Rapid Shutdown with the FranklinWH aPower S

To comply with NEC Article 690.12 and ensure rapid disconnection from photovoltaic panels in emergency situations, it is required to install a rapid shutdown system (PVRSE) that complies with the applicable codes and standards for the Authority Having Jurisdiction (AHJ).

A Photovoltaic Rapid Shutdown System (PVRSS) is a safety system mandated for solar panel installations that reduces system voltage within seconds of activation. This protects first responders from electrical shock.

Depending on array location and other factors, the rapid shutdown requirement may not be required for the installation. For example, a ground mounted array does not require a PVRSE. It is the installer's responsibility to comply with all enforced codes and standards for projects.

The aPower S inverter is certified and listed as a PVRSS when accompanied by approved products. The FranklinWH aPower S now supports multiple third-party rapid shutdown configurations from APsmart and Tigo Energy, as listed in the table below. When installed in accordance with the manufacturer's instructions, the rapid shutdown device (RSD) enables the FranklinWH System to comply with applicable NEC rapid shutdown requirements. FranklinWH has tested these integrations and received NRTL approval for compliance, assuring a safe and reliable system. This guide is written to prepare the installer to design and procure the correct equipment for the products shown below.

Products and models compatible and listed with FranklinWH

Product	Rooftop Receiver	Transmitter	Outdoor Kit
APsmart	RSD-S-PLC RSD-D-20	Transmitter-PLC-1P	Transmitter-PLC-Outdoor Kit APS-408006/APS-408012
Tigo	TS4-A-F TS4-A-2F	RSS Transmitter	Tigo 492-00000-51

NOTE

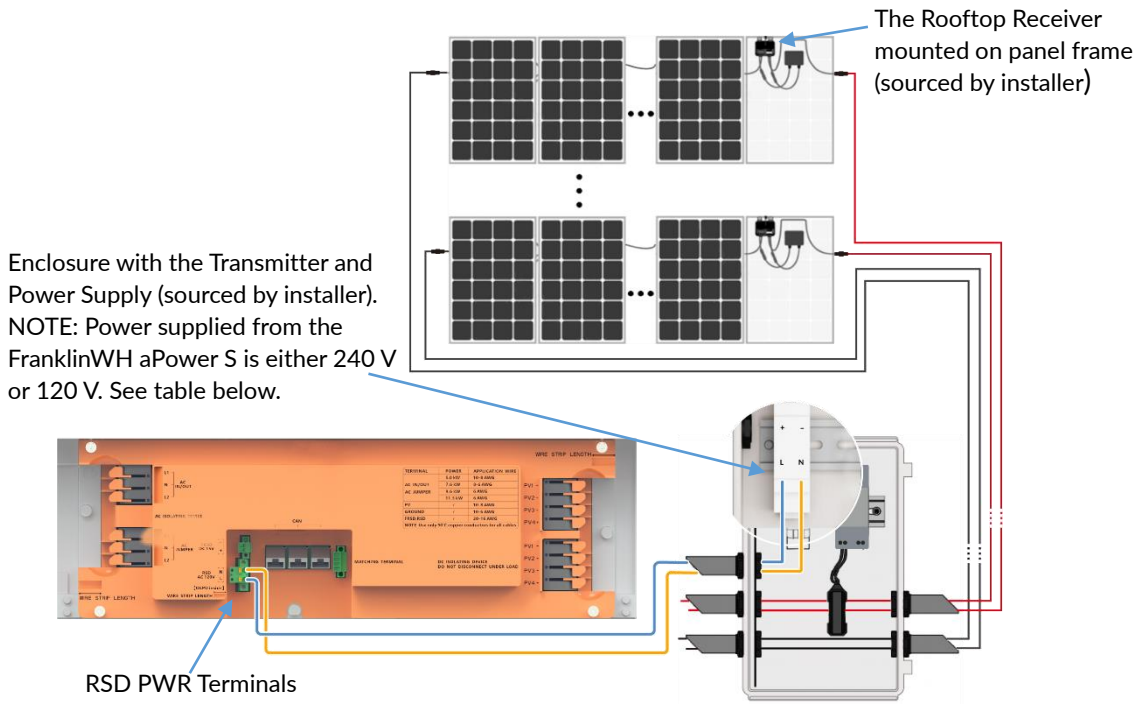
The models in the table are the only models that are compatible and listed with the aPower S. Ensure that the part numbers are correct for proper performance and safety.

Important

As of publication, the aPower S is not compatible with the Tigo TS-A-O/S optimizers installed with the TAP and CCA for Rapid Shutdown. Check with FranklinWH for updates on compatibility.

Equipment not supplied by FranklinWH: Rooftop Receivers and Transmitters

It is the installer's responsibility to source and install the rooftop receivers and the transmitter in the outdoor enclosure.



aPower S wiring detail showing PVRSE equipment installed on DC PV output circuits

Reference the manufacturer's documentation and training below to assure that these products are installed in accordance with OEM specifications.

APsmart: https://apsmartglobal.com/

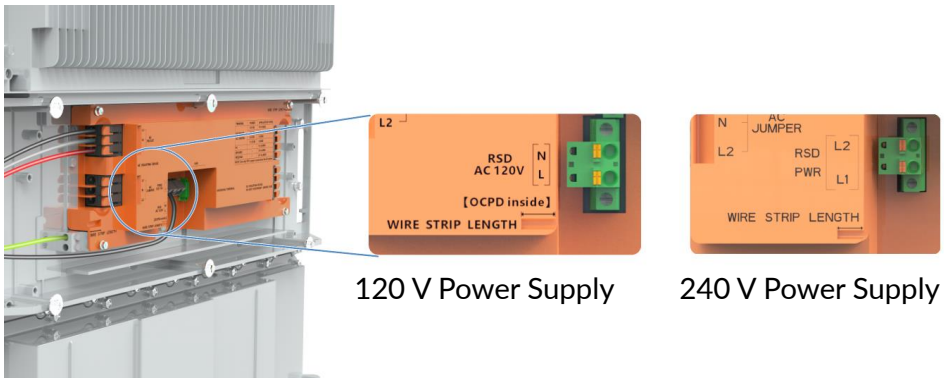
Tigo: https://www.tigoenergy.com/

NOTE

The design and installation of the rooftop receivers must comply with the manufacturer's instructions. It is the installer's responsibility to correctly install this equipment. If questions arise, contact the manufacturer of the rooftop receiver. FranklinWH does not support this part of the installation.

Determine the output voltage of the RSD PWR terminals

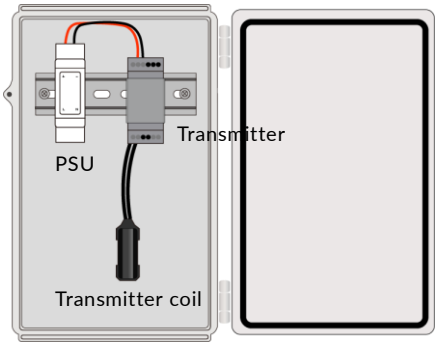
The RSD PWR terminals on the aPower S provide an output voltage of either 240 V or 120 V AC, as indicated by the silkscreen text on the Control Board Cover of the aPower S. It is recommended to select an RSS power supply that can accommodate a 120 V or 240 V AC input range and use a transformer to convert it to the 12 V DC required by the transmitters.



120 V Power Supply 240 V Power Supply

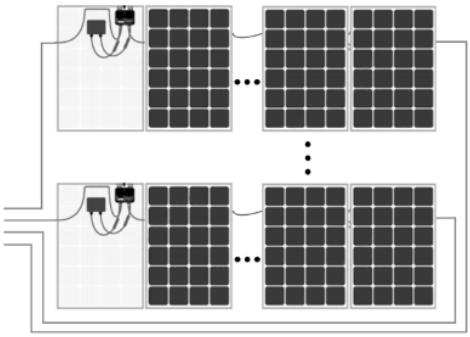
Installing the PVRSD outdoor enclosure

1. Drill appropriate cable entry holes on both sides of the PVRSE enclosure. Appropriate waterproof measures must be implemented to ensure IP67 ingress protection.
2. Follow the RSS transmitter manufacturer's instructions to mount and secure the power supply and transmitter on the DIN rail.



3. Securely mount the whole RSS transmitter-outdoor kit near the aPower S.

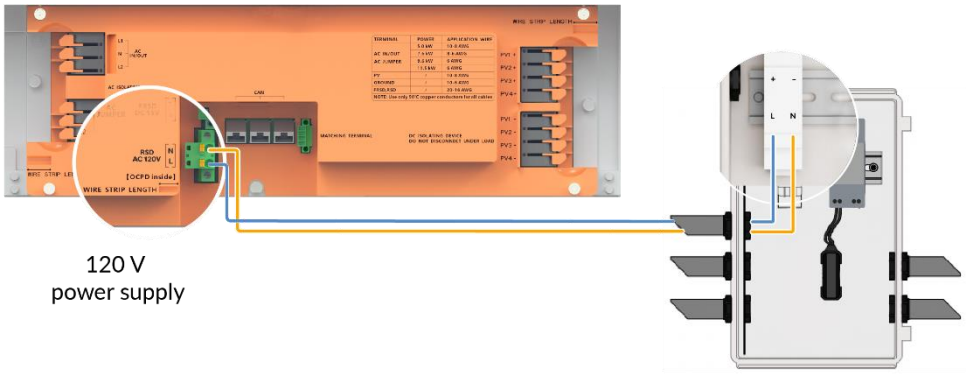
4. Install RSD modules on the PV panels. Refer to the manufacturer's instructions.



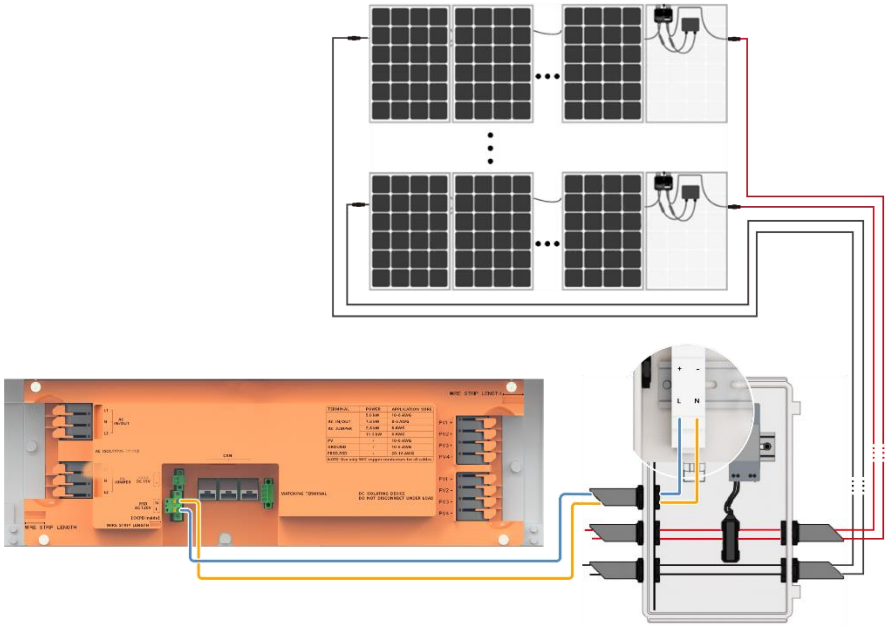
Connect the RSS transmitter outdoor kit to the aPower S

The aPower S supplies 120-240 V to the power supply in the transmitter-outdoor kit. **Do not energize the system prior to landing these conductors.**

1. Prepare RSD power cables (120-240 V) of 20 to 16 AWG and 195° F (90° C) rated temperature. Strip 0.39 - 0.43 inches (10 - 11 mm) of insulation from the wire.
2. Use the RSD power cables (120-240 V) to connect the aPower RSD terminals (L/N or L1/L2) and the AC conductors (L/N) of the power supply in the RSS transmitter-outdoor kit.

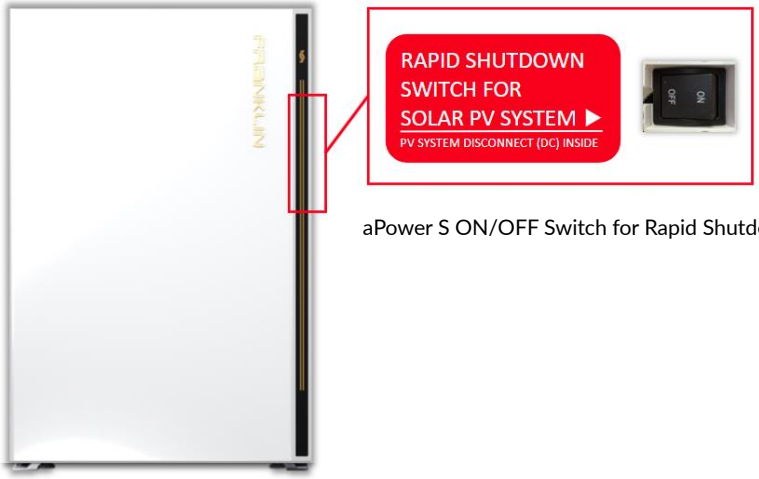


3. Route the PV power cables through the transmitter core referring to the manufacturer's instructions.



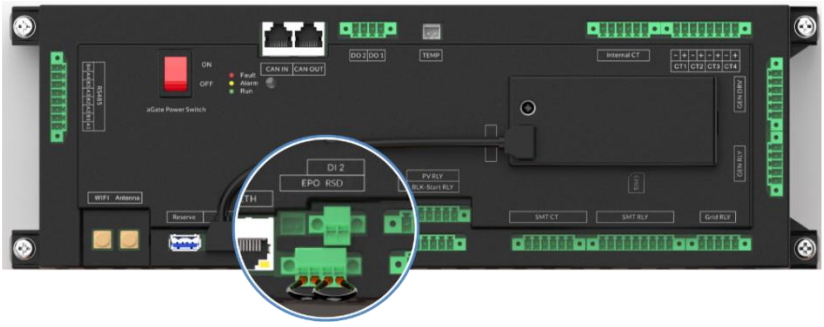
Factory installed RSD Switch for single aPower S installations

When installing a single aPower S within line of sight of the home's service entrance, the aPower S ON/OFF Switch can be used to initiate rapid shutdown. Always consult with the local AHJ in order to conform to all the applicable codes and standards.



aPower S ON/OFF Switch for Rapid Shutdown

When utilizing the ON/OFF switch as the RSD Switch, keep the RSD jumper in its factory installed position in the aGate, as shown below.



aGate X 1.3 EMS Factory Installed RSD Jumper

Optional External RSD Switch

When installing multiple aPower S units, or when a single battery is not co-located at the home service entrance, it is necessary to install an External RSD Switch.

It is the installers' responsibility to source and install the switch. There are several available products available. The switch must meet the guidelines below.

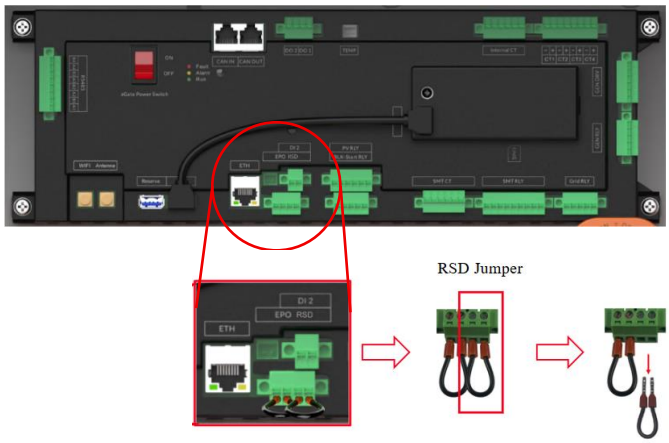
⚠ **WARNING:** The use of the RSD switch is strictly limited to installation and maintenance activities only.

Guidelines for RSD Switch Installation:

- RSD devices must be labeled properly according to NEC code.
- Must have an ON/OFF switch that maintains its position after being manually set to either status.
- Must have a clear indication of the ON/OFF positions.
- Must be outdoor rated (NEMA 3R or higher).
- The maximum length of the voltage wire between the RSD switch and the aGate should not exceed 150 feet (45.3 m).
- RSD switch type: Normally Closed (NC)
- The RSD shall have a rated voltage of 5 V or higher.

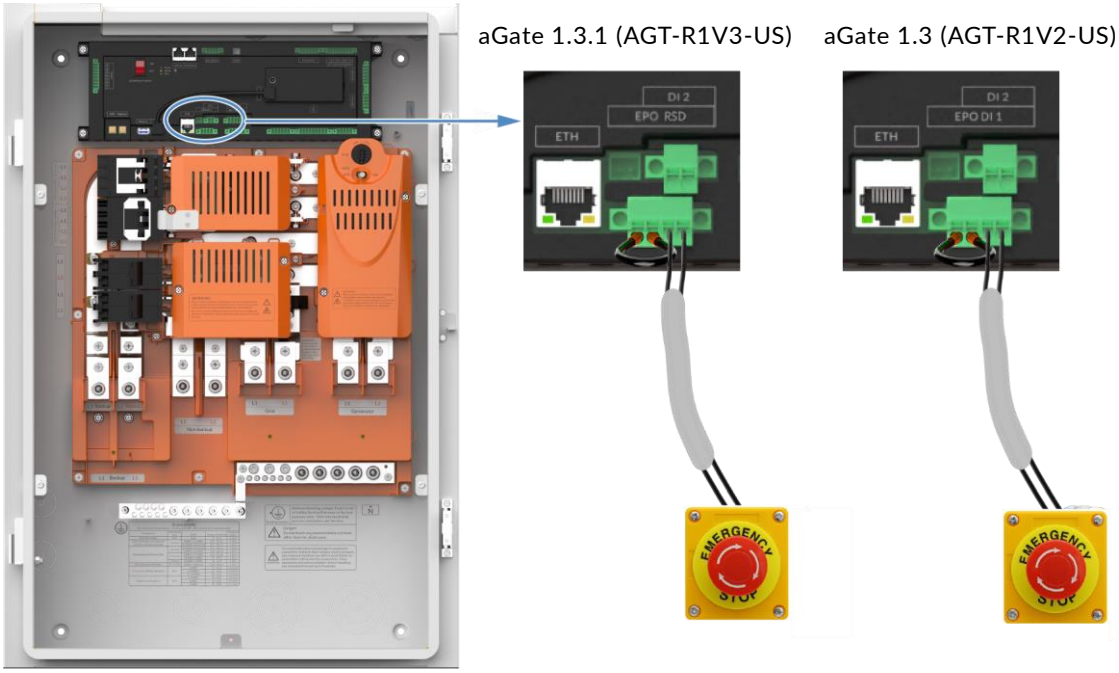
Installation Procedures: One aPower S

1. Remove the factory installed jumper from the terminal block connector on the EMS module in the aGate.



Remove RSD jumper from EMS module

2. Using wire rated at 24-16 AWG, connect an external RSD switch to the RSD terminal block (aGate X 1.3.1: AGT-R1V3-US) or DI1 terminal block (aGate X 1.3: AGT-R1V2-US).



NOTE

For installations of aGate X 1.3 connected with aPower S, please use the DI1 terminal block to connect and engage the external RSD switch, which will activate the RSD.

3. Make sure the RSD switch is OFF before operating the aPower.

EPO Switch vs. RSD Switch Comparison

	EPO	RSD
Primary function	Emergency shutdown of all power sources and loads. Includes disconnection of utility grid.	Safety shutdown of PV, aPower, and generator/V2L sources while maintaining utility grid and load operation
De-energized	All power sources, plus backup and non-backup loads	PV AC, PV DC, generator/V2L, aPower
Remaining energized	None (full site shutdown)	Utility grid, line-side PV, all loads
Command type	Parent command	Child command
Relationship	Triggering EPO also triggers RSD functionality	Operates independently and does not interrupt the main grid circuit
Typical use case	Emergency full-site shutdown	PV installation, maintenance, or fault response while keeping the utility grid and loads energized

Usage Guidelines:

- Use **EPO** when you need a full site power shutdown (all sources and loads).
- Use **RSD** for PV-related installation or maintenance when grid/generator power should be preserved.