# Rapid Shutdown (RSD) Error Troubleshooting Guide - NAM

## Revision History

- Version 2.0, November 2023: Content update

## Contents



**WARNING**

This guide troubleshoots a SolarEdge installation that is showing a Rapid Shutdown error. You should be completely familiar with SolarEdge systems, their concept of operation, safety features, and all applicable safety procedures and requirements. Do not attempt any troubleshooting without adequate safety equipment and a thorough understanding of all procedures.

# Overview

Rapid Shutdown is a function that, when the DC and/or AC circuit is open, the DC voltage in the PV array lowers to < $30V_{DC}$ within 30 seconds (NEC 2014 690.12). Rapid shutdown errors flag when the inverter detects a higher voltage than $30V_{DC}$ while in a non-productive state.

## Related Error Codes

- **3x9B:** Rapid shutdown
- **18xC7**: Rapid shutdown test failure on H-Series Single Phase Inverters
- **2xC5:** Rapid shutdown test failure on A-Series Single Phase Inverters
- **8x18:** Rapid shutdown test failure Three-Phase Inverters

# Troubleshooting

To troubleshoot rapid shutdown errors, perform the following steps:

1. Turn off the inverter by moving the P/1/0 switch to the **0** (**OFF**) position and wait for at least 5 minutes for the DC voltage to drop to a safe level.
2. Monitor $V_{DC}$ in SetApp, or on the LCD Inverter screen and record $V_{DC}$ once it has stopped draining.
3. Turn off the DCD switch, then remove the inverter and DCD switch cover. Check for any signs of dynamic failure such as debris, burn, or damage.

   If any damage is found, take photos and contact SolarEdge Technical Support.
4. Remove one string at a time and measure the string's DC voltage in open air. Record $V_{DC}$.
   - **$V_{DC}$ from strings > 30$V_{DC}$:** DC voltage is too high causing the inverter to flag rapid shutdown errors. Move on to Step 5.
   - **$V_{DC}$ from strings < 30 $V_{DC}$:** See Additional Troubleshooting Scenarios for further troubleshooting of rapid shutdown errors.
5. A string measuring over 30V will cause the inverter to flag rapid shutdown errors. If the string is shorter than 28 Power Optimizers but is measuring over 30V, investigate the string for any potential causes of the additional

voltage. This includes but is not limited to, improper connections in the array, failed Power Optimizer outputting > 1.1V while in safe voltage, and improper or damaged connections between Power Optimizers and PV modules within the string.

NOTE

If the voltage at the output of a Power Optimizer in the string is > 1.1V, you should investigate the string for any causes of this voltage increase. In this case, document the serial number and the voltages measured from the Power Optimizer and PV modules, and contact SolarEdge Technical Support.

6. If none of the above steps found a cause for the rapid shutdown errors, see Additional Troubleshooting Scenarios.

# Additional Troubleshooting Scenarios

## Battery Installs

Batteries should not send any voltage to the inverter when the inverter's switch is in the **0** (**OFF**) position. To test if the battery is the cause of the rapid shutdown issues, do as follows:

1. Turn off the inverter by moving the P/1/0 switch to the **0** (**OFF**) position to stop production.
2. Turn the DCD switch to the **OFF** position and remove the cover.
3. Remove the PV strings from the inverter.
4. Set the DCD switch to the **ON** position, while ensuring the P/1/0 switch remains in the **0** (**OFF**) position.
5. Record $V_{DC}$ measured by the inverter on the SetApp **Status** screen or the inverter screen for inverters with a display.
6. Shut down the battery and repeat step 5.

NOTE

If the battery is causing the DC voltage to be over 30V while the inverter is in a non-production state, contact the battery manufacturer for battery support.

## Three-Phase Inverter Hardware Mismatch

Some three-phase inverters have had a hardware change in both the inverter and DCD switch. However, in certain instances, one can be replaced independently, resulting in rapid shutdown errors. If you have replaced an inverter and/or DCD switch and see rapid shutdown errors since replacement, please contact SolarEdge Technical Support.

## Three-Phase Strings with 28 or More Optimizers

Per NEC 2104 690.12, the voltage on the rooftop solar system should be less than 30 $V_{DC}$ within 30 seconds of DC termination. However, three-phase inverters can have 28 or more Power Optimizers per string (1 Power Optimizer can be up to 1.1V while in safe $V_{DC}$), causing the inverter to flag rapid shutdown errors.

If the system is a ground-mounted installation, if the region the system is installed in has not adopted NEC 2014, or if the string has less than 28 Power Optimizers and flagging RSD, gather the single line diagram of the system, the installation date, the installation location (city/state), and contact SolarEdge Technical Support for further assistance.

## No Cause for RSD Errors Found

If the inverter flags rapid shutdown errors, but a cause for a higher voltage cannot be found, please contact SolarEdge Technical Support for further analysis and troubleshooting assistance.

# Contact Support

To open a case with SolarEdge Technical Support, use one of the following contact methods:

- **SetApp**: You can open a new case or start a live chat session via the SetApp smart device application.
- **SolarEdge Support Portal** – If registered, sign in and create a new case. Attach this filled-out form including any photos. Once a case is opened, use the case number provided when speaking with SolarEdge support.
- **Chat –** Located at the bottom of the Support Portal page, initiate a chat with a live agent to open a case. The agent can assist you in getting a case created and reviewing the supplied documentation.
- **Phone** – When contacting support by phone, notify the agent that you have this form and details to send in. The agent can assist you in submitting the attachments.

Filling out this form does not guarantee a Return Merchandise Authorization (RMA), and additional on-site troubleshooting may be required.

| | |
|---|---|
| Date | |
| Company Name | |
| Technician Name | |
| Site Name<br>(If monitored) | |
| Inverter SN | |
| Number of strings | |
| Number of modules in each string | |
| $V_{DC}$ of string in open air | |
| Faulty Optimizer SN | |
| New Optimizer SN<br>(If replaced while on-site) | |
| Module make and model | |
| $V_{DC}$ Measured on Optimizer | |
| $V_{DC}$ Measured on Module | |