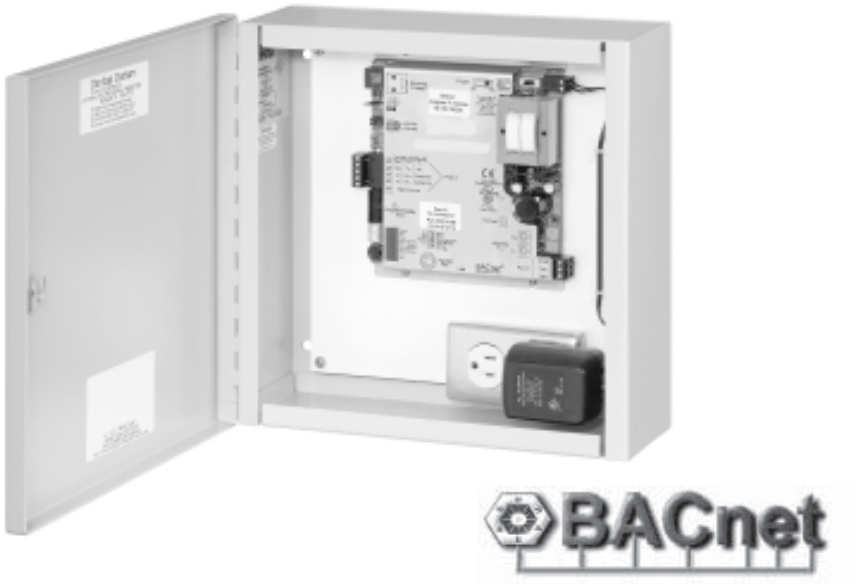
TRANE®

TR1™ Series VFD
Variable Frequency Drive

BACnet

Installation and Operation Manual



December, 2003 TR1-SVX03A-EN

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⚠DANGER

Rotating shafts and electrical equipment can be hazardous. Therefore, it is strongly recommended that all electrical work conform to National Electrical Code (NEC) and all local regulations. Installation, start-up and maintenance should be performed only by qualified personnel.

Motor control equipment and electronic controls are connected to hazardous line voltages. When servicing drives and electronic controls, there will be exposed components at or above line potential. Extreme care should be taken to protect against shock. Stand on an insulating pad and make it a habit to use only one hand when checking components. Always work with another person in case of an emergency. Disconnect power whenever possible to check controls or to perform maintenance. Be sure equipment is properly grounded. Wear safety glasses whenever working on electric control or rotating equipment.

⚠WARNING

Warnings Against Unintended Start

1. While the drive is connected to the AC line, the motor can be brought to a stop by means of external switch closures, serial bus commands or references. If personal safety considerations make it necessary to ensure that no unintended start occurs, these stops are not sufficient.
2. During programming of parameters, the motor may start. Be certain that no one is in the area of the motor or driven equipment when changing parameters.
3. A motor that has been stopped may start unexpectedly if faults occur in the electronics of the drive, or if an overload, a fault in the supply AC line or a fault in the motor connection or other fault clears.
4. If the "Local/Hand" key is activated, the motor can only be brought to a stop by means of the "Stop/Off" key or an external safety interlock.

⚠CAUTION

Electronic components of BACnet portal are sensitive to electrostatic discharge (ESD). ESD can reduce performance or destroy sensitive electronic components. Follow proper ESD procedures during installation or servicing to prevent damage.

⚠DANGER

Touching electrical parts may be fatal, even after equipment has been disconnected from AC line. To be sure that capacitors have fully discharged, wait 14 minutes for 208 V and 460 V units and 30†minutes for 600 V units over 25 HP after power has been removed before touching any internal component.

Table of Contents

Introduction

The BACnet portal is a microprocessor based communication server that provides seamless translation between BACnet and Trane TR1 Series variable frequency drives. For TR1 Series VFD applications into Tracer Summit, BACnet/Ethernet and BACnet/IP are the supported connection types. The BACnet portal provides a dedicated Ethernet port and two serial communication ports which can be configured for two different protocols. Baud rates are software selectable and default to 9600 baud rate. Up to ten drives can be connected to a single BACnet portal.

The BACnet portal serves as a gateway to the Johnson Controls Metasys® N2 protocol resident in the TR1 Series VFD. The BACnet port operates with an internal BACnet server operating protocol through standard CAT 5 Ethernet cabling. The serial port (port 2) connection uses EIA-485, half duplex, 9600 baud, shielded twisted-pair wiring. Data points from the N2 protocol are mapped to Analog Value (AV) and Binary Value (BV) BACnet objects.

Appendix A at the back of this manual contains the drive point maps for BACnet.

About this manual

The information in this manual is intended to provide comprehensive information on installation and set up of the TR1 Series VFD for communication over a BACnet network.

It is assumed that the user has knowledge of the capabilities of the BACnet network in addition to an understanding of the TR1 Series VFD. For specific information on operation of the drive, refer to the *TR1 Series VFD Installation and Operation Manual,* document number TR1-SVX10A-EN.

Ordering information

See Appendix B.

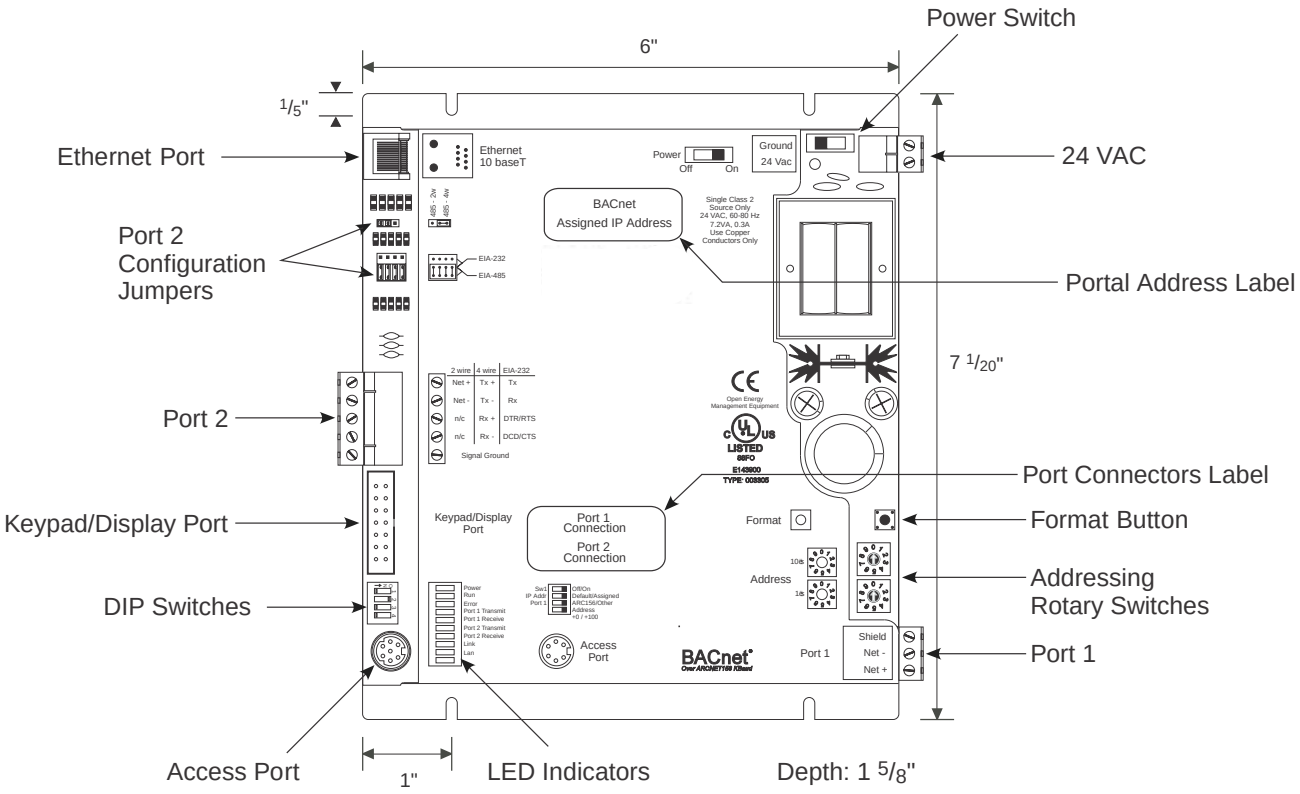


Figure 1. BACnet Portal

Power switch. Two position on/off power switch.

Portal address label. Identifies factory-set or default portal addresses used in BACnet.

Port connectors label. Identifies factory-settings for communication ports 1 and 2. Default setting for port 1 is no connection. Default setting for port 2 is EIA-485 2-wire to drive.

24 VAC connector. Input power for BACnet module.

Format button. Not used.

Address rotary switches. Rotary switches used to set BACnet portal network addresses. Set addresses 01-99 with DIP switch 5 in the +0 position. Set addresses 100-199 with DIP switch 5 in the +100 position.

Port 1. Preferred port for ARCnet connection. Selectable for ARCnet or 2-wire EIA-485. Set DIP switch 4 (Port 1) to *Other* to enable linking drives with EIA-485 wiring. Set DIP switch 4 (Port 1) to *ARC156* for use as ARCnet connector. (See DIP switches.) This port is not used for Tracer Summit connection.

LED indicators. Status indicator lights for functions as labeled.

Access port. Utility port for factory programming, set up, and to assign the IP address. The access port cannot be used as a communication point or to download memory to the BACnet.

DIP switches. Two position switches used to enable selection of IP address, module address, and network type. Sw1 and Sw2 are disabled in TR1 Series VFD communication applications.

Keypad/Display port. Access port for optional keypad.

Port 2. Preferred port for EIA-485 connection to the drives. The terminal is jumper selectable for 2-wire/4-wire EIA-485 or EIA-232. Default setting is EIA-485 (2-wire).

Port 2 configuration jumpers. Jumper placement determines the configuration for EIA-485 (2-wire), EIA-485 (4-wire), or EIA-232 communication for Port 2. Default is EIA-485 2-wire.

Ethernet port. Ethernet network connector supports 10baseT network communication with BACnet.

Installation requirements

Mount the BACnet enclosure as required using the predrilled mounting holes (see Figure 2). The unit weighs approximately 15.3 pounds (7 kg).

For BACnet portals ordered without an enclosure, mount the unit in an enclosed panel using the mounting holes provided on the BACnet portal backplate (refer back to Figure 1). Leave about 2 inches (5 centimeters) on each side for wiring access. In addition, the BACnet portal requires 24 VAC input power.

⚠WARNING

BACnet portal is a Class 2 device (less than 30VAC, 100VA maximum). Take appropriate isolation measures when mounting BACnet portal in control panels where non-Class 2 devices (for example, 120VAC) or wiring are present.

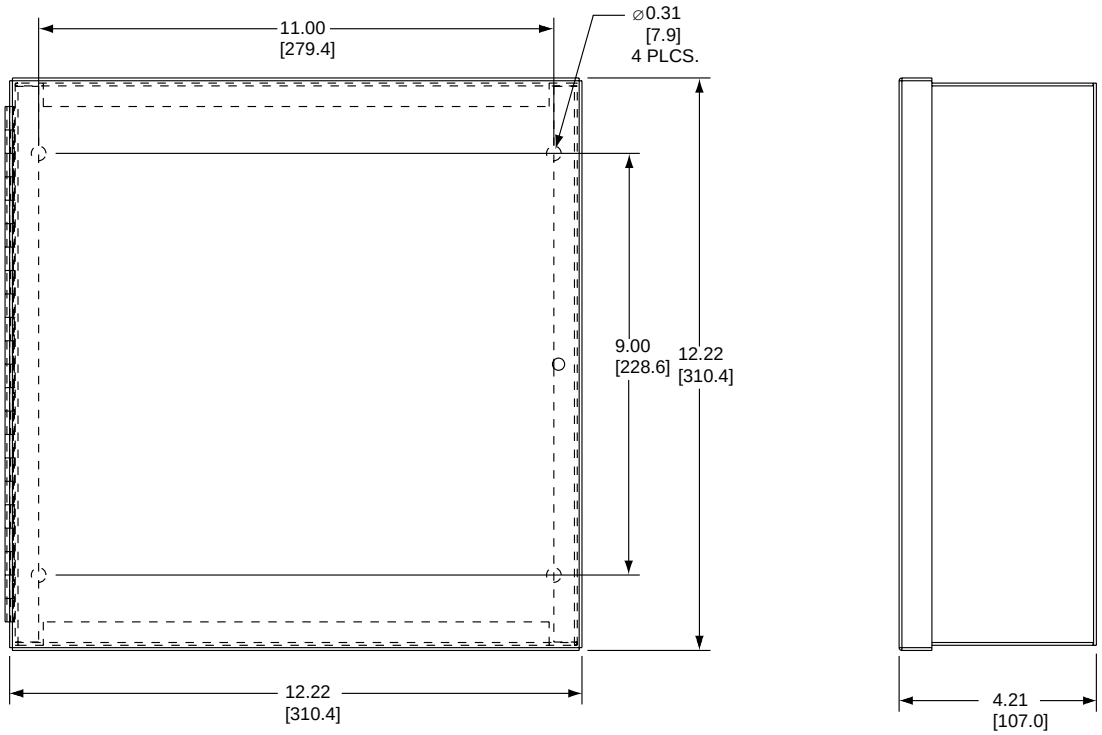
Wiring and terminal tightening specifications

Terminal tightening and wire specifications for the TR1 Series VFD are defined in Table I.

Total wiring length to connect up to 10 TR1 Series VFDs from the BACnet portal should not exceed 3,000 feet (900m) at 9600 baud rate.

Table I. Control Wiring and Torque Specifications

Torque Specification	Control Wiring	24 VAC Input Wiring
4.5 in-lbs (0.5 Nm)	18 – 24 AWG ($0.75mm^2$ – $0.2mm^2$) shielded twisted pair	22 AWG ($0.3mm^2$)



NOTE: Dimensions in inches [mm].

Figure 2. BACnet Enclosure Dimensions

Electrical wiring

1. Power must be supplied to the 115 VAC outlet from an external source (see Figure 3).
2. Plug transformer into 115 VAC outlet.
3. Connect transformer cable to 24 VAC connector on BACnet board.

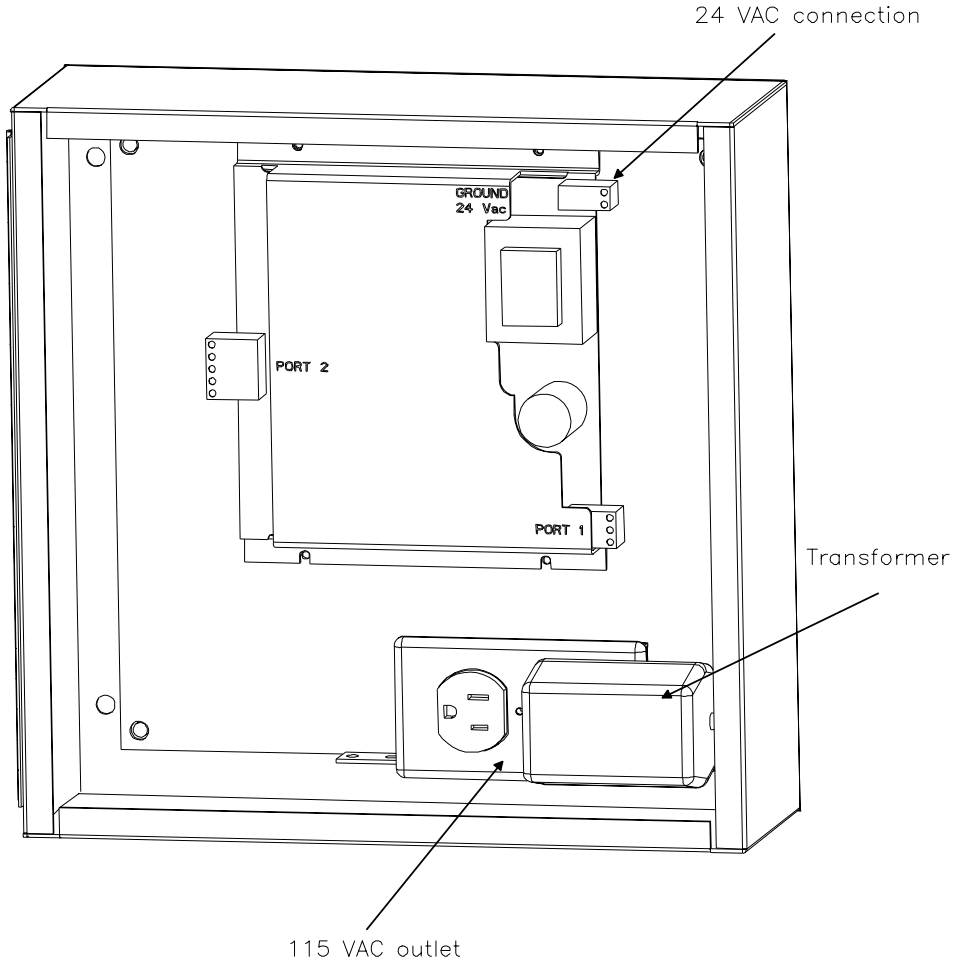


Figure 3. BACnet Portal Enclosure Electrical Components

Network connection

TR1 series VFD termination switch settings

DIP switches 2 and 3 on the main control board of the TR1 Series VFD (see Figure 4) are used to configure the drive for N2 serial bus termination. The switch position shown is the factory setting. See Table II for setting information. The DIP switch are located directly above terminals 61, 68 and 69 on the board.

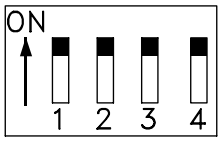


Figure 4. TR1 Series VFD DIP Switch

Network wiring

1. Connect signal wires to drive terminal 68 (P+) and terminal 69 (N-) on main control board of drive (see figure 5).

2. If shielded cabling is used, connect one end of shield to terminal 61. This terminal is connected to ground via an internal RC link.

For additional wiring guidelines, see the procedures for specific network-type connections in this manual.

NOTE

It is highly recommended to use shielded twisted-pair wires to reduce electrical noise on drive communications. Ensure that drive is grounded properly according to instructions in the drive manual.

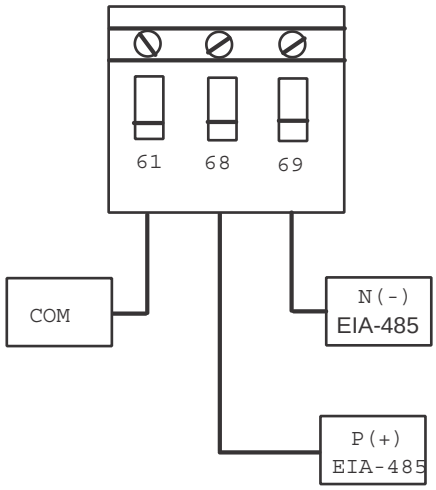


Figure 5. Network Wiring

Table II. DIP Switch Settings

SWITCH	SETTING
Switch 1	Reserved/No function
Switches 2 & 3	Used for terminating an EIA-485 interface. When the drive is the first, last, or only device on a network, switches 2 and 3 must be ON. When the drive is in any other location on the network, switches 2 and 3 must be OFF.
Switch 4	Not applicable with BACnet.

BACnet start up

1. Use the TR1 drive keypad to access the Extended Menu key and the 500 Group (serial communication) parameters (see *Changing TR1 series VFD parameter data*).

2. Set parameters 500, 501 and 502 as shown in Table III below.

Other settings may be changed to meet application requirements. The settings shown will serve as a good starting reference.

Parameters 503 through 508 are options that select control of the drive through the digital and/or the BACnet serial port. If *Digital input* is selected, the command can only be carried out through digital input. If *Serial communication* is selected, the command can only be carried out through serial communication. If *Logic and* is selected, the command must be by both serial communication and a digital input. If *Logic or* is selected, the command can be made by either digital or serial communication.

Parameter 560, *Override release time*, sets the interval between receiving messages that determine communication on the network is stopped.

Refer to the *TR1 Series VFD Installation and Operation Manual* for details on changing parameters and programming the drive.

Changing TR1 series VFD parameter data

Use the TR1 keypad to access the Extended Menu key and the 500 Group (serial communication) parameters. Enter or change parameter data or settings in accordance with the following procedure.

1. Press [Extend Menu] key.

2. Use ◀ and ▶ keys to find parameter group to edit.

3. Use [+] and [-] keys to find parameter you chose to edit.

4. Press [Change Data] key.

5. Use [+] and [-] keys to select correct parameter setting.

6. Press [Cancel] key to disregard change, or press [OK] key to accept change and enter new setting.

7. Press [Display Mode] key to return to normal drive display.

Table III. Serial Communication Startup Parameter Settings

Parameter	Name	Setting
500	Protocol	METASYS N2
501	Address	**01**
502	Baud rate	**9600 BAUD (fixed at 9600 for N2 protocol)**
503	Coasting	**LOGIC OR**
504	DC brake	**LOGIC OR**
505	Start	**LOGIC OR**
506	Reversing	**DIGITAL INPUT**
507	Select setup	**LOGIC OR**
508	Select speed	**LOGIC OR**
560	Override release time	**OFF**

The values in **bold** are **default values.**

Ethernet network connection

The Ethernet network connects directly to the BACnet Ethernet portal (refer back to Figure 1). The connection is a 10baseT port. Both Ethernet and Ethernet IP (BACnet IP) connect through this connector.

To establish Ethernet communication with the BACnet portal and TR1 drives, the following must be completed:

1. Wiring
2. Setting IP address of portal
3. For port 2 connection, setting port 2 configuration jumpers

Procedure

1. Wiring

Wire Connections. Each BACnet portal can support up to 10 drives (see Figure 6).

The preferred portal-to-drive wiring is EIA-485 from port 2. Connect portal Net+ to drive terminal 68 (+) and Net- to 69 (-). Additional drives are connected pos-to-pos and neg-to-neg in daisy chain fashion.

If required, port 1 can be factory-configured to connect the drives through EIA-485.

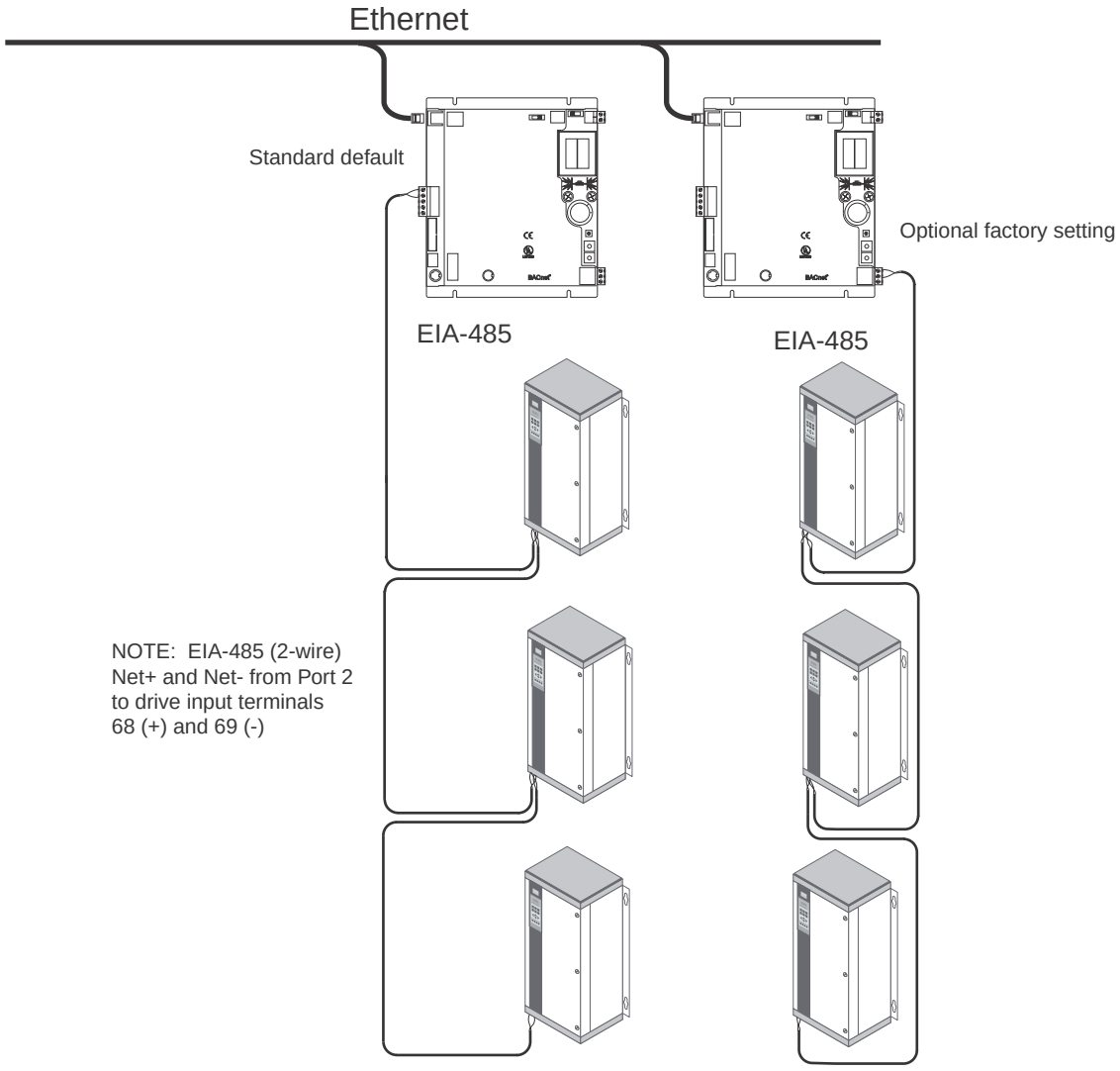


Figure 6. Ethernet Network Connection

NOTE

Steps 2 and 3 in the following connection procedure may have already been factory-set based upon customer ordering information. Default IP address is 192.168.168.xxx. Default subnet mask is 255.255.255.0. Default gateway address is 0.0.0.0.

2. Set IP address of portal

A. Set IP address to default or assigned. The BACnet portal has either an internal default Internet Protocol (IP) address or a factory-set IP address assigned from customer input. See the label attached to the portal for the IP address in either case (refer back to Figure 1). An IP address must always be present for Ethernet IP network communication. Set the IP address DIP switch (switch 3 in Figure 7) on the BACnet portal as either default or assigned. (Switches 1 and 2 are disabled.)

Figure 7. BACnet Portal DIP Switches

B. Set BACnet portal default address. The default IP address is 192.168.168.xxx. The xxx indicates the final portion of the IP address which is set using the rotary switches on the BACnet portal. The final portion of the address identifies the BACnet portal with a unique address on the BACnet network. For example, using the default address, Figure 8 shows the BACnet portal address configured as 192.168.168.3. Set the user-assigned final portion of the portal network address using the rotary switches.

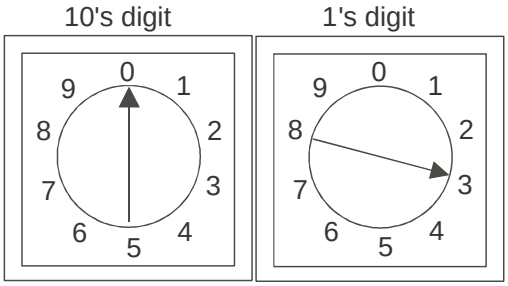


Figure 8. Rotary Address Switches

C. Set BACnet portal address DIP switch. The BACnet portal DIP switch 5 (refer back to Figure 7) must correspond to the final portion of the IP address setting. Set the switch to +0 for addresses 0 to 99 or to +100 for addresses 100 to 199.

3. Set configuration jumpers on portal

See the port connector label attached to the BACnet portal for the factory-configured port assignments (refer back to Figure 1).

Set port 2 configuration jumpers for communication type. When using port 2 on the BACnet portal for communication with the drives, set the port 2 configuration jumpers for EIA-485 (2-wire). Figure 9 illustrates the appropriate setting. EIA-485 (2-wire) is the factory default setting.

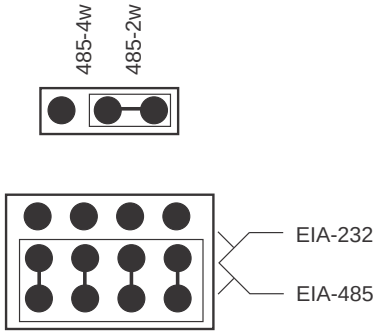
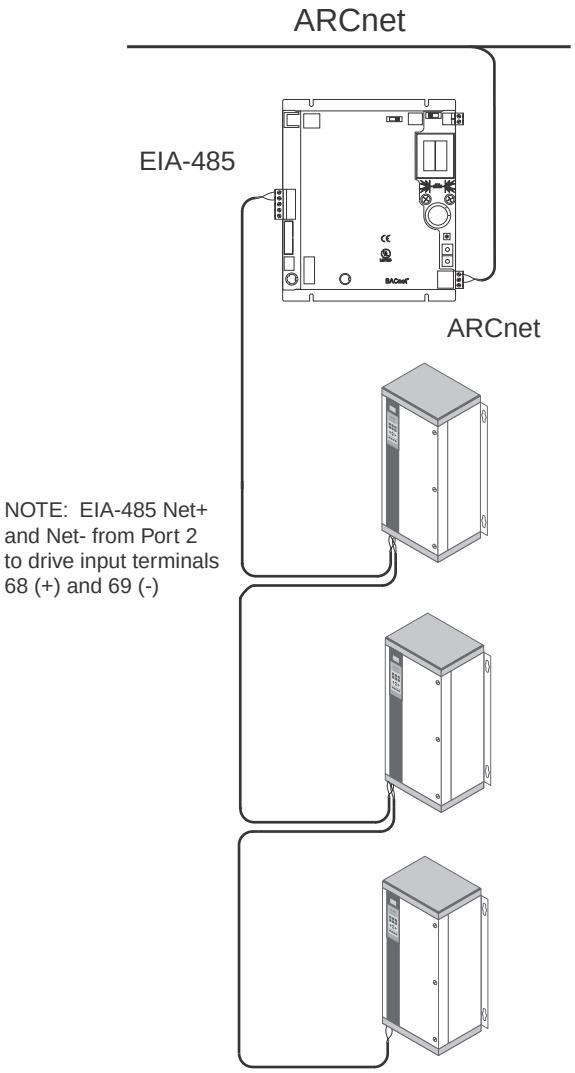


Figure 9. Port 2 Configuration Jumpers

When using port 1. Port 1 must be programmed for operation at the factory based upon customer ordering data. When using port 1 on the BACnet portal for communication with the drives, set the port 1 DIP switch (refer back to Figure 7) for *ARC156* when using an ARCnet interface to the drives or *Other* for EIA-485 or additional options.

ARCnet network connection



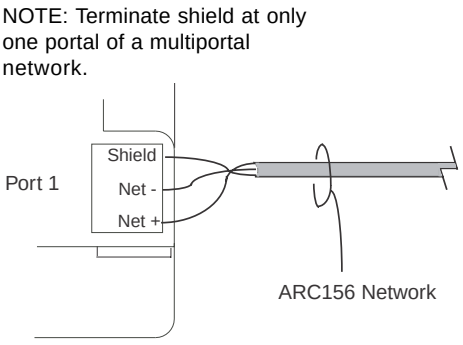


Figure 10. ARCnet Network Connection

Procedure

1. Switch BACnet portal power off.
2. Wire ARCnet network input cable to BACnet portal port 1 (see Figure 10).
3. Set port 1 DIP switch to *ARC156* (see Figure 11).
4. Plug EIA-485/232 configuration jumper to EIA-485 position as shown in Figure 12.
5. Set portal device instance number using rotary address switches (see Figure 13).
6. Set BACnet portal address DIP switch. BACnet portal DIP switch 5 (refer back to Figure 1) must correspond to device instance number setting. Set switch to +0 for addresses 0 to 99 or to +100 for addresses 100 to 199.
7. Wire to drives from BACnet port 2 from Net (+) to drive terminal 68 and Net (-) to drive terminal 69.

Figure 11. BACnet Portal DIP Switches

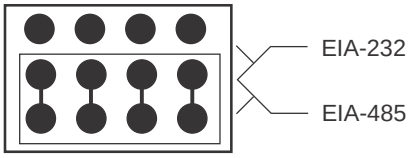


Figure 12. Port 2 Configuration Jumper Settings

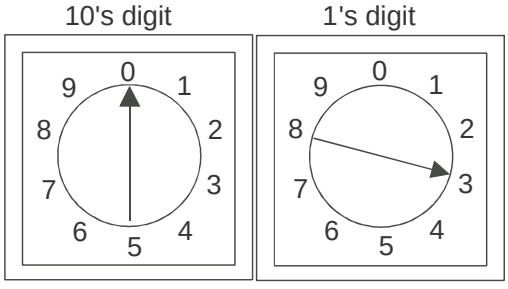
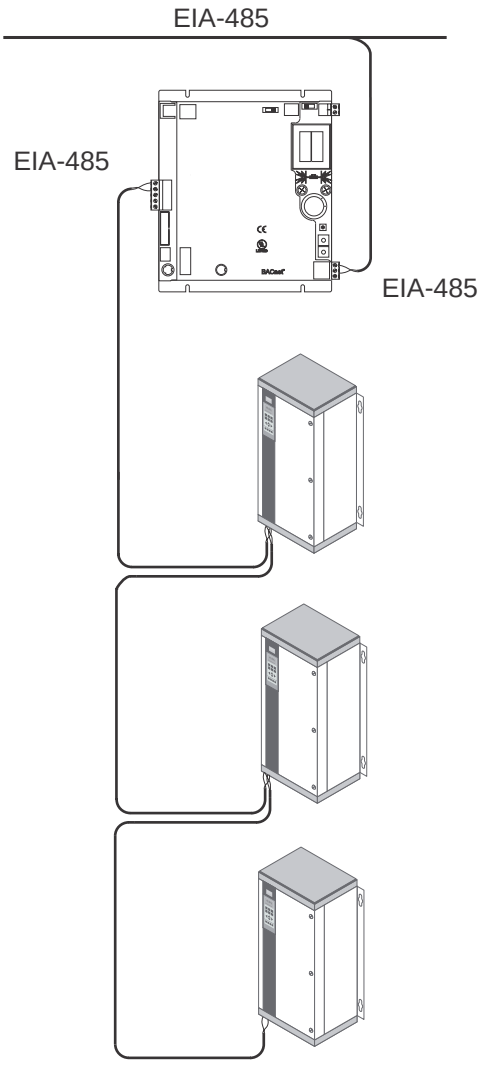


Figure 13. Rotary Address Switches

EIA-485 network connection



NOTE: EIA-485 (2-wire) from Port 2 to drive input terminals 68 (+) and 69 (-)

Figure 14. EIA-485 (2-wire) Network Connection

Procedure

1. Switch BACnet portal power off.
2. Wire EIA-485 network input cable to BACnet portal port 1 (see Figure 14).
3. Set port 1 DIP switch to *Other* (see Figure 15).
4. Plug EIA-485/232 configuration jumper to EIA-485 position as shown in Figure 16.
5. Plug EIA-485 configuration jumper to (2-wire) position as shown in Figure 16.
7. Wire to drives from BACnet portal port 2 from Net (+) to drive terminal 68 and Net (-) to drive terminal 69.

Figure 15. BACnet Portal DIP Switches

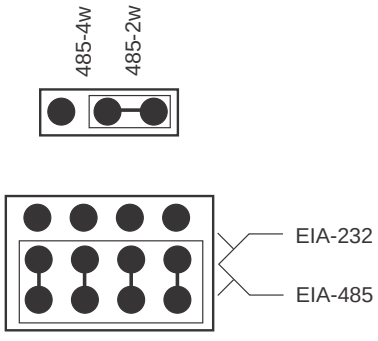


Figure 16. Port 2 Configuration Jumper Settings

EIA-232 network connection

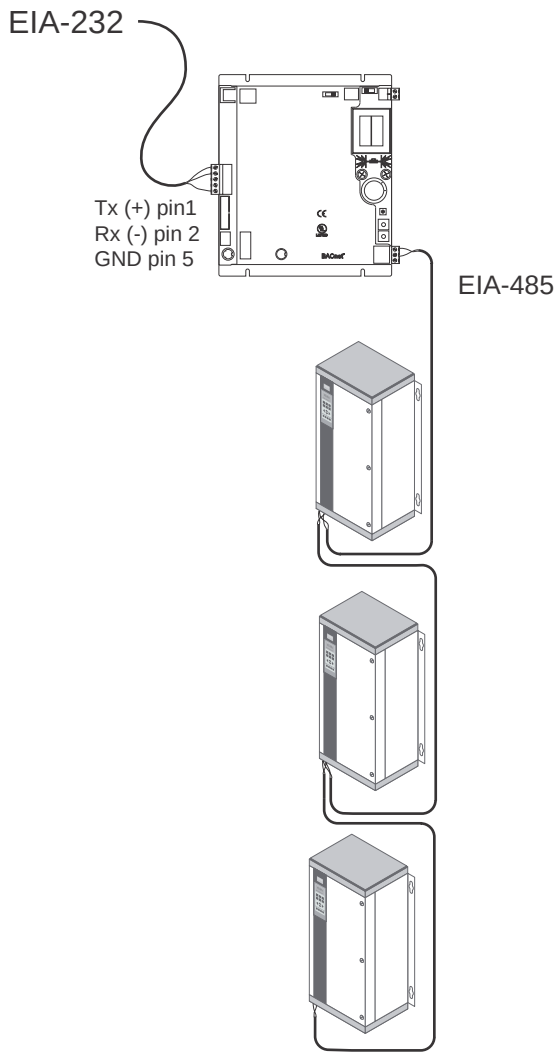


Figure 17. EIA-232 Network Connection

Procedure

1. Switch BACnet portal power off.
2. Wire EIA-232 network input cable to BACnet portal port 2 (see Figure 17). Tx (+) pin 1, Rx (-) pin 2, GND pin 5.
3. Set port 1 DIP switch to *Other* (see Figure 18).
4. Plug EIA-485/232 configuration jumper to EIA-232 position as shown in Figure 19.
5. Wire to drives from BACnet portal port 2 from Net (+) to drive terminal 68 and Net (-) to drive terminal 69.

Figure 18. BACnet Portal DIP Switches

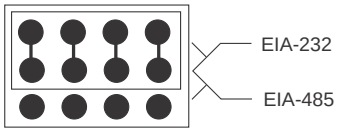


Figure 19. Configuration Jumper Settings

Power up

1. Turn BACnet portal power switch to OFF. This prevents portal from power up before proper voltage is verified.
2. Ensure that power is applied to drives.
3. Plug connector from transformer to BACnet portal 24 VAC power terminal.
4. Ensure that 24 VAC is present at BACnet portal power input terminals.
5. Turn BACnet portal power switch to ON. Power, Run and Error LEDs turn on. Run and Error LEDs then begin blinking. Error LED turns off.

Troubleshooting drive communication

For use in the event of trouble communicating with the drives. Test conditions for BACnet portal communications:

1. Test only one drive connected to portal at a time.
2. Portal power OFF.
3. For TR1 VFD termination, DIP switches 2 and 3 should be in the ON position. Termination DIP switches are located on TR1 VFD power board directly above drive terminals where connections to terminals 68 and 69 are made.
4. Drive power ON.
5. Apply power to BACnet portal and wait 20-25 seconds. (See Table IV for test results.)

Troubleshooting Ethernet communication

With the BACnet portal connected to BACnet network through the Ethernet connector, apply power to BACnet portal and switch portal ON. See Table V for test results.

Loss of signal recovery time

When serial communication is lost to the drive, recovery time to reestablish communication with the network can take up to 5 minutes.

Table IV. Troubleshooting Drive Communication

SYMPTOM	CAUSE	SOLUTION
Transmit LED ON steady and receive LED OFF.	Reversed polarity to drive or short in EIA-485 cable.	Reverse wires to drive terminals 68 (+) and 69 (-) or remove short.
Transmit LED blinks slowly 3 times, then pauses and repeats 3 blinks.	• Drive not ON. • Drive not set for N2 protocol in parameter 500. • Drive serial bus address not correct in parameter 501. • Network cable not connected. • For TR1 VFD: termination switches on drive in wrong position.	• Apply power to drive. • Set parameter 500 for N2 protocol. • Set drive address in parameter 501. • Connect network cable to unit. • Set termination switches 2 and 3 to ON position.

Table V. Troubleshooting Ethernet Communication

SYMPTOM	CAUSE	SOLUTION
Link LED is OFF. Lan LED is OFF.	• Network speed set to 100kbps. • BACnet board not connected to network. • Portal address not set for network or not recognized.	• Set network speed for 10kbps. • Connect board to network. • Ping portal to test communications. To ping portal, go to a DOS prompt on any network computer. Type “ping” and the portal address (displayed on the IP address label on the unit) and press enter. If communicating, you will get a reply. If not communicating, you will get no response indication.
Unable to see BACnet objects.	• Bad network connection. • Wrong device instance.	• Verify LED is lit at hub. • Use procedure outlined in BAS-PRB002-EN to perform Who-Is, I-Am on BACnet.

Appendix A

BACnet POINT MAPPING TABLES for BACnet PORTAL

Binary Values to Drive

The following Binary Values are "writeable" for the BACnet client (Tracer Summit).

BACnet REFERENCE NUMBER	DESCRIPTION	RANGE
coast_#	Motor will coast freely to a stop. Drive will not run in any mode when coast is active.	**0=Coast stop** 1=No coast
start_#	Provides a start command when active. Motor will ramp to stop when stop is active.	**0=Stop** 1=Start
reset_#	Allows resetting drive after a fault that does not require cycling power. Reset occurs at transition from OFF to ON.	**0=Off** 1=On
jog_#	Used to start and run drive at a frequency set in parameter 209.	**0=Off** 1=On
relay_1_#	Enables/disables high voltage Form C relay when parameter 323 is set to *Control Word Bit 11/12* [29].	**0=Off** 1=On
relay_2_#	Enables/disables low voltage Form A relay when parameter 323 is set to *Control Word Bit 11/12* [29].	**0=Off** 1=On
reverse_#	Changes motor direction of rotation when parameter 506 is set to a value other than *Digital Input*.	**0=Off** 1=On

NOTE: # symbol represents drive ID number.

The values in **bold** are **default values.**

Analog Values to Drive

The following Analog Values are "writeable" for the BACnet client (Tracer Summit).

BACnet REFERENCE NAME	DESCRIPTION	RANGE	PARA No.
bus_ref_#	Drive speed command (open loop) or setpoint (closed loop) via the serial bus.	0% to 100%	N/A
bus_feedback_#	Drive feedback value via the serial bus.	0% to 100%	535
bus_feedback_2_#	Second drive feedback value via the serial bus.	0% to 100%	536

NOTE: # symbol represents drive ID number.

Bus reference. When the drive is set for open loop operation in parameter 100, the bus reference is the speed command to the drive. In closed loop operation, bus reference is the drive's setpoint.

Bus feedback. This is the feedback signal provided to the drive via the BACnet bus. The TR1 Series VFD can regulate two feedback signals provided to the drive.

Range. Percentage of range between minimum reference (parameter 204) and maximum reference (parameter 205).

Drive Settings

The following Analog Values are "writeable" for the BACnet client (Tracer Summit).

BACnet REFERENCE NAME	DESCRIPTION	RANGE	PARA NO.
reset_counter_#	Resets kWh counter	**0=no reset** 1=reset	618
active_setup_#	Selects active setup	1 to 4	002
warn_feedback_low_#	Warning low feedback	-999,999.999 to FB high	227
warn_feedback_high_#	Warning high feedback	FB low to 999,999.999	228
setpoint_1_#	Set point 1	Min. FB to max. FB	418
setpoint_2_#	Set point 2	Min. FB to max. FB	419
prop_gain_#	PID proportional gain	0.00 to10.00	423
int_time_#	PID integration time	0.01 to 9999.00 sec.	424
fb_filter_time_#	Feedback filter time	0.01 to10.00 sec.	427

NOTE: # symbol represents drive ID number.

The values in **bold** are **default values.**

Analog Values from Drive

The following Analog Values are "readable" for the BACnet client (Tracer Summit).

BACNet Reference Name	UNIT	DESCRIPTION	PARA NO.
reference_#	%	Reference in % between min and max reference. Speed reference in open loop. Setpoint reference in closed loop.	509
feedback_#	Par. 415	Feedback using the unit of measure selected in parameter 415.	511
freq_#	Hz	Drive output frequency.	512
motor_curr_#	Amp	Current being supplied to motor.	514
power_#	kW	Power being supplied to motor.	515
motor_volt_#	VAC	Voltage being supplied to motor.	517
dc_bus_volt_#	VDC	DC bus voltage of drive.	518
therm_motor_load_#	%	Calculated thermal load on motor. Trip point is 100%.	519
therm_inverter_load_#	%	Calculated thermal load on drive. Trip point is 100%.	520
term_53_analog_#	VDC	Voltage value on analog input Terminal 53.	522
term_54_analog_#	VDC	Voltage value on analog input Terminal 54.	523
term_60_analog_#	mA	Current value on analog input Terminal 60.	524
heatsink_temperature_#	°C	Drive heatsink temperature.	528
operating_hours_#	Hour	Number of hours power applied to drive.	600
run_hours_#	Hour	Number of hours drive applied power to motor.	601
kwh_counter_#	kWh	Output power of drive in hours.	602

NOTE: # symbol represents drive ID number.

Binary Values from Drive

The following Binary Values are "readable" for the BACnet client (Tracer Summit).

BACnet REFERENCE NAME	SELECTION	PARA NO.
current_status_#	**0=OK** 1=Limit	527
voltage_status_#	**0=OK** 1=Limit	527
motor_run_status_#	**0=Not Running** 1=Running	527
frequency_status_#	0=Out of Range **1=In Range**	527
control_status_#	0=Local **1=Remote**	527
reference_status_#	0=Not on Ref. **1=On Ref**.	527
warning_status_#	**0=OK** 1= Warning	527
trip_status_#	**0=OK** 1=Tripped	527
coast_status_#	0=Not Enabled **1=Enabled**	527
frequency_low_#	**0=OK** 1=Warning	531
frequency_high_#	**0=OK** 1=Warning	533
current_low_#	**0=OK** 1=Warning	531
current_high_#	**0=OK** 1=Warning	531
feedback_low_#	**0=OK** 1=Warning	531
feedback_high_#	**0=OK** 1=Warning	531
live_zero_error_#	**0=OK** 1=Warning	531
phase_loss_#	**0=OK** 1=Warning	531
drive_therm_overload_#	**0=OK** 1=Warning	531
motor_therm_overload_#	**0=OK** 1=Warning	531
current_limit_#	**0=OK** 1=Warning	531
external_fault_# (safety interlock)	**0=OK** 1=Alarm	529
over_temp_#	**0=OK** 1=Alarm	529
earth_fault_#	**0=OK** 1=Alarm	529
trip_lock_#	**0=OK** 1=Trip Lock	529
standby_#	**0=False** 1=True	532
jogging_#	**0=False** 1=True	532
hand_mode_#	**0=Auto** 1=Hand	532
off_#	**0=False** 1=True	532
local_ref_#	**0=False** 1=True	532
running_at_ref_#	**0=False** 1=True	532
sleep_mode_#	**0=False** 1=True	532

NOTE: # symbol represents drive ID number.

The values in **bold** are **default values.**

Binary Values from Drive (continued)

BACnet REFERENCE NAME	SELECTION	PARA NO.
reverse_#	**0=False** 1=True	530
term_33_#	**0=Off** 1=On	521
terminal_32_#	**0=Off** 1=On	521
terminal_29_#	**0=Off** 1=On	521
terminal_27_#	**0=Off** 1=On	521
terminal_19_#	**0=Off** 1=On	521
terminal_18_#	**0=Off** 1=On	521
terminal_17_#	**0=Off** 1=On	521
terminal_16_#	**0=Off** 1=On	521

NOTE: # symbol represents drive ID number.

The values in bold are default values.

Appendix B

BACnet Communications Site Survey

CSO FIRM _____

CSO PO # _____

CSO CONTACT _____

CSO PHONE _____

Each BACnet portal can control and monitor any mix of TR1 Series VFDs up to a total of ten.
Use separate BACnet Communications Site Survey sheet for each portal.

NETWORK INFORMATION

BACnet can communicate over all of the following networks. Indicate the network that will be used.

☐ *Ethernet IP ☐ *Ethernet ☐ ARCnet (156K twisted pair)
☐ PTP over EIA-232 (RS-232) ☐ MSTP over EIA-485 (RS-485)
*Supported by Tracer Summit.

PORTAL CONFIGURATION

The following information is required to program the portal. Network number must be supplied in all cases.

Device Instance Number: _____ Supply number for TR1 BACnet portal in all cases.

Ethernet IP

IP Network Number: _____ Supply user's network number in all cases.

☐ Use default IP address.

Default address range is: 192.168.168.001
Default Subnet Mask is: 255.255.255.0
Default Gateway Address is: 0.0.0.0

☐ Use specified IP address.

You must specify the following.
IP address: __ __ __ . __ __ __ . __ __ __ . __ __ __
Subnet mask: __ __ __ . __ __ __ . __ __ __ . __
Gateway Address: __ . __ . __ . __

Ethernet (not routable)

Ethernet Network Number: _____ Must match user's network number.

ARCnet

Network Number: _____ Must match user's network number.

PTP over EIA-232 (RS-232)

Network Number: _____ Must be different than other network numbers.

MSTP over EIA-485 (RS-485)

☐ 2-wire (default) ☐ 4-wire
Network Number: _____ Must match user's network number.

☐ Master Station
Master Station ID: _____ Default is 127. Range is 0 through 127.
Baud Rate (default is 9600) ☐ 9600 ☐ 38400

☐ Slave Station
Slave Station ID: _____ Default is 127. Range is 0 through 254.
Baud Rate (default is 9600) ☐ 9600 ☐ 38400

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