

SkyBox Rapid Shutdown

Overview of the Rapid Shutdown Function

The rapid shutdown (RSD) function in the SkyBox is intended to stop inverter operations during an event requiring power to be disconnected. For inverter operations to start, either for the first time or to re-start, the SkyBox must have continuity across its rapid shutdown terminals, shown in Figure 1 below. Where a rapid shutdown system is not required, a small jumper is placed between these pins creating the continuous circuit.

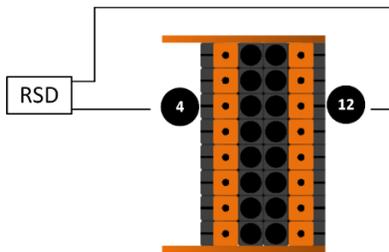


Figure 1: SkyBox Auxiliary Terminal

When this circuit is interrupted, either by a rapid shutdown system or by removing the jumper, the SkyBox stops harvesting PV and logs a fault message. If configured, the SkyBox will also stop sending power to the AC loads.

Configurations

Two different configurations are available for use with the SkyBox. Each setup has been tested successfully. These configurations are depicted on pages 2 and 3.

Standard IMO

This option uses the IMO Fire Raptor modules, rapid shutdown switch and power supply, and the OutBack Power 24V DPDT relay. The standard IMO configuration supports up to 40 Fire Raptor modules.

When a rapid shutdown is initiated using the IMO emergency shutdown switch, the switch loses AC power, which removes the 24V_{DC} power from both the 24V relay and the Fire Raptor modules. Upon loss of power, the relay changes state from its NO contact to its NC contact. This interrupts the SkyBox RSD circuit, stopping the production of PV power. If configured, this interruption in the RSD circuit also removes power to the AC loads.

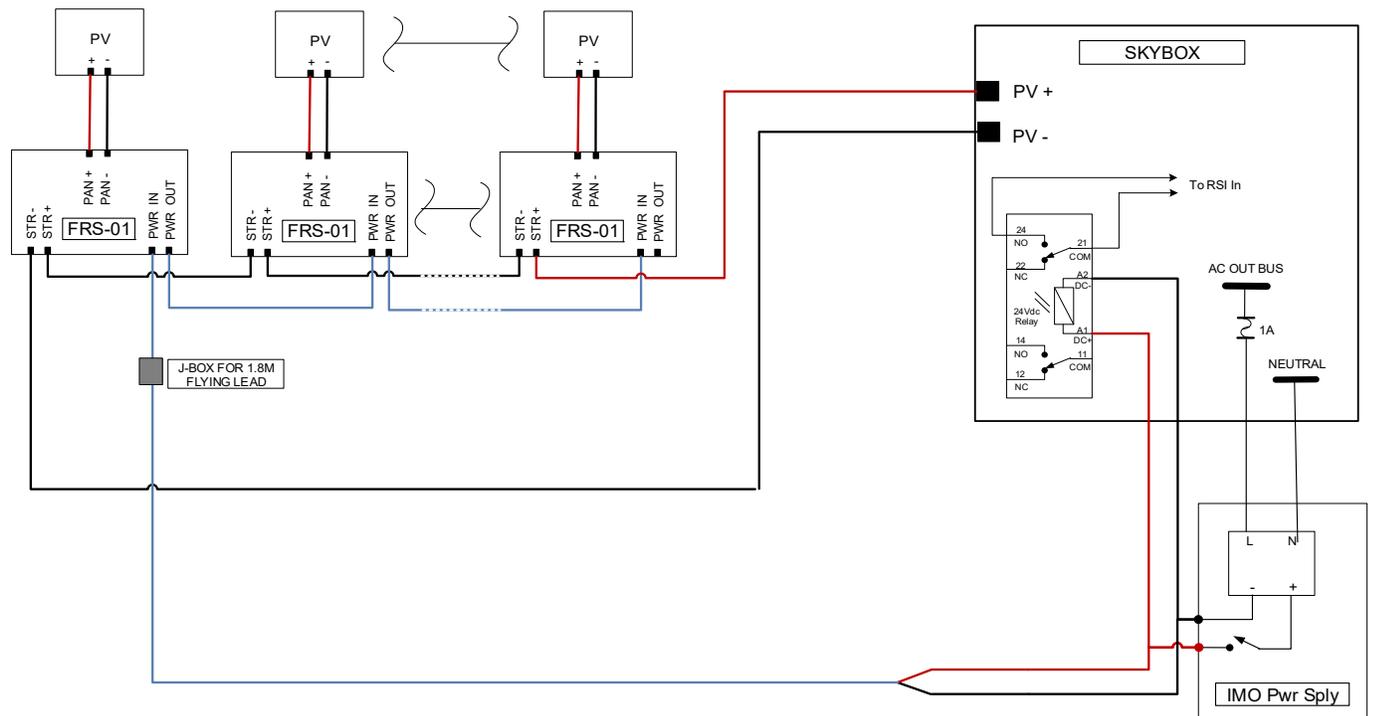


Figure 2: Diagram for Standard IMO Configuration, relay in de-energized state

Tigo

The second configuration tested includes the OutBack Power RSI, Tigo Cloud Connect Advanced (CCA) outdoor set up, and Tigo TS4-S modules for each PV panel.

The operation of the Tigo configuration is very similar to the IMO Fire Raptor configuration with the RSI. When a rapid shutdown event is initiated, the J3 contact in the RSI opens. This open contact removes power from the SkyBox RSD circuit and from the Tigo CCA, stopping all PV harvest.

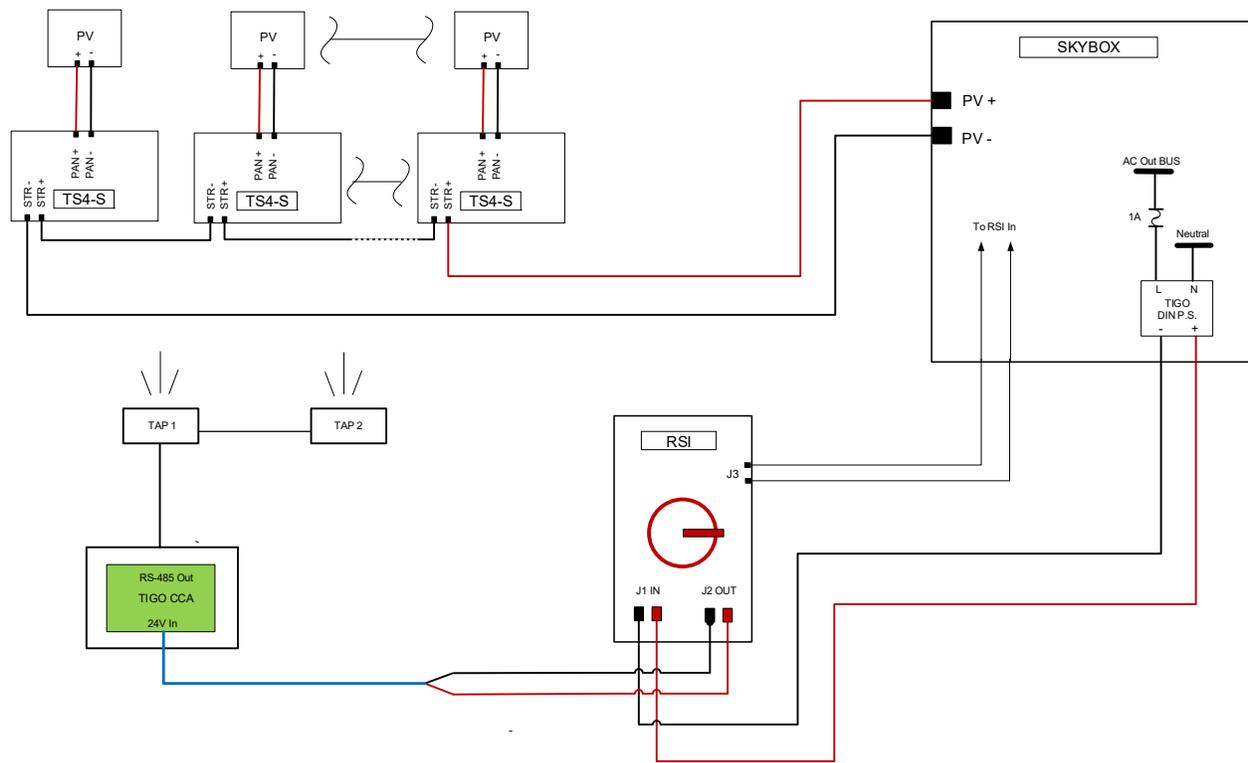


Figure 3: Diagram of the Tigo Configuration with RSI

Programming

Enabling rapid shutdown is not required in the SkyBox. It is an embedded function that cannot be disabled. However, the behavior of the SkyBox during an event can be modified. The SkyBox can either stop harvesting PV only, or it can stop harvesting PV and remove power to the AC loads.

This setting is found in the **Basic Settings** menu. The options are **PV** or **PV and AC**.

Home → SkyBox button → Configure

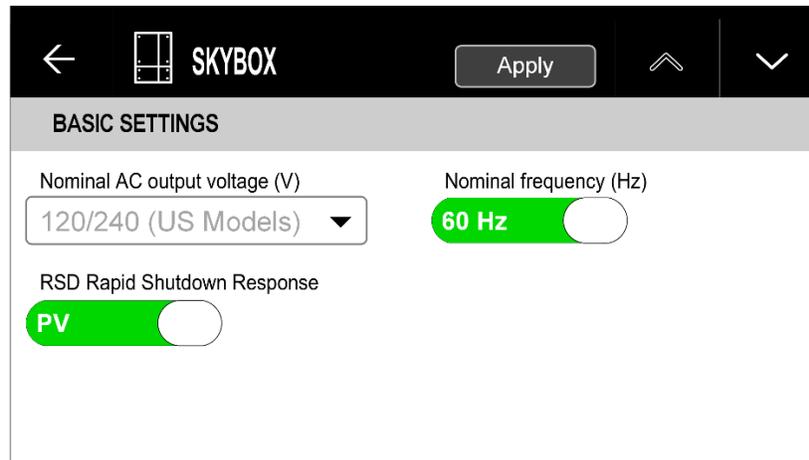


Figure 4: SkyBox RSD Menu

Commissioning and Testing

Any commissioning steps of the RSD system should be completed according to the manufacturer's instructions before commissioning the SkyBox system. Failure to do so will result in a **Rapid Shutdown Active** PV fault and the unit will not operate.

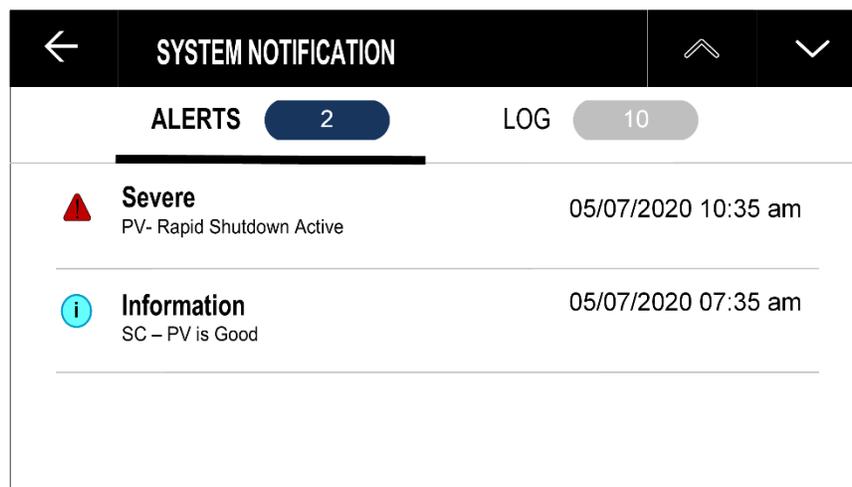


Figure 5: Alert notification screen with rapid shutdown fault

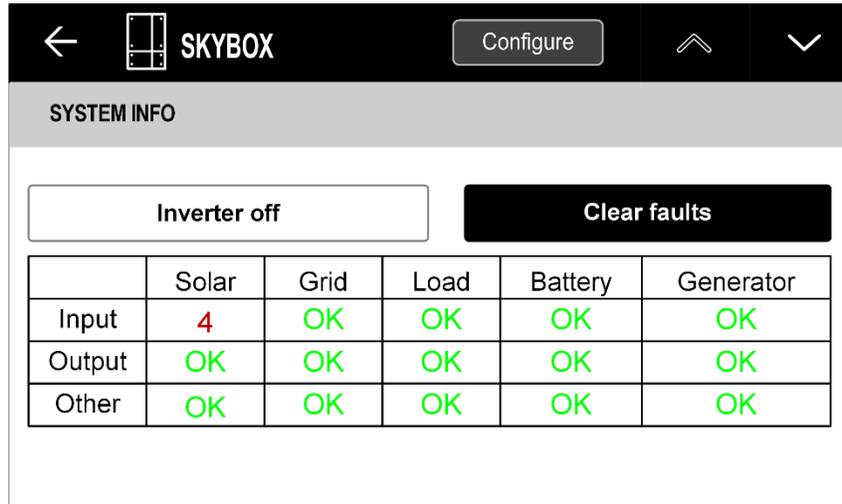


Figure 6: Numerical error rapid shutdown fault

To test the RSD system with the SkyBox, first complete both commissioning procedures. If the SkyBox is harvesting PV and no active fault is logged, the SkyBox RSD circuit senses continuity. Next, initiate a rapid shutdown event. Verify that the SkyBox stops harvesting PV power, logs a rapid shutdown event, and removes power from the AC loads (if applicable). Also measure the array voltage to ensure the module level shutdown devices operate as expected.

Troubleshooting

Common Issue: Continuous rapid shutdown fault that will not clear

- Check all connections for tightness, especially pins 4 and 12 in the SkyBox auxiliary terminal block.
- Check the SkyBox function by removing the RSD system and replacing with a small jumper.
- Troubleshoot the RSD system separately from the SkyBox as necessary.

If you continue to have trouble with the RSD system and the SkyBox, contact the OutBack Power Technical Support group.

About OutBack Power

OutBack Power is a leader in advanced energy conversion technology. OutBack Power products include true sine wave inverterchargers, maximum power point tracking charge controllers, and system communication components, as well as circuit breakers, batteries, accessories, and assembled systems.

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Other

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