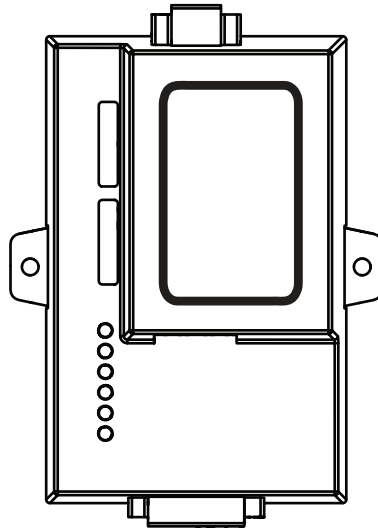




# INSTALLATION GUIDE

---

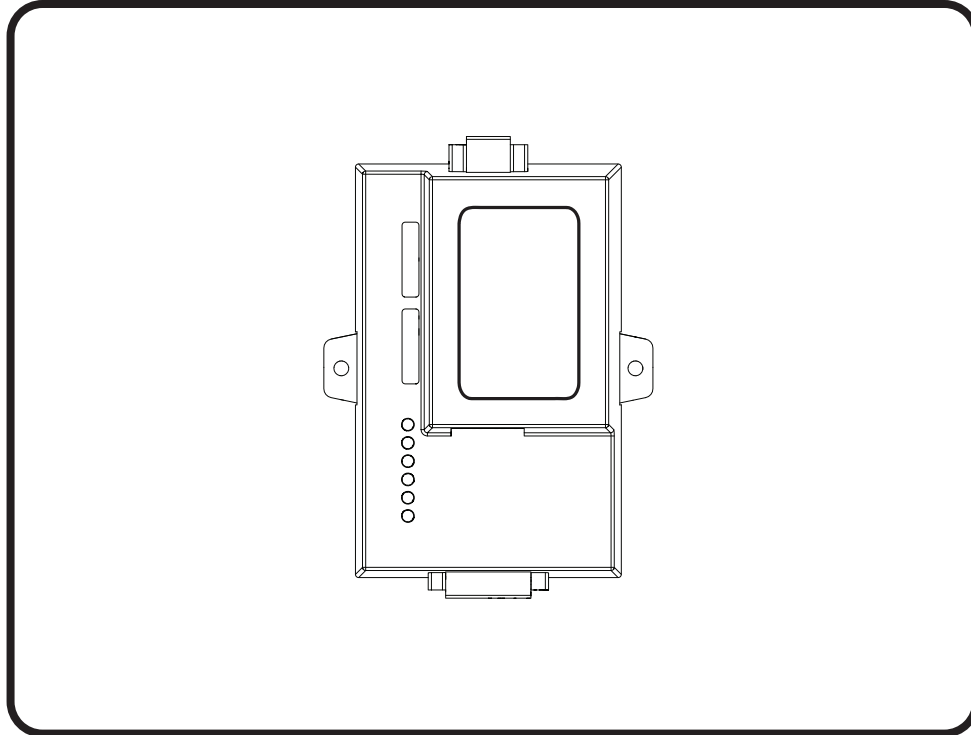
## BACnet Adapter





# Installation Guide

## BACnet Adapter



Installation Guide:  
Rev. O  
10/13/2022

**For Interfacing Big Ass Fans Products:**  
SM\_Vector, Delta\_VFD\_E, Delta\_VFD\_M, Viper

**To Building Automation Systems:**  
BACnet MS/TP, BACnet/IP, Modbus/TCP, and Metasys N2

### APPLICABILITY & EFFECTIVITY

Explains adapter hardware and how to install it.

Explains the electrical installation of Big Ass Fans when integrated with adapter hardware.



# Quick Start Guide

1. Methods of configuration (Section 1):
  - ProtoNode supporting RS-485 devices only: Run Auto Discovery.
  - ProtoNode supporting RS-485 and Ethernet devices at the same time: Run Auto Discovery and/or the Web Configurator.
  - ProtoNode Supporting only Ethernet devices: Run the Web Configurator only.
2. Record the information about the unit (Section 2.1).
3. Set the Modbus RTU serial settings (e.g. baud rate, parity, stop bits) and Modbus Node-ID for each of the devices that will be connected to ProtoNode FPC-N34 (Section 2.2).
4. Set the ProtoNode field protocol on the S bank DIP switches for BACnet MS/TP, BACnet/IP, Modbus TCP, or Metasys N2 (Section 2.3.1).
5. Set the BACnet MS/TP MAC address on DIP switch bank A (Section 2.4).
6. Set the BACnet device addresses for ProtoNode FPC-N34. BACnet MS/TP has both a MAC address and a Device Instance. BACnet/IP only has a Device Instance (Section 2.4).
7. Set the BACnet MS/TP baud rate of the field protocol on DIP switch bank B (Section 2.5.1).
8. Connect the ProtoNode's 3-pin RS-485 port to the field protocol cabling. Connect each of the devices on the RS-485 Modbus RTU port to the ProtoNode's RS-485 interface, which is located on the 6-pin connector of ProtoNode FPC-N34 (Section 3).
9. Wire power to the 6-pin connector of ProtoNode FPC-N34 (Section 3.5).
10. New installations with RS-485 devices: Run Auto Discovery for RS-485 devices connected to the ProtoNode. Enable the ProtoNode's Auto Discovery mode on the S3 DIP switch. It will take about three (3) minutes for all devices to be discovered and the configuration file to be built. When Auto Discovery is complete, turn off the S3 DIP switch (Section 4).
11. New installations with Ethernet or RS-485 devices that are not discoverable: Run the Web Configurator (Section 5).
12. Clear all discovered and/or Web-configured profiles/devices if you need to start the installation process over (Section 6).
13. If the field protocol is BACnet/IP or Modbus/TCP, run the ProtoNode Web GUI utility program to change the IP address. No changes to the configuration file are necessary (Section 7).
14. Complete the fan Modbus wiring and setup (Section 9).

# Contents

<b>1 - Introduction</b>	Quick Start Guide.....	ii
	1.1 - ProtoNode Gateway.....	1
	1.2 - Big Ass Fans Devices: Method of Configuration.....	2
	1.3 - Big Ass Fans Devices and Point Count Available.....	2
	1.4 - BTL Mark: BACnet Testing Laboratory.....	2
<b>2 - BACnet Setup</b>	2.1 - Record Identification Data.....	3
	2.2 - Configure Modbus RTU COM Settings.....	3
	2.3 - Select Field Protocol.....	4
	2.3.1 - Using the S0-S3 Bank of DIP Switches.....	4
	2.4 - Set MAC Address, Device Instance, Node-ID.....	5
	2.4.1 - Setting the MAC Address.....	5
	2.4.2 - Setting the Device Instance (Node-ID).....	5
	2.4.2.1 - Set Node_Off.....	6
	2.4.3 - Setting the Device Node-ID.....	6
	2.5 - Set Baud Rate.....	7
	2.5.1 - Setting the Serial Baud Rate.....	7
	2.5.1.1 - Baud Rate DIP Switch Selection.....	7
<b>3 - Interfacing ProtoNode to Devices</b>	3.1 - Connection Ports.....	8
	3.2 - Wiring Connections.....	9
	3.2.1 - Biasing the Modbus RS-485 Network.....	9
	3.2.2 - End-of-Line Termination Switch for the Modbus RS-485 Port on the ProtoNode.....	10
	3.3 - Wiring ProtoNode RER to RS-485 Field Protocol.....	10
	3.4 - Wiring Power to the ProtoNode.....	11
<b>4 - Run Setup for Connected RS-485 Devices</b>	4.1 - Run Auto Discovery.....	12
<b>5 - Run Web Configurator</b>	5.1 - Connect PC to ProtoNode via Ethernet Port.....	13
	5.2 - Configure Profiles in ProtoNode's Web Configurator.....	13
	5.2.1 - Selecting the Device Profiles That Will Be Connected to the ProtoNode.....	13
<b>6 - Restarting the Installation</b>	6 - Restarting the Installation.....	14
<b>7 - Changing the ProtoNode IP Address</b>	7.1 - Connect PC to ProtoNode via Ethernet Port.....	15
	7.2 - Use the ProtoNode Web GUI to Connect to the ProtoNode.....	15
	7.3 - Set IP Address for BACnet/IP and Modbus TCP.....	16
<b>8 - CAS BACnet Explorer</b>	8.1 - Downloading the CAS Explorer and Requesting an Activation Key.....	17
	8.2 - CAS BACnet Setup.....	18
	8.2.1 - CAS BACnet MS/TP Setup.....	18
	8.2.2 - CAS BACnet/IP Setup.....	18
<b>9 - Big Ass Fans Electrical Installation</b>	Safety Guidelines.....	19
	9.1 - Modbus Wiring Overview.....	19
	9.2 - Cable Types and Distances.....	20
	9.3 - Terminating or EOL Resistors.....	20
	9.4 - Setup and Wiring: Delta E Series VFDs.....	21
	9.5 - Setup and Wiring: Delta M Series VFDs.....	23
	9.6 - Setup and Wiring: Lenze SMVector VFDs.....	25
	9.7 - RS-485 Network Biasing: Lenze SMVector VFDs.....	27
	9.8 - Setup and Wiring: Viper VFDs.....	28
	9.9 - Connecting More Than 32 Fans (Daisy Chaining).....	30
	9.10 - Fire Alarm Interface Methods.....	31

## Contents (cont.)

<b>10 - Fan Remote Operator Station (Optional)</b>	10.1 - Dimensions.....	32
	10.2 - Installation.....	32
	10.3 - Operation.....	32
	10.4 - Remote Operator Station Wiring: Delta E Series VFDs.....	33
	10.5 - Remote Operator Station Wiring: Delta M Series VFDs.....	34
	10.6 - Remote Operator Station Wiring: Lenze SMVector VFDs.....	35
<b>Appendix A - Troubleshooting</b>	Appendix A.1 - Checking Wiring and Settings.....	37
	Appendix A.2 - Taking a Diagnostic Capture.....	37
	Appendix A.3 - Setting the Network Number for BACnet/IP.....	39
	Appendix A.4 - LED Diagnostics.....	39
<b>Appendix B - Modbus RTU Mappings</b>	Appendix B.1 - SMVector Modbus RTU Mappings.....	40
	Appendix B.2 - Delta VFD E Modbus RTU Mappings.....	40
	Appendix B.3 - Delta VFD M Modbus RTU Mappings.....	41
	Appendix B.4 - Viper Modbus RTU Mappings.....	41
<b>Appendix C - MAC Address DIP Switch Settings</b>	Appendix C - MAC Address DIP Switch Settings.....	43
<b>Appendix D - Reference</b>	Appendix D.1 - Specifications.....	46
	Appendix D.2 - Compliance with UL Regulations.....	46
<b>Warranty</b>	Warranty.....	47

## 1.1 - ProtoNode gateway

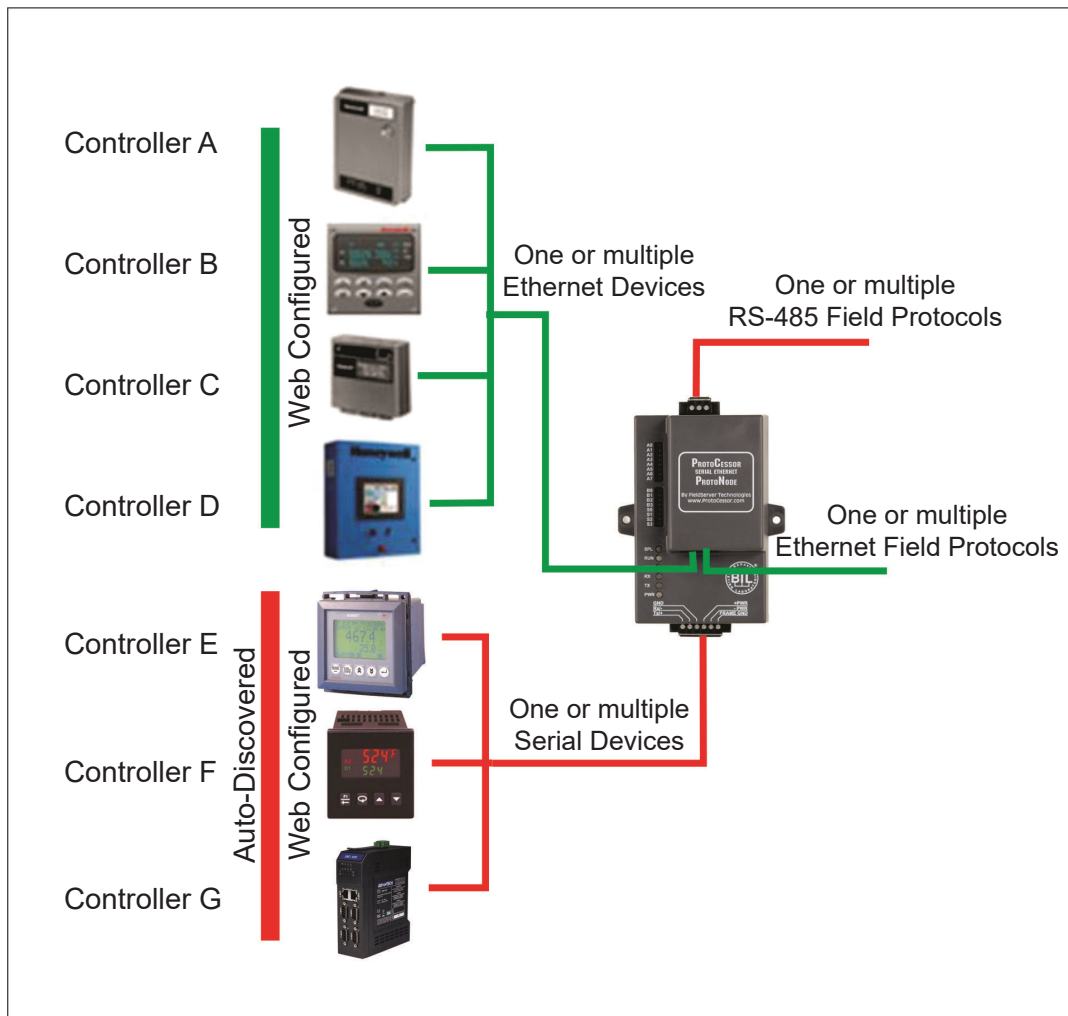
ProtoNode is an external, high performance Building Automation multi-protocol gateway that is pre-configured to automatically communicate between any of Big Ass Fans' products (hereafter called "device") to various building automation protocols. These protocols include BACnet<sup>1</sup>MS/TP, BACnet/IP, Metasys<sup>2</sup> N2 by JCI, and Modbus TCP. It is not necessary to download any configuration files to support the required applications.

The ProtoNode has been designed to simultaneously support both known RS-485 and Ethernet devices connected to the ProtoNode. The ProtoNode has all of the pretest Profiles/Configurations of all the devices stored inside itself. Two (2) methods of configuration are used to dynamically set the devices up for the various protocols:

- RS-485 devices connected to the ProtoNode are automatically discovered on power up. The ProtoNode performs an Auto-Discovery of known profiles or devices connected on the RS-485 network.
- Ethernet known devices connected to the ProtoNode cannot be Auto-Discovered. If you want to add known Ethernet devices, you must run the ProtoNode's Web Configurator. The Web Configurator will show all the stored profiles/devices that are inside the ProtoNode. It will show all the RS-485 devices that were discovered. You will select which Ethernet devices you want to connect to the ProtoNode (Ethernet and RS-485). You must select the device, Modbus Node-ID, and the IP Address if you are selecting Ethernet devices. After you select all of the devices, the ProtoNode automatically builds and downloads the configuration for the desired protocol.

<sup>1</sup>BACnet is a registered trademark of ASHRAE.

<sup>2</sup>Metasys is a registered trademark of Johnson Controls Inc.



## 1.2 - Big Ass Fans devices: Method of configuration

---

Devices	Type of communication	Type of configuration
SM_VECTOR	RS-485 and Ethernet	Auto-Discover and/or Web Config
DELTA_VFD_E	RS-485 and Ethernet	Auto-Discover and/or Web Config
DELTA_VFD_M	RS-485 and Ethernet	Auto-Discover and/or Web Config
VIPER	RS-485 and Ethernet	Auto-Discover and/or Web Config

Figure 1: Method of configuration for the devices

## 1.3 - Big Ass Fans devices and point count available

---

When installing the ProtoNode, be aware of the total combined points of the devices being connected to the ProtoNode. **The total number of devices attached to ProtoNode RER (FPC-N34) cannot exceed 1200 Modbus registers for BACnet MS/TP, BACnet/IP, Modbus/TCP or Metasys N2.**

Devices	Point count
SM_VECTOR	19
DELTA_VFD_E	12
DELTA_VFD_M	12
VIPER	12

Figure 2: Modbus registers

## 1.4 - BTL Mark: BACnet Testing Laboratory

---



BTL is a registered trademark of BACnet. BTL is a registered trademark of BACnet International. BTL is a registered trademark of BACnet International. BTL is a registered trademark of BACnet International.

The BTL Mark on ProtoNode RER is a symbol that indicates that a product has passed a series of rigorous tests conducted by an independent laboratory which verifies that the product correctly implements the BACnet features claimed in the listing. The mark is a symbol of a high-quality BACnet product. Go to <http://www.bacnetinternational.net/btl/> for more information about the BACnet Testing Laboratory.



The following describes BACnet setup for ProtoCessor ProtoNode RER.

## 2.1 - Record identification data

---

Each ProtoNode has a unique part number located on the underside of the unit. This number should be recorded, as it may be required for technical support. The number is as follows:

Model	Part number
ProtoNode RER	FPC-N34-103-126-0893

Figure 3: ProtoCessor part numbers

## 2.2 - Configure Modbus RTU COM settings

---

Configure the Modbus RTU COM settings on the device connected to ProtoNode RER (FPC-N34).

ALL devices connected to the ProtoNode MUST have the same Baud Rate, Data Bits, Stop Bits, and Parity. (Figure 4)

The figure below defines the installed default serial port settings necessary to communicate with the device.

Serial port setting	Device
Protocol	Modbus RTU
Baud Rate	9600
Parity	Even
Data Bits	8
Stop Bits	1

Figure 4: Modbus RTU COM settings

Set the Modbus Node-ID for each of the devices attached to the ProtoNode. The Modbus Node-IDs must be uniquely assigned between 1 and 255.

- **The Modbus Node-ID assigned to each device must be documented.**
- The Modbus Node-IDs assigned are used for setting the Device Instance for BACnet/IP and BACnet MS/TP. (See Section 2.4.2)
- The Metasys N2 and Modbus/TCP Node-ID will be set to the same value as the Node-ID of the Modbus RTU device.

**2.3 - Select field protocol**

Select the desired field protocol: BACnet MS/TP, BACnet/IP, Modbus/TCP, or Metasys N2 via S bank DIP switches for ProtoNode RER (FPC-N34 BACnet).

**2.3.1 - Using the S0–S3 bank of DIP switches**

- The S bank of DIP switches, S0–S2, is used to select BACnet MS/TP, BACnet/IP, Modbus/TCP, or Metasys N2 on ProtoNode RER.
- The S3 DIP switch is used to enable Auto Discovery of known devices attached to the ProtoNode RER, as well as save the recently discovered configuration. When the S3 DIP is Off, the ProtoNode will load the current saved configuration. **Turn S3 to On if the ProtoNode is being installed for the first time.**
- The following chart describes S0–S2 DIP switch configuration settings for the devices to support **BACnet MS/TP or BACnet/IP** on a ProtoNode RER.
- When the S bank of switches are all off (default setting), BACnet/IP is enabled.
- The OFF position is when the DIP switches are set closest to the outside of the box.

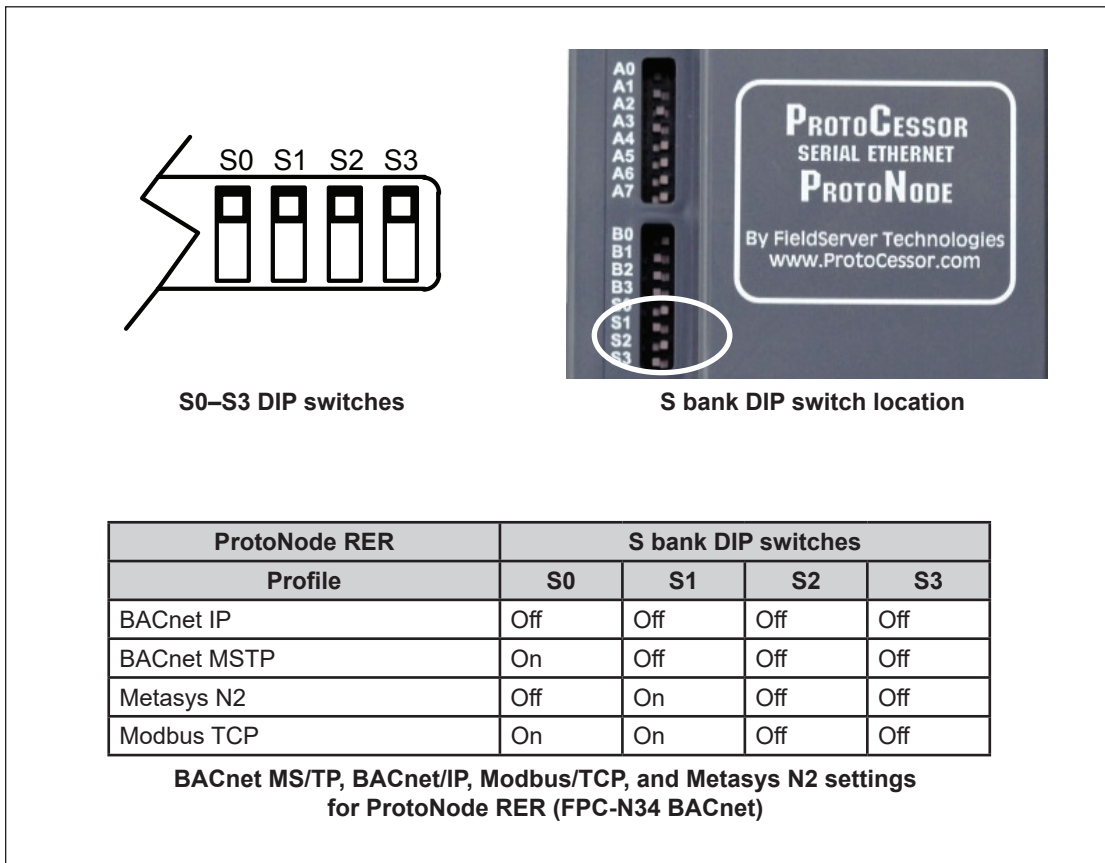


Figure 5: S bank DIP switches

## 2.4 - Set MAC address, Device Instance, Node-ID

---

Set the MAC address for BACnet MS/TP. Set the Device Instance for BACnet MS/TP and BACnet/IP. Set the Node-ID for Metasys N2 and Modbus/TCP on ProtoNode RER (FPC-N34).

### 2.4.1 - Setting the MAC address

Set the MAC address for BACnet MS/TP for ProtoNode RER (FPC-N34 BACnet).

- Only one (1) MAC address is set for the ProtoNode regardless of how many devices are connected to the ProtoNode.
- Set the BACnet MS/TP MAC address between 1 to 127 (Master MAC address); this is so that the BMS Front End can find the ProtoNode via BACnet auto discovery.
- Addresses from 128 to 255 are Slave Addresses and cannot be discovered by BMS Front Ends that support auto discovery of BACnet MS/TP devices. *Note: Never set a BACnet MS/TP MAC Address from 128 to 255.*
- Set DIP switches A0–A7 to assign MAC Address for BACnet MS/TP for the ProtoNode RER (FPC-N34).
- Refer to Appendix C.1 for the full range of addresses to set Node-ID/Device Instance.
- **When using Metasys N2 and Modbus/TCP, the A bank of DIP switches is disabled and not used. They should be set to OFF.**



Figure 6: MAC address DIP switches

*Note: When setting DIP switches, ensure power to the board is OFF.*

---

### 2.4.2 - Setting the Device Instance (Node-ID)

Set the Device Instance (Node-ID) for BACnet MS/TP and BACnet/IP on ProtoNode RER (FPC-N34 BACnet).

- The A bank of DIP switches is also used to set the BACnet Device Instances.
- BACnet/IP/BACnet MS/TP Addressing: The BACnet device instances will be set by taking the Node\_Offset found in Web Configurator and adding it to the Modbus Node-ID that was assigned to the device (Section 2.2). The BACnet Device Instance can range from 1 to 4,194,303.

For example:

- **Node\_Offset default = 50,000**
- Device 1 has a Modbus Node-ID of 1, Device 2 has a Modbus Node-ID of 2, Device 3 has a Modbus Node-ID of 3.
- Device 1 - Device Instance = 50,001
- Device 2 - Device Instance = 50,002
- Device 3 - Device Instance = 50,003
- To change the Node\_Offset, see Section 2.4.2.1. The node offset can be changed from 50,000 to 1 to 4,194,302 via the Web Configurator.

### 2.4.2.1 - Set Node\_Off

Set Node\_Off to assign specific Device Instances for BACnet MS/TP and BACnet/IP.

- If the Device Instances need to be set for addresses other than 50,000 to 50,127, change the Node+Offset (50,000 is the default for Node+Offset). See Section 4.1 to set the PC's IP address to the same Subnet as the ProtoNode and Section 4.2 to connect to the ProtoNode's Web Configurator which is shown in Figure 7.
- The BACnet Device Instance can range from 1 to 4,194,303.
- BACnet/IP/BACnet MS/TP Addressing: The BACnet device instances will be set by taking the Node\_Offset found in Web Configurator (see Figure 6) and adding it to the Modbus Node-ID that was assigned to the device (Section 2.2).
- Set the PC's IP address to be on the same subnet as the ProtoNode.
- Open the PC browser and enter the default IP address of the ProtoNode: 192.168.1.24. This will bring you to the FST Web Configurator landing page for the ProtoNode.
- Change the Node+Offset to meet the required device instance.

For example: Required Device Instance = 20,001

- Node\_Offset changed to = 20,000.
- Device 1 has a Modbus Node-ID of 1, Device 2 has a Modbus Node-ID of 2, Device 3 has a Modbus Node-ID of 3.
- Device 1 - Device Instance = 20,001
- Device 2 - Device Instance = 20,002
- Device 3 - Device Instance = 20,003

*Note: The Modbus Node address + Node\_Offset = Device Instance setting*

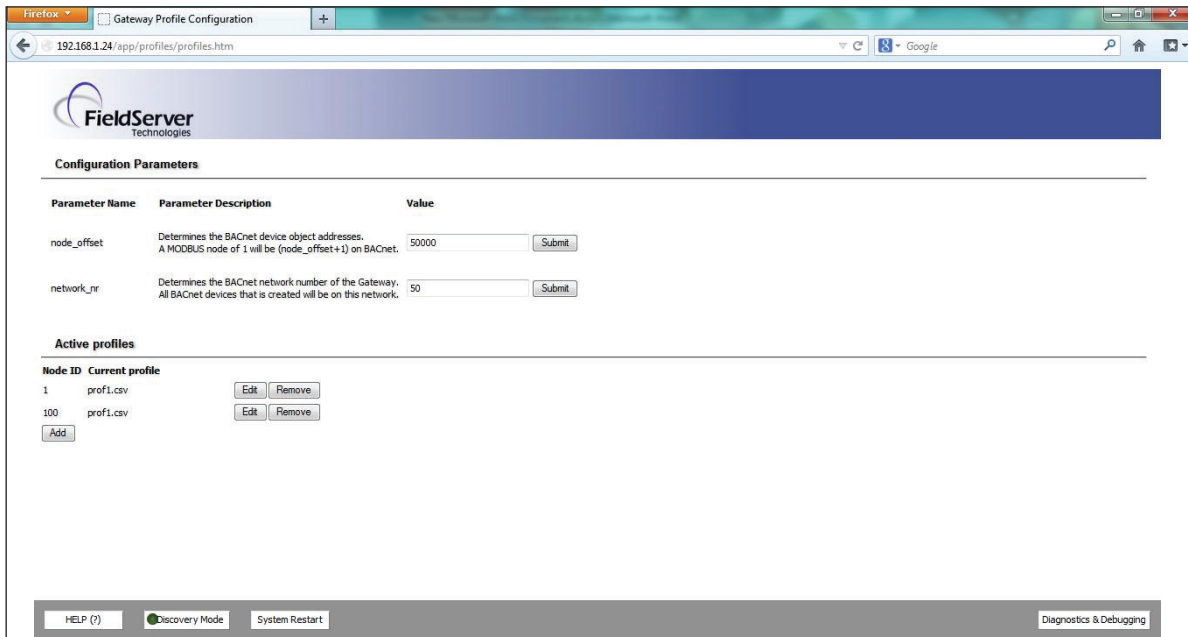


Figure 7: FST Web GUI screen

### 2.4.3 - Setting the Device Node-ID

Set the Device Node-ID for Metasys N2 and Modbus/TCP on ProtoNode RER (FPC-N34 Metasys N2).

- The Modbus RTU Node-IDs assigned to the devices attached to the ProtoNode in Section 2.2 will be the Metasys N2 and Modbus TCP Node\_IDs for the field protocols.
- Metasys N2 and Modbus/TCP Node-ID Addressing: Metasys N2 and Modbus/TCP Node-IDs range from 1 to 255.

## 2.5 Set baud rate

---

Set the baud rate for BACnet MS/TP on ProtoNode RER (FPC-N34 BACnet).

### 2.5.1 - Setting the serial baud rate

Set the serial baud rate (DIP switch B0–B3) for BACnet MS/TP.

- DIP switches B0–B3 can be used to set the serial baud rate to match the baud rate provided by the Building Management System for BACnet MS/TP.
- The baud rate on the ProtoNode for Metasys N2 is set for 9600. DIP switches B0–B3 are disabled for Metasys N2 on ProtoNode RER (FPC-N34).

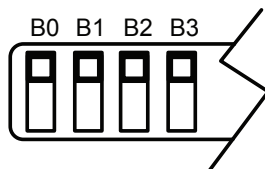


Figure 8: Baud rate DIP switches

---

#### 2.5.1.1 - Baud rate DIP switch selection

Baud	B0	B1	B2	B3
9600	On	On	On	Off
19200	Off	Off	Off	On
38400	On	On	Off	On
57600	Off	Off	On	On
76800	On	Off	On	On

Figure 9: Baud rate

# 8 3 - Interfacing ProtoNode to Devices

## 3.1 - Connection ports

The following shows the connection ports on ProtoNode RER (FPC-N34).

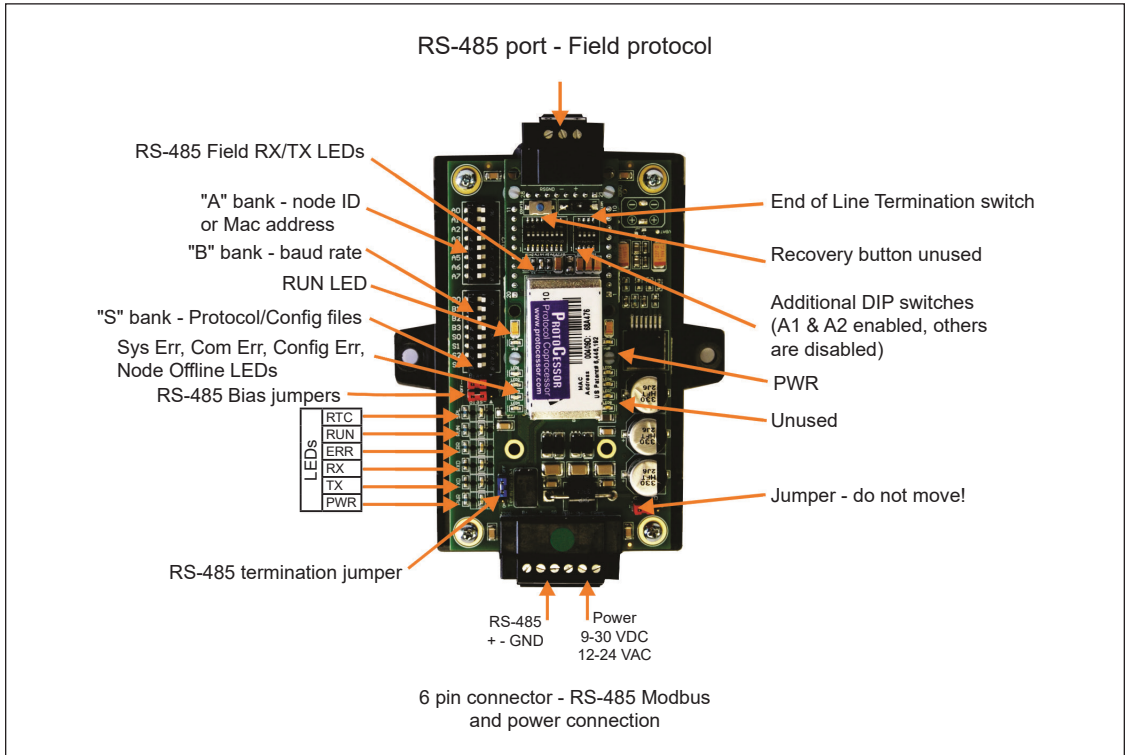


Figure 10: ProtoNode BACnet RER

### 3.2 - Wiring connections

The following shows the wiring connections to ProtoNode RER (FPC-N34 BACnet).

**ProtoNode 6-pin Phoenix connector: Pin outs to Modbus RTU products**

- ProtoNode RER (FPC-N34 BACnet) has a 6-pin Phoenix connector. Pins 1 through 3 are for Modbus RS-485 to the devices and pins 4 through 6 are for power.

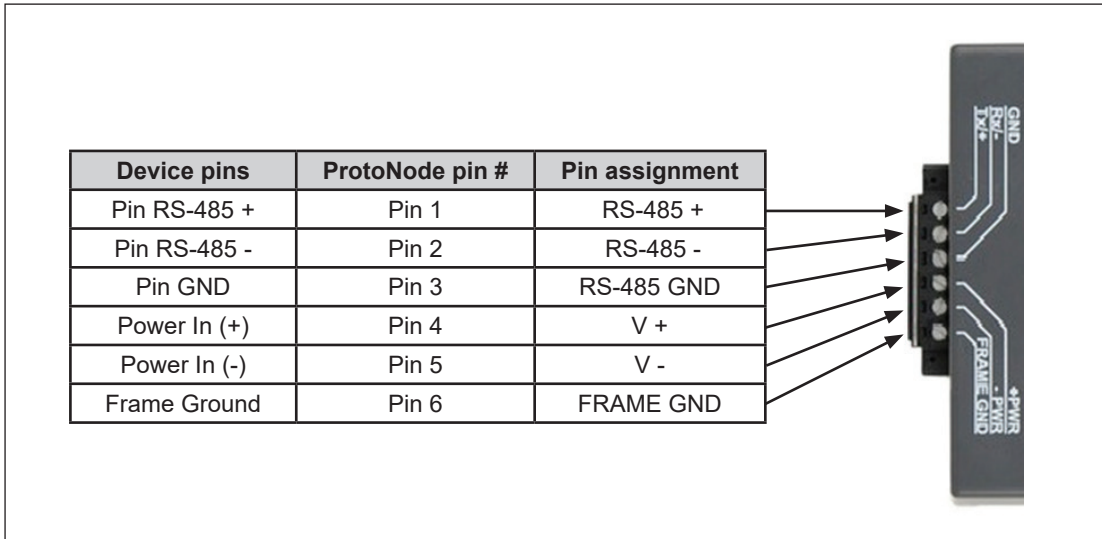


Figure 11: Power and RS-485 connections

#### 3.2.1 - Biasing the Modbus RS-485 network

- An RS-485 network with more than one device must have biasing to ensure proper communication. The biasing must be done on one device.
- The ProtoNode has a 510 Ohm resistor switch that is used to set the biasing. The ProtoNode’s default position for the Biasing switch is OFF from the factory.
- The biasing MUST always be left in the OFF position. The OFF position is when the two (2) RED biasing jumpers straddle the four (4) pins closest to the outside of the board of the ProtoNode. See Figure 12.
- **It is recommended that the biasing be left in the OFF position unless there is a problem with communicating with more than one device. If this occurs, try setting the biasing to ON.**

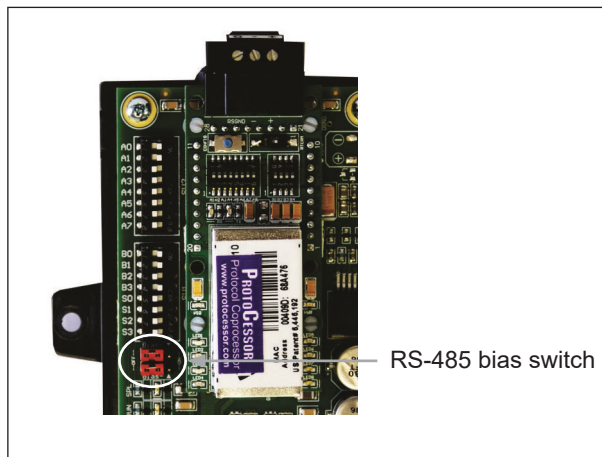


Figure 12: Modbus RS-485 biasing switch on the ProtoNode N34

**3.2.2 - End-of-line termination switch for the Modbus RS-485 port on the ProtoNode**

- On long RS-485 cabling runs, the RS-485 trunk must be properly terminated at each end.
- If the ProtoNode is placed at one end of the trunk, turn the blue RS-485 end-of-line terminating switch to the ON position.
- On short cabling runs, which most of the ENVI applications are, the EOL switch does not need to be turned ON. The default setting for this blue EOL switch is OFF.
- **Always leave the single red jumper in the A position.**

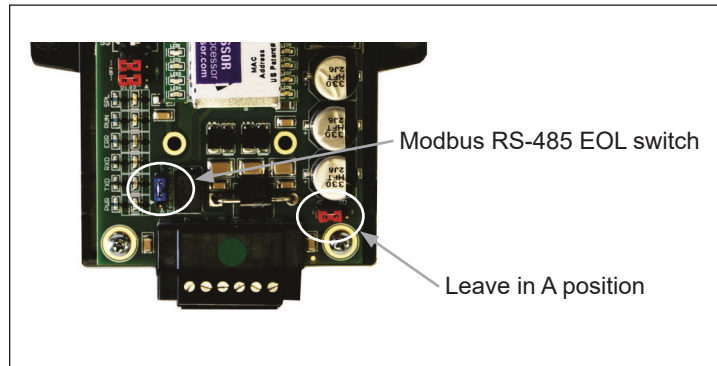


Figure 13: Modbus RS-485 end-of-line termination switch on the ProtoNode N34

**3.3 - Wiring ProtoNode RER to RS-485 field protocol**

The following shows how to wire ProtoNode RER to RS-485 field protocol (BACnet MS/TP or Metasys N2).

- Connect the BMS BACnet MS/TP or Metasys N2 RS-485 port to the 3-pin RS-485 connector on ProtoNode RER as shown below.
- See Section 4.1 for information on connecting ProtoNode RER to the BACnet/IP network.
- If the ProtoNode is the last device on the BACnet MS/TP or Metasys N2 trunk, the end-of-line terminator must be enabled (see Figure 15). It is disabled by default.

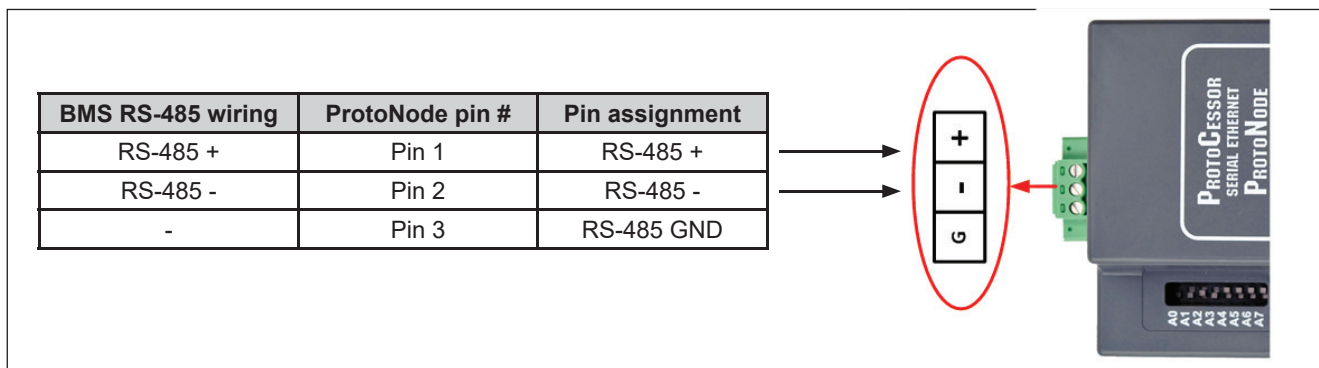


Figure 14: Connection from ProtoNode to RS-485 field protocol (BACnet MS/TP)

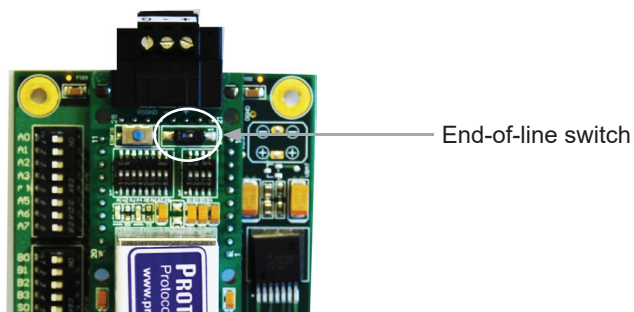


Figure 15: RS-485 EOL switch



### 3.4 - Wiring power to the ProtoNode

The following describes how to wire power to ProtoNode RER (FPC-N34 BACnet).

Ensure the power supply used complies with the specifications provided in Appendix D.1. Ensure the cable is grounded using the "Frame-GND" terminal. ProtoNode accepts either 9–30VDC or 12–24VAC.

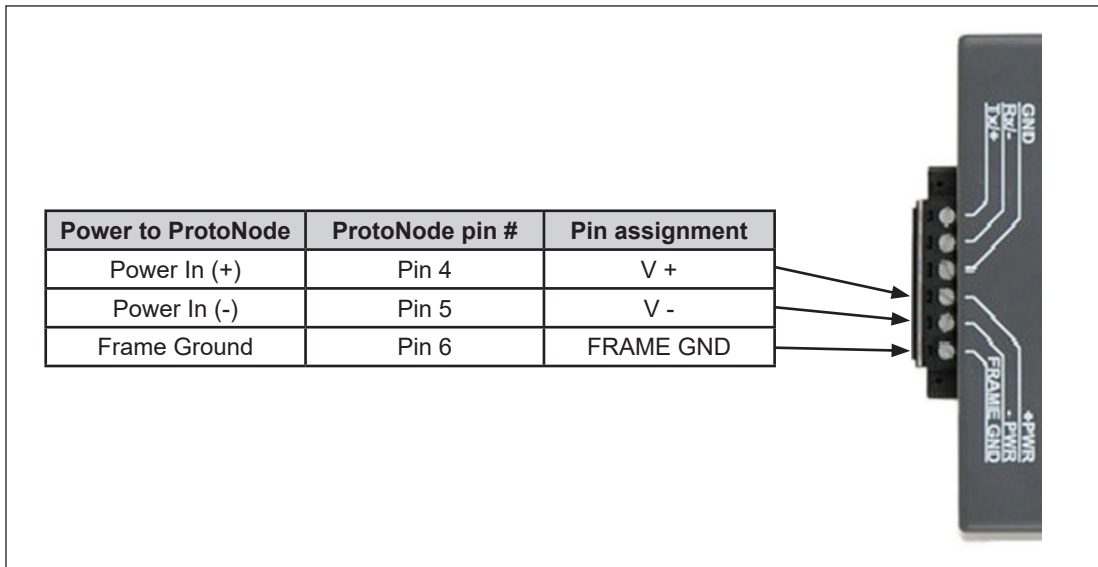
**Make sure the S3 DIP switch is in the On position to enable the ProtoNode "Auto Discovery" mode for RS-485 devices connected to the ProtoNode. See Section 4 before powering up.**

**Power requirements for ProtoNode at 9V through 30VDC or 12–24VAC**

ProtoNode family	Current draw type		
	12VDC/VAC	24VDC/VAC	30VDC
FPC – N34 (Typical)	170mA	100mA	80mA
FPC – N34 (Maximum)	240mA	140mA	100mA

*Note: These values are "nominal" and a safety margin should be added to the power supply of the host system. A safety margin of 25% is recommended.*

**Figure 16: Required current draw for the ProtoNode**



**Figure 17: Power connections**

# 12 4 - Run Setup for Connected RS-485 Devices

Run setup for RS-485 devices (profiles) connected to ProtoNode RER (Auto Discovery).

There may be some RS-485 devices that are not discoverable. These devices must be set up by the Web Configurator. See Section 1.2 for information on which devices can be Auto Discovered.

## 4.1 - Run Auto Discovery

---

When installing the ProtoNode for the first time, run Auto Discovery for all RS-485 devices connected to the ProtoNode. This process will automatically discover all discoverable RS-485 devices and then build/load the configuration file.

The following chart describes the S3 DIP switch setting for enabling Auto Discovery of known devices attached to the ProtoNode RER.

- Set S3 DIP switch to the On position to Auto Discover any of the products attached to the ProtoNode (**make sure power is off when setting the switch**).
- When the ProtoNode is wired to the Modbus devices, turn on the power. It will take three (3) minutes to discover all Modbus RTU devices attached to the ProtoNode.
- **After the ProtoNode has discovered all of the Modbus RTU devices, set the S3 DIP switch to the OFF position to turn off.**
- S3 DIP switch in the Off position will load the existing saved file.
- If the S3 DIP switch is not set to the Off position after an Auto Discover, the ProtoNode will go through the Auto Discovery looking for new devices to discover after every power up. Any devices discovered from past discoveries will remain loaded in the memory. The ProtoNode will not duplicate any discovered devices. See Section 6 to remove any existing discovered devices.

### ProtoNode RER

S3 DIP switch Auto Discovery mode	S3
Auto Discovery ON – Build New Configuration	On
Auto Discovery OFF – Load Current Configuration	Off

Figure 18: S3 DIP switch setting for Auto Discovering devices

Run the Web Configurator to set up the Ethernet and RS-485 devices (profiles) connected to ProtoNode RER.

## 5.1 - Connect PC to ProtoNode via Ethernet port

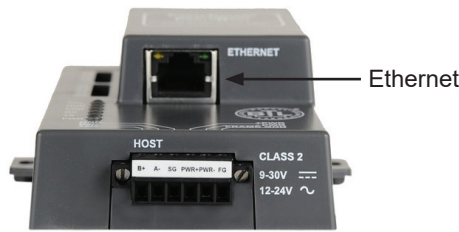


Figure 19: Ethernet port location

1. Connect a standard CAT5 Ethernet cable (straight through or crossover) between the PC and the ProtoNode.
2. The default IP address of the ProtoNode is **192.168.1.24**, and the subnet mask is **255.255.255.0**. If the PC and the ProtoNode are on different IP networks, assign a static IP address to the PC on the 192.168.1.xxx network.
3. Click **Start > Control Panel > Network Connections**.
4. Right-click **Local Area Connection**, and then click **Properties**.
5. Highlight **Internet Protocol (TCP/IP)**, and then click **Properties**.
6. Select **Use the following IP address**:

Use the following IP address:

IP address:	192 . 168 . 1 . 11
Subnet mask:	255 . 255 . 255 . 0
Default gateway:	. . .

7. Click **OK** twice.

## 5.2 - Configure profiles in ProtoNode's Web Configurator

Open the PC's Web browser and enter the default IP address of the ProtoNode (192.168.1.24). When the S bank of DIP switches is set for BACnet MS/TP, BACnet/IP, Metasys N2, or Modbus TCP, profiles for all of the devices for that particular protocol will be listed in the Configurator.

### 5.2.1 Selecting the device profiles that will be connected to the ProtoNode

When you open the Web Configurator, you will see Active Profiles on the left side of the screen. There is a pull-down box under Current Profiles that lists all the available profiles. Both Modbus RTU and Modbus TCP device profiles to BACnet MS/TP or BACnet/IP will appear for the FPC-N34.

To add an active profile, select **Add** under Active Profiles. For every device that will be added, you must add the Active Profile (on the left of the screen) and the Modbus Node Address for Modbus RTU and Modbus TCP devices that get assigned to the particular device. If selecting a Modbus TCP device, you must also add the IP address for the device being added.

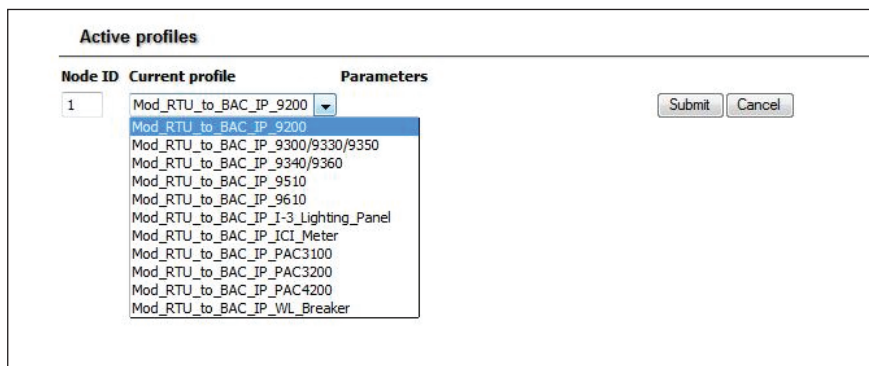


Figure 20: Web configurator showing the active Modbus RTU profiles to select from

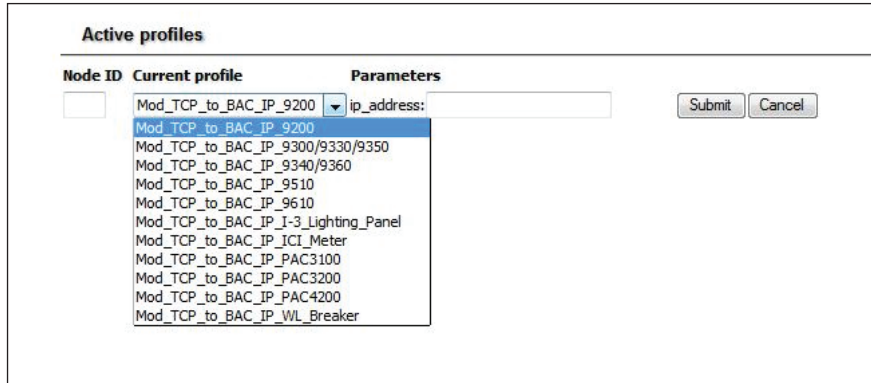


Figure 21: Web Configurator showing an active Modbus TCP profile selected

After selecting the profile, Modbus node address, and IP address for the Modbus TCP device, click **Add** to add the profile to be configured.

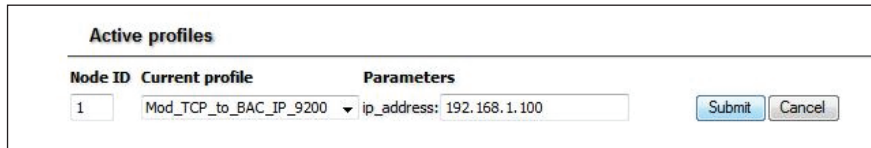


Figure 22: Web Configurator showing a completed profile added

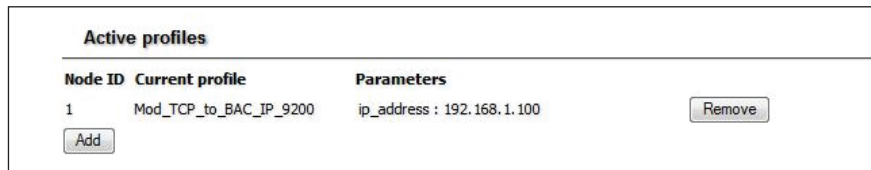


Figure 23: Web Configurator showing completed profiles added

Continue this process until all the devices have been added.

## 6 - Restarting the Installation

If you need to start the installation over, remove auto-discovered and/or Web-configured profiles.

1. Open the PC 's Web browser and enter the default IP address of the ProtoNode (192.168.1.24). This opens the Web Configurator.
2. Click **Clear Profiles and Restart**.

After the restart is complete, all past profiles that were discovered and/or added via the Web Configurator will be deleted. The unit is now ready to be reinstalled.

Change the ProtoNode IP address using the Web GUI for BACnet/IP and Modbus TCP.

## 7.1 - Connect PC to ProtoNode via Ethernet port

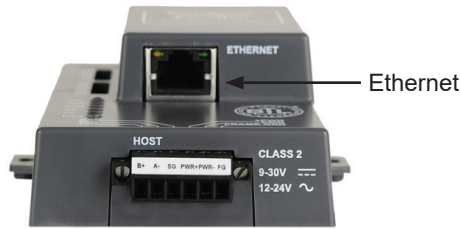


Figure 24: Ethernet port location

1. Connect a standard CAT5 Ethernet cable (straight through or crossover) between the PC and the ProtoNode.
2. The default IP address of the ProtoNode is **192.168.1.24**, and the subnet mask is **255.255.255.0**. If the PC and the ProtoNode are on different IP networks, assign a static IP address to the PC on the 192.168.1.xxx network.
3. Click **Start > Control Panel > Network Connections**.
4. Right-click **Local Area Connection**, and then click **Properties**.
5. Highlight **Internet Protocol (TCP/IP)**, and then click **Properties**.
6. Select **Use the following IP address**:

Use the following IP address:

IP address:	192 . 168 . 1 . 11
Subnet mask:	255 . 255 . 255 . 0
Default gateway:	. . .

7. Click **OK** twice.

## 7.2 - Use the ProtoNode Web GUI to connect to the ProtoNode

Open the PC's web browser and enter the default IP address of the ProtoNode (192.168.1.24). Determine if the ProtoNode is up and communicating. Figure 25 shows the main landing page for the ProtoNode.

Under Active Profiles, the discovered Modbus RTU devices with the associated Modbus RTU Node-IDs can be seen. If no profiles are present, the wiring, baud rate, and DIP switch settings must be checked, because there is a problem with the Modbus COMs. All the active devices must show the correct Modbus Node-IDs before proceeding.

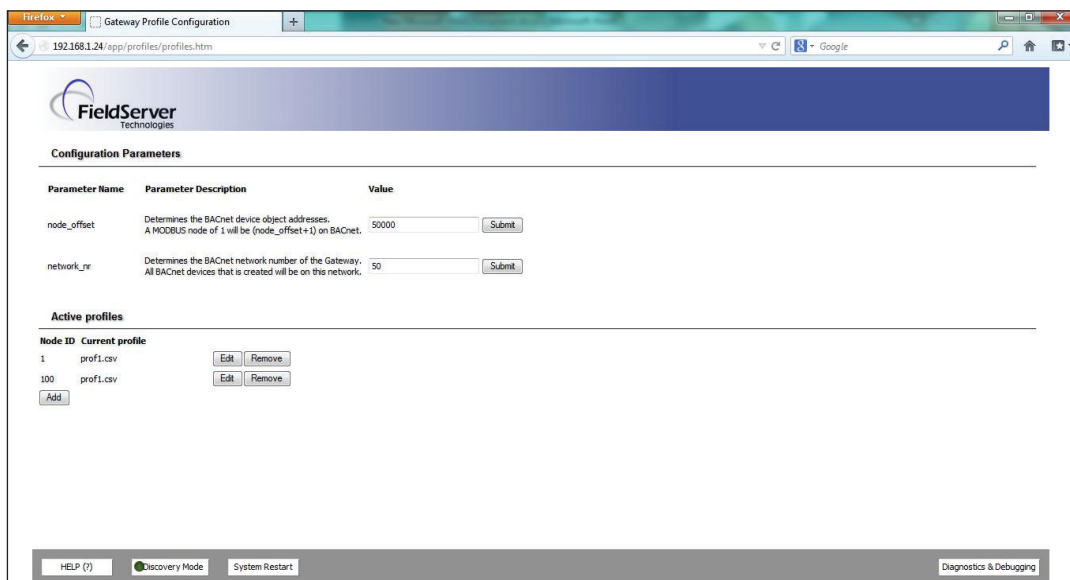


Figure 25: FST Web GUI screen

### 7.3 - Set IP address for BACnet/IP and Modbus TCP

1. Open the PC's Web browser and enter the default IP address of the ProtoNode (192.168.1.24). Connect to the ProtoNode.
2. From the GUI main landing, click **Diagnostics and Debugging** to get to the Utilities section of the GUI (to change IP address and other capabilities, see Figure 27).

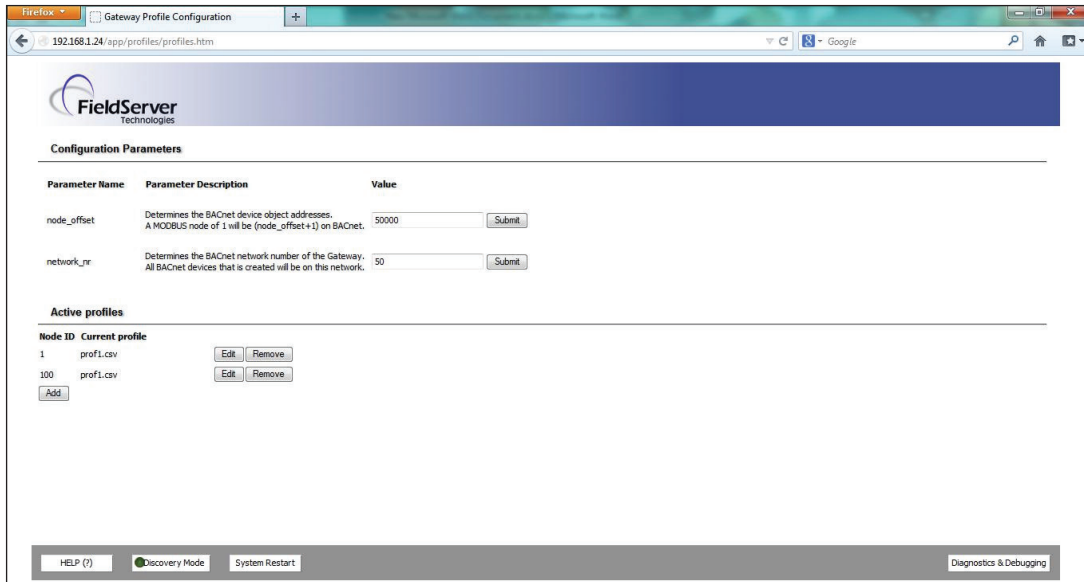


Figure 26: FST Web GUI Utilities page

3. From the Utility page, click **Setup > Network Settings** to enter the Edit IP Address Settings menu.
4. Modify the IP address (N1 IP address field) of the ProtoNode Ethernet port.
5. If necessary, change the Netmask (N1 Netmask field).
6. Type a new Subnet Mask.
7. If necessary, change the IP Gateway (Default Gateway field).
8. Type a new IP Gateway. *Note: If the ProtoNode is connected to a router, the IP Gateway of the ProtoNode should be set to the IP address of the router it is connected to.*
9. Reset the ProtoNode.
10. Unplug the Ethernet cable from the PC and connect it to the network hub or router.

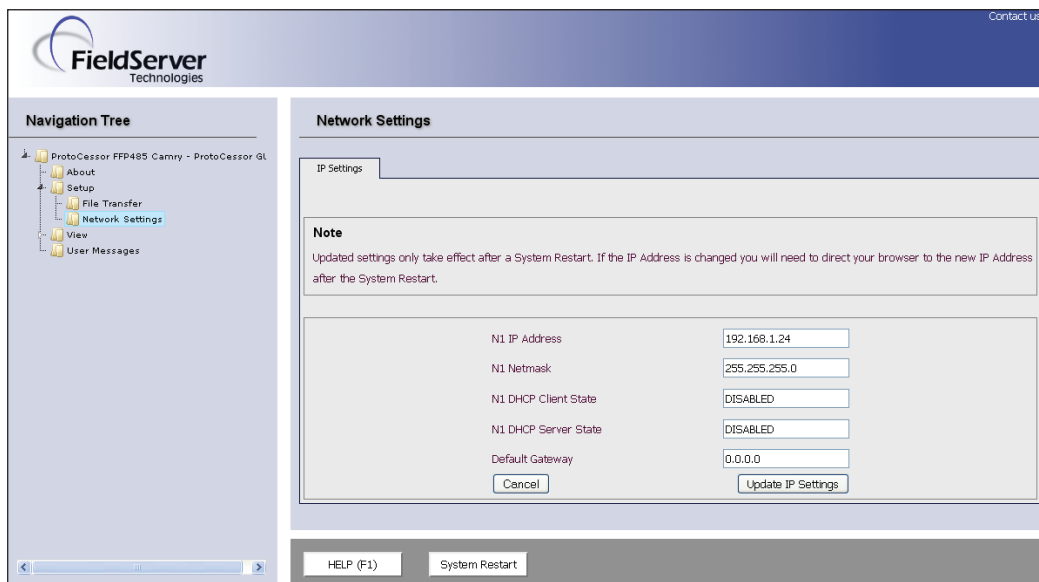


Figure 27: Changing IP address via FST Web GUI

The CAS BACnet Explorer is for validating the ProtoNode in the field.

ProtoCessor has arranged a complementary two-week fully functional copy of CAS BACnet Explorer (through Chipkin Automation) that can be used to validate BACnet MS/TP and/or BACnet/IP communications of the ProtoNode in the field without having to have the BMS Integrator on site. A serial or USB to RS-485 converter is required for testing BACnet MS/TP.

## 8.1 - Downloading the CAS Explorer and requesting an activation key

1. To request the complementary BACnet CAS key, go to <http://app.chipkin.com/activation/twoweek/> and fill in all the information. **Enter Vendor Code "BAF2013."** When you are finished, the key will be sent to the e-mail address you submitted. You must copy and paste the long key from this e-mail into the CAS key activation page.

**Request a two week account activation**

You have two choices

1. **Activate your account for two weeks**  
To request a two week account activation, simply complete this form and request a new product key from within the CAS BACnet Explorer.  
Note: Your contact info will be used by chipkin to contact you. If your contact info is invalid or you are unreachable your account will be revoked.

Name:

Company:

Address:

Phone number:

Email Address:

Vendor code:

Product: CAS BACnet Explorer

1. **Purchase**  
You can buy the CAS BACnet Explorer to get a full account from If you have one, you can use your discount coupon on the web page. [Visit this page](#)

Feel free to [contact us](#) with any questions you may have.

Figure 28: Downloading the CAS Explorer

2. Go to the following Web site and download and install the CAS BACnet Explorer on your PC:  
<http://www.chipkin.com/technical-resources/cas-bacnet-explorer/>
3. In the CAS activation form, enter the e-mail address and paste the CAS key that was sent. When you are finished, click **Activate**.

Settings

License

Network

Preferences

Auto Update

About

**License**

Email Address:

Product key:

Please copy and past the activation key from your email in to this dialog and click activate.  
If you do not have an activation key, you can request now by entering a valid email address and clicking the request a key button.

Figure 29: Requesting CAS activation key

## 8.2 - CAS BACnet setup

---

The following instructions are for setting up CAS Explorer for the first time on BACnet MS/ST and BACnet/IP.

### 8.2.1 - CAS BACnet MS/TP setup

Connect either the serial or USB to RS-485 converter to your PC and the 3-pin BACnet MS/TP connector on ProtoNode RER.

In CAS Explorer, do the following:

1. Click **Settings**.
2. Check the **BACnet MSTP** check box and uncheck the **BACnet/IP** and **BACnet Ethernet** check boxes.
3. Set the BACnet MSTP MAC address to 0.
4. Set the BACnet MSTP Baud Rate to 38400.
5. Click **OK**.
6. In the bottom right corner, make sure the **BACnet MSTP** box is green.
7. Click **Discover**.
8. Check all four (4) check boxes.
9. Click **Send**.

### 8.2.2 - CAS BACnet/IP setup

Connect a straight through or cross Ethernet cable from the PC to the ProtoNode.

In CAS Explorer, do the following:

1. Click **Settings**.
2. Check the **BACnet/IP** check box and uncheck the **BACnet MSTP** and **BACnet Ethernet** check boxes.
3. In the **Select a Network Device** box, select the network card of the PC by clicking it.
4. Click **OK**.
5. In the bottom right corner, make sure the **BACnet/IP** box is green.
6. Click **Discover**.
7. Check all four (4) check boxes.
8. Click **Send**.



# 9 - Big Ass Fans Electrical Installation



**WARNING:** To reduce the risk of electric shock, wiring should be performed by a qualified electrician! Incorrect assembly can cause electric shock or damage the motor and the controller! Hazard of electrical shock!

**WARNING:** Installation must be in accordance with the requirements specified in this installation manual and with any additional requirements set forth by the National Electric Code (NEC), ANSI/NFPA 70-2011, and all local codes. Code compliance is ultimately YOUR responsibility! Failure to comply with these codes could result in personal injury or property damage.

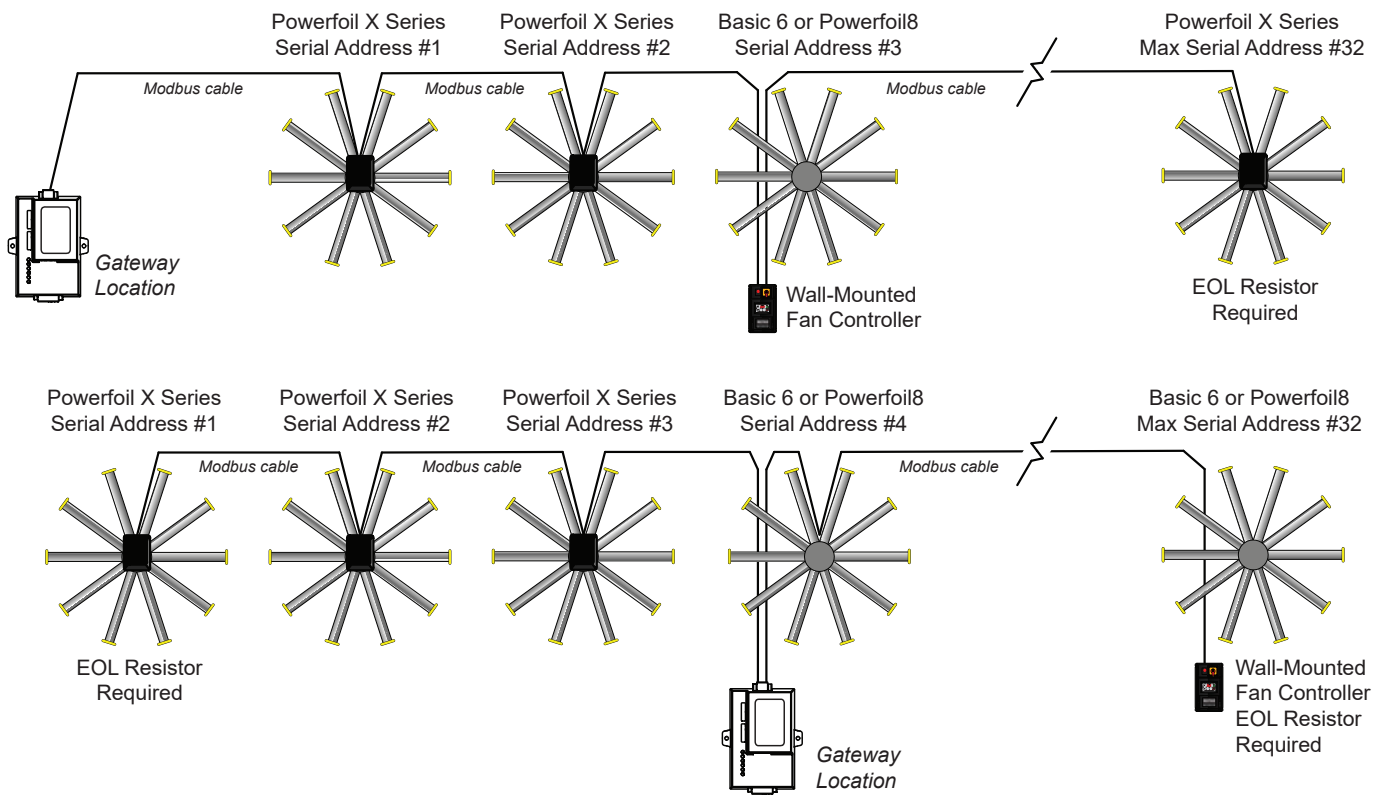
**WARNING:** The fan controllers contain high voltage capacitors that take time to discharge after removal of mains supply. Before working on the fan controller, ensure isolation of mains supply from line inputs at the fan controller's disconnect if installed. Wait three (3) minutes for capacitors to discharge to safe voltage levels. Failure to do so may result in personal injury or death. Darkened display LEDs are not an indication of safe voltage levels.

**CAUTION:** The Big Ass Fans product warranty will not cover equipment damage or failure that is caused by improper installation.

## 9.1 - Modbus wiring overview

**Do not assign the same address to two (2) fans.**

The Modbus RTU protocol is used for communication with fans over a two-wire RS-485 network. Each fan or device requires a unique serial address. The following pages detail the setup and connections unique to each supported type of fan. Two basic wiring layouts are shown below. The first illustrates multiple daisy chained drops with the gateway located on one end of the Modbus loop. The second illustrates the same fan drop arrangement with the gateway in a central location. Either scenario will handle up to 32 unique serial addresses.



## 9.2 - Cable types and distances

---

The maximum total distance for a Modbus loop is 4,000 cable feet (1,219.2 m); however, this may not always be practical. The cable impedance, load impedance, foreign signal presence, serial baud rate, and number of attached devices will decrease this maximum distance limit. Testing has shown that the system has a solid signal strength on a 1,000-ft (304.8 m) loop; however, there is no way to determine the maximum length for a particular application due to the number of variables.

There are a number of acceptable cable types that can be used for installation. On the following pages, Windy City Wire Modbus cable is used for all examples. **It is absolutely critical that the cable used meets TIA/EIA-485 standards for use on RS-485 networks.** Manufacturers that make acceptable cable include Carol<sup>®</sup>, Alpha Wire, Tyco/Raychem<sup>®</sup>, and Belden.

## 9.3 - Terminating or EOL resistors

---

A number of 1/4W, 120-ohm resistors are included in the provided hardware. As illustrated on the following pages, an EOL resistor must be placed across the MBA and MBB terminals at the last device in a Modbus cable run, even if it is only a single run between the gateway and a single fan.

**9.4 - Setup and wiring: 200–240 V & 400–480 V Delta E Series VFDs (Powerfoil®X Series fans)**

**⚠ WARNING:** The fan controllers contain high voltage capacitors that take time to discharge after removal of mains supply. Before working on the fan controller, ensure isolation of mains supply from line inputs at the fan controller's disconnect if installed. Wait three (3) minutes for capacitors to discharge to safe voltage levels. Failure to do so may result in personal injury or death. Darkened display LEDs are not an indication of safe voltage levels.

To enable the fan to connect to the BACnet adapter:

1. Remove the VFD enclosure cover. Connect the wall controller provided with the fan to the VFD by plugging the controller cable into the VFD's CAT5 power tap. Apply power to the fan.
2. Check the fan's Modbus address. Each fan is programmed with a random address between 1–247. On the wall controller, press and hold the - and + buttons until the Menu screen appears. Press + until you reach the About screen, and then press the power button to view the fan's Modbus address. If you want to change the address, press and hold the - and + buttons from the main controller screen until the Menu screen appears. Press the power button to select the Edit Parameters option. Follow the on-screen instructions to change parameter 09-00 to the Modbus number of your choice.
3. Record the Modbus address. You will need to know the address when setting up and using the BACnet adapter.
4. Disconnect AC mains power from the fan via the twist-lock plug or other means.
5. Install the Modbus cable into the VFD enclosure with the appropriate fitting, such as a cord grip connector or EMT connector.
6. Disconnect the controller cable from the CAT5 power tap, and then disconnect the power tap from the VFD's RJ45 port and low voltage terminals. Refer to the illustration on the right.
7. Connect the data cable as shown on the following page. Pay special attention to the polarity for MBA, MBB. *Note: It is helpful to plug the data port screw terminal block into the drive prior to termination. BE MINDFUL of the tightening torque. The VFD's data port can be damaged by excessive force applied on the screw heads. The cable shield's drain lead and reference line (if present) connect to the VFD's Analog Common terminal (ACM).*
8. Reinstall the VFD enclosure cover and reapply power to the fan.

*Note: The following actions will result in a communications loss and subsequent fan shutdown:*

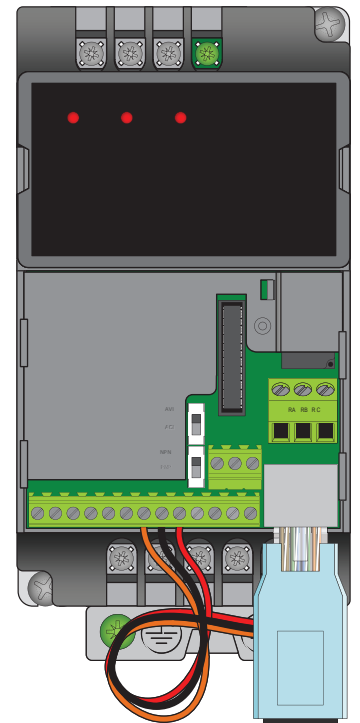
- Gateway power loss
- Modbus data loop wire break

Alternatively, the remote operator station can be installed.

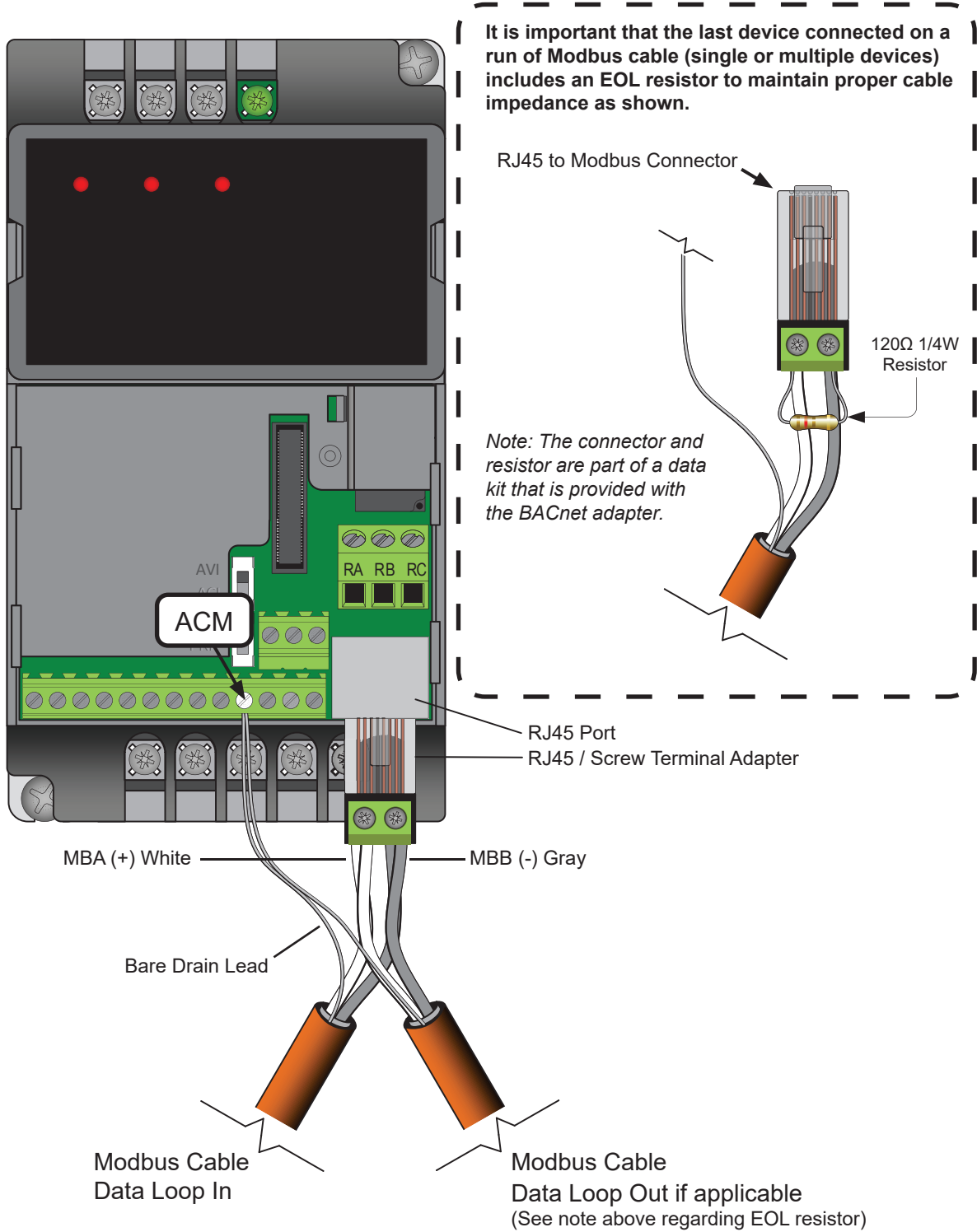
**Fan parameters**

All parameters for using Delta E Series VFDs with the BACnet adapter are programmed at the factory except for fan addresses. If you want to view or modify fan parameters, you will need to reconnect the wall controller and contact Customer Service. Big Ass Fans recommends storing the wall controller, CAT5 power tap, and controller cable near the fan in case you need to reconnect them.

**To view or modify fan parameters**, on the wall controller, press and hold the - and + buttons until the Menu screen appears. Press the power button to select the Edit Parameters option. Contact Customer Service for assistance with modifying fan parameters.



**CAT5 Power Tap  
(REMOVE after changing  
fan Modbus address)**



Note: The wire colors shown above are applicable to Windy City Wire Modbus cable only. Other cable types may differ. Take note of color/polarity if using a different model of cable.

**9.5 - Setup and wiring: 575V–600V Delta M Series VFDs (Powerfoil®X Series fans)**

**⚠ WARNING:** The fan controllers contain high voltage capacitors that take time to discharge after removal of mains supply. Before working on the fan controller, ensure isolation of mains supply from line inputs at the fan controller's disconnect if installed. Wait three (3) minutes for capacitors to discharge to safe voltage levels. Failure to do so may result in personal injury or death. Darkened display LEDs are not an indication of safe voltage levels.







The following parameter changes are required prior to disconnection of the wall-mounted fan controller:

Parameter	Default setting	Change to
Pr.00: First Start/Stop Reference, USB/RS485	1	3
Pr.01: First Speed Reference, USB/RS485	1	3
Pr.88: Communication Address	1	1–32 (must be unique to fan)
Pr.90: Transmission Fault Treatment; Warn and ramp to stop	3	1
Pr.91: Timeout Detection	0.0 sec (disable)	90.0 sec
Pr.92: Modbus RTU (8,E,1)	0	4

Make these parameter changes before disconnecting the wall controller cable from the VFD and proceeding with fan power down and Modbus loop termination. If necessary, Big Ass Fans recommends leaving the wall controller installed as a redundant means of control. Alternatively, the remote operator station can be installed.

**⚠ WARNING:** Before making parameter changes, ensure that the fan is stopped, the "RUN" LED is off, and the "STOP" LED is illuminated on the wall controller.

**To change fan parameters:**

1. Press **PROG/DATA** on the wall controller to enter programming mode.
2. Press  or  if necessary to display parameter P 00.
3. Press **PROG/DATA** to view the current setting.
4. Press  or  to change the setting to 3.
5. Press **PROG/DATA** to save the change.
6. Press  or  to move to another parameter within group 02, or press **Mode** to exit programming mode.

Repeat the steps above to navigate to and change the remaining required parameters. When you are finished, press **Mode** to exit programming mode and return to the normal operational screens.

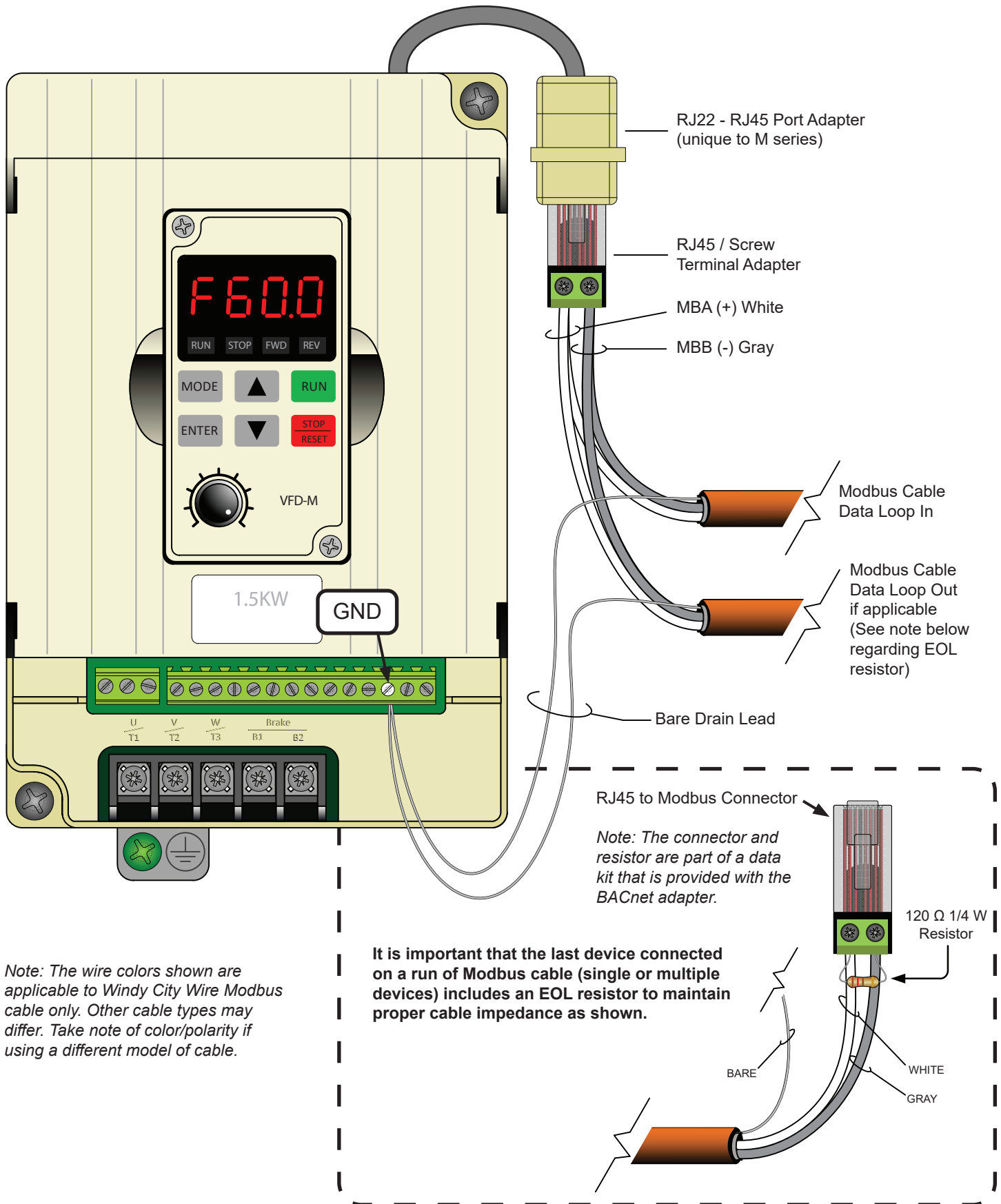
**Final connections**

1. Disconnect AC mains power from the fan via the twist-lock plug or other means, and then wait for a darkened LED display on the wall controller.
2. Remove the cover of the VFD enclosure and install the Modbus cable into the enclosure with the appropriate fitting, e.g. cord grip connector or EMT connector.
3. Disconnect the existing wall controller cable from the VFD's RJ22 to RJ45 port adapter. Leave the adapter in place.
4. Connect the data cable as shown on the following page. Pay special attention to the polarity for MBA, MBB. The cable shield's drain lead and reference line (if present) connect to the VFD's low voltage ground terminal (GND).
5. Reinstall the VFD enclosure cover and reapply power to the fan.

*Note: The following actions will result in a communications loss and subsequent fan shutdown:*

- Gateway power loss
- Modbus data loop wire break

9.5 - Setup and wiring: 575V–600V Delta M Series VFDs (Powerfoil®X Series fans) (cont.)










## 9.6 - Setup and wiring: Lenze SMVector VFDs (Powerfoil®8 and Basic 6® fans)

**⚠ WARNING:** The fan controllers contain high voltage capacitors that take time to discharge after removal of mains supply. Before working on the fan controller, ensure isolation of mains supply from line inputs at the fan controller's disconnect if installed. Wait three (3) minutes for capacitors to discharge to safe voltage levels. Darkened display LEDs are not an indication of safe voltage levels.

**⚠ WARNING:** Before making parameter changes, ensure fan is stopped and jumper wires are removed.

Parameter	Default setting	Action
P100: Start Stop Control	3	Confirm set to 3
P101: Speed Reference	0	Confirm set to 0
P116: Remote Speed Reference	6	Confirm set to 6
P122: Terminal 13B Function	9	Confirm set to 9
P199: Program Selection	0	Confirm set to 0
P400: Communication Protocol	2	Confirm set to 2
P410: Modbus Address	1	Set to 1–32 (must be unique to fan)
P411: Baud Rate	2	Confirm set to 2
P412: Communication Format	2	Confirm set to 2
P422: Network Stop	2	Confirm set to 2
P425: Communication Timeout	30.0 sec	Confirm set to 30.0 sec
P426: Timeout Action	4	Confirm set to 4

### To confirm or change fan parameters:

1. Press  on the wall controller to enter programming mode.
2. Press  or  until the desired parameter is displayed.
3. Press  to view the current setting.
4. Press  or  to change the setting (if necessary).
5. Press  to save the change.

Repeat the steps above to confirm or change parameters. When the last change is completed, the controller will return to the normal operational screen.

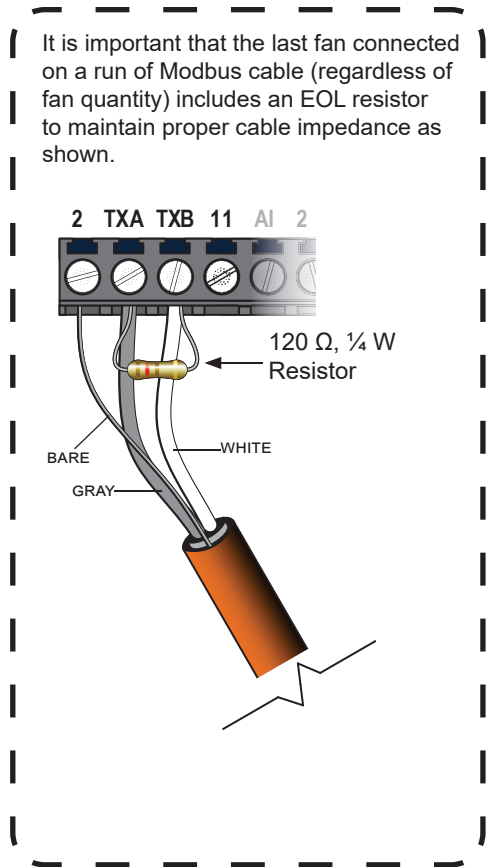
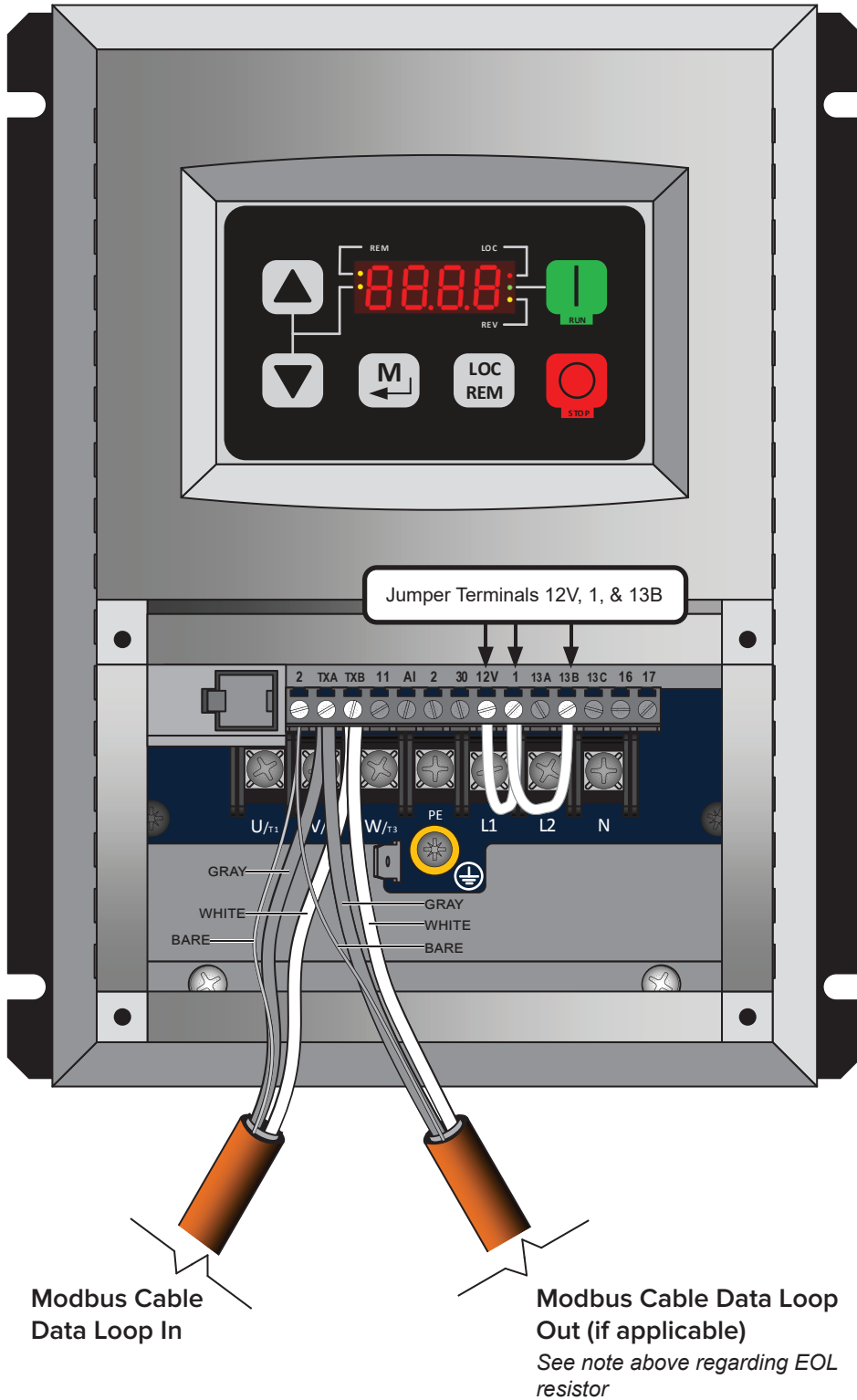
### Final connections

1. Disconnect AC mains power from the fan via the included rotary disconnect or other means, and then wait for a darkened LED display on the fan controller.
2. Remove the lower VFD cover and install the Modbus cable into the main drive housing with the appropriate fitting, e.g., cord grip connector or EMT connector.
3. Install jumpers between terminals 12, 1, and 13B.
4. Connect the data cable as shown on the following page. Pay special attention to the polarity for Data(+) and Data(-). The cable's shield and drain line (if present) land on terminal 2 (DC Common) on the VFD.
5. Reinstall the VFD's lower cover while being mindful of the bare drain leads slack (if present). *Incidental contact between the drain lead and the VFD's input/output leads can result in catastrophic damage to all other devices on the Modbus loop!*
6. Reapply power to the fan.

*Note: The following actions will result in a communications loss and subsequent fan shutdown:*

- Gateway power loss
- Modbus data loop wire break

9.6 - Setup and wiring: Lenze SMVector VFDs (Powerfoil®8 & Basic 6® fans) (cont.)



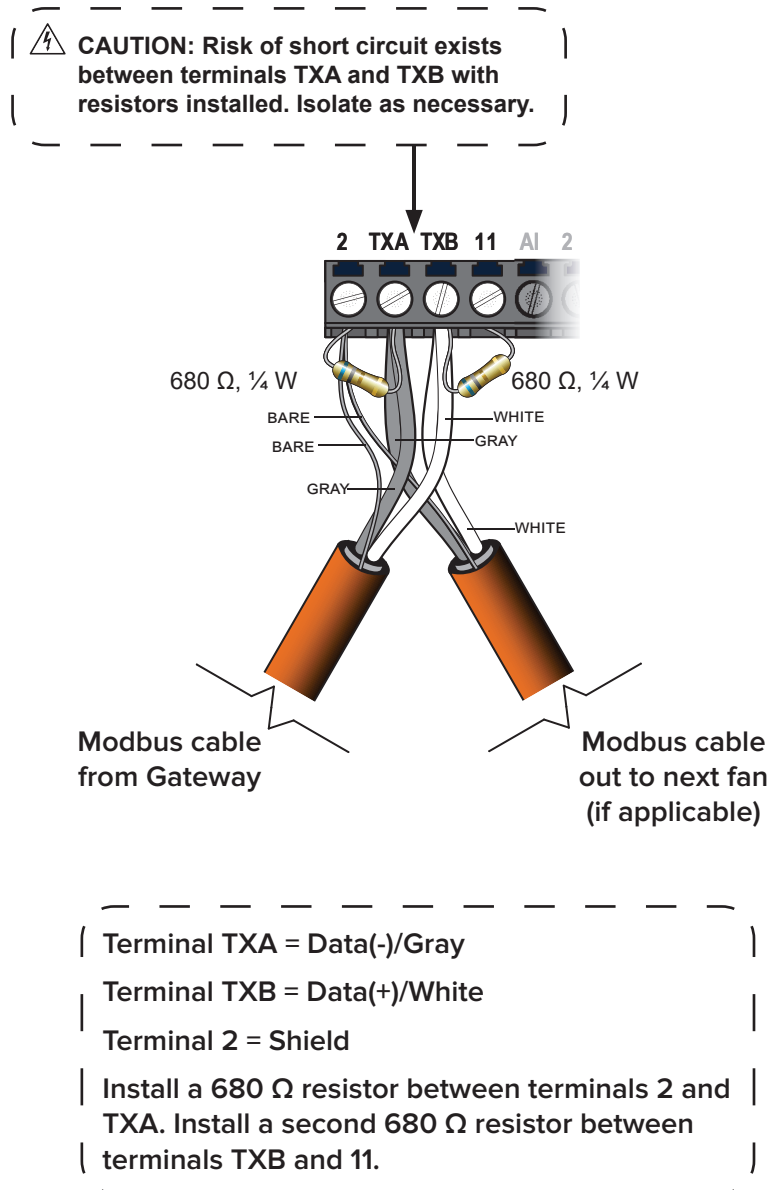
Terminal TXA = Data(-)/Gray  
 Terminal TXB = Data(+)/White  
 Terminal 2 = Shield

Note: The wire colors shown above are applicable to Windy City Wire Modbus cable only. Other cable types may differ. Take note of color/polarity if using a different model of cable.



### 9.7 - RS-485 Network Biasing: Lenze SMVector VFDs (Powerfoil®8 & Basic 6® fans)

Depending on the design of the RS-485 transmitters and receivers, biasing resistors may be required for proper data transmission. The biasing resistors keep the data lines on the system at a fixed level while the transmitters are in an idle state. Without these resistors, data corruption or data packet loss can occur. The SMVector drives fall within these requirements; therefore, **a pair of 680  $\Omega$ , 1/4 W resistors must be installed on either the first or last SMVector drive in the network series.** Due to the presence of a 120  $\Omega$  resistor at the end of the line, Big Ass Fans recommends installing the 680  $\Omega$  resistors at the first fan location to prevent clutter on the terminal strip.



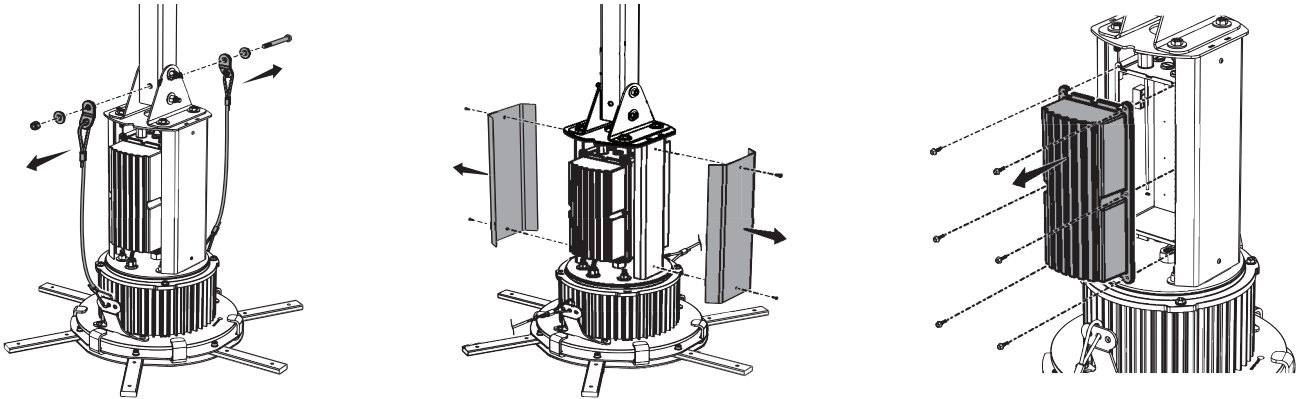
*Note: The wire colors shown are applicable to Windy City Wire Modbus cable only. Other cable types may differ. Take note of color/polarity if using a different model of cable.*

### 9.8 - Setup and wiring: Viper VFDs (Powerfoil D® fans)

**⚠ WARNING:** The fan controllers contain high voltage capacitors that take time to discharge after removal of mains supply. Before working on the fan controller, ensure isolation of mains supply from line inputs at the fan controller's disconnect if installed. Wait three (3) minutes for capacitors to discharge to safe voltage levels. Failure to do so may result in personal injury or death. Darkened display LEDs are not an indication of safe voltage levels.

To enable the fan to connect to the BACnet adapter:

1. Remove the fan's lower safety cables and side panels to access the VFD enclosure cover, and then remove the cover.



2. Connect the wall controller provided with the fan to the VFD by plugging the controller cable into the RJ45 port on top of the VFD enclosure. Apply power to the fan.
3. Check the fan's Modbus address. Each fan is programmed with a random address between 1–247. On the wall controller, press and hold the - and + buttons until the Menu screen appears. Press + until you reach the About screen, and then press the power button to view the fan's Modbus address. If you want to change the address, press and hold the - and + buttons from the main controller screen until the Menu screen appears. Press the power button to select the Edit Parameters option. Follow the on-screen instructions to change parameter 09-00 to the Modbus number of your choice.
4. Record the Modbus address. You will need to know the address when setting up and using the BACnet adapter.
5. Disconnect AC mains power from the fan via the twist-lock plug or other means.
6. Install the Modbus cable into the VFD enclosure with the appropriate fitting, such as a cord grip connector or EMT connector.
7. Disconnect the controller cable from the RJ45 port on top of the VFD enclosure.
8. Connect the data cable as shown on the following page. Pay special attention to the polarity for MBA, MBB. The cable's drain leads (if present) should be tied together at each fan and Earth grounded at one location only over the entire system length.
9. Reinstall the VFD enclosure cover, fan side panels, and lower safety cables, and then reapply power to the fan.

*Note: The following actions will result in a communications loss and subsequent fan shutdown:*

- Gateway power loss
- Modbus data loop wire break

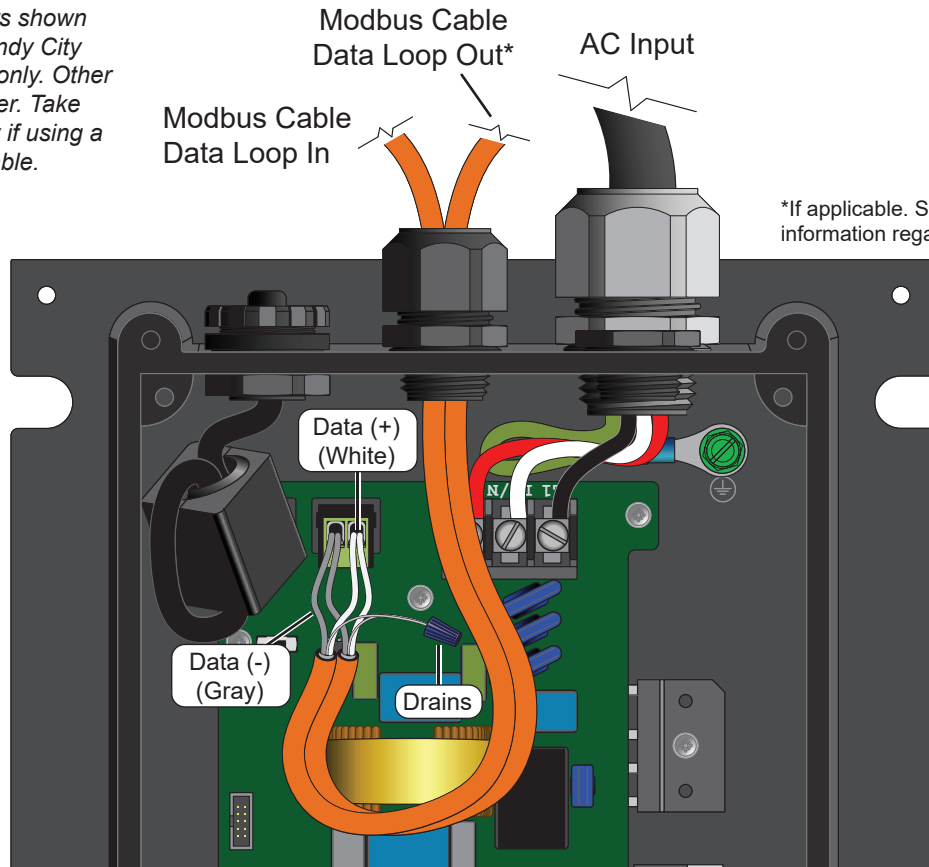
#### Fan parameters

All parameters for using Viper VFDs with the BACnet adapter are programmed at the factory except for fan addresses. If you want to view or modify fan parameters, you will need to reconnect the wall controller and contact Customer Service. Big Ass Fans recommends storing the wall controller and controller cable near the fan in case you need to reconnect them.

**To view or modify fan parameters**, on the wall controller, press and hold the - and + buttons until the Menu screen appears. Press the power button to select the Edit Parameters option. Contact Customer Service for assistance with modifying fan parameters.

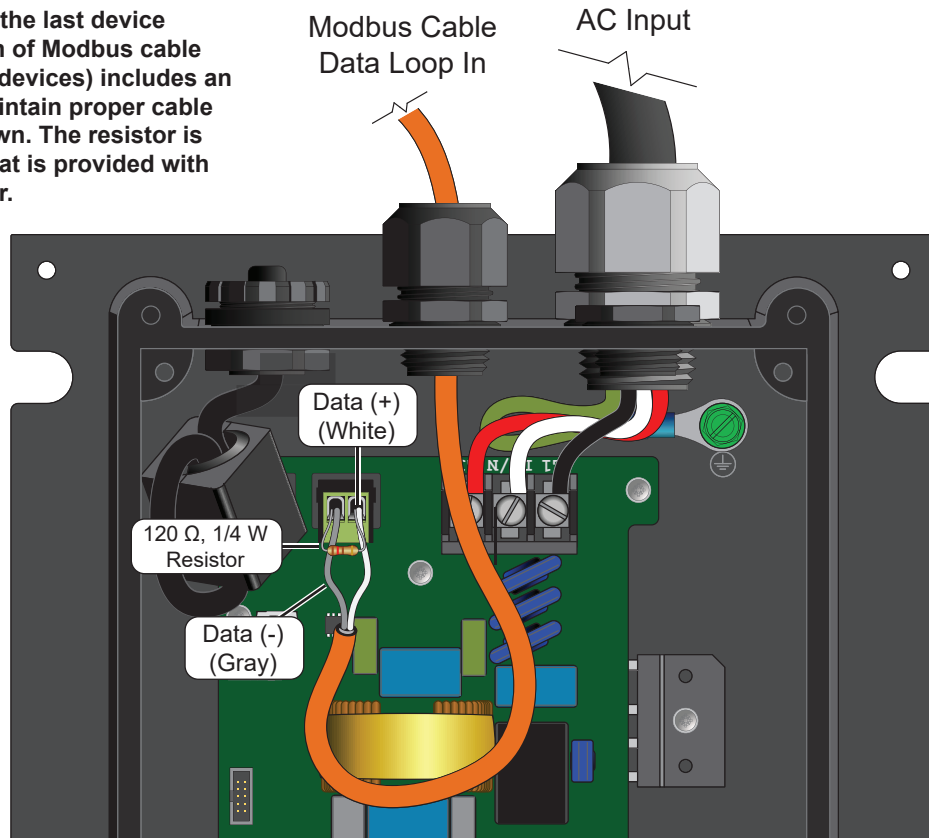
9.8 - Setup and wiring: Viper VFDs (Powerfoil D® fans) (cont.)

Note: The wire colors shown are applicable to Windy City Wire Modbus cable only. Other cable types may differ. Take note of color/polarity if using a different model of cable.



\*If applicable. See illustration below for information regarding EOL resistor.

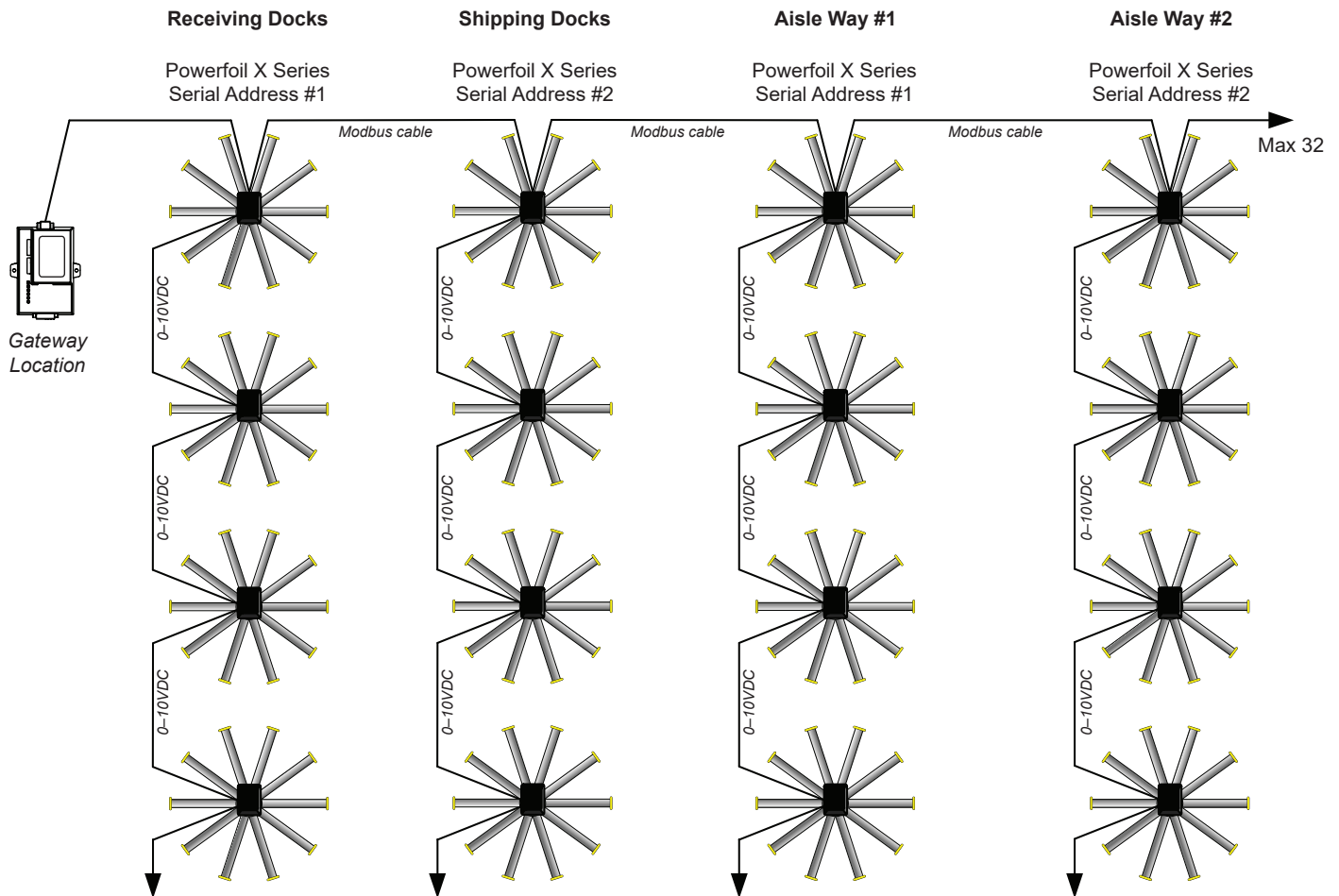
It is important that the last device connected on a run of Modbus cable (single or multiple devices) includes an EOL resistor to maintain proper cable impedance as shown. The resistor is part of a data kit that is provided with the BACnet adapter.



### 9.9 - Connecting more than 32 fans (daisy chaining)

The gateway is capable of communicating with only 32 unique serial addresses; however, **it is possible to connect more than 32 fans on a single gateway installation utilizing each fan controller's 0–10VDC daisy chaining setup as illustrated below.** Each fan controller contains a single 0–10VDC analog input for speed reference, as well as a 0–10VDC analog output; therefore, there is no signal loss from fan to fan, as each fan controller acts as a 0–10VDC repeater.

In this arrangement, a “fan” represents a group of fans, which are connected by the 0–10VDC analog loop. All fans on the 0–10VDC loop will behave identically. This is known as a master/slave setup or daisy chain, with the master being the first fan in the chain on the Modbus loop. You will reach a practical fan quantity limit based on square footage of your facility and/or for safety reasons before you find a physical hardware limitation. For 0–10VDC analog signals, an 18–20 AWG, two-conductor shielded cable is recommended for distances up to 100 ft (30.5 m). See the fan's Installation Guide for connection details.

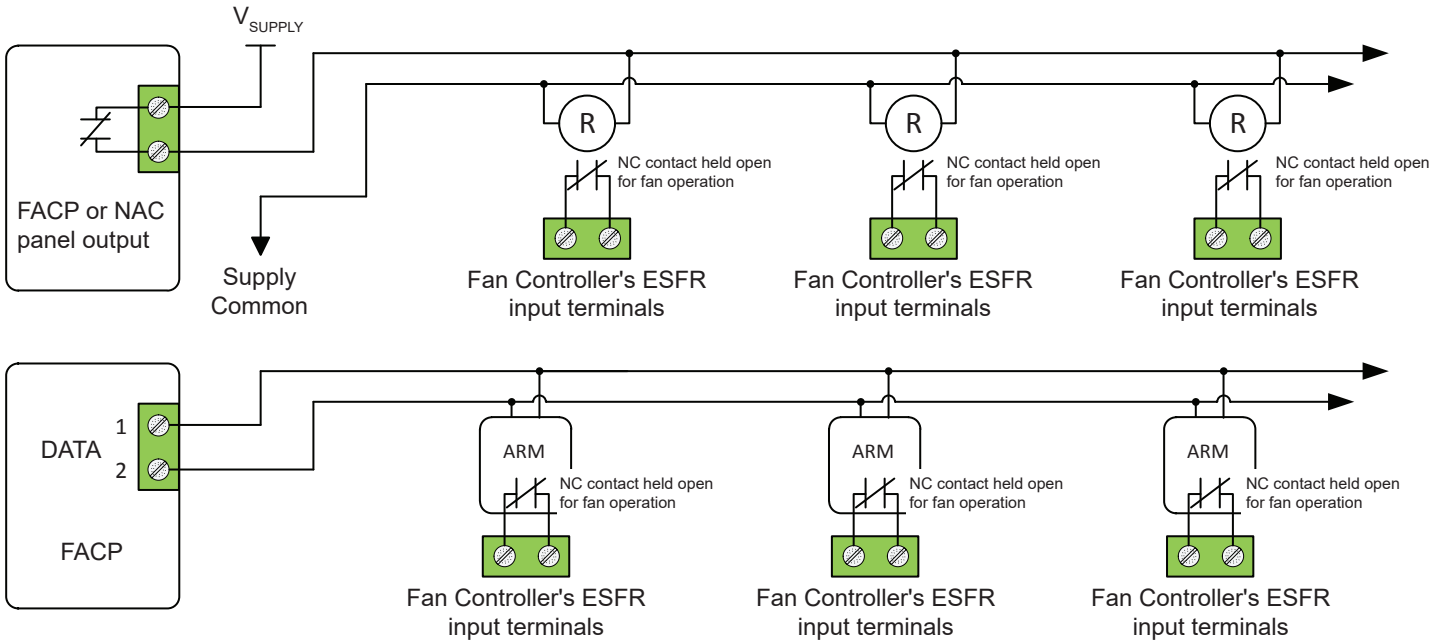


#### Daisy chain-capable fans and controllers

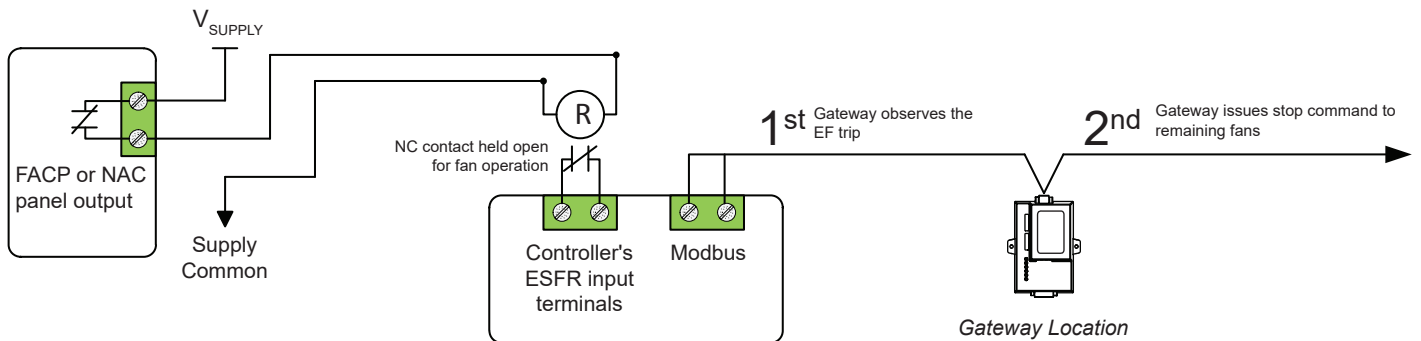
- Powerfoil®X Series fans with Delta E Series VFDs or Delta M Series VFDs
- Powerfoil®8 and Basic 6® fans with Lenze SMVector VFDs
- Any other fan system using VFDs that include both an analog input and analog output

9.10 - Fire alarm interface methods

The most common method for interfacing fans with a fire alarm system is to provide a dry relay contact to each fan. In this scenario, the relay coil is controlled by the Fire Alarm Control Panel (FACP) or a Notification Appliance Circuit (NAC). On newer systems, the relay is replaced by an addressable Alarm Release Module (ARM). In all of these scenarios, the fan sees a dry contact inserted across a run enable input to the fan controller. When the fan is turned on, it will enter an External Fault Trip (EF Fault). This is considered a “fail safe” scenario, especially when the FACP, NAC, or ARM relay coil remains energized at all times to enable fan operation. Any circuit power failure or alarm condition will result in a fan shutdown. The typical circuit layout is shown below.



The gateway provides an additional method of fire alarm system interface, which uses the run enable input on only one of the fan controllers. The gateway monitors all enable inputs on all of the addressed and connected fan controllers, and issues a shutdown command over the Modbus to the remaining controllers on the system if one of these inputs is reported as tripped. **The gateway will not be able to see a fire alarm trip on a 0–10V daisy chained fan!** This method may not comply with National Fire Protection Association (NFPA) Article 13 or other codes pertaining to fire alarm installation. **Consult all necessary parties and codes prior to implementation.**

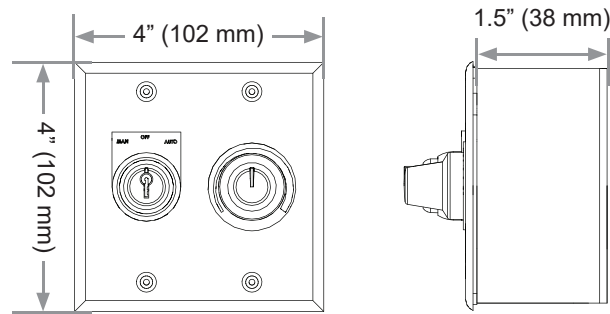


# 32 10 - Fan Remote Operator Station (Optional)

**⚠ WARNING:** Ensure power is disconnected from the fan(s) prior to installing the remote operator station(s).

The remote operator station lets you switch between automated fan control and local fan control. One remote operator station is required for each fan you plan to control locally. Each remote operator station must be wired to the fan it will control and can be mounted up to 100 ft (30.5 m) from the fan's VFD. The following pages describe how to mount and operate the remote operator station and how to wire it to each supported type of VFD. *Note: The required 6-conductor (20AWG minimum) cable is not provided. Big Ass Fans recommends Belden 5504UE or similarly rated cable.*

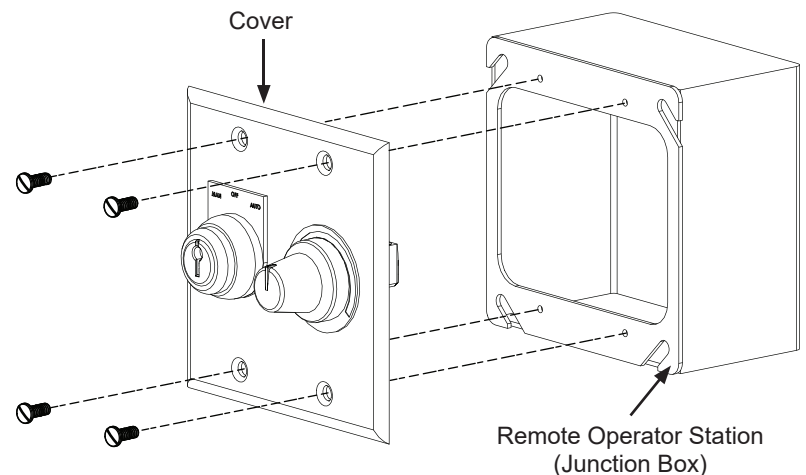
## 10.1 - Dimensions



## 10.2 - Installation

**To mount the remote operator station:**

1. Select a flat mounting location from which the fan is visible and that is 100 ft (30.5 m) or less from the fan's VFD. The mounting location should also be readily accessible, free from vibration, and at an adequate distance from foreign objects or moving equipment.
2. Remove the cover and four (4) screws and set them aside in a safe location.
3. Route power to the mounting location and mount the back of the remote operator station (junction box) to the wall using suitable customer-supplied mounting screws.
4. Wire the remote operator station to the fan's VFD. Refer to the following pages for wiring diagrams.
5. Reattach the cover using the four (4) screws as shown on the right.



## 10.3 - Operation

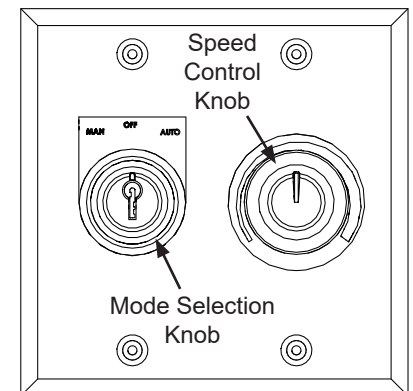
The remote operator station consists of a mode selection knob and a speed control knob. Use the provided key to turn the mode selection knob. **To prevent unauthorized access to the remote operator station, do not leave the key in the mode selection knob!**

**To control the fan automatically,** turn the mode selection knob to the AUTO position.

**To start the fan locally,** turn the mode selection knob to the MANUAL position.

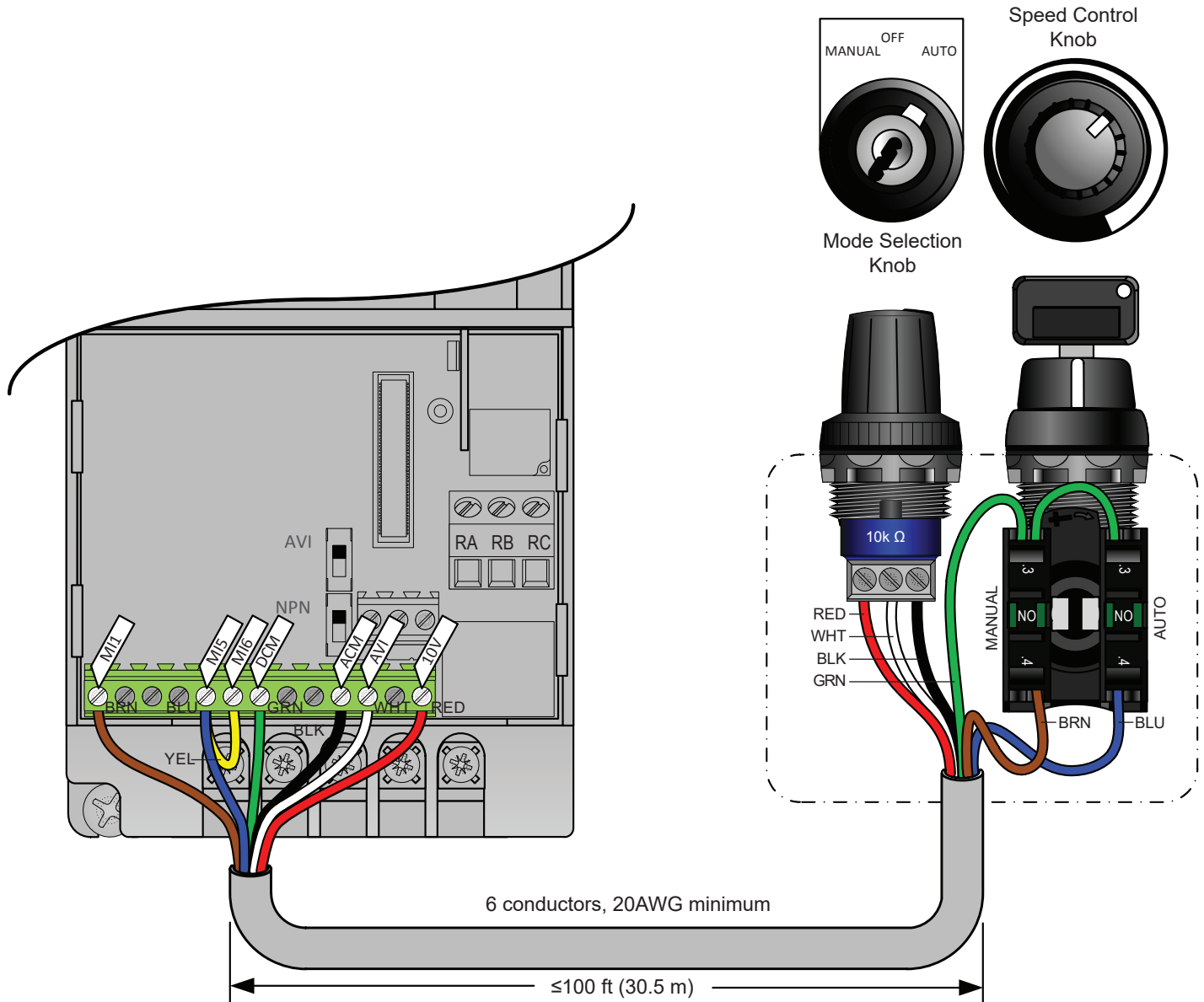
**To stop the fan locally** and lock it out, turn the mode selection knob to the OFF position.

**To adjust fan speed locally,** make sure the mode selection knob is turned to the MANUAL position, and then rotate the speed control knob to the desired speed setting.



## 10.4 - Remote operator station wiring: 200V–240V & 400V–480V Delta E Series VFDs (Powerfoil®X Series fans)

**⚠ WARNING:** The fan controllers contain high voltage capacitors that take time to discharge after removal of mains supply. Before working on the fan controller, ensure isolation of mains supply from line inputs at the fan controller's disconnect if installed. Wait three (3) minutes for capacitors to discharge to safe voltage levels. Failure to do so may result in personal injury or death. Darkened display LEDs are not an indication of safe voltage levels.



The following parameter changes are required for proper operation. To modify these parameters, you will need to reconnect the wall controller provided with the fan and contact Customer Service.

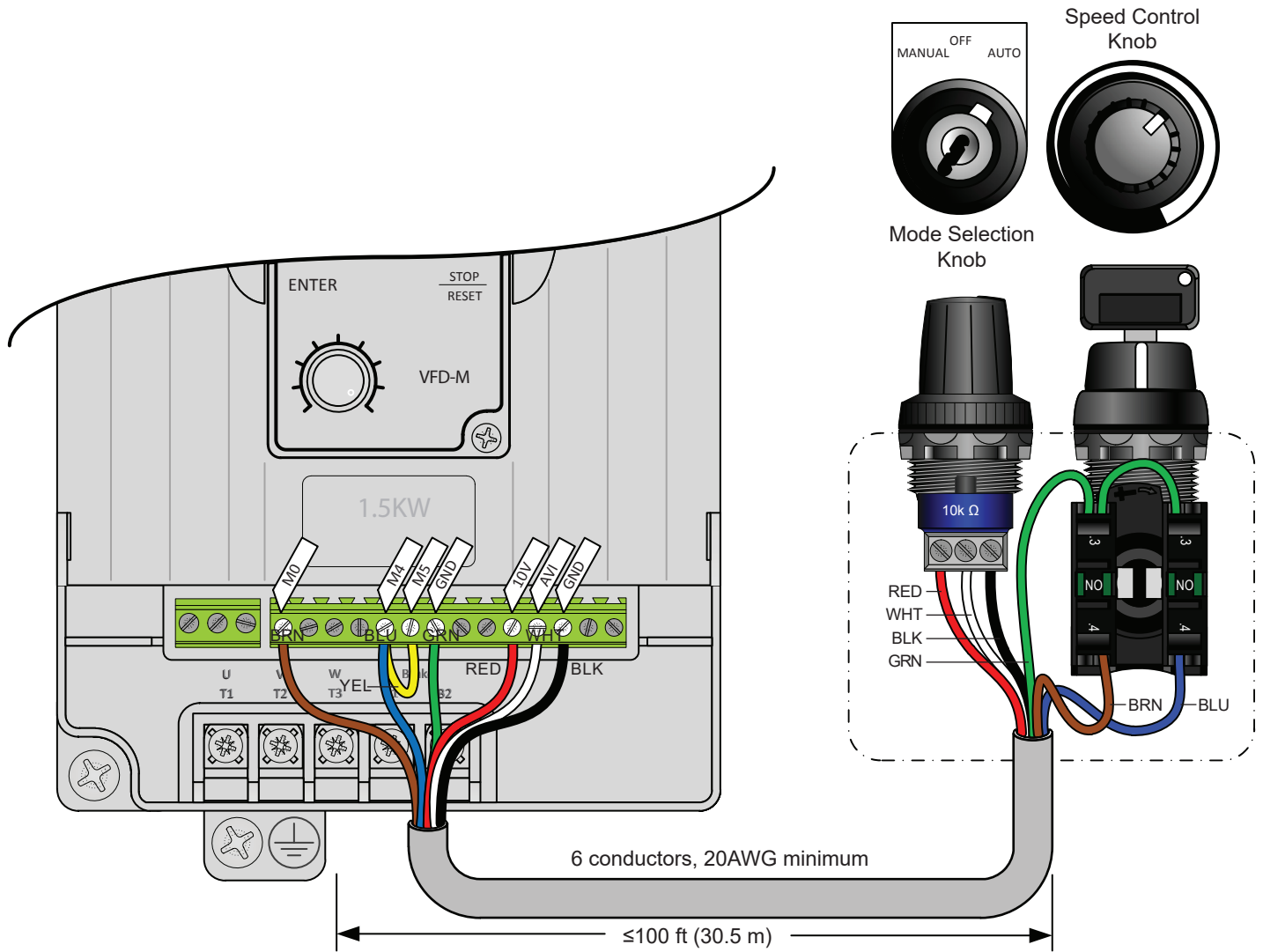
Parameter	Change to
02-00: First Master Frequency Command	"1" 0 to +10 V from AVI Terminal
02-01: First Operation Command	"1" External Terminals
04-07: Multifunction Input Terminal 5	"20" Communication Command Enable

### Jumper wire installation (yellow)

Big Ass Fans recommends making the parameter changes listed above prior to remote wiring or jumper wire installation. A new jumper should be installed between terminals MI5 and MI6.

10.5 - Remote operator station wiring: 575V–600V Delta M Series VFDs (Powerfoil®X Series fans)

**⚠ WARNING:** The fan controllers contain high voltage capacitors that take time to discharge after removal of mains supply. Before working on the fan controller, ensure isolation of mains supply from line inputs at the fan controller's disconnect if installed. Wait three (3) minutes for capacitors to discharge to safe voltage levels. Failure to do so may result in personal injury or death. Darkened display LEDs are not an indication of safe voltage levels.



The following additional parameter changes are required for proper operation:

Parameter	Change to
Pr.00: First Start/Stop Reference	"1" Master Freq. from 0 to +10V
Pr.01: First Speed Reference	"1" Master Start/Stop from Ext. Terminals
Pr.41: Multifunction Input Terminal 4	"24" Control Source = Communication
Pr.42: Multifunction Input Terminal 5	"28" 2nd Source for Frequency Command

**Jumper wire installation (shown above in yellow)**

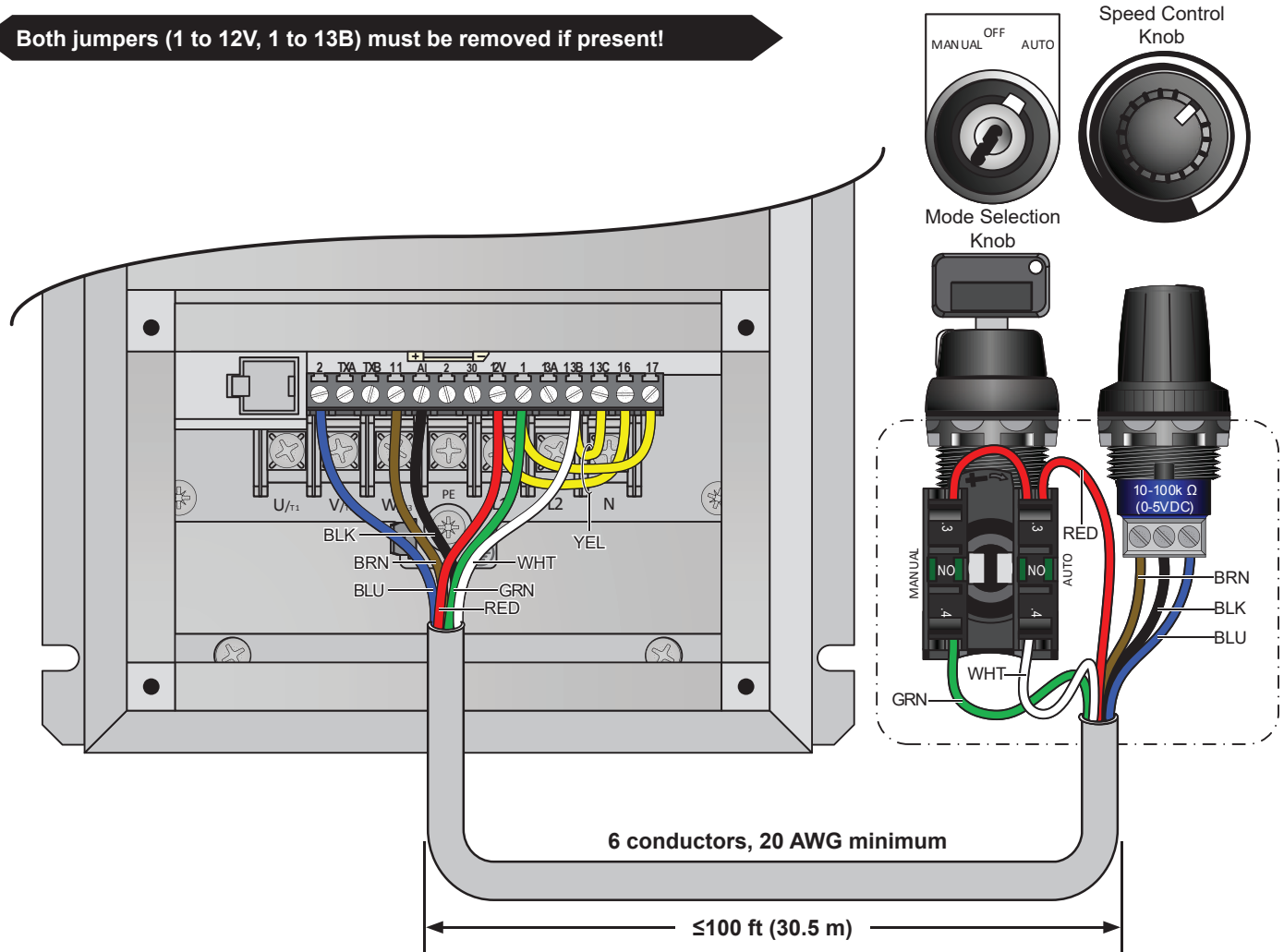
Big Ass Fans recommends making the parameter changes listed above prior to remote wiring or jumper wire installation. A new jumper should be installed between terminals M4 and M5.



10.6 - Remote operator station wiring: Lenze SMVector VFDs (Powerfoil®8 & Basic 6® fans)

**⚠ WARNING:** The fan controllers contain high voltage capacitors that take time to discharge after removal of mains supply. Before working on the fan controller, ensure isolation of mains supply from line inputs at the fan controller's disconnect if installed. Wait three (3) minutes for capacitors to discharge to safe voltage levels. Darkened display LEDs are not an indication of safe voltage levels.

**Both jumpers (1 to 12V, 1 to 13B) must be removed if present!**



The following parameter changes are required for proper operation:

Parameter	Default setting	Change to
P100: Start Stop Control	3	1
P116: Remote Speed Reference	6	1
P123: TB13C Function	0	7
P140: Relay Function	3	16
P156: Analog In Config	0	1

**Jumper wire installation (yellow)**

Big Ass Fans recommends making the parameter changes listed above prior to remote wiring or jumper wire installation. Jumpers should be installed between terminals 1 and 17, terminals 13B and 13C, and terminals 12V and 16. If an ESFR pilot relay is already installed on terminals 12V and 13A, remove the N.O. relay common lead from terminal 12V and relocate to terminal 16. This will prevent three wires from being landed under a single terminal. In this control arrangement, terminals 12V and 16 are both +12 VDC for digital supply.

# Notes

## Appendix A.1 - Checking wiring and settings

Symptom	Possible solution(s)
No COMS on Modbus RTU side.	<p>If TX/RX are not flashing rapidly, there is a COM issue on the Modbus side. Check the following:</p> <ul style="list-style-type: none"> <li>• Visually observe the LEDs on the ProtoNode (Appendix A.4).</li> <li>• Check the baud rate, parity, data bits, and stop bits.</li> <li>• Check the Modbus device address.</li> <li>• Verify wiring.</li> <li>• Verify all Modbus RTU devices that were discovered in the FST Web Configurator (see Section 7.2).</li> </ul>
Field COM issues.	<p>Verify the following:</p> <ul style="list-style-type: none"> <li>• Visually observe the LEDs on the ProtoNode (Appendix A.4).</li> <li>• Visually observe the DIP switch settings (ensure correct baud rate and device instance).</li> <li>• Verify the IP address setting.</li> <li>• Verify wiring.</li> </ul>

If the issue still occurs, take a diagnostic capture and send it to FieldServer (Appendix A.2).

## Appendix A.2 - Taking a diagnostic capture

Note: When the diagnostic capture is complete, e-mail it to support@protocessor.com. The capture enables Support to diagnose the issue quickly.

1. Make sure the FieldServer utilities are loaded on the PC (<http://fieldserver.com/techsupport/utility/utility.php>).



Figure 30: Ethernet port location

2. Disable any wireless Ethernet adapters on the PC/laptop.
3. Disable the firewall and virus protection software if possible.
4. Connect a standard CAT5 Ethernet cable between the PC and the ProtoNode.
5. The default IP address of the ProtoNode is **192.168.1.24**, and the subnet mask is **255.255.255.0**. If the PC and the ProtoNode are on different IP networks, assign a static IP address to the PC on the 192.168.1.xxx network.
6. Do one of the following:
  - For Windows XP:
    - a. Click **Start > Control Panel > Network Connections**.
    - b. Right-click **Local Area Connection**, and then click **Properties**.
    - c. Highlight **Internet Protocol (TCP/IP)**, and then click **Properties**.
  - For Windows 7:
    - a. Click **Start > Control Panel > Network and Internet > Network and Sharing Center > Change adapter settings**.
    - b. Right-click **Local Area Connection**, and then click **Properties**.
    - c. Highlight **Internet Protocol Version 4 (TCP/IPv4)**, and then click **Properties**.
7. Select **Use the following IP address:**

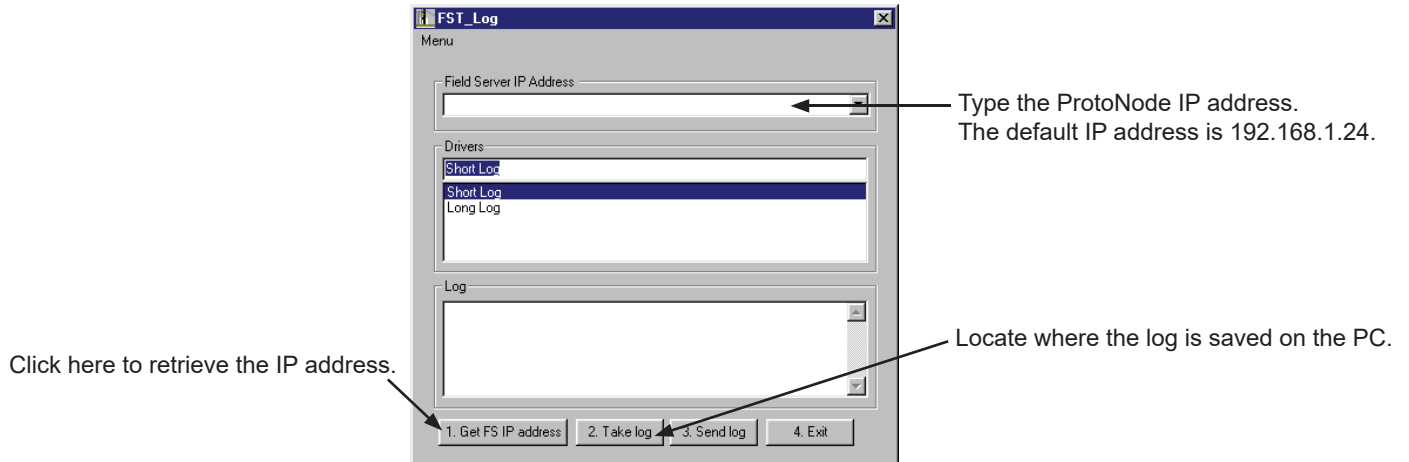
Use the following IP address:

IP address:	192 . 168 . 1 . 11
Subnet mask:	255 . 255 . 255 . 0
Default gateway:	. . .

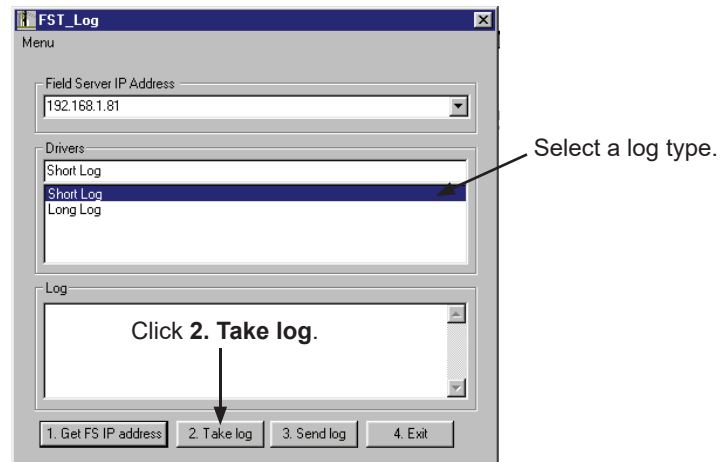
8. Click **OK** twice.

9. Double-click the FST Diag Utility.

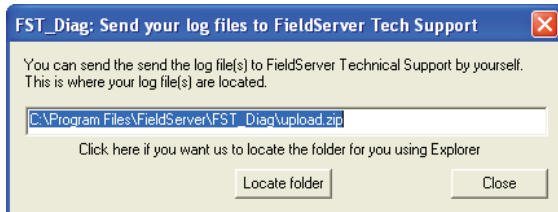
10. Select a FieldServer IP address. The IP address can be entered manually or selected by clicking **1. Get FS IP address** in the utility.



11. Click **2. Take log**. While the utility runs, DOS prompts will flash across the monitor. Do not click or type in the DOS prompts. This step may take a few minutes depending on the chosen log type and computer speed. When the utility is finished, an event log is displayed.



12. Click **3. Send Log**. The following dialog appears:



13. Click **Locate folder**. Browse to the folder containing the upload.zip file and e-mail the file to support@protocessor.com.

14. When the log is complete, click **4. Exit**.

### Appendix A.3 - Setting the network number for BACnet/IP

The network number for BACnet/IP can be changed when more than one ProtoNode is on the same subnet.

On the main Web Configurator screen, update the network number in the "network\_nr" parameter and click **Submit**. Note that the default value is 50.

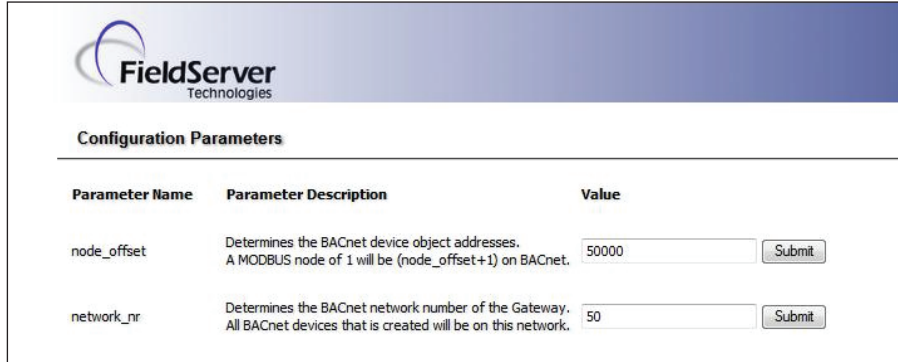
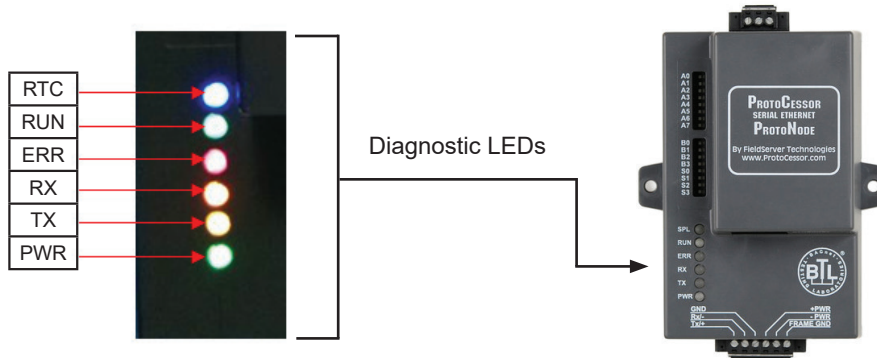


Figure 31: Web Configurator showing the network number for BACnet/IP

### Appendix A.4 - LED diagnostics

The following describes LED diagnostics for Modbus RTU communications between the ProtoNode and devices.

See the diagram below for ProtoNode RER LED locations.



Tag	Description
RTC	Unused
RUN	The RUN LED will start flashing 20 seconds after power up, indicating normal operation.
ERR	The SYS ERR LED will turn on solidly 15 seconds after power up. It will turn off after five (5) seconds. A steady red light indicates there is a system error on the ProtoNode. If this occurs, immediately report the related "system error" shown on the error screen of the GUI interface to FieldServer Technologies for evaluation.
RX	The RX LED will flash when a message is received on the host port.
TX	The TX LED will flash when a message is sent on the host port.
PWR	This is the power light. It should show steady green at all times when the ProtoNode is powered.

Figure 32: Diagnostic LEDs

### Appendix B.1 - SMVector Modbus RTU mappings

---

The following shows SMVector Modbus RTU mappings to BACnet MS/TP, BACnet/IP, and Metasys N2.

Point name	BACnet object type	BACnet object ID	N2 data type	N2 point address
Drive Control Stop Drive	BV	1	DO	1
Drive Control Start Drive	BV	2	DO	2
Drive Control Inhibit	BV	3	DO	3
Drive Control Set Reverse	BV	4	DO	4
Drive Control Set Forward	BV	5	DO	5
Drive Identity	AI	6	AI	6
Drive Status Stop/Run	BI	7	DI	7
Drive Status Commanded Direction	BI	8	DI	8
Drive Status Actual Direction	BI	9	DI	9
Drive Status Network Enable	BI	10	DI	10
Drive Status Control	AI	11	AI	11
Drive Status Network Control	BI	12	DI	12
Actual Output Frequency	AI	13	AI	13
Fault Status	AI	14	AI	14
Commanded Direction	AI	15	AI	15
Network Freq Command	AV	16	AO	16
Drive Unlock	AV	17	AO	17
Minimum Output Freq	AV	18	AO	18
Maximum Output Freq	AV	19	AO	19

### Appendix B.2 - Delta VFD E Modbus RTU mappings

---

The following shows Delta VFD E Modbus RTU mappings to BACnet MS/TP, BACnet/IP, and Metasys N2.

Point name	BACnet object type	BACnet object ID	N2 data type	N2 point address
Drive Identity Code	AI	1	AI	1
Maximum Output Freq	AV	2	AO	2
Minimum Output Freq	AV	3	AO	3
VFD Start_Stop	AV	4	AO	4
VFD Fwd_Rev_Toggle	AV	5	AO	5
Frequency Command	AV	6	AO	6
Activate External Fault	BV	7	DO	7
Reset All Faults	BV	8	DO	8
Drive Status Stop/Run	AI	9	AI	9
Drive Status Fwd/Rev	AI	10	AI	10
Actual Frequency	AI	11	AI	11
Fault Status	AI	12	AI	12

### Appendix B.3 - Delta VFD M Modbus RTU mappings

---

The following shows Delta VFD M Modbus RTU mappings to BACnet MS/TP, BACnet/IP, and Metasys N2.

Point name	BACnet object type	BACnet object ID	N2 data type	N2 point address
Drive Identity Code	AI	1	AI	1
Maximum Output Freq	AV	2	AO	2
Minimum Output Freq	AV	3	AO	3
VFD Start_Stop	AV	4	AO	4
VFD Fwd_Rev_Toggle	AV	5	AO	5
Frequency Command	AV	6	AO	6
Activate External Fault	BV	7	DO	7
Reset All Faults	BV	8	DO	8
Drive Status Stop/Run	AI	9	AI	9
Drive Status Fwd/Rev	AI	10	AI	10
Actual Frequency	AI	11	AI	11
Fault Status	AI	12	AI	12

### Appendix B.4 - Viper Modbus RTU mappings

---

The following shows Viper Modbus RTU mappings to BACnet MS/TP, BACnet/IP, and Metasys N2.

Point name	BACnet object type	BACnet object ID	N2 data type	N2 point address
Drive Identity Code	AI	1	AI	1
Maximum Output Freq	AV	2	AO	2
Minimum Output Freq	AV	3	AO	3
VFD Start_Stop	AV	4	AO	4
VFD Fwd_Rev_Toggle	AV	5	AO	5
Frequency Command	AV	6	AO	6
Activate External Fault	BV	7	DO	7
Reset All Faults	BV	8	DO	8
Drive Status Stop/Run	AI	9	AI	9
Drive Status Fwd/Rev	AI	10	AI	10
Actual Frequency	AI	11	AI	11
Fault Status	AI	12	AI	12

# Notes



# Appendix C - MAC Address DIP Switch Settings 43

Address	A0	A1	A2	A3	A4	A5	A6	A7
0	Off	Off	Off	Off	Off	Off	Off	Off
1	On	Off	Off	Off	Off	Off	Off	Off
2	Off	On	Off	Off	Off	Off	Off	Off
3	On	On	Off	Off	Off	Off	Off	Off
4	Off	Off	On	Off	Off	Off	Off	Off
5	On	Off	On	Off	Off	Off	Off	Off
6	Off	On	On	Off	Off	Off	Off	Off
7	On	On	On	Off	Off	Off	Off	Off
8	Off	Off	Off	On	Off	Off	Off	Off
9	On	Off	Off	On	Off	Off	Off	Off
10	Off	On	Off	On	Off	Off	Off	Off
11	On	On	Off	On	Off	Off	Off	Off
12	Off	Off	On	On	Off	Off	Off	Off
13	On	Off	On	On	Off	Off	Off	Off
14	Off	On	On	On	Off	Off	Off	Off
15	On	On	On	On	Off	Off	Off	Off
16	Off	Off	Off	Off	On	Off	Off	Off
17	On	Off	Off	Off	On	Off	Off	Off
18	Off	On	Off	Off	On	Off	Off	Off
19	On	On	Off	Off	On	Off	Off	Off
20	Off	Off	On	Off	On	Off	Off	Off
21	On	Off	On	Off	On	Off	Off	Off
22	Off	On	On	Off	On	Off	Off	Off
23	On	On	On	Off	On	Off	Off	Off
24	Off	Off	Off	On	On	Off	Off	Off
25	On	Off	Off	On	On	Off	Off	Off
26	Off	On	Off	On	On	Off	Off	Off
27	On	On	Off	On	On	Off	Off	Off
28	Off	Off	On	On	On	Off	Off	Off
29	On	Off	On	On	On	Off	Off	Off
30	Off	On	On	On	On	Off	Off	Off
31	On	On	On	On	On	Off	Off	Off
32	Off	Off	Off	Off	Off	On	Off	Off
33	On	Off	Off	Off	Off	On	Off	Off
34	Off	On	Off	Off	Off	On	Off	Off
35	On	On	Off	Off	Off	On	Off	Off
36	Off	Off	On	Off	Off	On	Off	Off
37	On	Off	On	Off	Off	On	Off	Off
38	Off	On	On	Off	Off	On	Off	Off
39	On	On	On	Off	Off	On	Off	Off
40	Off	Off	Off	On	Off	On	Off	Off
41	On	Off	Off	On	Off	On	Off	Off
42	Off	On	Off	On	Off	On	Off	Off
43	On	On	Off	On	Off	On	Off	Off
44	Off	Off	On	On	Off	On	Off	Off
45	On	Off	On	On	Off	On	Off	Off
46	Off	On	On	On	Off	On	Off	Off

Address	A0	A1	A2	A3	A4	A5	A6	A7
47	On	On	On	On	Off	On	Off	Off
48	Off	Off	Off	Off	On	On	Off	Off
49	On	Off	Off	Off	On	On	Off	Off
50	Off	On	Off	Off	On	On	Off	Off
51	On	On	Off	Off	On	On	Off	Off
52	Off	Off	On	Off	On	On	Off	Off
53	On	Off	On	Off	On	On	Off	Off
54	Off	On	On	Off	On	On	Off	Off
55	On	On	On	Off	On	On	Off	Off
56	Off	Off	Off	On	On	On	Off	Off
57	On	Off	Off	On	On	On	Off	Off
58	Off	On	Off	On	On	On	Off	Off
59	On	On	Off	On	On	On	Off	Off
60	Off	Off	On	On	On	On	Off	Off
61	On	Off	On	On	On	On	Off	Off
62	Off	On	On	On	On	On	Off	Off
63	On	On	On	On	On	On	Off	Off
64	Off	Off	Off	Off	Off	Off	On	Off
65	On	Off	Off	Off	Off	Off	On	Off
66	Off	On	Off	Off	Off	Off	On	Off
67	On	On	Off	Off	Off	Off	On	Off
68	Off	Off	On	Off	Off	Off	On	Off
69	On	Off	On	Off	Off	Off	On	Off
70	Off	On	On	Off	Off	Off	On	Off
71	On	On	On	Off	Off	Off	On	Off
72	Off	Off	Off	On	Off	Off	On	Off
73	On	Off	Off	On	Off	Off	On	Off
74	Off	On	Off	On	Off	Off	On	Off
75	On	On	Off	On	Off	Off	On	Off
76	Off	Off	On	On	Off	Off	On	Off
77	On	Off	On	On	Off	Off	On	Off
78	Off	On	On	On	Off	Off	On	Off
79	On	On	On	On	Off	Off	On	Off
80	Off	Off	Off	Off	On	Off	On	Off
81	On	Off	Off	Off	On	Off	On	Off
82	Off	On	Off	Off	On	Off	On	Off
83	On	On	Off	Off	On	Off	On	Off
84	Off	Off	On	Off	On	Off	On	Off
85	On	Off	On	Off	On	Off	On	Off
86	Off	On	On	Off	On	Off	On	Off
87	On	On	On	Off	On	Off	On	Off
88	Off	Off	Off	On	On	Off	On	Off
89	On	Off	Off	On	On	Off	On	Off
90	Off	On	Off	On	On	Off	On	Off
91	On	On	Off	On	On	Off	On	Off
92	Off	Off	On	On	On	Off	On	Off
93	On	Off	On	On	On	Off	On	Off

Address	A0	A1	A2	A3	A4	A5	A6	A7
94	Off	On	On	On	On	Off	On	Off
95	On	On	On	On	On	Off	On	Off
96	Off	Off	Off	Off	Off	On	On	Off
97	On	Off	Off	Off	Off	On	On	Off
98	Off	On	Off	Off	Off	On	On	Off
99	On	On	Off	Off	Off	On	On	Off
100	Off	Off	On	Off	Off	On	On	Off
101	On	Off	On	Off	Off	On	On	Off
102	Off	On	On	Off	Off	On	On	Off
103	On	On	On	Off	Off	On	On	Off
104	Off	Off	Off	On	Off	On	On	Off
105	On	Off	Off	On	Off	On	On	Off
106	Off	On	Off	On	Off	On	On	Off
107	On	On	Off	On	Off	On	On	Off
108	Off	Off	On	On	Off	On	On	Off
109	On	Off	On	On	Off	On	On	Off
110	Off	On	On	On	Off	On	On	Off
111	On	On	On	On	Off	On	On	Off
112	Off	Off	Off	Off	On	On	On	Off
113	On	Off	Off	Off	On	On	On	Off
114	Off	On	Off	Off	On	On	On	Off
115	On	On	Off	Off	On	On	On	Off
116	Off	Off	On	Off	On	On	On	Off
117	On	Off	On	Off	On	On	On	Off
118	Off	On	On	Off	On	On	On	Off
119	On	On	On	Off	On	On	On	Off
120	Off	Off	Off	On	On	On	On	Off
121	On	Off	Off	On	On	On	On	Off
122	Off	On	Off	On	On	On	On	Off
123	On	On	Off	On	On	On	On	Off
124	Off	Off	On	On	On	On	On	Off
125	On	Off	On	On	On	On	On	Off
126	Off	On	On	On	On	On	On	Off
127	On	On	On	On	On	On	On	Off
128	Off	Off	Off	Off	Off	Off	Off	On
129	On	Off	Off	Off	Off	Off	Off	On
130	Off	On	Off	Off	Off	Off	Off	On
131	On	On	Off	Off	Off	Off	Off	On
132	Off	Off	On	Off	Off	Off	Off	On
133	On	Off	On	Off	Off	Off	Off	On
134	Off	On	On	Off	Off	Off	Off	On
135	On	On	On	Off	Off	Off	Off	On
136	Off	Off	Off	On	Off	Off	Off	On
137	On	Off	Off	On	Off	Off	Off	On
138	Off	On	Off	On	Off	Off	Off	On
139	On	On	Off	On	Off	Off	Off	On
140	Off	Off	On	On	Off	Off	Off	On
141	On	Off	On	On	Off	Off	Off	On
142	Off	On	On	On	Off	Off	Off	On

Address	A0	A1	A2	A3	A4	A5	A6	A7
143	On	On	On	On	Off	Off	Off	On
144	Off	Off	Off	Off	On	Off	Off	On
145	On	Off	Off	Off	On	Off	Off	On
146	Off	On	Off	Off	On	Off	Off	On
147	On	On	Off	Off	On	Off	Off	On
148	Off	Off	On	Off	On	Off	Off	On
149	On	Off	On	Off	On	Off	Off	On
150	Off	On	On	Off	On	Off	Off	On
151	On	On	On	Off	On	Off	Off	On
152	Off	Off	Off	On	On	Off	Off	On
153	On	Off	Off	On	On	Off	Off	On
154	Off	On	Off	On	On	Off	Off	On
155	On	On	Off	On	On	Off	Off	On
156	Off	Off	On	On	On	Off	Off	On
157	On	Off	On	On	On	Off	Off	On
158	Off	On	On	On	On	Off	Off	On
159	On	On	On	On	On	Off	Off	On
160	Off	Off	Off	Off	Off	On	Off	On
161	On	Off	Off	Off	Off	On	Off	On
162	Off	On	Off	Off	Off	On	Off	On
163	On	On	Off	Off	Off	On	Off	On
164	Off	Off	On	Off	Off	On	Off	On
165	On	Off	On	Off	Off	On	Off	On
166	Off	On	On	Off	Off	On	Off	On
167	On	On	On	Off	Off	On	Off	On
168	Off	Off	Off	On	Off	On	Off	On
169	On	Off	Off	On	Off	On	Off	On
170	Off	On	Off	On	Off	On	Off	On
171	On	On	Off	On	Off	On	Off	On
172	Off	Off	On	On	Off	On	Off	On
173	On	Off	On	On	Off	On	Off	On
174	Off	On	On	On	Off	On	Off	On
175	On	On	On	On	Off	On	Off	On
176	Off	Off	Off	Off	On	On	Off	On
177	On	Off	Off	Off	On	On	Off	On
178	Off	On	Off	Off	On	On	Off	On
179	On	On	Off	Off	On	On	Off	On
180	Off	Off	On	Off	On	On	Off	On
181	On	Off	On	Off	On	On	Off	On
182	Off	On	On	Off	On	On	Off	On
183	On	On	On	Off	On	On	Off	On
184	Off	Off	Off	On	On	On	Off	On
185	On	Off	Off	On	On	On	Off	On
186	Off	On	Off	On	On	On	Off	On
187	On	On	Off	On	On	On	Off	On
188	Off	Off	On	On	On	On	Off	On
189	On	Off	On	On	On	On	Off	On
190	Off	On	On	On	On	On	Off	On
191	On	On	On	On	On	On	Off	On

Address	A0	A1	A2	A3	A4	A5	A6	A7
192	Off	Off	Off	Off	Off	Off	On	On
193	On	Off	Off	Off	Off	Off	On	On
194	Off	On	Off	Off	Off	Off	On	On
195	On	On	Off	Off	Off	Off	On	On
196	Off	Off	On	Off	Off	Off	On	On
197	On	Off	On	Off	Off	Off	On	On
198	Off	On	On	Off	Off	Off	On	On
199	On	On	On	Off	Off	Off	On	On
200	Off	Off	Off	On	Off	Off	On	On
201	On	Off	Off	On	Off	Off	On	On
202	Off	On	Off	On	Off	Off	On	On
203	On	On	Off	On	Off	Off	On	On
204	Off	Off	On	On	Off	Off	On	On
205	On	Off	On	On	Off	Off	On	On
206	Off	On	On	On	Off	Off	On	On
207	On	On	On	On	Off	Off	On	On
208	Off	Off	Off	Off	On	Off	On	On
209	On	Off	Off	Off	On	Off	On	On
210	Off	On	Off	Off	On	Off	On	On
211	On	On	Off	Off	On	Off	On	On
212	Off	Off	On	Off	On	Off	On	On
213	On	Off	On	Off	On	Off	On	On
214	Off	On	On	Off	On	Off	On	On
215	On	On	On	Off	On	Off	On	On
216	Off	Off	Off	On	On	Off	On	On
217	On	Off	Off	On	On	Off	On	On
218	Off	On	Off	On	On	Off	On	On
219	On	On	Off	On	On	Off	On	On
220	Off	Off	On	On	On	Off	On	On
221	On	Off	On	On	On	Off	On	On
222	Off	On	On	On	On	Off	On	On
223	On	On	On	On	On	Off	On	On
224	Off	Off	Off	Off	Off	On	On	On
225	On	Off	Off	Off	Off	On	On	On
226	Off	On	Off	Off	Off	On	On	On
227	On	On	Off	Off	Off	On	On	On
228	Off	Off	On	Off	Off	On	On	On
229	On	Off	On	Off	Off	On	On	On
230	Off	On	On	Off	Off	On	On	On
231	On	On	On	Off	Off	On	On	On
232	Off	Off	Off	On	Off	On	On	On
233	On	Off	Off	On	Off	On	On	On
234	Off	On	Off	On	Off	On	On	On
235	On	On	Off	On	Off	On	On	On
236	Off	Off	On	On	Off	On	On	On
237	On	Off	On	On	Off	On	On	On
238	Off	On	On	On	Off	On	On	On
239	On	On	On	On	Off	On	On	On
240	Off	Off	Off	Off	On	On	On	On

Address	A0	A1	A2	A3	A4	A5	A6	A7
241	On	Off	Off	Off	On	On	On	On
242	Off	On	Off	Off	On	On	On	On
243	On	On	Off	Off	On	On	On	On
244	Off	Off	On	Off	On	On	On	On
245	On	Off	On	Off	On	On	On	On
246	Off	On	On	Off	On	On	On	On
247	On	On	On	Off	On	On	On	On
248	Off	Off	Off	On	On	On	On	On
249	On	Off	Off	On	On	On	On	On
250	Off	On	Off	On	On	On	On	On
251	On	On	Off	On	On	On	On	On
252	Off	Off	On	On	On	On	On	On
253	On	Off	On	On	On	On	On	On
254	Off	On	On	On	On	On	On	On
255	On	On	On	On	On	On	On	On

## Appendix D.1 - Specifications



<b>Electrical connections</b>	One 6-pin Phoenix connector, one RS-485 +/- ground port, power +/- frame ground port One 3-pin RS-485 Phoenix connector, one RS-485 +/- ground port One Ethernet-10/100 Ethernet port
<b>Approvals</b>	Pending CE (EN55022; EN55024; EN60950), UL916, Pending FCC Class A Part 15, DNP3 Conformance Tested, OPC Self-tested for Compliance, RoHS Compliant, CSA 205 Approved BTL Marked
<b>Power requirements</b>	Multi-mode power adapter: 9–30VDC or 12–24VAC
<b>Physical dimensions</b>	11.5 cm L x 8.3 cm W x 4.1 cm H (4.5" x 3.2" x 1.6")
<b>Weight</b>	0.2 kg (0.4 lbs)
<b>Operating temperature</b>	-40°C to 75°C (-40°F to 167°F)
<b>Surge suppression</b>	EN61000-4-2 ESD EN61000-4-3 EMC EN61000-4-4 EFT
<b>Humidity</b>	5–90% RH (non-condensing)

Specifications subject to change without notice.

**Figure 33: Specifications**

## Appendix D.2 - Compliance with UL regulations

For UL compliance, the following requirements must be met when operating the ProtoNode:

- The unit shall be powered by a listed LPS or Class 2 power supply suited to the expected operating temperature range.
- The interconnecting power connector and power cable shall:
  - Comply with local electrical code.
  - Be suited to the expected operating temperature range.
  - Meet the current and voltage rating for ProtoNode/Net.
- The interconnecting power cable shall:
  - Be of length not exceeding 3.05 m (118.3")
  - Be constructed of materials rated VW-1 or FT-1 or better
- If the unit is to be installed in an operating environment with a temperature above 65°C (149°F), it should be installed in a Restricted Access Area requiring a key or a special tool to gain access.
- The device must not be connected to a LAN segment with outdoor wiring.

## Warranty period

Item	Period of coverage
BACnet Adapter	2 years

Big Ass Fans ("BAF") warrants its gateway apparatus for building automation systems ("BAS Gateway Apparatus") to be free from defects in workmanship or material under normal use and service for two years after the date of shipment to the customer. BAF will repair or replace any equipment found to be defective during the warranty period. Final determination of the nature and responsibility for defective or damaged equipment will be made by BAF, working with its product vendor.

This warranty only applies to the BAS Gateway Apparatus. It is contingent upon proper use in the application for which the product was intended and does not cover products which have been modified or repaired without BAF approval or which have been subjected to accident, improper maintenance, installation or application, or on which original identification marks have been removed or altered. This warranty also does not apply to interconnecting cables or wires, consumables or to any damage resulting from battery leakage.

In all cases our responsibility and liability under this warranty shall be limited to the cost of the equipment. The purchaser must obtain shipping instructions for the prepaid return of any item under this warranty provision and compliance with such instruction shall be a condition to make any claim under this warranty.

Except for the express warranty stated above, BAF disclaims all warranties with regard to the products sold hereunder including all implied warranties of merchantability and fitness for a particular purpose and the express warranties stated herein are in lieu of all obligations or liabilities on the part of BAF including, but not limited to, incidental or consequential damages arising out of or related to the use of the product, which are specifically disclaimed.

# CONTACT US

Talk to a Big Ass Fan Expert. Call us at one of the numbers below or visit [www.bigassfans.com](http://www.bigassfans.com)



## Customer Service

### United States

2348 Innovation Drive  
Lexington, KY 40511  
USA  
877-244-3267  
Outside the U.S.  
(+1 859-233-1271)  
[bigassfans.com](http://bigassfans.com)

### Canada

2180 Winston Park Drive  
Oakville, Ontario L6H 5W1  
Canada  
1 844-924-4277  
[bigassfans.com/ca](http://bigassfans.com/ca)

### Australia

35 French Street  
Eagle Farm, Brisbane  
QLD 4009  
Australia  
+61 1300 244 277  
[bigassfans.com/au](http://bigassfans.com/au)

### Singapore

50 Ubi Crescent  
#01-01 Ubi TechPark  
Singapore 408568  
+65 6709 8500  
[bigassfans.com/sg](http://bigassfans.com/sg)

### Mexico

CEBSA (Corporación Eléctrica  
del Bravo SA de CV)  
Avenida Ind. Rio San Juan  
Lote 3-A Parque Industrial del Norte  
Reynosa, Tamps C.P. 88736  
+52 1 899 925 6398  
<http://cebsainc.com/>

### All Other Geographies

+1 859-410-6286  
[bigassfans.com](http://bigassfans.com)



## Manufacturing and Warranty

You are responsible for providing and paying for shipping when returning a product to Big Ass Fans for the purpose of recycling under the WEEE directive.

### Manufacturer



2348 Innovation Drive  
Lexington, KY 40511  
USA

### Warranty and WEEE Returns

2201 Jaggie Fox Way  
Lexington, KY 40511  
USA

### Manufacturing Site

2251 Innovation Drive  
Lexington, KY 40511  
USA





004252  
REV. O  
10/13/2022



**BIG ASS FANS<sup>®</sup>**

2251 Innovation Drive, Lexington, KY 40511  
1 (877) BIG-FANS | [WWW.BIGASSFANS.COM](http://WWW.BIGASSFANS.COM)