



WARNING - THIS PHOTOVOLTAIC RAPID SHUTDOWN EQUIPMENT (PVRSE) DOES NOT PERFORM ALL OF THE FUNCTIONS OF A COMPLETE PHOTOVOLTAIC RAPID SHUTDOWN SYSTEM (PVRSS). THIS PVRSE MUST BE INSTALLED WITH OTHER EQUIPMENT TO FORM A COMPLETE PVRSS THAT MEETS THE REQUIREMENTS OF NEC (NFPA 70) SECTION 690.12 FOR CONTROLLED CONDUCTORS OUTSIDE THE ARRAY. OTHER EQUIPMENT INSTALLED IN OR ON THIS PV SYSTEM MAY ADVERSELY AFFECT THE OPERATION OF THE PVRSS. IT IS THE RESPONSIBILITY OF THE INSTALLER TO ENSURE THAT THE COMPLETED PV SYSTEM MEETS THE RAPID SHUTDOWN FUNCTIONAL REQUIREMENTS. THIS EQUIPMENT MUST BE INSTALLED ACCORDING TO THE MANUFACTURER'S INSTALLATION INSTRUCTIONS.

- To reduce risk of fire and shock hazard, install this device with strict adherence to National Electric Code (NEC) ANSI/NFPA 70 and/or local electrical codes. When the photovoltaic array is exposed to light, it supplies a DC voltage to the Tigo TS4 units and the output voltage may be as high as the PV module open circuit voltage (VOC) when connected to the module. The installer should use the same caution when handling electrical cables from a PV module with or without the TS4 units attached.
- Risk of electric shock: do not disassemble, or repair. There are no user serviceable parts inside. Refer servicing to qualified service personnel.
- Remove all metallic jewelry prior to installing the Tigo TS4 units to reduce the risk of contacting live circuitry. Do not attempt to install in inclement weather.
- Do not operate the Tigo TS4 units if they have been physically damaged. Check existing cables and connectors, ensuring they are in good condition and appropriate in rating. Do not operate Tigo TS4 units with damaged or substandard wiring or connectors. Tigo TS4 units must be mounted on the high end of the PV module backsheet or racking system, and in any case above ground.
- Before installing or using the Tigo System, please read all instructions and warning markings on the Tigo products, appropriate sections of your inverter manual, photovoltaic (PV) module installation manual, and other available safety guides.
- Do not connect or disconnect under load. Turning off the inverter and/or the Tigo products may not reduce this risk. Internal capacitors within the inverter can remain charged for several minutes after disconnecting all power sources. Verify capacitors have discharged by measuring voltage across inverter terminals prior to disconnecting wiring if service is required. Wait 30 seconds after rapid shutdown activation before disconnecting DC cables or turning off DC disconnect.
- All equipment shall be installed and operated in an environment within the ratings and limitations of the equipment as published in the installation manual.
- Trained professionals must perform installation only. Tigo does not assume liability for loss or damage resulting from improper handling, installation, or misuse of products.
- Always connect short input cables before connecting long put output cables. Failure to do so may void warranty.**

- All TS4 versions ship in the ON state. Use caution when connecting the units to the modules.
- Disconnect TS4s from the array string before disconnecting from a solar module.
- Each TS4 has an IP68 protection rating but only after properly installed.
- Do not leave TS4 connectors exposed to the rain. Water intrusion may damage the TS4.
- Connectors from different manufacturers cannot be mated with each other.
- TS4s must not be installed in readily accessible locations.
- (TS4-A-O) Operating temperature range -40 – 70 °C (-40 – 158 °F)
- (TS4-A-S) Operating temperature range -40 – 75 °C (-40 – 167 °F)

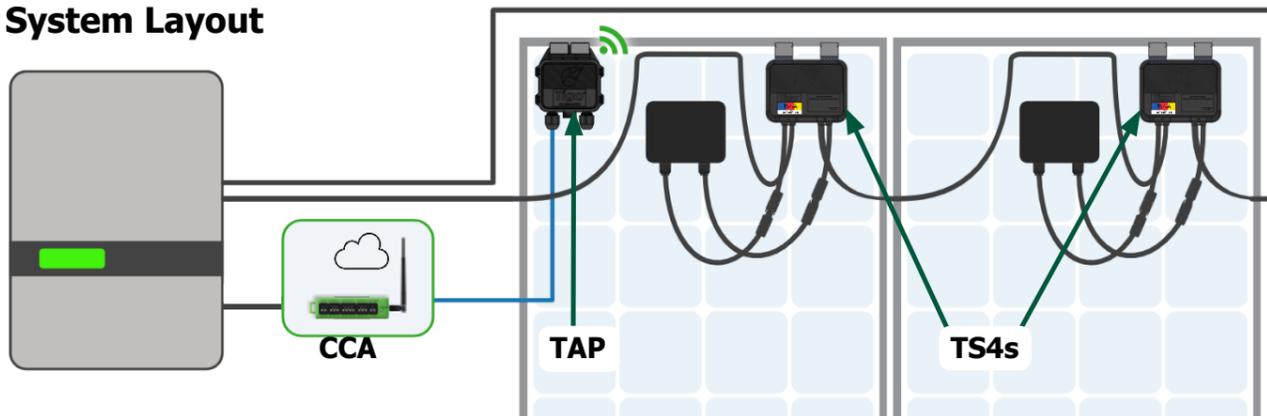


Install TS4s

Save the QR/barcode sticker on a site map or string list.

- Attach the TS4 to the top of the PV module frame.
If frame thickness is $\leq 35\text{mm}$ (1.4in), install with the TS4 label facing the PV module.
- Connect the short input cables to the PV module.
- Connect the long output leads to the adjacent TS4.

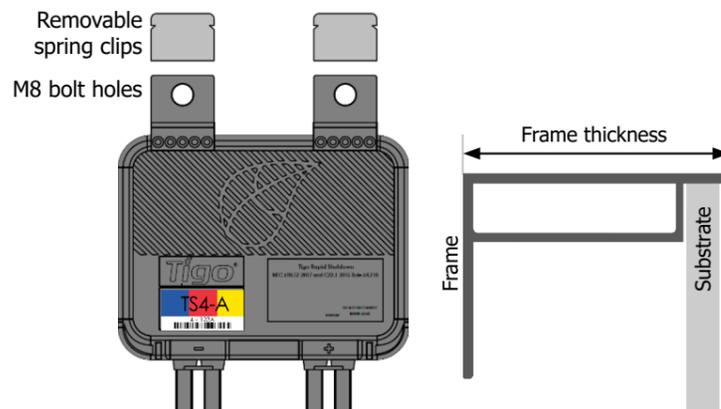
System Layout



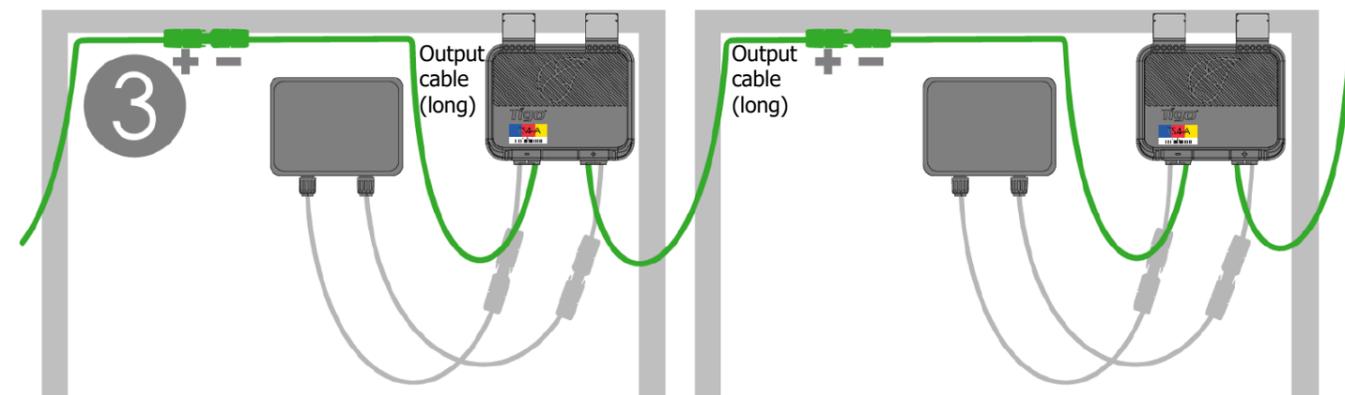
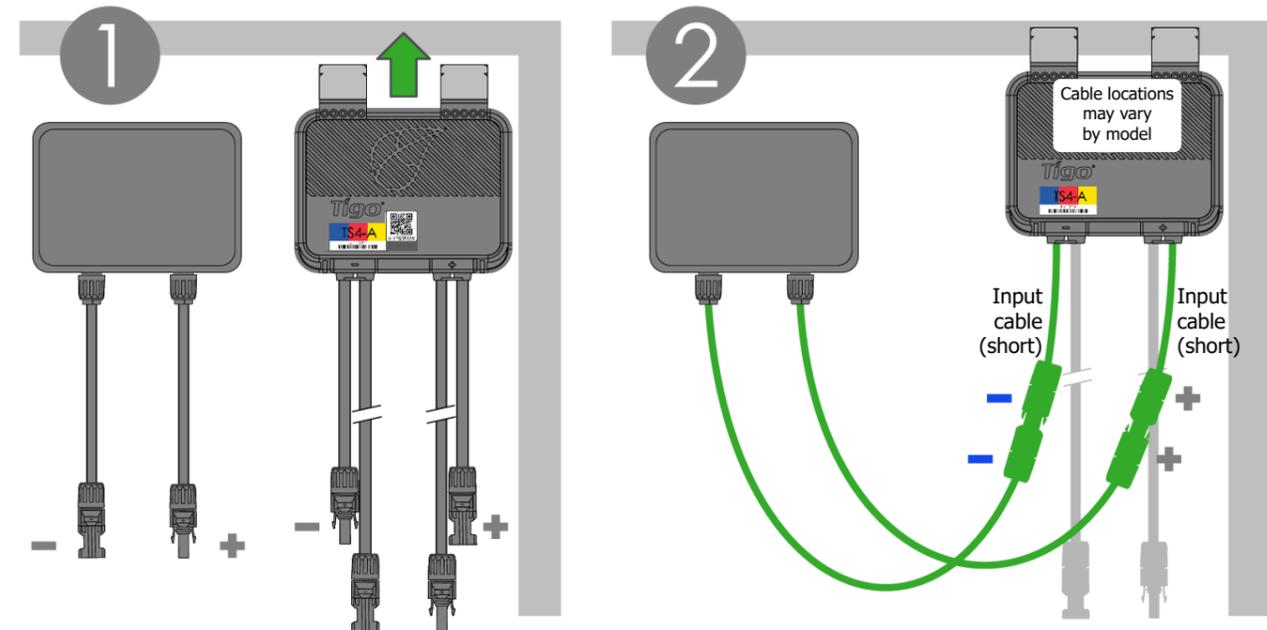
- The Cloud Connect Advanced (CCA) logger/gateway connects to the cloud via Ethernet or WiFi and to devices via Modbus.
- The CCA has a wired connection to the Tigo Access Point (TAP).
- The TAP communicates wirelessly with TS4-A-O/S MLPE via a mesh network.

TS4 Mounting Options

For frameless modules, use M8 bolts torqued to 10.2Nm.



- If frame thickness is $\leq 35\text{mm}$ (1.4"), install with the TS4 label facing the PV module.
- To enable natural convection (air cooling), no part of the TS4 should be within 12.7 mm (0.5 in) of the module substrate on any side.
- The TS4 ingress rating of TS4 is IP 68.
- Check PV module instructions for restrictions on mounting devices under the module.



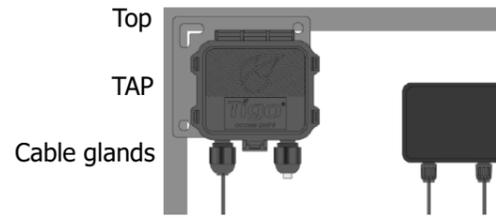
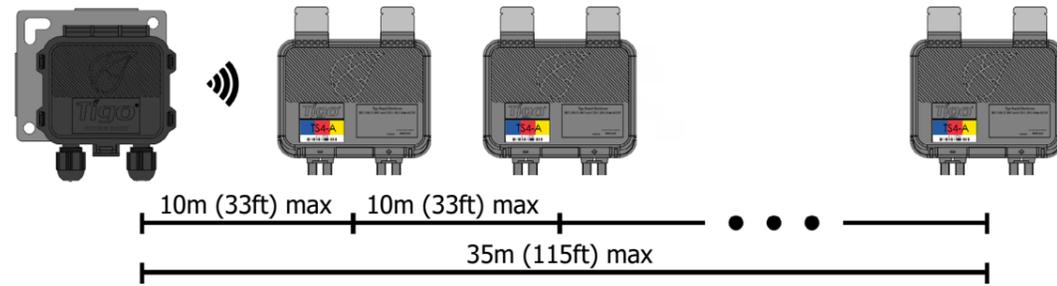
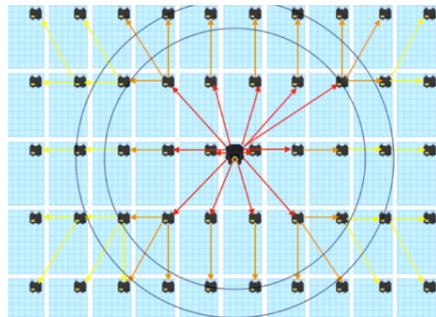
Install a TAP

One TAP can communicate with up to 300 TS4s.

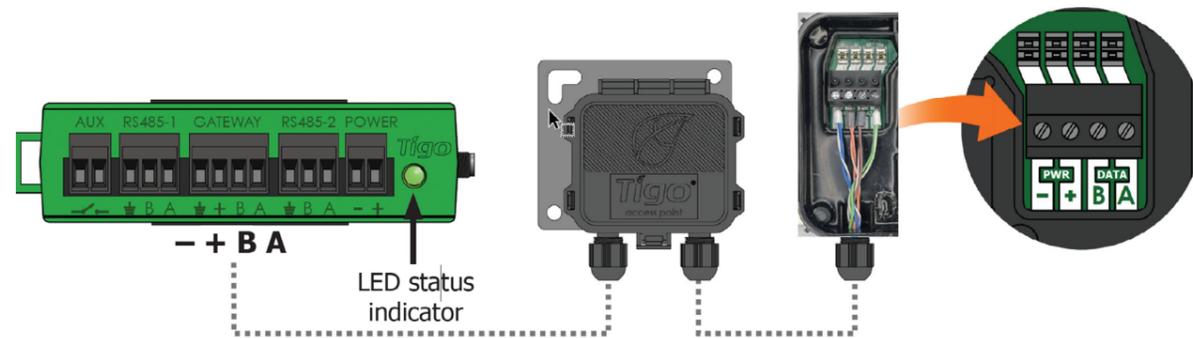


- Ensure the TAP is within 10m (33ft) of a TS4.
- Ensure the cable glands of the NEMA 4 TAP face down and cannot collect moisture.
- Make all TAP connections to the CCA before powering on the CCA.

Locate the TAP centrally in an array.



Connect the TAP and CCA using 4-wire or CAT5/6 cables.



- Wire schedule:
- Shielded if running next to PV conductors
 - 20 – 18 AWG or CAT5/6 twisted pairs
 - Solid core
 - Cable outside diameter (OD) ≤9mm (.35in)

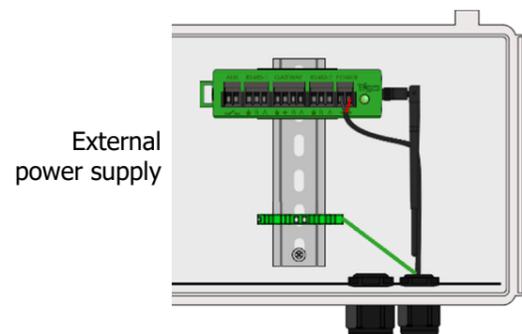
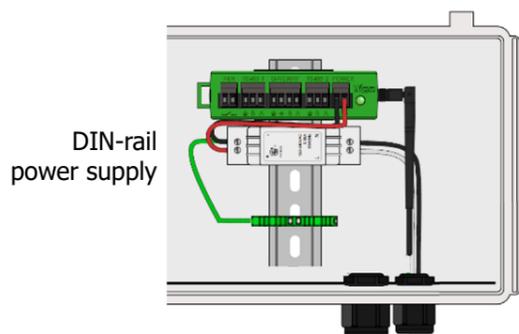
Install a CCA

Requires Ethernet or WiFi internet access. One CCA can communicate with up to 7 TAPs and up to 900 TS4s.



- The CCA must be on the same AC branch circuit as the inverter.
- Rapid shutdown occurs when an AC disconnect (inverter or switch) disconnects power to the CCA/TAP.
- Make all connections to TAPs before powering on the CCA.

1. Mount the CCA within a NEMA 1 (indoors) or NEMA 4 (outdoors) enclosure.
2. Connect TAP wires to the CCA GATEWAY port.
3. For systems with 2 TAPs or fewer, connect a Tigo or 3rd-party power supply with 12-24Vdc ±2%, 1A output. For systems with 3 TAPs or more, connect a Tigo or 3rd-party power supply with 24Vdc ±2%, 1A output.



CCA LED Status Indicator

| LED Activity | State | Description |
|-----------------------|-----------------|--|
| Solid green | System OK | The system is operating normally. |
| Blinking green/gray | EI app activity | The CCA is connected to the Tigo mobile EI app. |
| Blinking green/yellow | User PV-Off | The PV-Off mode was manually activated. |
| Blinking yellow/gray | Discovery | The CCA is scanning for TAPs/TS4s. |
| Solid yellow | Warning | Scanning is incomplete or the CCA cannot connect to the Tigo server. |
| Blinking red/yellow | Auto PV-Off | The PV-Off mode was automatically activated. |
| Solid red | Error | The CCA cannot find all TS4s or cannot connect to the Tigo server. |

Testing/Commissioning

Download the Tigo Energy Intelligence (EI) mobile app to test and commission all TS4/TAP/CCA components. To remove a CCA post-commissioning, contact Tigo Support.

Specifications and Additional PVRSS UL 1741 Compliance Requirements

| Model | Maximum Power | Maximum Input V | Maximum Input A | Maximum Input I _{sc} | Normal Operating Temperature Range | Maximum System V ¹ |
|---------|---------------|-----------------|-----------------|-------------------------------|------------------------------------|-------------------------------|
| TS4-A-O | 700 W | 80 V | 15 A | 20 A | -40 – 70 °C (-40 – 158 °F) | 1000V/1500V |
| TS4-A-S | 700 W | 80 V | 15 A | 20 A | -40 – 75 °C (-40 – 167 °F) | 1000V/1500V |

TS4 PV conductors are 12 AWG.

TS4-A-O/S PVRSE WARNING – THIS PHOTOVOLTAIC RAPID SHUTDOWN EQUIPMENT (PVRSE) DOES NOT PERFORM ALL OF THE FUNCTIONS OF A COMPLETE PHOTOVOLTAIC RAPID SHUTDOWN SYSTEM (PVRSS).

The combination of TS4-A-O/S with TAP and CCA is certified as a UL 1741 photovoltaic rapid shutdown system (PVRSS) within a rapid shutdown time limit of 30s. The CCA data logger/gateway (P/N 346-00000-00) is powered from the same AC circuit as the rapid shutdown initiator (RSI) circuit. It provides a keep-alive signal to TS4 MLPE via a wired connection to a TAP and a wireless connection between the TAP and TS4s.

The installer must install signage complying with Section 690.56(C) of NEC NFPA 70 and indicating whether all conductors are controlled, or only conductors leaving the footprint of the array are controlled.

IT IS THE RESPONSIBILITY OF THE INSTALLER TO ENSURE THAT THE COMPLETED PV SYSTEM MEETS RAPID SHUT DOWN FUNCTIONAL REQUIREMENTS.

PVRSE must not be installed in readily accessible locations.

¹ Depending on connection method.

Resources

