Allen-Bradley

PowerFlex® Communications

BACnet MS/TP Adapter

20-COMM-B
FRN 1.xxx

User Manual

Rockwell Automation

Allen Bradley 20-COMM-D | gesrepair.com

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.

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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 the 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.

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BACnet is a registered trademark of American Society of Heating, Refrigerating and Air-Conditioning Engineers (ASHRAE).

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

Description of Changes	Page(s)
In the “Quick Start” section: • In Step 4, removed connecting the adapter to the network. • In Step 5, added two new sub-steps (B and C). • Added a new Step 6 “Connect the adapter to the network.” • Incremented old Steps 6 and 7 to Steps 7 to 8.	1-6
Reorganized Chapter 2: • Moved the “Connecting the Adapter to the Drive” section after the “Commissioning the Adapter” section. • Moved the “Applying Power” section after the “Connecting the Adapter to the Drive” section. • In the “Applying Power” section, added three new subsections: – “Start-Up Status Indications” – “Verifying/Setting Key Adapter Parameters” – “Configuring/Verifying Key Drive Parameters.” • Moved the “Connecting the Drive/Adapter to the Network” section to the end of the chapter.	Chapter 2
In Chapter 3, moved the “Setting the Device Instance Number” section after the “Using the PowerFlex 7-Class HIM” section. Included additional information to the “Setting the Device Instance Number” section.	3-3
Added new Appendix D “Routing Capability for Networked Drives.”	D-1

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

Description of Changes	Page(s)
In the Features section — first bullet, removed text “... and can be used with the kit’s optional I/O board.” Also, added an Important statement regarding this information.	1-2
In the Viewing the Adapter Configuration table, added a third bullet in the Parameter 07 - [Baud Rate Act] row.	3-8
For Parameter 05 - [Flt Cfg Ref], corrected its detail information from being a bit parameter to a numeric parameter.	B-2

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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)	—
HIM	*HIM Quick Reference*	20HIM-QR001…
PowerFlex® 70 Drive (Std. and enhanced control)	*PowerFlex 70 User Manual* *PowerFlex 70/700 Reference Manual*	20A-UM001… PFLEX-RM001…
PowerFlex® 700 Drive* PowerFlex® 700 Ser. B Drive* *Standard and vector control	*PowerFlex 700 User Manual* *PowerFlex 700 Series B User Manual* *PowerFlex 70/700 Reference Manual*	20B-UM001… 20B-UM002… PFLEX-RM001…
PowerFlex® 700H Drive	*PowerFlex 700H Installation Manual* *PowerFlex 700H Programming Manual*	PFLEX-IN006… 20C-PM001…

Documentation can be obtained online at http://www.rockwellautomation.com/literature.

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

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

Conventions Used in This Manual

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 - [Reset Module]**.
- 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.
- This manual provides information about the 20-COMM-B BACnet MS/TP adapter and using it with PowerFlex 7-Class drives. The adapter can be used with other products that support a DPI adapter, such as the DPI External Comms Kit (20-XCOMM-DC-BASE). Refer to the documentation for your product for specific information about how it works with the adapter.

Getting Started

The 20-COMM-B BACnet MS/TP adapter is a communication option intended for installation into a PowerFlex 7-Class drive. It can also be used with other Allen-Bradley products that support an internal DPI ™ (Drive Peripheral Interface) adapter, such as the DPI External Comms Kit (20-XCOMM-DC-BASE).

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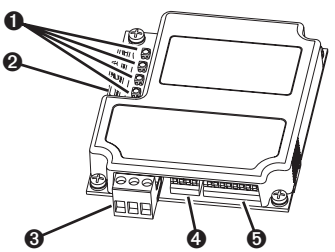
Components

Figure 1.1 Components of the Adapter



Item	Part	Description
❶	Status Indicators	Four LEDs that indicate the status of the network connection, DPI, and the adapter. Refer to Chapter 5, Troubleshooting.
❷	DPI Connector	A 20-pin, single-row shrouded male header. An Internal Interface cable connects to this connector and a connector on the drive.
❸	Terminal Block	A 3-pin terminal block with mating 3-pin linear plug connects the adapter to the network.
❹	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.
❺	MAC Address Switches	Switches for setting the MAC address. See Setting the MAC Address on page 2-2 for details.

Features

The 20-COMM-B BACnet MS/TP adapter features the following:

- The adapter is normally mounted in the PowerFlex 7-Class drive. It can also be installed in a DPI External Comms Kit

  Important: Due to inherent operating limitations, the adapter cannot be used with the kit's optional I/O board.

- Switches let you:
  - 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.
- Captive screws secure and ground the adapter to the drive or, when mounted in a DPI External Comms Kit, to the kit's metal enclosure.
- A number of configuration tools can be used to configure the adapter and connected drive. The tools include the PowerFlex HIM on the drive and drive-configuration software such as DriveExplorer (version 3.01 or higher) or DriveExecutive (version 3.01 or higher).
- Status indicators report the status of drive communications, the adapter, and network. They are visible when the drive cover is opened or closed.
- Read/write access to parameters is available. You can configure and monitor parameter values over the network.
- User-defined fault actions let you determine how the adapter and drive respond to communication disruptions on the network.

Compatible Products

The 20-COMM-B BACnet MS/TP adapter is compatible with most Allen-Bradley PowerFlex 7-Class (Architecture-Class) drives and other products that support DPI. DPI is a second generation peripheral communication interface and functional enhancement to SCANport. At the time of publication, compatible products include:

- PowerFlex 70 drives (standard and enhanced control)
- PowerFlex 700 drives (standard and vector control)
- PowerFlex 700 Series B drives (standard and vector control)
- PowerFlex 700H drives
- DPI External Comms Kit

Required Equipment

Equipment Shipped with the Adapter

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

❑ One 20-COMM-B BACnet MS/TP adapter
❑ A 2.54 cm (1 in.) and a 15.24 cm (6 in.) Internal Interface cable (only one cable is needed to connect the adapter to the drive)
❑ One 3-pin linear plug (plugged into the adapter socket)
❑ This manual

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 HIM
  – DriveExplorer (version 3.01 or higher)
  – DriveExecutive stand-alone software (version 3.01 or higher) or bundled with the DriveTools SP suite (version 1.01 or higher)
  – 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 PowerFlex drive if communications are disrupted. By default, this parameter faults the PowerFlex 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. 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. **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. 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

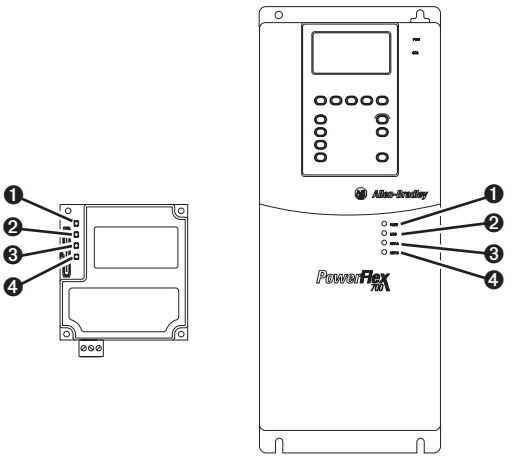
This section is provided to help experienced users quickly start using the adapter. If you are unsure how to complete a step, refer to the referenced chapter.

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 screws to secure and ground the adapter to the drive. When installing the adapter in a DPI External Comms Kit, refer to the *20-XCOMM-DC-BASE Installation Instructions* (Publication No. 20COMM-IN001…) supplied with the kit.	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/set 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	**Set up the controller to communicate with the adapter.** Use the controller's programming software to program the controller.	Instruction manual 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	Adapter Status Indicator 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 2-8 for possible start-up status indications and their descriptions.

Notes:

Installing the Adapter

Chapter 2 provides instructions for installing the adapter in a PowerFlex 7-Class drive. This adapter can also be installed in a DPI External Comms Kit. In this case, refer to the *20-XCOMM-DC-BASE Installation Instructions* (Publication No. 20COMM-IN001…) supplied with the kit.

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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 nodes are located on the network (starting and ending network nodes versus 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 invoke the change.

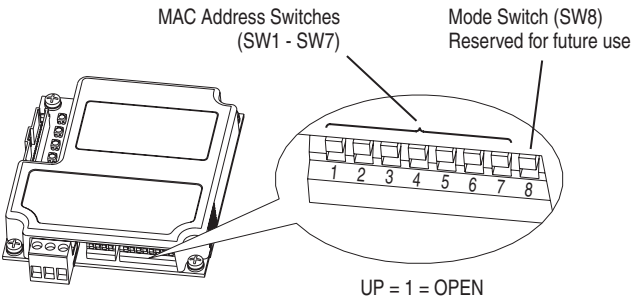
ATTENTION: Risk of equipment damage exists. The adapter contains ESD (Electrostatic Discharge) sensitive parts that can be damaged if you do not follow ESD control procedures. Static control precautions are required when handling the adapter. If you are unfamiliar with static control procedures, refer 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. The MAC address must be set 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 the adapter, 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 can be verified using a PowerFlex 7-Class HIM, DriveExplorer software, or DriveExecutive software to view **Parameter 08 - [MAC Address]** or Diagnostic Item number 16 (page 5-6).

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

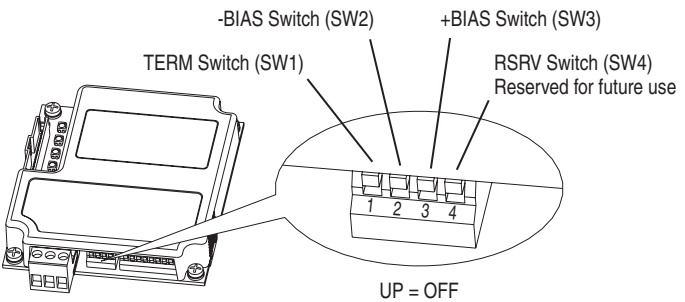
Table 2.A MAC Address Switch Settings (UP = 1 = OPEN) (Continued)

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



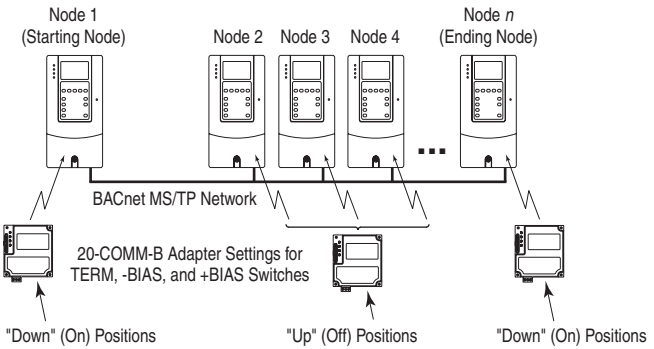
Switches	Description	Default
SW1	Turns on/off the termination resistor	Up (Off)
SW2	Turns on/off the -bias resistor	Up (Off)
SW3	Turns on/off the +bias resistor	Up (Off)
SW4	Reserved (not used)	—

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 20-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.

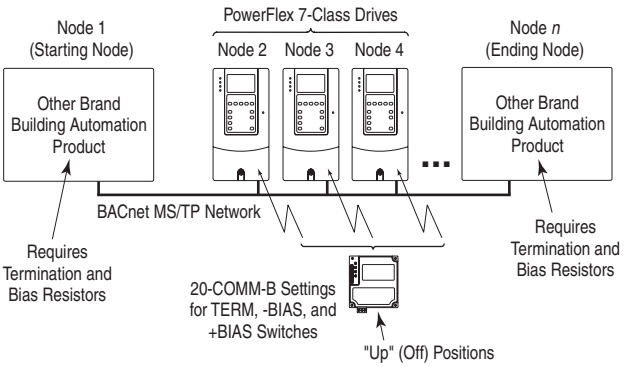
Figure 2.3 Example Network with PowerFlex Drives at Starting and/or Ending Nodes



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 the 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 instruction documentation for details.

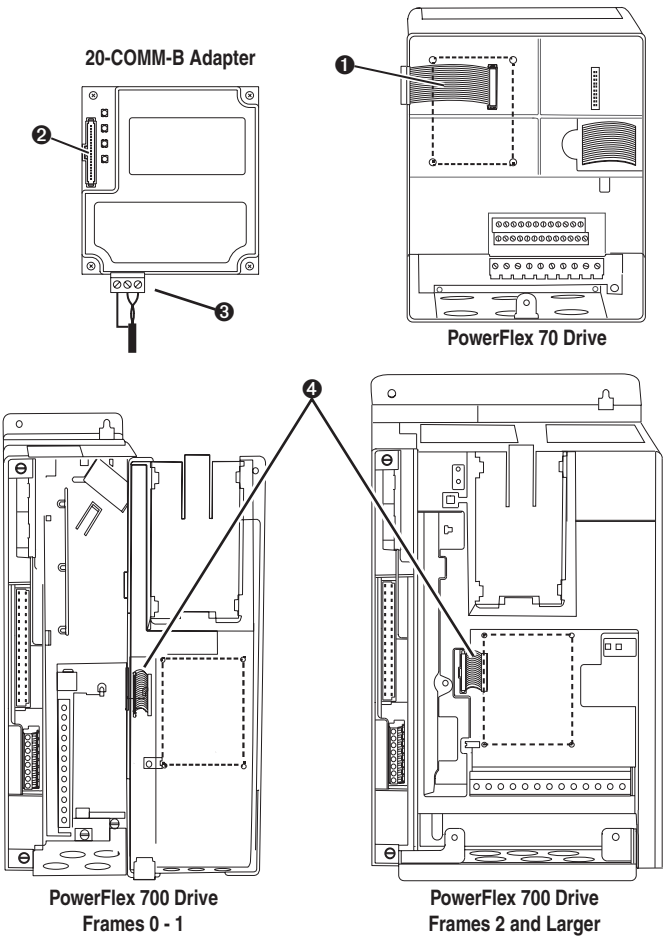
Figure 2.4 Example Network with PowerFlex Drives at Other Nodes



Connecting the Adapter to the Drive

1. Remove power from the drive.
2. Use static control precautions, and remove or open the drive cover.
3. Connect the Internal Interface cable to the DPI port on the drive and then to the DPI connector on the adapter.

Figure 2.5 DPI Ports and Internal Interface Cables



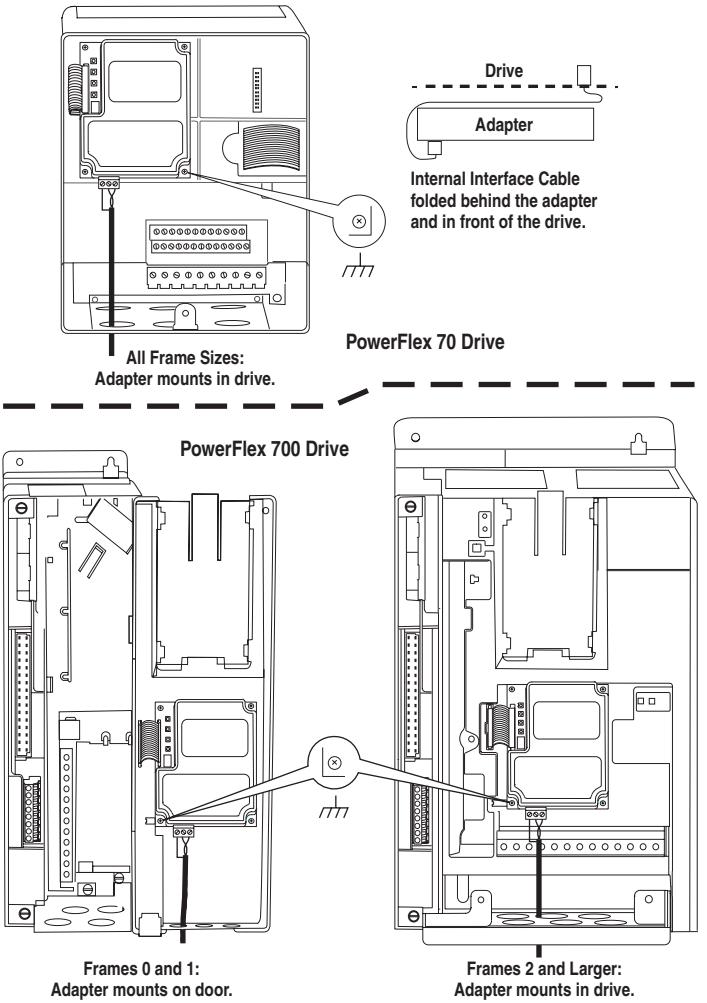
Item	Description
❶	15.24 cm (6 in.) Internal Interface cable
❷	DPI Connector

Item	Description
❸	RS-485 serial cable connection
❹	2.54 cm (1 in.) Internal Interface cable

4. Secure and ground the adapter to the drive by doing the following:
   - On a PowerFlex 70 drive, fold the Internal Interface cable behind the adapter and mount the adapter on the drive using the four captive screws.
   - On a PowerFlex 700 or PowerFlex 700H drive, just mount the adapter on the drive using the four captive screws.

Important: Tighten all screws since the adapter is grounded via the screws. Recommended torque is 0.9 N-m (8.0 lb.-in.).

Figure 2.6 Mounting and Grounding the Adapter



Applying Power

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

Install or close the drive cover, and 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 2.7) after power has been applied. Possible start-up status indications are shown in Table 2.B.

Figure 2.7 Drive and Adapter Status Indicators (location on drive may vary)

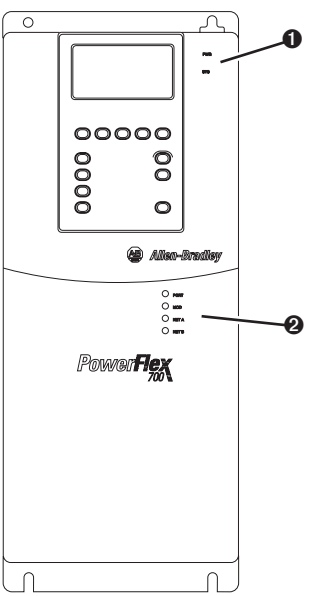


Table 2.B Drive and Adapter Start-Up Status Indications

Item	Name	Color	State	Description
Drive STS Indicator				
❶	STS (Status)	Green	Flashing	Drive ready but not running, and no faults are present.
			Steady	Drive running, no faults are present.
		Yellow	Flashing, Drive Stopped	An inhibit condition exists – the drive cannot be started. Check drive **Parameter 214 - [Start Inhibits]**.
			Flashing, Drive Running	An intermittent type 1 alarm condition is occurring. Check drive **Parameter 211 - [Drive Alarm 1]**.
			Steady, Drive Running	A continuous type 1 alarm condition exists. Check drive **Parameter 211 - [Drive Alarm 1]**.
		Red	Flashing	A fault has occurred.
			Steady	A non-resettable fault has occurred.
Adapter Status Indicators				
❷	PORT	Green	Flashing	Normal Operation. The adapter is establishing an I/O connection to 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

To access adapter parameters when using the LCD HIM, navigate to the Device Select screen. Then select the BACnet communications adapter (20-COMM-B) and press the Enter function key.

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 **Parameter 11 - [Device Instance]** to a unique number for representation to the Building Automation Controller. For more information, see Setting the Device Instance Number on page 3-3.

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

Configuring/Verifying Key Drive Parameters

The PowerFlex 7-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 090 - [Speed Ref A Sel]**, set the drive speed Reference to “22” (DPI Port 5).

2. Verify that drive **Parameter 213 - [Speed Ref Source]** is reporting that the source of the Reference to the drive is “22” (DPI Port 5). This ensures that any Reference commanded from the network can be monitored by using drive **Parameter 002 - [Commanded Speed]**. 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 removed before installing or removing an adapter.

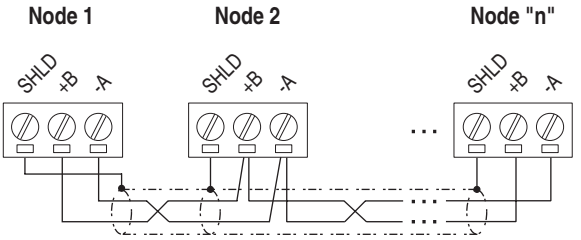
1. Remove power from the drive.

2. Use static control precautions, and remove or open the drive cover.

3. Connect a shielded, twisted wire pair to the network, and route it through the bottom of the drive (see Figure 2.6).

4. Connect the twisted wire pair and its shield to the 3-pin linear plug (provided with the adapter). See Figure 2.8 for terminal designations and typical terminal connections.

Figure 2.8 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. Install or close 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:

- **Parameter 02 - [Comm Loss Action]**
- **Parameter 03 - [Comm Loss Time]**

To access adapter parameters when using the LCD HIM, navigate to the Device Select screen. Then select the BACnet adapter (20-COMM-B) and press the Enter function key.

For adapter parameter configuration details, please refer to Chapter 3.

Notes:

Configuring the Adapter

Chapter 3 provides instructions and information for setting the parameters in the adapter.

Topic	Page
Configuration Tools	3-1
Using the PowerFlex 7-Class HIM	3-2
Setting the Device Instance Number	3-3
Setting a Comm Loss Action	3-5
Setting the Comm Loss Time	3-6
Setting the Baud Rate	3-7
Resetting the Adapter	3-7
Viewing the Adapter Configuration	3-8

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 7-Class HIM (20-HIM-*)	page 3-2
DriveExplorer Software (version 3.xx or higher)	http://www.ab.com/drives/driveexplorer, or DriveExplorer online help (installed with the software)
DriveExecutive Software (version 3.xx or higher)	http://www.ab.com/drives/drivetools, or DriveExecutive Online help (installed with the software)

Using the PowerFlex 7-Class HIM

If your drive has either an LED or LCD HIM (Human Interface Module), you can use it to access parameters in the adapter as shown below. It is recommended that you read through the steps for your HIM before performing the sequence. For additional HIM information, refer to your PowerFlex Drive User Manual or the HIM Quick Reference card.

Using an LED HIM

Step	Key(s)	Example Screens
1. Press ALT and then Sel (Device) to display the Device Screen.	ALT AND Sel (Device)	
2. Press the Up Arrow or Down Arrow to scroll to the 20-COMM-B adapter. Letters represent files in the drive, and numbers represent ports. The adapter is usually connected to port 5.	▲ OR ▼	5001
3. Press the Enter key to enter your selection. A parameter database is constructed, and then the first parameter is displayed.	↵	
4. Edit the parameters using the same techniques that you use to edit drive parameters.		

Using an LCD HIM

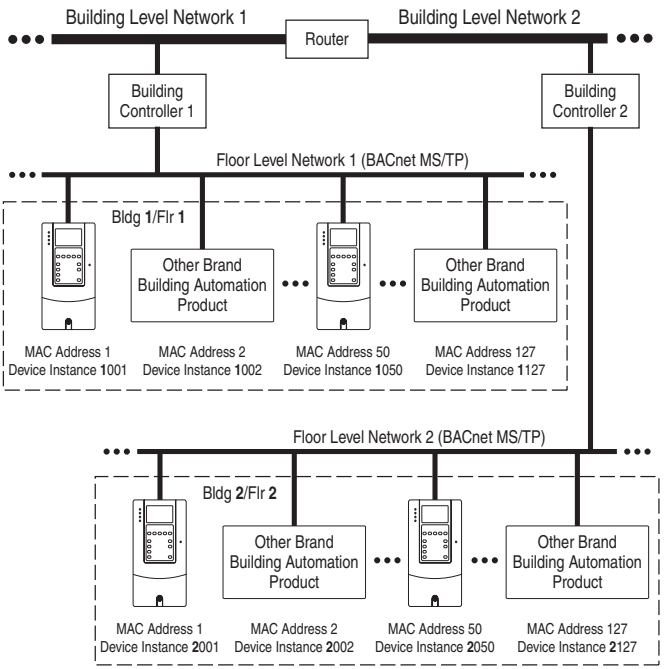
Step	Key(s)	Example Screens
1. In the main menu, press the Up Arrow or Down Arrow to scroll to **Device Select**.	▲ OR ▼	F-> Stopped Auto 0.00 Hz Main Menu: Diagnostics Parameter Device Select
2. Press Enter to enter your selection.	↵	
3. Press the Up Arrow or Down Arrow to scroll to the 20-COMM-B adapter.	▲ OR ▼	
4. Press Enter to select the adapter. A parameter database is constructed, and then the main menu for the adapter is displayed.	↵	Port 5 Device 20-COMM-B Main Menu: Diagnostics Parameter Device Select
5. Edit the parameters using the same techniques that you use to edit drive parameters.		

Setting the Device Instance Number

While there are many ways to implement Device Instance and network strategies, the example shown in Figure 3.1 illustrates one logical approach.

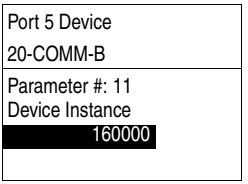
In this example, two individual Floor Level Networks are connected to the Building Level Network through a router which allows devices on each network to share the same MAC address. However, each device on the network must have a unique Device Instance which, in this case, consists of 4 digits. The first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

Figure 3.1 Building Automation Network Example



1. Set the value of **Parameter 11 - [Device Instance]** to a unique Device Instance Number.

Figure 3.2 Device Instance Screen on an LCD HIM



Default = 160000

2. Reset the adapter (see Resetting the Adapter on page 3-7) so that the new Device Instance Number takes effect.

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).

To change 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 3.3 Comm Loss Action Screen on an LCD HIM

```
Port 5 Device
20-COMM-B
Parameter #: 02
Comm Loss Action
            0
Fault
```

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

To set 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	Name	Description
04	Flt Cfg Logic	A 16-bit value sent to the drive for Logic Command.
05	Flt Cfg Ref	A 32-bit value (0 – 4294967295) sent to the drive as a Reference. **Important:** If the drive uses a 16-bit Reference, the most significant word of the value must be set to zero (0) or a fault will occur.

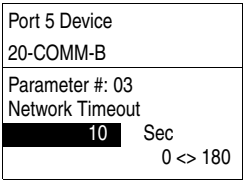
Changes to these parameters take effect immediately. A reset is not required.

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 3.4 Comm Loss Time Screen on an LCD HIM



Default = 10 Seconds

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 3.5 Baud Rate Screen on PowerFlex 4-Class HIM (22-HIM-*)

```
Port 5 Device
20-COMM-B
Parameter #: 06
Baud Rate Cfg
          0
Autobaud
```

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 or 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 **Reset Module**.

Figure 3.6 Reset Screen on an LCD HIM

```
Port 5 Device
20-COMM-B
Parameter #: 01
Reset Module
          1
Reset Module
```

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 settings. 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 Configuration

The following read-only parameters provide information about how the adapter is configured. You can view these parameters at any time.

Number	Name	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).

Using BACnet Objects

Chapter 4 provides information about controlling a compatible PowerFlex 7-Class drive using BACnet objects.

Topic	Page
Understanding BACnet Objects	4-1
Basic Drive Operation on the Network	4-2
Supported BACnet Objects	4-3

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				
			70 Std.	70 EC	700 Std.	700 VC	700 H
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 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 drive parameter 342 - [Analog Out1 Sel] to the value "24" (Param Cntl).	—	✔	—	✔	✔
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 345 - [Analog Out2 Sel] to the value "24" (Param Cntl).	—	—	—	✔	✔
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 90 - [Speed Ref A Sel] to the value "22" (DPI Port 5).	✔	✔	✔	✔	✔
AV1	Reference 2 (%)		✔	✔	✔	✔	✔
AV2	Output Frequency (Hz)	Read the drive's output frequency.	✔	✔	✔	✔	✔
AV3	Output Current (Amps)	Read the drive's output current.	✔	✔	✔	✔	✔

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

Object	Name	Use This Object to…	Compatible PowerFlex Drives				
			70 Std.	70 EC	700 Std.	700 VC	700 H
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	PID Feedback (%)	Read the drive's PID feedback.	✔	✔	✔	✔	✔
AV10	PID Error (%)	Read the drive's PID error.	✔	✔	✔	✔	✔
AV11	Run Time (Hours)	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	Digital Input 1	Read the state of Digital Input 1 on the drive's I/O terminal block.	✔	✔	✔	✔	✔
BI1	Digital Input 2	Read the state of Digital Input 2 on the drive's I/O terminal block.	✔	✔	✔	✔	✔
BI2	Digital Input 3	Read the state of Digital Input 3 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				
			70 Std.	70 EC	700 Std.	700 VC	700 H
BI3	Digital Input 4	Read the state of Digital Input 4 on the drive's I/O terminal block.	✔	✔	✔	✔	✔
BI4	Digital Input 5	Read the state of Digital Input 5 on the drive's I/O terminal block.	✔	✔	✔	✔	✔
BI5	Digital Input 6	Read the state of Digital Input 6 on the drive's I/O terminal block.	✔	✔	✔	✔	✔
BI10	Digital Output Act 1	Read the state of Digital Output 1 on the drive's I/O terminal block.	✔	✔	✔	✔	✔
BI11	Digital Output Act 2	Read the state of Digital Output 2 on the drive's I/O terminal block.	✔	✔	✔	✔	✔
BI12	Digital Output Act 3	Read the state of Digital Output 3 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 drive parameter 380 - [Digital Out1 Sel] to the value "30" (Param Cntl).	—	✔	—	✔	✔
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 drive parameter 384 - [Digital Out2 Sel] to the value "30" (Param Cntl).	—	✔	—	✔	✔
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 drive parameter 388 - [Digital Out3 Sel] to the value "30" (Param Cntl).	—	—	—	✔	✔
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.	✔	✔	✔	✔	✔

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

Object	Name	Use This Object to…	Compatible PowerFlex Drives				
			70 Std.	70 EC	700 Std.	700 VC	700 H
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 90 - [Speed Ref A Sel] to the value "22" (DPI Port 5).	✔	✔	✔	✔	✔
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

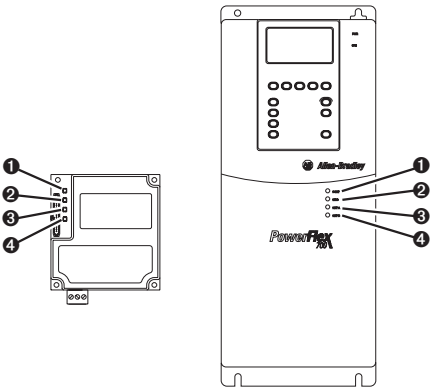
Chapter 5 provides information for diagnosing and troubleshooting potential problems with the adapter and network.

Topic	Page
Understanding the Status Indicators	5-1
PORT Status Indicator	5-2
MOD Status Indicator	5-3
NET A Status Indicator	5-4
NET B Status Indicator	5-4
Viewing and Clearing Adapter Diagnostic Items	5-5
Viewing and Clearing Events	5-7

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
1	PORT	DPI Connection Status	5-2
2	MOD	Adapter Status	5-3
3	NET A	Serial Communication Status	5-4
4	NET B	Serial Communication Traffic Status	5-4

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 DPI External Comms Kit).
Flashing Red	The adapter is not receiving a ping message 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 DPI External Comms Kit).
Solid Red	The drive has refused an I/O connection from the adapter. Another DPI peripheral is using the same DPI port as the adapter.	**Important:** Cycle power to the drive (or adapter if mounted in a DPI External Comms Kit) after making the following correction: • Verify that all DPI cables on the drive are securely connected and not damaged. Replace cables if necessary.
Orange	The adapter is connected to a product that does not support Rockwell Automation DPI communications.	Connect the adapter to a product that supports Allen-Bradley DPI communications (for example, a PowerFlex 70 or PowerFlex 700 drive).
Flashing Green	The adapter is establishing an I/O connection to the drive.	No action required.
Solid 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 DPI External Comms Kit).
Flashing Red	The adapter has failed the firmware test.	• Cycle power to the drive (or adapter if mounted in a DPI 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.
Solid 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 DPI 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 and Clearing Adapter Diagnostic Items

The following adapter diagnostic items can be viewed using DriveExplorer (version 3.01 or higher) or DriveExecutive (version 3.01 or higher) software, or an LCD PowerFlex HIM (Diagnostic/Device Items).

To view and clear adapter diagnostic items

Step	Keys	Example Screen
Viewing Diagnostic Items		
1. Access parameters in the adapter. Refer to Using the PowerFlex 7-Class HIM on page 3-2.		
2. Press the Up Arrow or Down Arrow to scroll to **Diagnostics**.	▲ OR ▼	Main Menu: Diagnostics Parameter Device Select
3. Press Enter to display the Diagnostics menu in the adapter.	↵	
4. Repeat steps 2 and 3 to enter the **Device Items** option.		
5. Press the Up Arrow or Down Arrow to scroll through the items.	▲ OR ▼	Device Item # 13 MAC Addr SW 1
Clearing Diagnostic Items		
1. Access parameters in the Adapter. Refer to Using the PowerFlex 7-Class HIM on page 3-2.		
2. Press the Up Arrow or Down Arrow to scroll to **Parameter**.	▲ OR ▼	Main Menu: Diagnostics Parameter Device Select
3. Press Enter to display the list of parameters in the adapter.	↵	
4. Repeat steps 2 and 3 to select **Parameter 28 - [Clear Counters]**.		
5. Set the value to 1 = Clear and then press Enter to clear the following diagnostic items: 24, 25, 26, 27, and 28.	↵	Parameter #: 28 Clear Counters 1 Clear

Adapter Diagnostic Items

If you encounter unexpected communications problems, diagnostic items can help you or Rockwell Automation personnel troubleshoot the problem.

No.	Name	Description
1	Common Logic Cmd	The present value of the Common Logic Command being transmitted to the drive by this adapter.
2	Prod Logic Cmd	The present value of the Product Logic Command being transmitted to the drive by this adapter.
3	Reference	The present value of the Reference being transmitted to the drive by this adapter. Note that a 16-bit value will be sent as the Most Significant Word of the 32-bit field.
4	Common Logic Sts	The present value of the Common Logic Status being received from the drive by this adapter.
5	Prod Logic Sts	The present value of the Product Logic Status being received from the drive by this adapter.
6	Feedback	The present value of the Feedback being received from the drive by this adapter. Note that a 16-bit value will be sent as the Most Significant Word of the 32-bit field.
7	DPI Port	The port to which the adapter is connected (usually port 5).
8	DPI Data Rate	The data rate used by the drive and detected by the adapter.
9	Ref/Fdbk Size	The size of the Reference/Feedback used by the drive.
10	DPI Rx Errors	The present value of the DPI CAN Receive error counter register.
11	DPI Rx Error Max	The maximum value of the DPI CAN Receive error counter register. Because the CAN interface controller on the adapter does not track the maximum error register values, the adapter periodically polls the CAN controller's Receive error counter register and reports the maximum value it has read in this diagnostic instance.
12	DPI Tx Errors	The present value of the DPI CAN Transmit error counter register.
13	DPI Tx Error Max	The maximum value of the DPI CAN Transmit error counter register. Because the CAN interface controller on the adapter does not track the maximum error register values, the adapter periodically polls the CAN controller's Transmit error counter register and reports the maximum value it has read in this diagnostic instance.
14	Boot Flash Count	The number of times the boot firmware in this adapter has been flash updated.
15	App Flash Count	The number of times the application firmware in this adapter has been flash updated.
16	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.
17	BN Rx Packets	The number of BACnet packets received by the adapter.
18	BN Tx Packets	The number of BACnet packets transmitted by the adapter.
19	BN Overrun Errs	A count of the number of BACnet receive overrun errors.
20	BN Framing Errs	A count of the number of BACnet receive framing errors.
21	BN CRC Errs	A count of the number of BACnet receive CRC errors.

Viewing and Clearing Events

The adapter maintains an event queue that reports the history of its actions. You can view this event queue using an LCD PowerFlex HIM, DriveExplorer software (3.01 or higher), or DriveExecutive software (3.01 or higher).

To view and clear events

Step	Keys	Example Screen
Viewing Events		
1. Access parameters in the adapter. Refer to Using the PowerFlex 7-Class HIM on page 3-2.		
2. Press the Up Arrow or Down Arrow to scroll to **Diagnostics**.	▲ OR ▼	Main Menu: Diagnostics Parameter Device Select
3. Press Enter to display the Diagnostics menu in the adapter.	↵	
4. Repeat steps 2 and 3 to enter the **Events** option and then **View Event Queue** option.		
5. Press the Up Arrow or Down Arrow to scroll through the events. The most recent event is Event 1.	▲ OR ▼	Event Q: 3 E3 Ping Time Flt
Clearing Events		
1. Access parameters in the adapter. Refer to Using the PowerFlex 7-Class HIM on page 3-2.		
2. Press the Up Arrow or Down Arrow to scroll to **Diagnostics**.	▲ OR ▼	
3. Press Enter to display the Diagnostics menu in the adapter.	↵	
4. Repeat steps 2 and 3 to enter the **Events** option and then the **Clear Event** option or **Clr Event Queue** option. A message will pop up to confirm that you want to clear the message or queue.		Dgn: Events View Event Queue Clear Event Clr Event Queue
5. Press Enter to clear all events out of the event queue. All event queue entries will then display “No Event.”	↵	

Events

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:

Code	Event	Description
1	No Event	Empty event queue entry.
2	DPI Bus Off Flt	A bus-off condition was detected on DPI. This event may be caused by loose or broken cables or by noise.
3	Ping Time Flt	A ping message was not received on DPI within the specified time.
4	Port ID Flt	The adapter is not connected to a correct port on a DPI product.
5	Port Change Flt	The DPI port changed after start up.
6	Host Sent Reset	The drive sent a reset event message.
7	EEPROM Sum Flt	The EEPROM in the adapter is corrupt.
8	Online @ 125 kbps	The adapter detected the drive communicating at 125 kbps.
9	Online @ 500 kbps	The adapter detected the drive communicating at 500 kbps.
10	Bad Host Flt	The adapter was connected to an incompatible product.
11	Dup Port Flt	Another peripheral with the same port number is already in use.
12	Type 0 Login	The adapter has logged in for Type 0 control.
13	Type 0 Time Flt	The adapter has not received a Type 0 status message within the specified time.
14	DL Login	The adapter has logged into a Datalink.
15	DL Reject Flt	The drive rejected an attempt to log in to a Datalink because the Datalink is not supported or is used by another peripheral.
16	DL Time Flt	The adapter has not received a Datalink message within the specified time.
17	Reserved	—
18	Control Disabled	The adapter has sent a “Soft Control Disable” command to the drive.
19	Control Enabled	The adapter has sent a “Soft Control Enable” command to the drive.
20	Message Timeout	A client-server message sent by the adapter was not completed within 1 sec.
21	Fault Cfg Error	One of the Flt Cfg XX In parameters is set to a value greater than 65535 and the drive requires a 16-bit value.
22	App Updated	New application firmware was detected.
23	Net Comm Flt	The adapter detected a communications fault on the network.
24	Net Sent Reset	The adapter received a fault from the network.
25	Net Close Flt	An I/O connection from the network to the adapter was closed.
26	Net Idle Flt	The adapter is receiving “idle” packets from the network.
27	Net Open	An I/O connection from the network to the adapter has been opened.
28	Net TImeout Flt	An I/O connection from the network to the adapter has timed out.
29	PCCC IO Close	The device sending PCCC Control messages to the adapter has set the PCCC Control Timeout to zero.
30	PCCC IO Open	The adapter has begun receiving PCCC Control messages.
31	PCCC IO Time Flt	The adapter has not received a PCCC Control message for longer than the PCCC Control Timeout.
32	Watchdog T/O Flt	The software detects a failure.
33	EEPROM Init	A blank EEPROM map revision was detected.
34	Normal Startup	The adapter successfully started up.
35	Manual Reset	The adapter was reset by changing its Reset Module parameter.

Specifications

Appendix A presents the specifications for the adapter.

Topic	Page
Communications	A-1
Electrical	A-1
Mechanical	A-1
Environmental	A-2
Regulatory Compliance	A-2

Communications

Network	
Protocols	BACnet MS/TP
Data Rates	9600, 19200, 38400 or 76800 baud
Drive	
Protocol	DPI
Data Rates	125 kbps or 500 kbps

Electrical

Consumption	
Drive	150 mA at 5 VDC
Network	None

Mechanical

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

Environmental

Temperature Operating Storage	 -10 to 50°C (14 to 122°F) -40 to 85°C (-40 to 185°F)
Relative Humidity	5 to 95% non-condensing
Atmosphere	**Important:** The 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: 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 BACnet MS/TP adapter parameters.

Topic	Page
About Parameter Numbers	B-1
Parameter List	B-1

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 “Ready.” Resets the adapter if set to “Reset Module.” Restores the adapter to its factory default settings if set to “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: 0 = Fault Values: 0 = Fault 1 = Stop 2 = Zero Data 3 = Hold Last 4 = Send Flt Cfg Type: Read/Write Reset Required: 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: 10 seconds Minimum: 0 seconds Maximum: 180 seconds Type: Read/Write Reset Required: 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: 0000 0000 0000 0000 Minimum: 0000 0000 0000 0000 Maximum: 1111 1111 1111 1111 Type: Read/Write Reset Required: 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: 0 Minimum: 0 Maximum: 4294967295 Type: Read/Write Reset Required: No **Important:** If the drive uses a 16-bit Reference, the most significant word of this value is ignored.
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: 0 = Autobaud Values: 0 = Autobaud 1 = 9600 kbps 2 = 19200 kbps 3 = 38400 kbps 4 = 76800 kbps Type: Read/Write Reset Required: Yes

Parameter No.	Name and Description	Details	
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 actual address selected 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 Instance]** Sets the Device Instance Number used by the adapter.	Default: Minimum: Maximum: Type: Reset Required:	160000 0 4194302 Read/Write Yes

Notes:

Protocol Implementation Conformance Statement (PICS)

Date: March 27, 2006
Vendor Name: Rockwell Automation
Product Name: 20-COMM-B
Product Model Number: 20-COMM-B
Applications Software Version: 3.003
Firmware Revision: 1.001
BACnet Protocol Revision: 2

Product Description

DPI to BACnet MS/TP communication adapter for PowerFlex 7-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 20-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.

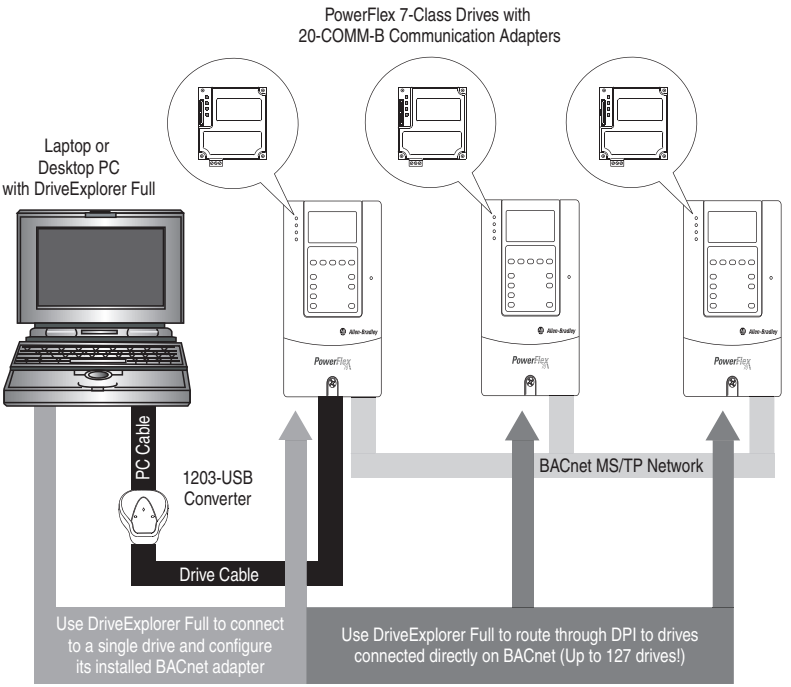
Notes:

Routing Capability for Networked Drives

Appendix D provides information about the unique routing capability for up to 127 PowerFlex 7-Class drives on a BACnet MS/TP network when using the DriveExplorer (Full version only) drive software tool.

First, configure the 20-COMM-B adapter in each networked drive using the procedures described in Chapter 2. Then use a 1203-USB or 1203-SSS 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



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 20-COMM-B adapter connects PowerFlex 7-Class drives to a BACnet MS/TP network. 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.

Bus Off

A condition that occurs when an abnormal rate of errors is detected in a device. The bus off device cannot receive or transmit messages on the network. This condition is often caused by corruption of the network data signals due to noise or data rate mismatch.

C

ControlFLASH

ControlFLASH is an Allen-Bradley software tool that lets users electronically update firmware on printed circuit boards. The tool takes advantage of the growing use of flash memory (electronic erasable chips) across industrial control products.

D

DPI (Drive Peripheral Interface)

A second generation peripheral communication interface used by various Allen-Bradley drives and power products, such as PowerFlex 7-Class drives. It is a functional enhancement to SCANport.

DPI Peripheral

A device that provides an interface between DPI and a network or user. Peripheral devices are also referred to as “adapters” and “modules.” The 20-COMM-B, 1203-SSS or 1203-USB converter, and PowerFlex 7-Class HIMs (20-HIM-xxx) are examples of DPI peripherals.

DPI Product

A device that uses the DPI communications interface to communicate with one or more peripheral devices. For example, a motor drive such as a PowerFlex 7-Class drive is a DPI product. In this manual, a DPI product is also referred to as “drive” or “host.”

DriveExplorer Software

DriveExplorer software is 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 higher) 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 higher), that you can use to program, monitor, control, troubleshoot, and maintain Allen-Bradley products. DriveTools SP (version 1.01 or higher) 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

EDS files are 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 communication is 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 Reference.

Flash Update

The process of updating firmware in a device. The adapter can be flash updated using the Allen-Bradley software tool ControlFLASH, the built-in flash capability of DriveExplorer (version 4.01 or higher), or when the adapter is installed in a DPI External Comms Kit, the X-Modem protocol and a 1203-SSS converter (version 3.xx or higher firmware).

H

HIM (Human Interface Module)

A device that can be used to configure and control a drive. PowerFlex 7-Class HIMs (20-HIM-xxx) can be used to configure PowerFlex 7-Class drives and connected peripherals.

Hold Last

When communication is 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,” transmit 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 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.

The Logic Status is used to monitor the PowerFlex 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.

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 Command)

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.

Ping

A message that is sent by a DPI product to its peripheral devices. They use the ping to gather data about the product, including whether it can receive messages and whether they can log in for control.

PowerFlex 7-Class (Architecture-Class) Drives

The Allen-Bradley PowerFlex 7-Class (Architecture-Class) family of drives for use on BACnet MS/TP networks include the PowerFlex 70 (standard and enhanced control), PowerFlex 700 (standard and vector control), PowerFlex 700 Series B (standard and vector control), and PowerFlex 700H. These drives can be used for applications ranging from 0.37 kW (0.5 HP) to 3,000 kW (4,000 HP).

R

Reference/Feedback

The Reference is used to send a setpoint (for example, speed, frequency, torque) to the drive. It consists of one word of output to the adapter from the network. The size of the word (either a 16-bit word or 32-bit word) is determined by the drive.

Feedback is used to monitor the speed of the drive. It consists of one word of input from the adapter to the network. The size of the word (either a 16-bit word or 32-bit word) is determined by the drive.

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.

T

Type 0 Control

When transmitting I/O, the adapter can use different types of messages for control. The Type 0 events help Allen-Bradley personnel identify the type of messages that an adapter is using.

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.

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