HEAT-TIMER®

Installation and Operation Manual

ETV Platinum Plus Remote Communications

Communication Upgrade
BACnet, Modbus, and RINET (Internet)

059306-00 Rev. A

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ETV Platinum Plus Components

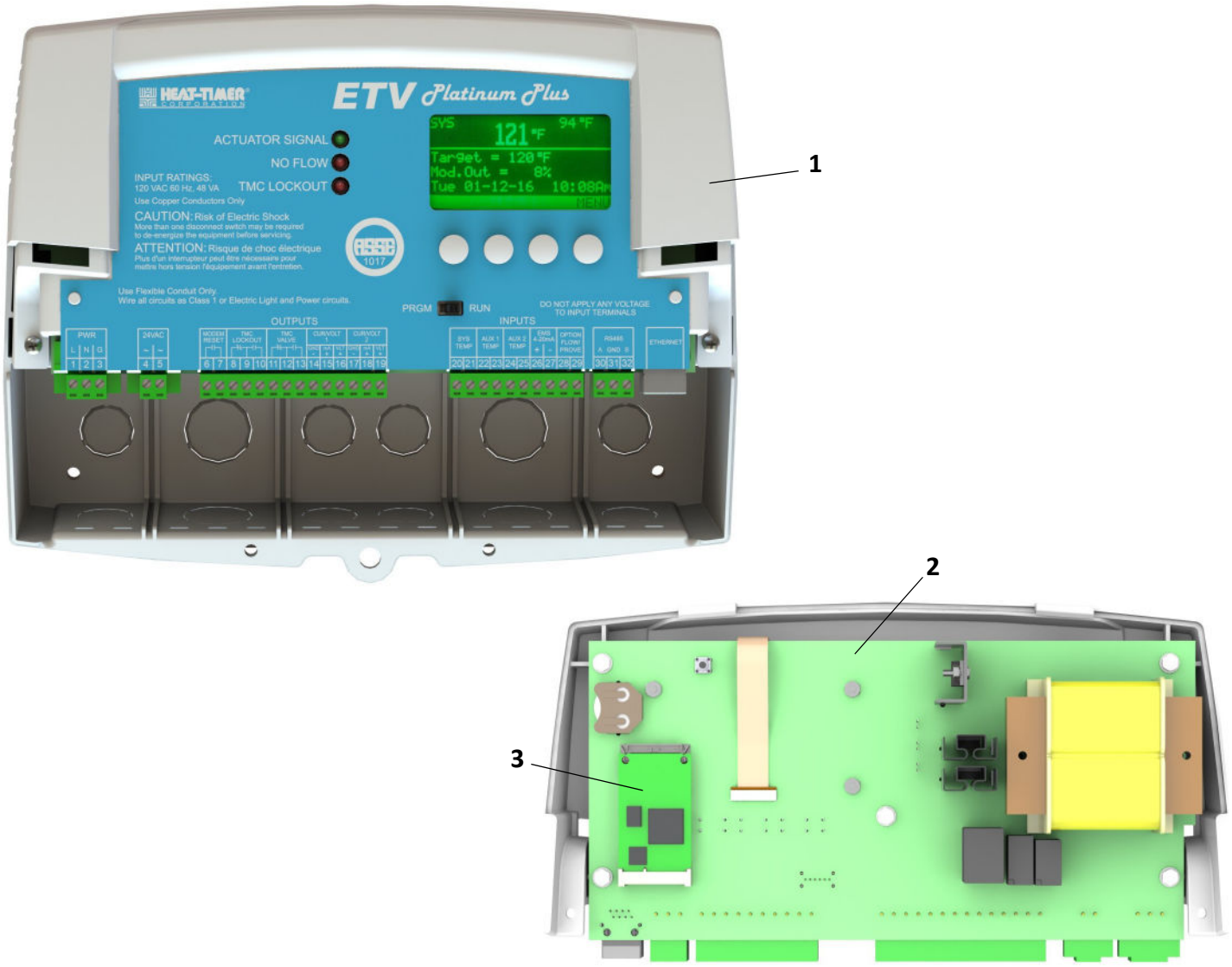


Figure 1: ETV Platinum Plus Remote Communications Components

Item	Description	Item	Description
1	ETV Platinum Plus Display Module (Front)	3	Communications Card
2	ETV Platinum Plus Display Module (Back)		

Detailed Operation

Overview

ETV Platinum Plus controls are designed to function as stand-alone hot water temperature controls. However, for ease of access, the ETV Platinum Plus control can be upgraded to support a RINET (internet), BACnet, or Mobus external communications option. The external communications option allows the user to remotely access and monitor the control.

The ETV Platinum Plus can be ordered with the optional communications upgrade factory-installed, or the appropriate communications card can be ordered as a field upgrade.

If the ETV Platinum Plus was ordered direct from the factory with the communications upgrade installed, skip the installation instructions and proceed to the appropriate section to configure the option:

- RINET (Internet) Communications Configuration (see page 8)
- BACnet Communications Configuration (see page 18)
- Modbus Communications Configuration (see page 23)

NOTICE

This manual describes only the installation of the communications option as a field upgrade and the configuration of the communications option. For information on installing and programming the ETV Platinum Plus, refer to the *ETV Platinum Plus Installation and Operation Manual* (Heat-Timer p/n 059304-00).

Communications Cards Upgrade Options

The following communications upgrade kits can be ordered as a field upgrade to the ETV Platinum Plus:

Communications Card Upgrade Option	Heat-Timer Part Number
RINET / Internet	900345-RINET
BACnet	900345-BAC
Modbus	900345-BUS

Communications Features

For detailed information on each communications upgrade, refer to the following sections:

- RINET (Internet) Communications Configuration (see page 8)
- BACnet Communications Configuration (see page 18)
- Modbus Communications Configuration (see page 23)

Installation Instructions

The installation process for ETV Platinum Plus Remote Communications consists of the following basic steps:

1. Initial installation (see “Design Considerations” below).
2. Installing the communications card (see page 6).
3. Installing RINET/internet communications equipment, if applicable (see page 9).
4. Connecting the communications wiring and programming the ETV Platinum Plus:
   - RINET (Internet) Communications Configuration (see page 8)
   - BACnet Communications Configuration (see page 18)
   - Modbus Communications Configuration (see page 23)

Supplied Materials

The following materials are supplied with the communications card:

- Installation and Operation Manual (p/n 059306-00)
- Warranty Card (p/n 059115-00)

Required Materials (Not Supplied)

The following materials/tools are required for installation, but are not supplied:

- Communications wires/cabling
- General tool kit (screwdrivers, wire strippers, power drill, etc.)
- 18 AWG cable (Heat-Timer p/n 703001-01 or equivalent #18⁄2 cable)
- Modem Box (p/n 940100-00) for RINET/internet connections only (optional if Heat-Timer is providing internet communications)

Design Considerations

When installing the communications option, certain design considerations must be taken into account. These include:

- Location of communications equipment and distance from the ETV Platinum Plus control
- Communications settings (Modbus address, BACnet ID, IP address and network settings) as appropriate

Installing the Communications Card

⚠ WARNING

ELECTRICAL SHOCK HAZARD! For your safety, to avoid the risk of electric shock, disconnect electrical power to the device before servicing or making any electrical connections. DO NOT re-connect electrical power until ALL wiring or service is completed. Failure to do so may result in severe personal injury or death.

All wiring must meet or exceed all applicable local, state, and/or federal guidelines, codes, regulations, and laws.

1. Disconnect power from the ETV Platinum Plus.
2. Remove the Enclosure Wiring Cover (1) by removing the two lower screws (2) holding it to the base (3), and then remove the Display Module (4) by removing the two middle screws (5) holding it to the base.

Figure 2: ETV Platinum Plus – Exploded View

3. Turn the Display Module over to reveal the circuit board.
4. While holding the communications card at a slight angle, position the slot on the card so it is aligned with the rib on connector (1) located on the back of the Display Module, and then slide the card into the connector.

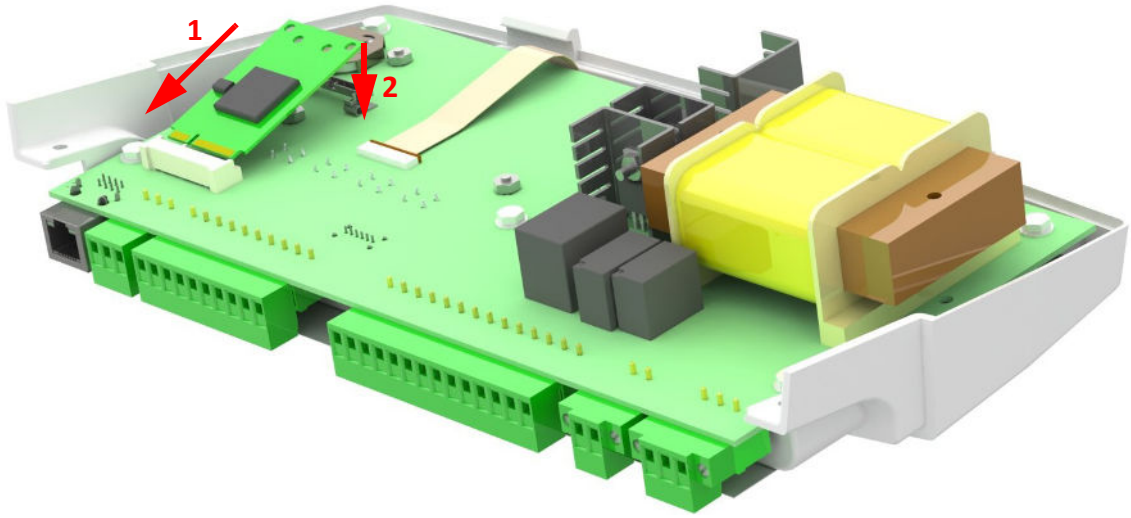


Figure 3: ETV Platinum Plus – Installing the Communications Card

5. When the communications card is fully seated in the connector (1), press down on the top of the card (2) to latch it into place.
6. Position the Display Module into the base and secure it in place using the middle screws (5) removed in Step 2 above.

   NOTE: Do not replace the Enclosure Wiring Cover until all wiring is completed.
7. Refer to the appropriate section to complete the installation and wiring:
   - For a RINET / internet connection see page 8.
   - For a BACnet connection, see page 18.
   - For a Modbus connection, see page 23.

RINET (Internet) Communications Configuration

RINET / Internet Communications

The ETV Platinum Plus supports RINET (internet) communications over an ethernet connection to a modem or router.

RINET Features

The RINET communications option provides the following features:

Feature	Description
View and Change Settings Remotely	Users can remotely view and change their ETV Platinum Plus settings by accessing the BuildingNet website (http://www.htcontrols.com) using any internet-connected device, such as a computer, tablet, or smartphone. No specialized software or equipment is required to communicate to the control. When a user logs on to their account, a list of all their buildings and controls is displayed. When the user enters any of their controls, the BuildingNet creates an internet connection between the user's computer and the control. Consequently, all viewed data and setting changes are instantaneous.
History	To help users analyze and fine tune the performance of the ETV Platinum Plus control, Heat-Timer designed the BuildingNet system to store all control operating history. This gives users the ability to view a detailed history of the control operation and sensor values. Each control's history view is equipped with pre-designed historical graphs. In addition, the BuildingNet system provides the ability to create additional customized graphs.
Alarming	Each control and its sensors are equipped with pre-configured alarms. Additional customized alarms can also be configured for sensors. Any alarm can be delivered as an e-mail, a text message to a mobile phone, to the web, or to any combination of the above. A detailed alarm history log of all alarm events and their deliveries can also be viewed to help identify problem patterns.
Security	ETV Platinum Plus controls provide different levels of access: • Control Security, which relates to accessing the control using its screen and buttons. Each control is equipped with a security password that can be activated to prohibit unauthorized users from changing settings locally. • Internet Security, which relates to accessing the control through the BuildingNet website. The owner of the control is the primary user with full access to the account. The owner can assign users to specific controls, and each user can have either Admin rights, full rights, or read-only rights to each of the controls.

Supported Internet Connections

The ETV Platinum Plus with RINET communications option supports the following internet connections:

- Dynamic IP without DHCP server (connection via cable modem without a DHCP server)
- Dynamic IP with DHCP Server (connection via DSL modem or cable modem and router)
- Static IP (connection via internet service provider with static IP or when using a specific LAN IP address)

Installing RINET / Internet Communications Equipment

If Heat-Timer is providing the internet service connection through a cellular modem, it is recommended that a Modem Box (Heat-Timer p/n 940100-00) be included in the installation. The Modem Box provides both protection for the modem and an electrical outlet for service power to the modem.

NOTE: When connecting the ETV Platinum Plus control directly to a modem, the control must manage the modem power. This is especially important when using a dynamic IP internet connection.

Installing the Modem Box

1. Select an appropriate location to mount the Modem Box. The location must meet the following minimum requirements:
   - The mounting surface should be flat and strong enough to hold the weight of the Modem Box.
   - The Modem Box can be mounted up to 200 feet (61 meters) from the ETV Platinum Plus control using a customer-supplied CAT5 cable.
   - DO NOT mount the Modem Box in a location where it will be exposed to extreme heat, cold, humidity, or moisture.
2. Position the Modem Box in the desired location, and then secure the box in place using the provided screws.
3. Install the duplex electrical outlet (provided) in the Modem Box, as shown:

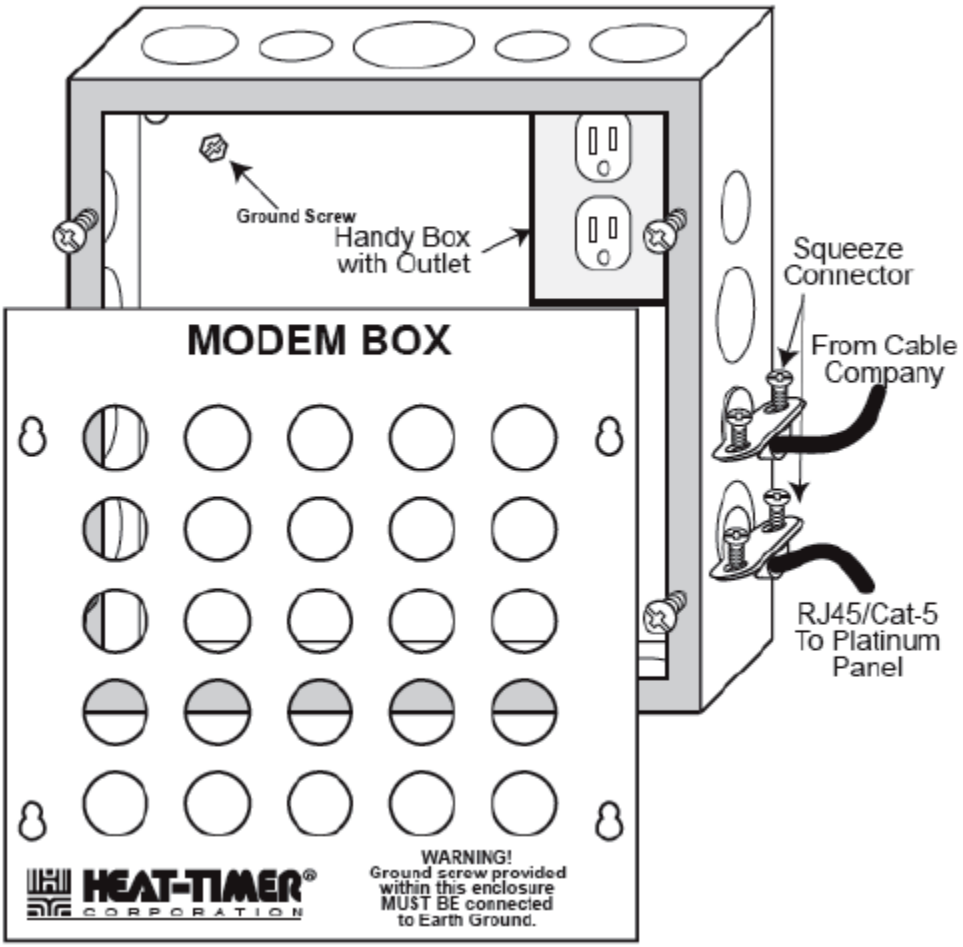


Figure 4: Modem Box Installation

Providing Power to the Modem or Router

When sharing the internet connection with multiple ETV Platinum Plus RINET controls or computers, the ETV Platinum Plus must manage the power to the modem or modem and router. This is done using terminals 6 and 7 on the control.

NOTE: ETV Platinum Plus outputs do not source power. 120Vac must be supplied to the terminals on the control.

When the ETV Platinum Plus is connected directly to a modem, facility power is routed through terminals 6 and 7 on the control to Outlet 1 in the modem box. The modem is plugged into Outlet 1.

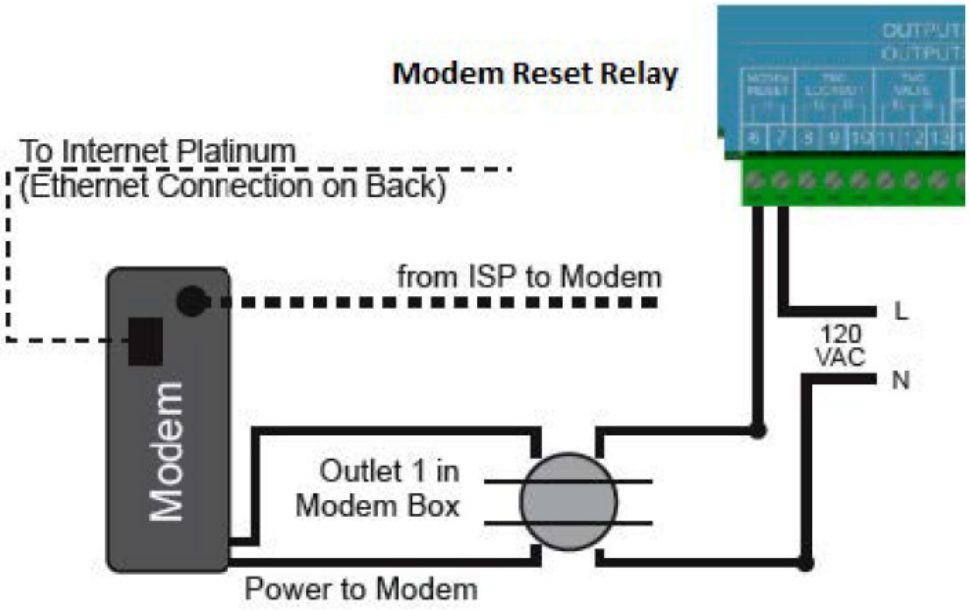


Figure 5: ETV Platinum Plus Connected to a Modem

When the ETV Platinum Plus is connected to the modem via a router, the control must manage the power to both the router and modem. The router must be connect to a 1–2 minute time delay relay (TDR). This gives the modem time to establish a solid connection with the ISP before assigning a connection to the router.

NOTE: The TDR shown in Figure 6 is just one example of a TDR. If a different TDR is used, refer to the instructions provided with the TDR for installation information.

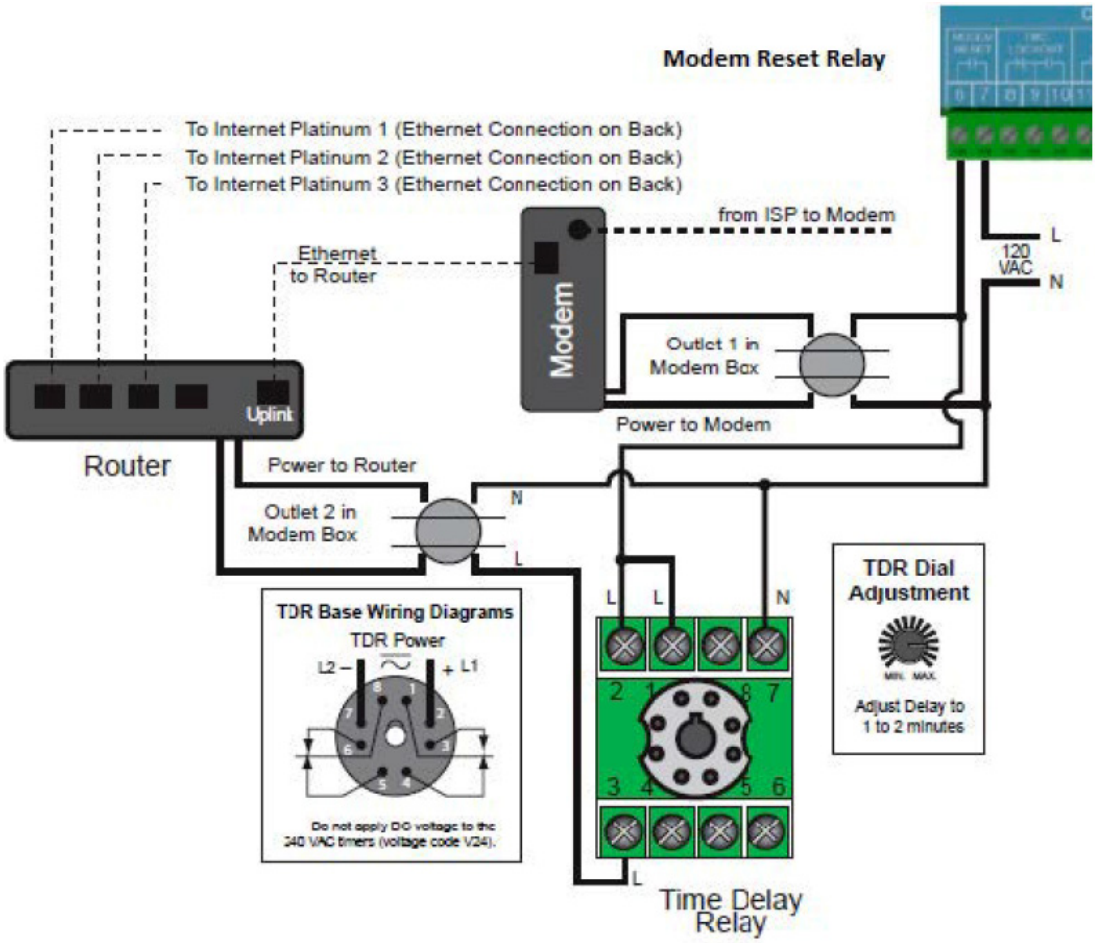


Figure 6: ETV Platinum Plus Connected to a Router

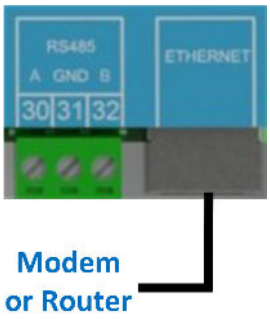
1. Run the 120Vac line voltage wire through a knockout in the ETV Platinum Plus enclosure and connect it to terminal 7 on the control.

> **⚠ CAUTION**
>
> **Class 1 voltage wiring must use a different enclosure knockout and conduit than any Class 2 voltage wiring (low-voltage communication wires).**

2. Run the 120Vac neutral wire through one of the side knockouts on the Modem Box. Connect the neutral wire to the Neutral terminal on Outlet 1 in the Modem Box.
3. Run the power wiring through a knockout in the ETV Platinum Plus enclosure and connect it to terminal 6 on the control.
4. Route the power wire from the ETV Platinum Plus to the Modem Box.

5. Run the power wire through one of the side knockouts in the Modem Box. Connect the wire to the Hot terminal on Outlet 1 in the Modem Box.
6. Plug the modem into Outlet 1 in the Modem Box.
7. If the control will manage power to a router, connect a TDR:
   a. Daisy-chain the 120Vac neutral wire and connect it to the terminal on the TDR relay coil (terminal 7 in the example shown in Figure 6) and to the Neutral terminal on Outlet 2 in the Modem Box.
   b. Daisy-chain the power wire from the ETV Platinum Plus terminal 6 and connect it to the terminal on the other side of the TDR relay coil (terminal 2 in the example shown in Figure 6) and to the common terminal on the TDR (terminal 1 in the example shown in Figure 6).
   c. Connect a power wire from the terminal on the normally open side of the TDR (terminal 3 in the example shown in Figure 6) to the Hot terminal on Outlet 2 in the Modem Box.
   d. Plug the router into Outlet 2 in the Modem Box.

Connecting the Internet (RINET) Communications Wiring



CAUTION

Class 2 voltage wiring (low-voltage communication wires) must use a different enclosure knockout and conduit than any Class 1 voltage wiring.

To connect the ETV Platinum Plus to the internet:

1. Run an ethernet cable through a knockout in the ETV Platinum Plus enclosure and connect it to the Ethernet connector on the control.
2. Extend the ethernet cable to the Modem Box and run the cable through one of the side knockouts. Secure the cable in place by tightening the squeeze connector screws.
3. Connect a cable from the ISP connection to the modem.
4. If the control is connected to the internet directly through the modem (see Figure 5 on page 10), connect the ethernet cable from the ETV Platinum Plus to the Ethernet/LAN port on the modem.
5. If the control is connected to the internet through a router/modem (see Figure 6 on page 11):
   a. Connect an ethernet cable from the Uplink port on the router to the Ethernet/LAN port on the modem.
   b. Connect the ethernet cable from the ETV Platinum Plus to a network port on the router.
6. After the communications option wiring to the ETV Platinum Plus is complete, replace the enclosure wiring cover and secure it in place with two screws.
7. Optionally secure the enclosure using a padlock with a maximum shank diameter of ⅛".
8. Replace the Modem Box cover and secure it in place with four screws.
9. Apply power to the ETV Platinum Plus and configure the internet communications.

Configuring Internet Communications

After powering on the ETV Platinum Plus, the `System Startup` menu is displayed. After selecting the Modulation Type in the Startup menu, the control automatically detects the type of communications card installed and displays the appropriate menus to configure the internet communications option.

The following internet settings must be configured. These settings will vary depending on the type of internet connection available (see Table 1 for information):

- **Internet ID** (see "Internet ID and Port Forwarding" on page 16 for more information)
- **IP Address**
- **Subnet Mask**
- **Default Gateway**
- **DNS Server**

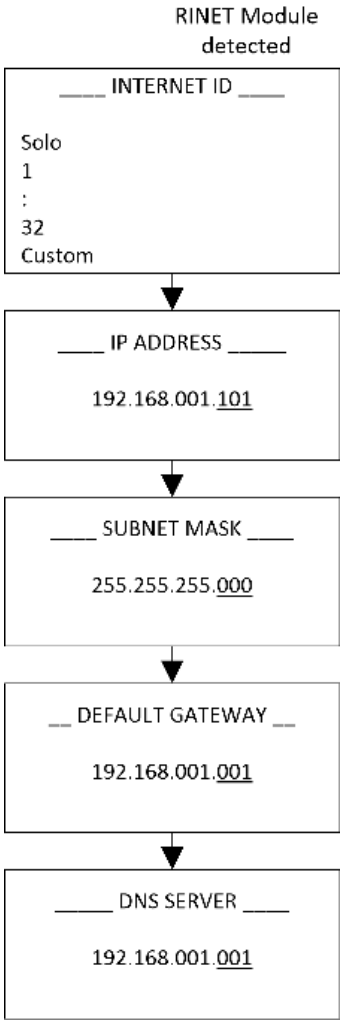


Figure 7: Internet Communications Configuration Menus in the Startup Menu

Table 1: RINET Internet Connection Settings

Internet Connection Type	Notes
Dynamic IP without a DHCP server	Typical cable modem configuration. The network has a cable modem that does not include a built-in DHCP server, and does not include a router. On the ETV Platinum Plus: • Set `Internet ID` = `Solo`. **NOTE: If the cable modem does have a built-in DHCP server, refer to the "Dynamic IP with a DHCP server" section below.**
Dynamic IP with a DHCP server	Typical DSL modem or cable modem with a router configuration. See “Internet ID and Port Forwarding” on page 16 for more information. **Option 1: Assigned Internet ID** On the ETV Platinum Plus: • Set `Internet ID` = a value between `1` and `32`. On the router: • Set Port Forwarding in accordance with Table 2 on page 16. • Set DHCP IP address assignment to **NOT** include the range 192.168.1.101 through 192.168.1.132. **Option 2: Custom Internet ID** On the ETV Platinum Plus: • Set `Internet ID` = `Custom`. • Enter the control IP Address, Subnet Mask, Default Gateway, and DNS server. On the router: • Set Port Forwarding to Port 8082. • Set DHCP IP address assignment to **NOT** include the control IP address. This information must be obtained from the network administrator.
Static IP	For a network configuration when the ISP assigns a static IP address or when using a specific LAN IP address. On the ETV Platinum Plus: • Set `Internet ID` = `Custom`. • Enter the control IP Address, Subnet Mask, Default Gateway, and DNS server. On the DHCP server: • Set DHCP IP address assignment to **NOT** include the control IP address. This information must be obtained from the network administrator.

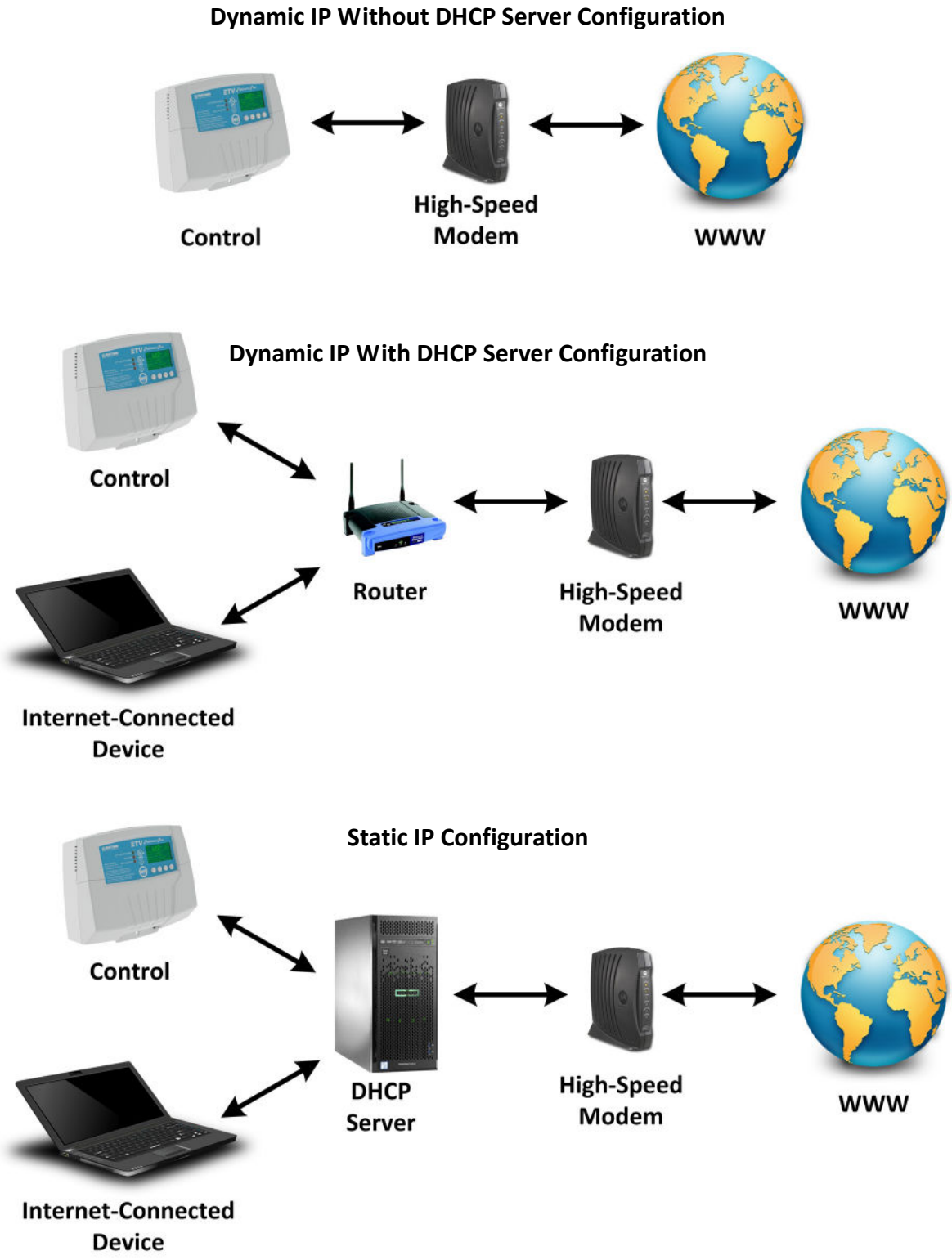


Figure 8: RINET / Internet Communications Options

Internet ID and Port Forwarding

When programming the ETV Platinum Plus RINET communications option, the `Internet ID` menu screen is displayed. Configure the Internet ID based on the information provided below:

Internet ID

Selections: `Solo`, `1-32`, `Custom` **Default:** `Solo`

Menu Path: */System Startup > Control Mode > ... > Modulation Type > {comm options}*

Description:

- `Solo`
  - Select this options if the control is directly connected to the internet using a cable modem without a firewall.
  - The control will acquire its internet information directly from the cable modem. Since no firewall exists, no port forwarding is required.
- `1–32`
  - Select one of these options if the control is connected to the internet through a router, modem with a built-in DHCP server, or a network server.
  - The control listens to the DHCP server and configures only the last octet of the IP address based on the selected Internet ID. For example, if `5` was selected as the Internet ID, the IP address will be ###.###.###.105 (where ### represents the first three octets of the DHCP configuration IP address). Each of the Internet IDs require a specific port to be forwarded to it. Therefore, port forwarding must also be configured (see Table 2).
  - The DHCP server must be configured to **NOT** provide an internet IP address that matches the control local static IP address.
- `Custom`
  - Select this option when the internet connection on the WAN side is static, when the DHCP server is not activated, or when using a local static IP address.
  - The IP address, Subnet Mask, Gateway, and DNS information must be entered into the control. This information must be obtained from the network administrator or the internet service provider.

Table 2: Port Forwarding

Internet ID	Actual IP	Port to Forward
Solo	N/A	8082
1	---.---.---.101	8082
2	---.---.---.102	8083
3	---.---.---.103	8084
4	---.---.---.104	8085
5	---.---.---.105	8086
6	---.---.---.106	8087
7	---.---.---.107	8088
8–32	---.---.---.108 to ---.---.---.132	8089 to 8113
Custom	Any IP	8082

Configuring Internet (RINET) Modems and Routers

The ETV Platinum Plus with RINET communications option requires access to the internet to allow the user to remotely access the control.

If the control does not share the internet connection with other devices, a modem is sufficient to provide internet access. However, if the control is to share the internet connection with other devices (computers, tablets, smartphones, or other controls), a router must be used with the modem.

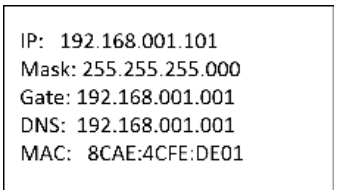
The following must be considered when configuring the router and modem to ensure an internet connection:

- The DHCP Server must be configured to not to assign IP addresses that are used by the ETV Platinum Plus control. This is done by setting the DHCP IP assignment range above or below the control's IP address.

  For example, either start the DHCP IP assignment range to 192.168.1.150 through 192.168.1.250 (above the control's IP address), or to 192.168.1.2 through 192.168.1.100 (below the control's IP address.
- Port Forwarding is required to allow incoming communication to the ETV Platinum Plus control. It tells the modem or router that inbound communication on specific ports must be forwarded to a specific control.

Refer to the documentation provided with the modem or router for information on configuring the device for internet communications.

Troubleshooting

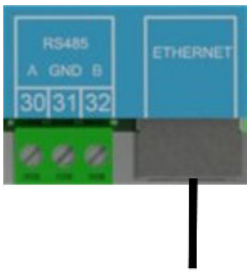
Symptom	Possible Cause	Recommended Action(s)
Can not install the control on the ICMS	Invalid IP address.	Verify the IP address on the control. Select `Maintenance > Configuration` and press `Next` until the internet connection screen is displayed.  Change the IP address, if appropriate.
	Port Forwarding required but not configured.	Port Forwarding is required when an internet router, DSL modem, or server is used in the network. Configure Port Forwarding using the information on page 16.
	Control is connected to a router that is behind a modem with DHCP activated.	Refer to "Two LANs Configured" below.
	Two LANs configured.	Log on to the router the control is connected to and view the WAN or internet IP address. If the address starts with 192.168.172.16 or 192.168.10.1, another LAN exists before the router. Configure the router/modem DHCP and port forwarding (see page 16). DO NOT use a second router. If the internet connection must be shared, use a hub.
Control display shows `IP DUPE`.	Two controls are configured with the same IP address.	Change the second control's Internet ID to a unique value and configure the Port Forwarding accordingly.

BACnet Communications Configuration

BACnet Communications Wiring

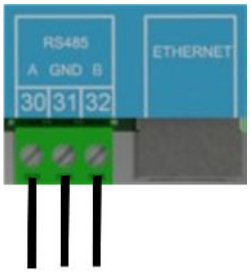
> **⚠ CAUTION**
>
> **Class 2 voltage wiring (low-voltage communication wires) must use a different enclosure knockout and conduit than any Class 1 voltage wiring.**

To connect the ETV Platinum Plus to a BACnet IP interface:



1. Run a CAT5 cable through a knockout located on the bottom of the ETV Platinum Plus enclosure.
2. Connect the CAT5 cable to the Ethernet connector on the ETV Platinum Plus.

To connect the ETV Platinum Plus to a BACnet MSTP interface:



1. Run the BACnet connection wires through a knockout located on the bottom of the ETV Platinum Plus enclosure.
2. Connect the positive (+) wire to terminal 30 on the ETV Platinum Plus.
3. Connect the ground wire to terminal 31 on the ETV Platinum Plus.
4. Connect the negative (–) wire to terminal 32 on the ETV Platinum Plus.

Completing the Wiring

1. After the communications option wiring to the ETV Platinum Plus is complete, replace the enclosure wiring cover and secure it in place with two screws.
2. Optionally secure the enclosure using a padlock with a maximum shank diameter of ⅛".
3. Replace the Modem Box cover and secure it in place with four screws.
4. Apply power to the ETV Platinum Plus and configure the communications settings.

Configuring BACnet Communications

After powering on the ETV Platinum Plus, the `System Startup` menu is displayed. After selecting the Modulation Type in the Startup menu, the control automatically detects the type of communications card installed and displays the appropriate menus to configure the BACnet communications option.

The following BACnet settings must be configured:

- **BACnet ID**–Must be provided by the BACnet network administrator. Each device on the BACnet network must have a unique address.

- **BACnet Option**–Select either BACnet IP or BACnet MSTP as appropriate and configure the options below:
  - BACnet IP
    - **IP Address**
    - **Subnet Mask**
    - **Default Gateway**
    - **BACnet Port**
  - BACnet MSTP
    - **MSTP Address**–Each device on the MSTP network must have a unique address.
    - **Baud Rate**–Determines the speed of communication. The ETV Platinum Plus and the BMS must use the same baud rate. Communications are fixed to 8 data bits, no parity, and 2 stop bits.

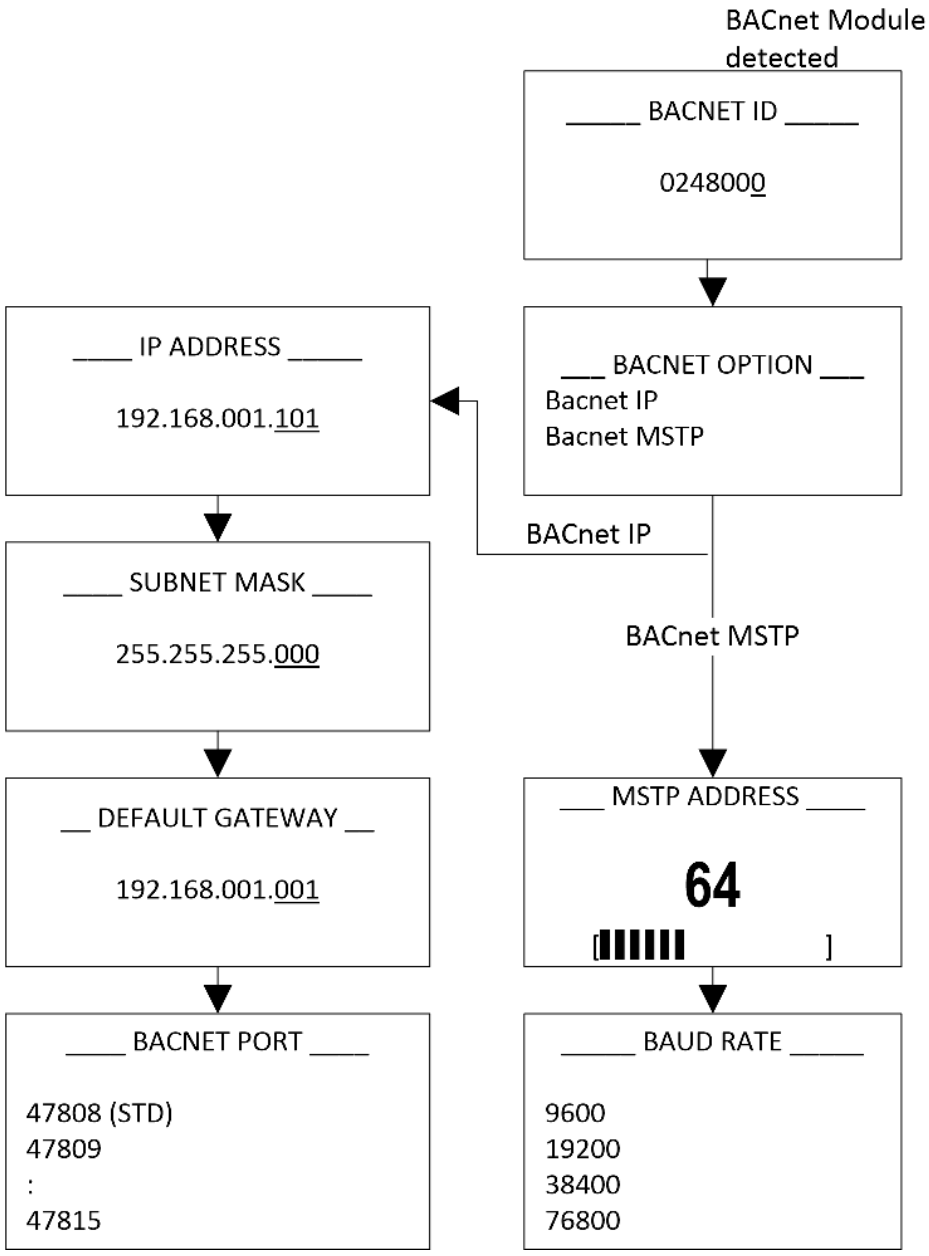


Figure 9: BACnet Communications Configuration Menus in the Startup Menu

Troubleshooting

Symptom	Possible Cause	Recommended Action(s)
BACnet: No communication.	Incorrect baud rate setting.	Modbus communication relies on having a single baud rate for all devices on the same network. Ensure the ETV Platinum Plus baud rate matches the rest of the network.
	Wiring damaged, not connected, or reversed polarity.	• Inspect all wiring. Replace any damaged wires. • Ensure the RS485 A(+) and B(-) terminal polarity is correct. • Ensure all wires are securely connected.
	Ground wire not connected properly.	Ensure the ground wire is connected to ETV Platinum Plus terminal 31, and that the ground wire is connected to the BMS RS485 ground.
BACnet: Intermittent communication.	Incorrect communication wiring type.	Replace Modbus communication wiring with 18 AWG twisted-pair wire.
	Intermittent wiring connection.	Ensure all wires are securely connected.
	Incorrect baud rate setting for wiring length used.	Longer wire runs require lower baud rates. Ensure the wire run does not exceed 500 feet (152.4 meters) and adjust the ETV Platinum Plus baud rate as appropriate.

BACnet Protocol Specification

BACnet PICS Statement

Product	Model Number	Protocol Revision	Software Version	Firmware Version
ETV Platinum Plus BACnet Control	ETV Platinum Plus	1.5	4.xx	

Vendor	Vendor ID	Address and Phone
Heat-Timer Corporation	248	20 New Dutch Ln. Fairfield, NJ 07004 - (973)575-4004

Product Description
Electronic Tempering Valve Control

BACnet Standardized Device Profile (Annex L)

Product	Device Profile
ETV Platinum Plus BACnet Control	BACnet Application Specific Controller (B-ASC)

Supported BIBBs (Annex K)

Supported BIBBs	BIBB Name
DS-RP-B	Data Sharing-ReadProperty-B
DS-WP-B	Data Sharing-WriteProperty-B
DM-DDB-B	Device Management-Dynamic Device Binding-B
DM-DOB-B	Device Management-Dynamic Object Binding-B
DM-DCC-B	Device Management-DeviceCommunicationControl-B

Standard Object Types Supported

Object Type	Creatable	Deletable
Analog Value	No	No
Binary Value	No	No
Multi-State Value	No	No
Device	No	No

Data Link Layer Options (Annex J)

Product	Data Link	Options
ETV Platinum Plus BACnet Control	BACnet IP/MSTP	

Segmentation Capability

Segmentation Type	Supported	Window Size (MS/TP product limited to 1)
Able to transmit segmented messages	No	
Able to receive segmented messages	No	

Device Address Binding

Product	Static Binding Supported
ETV Platinum Plus BACnet Control	No

Character Sets

Product	Character Sets Supported
ETV Platinum Plus BACnet Control	ANSI X3.4

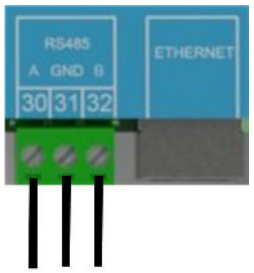
BACnet List Variables

Object ID	Name	Description	Type	uOM	Range / States / Special Values	Read Only
0	FLOW_STAT	Flow Switch Status	BV		0 = No Flow , 1 = Flow	X
100-102[0]	RELAY_STAT	Relay Output Status	BV		De-Energized, 1 = Energized	X
200	MOD_OUT	Valve Modulation Output	AV	%	from 0 to 100	X
302-303[1]	SNR_TYPE	Sensor Type	MV		5 = Temp, 10= switch	
400-403[2]	SNR_VAL	Sensor Reading	AV	°F	(-40 -- 250 Temperature), 32000=OPEN, 32001=SHORT	X
500	SYSTEM	System Temperature	AV	°F	(-40 -- 250 Temperature) Temperature, 32000=OPEN, 32001=SHORT	X
600	TARGET	Calculated Target Temperature	AV	°F	40 to 200	X
700	CTRL_MODE	Control Mode	MV		0 = ETV, 1 = ETV+TMC, 2 = TMC	
800	BATT_LEVEL	Battery level	AV	1/10V	0 -- 5	X
900	FLOW_OPT	Flow Switch Option	BV		0=No, 1=Yes	
1000	SP_INPUT	Setpoint Input	MV		0=Local Input, 1=Remote 4-20mA	
1100	EMS_LO	EMS Low Setting at 4mA	AV	°F	40 -- 200	
1200	EMS_HI	EMS High Setting at 20mA	AV	°F	40 -- 200	
1300	MOD_TYPE	Modulation Type	MV		0=(0-10V), 1=(2-10V), 2=(0-5V), 3=(1-5V), 4=(4-20mA)	
1400	DATE	Current Date	AV		0 -- 0xFFFFFFFF	
1500	TIME	Current Time	AV	min	0 -- 1439	
1600	SETPOINT	Mixing Valve Setpoint	AV	°F	40 -- 200	
1700	TMC_SETP	TMC Alarm Setpoint	AV	°F	40 -- 200	
1800	TMC_DELAY	TMC Alarm Trigger Delay	AV	sec	0 -- 60	
1900	MOD_GAIN	Mixing Valve Modulation Gain	AV		-10 -- +10	
2100	RTN_COMP	Return Compensation Source	MV		0=(None), 1=(Aux1), 2=(Aux2)	
2200	RTN_GAIN	Return Compensation Gain	AV	1/10	1 -- 10	
2300	HOT_COMP	Hot Compensation Source	MV		0=(None), 1=(Aux1), 2=(Aux2)	
2400	HOT_GAIN	Hot Compensation Gain	AV	1/10	1 -- 10	
2500	MIN_POS	Minimum Valve's Position	AV	%	from 0 to 100	
2600	MAX_POS	Maximum Valve's Position	AV	%	from 0 to 100	
2700-2728	SCH_TEMP	Scheduled Temperature	AV	°F	40-200, 32011=No Temp,	
2800-2828	SCH_TIME	Time Schedule	AV	min	0-1439	
2900	MAN_CTRL	Manual Valve Control Enable	BV		0 = No, 1 = Yes	
3000	MAN_POS	Manual Valve Position	AV	%	0-100	
3100-3103[2]	SNR_TRIM	Sensor Reading's Offset	AV	°F	-20 -- +20	
3200	DISP_UNIT	Temperature Display Unit	MV		0 = F, 1= C	
3300	DAYLGT_SAVE	Daylight saving option	BV		0=(Disable), 1=(Enable)	
3400-3401	VOLT_TRIM	Voltage Trim	AV		-100 -- 100	
3500-3501	CUR_TRIM	Current Trim	AV		-100 -- +100	

0 - Relay Status (100 = Modem, 101 = Lockout, 102 = Valve)
1 - Sensor Type (302 = Aux1, 303 = Aux2)
2 - Sensor Reading (XX00 = System, XX01 = EMS, XX02 = Aux1, XX03 = Aux2)

Modbus Communications Configuration

Modbus Communications Wiring



> **⚠ CAUTION**
>
> **Class 2 voltage wiring (low-voltage communication wires) must use a different enclosure knockout and conduit than any Class 1 voltage wiring.**

To connect the ETV Platinum Plus to a Modbus interface:

NOTE: Use 18 AWG twisted-pair cable (Heat-Timer p/n 703001-01 or equivalent #18/2 cable). Cable length must not exceed 500 feet (152.4 meters).

1. Run the Modbus connection wires through a knockout located on the bottom of the ETV Platinum Plus enclosure.
2. Connect the positive (+) wire to terminal 30 on the ETV Platinum Plus.
3. Connect the ground wire to terminal 31 on the ETV Platinum Plus.
   NOTE: The ground wire must be connected to the building management system (BMS) RS485 ground.
4. Connect the negative (–) wire to terminal 32 on the ETV Platinum Plus.

Completing the Wiring

1. After the communications option wiring to the ETV Platinum Plus is complete, replace the enclosure wiring cover and secure it in place with two screws.
2. Optionally secure the enclosure using a padlock with a maximum shank diameter of ⅛".
3. Replace the Modem Box cover and secure it in place with four screws.
4. Apply power to the ETV Platinum Plus and configure the communications settings.

Configuring Modbus Communications

After powering on the ETV Platinum Plus, the `System Startup` menu is displayed. After selecting the Modulation Type in the Startup menu, the control automatically detects the type of communications card installed and displays the appropriate menus to configure the Modbus communications option.

The following Modbus settings must be configured:

- **Modbus Address**–Must be provided by the Modbus network administrator. Each device on the Modbus network must have a unique address.

- **Modbus Option**–Select either Modbus Serial, Modbus TCP, or Modbus UDP as appropriate and configure the options below:
  - Modbus Serial
    - **Baud Rate**–Determines the communication speed. The ETV Platinum Plus and the BMS must use the same baud rate. Communications are fixed to 8 data bits, no parity, and 2 stop bits.
  - Modbus TCP or Modbus UDP
    - **IP Address**
    - **Subnet Mask**
    - **Default Gateway**
    - **DNS Server**

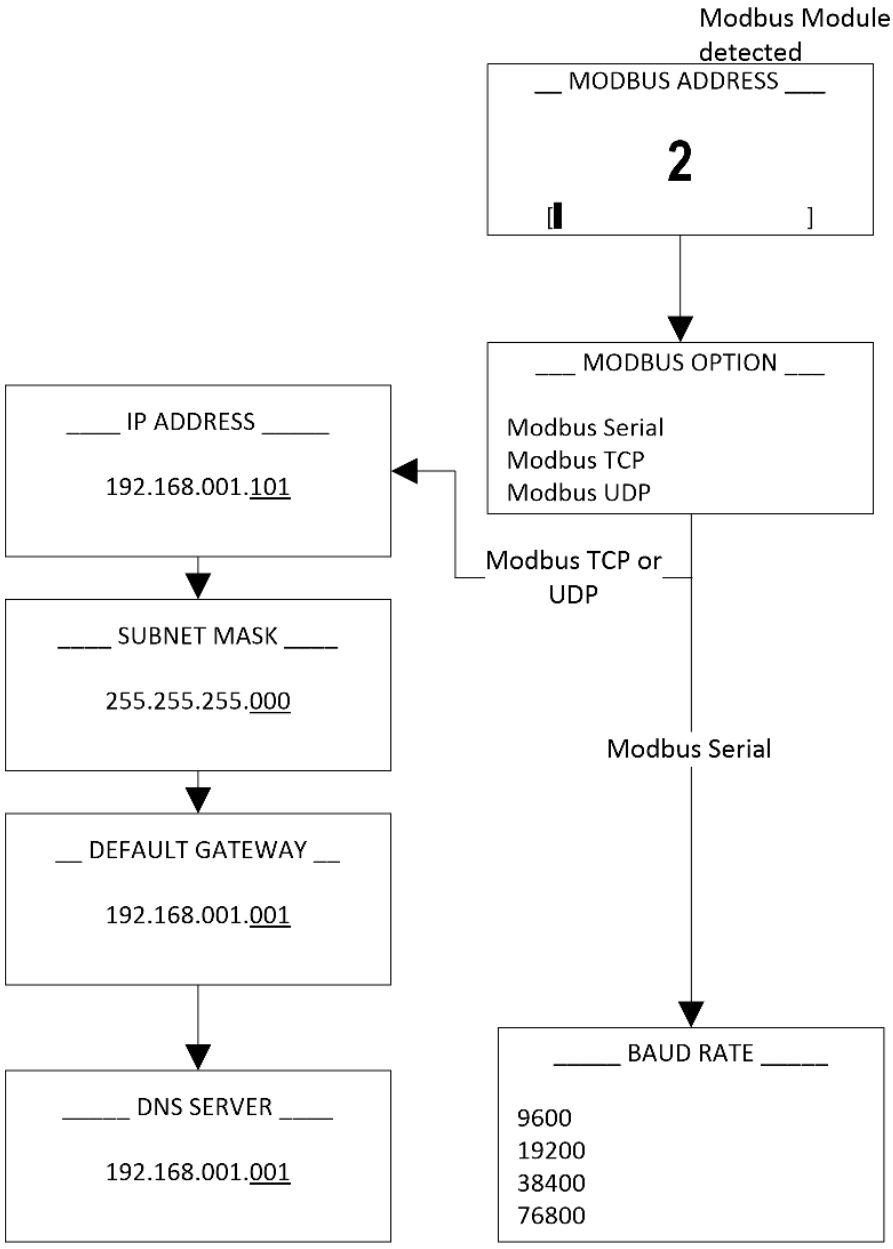


Figure 10: Modbus Communications Configuration Menus in the Startup Menu

Troubleshooting

Symptom	Possible Cause	Recommended Action(s)
Modbus: No communication.	Incorrect baud rate setting.	Modbus communication relies on having a single baud rate for all devices on the same network. Ensure the ETV Platinum Plus baud rate matches the rest of the network.
	Wiring damaged, not connected, or reversed polarity.	• Inspect all wiring. Replace any damaged wires. • Ensure the RS485 A(+) and B(-) terminal polarity is correct. • Ensure all wires are securely connected.
	Ground wire not connected properly.	Ensure the ground wire is connected to ETV Platinum Plus terminal 31, and that the ground wire is connected to the BMS RS485 ground.
Modbus: Intermittent communication.	Incorrect communication wiring type.	Replace Modbus communication wiring with 18 AWG twisted-pair wire.
	Intermittent wiring connection.	Ensure all wires are securely connected.
	Incorrect baud rate setting for wiring length used.	Longer wire runs require lower baud rates. Ensure the wire run does not exceed 500 feet (152.4 meters) and adjust the ETV Platinum Plus baud rate as appropriate.

Modbus Protocol Specification

Modbus List Variables

Variable	Name	Description	uOM	Range / States / Special Values	Read Only
40015	FLOW_STAT	Flow Switch Status		0 = No Flow , 1 = Flow	X
40016-18	RELAY_STAT	Relay Output Status		De-Energized, 1 = Energized	X
40019	MOD_OUT	Valve Modulation Output	%	from 0 to 100	X
40020-23	SNR_TYPE	Sensor Type		5 = Temp, 10= switch	
40024-27	SNR_VAL	Sensor Reading	°F	(-40 -- 250 Temperature), 32000=OPEN, 32001=SHORT	X
40028	SYSTEM	System Temperature	°F	(-40 -- 250 Temperature) Temperature, 32000=OPEN, 32001=SHORT	X
40029	TARGET	Calculated Target Temperature	°F	40 to 200	X
40030	CTRL_MODE	Control Mode		0 = ETV, 1 = ETV+TMC, 2 = TMC	
40031	BATT_LEVEL	Battery level	1/10V	0 -- 5	X
40032	FLOW_OPT	Flow Switch Option		0=No, 1=Yes	
40033	SP_INPUT	Setpoint Input		0=Local Input, 1=Remote 4-20mA	
40034	EMS_LO	EMS Low Setting at 4mA	°F	40 -- 200	
40035	EMS_HI	EMS High Setting at 20mA	°F	40 -- 200	
40036	MOD_TYPE	Modulation Type		0=(0-10V), 1=(2-10V), 2=(0-5V), 3=(1-5V), 4=(4-20mA)	
40037	DATE	Current Date		0 -- 0xFFFFFFFF	
40038	TIME	Current Time	min	0 -- 1439	
40039	SETPOINT	Mixing Valve Setpoint	°F	40 -- 200	
40040	TMC_SETP	TMC Alarm Setpoint	°F	40 -- 200	
40041	TMC_DELAY	TMC Alarm Trigger Delay	sec	0 -- 60	
40042	MOD_GAIN	Mixing Valve Modulation Gain		-10 -- +10	
40053	RTN_COMP	Return Compensation Source		0=(None), 1=(Aux1), 2=(Aux2)	
40054	RTN_GAIN	Return Compensation Gain	1/10	1 -- 10	
40055	HOT_COMP	Hot Compensation Source		0=(None), 1=(Aux1), 2=(Aux2)	
40056	HOT_GAIN	Hot Compensation Gain	1/10	1 -- 10	
40057	MIN_POS	Minimum Valve's Position	%	from 0 to 100	
40058	MAX_POS	Maximum Valve's Position	%	from 0 to 100	
40059-86	SCH_TEMP	Scheduled Temperature	°F	40-200, 32011=No Temp,	
40087-114	SCH_TIME	Time Schedule	min	0-1439	
40115	MAN_CTRL	Manual Valve Control Enable		0 = No, 1 = Yes	
40116	MAN_POS	Manual Valve Position	%	0-100	
40117 - 120	SNR_TRIM	Sensor Reading's Offset	°F	-20 -- +20	
40121	DISP_UNIT	Temperature Display Unit		0 = F, 1= C	
40122	DAYLGT_SAVE	Daylight saving option		0=(Disable), 1=(Enable)	
40123 - 124	VOLT_TRIM	Voltage Trim		-100 -- 100	
40125 - 126	CUR_TRIM	Current Trim		-100 -- +100	

Notes

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