithm, and there is no EOI input defined, issue this command at the start of the utility company's interval, the first time that DLLR runs. It synchronizes DLLR to the start minute of the utility company's billing interval (15, 30, or 60 minutes). Thereafter, DLLR uses a pseudo EOI pulse, so that the start of each subsequent interval is synchronized. If an EOI input is defined, DLLR automatically starts each interval at the correct time. When the Reset Interval command is received, the DLLR object resets interval parameters and starts a new Demand Interval. ⓘ Note: If the Sliding Window Algorithm is used, do not use this command, as the interval is reset each minute.
Disable	None	Stops DLLR operation. When disabled, DLLR releases all shed loads except those that are locked shed. Also, DLLR does not perform any calculations, report alarms, or issue any commands to any objects when disabled. DLLR attributes can be changed, but no actions are taken until DLLR is enabled.

Table 292: Commands Available to DLLR Objects

Command	Parameters	Description
Enable	None	Starts DLLR operation. If Shed mode is active, the configured DLLR strategies begin shedding loads as needed. If Monitor Only mode is configured, simulated load shedding begins.
Reset Initialization Parameters	None	<p>Initializes DLLR as if it were running the demand limiting algorithm for the first time. Use it in Monitor Only mode for testing new potential demand tariff targets without using any data from a previous test. It releases all shed loads, clears all load timers, reinitializes DLLR, and clears the Energy Profile.</p> <p>Note: Since these actions would adversely affect a smoothly running DLLR feature, you cannot issue this command while in Shed mode unless you manually set the Allow Reset in Shed Mode attribute to True. If you issue the Reset Initialization Parameters command while in Shed mode, the Allow Reset in Shed Mode attribute reverts to False immediately after the command is issued.</p>

¹ Possible target descriptions: Continuous, Off-Peak, On-Peak, Semi-Peak, Shoulder, Summer Off-Peak, Summer On-Peak, Winter Off-Peak, Winter On-Peak, Summer Semi-Peak, Winter Semi-Peak, Summer Shoulder, Winter Shoulder.

Global Data Object

Menu Selection: *Insert > Object > Global Data*

The Global Data object provides a means for distributing information about changes in a single attribute value to other attribute reference points. This minimizes hardware costs and system complexity. For example, an NAE might have multiple AHUs on its network, but only one has an outdoor air sensor. The Global Data object can share the value from the single sensor with the other AHUs.

The data types defined for the Global Data object's input and corresponding outputs should match. Otherwise, each output attempts to convert the value being received to the data type defined for it. The software does not check for data type consistency. Global data sharing is restricted to within one site.

For general information on Metasys system objects, see [Common Object Attributes](#).

Global Data Attributes

This object contains attributes common to many Metasys system objects. These common attributes are described in the [Common Object Attributes](#) section. This section includes attributes unique to the Global Data object. See the [Object and Feature Tabs](#) section for information on the attributes that appear on the other tabs of this object (for example, the Hardware and Options tab appear on point objects).

Table 293: Global Data object Attributes - Focus/Configuration Tab

Attribute Name	Notes ¹	Initial Value	Values/Options/Range	Description
Alternate Master	C,N,W	None		Defines an alternate to the Master. When the Master becomes unreliable, this attribute becomes the master attribute.
Execution Priority	C,W	Normal		Indicates the relative importance of performing the function of the object within the device.

Table 293: Global Data object Attributes - Focus/Configuration Tab

Attribute Name	Notes ¹	Initial Value	Values/Options/Range	Description
Failsoft	C,W			Routes to all the outputs if Setup is configured as Fail Soft. Fail Soft routes when the object becomes unreliable and when the output transitions from Reliable to Unreliable. This attribute is initialized to a specific value.
Master	C,W	None		Contains an attribute reference. The value associated with this attribute is written to each of the designated subordinate destinations.
Present Value	C	Master	n = 4 0 = Master, 1 = Alt Master, 2 = Last Reliable, 3 = Fail Soft	Stores data about the value shared with the subordinates.
Priority For Writing	C,W	15	16 (lowest priority) to 7 (highest priority)	Defines the priority at which the referenced attributes are commanded. Seven is the highest priority and 16 is the lowest supported by the Global Data object, with the default of 15. We do not recommend using priorities 7 or 8 as they may interfere with the operator override function.
Refresh Timer	C,W	2 min	Default value is 0. No range check done.	Indicates the amount of time, in minutes, between updates to the subordinates from the Master or Alternate Master. Updates initiated by the refresh timer occur in addition to updates initiated by a COV from the Master/Alt Master. For example, if the Refresh Timer attribute's value is 2, the Global Data object updates the subordinates with information from the Master/Alt Master every 2 minutes and with each COV. If this attribute is set to zero instead, updates are only sent upon receipt of additional COV reports.
Reliability			Reliable, Input Unreliable	Indicates whether a value is questionable. This attribute value equals Input Unreliable only if both the configured Master and Alternate Master inputs are unreliable.

Table 293: Global Data object Attributes - Focus/Configuration Tab

Attribute Name	Notes ¹	Initial Value	Values/Options/Range	Description
Setup	C	Last Reliable	n = 2 0 = Master, 1 = Alt Master	Defines whether the Fail Soft or Last Reliable value needs to be the output if the object becomes unreliable.
Subordinates List	C,N,W	None	Minimum number of entries = 0	Contains a list of attribute references. Each subordinate identified in this list of attribute references receives its value from the Master.

1 C - Configurable, N - Value Not Required, W - Writable

Global Data Commands

The table below lists the commands supported by the [Global Data Object](#).

Table 294: Global Data Object Commands

Command Name	Parameters	Description
Disable	None	Prevents the object from responding to any change in the Master, including reliability changes.
Enable	None	Updates the Subordinates List with COVs. Immediately after receiving this command, the Master referenced value is routed to each of the output references.

Interlock

Menu Selection: *Insert > Object > Interlock*

The Interlock object provides a means to establish conditional control over one or more other objects. It consists of an IF conditional statement, True command statements, and False command statements. Through these statements, the user specifies a set of conditional checks (using one or more points) for which a series of commands is used to control a collection of one or more other objects.

Three essential parameters of the IF conditional statement, shown in the following list, determine the Interlock object's mode of operation:

- list of attribute references
- constants
- operators

This object allows a user to place a VAV controller in the occupied mode whenever the main fan is on and in the occupied mode.

Note: On the Configure screen, click the Interlock Definition and Action Tables tabs for further configuration.

Tips for the Interlock Definition tab of the Configure screen:

- Click the Add button to add items to the list from the Select Item dialog box.
- Click the check box next to an item in the list and click Delete to remove the item from the list.
- Select the type of logic to use for the items in the list from the Logic menu. See the Interlock's Logic attribute description for the types of logic.

Tips for the Action Tables tab of the Configure screen:

- Check the **All Commands Priority** check box if you wish to use the same priority for all commands in the action tables. Clear the **All Commands Priority** check box to enable individual priority selection for the commands in the action tables.
- For the **Actions for Condition: True** and **Actions for Condition: False** tables, click the Add button to add items to the table from the Select Item dialog box.
- For the **Actions for Condition: True** and **Actions for Condition: False** sections, click the check box next to an item in the table and click Delete if you want to remove the item from the table.

For general information on Metasys system objects, see [Common Object Attributes](#).

For information on the logic used in the interlock object, see the Logic attribute description.

Interlock Configuration

Configure the attributes of the Focus/Configuration, Interlock Definition, and Action Tables tabs of the Interlock object. See the [Interlock Attributes](#) section for descriptions of the attributes on these tabs.

On the **Focus/Configuration** tab, click the **Advanced** radio button to view and edit all the attributes available on this tab.

On the **Interlock Definition** tab, define the items/objects to control and the desired conditional logic.

Tips for this tab include:

- Click the Add button to add items to the list from the Select Item dialog box. You can also select items from the All Items tree or from the Global Search results and drop them into the Interlock Definition table.
- Click the check box next to an item in the list and click Delete to remove the item from the list.
- Select the type of logic to use for the items in the list from the Logic menu. See the Logic attribute description for the types of logic.

On the **Action Tables** tab, define the commands and the priority for the items/objects under control.

Figure 54: Example of Interlock Action Table Headers and Options

The screenshot shows the 'Action Tables' tab of the configuration screen. At the top, there are 'Save' and 'Cancel' buttons. To the right, there are two checked checkboxes: 'Add New Items to All Conditions' and 'All Commands Priority: 16 (Default)'. Below this, there are two tables. The first table is titled 'Actions for Condition: True' and the second is 'Actions for Condition: False'. Each table has a 'Select All' checkbox (checked), an 'Item' column with 'BV1', a 'Command' column with 'Inactive', a 'Priority' column with '16 (Default)', and a 'Delay' column with '0'. There are 'Set Command' and 'Set Delay' buttons for each row. A note at the bottom right says '(Uncheck to specify individual priority)'. The tabs at the top are 'Configuration', 'Interlock Definition', and 'Action Tables'.

Tips for this tab include:

- Check the **All Commands Priority** check box if you wish to use the same priority for all commands in the action tables. Clear the **All Commands Priority** check box to enable individual priority selection for the commands in the action tables.
- Check the **Add New Items to All Conditions** check box if you wish to add new items to both the **Actions for Condition: True** and **Actions for Condition: False** tables. The **Add New Items to All Conditions** is selected by default.

- For the **Actions for Condition: True** and **Actions for Condition: False** tables, click the Add button to add items to the table from the Select Item dialog box. You can also select items from the All Items tree or from the Global Search results and drop them into the Interlock Action tables.
- For the **Actions for Condition: True** and the **Actions for Condition: False** tables, click the check box next to an item in the table and click Delete if you want to remove the item from the table.
- To select all items within a table, click the Select All column header. To unselect all items within a table, click the Select All column header again.
- To mass command items in the **Actions for Condition: True** or the **Actions for Condition: False**, select similar items that have the same configured attributes and enumerations (for example, select multiple BVs). Right-click the Command column header and click Set Command. Or, click **Set Command**. The Set Command for Selected Items appears.

Figure 55: Right-Click Set Command Option



- To mass set delay, select multiple items (can be dissimilar items), input a delay in the Set Delay field, and click **Set Delay**.

Interlock Attributes

This object contains attributes common to many Metasys system objects. These common attributes are described in the [Common Object Attributes](#) section. This section includes attributes of the Focus/Configuration tab, the Diagnostics tab (if applicable), and any other tab specific only to this object. See the [Object and Feature Tabs](#) section for information on the attributes that appear on the other tabs of this object (for example, the Hardware and Options tab appear on point objects).

Table 295: Interlock Object Attributes - Focus/Configuration Tab

Attribute Name	Notes ¹	Description
Executing		Specifies the current execution status of the object. It is True when the object receives a state command and starts sending commands. When all actions are completed for a given state, this flag is set to False.
Execution Priority	C,W	Indicates the relative importance of performing the function of the object within the device.
Last Executed Date	N	Indicates the date stamp for the beginning of executing the current state.
Last Executed Time	N	Indicates the time stamp for the beginning of executing the current state.
Present Value	D,R,W	Represents the current value of the object. Present Value is set based on the relationships set up in the Interlock definition.
Priority Array		Lists values of the object in level of importance.
Reliability		Indicates if the Present Value is questionable.
Restore Command Priority	C,W	Selects which commands (at a selected priority) persist through a device restart. When the bit is set, the command (at a selected priority) is saved at shutdown and restored at startup.

Table 295: Interlock Object Attributes - Focus/Configuration Tab

Attribute Name	Notes ¹	Description
Send OK		Indicates the success or failure of the subordinate commands. If any subordinate commands failed, this attribute is set to False. When a send error is detected, a five minute timer is set. When the timer expires, the interlock is reevaluated and all commands are sent again. Commands may fail if the subordinate object is off-box and offline or if the subordinate object is set for local control.
States Text	C,W	Indicates the displayed strings for the Present Value.

¹ C - Configurable, D - Default Attribute for Display, N - Value Not Required, R - Affected by Object Reliability, W - Writable

Table 296: Interlock Object Attributes - Interlock Definition Tab

Attribute Name	Notes ¹	Description
Logic	C,W	<p>Specifies the Boolean logic (And/Or) to be employed in combination with source inputs in deriving a True or False outcome.</p> <p>When the source input operator is unreliable, the interlock operates according to the following rules:</p> <ul style="list-style-type: none"> • Complex - Uses the equation defined by the Logic Equation attribute. If any input is unreliable, the expression cannot be evaluated; therefore, the interlock is unreliable and does not execute. • Match All (AND) - Every one of the source conditions must be True. If an input is reliable, it is evaluated. If the result is False, the interlock evaluates to False and executes. All inputs are checked for trouble (Reliability != Reliable). If any input is not reliable, the expression cannot be evaluated; therefore, the interlock is unreliable and does not execute. • Match Any (OR) - One or more of the source conditions must be True. If an input is reliable, it is evaluated. If the result is True, the interlock evaluates to True and executes. All inputs are checked for trouble (Reliability != Reliable). If no inputs are reliable, the expression cannot be evaluated; therefore, the interlock is unreliable and does not execute.
Logic Equation	C,W	<p>Contains a logic equation when the Logic attribute is set to Complex. Use the logic equation to define the relationship between the master conditions using logic operators and parentheses for determining precedence.</p> <p>Valid characters in the Logic Equation string are:</p> <ul style="list-style-type: none"> * AND operator + OR operator (Open parenthesis (for grouping)) Closed parenthesis (for grouping) numbers Master condition numbers spaces Spaces are allowed for readability
Source	C,W	<p>Lists objects whose attributes are used for input into the logic expression to decide if the condition is True or False.</p> <p>Information needed:</p> <ul style="list-style-type: none"> • Item - Name of the source object • Attribute - Varies according to object. Default = Present Value • Relation - Equal, Not Equal, Greater Than, Less Than, Greater Than or Equal, Less Than or Equal • Value - The value used in the Relation. Varies according to the object. • Differential - Accounts for variations in the value. Required (and only used) if the value is analog.

¹ C - Configurable, D - Default Attribute for Display, N - Value Not Required, R - Affected by Object Reliability, W - Writable

Table 297: Interlock Object Attributes - Action Tables Tab

Attribute Name	Notes ¹	Description
Action Table 1 (True)	C,W	<p>Action Tbl 1 (True)</p> <p>Lists commands issued by this object when the condition is true:</p> <ul style="list-style-type: none"> • Item - The name of the object to be commanded. Do not use any object that contains special characters, such as the ampersand (&). Otherwise, the Interlock may not function properly. • Command - The type of command to send to the object. • Priority - The priority at which to send the command. • Delay - The amount of time, in seconds, each command waits to be sent, after a change in condition. • Parameters - These vary according to command. <p>Any object capable of accepting commands can be defined in either action table. The available commands depend on the type of object and the user's access capability. An object may be sent more than one command by identifying the object more than once and specifying a different command. The user does not have to specify objects for both the True and False Action Tables. If no command is specified for an object, no command is sent.</p>
Action Table 2 (False)	C,W	<p>Lists commands issued by this object when the condition is false:</p> <ul style="list-style-type: none"> • Item - The name of the object to be commanded. Do not use any object that contains special characters, such as the ampersand (&). Otherwise, the Interlock may not function properly. • Command - The type of command to send to the object • Priority - The priority at which to send the command • Delay - The amount of time, in seconds, each command waits to be sent, after a change in condition • Parameters - These vary according to command. <p>Any object capable of accepting commands can be defined in either action table. The available commands depend on the type of object and the user's access capability. An object may be sent more than one command by identifying the object more than once and specifying a different command. The user does not have to specify objects for both the True and False Action Tables. If no command is specified for an object, no command is sent.</p>
Commands Priority	C,W	<p>Determines the order by importance for all commands sent. If the All Commands Priority option is not selected, the commands are sent at each individual priority specified in the Action Tbl attribute.</p> <p>If the All Commands Priority option is selected, then every item in the Action Table is sent a command at the priority specified. For example, if the command chosen is Operator Override, the command priority automatically sets to Operator Override (8) for every item listed in the Action Table.</p> <p>When the All Commands Priority option is selected, you cannot change the command priority within the Action Table.</p> <p>An object defined in the Action Tables must use commands greater than Priority 16 (default) if no Relinquish Default attribute is defined for that object. Otherwise, commands sent at Priority 16 to objects without a Relinquish Default will not be accepted by that object. Commands with a lower priority number are of higher priority (importance) or are more critical than commands with a higher priority number. For example, Manual Life Safety (1) is of higher priority than Scheduling (15).</p> <p>If the Commands Priority is defined as 16 (Default), then any existing commands from Scheduling (15) through Priority 9 (9) will be released when the command is sent.</p> <p>The Commands Priority uses the priorities in the Write Priority (Set 1).</p>

¹ C - Configurable, D - Default Attribute for Display, N - Value Not Required, R - Affected by Object Reliability, W - Writable

Interlock Attribute Details

Logic Equation

Contains a logic equation when the Logic attribute is set to Complex.

Use the logic equation to define the relationship between the master conditions using logic operators and parentheses for determining precedence.

Valid characters in the Logic Equation string are:

*AND operator

+OR operator

(Open parenthesis (for grouping)

)Closed parenthesis (for grouping)

numbersMaster condition numbers

spacesSpaces are allowed for readability

Equation Syntax

- Open and close parenthesis must match.
- Empty parenthesis are not allowed ().
- The equation must be at least 3 characters in length, not including spaces.
- The numbers must not exceed the master condition numbers.
- There is no implied precedence for the operators (*,+).
- Any combination of different operators must be grouped with parenthesis to determine precedence.
- Operators of the same type do not require the use of parenthesis.
- A grouping may contain only one operator type.
- Numbers or groupings must be separated by an operator (*,+).
- Groups can be nested.

Table 298: Examples

Incorrect	Correct
$1+2+3*4$	$1+2+(3*4)$ or $(1+2+3)*4$
$1*2+3*4$	$(1*2)+(3*4)$ or $1*(2+3)*4$
$1*2*3+4$	$1*((2*3)+4)$ or $(1*2)*(3+4)$ or $(1*2*3)+4$
$(1+2)*(3+4)+(6*7)$	$((1+2)*(3+4))+(6*7)$ or $(1+2)*((3+4)+(6*7))$
$(3*4)(1*2)$	$(3*4)*(1*2)$
$(3*+1)$	$(3*1)$
$(3*$	$(3*1)$

Sample Logic Equation

$((1+2)*(3+4))+(6*7)$

Where the equation says that master condition ((1 OR 2) AND (3 OR 4)) OR (6 AND 7) results in a TRUE (Action Tbl 1) execution.

Objects are given numbers in the left column that correspond to the order you add them to the Interlock Definition list (the first added is 1, the second added is 2, and so on). Use these numbers to represent the corresponding objects in the Logic Equation.

Interlock Commands

The table below lists the commands supported by the [Interlock](#).

Table 299: Interlock Commands

Command Name	Parameters	Description
Disable	None	Locks out all outputs and prevents the Interlock functionality.
Enable	None	Ensures object reacts to any changes it may have missed while it was disabled, and returns it to normal operation.
Operator Override	The value to be written to the Present Value attribute. This parameter has a True or False data type.	Updates the Present Value at Command Priority Operator Override. ► Important: The Operator Override command sends the specified command to the internal NxE object, which is then only sent to the field device when one of the following conditions is met: a) NOT Local Control and NOT Out
Release Operator Override	None	Releases Command Priority Operator Override from Present Value.
Re-command	None	Reissues the commands for the current state.
Release	Attribute name Command priority	Releases the identified command priority from the specified, writable attribute, and allows it to be controlled by the next highest priority.
Release All	Attribute name	Releases Command Priorities 3 through 16 from the specified, writable attribute. Command Priorities 1 and 2 remain. ① Note: The Release All command may not cause an immediate return to automatic operation. The Release All command clears all command priorities, including those that come from applications and features. When this happens, the output point goes to its Relinquish Default condition. In some cases, the application or feature may have sent a command that does not match Relinquish Default. In this instance, the output point does not end in the state that the applications or features intended. This situation can cause unexpected operation to occur; for example, a space could overcool or overheat, a fan might run longer than expected, and so on. If an operator has overridden an input, use the Release Operator Override command.

Multiple Command Object

Menu Selection: **Insert > Object > Multiple Command**

① Note:

- On the Configure screen, click the Action Tables tab for further configuration.
- Select or enter the desired value for the Relinquish Default. Edit the States Text and Number of States attributes on the Focus tab.

- Check the **All Commands Priority** check box if you wish to use the same priority for all commands. Clear the **All Commands Priority** check box to enable individual priority selection for the commands.
 - For each of the **Actions for Condition (State 0 - State N)** tables, click the Add button to add items to the table from the Select Item navigation tree.
 - For each of the **Actions for Condition (State 0 - State N)** tables, click the check box next to an item in the table and click Delete to remove the item from the table.

The Multiple Command object issues a series of commands to multiple objects by means of a single command action. Commanding this object results in the execution of the commands for the given state. This object supports States 1–32.

This object allows a user to start building controls for the day with one command or to prevent selected points from generating COS and alarm messages when a control point is in a specified state (Auto Shutdown).

For example, based on a single input, such as Room Occupied, a defined set of actions can occur: setpoint goes to 72°, a fan comes on, lights come on, and the door unlocks.

For general information on *Metasys* system objects, see the [Common Object Attributes](#) section.

Multiple Command Attributes

This object contains attributes common to many *Metasys* system objects. These common attributes are described in the [Common Object Attributes](#) section. This section includes attributes of the Focus/Configuration tab, the Diagnostics tab (if applicable), and any other tab specific only to this object. See the [Object and Feature Tabs](#) section for information on the attributes that appear on the other tabs of this object (for example, the Hardware and Options tab appear on point objects).

Note: In the Notes column, letters indicate the following: In the notes column, letters indicate the following: C - Configurable, D - Default Attribute for Display, N - Value Not Required, R - Affected by Extension’s Reliability, W - Writable.

Table 300: Multiple Command Object Attributes - Focus/Configuration Tab

Attribute Name	Notes	Initial Value	Values/Options/Range	Description
Enabled				Indicates whether the Multiple Command object is enabled or disabled.
Executing		False	False, True	Specifies the current execution status of the object. It is True when the object receives a state command and starts sending commands. When all actions are completed for a given state, this flag is set to False.
Execution Priority	C,W			Indicates the relative importance of performing the function of the object within the device.
Last Executed Date	N			Indicates the date stamp for the beginning of executing the current state.
Last Executed Time	N			Indicates the time stamp for the beginning of executing the current state.

Table 300: Multiple Command Object Attributes - Focus/Configuration Tab

Attribute Name	Notes	Initial Value	Values/Options/Range	Description
Present Value	D,W		States Text attribute identifies the states set for this attribute.	Indicates the current value of this object.
Send OK				Indicates the success or failure of the subordinate commands. If any subordinate commands failed, this attribute is set to False. When a send error is detected, a 5-minute timer is set. When the timer expires, the object is reevaluated and all commands are sent again. Commands may fail if the subordinate object is off-box and offline or if the subordinate object is set for local control.

Table 301: Multiple Command Object Attributes - Action Tables Tab

Attribute Name	Notes	Initial Value	Values/Options/Range	Description
Action Table (State0... StateN)	C,W		Object Reference, Delay, Command ID, Parameters, Priority	Lists actions to take for each supported state. Each action of the table contains a subordinate object reference, a delay, a command and its associated parameters, and a priority. The priority in this table is used only when Commands Priority is set to No Priority. The delay is the number of seconds before the given command is issued. Command delays can be lengthened or shortened to result in commands being sent out after, before, or at the same time as any other command. The total number of commands identified in the Action Table command set should not exceed 40.
Command Priority	C,W	16	Uses Write Priority (Set 1).	Determines the order by importance for all commands sent. If it is set to Priority None, commands will be sent at each individual priority specified in the Action Table attribute.
Relinquish Default				Specifies the default value to be used for the Present Value attribute when no commands are currently controlling this object. If this attribute is configured to any value other than None, the object sends commands for the value immediately.

Action Table (State0... StateN)

Tips for the Action Tables tab:

- Click the Add button to add items to the list from the Select Item dialog box. You can also select items from the All Items tree or from the Global Search results and drop them into the Action table.
- Click the check box next to an item in the list and click Delete to remove the item from the list.
- To select all items within a table, click the Select All column header. To unselect all items within a table, click the Select All column header again.
- To mass command items, select similar items that have the same configured attributes and enumerations (for example, select multiple BVs). Right-click the Command column header and click Set Command. Or, click **Set Command**. The Set Command for Selected Items appears.

Figure 56: Right-Click Set Command Option



Multiple Command Commands

The table below lists the commands supported by this object.

Table 302: Multiple Command Object Commands

Command Name	Parameters	Description
Disable	None	Specifies that (when the Multiple Command object is disabled) outputs are locked and commands are prevented from being sent.
Enable	None	Specifies that (when the Multiple Command object is enabled) the object it is capable of issuing commands.
Multistate0...Multistate31	None	Releases Command Priorities 9 through 15 (Scheduling) and then writes to the Present Value at the Default (16) command priority. The state command names and number of commands are dependent on the States Text and Number of States attributes.
Operator Override	State 0–31	Updates the Present Value at Command Priority Operator Override. The Operator Override command sends the specified command to the internal NxE object, which is then only sent to the field device when one of the following conditions is met: a) NOT Local Control and NOT Out Of Service, or b) NOT Local Control and after issuing the In Service command.
Release	<ol style="list-style-type: none"> 1. Attribute name 2. Command priority 	Releases the identified command priority from the specified, writable attribute, and allows it to be controlled by the next highest priority.

Table 302: Multiple Command Object Commands

Command Name	Parameters	Description
Release All	Attribute name	Releases Command Priorities 3 through 16 from the specified, writable attribute. Command Priorities 1 (Manual Emergency) and 2 (Fire Application) remain. Important: The Release All command may not cause an immediate return to automatic operation. The Release All command clears all command priorities, including those that come from applications and features. When this happens, the output point goes to its Relinquish Default condition. In some cases, the application or feature may have sent a command that does not match Relinquish Default. In this instance, the output point does not end in the state that the applications or features intended. This situation can cause unexpected operation to occur; for example, a space could overcool or overheat, a fan might run longer than expected, and so on. If an operator has overridden an input, use the Release Operator Override command.
Release Operator Override	None	Releases Command Priority Operator Override from Present Value.

N1 Pulse Counter Object

The N1 Pulse Counter object aids in the integration of N1 controllers with supervisory controllers, resulting in:

- consistent interface to N1 point objects for all controller types, so they appear as a homogenous set to the user interface
- flexibility in point mapping

This object allows you to read pulses from an electric or gas meter at a supervisory controller.

Note: The Pulse Counter object may feed its Present Value to the Pulse Meter Object.

For general information on Metasys system objects, see the [Object Help](#) section.

N1 Pulse Counter Attributes

This object contains attributes common to many Metasys system objects. These common attributes are described in the [Common Object Attributes](#) section. This section includes attributes of the Focus/Configuration tab, the Diagnostics tab (if applicable), and any other tab specific only to this object. See the [Object and Feature Tabs](#) section for information on the attributes that appear on the other tabs of this object (for example, the Hardware and Options tab appear on point objects).

Note: In the Notes column, letters indicate the following: In the notes column, letters indicate the following: C - Configurable, D - Default Attribute for Display, N - Value Not Required, R - Affected by Extension's Reliability, W - Writable.

Table 303: N1 Pulse Counter Object Attributes - Focus/Configuration

Attribute Name	Notes	Initial Value	Values/Options/Range	Description
Present Value	D,R,W		0 to 4,294,967,295	Actual value of the Pulse Count the last time it was read.
Reliability			Uses Reliability (Set 503).	Indicates whether the Present Value is reliable and why.

N1 Pulse Counter Commands

The following table lists the commands supported by the [N1 Pulse Counter Object](#).

Table 304: N1 Pulse Counter Object Commands

Command Name	Parameters	Description
Preset Counter	None	Defines a preset value in the counter. This command is available only if you have the Supervise Access level command priority.
Enable Alarms	None	Enables alarms for the N1 pulse counter.
Disable Alarms	None	Disables alarms for the N1 pulse counter.

N1 PID Loop Object

The N1 PIDL object generates outputs to maintain a measured value at a desired level. The PIDL performs Proportional, Integral, and Derivative control. The PID Loop object manipulates outputs for closed loop control at a given Digital Control Module (DCM101 or DCM140).

Note: For the PIDL object, the only difference between DCM101 and DCM140 operation is that the DCM101 has up to 16 PID Loops, and the DCM140 has up to 20 PID Loops.

The PID Loop object generates outputs for closed loop control by using a collection of inputs and other variables to perform calculations and issue commands. Each PID Loop object can accept up to six analog inputs, and issue commands to a maximum of eight analog outputs. Inputs come from AI objects. Outputs are sent to AOD objects or other PID Loops.

A primary function of the PID Loop object is to perform Proportional plus Integral plus Derivative calculations in order to maintain steady and accurate control of a closed loop. PID calculations take into account the past, present, and future (forecasted) performance of loop inputs for the purpose of adjusting outputs to correct levels. You can configure the PID Loop object to compute any or all of the following:

- **Proportional Only:** Present performance is analyzed by computing the difference between the PID Loop setpoint and its feedback. This difference is called an error. With proportional control, the output signal is directly proportional to the difference between the input and the setpoint (that is, the error).
- **Proportional plus Integral:** Present and past performance are analyzed in this calculation to affect the output. The error computed in the proportional calculation is now integrated (that is, accumulated over time). If the loop failed to reach setpoint in the past, the integration causes the output to increase or decrease to maintain setpoint.
- **Proportional plus Integral plus Derivative:** This calculation uses past, present, and future (forecasted) performance. The derivative part of the computation analyzes the rate of change of the feedback to predict the future value of the feedback. As the feedback changes faster, the PID Loop issues outputs that slow down the rate of change.

You can use the PID Loop object with a variety of control schemes, including sequencing a number of physical devices to maintain control of a closed loop. Additional functions of the PID Loop object include Self-tuning PID Control, bumpless transfer, and an auxiliary switch. Self-tuning PID

Control automatically and continually self-tunes the PID Loop to ensure correct feedback levels. The auxiliary switch allows another PID Loop object or a control process to take control of the closed loop. When control of a closed loop is turned over to the PID Loop object, the bumpless transfer function provides for a smooth and predictable transition.

N1 PID Loop Attributes

This object contains attributes common to many Metasys system objects. These common attributes are described in the [Common Object Attributes](#) section. This section includes attributes of the Focus/Configuration tab, the Diagnostics tab (if applicable), and any other tab specific only to this object. See the [Object and Feature Tabs](#) section for information on the attributes that appear on the other tabs of this object (for example, the Hardware and Options tab appear on point objects).

Note: In the Notes column, letters indicate the following: In the notes column, letters indicate the following: C - Configurable, D - Default Attribute for Display, N - Value Not Required, R - Affected by Extension's Reliability, W - Writable.

Table 305: N1 PID Loop Object Attributes - Focus/Configuration Tab

Attribute Name	Notes	Initial Value	Values/Options/Range	Description
COV Increment	C,W	0.1	Any value > 0	Defines the minimum change in the Present Value required for the object to report a change.
Device Type	C,N,W		20 Character Limit	Contains a description of the physical device connected to the object.
Display Precision	C,W	10ths		Defines the decimal rounding and the decimal places to display for the Present Value and associated attributes.
Feedback				Indicates the Feedback value, which results from the PIDL Input Conditioning process. This process scales each of the six PIDL inputs and determines a sum, a maximum, or a minimum.
Max Value	C,W	1.7E38		Defines the highest reliable value (in engineering units) for the Present Value.
Min Value	C,W	-1.7E38		Defines the lowest reliable value (in engineering units) for the Present Value.
Out of Service	C,W			De-couples the object from the physical input. When Out of Service is True, the object de-couples the Setpoint and Reliability from the hardware. The Reliability is writable when Out of Service is True. When de-coupled, the Setpoint can be changed to simulate specific conditions or for test purposes.
Present Value (Value)	D,N,R,W			Represents the current value of the object.
Reliability	W	0	No Fault Detected (Reliable), Open Loop, Shorted Loop, No Output, Unreliable Other	Indicates whether the Setpoint is unreliable. Examples: <ul style="list-style-type: none"> Reliable - No detectable faults Unreliable High - Setpoint is greater than the Max Value. Unreliable Low - Setpoint is less than the Min Value. When Out of Service is True, the Reliability attribute may be written directly.

Table 305: N1 PID Loop Object Attributes - Focus/Configuration Tab

Attribute Name	Notes	Initial Value	Values/Options/Range	Description
Setpoint				Indicates the desired value for the control loop feedback signal.
Units	C,W	No units		Contains the engineering units for the Present Value attribute.

N1 PID Loop Commands

The following table lists the commands supported by the [N1 PID Loop Object](#).

- ① **Note:** For the Release Operator Override, Release, and Release All commands, if all Command Priorities have been released and a Relinquish Default is not defined, the supervisory controller gives control to the actual hardware.

Table 306: N1 PID Loop Object Commands

Command Name	Parameters	Command Description
Adjust	The value to be written to the Setpoint. The value must be less than Max Value and greater than Min Value.	Releases Command Priorities 9 through 15 (Scheduling) and then writes to the Setpoint at the Default (16) command priority. The value must be less than Max Value and greater than Min Value. If Local Control is True, this command is rejected. The command is only sent when one of the following conditions is met: a) NOT Local Control and NOT Out of Service, or b) NOT Local Control and after issuing the In Service command.
Disable Alarms	None	Disables all types of alarming: alarm extensions, BACnet intrinsic alarming, and BACnet Event Enrollment objects.
Enable Alarms	None	Enables all types of alarming: alarm extensions, BACnet intrinsic alarming, and BACnet Event Enrollment objects.
In Service	None	Cancels the effect of an Out of Service command and returns the Out of Service attribute to False. The Setpoint and Reliability revert back to the values obtained from the physical hardware output. ① Note: For BACnet objects, support of this command is dependent on the ability to write the Out of Service attribute.
Operator Override	The value to be written to the Setpoint.	Updates the Setpoint at Command Priority Operator Override (8). The Operator Override command sends the specified command to the internal NxE object, which is then only sent to the field device when not Out of Service.

Table 306: N1 PID Loop Object Commands

Command Name	Parameters	Command Description
Out of Service	None	Allows a user to override the object's hardware output. The Out of Service command changes the Out of Service attribute to True. The Setpoint and Reliability no longer track the physical output. No commands are sent to the actual hardware. When the Out of Service attribute is set to False, the current Setpoint is sent to the actual hardware. When an Out of Service command is issued, the NxE does not communicate subsequent changes (operator or system) to the field device. For BACnet objects, support of this command is dependent on the ability to write the Out of Service attribute.
Release Operator Override	None	Releases Command Priority Operator Override (8) from Setpoint.
Release	Attribute name Command priority	Releases the identified Command Priority from the specified attribute and allows the next highest priority to control it.
Release All	Attribute name	Releases Command Priorities 3 through 16 (Default), from the specified, writable attribute. Command Priorities 1 and 2 remain.

Optimal Start Object

Menu Selection: **Insert > Object > Optimal Start**

Note: On the Configure screen, click the [...] button to select the object from the Select Item dialog box and then select the desired attribute for the Cooling Setpoint, Heating Setpoint, and Zone Temperature.

The Optimal Start object aids in the reduction of energy costs during a building's transition from unoccupied to occupied. This scenario is accomplished by turning on the preheating/precooling as late as possible to reach comfort levels prior to occupancy and turning off the heating/cooling as early as possible while maintaining occupied zone comfort until zone vacancy.

This object allows you to save energy by coordinating the startup and shutdown times of equipment according to when people occupy certain rooms or areas of the building.

Optimal Start Concepts

Optimal Start Overview

After you create an Optimal Start Object using the known characteristics of your building, the OST calculates the best times for startup and shutdown. For Optimal Start mode (Optimal Start Equation), the OST commands the Zone WC Mode Obj attribute to occupied and starts the heating

or cooling sequence at the appropriate time. For Optimal Start mode, the OST commands the Zone Occ Mode Obj attribute to unoccupied at the appropriate time.

If you set the Adaptation Enabled attribute to True (1), the OST automatically adjusts the Cooling Constant and Heating Constant as needed.

Note: Warmup and cooldown (WC) is also referred to as the prestart period in the OST object.

Optimal Start

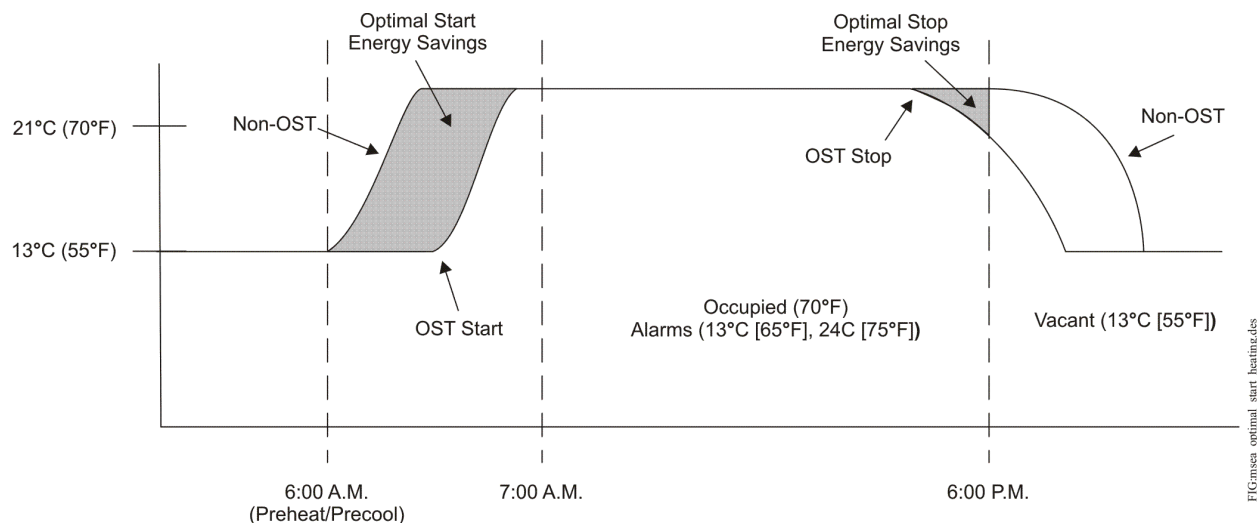
The goal of Optimal Start Object is to reach either the Heating Setpoint or Cooling Setpoint at occupancy. The Optimal Start object selects the appropriate setpoint depending on the temperature before starting the equipment. To meet this goal, the Optimal Start object calculates:

- Heating Constant and Cooling Constant represent the rate at which the temperature inside the building changes when the heating or cooling equipment is running
- the temperature difference between the Zone Temperature and the Heating Setpoint or Cooling Setpoint before occupancy
- how many minutes of precooling (cooldown) or preheating (warmup) are required based on the above difference
- optimal start time when the Zone WC Mode Obj (BO, BV, MO, or MV object) is controlled by the optimal start process

The Optimal Start object interacts with a [Schedule Object](#), binary objects, and analog objects in an Optimal Start application. See the [Object Help](#) section for information on these objects. See the [Optimal Start Object](#) section for attribute information on the Optimal Start object.

Figure 57 illustrates optimal start.

Figure 57: Optimal Start - Heating



Optimal Start Equation

The following equation calculates the optimal start time:

$$[(\text{Heating or Cooling Constant}/100) \times \text{Temperature Difference}^2] + \text{Heating or Cooling Deadtime} = \text{Optimal Start Time}$$

Table 307: Optimal Start Equation

Variable	Description
Heating or Cooling Constant	This variable is the value of the Heating or Cooling Constant attribute of the OST object and represents the rate of warmup or cooldown in the zone after equipment startup. If Adaptation Enabled is Yes, the Optimal Start object learns each day and sets a new value. This variable can be edited by the user.
Temperature Difference	This variable is the difference between the Zone Temperature and the value of the Heating Setpoint or Cooling Setpoint attribute before the warmup or cooldown period. Units = delta deg F or delta deg K
Heating or Cooling Deadtime	This variable is the value of the Heating or Cooling Deadtime attribute of the OST object and is the amount of time required to raise or lower the Zone Temperature 1.0 degree. Units = minutes. If Adaptation Enabled is Yes, the Optimal Start object learns each day and sets a new value. This variable can be edited by the user.

Optimal Start Example

For an example of the optimal start process, assume:

- The Zone Occ Mode Obj is scheduled to be occupied at 7:00 A.M. and unoccupied at 5:00 P.M.
- Zone Temperature = 55° F before the warmup period
- Heating Setpoint (since in Heating mode) = 70° F
- Heating Deadpoint (since in Heating mode) = 5 minutes
- Heating Constant (since in Heating mode) = 10 (The optimal start process has run for several days, and the Heating Constant has been adjusted to 10 based on past performance.)
- Temperature Difference = 70° F - 55° F = 15° F

Therefore:

$$\begin{aligned}
 \text{Optimal Start Time} &= [(10/100) \times 15^2] + 5 \\
 &= (0.1 \times 15^2) + 5 \\
 &= (0.1 \times 225) + 5 \\
 &= 22.5 + 5 \\
 &= 27.5 \\
 &= 28 \text{ minutes}
 \end{aligned}$$

The optimal start process turns on the Zone WC Mode Obj at 6:32 A.M. (28 minutes prior to the scheduled 7:00 A.M. start time.)

Adaptation

Each day, at occupancy, the optimal start process adapts the Heating or Cooling Constant. It checks the Zone Temperature at occupancy time. If the Zone Temperature did not reach a value within the range defined by the Temp Differential and the Heating Setpoint or Cooling Setpoint before the occupancy time, the Heating Constant or Cooling Constant is increased. This increase moves the optimal start time closer to the earliest start time defined in the OST object. If the Zone Temperature reached a value within the range defined by Temperature Differential and the Heating Setpoint or Cooling Setpoint prior to occupancy, the Heating Constant or Cooling Constant is

decreased. This decrease moves the optimal start time closer to the occupancy start time defined in the [Schedule Object](#).

Optimal Stop

The goal of optimal stop is to set the zone to the unoccupied mode prior to actual zone vacancy. The OST must do this while the zone is still occupied, without causing comfort level alarms. The Optimal Start object calculates the number of minutes before the zone is scheduled to change from occupied to unoccupied. The OST then uses the same equation ([Optimal Start Equation](#)) for deriving the optimal start time to determine the earliest stop time, except for two differences:

- To ensure occupancy comfort, the OST sets the Temperature Difference factor to the Temp Differential attribute.
- The Deadtime is set to 0.

$$(\text{Heating or Cooling Constant}/100) \times (\text{Temperature Difference})^2 + \text{Heating or Cooling Deadtime (always = 0)} = \text{Optimal Stop Time}$$

Object Interaction

Different objects interact in an Optimal Start application. The following figure illustrates a sample Optimal Start application. The table describes the objects and their role in an Optimal Start application.

Figure 58: Optimal Start Object Interaction

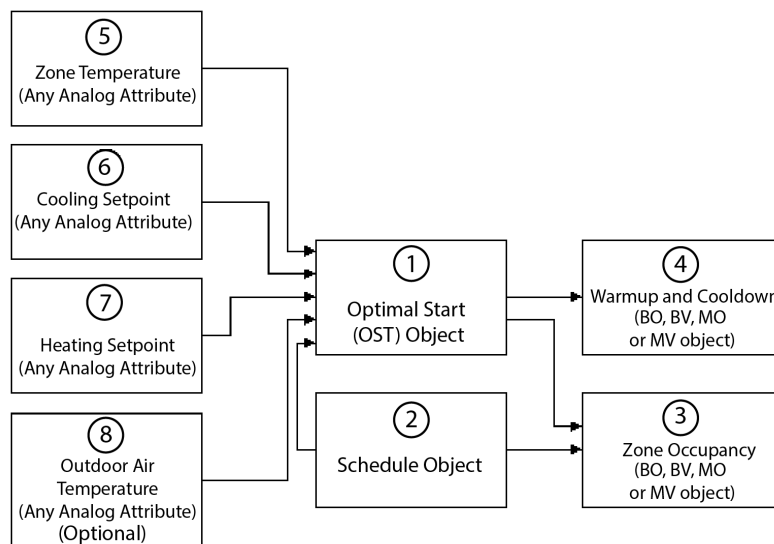


Table 308: Optimal Start Application Object Interaction

#	Object or Attribute	Role
1	Optimal Start (OST) Object	Receives temperature, setpoint, and scheduling data to determine optimal start and optimal stop times for the building zone.
2	Schedule Object	Provides occupied and unoccupied times for the building zone.
3	Zone Occupancy Mode	Refers to the binary or multi-state output and value objects that command a zone to occupied or unoccupied. It is commanded by the Schedule object to occupied and by the Optimal Start to unoccupied, possibly earlier than scheduled if the Maximum Prestop Time attribute is non-zero.

Table 308: Optimal Start Application Object Interaction

#	Object or Attribute	Role
4	Zone Warmup or Cooldown Mode	Refers to the binary or multi-state output and value objects that command the zone to warm up or cool down. It is commanded by the Optimal Start object at the optimal start time and released at the occupied time. It will not be released if the Zone Warmup or Cooldown (WC) Mode and the Zone Occupancy Mode objects are the same.
5-8	Zone Temperature, Cooling Setpoint, Heating Setpoint, Outdoor Air Temperature	Refers to the analog attributes (within Analog Input objects, Analog Value objects, for example) that are referenced by the Optimal Start object and provide the temperatures and setpoints for use in calculations.

Object/Attribute Involvement

Building an Optimal Start application means that the OST object and its associated Schedule object must have their attributes configured to reference the appropriate objects in order to achieve the desired operation. The following table lists the objects and attributes involved and guidelines for data entry.

Table 309: Optimal Start Object/Attribute Involvement

Object Type/ Function	Attributes Involved	Data Entry Guidelines
Optimal Start Object	Zone Schedule Object	Enter the Object Name of the Schedule object that schedules occupied and unoccupied times for the binary object controlling the zone occupancy mode of the heating and cooling equipment for the zone. This object must be defined in the schedule and have valid start and stop times for the current day for the Optimal Start object to run. Only one start time and stop time can be defined per day, and the start time must precede the stop time.
	Zone Occ Mode Obj	Enter the Object Name of the binary object controlling the occupancy mode of the heating and cooling equipment for the zone.
	Zone WC Mode Obj	Enter the Object Name of the binary (BO, BV) or multi-state (MO, MV) object controlling the warmup and cooldown mode of the heating and cooling equipment for the zone. This can be the same object as the Zone Occ Mode Object. ① Note: If the Zone Occ Mode Obj and the Warmup/Cooldown Mode Obj are the same point, then the point is commanded by the Scheduling at the scheduled time.
	Cooling Setpoint	Enter the Object/Attribute Name of the analog value that represents the cooling setpoint.
	Heating Setpoint	Enter the Object/Attribute Name of the analog value that represents the heating setpoint.
	Zone Temperature	Enter the Object/Attribute Name of the analog value that represents the temperature in the zone being controlled.
	Outdoor Air Temp	Enter the Object/Attribute Name of the analog value that represents the outdoor air temperature. If this attribute is not defined, or the referenced analog attribute is offline, the outdoor air temperature is assumed to be within the design temperatures limits for the OST calculations. If an analog attribute reference is defined for the outdoor air temperature, its value determines if the Optimal Start object should adapt heating and cooling constants and deadtimes. If its value is outside the design temperature limits, deadtime and constant calculations are skipped. If its value is outside the design temperatures before the warmup or cooldown period, the optimal start time is set to the maximum prestart time. If its value is outside the design temperatures before the unoccupied period, Prestop does not occur.
	Schedule Object	List of Object Property References

Optimal Start Attributes

This object contains attributes common to many Metasys system objects. These common attributes are described in the [Common Object Attributes](#) section. This section includes attributes of the Focus/Configuration tab, the Diagnostics tab (if applicable), and any other tab specific only to this object. See the [Object and Feature Tabs](#) section for information on the attributes that appear on the other tabs of this object (for example, the Hardware and Options tab appear on point objects).

① **Note:** In the Notes column, letters indicate the following: In the notes column, letters indicate the following: C - Configurable, R - Affected by Extension's Reliability, W - Writable.

Table 310: Optimal Start Object Attributes - Focus/Configuration Tab

Attribute Name	Notes	Initial Value	Values/Options/ Range	Description
Adaption Enabled	C,W	True		Indicates whether OST uses adaptive learning to change the building heating and cooling constants and heating and cooling deadtimes.
Calc Prestart Date				Indicates the last calculated prestart date. This value is updated each time the optimal start time is calculated (between early start time and optimal start time).
Cal Prestart Time				Indicates the last calculated prestart time. This value is updated each time the optimal start time is calculated (between early start time and optimal start time).
Calc Prestop Date				Indicates the last calculated prestop date. This value is updated each time the optimal stop time is calculated (between early stop time and optimal stop time).
Calc Prestop Time				Indicates the last calculated prestop time. This value is updated each time the optimal stop time is calculated (between early stop time and optimal stop time). If Max Prestop Time is zero, the value of this attribute is equal to the unoccupied time.
CoolDown Command	W	1	Set redirected to ZWC States Text; Number of States redirected to ZWC Nbr States Only available in the online UI	Specifies the command sent to the Zone WC Mode Obj point at prestart time when in cooling mode. The enumeration set and number of states for this attribute are redirected and filled in at runtime from the Zone WC Mode Obj point. The default value is set to a value of 1 upon creation so the attribute requires no configuration.
Cooling Constant	C,W	75.0	1-999	Defines the rate at which the zone cools down after equipment startup. If adaptation is enabled, this constant is adapted without user intervention. If adapting and the OST object Cooling Setpoint and Heating Setpoint attributes reference the same object on a field controller, then the cooling constant is adapted even if the mode is not cooling, meaning both constants change.
Cooling Dead Time	C,W	10 minutes	1-480 Units = Minutes	Indicates the time required after startup to lower the temperature by one degree. This value is adapted by the OST algorithm, if adaptation is enabled. If adapting, cooling, and heating setpoints are the same attribute, the Cooling Deadtime is adapted even if the mode is not cooling, meaning both deadtimes change.
Cooling Design Temp	C,W	35.0 deg C or 95.0 deg F	-20 to 120 Units = Temperature Units	Indicates the highest outside temperature at which the cooling system maintains zone comfort in the cooling mode.
Cooling Setpoint	C,W			Identifies the attribute of an object used to define the zone occupied target cooling temperature. This attribute may be the same as the Heating Setpoint attribute.

Table 310: Optimal Start Object Attributes - Focus/Configuration Tab

Attribute Name	Notes	Initial Value	Values/Options/ Range	Description
Cooling Stpt Status			Offline = 0 Online = 1 Uses Offline Online (Set 91).	Identifies the OST object's connection status to the Cooling Setpoint attribute. If this status is Offline, the Present Value is set to Not Operational. – Offline: Cooling Setpoint attribute is offline. – Online: Cooling Setpoint attribute is online.
Display Precision	C,W	0.1	Uses Display Precision (Set 0).	Indicates the rounded position and decimal places to display for this object.
Heating Constant	C,W	75.0	1-999	Defines the rate at which the zone heats up after equipment startup. If adaptation is enabled, this constant is adapted without user intervention. If adapting and the OST object Cooling Setpoint and Heating Setpoint attributes reference the same object on a field controller, then the heating constant is adapted even if the mode is not heating, meaning both constants change.
Heating Deadtime	C,W	10 minutes	1-480 Units = Minutes	Indicates the time required after startup to raise the temperature by one degree. This value is adapted by the OST algorithm, if adaptation is enabled. If adapting, cooling, and heating setpoints are the same attribute, the Heating Deadtime is adapted even if the mode is not heating, meaning both deadtimes change.
Heating Design Temp	C,W	-20.6 deg C or -5.0 deg F	-35 to 90 Units = Temperature Units	Indicates the lowest outside temperature at which the heating system maintains zone comfort in the heating mode.
Heating Setpoint	C,W			Identifies the attribute of an object used to define the zone occupied target heating temperature. This attribute may be the same as the Cooling Setpoint attribute.
Heating Stpt Status			Offline = 0 Online = 1	Identifies the OST object's connection status to the Heating Setpoint attribute. If this status is Offline, the Present Value is set to Not Operational. – Offline: Heating Setpoint attribute is offline. – Online: Heating Setpoint attribute is online.
Max Prestart Time	C,W	120 minutes	5-480 Units = Minutes	Indicates the maximum period of time required to bring the zone up to occupancy setpoint temperature under the worst conditions (earliest optimal start time).
Max Prestop Time	C,W	0 minutes	0-60 Units = Minutes	Indicates the maximum period of time that the heating/cooling system can be shut down and still maintain the occupied zone temperature until entering the unoccupied mode (earliest optimal stop time). By setting this time to zero (the default value), optimal stop is disabled.
Min Prestart Time	C,W	20 minutes	0-240 Units = Minutes	Indicates the minimum period of time before occupancy to start the heating/cooling system. This time allows for the required amount of air changes in the zone prior to occupancy (latest optimal start time).

Table 310: Optimal Start Object Attributes - Focus/Configuration Tab

Attribute Name	Notes	Initial Value	Values/Options/Range	Description
OST Type	C,W	Heating/Cooling	Heating and Cooling = 0 Heating Only = 1 Cooling Only = 2 Uses OST Type (Set 126).	Defines the OST supported configuration. When the zone is in a mode not supported by the OST object, the Present Value is idle. OST-supported modes include: – Heating and Cooling – Heating Only – Cooling Only
Outdoor Air Temp	C,N,W			Identifies the attribute of an object used to determine the outdoor temperature: – If this attribute is not defined, or is offline, the outdoor air temperature is not used in the OST calculations and is assumed to be within the design temperatures. – If an Analog attribute reference is defined for the outdoor air temperature, it aids in determining if the Optimal Start object should adapt constants and deadtimes. – If the attribute is defined and outside the design temperatures, deadtime and constant calculations are skipped. – If the attribute is defined and is outside the design temperatures during Prestart, the optimal start time is set to early start time. – If the attribute is defined and outside the design temperatures during Prestop, do not Prestop.
Present Value	D	Idle	Idle = 0 Prestart Heating = 1 Prestart Cooling = 2 Calculating Deadtime = 3 Calculating Constant = 4 Occupied = 5 Prestop = 6 Not Operational = 7 Uses OST State (Set 125).	Represents the current value of the object: – Idle: Waiting for next occupied time for a supported mode (heating or cooling). – Prestart Heating: Heating optimal start time is pending. – Prestart Cooling: Cooling optimal start time is pending. – Calculating Deadtime: Valid only if Adaptation Enabled. – Calculating Constant: Valid only if Adaptation Enabled. – Occupied – Prestop: Waiting to reach optimal stop time. If Max Prestop Time = 0, then mode is Occupied, not Prestop. – Not Operational: Optimal Start object is not operational due to errors in its connection status to other required objects. The specific problem can be determined by viewing the other status attributes. The Optimal Start object could also be Not Operational (or Unreliable) if the Zone Occ Mode Obj is in the schedule but there are no valid start and stop times for that day (due to holiday or schedule offline, for example).

Table 310: Optimal Start Object Attributes - Focus/Configuration Tab

Attribute Name	Notes	Initial Value	Values/Options/Range	Description
Prestart Cooling Command	W	1	Set redirected to zone occupied mode (ZOM) States Text; Number of States redirected to ZOM Nbr States Only available in the online UI	Specifies the command sent to the Zone Occ Mode Obj point at prestart time when in cooling mode. The enumeration set and number of states for this attribute are redirected and filled in at runtime from the Zone Occ Mode Obj point. The default value is set to a value of 1 upon creation so the attribute requires no configuration.
Prestart Heating Command	W	1	Set redirected to ZOM States Text; Number of States redirected to ZOM Nbr States Only available in the online UI	Specifies the command sent to the Zone Occ Mode Obj point at prestart time when in heating mode. The enumeration set and number of states for this attribute are redirected and filled in at runtime from the Zone Occ Mode Obj point. The default value is set to a value of 1 upon creation so the attribute requires no configuration.
Prestop Command	W	0	Set redirected to ZOM States Text; Number of States redirected to ZOM Nbr States Only available in the online UI	Specifies the command sent to the Zone Occ Mode Obj point at prestop time. The enumeration set and number of states for this attribute are redirected and filled in at runtime from the Zone Occ Mode Obj point. The default value is set to a value of 0 upon creation so the attribute requires no configuration.
Relative Temp Units	C	Relative deg F	Uses Unit Set (Set 869).	Specifies the units associated with the Temp Differential attribute.
Reliability		Reliable	Uses Reliability (Set 503).	Indicates if a value is questionable due to operational errors in the Optimal Start object's connection status to other required objects. Without a valid start and stop time for the current day (due to holiday or schedule offline, for example), the value is also Unreliable.
Schedule Occupied Command	W	1	Set redirected to ZOM States Text; Number of States redirected to ZOM Nbr States Only available in the online UI	Specifies the command sent to the Zone Schedule Obj point at prestart time when in occupied mode. The enumeration set and number of states for this attribute are redirected and filled in at runtime from the Zone Schedule Obj point. The default value is set to a value of 1 upon creation so the attribute requires no configuration.
Schedule Unoccupied Command	W	0	Set redirected to ZOM States Text; Number of States redirected to ZOM Nbr States Only available in the online UI	Specifies the command sent to the Zone Schedule Obj point at prestart time when in unoccupied mode. The enumeration set and number of states for this attribute are redirected and filled in at runtime from the Zone Schedule Obj point. The default value is set to a value of 0 upon creation so the attribute requires no configuration.
Send OK				Indicates if the status of the last command was sent to the Zone WC Mode Obj, Zone Occ Mode Obj, or Zone Schedule Obj.

Table 310: Optimal Start Object Attributes - Focus/Configuration Tab

Attribute Name	Notes	Initial Value	Values/Options/Range	Description
Stpt Reached Time				Indicates the time at which the zone temperature was equal to (within differential) the zone setpoint. This point is set between the optimal start time and occupied. If this point is not reached during that time, then it continues to be monitored during the occupied time until the zone temperature reaches the setpoint.
Temp Differential	C,W	3.0 delta deg F or 1.67 delta K	0-10 Units = Relative Temp Units	Indicates the value added and subtracted to the zone setpoint to define a temperature range.
Temperature Units	C	Deg F	Uses Unit Set (Set 869).	Indicates the units associated with the attributes for temperatures.
Warmup Command	W	1	Set redirected to ZWC States Text; Number of States redirected to ZWC Nbr States Only available in the online UI	Specifies the command sent to the Zone WC Mode Obj point at prestart time when in heating mode. The enumeration set and number of states for this attribute are redirected and filled in at runtime from the Zone WC Mode Obj point. The default value is set to a value of 1 upon creation so the attribute requires no configuration.
Zone Occ Mode Obj	C,W			Identifies the object used to command a zone to occupied or unoccupied. This object must be specified in the Zone Schedule Obj. This is commanded by scheduling to occupied and by OST if prestop is enabled. If the Zone Occ Mode Obj and the Warmup/Cooldown Mode Obj are the same point, then the point is commanded by Scheduling at the scheduled time.
Zone Occ Time				Indicates the scheduled zone occupied time, obtained from the Zone Schedule Obj.
Zone Schedule Obj	C,W			Identifies the Schedule object, which schedules the Zone Occ Mode Obj. This object must be defined in the schedule and have valid start and stop times for the current day in order for OST to run. Otherwise, the OST object's Present Value is Not Operational. Only one Start and Stop time can be defined per day, and the Start time must precede the Stop time. The Start time must be defined as binary State ON (1) and Stop time must be defined as binary State OFF (0).
Zone Schedule Status			Offline = 0 Online = 1	Identifies the OST object's connection status to the Zone Schedule Obj. If this status is Offline, the Present Value is set to Not Operational. - Offline: Zone Schedule Obj is offline - Online: Zone Schedule Obj is online.
Zone Temperature	C,W			Identifies the attribute of an object used to determine the zone temperature.
Zone Temp At Start	N			Specifies the zone temperature at the last optimal start time.

Table 310: Optimal Start Object Attributes - Focus/Configuration Tab

Attribute Name	Notes	Initial Value	Values/Options/Range	Description
Zone Temp Status			Offline = 0 Online = 1	Identifies the OST object's connection status to the Zone Temperature attribute. If this status is Offline, the Present Value is set to Not Operational. – Offline: Zone Temp attribute is offline. – Online: Zone Temp attribute is online.
Zone Unocc Time				Indicates the scheduled zone unoccupied (vacancy) time, obtained from the Zone Schedule Obj.
Zone WC Mode Obj	C,W		Must be defined as an N2 BO, BV, MO, or MV object.	Identifies the object used to command a zone to Warmup or Cooldown mode. This object may be the same as the Zone Occ Mode Obj. This object is commanded by the OST at the optimal start time. This object is released at the occupied time unless this object is also the value for the Zone Occ Mode Obj.

Optimal Start Commands

The table below lists the commands supported by the [Optimal Start Object](#).

Table 311: Optimal Start Object Commands

Command Name	Parameters	Command Description
Cancel Prestart	None	Delays pending start until latest prestart time. Only valid during Prestart and before the optimal start time.
Cancel Prestop	None	Cancels the pending stop. Only valid during Prestop and before the optimal stop time.
Disable	None	Prevents the object's functionality; no calculations take place.
Enable	None	Allows the object to perform its calculations once a minute.

Optimal Start Steps

Building an Optimal Start Application

About this task:

To build an Optimal Start application:

1. Add the N2 Controller object and the analog and binary objects required for the OST application to the database. See the [Object Help](#) section for information on objects and the [Related Documentation](#) table in the [Welcome](#) section for information on the SCT. See [Creating Items with Wizards](#) for information on creating objects and other items.
2. Add the [Schedule Object](#) (see [Scheduling](#)), referencing the binary object controlling Zone Occupancy Mode.
3. Make sure valid occupied and unoccupied times are entered into the Schedule object.
4. Add the [Optimal Start Object](#) referencing the above Schedule object, the Binary objects designated as Zone Occupancy Mode and Zone Warmup or Cooldown Mode, and the analog attributes of objects designated as temperatures and setpoints.

Result

Note: See the [Site Management Portal User Interface](#) section for information on creating, editing, commanding, and deleting objects. See the [Scheduling](#) section for information on scheduling.

Optimal Start Troubleshooting

Table 312: Optimal Start Application Troubleshooting

Problem	Solution
Present Value of the Optimal Start Object indicates Not Operational	<p>The Optimal Start object's Present Value attribute may indicate Not Operational because of errors in its connection status to other required objects.</p> <p>To verify the Optimal Start object's connection status to other required objects:</p> <ul style="list-style-type: none"> • Verify that the required Schedule object, binary objects, and analog objects are all defined and online. • Verify that the binary object controlling Zone Occupancy Mode is in the List of Prop Refs for the Schedule Object. • Verify that valid occupied and unoccupied times for the current day are defined in the Schedule object.
Optimal Start Object is not adapting Constants and Deadtimes	<p>To ensure the Optimal Start object is adapting constants and deadtimes:</p> <ul style="list-style-type: none"> • Verify that the Adaptation Enabled attribute indicates True. • Verify that the value of the Zone Temperature attribute is not within the value of the Temp Differential attribute relative to the Heating or Cooling Setpoint (plus or minus one degree) before the warmup or cooldown period. • Verify that the value of the Outdoor Air Temp attribute is within the values of the Cooling Design Temp and Heating Design Temp attributes.

Pulse Meter Object

Menu Selection: *Insert > Object > Pulse Meter*

The Pulse Meter object accumulates the differences between consecutive reads of the integer value provided by an [Accumulator Object](#) or Counter Input Object (defined by CCT), and calculates the rate of change between each reading of the value. This object also totals the counted pulses and converts them into units of consumption.

The Pulse Meter object must reference a counter/accumulator object to access the counter value that resides in the counter/accumulator hardware device (which is hardwired to the pulse input). The counter/accumulator object is hardware specific, while the Pulse Meter object is hardware independent.

Multiple Pulse Meter objects may share the same counter/accumulator object, and must reside on the same device as the counter/accumulator hardware device.

Note: The Pulse Meter object only handles counters that count forward.

Each Pulse Meter object may have different purposes, such as one calculates the rate over a 60-second period, while others calculate the rate over a 5-minute period. For example, some Pulse Meters are supposed to run only during certain times of the day.

Pulse Meter Attributes

This object contains attributes common to many Metasys system objects. These common attributes are described in the [Common Object Attributes](#) section. This section includes attributes of the Focus/Configuration tab, the Diagnostics tab (if applicable), and any other tab specific only to this object. See the [Object and Feature Tabs](#) section for information on the attributes that appear on the other tabs of this object (for example, the Hardware and Options tab appear on point objects).

- Note:** In the Notes column, letters indicate the following: In the notes column, letters indicate the following: C - Configurable, D - Default Attribute for Display, N - Value Not Required, R - Affected by Extension's Reliability, W - Writable.

Table 313: Pulse Meter Object Attributes - Focus/Configuration Tab

Attribute Name	Notes	Initial Value	Values/Options/Range	Attribute Description
Calculation		0	0-4,294,967,295	Increases by one each time the Pulse Meter object executes its main routine until it rolls over and starts again with zero.
Consump Unreliable	W	False		Indicates that the Consumption attribute may contain unreliable data. The following conditions can set the Consump Unreliable attribute to True: <ul style="list-style-type: none"> - If the calculated rate is too high, which happens if the Rate Limit is exceeded. - If the Pulse Meter object is disabled. - If the value of the Accumulator object is unreliable.
Consumption	W	0	Units = Consumption Units	Indicates the consumption since the last reset of the Pulse Meter object.
Consumption Units	C,W	kWh	Uses Unit Set (Set 869).	Indicates the measurement units for all consumption attributes.
Counter Object	C,W			Specifies the associated Accumulator Object or Counter Input Object (defined by CCT).
Display Precision	C,W	10ths		Specifies the rounded position and decimal places to display for this object's analog values.
Execution Trigger	W	False		When written to True, the execution function runs.
Meter Active	C,W	True	True, False	Specifies whether the pulse meter object currently should be metering.
Present Value	D,R		Units = Rate Units	Represents the currently calculated rate of consumption.
Previous Consumption	W	0	Units = Consumption Units	Indicates the last value of Consumption before the last reset.
Pulse Consumption	C,W	1.000000	Units = Consumption Units	Specifies the physical quantity that each single pulse represents.
Pulse Count			0-4,294,967,295	Indicates the pulse counter value as last reported from the Counter Input Object (define by CCT), or the last Present Value of the Accumulator Object.
Rate Constant	C,W	3600.000000		Specifies the value multiplied by the Consumption Units to get the Present Value units to match Rate Units.

Table 313: Pulse Meter Object Attributes - Focus/Configuration Tab

Attribute Name	Notes	Initial Value	Values/Options/Range	Attribute Description
Rate Default	C,W	0.0	> = 0, Units = Rate Units	Specifies the value of Present Value when the calculated rate exceeds the Rate Limit.
Rate Limit	C,W	3.402823466 E38	> = 0, Units = Rate Units	Specifies the highest allowed Present Value before using Rate Default.
Rate Units	C,W	kW	Uses Unit Set (Set 869).	Indicates the measurement units for all rate attributes.
Rate Unreliable		False		Indicates that the Present Value is unreliable because of a misreading of a counter.
Reliability		Reliable	Uses Reliability (Set 503).	Indicates if a value is questionable.
Reset	W	False	True while reset in progress	When written to True, it transfers the current value of the Consumption attribute into the Previous Consumption attribute before resetting Consumption to zero.
Reset Date	W			Indicates the date of the last resetting of Consumption attribute.
Reset Time	W			Indicates the time of the last resetting of Consumption attribute.
Rollover Limit	C,W	32767	0-4,294,967,295	Specifies the highest counter value before the pulse counter rolls over to zero. This value must match that of the counter, or the Max Value of the Accumulator.
Sample Time	C,W	60	Units = seconds, Value > 9	Specifies the period of automatic executions of the algorithm in seconds.

Pulse Meter Commands

The table below lists the commands supported by the [Pulse Meter Object](#).

Table 314: Pulse Meter Object Commands

Command Name	Parameters	Command Description
Enable	None	Enables the calculation of the pulse count and consumption for the Pulse Meter object.
Disable	None	Disables the calculation of the pulse count and consumption for the Pulse Meter object.
Reset	None	Resets the Pulse Meter, including the Consumption attribute.
Start Meter	None	Resumes metering.
Stop Meter	None	Stops metering.

Signal Select Object

Menu Selection: **Insert > Object > Signal Select**

The Signal Select object can process values from multiple zones to adjust various setpoints and can function with either analog or binary points.

For analog point types, the Signal Select object determines (one or more of) the low input, average input, and/or high input values for use in updating an attribute value of another object.

For binary point types, the Signal Select object determines (one or more of) the [average](#) state, the [logical Or](#) state, and/or the [logical And](#) state values for use in updating an attribute value of another object.

Computations take place at startup and at each time an input value experiences a change in value or reliability. The results of these calculations are sent to specified output points as commands. For example, this object allows you to average multiple zone temperatures and base a control, such as adjusting a setpoint, on that average.

Signal Select Concepts

Average Output Computation

In the case of binary types of input references, if the majority of inputs are at State 1 or the inputs are evenly split between State 1 and State 0, the Average output is commanded to State 1. If the majority of inputs are at State 0, the Average output is commanded to State 0.

Logical OR Computation

If any input is at State 1, the OR output is commanded to State 1. If all inputs are at State 0, the OR output is commanded to State 0.

Logical AND Computation

If all inputs are at State 1, the AND output is commanded to State 1. If any input is at State 0, the AND output is commanded to State 0.

Signal Select Attributes

This object contains attributes common to many Metasys system objects. These common attributes are described in the [Common Object Attributes](#) section. This section includes attributes of the Focus/Configuration tab, the Diagnostics tab (if applicable), and any other tab specific only to this object. See the [Object and Feature Tabs](#) section for information on the attributes that appear on the other tabs of this object (for example, the Hardware and Options tab appear on point objects).

Note: In the Notes column, letters indicate the following: In the notes column, letters indicate the following: C - Configurable, N - Value Not Required, W - Writable.

Table 315: Signal Select Object Attributes - Focus/Configuration Tab

Attribute Name	Notes	Initial Value	Values/Options/Range	Description
Average Output	C,N,W	None		Specifies the object attribute whose value is updated using the calculated average of all of the inputs of the Signal Select Object.
Execution Priority	C,W	Normal		Indicates the relative importance of performing the function of the object within the device.
Failsoft	C,W			Routes to all the outputs if Setup is configured as Fail Soft. Fail Soft routes when the object becomes unreliable and when the output transitions from Reliable to Unreliable.
High OR	C,N,W	None		Specifies the object attribute whose value is updated using the highest input of all the inputs in the Signal Select object, for analog point types. For binary point types, the value is updated using a logical OR condition of all inputs of the Signal Select object.

Table 315: Signal Select Object Attributes - Focus/Configuration Tab

Attribute Name	Notes	Initial Value	Values/Options/Range	Description
Input List	C,W		Minimum number of elements in the list =1, Maximum number of elements in the list = 12	Contains the list of attribute references used in the Signal Select calculations. An analog type defined as a binary input is converted to a binary value prior to each computation, and a binary value is converted to a binary input.
Low AND	C,N,W	None		Object attribute whose value is updated using the lowest input of all the inputs in the Signal Select object, for analog point types. For binary point types, the value is updated using a logical AND condition of all inputs of the Signal Select object.
Point Type	C,W	Analog	Analog or Binary	Specifies the type of input values monitored by the Signal Select object, the calculations it performs, and the outputs it produces. Point type can be analog or binary.
Present Value	W	Master	N = 3 0 = Calculated, 1 = Last Reliable, 2 = Fail Soft	Indicates the current value of the signal select object.
Reliability			Reliable or Input Unreliable	Indicates a value of Unreliable only if all of the configured inputs in question are unreliable.
Setup	W	Last Reliable	n = 2 0 = Last Reliable, 1 = Fail Soft	Indicates the current setup value of the signal select object.

Signal Select Commands

The table below lists the commands supported by the [Signal Select Object](#).

Table 316: Signal Select Object Commands

Command Name	Parameters	Description
Disable	None	Locks out all outputs and prevents the Signal Select functionality.
Enable	None	Ensures object reacts to any changes it may have missed while it was disabled and returns it to normal operation.

Solar Clock Object

Menu Selection: **Insert > Object > Solar Clock**

The solar clock object computes Present Value (Night/Day), Sun Position (Azimuth and Elevation), and Sunrise and Sunset times based on the local position (Latitude and Longitude) and local time and time zone information. This information is needed to control external motorized louvers as part of bioclimatic facades for buildings and may also be used to position tracking photovoltaic solar arrays. The Sunrise/Sunset times can be used for external lighting control.

This object runs on a periodic basis to compute its attributes. The equations to compute azimuth, elevation, sunrise, and sunset attributes were obtained from the National Oceanic and Atmospheric Administration (NOAA) Web site (<http://www.noaa.gov/>). The object obtains the Local Time, UTC Offset, DST Status, and DST Offset from the BACnet Device object.

Latitude and Longitude for this object are provided in decimal degrees. Often, these values are provided as degrees, minutes, and seconds. There are numerous Web sites that can convert the latitude and longitude values, if necessary. In addition, you can obtain your current location on the planet from free tools such as Google Earth. Google Earth includes an option to provide your location in decimal degrees.

- ① **Note:** For correct sunrise and sunset calculations, you must apply north/south and east/west rules. North latitudes are preceded by a plus, South latitudes are preceded by a minus. West Longitudes are preceded by a minus, East Longitudes are preceded by a plus. See Table 317.

Table 317: Latitude and Longitude Examples

Location	Landmark	Latitude	Longitude
Milwaukee, WI, USA	Brengel Technology Center	43.037507	-87.904456
Paris, France	Notre Dame Cathedral	48.854212	2.347641
Cape Town, South Africa	Green Point Stadium	-34.903488	18.411073
Sydney, Australia	Opera House	-33.857184	151.215176
Beijing, China	Tiananmen Square	39.06514	116.391213

For general information on Metasys system objects, see [Common Object Attributes](#).

Solar Clock Object Attributes

This object contains attributes common to many Metasys system objects. These common attributes are described in the Common Object Attributes section. This section includes attributes of the Focus/Configuration tab, the Diagnostics tab (if applicable), and any other tab specific only to this object. See the Object and Feature Tabs section for information on the attributes that appear on the other tabs of this object (for example, the Hardware and Options tab appear on point objects).

- ① **Note:** For correct sunrise and sunset calculations, you must apply north/south and east/west rules. North latitudes are preceded by a plus, South latitudes are preceded by a minus. West Longitudes are preceded by a minus, East Longitudes are preceded by a plus. See Table 317.
- ① **Note:** In the Notes column, letters indicate the following: In the notes column, letters indicate the following: A - Archive, C - Configurable, W - Writable.

Table 318: Solar Clock Object Attributes - Focus/Configuration Tab

Attribute Name	Notes	Initial Value	Values/Options/Range	Description
Present Value			1 = Day 0 = Night	Represents an Enumeration value that is true when the current time is between the computed time of Sunrise and Sunset, where 1 = Day and 0 = Night.
Latitude	W,C,A		Units = Degrees Angular Range = -90-90	Defines the angular distance, in decimal degrees, of the current location north or south of the equator. Lines of latitude are also known as parallels. The International standard defines north latitudes as positive values.
Longitude	W,C,A		Units = Degrees Angular Range = -180-180	Defines the angular distance, in decimal degrees, of the current location east or west of the Prime Meridian. Lines of longitude are also known as meridians. The International standard defines east longitude as positive values.

Table 318: Solar Clock Object Attributes - Focus/Configuration Tab

Attribute Name	Notes	Initial Value	Values/Options/Range	Description
Periodic Update	W,C,A	5	Units = Minute Range = 2-60	Determines how often sun position and Present Value attributes update during normal operation. The default value is 5 minutes.
Azimuth			Units = Degrees Angular	Defines the angular measurement in a spherical coordinate system. The vector from an observer (origin) to a point of interest (sun) is projected perpendicularly onto a reference plane; the angle between the projected vector and the reference vector on the reference plane is called the azimuth. It is defined as the angle from due north in a clockwise direction.
Elevation			Units = Degrees Angular	Defines the angle between the direction of the geometric center of the sun's apparent disk and the idealized horizon.
Sunrise			Display = HH:MM	Defines the time of apparent sunrise in hours and minutes. Sunrise may not occur in the same calendar day as sunset. Due to changes in air pressure, relative humidity, and other factors, we cannot predict the exact effects of atmospheric refraction on sunrise time. The error may increase with higher latitudes (closer to the poles).
Solar Noon			Display = HH:MM	Defines the time when the sun crosses the meridian of the observer's location. At solar noon, a shadow cast by a vertical pole points either directly north or directly south, depending on the observer's latitude and the time of year.
Sunset			Display = HH:MM	Defines the time of apparent sunset in hours and minutes. Sunset may not occur in the same calendar day as sunrise. Due to changes in air pressure, relative humidity, and other factors, we cannot predict the exact effects of atmospheric refraction on sunset time. The error may increase with higher latitudes (closer to the poles).
Offset	W,A		Units = Minutes Range = -60-60	Defines an offset to the computed Sunrise and Sunset times. The offset value is used to compute Present Value. A positive value makes the day longer and a negative value makes the day shorter.

Table 318: Solar Clock Object Attributes - Focus/Configuration Tab

Attribute Name	Notes	Initial Value	Values/Options/Range	Description
Equation of Time			Units = Minutes	Represents an astronomical term accounting for changes in the time of solar noon for a given location over the course of a year. Earth's elliptical orbit and Kepler's law of equal areas in equal times are the factors behind this phenomenon.
Solcar Declination			Units = Degrees	Defines the declination of the Sun. The declination varies from 23.44° at the winter solstice in the northern hemisphere, through 0° at the vernal equinox, to +23.44° at the summer solstice. The variation in the solar declination is the astronomical description of the sun going south in the northern hemisphere for the winter. For a ground-based view of the seasonal solar paths for different latitudes, use 0° for the Equator, 23°N for the Tropic of Cancer, 40°N for Boulder, CO, 71°N for the Arctic Circle, and 90° for the North Pole.

Solar Clock Object Commands

This object has no commands.

For managing outside lighting schedules, use the day/night present value status of this object with an Interlock Object's definition to drive the Action Tables for the **Actions of Conditions** setup.

Trend Log Object

Menu Selection: **Insert > Object > Trend Log**

The Trend Log object monitors and records the changes in the behavior of an individual attribute over time, thereby assisting you with diagnosing various system-wide behavioral characteristics. For example, use a Trend Log to collect data from the Analog Input object of a field controller, which reports information such as outdoor air temperature or room air temperature.

The trend log collects sample values at timed intervals or only upon changes in the given value. Trend data is still collected if the object is unreliable. The trend log continues to log data using the previous value preceded by ???, which indicates an unreliable status.

Note: When you create a Trend Log object at a network engine using a BACnet client, a folder called Trend Log is created and a new Trend Log object is created under that folder in the navigation tree.

You cannot define a Trend extension under the Trend Log object like you can with other objects. As a requirement for adding a trend log object from the UI, you select an input reference, then enable the trend log so that it can begin to collect samples.

Trend Log samples are stored locally with a default buffer size of 144 and a maximum of 5000 samples. Unlike a Trend extension on an object, repository storage is not available with the Trend Log object. The intention is that data sampled by the trend log object is stored at the BACnet client.

For general information on Metasys system objects, see [Common Object Attributes](#).

Trend Log Object Attributes

This object contains attributes common to many Metasys system objects. These common attributes are described in the [Common Object Attributes](#) section. This section includes attributes of the Focus/Configuration tab, the Diagnostics tab (if applicable), and any other tab specific only to this object. See the Object and Feature Tabs section for information on the attributes that appear on the other tabs of this object (for example, the Hardware and Options tab appear on point objects).

The Trend Log object has the same list of attributes as a trend extension. For information about the Trend tab of the Trend Log object, see [Trend Extensions](#).

Note: In the Notes column, letters indicate the following: In the notes column, letters indicate the following: A - Archive, C - Configurable, W - Writable.

Table 319: Trend Log Object Attributes - Focus/Configuration Tab

Attribute Name	Notes	Initial Value	Values/Options/Range	Description
Acked Transitions	C,W	False, False, False		Conveys three separate flags that each indicate if the most recent To Offnormal, To Fault, or To Normal event transitions have been acknowledged (if the transition requires acknowledgement).
Buffer Size	C	144	1-5,000	Specifies the maximum number of records the buffer may hold.
Buffer State		Operational	Operational, Buffer Full	Indicates whether the buffer is full or operational when the Stop When Full attribute is set to False.
Client COV Increment	C,W			Specifies the increment used to determine that a change of value occurred (when this Trend Log object collects data by COV). If the referenced object and attribute support COV reporting, then this attribute may have a Null value. In this case, the value of the trended object for COV increment is used. This value only applies to trended values of the real value (floating point) type.
COV Resubsc Interval	C,W	3,600	Units = Seconds	Specifies the number of seconds between COV resubscriptions (when this Trend Log object collects data by COV). This attribute is only used when the trended object is a BACnet Integration point on the IP network. The Subscribe COV requests specify twice during this interval for the actual subscription. The first subscription is issued when the Trend Log object begins operation or when enabled.
Enable	C,W	False		Indicates and controls whether logging is enabled (True or False).
Event Enable	C,W	True, False		Determines whether notifications are enabled for To Fault and To Normal events. A To Normal transition occurs when the value of the Records Since Notify attribute is equal to or greater than the value of the Notify Threshold attribute. A To Fault transition occurs when an attempted COV subscription fails. The To Normal transition must be enabled and set by default. The Read and Write methods ensure this value cannot be set to False.

Table 319: Trend Log Object Attributes - Focus/Configuration Tab

Attribute Name	Notes	Initial Value	Values/Options/Range	Description
Event State			Normal, Fault	Determines whether an active event state is associated with this extension. The value is set to Normal when there is no intrinsic alarming defined for this object. If intrinsic alarming is enabled (Enable Intrinsic Alarms = True), then this value is either Normal or Fault (problem occurred with the object subscribing for Change of Value [COV]s). This attribute appears on the view when the site is defined as a BACnet site.
Event Time Stamps				Conveys the times of the last event notifications for To Offnormal, To Fault, and To Normal events. Time stamps of type Time or Date have FF if no event notification of that type has generated since the object was created.
Input Reference	C			Defines the attribute of the object being sampled. This attribute is used for consistent references to an object or attribute. The Input Reference and the name of the object and attribute you want to trend must match exactly.
Intrinsic Alarming Defined	C,W	False		Enables (True) or disables (False) BACnet intrinsic alarming for this object. When disabled, writing to any of the intrinsic alarming attributes returns a Write_Access_Denied error. When disabled, reading the intrinsic alarming attributes returns the default value of each attribute.
Last Notify Record		0		Indicates the sequence number associated with the most recently collected record whose collection triggered a notification (that is, it caused the value of the Records Since Notify attribute to be equal to or greater than the value of the Notify Threshold attribute). If no notification has occurred since logging began, the value of this attribute is 0.
Logging Type		Polled	Polled, COV, Trigger	Specifies the method for which the referenced property is logged (Polled, Change of Value [COV], or Trigger).
Log Interval	C,W	60,000	Units = 100ths of a second	Specifies the periodic time in seconds for which the referenced property is logged.

Table 319: Trend Log Object Attributes - Focus/Configuration Tab

Attribute Name	Notes	Initial Value	Values/Options/Range	Description
Notification Class	C,W	1		<p>Specifies the notification class used for handling and generating event notifications for this object. Notification occurs based on the value of the Records Since Notification attribute. The Notification Class attribute implicitly refers to a Notification Class object that has a Notification Class property with the same value. If the class number references a non-existent Notification object, no Notification occurs.</p> <p>When the Notification Class attribute is written online, the Notification Object Reference is updated to the Object Reference of the Notification Class object with that instance number, if found. If the Notification Class object for a Johnson Controls proprietary object is not found, the reference is left blank.</p> <p>If both the Notification Object Reference and the Notification Class attributes are written simultaneously online (or both are configured and downloaded), the Notification Class attribute value is set to the value that was written to the Notification Object Reference, and the Notification Class value in the write message is ignored.</p>
Notification Object Reference	C,W		Limited to Notification Class on the same device.	<p>Specifies the Notification Class object used to route alarms for the object being configured (through tree selection). When the Notification Object Reference is written, the value of the Notification Class attribute is updated to reflect the referenced object's instance number. The value of the Notification Object Reference attribute is restricted to Notification Class objects on the same device as the alarming object. Validation only occurs during a write, not during a create (the download does not fail).</p>
Notify Threshold	C,W	130 (90% of Buffer Size)		Indicates when notification occurs based on the value of the Records Since Notification attribute.
Notify Type	C,W	Events		Conveys if the notifications generated by the object are Events or Alarms. This attribute is required if the object supports intrinsic reporting.
Record Count	C,D,W	0	0–5,000	<p>Represents the number of samples recorded since the creation of the trend extension or the last time the buffer was cleared, when the Stop When Full attribute is set to True.</p> <p>Represents the position of the next sample recorded, when the Stop When Full attribute is set to False.</p> <p>A value of zero for this attribute deletes all records in the log buffer and resets the Total Record Count to zero. If the buffer overflows, the Record Count resets to zero.</p>
Records Since Notify		0		Indicates the number of records collected since the last notification occurred or since logging began if no notification occurred.

Table 319: Trend Log Object Attributes - Focus/Configuration Tab

Attribute Name	Notes	Initial Value	Values/Options/Range	Description
Reliability		Reliable	Uses Reliability (Set 503).	Represents the reliability of the Present Value. If the Input Reference becomes unreliable, the trend extension monitoring the input becomes unreliable.
Sample Interval	C,W	600	0-604,800 Units = Seconds	Specifies the periodic time in seconds for which the referenced property is logged. If this attribute is zero, samples are recorded using COV reporting. If you want to take samples on a COV, set the value of this attribute to 0 seconds. If you are not sampling on a COV, configure the Sample Interval at 60 seconds or higher to prevent loss of trend data and reduction in performance of the network engine that receives samples from the configured trend.
Start Time	C,W			Specifies the time and date to enable logging when the Enable attribute is set to True. If the Start Time contains any wildcard values, then the conditions to enable logging based on time are ignored. When the Trend Log object is inactive due to the current time being outside of the Start Time or Stop Time, the Status attribute reflects this state (assuming it is the highest priority status). If you define a Stop Time that is before the Start Time, the Trend Log object is disabled.
Status Flags				Indicates the general status of the object in BACnet terms and contains four independent states. The four flags are: In Alarm —False if the Event State attribute value is Normal; otherwise, the In Alarm flag is True. (Set only by BACnet Intrinsic Alarming.) Fault —True (1) if the Reliability attribute is not reliable; otherwise, the Fault flag is False. Overridden —Overridden flag is True if the Present Value is overridden from the hardware source level. Out of Service —Out of Service flag is True if the Out of Service attribute value is True; otherwise, the Out of Service flag is False.
Stop Time	C,W			Specifies the time and date to disable logging. If the Stop Time contains any wildcard values, then the conditions to disable logging based on time are ignored. Logging is disabled if the Stop Time is prior to the Start Time. When the Trend Log object is inactive due to the current time being outside of the Start Time or Stop Time, the Status attribute reflects this state (assuming it is the highest priority status). A change in the active/inactive state due to the Start Time/Stop Time value has no impact on the Enable attribute. If the Trend Log object was disabled due to the Stop Time, the Trend Log object attempts to send the trend samples to the server. If you define a Stop Time that is before the Start Time, the Trend Log object is disabled.

Table 319: Trend Log Object Attributes - Focus/Configuration Tab

Attribute Name	Notes	Initial Value	Values/Options/Range	Description
Stop When Full	C,W	False		Specifies whether logging ceases when the buffer is full. When set to True, logging ceases and all accumulated samples remain in the buffer. When set to False, new samples begin to replace old samples.
Total Record Count				Represents the total number of records collected by the Trend Extension since creation. When the value of Total Record Count reaches its maximum possible value of 0xFFFFFFFF, the next value it takes is zero. Once this value has wrapped to zero, its semantic value (the total number of records collected) is lost, but its use in generating notifications remains.
Trigger	C,W			Causes the collection of data when changed from False to True, Enable is set to True, and the trend is within the Start/Stop times. When data collection completes, this attribute resets to False. This attribute does not trigger Johnson Controls COVs.

Trend Log Object Commands

The following table lists the commands supported by the [Trend Log Object](#). Click the command name for a description of the command.

Table 320: Trend Log Commands

Command Name	Parameters	Description
Clear	None	Clears all samples in the buffer.
Disable	None	Stops collection of samples.
Enable	None	Resumes collection of samples.
Execute	None	Takes a single sample.
Route	None	Performs no action because you cannot route samples when there is no capability to specify a repository.

Object Help

The Object Help describes each object in the system, the attributes of the objects, and the characteristics and functions of each attribute. The Object Help provides detailed information to aid in creating objects, entering values for configuring attributes, understanding how to read attributes, and defining the interaction between objects in regard to the attributes.

Object Help Concepts

Objects

Objects are self-contained functional items in the Metasys system that contain processes to manage building automation system components. Objects appear as items in the [Navigation Tree](#) that shows the hierarchical physical or logical relationship between the objects as created by the user. These objects are generally referred to as items in the Metasys user interface.

Each object that exists in a system is based on a specific object type. There is an object type to manage the functions of the site, object types to manage the operation of the various device types

installed on the site, object types to manage the physical input/output points of each field device, and others.

Examples: [Site Object](#), [Engine Device Object](#), [Analog Input Object](#), [Program \(Control System\) Object](#).

Objects communicate with the rest of the system and with the user through their [attributes](#). The object type defines the basic function of the object, but the actual behavior of each object also depends on the values assigned to its configuration attributes and received by its input attributes from other objects. The object writes its status conditions and the results of internal processes to its output attributes.

When an object type has an equivalent BACnet Object Type, the attribute list includes the BACnet Properties required by the BACnet protocol specification and some of the optional properties. These objects may be accessed from a BACnet network. For detailed information on BACnet objects and properties, refer to *ANSI/ASHRAE Standard 135-2008 - A Data Communication Protocol for Building Automation and Control Networks*.

Object Extensions

Object extensions provide additional features to objects and include Alarm, Trend Log, Totalization (Analog, Runtime, and Event), Load, Averaging, and Resource File. Object extensions do not appear in the navigation tree. The attributes of Object Extensions are displayed under specific tabs when viewing object details. You may define object extensions when the object is first created using the configuration wizard or add them later.

For more information on extensions, see the [Extensions](#) section.

Attributes

Attributes contain data that an object exposes to the system. The data in some attributes is set by the user or by other objects and features in the system and is used by the object to perform its function. Other attributes contain data produced by the object itself. The Attribute table for each object lists the characteristics of each attribute to help you configure the object.

There is a set of attributes common to many Metasys system objects. These attributes are described in the [Common Object Attributes](#) section. Each object attribute section includes attributes of the Focus/Configuration tab, the Diagnostics tab (if applicable), and any other tab specific only to that object. See the [Object and Feature Tabs](#) section for information on the attributes that appear on the other tabs of the object (for example, the Hardware and Options tab appear on point objects and the Email tab appears on Engine and Server objects). The attributes listed in the tables appear in alphabetical order.

The column headings in the Attribute table are defined as follows:

Attribute Name

Gives the name of the attribute as it appears on the user interface.

Example: High Limit

See the [Status and Display Attribute Location](#) topic.

Data Type

Lists the data type of the attribute value. The following table defines the various data types used in the Metasys system.

Table 321: Data Types

Data Type	Formal Name	Definition
Attribute Reference	Attribute Reference	Reference of an attribute from which data is read or to which data is sent. The format is <Object Reference.Attribute Name>
Date	Date	Day of week, day, month, year Example: Wednesday, February 19, 2003
List	List	List of attributes or properties of other objects that is created or used by a particular function of this object.
Number	Byte	Number from 0–255 with no decimal point. Allowable range appears in column headed Values/Options/Range
	Unsigned Integer Short	Number from 0 to 65,535 with no decimal point. Allowable range appear in column headed Values/Options/Range.
	Unsigned Long	Number from 0 to 4,294,967,295 with no decimal point. Allowable range appears in column headed Values/Options/Range.
	Signed Integer	Signed number that is also an integer with no decimal point. The value may be positive or negative. Allowable range appears in column headed Values/Options/Range. Examples: <ul style="list-style-type: none"> • DLLR: Shed Pending, Shed Lost • Accumulator: Scale As Integer
Object Reference	Object Reference	Item Reference of an object to which a command is sent
One State/Type/Node from a Set	Enumeration	Discrete state/type/mode taken from a set of numbered possible values and normally represented on the user interface by text.
Real Value	Float	Number with a decimal point to show required precision Example: 24.5
Set of Related Values	Structure	A set of values of mixed data types representing one physical entity
Series of True or False States	Bit String	Series of true/false states that each have an independent meaning but together define the overall state of an attribute or object
Set of Values	Array	A set of a specified number of values of the same data type
Text	String	A line of characters (letters and numbers)
Time	Time	Hours, minutes, seconds Example: 12:30:56 AM Each Time data type has a time chooser for graphical time selection, where writable.
True or False	Boolean	Data that can only be true or false

Notes

The Notes column lists specific characteristics of the attribute and its value. The characteristics (or flags) in Notes specify how the attribute is used in the object and how it can be set within the Metasys system.

Table 322: Notes

Note	Definition
C - Configurable	Indicates if the value of the attribute is defined by the user when first creating the object and cannot be changed by the object itself. Configurable (C) attributes that are writable (W) can be changed by the user online or by a process or feature in the running system after the object has been created.
D - Default Attribute for Display	Indicates that this is the primary value of this object, and is used when the user interface needs to display a single value from the object. For example, this attribute is displayed in the header bar of the display panel for an object.
N - Value Not Required	Indicates that this configurable attribute may contain a blank value. (Other configurable [C] attributes without N must contain a valid value for the object to function.) For example, a value for a high or low limit attribute is not required and a blank value indicates that the alarm processing is not required.
R - Affected by Object Reliability	Indicates that the reliability of the value of this attribute is dependent on the object being in a reliable state.
W - Writable	Indicates that the user can edit the value of the attribute online or by a process or feature in the running system or network. A write to a configurable (C) attribute replaces the existing value. A write to other attributes is handled as an override to the value calculated by the object or as a command for some action by the object.

BACnet Notes

The BACnet Notes column specifies if the attribute is exposed as a standard BACnet property and if it can be modified from a BACnet network.

Table 323: BACnet [System] Notes

Note	Definition
B - Exposed as Standard BACnet Property	Indicates that the attribute can be accessed as a standard BACnet Property of the equivalent BACnet Object Type from a BACnet network.
W - Writable	Indicates that the value of the attribute can be modified by a message from a device on the BACnet network.

Note: The types listed in Table 322 may also appear in the Note column, as applicable.

Initial Value

A configurable attribute takes the initial value when the object is being created if the user does not enter another value. Other attributes take the initial value on startup and until the object calculates a new value.

Values/Options/Range

Based on the attribute's data type, this column may show the range of valid values or a reference to the set of possible values for this attribute. If the complete set of values for the attribute is small, all possible values are shown in this column.

Status and Display Attribute Location

The Status and default display attribute (typically the Present Value) of objects appear just below the header of the [Display Panel](#) displaying the object.

Object Naming Attributes

Every object can be identified by one of three naming attributes.

Name - a freely definable user name for the object

Item Reference - a fixed name used internally by the system

BACnet Object Name - the name exposed to a BACnet network based on the Item Reference, or the name based on the **User Name Is BACnet Obj Name** common attribute setting

See the [Object and Feature Tabs](#) section for more information on these attributes.

Commands

The Commands table for each object lists the commands that the object supports. Commands allow you to perform an action on an object, such as Start or Stop. The user executes these commands through the user interface. If an object does not support any commands, the Commands table does not appear in the Help. For a description of each command, click the command name in the Commands table.

The column headings in the Commands table are defined as follows:

Command Name - Gives the name of the command as it appears in the user interface.

Parameters - Gives the parameters required in the command along with some descriptive information.

State, Mode, and Type Sets

State, Mode, and Type Sets provide the source of readable text for the user interface when the displayed value can be one of many states, modes, or types. For example, the Status attribute of every object is displayed as one of the texts listed in the Object Status (Set 505).

References to specific sets appear throughout the Object Help, usually in the [Values/Options/Range](#) column of the object's attribute table.

Enum Finder

The Enum Finder provides users advanced searching capabilities of enum sets for objects with the States Text attribute. With the object displayed in the focus window, click the Search (magnifying glass) icon next to the States Text attribute in the Configuration Tab in Edit mode to access the Enum Finder.

Table 324: Enum Finder Dialog Box

Screen Area	Description
Search Criteria	Allows you to enter enum set search criteria.
Results	Displays the prioritized search results for cross column searching of Set ID, Set Name, Enum ID, and Enum Value based on search criteria.
Additional Search Criteria (+) icon	Adds additional Search Criteria rows.
Ok	Applies the selected enum set to the States Text attribute of the object displayed in the focus window.
Cancel	Closes the Enum Finder without applying changes.

1. With the object displayed in the focus window, click **Edit** in the Configuration tab.

2. Click the **Search** icon next to the States Text attribute drop-down. The Enum Finder dialog box appears.
3. Enter enum search criteria text or numerical strings in the **Search Criteria** text box. The **Results** table auto-populates with results listed in priority order by best matches against search criteria.
 - ① **Note:** For optimal searching, add more search criteria by clicking the Additional Search Criteria (+) icon.
4. Select the enum set from the **Results** table and click **Ok**. The Enum Finder closes and the set is populated in the States Text attribute of the object displayed.
5. Click **Save**.

Common Object Attributes

The [Object and Feature Tabs](#) are used by most of the object types in the Metasys system. Each particular object in the [object list](#) contains a reference to the use of common object attributes.

Object List

The entire list of objects that are available in the Metasys system appears in the table of contents in the Help system and PDF. Also see the [Extensions](#) section for object extensions.

Object Creation

Objects can be created [offline](#) in the system database on the SCT and later downloaded to the host device as part of the edited database. You can also create objects with a browser if you have the Access Privileges to configure objects using the Security Administrator System. The user interface screens and procedures are similar in either case. Creating an object involves placing it at the desired position in the [Navigation Tree](#) and defining all the attributes that are required for it to operate. The procedure begins with the Insert Menu, and a wizard guides you through all the necessary configuration steps.

See the [Creating Items with Wizards](#) section for the steps to create objects/items.

Object Deletion

Objects can be deleted [offline](#) in the system database on the SCT and later downloaded to the host device as part of the edited database. You can also delete objects with a browser if you have the Access Privileges to configure objects using the Security Administrator System. The user interface screens and procedures are similar in either case. Deleting an object involves selecting it in the [Navigation Tree](#) and using the [Delete Items](#) command.

See the [Deleting Objects or Items](#) section for more information.

- ① **Note:** Before deleting an object, you should delete all references to the object within other objects and reconfigure any objects that are referenced in the object to be deleted. If the references are not edited or deleted, the referenced objects may not operate correctly. See the [Engine Device Object](#) for an example of how to locate incomplete references.

Common Object Attributes

The Common Object Attributes are used by most of the object types in the Metasys system. Each object type also has specific attributes that apply only to that object type. A reference to the use of Common Object Attributes and a description of specific object attributes are given under each particular object in the [Object List](#).

Common Attributes

This section lists the attributes that are common to Metasys system objects.

Note: For detailed information on BACnet properties, refer to *ANSI/ASHRAE Standard 135-2008 - A Data Communication Protocol for Building Automation and Control Networks*.

Table 325: Common Object Attributes - Focus/Configuration Tab

Attribute Name	Notes ¹	BACnet Notes ¹	Initial Value	Description
Alarm State			Normal	Indicates the current alarm state of the object.
Archive Date				Indicates the date of the last successful archive of object instances. The value of this attribute is valid if a valid archive exists and during the archive download process. The value of this attribute is 0xFF at all other times.
Authorization Category	C,W	W	General	Classifies the object by the category of system or equipment that it monitors to aid in the determination of user access privileges and alarm routing. Examples: HVAC, Fire, Security Note: When you are defining a new object, manually select the Authorization Category from the drop-down list on the Configuration tab. This extra step is only required if you need to select a category other than General. For example, if the user is only assigned the HVAC category, manually select HVAC under the Configuration tab during object definition.
Description	C,N,W	BNW	No text	Contains a user-defined description of the object or, for some integrations, the device description. After the description is defined by the user, the description is not read from the device again.
Enabled			True	Indicates whether the object is set to execute/enabled (True) or not execute/disabled (False).
Item Reference	C			Contains a unique reference name for the object that is the full path name of the object through the All Items navigation tree using the unique identifier you specified when you manually created the object. The Item Reference begins with the site and device identifiers (separated by a colon), followed by the identifiers of any parent objects, such as an integration object, field device, or any nested folders, and ends with the identifier of the object itself. You define the identifier of each object as it is created and the system builds the Item Reference automatically. Once the object is defined, the Item Reference cannot be changed directly. But, the Computer Name attribute of a Site Director or device is the object identifier. If you change the Site Director or device Computer Name attribute, the Item Reference then updates to show the new Computer Name. If a device has a domain specified in the Domain Name attribute, the name for the domain appears in the Item Reference after the Computer Name: Computer Name.Domain Name The following characters are not allowed in references: @ ? * # [] " ' " \ : / < > \$. ' _ & Figure 59 shows an example for a field point object in an N2 integration.

Table 325: Common Object Attributes - Focus/Configuration Tab

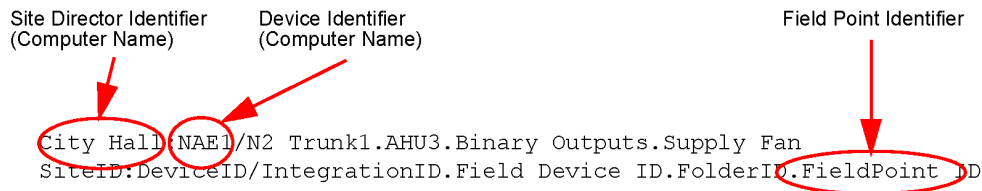
Attribute Name	Notes ¹	BACnet Notes ¹	Initial Value	Description
Name	C,W		Item ID	<p>Contains a freely definable user-friendly Name for the object that is independent of the Item Reference or the location of the object in the physical network. The Name is used as the label in the All Items navigation tree. The Name is shown in alarm reports, the event and audit viewers, and in summaries. The Name does not need to be unique to the site unless the name is used as the BACnet Object Name. When the name is used as the BACnet Object Name, it must be unique among the BACnet Object Names in the device (if it is not a Device object) or unique among the other device objects (if it is a Device object).</p> <p>The following characters cannot be used in an object name: @ ? * # [] " ' " " \ : / < > \$. , ' _ &</p> <p>The Name defaults to the object identifier you used during manual object creation, but can be edited later. For integrated BACnet objects, the name defaults to the BACnet Object Name in the remote BACnet device. For integrated N1 network objects, the name defaults to the System.Object Name in the Network Communication Module (NCM). Example: ConferenceCenter-Room2-SpaceSetPoint</p> <p>For devices, both the Computer Name and Name attributes default to the object identifier you used during manual object creation. But, do not confuse the Computer Name attribute with the Name attribute. Changing the NAE Name attribute does not impact the object references or network communication with other devices on the site.</p> <p>Changing the Computer Name online breaks any existing references between the NAE object and other objects on the site, and may break the existing network connection to other devices on the network. We do not recommend changing the Computer Name online. If you change the Computer Name attribute in the SCT (right-click the NAE in the navigation tree and select Rename), both the Computer Name and Name attributes are changed to the new name you select. The Item Reference then updates to show the new Computer Name.</p>
Object Count				Indicates the number of object instances within the device. This count includes objects of any type.
Object Identifier	C	B		Indicates the instance number of the Object Type used in the BACnet Object ID as exposed to a BACnet network. The object ID must be unique within the host device. The object ID of the Device object must be unique within the BACnet network.
Object Name		B		<p>Indicates the Object Name as exposed to a BACnet network. This attribute is equivalent to the Item Reference without the site identifier. You cannot edit this attribute, but it changes when the Item Reference attribute updates.</p> <p>In addition, you can change the Object Name attribute by editing the User Name attribute and setting the User Name Is BACnet Obj Name attribute to True. Example: NAE3/N2 Trunk1.AHU4.Supply Temp</p>
Object Type		B		<p>Indicates the Object Type as displayed in the Metasys software and as exposed to a BACnet network. Example: AI (Analog Input)</p>

Table 325: Common Object Attributes - Focus/Configuration Tab

Attribute Name	Notes ¹	BACnet Notes ¹	Initial Value	Description
Status			Normal	Displays the highest priority Status for the object. The value of the Status attribute displays next to the Default Attribute for Display (typically Present Value) in the header bar of the Display panel. Examples: (in order of priority - supported states depend on Object Type) <ul style="list-style-type: none"> - Out Of Service: The Out Of Service attribute value is True. - Offline: Communication with the physical hardware has failed. - Unreliable: Reliability attribute is not reliable. - Alarm: Object or alarm extension has an alarm state. - Normal: No abnormal condition for this object detected. - Output Clipped: Present Value is outside the limits of Min Value and Max Value. Status remains Output Clipped until the output changes.
User Name Is BACnet Obj Name	C,W	C,W	False	Controls whether the object's User Name attribute is also the Object Name attribute. The Object Name attribute is not writable, so the only way to change the Object Name attribute is to edit the User Name attribute and set the User Name Is BACnet Obj Name attribute to True.
Version				Displays the version number of the object software code. As the functionality of objects is enhanced, the version numbers are incremented. Example: 3.1 where 3 is the major revision and 1 is a minor revision

¹ B - Exposed as Standard BACnet Property, C - Configurable, N - Value Not Required, W - Writable

Figure 59: Example of Item Reference



Object and Feature Tabs

This section describes the tabs of the display panel for the objects and features in the system. Each display panel can contain different tabs depending on the item being viewed, and each tab shows different information.

Note: This section contains detailed information about the tabs used by multiple objects/features. When a tab only appears for a specific object/feature, the details of that tab are defined in that object/feature section. However, this section includes a brief description of such tabs and provides links to the detailed object/feature sections.

Action Tables Tab

The Action Tables tab appears on Interlock and Multiple Command objects. See the Interlock Object and Multiple Command Object sections for details.

Alarm Tab

The Alarm tab appears on an object that has an alarm extension. See Alarm Extensions in the Extensions section.

Associated Graphic Tab

The Associated Graphic tab appears when a graphic is referenced from the object using the Graphic attribute. See the User Graphics Tool (UGT) section for details on working with this tab.

Averaging Tab

The Averaging tab appears on an object that has an averaging extension. See Averaging Extensions in the Extensions section.

BACnet Alarm Tab

Attributes associated with the BACnet Intrinsic Alarming for an object are shown under the BACnet Alarm tab of the display panel. This tab appears when the site is defined as a BACnet site and the object has intrinsic alarming enabled (that is, Intrinsic Alarming Defined set to True).

Note: In the notes columns, attributes marked with the letter C are configurable, and attributes marked with the letter W are writable. In the BACnet notes column, attributes marked with the letter B are exposed as a standard BACnet property. For more information about attribute characteristics, see [Attributes](#).

Table 326: BACnet Alarm Tab Attributes

Attribute Name	Notes	BACnet Notes	Values/Options/Range	Description
Acked Transitions		B	To Offnormal, To Fault, To Normal Applies to all point objects and the Accumulator.	Displays three states that independently indicate the receipt of acknowledgments for To Offnormal, To Fault, and To Normal events. Transitions to High Limit and Low Limit Event States are considered Offnormal events. These states are set to False when the corresponding event occurs and an acknowledgment is expected as defined in the Notification Class Object referenced by the Notification Class attribute of this object. The states are set to True upon receipt of the corresponding acknowledgment.
Alarm Message Text	W	W	Maximum 256 characters Applies to all point objects and the Accumulator.	Specifies the body of the user-defined alarm message. Starting at Release 10.0, this attribute is replaced by Event Message Texts Config . The value of this attribute is kept in sync with the first element of the Event Message Texts Config attribute. Any modification to either one changes the other. Also, for upgraded systems that use Alarm Message Text, any text in this field is moved to the first element of the Event Message Texts Config field.

Table 326: BACnet Alarm Tab Attributes

Attribute Name	Notes	BACnet Notes	Values/Options/Range	Description
Alarm Values	C,W	W	Inactive, Active States Text attribute identifies the value set for this attribute. Applies to BI, BV, MI, and MV objects. For MI and MV objects, you can select multiple values from a list, unlike the other objects that are limited to one value.	Specifies the value (or list of values for multistate objects) that Present Value must reach before an event generates. If the object supports intrinsic reporting, this attribute is required. To Offnormal event generates under these conditions: – Present Value maintains the value(s) specified by Alarm Value(s) for a minimum period of time, specified in the Time Delay attribute. – To Offnormal flag is enabled in the Event Enable attribute. Once equal to the Alarm Value(s), the Present Value must become not equal to Alarm Value(s) before a To Normal event is generated under these conditions: – Present Value remains not equal to the Alarm Value(s) for a minimum period of time, specified by the Time Delay attribute. – To Normal flag is enabled in the Event Enable attribute.
BACnet Deadband	C,W	B,W	Applies to AI, AO, and AV objects.	Defines the value by which the Present Value must change below the High Limit or above the Low Limit before the object generates a To Normal event.
Error Status			Applies to the BO object.	Indicates whether the Present Value was successfully written to the object defined by the Feedback Reference. The Error Status displays Ok if the object was able to send its latest Present Value to the feedback object. Otherwise, the Error Status displays the error of the first failed command.
Event Enable	C,W	B,W	To Offnormal, To Fault, To Normal Applies to all point objects and the Accumulator.	Contains three states that independently enable To Offnormal, To Fault, and To Normal events. Transitions to High Limit and Low Limit Event States are considered Offnormal events. An unreliable condition generates a Fault event.
Event Message Texts	C, W		To Offnormal, To Fault, To Normal Applies to all point objects and the Accumulator.	An array of three character strings that holds the message texts that identify the last state of the object. The states in sequential order are: TO_OFF_NORMAL, TO_FAULT, and TO_NORMAL. If a particular event is yet to occur, the respective entry in the array is blank (null).
Event Message Texts Config	C, W		To Offnormal, To Fault, To Normal Applies to all point objects and the Accumulator.	An array of three character strings that defines the message texts used to identify the last state of the object. The states in sequential order are: TO_OFF_NORMAL, TO_FAULT, and TO_NORMAL, which you may customize by entering text in each field. What you enter here appears in the Event Message Texts attribute array. Starting at Release 10.0, this attribute replaces Alarm Message Text , but the two attributes are kept in sync so that any modification to either one changes the other.

Table 326: BACnet Alarm Tab Attributes

Attribute Name	Notes	BACnet Notes	Values/Options/Range	Description
Event State		B	Normal, Fault (unreliable), High Limit, Low Limit Applies to all point objects and the Accumulator.	Indicates the active alarm state of the Intrinsic Alarming feature if enabled for the object. In BACnet terms, High Limit and Low Limit states are Offnormal.
Event Time Stamps		B	BACnet formatted Time Stamps Applies to all point objects and the Accumulator.	Indicates the times of occurrence of the last To Offnormal, To Fault, and To Normal event transitions. Time and Date time stamps are shown as * if no transition of that type has been generated. Sequence time stamps are 0 if no transition of that type has been generated. If intrinsic reporting is supported by the object, this attribute is required.
Fault Values	C,W	W	Numbers: 0 to 65,535 States Text attribute identifies the value set for this attribute. The list of numbers come from a list of the Alarm Values. Applies to MI and MV objects.	Specifies any states the Present Value must equal before a To Fault event issues. If Present Value becomes equal to any of the states in the Fault Values list, and no physical fault is detected for any inputs represented by the Present Value attribute, then the Reliability attribute has the value Multistate Fault. If the object supports intrinsic reporting, the Fault Values attribute is required.
Feedback Reference	C,W	W	Applies to BO and MO objects.	Indicates the object reference of the feedback object.
Feedback Value	C,W	W	Inactive, Active States Text attribute identifies the value set for this attribute. Applies to BO and MO objects.	Indicates the status of a feedback value from which Present Value must differ before an event generates. The amount Present Value differs from Feedback Value to generate an event is locally determined. This attribute is required if the object supports intrinsic reporting. A To Offnormal event generates under these conditions: – Present Value differs from the Feedback Value for a minimum period of time, specified in Time Delay. – Event Enable attribute enables the To Offnormal flag. Once equal to the Feedback Value, the Present Value must become different from the Feedback Value before a To Normal event generates under these conditions: – Present Value remains not equal to the Feedback Value for a minimum period of time, specified by Time Delay. – Event Enable attribute enables the To Normal flag.
Graphic	C,W	C,W	Applies to all point objects and the Accumulator.	Indicates the graphic associated with the alarm extension.
Graphic Alias	C,W	C,W	Maximum 256 characters Applies to all point objects and the Accumulator.	Indicates a portion of the graphic's item reference, up to and including the name of the folder containing this object or the controller containing this point.

Table 326: BACnet Alarm Tab Attributes

Attribute Name	Notes	BACnet Notes	Values/Options/Range	Description
High Limit	C,W	B,W	Applies to AI, AO, AV, and Accumulator objects.	<p>Defines the high limit that the Present Value attribute must exceed before an event is generated.</p> <p>The object generates a To Offnormal event when the Present Value exceeds the High Limit for a minimum period of time, defined in the Time Delay attribute; the High Limit Enable is True in the Limit Enable attribute; or the To Offnormal is True in the Event Enable attribute.</p> <p>The object generates a To Normal event when the Present Value falls below the High Limit minus the Deadband for a minimum period of time, specified in the Time Delay attribute; the High Limit Enable flag is set in the Limit Enable attribute; or the To Normal flag is set in the Event Enable attribute.</p> <p>For the Accumulator object, this attribute indicates the upper limit of the Pulse Rate range.</p>
Life Safety Alarm Values			<p>Uses BAC LifSfty State (BACnet Lifesafety State) (Set 186).</p> <p>Applies only to Life Safety Zone and Life Safety Point objects.</p>	Specifies any states that the Present Value must equal before the point generates a To Offnormal event and enters the Life-Safety-Alarm event state.
Limit Enable	C,W	B,W	Applies to AI, AO, AV, and Accumulator objects.	Contains two flags that independently enable and disable reporting of High Limit and Low Limit events and their return to Normal. This attribute is required if the object supports intrinsic reporting.
Low Limit	C,W	B,W	Applies to AI, AO, AV, and Accumulator objects.	<p>Defines the low limit that the Present Value attribute must fall before an event generates.</p> <p>The object generates a To Offnormal event when the Present Value falls below the Low Limit for a minimum period of time, defined in the Time Delay attribute; the Low Limit Enable is True in the Limit Enable attribute; or the To Offnormal is True in the Event Enable attribute.</p> <p>The object generates a To Normal event when the Present Value exceeds the Low Limit plus the Deadband for a minimum period of time, specified in the Time Delay attribute; the Low Limit Enable flag is set in the Limit Enable attribute; or the To Normal flag is set in the Event Enable attribute.</p> <p>For the Accumulator object, this attribute indicates the lower limit of the Pulse Rate range.</p>
Notification Class	C,W	B,W	<p>0 to 4,294,967,295</p> <p>This is the BACnet Object Identifier of the Notification Class Object used for routing.</p> <p>Applies to all point objects and the Accumulator.</p>	Defines the notification class for handling and generating event notifications for the object. This attribute implicitly refers to the Notification Class Object that has a Notification Class attribute of the same value.

Table 326: BACnet Alarm Tab Attributes

Attribute Name	Notes	BACnet Notes	Values/Options/Range	Description
Notification Object Reference	C,W	C,W	Set to Notification Class: 1 Applies to all point objects and the Accumulator.	Allows selection of a Notification Class object. When the Notification Object Reference is written, the value of the Notification Class attribute is updated to reflect the referenced object's instance number. The value of the Notification Object Reference attribute is restricted to Notification Class objects on the same device as the Alarming object.
Notify Type	C,W	B,W	Alarm, Event Applies to all point objects and the Accumulator.	Defines whether the transitions generated by the object are Events or Alarms.
Pulse Rate	C,W		Applies to the Accumulator object.	Indicates the number of input pulses received during the most recently completed period specified by the Limit Monitoring Interval. This value is monitored by the Intrinsic Alarming logic for this object. This attribute is writable only when the object is out of service.
Time Delay	C,W	B,W	0 to 65,535 Units = seconds Applies to all point objects and the Accumulator.	Defines the minimum number of seconds that the Present Value must remain outside the range defined by the High Limit and Low Limit attributes before the object generates a To Offnormal event. Also defines the minimum time the Present Value must remain within the range defined by the High Limit and Low Limit attributes, including the Deadband attribute value, before the object generates a To Normal event. When used with the Feedback Value , this value specifies the minimum number of seconds that the Present Value must remain equal to the Feedback Value before a To Offnormal event generates or different from the Feedback Value before a To Normal event generates. For the Accumulator object, this value defines the minimum number of seconds that the Pulse Rate must remain outside of the range defined by the High Limit and Low Limit attributes before the object generates an event or alarm.

Calendar Tab

The Calendar tab appears on Calendar objects, which are used behind the scenes by the Scheduling feature.

Communications Tab

The Communications tab appears on Engine Device objects.

Configuration Tab

The Configuration tab appears when you define an object in the SCT or in a wizard. The Configuration tab shows operation attributes available for the object type to which the object belongs. The attributes displayed on the Configuration tab vary by object type. For example, the Analog Input object's Configuration tab has different attributes than the Metasys server object's Configuration tab. See the specific object section for details on its Configuration tab.

i Note: This tab is called the Focus tab in the online Site Management Portal.

Diagnostic Tab

The Diagnostic tab only appears for objects containing diagnostic data. The attributes displayed on the Diagnostic tab vary by object type. For example, the Diagnostic tab of the BACnet Protocol Engine Object has different attributes than the Engine Device Object. See the specific object section for details on its Diagnostic tab.

Email Tab

The Email tab appears on Engine or Server objects. The Email DDA Attributes appear on the Shared Configuration section of the Email Tab. The Email DDA Destination Configuration Attributes appear when you edit a specific Email destination on the Email tab.

Notes:

- At Metasys Release 10.1 and later, the edit button is disabled for an ADS, ADX, or OAS. For these devices, use the Metasys UI to modify the attributes on this tab.
- At Metasys Release 7.0 or later, Email Tab Destinations and all DDA communications feature alphabetical sorting. See table below.

Table 327: Email Sorting Icons



Icon	Icon Name	Description
	Ascending	Sorts destinations in alphabetical order
	Descending	Sorts destinations in reverse alphabetical order

Table 328: Email DDA Shared Configuration Attributes

Attribute Name	Description
SMTP Server Host	Specifies either a host name or IP address of a SMTP server. A host name can be specified only if a DNS is available to the device. This attribute is used in conjunction with Email DDA attribute. If no Email DDA destinations are configured, this attribute is ignored.
SMTP Port	Signifies the TCP port on which Email DDA should connect to deliver an email message. By default, this field is set to 25 (SMTP); however, some internal SMTP servers may be set up to non-standard ports, which require that this field be changed to match the listening port of the mail exchanger. If no Email DDA attribute exists, this attribute is ignored.
Authentication Type	Specifies the type of authentication used to send and receive emails. Depending on the selection you make, the fields on the Email tab become enabled or disabled to help you fill in only the fields required for that authentication type. If you select SMTP, the SMTP User Name and SMTP Password attributes become enabled. If you select POP-before-SMTP, the POP User Name and POP Password attributes become enabled.
SMTP User Name	Specifies a user name for the SMTP server. This attribute is ignored if the SMTP Server Host is empty. This attribute applies only when using SMTP authentication. If no Email DDA destinations are configured, this attribute is ignored. See SMTP Password.

Table 328: Email DDA Shared Configuration Attributes

Attribute Name	Description
SMTP Password	Specifies the password for the SMTP user name. This attribute is ignored if the SMTP Server Host is empty. This attribute applies only when using SMTP authentication. If no Email DDA destinations are configured, this attribute is ignored. See SMTP User Name.
POP Server Hostname	Specifies the hostname for the POP server. This attribute applies only when using POP authentication. If no Email DDA destinations are configured, this attribute is ignored.
POP User Name	Specifies a user name for the POP server. This attribute is ignored if the POP Server Hostname is empty. This attribute applies only when using POP authentication. If no Email DDA destinations are configured, this attribute is ignored.
POP Password	Specifies the password for the POP user name. This attribute is ignored if the POP Server Hostname is empty. This attribute applies only when using POP authentication. If no Email DDA destinations are configured, this attribute is ignored.
From Email Address	Specifies the email address from which all emails are sent. The From Email Address is a required field. If this attribute is not populated, the Email DDA does not attempt to send an email message.
SSL Email Enabled	When enabled or set to True, emails attempt to send over an SSL encrypted connection. If SSL is not supported, the email sends unencrypted unless SSL Email Ignoring Errors option is set to False. This attribute is disabled by default.
SSL Email Ignoring Errors	When True, the email is still sent even if the email server certificate appears to be invalid. When false, the email is sent only if the operating system can verify that the server sent a valid SSL certificate. The feature is only enabled if SSL Email Enabled is True. ① Note: Make sure that proper certificate revocation, such as Online Certificate Status Protocol (OCSP) stapling, is enabled and configured. For more information about OCSP configuration, refer to https://docs.microsoft.com/en-us/openspecs/windows_protocols/ms-ocsp/5792b4c4-c6ba-439a-9c2a-52867d12fb66 .
Email Diagnostics	Displays diagnostic information regarding the communication between the Email DDA (SMTP Client) and the SMTP Server. This attribute displays both successful and unsuccessful email message deliveries.

Table 329: Email DDA Destination Configuration Attributes

Attribute Name	Description
Label	Identifies the user-friendly destination name in the list of Email DDAs. Maximum characters: 80
Email Address	Specifies the email address of one or more recipients. You must use valid email addresses set up on an email server for the device to successfully send the email alarms. When entering more than one email address, separate the addresses with a comma (for example, Jonathan.Smith@jci.com, Jane.Smith@jci.com). Click the Browse icon to select email addresses defined by the user accounts in the Security Administrator system. See the Metasys/BACnet Alarming Overview section for more information about the Email DDA and selecting email addresses. Maximum characters: 256
Priority	Specifies the priority of the outbound email message. This attribute defines the X-Priority field within the email's MIME header. X-Priority is one of several ways to define the significance of an email. Not all email clients interpret it the same way. Refer to your email client's documentation for more information. You can choose from the following values: <ul style="list-style-type: none">• High• Normal• Low See the Hi Normal Low (Set 100).
Subject	Specifies the user-defined text that appears in the subject field of the email message. Maximum characters: 256
Retries	Specifies the number of attempts made to send a message if there is a failure before the system discards it. Range: 0-10
Enabled	Defines whether or not the destination is enabled. When this attribute is False, the Engine or Server does not deliver alarms to the configured recipients.

Table 329: Email DDA Destination Configuration Attributes

Attribute Name	Description
Filters	Specifies the rules to filter alarms. This attribute uses Alarm Value (Set 108). See Filters for more information.
Format	Defines the format of the message, indicating which fields are present in the received message. The following fields are optional: <ul style="list-style-type: none"> • Acknowledge Required (not an option for pager) • Authorization Category • Item Description • Item Fully Qualified Reference • Message • Previous Status • Priority • Site Name • Value

See [Event Message Routing, Filtering, and Destinations](#) for more information on this DDA.

Filters

Defines the rules used to filter alarms. This attribute appears on the Email, Pager, Printer, and SNMP tabs. See [Event Message Routing, Filtering, and Destinations](#) in the [Alarm and Event Management](#) section for more information on filtering.

Table 330: Filter Parameters

Filters	Operators Allowed	Values
Acknowledge Required	== or !=	True or False
Current Status	== or !=	Object Status Set
Start Day of Week	<, <=, >, >=, ==, or !=	Day of the week. Any value from Monday to Sunday
Start Time	<, <=, >, >=, ==, or !=	Time
End Day of Week	<, <=, >, >=, ==, or !=	Day of the week. Any value from Monday to Sunday
End Time	<, <=, >, >=, ==, or !=	Time
Item Type	== or !=	Object Type Set
Authorization Category	== or !=	Authorization Category Set
Previous Status	== or !=	Object Status Set
Priority	<, <=, >, >=, ==, or != ① Note: If you specify a filter with a value of >10, you receive only alarms with priorities between 11 and 255.	Number value

If you define multiple filters for a destination, the DDA combines all the criteria with an AND condition (all filter criteria must be met).

Engineering Tab

About this task:

The Engineering tab appears on integration objects in the system. This tab allows you to view and edit attributes of items such as devices and points on an integration.

To use the Engineering tab to view and edit attributes:

1. Right-click the integration object on the Navigation tree and select **View**. The Integration object appears.
2. Click the **Engineering** tab, and navigate to an item in the Integration Tree.
 - ① **Note:** You may need to click **Relearn** to discover the integrated devices and points on the network and populate the Integration Tree with the data.
3. Double-click the selected item. The Details screen for the selected item appears.
4. Click the **Edit** button.
5. Make the desired changes and click **Save**.

Event Tab

The Event tab appears on Event Enrollment objects.

See the [BACnet Event Enrollment Object Alarming](#) and [Event Enrollment Configuration Examples](#) in the [Alarm and Event Management for Metasys Systems Integrated with BACnet Devices](#) section.

For detailed information, refer to the *BACnet Event Enrollment Object Alarming* and *Event Enrollment Configuration Examples* topics in the *Alarm and Event Management for Metasys Systems Integrated with BACnet Devices* section of the *Metasys SMP Help (LIT-1201793)*.

Focus Tab

The Focus tab appears when you define an object in the online Site Management Portal. The Focus tab shows operation attributes available for the object type to which the object belongs. The attributes displayed on the Focus tab varies by object type. For example, the Analog Input object's Focus tab has different attributes than the Metasys server object's Focus tab. See the specific object section for details on its Focus tab.

① **Note:** This tab is called the Configuration tab in the SCT or in a wizard.

Graphic Tab

The Graphic tab appears on a device object that has an associated Graphic defined. See the [Graphic Object](#) for details on working with this tab.

Group Tab

The Group tab appears on Group objects.

Hardware Tab

The Hardware tab shows hardware-related attributes associated with the hardware source of an integration, device, or a point (for example, when an object has a reference to a physical input or output).

① **Note:** Each Hardware attribute table is organized and divided into sections of Integration Hardware attributes, Device Hardware attributes, and Point Hardware attributes (calling out when attributes are shared between these object types). These sections are indicated by headings that span across the table.

BACnet Hardware Tab

Attributes associated with the hardware source for object data are shown under the Hardware tab of the display panel. These attributes are not exposed to a BACnet network.

- ① **Note:** Each Hardware attribute table is organized and divided into sections of Integration Hardware attributes, Device Hardware attributes, and Point Hardware attributes (calling out when attributes are shared between these object types). These sections are indicated by headings that span across the table. Attributes marked with the letter C are configurable and attributes marked with the letter W are writeable.

Table 331: BACnet Hardware Tab Attributes

Attribute Name	Notes	Initial Value	Values/Options/Range	Description
Disable Automatic Alarming	C,W	False	False True	Specifies whether automatic online/offline device event reporting is disabled (True) or enabled (False). This attribute only applies to the device and not to the device's mapped objects. Devices with the Disable Automatic Alarming attribute set to True suppress the alarm event but still indicate they are offline in the navigation tree with a red X. Alarm extensions are not affected by this attribute.
Instance Number	C	None	0-65,535	Contains the number of mapped BACnet objects that are being polled on a periodic basis or are part of the BACnet Object Identifier (along with the Object Type). The BACnet Object Identifier is used to establish communication with the object.
Remote Device Addr		None	BACnet device address	Contains the BACnet address of the remote BACnet device where the integrated BACnet object resides.
Remote Object Name		None		Contains the BACnet Object Name of the integrated BACnet object as defined in the remote BACnet device.

IP Field Controller Hardware Tab

Attributes associated with the hardware source for object data are shown under the Hardware tab of the display panel. Attributes marked with the letter C are configurable and attributes marked with the letter W are writeable.

Table 332: IP Field Controller Hardware Attributes

Attribute Name	Notes	Initial Value	Values/Options/Range	Description
Computer Name	W			Contains the host name of the device.
Controller Number	C,W	0	Range = 000-999	Contains the three rotary switches that identify the device within the various levels of your site. Each rotary switch is selectable from 0 to 9, producing a number ranging from 000 to 999.
DHCP Enabled	C,W	True	False True	Specifies whether a unique IP address is assigned automatically (True) or manually (False). A unique IP address is assigned automatically by the DHCP server or manually by the user.

Table 332: IP Field Controller Hardware Attributes

Attribute Name	Notes	Initial Value	Values/Options/Range	Description
Disable Automatic Alarming	C,W	False	False True	Specifies whether automatic online/offline device event reporting is disabled (True) or enabled (False). This attribute only applies to the device and not to the device's mapped objects. Devices with the Disable Automatic Alarming attribute set to True suppress the alarm event but still indicate they are offline in the navigation tree with a red X. Alarm extensions are not affected by this attribute.
Domain Name	W			Contains the network domain in which the device belongs to.
Ethernet MAC Address	W	00:00:00:00:00:00		Contains the unique hardware number that identifies the device within a network.
Instance Number	C,W	0	Range = 0-4,194,303	Contains the Object Instance part of the BACnet Object Identifier, which is used with the Object Type value to define the full BACnet Object Identifier value. The BACnet Object Identifier is used to establish communication with the object.
IP Mask	C,W	0.0.0.0		Contains the bit mask that defines which bits are used to separate between the host portion of the address and the domain portion of the address. The IP Mask consists of four numbers ranging from 0 to 255 separated by three periods.
IP Router Address	C,W	Listof[0]		Contains the address of the device which is used to forward messages to a remote IP network.
JCI IP Address	C,W	0.0.0.0		Contains the unique address other networks connected to the IP use to identify the device. The JCI IP address consists of four separate numbers ranging from 0 to 255 separated by three periods.

LonWorks Hardware Tab

Attributes associated with the hardware source for object data are shown under the Hardware tab of the display panel. These attributes are not exposed to a BACnet network. Attributes marked with the letter C are configurable, and attributes marked with the letter W are writable.

Table 333: LonWorks Hardware Tab Attributes

Attribute Name	Notes	Initial Value	Values/Options/Range	Description
Alarm Event State	C,W	True	False True	Specifies whether Node State changes will cause alarms. The value of True allows Node State alarms to be processed by the NxE. The value of False masks Node State alarms from the NxE.
Command Status Mapping Table	C,W		Applies to BI, BO, MI, and MO objects only.	Limits or modifies the mapping to the field states/commands used by the object. This string refers to one of the conversion identifiers in the CommandStatusMap.xml file.
Custom Scale/Offset	C,W		Applies to AI and AO objects only.	Provides a custom scaling function for converting the field data to the defined units of the object. This attribute is for AI and AO objects only.
Device Class			Maximum Length = 40 Category = Default	Indicates the class of a device. The LonWorks network server is responsible for populating the Program ID (which includes the Manufacturer, Device Class, Device Subclass, Transceiver, and Model). If no standard Program ID exists, the value is n/a.

Table 333: LonWorks Hardware Tab Attributes

Attribute Name	Notes	Initial Value	Values/Options/Range	Description
Device Subclass			Maximum Length = 40 Category = Default	Indicates the device subclass usage of a device. The LonWorks network server is responsible for populating the Program ID (which includes the Manufacturer, Device Class, Device Subclass, Transceiver, and Model). If no standard Program ID exists, the value is n/a.
Disable Automatic Alarming	C,W	False	False True	Specifies whether automatic online/offline device event reporting is disabled (True) or enabled (False). This attribute only applies to the device and not to the device's mapped objects. Devices with the Disable Automatic Alarming attribute set to True suppress the alarm event but still indicate they are offline in the navigation tree with a red X. Alarm extensions are not affected by this attribute.
Domain ID	C	01	Maximum Length = 12 Category = Default Hex bytes of length 0,1,3, or 6	Defined by MCL software for the particular LonWorks network trunk. The validation code checks for proper format (zero, one, three, or six hexadecimal bytes).
Driver Name		Ipcdrv	Maximum Length = 30 Category = Default	Displays to the name of the installed LonWorks network driver.
DSN 1	C		Maximum Length = 30 Category = Default	Displays the native LonWorks network address (in Domain-Subnet-Node format). DSNs must be unique on the LonWorks network. DSN 1 is required. Use the format xx/xx/xx.
DSN 2	C		Maximum Length = 30 Category = Default	Displays the native LonWorks network address (in Domain-Subnet-Node format). DSNs must be unique on the LonWorks network. DSN 1 is required, but DSN 2 can be left blank. Use the format xx/xx/xx.
Enable Polling	C,W		Applies to AO, BO, and MO objects only.	Indicates whether polling is enabled or disabled when the Engine is in complete control of this item.
Field Units	C,W	DegF	Uses Unit Set (Set 869). This attribute is for AI and AO objects only.	Lists the engineering units that pertain to the LonWorks network data. This attribute is for AI and AO objects only.
File Filter	W		Maximum Length = 40 Category = Default	Lists the types of files that can be used as file extensions to the LON Integration object. The list includes: <ul style="list-style-type: none"> • eng • enm • enu • fmt • fpt • typ • xif File Filter can be edited for alternate languages and must be in the xxx file format.
Interface Value				Indicates the current value from the hardware interface. The Interface Value updates when the hardware is read or when the hardware's current value changes.

Table 333: LonWorks Hardware Tab Attributes

Attribute Name	Notes	Initial Value	Values/Options/Range	Description
LNS Database Name	C,W		Maximum Length = 30 Category = Default	Displays the name of the LNS database used to build the LonWorks network trunk.
Location Label			Maximum Length = 30 Category = Default	Describes the location of the controller.
Manual Control			Applies to AO, BO, and MO objects only.	Indicates that an HOA switch on the referenced item is set to Hand or Off.
Manufacturer			Maximum Length = 40 Category = Default	Indicates the manufacturer of a device. The LonWorks network server is responsible for populating the Program ID (which includes the Manufacturer, Device Class, Device Subclass, Transceiver, and Model). If no standard Program ID exists, the value is n/a.
Message Retry Count	C,W	1	Range = 0-15	Indicates the number of retry attempts to use when communicating with this controller.
Model		0		Indicates the model number of a device. The LonWorks network server is responsible for populating the Program ID (which includes the Manufacturer, Device Class, Device Subclass, Transceiver, and Model). If no standard Program ID exists, the value is n/a.
Neuron ID			Fixed Length = 6 Category = Default	Displays the Neuron ID of the local LonWorks network interface board or contains the Neuron ID of the remote LonWorks network controller. The Neuron ID must be unique to the LonWorks network.
Offline				Indicates whether the connected LonWorks network hardware is online or offline.
Overridden				Indicates if the hardware is overridden (if supported).
Priority			1-3	Indicates the Priority (1-3) at which to poll this item.
Program ID			Number of Elements = 40 Category = Default	Displays the Standard Program ID for the device in hex characters. The LonWorks network server is responsible for populating the Program ID (which includes the Manufacturer, Device Class, Device Subclass, Transceiver, and Model). If no standard Program ID exists, the value is n/a.
Resource File Language	C,W	ENU	Maximum Length = 3 Category = Default	Defines the language extracted from the resource file.
Status Launch Interval	C,W	0	Range = 0-10,000 milliseconds	Indicates how often the LON integration launches a status request to the field. A value of 0 means as often as needed. This attribute limits the LON bandwidth usage for the LON integration.
Target Reference	C			Defines the path into a controller for the data being mapped by the object.
Temporary Status Item Expiration Time	C,W	60	Range = 0-65,535 seconds Immediate (0), Never (65,535)	Indicates the time to poll the temporary objects in the status list.
Transceiver			Maximum Length = 40 Category = Default	Indicates the transceiver type for a device. The LonWorks network server is responsible for populating the Program ID (which includes the Manufacturer, Device Class, Device Subclass, Transceiver, and Model). If no standard Program ID exists, the value is n/a.

Table 333: LonWorks Hardware Tab Attributes

Attribute Name	Notes	Initial Value	Values/Options/Range	Description
Trouble			Applies to BI and BO objects.	Indicates whether the hardware device is currently under a trouble condition. Applies to BI and BO objects.
Update Interval	C,W		Units = Seconds 0-65,535 Applies to AO, BO, and MO objects only.	Specifies how often (in seconds) to repeat the last command. This attribute provides a heartbeat for controllers needing it. Use this attribute sparingly.
XIF Present				Indicates whether a XIF file matching this controller's Program ID was found.

MS/TP Hardware Tab

Attributes associated with the hardware source for object data are shown under the Hardware tab of the display panel. Attributes marked with the letter **C** are configurable and attributes marked with the letter **W** are writeable.

Table 334: MS/TP Hardware Tab

Attribute Name	Notes	Initial Value	Values/Options/Range	Description
Baud Rate Selection	C,W	0	Uses MSTPDL Baud Rate See the attribute description.	Indicates the baud rate of the NAE FC bus. <ul style="list-style-type: none"> Auto: Uses baud rate of running network. This value is the recommended setting for everything on the FC bus except the bus supervisor port. 1200: Uses 1200 baud only. This value is not recommended and may not be allowed on some devices. 9600: Uses 9600 baud only. This value is the lowest standard MS/TP baud rate. 19200: Uses 19200 baud only. This value is not recommended. 38400: Uses 38400 baud only. This value is the recommended baud rate for bus supervisor ports. 76800: Uses 76800 baud only.
Device Type				Indicates the type of device. This value comes from CCT.
Disable Automatic Alarming	C,W	False	False True	Specifies whether automatic online/offline device event reporting is disabled (True) or enabled (False). This attribute only applies to the device and not to the device's mapped objects. Devices with the Disable Automatic Alarming attribute set to True suppress the alarm event but still indicate they are offline in the navigation tree with a red X. Alarm extensions are not affected by this attribute.
FC Bus MAC Address				Displays the MAC address of the device on which the object exists (if the object physically resides on a device on the FC bus) or the FEC/VMA field controller MAC Address that the point is connected to (if the object physically resides on the SA bus).

Table 334: MS/TP Hardware Tab

Attribute Name	Notes	Initial Value	Values/Options/Range	Description
Instance Number				Displays the Instance Number of the object on the remote field device. The Instance number, along with the object type, defines the remote object's BACnet Object Identifier. The BACnet Object Identifier is used to establish communication with the object.
MAC Address	C		1-255	Indicates the MAC address of the device on the field bus.
Network Address	C,W	0	1-65,534 0 = Local network 65,535 = Reserved for broadcast	Contains the network number of the MS/TP bus used for BACnet message addressing. A value of 0 indicates a local network (the device is not intended as a router). Do not change this number after you start device mapping or discovery because it may invalidate the devices that have been found.
Offline				Specifies whether or not the point is offline.
SA Bus MAC Address			This attribute applies to AI, AO, BI, BO, and Accumulator objects.	Displays the MAC address of the device on which the object exists (if the object physically resides on a device on the SA bus).
Slot			This attribute applies to AI, BI, and Accumulator objects.	Defines the physical location of a point data source on the device.
Slot A			This attribute applies to AO and BO objects.	Defines the physical location of a point data source on the device.
Slot B			This attribute applies to PAO and BO objects.	Defines the physical location of a second data point source on the devices (if present). Only a PAO would have Slot B defined.
Trunk Number				Displays the trunk number where the device (on which the point resides) is located.

N1 Hardware Tab

Attributes associated with the hardware source for object data are shown under the Hardware tab of the display panel. These attributes are not exposed to a BACnet network. Attributes marked with the letter **C** are configurable and attributes marked with the letter **W** are writeable.

Table 335: N1 Hardware Tab Attributes

Attribute Name	Notes	Initial Value	Values/Options/Range	Description
Interface Value				Indicates the current value from the hardware interface. The Interface Value updates when the hardware is read or when the hardware's current value changes.
NCM Name		None	8 characters maximum	Contains the name of the NCM where the integrated N1 object resides, as defined in the N1 network. Read from the NCM.
Network Name		None	8 characters maximum	Contains the network name of the NCM where the integrated object resides as defined in the N1 network. The network name is obtained at startup through the N1 Migration Object.
Offline		False		Indicates whether the object is online or offline as determined by the communication status to the NCM.
Overridden		False		Indicates if the point is overridden in the NCM.

Table 335: N1 Hardware Tab Attributes

Attribute Name	Notes	Initial Value	Values/Options/Range	Description
Reference		None	<system>.<object>	Contains the name of the hardware object in the format of system.object, that the N1 object is associated within the NCM.
Remote Object Name	C,W	None	<system>.<object> 8 characters each maximum	Contains the name of the object in the format of system.object.

N2 Hardware Tab

Attributes associated with the hardware source for object data are shown under the Hardware tab of the display panel. These attributes are not exposed to a BACnet network. Attributes marked with the letter **C** are configurable and attributes marked with the letter **W** are writeable. The writeable attributes in the N2 Master Datalink object are writeable only if the UDP Port attribute is not zero. If the UDP Port attribute is zero and you attempt to write these attributes, an error message appears.

Table 336: N2 Hardware Tab Attributes

Attribute Name	Notes	Initial Value	Values/Options/Range	Description
Controller Type	C		AHU, VAV, UNT, PHX, VND, MIG, VMA, DX, TC, XTM, LCP, ILC, IFC	Defines the N2 controller type assigned to this object.
Disable Automatic Alarming	C,W	False	False True	Specifies whether automatic online/offline device event reporting is disabled (True) or enabled (False). This attribute only applies to the device and not to the device's mapped objects. Devices with the Disable Automatic Alarming attribute set to True suppress the alarm event but still indicate they are offline in the navigation tree with a red X. Alarm extensions are not affected by this attribute.
Error Log	W		See Table 337	Lists up to 100 error log entries. Each entry contains the N2 Controller Type, N2 Address, Error Description, and a Timestamp (time error occurred). Logging stops once the 100th entry is added. This list is stored in memory only. The Clear Statistics command clears the Error Log.
Host Name				Indicates the host name of the Ethernet (or wireless) converter. When a host name is given, the system attempts to resolve the Host Name and IP Address using DNS/DHCP (assuming that the installer assigned a host name to the converter and enabled DHCP). If the device can be located using the ping hostname command, the system can resolve the host name to an IP address. After resolving the host name, the system updates the IP address.
Interface Value				Indicates the current value from the hardware interface. The Interface Value updates when the hardware is read or when the hardware's current value changes.
Message Timeout	W	250	250–3,000 Milliseconds	Specifies the delay in milliseconds between the last character going out and the first character received. The timeout for VMA devices is three times this value. The actual timeout can be extended dynamically when at least one character of a response message is received before the timeout.

Table 336: N2 Hardware Tab Attributes

Attribute Name	Notes	Initial Value	Values/Options/Range	Description
Net N2 Address	C	0	1-254	Defines the host controller Address (1-254) on the N2 bus.
Net Point Address				Defines the hardware address associated with the point.
Net Point Type				Indicates the type of point (for example, AI or BI).
Offline			Offline (True), Online (False)	Indicates whether the hardware device is currently communicating with the system (True = Offline; False = Online).
Online Point Delay	C,W		Range = 0-8 Units = Minutes	Indicates the number of minutes that must elapse before bringing an N2 Controller online. This attribute allows integration devices, such as the MIG or VND, to gather status from their many field points before being reported online by the engine. With no delay, the N2 Controller reports unreliable and causes nuisance alarms. This timer is ignored when the Controller Type is not MIG or VND.
Overridden				Indicates whether the hardware device is currently overridden.
Poll Delay	W	100	0-65,535 Milliseconds	Specifies the time to wait in milliseconds for a response to an offline poll. The Poll Delay attribute is writable only if UDP Port is not zero. If UDP Port is zero and you attempt to write Poll Delay, an error message appears.
Retries	W	3	3-10	Specifies the number of message retries allowed when the device is online, including the initial attempt. Only one retry is attempted to an offline device. The Retries attribute is writable only if UDP Port is not zero. If UDP Port is zero and you attempt to write Retries, an error message appears
Trouble			Applies to BI and BO objects.	Indicates whether the hardware device is currently under a trouble condition. Applies to BI and BO objects.
Trunk Number			0-65,535	Specifies the number of the trunk on which the object resides.
UDP Port	W	0		Indicates the Ethernet UDP Port used for N2 communication over the IP network. The recommended UDP Port for N2 Trunk 1 is 4096 and for N2 Trunk 2 is 4097. Only valid on NAE5512 and NAE5513 models.

Table 337: N2 Errors

Error Number	Description
0	Controller has reset and is waiting for the Identify Yourself command
1	Undefined Command: command not understood by addressed controller
2	Checksum Error detected by controller
3	Input buffer overflow detected by controller
4	Invalid ASCII character detected by controller
5	Data field error: size of message not correct for command type
6	Invalid Data: one of the fields contains a value that is out of the expected range

Table 337: N2 Errors

Error Number	Description
7	Invalid command for data type: command not appropriate for this field or record
8	Command not accepted due to problems with the controller, the command is ignored
9	Device at address is the wrong type
10	No additional records are available (end of search)
11	Controller not ready
12	Data not matching the item or function type
13	Nonexistent item or function
14	Temporarily impossible to access the item
15	Not a programmable item
16	Table programmed with illegal item
17	Trend programmed with illegal item
18	Invalid Function Module
19	Exceeding Addressing Range
20	Password Not Enabled
21	I2C bus communication error (see I2CE)
22	Hardware not available (see OPMO)
23	Illegal item number
24	Counters unreliable
25	Power supply unreliable
26	Checksum Error detected by NxE
27	Block Checksum Error detected by NxE
28	Controller type does not match NxE database
29	Controller revision is less than C03
30	Controller revision is less than B03
31	Controller revision is less than A03
32	Controller revision is less than C05
33	VMACOV error
34	VMA BAC error
35	VMA FMT error
36	Retry error not due to a NAK
37	Unknown NAK error

VND Hardware Tab

Attributes associated with the hardware source for object data are shown under the Hardware tab of the display panel. Attributes marked with the letter **C** are configurable and attributes marked with the letter **W** are writeable.

Table 338: VND Hardware Tab Attributes

Attribute Name	Notes	Initial Value	Values/Options/Range	Description
Disable Automatic Alarming	C,W	False		Specifies whether automatic online/offline device event reporting is disabled (True) or enabled (False). This attribute only applies to the device and not to the device's mapped objects. Devices with the Disable Automatic Alarming attribute set to True suppress the alarm event but still indicate they are offline in the navigation tree with a red X. Alarm extensions are not affected by this attribute.
Field Value			Applies to only AI, AO, BO, MI, and MO objects.	Indicates the current value of the field point. Applies to only AI, AO, BO, MI, and MO objects.
Interface Value			Applies to only AI, AO, BO, MI, and MO objects.	Indicates the current value from the hardware interface. The Interface Value updates when the hardware is read or when the hardware's current value changes. Applies to only AI, AO, BO, MI, and MO objects.
Max Value	C,W	250.0 deg F	Applies to only AO objects.	Defines the highest reliable value for the Present Value. Applies to only AO objects.
Min Value	C,W	-50.0 deg F	Applies to only AO objects.	Defines the lowest reliable value for the Present Value. Applies to only AO objects.
Offline			Applies to only AI, AO, BI, BO, MI and MO objects.	Specifies whether or not the point is offline. Applies to only AI, AO, BI, BO, MI and MO objects.
Overridden			Applies to only AI, AO, BO, MI, and MO objects.	Indicates whether the hardware device is currently overridden. Applies to only AI, AO, BI, BO, MI and AO objects.
Priority	C,W		Applies to only AI, AO, BO, MI, and MO objects.	Specifies the priority for polling the vendor point. Applies to only AI, AO, BI, BO, MI and MO objects.
Protocol Description	C	VendorDriver		Indicates the protocol supplied by the Vendor DLL.
Protocol Revision	C			Indicates the revision of the protocol for reference purposes.
Protocol Revision Date	C			Indicates the date the Vendor DLL protocol was compiled.
Protocol Review Time	C			Indicates the time the Vendor DLL protocol was compiled.
Temporary Status Item Expiration Time	C,W		0-65,535 Units = Seconds	Indicates how long a point remains in the polling list.
Trouble			Applies to only BI and BO objects.	Indicates whether the hardware point is currently under a trouble condition. Applies to only BI and BO objects.
Vendor Configuration Data	C,W		Maximum characters = 80 Maximum entries = 128	Contains data for proper configuration of the integration.
Vendor DLL	C,W	VENDOR.DLL		Specifies the name of the vendor DLL to load at startup.
Vendor Integration Size			Units = bytes	Specifies the name of the vendor DLL to load at startup.
Vendor Reference	C			Specifies the address of the vendor device.
Vendor Revision Date	C			Indicates the date of the Vendor integration revision.
Vendor Revision Time	C			Indicates the time of the Vendor integration revision.

XL5K Hardware Tab

Attributes associated with the hardware source for object data are shown under the Hardware tab of the display panel. Attributes marked with the letter **C** are configurable and attributes marked with the letter **W** are writeable.

Table 339: XL5K Hardware Tab Attributes

Attribute Name	Notes	Initial Value	Values/Options Ranges	Description
Baud Rate	C,W	9600		Indicates the baud rate of the integrated Honeywell XL-5000 field device. Baud rates typically encountered include: 4800, 9600, 19200, 38400, and 76800.
Data Bits	W	8	Uses Databits	Indicates the data bits used by the XL-5000 equipment. The valid data bits/stop bits value for Honeywell protocol is 8/1.
Device Configured OK				Indicates if the Honeywell field device is fully configured, ready to run, operational, and if its database has objects.
Device Database OK				Indicates if the Honeywell field device has a fully populated database containing no errors, corruptions, or missing parts.
Device Health			OK or Fault	Indicates if the Honeywell field device is fully operational, running, and has correct operations.
Device Number	C,W	30	Range = 1-30	Indicates the number assigned to the NIE (as a Honeywell field device on the C-bus).
Device Type	C		Maximum Length = 18 characters	Indicates the type of Honeywell field device. For example, the XL-5000 family: XL-10, XL-20, XL-50, XL-80, XL-100, XL-300, XL-500, XL-600, Zone Manager.
Disable Automatic Alarming	C,W	False	False True	Specifies whether automatic online/offline device event reporting is disabled (True) or enabled (False). This attribute only applies to the device and not to the device's mapped objects. Devices with the Disable Automatic Alarming attribute set to True suppress the alarm event but still indicate they are offline in the navigation tree with a red X. Alarm extensions are not affected by this attribute.
Download Date				Displays the Date stamp returned from the Honeywell field device (if extractable, otherwise displays the date when the object was defined).
Download Time				Displays the Time stamp returned from the Honeywell field device (if extractable, otherwise displays the time when the object was defined).
Driver Name		XL5Kdrv		Indicates the protocol DLL driver name for this integration (for example, XL5Kdrv).
Firmware Version				Indicates the firmware version of the receiver module.
Hardware Version				Indicates the hardware version of the receiver module.
Parity	W	Even	Uses Parity	Indicates the parity used by the XL-5000 equipment. The valid parity for Honeywell protocol is Even.
Protocol Revision				Indicates the current version number of the XL5K Protocol Engine (PC104).
Remote Name	C,W		Honeywell device name	Indicates the existing name of the Honeywell field device.
Remote Object Type	C	Undefined		Indicates the type of remote object (for example, Analog Input, Digital Output, and Pulse Input).

Table 339: XL5K Hardware Tab Attributes

Attribute Name	Notes	Initial Value	Values/Options Ranges	Description
Reset Date				Indicates the date of the last Clear Statistics command.
Reset Time				Indicates the time of the last Clear Statistics command.
Stop Bits	W	1	Uses Stopbits	Indicates the stop bits used by the XL-5000 integration. The valid Data Bits value for Honeywell protocol is 8/1.
Trunk Number	W	1	Range = 0-6	Indicates the trunk number used for the integration. This number is typically 1.

Input Category Tab

The Input Category tab appears on GIO objects and includes the status, description, and value of the items in the category. See the [Generic Integration Object](#) section for details.

Interlock Definition Tab

The Interlock Definition tab appears on Interlock objects.

Load Tab

The Load tab appears on an object that has a load extension.

Load Summary Tab

The Load Summary tab appears on DLLR objects.

Logic Tab

The Logic tab appears on Program (Control System) objects, which are used for the LCT feature.

Members Tab

The Members tab appears on Life Safety Point and Life Safety Zone point objects.

Network Tab

The Network tab appears on Engine Device objects.

Options Tab

Attributes associated with the default state, control source, and restart options for an object are shown under the Options tab of the display panel. Attributes marked with the letter **C** are configurable and attributes marked with the letter **W** are writeable.

Table 340: Options Tab

Attribute Name	Notes	Initial Value	Values/Options/Range	Description
Auto Restore	C,W	True	Applies to AO, BO, MO, AV, BV, and MV objects.	When True, the point restores the last command on field device online/offline transition.
Connected Status			Ok Applies to AV, BV, and MV objects.	Indicates the current status of the connection between the AV/BV/MV and the object that is specified in the Connected To attribute.

Table 340: Options Tab

Attribute Name	Notes	Initial Value	Values/Options/Range	Description
Connected To	C, W, N		Object Name, Reference, Attribute Applies to AV, BV, and MV objects.	Specifies an optional attribute reference of another object in the system to which the AV/BV/MV is connected. The direction of the data flow depends on the value of the Direction attribute.
Direction	C, W	Not Connected	Sends Value To; Receives Value From; Not Connected Applies to AV, BV, and MV objects.	Specifies the directional flow of data if the Connection To attribute is configured. If the Connected To attribute is not set, this attribute is not used. Three direction states can be written: <ul style="list-style-type: none"> • Sends Value To: changes to Present Value are sent to the object/attribute configured in Connected To. • Receives Value From: changes to Present Value are received from the object/attribute configured in Connected To. If the AV/BV/MV is set to Monitor Only=True, you cannot set the Direction. • Not Connected: the object is not connected to any source or destination; the value of the Connected To attribute is ignored.
Ignore Relinquish Default	C,W	True	Applies to AO, BO, MC, MO, AV, BV, and MV objects.	When True, the Relinquish Default attribute is not used and has no effect.
Local Control	C,W	True	True or False Applies to AO, BO, MO, AV, BV, and MV objects.	When True, the point is under local control and the Present Value can be commanded only with an operator override command.
Relinquish Default	C,W		Values and ranges depend on object type. Applies to AO, BO, MC, MO, AV, BV, and MV objects.	Used as the default value for Present Value when all command values in Priority Array are Null.
Restore Command Priority	C,W	Operator Override	Uses Restore Priority Applies to AO, BO, MC, MO, AV, BV, and MV objects.	Allows you to select which commands (at a selected priority) persist through a supervisory device restart. When the bit is set, the command (at the selected priority) is saved at shutdown and restored at startup.

Output Category Tab

The Output Category tab appears on GIO objects and includes the status, description, and value of the items in the category. See the [Generic Integration Object](#) section for details.

Pager Tab

The Pager tab appears on some older Engine models that run a version of Windows Embedded operating system. The newer Engine models that run a Linux operating system do not support pagers. The Pager DDA Attributes appear on the Shared Configuration section of the Pager Tab. The Pager DDA Destination Configuration Attributes appear when you edit a specific Pager destination on the Pager Tab.

Table 341: Pager DDA Shared Configuration Attributes

Attribute Name	Data Type	Initial Values	Description
Connect Using	One from a list of values	Internal Modem (0)	Refer to the modem type.
Access Number	Text		Be sure to check the Access Number and Password after an upgrade. In some cases, these values are not maintained after upgrade.
Redial Attempts	Number	3	Minimum Value = 0, Maximum Value = 32767 Range Check = Use Limits
Time Between Redial Attempts	One from a list of values	1 Second (0)	Refer to the Redial Delay (Set 565).
Idle time Before Hanging Up	One from a list of values	1 Minute (1)	Refer to the Idle Time (Set 566).
Redial if Line is Dropped	True or False	True	Whether the modem redials the number if the line is dropped.
Databits	One from a list of values	7	Refer to the Pager Databits
Parity	One from a list of types	Even	Refer to the Pager Parity
Stopbits	One from a list of values	1	Refer to the Pager Stopbits
Password	Text	000000	Supports alphanumeric and special ASCII characters. 000000 is the standard default password for the Telocator Alphanumeric Protocol used by the pager.
Pager Diagnostics	Text		Displays the communication between the Pager DDA, modem, and customer's paging Service. It displays both successful and unsuccessful attempts to send a page.

Table 342: Pager DDA Destination Configuration Attributes

Attribute Name	Description
Label	Identifies the user-friendly name for a pager destination in the list of Pager DDAs.
Pager Phone Number	Specifies the phone number for the user's pager.
Max Characters	Specifies the maximum number of characters supported by the pager service provider.
Retries	Specifies the number or attempts made to send a message if there is a failure before the system discards it. Range: 0-10

Table 342: Pager DDA Destination Configuration Attributes

Attribute Name	Description
Enabled	Defines whether or not the destination is enabled. When this attribute is False, the Engine or Server does not deliver pager messages to the configured recipients.
Filters	Specifies the rules to filter pager messages. See Filters for more information.
Format	Defines the format of the message, indicating which fields are present in the received message. The following fields are optional: <ul style="list-style-type: none"> • Acknowledge Required (not an option for pager) • Authorization Category • Item Description • Item Fully Qualified Reference • Message • Previous Status • Priority • Site Name • Value

See [Event Message Routing, Filtering, and Destinations](#) for more information on this DDA.

Parameter Category Tab

The Parameter Category tab appears on GIO objects and includes the status, description, and value of the items in the category.

Printer Tab

The Printer tab appears on Server objects. The Printer DDA Destination Configuration Attributes appear when you edit a specific Printer destination on the Printer tab.

- ① **Note:** At Metasys Release 10.1 and later, the edit button is disabled for an ADS, ADX, or OAS. For these devices, use the Metasys UI to modify the attributes on this tab.

Table 343: Printer DDA Destination Configuration Attributes

Attribute Name	Description
Printer	Specifies the name of the printer where reports are routed. The Printer DDA can send alarms to one or multiple printers. ① Note: If you are uncertain about the proper printer name to use, print a test page from the printer and look for the Printer name line in the test printout. Copy the name and syntax exactly.
Font Face	Specifies the font used by the printed report.
Font Size	Specifies the font size used in the printed report.
Orientation	Defines the orientation of the printed report (landscape or portrait).

Table 343: Printer DDA Destination Configuration Attributes

Attribute Name	Description
Line Out	Defines how many lines of data are required before the Printer DDA routes reports to the printer. Setting this value to 0 enables tractor-feed/line printing. See the Printer topic in the Alarm and Event Management section. Range: 0 to 60
Timeout	Timer (in minutes) that begins when the first alarm is stored in the DDA line out buffer (Line Out). Upon expiration, the contents of the line out buffer prints.
Printing Priority Threshold	Specifies the priority for printing alarm messages. You can print multiple alarms in a normal priority range at once using the Line Out and Timeout attributes. You also can set the Printing Priority Threshold to print the contents of the line out buffer immediately when a higher priority alarm (such as a fire alarm) is detected. You can set the Printing Priority Threshold to a value from 0 to 255. When an alarm is received that has a lower priority number than the Printing Priority Threshold (lower priority numbers have a higher alarm priority), the contents of the line out buffer print immediately when the higher priority alarm (such as a fire alarm) is detected, thus printing the high priority alarm in addition to the contents of the line out buffer. For example, if the Printing Priority Threshold is set to 20, alarms with a priority number of 20 or greater are buffered using the Line Out and Timeout attributes. Receiving an alarm with a priority number of 19 or less forces an immediate printout of the currently buffered alarms plus the new high priority alarm. This functionality applies when the Line Out attribute is set to 1 or greater. Also see the Printer topic in the Alarm and Event Management section. See the Hi Normal Low.
Retries	Specifies the number or attempts made to print a report if there is a failure before the system discards it. Range: 0 to 10
Enabled	Defines whether or not the destination is enabled. When this attribute is False, the Server does not deliver reports to the configured printer.

Table 343: Printer DDA Destination Configuration Attributes

Attribute Name	Description
Filters	Specifies the rules to filter messages. See Event Message Routing, Filtering, and Destinations for more information.
Format	Defines the format of the message, indicating which fields are present in the received message. The following fields are optional: <ul style="list-style-type: none"> • Acknowledge Required (not an option for pager) • Authorization Category • Item Description • Item Fully Qualified Reference • Message • Previous Status • Priority • Site Name • Value

See [Event Message Routing, Filtering, and Destinations](#) for more information on this DDA.

Profile Tab

The Profile tab appears on DLLR objects.

Recipient List Tab

The Recipient List tab appears on Notification Class objects.

Remote Services Connection Tab

The Remote Services Connection tab resides on the Site Object and enables you to connect to the cloud-based platform. Starting at Release 10.0, you can no longer configure a connection to a cloud-based platform with the attributes in the Remote Services Connection tab of the Site object. The tab is appears but its attributes should no longer be defined.

Resource Tab

The Resource tab appears on an object that has a resource file extension.

Schedule Tab

The Schedule tab appears on Schedule objects.

Site View Tab

The Site View tab appears on Site objects.

SNMP Tab

The SNMP tab appears on Engine or Server objects. The SNMP DDA Attributes appear on the Shared Configuration section of the SNMP Tab. The SNMP DDA Destination Configuration Attributes appear when you edit a specific SNMP destination on the SNMP tab.

Note: At Metasys Release 10.1 and later, the edit button is disabled for an ADS, ADX, or OAS. For these devices, use the Metasys UI to modify the attributes on this tab.

Table 344: SNMP DDA Shared Configuration Attributes

Attribute Name	Description
SNMP Enabled	Specifies whether the SNMP feature is enabled. Once this attribute is enabled, the ability to send and receive messages (Traps and Gets) can be enabled or disabled on an individual basis using the other SNMP DDA attributes.
SNMP Trap Version	Specifies the version used to send SNMP traps. The versions are v1, v2c, and v3.
SNMP Management Device	Specifies an IP address or Host Name on which to filter Get requests. SNMP only responds to requests from the device listed in this attribute. If this attribute is 0.0.0.0, SNMP responds to all requests.
SNMP Request Port	Specifies the port on the destination device that requests information from the Engine or Server. The direction of communication is from the destination device to the Engine or Server. Currently, this function is supported only on hardware and software-based network engines. For hardware network engines that run with a Windows operating system, changing the value of this attribute requires a restart for the change to take effect, but for engines running the Linux operating system, a restart is not required. Setting this attribute to 0 disables the Get feature of SNMP.
Contact Person	Specifies the IT person who is responsible for managing SNMP communications.
Public Community Name	A case-sensitive string used to authenticate v1 and v2c Get and Get Next messages. This attribute contains the community string used by the Network Management System to edit data in objects maintained by managed devices.
SNMP Trap Message Format	Defines the message format used for generating SNMP Traps, including the startup Trap. The options are: <ul style="list-style-type: none"> String Based (default) - SNMP Traps are sent as a string of characters MIB Based - SNMP Traps are sent using the OIDs defined in the Johnson Controls MIB (called, JCI MIB).

Table 345: SNMP DDA Destination Configuration Attributes

Attribute Name	Description
Label	The name of this destination when it appears in the Destinations list.
Trap Community Name	A case-sensitive string used to authenticate v1 and v2c SNMP Traps. This attribute contains the community string used by the Network Management System to edit data in objects maintained by managed devices.
JCI IP Address	Specifies the IP address or host name of the system that receives the traps.

Table 345: SNMP DDA Destination Configuration Attributes

Attribute Name	Description
Destination Port Number	Specifies the port on the destination device that receives messages from the Engine or Server. The direction of communication is from the Engine or Server to the destination device. Setting this attribute to 0 disables the Get feature of SNMP.
Enabled	Specifies whether this SNMP destination is enabled or disabled.
Filters	Specifies the rules to filter alarms. This attribute uses Alarm Value (Set 108). See Filters for more information.
Format	Allows you to select which attributes of a Metasys event are in the SNMP Trap. The following fields are optional: <ul style="list-style-type: none"> • Acknowledge Required (not an option for pager) • Authorization Category • Item Description • Item Fully Qualified Reference • Message • Previous Status • Priority • Site Name • Value

See [Event Message Routing, Filtering, and Destinations](#) for more information on this DDA.

For detailed information on SNMP, refer to the *SNMP Agent Protocol Implementation* appendix located in the *Network and IT Guidance Technical Bulletin (LIT-12011279)*.

Syslog Tab

The Syslog tab appears on Engine or Server objects. The Syslog DDA Attributes appear on the Shared Configuration section of the Syslog Tab. The Syslog DDA destination Configuration Attributes appear when you edit or create a new Syslog Destination on the Syslog tab.

Note: At Metasys Release 10.1 and later, the edit button is disabled for an ADS, ADX, or OAS. For these devices, use the Metasys UI to modify the attributes on this tab.

Syslog has one Share Configuration attribute—Syslog Reporting Enabled. When the Syslog Reporting Enabled attribute is set to **True** the feature is active and your error logging is forwarded to your destination server.

Table 346: Syslog DDA Destination Configure Attributes

Attribute	Value / Description
Label	Destination name
Syslog Server	IP Address for the destination server
UDP Send Port	The designated port on the device for error transmitting to your server.
UDP Receive Port	The designated port on your server for receiving the error transmits.
Event Filters	To add or remove Events from displaying
Audit Filters	To add or remove Audits from displaying

Summary Tab

The Summary tab provides summary data for items in the navigation tree. For example, the Summary tab of the MSTP Field Bus object shows summary data for the devices on the field bus. The Summary tab shows the status, icon, item, value, and description information of the items. You can view and edit items on this tab using the right-click menu options.

Note: Data appears in the Status column of the Summary tab when the status is not Normal (for example, High Alarm).

Summary Definition Tab

The Summary Definition tab appears on Summary Definition objects used by the Tailored Summary feature. This tab allows you to view and edit the Summary Definition object. Refer to the *Tailored Summaries* section in the *Metasys SCT Help (LIT-12011964)* for more information on this object and feature.

Tailored Summary Tab

The Tailored Summary tab appears when you view the folder containing the Tailored Summary in the associated User View. This tab allows you to view the Tailored Summary you defined using the User View and the Summary Definition tab. See the *Tailored Summaries* section in the *Metasys SCT Help (LIT-12011964)* for more information on this feature.

Totalization Tab

The Totalization tab appears on an object that has a totalization extension.

Tree View Tab

The Tree View tab appears on User Navigation Tree objects, which are used by the User Views feature.

Trend Tab

The Trend tab appears on an object that has a trend extension.

Trend Study Tab

The Trend Study tab appears on the Trend Study feature.

User Defined Enumeration Editor Tab

The User Defined Enumeration Editor provides the user interface for the quick modification, creation, or deletion of User Defined Enumerations on a Metasys Site. Authorized users can modify one or more User Defined Enumerations. This tool provides a solution for various change requests, and satisfies requirements for new and future Metasys system features that need to provide the user with the ability to define the displayed text for multiple User Defined Enumerations. The User Defined Enumeration Editor is available in both the online (runtime) and offline (SCT) modes of the Metasys system supervisory user interface. Access the tool by selecting the **Custom Enumeration** tab of the Site Object.

- For Release 5.2 and later, the Rediscover Text Strings operation generates custom enumerations from all mapped BACnet and MS/TP objects. These custom enumerations are backed up when the Site Director is uploaded in the Release 5.2 database. During the upgrade process, a restored, upgraded, or downloaded Release 5.2 database maintains these custom enumerations during the upgrade process.
- For Release 6.5 and later, the **User Defined States Text** attribute is set to true whenever an object has a custom enumeration set assigned to it.
- Engines at Release 8.0 and later automatically read custom state sets text created in CCT and display them in the SMP user interface, instead of the generic **State 0 to State X** text.

Figure 60: User Defined Enumeration Editor

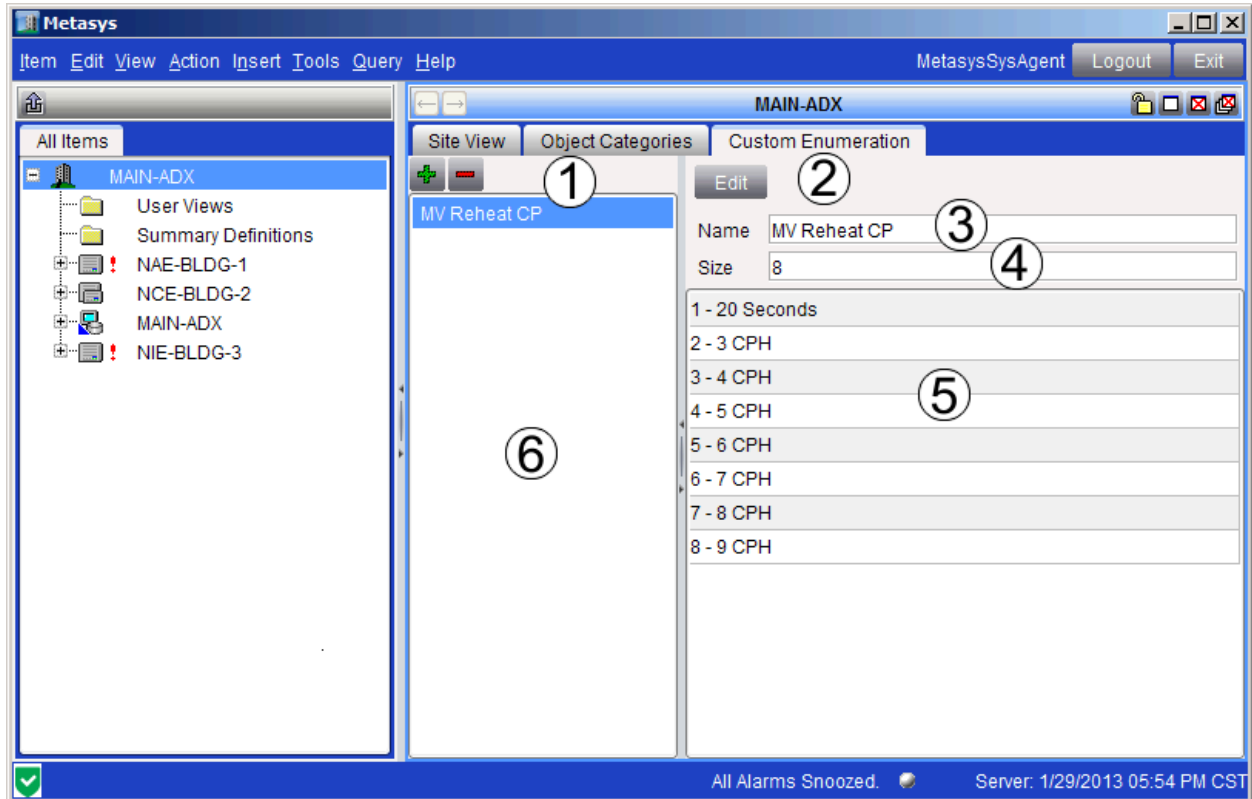


Table 347: User Defined Enumeration Editor Areas

Item	Name	Use
1	Add and Delete Custom Enumeration buttons.	Add new or Delete existing User Defined Enumeration Sets.
2	Edit OR Save and Cancel Buttons.	When you select the Custom Enumeration tab there is an Edit button here; upon selecting Edit , the button is replaced by the Save and Cancel buttons.
3	Name	Name of the new or selected Enumeration set - limited to 32 characters.
4	Size	Enumeration set size. This is the number of values within the selected enumeration. You may not see optimal performance if this exceeds 5 members.
5	Enumeration Entries	Entries within the selected enumeration. Cannot be blank or white space. You may not see optimal performance if this exceeds 10 characters.
6	List of existing user defined enumeration sets.	Displays the current list of User Defined Enumerations. This list is limited to 256 entries.

Graphic

Menu Selection: **Insert > Graphic**

Inserts a graphic into the site.

User Graphics Tool (UGT)

Graphics provide a visual representation of the monitored systems that enable you to quickly check the status of system symbols and recognize unusual system conditions. Graphics can be designed to allow the user to move through buildings, floors, and other areas, viewing building systems and control processes. You can view, create, and edit graphics using the User Graphics Tool (UGT).

User graphics are usually made up of three parts:

- the [Static Background](#) image
- [Symbols](#)
- [Hyperlinks](#) that allow you to navigate to graphics and web addresses

The UGT operates in two modes:

- The [Edit Mode](#) allows you to edit an existing graphic or create new graphics.
- The [View Mode](#) allows you to view existing graphic to monitor and command all systems integrated into the Metasys network.

The UGT is available with the NAE, NIE, Metasys server, and SCT. You can access the UGT when you are logged in to the Metasys user interface through any web browser. The [Group Object](#) represents user graphics in the All Items navigation tree and can be displayed in any active [display panel](#).

i Note: If your graphics reference multiple Engines or multiple Metasys servers, and one device needs to be downloaded, upload all Engine/Metasys servers prior to making changes in SCT. This procedure ensures your graphics work consistently.

For information on default preferences for graphics (such as status colors, fan colors, state colors, and alarm flashing settings), see [Graphic Settings Tab](#) in the [Preferences](#) section.

For more information on configuring an NAE or NIE and for details on user access configuration, see the [Related Documentation](#) table.

User Graphics Tool Concepts

Graphic Workspace

When viewing an existing graphic or creating new graphics, the UGT runs in the Graphics Workspace, which is displayed in an active [display panel](#). The default workspace background is gray. The graphic workspace displays all graphical symbols and a user-selectable [Static Background](#). The UGT [Toolbar](#) shows only the appropriate tools for the [UGT Modes](#) that you are working in, either [View Mode](#) or [Edit Mode](#).

UGT Modes

The User Graphics tool runs in either [Edit Mode](#) [View Mode](#). When you are generating new graphics or editing graphics, the User Graphics tool is in Edit mode. When you finish editing and click save and the UGT switches to View mode.

You can generate graphics in the Metasys system with the online mode or with the offline mode:

Online: Use this method if your web browser is connected to an Engine or Metasys server. In this case, a new graphic is generated online in the device where the graphic resides during normal operation. When you are finished creating or editing graphics, Upload the database to the archive database in the SCT.

Offline: If your web browser is connected to the SCT. In this case, the new graphic is generated offline and stored in the archive database. When you are finished creating or editing graphics, Download the database to the device where the graphic resides during normal operation.

Edit Mode

Edit mode is the mode used by the UGT to design and edit graphics. Access the Edit mode by clicking the Edit button on the UGT [Toolbar](#). In Edit mode, you have access to all toolbar items/symbols and you can [bind](#) symbols to objects and link graphics to other graphics.

Right clicking in Edit mode brings up basic choices for editing graphics such as copy, paste, delete, duplicate, hide, and zoom, depending on the type of item you select. Double clicking in Edit mode brings up the binding information for a symbol.

For a list of mouse shortcuts, see the [Mouse Shortcuts: Edit Mode](#) topic.

View Mode

Graphics display in the View mode when you are [navigating using graphics](#) and when you first open a graphic. Graphics appear in an active [display panel](#). You must enter the [Edit Mode](#) (by clicking the [Edit button](#)) to design or edit a graphic. In View mode, you have access only to a limited number of items on the UGT [Toolbar](#). The symbols in the palette on the left do not appear in this mode.

The View mode allows you to command an object bound to a [Value Display Box](#) or [Analog Fill Bar Graph](#) and to click on [Hyperlinks](#) to access linked graphics. Double clicking on a bound symbol in View mode displays the Focus view of the bound object.

For binary point objects, the value and status update every 10 seconds. For analog point objects, the value and status update every 10 seconds. Commands and value changes return a new state/value or error message within 10 seconds or less. The error message could be related to priority (if the system can't perform the requested function now) or failure to reach a commanded state or value. Error messages appear in dialog boxes.

For a list of mouse shortcuts, see the [Mouse Shortcuts: View Mode](#) topic.

Toolbar

The UGT toolbar shows only the appropriate tools for the current [mode](#) of the UGT. The table below shows the toolbar options available in [Edit Mode](#) and [View Mode](#).

For information on mouse shortcuts, see [Mouse Shortcuts](#).

Table 348: UGT Toolbar Options in Edit Mode and View Mode






















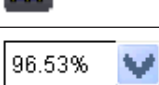
Icon (Standard Windows Icons not Shown)	Description	Visible In:		Action Performed
		Edit Mode	View Mode	
	Save	X		Saves all changes to the graphic and exits Edit mode.
	Cancel	X		Cancels any changes to the graphic (made since the last save) and exits Edit mode.
	Edit		X	Changes the UGT to Edit mode. Note: This is the only toolbar item that requires Configure Access (Security Administrator System).
	Print	X	X	Brings up the Print dialog.
	Print Preview	X	X	Brings up the Print Preview dialog.
	Cut	X		Cuts the selected symbol out of the graphic.
	Copy	X		Copies the selected symbol.

Table 348: UGT Toolbar Options in Edit Mode and View Mode

Icon (Standard Windows Icons not Shown)	Description	Visible In:		Action Performed
		Edit Mode	View Mode	
	Paste	X		Pastes a cut or copied symbol into the system.
	Undo	X		Undoes the previous action (except for a save) up to 4 actions.
	Redo	X		Redoes the previous undone action up to 4 actions.
	Set Background Image	X		Allows you to import the background of the graphic.
	Set Advanced Image	X		Allows you to import an advanced graphic.
	Save Background Image	X		Saves the background image.
	Bind	X		Brings up the Bind Information dialog box for the selected item. (This box is the same as when you double click on an item.)
	Select	X	X	Turns the cursor into a selection cursor.
	Text	X		Turns the cursor into a text cursor that allows you to create a text box.
	Pan	X	X	Turns the cursor into a hand that allows you to pan over the diagram by dragging.
	Marquee Zoom	X	X	Allows you to select an area to zoom in on.
	Interactive Zoom	X	X	Zooms in and out on a graphic when you hold the mouse down.
	Zoom - Fit Window	X	X	Zooms the diagram to fit within the window.
	Overview	X	X	Shows an overview of the entire graphic in one window.
	Selective Zoom	X	X	Allows you to select the percentage zoom applied to the diagram.

Static Background

Backgrounds are static images displayed in the background of a graphic. Backgrounds represent buildings, floor plans, mechanical equipment, and any other picture that represents the location or function of the equipment in the graphic. By default, a newly created graphic has a gray background. You can insert a background image using a file based on SVG, SVGZ, or JPEG graphic format.

You can create SVG/SVGZ background images with graphic drawing packages or from established libraries of images. We recommend using the Professional or Standard edition of Microsoft Visio 2003, 2007 or 2010 (32 bit) software and the AGSL to create background images. Alternatively, you can use Microsoft Visio 2002 software with the GSL. SVGZ and SVG images must be created in positive space (quadrant 1, on the positive X and positive Y axis).

Background images in JPG format are usually created with cameras or scanners. You cannot resize a UGT background in JPG format, and if an area of the graphics workspace is not fully covered by the JPG image, the exposed area defaults to gray.

Access available backgrounds with the background icon on the [Toolbar](#).

For information on how to edit an existing background image, see [Editing a Background Image](#).

Managing Graphic Creation

In general, you should store your graphic files on the Site Director. The Site Director provides you with a uniform point of entry and traffic control. The Site Director allows information sharing between users while minimizing network traffic.

NAE35/NAE45 Graphic Size Limitation

When you create or edit graphics with an online UI to an NAE35 or NAE45, changes you make do **not** save if the graphic is too large. The total size of the graphic background, dynamics, and static text must not exceed 700K bytes. A typical size for an SVGZ graphic is 100–200K. You do not receive a warning that the graphic is too large to save. Transactions larger than 1 MB are rejected by the NAE. The size limitation includes a 40% overhead from the HTML **wrapper** around the save transaction.

① **Note:** This size restriction does not apply to graphics that are created and saved through the online UI to an NAE55, NAE85, or SCT.

When you work with NAE35/NAE45 graphics, use the following equation to help keep your graphics at a manageable size:

$(\text{background image size} \times 140\%) - 1 \text{ MB } (1,048,576 \text{ bytes}) = \text{available space for graphic dynamic symbols and text blocks}$

① **Note:** Each graphic symbol is 3,000 bytes.

Example:

Background size: 700,000 bytes

Background + overhead: $700,000 \times 140\% = 980,000$

Total Space for symbols and text = $1,048,576 - 980,000 = 68,576$

Total symbol and text elements = $68,576 / 3,000 = 22$

Symbols

Symbols are graphic elements or components that are inserted into graphics to represent the value or status of equipment in your system. The UGT contains the set of symbols described in the table below. In Edit mode, the symbols appear in a palette to the left side of the graphic workspace.

Symbols support drag and drop functionality. For more information, see [Drag and Drop Shortcuts](#).

Table 349: Symbol Descriptions

Symbol	Description
Buttons	Buttons allow you to hyperlink from one graphic to an item, URL, or application.
Value Display Boxes	Value Display Boxes display the value and status of bound objects and allow you to access the Focus view of the bound object. Value Display Boxes also show the units used by the value.
Gauges	Gauges display the value and status of bound objects with graphs, dials, and standard colors. UGT offers the following gauge categories: Analog Fill Bar Graph Dial Gauge
Dynamics	Dynamic symbols indicate the value of bound objects. Some of these symbols move as the object change. Members of this category are: Fans Basic Shapes (Block) Switch (2 or 3 State)

Button Symbols

Button symbols are useful when browsing to another graphic, object, or a website. Buttons support the drag and drop functionality, allowing you to drag items from the navigation tree and drop them in the graphic workspace with the following rules:

If you select multiple objects in the [Navigation Tree](#) and then drag a button to the [Graphic Workspace](#), the UGT creates buttons that [Alias](#) the selected objects.

If you select a graphic/object in the navigation tree and then drag a button to the graphic workspace, the UGT creates a button bound to the selected graphic/object.

In Edit mode, after you drag and drop a button, click on it to add a label. If you double click on a Button in the Edit mode, the **Hyperlink Information** box appears. Using this box, you can specify to link the graphic to a graphic, object, or web page, choose display properties, and choose to hide the button. See the [Button Symbols](#) topic for more information.

Only buttons support [Hyperlinks](#).

In the View mode, left click on the Button to navigate to the bound object, graphic, or web page. When your cursor passes over a button, the cursor changes into a finger pointer.

See the [Buttons](#) step section for information on binding Buttons.

Hyperlinks

Hyperlinks are links from one graphic to other items (graphics or other objects), URLs, or applications using [buttons](#). If you click on a button hyperlinked to an item, your view switches from the current graphic to the hyperlinked graphic or object. If you click on a hyperlink to a URL, the website appears in a separate browser window. If you click on a hyperlink to an application, the application opens.

Only buttons support hyperlinks. Set hyperlinks when you bind a button symbol.

Value Display Boxes

Value Display Boxes are useful for displaying the value and status of a large number of objects in a single graphic. The Value Display Box supports drag and drop functionality. If you select a single item or multiple items in the navigation tree and then drag and drop a Value Display Box, the box/es automatically binds to the selected item/s.

If a Value Display Box is configured to display the Status of the bound object, the text and box background appear in the standard [Status Colors](#).

In View mode, Value Display Boxes appear as if they are editable boxes, but they are not. Double click on the Value Display Box to display the Focus view for the bound object and right click to show the command menu.

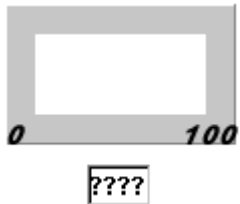
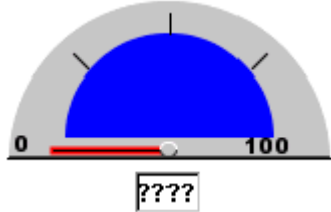
See the [Value Display Boxes](#) step section for information on binding Value Display Boxes.

Gauges Category

Gauges provide an indication of the present value and status for the bound objects. If you select a single item or multiple items in the navigation tree and drag a gauge to the workspace, the UGT creates one gauge per item and binds each symbol to an item.

The following table lists the gauges included in the UGT.

Table 350: Gauges

Gauge Type	Symbol	Animation
Analog Fill Bar Graph		Bar moves to indicate value of bound object.
Dial Gauge		Dial needle moves to indicate value of bound object.

Analog Fill Bar Graph

Analog Fill bar graph symbols show the present value of an object by changing the size of the bar in the graph and indicating the present value as a number in the display box. The color of the moving bar graph and the display box background color indicate the status of the bound object. We recommend using Analog Fill Bar Graphs with analog objects.

You can define the minimum and maximum value of the bar graph range. If you don't define the minimum and maximum for the bar range, the gauge defaults to 0 for the minimum and 100 for the maximum. Under the bar, a value box displays the numeric value of the bound object. Analog Fill symbols can be configured to move vertically or horizontally. To change the orientation of the Analog Fill box, see [Gauges: Analog Fill](#).

In View mode, the display box appears as an edit box, but it is not editable. If you choose, the [color](#) of the display box background shows the status of the bound object and the units used by the symbol. Double click on the symbol to see the Focus view of the bound object and right-click to show the command dialog box.

Dial Gauge

Dial gauges indicate the present value of a bound object with the position of a needle on a gauge. A display box shows the present value as a number with units, and shows the status of the bound object. We recommend using Dial Gauge with analog objects.

You can choose the minimum and maximum value for the dial range. If you don't define the minimum and maximum for the dial range, the gauge defaults to 0 for the minimum and 100 for the maximum.

In the View mode, the Dial Gauge appears as a circular dial with a needle pointing to the position that represents the value of the bound analog object. A value box below the dial shows the numeric value of the bound object. Double click the dial gauge to display the Focus view for the bound object and right-click to show the command dialog box.


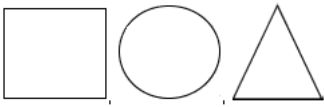
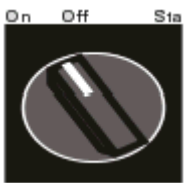
See the [Gauges: Dial Gauge Symbol](#) step section for information on binding Dial Gauges.

Dynamics

Dynamic symbols display the status of bound objects. If you select a single item or multiple items in the navigation tree and drag a dynamic symbol to the workspace, the UGT creates one symbol per item and binds each symbol to an item.

The dynamics category includes the symbols listed in the table below.

Table 351: Dynamics

Dynamics Type	Symbol	Animation
Fans		Fan/pump blades spin or remain stationary.
Basic Shapes (Square, Circle, and Triangle)		Colors change.
Switch (2 or 3 State)		Switch changes positions.

Fans

Fan symbols display rotational movement when bound to an object. Use this dynamic component to provide animation capabilities for fans or pumps that appear in the background image. You can choose either a clockwise or a counter-clockwise spin. We recommend using Fans with binary objects.

In View mode, if the bound object has a value of 0, the fan appears stationary. If the bound object has a value greater than 0, the fan/pump blade spins. The fan/pump color shows the state of the bound object (red for Off, green for On).

If the fan is spinning, the bound object has a normal status or is unreliable, and the device that the bound point resides on is online, the color of the fan is set to the color defined in the system preferences for the On state. If the fan is not spinning, the bound object has a normal status or is unreliable, and the device that the bound point resides on is online, the color of the fan is set to the color defined in the system preferences for the Off state. If neither of these scenarios apply, the color of the fan is defined by the status colors defined in the system preferences.

In the View mode, a double click on a fan symbol displays the Focus view of the bound object. A right-click shows the command dialog box.

See the [Dynamics: Fans](#) step section for information on binding Fans.

Basic Shapes

Basic Shapes show the status of the bound object. Any basic shape can be bound to either an analog, binary, or multistate object. You can resize these symbols, which include a square, triangle, and circle.

If a basic shape is bound to an analog object, in the View mode, the color of the shape indicates the status of the bound object. White is normal, but other colors are listed. See [Status Colors](#).

If a basic shape is bound to a binary object, in the View mode, the color of the shape indicates the state of the bound object. By default, if the state is 0, the shape is white and if the state is greater than 0, the shape is green. These can be configured by the user when you bind the symbol.

Double click on the shape to display the Focus view for the bound object. Right-click to display the commands.

- ✓ **Tip:** Use the circles to depict temperature sensors on a floor plan graphic. Circles and rectangles can be used as status lights.

See the [Dynamics: Basic Shapes](#) step section for information on binding basic shapes.

Switch (2 or 3 State)

The Switch is a dynamic symbol that can be bound to an object, and can be configured to be either a 2 or 3 state switch). User-defined text appears at the top of the Switch to show what state the point is in. You can resize Switches. We recommend you bind a Switch to a binary or multistate object.

In View mode, Switch symbols show the state of the bound object. Double click on the shape to display the Focus view for the bound object. Right-click to show the command dialog box.

See the [Dynamics: Switches](#) step section for information on binding switches.

Binding Symbols to Objects

In the UGT you can bind symbols to objects, which allows the symbol to display the condition of the bound object. Refer to each [symbol](#) section for details about which object type can be bound to each symbol.

To speed up the binding process, select one item or several items (using the Shift or Control key) in the navigation tree and then drag and drop a symbol into the graphic workspace. The symbol automatically binds to the item or items selected in the tree.

To bind graphics in [Edit Mode](#), see [Binding Symbols to Objects in Edit Mode](#).

For information on drag and drop binding shortcuts, see [Drag and Drop Shortcuts](#).

Status Colors

Status colors are used by symbols such as Value Display Boxes, Analog Fill Bar Graphs, and Basic Shapes to indicate the status of a bound object. The following table lists the default status colors used by the UGT.

Table 352: Status Colors

Status	Symbol Text Color	Symbol Background Color
Normal	Black	White
Alarm	Black	Red
Warning	Black	Yellow
Trouble	Black	Yellow
Offline	White	Black
Operator Override	Black	Orange
Out of Service	Black	Light Brown

Note: All status color defaults can be changed in the [Graphic Settings Tab](#) in the [Preferences](#) chapter.

See [Binding Symbols to Objects in Edit Mode](#) for information on binding graphics.

Alias

Aliases simplify the process of binding symbols to objects during graphic generation when a site has several graphics that contain a common set of objects. The Alias feature allows you to use a wildcard character (*) to represent a single string of characters that may be part of the complete object reference as part of the binding information for a symbol. When a graphic is displayed in [View Mode](#), the alias symbol (*) is replaced with the text from the alias box of the symbol you used to access the graphic. If you navigate to a graphic using an aliased button, you cannot edit the graphic. To edit the aliased graphic, access it through the navigation tree.

For example, aliasing allows you to use a single aliased graphic for multiple field controllers, such as VMAs, with similar configurations. See [Creating Aliases](#).

Figure 61 shows an example of a main graphic and an aliased graphic. In the figure, the top panel contains the main graphic, which has several buttons bound to the aliased graphic. Each button has its alias string set to the reference for a different field device. The bottom panel shows the aliased graphic, displayed directly from the navigation view (that is, with no alias strings passed in).

Figure 62 show the aliased graphic as it displays when the user clicks the corresponding buttons in the main graphic (that is, with field device-specific values).

Figure 61: Alias Example - Main and Aliased Graphics

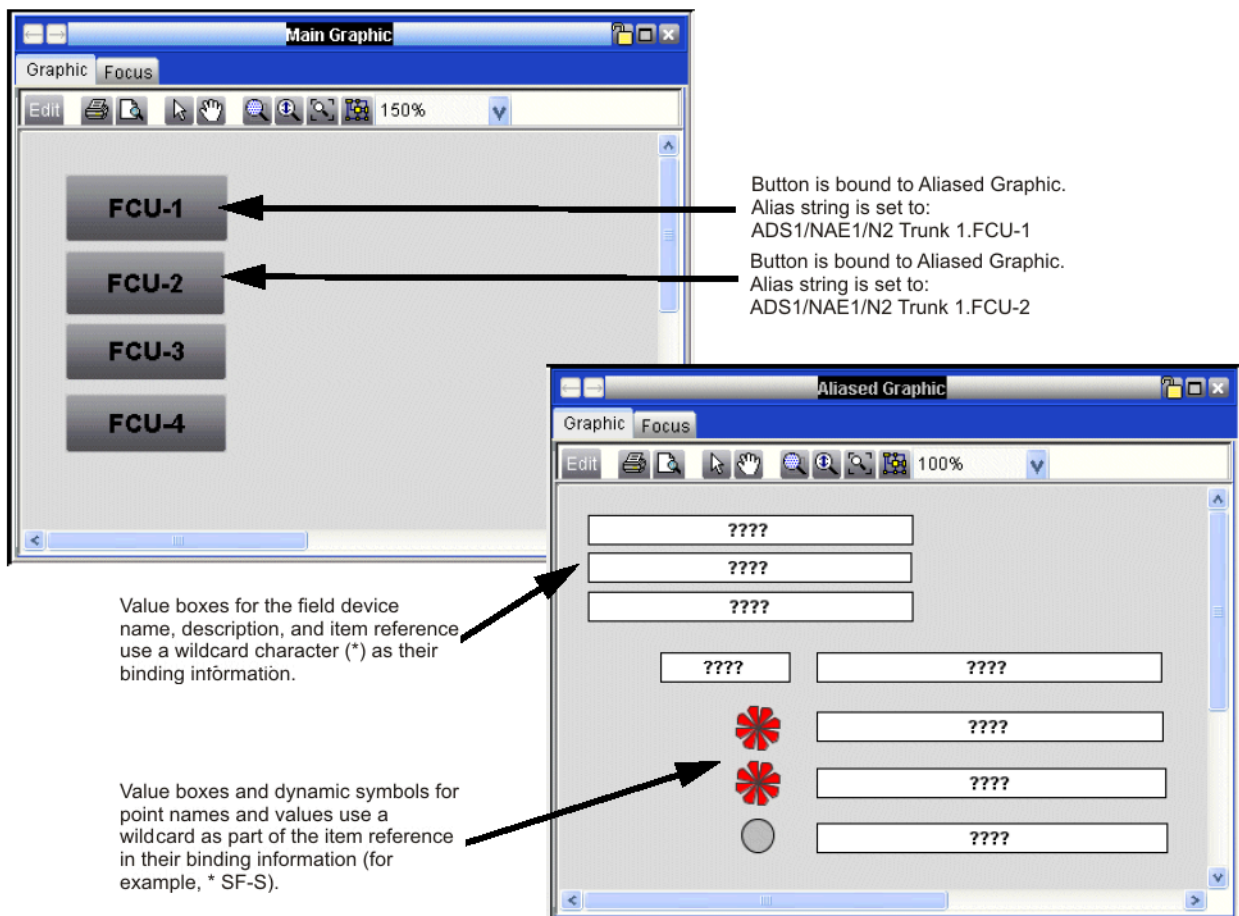
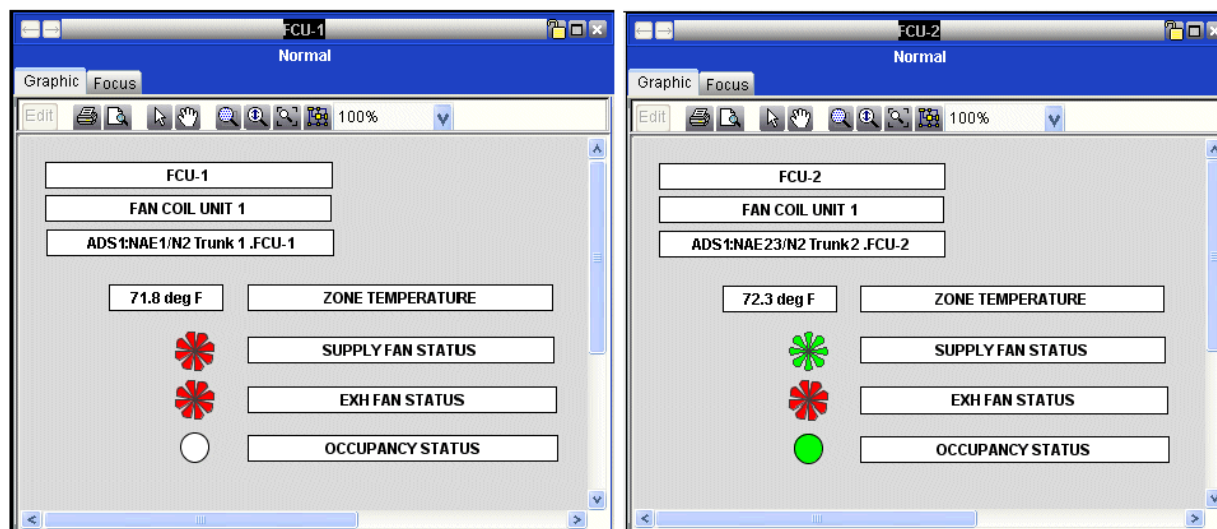


Figure 62: Alias Example - Using the Aliases



This graphic appears if you click FCU-1 in Main Graphic (Figure 20-41). Content is specific to FCU-1.

This graphic appears if you click FCU-2 in Main Graphic (Figure 20-41). Content is specific to FCU-2.

For more information on binding graphics, see [Binding Symbols to Objects in Edit Mode](#).

Navigation

You can navigate between graphics by using [hyperlinked Button Symbols](#) or by selecting graphics from the navigation tree and displaying them in the Display Frame. You can restrict user access to specific graphics by setting security levels in the Security Administrator System.

You can also create user views that contain only graphics (hierarchy of graphics references).

Commands

You can command objects that are bound to symbols by right clicking on the symbol in [View Mode](#). If you are not authorized to command the object, the command is disabled in the command dialog box.

Mouse Shortcuts

Use mouse shortcuts to speed up User Graphics Tool use. See [Mouse Shortcuts: Edit Mode](#) and [Mouse Shortcuts: View Mode](#).

Mouse Shortcuts: Edit Mode

The following table lists the mouse shortcuts you can use in the [Edit Mode](#) of the User Graphics Tool.

Table 353: Edit Mode Mouse Shortcuts

Item	Single Left Click	Double Left Click	Right-Click
Static Background Image	No action takes place.	No action takes place.	Remove Background
Button	Select	Hyperlink Information dialog box appears.	Cut, Copy, Paste, Duplicate, Delete, Format , Align
Value Display Box	Select	Bind Information dialog box appears.	Cut, Copy, Paste, Duplicate, Delete, Format , Align
Gauge: Analog Fill	Select	Bind Information dialog box appears.	Cut, Copy, Paste, Duplicate, Delete, Format , Align

Table 353: Edit Mode Mouse Shortcuts

Item	Single Left Click	Double Left Click	Right-Click
Gauge: Dial	Select	Bind Information dialog box appears.	Cut, Copy, Paste, Duplicate, Delete, Format , Align
Dynamics: Fan	Select	Bind Information dialog box appears.	Cut, Copy, Paste, Duplicate, Delete, Format , Align
Dynamic: Basic Shape	Select	Bind Information dialog box appears.	Cut, Copy, Paste, Duplicate, Delete, Format , Align
Dynamics: Switches	Select	Bind Information dialog box appears.	Cut, Copy, Paste, Duplicate, Delete, Format , Align

Format

The Format menu choice contains the choices listed in the following table.

Table 354: Format Menu Options

Choice	Description
Copy Binding	Copies the selected symbol's binding information, which you can then paste to a new symbol. With this feature, you can easily bind several symbols to one object.
Paste Binding	Pastes the previously copied binding information to the selected symbol(s).
Copy Format	Copies the selected symbol's formatting (size and font information), which you can then paste onto another symbol. This allows you to easily format multiple symbols in the same way.
Paste Format	Pastes the previously copied formatting information to the selected symbol(s).

Align

The Align menu choice contains the choices listed in the following table.

Table 355: Align Menu Options

Choice	Description
	<p>Note: When you select multiple objects by dragging the mouse across them, the first selected symbol is not based on the symbol's location within the graphic, but on the order in which it was originally added to the graphic. We recommend that you first click on the symbol with which you want to align other symbols. Once you have selected that symbol, hold down the Shift key while you drag the mouse across additional symbols to select them (you can also use Shift + click to select additional symbols).</p>
Align Top	Aligns all symbols to the top most edge of the first symbol you selected.
Align Bottom	Aligns all symbols to the bottom most edge of the first symbol you selected.
Align Left	Aligns all symbols to the left most edge of the first symbol you selected.
Align Right	Aligns all symbols to the right most edge of the first symbol you selected.
Align Horizontal Center	Aligns all symbols to the horizontal center of the first symbol you selected.
Align Vertical Center	Aligns all symbols to the vertical center of the first symbol you selected.

Mouse Shortcuts: View Mode

The following table lists the mouse shortcuts you can use in the [View Mode](#) of the User Graphics Tool.

Table 356: View Mode Mouse Shortcuts

Symbol	Single Left Click	Double Left Click	Right-Click
Button	Navigate to hyperlink .	Navigate to hyperlink .	No action takes place.
Value Display Box	Select	Display focus view of bound object.	Command box appears.
Gauge: Analog Fill	Select	Display focus view of bound object.	Command box appears.
Gauge: Dial	Select	Display focus view of bound object.	Command box appears.
Dynamics: Fan	Select	Display focus view of bound object.	Command box appears.
Dynamic: Basic Shape	Select	Display focus view of bound object.	Command box appears.
Dynamics: Switches	Select	Display focus view of bound object.	Command box appears.

Drag and Drop Shortcuts

Consider the following shortcuts when dragging and dropping items to the [Graphic Workspace](#):

- If you select a [Graphic Object](#) in the navigation tree and then drag a [button](#) to the graphics workspace, the UGT creates a button already bound to the selected Graphic object.
- If you select multiple field points in the [Navigation Tree](#) and drag a [Value Display Box](#) to the graphics workspace, the UGT creates multiple Value Display Boxes each bound to a field point.
- If you select multiple field points in the navigation tree and drag a [dynamic symbol](#) or [gauge](#) to the graphics workspace, the UGT creates multiple symbols each bound to a field point.
- If you select multiple field controllers along with a Graphic object in the navigation tree and drag a button to the graphics workspace, the UGT creates buttons for all the controllers. All buttons have the appropriate [Alias](#) string already entered.
- To change the binding information for a symbol or to add [binding](#) information (if you drag and drop a symbol without selecting anything in the navigation tree), see [Binding Symbols to Objects in Edit Mode](#).

User Graphics Tool Steps

Generating Graphics (Overview)

About this task:

Notes:

- This process is the same when the system is offline, except the binding is done to the archive database instead of the online system.
- For information on default preferences for graphics (such as status colors, fan colors, state colors, and alarm flashing settings), see [Graphic Settings Tab](#) in the [Preferences](#) section.

To create a complete graphic:

1. On the Insert Menu, select **Graphic**. The [Graphic](#) appears.
2. Follow the wizard instructions.
3. Drag the graphic from the [Navigation Tree](#) to the [display panel](#).
4. Click on the Background Image [icon](#) on the UGT toolbar to import a [Static Background](#) image into the graphic.
 - ① **Note:** To scale imported SVGZ Floorplans from Visio, cut the rescaled image from Visio. Paste the image into Paint. Cut the image from Paint and use paste special as a Device Independent Bitmap into Visio.
5. [Add Symbols](#) as needed on top of the static background.
6. [Bind](#) the symbols to [object](#).
7. Add [Hyperlinks](#) to the buttons and [create aliases](#) (if desired).
8. [Save](#) the graphic.
9. Download the graphic to the online device (if you have created the graphic with the *Metasys* software [offline](#) using the SCT). Upload the graphic to the archive database of the SCT (if you have created the graphic with *Metasys* software [online](#)).

Changing UGT Modes

To change from View mode to Edit mode, click the Edit button on the UGT [Toolbar](#).

To change from Edit mode to View mode, click Save on the UGT toolbar.

Viewing User Graphics

To view user graphics, double click on or drag a graphic item from the [Navigation Tree](#) into the [Panel Layout](#).

- ① **Note:** To be sure the graphic item drops completely, release the drop with your cursor over the header section of the desired display frame.

Copying an Existing Graphic

About this task:

- ① **Note:** This is available when using the [SCT](#) only.
1. Click an existing graphic item in the [Navigation Tree](#).
 2. On the **Edit** menu, select **Copy**.
 3. Click in the navigation tree where the new graphic is to appear.
 4. On the **Edit** menu, select **Paste** and name the new graphic.

Binding Symbols to Objects in Edit Mode

Buttons

About this task:

To bind buttons to items, URLs, or applications:

1. Double-click a [button](#). The Hyperlink Information dialog box appears.
2. Use the information in the following table to edit the fields.

Table 357: Button Options

Field	Description
Hyperlink Type	Selects whether the button provides a link to an item, URL, or application.
Item/URL/ Application	If you link the button to a URL, type the address here. If you link to an item or application, click the Browse icon and see below. Applications configured using the Metasys Preferences Applications Tab appear on the drop-down menu.
Browse icon	Opens a dialog box for browsing to an item or application. If you are linking to an item, UGT displays a navigation tree listing graphics/objects you can bind to the button. If you are linking to an application that is not in the Application drop-down menu, UGT allows you to navigate to and select an executable file for an application that resides on your local file system or a network drive. Note: The linked application does not close when you exit the UI.
Hidden	Hides the button in the View mode, creating a virtual hyperlink on the background image.
Alias	Passes the defined Alias string to the linked graphic when you press the button.
Properties	Displays a dialog box to change font size and text justification for the button label text.
OK	Accepts changes.
Cancel	Cancels changes.

Value Display Boxes

About this task:

To bind Value Display Boxes to objects:

1. Double click a [Value Display Box](#). The **Binding Information** dialog box appears.
2. Use the information in the following table to edit the fields.

Table 358: Value Display Box Options

Field	Description
Object	Allows you to type in the Item Reference of the object you want to bind to the Value Display Box. Or lets you click the Browse icon to launch a tree browser to select the object to bind to the Value Display Box.
Attribute	Allows you to select the specific attribute to bind to the Value Display Box. The bound attribute is initially set to the object's Default attribute, which varies per object type, but is typically Present Value. If an object does not have a Default attribute, the value box displays ??? on the graphic until you change the binding to a different attribute. You can bind to string values or to numeric values.

Table 358: Value Display Box Options

Field	Description
Units	Shows the Units for the bound object in the Value Display box.
Status	Shows the Status for the bound object by color-coding the text and background for the Value Display box.
Properties	Allows you to configure the text properties for the Value Display Box text.
OK	Accepts changes.
Cancel	Cancels changes.

Result

Note: In the View mode, double clicking on the Value Display box displays the focus view for the bound object. Right-click displays the commands.

Gauges: Analog Fill

About this task:

To bind Analog Fill symbols to objects:

1. Double-click an [Analog Fill Bar Graph](#) icon. The **Binding Information** dialog box appears.
2. Use the information in the following table to edit the fields.

Table 359: Analog Fill Gauge Options

Field	Description
Object	Allows you to type in the Item Reference of the object you want to bind to the Analog Fill Gauge. Or, lets you click the Browse icon to launch a tree browser to select the object to bind to the Analog Fill Gauge.
Attribute	Allows you to select the object's attribute to bind to the gauge.
Fill Color	Launches the fill color selector to select the color displayed by the bar graph.
Orientation	Chooses vertical or horizontal motion of the bar graph.
High Limit	Sets the high number for the display range of the gauge.
Low Limit	Sets the low number for the display range of the gauge.
Units	Displays the units used by the bound object.
Status	Displays the status of the object in the display box of the symbol.
Properties	Allows you to configure the text properties for the text in the display box of the gauge.
OK	Accepts changes.
Cancel	Cancels changes.

Gauges: Dial Gauge Symbol

About this task:

To bind Dial Gauge symbols to objects:

1. Double-click the [Dial Gauge](#) symbol. The **Binding Information** dialog box appears.
2. Use the information in the following table to edit the fields.

Table 360: Dial Gauge Symbol Options

Field	Description
Object	Allows you to type in the Item Reference of the object you want to bind to the Dial Gauge. Or, lets you click the Browse icon to launch a tree browser to select the object to bind to the Dial Gauge.
Attribute	Allows you to select the object's attribute to bind to the gauge.
Gauge Color	Launches the color selector for the gauge to select the color displayed in the center of the gauge.
High Limit	Sets the high number for the display range of the gauge.
Low Limit	Sets the low number for the display range of the gauge.
Units	Displays the units used by the bound object.
Status	Displays the status of the bound object in the display box of the gauge.
Properties	Allows you to configure the text properties for the text in the display box of the gauge.
OK	Accepts changes.
Cancel	Cancels changes.

Dynamics: Fans

About this task:

To bind Fan symbols to objects:

1. Double-click the [Fans](#) symbol. The **Binding Information** dialog box appears.
2. Use the information in the following table to edit the fields.

Table 361: Fan Dynamics Options

Field	Description
Object	Allows you to type in the Item Reference of the object you want to bind to the Fan. Or, lets you click the Browse icon to launch a tree browser to select the object to bind to the Fan.
Attribute	Allows you to select the object's attribute to bind to the fan.
Clockwise/Counter-Clockwise	Selects if the Fan symbol spins in a clockwise or counter-clockwise direction.
OK	Accepts changes.
Cancel	Cancels changes.

Dynamics: Basic Shapes

About this task:

To bind Basic Shapes symbols to objects:

1. Double-click the [Basic Shapes](#) symbol. The **Binding Information** dialog box appears.
2. Use the information in the following table to edit the fields.
For information on default preferences for graphics (such as status colors, fan colors, state colors, and alarm flashing settings), see [Graphic Settings Tab](#) in the [Preferences](#) section.

Table 362: Basic Shape Dynamics Options

Field	Description
Object	Allows you to type in the Item Reference of the object you want to bind to the Basic Shape. Or, lets you click the Browse icon to launch a tree browser to select the object to bind to the Basic Shape.
Attribute	Allows you to select the object's attribute to bind to the Basic Shape.
State 0	Allows you to set the color for State 0. The default color is determined by the preferences. See Graphic Settings Tab in the Preferences section for details.
State 1	Allows you to set the color for State 1.
State 2	Allows you to set the color for State 3.
State 3	Allows you to set the color for State 4.
All Other States	Allows you to set the color for all other states.
Orientation	For the triangle basic shape, chooses the position of the point (Up, Down, Left, or Right).
OK	Accepts changes.
Cancel	Cancels changes.

Dynamics: Switches

About this task:

To bind Switch symbols to objects:

1. Double-click the [Switch](#) symbol. The **Binding Information** dialog box appears.
2. Use the information in the following table to edit the fields.

Table 363: Dynamic Switch Options

Field	Description
Object	Allows you to type in the Item Reference of the object you want to bind to the Switch. Or, lets you click the Browse icon to launch a tree browser to select the object to bind to the Switch.
Attribute	Allows you to select the object's attribute to bind to the switch.
Number of States	Allows you to choose the number of states (2 or 3) the switch has.
State 0/1/2	Allows you to choose the text associated with each state.
OK	Accepts changes.
Cancel	Cancels changes.

Monitoring and Commanding Items Using Graphics in View Mode

About this task:

- Note:** The Metasys system user interface provides the capability to monitor and command the Metasys system using graphics. To navigate through the system, see [Navigating Graphics in View Mode](#).

To monitor your Metasys system using graphics:

1. [Display graphics](#) to show the status/state of your system components.
2. [Navigate](#) through the system.

3. To command objects/items using graphics, right-click on the symbol in View mode and select the desired command.

Result

- ❗ **Note:** Right-clicking has no effect on [Button Symbols](#).

Navigating Graphics in View Mode

About this task:

To navigate graphics in View mode, double-click the symbol and navigate by one of the following two methods:

1. Navigate to the [hyperlink](#) of a [button symbol](#) by clicking on the button.
2. Navigate to the Focus view of an object by double-clicking a [Dial Gauge](#) or [Fan](#) symbol.

Adding Symbols to the Workspace

To add symbols to the workspace, drag the symbol from the palette and drop the symbol into the workspace.

Notes:

- Depending on the symbol you are adding, be wary if items are selected in the navigation tree. Some symbols automatically bind to items selected in the tree. See the [Symbols](#) topics for more information on drag and drop capabilities.
- For more information on drag and drop binding shortcuts, see [Drag and Drop Shortcuts](#).

Deleting Symbols from the Graphics Workspace

To delete symbols from the workspace, select the symbol and press Delete on your keyboard or right-click on the symbol and select **Delete** from the menu.

Adding Text Blocks

About this task:

To add text blocks in Edit mode:

1. Click the **Text** icon on the UGT [Toolbar](#).
2. Click the workspace to select a location for the text. The text block appears.
3. Click the **Select** icon from the toolbar and double-click on the text block. The edit text box appears.
4. Type in the text box and click **OK**.
5. Select the **Select** icon on the UGT [Toolbar](#).
6. Select the text block and drag the sides to resize the block.

Editing Text Blocks

About this task:

To edit text:

1. With the selection pointer [tool](#), double-click on the block. The block opens for editing.
2. Change the text and click **OK**.
3. To change the text properties, right click on the text block and select **Properties** from the menu.

Result

- ❗ **Note:** You can change the font (type, size, bold, italic, bold italic), text color, background color, and border visibility/color.

Editing a Background Image

About this task:

Use this procedure if you want to edit a background of a graphic by exporting it from the UGT. Use this method when a copy of the existing background image is not available.

1. Drag the desired graphic from the [Navigation Tree](#) to the [display panel](#).
2. Click the **Edit** button on the UGT [Toolbar](#) to enter [Edit Mode](#).
3. Click the **Save Background Image** icon on the UGT toolbar to save the static background image to a location on your hard drive. The **Save** dialog box appears.
4. Enter a name for the background image, select the desired location on your hard drive, select JPG or SVG format, and click **Save**.
5. Open the background image file in the desired graphic editing program. Edit the background image as desired and save the file in SVG, SVGZ, or JPG format. See the Static background image section for information on supported file formats.
 - ① **Note:** You can only save a background image under its original file type. For example, if the background image was originally a JPG, you can save it only as a JPG now. You can save SVG and SVGZ files as SVG or SVGZ.
6. Return to the graphic in the UGT.
7. Click the **Set Background Image** icon on the UGT toolbar to import the revised background image file into the graphic.
8. [Save](#) the graphic.
9. Download the graphic to the online device (if you have created the graphic with the Metasys software [offline](#) using the SCT). Upload the graphic to the archive database of the SCT (if you have created the graphic with Metasys software [Online Mode](#)).

Result

- ① **Note:** Save a copy of the background image file in a folder on your hard drive as a backup method. If you decide to edit that background image later, you can edit your hard drive copy and use the **Set Background Image** icon to re-import the background into the graphic in the UGT. You also can use your hard drive copy in the event that you lose your databases and need to recover the background image.

Creating Aliases

About this task:

See [Alias](#) for more information on aliases.

- ① **Note:** Do not set the Graphic attribute for an alarm extension to an aliased graphic. Aliased graphics do not display properly when displayed from the Alarms Window or Event Viewer.
1. [Create](#) a graphic with an appropriate background image, and add value boxes to represent common field points.
 2. For each value box, edit the bound reference and use a wildcard character (*) to replace the portion of the reference specific to a particular supervisory device, field trunk, and/or field controller.

For example, change the bound object reference for a Zone Temperature AI from ADS1:NAE1/N2 Trunk 1.VMA-1.ZN-T to *.ZN-T. This is your **aliased graphic**.

 - ① **Note:** One wildcard character is allowed per reference, and all wildcard characters used in bindings for a particular aliased graphic must represent the same string.
 3. [Create](#) a separate **main graphic** to use as the access point for your aliased graphic.

4. On the main graphic, add a button bound to the aliased graphic. Give the button a name indicating the field device it represents (see Tip below).
5. Set the alias string for the button to the text that should replace the wildcard in the reference for the value boxes on the aliased graphic.

For the example above, the alias string would be:

ADS1:NAE1/N2 Trunk 1.VMA-1

6. Repeat step Step 4 and step Step 5 to add buttons for additional field controllers, setting the alias string appropriately for each.

For example, ADS1:NAE201/N2 Trunk 2.VMA-43.

- ✓ **Tip:** You can use the following shortcut steps to quickly create the buttons for your aliased graphic on your main graphic:
 - a. Display your main graphic in the Display panel, and click Edit.
 - b. Select the aliased graphic in the All Items navigation tree, then use Ctrl + click or Shift + click to select the items to use with the aliased graphic.

For the example given earlier, select VMA-1 under N2 Trunk on NAE1, and VMA-43 under N2 Trunk 2 on NAE 201.
 - c. With the aliased graphic and other items selected in the navigation tree, drag the Button from the UGT palette into the graphic display area. A new button appears in the main graphic for each item. Each button is labeled with the item name, bound to the aliased graphic, and has its alias string set to the full reference of the selected item (for example, ADS1:NAE1/N2 Trunk 1.VMA-1).
 - d. Find the button on the main graphic that has its alias string set to the aliased graphic (labeled with the name of the aliased graphic). This button is no longer needed, so you may delete it.
 - e. Save your changes.

Result

Once you have finished configuring your main and aliased graphic, display the main graphic in the online UI. Use the buttons on the main graphic to open the aliased graphic for each field device. See Figure 61 and Figure 62.

Saving a Graphic

To save a graphic, click the Save button on the [Toolbar](#).

Graphics+

Graphics+ files created with the Graphic Generation Tool (GGT) provide comprehensive and three-dimensional views of building automation systems that allow you to monitor the status of a single building or an entire campus of buildings. Unusual conditions are quickly identified on a dashboard screen that can navigate deep into a building, floor, or zone. With minimal navigation, you can diagnose a problem and take corrective action. You can view historical data directly within the graphic, further enabling effective problem diagnosis. You can also issue commands from the graphic.

Graphics+ files are created offline with the GGT, a stand-alone application that runs on a computer with a supported Microsoft Windows operating system. These graphics are then saved as Metasys objects (typically on the Site Director) and viewed within the Site Management Portal UI in any active display panel.

Graphics are usually made up of three parts:

- one or more background images
- animated HVAC elements, ductwork or piping, and/or floor plan information

- buttons that allow you to navigate to other graphics, applications, and Web addresses

You can access a graphic when you are logged in to the Site Management Portal UI through any Web browser. The [XAML Graphic Object](#) represents a Graphics+ object in the All Items navigation tree. You can open these graphics in any active display panel.

For information about Graphics+ symbol and element functions, refer to the *Graphics+ Runtime Help (LIT-12011708)*.

For information about creating and editing Graphics+ files, then saving the graphic to an online device (ADS, ADX, or supervisory controller) or offline to an SCT archive database, refer to the *Graphic Generation Tool Help (LIT-12011697)*.

Graphics+ Concepts

Graphics+ View

Graphics appear in the navigation tree as stand-alone items. You can access graphics from a Tailored Summary, the Alarm Pop-ups window, or the Associated Graphic tab of a Field Controller device. The icon below identifies a Graphics+ graphic.

Figure 63: Icon for Graphics+ Graphics



When you open the graphic, a Display Control tool appears in the upper left corner of the active display panel. Use the Display Control to zoom and pan a graphic. You can also open the Trend Module from this control. See Figure 64 and Table 364 for details on the Display Control tool.

Figure 64: Graphics+ Control Tool

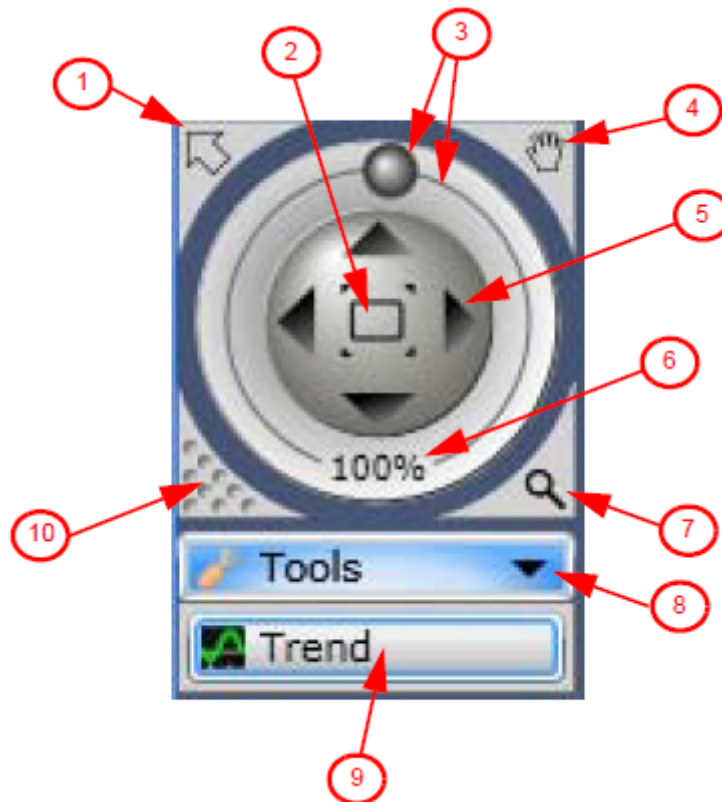


Table 364: Components of Display Control Tool

Callout	Name	Description
1	Collapse	Hides the Display Control tool. After you hide the tool, a faint arrow appears that allows you to restore the tool.
2	Fit to Window (center block)	Zooms the graphic to fit in the frame.
3	Zoom Ball with Zoom Ring	Allows you to zoom by moving the ball clockwise (zoom in) and counterclockwise (zoom out) along the zoom ring.
4	Turn On/Off Panning	Enables and disables the panning tool that allows you to move the graphic in the workspace.
5	Move (four arrows)	Allows you to pan up, down, left, and right over the graphic in set increments.
6	Current Zoom Level	Displays the current zoom level.
7	Turn On/Off Zoom Mode	Enables and disables the manual zoom (magnifying glass) that allows you to re-center the graphic and zoom in an out.
8	Tools Menu	Drops down a list of Tools. At this time, only the Trend Module is available.
9	Trend	Opens and closes the Trend Module. This option appears when you click the Tools down arrow.
10	Move Display Control	Allows you to move the Display Control tool to a different area of the graphic.

Navigation

You can navigate between graphics using various types of elements of a Graphics+ graphic or by opening the desired graphic from the navigation tree. You can restrict user access to specific graphics by setting security levels in the Security Administrator System.

You can also create user views that contain only graphics (hierarchy of graphics references).

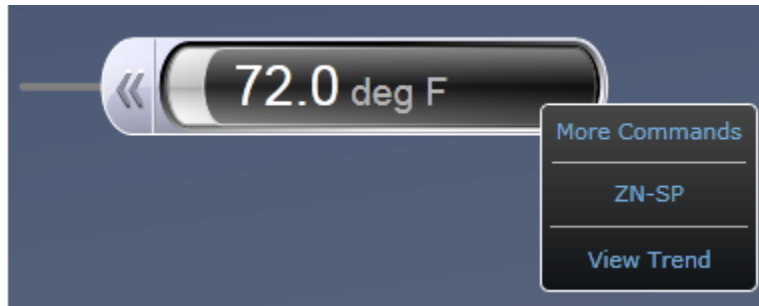
Commands

You can command objects that are bound to graphic symbols using two methods. The first method is to left-click the object's Inline Command Box or Advanced Value Box, then edit the value of the object. If commanding is disabled for that symbol, the value is not be editable. The second method is to right-click the object's Inline Command Box, Advanced Value Box, or other elements of Graphics+ symbols such as gauges, to open the User Actions Panel, then select More Commands to bring up the Metasys commands dialog box. With both methods, if you are not authorized to command the object, the command selection is disabled.

User Actions Panel

You can open the User Actions Panel for a graphic element by right-clicking the graphic element. The User Actions Panel is a submenu of options that appears adjacent to the graphic element (Figure 65). The panel in the Site Management Portal UI supports three actions: View, Command, and Trend (SCT only supports View; Trend only appears for trended objects). To view the Focus window for the object, select its name (for example, ZN-SP). To command the object, select More Commands. To view trend data for the object in the Trend Module, select View Trend. If more than one attribute is trended, select View Trend, then click the attribute name. User access to all three actions is set with security levels in the Security Administrator System.

Figure 65: Opening a User Actions Panel



Behaviors

Many elements of Graphics+ graphics support built-in or configurable behaviors.

Elements that support behaviors can flash if the bound object is in an alarm or warning state, change color based on the bound object's state or status, or show or hide depending on the bound object's state or status.

In the Metasys UI, the elements of the Graphics+ graphic display the behaviors as the bound object's state or status changes.

Note: Support of behaviors is limited in SCT.

Trend Module

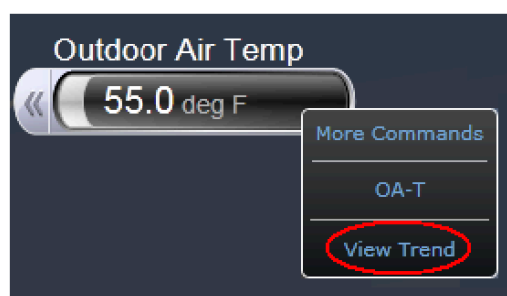
From a Graphics+ object, you can view trended data for any object in the Site Management Portal UI with the Trend Module. The object must be displayed in the graphic and have at least one trend extension defined. Examples of graphic elements that support the Trend Module include any value box (for example, Basic Value Box, Inline Command Box, and Key Data Item), any basic shape, the LCD display in the Room Control Module, gauges, and the Room Status element. The Trend Module shows trend data from the device's online buffer, not from archived samples stored in a historical database.

Opening the Trend Module

To open the Trend Module for an object on a Graphics+ graphic, click View Trend from the element's User Actions Panel. The Trend Module appears with the charted trend data. If more than one trended attribute is available, click View Trend to display a submenu that lists all available trended attributes. Click a trended attribute to open the Trend Module.

Figure 66: Selecting a Trend to Add to the Trend Module

Single Trend Available

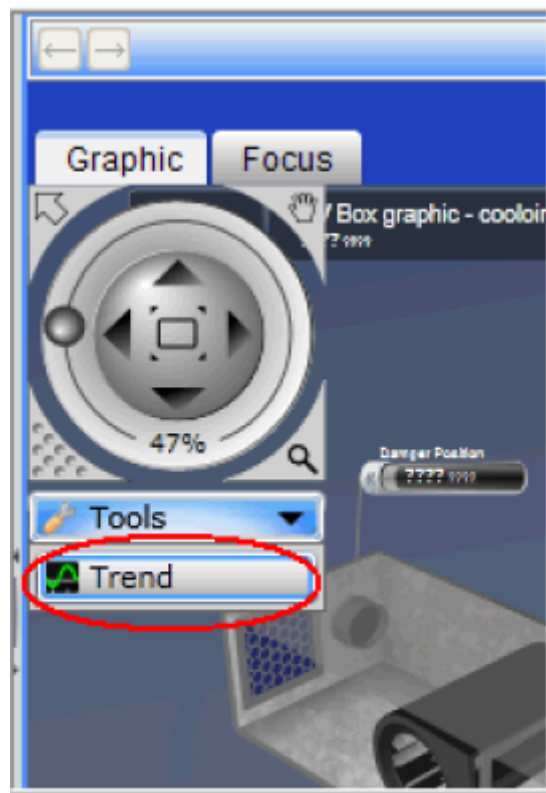


Multiple Trends Available



If you want to open the Trend Module without adding or changing its content, click the Tools drop-down arrow on the Graphics+ Display Control tool and select Trend. The Trend Module reappears in its last state and condition.

Figure 67: Reopening the Trend Module



Closing the Trend Module

You close the Trend Module by clicking the **X** in the upper-right corner of the Trend Module screen.

Trend Module Chart Functions

See Figure 68 and Table 365 for explanations of the Trend Module chart components.

Figure 68: Graphics+ Trend Module - Chart Functions



Table 365: Descriptions of Trend Module Chart Components

Number	Name	Description
1	Plot Area	Plots the trend data for all objects added to the Trend Module.
2	Box Zoom	Zooms in for the area that is highlighted. To enable box zoom, place the cursor inside the plot area, hold down the mouse and drag left or right. A white shadow appears to outline the zoom area.
3	Callouts	Indicates the name of the trended object with its value at the selected moment in time (white vertical line).
4	Maximize	Changes the size of the Trend Module to its maximum size within the constraints of the Metasys display panel.
5	Close	Removes the Trend Module from the screen.
6	Zoom Out	Returns the chart to its original size. This option is only available if the chart is currently zoomed in.

Table 365: Descriptions of Trend Module Chart Components

Number	Name	Description
7	Right Y Axis (state data)	Indicates the axis that is plotting the discrete states for objects currently displayed in the Trend Module. Metasys objects that are displayed on this axis typically consist of Boolean or multi-state values.
8	Right Pan Arrow	Shifts the chart to display more recent trend data.
9	Newest Date/Time	Displays date and time of the last value that appears on the chart.
10	Moment in Time (X Axis)	Indicates the date and time of the value at a particular location on the chart. The date/time information as well as a vertical moment in time line is displayed as you move the mouse over the chart. The units along the x-axis always represent time.
11	Oldest Date/Time	Indicates the date and time of first sample that appears on the chart.
12	Left Pan Arrow	Shifts the chart to display older trend data.
13	Left Y Axis (numeric)	Indicates the axis that is plotting the numeric values for objects currently displayed in the Trend Module. Metasys objects that are displayed using this axis typically consist of analog values.
14	Scroll Bar	Adjusts the range of data that appears on the chart. Also zooms in and out when you resize the scroll bar. To zoom, click and drag the left/right arrows of the scroll bar. To pan, drag the scroll bar left or right.
15	Refresh	Updates the trend data for all objects shown in the Trend Module.







Trend Module Legend Functions

See Figure 69 and Table 366 for explanations of the Trend Module legend components.

Figure 69: Graphics+ Trend Module - Legend Functions



Table 366: Descriptions of Trend Module Legend Components

Number	Name	Description						
1	Legend Splitter Bar	Resizes the space taken by the legend. Move the splitter to the bottom or double-click the splitter bar to hide the legend and increase the size of the trend chart.						
2	Legend Icons	<p>Display both the color and the y-axis that is used to display the trend data for the trended object in this row of the legend. The legend color assigned to an object matches its trended values in the chart, so that you can correlate information between the legend and the chart.</p> <p>Four preset trend line colors are used: blue, orange, violet, and white. The colors cannot be customized. These icons are used:</p> <table border="1"> <thead> <tr> <th>Icon</th> <th>Description</th> </tr> </thead> <tbody> <tr> <td></td> <td>The forward facing L indicates that the left y-axis is used for this trend series, which displays numeric values.</td> </tr> <tr> <td></td> <td>The backward facing L indicates that the right y-axis is used for this trend series, which displays state values.</td> </tr> </tbody> </table>	Icon	Description		The forward facing L indicates that the left y-axis is used for this trend series, which displays numeric values.		The backward facing L indicates that the right y-axis is used for this trend series, which displays state values.
Icon	Description							
	The forward facing L indicates that the left y-axis is used for this trend series, which displays numeric values.							
	The backward facing L indicates that the right y-axis is used for this trend series, which displays state values.							
3	Show/Hide Trend	Selects which objects currently appear in the chart. Click this box to hide and unhide trend data.						
4	Object Name	Displays the name for the trended Metasys object. When you click the object name (or its row), the corresponding line in the chart is highlighted.						
5	Trend Name	Displays the name of the trend that appears in the chart. If more than one trend is available for this trended object, a drop-down box appears from which to select.						
6	Navigate	Navigates away from the Trend Module and the graphic and opens the trend data for the attribute. If you are not authorized to view the object, the navigate button is disabled.						
7	Remove	Removes the trended object and its associated data from the Trend Module.						

Loading Indicator

A loading indicator appears in the chart area while the system is retrieving trend data.

Trend Module Repositioning

You can reposition the trend module anywhere within the graphic's display panel, but not across panels in a multiple-panel layout. To move the Trend Module, drag the title bar.

You can dock the Trend Module by dragging the module outside the panel boundary on the top, bottom, right or left side of the Metasys display panel. The Trend Module does not support multiple monitors.

Zoom Operations

You can zoom in the chart by holding down the mouse and sliding across the chart (either to the left or to the right). This action activates drag zoom. Zoom works for values on the x-axis, not values on the y-axis. To zoom out, click the Zoom Out link that appears in the upper right corner on a zoomed chart.

You can also zoom from the horizontal scroll bar by clicking and dragging on the ends of the scroll bar.

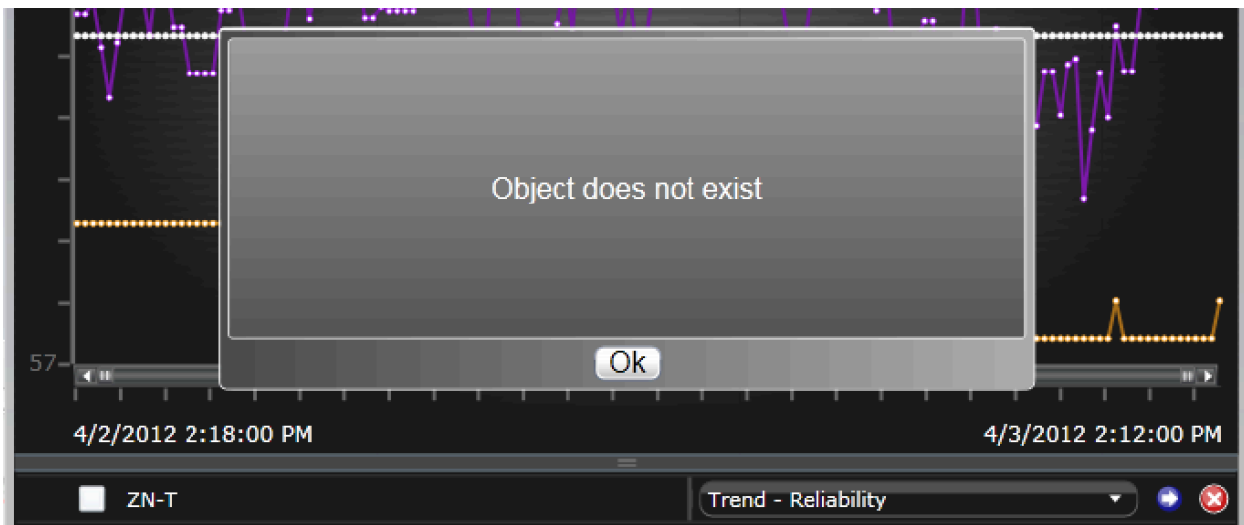
Legend Operations

Once the trend data is plotted, use the check boxes in the legend to hide or unhide trend values from appearing in the chart. If you want to remove the trended object from the legend and the chart, click the **Remove** icon (X).

To highlight a specific trend object and its data, click on its name in the legend. This action sends the selected series and its associated y-axis information to the foreground of the chart.

If you try to plot a trended attribute that was deleted or whose object is offline, its legend icon is blank and a user message box appears.

Figure 70: User Message: No Trend Data Available



Trend Module Limitations

The limitations of the Trend Module are as follows:

- A maximum of 500 data points can be displayed for a single trended object. No data older than 2 years can be displayed.
- The trend data originates from the device's online buffer; samples stored in a historical database such as the JCIHistorianDB archive database are not included.
- You can open only one Trend Module per graphic.
- The Trend Module can chart a maximum of four trended Metasys objects. If you try to plot a fifth object, a user message box appears.

Figure 71: User Message Example: Full Trend Module



- The Trend Module does not support nested trend extensions. For example, the Trend Module cannot chart totalization extensions that contain a trend extension.
- You cannot save the Trend settings for later use. Once you close the graphic, you need to select the objects for the trend module again.

Refresh Function

The Trend Module does not automatically refresh with new data samples. Use the refresh button to display the latest trend data within the Trend Module.

Error Handling

If an error occurs while stored trend samples are retrieved (for example, the bound trend object does not exist or its supervisory device is offline), the chart line for this trend series does not appear. The error message `Could not retrieve trend information` appears as a tooltip for the existing legend item.

Graphics+ Steps

Viewing Graphics

To view a graphic, double-click or drag the Graphics+ object from the [Navigation Tree](#) into the [Panel Layout](#).

Monitoring and Commanding Items Using Graphics

About this task:

- ① **Note:** The Site Management Portal UI provides the capability to monitor and command the Metasys system from a graphic.

To monitor your Metasys system using graphics:

1. Open a graphic to display the current status/state of system components.
2. Navigate through the system.

3. To command Metasys objects or items using graphics, right-click the graphic element to open the User Actions Panel and click **More Commands**. Select from the available commands. To change the value of a Metasys object or item from an inline command box, click inside the box, type a new value, and press Enter. For information on the runtime behavior of a particular graphic element, refer to the *Graphics+ Runtime Help (LIT-12011708)*.

Navigating Graphics

To navigate graphics, click the image or navigation button in the graphic to navigate to the linked graphic.

Opening the User Actions Panel from a Graphic

About this task:

To open the user actions panel from a graphic:

1. Open a Graphics+ object to display the current status and state of system components.
2. Right-click the graphic element. The User Actions Panel that applies to the object appears. If no panel appears, this element does not support the User Actions Panel. Supported elements include value boxes, room status elements, the LCD display within a Room Control Module, basic shapes, and gauges.
3. Select an action.

Opening the Trend Module from a Graphic

About this task:

Note: You can open the Trend Module from a User Actions Panel or from the Graphics+ Display Control tool.

1. Open a Graphics+ object.
2. To open the **Trend Module** from a **User Actions Panel**, right-click a graphic element to open its **User Actions Panel**. Supported elements include value boxes, room status elements, the LCD display within a Room Control Module, basic shapes, and gauges.
3. Click **View Trend**. If more than one trend is available, click **View Trend**, then select from the list of trended attributes that appear in the submenu. The Trend Module loads and plots the trend data.

Note: If **View Trend** does not appear in the **User Actions Panel**, this object has no trend extension.

4. For more details, see [Trend Module](#).
5. To open the Trend Module from the Graphics+ Display Control tool, click the **Tools** drop-down arrow. The Trend option appears.
6. Click **Trend**. The **Trend Module** appears either blank (no trend data selected) or replots the trend data for the objects you selected earlier.

Graphic Object

The Graphics object defines the attributes that represent a defined user graphic for a given set of objects. Graphic objects must exist under a container object or under another Graphic object (this allows you to link graphics together).

For detailed information on the User Graphics Tool, see [User Graphics Tool \(UGT\)](#).

Graphic Attributes

This object contains attributes common to many Metasys system objects. These common attributes are described in the [Common Object Attributes](#) section. This section includes attributes of the

Focus/Configuration tab, the Diagnostics tab (if applicable), and any other tab specific only to this object. See the [Object and Feature Tabs](#) section for information on the attributes that appear on the other tabs of this object (for example, the Hardware and Options tab appear on point objects).

Table 367: Graphic Object Attributes - Focus/Configuration Tab

Attribute Name	Notes	Initial Value	Values/Options/Range	Attribute Description			
File Name	Writable			Specifies an XML file containing a user interface tree.			
				Table 368: File Name Attribute			
				Element Name	Data Type	Initial Value	
				Exportable	True or False value	False (0)	
				Object Reference	List of References		
				References	True or False value	False (0)	
				Relative Path	Text		
				Relative Path: The name of the file relative to the directory containing the .moi file for the device.			

XAML Graphic Object

The Extensible Application Markup Language (XAML) Graphic object defines the attributes that represent a defined Graphics+ file for a given set of objects. XAML Graphic objects are created exclusively with the GGT and are saved on an SCT computer, or supervisory device as a file with an .xaml file extension.

Note: The Object Type for this object is labeled XAML Graphic in the software.

For detailed information on viewing XAML Graphic objects, refer to the *Graphics+ Runtime Help (LIT-12011708)*.

For detailed information on the Graphic Generation Tool that is used to create and modify XAML Graphic objects, refer to the *Graphic Generation Tool Help (LIT-12011697)*.

This object contains attributes common to many Metasys system objects. These common attributes are described in the [Common Object Attributes](#) section.

Trend Studies

Menu Selection: **Insert > Trend Study**

Inserts a trend study into the site.

✓ **Tip:**

- With the Trend Study tab selected on the Configure Screen, click the plus icon to add trend items, or click the minus icon button to delete trend items.
- Select the Configuration tab on the Configure screen for further configuration.

The Metasys Historical Data Management feature allows you to collect and store historical samples of Engine object data. Metasys Trend Studies allow you to view the historical data. Using this

information, you can manage energy usage, bill tenants, prove compliance to standards, and diagnose problems in your Metasys system. You can also trend attributes of system objects. With the addition of an ADS Device Object to your network, the Metasys system provides long-term storage of historical data and you dramatically [increase storage capabilities](#).

See the [Site Object](#) and [Engine Device Object](#).

The Engine allows you to add [Trend Extensions](#) to objects. The Trend Extension contains all of the trend definition information associated with the object. Each trend is associated with a single attribute of that object and collects historical data samples of that attribute. With Trend Extensions, data is collected in the Engine only, but you can configure the Engine to transfer the data to the Metasys server for long-term storage. For more information on extensions, see [Extensions](#).

Do not confuse the trend study with the Trend Viewer or Trend Extension. For information on Trend Extensions or the Trend Viewer, see the Trend [Extensions](#) and [Trend Viewer](#) sections.

For performance information on trends, refer to the *Metasys System Configuration Guide (LIT-12011832)*.

Trend Studies Concepts

Historical Data Overview

Basic Historical Data Management begins with the Engine [trend extension](#). Each Engine attribute that can be trended can store historical data samples about the attribute. Sample storage in the Engine is limited to the size of the individual [Trend Buffer](#). For storage of long-term or large numbers of samples, configure your system to store historical data in the Metasys server. Use the Trend Extension to view and configure trends in the Engine and the Trend Study to view trend data from the Engine and/or Metasys server.

Note: Although multiple trend extensions can be added to an object on an NxE, these extensions will be combined as a single trend if sent to a Historical Data Repository. This may not yield the expected result. To use multiple trends on a single object in an Historical Data Repository, create duplicate AV or BV objects and that map to the point in question, then create a new trend on the parallel AV or BV.

Historical Data Management in a Metasys Server

When you add a Metasys server to your Metasys system, trend data can be placed in a Historical Data Repository for long-term storage. If your Engine is configured to route trends to the Metasys server, the Metasys server stores the trends in the Historical Data database. The Metasys server utilizes a standard database management system that supports archival storage.

Trend Studies

Accessible through the navigation tree, [Trend Studies](#) display trend sample data from trends in Engine [trend buffers](#) and/or Metasys server repositories. A Metasys server on the site is not required to retrieve trend data from the Engine.

When you create a [Trend Study](#), you use the Trend Study [wizard](#) to choose the sources for the trends and the display properties.

An [Audit Trail](#) message is created whenever you create, delete, or edit a Trend Study. Trend Studies, [graphics](#), and folders are the only items you can create under a Metasys server on the navigation tree.

The main advantages to using Trend Studies are that you can:




- view multiple trends at once (from both Engine and Metasys server)
- view Metasys server historical trend data
- configure the [Study Range](#) with flexible parameters

- ① **Note:** You do not need a Metasys server on the site to forward trend samples to a Metasys server. You can forward trend samples to a Metasys server on a different Metasys site. See the for Metasys server information.

Views

There are three views in the Trend Study: Chart View, Table View, and Definition View.

Table 369: Views

Button	View	Description
	Chart View	Allows you to view trend data in a chart format.
	Table View	Allows you to view trend data in a table format.
	Definition View	Allows you to view the Trend Study setup and display options.

Trend Study Chart View

The Chart view allows you to view data samples in a graphical format and retrieve new trend data. You can zoom, unzoom, and pan within the Chart. You can also specify the X-axis and Y-axis ranges. You can change the Y-axis type to view the chart using stacked Y-axis or single Y-axis.

Table 370: Chart View





Button	Name	Description
	Update	Retrieves the most recent data samples for the displayed trends.
 (Zoom)  (Normal)	Zoom	<p>Toggles the mouse behavior for the chart between zoom mode and normal mode.</p> <p>While in zoom mode:</p> <ul style="list-style-type: none"> drag the mouse over an area of the chart to zoom in on that area. click Zoom to exit zoom mode and restore the mouse to normal mode. left-click to zoom out one level. <p>When you exit zoom mode, the chart remains at the current zoom level. Use the Restore button to fully zoom out on the chart.</p> <p>① Note:</p> <ul style="list-style-type: none"> You cannot pan while the mouse is in zoom mode. You can also zoom and unzoom in normal mode by using the Shift key and the mouse. To zoom, hold the Shift key down while dragging the mouse across the chart. To zoom out one level, left-click the mouse while holding the shift key down.
	Restore	Allows you to return to an unzoomed view and Allows you to return to an unzoomed view and switches the mouse back to normal mode if the chart's zoom mode is active.

Table 370: Chart View








Button	Name	Description
	Pan	Allows you to pan the view of the chart vertically or horizontally by dragging the mouse across a zoomed chart. Panning is not available for unzoomed charts or when zoom mode is active. To pan left or right, drag the mouse over the X-axis. To pan up or down, drag the mouse over the Y-axis.
	Points Line	Displays the data using lines and point markers. The Points Line chart is the default chart type in chart view.
	Area	Displays the data using an area chart.
	Bar	Displays the data using a bar chart. Note: Only use the bar chart when the number of data samples can reasonably be expected to display as bars. If too many data samples exist when you click this option, the display becomes unstable and fails to properly update the screen. To recover, select any other display option.
	Points	Displays the data using markers, with no lines.
	Line	Displays the data using lines, with no markers.
	Stacked Y-axis	Displays a separate Y-axis for each trend.
	Single Y-axis	Displays the trends using a single Y-axis.

Chart Right-Click Menu

You can access a right-click menu from the Chart view. Place your cursor in the chart and right-click in the panel to display the menu.

Table 371: Chart View Right-Click Menu

Menu Item	Description
Background Color	Opens the Select a Color dialog box and allows you to configure the background color.
Y-axis Scale	Displays the Y-axis Range Configuration dialog box.
X-axis Scale	Displays the X-axis Range Configuration dialog box.
Gridlines	Allows you to select what type of gridlines to appear on the chart. You can choose: None, X and Y, X Only, and Y Only.
Chart Type	Allows you to select what type of chart to display. You can choose: Points Line, Area, Bar, Points, and Line.
Stacked Y-axis	Displays the chart on a stacked Y-axis.

Chart Legend

The Chart Legend appears below the graphical charting area. The Chart Legend displays the list of trend items for the Trend Study in a table, and includes information about each item.

Table 372: Legend






Button/Field	Name	Description
	Select All	Selects the maximum number of trend items for display in the chart.
	Remove All Selections	Deselects all trend items in the chart Legend.
<input checked="" type="checkbox"/>	Show	Indicates if the trend item appears in the Chart. When checked, the data appears on the chart and in the table. When unchecked, the data does not appear in the chart or table.
	Historical Trend Icon	Indicates the trend was selected from the Metasys server Historical Database folder.
	Marker	Indicates the appearance of the marker style and color for the trend item on the Chart.
	Color Palette	Displays the Select a Color dialog box. Allows you to change the color used to chart the trend data.
	Name	Displays the trend item name based on the Name attribute.
	Reference	Displays the trend item's full reference.



Chart Legend Right-Click Menu

You can right-click an item in the Chart Legend to access item-specific menu options. The right-click menu content is based on the type of item you click on. For example, if you right-click a trend item from a historical database, you can only Refresh the Trend Study display.

Trend Study Table View

The Table view of the Trend Study allows you to view data for the selected trends in a table format. You can copy the trend data to the clipboard for pasting into other applications such as Microsoft Excel.

Table 373: Table View

Button	Name	Description
 <p>The Historical Trend Icon appears in the Table View column headings when applicable.</p>	Update	Updates the data samples with new trend data immediately.
	Copy to Clipboard	Allows you to copy selected trend data to the system clipboard for pasting into other applications such as Microsoft Excel. You can also use Ctrl + C to copy selected trend data.

Trend Study Definition View

Use the Definition View to edit the Trend Study configuration. You can choose which trends are viewed, choose the [Study Range](#), and edit the display properties. You can view more than one trend item at a time on the same graph. The following table details the fields in the Definition View.

Table 374: Definition View

Field	Description
General	<p>Allows you to edit the refresh rate and display precision.</p> <ul style="list-style-type: none"> • Refresh rate: specifies the amount of time, in seconds, for automatic refresh of data. You must configure this attribute with a value of 0 seconds, 60 seconds, or greater than 60 seconds. Values 1 to 59 are invalid and not allowed. 0 means manual refresh. If the refresh rate is 0, click the Update button to display new data. • Display precision: specifies the decimal point rounding and the number of decimal places used to format real values that do not report a display precision. If the value reports a display precision, this Trend Viewer attribute is ignored in favor of the value's native display precision.
Range Start and Range End	<p>Specifies the Start Time and End Time for the Trend Study.</p> <ul style="list-style-type: none"> • Radio Buttons: allows you to choose relative time or absolute time for the Study Range (start and end times). The fields enable depending on which one you select. • Date: displays the date for the Study Range. • Absolute Time: allows you to select a specific date and time for the Study Range. This selection creates a fixed range of time when the Study is viewed. • Relative Time: allows you to select either Today or Now. If you select Today, enter the Relative Time. If you choose Now, specify an Offset. This selection creates a moving range that is relative to the time the Study is viewed. • Offset: represents a combination of a whole number of days, hours, minutes, and seconds before or after (- or +) the current date and time.
Chart Display	<p>Allows you to add gridlines, stack the Y-axis, and choose the chart style for the Trend Study.</p>

Definition View Trend Items Table

The Trend Items table appears at the bottom of the Definition view. The Trend Items table displays the list of the Trend Study's trend items.

Table 375: Trend Items Table




Button	Name	Description
	Historical Trend Icon	Indicates the trend was selected from the Metasys server Historical Database folder.
	Add	<p>Opens the Select Item dialog box and allows you to add trend items to the Trend Study. This button only enables when the view is in edit mode.</p> <p>ⓘ Note: All items and navigation trees appear in the Select Item window; however, you can only select trends. All other items appear dimmed.</p>
	Remove	Allows you to remove a trend item from the Trend Study. This button only enables when the view is in edit mode.
	Name	Displays the name of the trend item.
	Reference	Displays the trend item's reference information.

Table 375: Trend Items Table

Button	Name	Description
	Aggregate Function	<p>Allows you to select the aggregate function to use on the trend sample data (NONE, Average, Minimum, Maximum, Standard Deviation, Range, Sum, and Variance). You can sample the same point for different aggregate functions and display them on a single chart. Aggregate functions group multiple values together to construct a single value that has significant meaning or measurement. Descriptions of available aggregate functions are as follows:</p> <ul style="list-style-type: none"> • Average: the sum of values divided by the total number of values • Minimum: the lowest value of a set of values • Maximum: the highest value of a set of values • Standard Deviation: the amount of variation or dispersion of a set of data values • Range: the difference between the lowest and highest values on a particular scale • Sum: the addition of two or more numbers • Variance: the quantity equal to the square of the standard deviation <p>The aggregate functions of the trend study apply to information in the Historical Data at the Metasys server and do not apply to data in the NAE buffer.</p>
	Aggregate Interval	<p>Specifies the time, in minutes, over which the aggregate function should be applied (for example, 60 for an hourly calculation, or 1,440 for a daily calculation).</p>
	Plotting Style	<p>Allows you to select the plotting method for the trend item.</p> <ul style="list-style-type: none"> • Continuous - straight line between data samples. Continuous plotting connects samples with the shortest possible line, giving an appearance of a set of diagonal ramps as samples change value. • Discrete - line stays at the same value until the next data sample is taken (good for binary data). Discrete plotting has 90-degree angles at the time when samples change value. The chart appears to be a series of steps.

Study Range

The Study Range is the time period used to filter trend data. The Trend Study gathers and displays the trends that are taken during this time period.

Default Destination

The ADS Repository defines where trend samples are sent when the local trend buffers reach their defined Transfer Setpoint (see the [Trend Extensions](#) section), the Engine defined ADS Delivery Time

(see the [Engine Device Object](#)) is reached, or the user initiates a transfer. You can initiate a transfer by using the Trend Extension's Route command.

Notes:

- You do not need a Metasys server on the site to forward trends to a Metasys server. You can forward trend samples to a Metasys server on a different Metasys site. The off-site a Metasys server that receives forwarded trend samples must be the Site Director of its site.
- You can define only one repository as the default destination for each Engine.

For more information on a Metasys server default trend destinations, see [Configuring the Metasys Server as the Destination for Trend Data](#).

Trend Studies Steps

Setting Up Trend Studies (Overview)

1. [Create a Trend Extension](#).
2. [Configuring the Metasys Server as the Destination for Trend Data](#)
3. Configure the [trend extension](#) to [pass trends to the ADS/ADX](#).
4. Configure the [ADS/ADX to forward trends to another ADS/ADX](#) trend repository (if desired).
5. [Create a Trend Study](#).

Result

Notes:

- If you have a site with an ADS/ADX and engines, and you create a Trend Study on an engine (rather than on the ADS/ADX), any trend items added to the trend study from the ADS/ADX's Historical DB folder is listed with the current site name in their references instead of their actual site names.
- When referencing trend items that were forwarded from an off-site device, create the trend study object on the ADS/ADX, rather than on the engine.

Configuring the Metasys Server as the Destination for Trend Data

About this task:

Notes:

- You can define only one repository as the default destination.
- If you need to provide long-term storage for trend samples from an Engine, follow these steps to configure the Trend Repository of a Metasys server as the [Default Destination](#).

To configure the a Metasys server Trend Repository as the Default Destination for trend samples from an Engine:

1. Select the Engine device in the navigation tree.
2. View the Engine. See [Displaying Information About an Item](#) for more information on how to display an item.
3. Select the **Focus** tab and click the **Advanced** radio button to display additional item information.
4. Select **Edit**.
5. Edit the ADS Repository and the ADS Delivery Time. (The [Engine Device Object](#) attributes table contains Default Value and Values/Options/Range information for the attributes.)
6. Click **Save**.

- ① **Note:** If you want to define the a Metasys server attributes for the entire site instead of at the individual Engine level, select the Site in the navigation tree and edit the ADS Repository and the ADS Delivery Time. (The [Site Object](#) attributes table contains Default Value and Values/Options/Range information for the attributes.)

Configuring the Trend Extension to Pass Trend Data to the Metasys server

To configure the Metasys server as a default destination for trends, you must configure the Repository Enabled and Transfer Setpoint attributes in the [Trend Extension](#). See the [Object Help](#) section.

Configuring a Metasys Server to Forward Trend Data to Another Metasys Server Trend Repository

1. View the original Metasys server.
2. Select the **Focus** tab and click the **Advanced** radio button to display additional item information.
3. Select **Edit**.
4. Scroll down to the **Repository Storage** section.
5. Edit the Metasys server Device Object's attribute.
6. Click **Save**.

Creating Trend Studies (Overview)

About this task:

- ① **Note:** Before creating a Trend Study, create a Trend extension. See [Setting Up Trend Studies \(Overview\)](#) for details.

1. From the **Insert** Menu, select **Trend Study**.
2. Follow the Trend Study's [wizard](#) steps. The new study appears in the [Navigation Tree](#).
3. Drag the study to the [Panel Layout](#).
4. On the **Definition View**, click **Edit** and configure the fields (see [Trend Study Definition View](#)) as you want them.
5. Add trend items to the **Trend Item** table using the add button. The **Select Item** window appears.
6. Select one or more trend items.

① **Notes:**

- Multiple selection adds multiple items.
- All non-trend items appear dimmed. If everything appears dimmed in the Select Item tree, check to see if you have at least one object with a Trend Extension and/or that Engine devices from other sites are storing samples in the Metasys server (if applicable).

7. Click **OK**. See [Adding New Trend Items to the Trend Study](#).
8. Click **Save**.
9. Click the **Chart** or **Table** buttons to see trended data in the specific format.

- ① **Note:** If nothing appears in the chart or table, check to see if you have samples in your study range and adjust if necessary.


Editing Trend Studies

1. [View the Trend Study](#).
2. Click the **Definition View** button.

3. Click the **Edit** button.
4. Make your changes using the table in the [Trend Study Definition View](#) section, including adding new Trend Items.
5. Click the **Save** button to save the changes.

Viewing Trend Studies

About this task:

 **Note:** To create Trend Studies, see [Creating Trend Studies \(Overview\)](#).

1. From the navigation tree, drag the Trend Study you want to view to the [Panel Layout](#).
2. Select the **Definition View** button to edit the Trend Study. Select the **Chart View** or **Table View** buttons to view the trend data.

Result

 **Notes:**

- The UI limits the number of data samples you can retrieve. Therefore, you may not see the full range specified. The most recent data samples are always retrieved first.
- If the chart appears to flicker, you have too many trend samples in the Trend Study. Reduce the number of displayed trends or change the trending date/time range to display fewer samples and improve performance. See [Deleting Trends from the Trend Study](#).

Deleting Trend Studies

1. Select a Trend Study in the navigation tree.
2. Select **Edit > Delete Items** and answer **Yes** to the **Confirm Delete** box.

Adding New Trend Items to the Trend Study

1. [View the Trend Study](#).
2. If necessary, click the **Definition View** button.
3. Click the **Edit** button in the upper left of the **Trend Study** tab.
4. Click the **Add** icon in the **Trend Items** table. The **Select Item** dialog box appears.
5. Select the trend(s) that you wish to add from the **Select Item** dialog box.

 **Notes:**

- Multiple selection adds multiple items.
 - All non-trend items appear dimmed. If everything appears dimmed in the Select Item dialog box, check to see if you have at least one object with a Trend Extension and/or that Engine devices from other sites are storing samples in the Metasys server (if applicable).
6. Click the **OK** button in the **Select Item** dialog box.
 7. Click the **Save** button in the **Definition View** to save the changes.

Deleting Trends from the Trend Study

1. [View the Trend Study](#).
2. Click the **Definition View** button.
3. Click the **Edit** button.
4. Select a trend in the **Trend Item** table.
5. Click the **Remove** icon. The **Remove** confirmation dialog box appears asking if you want to remove the trend item. Click **Yes**.

6. Click **Save**.

Configuring the X-axis

About this task:

To configure the X-axis in the Chart view:

1. Place your cursor on the chart and right-click.
2. Select the **X-axis Scale**. The Range Configuration dialog box appears.
3. Specify whether to **Use Automatic Range Calculation**. The automatic range is determined automatically based on the set-up in the Definition View.

i **Notes:**

- You are limited to dates and times between the start and end dates configured in the Trend Study definition.
- When you select **Use Automatic Range Calculation**, you do not fill in the **Range** fields.

4. Specify the **Start Time, Start Date, End Time, and End Date**.
5. Click **OK**.

Result

- i** **Note:** You can also configure the X-axis range by changing the start and end dates and times in the **Definition View**. See the table in the [Trend Study Definition View](#).

Configuring the Y-axis

About this task:

To configure the Y-axis in the Chart view:

1. Place your cursor on the chart and right-click.
2. Select the **Y-axis Scale** menu item. The **Range Configuration** dialog box appears.
3. If you are using stacked Y-axis, choose the trend item to which the Y-axis range should be applied from the item drop-down list.
4. Specify whether to **Use Automatic Range Calculation**. The **Range** is determined automatically based on the trend items.

- i** **Note:** When you select **Use Automatic Range Calculation**, you do not fill in the Range fields.

5. Specify the minimum and maximum values for the Y-axis.

- i** **Note:** When you use stacked Y-axis, click **Apply** to apply the changes to a specific trend item. You can continue setting the ranges for other trend items in the **Range Configuration** dialog box.

6. Click **OK**.

New User View

Menu Selection: **Insert > User View**

Inserts a user navigation view (also referred to as user view, user-defined navigation tree, and user-defined tree) item into the All Items navigation tree. In online mode, the user view appears as a separate tab in addition to the All Items navigation tree if the user has permission for the user view. In online and offline modes, the user view appears in the User Views folder under the Site in the All Items tree.

Assign permissions to user views using the Security Administrator System in the online mode. You cannot assign permissions to user views in the SCT.

✓ **Tip:** On the Configure screen, click the Configuration tab for further configuration.

User Views

User views (user-defined navigation trees) contain references to selected items found in the All Items navigation tree (the default navigation tree). For example, you could create a user navigation tree with all the AIs grouped together, or a navigation tree that contains only points for a certain area of a building. User views are useful for restricting access for certain users and grouping commonly used items/graphics together. You can use the user view edit capabilities to easily consolidate small user views into a larger view, or to break large user views into multiple smaller views. Specify the User View navigation display as either a set of tabs (Tabbed) or a drop-down list (List) in the Default navigation display preference in the [Display Settings Tab](#) in the [Preferences](#) section. We recommend list view if the system has many user views, as list view takes up less space in the navigation tree pane. User views provide a mechanism for viewing Tailored Summaries. See the *Tailored Summary Concepts* section in the *Metasys SCT Help (LIT-12011964)* for more information.

User views are easy to create. The system supports drag-and-drop functionality of items from the Global Search Results table to add them as references in a User View. To do this, view both the Global Search Viewer and the User View in the display frame (using a multiple panel view). Click **Edit** in the **User View**. Then drag the desired items from the Search Results table to the User View. The system also supports drag-and-drop functionality to add references to items from the navigation frame (User View [online] or All Items tree) to a User View in Edit mode. In addition, to add an entire tree (only from the navigation frame) to a User View, press the Ctrl key and drag and drop the tree to a User View in Edit mode.

For more information on the wizard used to create a user view, see the [New User View](#) section. For more information on the object created by this wizard, see [User Navigation Tree](#).

The Security Administrator System allows administrators to assign user view permissions to specific users (in the Online UI only). For information on the Security Administrator System, see [Related Documentation](#).

User Views Concepts

User View Behavior by Mode

User views appear and function differently, depending on what [mode](#) you are in (Table 376).

Table 376: User Views in Modes

Mode	Location in UI	Behavior Notes
Offline (SCT)	<ul style="list-style-type: none"> User Views folder in the All Items navigation tree 	<ul style="list-style-type: none"> create, edit, and delete user views copy and paste user views drag and drop the user view into the Display frame for editing
Online (SMP)	<ul style="list-style-type: none"> User Views folder in the All Items navigation tree User View tab Security Administrator System 	<ul style="list-style-type: none"> create, edit, and delete user views drag and drop the user view into the Display frame for editing click a user view tab to display the user view as an actual tree in the navigation frame. In this tree, you can view and navigate to items. assign permissions to the user views (through Security Administrator System)
Simulation	<ul style="list-style-type: none"> User Views folder in the All Items navigation tree 	

User View Authorization

User view authorization is based on the security privileges assigned to your user account by a Metasys Administrator. Authorization uses navigation permissions and category-based permissions.

Your navigation permissions determine which user views display in the navigation frame of the online UI. Only the user views assigned to you or your assigned security roles appear. When a user view is created online, navigation permissions for the view are automatically assigned to the user who created the view. When a user view is created offline in the SCT and then downloaded to the site, no navigation permissions are assigned. In this case, the user view does not display in the navigation frame for any users. The Metasys Administrator must assign permissions to all users and/or roles requiring the navigation view.

Your category-based permissions determine if you are allowed to create, view, edit, or delete a user view from a particular authorization category (for example, HVAC). Category-based permissions are separate from navigation permissions.



ⓘ Note: A User View can contain objects assigned to categories that a user does not have permissions for. In this case, the objects appear in the User View navigation tree, but the user cannot access any information from these objects.

Alarm notification is not limited or affected by the current user view, only by the user's permissions for managing item events. Therefore, it is possible for a user to receive an alarm for an item that does not exist in the currently displayed user view.

User View Structure

User views provide graphical, functional, and geographical organizations of your Metasys system. For example, you might create a user view comprised only of nested references to graphics. Or you may organize your user view with separate levels for campus, building, floor, room, and so on. You may even create a separate user view for each user, to provide that user a focused view into the system or to restrict the user's access.

Table 377: User View Structure Icons

Button Icon	Button Name	Description
	User view folder	A folder created in the user view.
	Reference to a folder	A reference in the user view to a folder from the All Items view.

The structure, or hierarchy, of a user view is based on the following general rules:

- User view folders may contain any number of additional child folders or other references. For example, you can add multiple Summary Definition objects for the Tailored Summary feature to a user view folder.
- You cannot nest anything under a reference to a folder.
- Graphic references may contain any number of additional graphic references.
- With the exception of graphics, references may only be nested under user view folders (that is, a non-graphic reference cannot be a child of a reference). References do not need to be nested to exist in the User View.
- Any item may be referenced any number of times within the user view hierarchy.

Tree View Tab

The Tree View tab appears when you are adding a user view with the [New User View](#) or when you display an existing user view for editing.

Table 378 shows the buttons in the Tree View tab and when to use them. All the functions represented by buttons in Table 378 are also accessible through the right-click menu. Table 379 describes the functionality available in the Tree View tab.

Table 378: Tree View Tab Buttons/Right-Click Menu







Button Icon	Button Name	Description
	Add Reference(s)	Adds one or more items to the user view. When you add a reference to an item that has children in the navigation tree, the children are not included in the user view.
	Add Tree(s)	Adds an entire user view, an entire folder hierarchy, or single item reference to a user view. When you add an item using this button, you add the item and all of its children to the user view.
	New Folder	Creates a new folder in the user view. Use this button to add a folder to a user view.
	Remove	Removes anything you select from the user view. The Remove button removes not only what you select, but all children of the item you select.
	Move Up	Moves a selected user view item up in the user view. This button changes the order of items in the navigation tree but does not nest items. See Drag and Drop in the Table 379.
	Move Down	Moves a selected user view item down in the user view. This button changes the order of items in the navigation tree but does not nest items. See Drag and Drop in the Table 379.

Table 378: Tree View Tab Buttons/Right-Click Menu





Button Icon	Button Name	Description
	Sort Ascending	Sorts the items in the user view in ascending, alphanumeric order. You can sort items at any level in the user view (for example, the folders directly under the User View or the contents of a folder). The items are sorted only one level down (not subsequent levels).
	Sort Descending	Sorts the items in the user view in descending, alphanumeric order. You can sort items at any level in the user view (for example, the folders directly under the User View or the contents of a folder). The items are sorted only one level down (not subsequent levels).
	Edit Label	Changes the label used for an item within a specific user view. Changing the label for an item in the user view does not affect the item's Name attribute or reference, and does not affect the label used for other occurrences of the item in the same or other user views. To change the label for an item, triple-click the item or right-click the item and select Rename .
	Find and Replace	Repairs or updates site, Engine, or Metasys server identifiers in the references of items stored in the user view. The references are used to identify the items in the view, and updates from this feature do not affect the items themselves. You cannot use this feature to find and replace field device identifiers within references. See Find and Replace .

Table 379: Tree View Tab Functionality

Functionality	Description
Ctrl/Shift Keys	Selects multiple items in the Select Item dialog box, which is displayed when you click Add Reference or Add Tree .
Drag and Drop	Moves the selected reference or folder, and its nested items, to a new location within the user view. When you are dragging an item to a collapsed folder, hover the mouse pointer over the collapsed folder for a moment and it automatically expands. To change the order in which items appear within a parent folder or under a graphic, see Move Up and Move Down in Table 378. ① Note: You can drag and drop objects from the all items tree or any other user view into the user view you are editing. When you drag/drop an object with children, only the parent object is added to the user view.

Find and Replace

The Find and Replace button appears on the [Tree View Tab](#). You can use the Find and Replace option after renaming a site/device to update references to the new site/device name. This feature resolves any references that may have become broken due to the name change. See the following table for search options.

Table 380: Search Options

Button	Description
Full Reference	Updates the first occurrence of the specified text in all references with the replacement (Replace with) text. Enter the reference text and the new text and click Find . A list of references is generated. Click Replace All to update all references, or select a reference and click Replace to update a reference individually.
Site Name Only	Updates the site identifier in all references to the site name where the user navigation view resides. This value comes from the user navigation view's full reference and is not editable in this dialog box. Click Find . A list of references is generated. Click Replace All to update all references, or select a reference and click Replace to update a reference individually.
Device Name Only	Replaces the Engine or Metasys server device identifier in item references with a different device identifier. All Device Names is entered by default, but you can specify a specific device name if desired. Enter the new name and click Find . A list of references is generated. Click Replace All to update all references, or select a reference and click Replace to update a reference individually. The device identifier updates in the references for the selected item and its children.

You also can use the Find and Replace option in online mode to quickly duplicate user view hierarchies for supervisory devices with similar configurations.

Note: The Select Item dialog box contains the set of views that appear in your navigation frame. Because user views do not appear in the navigation frame in the SCT, these steps work only in online mode.

For example, perhaps you have several NAEs on your site that have the same set of N2 controllers and field points under their N2 trunks. You can create a user view to group your field devices and field points for NAE-1 into a logical system-based or geographical hierarchy. You can then duplicate the NAE-1 user view to create the same references and hierarchy for NAE-2.

Follow these steps:

1. [Create a user view](#) referencing NAE-1 items (for example, field devices and/or field points), organizing the items in folders as desired.
2. Refresh all tabs in the navigation frame to update the navigation views displayed in the UI.
3. Create and edit a new user view for NAE-2, or edit the user view you created for NAE-1.
4. Add items to the new NAE-2 user view.
 - a. Click **Add Trees** (see Table 378) to display the Select Item dialog box.
 - b. In the dialog box, select the tab for the user view you created for NAE-1.
 - c. Select the items you wish to duplicate (choose the root node to duplicate the entire navigation view).
 - d. Click **OK**. The Select Item dialog box closes, and the selected items and their children appear in the NAE-2 user view.
5. Use the Find and Replace feature (Device Name Only in the Table 380) to replace the NAE-1 identifier with NAE-2 in the references for the duplicated items.
6. Save your changes when finished.

User Views with Tailored Summaries

The Tailored Summary feature relies on the User View feature to provide a mechanism for viewing Tailored Summaries. After defining Summary Definition objects, add them to a folder in the User View through the All Items tree. Then view the Tailored Summary through the User View (that is, view the User View folder to display the Tailored Summary). See the *User View Editor, Workflow, and Defining User Views with Summary Definitions* topics in the *Tailored Summaries* section in the *Metasys SCT Help (LIT-12011964)*.

User Views Steps

Creating a User View

About this task:

See [User View Authorization](#) for details on the user view permissions.

To create a user view:

1. On the Insert menu, click **User View**.
2. Follow the [wizard](#) instructions. See [New User View](#) for information on the wizard. See Table 378 and Table 379 for details on using the Tree View tab.

Editing a User View

About this task:

Notes:

- The Edit menu or **Right-click > Delete** functions are not used to delete items from a User View while the User View Editor is open. Using either function permanently deletes selected items from the archive.

To edit a user view:

1. Browse to the user view (in either the User Views folder in the All Items navigation tree or by selecting the user view tab).
2. Double-click the user view. The user view editor appears in the Display frame.
3. Click **Edit** and work with the user view as follows:
 - Use the New Folder button to add a folder.
 - Use the Add Reference(s) and Add Tree(s) buttons to add references to items.
 - Use drag-and-drop functionality to add references to items from the navigation frame (User View [online] or All Items tree) to a User View in Edit mode.
 - Use drag-and-drop functionality to add references to items in a User View from the Global Search Results table. View both the Global Search Viewer and the User View in the display frame (using a multiple panel view). Click **Edit** in the User View. Then drag the desired items from the Search Results table to the User View.
 - Press the Ctrl key and drag and drop a tree (only from the navigation frame) to a User View in Edit mode to add an entire tree to the User View. This functionality does not apply to the Global Search Results table.
 - Select one or more items and use the Remove button to remove items.
 - Sort the items in the user view using the Sort Ascending and Sort Descending buttons.
 - Use the Move Up and Move Down buttons to reorganize the order of the items.
 - Use the Edit Label button to rename items.
 - Use the Find and Replace button to resolve broken references after changing the Site Director or to duplicate user view hierarchies for supervisory devices with similar configurations. For details, see [Find and Replace](#).

For information on the buttons and functionality in the Tree View tab, see the [Tree View Tab](#) section.

For information on the attributes in the Focus tab, see the [Summary Definition Object](#).

4. Click **Save** when finished.

Deleting a User View

About this task:

To delete a user view:

1. Select the user view in the User Views folder of the All Items navigation tree.
2. On the Edit menu, select Delete Items.
3. Click **Continue** in the Delete Items wizard dialog box. The user view disappears.

Consolidating User Views

About this task:

You can consolidate multiple small user views into one larger user view.

To consolidate user views:

1. [Create](#) a new user view, or [edit](#) an existing user view. This is the user view to which you add other views to consolidate them.
2. With the user view in Edit mode, select the location (root or existing folder) where you would like to add the contents of another user view.
3. Click **Add Tree**. The Add Tree(s) dialog box appears.
4. In the Add Tree(s) dialog box, select the tab for the user view you would like to add.
5. Select the root node of the user view you would like to add.
6. Click **OK**.

i **Note:** You also can press the Ctrl key and drag and drop a tree (only from the navigation frame) to a User View in Edit mode to add an entire tree to the User View.

A new folder, which contains the contents of the user view you selected, appears in the user view you are editing. If you would like to rename the folder or move the children to another location within the user view, see Table 379.

7. Repeat Step 1 through Step 6 if you would like to consolidate other user views into the user view you are editing.
8. When you are finished consolidating user views, click **Save**.
9. Refresh the tabs in the navigation frame and [delete](#) any user views you no longer need.
10. Have a Metasys Administrator adjust the navigation permissions for the consolidated user view (if necessary).

Breaking Up User Views

About this task:

You can break up a large user view into several smaller views.

To break user views:

1. [Create](#) a new user view, or [edit](#) an existing user view.
2. Click **Add Tree**. The Add Tree(s) dialog box appears.
3. In the Add Tree(s) dialog box, select the tab for the user view you would like to break into several smaller views.
4. Select the items from the large user view you would like to add to the new smaller view.

5. Click **OK**.

① **Note:** You also can press the Ctrl key and drag and drop a tree (only from the navigation frame) to a User View in Edit mode to add an entire tree to the User View.

The items you selected and their children appear in the new user view. If you would like to rename the folder or move the children to another location within the user view, see Table 379.

6. Repeat Step 1 through Step 7 if you want to move more content from the large user view to the new smaller user view.
7. When you are finished with this new smaller user view, click **Save**.
8. Repeat Step 1 through Step 7 to create additional smaller user views with content from the large user view.
9. Refresh the tabs in the navigation frame and review the user views to make sure they contain the correct items.
[Edit](#) the new smaller user views as necessary.
Edit the large user view and remove the items that are now located in the new smaller views, if desired.
10. Refresh the tabs in the navigation frame.
11. Have a **Metasys Administrator** adjust the navigation permissions for the consolidated user view (if necessary).

User Navigation Tree

The user navigation tree object defines the attributes that represent the navigation tree.

For information on the Tree View and the User View feature, see [User Views](#).

User Navigation Tree Attributes

This object contains attributes common to many Metasys system objects. These common attributes are described in the [Common Object Attributes](#) section. See the [Object and Feature Tabs](#) section for information on the attributes that appear on the other tabs of this object (for example, the Hardware and Options tab appear on point objects).

See *Tree View Tab* section for details on the buttons of the tab.

Summary Definition Wizard

Menu Selection: **Insert > Summary Definition**

Inserts a Summary Definition into the system. The Summary Definition object is used by the Tailored Summary feature. See the [Summary Definition Object](#) section and the *Tailored Summaries* section in the *Metasys SCT Help (LIT-12011964)* for more information on this object and feature.

Summary Definition Object

The Summary Definition object is an integral part of the Tailored Summary feature. This object allows you to view and edit the columns and key data values used in a Tailored Summary based user view. Tailored summaries are essentially summary views of Metasys system items where the rows and columns of the summary are tailored to contain information of interest.

A summary definition contains the column rules and key data rules used to display a tailored summary. Each column may contain a column heading, an item name or Fully Qualified Reference (FQR), and attribute to display in that column. Each key data item may contain an item name to display in a tailored summary in a header section outside of the data table. After defining the

columns and key data items in the summary definition, you can associate that definition with a user view folder using the user view editor.

For information on how this object interacts with the Tailored Summary and User View features, see [Tailored Summary Viewer](#) or consult the *Tailored Summaries* section in the *Metasys SCT Help (LIT-12011964)*. For information on the User View feature, see [User Views](#).

Summary Definition Attributes

This object contains attributes common to many Metasys system objects. These common attributes are described in the [Common Object Attributes](#) section. For information on the Tailored Summary feature, see the *Tailored Summaries* section in the *Metasys SCT Help (LIT-12011964)*.

Click the attribute name in the table for a description of the attribute.


 **Note:** In the notes column, attributes marked with the letter C are configurable, attributes marked with the letter N do not require a value, and attributes marked with the letter W are writable.

Table 381: Summary Definition Object Attributes - Focus/Configuration Tab

Attribute Name	Notes	Initial Value	Values/Options/Range	Description
Key Data	C,N,W		Limit of 4 key items	Holds the item name or Fully Qualified Reference of a key item to display in a tailored summary. You can configure up to four key items.

Table 382: Summary Definition Object Attributes - Summary Definition Tab

Attribute Name	Notes	Initial Value	Values/Options/Range	Description
Column Definition	C,W		Column Heading, Child Item, Attribute	Defines the columns displayed in a tailored summary. You can define up to seven columns (list of structures). Each structure contains the following information: Column Heading - Defines the name of the column header. Child Item - Indicates item for which the column data is retrieved based on its name attribute, which must match a user-specified pattern (such as ZN-* or ZN-T, Zone-T). To display an attribute of the row item, leave this field blank. Otherwise, specify the name of the child item to display. Attribute - Defines the attribute information for the column. The attributes are grouped into categories for easy selection. Select a category in the Attribute Filter section of the Select Column Attribute dialog, and then select the desired attribute from the list.
Row Heading Column Text	C,N,W		Label Maximum: 50 characters	Defines the text to display as the label for the row headings column (that is, the first column) in a tailored summary.

Tools Menu

Click one of the following menu items for a description of the menu item or perform a key-word search for the menu item in this PDF, using Ctrl+F.

Table 383: Tools Menu

Menu Item	
User Profile	Field Device Tools ^{1, 2}
Change Password	Pair Network Engine with Site Director
Administrator	
Configure Preferences	
All Items Organizer	

1 The [Field Device Tools](#) menu selection includes these options: HVAC PRO (N2), GX-9100 (N2), XTM Configuration (N2), DX Commissioning (N2), N2 Device Loader (N2), CCT (MSTP/IP).

2 To use the CCT in Ethernet passthru mode, open CCT from the **Tools > Field Device Tools > CCT** (MS/TP) menu option.

User Profile

Menu Selection: **Tools > User Profile**

Launches the current user's properties for managing the user's language, default navigation view, and other profile settings.

Preferences

The Metasys system provides customized preferences for the user interface. The preferences allow you to configure how the user interface behaves, including its sounds and colors, startup views, alarm priorities, and the ability to add links to external applications that can be accessed from within the UI.

Some of the preferences defined in the Metasys Preferences dialog box also apply to the Metasys UI. The [Metasys Preferences Dialog Box](#) section calls out such preferences.

Metasys Preferences Dialog Box

The Metasys Preferences dialog box is accessed through the Tools menu (Configure Preferences) and allows you to configure system and user preferences. Users authorized to edit system preferences can edit all preference fields using the Metasys Preferences dialog box. See [Users Authorized to Edit System Preferences](#). Unauthorized users can edit only user preferences.

Some of the preferences defined in the Metasys Preferences dialog box also apply to the Metasys UI. The following table calls out the tabs with such preferences. See the specific tab section for details.

Click the tab name in the table for a description of the Metasys Preferences tabs. For more information on the modes of operation, see [Metasys Modes](#).

Table 384: Metasys Preferences Dialog Box Tabs for Metasys UI and SMP

Tab	Applies to SMP UI	Applies to Metasys UI
Information Tab ¹	X	
Alarm Settings Tab ²	X	X
Trend Settings Tab	X	X
Graphic Settings Tab	X	X
Display Settings Tab	X	X
Applications Tab	X	

Table 384: Metasys Preferences Dialog Box Tabs for Metasys UI and SMP

Tab	Applies to SMP UI	Applies to Metasys UI
Electronic Signature Settings Tab ³	X	
Annotation Settings Tab	X	X

1 Simulation mode uses the default preferences. Preferences are not configurable in Simulation mode.

2 Only settings that apply to the SCT are available.

3 This tab appears only for Metasys for Validated Environments (MVE) installations.

Information Tab

The Information tab displays messages regarding the current state of the preferences. This tab does not contain configurable preferences.

Alarm Settings Tab

The Alarm Settings tab allows you to configure up to 10 alarm priority groups, each with a unique sound and a unique color. The groups are based on the priority of the alarm. The Alarm Settings tab allows you to specify the alarm sound interval. The alarm settings are system settings and therefore can be edited only by [Users Authorized to Edit System Preferences](#).

These alarm settings apply to the Site Management Portal UI (online mode). The alarm color preferences also apply to the Metasys UI.

The alarm sound files can be Audio (.au) or Wave (.wav) files. The Metasys UI uses Wave (.wav) files for all web browsers except Windows Internet Explorer. For Windows Internet Explorer, the Metasys UI uses the MP3 file equivalent to the configured Wave (.wav) file.

Alarm sound files must be placed manually into the audio folder. Refer to the *Configuring and Managing Preferences* appendix of the *ADS/ADX Commissioning Guide (LIT-1201645)* or the *NAE Commissioning Guide (LIT-1201519)* for details. The Metasys system validates that the audio file exists on the device and is in a supported format. If the audio file does not exist or is not in a supported format, the UI marks the audio file red. If the specified sound file for a particular range of alarm priorities is missing, the UI uses the default system beep for those alarm priorities. The UI uses the specified sound files for other alarm priorities if their sound files exist.

The Alarm Settings tab controls the sounds made by the Metasys system when an alarm is received; however, the sound settings of the client computer control the volume of the audible alarms.

Note:

- The client computer can only play sound files if a sound card is installed on it. If the UI does not detect an installed sound card, it uses the default system beep, regardless of whether sound files are specified and available.
- To hear alarm notifications, you must also have Enable Audio Alarm selected in your [User Profile](#).

The following table describes the attributes of the Alarm Settings tab.

Table 385: Alarm Settings Tab

Field Name	Description
Alarm Sound Interval	Sets the audible alarm beeping time delay in seconds.
Use Default System Beep	Specifies whether the system uses sound files with the four-level alarming feature or the system uses the default system beep.
Event viewer uses translucent colors	When true, the event viewer displays the event with a background color that is a translucent version of the color specified for the priority level. The color that appears in the Alarm window is not affected by this field.

Table 385: Alarm Settings Tab

Field Name	Description
Insert Button	Allows you to add and define up to 10 total priority levels. If you click the Insert button, you can add priority levels. In this case, you can have more than four priority levels.
Delete Button	Allows you to remove priority levels.
Priority	<p>Indicates the range of priorities of each priority level. The number of priorities is adjustable, but in each case, the first priority begins at 0 and the next range begins one number higher than where the previous range stopped, up to 255.</p> <p>For example, the following describes the priority ranges if you had 4 priority levels:</p> <ul style="list-style-type: none"> • The Level 1 range starts at priority 0 and ends at the number configured here. <ul style="list-style-type: none"> • The default Level 1 range is 0-39. • The Level 2 range starts at priority Level 1 + 1 ($39 + 1 = 40$) and ends at the number configured here. <ul style="list-style-type: none"> • The default Level 2 range is 40-79. • The Level 3 range starts at priority Level 2 + 1 ($79 + 1 = 80$) and ends at the number configured here. <ul style="list-style-type: none"> • The default Level 3 range is 80-139. • The Level 4 range starts at priority Level 3 + 1 ($139 + 1 = 140$) and ends at the number configured here. <ul style="list-style-type: none"> • The default Level 4 range is 140-255.
Audio File	<p>Indicates the sound file that plays for each priority level when an alarm comes in. The default files for levels 1 through 4 are alarm1.wav, alarm2.wav, alarm3.wav, and alarm4.wav, respectively.</p> <p>The sound files on a device are only used by the UI when you are directly logged in to that device. If a sound file is missing from the device, the Metasys system uses the default system beep in its place.</p>
Color	Allows you to customize the background color and text color for each priority level. The color you specify here appears in the alarms window and in the event viewer.

Trend Settings Tab

The Trend Settings tab allows you to configure the number of trends to display, the number of samples to display, and other trending chart options. The following table describes the attributes of the Trend Settings tab.

Table 386: Trend Settings Tab

Field Name	Description
Maximum samples to display	Indicates the maximum number of new and historical trend samples shown in a Trend Display or Trend Study. This attribute allows you to reduce the amount of memory used by the UI for each trend. The range is 100–6,000. The default value is 6,000.
Number of initial visible trends	Indicates the initial number of trends that are marked Visible within the Trend Viewer or Trend Study. The range is from 1 to the value of the Maximum number of visible trends attribute. The default value is 6.
Maximum number of visible trends	Indicates the maximum number of trends that can be marked Visible within the Trend Viewer or Trend Study. The range is from 1 to 10. The default value is 10.
Default chart background color	Indicates the default background color of trend charts. The default color is light gray. Click the Browse icon to access the Select a Color dialog box. The Select a Color dialog box allows you to select a custom color from three color palettes and to preview the color for the attribute.
Default chart grid color	Indicates the default color of the grid lines of trend charts. The default color is white. Click the Browse icon to access the Select a Color dialog box. The Select a Color dialog box allows you to select a custom color from three color palettes and to preview the color for the attribute.
Default line style	Allows you to select what type of gridlines appear on the chart. You can choose: None, X and Y, X Only, and Y Only. The default value is None.
Legend initially collapsed	Indicates whether the trend legend is collapsed when the Trend Viewer or a Trend Study is initially opened. This attribute allows you to maximize screen space for viewing trend charts. The default value is False.
Line	Indicates the line on the chart to which the settings apply.
Line Color	Allows you to customize the color of the line. Click the Browse icon to access the Select a Color dialog box. The Select a Color dialog box allows you to select a custom color from three color palettes and to preview the color for the attribute.
Line Marker	Opens a drop-down menu and allows you to select a marker type for the line.

Graphic Settings Tab

The Graphic Settings tab allows you to configure the status colors, fan colors, and state colors that appear in standard and dynamic graphics, along with alarm flash settings. These settings apply to the Site Management Portal UI (online mode), SCT, and the Metasys UI. The status color settings may also be used by summaries or other views (Tailored Summaries, for example) to provide a consistent indication of an object's status.

The following table describes the attributes of the Graphic Settings tab.

Table 387: Graphic Settings Tab

Field Names/ Attribute	Description
Browse button	Accesses the Select a Color dialog box. The Select a Color dialog box allows you to select a custom color from three color palettes and to preview the color for the attribute.
Status Colors	Applies to value boxes, cells in Tailored Summaries, basic shapes (circle, triangle, and square), and the Room Status symbol used in floor plan-based graphics. See the Analog Alarm Extension for details on how these states are calculated.
Normal	Specifies the color used to indicate a status of Normal. The default color is white: RGB(255, 255, 255).
Out of Service	Specifies the color used to indicate a status of Out of Service. The default color is orange: RGB(255, 142, 25).
Overridden	Specifies the color used to indicate a status of Overridden. The default color is orange: RGB(255, 142, 25).
Trouble/Warning	Specifies the color used to indicate a status of Trouble, Low Warning, High Warning, or SAB Device Warning. The default color is yellow: RGB(255, 255, 0).
Offline	Specifies the color used to indicate a status of Offline. The default color is black: RGB(0, 0, 0).
Value Inaccessible	Specifies the color used to indicate a status of an inaccessible value (for example, communications failed). The default color is gray: RGB(190, 190, 190).
Alarm	Specifies the color used to indicate a status of High Alarm, Low Alarm, Alarm, or SAB Device Alarm. The default color is red: RGB(255, 0, 0).
Above Setpoint	Specifies the color used to indicate a status of Above Setpoint. The default color is pink: RGB(191, 0, 95).
Below Setpoint	Specifies the color used to indicate a status of Below Setpoint. The default color is blue: RGB(0, 0, 255).
Unoccupied	Specifies the color used to indicate an Unoccupied status. The default color is dark gray: RGB(150,150,150).
Fan Status	Allows you to customize the fan status color of the attribute that appears in system graphics. The Fan Status colors apply only to fans.
Stopped	Defines the background color used for a fan symbol when its bound object's value indicates the fan is stopped. Stopped is defined as State 0 (for binary/multistate objects) or as zero (for analog objects). The default color is red: RGB(255, 0, 0).
Running	Defines the background color used for a fan symbol when its bound object's value indicates the fan is running. Running is defined as State 1+ (for binary/multistate objects) or as non-zero (for analog objects). The default color is green: RGB(0, 153, 51).

Table 387: Graphic Settings Tab

Field Names/ Attribute	Description
Default State Colors	Allows you to customize the default state color of the attribute that appears in system graphics. The Default State Colors apply to basic shapes (circle, triangle, square) that are bound to a binary/multistate object. These default state colors can be changed for each shape after it is added to a graphic.
State 0	Specifies the color used for the State 0 setting of a dynamic graphic symbol. The default color is white: RGB(255, 255, 255).
State 1	Specifies the color used for the State 1 setting of a dynamic graphic symbol. The default color is green: RGB(0, 153, 51).
State 2	Specifies the color used for the State 2 setting of a dynamic graphic symbol. The default color is red: RGB(255, 0, 0).
State 3	Specifies the color used for the State 3 setting of a dynamic graphic symbol. The default color is blue: RGB(0, 0, 255).
All Other States	Specifies the color used for the All Other States setting of a dynamic graphic symbol. The default color is light gray: RGB(204, 204, 204).
Simple Symbol Flash Settings	Allows you to customize simple UGT shapes (such as circles and squares) to flash when their bound object is in alarm.
Flash Type	Defines the type of flashing applied to basic shape symbols: <ul style="list-style-type: none"> • Disabled (No Flashing) • State Color/Alarm Color (Flashes between the State Color and Alarm Color) • State Color/Alternate Color (Flashes between the State Color and Alternate Color) <p>The default value is 0: Disabled (No Flashing).</p>
Alternate Flash Color	Defines the color used when flashing between the current color and an alternate flash color. The default color is white: RGB(255, 255, 255).
Flash Rate	Defines the flash rate for graphics symbol flashing. The range is from 100 to 1,000 ms. The default value is 250 ms.

Display Settings Tab

The Display Settings tab allows you to configure other properties related to the user interface display. These settings apply to the Site Management Portal user interface and the SCT.

The following table describes the attributes of the Display Settings tab.

Table 388: Display Settings Tab

Field Name	Description
View Settings	
Server time synchronization interval	Specifies how often (in minutes) the local time is synchronized with the server time. The range is 5–60 minutes. The default value is 30 minutes.
Hide unauthorized commands	Indicates whether the Command window hides the unauthorized commands for the logged in user. The default value is False, in which case the unauthorized commands appear dimmed.

Table 388: Display Settings Tab

Field Name	Description
New entry timeframe	Indicates the amount of time that audits/events are considered new (based on their time of occurrence in the Metasys system). The default value is 15 minutes. New audits/events are marked with a blue star in the Event Viewer and Audit Viewer.
Query Results	
Maximum results in global search	<p>Indicates the maximum number of rows displayed in the Global Search results view.</p> <p>If you are logged into an NAE, the range is 10–500 and the default value is 500. If you are logged into a Metasys server, the range is 10–2,000 and the default value is 500.</p> <p>① Note: If you display more than 500 results while logged into a Metasys server, Data Refresh disables.</p> <p>If you are logged into SCT, the range is 10–10,000 and the default value is 5,000.</p> <p>① Note: Increasing the number of results in global search may have a negative impact on performance.</p>
Print Settings	
Default paper size	Specifies the default paper size (Letter or A4) to be used for printing. The default value is Letter.
General Display Settings	
Default to Advanced View	Indicates whether the Advanced View is the default view when opening an item in the display panel or a wizard. The default value is False. If the user is not authorized to access the Advanced View, the Advanced View is not shown.
Extended labels enabled on Login	Indicates whether extended labels are displayed in the navigation tree on login. The default value is False.
Default command set	<p>Specifies which types of commands are shown by default when the Command window opens. The options are All Commands (default), Primary Commands, Secondary Commands, and Alarming Commands.</p> <p>① Note: We recommend using Primary Commands as the default command set to reduce errors by lower level operators.</p>
Default schedule display	<p>Indicates the initial display mode shown in the scheduling feature:</p> <ul style="list-style-type: none"> • Today's Schedule (default) • Weekly Schedule • Exception Schedule • Scheduled Items
Default navigation display	<p>Specifies the User View navigation display as either a set of tabs (Tabbed) or a drop-down list (List). The default is Tabbed.</p> <p>① Note: List is recommended if the system has many user views, as this takes up less space in the navigation tree pane.</p>
Online Display Settings	

Table 388: Display Settings Tab

Field Name	Description
Enable alarm pop-ups on login	Specifies that upon login, whether the alarm pop-up window appears automatically (True or False). The default is True. If you change this attribute to False, a confirmation message appears that warns you that disabling alarm pop-ups may result in missed notifications of important alarms. Click Yes to disable alarm pop-ups or No to enable alarm pop-ups.
Collapse navigation frame on login	Specifies that upon login, the navigation tree collapses to the left (True or False). The default is False.
Default display panel layout	Specifies the Display Frame Layout that is displayed at login. The default panel layout is Single Panel.
Startup item 1-4	<p>Defines up to four startup views, which are automatically displayed at login. The number of views that can be displayed is based on the Default display panel layout.</p> <p>❶ Note: Aliased graphics do not display properly if selected as a startup item. Specify the main graphic instead.</p> <p>Click the Browse icon to access the Select Item dialog box. Select the item you want to appear in the panel upon login and click OK.</p> <p>❶ Note: Login time is increased when startup views are specified.</p>
Delay startup graphic load	Specifies an optional login delay time of 1 to 60 seconds to allow the SMP UI to fully load a system graphic. The default is 0 seconds.

Applications Tab

The Applications tab allows you to specify links to external applications, such as a spreadsheet or Microsoft Word document, that can be launched from the Tools menu or from within graphics. The following table describes the attributes of the Applications tab.

Table 389: Applications Tab

Field Name	Description
Add button	<p>Allows you to add a new external application that can be accessed from within the Site Management Portal (SMP) UI. Once you click Add, the lower pane allows you to enter application information. If you are authorized to change system preferences, an Add Application dialog box appears first and allows you to specify whether the application is to be a system or user preference.</p> <p>❶ Note: If you are not authorized to change system preferences, the application is automatically added as a user preference.</p> <p>For more information, see System and User Preferences.</p>
Remove button	Removes the selected application from the list.
Application Name	Enter the name of the application as you want it to appear on the Tools menu or within graphics.

Table 389: Applications Tab

Field Name	Description
Application Path	<p>Enter the full path of the application, including the command line arguments. The path is based on the local file system (where you are browsing from), not on the path of the device you are logged in to. The application path can also use any mapped network drives.</p> <p>Click the Browse button to access a Browse dialog box and select the application and path.</p> <p>To launch a specific file, select the path to the application that opens the file, followed by a space and the path to the specific file in quotation marks. Use the following format:</p> <pre>C:\Application Path\Application.exe "C:\filename path \filename.extension"</pre> <p>For example, to launch a Microsoft Word document named <code>Worksheet_01</code>:</p> <pre>C:\Program Files\Microsoft Office\OFFICE11\WINWORD.EXE "C: \Documents and Settings\username\Desktop\Worksheet_01.doc"</pre> <p>① Note: The Application you add is specific to the computer you are using when you add it. The application may not launch from a different computer unless the application exists on that computer in the same location.</p>
Tools Menu	<p>Indicates whether the application appears on the Tools menu in the SMP UI. Select True (default) to have the application appear on the Tools menu. Select False if you do not want it to appear on the Tools menu.</p> <p>① Note: You must log out of the SMP UI and then log back in for new items to appear in the Tools menu.</p>
Graphics	<p>Indicates whether the application can be hyperlinked to and launched by a button in a standard graphic. The application name you specify appears on the Hyperlink Information Application drop-down menu for buttons in graphics. See Buttons.</p> <p>Select True to enable this functionality. Select False (default) if you do not want the application to provide graphics.</p> <p>① Note: This hyperlink capability is supported in the Graphics+ as well as the User Graphics Tool (UGT).</p>
Mnemonic	<p>Allows the application to be launched from a navigation key.</p> <p>For example, if you add the Calculator to the Tools menu and specify the letter C as the mnemonic, you can access the Calculator in the following way:</p> <p>From the SMP UI, press Alt+T to access the Tools menu. Press C to highlight Change Password. Press C again to highlight the Calculator application. Press Enter to start the Calculator application.</p>
Type	<p>Specifies whether the application is available for the system or the user. This is specified when you first click Add to add a new application to the list. Once specified, this attribute cannot be changed.</p>

Electronic Signature Settings Tab

The Electronic Signature Settings tab appears only for Metasys for Validated Environments (MVE) installations. This tab allows you to define reasons for electronic signature requirements.

MVE sites have settings in the [Site Object](#) for enabling annotation and electronic signature functionality. You can set the MVE site to require only annotations, only electronic signatures, both annotations and signatures, or neither annotations nor signatures. Non-MVE sites may optionally define and use annotations; however, electronic signatures are specific to MVE sites.

You can configure electronic signatures at the device and object levels. Table 390 describes the attributes of the Electronic Signature Settings tab.

Table 390: Electronic Signature Settings Tab

Field Name	Description
Reason Text	Enter a new reason for electronic signature requirement, to be added to the list of predefined reasons. The text can be from 1 to 255 characters in length. Click Add to save the new reason. Predefined reasons are Approval, Author, Required, Cause, and Operator Action. These reasons can be edited or deleted.
Predefined Reason List	Displays the list of predefined reasons. Select a reason and click Delete to remove the reason from the list. The Move Up and Move Down buttons allow you to reorder the list.

For additional information, refer to the *Metasys for Validated Environments, Extended Architecture Technical Bulletin (LIT-12011327)*.

Annotation Settings Tab

The Annotations Settings tab allows you to define customized annotations to select when acknowledging and discarding events.

MVE sites have settings in the [Site Object](#) for enabling annotation (and electronic signature) functionality. You can set the MVE site to require only annotations, only electronic signatures, both annotations and signatures, or neither annotations nor signatures. Non-MVE sites may optionally define and use annotations; however, electronic signatures are specific to MVE sites.

We recommend that you define custom annotations specific to your needs, in addition to the predefined annotations. When the new Annotation Settings are saved in an MVE system, the new annotation selections are available to users when they electronically sign for changes.

You can configure annotations at the device and object levels. See [Audit Message Annotations in Audit Trail](#) for details on annotation fields. Also see [Configuring Annotation and Electronic Signature Requirements in the Site Object in MVE](#).

Table 391 describes the attributes of the Annotation Settings tab.

Table 391: Annotation Settings Tab

Field Name	Description
Annotation Text	Enter a new annotation to be added to the list of predefined annotations. The text can be from 1 to 255 characters in length. Click Add to save the new annotation. Predefined annotations can be edited or deleted.
Predefined Annotation List	Displays the list of predefined annotations. Select a reason and click Delete to remove the annotation from the list. The Move Up and Move Down buttons allow you to reorder the list.

For additional information, refer to the *Metasys for Validated Environments, Extended Architecture Technical Bulletin (LIT-12011327)*.

System and User Preferences

Preferences are divided into two categories: system preferences and user preferences.

System Preferences

System preferences apply to all users who log in to the site or device. System preferences affect the performance and operation of the system and require authorization to configure. A change to the

audible alarm notification is an example of a system preference. Only the users defined in the [Users Authorized to Edit System Preferences](#) section are authorized to configure system preferences.

To synchronize system preferences within a site or to reuse the system preferences on another site, refer to the *Configuring and Maintaining Preferences* appendix of the *ADS/ADX Commissioning Guide (LIT-1201645)* or the *NAE Commissioning Guide (LIT-1201519)*.

User Preferences

User preferences apply to a specific Metasys system user. User preferences define how the information is displayed in the user interface, and do not affect the operation for other users of the system. The colors and marker styles of a trend display are examples of user preferences.

Beginning at SCT Release 11.0 and later, user preferences and object lists are included in uploads and downloads.

At Release 8.0 or later, user preferences (and object lists) that are created on the Metasys server are saved in the archive database by SCT. They are part of the archive upload/download process, so you no longer need to save these xml files before an upgrade. This feature is dependent on the Metasys server version, and is not applicable for releases earlier than Release 8.0.

To synchronize user preferences within a site or to reuse the user preferences on another site, refer to the *Configuring and Maintaining Preferences* appendix of the *ADS/ADX Commissioning Guide (LIT-1201645)* or the *NAE Commissioning Guide (LIT-1201519)*.

Users Authorized to Edit System Preferences

Any user whose account is assigned to the Administrator role is authorized to configure system preferences.

Change Password

Menu Selection: **Tools > Change Password**

Changes the current user's password. The password you select must meet the requirements for complex passwords. For details, refer to the *Network and IT Guidance Technical Bulletin (LIT-12011279)*.

Note: For Active Directory users, the Change Password menu remains disabled.

Administrator

Menu Selection: **Tools > Administrator**

Launches the Security Administrator System. This menu item is only available for users in the ADMINISTRATOR role. Within the Security Administrator System, Administrators manage user accounts by creating roles/profiles; setting user passwords; assigning category-based, system-level, and navigation view permissions/access; and performing other duties. The same set of administrative management is available in Metasys UI Online, which is now preferred over the Security Administrator System in SMP.

For more information on the Security Administrator System in SMP, refer to the *Security Administrator System Technical Bulletin (LIT-1201528)*. For more information on the Security Administrator System in Metasys UI Online, refer to the *Settings, Security, and Authorization for Metasys UI* section in *Metasys UI Help (LIT-12011953)*.

Configure Preferences

Menu Selection: **Tools > Configure Preferences**

Launches the Metasys [Preferences](#) dialog box.

The Metasys system provides customized preferences for the user interface. The preferences allow you to configure how the user interface behaves, including the sounds and colors, the startup view, and the ability to add links to external applications that can be accessed from within the user interface.

All Items Organizer

Menu Selection: **Tools > All Items Organizer**

Launches the Metasys All Items Organizer.

Allows an authorized user to specify the order of any items in the All Items tree. You can order all devices below the site (for example, NxEs) and nodes within devices.


Field Device Tools

Passthru Wizard

Modes: Available in online and offline mode only

Menu Selection: **Tools > Field Device Tools**

Accesses tools such as HVAC PRO, GX-9100, XTM Configurator, DX Commissioning, N2 Device Loader, and CCT.

 **Note:** The Field Device Tools menu selection replaces the N2 Tools menu selection available at Release 2.0 and earlier.

 **tips:**

- You must have N2 Tools and SCT installed on the same PC that is running Passthru with HVAC PRO, GX-9100, XTM Configurator, DX Commissioning, or N2 Device Loader passthru.
- The Passthru wizard does not always appear when you are connected to the NAE or Metasys server online if you are already logged on to the site. The selected tool loads automatically after you select it from the Tools menu.
- On the Passthru Site Login screen of the wizard, enter your username and password as defined by your User Profile. To verify access, click **Login** to check if your login parameters are valid to access the tools.
- As a best practice, if you have a Site Director NAE with child NAEs, do not initiate CCT Passthru at the Site Director to commission field controllers on the child NAE. File transfers between the Site Director NAE and its child NAE may terminate prematurely. This behavior only affects NAEs that have been updated with Release 9.0.7; earlier releases are not affected. Instead, commission the field controllers directly at the child NAE. However, if you have no other option, you may add a parameter to the CCT configuration file to increase the time allowed for transfers. This file is located on the CCT computer in this folder: C:\ProgramData\Johnson Controls\MetasysIII\CCT\UI. Open the ApplicationConfiguration.properties file with a text editor and add this parameter at the end of the file on a separate line: **da.SyncAgent.Download.ReadAttrTimeout=30**. Even with this parameter added, successful transfers between network engines at Release 9.0.7 is not guaranteed.

Passthru Requirements

For installation requirements, refer to the *Metasys Server Installation and Upgrade Instructions (LIT-12012162)*.

- ① **Note:** Computers with Windows 8 and Windows 7 **require** the use of Passthru. To use CCT, HVAC PRO™ software, or the GX-9100 tool software in Passthru mode from SCT, you must disable user account control in Control Panel. If you do not disable user account control, Passthru mode does not work. To disable user account control, go to **Control Panel > System and Security > Action Center**. Locate **User Action Control** under the Security section and click **Choose Your UAC level**. On the left side of the screen, drag the slide bar to **Never Notify**. Click **OK** and restart the computer.

Launching N2 Configuration Tools and CCT in Passthru Mode

About this task:

N2 Devices are configured using N2 configuration tools in Passthru mode in the SCT. To use the N2 configuration tools in Passthru mode, install the N2 configuration tools on the SCT computer.

CCT devices are configured using CCT in Passthru mode. To use CCT in Passthru mode, install CCT on the SCT computer.

To launch N2 configuration tools and CCT in Passthru mode:

- Open the archive database in SCT or log in to the engine.
- On the Tools menu, select **Field Device Tools**, then click the N2 configuration tool you want to use or CCT (MS/TP). The selected tools open in Passthru mode.
- If you are launching a Passthru session from the SCT, you are guided through a login sequence to log in to the Site Director that contains the devices that contain the N2 controllers or MS/TP controllers.
- Any offline conditions/actions in the Site Director (such as a download to the Site Director) interrupts N2 and MS/TP Passthru communications.
 - When you use the GX-9100 tool in Passthru mode, engines appear as N30 devices in the UI of the GX-9100 tool.
 - If you use Passthru on a Windows 8 or Windows 7, you must turn off the user access control (UAC). To turn off UAC, go to Control Panel and click **System and Security > Action Center**. The Action Center window appears. Click **Change User Account Control** settings, then move the slider bar to the bottom position called **Never notify**. Click **OK** and restart the computer.

User Defined States Text

Prior to Release 6.0, States Text was auto generated for third-party BACnet® Objects devices during the online discovery process within the Metasys system. Once the states text was discovered online, the information could be uploaded into an SCT archive for storage.

At Release 6.0 and later, User Defined States Text sets can be created both online or offline in SCT. The new Custom Enumeration tab has been added to the Site Object, which allows the creation of new enum sets that can be applied to any Binary or Multi-Value Objects.

- ① **Note:** If you create a custom enumeration set that has only two members, the set does not appear in the list of sets for a Multistate Value Object.

HVAC PRO

HVAC PRO configures the ASC: VMA14, VAV, AHU, and UNTs.

In Passthru mode, you can use the HVAC PRO software to download, upload, and commission ASC devices through an engine.

In addition, Passthru mode makes it easier to identify and manage controllers for common tasks by showing the user a complete list of controllers currently mapped to an engine. The first step in

any Passthru operation from HVAC PRO is to select a controller from a list. Subsequent Passthru operations, such as Controller Information and Upload/Download, are performed on the selected controller.

HVAC PRO restricts the number of characters allowed in each controller name. See [HVAC PRO Name Restrictions in Passthru Mode](#).

HVAC PRO Name Restrictions in Passthru Mode

HVAC PRO Release 8.06 and later restricts the number of characters allowed in each controller name. HVAC PRO does not download, upload, commission, or retrieve information about the controller if the item name or controller name exceeds the 157 maximum characters limit.

The controller's full name consists of the following: domain name, site name, equipment name, trunk name, and the actual controller's name. The controller name appears in the following format:

```
Site_name:device_name.domain_name/N2 Trunk #.controller_name
```

The following table describes the controller name restrictions.

- ① **Note:** The component column lists each of the components represented in a Full Item reference. The Maximum Viewable Characters column lists the restrictions on the Component names when entered through SCT or a web-based user interface of the Metasys supervisory controller. The Maximum Characters Allowed by HVAC PRO column shows the maximum number of characters in a Full Item Reference allowed in HVAC PRO.

Table 392: Controller Name Restrictions

Component	Maximum Number of Characters Allowed by the Engine or SCT	Maximum Viewable Characters		Maximum Characters Allowed by HVAC PRO
Site Name	fewer than or equal to 32	30	47 Total	157
Device Name	fewer than or equal to 15			
Domain Name	fewer than or equal to 64			
N2 Trunk Name	fewer than or equal to 32	-		
Controller Name	fewer than or equal to 32			

HVAC PRO Naming Recommendations

Use the following list of naming conventions to assist you while naming your controllers. If you follow these recommendations, 61 additional characters are available.

- Choose a site name under 15 characters.
- Choose a device name (network name) under 15 characters.
- Leave the default N2 Trunk name unchanged, so it only consists of 10 characters (for example, N2 Trunk 1 or N2 Trunk 2).
- Choose a controller's name under 15 characters.

GX-9100 Tool

The GX-9100 tool configures the DX-9100 and DX-9200 controllers.

In Passthru mode, you can use the GX-9100 software to download or upload the DX configurations. When you use the GX-9100 through an engine, the LoaderUI application launches to initiate the upload or download.

XTM Configurator

The XTM Configurator supports building configuration files for XTM.

Note: The XTM Configurator tool does not support N2 passthru but can be used to download XTM using a serial connection.

DX Commissioning

Opens the DX Commissioning Tool.

N2 Device Loader

Opens the N2 LoaderUI window. You can browse to the location of the DX-9100 device file and other N2 device files to upload and download. All devices found on the selected engine appear with the Address, Device Type, and Object Name. You can open the device file in the GX-9100 or HVAC PRO tool.

Controller Configuration Tool (CCT)

You can use CCT to configure, simulate, load, and commission devices on an MS/TP bus. The list of devices that you can configure in CCT includes CVMs, CGMs, FECs, FACs, IOMs, NCEs, NIE29s, VMA16s, and VAVs. You can operate CCT in three modes of operation that provide key functionality for your system: Configuration, Simulation, and Commissioning.

Pair Network Engine with Site Director

Menu Selection: **Tools > Pair NxE with Site Director**

Launches the Pair NxE with Site Director wizard option to force device pairing between a network engine and its Site Director. Beginning at Metasys Release 10.0, a more secure authentication process has been implemented between updated NxEs and the Site Director that involves device pairing. After you pair an NxE with a Site Director, the two devices use unique credentials to authenticate communication between them. Unpaired NxEs are not able to communicate with a Site Director. Normally, the pairing operation occurs for you when the engine's database is downloaded with SCT. However, in cases when the pairing between devices is lost, the Pair NxE with Site Director option is available. For example, use this function in the following scenarios:

- If you change the Site Director of any network engine and the device pairing for some reason does not occur automatically as it should, perhaps due to a sudden communication loss. If this occurs, use this option to force the device pairing.
- If you reinstall or upgrade the Metasys server from Release 10.0 to a newer release or to a newer build of Release 10.0. Communication between the two devices may be lost until you pair the devices.
- If pairing is lost for some unknown reason and the network engine shows `Item Not Found` when you open its **Focus** window. Forcing a device pairing can often reestablish communication.

However, do **not** use this option for network engines that are running Release 9.0 software or earlier, because these older engines do not have this capability.

To pair an NxE with a Site Director, complete the following steps:

1. From the **Tools** menu, select **Pair NxE with Site Director**. The **NAE Pairing** wizard appears.

2. Select the devices that you want to pair with the Site Director. Click **Next**. The **Device Pairing** window appears.
3. Specify an administrator account user's credentials of the Site Director. Click **Pair Device(s)**. If pairing is successful, `Paired` appears in the **Device Paired** column for each device.
 - ❶ **Note:** If `Pairing not needed` appears in the **Device Paired** column, the device is at a release earlier than Metasys Release 10.0, and does not need to be paired. If `Failed to Pair` appears in the **Device Paired** column, the device is pointing to a different Site Director.
4. Click **Next**. The **Summary** window appears that lists which devices have been successfully reauthenticated to their Site Directors. Click **Finish**.

Query Menu

Click one of the following menu items for a description of it. For more information on the modes of operation, see [Metasys Modes](#).

Table 393: SMP Query Menu

Menu Item		
Alarm Report ¹	Global Search	New Scheduled Report ²
Offline Report ¹	Open Object List ³	
Disabled Report ¹	Save Object List ³	
Operator Override Report ¹	Delete Object List ³	
Supervisory Override Report ¹		
Trouble Report ¹		
Out of Service Report ¹		
Dormant User Account Report ¹		

- 1 The content of this report is filtered based on authorization.
- 2 Available on the Metasys server only.
- 3 Available on the Site Director only.

Query Menu Introduction

Query Menu Concepts

Reports

Use the predefined report feature to query a single network engine, multiple network engines, or the entire site (all network engines on the site) for alarm, offline, disabled, override, trouble, and out of service conditions. To generate a report, select one or multiple network engines or the site in the navigation tree and select a report from the [Query Menu](#). The query executes for the selected network engines or site. When you select multiple network engines or the site in the navigation tree, the report feature queries each supervisory device and combines the results in one report.

These predefined reports (alarm, offline, disabled, override, trouble, and out of service) are different from the Scheduled Reports option available in the Query menu. For information on

scheduled reports, see the [Scheduled Reports](#) section. For information on the Global Search and Object List options, see the [Global Search](#) section.

The query produces a report in the display panel. The report shows the time the query was initiated, the report status, and the report results. The stop button allows you to cancel a running query at any time. The Copy button allows you to copy the report content to the clipboard. The following figure shows an example of an Offline Report. See the [Running Reports](#) topic for information on how to run a query.

Figure 72: Offline Report Screen

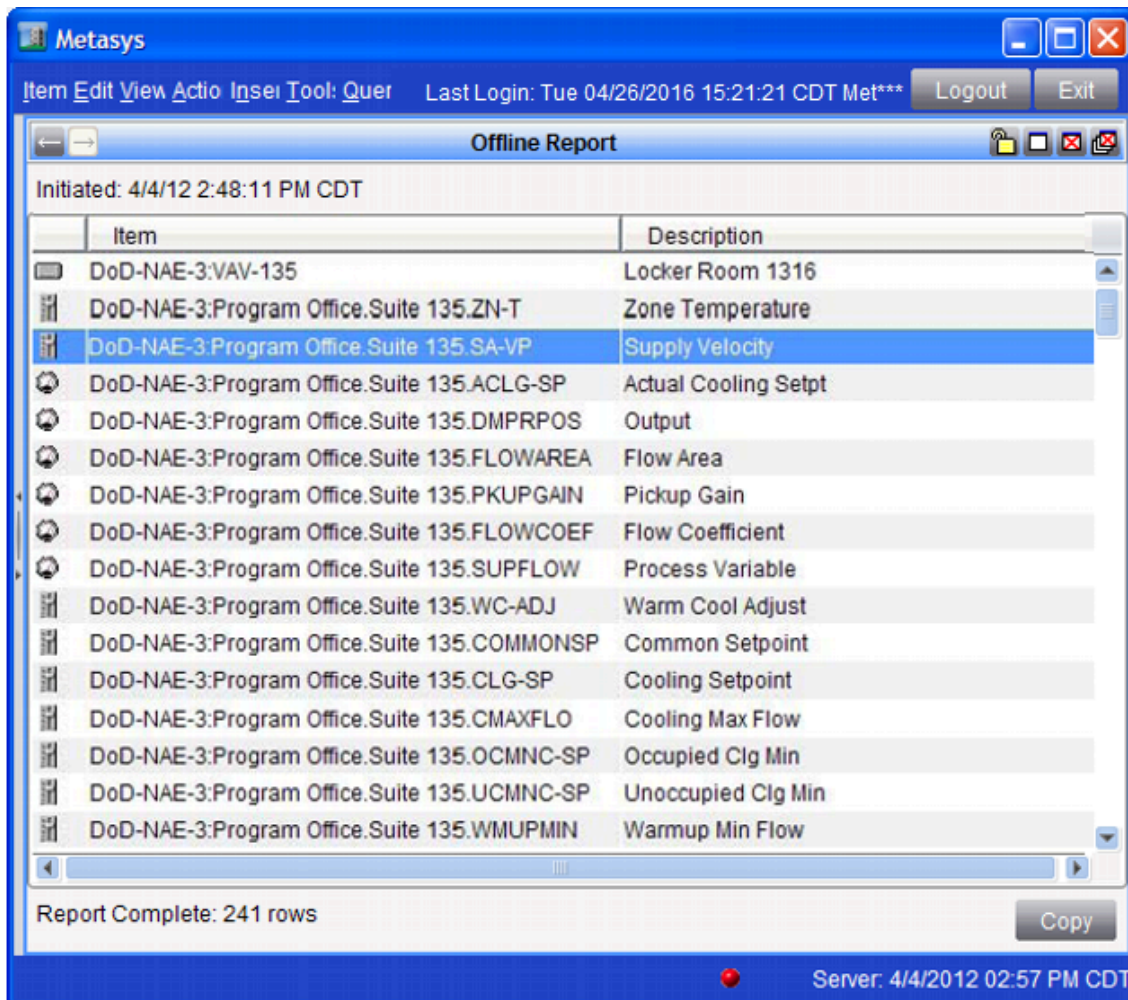


Table 394 describes the information provided by each report.

Table 394: Report Types and Descriptions

Report	Description
Alarm	Lists all items in alarm state in the selected site or devices. For each item in alarm state, the report displays the item type icon, item name, item description, alarm type, and the value of the item when it entered alarm state.
Offline	Lists all items in offline state in the selected site or devices. For each offline item, the report displays the item type icon, item name, and item description.

Table 394: Report Types and Descriptions

Report	Description
Disabled	Lists all disabled items in the selected site or devices. For each disabled item, the report displays the item type icon, item name, and item description.
Dormant User Account	Lists all user accounts for the system by supervisory device. This applies to Local Metasys User accounts and Active Directory accounts. For each account, the device name, account name, user name, role, account type, last successful login, days since last login, status, is dormant, days dormant, and dormant event sent are displayed. Distinguishes among accounts that have not attempted access in previous x number of days, accounts that have never been used, and accounts that have never successfully accessed the Metasys device, additionally showing which of these accounts are disabled. ⓘ Note: Any devices that are not responding or are at a release prior to 8.0 are not included in the report and are noted at the bottom of the report dialog box.
Operator Override	Lists all items currently overridden by the operator. For each overridden item, the report displays the item type icon, item name, status, item description, and the current value of the item. See the status column to determine whether an operator overridden item should be released.
Out of Service	Lists all items that have the Out of Service attribute set to True. For each out of service item, the report displays the item type icon, item name, and item description. All BACnet point objects have this property (for all integrations) as well as the BACnet Loop, Program, and Schedule objects.
Supervisory Override	Lists all items currently overridden by the supervisory device. For each overridden item, the report displays the item type icon, item name, status, item description, and the current value of the item. See the status column to determine whether a supervisory overridden item should be released.
Trouble	Lists all items that have the Trouble attribute set to True . For each item in trouble state, the report displays the item type icon, item name, and item description. Usually, Binary Input and Binary Output points have this property. It is mostly used in Fire and Security applications but may be used when the Binary Output command does not match the feedback. (The Binary Input feature is integration dependent.)

Global Search

The Global Search feature allows you to search the Metasys system for multiple items that meet specific criteria based on naming and object type. Use global search to manage lists of objects, which other features can use for commanding, trending, reporting, modification, and object selection. For example, you can create a list of all discharge air temperatures for the AHU in a building. Or, you can easily create new User Views and Summary Definitions by using drag and drop to add items from the search window.

For information on backing up object lists before an upgrade, refer to the *Preferences* appendix in the *NAE Commissioning Guide (LIT-1201519)* or the *ADS/ADX Commissioning Guide (LIT-1201645)*.

Global Search Concepts

Global Search Overview

The Global Search feature allows you to search for objects from an entire site or from a portion of a site (for example, one or more trunks or devices). Use the Global Search Viewer to add and remove items from the search scope and search by object name and type. During a search, the items found appear in the results table immediately, and the status bar shows the current search location. The status bar also shows the number of items found.

With the Global Search feature, you can view information about multiple items at once. The Global Search Viewer lets you view summary data for multiple objects and allows multiple selection for Global Modifying.

Global Search Viewer Screen

You can access the Global Search Viewer from the Query Menu by selecting Global Search. The Global Search Viewer opens in the [Panel Layout](#) of the Metasys system Site Management Portal.

You can have multiple Global Search Viewers open, but can only initiate one search at a time within the same UI. If you try to start another search in the same UI, then an error message appears stating that you must either stop the search in progress or wait until it completes before initiating another search.

The Global Search feature displays 500 items by default and can be increased to 2,000 in user preferences.

SCT does not support dynamic updating for search values with the Global Search feature. If the search results reach the maximum number of items, then a message appears stating the current search is too broad, and you should change the search criteria to narrow the search and try again.

- ① **Note:** On an NxE with more than 500 items, the Global Search may display red Xs and the message `Value cannot be read`. As the view continues to update data, the red Xs disappear. However, once the search reaches 500, results data updates are disabled and the red Xs remain.

Figure 73: Global Search Viewer Screen

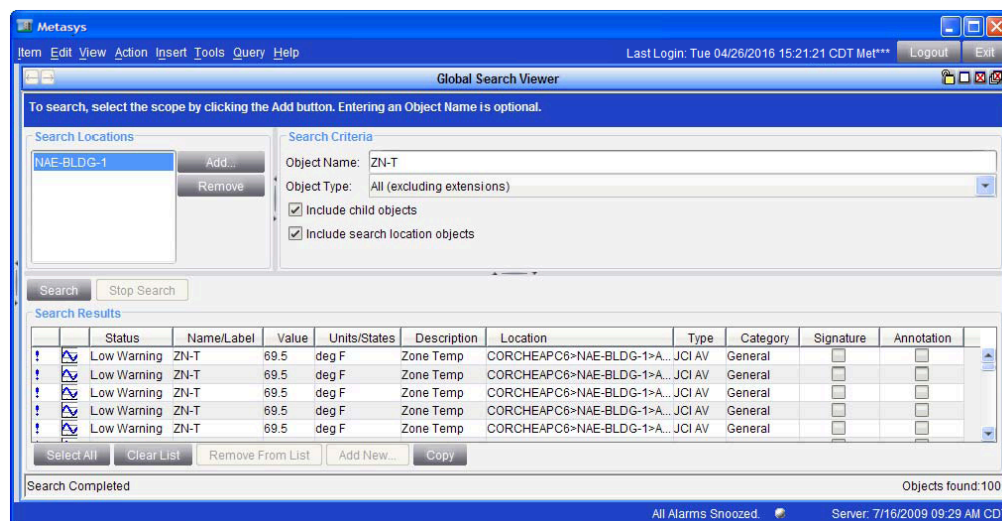


Table 395: Global Search Viewer Screen Components

Screen Area/Item	Description
Instructions Area	Provides tips to help you perform a search.
Search Locations List Box	<p>Lists the parts of the Metasys system navigation view you selected to search.</p> <p>When you initially invoke the Global Search feature, any items currently selected in the navigation view appear in the Search Locations list box. If no items are selected in the navigation view, then the box appears blank. You can drag and drop items from the navigation trees into the Search Locations List Box to make or change selections most efficiently. You can also use the Add and Remove buttons to make or change selections.</p>
Add Button	<p>Opens the Select Item dialog box and allows you to select the parts of the system that you want to search. Though the preferred method to make or change selections is the drag and drop functionality, you can select items from available views (All Items tab or User View tabs) depending on your user authorization.</p> <p>You can search the entire site, one or more devices, one or more trunks on a device, one or more User Views, and so on. Hold down the Ctrl or Shift keys when clicking to select multiple items. After completing the dialog box, the items you selected appear in the Select Scope box.</p>
Remove Button	Removes selected items from the Search Locations list box.
Object Name Box	<p>Allows you to type the full or partial name of the object you want to find. You can leave it blank for a more expansive search. You also can use one or more wildcards (* or ?) to aid in your search.</p> <p>Wildcard Examples:</p> <ul style="list-style-type: none"> • LCP-2* • ZN-T* • OCC-S* • N?E* (searches for all items named NAE*, NIE*, and so on) <p>The object name search is not case-sensitive.</p> <p>The search looks at the Name attribute. For searches against user navigation views, the search also considers the user-defined label assigned to the item within that particular navigation view and includes the item, if the Name attribute or label matches the search criteria for object name.</p>

Table 395: Global Search Viewer Screen Components

Screen Area/Item	Description
Object Type Drop-Down List	<p>Allows you to select a specific type of object to search for or allows a search for all object types. Options include:</p> <ul style="list-style-type: none"> • All (excluding extensions) • Trend Extensions • Totalization Extensions • Alarm Extensions • Schedules • Calendars • Field Devices • Field Points
Include child objects Check Box	Includes all child objects of any items found when searching the Search Locations. That is, it includes the nested child objects.
Include search location objects Check Box	Includes the location items in the search results if they meet the search criteria, as well as any items found when searching in those locations. For example, if you initiate a search on an N2 Trunk named N2 Trunk 1 to search for all objects named *2*, and you check Include search location objects , then the results include the N2 Trunk in the results. If you do not check the option, then the search results only include items under the N2 Trunk (along with their child objects, if the Include child objects option was checked) and does not include the N2 Trunk itself.
Search Button	Begins the search.
Stop Search Button	Cancels a search in progress; no more new objects appear in the Search Results table.
Search Results Table	<p>Displays the results of the search (object list).</p> <ul style="list-style-type: none"> • Dynamic data in this table automatically refreshes periodically. The refresh rate depends on the platform you are logged in to. • If you select an item in the Search Results and place your cursor over the item within each column, then tooltips appear and provides more information, if available. • Any data that does not fit within the columns is identified by an ellipsis (. . .). You can resize the column or place your cursor over the table cell to see its tooltip text. • If the search finds an object in more than one location (for example, in the All Items navigation view and in a user navigation view), then the object is listed twice in the Search Results Table. If the same location is searched a second time or if search locations overlap, then the object is not repeated in the table. Items are only repeated in the table if their location differs. <p>See the Working with Search Results section for more information on manipulating and using the table data.</p>
Status Icon Column	Displays the icon of the object's current status as defined by its Status attribute.

Table 395: Global Search Viewer Screen Components

Screen Area/Item	Description
Icon Column	Displays the icon of the object as it appears in the navigation tree.
Status Column	Displays the current status of the object as defined by its Status attribute.
Name/Label Column	Displays the name of the object as defined by its Name attribute. The object's full reference identifier appears in a tooltip when the cursor is placed over the name.
Value Column	Displays the object's value as defined by its default attribute (generally, the Present Value attribute).
Units/States Column	Displays the Units attribute data for analog objects, Number of States attribute data for multistate objects, and appears blank for all other objects.
Description Column	Displays the data defined in the object's Description attribute.
Location Column	Displays the object's context, specifically its location within a particular navigation view.
Type Column	Displays the object's type (for example, NAE55).
Category	Displays the object's category as defined by its Object Category attribute (for example, General).
Signature	Indicates whether a signature is associated with the object.
Annotation	Indicates whether an annotation is associated with the object.
Select All	Selects all rows in the Search Results table.
Clear List	Removes all of the objects from the Search Results table.
Remove From List	Removes selected objects from the Search Results table.
Add New	Allows you to manually add one or more objects to existing search results (where the added objects append to the bottom of the existing Search Results table).
Copy to Clipboard	Copies the selected search results in a tab-delimited format to the Clipboard for pasting into other applications, such as Microsoft Excel® or Word®.
Status Bar	Displays the current location of the search in progress, the status of the search, and the number of objects found.

Object List

The objects listed in the Search Results table make up an object list. You can save an object list for future viewing and commanding. You can open an existing object list in the Global Search Viewer if you want to access the same search results without having to perform the search again. You also can open object lists for use by other features such as the Trend Viewer, Scheduled Reports, Global Commands, and Global Modify. Object lists provide easy object selection for these features.

When you save an object list, it is saved on the Site Director. Sorting order is not saved in the object list. For information on working with and using object lists, see the [Working with Search Results](#), [Saving an Object List](#), [Opening an Object List](#), and [Deleting an Object List](#) sections. Also, see the [Trend Viewer](#), [Scheduled Reports](#), [Commands Dialog](#), and [Modify Dialog](#) sections.

On the Metasys server, object list files are stored at C:\ProgramData\Johnson Controls\MetasysIII\File Transfer\Object Lists.

On the engines, use Remote Desktop within the NxE Information and Configuration Tool (NCT) to access the files. For information on backing up object lists, refer to the *Preferences* appendix in the *NAE Commissioning Guide (LIT-1201519)* or the *ADS/ADX Commissioning Guide (LIT-1201645)*.

Global Search Steps

Performing a Global Search

About this task:

- ① **Note:** When initiating a global search, especially after restarting the Metasys server, the operation may timeout. This is most likely to occur when CPU usage is high.

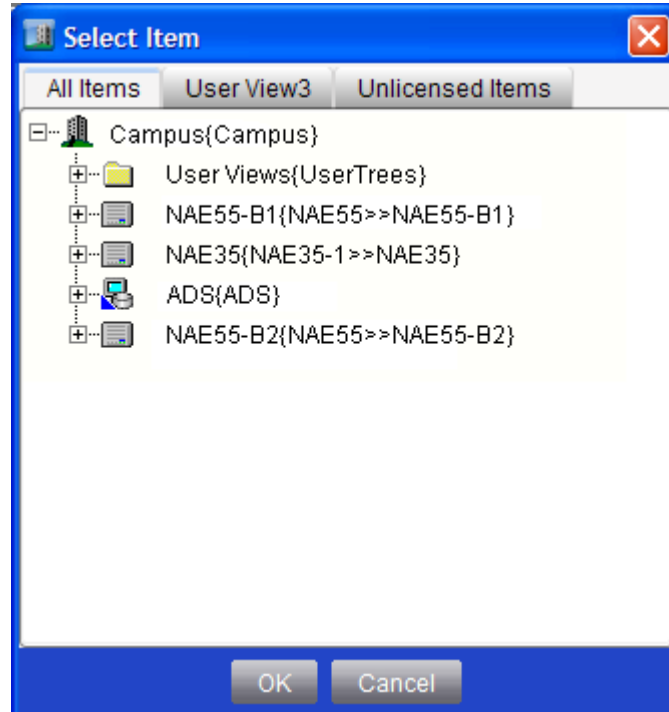
To perform a global search:

1. From the Query Menu, select **Global Search**. The Global Search Viewer appears in a display panel. Any items currently selected in the navigation view appear in the Search Locations list box.
2. To add other areas to search, in the Search Locations section, click **Add**. The Select Item dialog box appears.

Notes:

- You can also use the drag-and-drop feature to set search locations from objects in the All Items tree.
- Any item you select in the All Items tree before you launch Global Search is added to the Search Location.

Figure 74: Select Item Dialog Box



3. Select the part of the system that you want to search from the available tabs depending on your user authorization and Metasys mode. You can search the entire site, the All Items navigation tree, a User View, one or more devices, one or more trunks on a device, and so on. Use the Ctrl or Shift keys when clicking to select multiple items.
 - ① **Note:** Selecting a User View object from the All Items tab does not search that User View's contents. You must select the root of the User View from its tab.
4. Click **OK**.
 - ① **Note:** To remove items from the Search Locations box, select the item and click **Remove**.
5. Select the **Include child objects** check box if you want to include all child objects of any items found when searching the Search Locations.
6. Select the **Include search location objects** check box to include the Search Locations in the results.
7. In the Object Name box, type the full or partial name of the object you want to find or leave it blank. You can use one or more wildcards (* or ?) to aid in your search (for example, N?E*). The object name search is not case-sensitive.
8. From the Object Type menu, select the type of object to search or select **All** (excluding extensions).
9. Click **Search**. The search begins and the Search Results table fills with any matching object information. When finished, the status section displays Search Completed and the number of objects found.

Result

- ① **Note:** If you rename an object, then you must remove the old name from the Search Locations list before the object can appear in the results list under its new name.

See the [Working with Search Results](#) section.

Stopping a Search

To stop a running search, click **Stop Search**.

Working with Search Results

Selecting and Using the Search Results

Use the drag-and-drop functionality to add items from the Global Search Results table to a User View, a Scheduled Items List, or the Action Tables of an Interlock or Multiple Command Object. You can also use the Search Results with the Tailored Summary Viewer found in the View Menu. Highlight the desired set of results from the list and follow these steps to use the drag-and-drop functionality to apply the desired Summary Definition against the results set:

1. Click **Edit** in the User View or Tailored Summary Definition.
2. Drag items from the Search Results table to the User View or Tailored Summary Viewer.

You also can drag an item from the Global Search Results table and drop it into an empty display panel to view the item or perform a Global Modify to the search results.

Selecting Objects in the Search Results

To select objects in the search results, click an individual object in the Search Results table or hold down the Ctrl or Shift keys when clicking to select multiple items.

To select all of the search results, click **Select All**.

- ① **Note:** Click and drag your cursor over objects in the Search Results table to select objects that appear consecutively.

Removing Objects from the Search Results

1. Click an individual object in the Search Results table or hold down the Ctrl or Shift keys when clicking to select multiple items.
2. Click **Remove From List**. The Confirm Delete dialog box appears asking if you want to delete the selected item from the list.
3. Click **Yes**.

① **Note:** You also can use the Delete key to remove selected objects from the Search Results table.

Clearing All Search Results

1. Click **Clear List**. The Confirm Delete dialog box appears asking if you want to delete all the items from the list.
2. Click **Yes**.

Manually Adding Objects to Existing Search Results

About this task:

① **Note:** The added objects append to the bottom of the existing Search Results table.

1. Click **Add New**. The Select Item dialog box appears.
2. Select the object to add to the search results. Hold down the Ctrl or Shift keys when clicking to select multiple items.
3. Click **OK**.

Adding New Search Results to Existing Search Results

About this task:

To add new search results to existing search results (where the results of the new search append to the bottom of the existing Search Results table):

1. In the Search Locations box, remove the existing location, if desired, by selecting it and clicking **Remove**. The existing search results remain in the Search Results table.
2. Perform step Step 2 through step Step 9 in the [Performing a Global Search](#) section to add the new search criteria and execute the search. The results appear at the bottom of the Search Results table.

Sorting Search Results

To sort search results, click the heading of a column. The results sort and a small red triangle appears indicating the order of the sort (ascending or descending). Click the column heading again to change the sort order.

Expanding and Collapsing the Global Search Viewer Display Areas

To expand and collapse the Search Locations, Search Criteria, and Search Results table display areas of the Global Search Viewer, click one of the splitter bar arrows located between the display areas to show and hide the section. Continue to click until the desired display is achieved.

Figure 75: Splitter Bar Arrows Icon



Reordering Columns in the Search Results Table

To reorder the columns in the Search Results table, drag the heading of the column to the preferred location.

Printing the Search Results Table

To print the Search Results table (object list), follow the [Print](#) instructions.

- ① **Note:** You also can use the Scheduled Reports feature to run reports and print object lists. See the [Scheduled Reports](#) section.

Commanding Objects in the Search Results Table

About this task:

To command objects in the Search Results table (object list):

1. Select one or more objects following the instructions in the [Selecting Objects in the Search Results](#) section.
2. If you selected one object, then right-click and select **Commands**. The Command dialog box appears. Follow the [Commanding Items](#) instructions in the [Site Management Portal User Interface](#) section.
If you selected two or more objects, right-click and select **Commands**. The Global Commands dialog box appears. See the [Commands Dialog](#) section.

Modifying Objects in the Search Results Table

1. Select one or more objects following the instructions in the [Selecting Objects in the Search Results](#) section.
2. If you selected one object, then right-click and select **Modify**. The Modify dialog box appears. If you selected two or more objects, right-click and select **Modify**. The Global Modify dialog box appears. See the [Modify Dialog](#) section.

Copying Search Results to the Clipboard

1. Select the results according to the [Selecting Objects in the Search Results](#) section.
2. Click **Copy to Clipboard**.
 - ① **Note:** You also can use Ctrl+C to copy the data.
3. Open the program to paste the results (for example, Microsoft Excel or Word).
4. Paste the results according the program's conventions (generally, **Edit > Paste**).

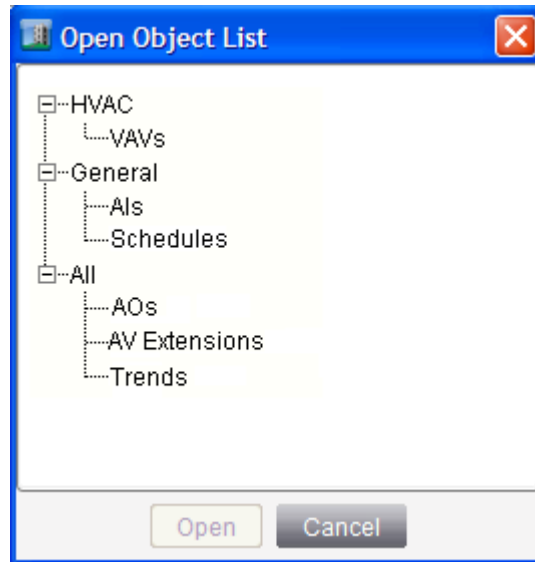
Modifying an Object List

See the procedures in the [Working with Search Results](#) section.

Opening an Object List

1. From the [Query Menu](#), select **Open Object List**, or right-click the Global Search Viewer title bar and select **Open Object List**. The Open Object List dialog box appears.

Figure 76: Open Object List Dialog Box



2. Select an object list to open. You can only open object lists under **All** or under categories for which you have View access.
3. Click **Open**. The Global Search Viewer appears in the display panel with the search criteria and the object list filling the Search Results table.

Result

- ① **Note:** Objects that are renamed in the SMP UI after an object list is saved do not reflect the new name in the object list until the object list is re-saved.

Saving an Object List

About this task:

To save an object list (objects appearing in the Search Results table):

1. From the [Query Menu](#), select **Save Object List**, or right-click the Global Search Viewer title bar and select **Save Object List**. The Save Object List dialog box appears.
2. In the Name box, enter a unique name for the object list. This name must be unique; otherwise, you risk overwriting an existing object list.
3. In the Category list, select **All** or select the desired category (for example, General, Security, and Lighting) to which you want to save the list. You only can save to authorized categories based on your user rights defined in the Security Administrator system.
 - ① **Note:** If you select a specific category, then the object list is available for use or modification only by users with the proper authorization for that category. If you select **All**, all users can access the object list, including the ability to open, modify, or delete the list.
4. Click **Save**. The object list is saved on the Site Director.

Result

- ① **Note:** Sorting order is not saved in the object list.

Deleting an Object List

1. Select an object list to delete from the tree. Hold down the Ctrl or Shift keys when clicking to select multiple object lists. You can only delete object lists under **All** or under categories for which you have authorization based on your user rights defined in the Security Administrator system.
2. Click **Delete**.

Create New Scheduled Report Screen

The Create New Scheduled Report screen (Figure 77) allows you to configure new report information and associated schedule information. You can access the Create New Scheduled Report screen from the [Query Menu](#) by selecting New Scheduled Report.

Figure 77: Create New Scheduled Report Screen

Metasys - Create New Scheduled Report

Configure the new report information and the associated schedule information. Click Save to activate this schedule.

Report Information

Report Name: Zone Status Report
Object List: ZLObjectList
Report Format: Text Send To Printer
 Run Report Now Schedule Report
Run This Report: Weekly
Start Date: Friday, July 10, 2009
End Date: Sunday, August 9, 2009 No End Date

Date Information

Run every week on the following day(s):
 Monday Saturday
 Tuesday Sunday
 Wednesday
 Thursday Mon-Fri
 Friday All

Time Information

Run At: 10 AM : 00
 Repeat
Every: minutes
Until: 12 AM : 00

Save Cancel

Table 396 describes the fields in the Create New Scheduled Report screen.

Table 396: Scheduled Reports

Field	Description
Report Name	Allows you to enter a name for the report. Use a descriptive name so that you can recognize the details by the name (for example, Weekly Building Two Status Report). <i> ⓘ Note: Enter a name that has fewer than 100 characters. Otherwise, you receive an error when you attempt to view the new report.</i>
Object List	Allows you to select which object list to run the report against. For information on Object Lists, see Object List in the Global Search section.
Report Format	Allows you to select the report file format: Tab Delimited, XML, and Text. <ul style="list-style-type: none"> • Tab Delimited: saves the report with an .txt extension. You can use the report with a spreadsheet application, such as Excel. • XML: saves the report with an .xml extension. You can use the report with an Internet browser, such as Internet Explorer. • Text: saves the report with an .txt extension. You can use the report with any text-viewing application, such as Notepad.
Send To Printer	Allows you to automatically send the report to the default printer of the Metasys Server each time the report generates. The report first saves to a file on the server; then, it is sent to the default printer. Scheduled reports configured to be sent directly to printer on the Metasys Server are printed in the system's default language. For more information on configuring the default printer on the Metasys Server, refer to the Metasys Server documents listed in Related Documentation .
Run Report Now	Allows you to run the report immediately.
Schedule Report	Allows you to schedule the report to run at one or more future times.
Run This Report	Allows you to select how often to generate the report. Selections include: One Time Only (default), Daily, Weekly, Monthly, and Yearly.
Start Date	Allows you to select the report start date.
End Date	Allows you to select the report end date.
No End Date	Allows you to configure the report to run indefinitely.
Date Information	Allows you to further configure the date information for when the scheduled report runs.
Time Information	Allows you to further configure the time information for when the scheduled report runs.

Scheduled Reports

The Scheduled Reports feature provides a reporting service on a Metasys Server Site Director. The Metasys Server generates summary reports based on Object Lists and Report Schedules.

Scheduled Reports Concepts

Scheduled Report

A Scheduled Report consists of one Object List and one Report Schedule. You select the objects that appear on an Object List. Create and Save Object Lists to the Site Director using the [Global Search](#) feature. A Report Schedule specifies the day and time to run the report.

Object List

An Object List is a list of objects you select. Object Lists are created and saved to the Site Director using the [Global Search](#) feature. See the [Object List](#) section in the Global Search section for more information.

Report Schedule

The Report Schedule specifies the days and times a report is generated.

Report Output

Scheduled reports generate files on the Metasys Server that contain the actual report output. You can view the content of a report output file through the online SMP UI using any compatible Web browser, but you must log in to the Metasys Server Windows operating system and use Windows Explorer (or another software application) to browse to and delete/manage the files. Scheduled reports configured to be sent directly to the printer on the Metasys Server are printed in the system's default language.

To view the content of the Report Output file in the SMP UI, use the Report Output Viewer. See [Report Output Viewer](#) for information on viewing the Scheduled Report output in the SMP UI. To manage report output files, see [Accessing Report Output Files on the Metasys Server](#).

Report Output Viewer

The Report Output Viewer allows you to view the content of a Scheduled Report output file in the UI in the Report Output Viewer window. The Report Output Viewer displays output in any format (tab delimited, XML, and text) and is available by using the [Scheduled Reports Viewer](#).

Each Report Output viewer window displays the content of a single report output file. You can have multiple Report Output viewers open simultaneously. To display the Report Output viewer, see [Viewing the Content of a Report Output File](#).

Scheduled Reports Overview

Each scheduled report contains one or more properties (for example, Item Name and Status) of each item in an Object List. A report engine on the server runs the Scheduled Report at the specified times and saves it to a file in a standard location on the server. The report engine can also send the report output to a printer if specified.

There are two scheduled report screens: the [Create New Scheduled Report Screen](#) and the [Scheduled Reports Viewer](#) screen.

Scheduled Reports Steps

Creating a New Scheduled Report

1. On the [Query Menu](#), select **New Scheduled Report**. The Metasys - New Scheduled Report screen appears.
2. Enter a report name that has fewer than 100 characters.
3. Select an **Object List**.
4. Select a **Report Format**.
5. Select **Send to Printer** if you want to print the report.
6. Select either **Run Report Now** or **Schedule Report**.
7. In the **Run This Report** drop-down list, specify how often you want to run the report.
8. Enter a **Start Date**.
9. Enter an **End Date**.

Note: If you wish to run the report indefinitely, select **No End Date**.

10. Enter the Date Information if you schedule to run the report more than **One Time Only**.
11. Enter the time you want the report to run in the Time Information section.
 - ⓘ **Note:** To repeat the schedule select the **Repeat** check box. Enter the interval (in minutes) to repeat and configure the time when this repeating interval ends. The range is 15 to 1,440 minutes. For an example, see the [Scheduling Scenarios](#) section.
12. Click **Save**.
 - ⓘ **Note:** If you click **Cancel**, a Metasys - Report Changes Pending screen appears. Click **Yes** to save your changes. Click **No** to close the screen without saving your changes.

Launching the Scheduled Reports Viewer

To launch the Scheduled Report Viewer, select **Scheduled Reports** from the [View Menu](#). The Scheduled Reports Viewer Screen appears.

Editing an Existing Scheduled Report

1. [Launch](#) the Scheduled Reports Viewer.
2. On the **Scheduled Actions** tab, select the report to edit.
3. Click **Edit**.
4. Make the necessary changes.
5. Click **Save**.

Copying an Existing Report to a New Report

1. [Launch](#) the Scheduled Reports Viewer.
2. Select the **Scheduled Actions** tab.
3. Select a report to copy.
4. Click **Edit**.
5. Click **Copy to New Report**. The Copy to a New Report dialog box appears.
 - ⓘ **Note:** The Copy To a New Report button allows you to save an exact copy of the current report with a different name. Your new report appears in the Scheduled Actions tab in the Scheduled Reports Viewer.
6. Enter a new name or Object List.
7. Click **OK**. A message appears to indicate a successful copy. Your new report appears in the Scheduled Actions tab in the Scheduled Reports Viewer.

Enabling/Disabling a Report

1. [Launch](#) the Scheduled Reports Viewer, and select either the **Actions in Progress** tab or the **Scheduled Actions** tab.
2. Click the report.
3. Click **Enable** or **Disable**.

Rescheduling a Completed or In Progress Report

1. [Launch](#) the Scheduled Reports Viewer and select the **Completed Actions** or **Actions in Progress** tab.
2. Click the report.
3. Click **Reschedule**. The Reschedule a Report screen appears.
4. Modify the date and time using the drop-down menus.
5. Click **OK**.

Viewing the Status of a Report

1. [Launch](#) the Scheduled Reports Viewer and select the **Completed Actions** tab.
2. Click the report.
3. Click **View Status**. The Scheduled Reports Status dialog box appears.
4. Verify the scheduled report has completed successfully.
5. Click **OK**.

Deleting an Existing Scheduled Report

1. [Launch](#) the Scheduled Report Viewer and select the **Scheduled Actions** tab.
2. Click one or more reports.
3. Click **Delete**. The Confirm Delete dialog box appears.
4. Click **Yes** to confirm the delete.

Deleting a Completed Report Status Entry or an In Progress Report

1. [Launch](#) the Scheduled Reports Viewer and select the **Completed Actions** or **Actions in Progress** tab.
2. Click one or more reports.
3. Click **Delete**.

- Note:** The current Report Schedule is not affected. Deleting a completed report status entry or an in progress report only affects the instance of the report that is currently running or the completed status entry.

Automatically Deleting Completed Report Status Entries

About this task:

To automatically delete completed report status entries after a given amount of days:

1. [Launch](#) the Scheduled Reports Viewer and select the Completed Actions tab.
2. Enter a number of days in the **Number of days after which entries will be automatically deleted (1-30)** text box.

- Note:** The SMP UI supports a maximum of 500 entries displayed on each screen of the Scheduled Reports Viewer. Either configure the number of days between automatic deletion to ensure the number of entries remains less than 500 or periodically delete the entries manually.

Accessing Report Output Files on the Metasys Server

About this task:

You may need to access report output files to view, delete, or use data from the report in other applications. To view the output in the SMP UI, see [Viewing the Content of a Report Output File](#).

To access report output files on the Metasys Server:

1. Log on the computer that is running your Metasys Server,
2. Navigate to the report directory. The default directory of the report output files on the Metasys Server Site Director is `C:\ProgramData\Johnson Controls\MetasysIII\File Transfer\Report Definitions`.

To change the default directory of the report output files, see the [Changing the Report Output Directory Location](#) section.

- Note:** The directory name and report name are the same.
3. Select the report to view.
 4. Open the report in the correct viewer.

Notes:

- The correct viewer depends on the report type (for example, text in Notepad, XML in Internet Explorer, and tab delimited in Excel).
- You may wish to periodically archive or delete report output files to avoid filling the Metasys Server hard disk.

Viewing the Content of a Report Output File

About this task:

You can use the Report Output viewer to view the content of a report output file, copy the content to the clipboard, or save the content to a file on your local computer. To view and manage the output files on the Metasys Server, see [Accessing Report Output Files on the Metasys Server](#).

To view the content of a Report Output file in the SMP UI:

1. [Launch the Scheduled Reports Viewer](#).
2. On the **Completed Actions** tab, select the report for the output file you would like to view.
 - ① **Note:** You can also double-click the report to view it in the **Report Output Viewer** window.
3. Click **View Report**. The **Report Output Viewer** window appears.
 - The **View Report** button is enabled only when a single report is selected. If no reports are selected, or more than one report is selected, the button is disabled.
 - To copy the content to the clipboard, click **Copy to Clipboard**. To save the content to a file on your computer, click **Save to File**.
 - If the report was not successful, the following error message appears: `The report output file does not exist or cannot be accessed.`
4. Click **Close** when you are finished. All open Report Output Viewer windows close when you log out or exit the UI.

Changing the Report Output Directory Location

About this task:

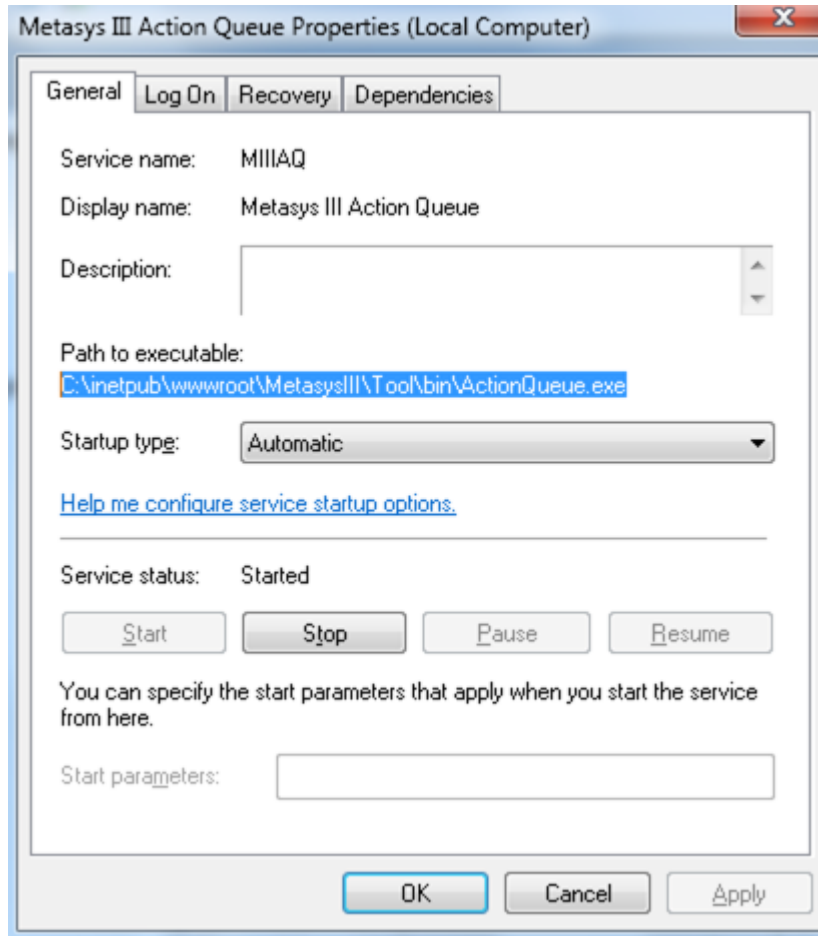
The default directory for the Scheduled Report output on the Metasys Server Site Director is `C:\ProgramData\Johnson Controls\MetasysIII\File Transfer\Report Definitions`.

Use this procedure if you want to change the location of the report output directory.

To change the Report Output directory location:

1. From the Control Panel of the Metasys Server Site Director computer, select **Administrative Tools > Services**. The Services window appears.
2. Right-click the **Metasys III Action Queue** service and select **Stop**.
3. Right-click the **Metasys III Device Manager** service and select **Stop**.
4. Right-click the **Metasys III Action Queue** service and select **Properties**. The Metasys III Action Queue Properties dialog box appears.

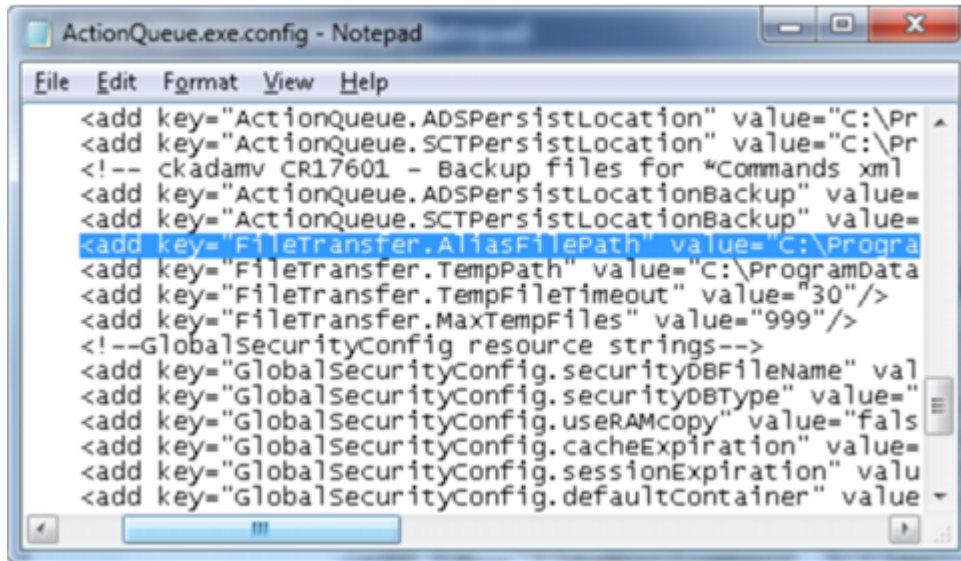
Figure 78: Metasys III Action Queue Properties Dialog Box



5. Note the directory in the **Path to executable** text box (Figure 78), and use Windows Explorer to navigate to that directory.
6. Open the **ActionQueue.exe.config** file using a standard text editor, such as Notepad.
7. Locate the following line of text (Figure 79):

```
<add key="FileTransfer.AliasFilePath" value="C:\ProgramData\Johnson Controls\MetasysIII\FileTransfer\"/>
```

Figure 79: ActionQueue.exe.config File Text



8. Change the contents of the value section to the preferred location of the report output. For example, to send report output to the C:\Metasys System directory, the line of text appears as follows:
`<add key="FileTransfer.AliasFilePath" value="C:\Metasys System\"/>`
9. Save and close the **ActionQueue.exe.config** file.
10. Cut the Report Definitions subdirectory and its contents from C:\ProgramData\Johnson Controls\MetasysIII\File Transfer\Report Definitions.
11. Paste the files to the location defined in step Step 8 (for example, C:\Metasys System\Report Definitions).
12. Return to the Services window. (See Step 1 for the location.)
13. Right-click the **Metasys III Device Manager** service and select **Start**.
14. Right-click the **Metasys III Action Queue** service and select **Start**.

Scheduling Scenarios

Repeat step Step 1 to step Step 4 in [Creating a Daily Report](#) section for all of the Scheduling Scenarios.

Creating a Daily Report

About this task:

To create a new report that runs every day at 8:00 A.M. with no end dates:

1. On the Query menu, select **New Scheduled Report**. The Create New Scheduled Report Dialog Box appears.
2. Enter a report name that has fewer than 100 characters.
3. Select an Object List to run the report against.
4. Select a Report Format.
5. Select **Schedule Report**.
6. Select **Run This Report Daily**.
7. Verify the Start Date is set to today.
8. Select the **No End Date** check box.

9. In the Time Information section, configure the Run At time to 8:00 A.M.

① **Note:** Do not configure Repeating Information.

10. Click **Save**.

Creating a Repeating Weekday Report

About this task:

To create a new report that runs every hour on weekdays between the hours of 11:00 A.M. and 1:00 P.M. with an end date of two months from today:

1. Repeat step Step 1 to step Step 4 in [Creating a Daily Report](#).
2. Select **Run This Report Weekly**.
3. Verify the Start Date is set to today.
4. Configure the End Date to two months from today.
5. In the Date Information section, select the **Mon - Fri** check box.
6. In the Time Information section, configure the Run At time to 11:00 A.M.
7. Select the **Repeat** check box. The Until and Every fields enable.
8. Configure the Every field to 60 minutes.
9. Configure the Until field to 1:00 P.M.
10. Click **Save**.

Creating a Repeating Monthly Report

About this task:

To create a repeating monthly report that runs on the 15th and last day of every month at 8:00 A.M. with no end date:

1. Repeat step Step 1 to step Step 4 in [Creating a Daily Report](#).
2. Select **Run This Report Monthly**.
3. Verify the Start Date is set to today.
4. Select the **No End Date** check box.
5. In the Date Information section, select 15 and Last (Ctrl + click).
6. In the Time Information section, configure the Run At time information to 8:00 A.M.
7. Click **Save**.

Creating a Repeating Yearly Report

About this task:

To create a repeating yearly report that runs on the last day of February:

1. Repeat step Step 1 to step Step 4 in [Creating a Daily Report](#).
2. Select **Run This Report Yearly**.
3. Enter the Start Date.
4. Enter the End Date.
5. In the Date Information section, select **Feb** and **Last** from the drop-down menus.
6. In the Time Information section, configure the Run At time information.
7. Click **Save**.

① **Note:** If it is a leap year, this report runs on February 29th; otherwise, it runs on February 28th.

Create a Report to Run Immediately

About this task:

To create a new report to run immediately:

1. Repeat step Step 1 to step Step 4 in [Creating a Daily Report](#).
2. Select **Run Report Now**.
3. Click **Save**.

Help Menu Introduction

Help Menu

The Metasys Help files provide shared system information and individualized, mode-dependent information for the Metasys Site Management Portal (SMP) or the System Configuration Tool (SCT). The *Metasys SMP Help (LIT-1201973)* and *Open Data Server Help (LIT-12011942)* provide information about alarming, commanding, auditing live data values, and other online features. The *Metasys SCT Help (LIT-12011964)* provides information about offline operations such as managing archives, creating spaces, simulating systems, and establishing equipment and serving relationships.

In either SMP or SCT mode, the Metasys System Help menus provide Help files in PDF format. Refer to the [QuickLIT website](#) for the most up-to-date version of the Metasys Help files.

For more information on the modes of operation, see [Metasys Modes](#). For a description of the Authorized Required column, see Authorized Menu Items.

Help Menu Concepts

Metasys Help

Menu Selection: **Help > Metasys Help**

Launches the Metasys System Help for the Site Management Portal User Interface.

Metasys Graphics Help

Menu Selection: **Help > Metasys Graphics Help**

Launches the *Metasys Graphics+ Runtime Help*.

SCT Help

Menu Selection: **Help > SCT Help**

Launches the *Metasys SCT Help*.

Starting at Release 10.0, you can also launch the *Metasys SCT Help* using the question mark icon located in the upper right-hand corner in the Space Tree Editor, Modify Dialog, and All Items Organizer windows of the Metasys SCT user interface. Click the icon to open the topic related chapter of the Help PDF in a web browser.

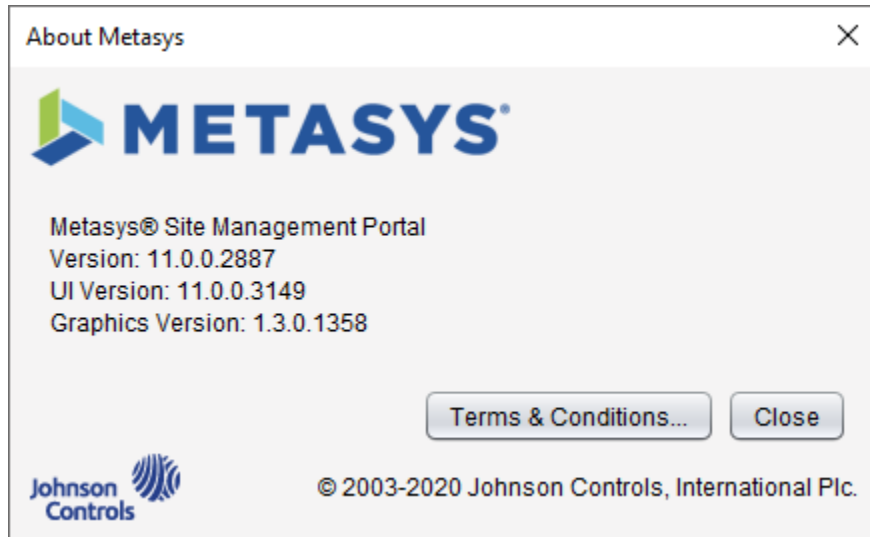
- ① **Note:** We recommend setting your default web browser to Google Chrome for proper functionality of this feature.

About Metasys

Menu Selection: **Help > About Metasys**

Displays the Metasys software version, UI version, Graphics+ runtime software version, and copyright. Click **Terms & Conditions** to view terms and conditions information.

Figure 80: About Metasys Software



Help Menu Steps

Printing the Help

Printing Specific Help Topics

About this task:

To print a specific Help topic:

1. Click the **Print** button in the Help or click the **Options** button and select **Print**.
2. If the Contents tab is currently active, choose between printing the selected topic only or the selected heading and all sub-topics. The content prints.
If another tab is active, select a printer and the Help prints the current content displayed on the right side.

Result

Note: Information in drop-down lists prints only if you have the list open on the screen. Pop-up content does not print in the pop-up window.

Printing the Entire Help System

About this task:

The entire Help system is available for printing in Adobe PDF format.

To print the entire Help system:

1. If necessary, download Adobe Reader® (required to view the PDF file) from the [Adobe Reader site](#).
2. Go to the [QuickLIT Product Information website](#).
3. In the tree on the left, browse to **Metasys System > General System Information**.
4. On the right side of the window, click **Metasys System Help** (PDF format). The Help PDF opens in Adobe Reader.
5. On the File menu of Adobe Reader, select **Print**.

Result

- ① **Note:** This file is large (approximately 800 pages). Allow adequate time for downloading and printing.

Right-Click Menus

The contents of the menus vary depending on the item or feature selected. The contents are either feature-specific based on the active panel or item-specific based on the selected item in the navigation tree.

Right-Click Menus and Menu Bar Equivalents

The following table shows the menu items that may appear in a right-click menu and their equivalent in the menu bar.

Table 397: Right-Click Menus and Menu Bar Equivalents

Right-Click Menu Item	=	Menu Bar Item
Audit Viewer	=	View > Audit Viewer
Command	=	Action > Command
Modify	=	Action > Modify
Edit		
Copy	=	Edit > Copy
Paste	=	Edit > Paste
Delete Items	=	Edit > Delete Items
		① Note: The Edit menu or right-click > Delete functions cannot be used to delete items from a User View while the User View Editor is open. Using either function permanently deletes selected items from the archive.
Event Viewer	=	View > Event Viewer
Alarm Report	=	Query > Alarm Report
Offline Report	=	Query > Offline Report
Disabled Report	=	Query > Disabled Report
Operator Override Report	=	Query > Override Report
Supervisory Override Report	=	Query > Override Report
Trouble Report	=	Query > Override Report
Out of Service Report	=	Query > Override Report
Show Extensions	=	Action > Show Extensions
Export CAF File	=	Action > Export CAF File
Export CAF Files	=	Action > Export CAF Files
Refresh	=	Action > Refresh
Refresh All Tabs	=	Action > Refresh All Tabs
Refresh Current Tab	=	Action > Refresh Current Tab
View	=	View > Selected Item
Rename	=	Action > Rename
Remove From Site	=	Action > Remove From Site
Add Annotation	=	Action > Add Annotation
View Annotations	=	Action > View Annotations

Table 397: Right-Click Menus and Menu Bar Equivalents

Right-Click Menu Item	=	Menu Bar Item
Import Integration	=	Action > Import Integration
Import Definition	=	Action > Import Definition
Locate in Tree	=	Action > Locate in Tree

Right-Click Menus - Feature Specific

Click one of the following active panels or features for a description of the active panel or feature. For more information on the modes of operation, see [Metasys Modes](#).

Table 398: Right-Click Menus - Feature Specific

Active Panel/Feature	Online SMP ¹
Audit Viewer	<ul style="list-style-type: none"> • Refresh² • Discard • Add Annotation³ • View Annotation
Event Viewer	<ul style="list-style-type: none"> • Refresh² • Discard • Ack • View Item ① Note: Once you navigate to the item, you can right-click it and use the Locate in Tree feature. • Add Annotation³ • View Annotation
Report Viewer	<ul style="list-style-type: none"> • Refresh² • View⁴
Global Search Viewer	<ul style="list-style-type: none"> • Refresh² • Delete Items • Open Object List² • Save Object List² • View⁴ • Command⁴ • Modify • Add Annotation³ • View Annotations³ • Show Extensions • Locate in Tree
Change Results Viewer	

Table 398: Right-Click Menus - Feature Specific

Active Panel/Feature	Online SMP ¹
All Items Organizer	<ul style="list-style-type: none">• Refresh²• Move Up• Move Down• Sort Ascending⁵• Sort Descending⁵
Tailored Summaries ⁶	<ul style="list-style-type: none">• Refresh Current Tab²• Refresh all Tabs²• View• Event Viewer⁵• Audit Viewer⁵• Command• Modify• Add Annotation³• View Annotations³• Show Extensions• Alarm Report⁵• Offline Report⁵• Disabled Report⁵• Operator Override Report⁵• Supervisory Override Report⁵• Trouble Report⁵• Out of Service Report⁵• Import Integration⁷• Locate in Tree

Table 398: Right-Click Menus - Feature Specific

Active Panel/Feature	Online SMP ¹
Trend Viewer	<ul style="list-style-type: none"> • Refresh^{2,4} • View⁴ • Command⁴ • Modify⁸ • Event Viewer⁴ • Audit Viewer⁴ • Add Annotation³ • View Annotations³ • Background Color⁹ • Y-Axis Scale⁹ • X-Axis Scale⁹ • Gridlines⁹ <ul style="list-style-type: none"> - None⁹ - X and Y⁹ - X Only⁹ - Y Only⁹ • Chart Type⁹ <ul style="list-style-type: none"> - Points Line⁹ - Area⁹ - Bar⁹ - Points⁹ - Line⁹ • Stacked Y-Axis⁹ • Locate in Tree • Delete Items
Tabbed Item Viewer (Display Panel Tabs)	<ul style="list-style-type: none"> • Modify • Refresh Current Tab² • Refresh All Tabs² • Command • Show Extensions

1 The View, Commands, and Show Extensions menu items are item specific.
2 With the header of the display panel selected.
3 Available on the Metasys Server only.
4 With an item in the report, Legend, Trend Items table, or results table selected.
5 Available for an Engine only.
6 The menu options available are item specific (that is, they depend on the type of item selected in the Tailored Summary table and Key Data table).
7 Available for a Tailored Summary with trunk/integration data (for example, trunk diagnostics).
8 With an item in the Legend selected.

Right-Click Menu - Item Specific

Click one of the following items for a description of the item. For more information on the modes of operation, see [Metasys Modes](#).

Table 399: Right-Click Menu - Item Specific

Item	Online SMP
Folder	<ul style="list-style-type: none"> • View • Modify • Import Definition¹
ADS	<ul style="list-style-type: none"> • View • Modify • Command • Event Viewer • Audit Viewer • Add Annotation² • View Annotations² • Remove from Site
User Views	<ul style="list-style-type: none"> • View • Modify
Site	<ul style="list-style-type: none"> • View • Command • Add Annotation² • View Annotations²

Table 399: Right-Click Menus - Item Specific

Item	Online SMP
Supervisory Device (Engine)	<ul style="list-style-type: none"> • View • Event Viewer • Audit Viewer • Command • Modify • Add Annotation² • View Annotations² • Show Extensions • Alarm Report • Offline Report • Disabled Report • Operator Override Report • Supervisory Override Report • Trouble Report • Out of Service Report • Remove from Site
Summary Definition Object	<ul style="list-style-type: none"> • View • Modify • Export Definition
All Other Objects ³	<ul style="list-style-type: none"> • View • Command • Modify • Show Extensions • Add Annotation² • View Annotations² • Delete Items

1 Available for the Summary Definitions folder in the All Items tree.

2 Available on the Metasys Server only.

3 For Trend or other extensions, the View and Show Extensions menu items display for the parent item, not for the extension itself.

Troubleshooting

Table 400: Troubleshooting

Problem	Solution
<p>When you attempt to execute any N2 Passthru tool (for example, HVAC PRO) from the ADS, ADX, or NAE user interface, the following error appears:</p> <pre>The Supervisory Controller does not contain any supported devices</pre>	<p>Date or time may be incorrect. Verify that all dates and times are correct. For more information, refer to <i>Appendix: Time Zone, Date, and Time Management</i> in the <i>ADS/ADX Commissioning Guide (LIT-1201645)</i>.</p> <p>OR</p> <p>Item name may be too long. Refer to the <i>HVAC PRO Name Restrictions in Passthru Mode</i> section in the <i>SCT Help (LIT-12011964)</i>.</p>
<p>After I manually change the date on a network engine, then adjust the date using a manual command, the new date that appears in the SMP UI is one day ahead of the commanded date.</p>	<p>This behavior occurs only for these time zones: (UTC+400) - Abu Dhabi, Muscat (UTC+5:54) - Kathmandu (UTC+1200) - Fiji</p> <p>To set the date correctly, log on the network engine with the NCT and change the date. Refer to the <i>NxE Information and Configuration Tool Technical Bulletin (LIT-1201990)</i>.</p>
<p>The Event Viewer is repeatedly showing the following alarm message:</p> <pre><service name> Queue System Monitor Alarm. <service name> queue's messages are not getting processed. where <service name>is the name of the Metasys-related service.</pre>	<p>These types of warnings are from Metasys-related services that have not fully started on the server. They are normal messages that occur when the server is first started, then stop occurring once all Metasys-related services have fully started. This reflects normal operation. An example for message queue monitoring service that is starting up would be as follows:</p> <pre>NewActivityData Queue System Monitor Alarm. NewActivityData queue's messages are not getting processed.</pre>
<p>A network engine does not come back online to the Site Director after you download its archive with SCT.</p>	<p>Communication between the Site Director and the network engine may be problematic on some building networks. To resolve this issue, specify a domain name in the Completion Domain attribute under the Network tab of the engine (for example, mycorp.com). The network engine then communicates with its Site Director using the domain name appended to the engine name, such as NAE-1.mycorp.com. You may also need to restart the network engine for the change to be fully applied.</p>

Table 400: Troubleshooting

Problem	Solution
<p>SCT does not log in to allow HVAC PRO to load despite already being logged in to the NAE. SCT (offline) allows you to log in and run HVAC PRO, but you receive a ZSWHPRO crash when you try to do anything over Passthru.</p>	<p>The Site Director is offline. Log in and verify it is online.</p>
<p>When you attempt to open a graphic, the following message appears: Metasys Graphic Viewer file is still being validated. Please wait a few seconds and click "Refresh All Tabs."</p>	<p>The graphic is still loading onto the screen. The graphic signature validation process typically takes a few more seconds than it takes the SMP UI to load the graphic, which results in this message that requests the user to wait a few seconds and refresh all tabs. To resolve, specify a value for the Delay start graphic load attribute under the Display Settings Tab of Metasys Preferences.</p>
<p>Login responds with: Unable to Login. Unexpected Error.</p>	<p>A user might be denied access to the Metasys Server/SCT computer over the network. In Control Panel > Administrative Tools, check the Local Security Policy properties on the Metasys Server/SCT computer and make sure that the user's name is not listed under the User Rights Assignment called Deny access to this computer from the network.</p> <p>OR</p> <p>An Active Directory user is denied access to the SCT because their user name has not been added to the MSEA-SSO user group on the SCT computer. For details, refer to the <i>Security Administrator System Technical Bulletin (LIT-1201528)</i>.</p> <p>OR</p> <p>Verify the JRE proxy settings are disabled. To verify proxy settings are disabled:</p> <ol style="list-style-type: none"> 1. On the Start menu, select Settings > Control Panel. 2. Select the Java icon. The Java Control Panel appears. 3. Select the Proxies tab. 4. Clear the Use browser settings check box. 5. Click OK. <p>OR</p> <p>SCT must be completely uninstalled. You may also have to uninstall IIS 5.0 and the .NET Framework. Reinstalling SCT should fix this problem. If there are error messages from the Installer, there may also be an issue at runtime.</p>

Table 400: Troubleshooting

Problem	Solution
SCT installer responds with: <code>XPPKInitConsole.exe crash</code>	The error typically occurs if IIS 5.0 is installed after the .NET Framework. Uninstall .NET, IIS, and SCT. Reinstall in the following order: IIS, .NET, SCT.
HVAC PRO gives the item reference of the NAE, but fails to get any controllers and causes ZSWHPRO.EXE to crash.	Only the second N2 Trunk is integrated. Integrate the first N2 Trunk, even if it has no controllers on it. You must integrate the first N2 Trunk if N2 Trunk 2 is being used in HVAC PRO, even if there are no devices on the first N2 trunk.
N2 applications respond with no information, or lock up.	Two N2 Passthru Applications may not run at the same time when used in Passthru mode. Close all of the N2 Passthru applications and restart. Run one N2 Passthru application at a time.
SCT upgrade tool fails with the following archive upgrade log error for a restored database: <code>In ConvertArchives: Error in reading archive data for fixbuild1, Empty Archive</code>	Verify the name of the backup matches the name of the archive. To verify the backup and archive names match, log in to the Site Director. The name at the top of the tree is the archive name. Rename the SCT backup database to match the archive name, restore the database, and execute the archive upgrade again.
When you attempt to use one of the N2 Passthru tools, the following error message appears: <code>Supervisory Device Offline</code>	M-Tools may have been installed while running the N2 Passthru. Shut down all active N2 Tools and SCT. Reinstall SCT.
A DX9100 device may remain offline after exiting the GX9100 Commissioning tool. This occurs when the tool is run in passthru mode from a Metasys Server. In the NAE, the DX9100 N2 Device tab shows: <code>Offline = True and Enabled = True</code>	The GX9100 device is disabled at the GX9100. To enable the GX9100 device, you must first command the DX9100 N2 Device to Disable , then command the DX9100 device to Enable .
The N2DeviceLoader/LoaderUI (LoaderUIG3.exe) crashes when you try to connect to the site.	The error typically occurs when you have a child NAE listed above the Site Director. When the child NAE appears offline (with a red or blue X), the N2DeviceLoader/LoaderUI crashes. Right-click the offline NAE and choose Remove from Site .
The SCT installed without error, but the SCT UI window freezes or stalls while Java software is loading.	A connection manager may be installed on the computer. If present, uninstall the connection manager. As a reference, refer to <i>Microsoft Knowledge Base Article KB910435</i> (http://support.microsoft.com/kb/910435).

Table 400: Troubleshooting

Problem	Solution
SCT responds with: <code>You do not have permission to use the System Configuration Tool</code>	This error occurs when you attempt to log in to the SCT and you do not have proper permissions assigned. If you are an Active Directory user, this occurs when attempting to start the SCT. Verify that System Configuration Tool is an assigned privilege for the user in the System Access Permissions of the Security Administrator System.
The SCT download freezes with the load status of establishing communications. No error message appears.	If this problem occurs while performing downloads in the SCT, wait a few minutes to allow the download to complete. Then, refresh the SCT display. The updated status message appears when the download completes. Note: <ul style="list-style-type: none">• The amount of time it takes to download depends on the size of the database, but is usually a few minutes.• In addition, you can determine that the database downloaded properly by waiting for the device to come online after the download completes.
When downloading a device or server, the following message appears: <code>Communication Lost after Reset</code> <code>Communication error (521)</code>	This error may occur due to problems with network connectivity, or the unavailability of the target devices. Check the following: <ul style="list-style-type: none">• The device (Metasys Server, NxE) to which you are downloading is powered, operational, and has network connectivity to the computer running SCT.• In an ADX split configuration, both the ADX web/application server and the ADX database server are powered and operational, and the ADX web/application server has network connectivity to the computer running SCT and to the ADX database server.
You are uncertain whether to control your building with standard objects or the LCT.	In general, if you can perform tasks with standard objects, do so. Standard objects are less memory intensive and thus have a smaller impact on system performance than complex LCT logic.

Table 400: Troubleshooting

Problem	Solution
<p>In SCT, when trying to save a standard user graphic from a restored database, the following error appears:</p> <p>Failed to communicate to the server or device.</p>	<p>This problem occurs when the user graphic size is over 4 MB, which is the default maximum allowed size for an IIS message as defined by Microsoft Corporation.</p> <p>The workaround is to increase the default size using the <code><httpRuntime></code> element in the <code>system.web</code> section of the <code>web.config</code> file. Change the values of the <code>maxRequestLength</code> and <code>executionTimeout</code> attributes.</p> <p>① Note: <code>maxRequestLength</code> is defined as the number of KB allowed, so that the default is 4,096 KB (4 MB); <code>executionTimeout</code> is the number of seconds until the request is killed.</p> <p>For example, a <code>maxRequestLength</code> of 40 MB and <code>executionTimeout</code> of 10 minutes appears as follows:</p> <pre> ... <configuration> <appSettings> <!-- The following settings are used by the GenericItem Capability. --> <add key="GenericItemDb.AssemblyName" value="C:\inetpub\wwwroot\MetasysIII \Tool \bin\Subsystems.Database.dll"/> <add key="GenericItemDb.ClassName" value="JohnsonControls.MetasysIII.Databa se.GenericItemDbFactory"/> ... </appSettings> <system.web> <httpRuntime executionTimeout="600" maxRequestLength="40960"/> </system.web> </configuration> </pre>
<p>On your Windows operating system, applications such as IIS Manager and Windows Event Viewer do not run with Administrative privileges even though you are logged in to the computer as an Administrator.</p>	<p>Manually run the application as an Administrator: Right-click the application and select Properties > Run As Administrator.</p>
<p>On your Windows operating system, when using Windows Authentication to access a SQL database with SQL Server Express Management Studio (or other user-driven application), you do not obtain sysadmin permissions in the SQL database even though you are logged in to the computer as Built-in/Administrators and have sysadmin permissions in the SQL database.</p>	<p>Manually run the application as an Administrator: Right-click the application and select Run As Administrator.</p>

Table 400: Troubleshooting

Problem	Solution
You cannot view log files on your Windows operating system.	Due to changes in Administrator viewing behavior, log files may not be visible. Manually run Windows Explorer as an Administrator: Right-click the Windows Explorer icon and select Run As Administrator .
You cannot access protected folders (such as Program Data), even though you are logged on the computer's operating system as an Administrator.	Manually run Windows Explorer as an Administrator: Right-click the Windows Explorer icon and select Run As Administrator .
You cannot find the Add/Remove programs option in Control Panel of your Windows operating system.	Add/Remove Programs is now called Programs and Features . In Control Panel, select Control Panel Home on the left pane. Then in the right pane, select Programs > Programs and Features .
You cannot locate where to change the folder settings, such as showing file extensions and showing system files, on your Windows operating system.	In Control Panel, select Appearance and Personalization > Folder Options . ① Note: This task is done on an individual user basis.
Your Windows operating system does not prompt for consent or for your credentials when you are making a software or configuration change.	This situation happens when you are logged in as the built-in Administrator account. The built-in Administrator account provides a full administrator access token, unlike other administrative users who are logged in with only standard access tokens that require elevation to perform administrative tasks. The built-in Administrator account in your operating system is disabled.
One of the following errors appears after attempting a global modification: Object does not exist. One or more attribute modifications failed.	When running Metasys Release 3.0 or later, you cannot use the global modify feature on devices at Release 2.2 or earlier. For information on globally modifying items, see Performing a Global Modify in the Modify Dialog section.

Table 400: Troubleshooting

Problem	Solution
An object appears with no name in the navigation tree or the Focus/Configuration tab.	<p>This problem occurs when an object is created through third-party BACnet network and neither the Object Name (BACnet property) nor the User Name (Johnson Controls proprietary property) is initialized. As a result, the object appears with no name in the navigation tree (that is, only the icon appears) or the Focus/Configuration tab. The object functions properly. An SCT download works and the Site Management Portal UI displays the information as it was before the upload.</p> <p>The UI forces you to enter a user name when you attempt to edit any other fields of the object.</p> <p>This problem does not occur if you specify an Object Name either during the BACnet create or through a BACnet write after object creation.</p>
If you use the Release All command from the Site Management Portal UI to release overrides of the FEC Outputs, the priority array that resides in the FEC controller clears. The FEC controller outputs go to the Relinquish Default values and are not commanded with the value determined by the controller application because the module outputs send on a COV basis.	<p>This is a misuse of the Release All command. The Release All command works exactly as designed. The proper command to use is the Override Release command.</p> <p>To recover the FEC controller from a Release All Command, issue the command value determined by the application instead of the relinquish default.</p> <p>To release an override, use the Override Release command. For other types of releases, make sure you use the release that corresponds to the command to release.</p>
The Metasys system cannot discover BACnet Trend Logs on a Siemens® device.	<p>You cannot discover BACnet Trend Logs on a SIEMENS device. Add the Trend Log manually to show the trend log attributes in the views and log data graph properly. The SIEMENS third-party Trend Log object does not support the Logging Type attribute, which is used in the BACnet discovery process.</p>
When adding a LonWorks point manually, the Target Reference appears blank.	<p>This is normal functionality. Manually type the path for the Target Reference (path into the controller for the data being mapped by the object) in the text box on the Select Data Source screen.</p>

Table 400: Troubleshooting

Problem	Solution
<p>You cannot command analog objects to values outside of the minimum and maximum present value allowable range. If you have objects with values outside of the allowable range and upgrade to the next software release, the objects may now appear unreliable. This affects programmed features such as the LCT, Scheduling, and the MCO, as well as manual commands.</p>	<p>Change the minimum and maximum range to include the values used to ensure your features work properly.</p>
<p>An operator command to an MCO in an NAE35/45 or NCE25 fails the first time, but succeeds the second time it is commanded. This issue does not occur for MCO objects in the NAE55.</p>	<p>The enabled firewall on the NAE35/45 or NCE25 engine is interfering with command execution. As a workaround, re-issue the same command to the MCO.</p>
<p>The Metasys system cannot command or write LonWorks, N1, N2, XL5000, and VND output points at priority 6 (Minimum On Off).</p>	<p>Priority 6 (Minimum On Off) is reserved by the BACnet protocol for minimum on/off control. You may need to edit interlocks, multiple command objects, schedules, and LCT objects in existing databases using this priority after converting them.</p>
<p>When a point goes into alarm, Metasys software receives the alarm message and a multitude of normal messages. You must acknowledge all normal messages to get to the alarm message. You are not using BACnet intrinsic alarming.</p>	<p>If you experience this issue:</p> <ol style="list-style-type: none"> 1. In the Notification Class object, on the Focus\Configuration tab, click Edit. 2. Find the Ack Required attribute. 3. Deselect To Normal. 4. Click Save.
<p>Computer Name (Host Name) restrictions are unclear to you.</p>	<p>Starting at Release 2.1.10, the NAE Update Tool places restrictions on the Host Name (Computer Name) values you can use for NAE35, NAE45, and NCE25 models. Name values must start with a letter, end with either a letter or a number, and may contain dashes only in the interior of the name. The Host Name must contain a letter other than or in addition to the letter A. For example, A522446 is not valid, but either A522446B or AB52446 are valid. Failure to follow the Host Name restrictions results in the Computer Name value changing when an NAE35, NAE45, or NCE25 is updated. Refer to the <i>NAE Update Tool Technical Bulletin (LIT-12011524)</i> for more information on Host Name restrictions.</p>

Table 400: Troubleshooting

Problem	Solution
<p>Changes made at an NxE do not appear in the UI of the Site Director.</p>	<p>For releases prior to Release 5.0, use the Update All Items Cache command to update the All Items cache on the Site Director. See the Update All Items Cache command and All Items Update in Progress attribute descriptions in the Site Object section for details.</p> <p>① Note: The All Items cache automatically updates for engines at Release 5.0 or later.</p>
<p>You cannot edit an LCT process on an NxE at version 2.1 or 2.2 from ADSs/ADXs at Release 3.0 or later.</p> <p>The following error message appears when attempting to edit LCT processes or Program (Control System) objects from earlier versions:</p> <p><code>This logic diagram is read-only for the current version of Metasys. To edit the diagram you must directly log in to the device on which it is located.</code></p> <p>A similar error message appears if you try to edit a graphic object at Release 2.2 or earlier from a Site Director at Release 3.0 or later.</p>	<p>You cannot have mixed versions to edit the LCT in the Engine from the Metasys Server, if the Metasys Server is at Release 3.0 or later. You cannot have devices at different releases because the Scalable Vector Graphic (SVG) rendering program was changed after Release 2.2.</p> <p>This change in functionality is per design. As the system progressed, we were unable to support newer features while maintaining the ability to edit the processes created in the earlier versions. To edit LCT processes or Program (Control System) objects in a mixed system, you need to log in to the Engine directly.</p>
<p>Some graphics appear jumbled when viewed in a single pane. If you minimize the window and maximize it again, the problem resolves for a few moments and then recurs.</p>	<p>This issue may be due to the following circumstances:</p> <ul style="list-style-type: none"> • older Java software components are present on the computer • the graphics card on your computer is not configured properly <p>To resolve this issue, remove any unused Java software on your computer using Add/Remove Programs. Check the product documentation from the graphic card manufacturer to ensure the card is configured properly.</p>
<p>You are using Metasys software with P2000 software and alarm behavior is unexpected.</p>	<p>Discarding or acknowledging an alarm at the Metasys Server acknowledges the alarm, but the alarm reappears (with the same date/time stamp) in the Alarms window and Event Viewer of the Metasys Server, but not the P2000 Event Viewer.</p> <p>This is expected behavior at this time and occurs because the Metasys Server cannot confirm activity in the P2000 system.</p>

Table 400: Troubleshooting

Problem	Solution
A graphic takes an unusually long time to appear in the UI.	<p>To resolve this issue, try resizing the UI window. The graphic should appear at the usual speed.</p> <p>① Note: Keep in mind that graphic complexity, network traffic, and other factors can impact the speed at which graphics display. If a graphic displays consistently slow, one of the factors may be the cause.</p>
Nodes in the navigation tree are slow to open for Release 5.0 or later.	<p>This behavior may occur if the NavTreeCache database requires maintenance. A stored procedure in the NavTreeCache database called <code>spu_DoDBMaintenance</code> performs the required maintenance. You can run this stored procedure manually or on a schedule using either the SQL Server Agent or Windows OS Task Scheduler. Refer to microsoft.com for details on stored procedures and how to run them.</p>
When entering the IP address in the Internet Explorer address bar to launch <i>Metasys</i> software, Multiple UI windows open.	<p>If you are using a private network, we recommend you turn off the Internet Explorer SmartScreen Filter feature. Failure to do so does not prevent <i>Metasys</i> software from running but may launch multiple UI windows unnecessarily.</p>
Email is no longer being sent after upgrading from Release 4.0 to Release 5.0.	<p>Due to changes made at Release 5.0, you may need to rebuild the Email DDA.</p>
You are editing pager destinations and you lose some of the definitions.	<p>This occurs when the web service times out. You can work around this by extending the web service timeout. To do this:</p> <ol style="list-style-type: none"> 1. Navigate to <code>c:\Inetpub\wwwroot\MetasysIII\WS</code> 2. Open the <code>web.config</code> file in a text editor. 3. Go to the section that ends with <code></system.web></code>. 4. Insert a blank line above that entry. 5. In the inserted line, enter: <code><httpRuntime executionTimeout="600"/></code>. 6. Save the <code>web.config</code> file. This changes the default timeout of 110 seconds to 10 minutes, allowing sufficient time for the save to occur. <p>① Note: Depending on your operating system and configuration, this file may be listed as an XML configuration file named web.</p>

Table 400: Troubleshooting

Problem	Solution
<p>After a VND Integration is defined and a resource file extension is added, the file associated with the resource is not downloaded into the NAE45 (\N40 folder) and therefore cannot be found or used for point auto-discovery.</p>	<p>This problem occurs when the User Access Control (UAC) default setting is set higher than Never Notify. Lower the UAC to Never Notify and the resource file can then be downloaded into the NAE.</p> <p>① Note: Windows 10, Windows 8.1, and Windows 8, and server-class Windows operating systems may require changing the User Account Control (UAC) settings to allow resource files (LON and Vendor Integrations) to be added to the NxE/LCS engines. The <i>Metasys</i> Site Portal does not inform the user when a resource file fails to download. For details, refer to the <i>Disabling User Access Control</i> section of the <i>Meta-</i></p>
<p>After adding a field device using the Insert Field Device Wizard and using Auto Discovery, the navigation tree does not automatically update for defined points (+ sign appears next to device in tree).</p>	<p>If the navigation tree does not automatically update for defined points after adding a field device using Auto Discovery (+ sign appears next to device in tree), select Refresh All Tabs on the Action menu to update.</p>
<p>The following message appears in the Alarms window or in the Event Viewer: Warning - MSMQ not processing messages from Private\$Message_trendbacklog. Message Count: 1.</p>	<p>This alarm indicates that the Metasys Server server could not process at least one message in the Metasys_trendbacklog queue. The NAE might be receiving trend data from a point with an unsupported data type. For further assistance, contact the Field Support Center (FSC).</p>
<p>On Windows 10, Windows 8.1, Windows 8, Windows Server 2012 R2, or Windows Server 2012, the Alarms window does not appear.</p>	<p>Always view the SMP UI on the desktop. The Alarms window does not appear on the Windows 10, Windows 8.1, Windows 8, Windows Server 2016, Windows Server 2012 R2, or Windows Server 2012 Start screen.</p>
<p>On Windows 10, Windows 8.1, and Windows 8, with Internet Explorer 10, when you click Print Preview for a Graphics+ object, the following ActiveX web browser message appears: An ActiveX control on this page is not safe. Your current security settings prohibit running unsafe controls on this page. As a result, this page might not display as intended. The Print Preview window does not open.</p>	<p>To resolve this issue, in Internet Explorer go to Tools > Internet Options > Security tab and complete the following tasks:</p> <ul style="list-style-type: none"> • add the <i>Metasys</i> site as a Trusted site. Ensure you clear the check box next to Require server verification (https:) for all sites in this zone. • change the security level to Medium-low. Next, go to the Advanced tab and set the ActiveX settings from Disable to Prompt.

Table 400: Troubleshooting

Problem	Solution
<p>The following message appears in the Alarms window or in the Event Viewer: COV registration has failed due to table full error. Restart {NAE} to recover.</p> <p>Notes: Symptoms of a full table include:</p> <ul style="list-style-type: none"> • COV updates made to the UI fail. • Logic configured online after startup appears unreliable. • MS/TP field points mapped online after startup are not appearing online. 	<p>This problem occurs when the signup database reaches the maximum size. Restart the specified NAE as soon as possible.</p>
<p>The following message appears in the Alarms window or in the Event Viewer: COV registration failure may occur soon due to table full error. Restart {NAE} to prevent.</p>	<p>This problem occurs when the signup database is nearing the maximum size. Restart the specified NAE as soon as practical, but it must be restarted before the Site Director resets for any reason.</p>
<p>One of the following messages appears in the Alarms window or in the Event Viewer: Server Certificate will expire <datetime>. Restart device to automatically replace. Server Certificate has expired <datetime>. Restart device to automatically replace. Server Certificate is not valid until <datetime>. Restart device to automatically replace.</p>	<p>The self-signed certificate assigned to the network engine that is identified in the message is about to expire, has expired, or is not in effect. For any of these situations, issue a Restart command to the network engine to issue a new, self-signed certificate.</p> <p>① Note: The Certificate Renewal Period attribute in the Site object controls when these reminders are issued. Once activated, the reminder message occurs once per day until you issue the new certificate.</p>
<p>One of the following messages appears in the Alarms window or in the Event Viewer: Server Certificate will expire <datetime>. Install new certificate using SCT. Server Certificate has expired <datetime>. Install new certificate using SCT. Server Certificate is not valid until <datetime>. Install new certificate using SCT.</p>	<p>The trusted certificate assigned to the network engine that is identified in the message is about to expire, has expired, or is not in effect. For any of these situations, obtain a new certificate from our certificate authority and install it with SCT.</p> <p>① Note: The Certificate Renewal Period attribute in the Site object controls when these reminders are issued. Once activated, the reminder message occurs once per day until you issue the new certificate.</p>

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