Network Control Engine Technical Bulletin

MS-NCE25xx-x

Johnson Controls
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Contents

Document introduction 3

Summary of changes 3

Related documentation 3

Network Control Engine overview 4

NCE commissioning and configuration 6

Field controller configuration 7

Supervisory controller commissioning 7

Supervisory controller configuration 8

System Configuration Tool (SCT) 8

Metasys archive database 8

NCE archive database 8

Controller Configuration Tool (CCT) 9

Controller Application File (CAF) 9

NCE SA bus 9

Input/output points 10

Optional display and display keypad 11

NCE series model information 12

Before you commission and configure 12

Commissioning and configuration requirements 12

General guidelines for commissioning and configuring an NCE 12

General procedures 13

Preparing to commission and configure your NCE 13

Configuring the NCE field controller 13

Commissioning the NCE supervisory controller 13

Configuring the NCE supervisory controller 14

Technical specifications 14

Document introduction

This document describes the *Metasys*® Network Control Engine (NCE) and outlines the general procedures about how to commission and configure an NCE for operation. This document does not provide the detailed procedures about how to commission, configure, operate, or troubleshoot an NCE, or use the Local Controller Display. Detailed procedures are available in related documents and referenced where appropriate. This document does not describe how to install or wire the network engine. Refer to the *NCE25 Installation Instructions (Part No. 24-10143-63)* for further information and procedures about how to install and wire the NCE.

Note: Beginning at *Metasys* system Release 9.0.7, the NCE25 Series controllers provide integration to many network protocols, including BACnet®/IP, BACnet MS/TP, N2 Bus, Modbus® RTU, Modbus TCP, M-Bus (EN 13757-3), KNX IP, and other third-party protocols. If you have a non-standard vendor (VND) integration, contact your local Systems Integration Services (SIS) team before you upgrade the engine to Release 9.0.7. For further details, refer to the *Network Engine Commissioning Guide (LIT-1201519)*.

Summary of changes

The following information is new or revised:

- Updated information in Commissioning and configuration requirements.
- Updated the Technical specifications.
- Removed modem and pager support information as they are no longer supported at Release 9.0.7.

Related documentation

Table 1: NCE related documentation

For information on	See document
Installation and specifications for the NCE25 series controllers	*NCE25 Installation Instructions (Part No. 24-10143-63)*
Commissioning an NCE supervisory controller	*Network Engine Commissioning Guide (LIT-1201519)*
Installing the ADS and ADX	*Metasys Server Installation and Upgrade Instructions Wizard (LIT-12012162)*
Installing the SCT on a computer	*SCT Installation and Upgrade Instructions (LIT-12012067)*
Using the SCT to build, edit, download, and upload an archive database	*Metasys SCT Help (LIT-12011964)*
Installing the CCT software	*CCT Installation Instructions (LIT-12011529)*
Using the CCT software to configure the NCE field controller	*Controller Tool Help (LIT-12011147)*
Wireless commissioning converter installation and specifications, and setting up a Bluetooth wireless adapter	*Wireless Commissioning Converter Installation Instructions (Part No. 24-10108-2)*
	Metasys CCT Bluetooth Technology Communication Commissioning Guide (LIT-12011038)
Installation of and specifications for the DIS1710 local controller display	*DIS1710 Local Controller Display Installation Instructions (Part No. 24-10240-9)*

Table 1: NCE related documentation

For information on	See document
Operating and troubleshooting the DIS1710 local controller display	*DIS1710 Local Controller Display Technical Bulletin (LIT-12011270)*
NCE BACnet protocol conformance	*NAE/NCE Protocol Implementation Conformance Statement (LIT-1201532)*
Designing and configuring an MS/TP bus application, a FC bus, and a Sensor/Actuator (SA) bus	*MS/TP Communications Bus Technical Bulletin (LIT-12011034)*
Integrating BACnet MS/TP and BACnet IP devices into the *Metasys* system network	*BACnet Controller Integration with NAE/NCE/ODS Technical Bulletin (LIT-1201531)*
Integrating an N2 bus, and N2 field devices into the *Metasys* system	*N2 Integration with the NAE Technical Bulletin (LIT-1201683)*
Enabling NAEs to communicate with MS/TP controllers over wireless mesh networks	*ZFR1800 Series Wireless Field Bus System Technical Bulletin (LIT-12011295)*

Network Control Engine overview

The NCE combines the network supervisory capabilities and IP network connectivity of a Network Automation Engine (NAE) with a Field Equipment Controller (FEC). NCEs provide a cost-effective solution designed for central plants, including larger built-up air handlers, chiller plants, and boiler plants.

The NCE brings together the supervisory controller (NAE) and a field controller (FEC) into a single hardware package. The two controllers have separate hardware platforms with independent microprocessors and memory. The two controller platforms are connected internally on an FC Bus. Each platform requires separate application files to operate on the network. See Figure 1 for information on NCE physical features.

The NCE supervisory controller provides IP Ethernet network connectivity, the *Metasys* Site Management Portal (SMP) UI, and the network supervisory capabilities featured on an NAE35/NAE45. The NCE supervisory controller connects and operates like an NAE35/NAE45 on the *Metasys* network. For a diagram of the NCE in a network, refer to the *Network Engines Product Bulletin (LIT-12012138)*.

The NCE supervisory controller also provides connectivity to and control of a specified field bus trunk with up to 32 field controllers (maximum). Depending on the model, an NCE at Release 9.0.7 supports many different integrations that include BACnet/IP, BACnet MS/TP, N2 Bus, Modbus RTU, Modbus TCP, M-Bus (EN 13757-3), and KNX IP.

ⓘ **Note:** LonWorks® is no longer supported for an NCE25 at Release 9.0.7. All NCE25s that feature the LonWorks integration remain at Release 9.0 or earlier.

The NCE field controller supports an SA Bus and features 33 onboard hardwire Input/Output (I/O) points. See Input/output points. The NCE field controller functions like an integral FEC. The NCE field controller is connected and mapped to the NCE supervisory controller. You can connect Input/Output Modules (IOMs) to the NCE SA Bus to increase the number of I/O points controlled by the NCE.

ⓘ **Note:** The NCE supervisory controller is the MS/TP bus supervisor for the integral FEC field controller. All NCE supervisory controllers have a default, fixed device-address-value of 0 on the FC Bus. The integral FEC field controllers have a fixed device-address-value of 4 on the FC Bus. On NCE models that support an MS/TP bus (MS-NCE256x-xx), the first available device-address-value on the FC Bus is 5. For more information on device addresses on the MS/TP bus, refer to the *MS/TP Communications Bus Technical Bulletin (LIT-12011034)*.

Some NCE models feature an integral display with a navigation keypad. The display and keypad provide field controller information for setup, monitoring, and control of the NCE field controller features and I/O points. See Optional display and display keypad for more information.

➤ **Important:** For all NCE models that are updated with Release 9.0.7, the internal and external modem support is no longer offered. Do not update NCEs that require this functionality.

For a list of model descriptions and a diagram of the NCE in a network, refer to the *Network Engines Product Bulletin (LIT-12012138)*.

Figure 1: Front of NCE2567-0 showing physical features, (Power and I/O terminal blocks, and NCE mounting clips not shown)

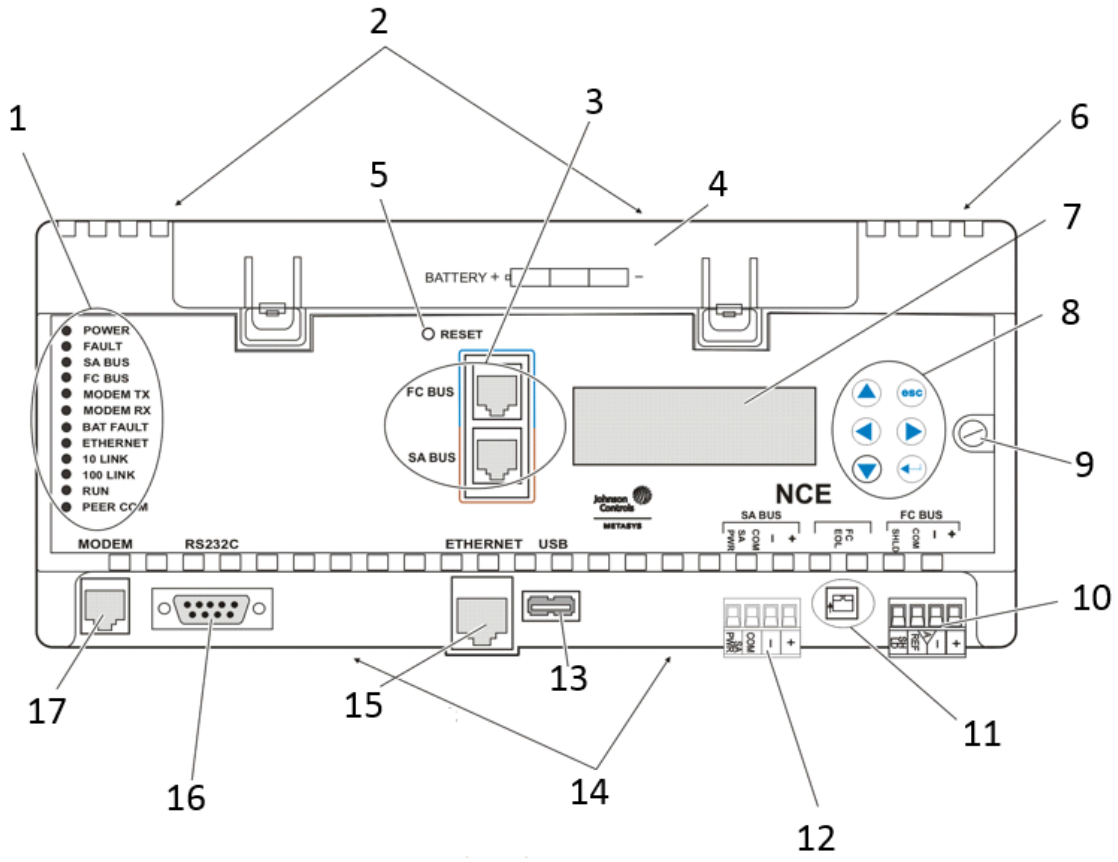

Table 2: NCE25 physical features

Callout	Description
1	LED status indicators. The LED status indicators vary depending on the NCE model.
2	Binary output, Configurable output, and Analog output terminal blocks. These are located on the top side of the NCE.
3	RJ-style 6-Pin modular Bus ports. • FC Bus port for MS/TP models only, connects to a Wireless Commissioning Converter (MS-BTCVT-1). • SA Bus port connects to a NS network sensor, a DIS1710 local controller display, or a Wireless Commissioning Converter (MS-BTCVT-1).
4	Data protection battery component.

Table 2: NCE25 physical features

Callout	Description
5	NCE reset switch.
6	24 VAC Class 2 supply power terminal block. It is located on the top side of the NCE.
7	Display screen on specified models and displays NCE menus and commands.
8	Display navigation keypad is used to navigate the display menus an initiate commands.
9	Cover screw.
10	FC Bus terminal block connects an NCE to an N2 Bus or FC Bus segment. It is not available on all models.
11	End-of-Line (EOL) termination switch sets the NCE as an EOL terminating device. Set the EOL switch according to the NCE position on the N2 or FC Bus segment.
12	SA Bus terminal block connects the NCE field controller to the SA Bus.
13	Standard USB port.
14	Universal inputs and Binary input terminal blocks are located on the bottom side of the NCE.
15	Ethernet port RJ-45 8-pin modular jack connects the NCE to the IP network.
16	RS-232 Serial port.
17	Modem Jack. RJ-style 6-pin modular jack, only on NCE models with optional internal modems.

NCE commissioning and configuration

Each *Metasys* network installation, commissioning, and configuration scenario is unique. The commissioning and configuration tasks, the task order, and the required attribute values at commissioning for an NCE are determined by the project workflow. In some scenarios, NCEs may be commissioned and configured before they are installed and connected to the *Metasys* network; in other scenarios, NCEs may be mounted and wired to the networks and I/O points before they are commissioned and configured.

Note: Installation includes locating, mounting, wiring, and powering on an NCE. For more information and detailed procedures about how to install an NCE, refer to the *NCE25 Installation Instructions (Part No. 24-10143-63)*.

Important: Modem functions are not available after the network engine is updated to Release 9.0.7. In addition, the NCE25 LonWorks models do not support Release 9.0.7.

You can apply the commissioning and configuration tasks to an NCE in almost any order, but the NCE supervisory controller must have a valid archive database and the NCE field controller must have a valid Controller Application File (CAF) to operate.

To completely commission and configure an NCE for operation on the field network and the supervisory (IP) network, you must complete the following tasks:

- **Configure the NCE field controller** for your NCE field controller application by creating a CAF in CCT and loading the CAF into the NCE field controller. See Field controller configuration.
- **Commission the NCE supervisory controller** to connect to a computer, access the NCE UI, and set the basic NCE supervisory controller attributes. See Supervisory controller commissioning.

- **Configure the NCE supervisory controller** for your network and field bus application by creating an archive database in SCT and downloading it to the NCE supervisory controller. See Supervisory controller configuration.

Field controller configuration

Field controller configuration prepares the NCE field controller (FEC component) for operation in a specific local field application. Field controller configuration requires you to create a CAF in CCT, and download the CAF to the NCE field controller. See Controller Application File (CAF) for more information about CAFs.

You can download a CAF to an NCE field controller in one of the following ways:

- Directly from a computer with CCT to the NCE field controller using a Wireless Commissioning Converter (MS-BTCVT-1) that is connected to the NCE SA Bus or FC Bus Port.
- Indirectly from a computer logged on to the SMP UI of the NCE or the SCT, using an Ethernet connection and the **Passthru** feature available from the CCT **Tools** menu.
- Indirectly from a computer with CCT connected to an Ethernet connection and the **Ethernet** feature available from the CCT **Tools** menu.
- Directly from a computer with SCT that uses an Ethernet connection during the configuration of the NCE supervisory controller. If the CAF for the NCE field controller is available when you download the NCE archive database using SCT, you can add the CAF as a resource file extension, and download the CAF and the archive database while using the SCT.
- Using the MAP gateway.

For information on how to use the CCT to configure the NCE field controller, see Configuring the NCE field controller. For information on how to combine the NCE field controller configuration and NCE supervisory controller configuration, see Configuring the NCE supervisory controller.

Supervisory controller commissioning

Commissioning the NCE supervisory controller (NAE component) establishes connectivity to the NCE, which allows access to the SMP UI through the NCE, and prepares the NCE to receive an archive database download from the SCT.

The first task to commission the NCE supervisory controller is to log on to the NCE from a web browser or the Launcher application. After you log on, you can access, navigate, and modify NCE attributes through the SMP UI. You can also commission the NCE for operation on the IP Ethernet.

For typical network connection scenarios, refer to the *Site Management Portal User Interface* and *Accessing the Site Management Portal UI on an NAE* sections in the *NAE Commissioning Guide (LIT-1201519)*. This commissioning guide also includes information and procedures about how to access, navigate, and edit the SMP UI through the NCE.

After you access the SMP UI through the NCE, you can set the basic NCE supervisory controller attributes:

- object name (Name attribute) and basic device parameters
- host name, domain name, and network parameters
- direct-connect parameters
- time and date management parameters (Local Time and Local Date attributes)
- alarm and event parameters
- SNMP message and network management destination
- Site Director status (Site Director Online attribute)

See Commissioning the NCE supervisory controller for steps.

After you commission the NCE supervisory controller to establish connectivity, allow user interface access, and set up the basic attributes, you can configure the NCE supervisory controller for your specific *Metasys* network application. See Supervisory controller commissioning.

Supervisory controller configuration

Configuring the NCE supervisory controller (NAE component) prepares the NCE to operate in a specific *Metasys* network application and communicate with, monitor, and control the NCE field controllers. After the NCE supervisory controller is configured, the NCE can compile, generate, and communicate information about site status, alarms, events, and trends.

The NCE supervisory controller is typically configured by using the SCT to download a pre-built archive database that contains the device objects, object references, attribute values, logic, graphics, user information, and other data required for the NCE supervisory controller to perform on the *Metasys* network. See NCE archive database.

You can download the archive database to the NCE supervisory controller from the SCT over an Ethernet connection to the Local Area Network (LAN). You can also download the archive database to the NCE supervisory controller from SCT over a direct connection to the NCE Serial Port. Refer to *Metasys SCT Help (LIT-12011964)* for information about how to create and download archive databases.

In most configuration scenarios, the values in the downloaded archive database overwrite the existing values on a commissioned NCE supervisory controller. We recommend that you commission the controller initially to prepare a framework for later downloads. After an NCE supervisory controller is configured with an archive database containing user information, you can set up the e-mail Destination Delivery Agents (DDAs) and create specific alarm and event notifications for delivery to specific e-mail destinations.

If the CAF for the NCE field controller is available when you download the NCE archive database using SCT, you can add the CAF as a resource file extension and download the CAF and the archive database at the same time using SCT. You must either download the CAF using SCT during supervisory controller configuration or using CCT during field controller configuration. See Field controller configuration.

System Configuration Tool (SCT)

SCT is an offline software tool used to create, edit, save, and restore the various archive and security databases that are used to configure *Metasys* system networks, ADSs/ADXs, NAEs, NCEs, and supported field devices. The SCT UI has a similar look and function to the online *Metasys* SMP UI.

SCT also provides a **Passthru** feature that allows you to commission field devices on the MS/TP Bus using CCT software. For details, refer to the *Controller Tool Help (LIT-12011147)*.

SCT also provides a logic-simulation feature that allows you to simulate an online supervisory device and test database control logic prior to downloading it to an NCE. Using SCT, you can view and configure multiple sites in one archive.

Metasys archive database

A *Metasys* archive database contains the configuration information for ADSs/ADXs, NAEs, NCEs, controllers, field devices, and field points that make up a single site or multiple sites on a *Metasys* network. Multiple *Metasys* archive databases representing multiple sites can reside on a single computer running SCT.

NCE archive database

An NCE archive database, which resides in the supervisory controller (NAE component), contains only the specific configuration information that makes up the network integrations, field devices, and field points that the NCE supervises. The NCE retains only its own archive database, but you also can save the NCE database in a *Metasys* archive database on an ADS/ADX or another computer using SCT.

You should create, edit, and store the NCE archive database offline in the SCT. By doing this, you can download a copy of the database to the NCE supervisory controller at any time before or after installing the NCE.

You can create the archive database with all of the objects for the field devices on the NCE field bus in the database or with only some/none of the devices on the field bus. After an incomplete archive database is downloaded to the NCE, you can access the SMP UI on the NCE and auto-discover the remaining field devices on the N2 Bus or MS/TP trunk.

Note: For auto-discovery to function properly, each field device on the N2 Bus or MS/TP trunk must have a valid configuration file so the NCE supervisory controller can discover it and upload the device file to the database. After auto-discovery is complete, you should upload a copy of the enhanced archive database to the SCT.

You can upload an NCE archive database to the SCT to save it to a hard disk or other long-term storage media. You also can edit an NCE archive database offline in SCT and download the edited archive database to the NCE.

Downloading the NCE archive database is part of the supervisory controller configuration procedure. See Supervisory controller configuration for more information on three methods you can use to download archive databases to NCE supervisory controllers.

Controller Configuration Tool (CCT)

CCT is a software application that can be used in conjunction with SCT to commission, configure, and simulate Field Equipment Controllers (FECs), Input/Output Modules (IOMs), CGM, CVM, and VAV Modular Assembly (VMA) 1600s on an MS/TP bus.

Use CCT worksheets and wizards to create or edit a CAF, and then download the CAF to the NCE field controller. See Controller Application File (CAF) and Field controller configuration for more information about CAFs and how to download CAFs.

Controller Application File (CAF)

A CAF is a resource file that resides in the NCE field controller (FEC component) and contains all of the logic components needed to represent a field control system that is monitored and controlled by an FEC, VMA1600, or NCE field controller. CAFs for field controllers are much like the archive databases for supervisory controllers. A valid CAF is required to configure the NCE field controller.

Use CCT to create and edit a CAF. You should create, edit, and store the CAF offline in CCT. You can then download a copy of the CAF to the NCE field controller at any time before or after installing the NCE.

Creating and downloading the CAF is part of the field controller configuration procedure. See Field controller configuration for more information on three methods you can use to download CAFs to field controllers.

If the CAF is added as a resource file extension of the NCE, you can upload the CAF to SCT. If you want to modify the CAF, you need to separately upload the CAF with CCT. You can then edit the file using CCT, then save the file to the hard disk and/or with a resource file extension with SCT. CCT prompts you to save the CAF for each system you create. If you save the CAF, it allows you to access it offline and make changes, or copy and edit it for use in similar systems on other field controllers. The default location to save a CAF is: *C:\Users\username*.

You cannot use certain characters when saving a CAF. Illegal characters include: * ? " < > | / \

For detailed information on how to create, edit, and download CAFs, refer to the *Controller Tool Help (LIT-12011147)*.

NCE SA bus

The NCE field controller supports one Sensor/Actuator (SA) Bus and all NCE models have an SA Bus terminal block and a modular SA Bus Port. The SA Bus supports up to 128 I/O points. Refer to the *MS/TP Communications Bus Technical Bulletin (LIT-12011034)* for more information about how to set up and address an SA Bus.

Input/output points

The NCE field controller includes 33 hard-wire I/O points, which can be configured for multiple types of inputs or outputs. See Figure 2 and Figure 3 for more information. Most of the points are configured in CCT. The Binary Outputs are configured by positioning two jumpers next to the output terminal block.

Each NCE model has the following inputs and outputs:

- **10 Universal Inputs**, each of which can be configured as either a Voltage Analog Input (0–10 VDC), Current Analog Input (4–20 mA), Resistive Analog Input, or a Dry-Contact Binary Input (100 mA maximum total load on +15 VDC power supply for Universal inputs). See Figure 3.
- **8 Binary Inputs**, each of which can be configured as either a Dry-Contact Maintained Input or a Pulse Counter Mode Input (50 Hz at 50% Duty Cycle). See Figure 3.
- **4 Analog Outputs**, each of which can be configured as either a Voltage Analog Output (0–10 VDC) or Current Analog Output (4–20 mA). See Figure 2.
- **7 Binary Outputs**, each of which can be configured as either an internally powered or externally powered 24 VAC Triac output. See Figure 2.
- **4 Configurable Outputs**, each of which can be configured as either a Voltage Analog Output (0–10 VDC) or a Binary Output (24 VAC Triac). See Figure 2.

Figure 2: NCE output terminal blocks, Binary output jumpers, and supply power terminal block as viewed from the top of an NCE

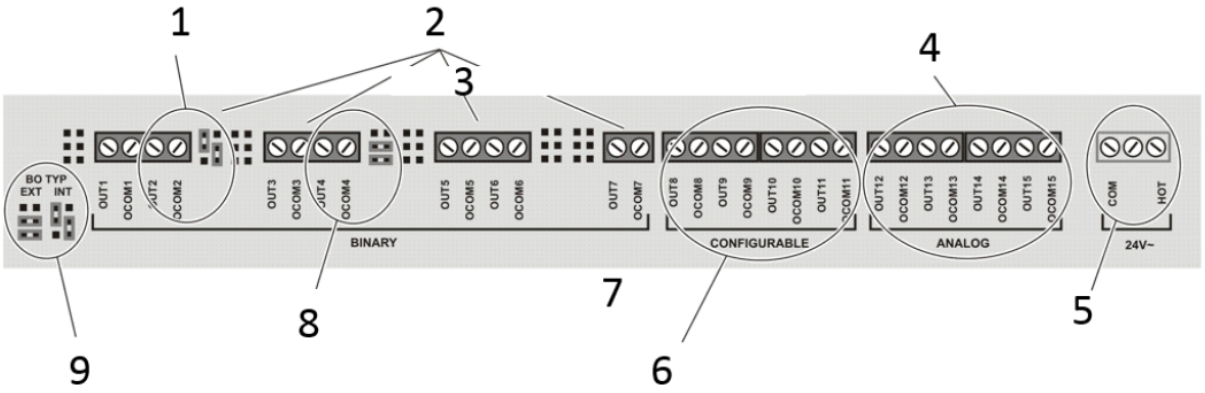

Table 3: Callout table for NCE25 series output terminal blocks, binary output jumpers, and supply power terminal block as viewed from the top of an NCE25

Callout	Description
1	Binary output 2 jumpers positioned for an internal source of power.
2	Binary outputs are 24 VAC Triac outputs.
3	Back of NCE (Flush to mounting surface).
4	Analog outputs can be defined as: • Voltage Analog outputs (0-10 VDC) • Current Analog outputs (4-20 mA)
5	24 VAC, Class 2 supply power terminal block. The center terminal is not used.
6	Configurable outputs can be defined as the following: • Voltage Analog outputs (0-10 VDC) • Binary outputs (24 VAC Triac)

Table 3: Callout table for NCE25 series output terminal blocks, binary output jumpers, and supply power terminal block as viewed from the top of an NCE25

Callout	Description
7	Front of NCE.
8	Binary output 4 jumpers positioned for an external source of power.
9	Required jumper positons for setting a Binary output's power source.

Figure 3: NCE Universal input and Binary input terminal blocks as viewed from the bottom of an NCE

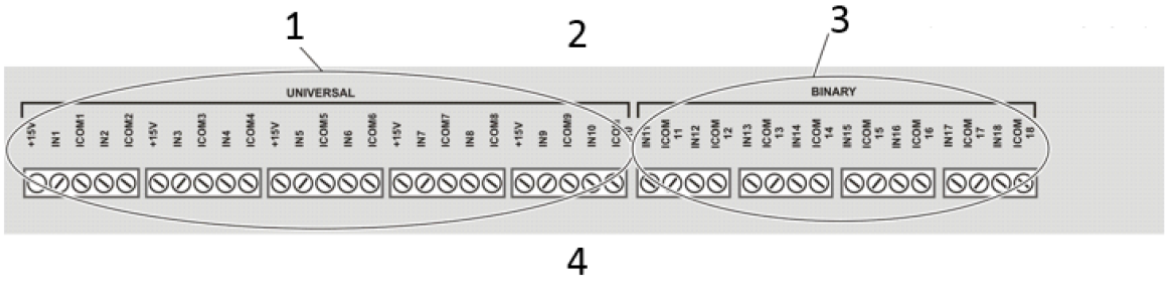

Table 4: Callout table for Universal input and Binary input terminal blocks as viewed from the bottom of an NCE25

Callout	Description
1	Universal inputs can be defined as the following: • Voltage Analog inputs (0-10 VDC) • Current Analog inputs (4-20 mA) • Resistive Analog inputs (0-2k Ohm) - RTD: 1k Nickel, 1k Platinum, or A99B SI - NTC: 10k Type L or 2.225k Type 2 • Dry contact Binary inputs
2	Front of NCE.
3	Binary inputs can be defined as: • Dry contact maintained • Pulse counter mode
4	Back of NCE (Flush to Mounting Surface).

Optional display and display keypad

Some NCE models feature an integral display with a display navigation keypad. The display and keypad provide a user interface for the NCE field controller only. On NCE models without an integral display and keypad, an optional stand-alone display is available, which can be connected to the NCE on the SA Bus to provide the same functionality as an integral display and keypad.

For a list of NCE model descriptions, refer to the *Network Engines Product Bulletin (LIT-12012138)*. Refer to the *DIS1710 Local Controller Display Technical Bulletin (LIT-12011270)* for more information and detailed procedures about how to use the integral or remote display, and display keypad.

The screen displays NCE field controller information, field controller I/O point information, and command menus, which allow you to directly monitor the NCE field controller I/O point status on the display and change I/O point settings using the display keypad.

The display is configured in CCT and the display configuration information is part of the NCE field controller CAF. Refer to the *Controller Tool Help (LIT-12011147)* for information and procedures about how to configure the display.

NCE series model information

Refer to the *Network Engines Product Bulletin (LIT-12012138)* for model and accessory information.

Before you commission and configure

Before you commission and configure your NCE, see Commissioning and configuration requirements and General guidelines for commissioning and configuring an NCE.

Commissioning and configuration requirements

You need the following items to commission an NCE:

- An NCE with *Metasys* software.
- A laptop or desktop computer with a supported browser to download the Launcher application. Refer to the *Launcher Installation Instructions (LIT-12011783)*.

  Note: In some scenarios, the computer must be a DHCP client or must be configured to use a static IP address appropriate for the LAN.
- The NCE Ethernet MAC address.
- A computer with CCT software.

  Note: You can configure and commission any NCE supervisory application, regardless of the CCT software version.

Depending on your workflow, you also may need:

- An MS-BTCVT-1 Wireless Commissioning Converter or an Ethernet crossover cable (for downloading the CAF to the NCE field controller).
- A MAP Gateway to load the controller.
- A null modem Serial cable.
- A new, unique IP address for each NCE on the *Metasys* building network.
- A copy of the NCE archive database that configures the NCE for your specific site. You can create and store the NCE archive database offline in the SCT.
- SCT Release 13.0 installed on your computer.

Refer to the *SCT Installation and Upgrade Instructions (LIT-12012067)* and *CCT Installation Instructions (LIT-12011529)* for more information, minimum requirements, and detailed procedures for SCT and CCT.

General guidelines for commissioning and configuring an NCE

Consider the following guidelines when commissioning and configuring NCE:

- Many different workflows exist to commission and configure an NCE and each project or site application has different requirements. You can achieve identical results using different workflows.
- You can apply the commissioning and configuration tasks in almost any order, but the NCE field controller cannot operate without a valid CAF, and the NCE supervisory controller cannot operate without a valid archive database.
- You can download the CAF to the NCE field controller using CCT and the procedure in Configuring the NCE field controller, or you can download the CAF file when you download the archive

database with SCT in Configuring the NCE supervisory controller.

- If you follow the steps in Configuring the NCE field controller to download the CAF using CCT, the NCE field controller operates as a stand-alone field controller, independent of supervisory control. You can commission and configure the NCE supervisory controller later to provide network supervisory control.

General procedures

Follow the steps in the next sections to commission and configure your NCE.

Preparing to commission and configure your NCE

To prepare to commission and configure your NCE, complete the following steps:

1. Verify that you meet the requirements in Commissioning and configuration requirements.
2. Consider the guidelines in General guidelines for commissioning and configuring an NCE.

Configuring the NCE field controller

You must either download the CAF to the NCE field controller using this procedure or include the CAF with the archive database when following the steps in Configuring the NCE supervisory controller.

To configure the NCE field controller, complete the following steps:

1. Create a CAF in CCT. Refer to the *Controller Tool Help (LIT-12011147)*.
2. Download a copy of the CAF to the NCE field controller using one of the supported methods. See Field controller configuration.

Commissioning the NCE supervisory controller

ⓘ **Note:** Follow the procedure as stated even though values are overwritten by an archive download. The NCE requires this framework for the download to complete successfully. Refer to the *NAE Commissioning and Configuration Flowchart* in the *NAE Commissioning Guide (LIT-1201519)* for details on commissioning the NCE supervisory controller. Also see Supervisory controller commissioning.

To commission the NCE supervisory controller, complete the following steps:

1. Establish a network or direct connection to the NCE supervisory controller.
2. Access the NCE supervisory controller UI.
3. Establish basic NCE supervisory controller parameters in the NCE **Focus** window.
4. Establish NCE supervisory controller network parameters.
5. Set the time, date, time zone, and time synchronization for the NCE.
6. Demote the NCE from Site Director unless you are using the NCE in a stand-alone application.

   ⓘ **Note:** In most applications, the NCE should not be the designated Site Director. If the NCE is not the Site Director, assign the appropriate NAE or ADS/ADX Site Director to the NCE.
7. Establish e-mail, and SNMP alarm and event notifications, and destinations for the NCE supervisory controller.

Configuring the NCE supervisory controller

ⓘ **Note:** Refer to the *NAE Commissioning and Configuration Flowchart* in the *NAE Commissioning Guide (LIT-1201519)* for more information on commissioning the NCE supervisory controller. Also see Supervisory controller commissioning.

Configuring the NCE supervisory controller requires you to create an archive database for your NCE application and download the database to the NCE supervisory controller. There are various scenarios to accomplish this task, and the scenario you use depends on the job workflow.

See NCE archive database for details on archive databases. Also refer to the *Metasys SCT Help (LIT-12011964)* and *Metasys SMP Help (LIT-1201793)* for information about how to create, edit, and download archive databases.

To configure the NCE supervisory controller, complete the following steps:

1. Create an archive database in SCT for your NCE application.

   ⓘ **Note:** You also can download a partial archive database to the NCE supervisory controller and use Auto-Discovery to map all other active devices and points. After the auto-discovery is complete, upload a copy of the completed archive database to the SCT.

2. Connect the NCE supervisory controller to the SCT computer using a direct connection or an Ethernet connection to the LAN.

3. Download the archive database to the NCE supervisory controller.
   If the CAF for the NCE field controller application is available, you can download the CAF with the archive database using SCT at this time. You must either download the CAF to the NCE field controller using this procedure or download the CAF using CCT using the Configuring the NCE field controller section.

Technical specifications

Table 5: NCE25

Power Requirement	Dedicated nominal 24 VAC, Class 2 power supply (North America), SELV power supply (Europe), at 50/60 Hz (20 VAC minimum to 30 VAC maximum)
Power Consumption	25 VA maximum for NCE25 only ⓘ **Note:** The 25 VA rating does not include any power supplied by the NCE to devices connected at the NCE BOs. BO devices connected to and powered by an NCE can require an additional 125 VA (maximum).
Power Source	+15 VDC power source terminals provide 100 mA total current; quantity of inputs: five, located in Universal IN terminals; for active (3-wire) input devices
Ambient Operating Conditions	0°C to 50°C (32°F to 122°F), 10 to 90% RH, 30°C (86°F) maximum dew point
Ambient Storage Conditions	-40°C to 70°C (-40°F to 158°F), 5% to 95% RH, 30°C (86°F) maximum dew point
Data Protection Battery	Supports data protection on power failure. Rechargeable NiMH battery: 3.6 VDC 500 mAh, with a typical life of 5 to 7 years at 21°C (70°F); Product Code Number: MS-BAT1020-0

Table 5: NCE25

Processors	**Supervisory Controller:** 192 MHz Renesas SH4 7760 RISC processor **Field Controller:** 20 MHz Renesas H8S2398 processor
Memory	**Supervisory Controller:** 128 MB flash nonvolatile memory for operating system, configuration data, and operations data storage and backup and 128 MB SDRAM for operations data dynamic memory **Field Controller:** 1 MB flash memory and 1 MB RAM
Operating System	Microsoft® Windows Embedded CE 6.0 (Release 9.0) Buildroot 2017.08.2 with Linux® kernel 14.4 (Release 9.0.7)
Network and Serial Interfaces (Depending on the NCE model)	• One Ethernet port; 10/100 Mbps; 8-pin RJ-45 connector. • One optically isolated RS-485 SA Bus port; with a pluggable and keyed 4-position terminal block (on all NCE25 models). • One optically isolated RS-485 port; with a pluggable and keyed 4-position terminal block (only on NCE25 models that support an N2 Bus or MS/TP bus trunk). • One LonWorks port; FTT10 78 Kbps; pluggable, keyed 3-position terminal block (only on NCE25 models that support a LonWorks Network trunk). The LonWorks models are supported to run the *Metasys* Release 9.0 software, but not the Release 9.0.7 update. • One RS-232-C serial port with a standard 9-pin sub-D connector that supports standard baud rates. • One USB serial port with a standard USB connector that supports an optional, user-supplied external modem. Modem functions are available with *Metasys* Release 9.0, but are not available after the NCE is updated with Release 9.0.7. • Option: One telephone port for the internal modem; up to 56 Kbps; 6-pin modular connector (NCE models with an optional internal modem have one RS-232-C serial port only; not supported for an engine with Release 9.0.7).
Analog Input/Analog Output Point Resolution	• Analog Input Points: 16-bit resolution • Analog Output Points: 16-bit resolution and ±200 mV accuracy on 0-10 VDC applications
Input/Output Capabilities	• 10-Universal Inputs: Defined as 0–10 VDC, 4–20 mA, 0–600k ohm, or Binary Dry Contact • 8-Binary Inputs: Defined as Dry Contact Maintained or Pulse/Accumulator Mode • 4-Analog Outputs: Defined as 0–10 VDC or 4–20 mA • 7-Binary Outputs: Defined as 24 VAC Triac (selectable internal or external source power) • 4-Configurable Outputs: Defined as 0–10 VDC or 24 VAC Triac BO
Dimensions (Height x Width x Depth)	155 mm x 270 mm x 64 mm (6.1 in. x 10.6 in. x 2.5 in.), minimum mounting space required: 250 mm x 370 mm x 110 mm (9.8 in. x 14.6 in. x 4.3 in.)
Housing	Plastic housing Plastic material: ABS and polycarbonate Protection: IP20 (IEC60529)

Table 5: NCE25

Mounting	On a flat surface with screws, on three mounting clips, or a single 35 mm DIN rail
Shipping Weight	1.2 kg (2.7 lb)
Compliance 	**United States:** UL Listed, File E107041, CCN PAZX, UL 916, Energy Management Equipment; FCC Compliant to CFR47, Part 15, Subpart B, Class A
	Canada: UL Listed, File E107041, CCN PAZX7, CAN/CSA C22.2 No. 205, Signal Equipment Industry Canada Compliant, ICES-003
	Europe: CE Mark - Johnson Controls declares that this product is in compliance with the essential requirements and other relevant provisions of the EMC Directive.
	Australia and New Zealand: RCM Mark, Australia/NZ Emissions Compliant
	BACnet International: BTL 135-2010 Listed B-BC at *Metasys* system Release 8.1

The performance specifications are nominal and conform to acceptable industry standard. For application at conditions beyond these specifications, consult the local Johnson Controls office. Johnson Controls shall not be liable for damages resulting from misapplication or misuse of its products.