PowerFlex® 22-COMM-B BACnet MS/TP Adapter

Allen-Bradley

Firmware Version 1.xxx
User Manual

Allen-Bradley • Rockwell Software

Rockwell Automation

Important User Information

Solid state equipment has operational characteristics differing from those of electromechanical equipment. *Safety Guidelines for the Application, Installation and Maintenance of Solid State Controls* (Publication SGI-1.1 available from your local Rockwell Automation sales office or online at **http://www.rockwellautomation.com/literature**) describes some important differences between solid state equipment and hard-wired electromechanical devices. Because of this difference, and also because of the wide variety of uses for solid state equipment, all persons responsible for applying this equipment must satisfy themselves that each intended application of this equipment is acceptable.

In no event will Rockwell Automation, Inc. be responsible or liable for indirect or consequential damages resulting from the use or application of this equipment.

The examples and diagrams in this manual are included solely for illustrative purposes. Because of the many variables and requirements associated with any particular installation, Rockwell Automation, Inc. cannot assume responsibility or liability for actual use based on the examples and diagrams.

No patent liability is assumed by Rockwell Automation, Inc. with respect to use of information, circuits, equipment, or software described in this manual.

Throughout this manual, when necessary we use notes to make you aware of safety considerations.

WARNING: Identifies information about practices or circumstances that can cause an explosion in a hazardous environment, which may lead to personal injury or death, property damage, or economic loss.

Important: Identifies information that is critical for successful application and understanding of the product.

ATTENTION: Identifies information about practices or circumstances that can lead to personal injury or death, property damage, or economic loss. Attentions help you identify a hazard, avoid a hazard, and recognize the consequences.

Shock Hazard labels may be located on or inside the equipment (e.g., drive or motor) to alert people that dangerous voltage may be present.

Burn Hazard labels may be located on or inside the equipment (e.g., drive or motor) to alert people that surfaces may be at dangerous temperatures.

The information below summarizes the changes made to this manual since its last release (October 2006):

Description of Changes	Page(s)
Updated information in the “Related Documentation” section.	P-1
In the “Compatible Products” section, added the PowerFlex 4M drive. **NOTE:** The 22-COMM-B adapter must have firmware version 1.003 (or later) to be compatible with the PowerFlex 4M drive.	1-3
Updated information in the “Using the Optional, External PowerFlex 4-Class HIM” section.	3-2
Added the new section “Flash Updating the Adapter.”	3-10
Revised Table 4.A to include the PowerFlex 4M drive.	4-3

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About This Manual

Related Documentation

For:	Refer to:	Publication
DriveExplorer™	http://www.ab.com/drives/driveexplorer, and DriveExplorer online Help (installed with the software)	—
DriveTools™ SP (includes DriveExecutive™)	http://www.ab.com/drives/drivetools, and DriveExecutive online Help (installed with the software)	—
PowerFlex 4-Class HIM (22-HIM-A3 or 22-HIM-C2S)	HIM Quick Reference	22HIM-QR001
PowerFlex® 4 Drive	PowerFlex 4 User Manual PowerFlex 4 Quick Start	22A-UM001 22A-QS001
PowerFlex® 4M Drive (1)	PowerFlex 4M User Manual PowerFlex 4M Quick Start	22F-UM001 22F-QS001
PowerFlex® 40 Drive	PowerFlex 40 User Manual PowerFlex 40 Quick Start	22B-UM001 22B-QS001
PowerFlex® 400 Drive	PowerFlex 400 User Manual PowerFlex 400 Quick Start	22C-UM001 22C-QS001

(1) The 22-COMM-B adapter must have firmware version 1.003 (or later) to be compatible with the PowerFlex 4M drive.

You can view or download publications at http://www.rockwellautomation.com/literature. To order paper copies of technical documentation, contact your local Rockwell Automation distributor or sales representative.

To find your Rockwell Automation distributor or sales representative, visit www.rockwellautomation.com/locations.

For information such as firmware updates or answers to drive-related questions, go to the Drives Service & Support web site at www.ab.com/support/abdrives and click on the “Downloads” or “Knowledgebase” link.

Rockwell Automation Support

Rockwell Automation, Inc. offers support services worldwide, with over 75 sales/support offices, over 500 authorized distributors, and over 250 authorized systems integrators located throughout the United States alone. In addition, Rockwell Automation, Inc. representatives are in every major country in the world.

Local Product Support

Contact your local Rockwell Automation, Inc. representative for:

- Sales and order support
- Product technical training
- Warranty support
- Support service agreements

Technical Product Assistance

For technical assistance, please review the information in Chapter 5, Troubleshooting first. If you still have problems, then access the Allen-Bradley Technical Support web site at www.ab.com/support/abdrives or contact Rockwell Automation, Inc.

Conventions Used in this Manual

This manual provides information about the adapter and using it with PowerFlex 4-Class drives. The adapter can be used with other products that support a DSI™ adapter, such as the DSI External Comms Kit (22-XCOMM-DC-BASE). Refer to the documentation for your product for specific information about how it works with the adapter.

The following conventions are used throughout this manual:

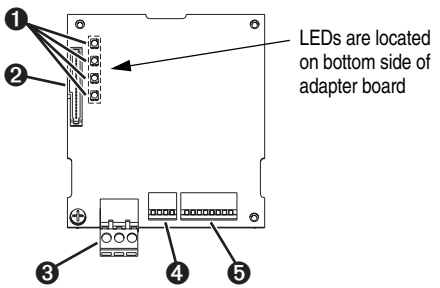
- Parameter names are shown in the format **Parameter xx - [*]**. The xx represents the parameter number, and the * represents the parameter name—for example, **Parameter 01 - [Mode]**.
- Menu commands are shown in bold type face and follow the format **Menu > Command**. For example, if you read “Select **File > Open**,” you should click the **File** menu and then click the **Open** command.
- The firmware release is displayed as FRN X.xxx. The “FRN” signifies Firmware Release Number. The “X” is the major release number. The “xxx” is the minor update number.

Getting Started

The adapter is intended for installation into a PowerFlex 40 or PowerFlex 400 drive and is used for network communication. The adapter can also be installed in a DSI External Comms Kit (22-XCOMM-DC-BASE). This kit enables PowerFlex 4 and PowerFlex 4M drives, which cannot accommodate an internally-mounted adapter, to connect to a BACnet MS/TP network. **NOTE:** The 22-COMM-B adapter must have firmware version 1.003 (or later) to be compatible with the PowerFlex 4M drive.

Components

Figure 1.1 Components of the Adapter



Item	Component	Description
1	Status Indicators	Four LEDs that indicate the status of the network connection, DSI, and the adapter. Refer to Chapter 5, Troubleshooting.
2	DSI Connector	A 20-pin, single-row shrouded male header. An Internal Interface cable connects to this connector and a connector on the drive.
3	Terminal Block	A 3-pin terminal block with mating 3-pin linear plug connects the adapter to the network.
4	TERM, -BIAS, and +BIAS Switches	Switches for turning on/off the adapter's internal termination resistor and bias resistors. See Setting the TERM, -BIAS, and +BIAS Switches on page 2-4 for details.
5	MAC Address Switches	Switches for setting the MAC address. See Setting the MAC Address on page 2-2 for details.

Features

The adapter features include:

- Typical mounting in a PowerFlex 40 or PowerFlex 400 drive. The adapter can also be installed in a DSI External Comms Kit (22-XCOMM-DC-BASE).
- Switches that enable you to:
  - Set a MAC address before applying power to the drive.
  - Turn on/off the adapter's built-in termination resistor and bias resistors for optimizing operation on the network.
- A captive screw secures and grounds the adapter to the drive or, when mounted in a DSI External Comms Kit, to the kit's metal enclosure.
- Compatibility with various configuration tools to configure the adapter and connected drive. The tools include an external PowerFlex 4-Class HIM (22-HIM-A3 or 22-HIM-C2S), and drive-configuration software such as DriveExplorer (version 3.01 or later) or DriveExecutive (version 3.01 or later).
- Status indicators that report the status of drive communications, the adapter, and network.
- Read and write access to parameters to configure and monitor parameter values over the network.
- User-defined fault actions to determine how the adapter and connected drive respond to I/O communication disruptions (Comm Loss Action) on the network.

Compatible Products

The adapter is compatible with Allen-Bradley PowerFlex 4-Class (Component-Class) drives and other products that support an internal DSI adapter. At the time of publication, compatible products include:

- PowerFlex 4 drives (when used with DSI External Comms Kit)
- PowerFlex 4M drives[1] (when used with DSI External Comms Kit)
- PowerFlex 40 drives
- PowerFlex 400 drives

[1] The 22-COMM-B adapter must have firmware version 1.003 (or later) to be compatible with PowerFlex 4M drives.

Required Equipment

Equipment Shipped with the Adapter

When you unpack the adapter, verify that the package includes:

- ❑ One adapter
- ❑ One 15.24 cm (6 in.) Internal Interface cable
- ❑ One 3-pin linear plug (plugged into the adapter socket)
- ❑ One *PowerFlex 4-Class DSI (Drive Serial Interface) Network Communications Adapter Installation Instructions* (publication 22COMM-IN002)

User-Supplied Equipment

To install and configure the adapter, you must supply:

- ❑ A small flathead screwdriver
- ❑ A shielded, twisted wire pair to connect the adapter to the network
- ❑ A configuration tool, such as:
  - PowerFlex 4-Class HIM (22-HIM-A3 or 22-HIM-C2S) – required to access adapter parameters when not using DriveExplorer or DriveExecutive software
  - DriveExplorer software (version 3.01 or later)
  - DriveExecutive stand-alone software (version 3.01 or later) or bundled with the DriveTools SP suite (version 1.01 or later)
  - Third-party network configuration software

Safety Precautions

Please read the following safety precautions carefully.

ATTENTION: Risk of injury or death exists. The PowerFlex drive may contain high voltages that can cause injury or death. Remove power from the PowerFlex drive, and then verify power has been discharged before installing or removing an adapter.

ATTENTION: Risk of injury or equipment damage exists. Only personnel familiar with drive and power products and the associated machinery should plan or implement the installation, start-up, configuration, and subsequent maintenance of the product using an adapter. Failure to comply may result in injury and/or equipment damage.

ATTENTION: Risk of equipment damage exists. The adapter contains ESD (Electrostatic Discharge) sensitive parts that can be damaged if you do not follow ESD control procedures. Static control precautions are required when handling the adapter. If you are unfamiliar with static control procedures, refer to *Guarding Against Electrostatic Damage* (publication 8000-4.5.2).

ATTENTION: Risk of injury or equipment damage exists. If the adapter is transmitting control I/O to the drive, the drive may fault when you reset the adapter. Determine how your drive will respond before resetting an adapter.

ATTENTION: Risk of injury or equipment damage exists. **Parameter 02 - [Comm Loss Action]** lets you determine the action of the adapter and connected drive if communications are disrupted. By default, this parameter faults the drive. You can set this parameter so that the drive continues to run. Precautions should be taken to ensure that the setting of this parameter does not create a risk of injury or equipment damage. When commissioning the drive, verify that your system responds correctly to various situations (for example, a disconnected cable).

ATTENTION: Risk of injury or equipment damage exists. **Parameter 03 - [Comm Loss Time]** lets you determine how long it will take the adapter to detect network communication losses. By default, this parameter sets the timeout to ten seconds. You can set it so that the duration is shorter, longer, or disabled. When set to disabled, this also disables adapter **Parameter 02 - [Comm Loss Action]**. Therefore, a communications fault action will be ignored. Take precautions to ensure that the setting does not create a risk of injury or equipment damage. When commissioning the drive, verify that your system responds correctly to various situations (for example, a disconnected cable).

ATTENTION: Risk of injury or equipment damage exists. When a system is configured for the first time, there may be unintended or incorrect machine motion. Disconnect the motor from the machine or process during initial system testing.

ATTENTION: Risk of injury or equipment damage exists. The examples in this publication are intended solely for purposes of example. There are many variables and requirements with any application. Rockwell Automation, Inc. does not assume responsibility or liability (to include intellectual property liability) for actual use of the examples shown in this publication.

Quick Start

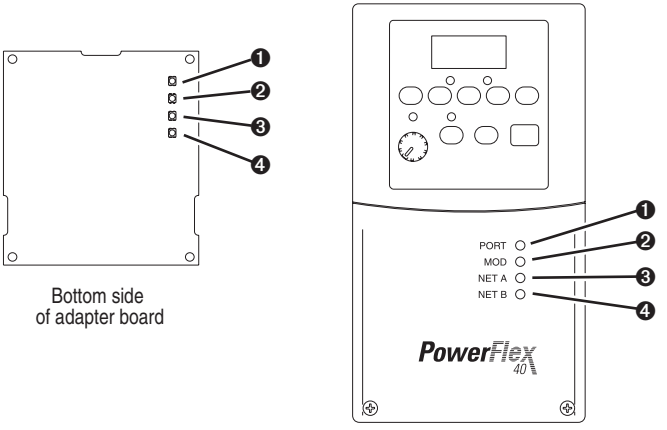
This section is provided to help experienced users quickly start using the adapter. If you are unsure how to complete a step, refer to the referenced chapter.

Step	Action	Refer to …
1	**Review the safety precautions for the adapter.**	Throughout this manual
2	**Verify that the PowerFlex drive is properly installed.**	Drive User Manual
3	**Commission the adapter.** Set a unique MAC address and, depending on where the PowerFlex drive nodes are located on the network, appropriately set the TERM, -BIAS, and +BIAS switches.	Chapter 2, Installing the Adapter
4	**Install the adapter.** Verify that the PowerFlex drive is not powered. Then, connect the adapter to the drive using the Internal Interface cable. Use the captive screw to secure and ground the adapter to the drive. When installing the adapter in a DSI External Comms Kit, refer to the *22-XCOMM-DC-BASE Installation Instructions* (publication 22COMM-IN001) supplied with the kit.	*PowerFlex 4-Class DSI Network Communication Adapter Installation Instructions* (publication 22COMM-IN002) and Chapter 2, Installing the Adapter
5	**Apply power to the adapter and verify key settings.** A. The adapter receives power from the drive. Verify that the adapter is installed correctly and then apply power to the drive. The PORT status indicator should be solid green. If it is red, there is a problem. Refer to Chapter 5, Troubleshooting. B. Verify/configure key adapter parameters. C. Configure/verify key drive parameters.	Chapter 2, Installing the Adapter
6	**Connect the adapter to the network.** Verify that the PowerFlex drive is not powered. Then, connect the adapter to the network using a shielded, twisted wire pair.	Chapter 2, Installing the Adapter
7	**Configure the adapter for your application.** Set adapter parameters for the following functions as required by your application: • Fault actions • Baud rate	Chapter 3, Configuring the Adapter
8	**Configure the controller to communicate with the adapter.** Use the controller's programming software to program the controller.	Instructions for your controller's programming software

Status Indicators

The adapter uses four status indicators to report its operating status. They can be viewed on the adapter or through the drive cover (Figure 1.2).

Figure 1.2 Status Indicators (location on drive may vary)



Item	Name
❶	PORT
❷	MOD
❸	NET A
❹	NET B

After installing the adapter and applying power to the drive, refer to Start-Up Status Indications on page 2-9 for possible start-up status indications and their descriptions.

Notes:

Installing the Adapter

This chapter provides instructions for installing the adapter in a PowerFlex 40 or PowerFlex 400 drive. This adapter can also be installed in a DSI External Comms Kit. In this case, refer to the *22-XCOMM-DC-BASE Installation Instructions* (publication 22COMM-IN001) supplied with the kit.

Preparing for an Installation

Before installing the adapter, verify that you have all required equipment. Refer to Required Equipment on page 1-3.

Commissioning the Adapter

To commission the adapter, you must set a unique MAC address and, depending on where the PowerFlex drive node is located on the network (starting and ending network nodes versus all other node locations), appropriately set the TERM, -BIAS, and +BIAS switches.

Important: New settings are recognized only when power is applied to the adapter or it is reset. If you change a switch setting, cycle power or reset the adapter to apply the change.

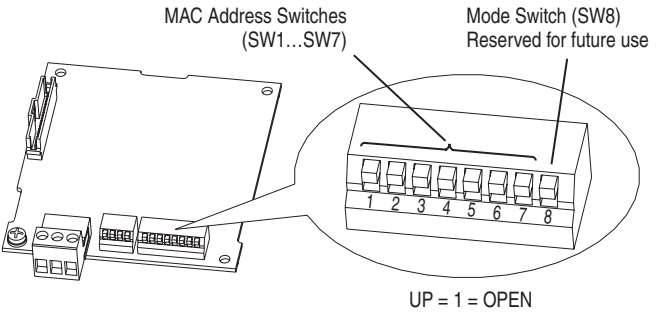
ATTENTION: Risk of equipment damage exists. The adapter contains ESD (Electrostatic Discharge) sensitive parts that can be damaged if you do not follow ESD control procedures. Static control precautions are required when handling the adapter. If you are unfamiliar with static control procedures, refer to *Guarding Against Electrostatic Damage* (publication 8000-4.5.2).

Setting the MAC Address

Set the MAC address using the MAC Address switches (Figure 2.1). Refer to Table 2.A for specific MAC address switch settings.

Important: Each node on the network must have a unique MAC address. Set the MAC address before power is applied because the adapter uses the MAC address it detects when it first receives power. To change a MAC address, you must set the new value. Then remove and reapply power to (or reset) the adapter.

Figure 2.1 Setting the Adapter MAC Address Switches



Switches	Description	Default	
SW1	Least Significant Bit (LSB) of MAC Address	0	Node 0
SW2	Bit 1 of MAC Address	0	
SW3	Bit 2 of MAC Address	0	
SW4	Bit 3 of MAC Address	0	
SW5	Bit 4 of MAC Address	0	
SW6	Bit 5 of MAC Address	0	
SW7	Most Significant Bit (MSB) of MAC Address	0	
SW8	Mode (reserved for future use)	—	—

TIP: The MAC address switch settings can be verified by viewing **Parameter 08 - [MAC Address]** or Diagnostic Item number 12 (page 5-4) using an optional, external PowerFlex 4-Class HIM, DriveExplorer software, or DriveExecutive software.

Table 2.A MAC Address Switch Settings (UP = 1 = OPEN)

MAC Address	Switch Setting							MAC Address	Switch Setting						
	SW1	SW2	SW3	SW4	SW5	SW6	SW7		SW1	SW2	SW3	SW4	SW5	SW6	SW7
0	0	0	0	0	0	0	0	4	0	0	1	0	0	0	0
1	1	0	0	0	0	0	0	5	1	0	1	0	0	0	0
2	0	1	0	0	0	0	0	6	0	1	1	0	0	0	0
3	1	1	0	0	0	0	0	7	1	1	1	0	0	0	0

Table 2.A MAC Address Switch Settings (UP = 1 = OPEN) (Continued)

MAC Address	Switch Setting							MAC Address	Switch Setting						
	SW1	SW2	SW3	SW4	SW5	SW6	SW7		SW1	SW2	SW3	SW4	SW5	SW6	SW7
8	0	0	0	1	0	0	0	56	0	0	0	1	1	1	0
9	1	0	0	1	0	0	0	57	1	0	0	1	1	1	0
10	0	1	0	1	0	0	0	58	0	1	0	1	1	1	0
11	1	1	0	1	0	0	0	59	1	1	0	1	1	1	0
12	0	0	1	1	0	0	0	60	0	0	1	1	1	1	0
13	1	0	1	1	0	0	0	61	1	0	1	1	1	1	0
14	0	1	1	1	0	0	0	62	0	1	1	1	1	1	0
15	1	1	1	1	0	0	0	63	1	1	1	1	1	1	0
16	0	0	0	0	1	0	0	64	0	0	0	0	0	0	1
17	1	0	0	0	1	0	0	65	1	0	0	0	0	0	1
18	0	1	0	0	1	0	0	66	0	1	0	0	0	0	1
19	1	1	0	0	1	0	0	67	1	1	0	0	0	0	1
20	0	0	1	0	1	0	0	68	0	0	1	0	0	0	1
21	1	0	1	0	1	0	0	69	1	0	1	0	0	0	1
22	0	1	1	0	1	0	0	70	0	1	1	0	0	0	1
23	1	1	1	0	1	0	0	71	1	1	1	0	0	0	1
24	0	0	0	1	1	0	0	72	0	0	0	1	0	0	1
25	1	0	0	1	1	0	0	73	1	0	0	1	0	0	1
26	0	1	0	1	1	0	0	74	0	1	0	1	0	0	1
27	1	1	0	1	1	0	0	75	1	1	0	1	0	0	1
28	0	0	1	1	1	0	0	76	0	0	1	1	0	0	1
29	1	0	1	1	1	0	0	77	1	0	1	1	0	0	1
30	0	1	1	1	1	0	0	78	0	1	1	1	0	0	1
31	1	1	1	1	1	0	0	79	1	1	1	1	0	0	1
32	0	0	0	0	0	1	0	80	0	0	0	0	1	0	1
33	1	0	0	0	0	1	0	81	1	0	0	0	1	0	1
34	0	1	0	0	0	1	0	82	0	1	0	0	1	0	1
35	1	1	0	0	0	1	0	83	1	1	0	0	1	0	1
36	0	0	1	0	0	1	0	84	0	0	1	0	1	0	1
37	1	0	1	0	0	1	0	85	1	0	1	0	1	0	1
38	0	1	1	0	0	1	0	86	0	1	1	0	1	0	1
39	1	1	1	0	0	1	0	87	1	1	1	0	1	0	1
40	0	0	0	1	0	1	0	88	0	0	0	1	1	0	1
41	1	0	0	1	0	1	0	89	1	0	0	1	1	0	1
42	0	1	0	1	0	1	0	90	0	1	0	1	1	0	1
43	1	1	0	1	0	1	0	91	1	1	0	1	1	0	1
44	0	0	1	1	0	1	0	92	0	0	1	1	1	0	1
45	1	0	1	1	0	1	0	93	1	0	1	1	1	0	1
46	0	1	1	1	0	1	0	94	0	1	1	1	1	0	1
47	1	1	1	1	0	1	0	95	1	1	1	1	1	0	1
48	0	0	0	0	1	1	0	96	0	0	0	0	0	1	1
49	1	0	0	0	1	1	0	97	1	0	0	0	0	1	1
50	0	1	0	0	1	1	0	98	0	1	0	0	0	1	1
51	1	1	0	0	1	1	0	99	1	1	0	0	0	1	1
52	0	0	1	0	1	1	0	100	0	0	1	0	0	1	1
53	1	0	1	0	1	1	0	101	1	0	1	0	0	1	1
54	0	1	1	0	1	1	0	102	0	1	1	0	0	1	1
55	1	1	1	0	1	1	0	103	1	1	1	0	0	1	1

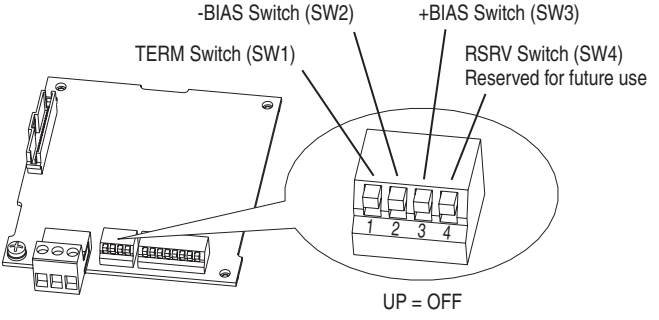
Table 2.A MAC Address Switch Settings (UP = 1 = OPEN) (Continued)

MAC Address	Switch Setting							MAC Address	Switch Setting						
	SW1	SW2	SW3	SW4	SW5	SW6	SW7		SW1	SW2	SW3	SW4	SW5	SW6	SW7
104	0	0	0	1	0	1	1	116	0	0	1	0	1	1	1
105	1	0	0	1	0	1	1	117	1	0	1	0	1	1	1
106	0	1	0	1	0	1	1	118	0	1	1	0	1	1	1
107	1	1	0	1	0	1	1	119	1	1	1	0	1	1	1
108	0	0	1	1	0	1	1	120	0	0	0	1	1	1	1
109	1	0	1	1	0	1	1	121	1	0	0	1	1	1	1
110	0	1	1	1	0	1	1	122	0	1	0	1	1	1	1
111	1	1	1	1	0	1	1	123	1	1	0	1	1	1	1
112	0	0	0	0	1	1	1	124	0	0	1	1	1	1	1
113	1	0	0	0	1	1	1	125	1	0	1	1	1	1	1
114	0	1	0	0	1	1	1	126	0	1	1	1	1	1	1
115	1	1	0	0	1	1	1	127	1	1	1	1	1	1	1

Setting the TERM, -BIAS, and +BIAS Switches

The adapter's TERM, -BIAS, and +BIAS switches (Figure 2.2) are used to turn on/off its built-in termination resistor and bias resistors.

Figure 2.2 Setting the TERM, -BIAS, and +BIAS Switches



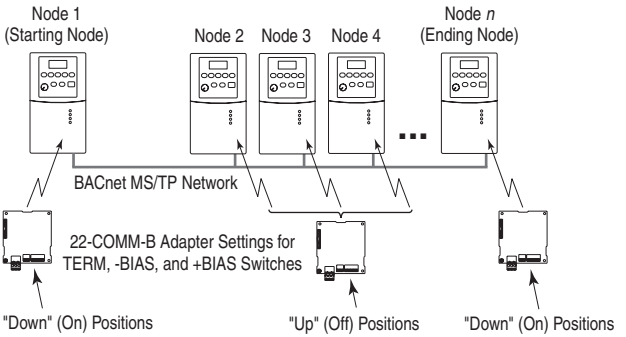
Switches	Description	Default
SW1	Turns on/off the termination resistor	Up (Off)
SW2	Turns on/off the -bias resistor	Up (Off)
SW3	Turns on/off the +bias resistor	Up (Off)
SW4	Reserved (not used)	—

Since nodes on a BACnet MS/TP network are typically a mix of Allen-Bradley PowerFlex drives and other brands of building automation products, the network node locations for the PowerFlex drives will determine how their adapter's TERM, -BIAS, and +BIAS switches should be set.

Network with PowerFlex Drives at Starting and/or Ending Nodes

For a network with PowerFlex drives at the starting and/or ending nodes (Figure 2.3), set their 22-COMM-B adapter's TERM, -BIAS, and +BIAS switches to the "Down" (On) position. All other PowerFlex drive network nodes must have these switches set to the "Up" (Off) position.

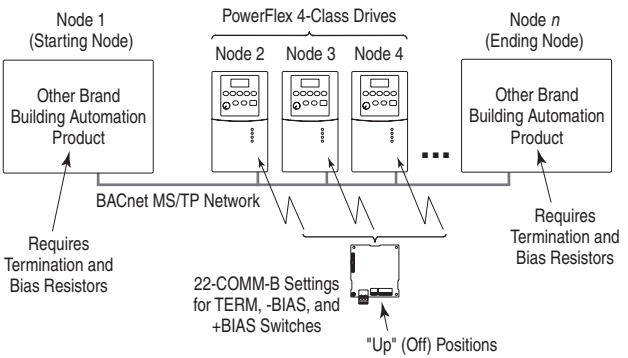
Figure 2.3 Example Network with PowerFlex Drives at Starting and/or Ending Nodes



Network with PowerFlex Drives at Other Nodes

For a network with PowerFlex drives at other node locations—not starting and/or ending nodes (Figure 2.4), set their 22-COMM-B adapter's TERM, -BIAS, and +BIAS switches to the "Up" (Off) position. In this network scenario, other brands of building automation products at the starting and/or ending nodes require appropriate termination and bias resistors. Refer to their documentation for details.

Figure 2.4 Example Network with PowerFlex Drives at Other Nodes



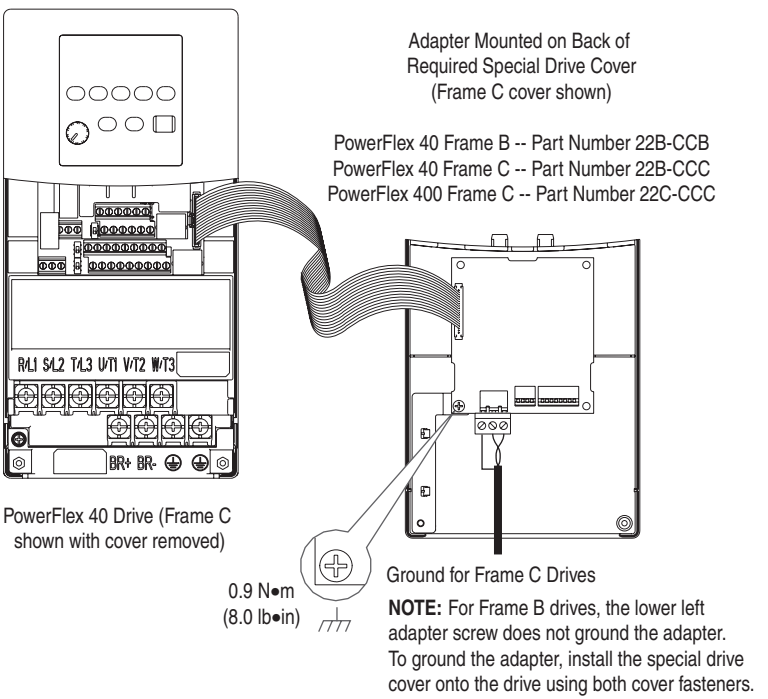
Connecting the Adapter to the Drive

PowerFlex 40 Frames B and C, and PowerFlex 400 Frame C

1. Remove power from the drive, and remove the drive cover.
2. Use static control precautions.
3. Mount the adapter on the *required special* drive cover (ordered separately; see Figure 2.5 for part numbers).
   - Frame B: Do not use the adapter screw; snap the adapter in place.
   - Frame C: Use the adapter screw to secure the adapter to the cover.

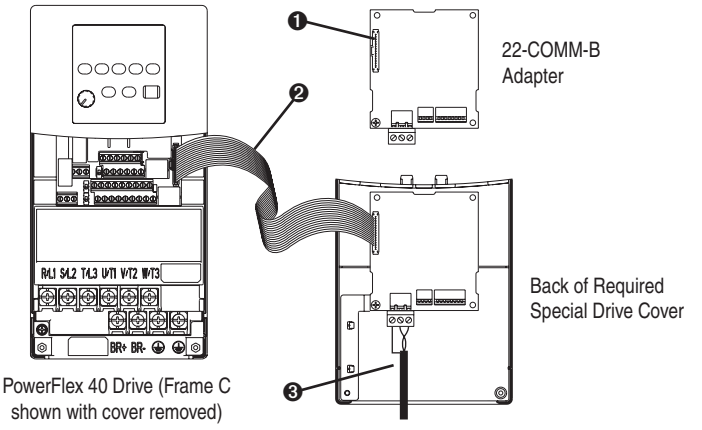
   Important: To properly ground the adapter in Frame B drives, install the special drive cover onto the drive using both cover fasteners. To ground the adapter in Frame C drives, tighten the adapter's lower left screw (see Figure 2.5). In either case, tighten the screw(s) to the recommended torque (0.9 N•m / 8.0 lb•in).

Figure 2.5 Mounting and Grounding the Adapter – PowerFlex 40 Frames B and C, and PowerFlex 400 Frame C



4. Connect the Internal Interface cable to the DSI port on the drive and then to the mating DSI connector on the adapter.

Figure 2.6 Connecting DSI Ports with Internal Interface Cable



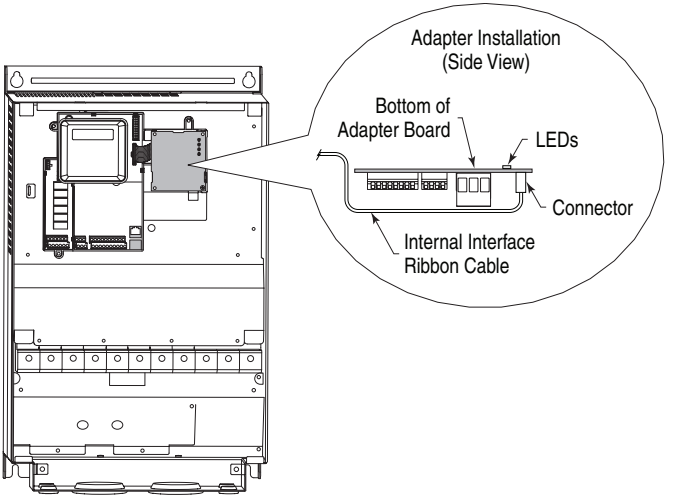
Item	Description
❶	DSI connector
❷	15.24 cm (6 in.) Internal Interface cable
❸	Shielded, twisted wire pair for network connection

PowerFlex 400 Frames D, E, and F

1. Remove power from the drive, and open the drive cover.
2. Use static control precautions.
3. With the adapter board right side up, remove its mounting screw from the lower left hole. Save the screw for mounting in Step 6.
4. Connect the Internal Interface cable to the DSI port on the drive (see Figure 2.7).
5. With the adapter board oriented bottom side up, route the Internal Interface cable under the adapter, and then to the mating DSI connector on the adapter.
6. Install the adapter, bottom side up, to the right side of the display board by snapping it into place. Then insert the adapter mounting screw into the lower left hole on the board.

   Important: Tighten the mounting screw in the adapter's lower left hole to the recommended torque (0.9 N•m/8.0 lb•in) to ground the adapter to the drive.

Figure 2.7 Mounting and Connecting the Adapter – PowerFlex 400 Frames D, E, and F



Applying Power

ATTENTION: Risk of equipment damage, injury, or death exists. Unpredictable operation may occur if you fail to verify that parameter settings and switch settings are compatible with your application. Verify that settings are compatible with your application before applying power to the drive.

Apply power to the drive. The adapter receives its power from the connected drive. When you apply power to the adapter for the first time, its topmost status indicator "PORT" should be solid green after an initialization. If it is red, there is a problem. Refer to Chapter 5, Troubleshooting.

Start-Up Status Indications

Status indicators for the drive and communications adapter can be viewed on the front of the drive (Figure 2.8) after power has been applied. Possible start-up status indications are shown in Table 2.B.

Figure 2.8 Drive and Adapter Status Indicators (location on drive may vary)

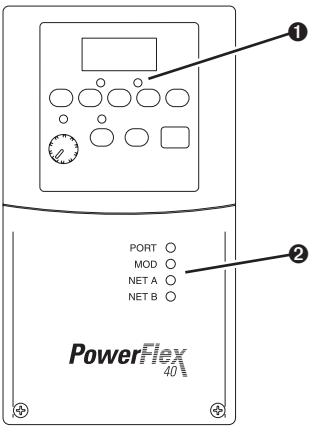


Table 2.B Drive and Adapter Start-Up Status Indications

Item	Name	Color	State	Description
				Drive FAULT Status Indicator
❶	FAULT	Red	Off	Drive ready but not running, and no faults are present.
			Flashing	A fault has occurred.
				Adapter Status Indicators
❷	PORT	Green	Flashing	Normal Operation. The adapter is establishing communications with the drive. It will turn solid green or red.
			Steady	Normal Operation. The adapter is properly connected and communicating with the drive
	MOD	Green	Flashing	Normal Operation. The adapter is operating but is not transferring I/O data.
			Steady	Normal Operation. The adapter is operating and transmitting I/O data.
	NET A	Green	Flashing	Normal Operation. The adapter is properly connected and communicating on the network.
	NET B	Green	Off	Normal Operation. The adapter is properly connected but is idle.
			Flashing	Normal Operation. The adapter is transmitting data.

Verifying/Setting Key Adapter Parameters

For instructions to use an optional PowerFlex 4-Class HIM to access adapter parameters, see Using the Optional, External PowerFlex 4-Class HIM on page 3-2.

1. Verify that adapter **Parameter 08 - [MAC Address]** is reporting the MAC address set in Setting the MAC Address on page 2-2.

2. Set adapter **Parameters 11 - [Device Inst Hi]** and **12 - [Device Inst Lo]** to establish a unique number for representation to the Building Automation Controller. For more information, see Setting the Device Instance Number on page 3-4.

3. Reset the adapter by setting adapter **Parameter 01 - [Reset Module]** to “1” (Reset Module) to apply the new Device Instance Number.

Configuring/Verifying Key Drive Parameters

The PowerFlex 4-Class drive can be separately configured for the control and reference functions in various combinations. For example, you could set the drive to have its control come from a peripheral or terminal block with the reference coming from the BACnet MS/TP network. Or you could set the drive to have its control come from the BACnet MS/TP network with the reference coming from another peripheral or terminal block. Or you could set the drive to have both its control and reference come from the BACnet MS/TP network.

The following steps in this section assume that the drive will receive the Logic Command and Reference from the BACnet MS/TP network.

1. Using drive **Parameter P038 - [Speed Reference]**, set the drive speed Reference to “5” (Comm Port).

2. Verify that drive **Parameter P036 - [Start Source]** is reporting that the source of the Reference to the drive is “5” (Comm Port). This ensures that any Reference commanded from the network can be monitored by using drive **Parameter d002 - [Commanded Freq]**. If a problem occurs, this verification step provides the diagnostic capability to determine whether the drive/adapter or the network is the cause.

Connecting the Drive/Adapter to the Network

ATTENTION: Risk of injury or death exists. The PowerFlex drive may contain high voltages that can cause injury or death. Remove power from the drive, and then verify power has been discharged before installing or removing an adapter.

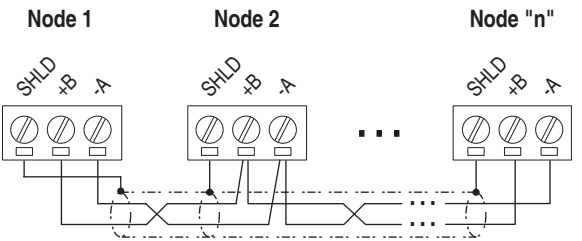
1. Remove power from the drive.

2. Use static control precautions.

3. Connect one end of a shielded, twisted wire pair to the network.

4. Route the other end of the twisted wire pair through the bottom of the drive (see Figure 2.5). Connect the twisted wire pair and its shield to the 3-pin linear plug (provided with the adapter). See Figure 2.9 for terminal designations and typical terminal connections.

Figure 2.9 Typical Network Terminal Connections



Terminal	Signal	Function
SHLD	Termination	Shield Termination
+B	Signal B	TxRxD+
-A	Signal A	TxRxD-

5. Insert the 3-pin linear plug into the mating adapter socket.

6. Close or install the drive cover.

7. Apply power to the drive.

8. Verify that adapter **Parameter 07 - [Baud Rate Act]** is reporting the actual network baud rate. If not, use **Parameter 06 - [Baud Rate Cfg]** to set the adapter to a fixed baud rate that matches the network baud rate.

TIP: After the drive is connected and communicating on the BACnet MS/TP network, it may be necessary to set additional adapter parameters to meet your application requirements (for example **Parameters 02 - [Comm Loss Action]** or **03 - [Comm Loss Time]**).

For instructions to use an optional PowerFlex 4-Class HIM to access adapter parameters, see Using the Optional, External PowerFlex 4-Class HIM on page 3-2.

Configuring the Adapter

This chapter provides information and instructions for setting the parameters in the adapter.

For a list of parameters, refer to Appendix B, Adapter Parameters. For definitions of terms in this chapter, refer to the Glossary.

Configuration Tools

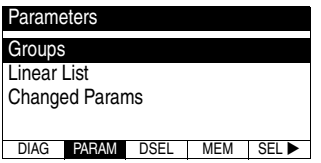
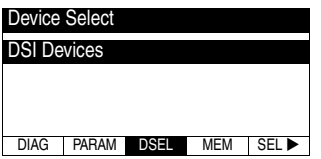
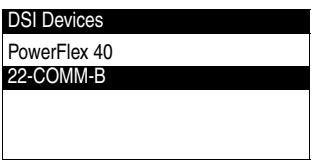
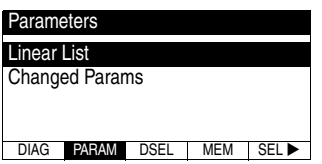
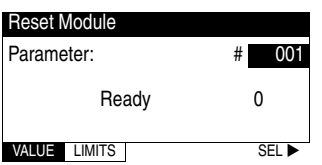
The adapter stores parameters and other information in its own Non-Volatile Storage (NVS) memory. You must, therefore, access the adapter to view and edit its parameters. The following tools can be used to access the adapter parameters:

Tool	Refer to...
PowerFlex 4-Class HIM (22-HIM-A3 or 22-HIM-C2S)	page 3-2
DriveExplorer Software (version 3.01 or later)	http://www.ab.com/drives/driveexplorer, and DriveExplorer online help (installed with the software)
DriveExecutive Software (version 3.01 or later)	http://www.ab.com/drives/drivetools, and DriveExecutive online help (installed with the software)

Using the Optional, External PowerFlex 4-Class HIM

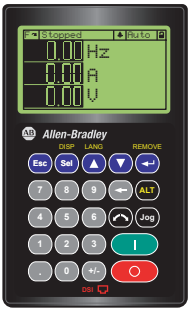
Adapter parameters cannot be accessed using the integral keypad on a PowerFlex 4-Class drive. You must use DriveExplorer or DriveExecutive software, or an optional, external PowerFlex 4-Class HIM (22-HIM-A3 or 22-HIM-C2S). See Figure 3.1 for styles. Basic steps to access parameters in the adapter using the external HIM are shown in Table 3.A. For additional HIM information, refer to the *PowerFlex 4-Class HIM Quick Reference* (publication 22HIM-QR001).

Table 3.A Accessing Adapter Parameters Using the HIM

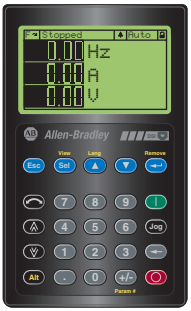
Step	Example Screens
1. Power up the drive. Then plug the external HIM into the bottom of the drive. The **Parameters** menu for the drive will be displayed.	
2. Press Sel key once to display the **Device Select** menu.	
3. Press (Enter) key to display the **DSI Devices** menu. Press Arrow to scroll to **22-COMM-B**.	
4. Press (Enter) key to select the adapter. The **Parameters** menu for the adapter will be displayed.	
5. Press (Enter) key to access the parameters. Edit the adapter parameters using the same techniques that you use to edit drive parameters.	

NOTE: All configuration procedures throughout this chapter use the optional, external PowerFlex 4-Class HIM to access parameters in the adapter and show example HIM screens.

Figure 3.1 Optional, External PowerFlex 4-Class HIMs



22-HIM-A3 Series A



22-HIM-A3 Series C

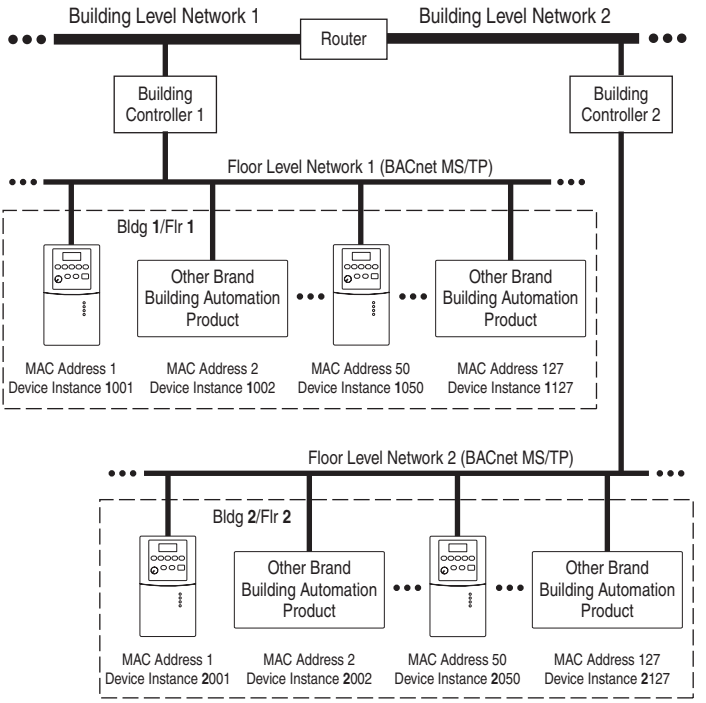
22-HIM-C2S
Series A or Series C

Setting the Device Instance Number

While there are many ways to implement Device Instance and network strategies, the example shown in Figure 3.2 illustrates one logical approach.

In this example, two individual Floor Level Networks are connected to the Building Level Network through a router which allows devices on each network to share the same MAC address. However, each device on the network must have a unique Device Instance which, in this case, consists of 4 digits. The first digit (in bold) represents the Building or Floor number. The last 3 digits represent the device's set MAC address.

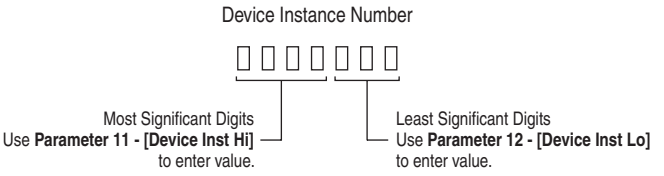
Figure 3.2 Building Automation Network Example



The Device Instance Number can be a number from 1 to 4,194,302. When the Device Instance Number is three digits or less, set **Parameter 11 - [Device Inst Hi]** to "0" (zero) and use **Parameter 12 - [Device Inst Lo]** to directly enter the number. When the Device Instance Number is four or more digits, use **Parameter 11 - [Device Inst Hi]** to enter the

high portion (most significant digits) of the number and **Parameter 12 - [Device Inst Lo]** to enter the low portion (always the three least significant digits) of the number. Figure 3.3 illustrates how to apportion the Device Instance Number for entry into the adapter.

Figure 3.3 Apportioning the Device Instance Number for Entry



1. Enter the Device Instance Number using **Parameter 11 - [Device Inst Hi]** and **Parameter 12 - [Device Inst Lo]**.

Figure 3.4 Example Device Inst Hi/Lo HIM Screens

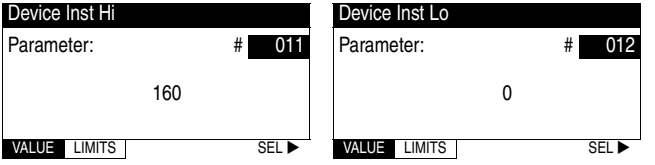


Table 3.B shows Device Instance Number examples to illustrate the values needed to be entered for each parameter.

Table 3.B Examples of Device Instance Numbers

Device Instance Number	Parameter 11 - [Device Inst Hi] Value	Parameter 12 - [Device Inst Lo] Value
14	0	14
328	0	328
2369	2	369
160000 (default)	160	0
4150732	4150	732

2. Reset the adapter (see Resetting the Adapter on page 3-9) to apply the new Device Instance Number.

Setting a Comm Loss Action

By default, when communications are disrupted (for example, a cable is disconnected), the drive responds by faulting if it is using I/O from the network. You can configure a different response to communication disruptions using **Parameter 02 - [Comm Loss Action]**.

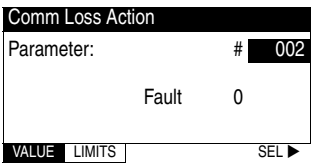
ATTENTION: Risk of injury or equipment damage exists. **Parameter 02 - [Comm Loss Action]** lets you determine the action of the adapter and connected drive if communications are disrupted. By default, this parameter faults the drive. You can set this parameter so that the drive continues to run. Take precautions to ensure that the setting of this parameter does not create a risk of injury or equipment damage. When commissioning the drive, verify that your system responds correctly to various situations (for example, a disconnected cable).

Changing the Comm Loss Action

Set the value of **Parameter 02 - [Comm Loss Action]** to the desired response action:

Value	Action	Description
0	Fault	The drive is faulted and stopped. (Default)
1	Stop	The drive is stopped, but not faulted.
2	Zero Data	The drive is sent 0 for output data. This does not command a stop.
3	Hold Last	The drive continues in its present state.
4	Send Flt Cfg	The drive is sent the data that you set in the fault configuration parameters (**Parameter 04 - [Flt Cfg Logic]** and **Parameter 05 - [Flt Cfg Ref]**).

Figure 3.5 Example Comm Loss Action HIM Screen



Changes to this parameter takes effect immediately. A reset is not required.

Setting the Fault Configuration Parameters

If you set **Parameter 02 - [Comm Loss Action]** to "Send Flt Cfg," the values in the following parameters are sent to the drive after a communications fault occurs. You must set these parameters to values required by your application.

Parameter	Description
04 - [Flt Cfg Logic]	A 16-bit value sent to the drive for Logic Command.
05 - [Flt Cfg Ref]	A 16-bit value (0...65535) sent to the drive as a Reference.

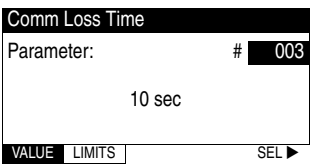
Changes to these parameters take effect immediately. A reset is not required.

Setting the Comm Loss Time

Set **Parameter 03 - [Comm Loss Time]** to a communication loss timeout period suitable for your application. By default, the timeout is set to ten (10) seconds. You can increase or decrease this value. Alternatively, you can set the value to zero (0) to disable this timeout feature so that the adapter does not detect communication losses.

ATTENTION: Risk of injury or equipment damage exists. **Parameter 03 - [Comm Loss Time]** lets you determine how long it will take the adapter to detect network communication losses. By default, this parameter sets the timeout to ten (10) seconds. You can set it so that the duration is shorter, longer, or disabled. When set to disabled, this also disables adapter **Parameter 02 - [Comm Loss Action]**. Therefore, a communications fault action will be ignored. Take precautions to ensure that the setting does not create a risk of injury or equipment damage. When commissioning the drive, verify that your system responds correctly to various situations (for example, a disconnected cable).

Figure 3.6 Example Comm Loss Time HIM Screen



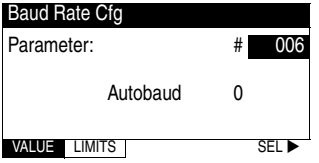
Changes to this parameter take effect immediately. A reset is not required.

Setting the Baud Rate

The value of **Parameter 06 - [Baud Rate Cfg]** determines the baud rate used by the adapter. The Autobaud setting will detect the baud rate used on the network if another device is setting the baud rate. Your application may require a different setting.

1. Set the value of **Parameter 06 - [Baud Rate Cfg]** to the baud rate at which your network is operating.

Figure 3.7 Example Baud Rate Cfg HIM Screen



Value	Description
0	Autobaud (Default)
1	9600
2	19200
3	38400
4	76800

2. Reset the adapter (see Resetting the Adapter) so that the new baud rate takes effect.

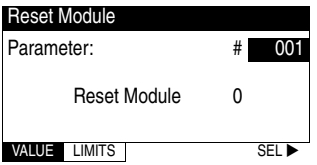
Resetting the Adapter

Changes to switch settings and some adapter parameters require that you reset the adapter before the new settings take effect. You can reset the adapter by cycling power to the drive or by using **Parameter 01 - [Reset Module]**.

ATTENTION: Risk of injury or equipment damage exists. If the adapter is transmitting control I/O to the drive, the drive may fault when you reset the adapter. Determine how your drive will respond before resetting a connected adapter.

Set **Parameter 01 - [Reset Module]** to “1” (Reset Module).

Figure 3.8 Example Reset Module HIM Screen



Value	Description
0	Ready (Default)
1	Reset Module
2	Set Defaults

When you enter “1” (Reset Module), the adapter will be immediately reset. When you enter “2” (Set Defaults), the adapter will set all adapter parameters to their factory-default values. After performing a Set Defaults, enter “1” (Reset Module) so that the new values take effect. The value of this parameter will be restored to “0” (Ready) after the adapter is reset.

Viewing the Adapter Status Using Parameters

The following parameters provide information about the status of the adapter. You can view these parameters at any time.

Parameter	Description
07 - [Baud Rate Act]	The baud rate used by the adapter. This will be one of the following values: • The value of **Parameter 06 - [Baud Rate Cfg]**. • An old baud rate if **Parameter 06 - [Baud Rate Cfg]** has been changed and the adapter has not been reset. • The value “0” (Unknown) if **Parameter 06 - [Baud Rate Cfg]** is set to “0” (Autobaud) and the adapter has not yet detected the baud rate.
08 - [MAC Address]	The MAC address used by the adapter that was set by the MAC Address Switches SW1…SW7 (Figure 2.1).

Flash Updating the Adapter

The adapter can be flash updated over the network or serially through a direct connection from a computer to the drive using a 1203-USB converter or 22-SCM-232 serial converter module (firmware version 2.005 or later).

When flashing over the network, you can use the Allen-Bradley software tool ControlFLASH, the built-in flash capability of DriveExplorer Lite or Full, or the built-in flash capability of DriveExecutive.

When flashing through a direct serial connection from a computer to a drive, you can use the same Allen-Bradley software tools described above, or you can use HyperTerminal set to the X-modem protocol.

To obtain a flash update for this adapter, go to http://www.ab.com/support/abdrives/webupdate. This site contains all firmware update files and associated Release Notes that describe firmware update enhancements/anomalies, how to determine the existing firmware version, and how to flash update using DriveExplorer, DriveExecutive, ControlFLASH or HyperTerminal.

Using BACnet Objects

This chapter provides information about controlling a PowerFlex 4-Class drive using BACnet objects.

Understanding BACnet Objects

BACnet nodes are controlled and monitored by the use of several types of objects. The BACnet controller performs read and write commands to these objects, and the adapter transfers/translates the data between these objects and the drive.

When a read or write command occurs to a specific object, data in the object is refreshed from or transferred to the drive.

The BACnet object types that are supported by the adapter are:

- Analog Input (AI)
- Analog Output (AO)
- Analog Value (AV)
- Binary Input (BI)
- Binary Output (BO)
- Binary Value (BV)

Basic Drive Operation on the Network

This section describes how to operate a drive on the network using a combination of BACnet object types for basic control.

ATTENTION: Control information written to the adapter by a BACnet controller is volatile. That is, it will not survive an adapter reset or power cycle. For example, if a BACnet controller writes to a Binary Output (BO) object to energize an output relay on the drive and then that drive is reset or power cycled, the drive will return the relay to its default (de-energized) state. The adapter will not attempt to restore the relay to the energized state unless a BACnet controller writes to it again.

Basic Drive Control (Start/Stop)

1. Write a speed reference value (in %) to the Reference 1 Analog Value object (AV0) Present Value property.
2. To start the drive, write a value of "1" to the Run/Stop Binary Value object (BV10) Present Value property.
3. To stop the drive, write a value of "0" (zero) to the Run/Stop Binary Value object (BV10) Present Value property.

Using an Alternate Speed Reference

To assign an alternate speed reference to the drive:

1. Write a speed reference value (in %) to the Reference 2 Analog Value object (AV1) Present Value property.
2. Write a value of "1" to the Ref2/Ref1 Binary Value object (BV12) Present Value property.

Changing Motor Rotation Direction

To command a reverse direction of motor rotation when the drive is running, write a value of "1" to the Rev/Fwd Binary Value object (BV11) Present Value property. To command a forward direction when the drive is running, write a value of "0" (zero) to the Rev/Fwd Binary Value object (BV11) Present Value property.

Clearing a Drive Fault

To clear a drive fault, write a value of "1" to the Clear Faults Binary Value object (BV13) Present Value property.

Supported BACnet Objects

The type of drive used on the network determines the specific BACnet objects that are supported. Refer to Table 4.A for descriptions of the BACnet objects and the drives supporting those objects.

Table 4.A BACnet Object Descriptions and Supported Drives

Object	Name	Use This Object to...	Compatible PowerFlex Drives			
			4	4M	40	400
Analog Input (AI) Objects						
AI0	Analog Input 1 (%)	Read the value of Analog Input 1 (voltage or current) on the drive's I/O terminal block.	✓	✓	✓	✓
AI1	Analog Input 2 (%)	Read the value of Analog Input 2 (voltage or current) on the drive's I/O terminal block.	✓	✓	✓	✓
Analog Output (AO) Objects						
AO0	Analog Output 1 (%)	Read/write the value of Analog Output (PowerFlex 40) or Analog Output 1 (Powerflex 400) on the drive's I/O terminal block. The drive must be configured to accept the value of this output from the network. This is done by setting the following drive parameter: • PowerFlex 40: A065 - [Analog Out Sel] to the value "18" (Setpnt 0-10), "19" (Setpnt 0-20) or "20" (Setpnt 4-20) • PowerFlex 400: T082 - [Analog Out1 Sel] to the value "5" (Setpnt 0-10), "12" (Setpnt 0-20) or "19" (Setpnt 4-20)	—	—	✓	✓
AO1	Analog Output 2 (%)	Read/write the value of Analog Output 2 on the drive's I/O terminal block. The drive must be configured to accept the value of this output from the network. This is done by setting drive parameter T085 - [Analog Out2 Sel] to the value "5" (Setpnt 0-10), "12" (Setpnt 0-20) or "19" (Setpnt 4-20).	—	—	—	✓
Analog Value (AV) Objects						
AV0	Reference 1 (%)	Read/write the Reference 1 and Reference 2 values. The drive must be configured to accept its speed reference from the network. This is typically done by setting drive parameter P038 - [Speed Reference] to the value "5" (Comm Port).	✓	✓	✓	✓
AV1	Reference 2 (%)		✓	✓	✓	✓
AV2	Output Frequency (Hz)	Read the drive's output frequency.	✓	✓	✓	✓

Table 4.A BACnet Object Descriptions and Supported Drives (Continued)

Object	Name	Use This Object to...	Compatible PowerFlex Drives			
			4	4M	40	400
AV3	Output Current (Amps)	Read the drive's output current.	✔	✔	✔	✔
AV4	Output Voltage (VAC)	Read the drive's output voltage.	✔	✔	✔	✔
AV5	Output Power (kW)	Read the drive's output power.	—	—	✔	✔
AV6	Output Energy (kWh)	Read/write the drive's accumulated output energy. **Note:** When writing, this object accepts only a value of "0" (zero).	—	—	—	✔
AV7	DC Bus Voltage (VDC)	Read the drive's DC bus voltage.	✔	✔	✔	✔
AV8	Drive Temp (°C)	Read the drive's temperature.	✔	✔	✔	✔
AV9	Reserved	—	—	—	—	—
AV10	Reserved	—	—	—	—	—
AV11	Run Time (Hours)	• PowerFlex 4/4M/40: Read the drive's accumulated run time. • PowerFlex 400: Read/write the drive's accumulated run time. **Note:** When writing, this object accepts only a value of "0" (zero).	✔	✔	✔	✔
AV12	Fault 1	Read the code for the drive's most recent fault.	✔	✔	✔	✔
AV13	Fault 2	Read the code for the drive's second most recent fault.	✔	✔	✔	✔
AV14	Fault 3	Read the code for the drive's third most recent fault.	✔	✔	✔	✔
AV15	Accel Time 1 (Sec)	Read/write the drive's Accel Time 1 setting.	✔	✔	✔	✔
AV16	Decel Time 1 (Sec)	Read/write the drive's Decel Time 1 setting.	✔	✔	✔	✔
AV17	Mailbox Param	Read/write any drive parameter. To read a drive parameter, write the number for the desired parameter to the Mailbox Param object, and then read the Mailbox Value object. To write a drive parameter, write the number for the desired parameter to the Mailbox Param object, and then write the desired value to the Mailbox Value object.	✔	✔	✔	✔
AV18	Mailbox Value		✔	✔	✔	✔
		Binary Input (BI) Objects				
BI0	Stop Input	Read the state of the Stop Input on the drive's I/O terminal block.	✔	✔	✔	✔

Table 4.A BACnet Object Descriptions and Supported Drives (Continued)

Object	Name	Use This Object to...	Compatible PowerFlex Drives			
			4	4M	40	400
BI1	Start Input	Read the state of the Start Input on the drive's I/O terminal block.	✔	✔	✔	✔
BI2	Dir Input	Read the state of the Dir (Direction) Input on the drive's I/O terminal block.	✔	✔	✔	✔
BI3	Digital Input 1	Read the state of Digital Input 1 on the drive's I/O terminal block.	✔	✔	✔	✔
BI4	Digital Input 2	Read the state of Digital Input 2 on the drive's I/O terminal block.	✔	✔	✔	✔
BI5	Digital Input 3	Read the state of Digital Input 3 on the drive's I/O terminal block.	—	—	✔	✔
BI6	Digital Input 4	Read the state of Digital Input 4 on the drive's I/O terminal block.	—	—	✔	✔
		Binary Output (BO) Objects				
BO0	Digital Output Cmd 1	Read/write the state of Digital Output 1 on the drive's I/O terminal block. The drive must be configured to accept the value of this output from the network. This is done by setting the following drive parameter: • PowerFlex 4/40: P055 - [Relay Out Sel] to the value "20" (ParamControl) • PowerFlex 4M: t221 - [Relay Out Sel] to the value "11" (ParamControl) • PowerFlex 400: T055 - [Relay Out1 Sel] to the value "12" (ParamControl)	✔	✔	✔	✔
BO1	Digital Output Cmd 2	Read/write the state of Digital Output 2 on the drive's I/O terminal block. The drive must be configured to accept the value of this output from the network. This is done by setting the following drive parameter: • PowerFlex 40: P058 - [Opto Out1 Sel] to the value "20" (ParamControl) • PowerFlex 400: T060 - [Relay Out2 Sel] to the value "12" (ParamControl)	—	—	✔	✔
BO2	Digital Output Cmd 3	Read/write the state of Digital Output 3 on the drive's I/O terminal block. The drive must be configured to accept the value of this output from the network. This is done by setting the following drive parameter: • PowerFlex 40: P061 - [Opto Out2 Sel] to the value "20" (ParamControl) • PowerFlex 400: T065 - [Opto Out Sel] to the value "12" (ParamControl)	—	—	✔	✔

Table 4.A BACnet Object Descriptions and Supported Drives (Continued)

Object	Name	Use This Object to...	Compatible PowerFlex Drives			
			4	4M	40	400
Binary Value (BV) Objects						
BV0	Ready	Read the drive's Ready status, which is active if the drive is ready to accept a run command.	✔	✔	✔	✔
BV1	Running	Read the drive's Running status, which is active if the drive is running.	✔	✔	✔	✔
BV2	Running Reverse	Read the drive's Running Reverse status, which is active if the drive is running in the reverse direction.	✔	✔	✔	✔
BV3	Fault	Read the drive's Fault status, which is active if the drive is faulted.	✔	✔	✔	✔
BV4	Alarm	Read the drive's Alarm status, which is active if the drive has an alarm.	✔	✔	✔	✔
BV5	At Reference	Read the drive's At Reference status, which is active if the drive is running at the specified speed reference.	✔	✔	✔	✔
BV10	Run/Stop	Read/write the adapter's Run/Stop command. Turn on this object to start the drive. Turn off this object to stop the drive.	✔	✔	✔	✔
BV11	Rev/Fwd	Read/write the adapter's Rev/Fwd command. Turn on this object to command the reverse direction when the drive is running. Turn off this object to command Forward.	✔	✔	✔	✔
BV12	Ref2/Ref1	Read/write the adapter's Ref2/Ref1 command. Turn on this object to select the Reference 2 instance of the AV object as the drive's speed reference. Turn off this object to select Reference 1. The drive must be configured to accept its speed reference from the network. This is typically done by setting drive parameter P038 - [Speed Reference] to the value "5" (Comm Port).	✔	✔	✔	✔
BV13	Clear Faults	Read/write the adapter's Clear Faults command. Turn on this object to clear the drive fault. Turning off this object does nothing.	✔	✔	✔	✔

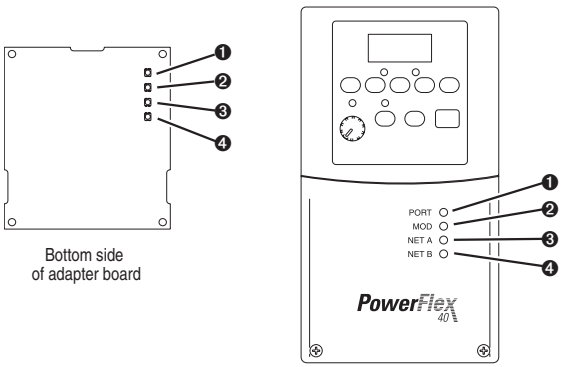
Troubleshooting

This chapter provides information for diagnosing and troubleshooting potential problems with the adapter and network.

Understanding the Status Indicators

The adapter has four status indicators. They can be viewed on the adapter or through the drive cover. See Figure 5.1.

Figure 5.1 Status Indicators ***(location on drive may vary)***



Item	Status Indicator	Description	Page
❶	PORT	DSI Connection Status	5-2
❷	MOD	Adapter Status	5-2
❸	NET A	Serial Communication Status	5-3
❹	NET B	Serial Communication Traffic Status	5-3

PORT Status Indicator

State	Cause	Corrective Actions
Off	The adapter is not powered or is not properly connected to the drive.	• Securely connect the adapter to the drive using the Internal Interface (ribbon) cable. • Apply power to the drive (or adapter if mounted in a DSI External Comms Kit).
Flashing Red	The adapter is not receiving communication from the drive.	• Verify that cables are securely connected and not damaged. Replace cables if necessary. • Cycle power to the drive (or adapter if mounted in a DSI External Comms Kit).
Orange	The adapter is connected to a drive that is not compatible.	Connect the adapter to a compatible PowerFlex 4, PowerFlex 4M, PowerFlex 40 or PowerFlex 400 drive.
Flashing Green	The adapter is establishing communications with the drive.	No action required. This status indicator will turn steady green or flashing red.
Steady Green	The adapter is properly connected and is communicating with the drive.	No action required.

MOD Status Indicator

State	Cause	Corrective Actions
Off	The adapter is not powered or is not properly connected to the drive.	• Securely connect the adapter to the drive using the Internal Interface (ribbon) cable. • Apply power to the drive (or adapter if mounted in a DSI External Comms Kit).
Flashing Red	The adapter has failed the firmware test.	• Cycle power to the drive (or adapter if mounted in a DSI External Comms Kit). • If cycling power does not correct the problem, the adapter parameter settings may have been corrupted. Reset defaults and reconfigure the adapter. • If resetting defaults does not correct the problem, flash the adapter with the latest firmware release.
Flashing Green	The adapter is operational, but is not transferring I/O data.	Enable the network device that is providing control to the adapter.
Steady Green	The adapter is operational and transferring I/O data.	No action required.

NET A Status Indicator

State	Cause	Corrective Actions
Off	The adapter is not powered or is not properly connected to the network.	• Securely connect the adapter to the drive using the Internal Interface (ribbon) cable. • Correctly connect the network cable to the adapter's network connector. • Apply power to the drive (or adapter if mounted in a DSI External Comms Kit) and network.
Flashing Red	A network connection has timed out.	• Enable the network device that is providing control to the adapter. • Check the amount of traffic on the network.
Flashing Green	The adapter is properly connected and communicating on the network.	No action required. The LED will flash green each time the token is passed to the adapter by another BACnet device.

NET B Status Indicator

State	Cause	Corrective Actions
Off	Adapter is not powered or is not transmitting on the network.	If NET A indicator is off: • Securely connect the adapter to the drive using the Internal Interface (ribbon) cable, and to the network using the appropriate network cable. • Correctly connect the network cable to the adapter's network connector. Normal condition if the adapter is idle.
Flashing Green	The adapter is transmitting on the network.	No action required.

Viewing Adapter Diagnostic Items

If you encounter unexpected communications problems, the adapter's diagnostic items can help you or Rockwell Automation personnel troubleshoot the problem. Adapter diagnostic items can be viewed using a PowerFlex 4-Class HIM, DriveExplorer software (version 3.01 or later), or DriveExecutive software (version 3.01 or later).

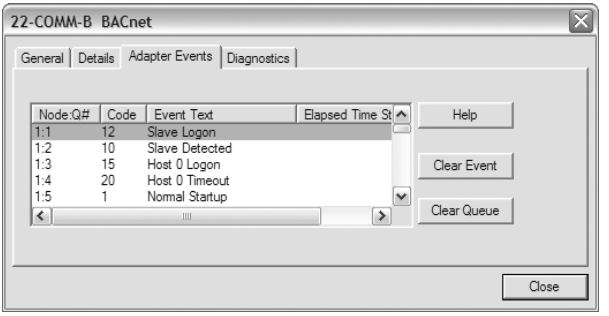
Table 5.A Adapter Diagnostic Items

No.	Name	Description
1	Reserved	—
2	Logic Cmd	The present value of the Logic Command being transmitted to the drive by the adapter.
3	Reference	The present value of the Reference being transmitted to the drive by the adapter.
4	Reserved	—
5	Logic Sts	The present value of the Logic Status being received from the drive by the adapter.
6	Feedback	The present value of the Feedback being received from the drive by the adapter.
7	DSI Overrun Errs	The number of DSI receive overrun errors.
8	DSI Framing Errs	The number of DSI receive framing errors.
9	DSI CRC Errs	The number of DSI receive CRC errors.
10	Boot Flash Count	The number of times the boot firmware in this adapter has been flash updated.
11	App Flash Count	The number of times the application firmware in this adapter has been flash updated.
12	MAC Addr SW	The MAC address selected by the DIP switches (SW1…SW7) on the adapter. This value is not latched when the adapter powers up, and will update as the switch settings are changed.
13	BN Rx Packets	The number of BACnet packets received by the adapter.
14	BN Tx Packets	The number of BACnet packets transmitted by the adapter.
15	BN Overrun Errs	A count of the number of BACnet receive overrun errors.
16	BN Framing Errs	A count of the number of BACnet receive framing errors.
17	BN CRC Errs	A count of the number of BACnet receive CRC errors.

Viewing and Clearing Events

The adapter has an event queue to record significant events that occur in the operation of the adapter. When such an event occurs, an entry is put into the event queue. You can view the event queue using a PowerFlex 4-Class HIM, DriveExplorer software (version 3.01 or later), or DriveExecutive software (version 3.01 or later).

Figure 5.2 DriveExplorer Event View/Clear Screen



The event queue can contain up to 32 entries. Eventually the event queue will become full, since its contents are retained through adapter resets. At that point, a new entry replaces the oldest entry. Only an event queue clear operation or adapter power cycle will clear the event queue contents.

Resetting the adapter to defaults has no effect on the event queue.

Many events in the event queue occur under normal operation. If you encounter unexpected communications problems, the events may help you or Allen-Bradley personnel troubleshoot the problem. The following events may appear in the event queue.

Table 5.B Adapter Events

Code	Event	Description
		Adapter Events
0	No Event	Text displayed in an empty event queue entry.
1	Normal Startup	Power is applied to the adapter.
2	Manual Reset	The adapter was reset from the “Reset Module” parameter.
3	Watchdog T/O Flt	The software watchdog detected a failure and reset the adapter.
4	App Updated	The application firmware has been flash updated.
5	Boot Updated	The boot firmware has been flash updated.
6	EEPROM Sum Flt	The EEPROM checksum/CRC is incorrect. The functionality of the adapter will be limited. Default parameter values must be loaded to clear this condition.

Code	Event	Description
7–9	Reserved	—
	DSI Events	
10	Slave Detected	The adapter detected that the slave has been connected.
11	Slave Removed	The adapter detected that the slave has been disconnected.
12	Slave Logon	The adapter has established communications with the slave.
13	Slave Timeout	The adapter has lost communications with the slave.
14	Slave Brand Flt	The slave brand is different than the adapter.
15	Host 0 Logon	The adapter has established communications with the drive.
16-19	Reserved	—
20	Host 0 Timeout	The adapter has lost communications with the drive.
21-24	Reserved	—
25	Host 0 Brand Flt	The drive is not an Allen-Bradley brand drive.
26–39	Reserved	—
	Network Events	
40	Net Link Up	The network link is established.
41	Net Link Down	The network link is lost.
42	Dup Net Addr	The adapter detected that another device is using its network address. In this case, the adapter will not participate in any network activity.
43	Net Open	An I/O connection from the network to the adapter was opened.
44	Net Close	An I/O connection from the network to the adapter was closed.
45	Net Timeout	An I/O connection from the network to the adapter has timed out.
46	Net Comm Flt	The adapter has performed the “Comm Flt” action specified by the user.
47	Net Idle Flt	The adapter has performed the “Idle Flt” action specified by the user.
48	PCCC IO Open	The adapter has begun receiving PCCC Control messages (the PCCC Control Timeout was previously set to a non-zero value).
49	PCCC IO Close	The device sending PCCC Control messages to the adapter has set the PCCC Control Timeout to a value of zero.
50	PCCC IO Time Flt	The adapter has not received a PCCC Control message for longer than the PCCC Control Timeout.
51	Net Sent Reset	The adapter received a reset from the network.
52	Msg Ctrl Open	The adapter has begun receiving Client-Server Control messages (the Client-Server Control Timeout was previously set to a non-zero value).
53	Msg Ctrl Close	The device sending Client-Server Control messages to the adapter has set the Client-Server Control Timeout to a value of zero.
54	Msg Ctrl Timeout	The adapter has not received a Client-Server Control message for longer than the established timeout period.

Specifications

Appendix A presents the specifications for the adapter.

Communications

Network	
Protocol	BACnet MS/TP
Data Rates	9600, 19200, 38400 or 76800 baud
Drive	
Protocol	DSI
Data Rate	19.2 kbps

Electrical

Consumption	
Drive	275 mA at 5 VDC supplied by the host (drive or DSI External Comms Kit)
Network	None

Mechanical

Dimensions	
Height	19 mm (0.75 inches)
Length	86 mm (3.39 inches)
Width	78.5 mm (3.09 inches)
Weight	85g (3 oz.)

Environmental

Temperature Operating Storage	 -10…50 °C (14…122 °F) -40…85 °C (-40…185 °F)
Relative Humidity	5…95% non-condensing
Atmosphere	**Important:** Adapter **must not** be installed in an area where the ambient atmosphere contains volatile or corrosive gas, vapors or dust. If the adapter is not going to be installed for a period of time, it must be stored in an area where it will not be exposed to a corrosive atmosphere.

Regulatory Compliance

Certification	Specification
BACnet	BTL (BACnet Testing Laboratories) approval pending
UL	UL508C
cUL	CAN / CSA C22.2 No. 14-M91
CE	EN50178 and EN61800-3
CTick	EN61800-3

NOTE: The addition of a ferrite core (Fair-Rite P/N 0431167281 or equivalent) to the BACnet cable might be required on applications which must meet IEC 61800-3.

NOTE: This is a product of category C2 according to IEC 61800-3. In a domestic environment this product may cause radio interference in which case supplementary mitigation measures may be required.

Adapter Parameters

Appendix B provides information about the adapter parameters.

About Parameter Numbers

The parameters in the adapter are numbered consecutively. However, depending on which configuration tool you use, they may have different numbers.

Configuration Tool	Numbering Scheme
• DriveExplorer • DriveExecutive • HIM	The adapter parameters begin with parameter 1. For example, **Parameter 01 - [Reset Module]** is parameter 1 as indicated by this manual.

Parameter List

Parameter No.	Name and Description	Details	
01	**[Reset Module]** No action if set to “0” (Ready). Resets the adapter if set to “1” (Reset Module). Restores the adapter to its factory default settings if set to “2” (Set Defaults). This parameter is a command. It will be reset to “0” (Ready) after the command has been performed.	Default: Values Type: Reset Required:	0 = Ready 0 = Ready 1 = Reset Module 2 = Set Defaults Read/Write No

ATTENTION: Risk of injury or equipment damage exists. If the adapter is transmitting I/O that controls the drive, the drive may fault when you reset the adapter. Determine how your drive will respond before resetting a connected adapter.

Parameter No.	Name and Description	Details	
02	**[Comm Loss Action]** Sets the action that the adapter and drive will take if the adapter detects that network communications have been disrupted. This setting is effective only if I/O that controls the drive is transmitted through the adapter.	Default: Values: Type: Reset Required:	0 = Fault 0 = Fault 1 = Stop 2 = Zero Data 3 = Hold Last 4 = Send Flt Cfg Read/Write No
	ATTENTION: Risk of injury or equipment damage exists. **Parameter 02 - [Comm Loss Action]** lets you determine the action of the adapter and connected drive if communications are disrupted. By default, this parameter faults the drive. You can set this parameter so that the drive continues to run. Precautions should be taken to ensure that the setting of this parameter does not create a risk of injury or equipment damage. When commissioning the drive, verify that your system responds correctly to various situations (for example, a disconnected drive).		
03	**[Comm Loss Time]** Sets the communication loss timeout period in seconds. The value zero disables this feature.	Default: Minimum: Maximum: Type: Reset Required:	10 seconds 0 seconds 180 seconds Read/Write No
	ATTENTION: Risk of injury or equipment damage exists. **Parameter 03 - [Comm Loss Time]** lets you determine how long it will take the adapter to detect network communication losses. By default, this parameter sets the timeout to ten (10) seconds. You can set it so that the duration is shorter, longer, or disabled. When set to disabled, this also disables adapter **Parameter 02 - [Comm Loss Action]**. Therefore, a communications fault action will be ignored. Take precautions to ensure that the setting does not create a risk of injury or equipment damage. When commissioning the drive, verify that your system responds correctly to various situations (for example, a disconnected cable).		
04	**[Flt Cfg Logic]** Sets the Logic Command data that is sent to the drive if **Parameter 02 - [Comm Loss Action]** is set to “Send Flt Cfg” and network communications are disrupted. The bit definitions will depend on the product to which the adapter is connected. See the documentation for the drive being used.	Default: Minimum: Maximum: Type: Reset Required:	0000 0000 0000 0000 0000 0000 0000 0000 1111 1111 1111 1111 Read/Write No
05	**[Flt Cfg Ref]** Sets the Reference data that is sent to the drive if **Parameter 02 - [Comm Loss Action]** is set to “Send Flt Cfg” and communications are disrupted.	Default: Minimum: Maximum: Type: Reset Required:	0 0 65535 Read/Write No

Parameter No.	Name and Description	Details	
06	**[Baud Rate Cfg]** Sets the baud rate (kilobits per second) at which the adapter communicates. (Updates **Parameter 07 - [Baud Rate Act]** after a reset.)	Default: Values: Type: Reset Required:	0 = Autobaud 0 = Autobaud 1 = 9600 kbps 2 = 19200 kbps 3 = 38400 kbps 4 = 76800 kbps Read/Write Yes
07	**[Baud Rate Act]** Displays the baud rate (kilobits per second) actually used by the adapter.	Default: Values: Type:	0 = Unknown 0 = Unknown 1 = 9600 kbps 2 = 19200 kbps 3 = 38400 kbps 4 = 76800 kbps Read Only
08	**[MAC Address]** Displays the address set by the MAC Address Switches SW1…SW7 (Figure 2.1) on the adapter. This value is latched when the adapter powers up.	Default: Minimum: Maximum: Type:	0 0 127 Read Only
09	**[Max Master]** Sets the maximum MAC Address for any device in the BACnet MS/TP token ring.	Default: Minimum: Maximum: Type: Reset Required:	127 0 127 Read/Write Yes
10	**[Max Info Frames]** Sets the maximum number of messages that the adapter can transmit while it owns the token.	Default: Minimum: Maximum: Type: Reset Required:	1 1 255 Read/Write Yes
11	**[Device Inst Hi]** Sets the high portion (most significant digits) of the Device Instance Number. The Device Instance Number used by the adapter is the value of this parameter times 1000 plus the value of **Parameter 12 - [Device Inst Lo]**.	Default: Minimum: Maximum: Type: Reset Required:	160 0 4194 Read/Write Yes
12	**[Device Inst Lo]** Sets the low portion (always the last three least significant digits) of the Device Instance Number. The Device Instance Number used by the adapter is the value of **Parameter 11 - [Device Inst Hi]** times 1000 plus the value of this parameter.	Default: Minimum: Maximum: Type: Reset Required:	0 0 999 Read/Write Yes

Notes:

Protocol Implementation Conformance Statement (PICS)

Date: March 27, 2006
Vendor Name: Rockwell Automation
Product Name: 22-COMM-B
Product Model Number: 22-COMM-B
Applications Software Version: 3.003
Firmware Revision: 1.001
BACnet Protocol Revision: 2

Product Description

DSI to BACnet MS/TP communication adapter for PowerFlex 4-Class drives

BACnet Standardized Device Profile (Annex L)

☐ **BACnet Operator Workstation (B-OWS)**
☐ **BACnet Building Controller (B-BC)**
☐ **BACnet Advanced Application Controller (B-AAC)**
☒ **BACnet Application Specific Controller (B-ASC)**
☐ **BACnet Smart Sensor (B-SS)**
☐ **BACnet Smart Actuator (B-SA)**

List all BACnet Interoperability Building Blocks Supported (Annex K)

DS-RP-B, DS-RPM-B,
DS-WP-B, DS-WPM-B,
DM-DDB-B, DM-DOB-B,
DM-DCC-B,
DM-PT-A, DM-PT-B,
DM-RD-B

Segmentation Capability

☐ Segmented requests supported Window size _____
☐ Segmented responses supported Window size _____

Standard Object Types Supported

The table below lists the object types supported by the 22-COMM-B. Dynamic object creation and deletion is not supported. The property access rules use the following key:

R = Read Only: the property is supported for this object type
W = Read/Write: the property is supported for this object type
C = Commandable: the property is supported for this object type

Property	Analog Input	Analog Output	Analog Value	Binary Input	Binary Output	Binary Value	Device
APDU Timeout							R
Application Software Version							R
Database Revision							R
Description	R	R	R	R	R	R	W(1)
Device Address Binding							R
Event State	R	R	R	R	R	R	
Firmware Revision							R
Location							W(2)
Max APDU Length Accepted							R
Max Info Frames							W(3)
Max Master							W(4)
Model Name							R
Number of APDU Retries							R
Object Identifier	R	R	R	R	R	R	R
Object List							R
Object Name	R	R	R	R	R	R	R
Object Type	R	R	R	R	R	R	R
Out of Service	R	R	R	R	R	R	
Polarity				R	R		
Present Value	R	C	C(5)	R	C	C(5)	
Priority Array		R	R(6)		R	R(6)	
Protocol Object Types Supported							R
Protocol Revision							R
Protocol Services Supported							R
Protocol Version							R
Relinquish Default		R	R(6)		R	R(6)	
Segmentation Supported							R
Status Flags	R	R	R	R	R	R	
System Status							R
Units	R	R	R				
Vendor Identifier							R
Vendor Name							R

(1) This property will accept a maximum of 16 characters when written.
(2) This property will accept a maximum of 32 characters when written.
(3) This property will accept a value between 1 and 255 inclusive when written.
(4) This property will accept a value between 0 and 127 inclusive when written.
(5) This property is commandable for some instances of this object. Otherwise it is read/write.
(6) This property is supported only for instances of this object where the Present Value property is commandable.

Data Link Layer Options

☐ BACnet IP, (Annex J)
☐ BACnet IP, (Annex J), Foreign Device
☐ ISO 8802-3, Ethernet (Clause 7)
☐ ANSI/ATA 878.1, 2.5 Mb. ARCNET (Clause 8)
☐ ANSI/ATA 878.1, RS-485 ARCNET (Clause 8), baud rate(s)
☒ MS/TP master (Clause 9), baud rate(s): 9600, 19200, 38400, 76800
☐ MS/TP slave (Clause 9), baud rate(s):
☐ Point-To-Point, EIA 232 (Clause 10), baud rate(s):
☐ Point-To-Point, modem (Clause 10), baud rate(s):
☐ LonTalk, (Clause 11), medium:
☐ Other:

Device Address Binding

Is static device binding supported? (This is currently necessary for two-way communication with MS/TP slaves and certain other devices.)
☐ Yes ☒ No

Networking Options

Not applicable.

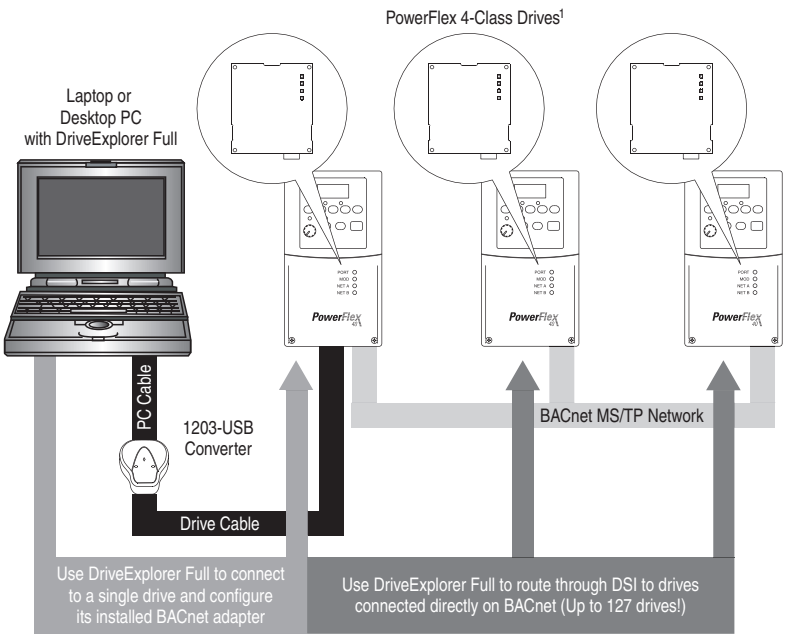
Notes:

Routing Capability for Networked Drives

Appendix D provides information about the unique routing capability for up to 127 PowerFlex 4/4M/40/400 drives on a BACnet MS/TP network when using the DriveExplorer (Full version only) drive software tool.

First, configure the 22-COMM-B adapter in each networked drive (or DSI External Comms Kit) using the procedures described in Chapter 2. (**NOTE:** To be compatible with PowerFlex 4M drives, the 22-COMM-B adapter must have firmware version 1.003 or later.) Then use a 1203-USB or 22-SCM-232 converter to connect the first networked drive to a laptop or desktop PC with DriveExplorer Full. Thereafter, you can use DriveExplorer Full to route to any drive on the BACnet MS/TP network to configure or monitor the drive or any of its connected peripherals.

Figure D.1 BACnet MS/TP Network Routing Capability



[1] PowerFlex 40 and PowerFlex 400 Drives (with internally-mounted 22-COMM-B adapters as shown) or any PowerFlex 4-Class Drives (typically PowerFlex 4 and PowerFlex 4M) connected to 22-COMM-B adapters that are mounted in DSI External Comms Kits.

Notes:

A

Adapter

Devices such as drives, controllers, and computers usually require an adapter to provide a communication interface between them and a network such as BACnet MS/TP. An adapter reads data on the network and transmits it to the connected device. It also reads data in the device and transmits it to the network.

The 22-COMM-B adapter connects PowerFlex 4, PowerFlex 4M, PowerFlex 40 or PowerFlex 400 drives to a BACnet MS/TP network. (**NOTE:** The 22-COMM-B adapter must have firmware version 1.003 or later to be compatible with PowerFlex 4M drives.) Adapters are sometimes also called “cards,” “embedded communication options,” “gateways,” “modules,” and “peripherals.”

B

BACnet MS/TP

BACnet is a data communication protocol for Building Automation and Control networks. BACnet MS/TP (master-slave/token-passing) is a specific type of BACnet network designed to run at speeds of 1 Mbps or less over twisted pair wiring.

Baud Rate

The speed at which data is transferred on the network. Each device on a network must be set for the same baud rate.

C

ControlFLASH

An Allen-Bradley software tool that lets users electronically update firmware on printed circuit boards.

D

DSI (Drive Serial Interface)

DSI is based on the Modbus RTU serial communication protocol and is used by various Allen-Bradley drives and power products, such as PowerFlex 4-Class drives.

DSI Peripheral

A device that provides an interface between DSI and a network or user. Peripheral devices are also referred to as “adapters” or “modules.” The 22-COMM-B adapter, 1203-USB or 22-SCM-232 converter, and PowerFlex 4-Class HIMs (22-HIM-A3 or 22-HIM-C2S) are examples of DSI peripherals.

DSI Product

A device that uses the DSI communications interface to communicate with one or more peripheral devices. For example, a motor drive such as a PowerFlex 4-Class drive is a DSI product. In this manual, a DSI product is also referred to as “drive” or “host.”

DriveExplorer Software

A tool for monitoring and configuring Allen-Bradley products and adapters. It can be run on computers running various Microsoft Windows operating systems. DriveExplorer (version 3.xx or later) can be used to configure this adapter and PowerFlex drives. Information about DriveExplorer software and a free lite version can be accessed at http://www.ab.com/drives/driveexplorer.

DriveTools SP Software

A software suite designed for running on various Microsoft Windows operating systems. This software suite provides a family of tools, including DriveExecutive (version 3.01 or later), that you can use to program, monitor, control, troubleshoot, and maintain Allen Bradley products. DriveTools SP can be used with PowerFlex drives. Information about DriveTools SP can be accessed at http://www.ab.com/drives/drivetools.

E

EDS (Electronic Data Sheet) Files

Simple text files that are used by network configuration tools to describe products so that you can easily commission them on a network. EDS files describe a product device type, revision, and configurable parameters. EDS files for many Allen-Bradley products can be found at http://www.ab.com/networks/eds.

F

Fault Action

A fault action determines how the adapter and connected drive act when a communications fault (for example, a cable is disconnected) occurs.

Fault Configuration

When communications are disrupted (for example, a cable is disconnected), the adapter and PowerFlex drive can respond with a user-defined fault configuration. The user sets the data that is sent to the drive using specific fault configuration parameters in the adapter. When a fault action parameter is set to use the fault configuration data and a fault occurs, the data from these parameters is sent as the Logic Command and/or Reference.

Flash Update

The process of updating firmware in a device. The adapter can be flash updated using various Allen-Bradley software tools. Refer to Flash Updating the Adapter on page 3-10 for more information.

H

HIM (Human Interface Module)

A device that can be used to configure and control a drive. PowerFlex 4-Class HIMs (22-HIM-A3 or 22-HIM-C2S) can be used to configure PowerFlex 4-Class drives and their connected peripherals.

Hold Last

When communications are disrupted (for example, a cable is disconnected), the adapter and PowerFlex drive can respond by holding last. Hold last results in the drive receiving the last data received via the network connection before the disruption. If the drive was running and using the Reference from the adapter, it will continue to run at the same Reference.

I

I/O Data

I/O data, sometimes called “implicit messages” or “input/output,” is time-critical data such as a Logic Command and Reference. The terms “input” and “output” are defined from the controller’s point of view. Output is produced by the controller and consumed by the adapter. Input is produced by the adapter and consumed by the controller.

L

Logic Command/Logic Status

The Logic Command is used to control the PowerFlex 4-Class drive (for example, start, stop, direction). It consists of one 16-bit word of output to the adapter from the network. The definitions of the bits in this word depend on the drive, and are shown in the drive’s documentation.

The Logic Status is used to monitor the PowerFlex 4-Class drive (for example, operating state, motor direction). It consists of one 16-bit word of input from the adapter to the network. The definitions of the bits in this word depend on the drive, and are shown in the drive’s documentation.

M

MAC Address

Each device on a network must have a unique MAC address to identify it. On BACnet MS/TP networks, devices can have MAC addresses between 0 and 127 if the network is set up to accommodate that number of devices.

N

NVS (Non-Volatile Storage)

NVS is the permanent memory of a device. Devices such as the adapter and drive store parameters and other information in NVS so that they are not lost when the device loses power. NVS is sometimes called "EEPROM."

P

PCCC (Programmable Controller Communications Commands)

PCCC is the protocol used by some controllers to communicate with devices on a network. Some software products (for example, DriveExplorer and DriveExecutive) also use PCCC to communicate.

PowerFlex 4-Class (Component-Class) Drives

The Allen-Bradley PowerFlex 4-Class family of drives supports DSI and, at the time of publication, includes the PowerFlex 4, PowerFlex 4M, PowerFlex 40, and PowerFlex 400.

R

Reference/Feedback

The Reference is used to send a setpoint (for example, speed, frequency, torque) to the drive. It consists of one 16-bit word of output to the adapter from the network.

Feedback is used to monitor the speed of the drive. It consists of one 16-bit word of input from the adapter to the network.

S

Status Indicators

Status indicators are LEDs that are used to report the status of the adapter, network, and drive. They are on the adapter and can be viewed on the front cover of the drive when the drive is powered.

Z

Zero Data

When communications are disrupted (for example, a cable is disconnected), the adapter and drive can respond with zero data. Zero data results in the drive receiving zero as values for Logic Command and Reference data. If the drive was running and using the Reference from the adapter, it will stay running but at zero Reference.

Numerics

A

B

C

D

Z

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