emporia

# Flexible Current Sensors for Vue 3 Energy Monitors

## Installation Guide

# Safety Information

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

## ⚠ WARNING

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

## ⚠ WARNING

The Emporia Vue requires installing transformers inside a home's electrical panel and working around dangerous voltage that could lead to injury or death. The installation should be performed by a skilled person such as a licensed electrician or other qualified professional in accordance with the regional electrical code where it is being installed.

Improper installation or use of the equipment can be dangerous or even fatal. In no event shall Emporia be liable to you or any third party for any damages, either direct or indirect, arising from or related to any personal injury as a result of your failure to follow the safety information and instructions in this installation guide.

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# Safety Information (continued)

## ⚠ WARNING

- Remove power from the electrical panel before inspecting. Wear protective eyewear and protective gloves before attempting to inspect the Vue system. Ensure no wiring for voltage measurement, current measurement, power, or data are frayed or have exposed conductors. Ensure there are no cracks, breaks, or other defects in the enclosure of the Vue or CTs.
- If you believe any of the Emporia Vue components may have been damaged, do not attempt to use them. Contact support at support@emporiaenergy.com immediately.
- Do not use the Emporia Vue in any manner other than specified in this installation guide, otherwise, the protection provided by the equipment may be impaired.
- Do not attempt to open, disassemble, or repair any of the components of the Emporia Vue.
- Do not install the Emporia Vue in environments with explosive gas or vapors; nor in damp or wet environments; nor in direct sunlight; nor where temperatures are consistently below -40° F (-40° C) or above 122° F (50° C).
- Ensure the Emporia Vue does not have power during any handling, including installation and disassembly.
- Do not perform any maintenance, service, or cleaning of the Vue after installation. Contact customer service for support.
- The Emporia Vue should only be used with Listed Energy-Monitoring Current Transformers.
- Basic Insulation: use CTs only on insulated conductor, secured from contacting live parts.
- To reduce risk of electric shock, always open or disconnect circuits from the power-distribution system (or service) of a building before installing or servicing current transformers.
- The Emporia Vue should be wired to power using 16AWG, 600V, UL1015, 105° C (or higher) copper-only wires
- It is recommended that the Emporia Vue be wired to the breaker closest to the device.

# Safety Information (continued)

## ⚠ WARNING

- Do not position the Emporia Vue so that it is difficult to operate disconnecting devices or breakers.
- Do not use 3rd party accessories or Current Transformers (CTs) with the Emporia Vue. The Vue and CTs are customized and integrated. Third party accessories or CTs may compromise the data accuracy and equipment safety.
- The current transformers may not be installed in equipment where they exceed 75 percent of the wiring space of any cross-sectional area within the equipment.
- Restrict installation of current transformers in an area where it would block ventilation openings.
- Restrict installation of current transformers in an area of breaker arc venting. Do not install the Emporia Vue Energy Monitor in any area where breaker arc venting exhaust gasses could be re-directed as a result of submetering equipment installation.
- The Emporia Vue is not suitable for Class 2 wiring methods and not intended for connection to Class 2 equipment. (Refer to NEC 2023, Section 725.)
- Secure current transformers and route conductors so that the conductors do not directly contact live terminals or buses.
- The Emporia Vue shall not be mounted within 50.8 mm (2 in) of any live parts including primary conductors, primary terminals, and primary lugs; but excluding insulated cables. It's acceptable for the Vue to be mounted to the grounded panel box and near the neutral/ground bus bars. The Vue employs Class I wiring allowing its wires to safely coexist with all other wires in the panel.
- If the Emporia Vue Energy Monitor is attached to the enclosure, it shall not contact the panel interior insulation such as the material that separates the GND and LIVE bus bars.
- Emporia Vue Energy Monitor mounting provisions shall not be attached to any energized part.
- Voltage sensing and power supply connections to the primary voltage shall have overcurrent protection through connection to a breaker/MCB.

# Before you get started

The Emporia Vue and current sensors are installed in your home's electrical panel. You'll turn off the main breaker, which will shut off all of the power in your home. **However, the service mains will remain dangerously energized.** The following items may help with safe installation.

Phillips and flathead screwdrivers

Protective eyewear

Protective gloves

Alternative light source

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# What's in the box

Your new Flexible Current Sensors are meant to replace the 200A current sensors that come standard with the Vue 3 Home Energy Monitor. If you believe that any of these items may have been damaged for any reason, do not attempt to use them and call support immediately.

**Rogowski kits are available with either 2 or 3 Flexible Current Sensors, and each kit comes with only one power supply.**

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# Assembly: Connect DC wires to integrators and AC wires to power supply

Your Flexible Current Sensors require power to operate. Locate the 12V wire harness on the power supply and insert the 4 terminal plug into the integrator port as illustrated in the image below. Repeat this for each integrator. Connect the 120V AC power to the intergrator by connecting the black wire to a breaker and the white wire to the neutral bar.

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# Steps 1 - 4: Vue Installation

**This guide assumes that you have a Emporia Vue 3 and you have completed Steps 1 through 4 of the Vue installation guide** — up to the point where you are instructed to plug in and connect the 200A sensors.

At this point in the installation, you should have:

1. Created an account and started the setup process in the app;
2. Turned off your main breaker and removed the cover on your electrical panel;
3. Found a place for your monitor; and
4. Prepared for Internet connection. **Your panel and Vue should be in a state similar to the image below.**

**WARNING: The service mains are always live!**

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# Step 5: Plug in and connect the Flexible Current Sensors

Push the button on the side of the sensors to release one end of the Rogowski coil. Place each coil around one of the main service bus bars. Next, close the coils in the clasps to secure the sensors. **IMPORTANT! The label on the Rogowski coil should point AWAY FROM the breakers.** Then, insert each of the signal cables into the Vue 3 at port A, B, or C.

**WARNING: The service mains are always live!**

Ensure the white label faces the service entrance when installing the coils.

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# Step 6: Plug in the voltage sensing wire harness

Insert the 7.6mm screw terminal plug of the power supply wiring harness with four 16 AWG wire leads into the port on the left side of the energy monitor until it clicks into place securely. These wires can also be cut to length to reduce panel clutter. The wire harness allows for single-phase power and three-phase voltage sensing: **Black (L1)** provides power and voltage sensing, **White (N)** connects to Neutral, and **Red (L2)** and **Blue (L3)** provide voltage sensing only (if applicable).

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# Step 7: Connect the wire harness

The wire harness is wired to one or more breakers in the electric panel.

**1. Wiring to an empty breaker**

If wiring to an empty (unused) breaker, wire it directly to the breaker. Ampacity rating of this breaker does not matter.

**2. Wiring to an in-use breaker**

If wiring to an in-use breaker, use the splicing wires / wire nuts included with the Vue for breakers rated up to 15A. Any amapacity rating may be used if the splicing wire gauge matches the existing wire and meets applicable electric codes.

**3. Wiring to a AFCI / GFCI breaker**

If the wire harness is wired to an AFCI / GFCI breaker, **the black wire needs to be wired to the hot side and the white to the neutral on this breaker. The white is not wired to the neutral bus.**

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# Step 7 (continued): Connect the wire harness

The voltage sensing wire harness will be connected differently depending on the number of Main CTs installed in Step 5 as well as whether or not there are an adequate number of empty breakers. Go to the step below based on the system. If you're unsure, contact Emporia Support and we'll help you through it.

**Step 7(a) Common in N. American homes**

- Two empty
- Two main CTs

**Step 7(b) Common in N. American homes**

- No empty breaker
- Two main CTs

**Step 7(c) Common in European 3-phase homes**
**Common in N. American Commercial systems**
**Uncommon in N. American homes**

- Three empty breakers
- Three main CTs

**Step 7(d) Common in European 3-phase homes**
**Common in N. American Commercial systems**
**Uncommon in N. American homes**

- No empty breaker
- Three main CTs

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# Step 7(a): Two empty breakers and two main CTs

## Common in N. American homes

The input wires from the sensor power supply are interchangeable. Secure the **White (N)** and **Blue (L3)** wires from the wire harness and one of the input wires from the power supply to the neutral bus bar. Turn off two vertically adjacent (stacked) single pole breakers. Connect the **Red (L2)** wire from the harness to one of the breakers. Connect the **Black (L1)** harness wire, one of the input wires from the power supply, and an extra wire with a wire nut. Then secure the extra wire to the remaining empty breaker.

Any empty breaker size can be used in this scenario (not limited to 15A).

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# Step 7(b): No empty breaker and two main CTs

## Common in N. American homes

The input wires from the sensor power supply are interchangeable. Secure the **White (N)** and **Blue (L3)** wires from the wire harness and one of the input wires from the power supply to the neutral bus bar. Turn off two vertically adjacent (stacked) single pole breakers. Connect the **Red (L2)** wire and an extra wire with a wire nut and then connect the extra wire to one of the breakers. Connect the **Black (L1)** harness wire, one of the input wires from the power supply, and an extra wire with a wire nut. Then secure the extra wire to the remaining empty breaker.

A larger amp breaker may be used if the gauge of the splicing wire matches the existing gauge wire from the breaker meeting the national and regional codes.

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# Step 7(c): Three empty breakers and three main CTs

**Common in European 3-phase homes**
**Common in N. American commercial systems**
**Uncommon in N. American homes**

The input wires from the sensor power supply are interchangeable. Secure the **White (N)** wire from the wire harness and one of the input wires from the power supply to the neutral bus bar. Turn off three vertically adjacent (stacked) single pole breakers. Connect the **Red (L2)** and **Blue (L3)** wires from the wire harness to two of those breakers. Connect the **Black (L1)** harness wire, one of the input wires from the power supply, and an extra wire with a wire nut. Then secure the extra wire to the remaining empty breaker.

Any empty breaker size can be used in this scenario (not limited to 15A).

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# Step 7(d): No empty breaker and three main CTs

**Common in European 3-phase homes**
**Common in N. American commercial systems**
**Uncommon in N. American homes**

The input wires from the sensor power supply are interchangeable. Secure the **White (N)** wire from the wire harness and one of the input wires from the power supply to the neutral bus bar. Turn off three vertically adjacent (stacked) single pole breakers. Connect the **Red (L2)** and **Blue (L3)** wires each to an extra wire with a wire nut, and then connect each of the extra wires to two of the empty breakers. Connect the **Black (L1)** harness wire, one of the input wires from the power supply, and an extra wire with a wire nut. Then secure the extra wire to the remaining empty breaker.

A larger amp breaker may be used if the gauge of the splicing wire matches the existing gauge wire from the breaker meeting the national and regional codes.

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# Step 8: Return to Vue Guide

This concludes the steps in this guide. Please return to the Emporia Vue 3 instructions and continue with **Step 8: Plug in and connect the Branch current transformers.**

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# Technical Details

**Flexible Current Sensor**

| | |
|---|---|
| Coil window diameter: | 62.7mm |
| Coil cable diameter: | 8.8mm |
| Max rated current: | 200A |
| Power supply output voltage: | 12VDC, regulated |
| Power supply input voltage range: | 120 - 277VAC |
| Integrator input voltage range: | 5 - 12VDC |

The Vue energy monitor and current sensors are considered a system designed for field installation in a switch enclosure as per section 312.8(B) of the 2017 National Electrical Code (NEC) regarding Power Monitoring Equipment. The Vue is considered a non-invasive load monitor (NILM) and as a non-permanent fixture, it is acceptable to install in an electrical panel.

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