

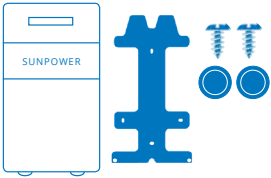
PVS5x Installation Instructions

Follow these instructions to install and commission the PVS Supervisor 5x (PVS5x) to receive monitoring data. **See the *Equinox Installation Guide (#518101)* for the complete Equinox (AC Modules, InvisiMount, and PVS5x) installation instructions.**



Kit includes:

- PVS Supervisor 5x (PVS5x)
- Mounting bracket
- (2) Screws
- (2) Hole plugs
- (2) 100 A Current Transformers (shipped separatley)
- PLC Ethernet Adapter (optional accessory from SunPower)



You will need:

- Phillips screwdriver
- Small flathead screwdriver
- Hardware that supports 6.8 kg (15 lbs) to install the bracket
- RJ45 crimp tool
- Wire cutter
- Wire stripper
- Laptop with latest Chrome or Firefox version installed
- Ethernet cable
- Your SunPower monitoring website credentials
- (Optional) Customer’s Wi-Fi network and password


Routing wire and cable:

- **Fill all openings in the enclosure with components rated Type 4 or better to maintain the integrity of the enclosure’s environmental system**
- Drill extra openings with appropriate knockout tools (**do not** use screwdriver and hammer)
- Use only the provided conduit openings or knockout locations and never cut holes in the top or sides of the enclosure
- Never run inverter or Ethernet communication cable in the same conduit as AC wiring
- CT and AC wiring may be run in the same conduit

1. Mount the PVS5x

1. Select an installation location that is not in direct sunlight.
2. Mount the PVS5x bracket using appropriate hardware for the mounting surface and that can support 6.8 kg (15 lbs).
3. Fit the PVS5x onto the bracket until the mounting holes at the bottom are aligned.
4. Use a screwdriver to secure the PVS5x to the bracket using the provided screws. Do not overtighten.


2. Wire the PVS5x power



Danger! Hazardous voltages! Do not power up the system until after you complete Sections 1 through 3. Accessing the system involves possible contact with potentially lethal voltages and currents. No attempt to access, install, adjust, repair, or test the system should be made by anyone who is not qualified to work on such equipment.

1. Use a screwdriver—do not use power tools—to prepare the PVS5x for AC wiring:
 - Loosen the three captive screws on the bottom of the PVS5x enclosure and remove the cover
 - Remove the lower AC wiring cover
 - Remove the upper AC wiring cover
 - Flip the AC wiring partition to the opposite side of where your AC wiring will be incoming
- Warning!** Do not use the AC wiring partition to secure cables or wiring.
2. Run power conduit from the service panel to the PVS5x. If you use the rear conduit entrances, seal the holes on the bottom of the enclosure with the included hole plugs.
3. Connect the PVS5x to either a 15 A (with 14 AWG) or a 20 A (with 12 AWG) UL Listed dedicated dual-pole breaker.
Note: For AC modules, this breaker should be in the same service panel containing the AC module output circuits.
4. Strip wires and land according to the color-coded labels (black wire to **L1**, red wire to **L2**, the white wire to **N**, and green wire to **GND**) in the J5 terminals on the bottom, left of the PVS5x board. Tighten to 0.5–0.6 N-m (4.4–5.3 in-lb).
Caution! Do not overtighten terminals.

3. Install and wire the consumption CTs



Danger! Hazardous voltages! Do not power up the system until after you complete Sections 1 through 3. Accessing the system involves possible contact with potentially lethal voltages and currents. No attempt to access, install, adjust, repair, or test the system should be made by anyone who is not qualified to work on such equipment.

The SunPower-provided CTs are suitable for use on 200 A conductors. CTs may be labeled “100 A” but this is a calibration reference rating only. You may install CTs in parallel or bundled configurations. **Refer to the *Consumption Meter CT Installation Instructions*.**

1. Turn off all power to the main service panel in which you are installing CTs.
2. Place the CTs in the main service panel, around incoming service conductors, with the side labeled **THIS SIDE TOWARD SOURCE** *toward the utility meter and away from the loads*. Never install CTs in the utility-designated section of the the service panel.
 - Place **L1 CT** (black and white wires) around incoming Line 1 service conductor
 - Place **L2 CT** (red and white wires) around incoming Line 2 service conductor
3. Align the steel core pieces and snap the CTs closed.
4. Route CT wires through conduit to PVS5x.
 - **Running CT wires:** You may run CT and AC wiring in the same conduit. Do not run CT wiring and internet communication cables in the same conduit.
 - **Extending CT leads:** Use Class 1 (300V rated minimum, 16 AWG maximum) twisted-pair instrument cable and appropriate connectors; SunPower recommends the use of silicone-filled insulation displacement connectors (IDC) or telecom crimps; do not use power cables (for example, THWN or Romex) to extend the CT leads.
Note: See *Continental Control Systems: Current Transformer (CT) Wire Extension* guide at: https://ctlsys.com/current_transformer_wire_extension for suggested wire types and sources.

5. Land **L1 CT** and **L2 CT** wires in corresponding **CONS L1** and **CONS L2** in the J16 terminals on the bottom, right terminals of the PVS5x board. Tighten to 0.5–0.6 N-m (4.4–5.3 in-lb). If you shorten the leads, strip no more than 6mm (1/4").
Caution! Do not overtighten terminals.

4. Verify CT Voltage Phases

1. Turn on power to the PVS5x.
2. Use a voltmeter to measure voltage between the PVS5x L1 terminal and the L1 incoming service conductor in the main service panel with the L1 CT in place.
3. If the voltmeter reads:
 - 0V the phases are correctly aligned.
 - 240V the phases are incorrectly aligned. Move the CT to the other incoming service conductor and retest to verify 0V.
4. Repeat Steps 4.2 and 4.3 for L2.

5. Connect the system communication

1. Replace the upper AC wiring cover.
2. Replace the lower AC wiring cover over the AC power wires (on the left if you ran through left hole; on the right if you ran through the right hole).
3. Run communication conduit to the PVS5x conduit opening. If you use the rear conduit entrances, seal the holes on the bottom of the enclosure with the included hole plugs.
Warning! Never run inverter communications cable in same conduit as AC wiring.
4. Connect communication for each device using corresponding port:
 - **AC modules:** Verify that you connected the AC modules to the AC module subpanel. No additional connection is required, the PVS5x communicates with AC Modules using PLC protocol.
 - **SMA US-22 inverter:** Connect an RS-485 communication cable from the PVS5x **RS-485 2-WIRE** port (blue) and to the first (or only) inverter in the daisy chain. Follow the manufacturer’s instructions to daisy-chain additional SMA US-22 inverters.
 - **SMA US-40 inverter:** Connect a tested Ethernet cable from the PVS5x **LAN1** port to first (or only) SMA US-40 port A or B. Follow the manufacturer’s instructions to daisy-chain additional SMA US-40 inverters using Ethernet cables.

6. Connect the PVS5x to the internet

Connect to customer’s Internet using either:

- **Ethernet cable:** from PVS5x LAN2 to customer’s router (**recommended method**)
- **Power Line EA:** to customer’s router (optional accessory available from SunPower)
- **Customer’s Wi-Fi network:** connect during commission (Section 6) using customer’s Wi-Fi network name and password

7. Commission with the PVS Management App

1. Turn laptop Wi-Fi off.
2. Use an Ethernet cable to connect your laptop to either the PVS5x or the inverter based on installation type:
 - **AC module or SMA US-22:** Connect laptop to PVS5x **LAN 1** port.
 - **SMA US-40 inverter:** Connect laptop to available communication port (**A or B**) in the last (only) inverter.
3. Open a browser (the latest version of either Chrome or Firefox) and type: www.sunpowerconsole.com.
4. Follow the PVS Management App onscreen instructions.
5. Replace the PVS5x enclosure cover and use a screwdriver to tighten the three screws on the bottom of the enclosure.

Safety & Certifications

Safety Instructions

- Installation and field service is to be performed only by qualified, trained personnel with the necessary skills and knowledge to work on this type of electrical device. Field service is limited to the components contained in the lower compartment of the PVS5x.
- Perform all electrical installations in accordance with any national and local codes, such as the National Electrical Code (NEC) ANSI/NFPA 70.
 - This enclosure is suitable for use indoors or outdoors (Type 3R). Operating ambient from –30°C to 60°C.
 - Before connecting power, the PVS5x must be securely mounted to an inside or outside wall following the instructions in this document.
 - For electrical wiring code compliance, connect the PVS5x to a dedicated UL Listed 15 A rated breaker using 14 AWG wiring, or a UL Listed 20 A rated breaker using 12 AWG wiring. The input operating current is less than 0.1 amp with AC nominal voltages of 240 VAC (L1–L2).
 - The PVS5x contains internal transient surge protection for connection to the load side of the service entrance AC service panel (overvoltage category III). For installations in areas at risk of surges generated by high-voltage utilities, industry, or by lightning, it is recommended that an external surge protective device also be installed.
 - Do not attempt to repair the PVS5x. Tampering with or opening the upper compartment voids the product warranty.

Safety Certification

- UL Listed to UL60950-1 ITE and UL60950-22 for outdoor use.
- The PVS5x is not a utility meter, disconnect device, or power distribution device.

FCC Compliance

- This device complies with Part 15 of the FCC Rules. Operation is subject to the following two conditions:
- (1) This device may not cause harmful interference, and
 - (2) This device must accept any interference received, including interference that may cause undesired operation.
- NOTE:** 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, 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 into an outlet on a circuit different from that to which the receiver is connected.

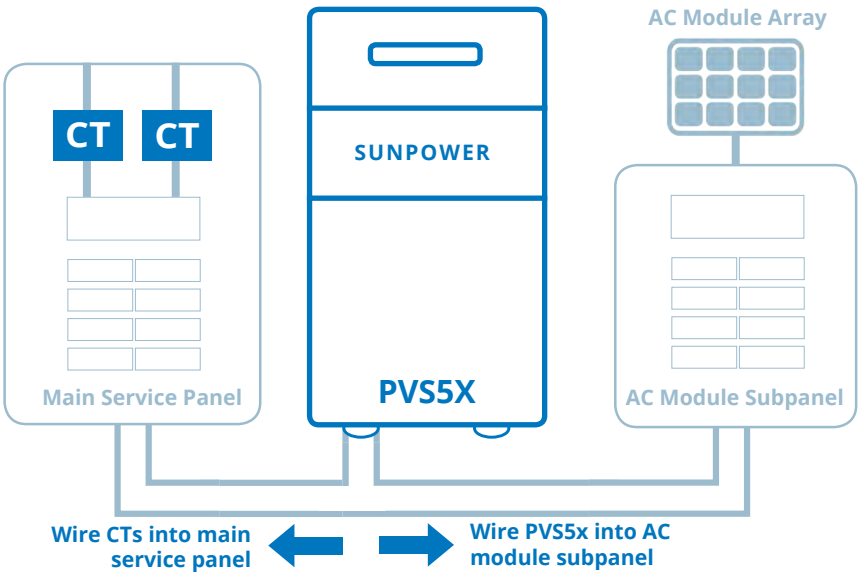
IMPORTANT NOTES: Radiation Exposure Statement

- This equipment complies with FCC RF radiation exposure limits set forth for an uncontrolled environment. This equipment should be installed and operated with minimum distance 25 cm (9.84 in) between the device and your body.
- CAUTION:** Changes or modifications not expressly approved by the party responsible for compliance could void the user’s authority to operate the equipment. This device and its antenna(s) must not be co-located or operating in conjunction with any other antenna or transmitter except in accordance with FCC multi-transmitter product procedures.

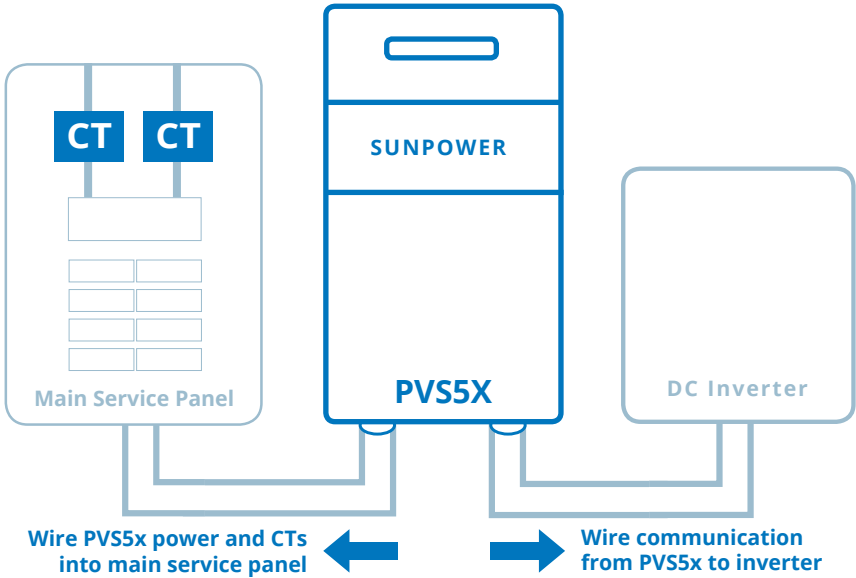
PVS5x Quick Start Guide

Follow these instructions to install, configure, and commission the PVS Supervisor 5x (PVS5x) to begin receiving monitoring data. **Refer to the *PVS5x Installation Instructions on the other side* for the complete PVS5x installation instructions.**

PVS5x Connection Diagram: AC Module Site



PVS5x Connection Diagram: DC Inverter Site

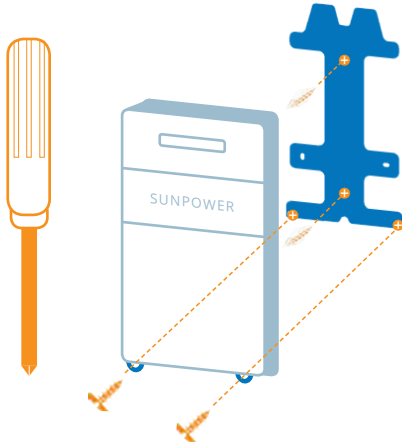


Routing wire and cable:

- Fill all openings in the enclosure with components rated Type 4 or better to maintain the integrity of the enclosure's environmental system
- Drill extra openings with appropriate knockout tools (**do not** use screwdriver and hammer)
- Use only the provided conduit openings or knockout locations and never cut holes in the top or sides of the enclosure
- Never run inverter or Ethernet communication cable in the same conduit as AC wiring
- CT and AC wiring may be run in the same conduit

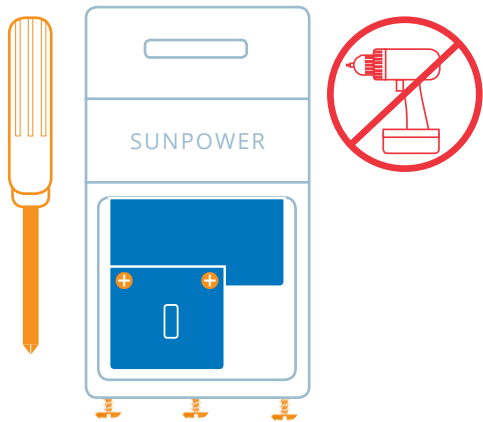
1. Mount the PVS5x

Mount PVS5x bracket using hardware that supports 6.8 kg (15 lbs) and use screwdriver to secure the PVS5x to bracket using provided screws.



2. Remove all PVS5x covers

Use screwdriver to remove enclosure and AC wiring covers.

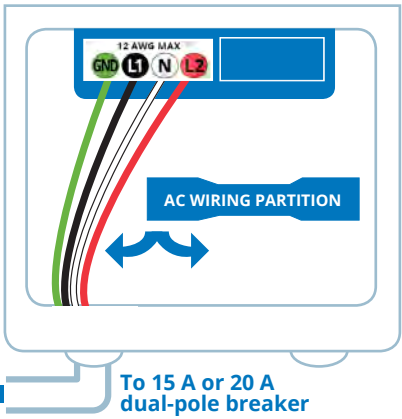


3. Wire PVS5x power

Install a dedicated 240 or 208 VAC circuit. Flip AC wiring partition to opposite side of incoming AC wiring. Land wires in J5 terminals: black to L1, red to L2, white to N, and green to GND.

DANGER!
240 VAC
208 VAC 2-POLE

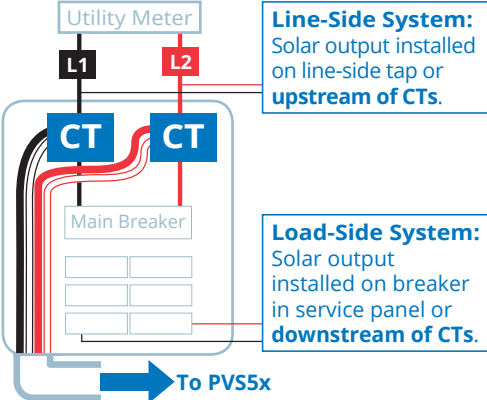
CAUTION
Tighten all terminals to 0.5-0.6 Nm (4.4-5.3 in-lb). DO NOT overtighten.



4. Install consumption CTs

Refer to Section 3 on the other side for complete CT installation instructions. Place CTs around incoming service conductors: L1 CT (black and white wires) around Line 1 and L2 CT (red and white wires) around Line 2.

DANGER!
Hazardous voltage
Use appropriate PPE and turn off power to the service panel.



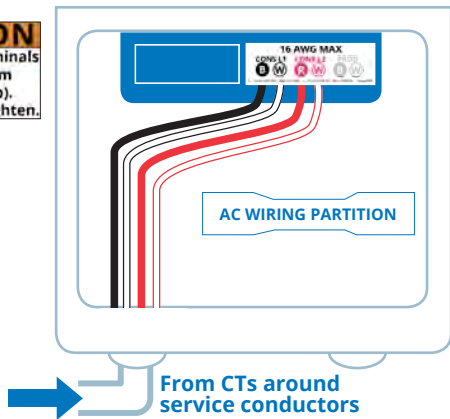
Line-Side System:
Solar output installed on line-side tap or upstream of CTs.

Load-Side System:
Solar output installed on breaker in service panel or downstream of CTs.

5. Wire consumption CTs

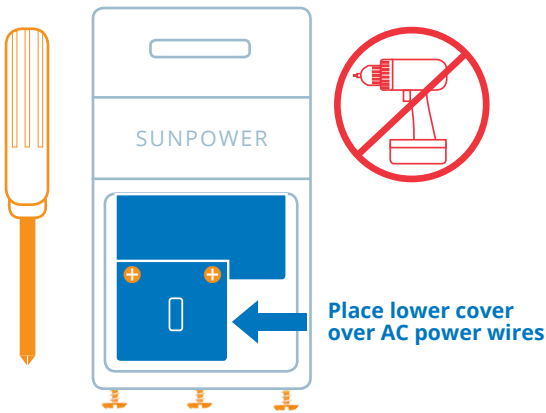
Land wires in J16 terminals: L1 CT and L2 CT wires in corresponding CONS L1 and CONS L2.

CAUTION
Tighten all terminals to 0.5-0.6 Nm (4.4-5.3 in-lb). DO NOT overtighten.



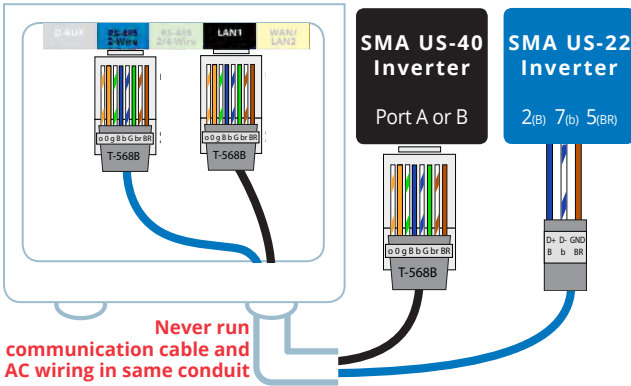
6. Replace PVS5x wiring covers

Use screwdriver to replace AC wiring covers over AC power wires.



7. Connect DC inverter communication

If DC inverter is installed, connect communication from DC inverter to the PVS5x. No additional connection is required for AC modules.



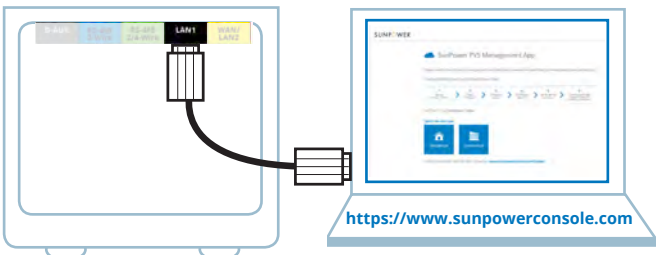
8. Connect PVS5x to the internet

Connect to customer's internet with either:

- Ethernet Cable**
From PVS5x LAN2 to customer's router (recommended method).
- PLC Adapter (optional SunPower accessory)**
To customer's router.
- Customer's Wi-Fi**
Connect during commissioning with network and password.

9. Commission with PVS Management App

Turn off laptop Wi-Fi off, connect Ethernet cable from PVS5x LAN1 to laptop, open latest Chrome or Firefox, type www.sunpowerconsole.com, and follow instructions.



Note: For sites with SMA US-40 DC inverter, connect Ethernet cable from laptop to port A or B in the last (or only) inverter.

10. Replace PVS5x cover

Use screwdriver to replace enclosure cover.

