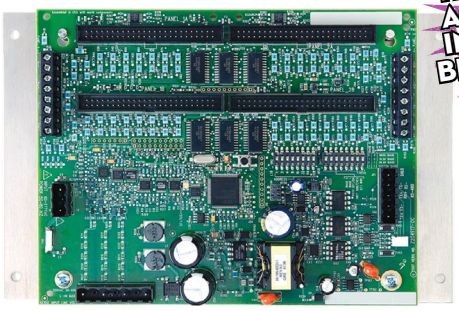
Power Monitoring Multi-circuit

# Panelboard Monitoring System

## E3x Series

1% SYSTEM ACCURACY INCLUDING BRANCH CTS



E3xA/B/C

E3xE

**INTEGRATED ETHERNET W/SNMP, BACNET, & MODBUS**

**Monitor Current, Voltage, & Energy Consumption with One Device**

## FEATURES

- *Revenue grade measurements*
- *ANSI & IEC Class 1 metering system accuracy including branch CTs*
- *Solid-core branch CT strip models for new construction*
- *Split-core branch CT models for retrofit applications*
- *Reports volts, amps, power, demand, & energy for each circuit... one product covers up to two complete 42 breaker panelboards**
- *Up to 92 circuits with one product (84 branch circuits, 2 3-phase mains, 2 neutrals*)...saves space*
- *User configurable meters provide multi-phase totals for loads with any combination of 1, 2, 3 pole breaker positions*
- *3/4", 1", or 18 mm spaced solid-core branch CT strips... flexible installation*
- *4 user-configurable alarm threshold registers...improved load management*
- *Selectable orientation and numbering of the circuits*
- *50mA to 100A monitoring...widest dynamic range in the industry*
- *Modbus RTU standard on all models*
- *Modbus TCP over ethernet is standard on E3xExxx models and available on others with addition of U013-0012*
- *BACnet IP (with BBMD support) or MS/TP is standard on E3xExxx models and available on others with addition of E8951*
- *SNMP support is standard on E3xExxx models and available on others with addition of E8951*

** Depending on options ordered.*

## SPECIFICATIONS

5 Year Warranty

| | |
|---|---|
| **INPUTS** | |
| **Input Power** | 100-277VAC, 50/60 Hz, 15VA max. |
| **ACCURACY** | |
| **Power/Energy** | IEC 62053-21 Class 1, ANSI C12.1-2008. 1% system accuracy (includes main board and branch CTs) |
| **Voltage** | ±0.5% of reading 90-277VAC line-to-neutral |
| **Current** | ±0.5% of reading |
| **Minimum ON Current** | 50mA |
| **OPERATION** | |
| **Sampling Frequency** | 2560 Hz |
| **OUTPUTS** | |
| **Serial Protocols** | All: Modbus RTU<br>E3xE models: BACnet MSTP |
| **Serial Connection** | All: 2-wire, RS-485<br>E3xA/B/C models: 4-wire RS-485 |
| **Address** | E3xA/B/C models: Selectable address 1 to 247 (uses 2 addresses for Modbus RTU)<br>E3xE models: Selectable at address 1 to 247 for Modbus RTU; 0-127 for BACnet MS/TP |
| **Baud Rate** | All: 9600, 19200, 38400 (selectable on A/B/C models) |
| **Parity** | All: Modbus RTU: NONE, ODD, EVEN (selectable on A/B/C models)<br>E3xE models: BACnet MS/TP: NONE (fixed) |
| **Terminal Block Torque** | 4.4 to 5.3 in-lb (0.5 to 0.6 N-m) |
| **Ethernet Protocols** | All: Modbus TCP<br>E3xE models: BACnet IP, SNMP V2c |
| **Ethernet Connection** | E3xE models only: RJ-45 10/100 Mbit |
| **ENVIRONMENTAL** | |
| **Operating Range** | 0° to 60°C (32° to 140°F) (<95% RH non-condensing)* |
| **Storage Temp Range** | -40° to 70°C (-40° to 158°F) |
| **Altitude of Operation** | 3000 m |
| **Agency Approvals** | UL508, EN61010-1, Cat. III, pollution degree 2 |

** Indoor use only.*

## DESCRIPTION

The **E3x Series Panelboard Monitoring System** provides a cost effective solution for electrical load management, making it ideally suited for applications where loads are dynamic, such as the data storage industry, lighting panels, etc.

The E3x series monitors the current, voltage, instantaneous power, demand, and energy consumption of each circuit in a panelboard including the main feed.** As a circuit approaches the user-configured thresholds, alarm indicators are triggered, preventing costly downtime from overloaded circuits or failed loads. (See graph, facing page)

** E3xE models monitor only current values.*

## APPLICATIONS

- *Load-based cost allocation*
- *Overload protection*
- *Data center PDUs*
- *Subtenant billing*
- *Lighting control panels*
- *Load management*
- *Load balancing*
- *Energy management*

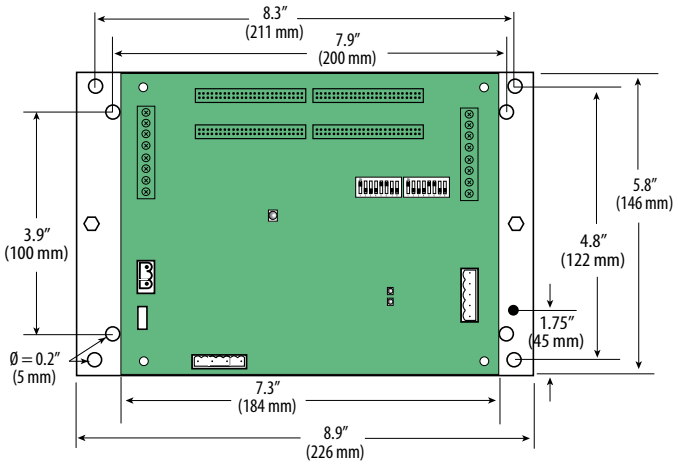
## PRODUCT CAPABILITIES

| | E3xA | E3xB | E3xC | E3xE |
|---|---|---|---|---|
| **Monitoring at Mains** | | | | |
| Current per phase | ● | ● | ● | ● |
| Max. current per phase | ● | ● | ● | ● |
| Current demand per phase | ● | ● | ● | ● |
| Max. current demand per phase | ● | ● | ● | ● |
| Current phase angle | ● | ● | | ● |
| Energy (kWh) per phase | ● | ● | | ● |
| Real Power (kW) per phase | ● | ● | | ● |
| Apparent Power (kVA) | ● | ● | | ● |
| Power factor total* | ● | ● | | ● |
| Power factor per phase | ● | ● | | ● |
| Voltage, L-L and average | ● | ● | | ● |
| Voltage, L-N and average | ● | ● | | ● |
| Voltage, L-N and per phase | ● | ● | | ● |
| Frequency (phase A) | ● | ● | | ● |
| **Monitoring at Branch Circuit** | | | | |
| Current | ● | ● | ● | ● |
| Max. current | ● | ● | ● | ● |
| Current demand | ● | ● | ● | ● |
| Max. current demand | ● | ● | ● | ● |
| Current phase angle | ● | | | ● |
| Real power (kW) | ● | | | ● |
| Real power (kW) demand | ● | | | ● |
| Real power (kW) demand max. | ● | | | ● |
| Energy (kWh) per circuit | ● | | | ● |
| Power factor | ● | | | ● |
| Apparent Power (kVA) | ● | | | ● |
| **Modbus Alarms** | | | | |
| Voltage over/under | ● | ● | | ● |
| Current over/under | ● | ● | ● | ● |
| **Protocols Supported** | | | | |
| Modbus RTU | ● | ● | ● | ● |
| Modbus TCP | ** | ** | ** | ● |
| BACnet MS/TP | † | † | † | ● |
| BACnet IP with BBMD support | † | † | † | ● |
| SNMP V2 | ‡ | ‡ | ‡ | ● |

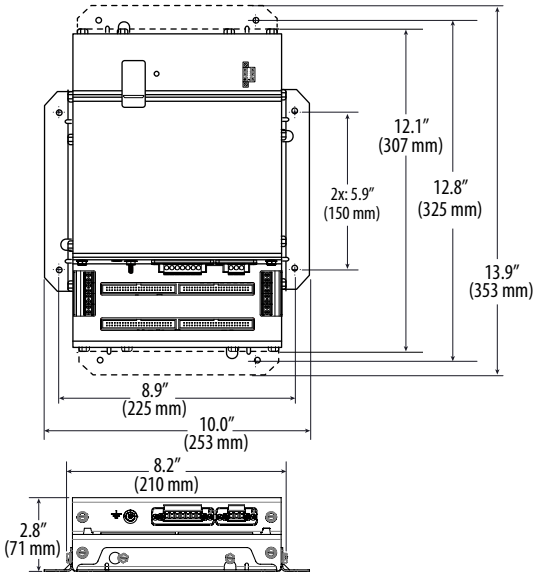
** Based on a 3-phase breaker rotation. ** with UO13-0012 or E8951 added*
*† with E8951 added ‡ with E8951 added; requires one E8951 for each meter*

## DIMENSIONAL DRAWINGS

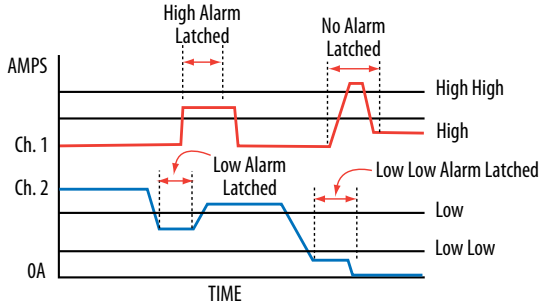
*E3xA/B/C Main Board*




*E3xE*




## OPERATION EXAMPLE




## ACCESSORIES

*Ribbon Cables, round or flat (CBLxxx)*
*E3x cover (AE001)*
*Modbus TCP Gateway (U013-0012)*
*Modbus-to-BACnet Converter (E8951)*
*Network Display (H8932, H8936)*
*Branch CTs (E31CT0, E31CT1, E31CT3)*
*Split-core CTs for auxiliary inputs (H681x, E681x)*
*Solid-core CTs for auxilliary inputs (E682x)*
*Repair kit for E30 (AE006)*


CBL022


AE001


U013-0012


E8951


H8932/H8936


E31CT0
E681A500V3


E31CT1
E681B101V3

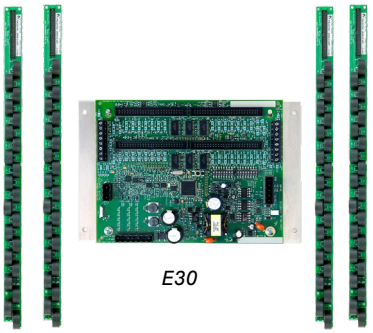

E31CT3
E681C201V3


H681x


E682x

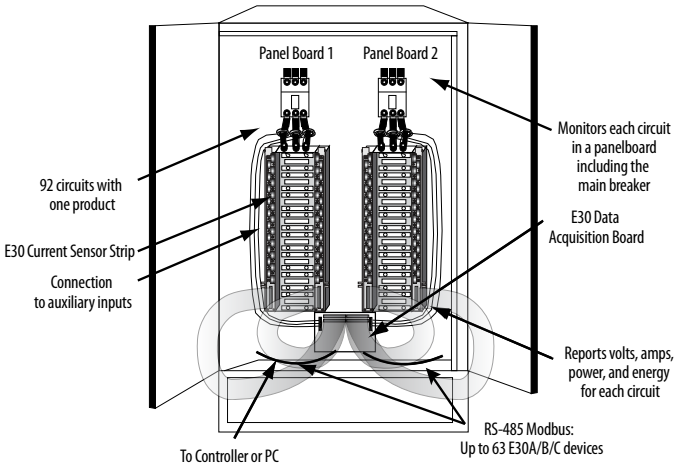

AE006

# Panelboard Monitoring System – Solid-core



E30

## WIRING DIAGRAM



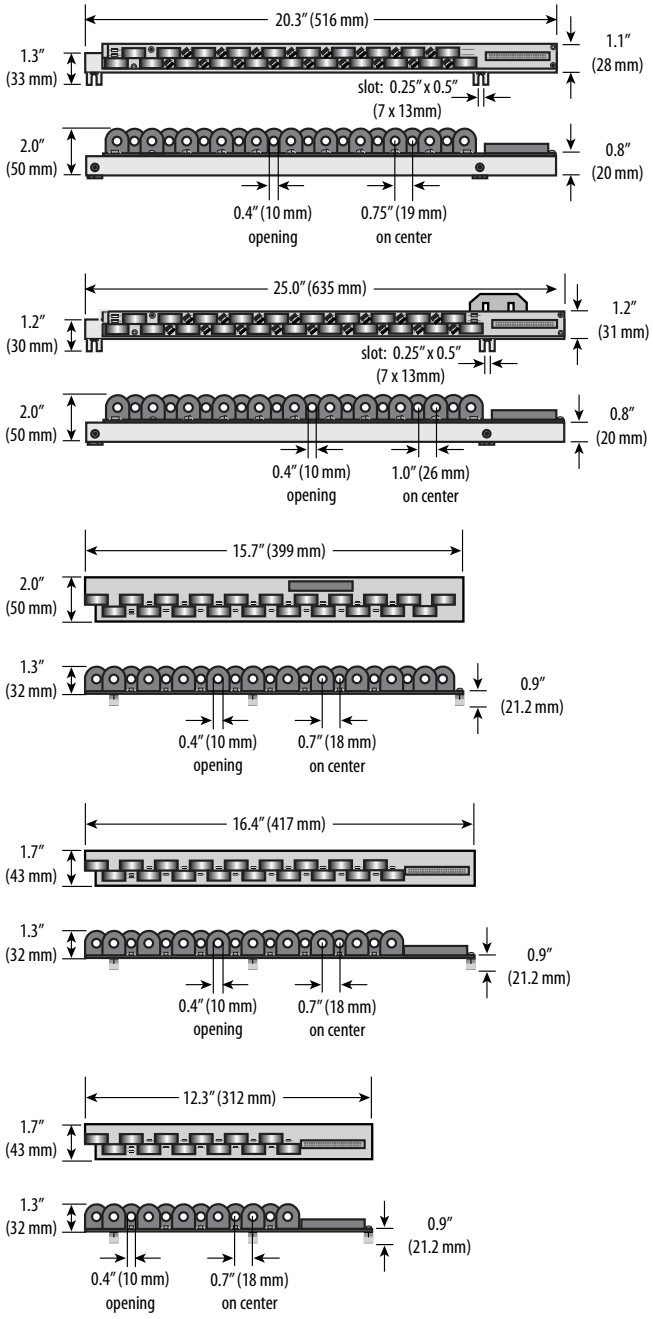

## SOLID CORE BRANCH CTs

| | 100A Solid-Core Branch CT |
|---|---|
| Voltage Rating | 300 VAC |
| Temperature | 0° to 60°C |
| Agency | EN61010-1 |

Observe precautions for handling static sensitive devices to avoid damage to the circuitry that is not covered under the factory warranty.

## DIMENSIONAL DRAWINGS

*Branch CT Strips*




## ORDERING INFORMATION

(E30E only)

*Description* — *Branch CT Spacing* — *# of Branch CTs & Ribbon Cables*

**E30** ☐ ☐ ☐

**A** = Advanced
**B** = Intermediate
**C** = Basic
**E** = Advanced w/ethernet

**0** = 100A, ¾" spacing
**1** = 100A, 1" spacing
**2** = 100A, 18 mm spacing

**24** = 2 strips of 12 branch CTs (18 mm only) and two 4-ft. round ribbon cables
**36** = 2 strips of 18 branch CTs (18 mm only) and two 4-ft. round ribbon cables
**42** = 2 strips of 21 branch CTs (¾", 1", or 18 mm) and two 4-ft. round ribbon cables
**48** = 4 strips of 12 branch CTs (18 mm only) and four 4-ft. round ribbon cables
**72** = 4 strips of 18 branch CTs (18 mm only) and four 4-ft. round ribbon cables
**84** = 4 strips of 21 branch CTs (¾", 1", or 18 mm) and four 4-ft. round ribbon cables

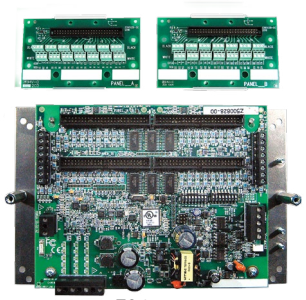
*Example:*

**E30** | A | 0 | 42

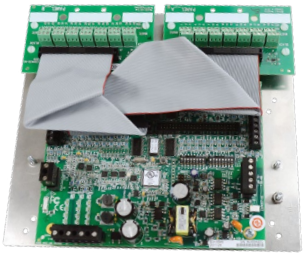
***NOTE:*** *CTs for mains (not used on E3xC models) must be ordered separately. Use 0-0.333V CTs rated for use with Class 1 voltage inputs.*

*Free Configuration tool available from www.veris.com.*
*Consult factory for additional mounting options.*

# Panelboard Monitoring System – Split-core

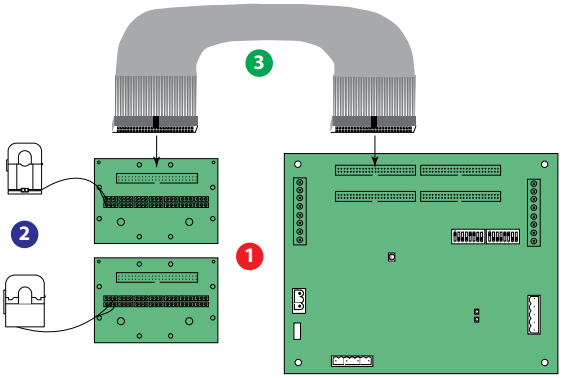


E31



E31xY63

## WIRING DIAGRAM




Observe precautions for handling static sensitive devices to avoid damage to the circuitry that is not covered under the factory warranty.

## ORDERING INFORMATION

CE cULus LISTED BTL (E31E only)

### 1 Boards

| | Description | # of CTs |
|---|---|---|
| E31 | ☐ | ☐ |

A = Advanced board
B = Intermediate board
C = Basic board
E = Advanced w/ ethernet

002 = 2 adapter boards, no CTs, no cables
004 = 4 adapter boards, no CTs, no cables
42 = 2 adapter boards, 42 50A CTs, 2 4 ft. round ribbon cables
84 = 4 adapter boards, 84 50A CTs, 4 4 ft. round ribbon cables
Y63 = 2 adapter boards, flat ribbon cables, pre-assembled on one bracket, CTs not included (not available with E31E models)

### 2 Branch CTs *(up to 21 CTs per adapter board)*

| | |
|---|---|
| E31CT0 | Six-pack, 50A Branch CT, 6 ft. (1.8 m) lead |
| E31CT0R20 | Six-pack, 50A Branch CT, 20 ft. (6 m) lead |
| E31CT1 | Six-pack, 100A Branch CT, 6 ft. (1.8 m) lead |
| E31CT1R20 | Six-pack, 100A Branch CT, 20 ft. (6 m) lead |
| E31CT3 | Single CT, 200A Branch CT, 6 ft. (1.8 m) lead |
| E31CT3R20 | Single CT, 200A Branch CT, 20 ft. (6 m) lead |

### 3 Ribbon Cable *(order 1 cable per adapter board)*

| | | | |
|---|---|---|---|
| CBL031 | Round Ribbon Cable, 18 in. (0.5 m) | CBL008 | Flat Ribbon Cable, 18 in. (0.5 m) |
| CBL032 | Round Ribbon Cable, 30 in. (0.8 m) | CBL016 | Flat Ribbon Cable, 4 ft. (1.2 m) |
| CBL022 | Round Ribbon Cable, 4 ft. (1.2 m) | CBL017 | Flat Ribbon Cable, 5 ft. (1.5 m) |
| CBL033 | Round Ribbon Cable, 8 ft. (2.4 m) | CBL018 | Flat Ribbon Cable, 6 ft. (1.8 m) |
| CBL023 | Round Ribbon Cable, 10 ft. (3 m) | CBL019 | Flat Ribbon Cable, 8 ft. (2.4 m) |
| CBL024 | Round Ribbon Cable, 20 ft. (6 m) | CBL020 | Flat Ribbon Cable, 10 ft. (3 m) |
| | | CBL021 | Flat Ribbon Cable, 20 ft. (6 m) |

***Ordering Examples:***

*Option A: For monitoring 42 or 84 circuits, order a pre-made kit from Group 1 only (see Application/Wiring Diagram above). Example: E31x42 or E31x84*

*Option B: For monitoring other configurations, build your own kit by selecting from Groups 1, 2, and 3.*

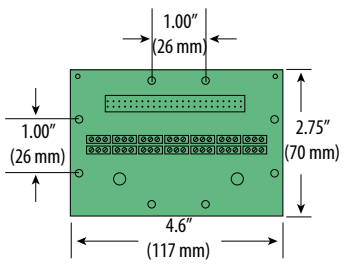
*Example kit for an 18-circuit panel retrofit:*

1. *E31A002 - Advanced board, 2 adapter boards (1 unit)*
2. *E31CT0 - 50A Branch CT six-pack (3 units)*
3. *CBL023 - 10 ft. round ribbon cable (2 units)*

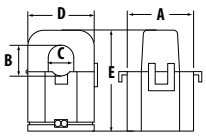
***NOTE:*** *CTs for mains (not used on E3xC models) must be ordered separately. Use 0-0.333V CTs rated for use with Class 1 voltage inputs.*

## DIMENSIONAL DRAWINGS

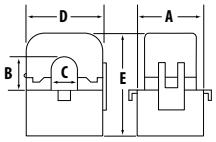
*E31 Adapter Board*



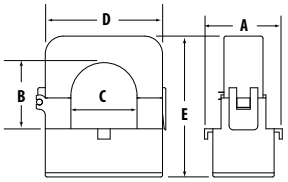

*Branch CTs*




**E31CT0 50 Amp**
A = 1.0″ (26 mm)
B = 0.5″ (11 mm)
C = 0.4″ (10 mm)
D = 0.9″ (23 mm)
E = 1.6″ (40 mm)

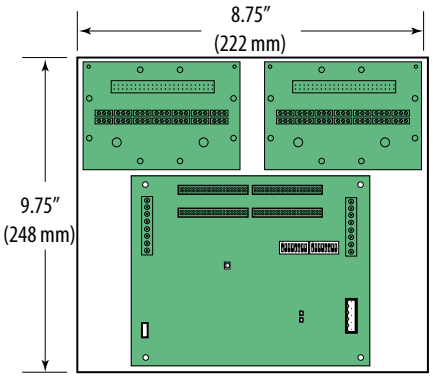



**E31CT1 100 Amp**
A = 1.5″ (37.5 mm)
B = 0.6″ (16 mm)
C = 0.6″ (16 mm)
D = 1.85″ (47 mm)
E = 2.1″ (53 mm)




**E31CT3 200 Amp**
A = 1.5″ (39 mm)
B = 1.25″ (32 mm)
C = 1.25″ (32 mm)
D = 2.5″ (64 mm)
E = 2.8″ (71 mm)

*E31xY63 Boards with Bracket*




## SPLIT-CORE BRANCH CTs

| | 50A Split-Core Branch CT | 100A Split-Core Branch CT | 200A Split-Core Branch CT |
|---|---|---|---|
| Voltage Rating | 300VAC | 300VAC (CE), 600VAC (UL) | 300VAC (CE), 600VAC (UL) |
| Measurement Range | 0 to 60A | 0 to 120A | 0 to 240A |
| Temperature | 0° to 60°C | 0° to 60°C | 0° to 60°C |
| Agency | UL 61010-1 Recognized, EN61010-1 | UL 61010-1 Recognized, EN61010-1 | UL 61010-1 Recognized, EN61010-1 |