VERIS INDUSTRIES ™

E34A

E34E

c(UL)us LISTED   CE *

*The CE mark indicates RoHS2 compliance. Please refer to the CE Declaration of Conformity for additional details.

E34 Series
Multi-Circuit Meters

Product Overview

The E34 Series Multi-Circuit Meters are designed to measure the current, voltage and energy consumption of up to 14 3-phase circuits with a single board or up to 28 3-phase circuits with a 2-board configuration.

The E34 uses commonly available split-core current sensors with 1/3 V (voltage-mode) outputs to cover a wide range of loads.

Data is transmitted using an RS-485 Modbus protocol. E34E models also incorporate Ethernet, with support for BACNet IP, Modbus TCP and SNMP protocols and include BACnet MS/TP serial capability and a sturdy metal enclosure.

The E34 comes pre-configured for 3-phase loads, but can easily be configured on site to accommodate any combination of 3-phase, 2-phase and single-phase loads, with or without Neutral current, using the channels available on the model selected (see table below).

To configure the E34 for operation, use the NetConfig configuration software tool and the E3x Commissioning Guide on the USB drive provided.

Product Identification

E34

Communication Option	*Number of 3-Phase Meters*
☐	☐
A = Modbus RTU only	04 = 4 (3-phase) meters
E = Integrated Ethernet with Modbus, BACnet & SNMP	08 = 8 (3-phase) meters
	14 = 14 (3-phase) meters
	28 = 28 (3-phase) meters

Number of Meters Supported

E34A Modbus RTU Only	E34E Integrated Ethernet	Number of Meters			
		3-Phase without Neutral	3-Phase with Neutral	2-Phase	1-Phase
E34A04	E34E04	4	3	6	12
E34A08	E34E08	8	6	12	24
E34A14	E34E14	14	10	21	42
E34A28	E34E28	28	21	42	84

Safety Information

Important Information

Read these instructions carefully and look at the equipment to become familiar with the device before trying to install, operate, service or maintain it. The following special messages may appear throughout this bulletin or on the equipment to warn of potential hazards or to call attention to information that clarifies or simplifies a procedure.

The addition of either symbol to a "Danger" or "Warning" safety label indicates that an electrical hazard exists which will result in personal injury if the instructions are not followed.

This is the safety alert symbol. It is used to alert you to potential personal injury hazards. Obey all safety messages that follow this symbol to avoid possible injury or death.

DANGER
DANGER indicates a hazardous situation, which if not avoided, **will result in** death or serious injury.

WARNING
WARNING indicates a hazardous situation, which if not avoided, **could result in** death or serious injury.

CAUTION
CAUTION indicates a hazardous situation, if not avoided, **could result in** minor or moderate injury.

NOTICE
NOTICE is used to address practices not related to physical injury.

Please Note: Electrical equipment should be installed, operated, serviced and maintained only by qualified personnel. No responsibility is assumed by Veris Industries for any consequences arising out of the use of this material. A qualified person is one who has skills and knowledge related to the construction, installation, and operation of electrical equipment and has received safety training to recognize and avoid the hazards involved.

Safety Precautions

⚠ ⚠ DANGER

HAZARD OF ELECTRIC SHOCK, EXPLOSION, OR ARC FLASH

- This product must be installed inside a suitable fire and electrical enclosure.
- Follow safe electrical work practices. See NFPA 70E in the USA, or applicable local codes.
- This equipment must only be installed and serviced by qualified electrical personnel.
- Do not use this device for critical control or protection applications where human or equipment safety relies on the operation of the control circuit.
- Do not install this product in hazardous or classified locations.
- Read, understand and follow the instructions before installing this product.
- Turn off all power supplying equipment before working on or inside the equipment.
- Product may use multiple voltage/power sources. Disconnect all sources before servicing.
- Use a properly rated voltage sensing device to confirm that power is off.
- Do not use data from this device to confirm power is off.
- Replace all doors, covers and protective devices before powering the equipment.
- Do not exceed the product's ratings or maximum limits.
- Treat communications and I/O wiring connected to multiple devices as hazardous live until determined otherwise.

Failure to follow these instructions will result in death or serious injury.

If this product is used in a manner not specified by the manufacturer, the protection provided by the product may be impaired.

The installer is responsible for conformance to all applicable codes.

The safety of any system incorporating this equipment is the responsibility of the assembler of the system.

Note: See IEC 60950-1:2005, Annex W for more information on communications and I/O wiring connected to multiple devices.

Protective bonding: electrical connection of accessible conductive parts or protective screening to provide electrical continuity to the means for connection of an external protective conductor.

Control system design must consider the potential failure modes of control paths and, for certain critical control functions, provide a means to acheive a safe state during and after a path failure. Examples of critical control functions are emergency stop and over-travel stop.

⚠ WARNING

LOSS OF CONTROL

- Ensure that the system will reach a safe state during and after a control path failure.
- Separate or redundant control paths must be provided for critical control functions.
- Test the effect of transmission delays or failures of communication links.
- Each implementation of equipment using communication links must be individually and thoroughly tested for proper operation before placing it in service.

Failure to follow these instructions can result in death or serious injury.

For additional information about anticipated transmission delays or failures of the link, refer to NEMA ICS 1.1 (latest edition). *Safety Guidelines for the Application, Installation, and Maintenance of Solid-State Controls* or its equivalent in your specific country, language, and/or location.

Provide a disconnect device to disconnect the meter from the supply source. Place this device in close proximity to the equipment and within easy reach of the operator, and mark it as the disconnecting device. The disconnecting device shall meet the relevant requirements of IEC 60947-1 and IEC 60947-3 and shall be suitable for the application. In the US and Canada, disconnecting fuse holders can be used. Provide overcurrent protection and disconnecting device for supply conductors with approved current limiting devices suitable for protecting the wiring.

FCC PART 15 INFORMATION

E34A Models: This equipment has been tested and found to comply with the limits for a Class B digital device, pursuant to Part 15 of the FCC rules. These limits are designed to provide reasonable protection against harmful interference in a residential installation. This equipment generates, uses, and can radiate radio frequency energy and, if not installed and used in accordance with the instructions, may cause harmful interference to radio communications. However, there is no guarantee that interference will not occur in a particular installation. If this equipment does cause harmful interference to radio or television reception, which can be determined by turning the equipment off and on, the user is encouraged to try to correct the interference by one or more of the following measures:

    – Reorient or relocate the receiving antenna.
    – Increase the separation between the equipment and receiver.
    – Connect the equipment to an outlet on a circuit different from that of the receiver.
    – Consult the dealer or an experienced radio/TV technician for help.

The user is cautioned that any changes or modifications not expressly approved by Veris Industries could void the user's authority to operate the equipment.

E34E Models: This equipment has been tested and found to comply with the limits for a Class A digital device, pursuant to part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference when the equipment is operated in a commercial environment. This equipment generates, uses, and can radiate radio frequency energy and, if not installed and used in accordance with the instruction manual, may cause harmful interference to radio communications. Operation of this equipment in a residential area is likely to cause harmful interference in which case the user will be required to correct the interference at his own expense.

CAN ICES-3 (B) /NMB-3(B)

Specifications

MEASUREMENTS	
Measurement Voltage	90 to 300 Vac line-to-neutral, 50/60 Hz
Total Harmonic Distortion (THD)	THD % voltage line-to-line, line-to-neutral and THD % on current
CONTROL POWER	
E34A	90 to 277 Vac line-to-neutral, 50/60Hz, 8 VA
E34E	100 to 277 Vac line-to-neutral, 50/60Hz, 15 VA
ACCURACY	
Power/Energy	IEC 62053-21 Class 0.5, ANSI C12.20 class 0.5
Voltage	±0.5% of reading 90 to 277 V line-to-neutral
Current	±0.5% of reading from 2% to 100% of full-scale
OPERATION	
Sampling Frequency	2560 Hz
Update Rate	1.8 seconds (both panels)
Overload Capability	22 kAIC
E34A SERIAL COMMUNICATION	
Type	Modbus RTU
Connection	DIP switch-selectable 2-wire or 4-wire, RS-485
Address	DIP switch-selectable address 1 to 247 (in pairs of 2)*
Baud Rate	DIP switch-selectable 9600, 19200, 38400
Parity	DIP switch-selectable NONE, ODD, EVEN
Communication Format	8 data bits, 1 start bit, 1 stop bit
Termination	5-position plug-in connector (TX+ TX- SHIELD TX+/RX+ TX-/RX-)
E34E SERIAL COMMUNICATION	
Physical Interface	2-wire RS-485
Serial Protocols Supported	Modbus RTU or BACnet MS/TP
Address Range	1 to 247 for Modbus RTU; 0 to 127 for BACnet MS/TP
Baud Rate	9600, 19200, 38400
Parity	Modbus RTU: NONE, ODD, EVEN BACnet MS/TP: NONE (fixed)
Communication Format	8 data bits, 1 start bit, 1 stop bit
Termination	2x3 position connector
E34E ETHERNET COMMUNICATION	
Physical Interface	RJ45 connector with 10/100 Mbit Ethernet
Protocols Supported	Modbus TCP, BACnet IP, SNMP V2c
WIRE SIZE RANGE	
Removable Connectors on Main Board	22 to 12 AWG
CT Terminals and E34E Serial Connector Terminals	26 to 16 AWG
TERMINAL BLOCK TORQUE	
Removable Connectors	4.4 to 5.3 in-lb (0.5 to 0.6 N-m)
MECHANICAL	
Ribbon Cable Support (28-meter models only)	4 ft. (0.9 m) round ribbon cable ships standard; up to 20 ft. (6 m) flat or round available
OPERATING CONDITIONS	
Operating Temperature Range	0 to 60 °C (32 to 140 °F) (<95% RH non-condensing)
Storage Temperature Range	-40 to 70 °C (-40 to 158 °F)
Altitude of Operation	3000 m
Mounting Location	Not suitable for wet locations. For indoor use only.

Specifications (cont.)

COMPLIANCE INFORMATION	
Agency Approvals	UL508 open type device**, IEC/EN61010-1
Installation Category	Cat III, pollution degree 2***
Conducted Emissions	E34A Models: FCC part 15 Class B, EN61000-6-3, EN61326-1 Class B (residential and light industrial)
Radiated Emissions	E34E Models: FCC part 15 Class A, EN6100-6-4, EN61326-1 Class A
Conducted and Radiated Immunity	EN 61000-6-2 and EN 61326-1

* See Configuration section for details.

**The E34 must be installed in an appropriate electrical and fire enclosure per local regulations. If E34 products are used in installations with circuits higher than the product ratings, the circuits must be kept segregated per UL508A Sec. 17.5. Note: E34 internal circuitry (cables and CTs) are not circuits as defined by UL508A, as they do not extend beyond the E34 itself without further safety/fire isolation.

*** A Pollution Degree 2 environment must control conductive pollution and the possibility of condensation or high humidity. Consideration must be given to the enclosure, the correct use of ventilation, thermal properties of the equipment and the relationship with the environment.

Table of Contents

Dimensions

E34A Base Board

8.3"
(211 mm)

7.9"
(200 mm)

5.8"
(146 mm)

3.9"
(100 mm)

4.8"
(122 mm)

1.75"
(45 mm)

Ø = 0.2"
(5 mm)

7.3"
(184 mm)

8.9"
(226 mm)

1.74"
(44 mm)

E34E Main Unit

12.1"
(307 mm)

12.8"
(325 mm)

2x: 5.9"
(150 mm)

13.9"
(353 mm)

8.9"
(225 mm)

10.0"
(253 mm)

8.2"
(210 mm)

2.8"
(71 mm)

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Dimensions (cont.)

28-Meter CT Adapter Assembly

9.50"
(241 mm)

0.56" (14.3 mm)
1.60" (40.5 mm)
5.53" (140.5 mm)
6.56" (167 mm)
7.13" (181 mm)
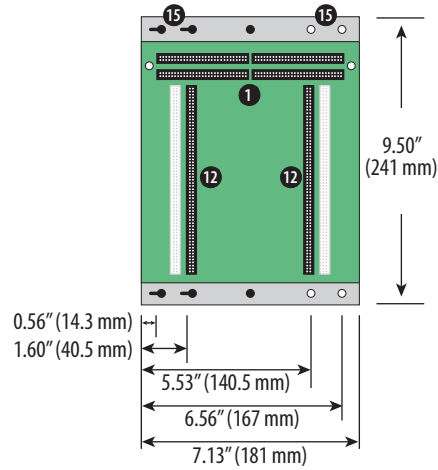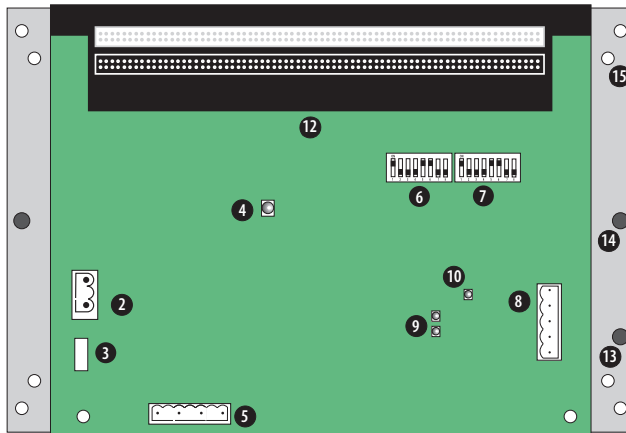
Product Diagrams

E34A14

E34A28

E34E14

E34E28

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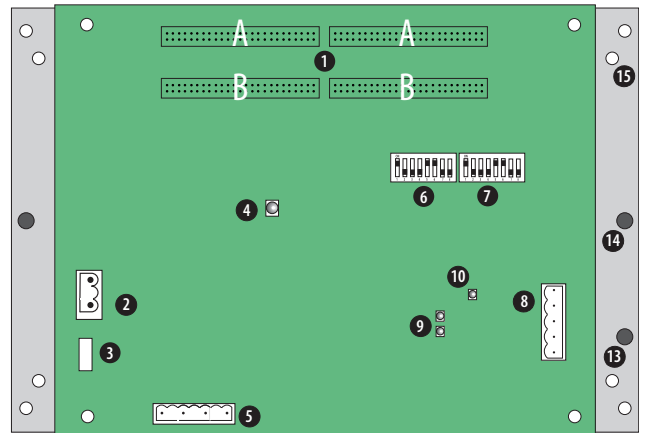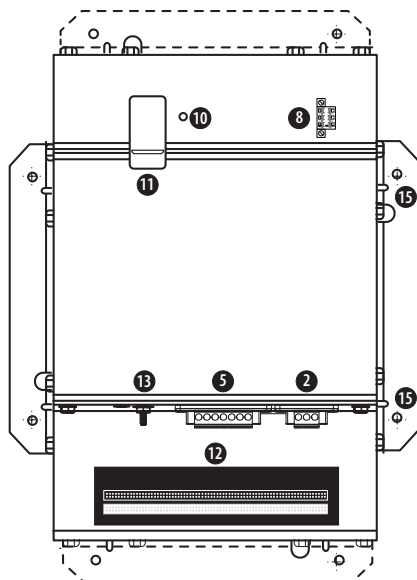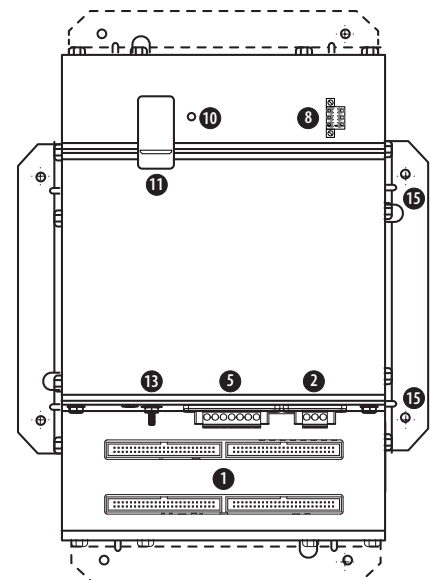
Product Diagram (cont.)

1. 50-pin ribbon cable connectors (E34A28 and E34E28 only): Ribbon cables attach here for easy connection of adapter boards to the data acquisition board. The two connectors on the left are for panelboard 1; the two on the right are for panelboard 2.

   Note: Connect Adapter Board Connectors A and B to the correct ribbon cable connectors for each panel. The top connectors are for Adapter Board Connector A, and the bottom connectors are for Adapter Board Connector B.

   Note: The standard ribbon cable included with E34A28 and E34E28 is 4 feet long (1.2 meters). For other ribbon cable options, see the Recommended Accessories section.

2. Control power connection: Provides power to operate the meter

3. Control power fuse: 600 Vac, 500 mA time lag, factory-replaceable

4. Alive LED (E34A models): Red/green/amber LEDs. Blink codes are described in the Blink Codes for Status LED section of this document.

5. Voltage taps: 1, 2, or 3 phase plus neutral connections. For voltage sensing and power calculations. Voltage taps are shared by all meters (including both logical panels on 28-meter models).

6. Communications address DIP switch (E34A models): Each Modbus device must have a unique address. Switches are binary weighted. Left-most switch has a value of 1; right-most switch has a value of 128. Note: switches set the address for panel 1; panel 2 is automatically set to (Panel 1 address + 1). See Configuration section for details.

7. Communications settings DIP switch (E34A models): Configures baud rate, parity, 2- or 4-wire communications.

8. RS-485 connection: Used for Modbus serial communications. The Universal plug accommodates 2 or 4 wire connections.

9. RS-485 LEDs (E34A models): The RX LED (closest to DIP switches) indicates the RS-485 is receiving information; the TX LED indicates transmission of information.

10. Power LED: Indicates power to the E34

11. Ethernet connection ("E" models only)

12. CT lead connections

13. Ground terminal

14. Mounting studs for optional plexiglas cover (AE001)

15. Holes for mounting the E34

Data Outputs

The E34 provides several types of measurements that give a comprehensive view of power consumption for every load on the panel (the table below shows which measurements are offered on each model):

- Real-time measurements: A live and up-to-date view of present power levels and the factors that affect them.
- Demand measurements: Averages of values measured over a specified time interval. The time interval (typically 15 minutes) can be set from 10 seconds to more than a day. The demand calculation can be configured to use single intervals or the sliding average of up to six sub-intervals. Demand measurements are useful for tracking or graphing load levels over time to correlate with total energy consumption.
- Historic maximum measurements: These measurements store the largest value recorded for a specific measurement since the last time they were cleared. They are useful for identifying peak levels critical to equipment sizing or demand limits in utility agreements.
- Accumulated energy measurements: Ongoing totals of cumulative energy used since the last time the value was cleared. Energy values provide the informational basis for billing, cost allocation, carbon offset, BTU equivalent calculations, and other applications of overall energy use.
- Energy snapshots: Energy totals that only change when the demand intervals are updated. They are samples of the free-running energy accumulators at the end of each demand interval, as configured by the user. These provide energy readings that are easily correlated to the demand values to simplify the tasks of sub-billing and cost allocation.
- Alarms: Informs of excessively high or low current on each branch and aux channel. The user can set two high-level and two low-level thresholds, and a delay time for latching alarms. Alarms are reported as both non-latched events and latched events. Non-latching alarms are active while the current exceeds the threshold, but go inactive if the current returns to a level within the specific thresholds. Latching alarms become active when the current exceeds the threshold for a time period greater than the specified delay and remain active until they are cleared remotely.
- Alarm status can be polled via Modbus.

Advanced Features - The E34 also supports a number of advanced features. Some are always active, and others are configured manually via Modbus register 62017). For models with 42 channels or more, these features are configured independently for each panel.

- Logical meter support: The E34 can be configured to map any set of 1, 2 or 3 channels that are adjacent in the panel to a logical meter, referred to in the point map as a logical circuit, that provides accurate multi-phase measurement totals. Map these logical circuits by writing the desired logical circuit number into a set of registers/data objects provided for each branch and aux channel (per panel).
- The channels assigned to each logical circuit must be adjacent in the panel (for example, channels 5, 6 and 7), but there are no limitations on where those adjacent channels are aligned in the panel (any position where a multi-phase breaker can be installed). This functionality is always active, but a user selection affects how the data can be accessed via Modbus. Measurement data via Modbus for logical circuits is presented in two ways: arranged either by logical circuit number (looks more like a collection of individual meters) or by measurement type (arranged similar to the single-phase data section of the point map).
- Phase angle measurements: The E34 measures the phase angle of every voltage and current input and presents these measurements (in degrees) in additional data registers/objects. These values are used to verify that current inputs are assigned to the proper voltage phases and to help determine how power factor variations are influenced by current phase changes vs. harmonic distortion. Phase angle measurements are instantaneous and always active.
- User CT phase assignment: By default, the E34 assigns each CT channel to voltage phases on a rotating sequence. The user can easily override the default phase assignments as needed to accommodate their specific application or miswiring of phases on installation. The explicit assignments set by the user are stored by the E34 in non-volatile memory.
- Phase angle reference: The E34 measures the phase angle of every current and voltage input. The user can select whether the phase angles are stated relative to an absolute reference (the phase angle of voltage input V1) or relative to the voltage phase assigned to that specific current input channel.
- Signed power: Users can configure the E34 to report power as a signed value indicating whether the power is currently being delivered (imported from the grid) or received (exported to the grid) for channels with generation sources or bi-directional (regenerative) loads. When signed power is disabled, the energy accumulators include all energy measured, regardless of direction. When signed power is enabled, the energy accumulators only include all energy delivered (imported from the grid).
- Signed power factor: By default, the E34 reports power factor as an unsigned value. The user can set it to report as a signed value, where the sign indicates whether the current phase angle leads or lags the corresponding voltage phase.
- Demand/snapshot time interval source: The E34 offers two mechanisms for driving the demand/snapshot time interval, an interval timer or an RTC (real-time clock). The legacy mode (default) uses an interval timer that does not need to be set to an absolute time. When using the interval timer the demand/snapshot interval can be set from

Data Outputs (cont.)

10 to 32,767 seconds (over 9 hours). An alternate mode utilizes an RTC set to a specific date and time to synchronize the results with a larger system. The RTC must first be set in order to run and capture demand values and energy snapshots. When power is interrupted, the RTC resets to a default date and time and must be set again in order to run. When using the RTC, the demand/snapshot interval can be set from 10 to 3,600 seconds (1 hour).

Measurements	
Real Time Measurements	Current: multi-phase average and per phase
	Current phase angle per branch
	Real power (kW): multi-phase total and per phase
	Apparent power (kVA): multi-phase total and per phase
	Power factor: multi-phase average and per phase
Demand Measurements	Current present demand: multi-phase average and per phase
	Real power (kW) present demand: multi-phase average and per phase
Historic Maximums	Maximum instantaneous current: multi-phase average and per phase
	Maximum current demand: multi-phase average and per phase
	Maximum real power demand: multi-phase total and per phase
Accumulated Energy	Energy (kWh): multi-phase total and per phase
Energy Snapshots	Energy (kWh): multi-phase total and per phase
Modbus Alarms	
Alarms	Voltage over/under
	Branch current over/under
	Mains current over/under

Blink Codes for Status LED (E34A Models Only)

Color and Pattern	Status Description
Green, once per second	Normal operation
Amber, once per second	Volts or amps clipping
Amber, twice per second	Invalid firmware image
Red, solid or blink	Diagnostic event detected

Installation

NOTICE

ESD-SENSITIVE DEVICES
Observe handling precautions for static sensitive devices.
Failure to follow this instruction can result in damaged circuitry and loss of factory warranty.

⚠ ⚠ DANGER

HAZARD OF ELECTRIC SHOCK, EXPLOSION, OR ARC FLASH
• This product must be installed inside a suitable fire and electrical enclosure.
• Follow safe electrical work practices. See NFPA 70E in the USA, or applicable local codes.
• This equipment must only be installed and serviced by qualified electrical personnel.
• Do not use this device for critical control or protection applications where human or equipment safety
  relies on the operation of the control circuit.
• Do not install this product in hazardous or classified locations.
• Read, understand and follow the instructions before installing this product.
• Turn off all power supplying equipment before working on or inside the equipment.
• Product may use multiple voltage/power sources. Disconnect all sources before servicing.
• Use a properly rated voltage sensing device to confirm that power is off.
• Replace all doors, covers and protective devices before powering the equipment.
• Do not exceed the product's ratings or maximum limits.
• Treat communications and I/O wiring connected to multiple devices as hazardous live until determined
  otherwise.
• Use the protective ground connection on the mounting bracket if the device is not mounted to a
  suitable ground surface..
Failure to follow these instructions will result in death or serious injury.

1. Turn off all power supplying this device and the equipment in which it is installed before working on the device or equipment.

2. Always use a properly rated voltage sensing device to confirm power is off.

3. Install the acquisition board mounting bracket in the panel. Panels can be oriented side-by-side (Figure 1A) or vertically (Figure 1B). A grounding connection is located on the mounting bracket, near the lower right corner.

Figure 1A

Ground

E34A

Figure 1B

Main Circuit Board

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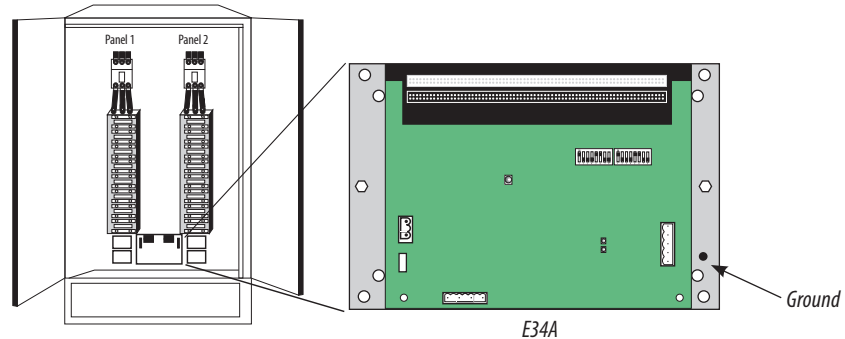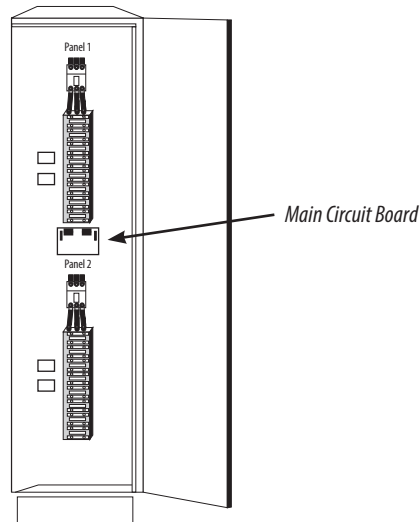
Installation (cont.)

4. Determine where you will mount the E34 measurement unit. The preferred location is inside the enclosure of the panelboard being monitored. If sufficient space is not available there, mount the unit in an appropriate enclosure nearby. Decide whether to mount the E34 vertically or horizontally.

   The E34 is shipped with the brackets placed on the two sides for vertical mounting. If desired, you can move the brackets from the sides to the ends of the housing. Loosen the screws on the sides of the E34 that hold the brackets in place. Do not fully remove the screws from the E34 housing. Loosen the screws on the two ends of the housing (without fully removing the screws from the housing), and set the brackets into their new positions. Tighten all screws.

Figure 2

Vertica & Horizontal Mounting Options
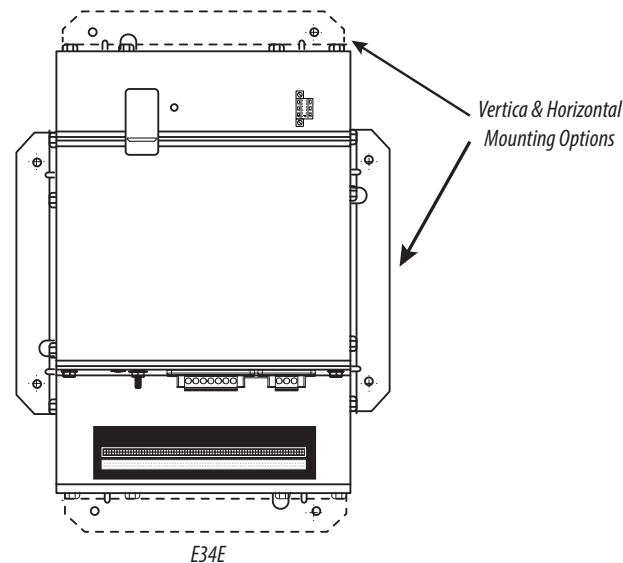
E34E

5. On E34A28 or E34E28 models, connect the 28-meter adapter assembly to the meter using the ribbon cables supplied. To order different length cables, see the list of Recommended Accessories.

6. The E34 supports CTs with voltage mode outputs (0.333V full-scale). Install the current sensors onto the conductors to be monitored according to the instructions provided with the CTs.

Figure 3

28-Meter CT Adapter Board

E34A28

E34E28

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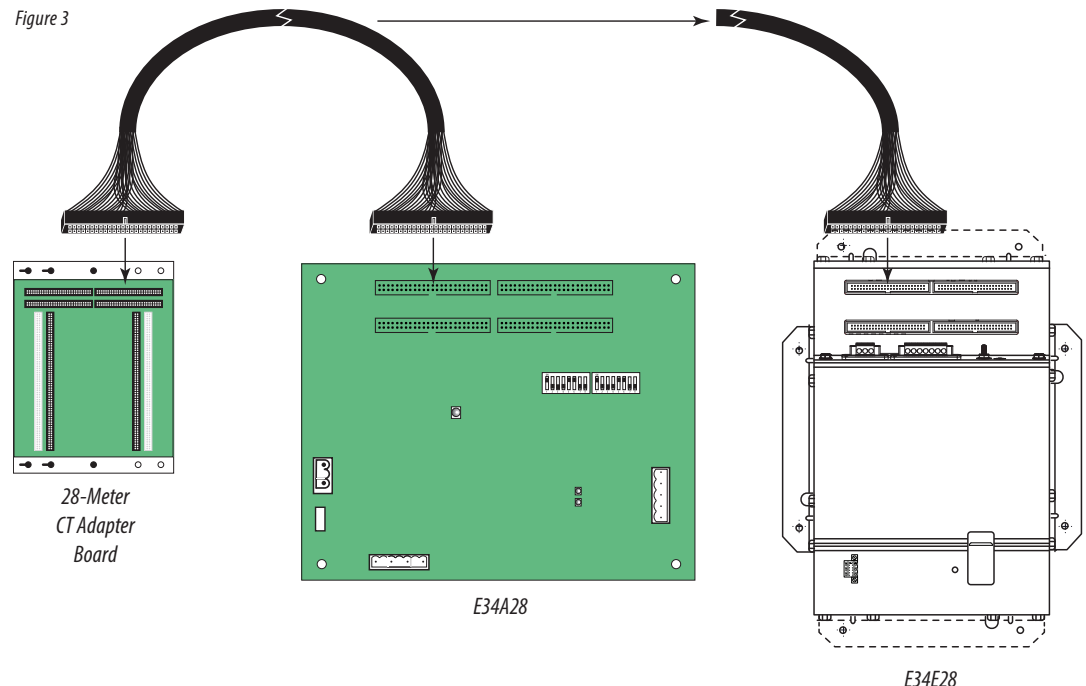
Installation (cont.)

NOTICE
EQUIPMENT DAMAGE Do not use CTs with current-mode outputs. **Failure to follow this instruction can result in equipment damage.**

Figure 4

Figure 5

E34A

E34E
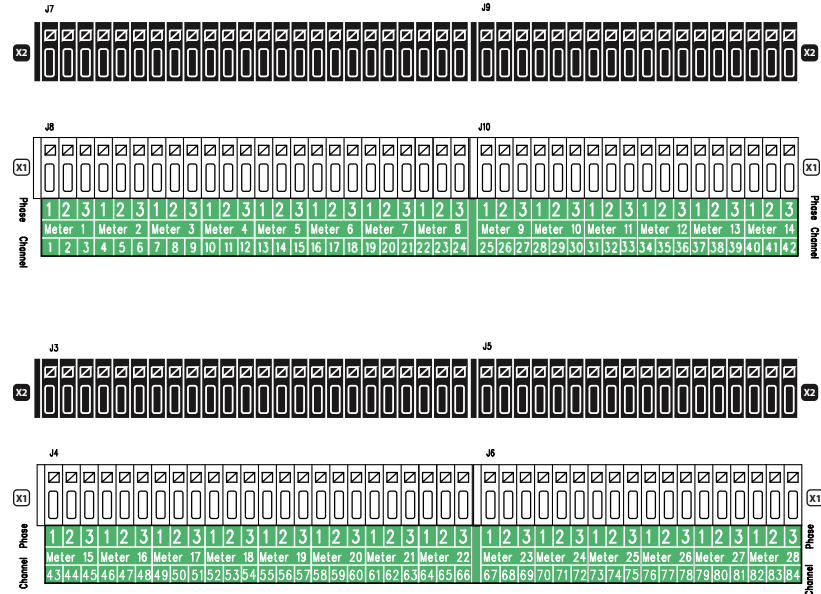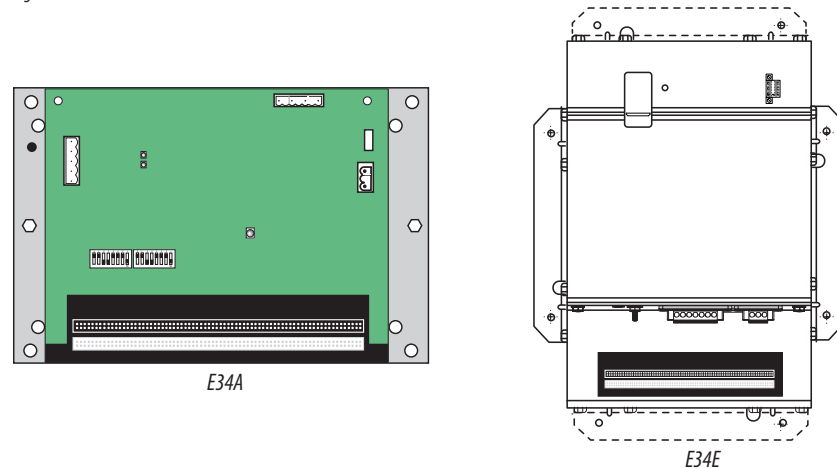
7. Strip 9 mm of insulation from the end of the CT leads. A visual strip length indicator is provided on the CT adapter board to show how much to strip.

Figure 6

STRIP WIRE
9mm

Strip Length Indicator Locations

28-Meter CT Adapter Board
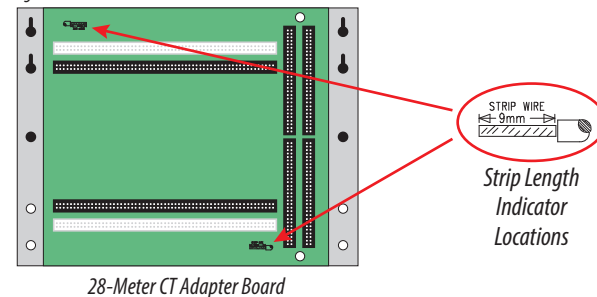
Installation (cont.)

8. To connect the stripped CT leads, press the square button on the desired connector input, insert the stripped end of the wire completely, and release the button.

9. Insert the x1 lead (white wire on Veris CTs) to the inputs on the white connector and the x2 lead (black wire on Veris CTs) to the inputs on the black connector.

10. Plastic cable ties are included with the product for strain relief on the E34A28 and E34E28. Insert the strain relief device into one of the available holes on the adapter board (Figure 7A). Gather all current sensor wires connected to that adapter board and secure the cable tie around them (Figure 7B).

Figure 7
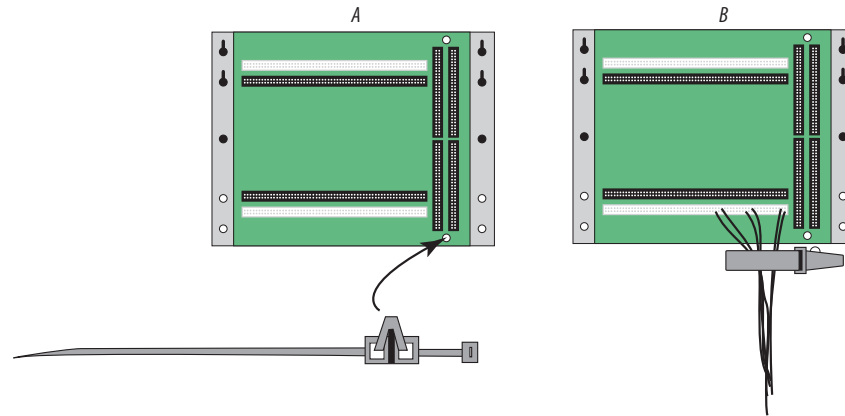
11. The adapter boards are silk screened with labeling for the default configuration of all 3-phase meters. Alternate label overlays are provided for configurations with all 2-phase meters or all single-phase meters. Channel numbers are provided as well for setting up and using custom configurations with mixed meter types.

    Note: On the E34A28 and E34E28, the adapter board is configured with sequential numbers for the logical meters, but the channel numbers are in two sets of 42 channels associated with two different Modbus configuration panels (similar register set at different Modbus addresses).

Wiring

⚠ ⚠ DANGER

HAZARD OF ELECTRIC SHOCK, EXPLOSION, OR ARC FLASH
- While removing or installing panels and covers, ensure that they do not contact an energized bus.
- NEVER bypass external fusing.
- NEVER short the secondary of a potential transformer.
- Before closing covers and doors, carefully inspect the work area and remove any tools, wire scraps or other objects that may
  have been left inside the equipment.
- Do not exceed the product's ratings or maximum limits.
- Turn off all power supply equipment before working on or inside equipment.
- Use a properly rated voltage sensing device to cofirm that power is off.
- Treat all measurement circuits and CT connections as energized live.

Failure to follow these instructions will result in death or serious injury.

NOTICE

ESD-SENSITIVE DEVICES
Observe handling precautions for static sensitive devices.
Failure to follow this instruction can result in damaged circuitry and loss of factory warranty.

For all steps in this section, when tightening terminals, apply the correct torque.

Removable connectors on main board: 4.4 to 5.3 in-lb (0.5 to 0.6 N-m). See Figure 8.

Figure 8
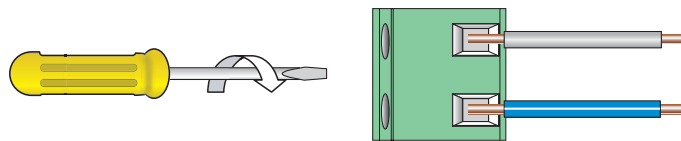
1. Connect 2-wire 90 to 277 Vac power to the main power terminals. Observe polarity. Connect voltage lines to the voltage taps (Figure 13). Provide overcurrent protection and disconnecting means to protect the wiring. Use Veris AH02, AH03, AH04, or equivalent. Suggested: 0.5 A, time delay fuses.

Wiring configurations are listed below.

120/240 V Delta High Leg

Figure 9
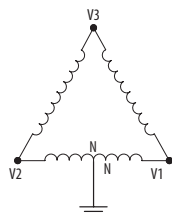
120/240V Delta High Leg (where the center tap of one of the three phase-to-phase transformers is grounded): the E34 supports these applications, as long as the line-to neutral voltage (especially of the High Leg) does not exceed 300 Vac (as in North American 120/240 V High Leg Delta configurations).

Wiring (cont.)

3-Wire (Ungrounded) Delta

Figure 10
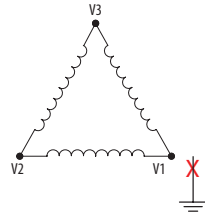
In 3-wire (ungrounded) Delta applications, the E34 supports these applications with the following caveats:

Control Power for the meter cannot exceed 277 Vac. In applications where the L-L voltage is 277 Vac or less (e.g. 208 V line-to-line) it can be connected to two of the phases being monitored without exceeding the limit. For higher voltages (e.g. 480 V line-to-line), this must be supplied from a source that is 277 Vac or less. It could be a separate source or a transformer can be used to step it down from two of the phases being measured.

4-Wire Wye, 3-Wire Split-Phase and 2-Wire Single Phase

Figure 11
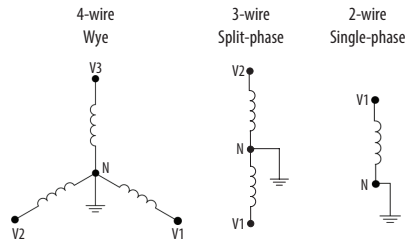
The E34 supports measurement of all 4-wire Wye, 3-wire split-phase and 2-wire single phase and configurations that operate between 90 and 300 Vac line-to neutral. Voltage taps are shared by both panels.

Corner-Grounded Delta

Figure 12
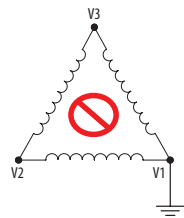
Corner-grounded delta: the E34 does not support these applications at any voltage level.

The E34 supports measurement of all 4-wire Wye, 3-wire split-phase and 2-wire single phase and configurations that operate between 90 and 300 Vac line-to neutral. Voltage taps are shared by both panels.

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Figure 13

E34E

E34A

Control
Power

V2/N

90 to 277 Vac

V1/L

Voltage Inputs
90 to 300 V   50/60 Hz

V1   V2   V3   N

L-L   L-N

Voltage Inputs
90 to 300 V   50/60 Hz

Control Power
100 to 277 V   50/60 Hz 15 VA

N   V3   V2   V1

V1   V2/N
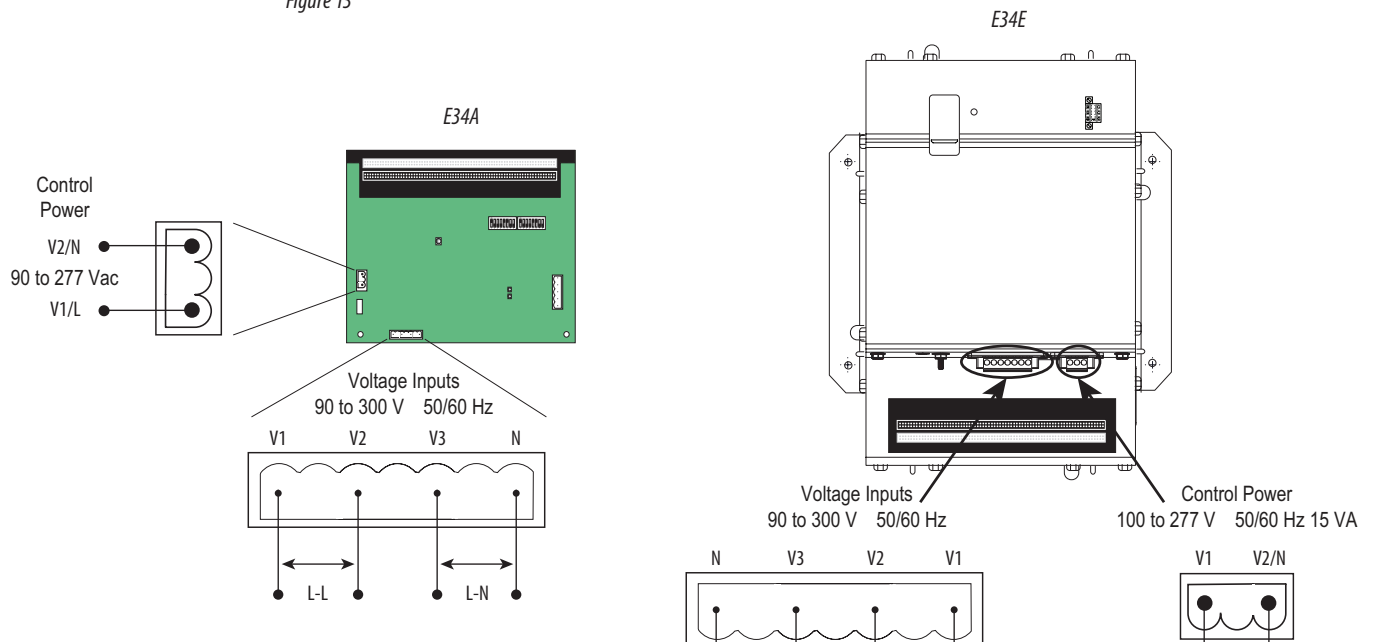
1. Connect 2-wire or 4-wire Modbus RS-485 daisy chain network (Figures 14 and 15).

Figure 14

E34E

E34A

RS-485

S   S
–   –
+   +

SHIELD

RX- TX-

RX+ TX+

TX-

TX+
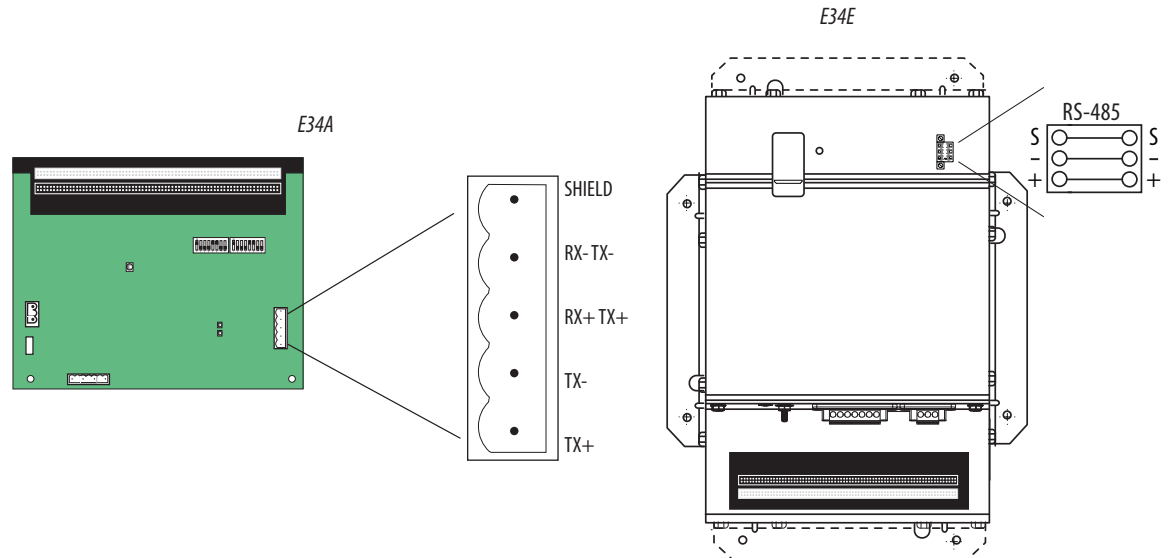
Wiring (cont.)
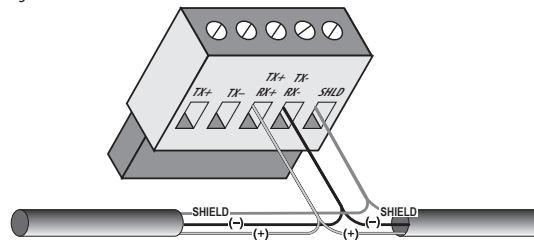
Figure 15

2. Mechanically secure the RS-485 cable(s) where they enter the electrical panel.

3. Connect all RS-485 devices in a daisy-chain fashion, and properly terminate the chain (Figure 16).

Figure 16

RS-485 cable

120 Ω terminator at each end of daisy chain

RS-485 cable

120 Ω terminator at each end of daisy chain

E34A Models

E34E Models
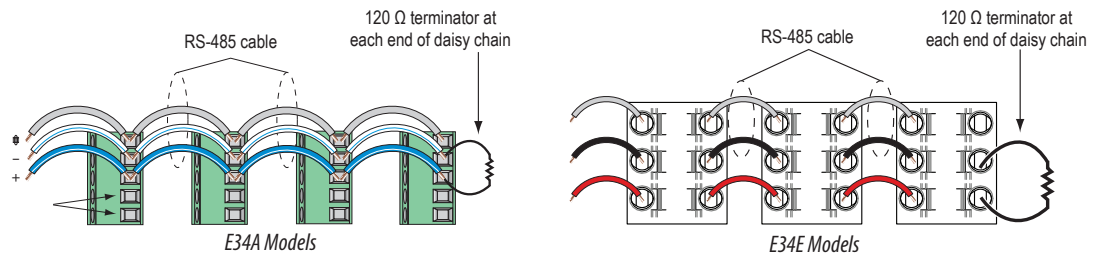
4. Shield the RS-485 cable using twisted-pair wire. The cable must be voltage-rated for the installation.

Configuration

⚠ ⚠ DANGER
HAZARD OF ELECTRIC SHOCK, EXPLOSION, OR ARC FLASH
• Turn off all power supplying equipment before working on or inside the equipment.
• Use a properly rated voltage sensing device to confirm that power is off.
Failure to follow these instructions will result in death or serious injury.

NOTICE
ESD-SENSITIVE DEVICES
Observe handling precautions for static sensitive devices.
Failure to follow this instruction can result in damaged circuitry and loss of factory warranty.

1. Communications Configuration: Communications parameters for the E34 series are field selectable for your convenience. Please see the Product Diagrams section for selector location. E34A models are set using DIP switches on the main board. E34E models are configured with the GUI (Graphical User Interface). See the Gateway Configuration section for further information.

   The following parameters are configurable:

   • Baud Rate: 9600, 19200, 38400
   • Parity On or Off
   • Parity: Odd or Even
   • Wiring: 2 or 4

Configuration (cont.)

Example: 2-wire 19200 Baud No Parity
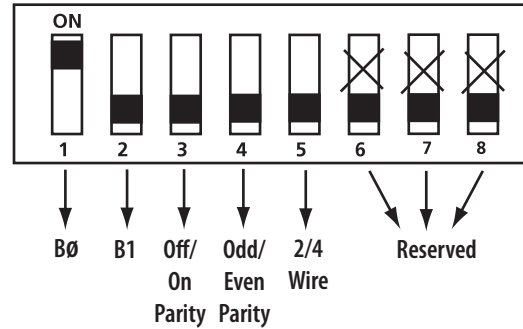
1	2	3	4	5	6	7	8	
off	off				X	X	X	9600
on	off				X	X	X	19200
off	on				X	X	X	38400
on	on				X	X	X	Reserved
		off	off		X	X	X	No Parity
		on	off		X	X	X	Odd Parity
		off	on		X	X	X	No Parity
		on	on		X	X	X	Even Parity
				on	X	X	X	4-wire RS-485
				off	X	X	X	2-wire RS-485

2. Address Configuration: Each Modbus device on a single network must have a unique address. Set the switch block to assign a unique address before the device is connected to the Modbus RS-485 network. If an address is selected that conflicts with another device, neither device will be able to communicate.

3. The E34 uses two logical addresses. Panel 1 uses the base address as set on the DIP switches. Panel 2 uses this base address + 1. Address the E34 as any whole number between and including 1-246. Each unit is equipped with a set of 8 DIP switches for addressing. See the diagram below.
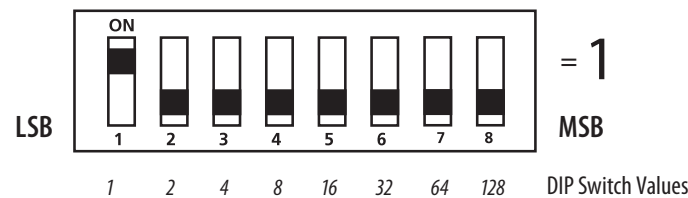
4. To determine an address, simply add the values of any switch that is on.

For example:
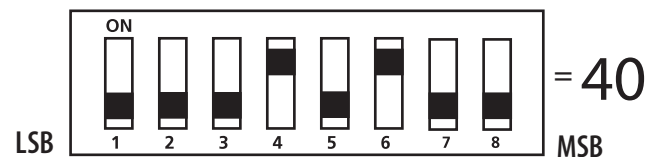
Switch number 4 has an ON Value of 8 and switch number 6 has an ON Value of 32.   (8 + 32 = 40). Therefore, the address for Panel 1 is 40, and the address for Panel 2 is 41.

See the Address Selection section for a pictorial listing of the switch positions for Modbus address selection.

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Default DIP Switch Settings

The E34A includes two DIP switches, as shown below. Switches are shown in their default positions.

E34A

Comms Address

Comms Settings

    ©2017 Veris Industries   USA 800.354.8556 or +1.503.598.4564 / support@veris.com   0717

Address Selection

| DO NOT USE ZERO | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 |

| 11 | 12 | 13 | 14 | 15 | 16 | 17 | 18 | 19 | 20 | 21 |

| 22 | 23 | 24 | 25 | 26 | 27 | 28 | 29 | 30 | 31 | 32 |

| 33 | 34 | 35 | 36 | 37 | 38 | 39 | 40 | 41 | 42 | 43 |

| 44 | 45 | 46 | 47 | 48 | 49 | 50 | 51 | 52 | 53 | 54 |

| 55 | 56 | 57 | 58 | 59 | 60 | 61 | 62 | 63 | ...... | 246 |
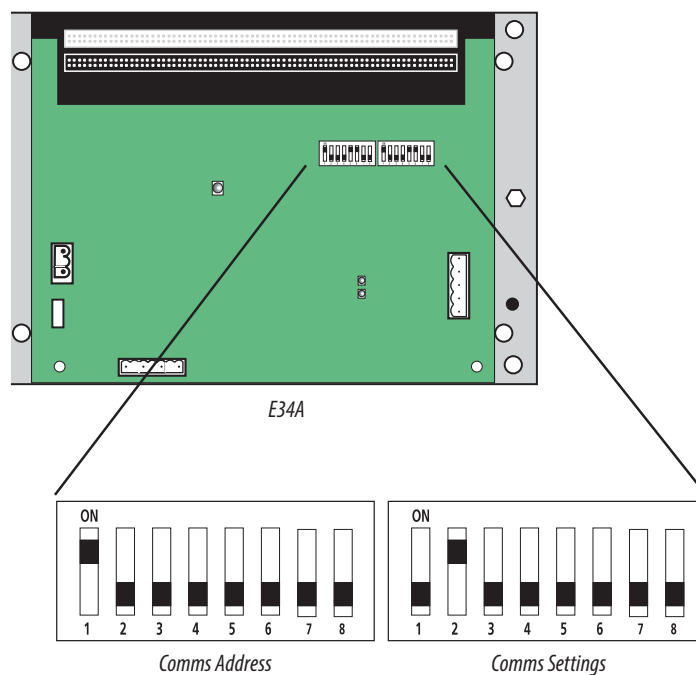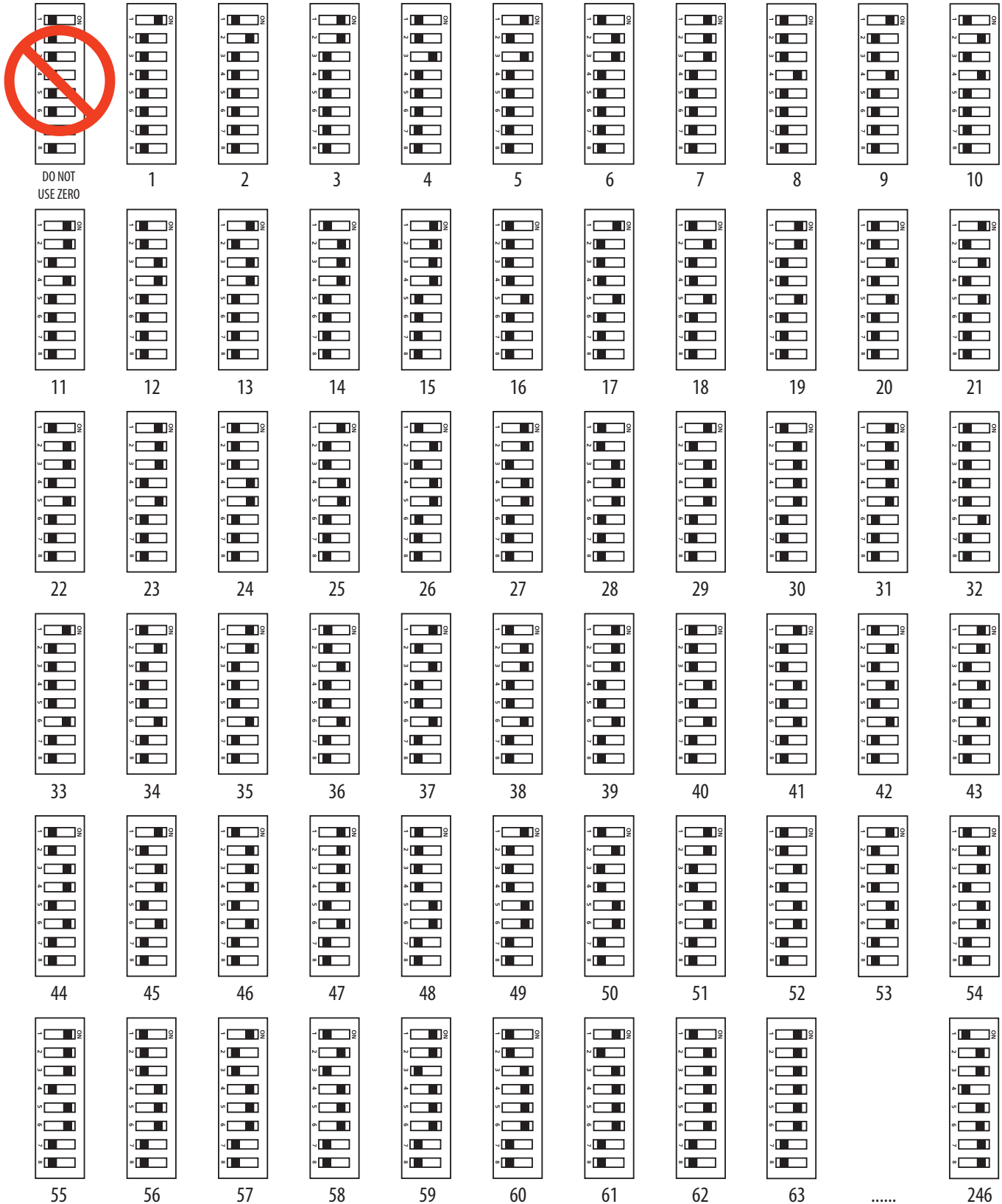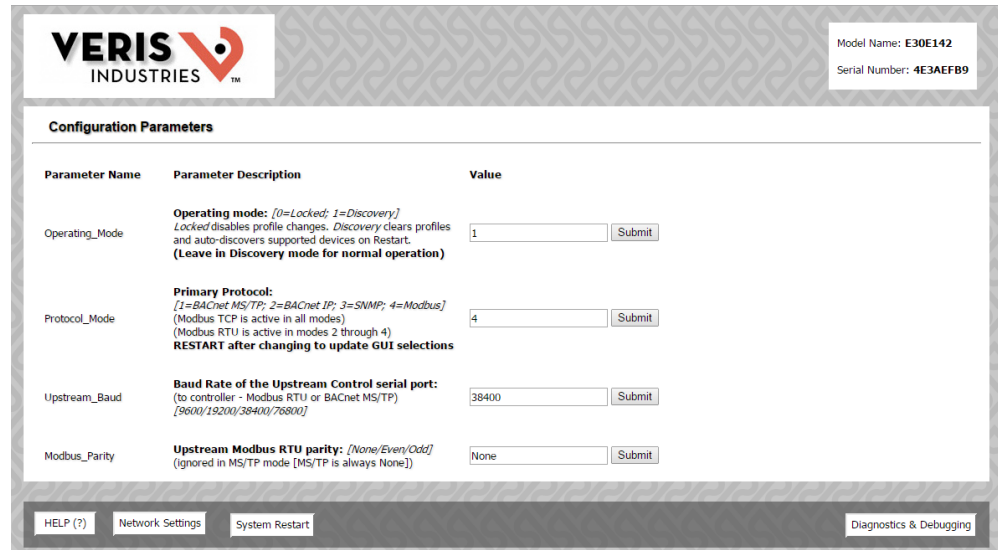
Gateway Configuration

Accessing the Graphical User Interface (GUI)

Gateway configuration is performed after the installation is complete and power is applied to the product.

If the E34E IP address parameters are already configured to work on the network and is being accessed from a PC on that same network, open a web browser and enter the IP address of the E34E into the address/URL field on the browser. Press Enter. The GUI launches and appears, as shown, in the browser window. Note: The screen captures provided in this example were taken using Windows 7. Other operating systems will look different.

If the E34E IP address parameters are not configured for the network, you can either use a PC-based tool called the Veris Toolbox, which can be downloaded from the Veris website at www.veris.com (see the section Using the Veris Toolbox to Set Up the IP Address for Use on Your Network) or, connect a PC directly and access the GUI as described in the section Using the GUI to Set Up the IP Address for Use on Your Network.

Using the Veris Toolbox to Set Up the IP Address for Use on Your Network

1. Download the Veris Toolbox software onto a PC from www.Veris.com/BACnet.

2. Extract the software from the zip file.

3. Run the Setup.exe file and follow the installation instructions.

4. Either connect the E34E Ethernet interface to the same network subnet as your PC or connect a cable between them directly. You will not need to change any network settings on the PC for the Toolbox software to find the E34E.

5. Apply power to the E34E.

6. Launch the Veris Toolbox software. It will discover the E34E, regardless of its IP settings.

Gateway Configuration (cont.)
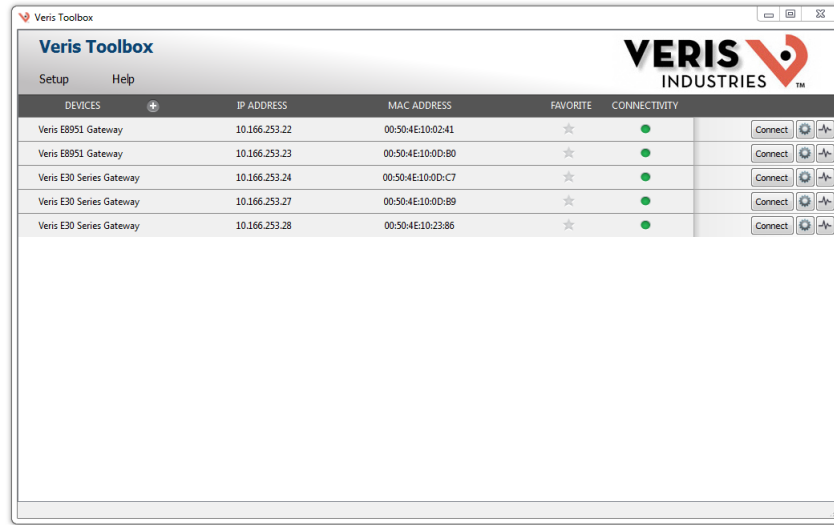
7. Click the gear-shaped configuration icon near the right edge of the window on the line that shows the device you wish to configure. The Configure Device dialog will appear.
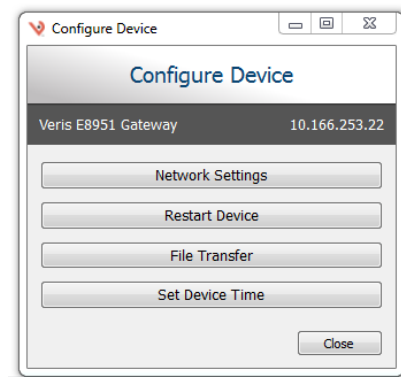
8. Click the **Network Settings** button. The Device Network Settings dialog will appear. This dialog shows all the current IP settings of the E34E.
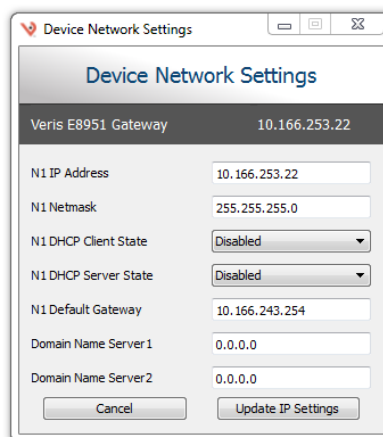
9. Enter the network settings needed to operate properly on your network.

10. Click the **Update IP Settings** button. The Change IP Settings confirmation dialog will appear.

Gateway Configuration (cont.)
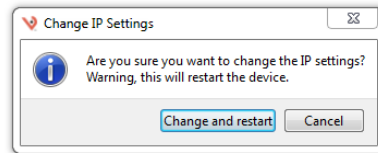
Confirm that the settings you entered are correct and click the **Change and Restart** button. The E34E will reset and power up with the new settings. If you watch the Veris Toolbox screen, the entry for the old address will soon show a lost connection. Eventually a new entry with the new IP address will appear and the old entry will be deleted.

11. Disconnect the E34E and connect it to the network on which it will be used.

Using the GUI to Set Up the IP Address for Use on Your Network

If the E34E IP address parameters are not configured for the network, connect a PC directly and access the GUI from it as follows:

1. Connect a standard Ethernet cable between a PC and the E34E if they are not already connected. Secure a ferrite filter (included) around the Ethernet cable to ensure the device meets emission requirements.
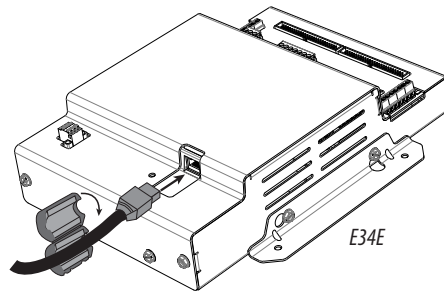
2. Temporarily change the IP address of the PC to a static value on the same subnet as the E34E. For example: If the E34E is set to its factory default IP address of 192.168.1.24, set the PC to an unused static IP address on the 192.168.1.xxx subnet (where xxx is any value between 1 and 255, except 24). Set the subnet mask to 255.255.255.0.
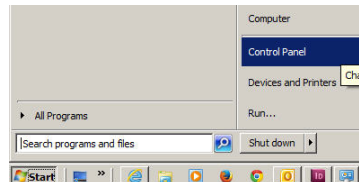
a. Open the Control Panel:

b. In the Control Panel, select **Network and Sharing Center**. In the Sharing Center, select **Change Adapter Settings** in the list at the upper left corner.

c. Select the connection for the network to which the E34E is connected.
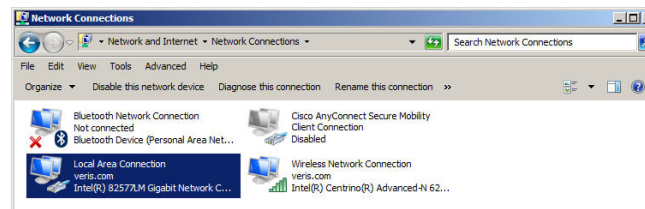
When the Local Area Connection Status dialog box appears, click **Properties**.

Gateway Configuration (cont.)
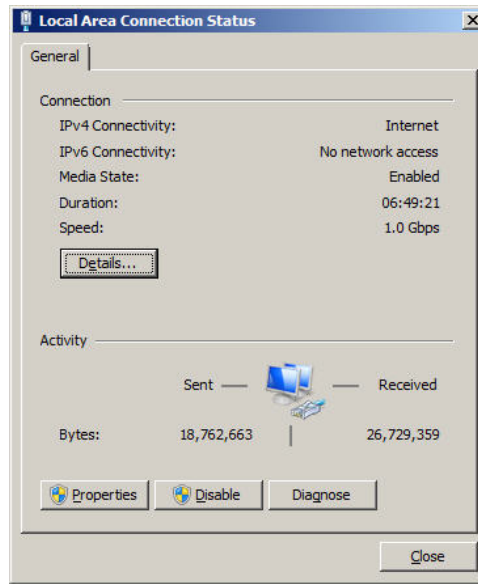
d. Highlight **Internet Protocol Version 4 (TCP/IPv4)**, and click **OK**.
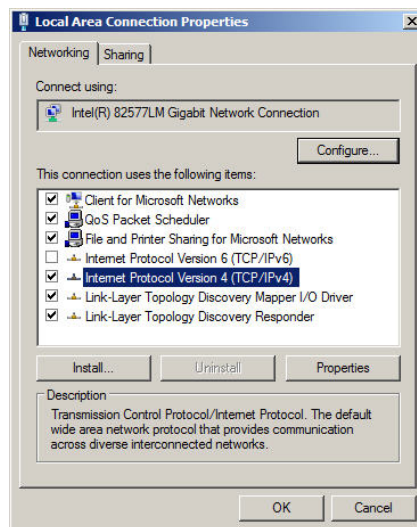
e. Select **Use the following IP Address**. Make note of the IP address that appears, then enter the static IP address (e.g. if the E34E is still set to its default address of 192.168.1.24, then change it to 192.168.1.100). Enter **255.255.255.0** for the subnet mask.

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Gateway Configuration (cont.)

Enter static IP address

Enter subnet mask
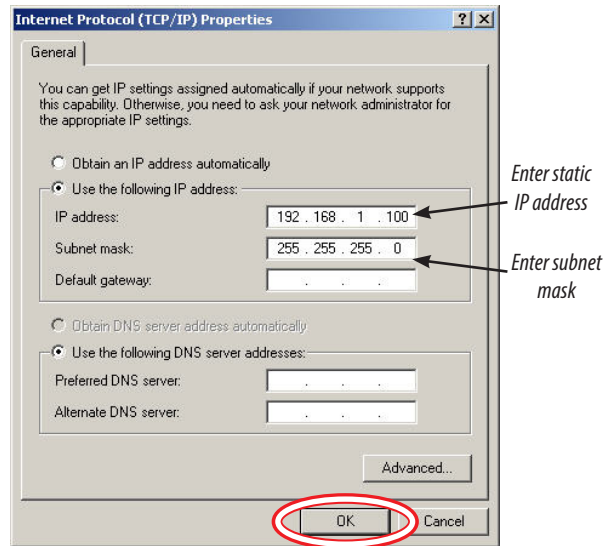
  f. Click **OK**.

3. Open a PC web browser and enter the IP address of the E34E (default address is 192.168.1.24) to access the GUI. The GUI launches and appears in the browser window.

4. To set IP address parameters, click the button labeled **Network Settings** at the bottom of the page.
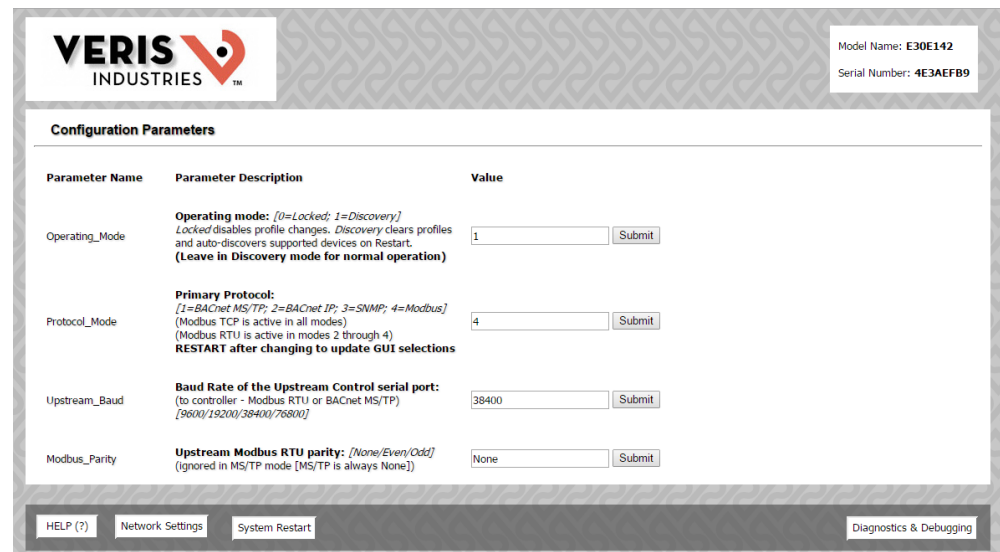
  The Network Settings overlay appears.

  Have the desired IP settings ready in advance (contact the system administrator). IP parameters for use with BACnet IP are static, not dynamic.

5. Set the IP address for use on the BACnet/IP network:

Gateway Configuration (cont.)

a. Enter the desired IP address in the N1_IP_Address field (in the format xxx.xxx.xxx.xxx)

b. If necessary, change the Subnet Mask by entering the appropriate new value in the N1_Netmask field

c. If the E34E is connected to an Ethernet gateway, enter its IP address in the Default Gateway field. This is important when the E34E is used as a BACnet BBMD device.

d. Click the **Update IP Settings** button. The E34E changes its settings.

e. Click the **System Restart** button and wait for the E34E to fully initialize. The GUI will connect when the E34E is installed on a network that matches the settings and the new IP address is entered into a web browser on a PC properly configured for the network.

Using the GUI to Set the Configuration Parameters for the Communication Protocols

Access the GUI according the instructions in the Accessing the Graphical User Interface (GUI) section.

The home screen on the GUI provides fields for configuration of the E34E. The E34E has four primary modes of operation, each of which support a different combination of protocols. Each option field has a Submit button to the right. When changing the value

Gateway Configuration (cont.)

in any field, click **Submit** to store the new value. The GUI prompts the user to restart the system. If multiple values are changed, it is easiest to submit all changes and restart only once when finished with the whole screen. To restart, click the **System Restart** button in the row at the bottom of the screen. The restart takes several seconds, during which the server may lose its connection. Messages appear at the top of the screen indicating current status, but do not perform any actions. Simply allow the tool to complete the restart cycle.

The first selection in the GUI is Operating_Mode, which has two choices:

1. Locked: used for all normal product operation. It is provided as a tool for high-level technical support. The gateway retains its current profile configuration when powered.
2. Discovery mode (default): deletes profiles and rediscovers them when the device is powered again. The results are the same, unless the profile configuration is intentionally altered. Profile selection and discovery are especially important when using BACnet or SNMP protocols. For normal operation, always use discovery mode.

The second selection in the GUI is Protocol_Mode, used to select the combination of protocols the product communicates with. The E34E supports five protocols, some of which can operate simultaneously. The table below shows which protocols are supported in each mode.

Protocol Mode	Primary Protocol	Ethernet Protocol	RS-485 Protocol
1	BACnet MS/TP	Modbus TCP	BACnet MS/TP
2	BACnet IP	BACnet IP/Modbus TCP	Modbus RTU
3	SNMP	SNMP/Modbus TCP	Modbus RTU
4	Modbus	Modbus TCP	Modbus RTU

To select a primary protocol mode, enter the corresponding number into the text field adjacent to the Primary Protocol option and click the **Submit** button to the right of the text field. A prompt appears at the top of the screen instructing the user to restart the system. When finished, the screen refreshes itself with the appropriate fields for the selected mode.

The next GUI selection, in any protocol mode, is the Upstream_Baud rate selection. If you have selected BACnet MS/TP (mode 1) as the primary protocol mode, this value sets the MS/TP baud rate. If you have selected modes 2 or 3 as the primary protocol mode, you may not be using the RS-485 interface at all. If so, this setting can be ignored.
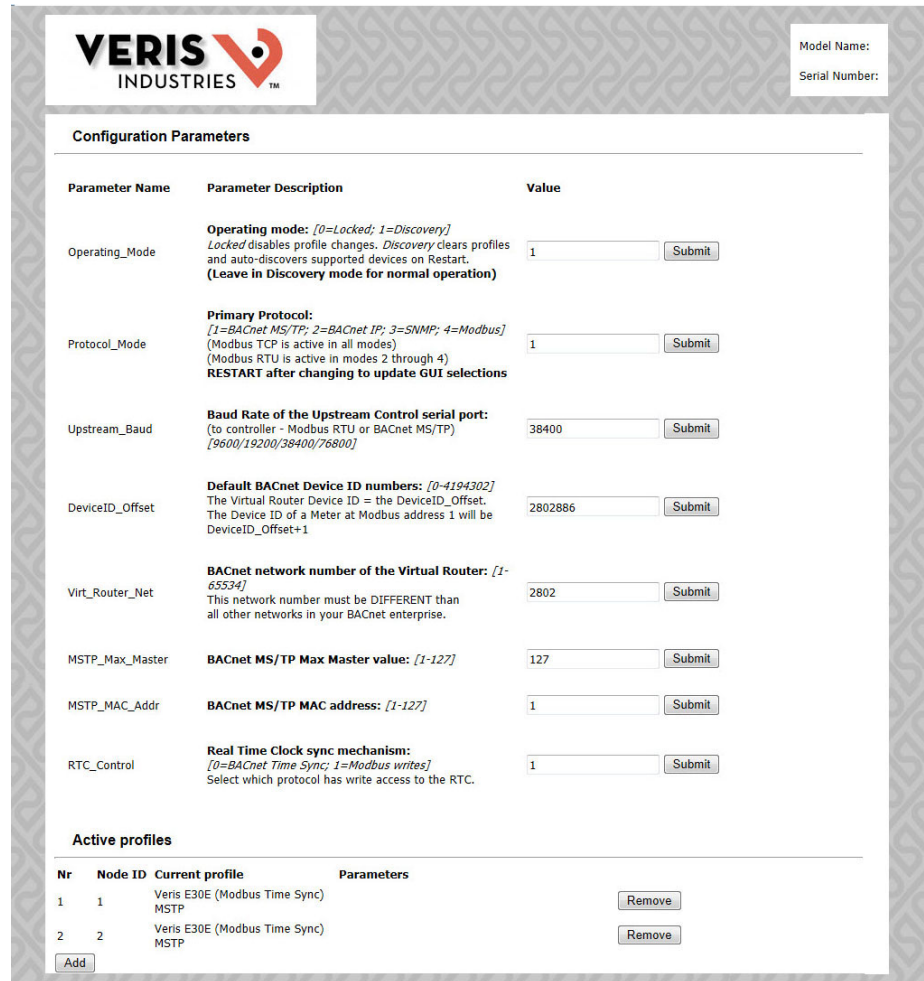
If you have selected BACnet IP, SNMP or Modbus mode, the next selection is Modbus_Address, which sets the Modbus address(es) for the E34E when access with Modbus RTU with the RS-485 serial connection.

The next selection (in BACnet IP, SNMP or Modbus modes) is Modbus_Parity, which sets the parity of the upstream serial connection. If using Modbus RTU protocol, set this to match your Modbus master. If not, ignore this field.

The following sections show the field selections (with factory default values) specific to each of the four Protocol_Modes.

Gateway Configuration (cont.)

1. BACnet MS/TP mode

The first three options are discussed previously.

The DeviceID_Offset parameter is used to assign Device_IDs on power-up or on restart until they have been overwritten via BACnet. Enter your desired value here and click **Submit.** The new value is first used at the next power-up or system restart. Valid Device_ID numbers range from 1 to 4194303. Since the numbers assigned during discovery are the sum of the Offset and the Modbus address (which can be any value from 1 to 247), the Offset values entered in the GUI must be no larger than 4194057.

The E34E gateway creates a BACnet virtual router and separate BACnet devices for each 42-channel meter panel behind this virtual router, allowing the devices to be discoverable and independently accessed via BACnet, even if the virtual router is connected by MS/TP, using a single MAC address. To use this product with MS/TP, the BACnet system must support the discovery and use of a BACnet router on the MS/TP trunk and any devices beyond it. This virtual router creates an exclusive BACnet network on which the meter's BACnet devices reside. This network must have a BACnet network number that is different from any other networks in the entire BACnet enterprise. When multiple E34E products are added anywhere in the enterprise, each one must have a unique network number. If an exclusive value in this field is not set, communication conflicts in the BACnet system may occur.

Enter a non-conflicting value here and click **Submit**. Valid network numbers range from 1 to 65534; if other values are entered, the network number defaults to 5. The new value is first used at the next power-up or system restart. If using an external BACnet router to connect the E34E as an MS/TP device, it is recommended that the router also be restarted after the E34E has completed discovery, when the network number is changed.

The next field for the BACnet MS/TP protocol mode is the MSTP_Max_Master, which allows this value to be set prior to using BACnet software to access the E34E. The default value of 127 works regardless of the addresses the MS/TP network uses, but
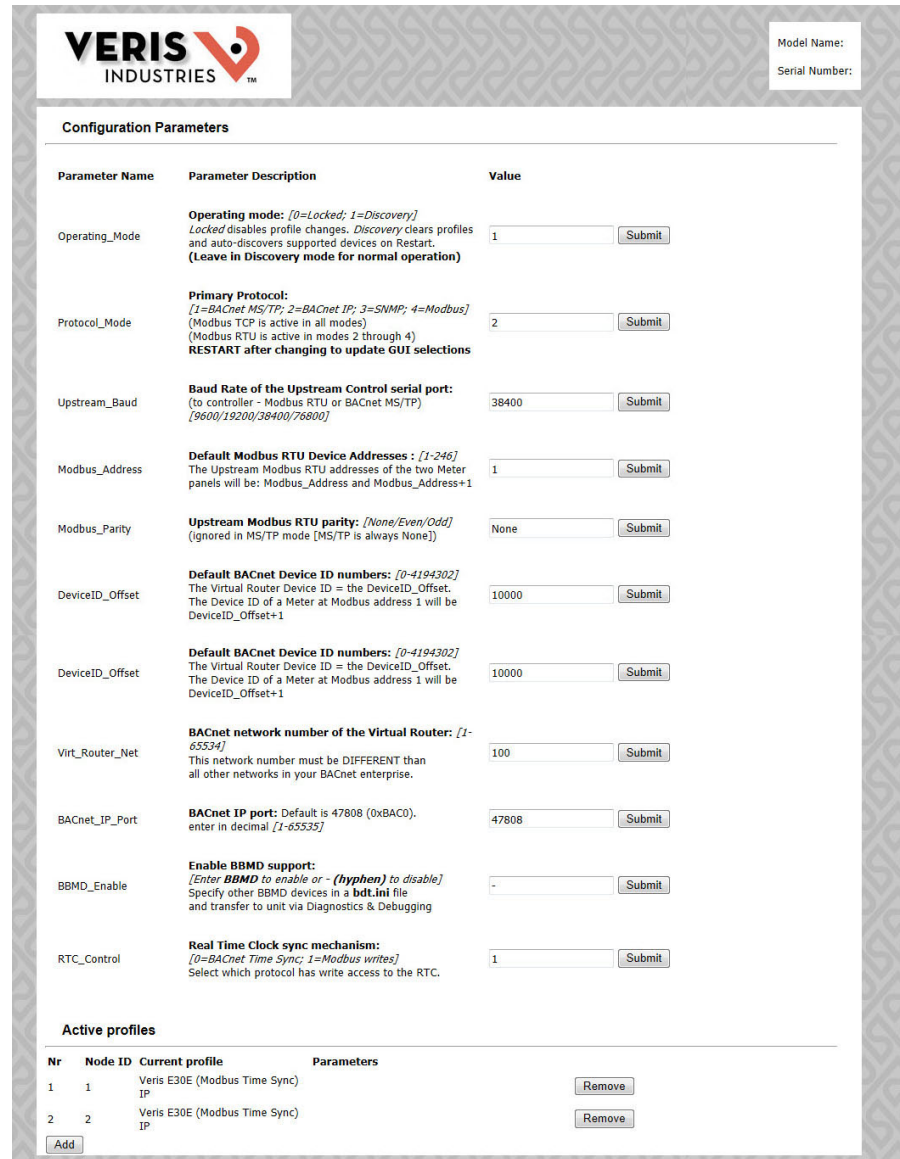
Gateway Configuration (cont.)

selecting a lower value may optimize the network. Do not set this value lower than the highest address on the network. To set this value via BACnet, write to the Max_Master property of the device object for the E34E's virtual router.

The next field for the BACnet MS/TP protocol mode is the MSTP_MAC_Addr, which sets the MAC address for the virtual router. The E34E panel(s) are devices on the internal BACnet network and are not directly addressable as MAC addresses on the MS/TP network.

The final field for the BACnet MS/TP mode is RTC_Control, which selects which protocol (BACnet or Modbus) has write access to the RTC. If 0 (BACnet) is selected, the RTC is set using the BACnet Time Synchronization service. If 1 (Modbus) is selected, the RTC is set by writing to the appropriate Modbus registers.

2. BACnet IP mode

BACnet IP mode uses the same DeviceID_Offset, Virt_Router_Net and RTC_Control parameters described above for BACnet MS/TP mode. One additional parameter, BACnet_IP_Port, is used to set the UDP port. Most BACnet systems use the default port (47808 decimal, 0xBAC0 hex) that is recommended in the BACnet standard as the only UDP port. Some large systems need to segment the enterprise and use more than port. If so, enter the number of the port you need to use to access this device. BACnet IP mode does not use MSTP_Max_Master or MSTP_MAC_Addr.

Gateway Configuration (cont.)

BACnet IP mode adds another field called BBMD_Enable. See the section BBMD Support for a full description of how to enable and use BBMD support.

3. SNMP mode

SNMP mode uses four unique parameters. The SNMP_Community strings are used to control access to the device. Whatever values are entered here must also be used in the MIB browser or SNMP access software to communicate with this device. The Read_Community string is used to enable reading data. The Write_Community string is used to enable writing data. The Trap_Community string is used to enable the receipt of event notifications.

The last parameter, SNMP_Notif_IP is used to set the IP address of the client that will be used to receive SNMP event notifications, such as alarms.

Operating the E34E

Restart the E34E by using the button at the bottom of the GUI or by cycling the power. It takes about 30 seconds to initialize completely and be ready for external communication.

BACnet Network Management – Important Steps to Avoid Conflicts

BACnet configuration uses two default settings that might need to be changed, depending on the application.

a. **Virtual router network ID number**. Every logical network segment (IP subnet, MS/TP trunk, etc.) in an entire system must have a (16-bit) network ID number that is unique from all other BACnet networks in the enterprise. The BACnet network

Gateway Configuration (cont.)

administrator assigns this network ID so that no two ID numbers conflict (whether using BACnet/IP or MS/TP). Within each segment, every device is physically identified by the combination of its 8-bit MAC address and the 16-bit network ID number.

To support multiple meter panels (Panel 1 and Panel 2 are separate) with a single gateway, the E34E creates a virtual BACnet router that presents multiple BACnet devices using a single (its own) MS/TP MAC address. Each E34E must have its own (internal) network ID, and it creates a device object for itself and one for each Modbus address discovered.

The factory default network address is 50 (decimal). If that number is already in use in the system, assign a unique address using the graphical user interface (GUI) on the built-in web server (this requires an Ethernet connection to a web browser; see BACnet/IP Setup section for instructions on changing configuration settings using the GUI). Valid network numbers range from 1 to 65534; if other values are entered, the network number defaults to 5.

b. **Device_ID Offset.** Every BACnet device must have a BACnet Device_ID number that is unique throughout the entire enterprise. Since the E34E presents every Modbus meter as a BACnet device, each connected meter that has a Modbus address must have a BACnet Device_ID.

By default, each device discovered receives a Device_ID number that is the sum of an offset value (default is 50000) and the Modbus address of the device. If these Device_ID numbers cause a conflict with existing devices in the system, or if the system includes multiple E34 Series, change the Device_ID numbers before connecting the E34E to the system. This can be managed one of two ways:

   i.   Connect to the E34E directly (offline from the system) with the devices (meters). After the E34E discovers the devices and assigns their default ID numbers, the user can choose new Device_ID values and write these to each device using BACnet software. Subsequent discoveries will not overwrite these values with defaults even if the E34E is then set to Discovery mode.

   ii. Use the GUI on the built-in web server to modify the offset value used to calculate default Device_IDs in the discovery process (this requires an Ethernet connection to a web browser; see BACnet/IP Setup section for instructions on changing configuration settings using the GUI). The E34E retains this offset value and uses it to assign Device_ID numbers every time power is cycled if the E34E is in Discovery mode. Valid Device_ID numbers range from 1 to 4194303. Since the numbers assigned during discovery are the sum of the Offset and the Modbus address (which can be any value from 1 to 247), any Offset values entered in the GUI must be less than 4194057.

BACnet PICS

BACnet PICS (Protocol Implementation Conformance Statement)

Vendor Name: Veris Industries
BACnet Vendor ID 133
Product Name: E34E Series Multi-Circuit Meter
Product Model Number: <Model Number>
Product Description: Multi-Circuit Meter
Multi-Circuit Meter BACnet Protocol Version: Version 1 Revision 12

BACnet Standardized Device Profile (Annex L) – [Note: E34E incorporates a gateway device]
- BACnet Application Specific Controller (B-ASC)

BACnet Interoperability Building Blocks Supported (Annex K):
- K.1.2 BIBB - Data Sharing - ReadProperty-B (DS-RP-B)
- K.1.4 BIBB - Data Sharing - ReadPropertyMultiple-B (DS-RPM-B)
- K.1.8 BIBB - Data Sharing - WriteProperty-B (DS-WP-B)
- K.1.10 BIBB - Data Sharing - WritePropertyMultiple-B (DS-WPM-B)
- K.1.12 BIBB - Data Sharing - COV-B (DS-COV-B)
- K.2.2 BIBB - Alarm and Event - Notification Internal-B (AE-N-I-B)
- K.2.5 BIBB - Alarm and Event – ACK-B (AE-ACK-B)
- K.2.11 BIBB - Alarm and Event - Information-B (AE-INFO-B)
- K.5.2 BIBB - Device Management - Dynamic Device Binding-B (DM-DDB-B)
- K.5.4 BIBB - Device Management - Dynamic Object Binding-B (DM-DOB-B)
- K.5.6 BIBB - Device Management - DeviceCommunicationControl-B (DM-DCC-B)
- K.5.12 BIBB - Device Management - TimeSyncronization-B (DM-TS-B)
- K.5.22 BIBB - Device Management - List Manipulation-B (DM-LM-B)

Standard Object Types Supported
- Device Object
- Analog Input
- Analog Output
- Analog Value

Unsupported Properties and Restrictions
- Does not support BACnet CreateObject
- Does not support BACnet DeleteObject
- Does not support any proprietary properties
- No proprietary properties exist
- No range restrictions exist
- Max_Master is writable

Data Link Layer Options:
- BACnet IP, (Annex J)
- MS/TP master (Clause 9), baud rate up to 76.8 kbps

Networking Options:
- BACnet/IP Broadcast Management Device (BBMD)
- Registrations by Foreign Devices

Character Sets Supported:
- ISO 10646 (UTF-8) / ANSI X3.4

General BACnet Programming Information

The E34E consists of a BACnet virtual router and one or two 42-channel branch circuit meters. The BACnet virtual router has its own device object and an internal BACnet network. The branch circuit monitors have their own device objects that are logical devices on the network internal to (beneath) the virtual router. It is critical that the network number of the virtual router's internal network be different than any other network number in your entire BACnet system. The network number is set to 50 at the factory, but can be changed in the GUI or by writing to the Present_Value of the AV2 data object associated with that device. Changes to the network number do not take effect until the E34E is re-started, either from the GUI or by cycling the power.

The default Device ID of the virtual router is the Device_Offset parameter, which is set to 5000 at the factory, but can be changed in the GUI or by writing to Present_Value of the AV1 data object associated with that device. Changes to the network number do not take affect until the E34E is re-started, either from the GUI or by cycling the power. The default Device IDs are numbered to consecutively follow the Device ID of the virtual router (e.g. if the Device_Offset parameter is 50000, the virtual router has a Device_ID of 50000, the branch circuit monitor called Panel 1 has a Device_ID of 50001 and the branch circuit monitor called Panel 2 (if present) has a Device_ID of 50002.

All Device_IDs are writable. Once a device's Object_Identifier is overwritten, changes to the ID Offset no longer affect that Object_Identifier, even in Discovery mode. Make further changes to the value by writing the Object_Identifier property.

The default Object_Name property value of each device object is an abbreviated name of the meter series discovered with an underscore and the Modbus address of the meter appended to it. The Object_Name is a writable property. Once a device's Object_Name is overwritten, the Object_Name does not revert to the initial default, even in Discovery mode. Make further changes to the value by writing the Object_name property.

The E34E supports Subscribe_COV, with default COV increment values assigned as shown in the data object tables. If these values are not appropriate for a specific application, write them as needed when they are subscribed. On subsequent power cycles, no subscriptions are active and the COV increments return to their default values.

With few exceptions, any data values written to AV objects are accepted (without error) by the data object and passed through to the corresponding Modbus register. There is no direct indication via the BACnet protocol if invalid values are rejected. After an invalid value is written to the Present_Value of an AV, subsequent reads of that property return the new (invalid) value until the next time the E34E refreshes its data (this may take several seconds).

BBMD Support

When the E34E is in BACnet IP mode, it can be configured as a BACnet Broadcast Management Device (BBMD) by entering "BBMD" in the Enable BBMD Support field in the GUI, adding devices to a comma separated value text file named bdt.ini, and loading it onto the device. The example below shows the syntax required for the bdt.ini file. All lines beginning with two forward slashes are interpreted as comments. Use exactly one line per device added, separated by commas (no spaces). The file must include an entry (line) for each BBMD device in the BACnet enterprise, including the E34E itself. Note: The default gateway address in the network setup must be correct for BBMD support to operate correctly. Once edited, upload the btd.ini file to the gateway through the GUI. Click the **Diagnostics and Debugging** button in the lower right corner of the GUI and follow the folder tree under Navigation to the following folder: **Veris E3x Series Gateway/Setup/File Transfer**. Select the **General** tab (this is important - using the wrong tab can overwrite critical files). Click the **Browse** button and select your bdt.ini file. Then click **Submit**. The GUI quickly indicates "The file was updated successfully." Click the **System Restart** button, click **OK** on the confirmation dialog and wait for the gateway to reinitialize (takes about 30 seconds). BBMD changes are made by uploading a new btd.ini file. After setting the GUI to enable BBMD support and transferring a new or revised bdt.ini file, restart the E34E to load the file. BBMD support can be disabled in the GUI by entering "-" (a hyphen) in the Enable BBMD Support field in the GUI.

```
// Bdt.ini
// The format of this table must be (without the forward slashes - they are comment indicators):
//
//BBMD IP_Address , BBMD port , BBMD subnet Mask
//
147.26.116.217,47808,255.255.255.255
172.16.17.198,47808,255.255.255.255
```

General SNMP Programming Information

The E34E can be configured to support the SNMP V2c protocol over Ethernet. The SNMP community string and the IP address for the client receiving SNMP V2c event notifications can be set via the GUI. MIB files are available for download at www.veris.com/SNMP.aspx to enable accessing the E34E from an MIB browser.

The E34E OID structure organizes the data under two "panels" representing the two breaker panels that can be monitored by a fully populated E34E. Panel 1 corresponds to the branch current sensor strips connected to the "Panel 1A" and "Panel 1B" connectors and to the data set under Modbus address 1 or BACnet device identified as Node_1 in the GUI. Panel 2 corresponds to the branch current sensor strips connected to the "Panel 2A" and "Panel 2B" connectors and to the data set under Modbus address 2 or BACnet device identified as Node_2 in the GUI.

For each panel, data is arranged under six tree branches.

- The Configuration branch contains all writable configuration parameters.
- The Alarms branch contains all the alarm notification traps, the global alarm status registers and counters and tables of the alarm status indicators.
- The Voltage Inputs branch contains all data measurements pertaining to the voltage inputs.
- The Auxiliary Inputs branch contains all data measurements pertaining to the aux inputs other than voltage-related.
- The Branch Inputs branch contains all data measurements to the branch inputs in table format.
- The Flex Circuits branch contains all data measurements to the logical meter summaries in table format.

Commissioning

⚠ ⚠ DANGER
HAZARD OF ELECTRIC SHOCK, EXPLOSION, OR ARC FLASH
• Follow safe electrical work practices. See NFPA 70E in the USA, or applicable local codes.
• Replace all doors, covers and protective devices before powering the equipment.
Failure to follow these instructions will result in death or serious injury.

1. Reconnect power to the panel.

2. Configure installation mode using Modbus Register 6.

3. Configure CT scaling.

4. Configure alarms.

5. Configure demand.

Download the free NetConfig configuration tool and the E3x Commissioning Guide from www.veris.com/modbus to commission the device for operation.

Recommended Accessories

Part ID	Description
AE001	E3x MCB Cover
CBL008	Flat ribbon cable, 50 x 28 AWG, 1.5 ft. (0.45 m)
CBL016	Flat ribbon cable, 50 x 28 AWG, 4 ft. (1.2 m)
CBL017	Flat ribbon cable, 50 x 28 AWG, 5 ft. (1.5 m)
CBL018	Flat ribbon cable, 50 x 28 AWG, 6 ft. (1.8 m)
CBL019	Flat ribbon cable, 50 x 28 AWG, 8 ft. (2.4 m)
CBL020	Flat ribbon cable, 50 x 28 AWG, 10 ft. (3.0 m)
CBL021	Flat ribbon cable, 50 x 28 AWG, 20 ft. (6.1 m)
CBL022	Round ribbon cable, 50 x 28 AWG, 4 ft. (1.2 m)
CBL023	Round ribbon cable, 50 x 28 AWG, 10 ft. (3 m)
CBL024	Round ribbon cable, 50 x 28 AWG, 20 ft. (6 m)
CBL025	Flat ribbon cable, 50 x 28 AWG, 2 m
CBL026	Flat ribbon cable, 50 x 28 AWG, 4 m
CBL027	Flat ribbon cable, 50 x 28 AWG, 6 m
CBL031	Round ribbon cable, 50 x 28 AWG, 1.5 ft. (0.45 m)
CBL032	Round ribbon cable, 50 x 28 AWG, 2.5 ft. (0.76 m)

Troubleshooting

Problem	Solution
Product is not communicating over Modbus daisy chain	• Check the unit Modbus address to ensure that each device on the daisy chain has a unique address. • Check Parity. • Check the communications wiring. • Check that the daisy chain is properly terminated.
RX LED is solid (E34A models)	• Check for reversed polarity on Modbus comms. • Check for sufficient biasing on the Modbus bus. Modbus physical specification calls for 450-650 Ω biasing. This is usually provided by the master.
The main board has a slow flashing amber light (E34A models)	• One or more channels is clipping. This can be caused by a signal greater than the split-core size or 277 V L-N, or by a signal with high THD near the gain stage switching points (1.5 A and 10 A).
The main board has a flashing green light (E34A models)	• Everything is wired properly and the main board has power.
The main board has a flashing or solid red light (E34A models)	• Light may be red briefly while device powers up. • If light is red for more the 60 sec. device has encountered a diagnostic event. Contact technical support. • The light will flash red if incompatible CT strips or adapter boards are detected
Power factor reading is not as expected	• Verify voltage taps are connected in appropriate phase rotation. • Verify phase rotation of breakers (firmware rev. 1.012 or higher allows for custom rotation if needed).
Current is reading zero, even when small currents are still flowing through circuit	• The product cuts off measurements if the current on any input is less than 0.1% of the full range current setting used for any CT, and will set the reporting register to 0 mA for currents near or below this range.
Non-zero current or power readings are showing on one or more unused channels.	The CT range setting of any channel that does not have a CT actually connected should be set to zero. Channels without CTs connected will pick up noise that can cause non-zero readings if the range is not zero. When CTs are properly connected, the impedance of the CT itself will absorb spurious noise at the proper range setting.

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China RoHS Compliance Information - Environment Friendly Use Period (EFUP) Table

部件名称	有害物质 - Hazardous Substances					
Part Name	铅 (Pb)	汞 (Hg)	镉 (Cd)	六价铬 (Cr (VI))	多溴联苯 (PBB)	多溴二苯醚 (PBDE)
电子件 Electronic	X	O	O	O	O	O

本表格依据SJ/T11364的规定编制。

O: 表示该有害物质在该部件所有均质材料中的含量均在GB/T 26572规定的限量要求以下。

X: 表示该有害物质至少在该部件的某一均质材料中的含量超出GB/T 26572规定的限量要求。

（企业可在此处，根据实际情况对上表中打 ×﹒ 的技术原因进行进一步说明。）

This table is made according to SJ/T 11364.

O: indicates that the concentration of hazardous substance in all of the homogeneous materials for this part is below the limit as stipulated in GB/T 26572.

X: indicates that concentration of hazardous substance in at least one of the homogeneous materials used for this part is above the limit as stipulated in GB/T 26572

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