**WIRING THE RSD BOX**

a. Ensure power is not present on the conductors to be connected, wear appropriate PPE and insulated tools when working with this equipment.

b. To access the wiring terminals in the RSD box, the cover 1 must be removed by loosening the four screws. When connection operations are complete, re-install the cover 1 and tighten the cover screws with 1.13 Nm (10.0 in-lbs) torque to maintain waterproof sealing.

c. The RSD Power Supply must only be connected to a 3-wire 240V line-to-line or 2-wire 208V line-to-neutral power supply. This power supply is to be installed inside the wiring box of the ABB string inverter.

d. This RSD system operates only when properly connected to the power supply and PV strings. The RSD system operates only when properly connected to the power supply and PV strings.

e. In the full product manual located at www.abb.com/solarinverters, see Technical Data, section 14, for appropriate wire size on all conductors.

**WIRING THE POWER SUPPLY**

The Rapid Shutdown kit includes two terminal blocks, a 24V power supply and three short conductors used to connect the power supply to the inverter AC terminals and ground. This power supply is to be installed inside the wiring box of the ABB string inverter.

b. Before installing the power supply, open the PV system AC disconnect switch or PV breaker to ensure the inverter is disconnected from the grid.

c. The RSD Power Supply must only be connected to a 3-wire 240V line-to-line or 2-wire 208V line-to-neutral inverter output.

The Rapid Shutdown kit is NOT compatible with a 277V grid connection. It must only be used with a 208V or 240V grid connection.

*In addition to what is explained in the guide, the safety and installation instructions includeELECTRICAL WARNINGsexcept where noted in the table and instructions.*

**SAFETY HAZARD SYMBOLS**

**RISK OF ELECTRICAL SHOCK, HAZARDOUS VOLTAGE WILL CAUSE SEVERE INJURY OR DEATH, NO USER SERVICEABLE PARTS INSIDE, ONLY TRAINED SERVICE PERSONNEL ARE ALLOWED ACCESS.**

**WHEN THE PHOTOVOLTAIC ARRAY IS EXPOSED TO LIGHT, IT SUPPLIES DC VOLTAGE TO THIS EQUIPMENT.**

**VERIFY THE CORRECT CONNECTION OF THE STRINGS TO THE INPUT TERMINALS. POLARITY REVERSAL MAY CAUSE SERIOUS DAMAGE. REFER TO THE INSTRUCTION MANUALS FOR MORE DETAILS.**

**SAVE THESE INSTRUCTIONS!**

*The labels on the RSD box carry the markings, main technical data and identification of the equipment and manufacturer.*

**IMPORTANT SAFETY INSTRUCTIONS:** This Quick Installation Guide (QIG) contains important safety instructions that must be followed during installation and maintenance of the Rapid Shutdown (RSD) system.

**SAVE THESE INSTRUCTIONS!** Keep this document in a safe place near the photosensitive (PV) system inverter for easy access during installation and maintenance.

**LABELS.** The labels on the RSD box carry the markings, main technical data and identification of the equipment and manufacturer.

**ELECTRICAL WARNINGS.**

a. The ABB RSD system is designed to comply with the 2014 NFPA 70 National Electric Code, section 690.12 and tested according to international safety requirements (UL/CSA/CSA). However, certain safety precautions must be observed when installing and operating this product. Personal Protective Equipment (PPE) must be worn at all times when servicing this equipment.

b. Wiring methods should be in accordance with the National Electric Code, ANSI/NFPA 70 and any prevailing local codes and regulations.

c. The RSD system is designed to comply with the 2014 NFPA 70 National Electric Code, section 690.12 and tested according to international safety requirements (UL/CSA/CSA). However, certain safety precautions must be observed when installing and operating this product. Personal Protective Equipment (PPE) must be worn at all times when servicing this equipment.

**RSD INSTALLATION LOCATION**

a. The RSD box is intended for roof installation within ten feet of the PV array. The RSD box may also be installed within the attic below the five feet of the roof up to the eave of a building. 

b. Install the RSD box on the PV module mounting rail, racking system, the roof, or in the attic below the PV array. 
c. The RSD box may be installed at angles from horizontal to vertical.

d. Ensure sufficient working area around the RSD box to allow easy access for maintenance and servicing of the PV system.

e. In the full product manual located at www.abb.com/solarinverters, see Technical Data, section 14, to check the environmental parameters to be observed (degree of protection, temperature, etc.).

**LIST OF COMPONENTS**

<table>
<thead>
<tr>
<th>Qty</th>
<th>Description</th>
<th>Part Number</th>
<th>Included in standalone or kit</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Rapid Shutdown (RSD) box</td>
<td>RS2-1CN6</td>
<td>Standalone and kit</td>
</tr>
<tr>
<td>1</td>
<td>DC power supply</td>
<td>S9V2F-035Z</td>
<td>Kit only</td>
</tr>
<tr>
<td>2</td>
<td>Three-position terminal blocks</td>
<td>1SN290428R0400</td>
<td>Kit only</td>
</tr>
<tr>
<td>1</td>
<td>Inverter-power supply conductors kit (Terminal 1, Terminal 2, GND)</td>
<td>D 2411 0000 799</td>
<td>Kit only</td>
</tr>
<tr>
<td>1</td>
<td>Cover for three-position terminal block</td>
<td>1SN291732R200</td>
<td>Kit only</td>
</tr>
<tr>
<td>1</td>
<td>Quick Installation Guide</td>
<td>BCM03570-AP_AB</td>
<td>Kit only</td>
</tr>
</tbody>
</table>

**RSD INSTALLATION**

1. Mounting the RSD Box

a. The mounting bracket 3 will connect the RSD box via the mounting bracket 5 and RSD mounting brackets 6.

   i. The PV string inputs are labeled +S# and –S# to the terminal block. Use the procedure below to connect wiring to the terminal block.

   ii. A jumper is installed between +OW1 and +OW2. This is to remain in position for installations to check the environmental parameters to be observed (degree of protection, temperature, etc.).

   iii. The PJ terminals are labeled "OW1" and "OW2" on the bottom of the PV system.

2. Wiring the RSD Box

   a. Ensure power is not present on the conductors to be connected, wear appropriate PPE and insulated tools when working with this equipment.

   b. To access the wiring terminals in the RSD box, the cover 1 must be removed by loosening the four screws. When connection operations are complete, re-install the cover 1 and tighten the cover screws with 1.13 Nm (10.0 in-lbs) torque to maintain waterproof sealing.

   c. The RSD Power Supply must only be connected to a 3-wire 240V line-to-line or 2-wire 208V line-to-neutral power supply. This power supply is to be installed inside the wiring box of the ABB string inverter.

3. Wiring the Power Supply

   a. The Rapid Shutdown kit includes two terminal blocks, a 24V power supply and three short conductors used to connect the power supply to the inverter AC terminals and ground. This power supply is to be installed inside the wiring box of the ABB string inverter.

   b. Before installing the power supply, open the PV system AC disconnect switch or PV breaker to ensure the inverter is disconnected from the grid.

   c. The RSD Power Supply must only be connected to a 3-wire 240V line-to-line or 2-wire 208V line-to-neutral inverter output.

   d. The RSD system operates only when properly connected to the power supply and PV strings. These connections must be made only by qualified technical personnel.

   e. The DC operating current and voltage MUST NOT exceed the limits documented in the technical specifications found in section 5 of this QIG.

   f. For models containing a disconnect switch on the cover of the RSD box, this switch disconnects the PV output conductors from the PV source circuits (strings) entering the RSD box. It does not disconnect the current or voltage entering the RSD box via the PV strings.

   g. Conductors with finer stranding, a suitable UL listed wire ferrule must be used.

   h. The RSD system operates only when properly connected to the power supply and PV strings. These connections must be made only by qualified technical personnel.

   i. The DC operating current and voltage MUST NOT exceed the limits documented in the technical specifications found in section 5 of this QIG.

   j. For models containing a disconnect switch on the cover of the RSD box, this switch disconnects the PV output conductors from the PV source circuits (strings) entering the RSD box. It does not disconnect the current or voltage entering the RSD box via the PV strings.

   k. Conductors with finer stranding, a suitable UL listed wire ferrule must be used.
Step 1. Disconnect the black inverter conductors in the top positions of the existing terminal blocks by inserting a ¼” flat screwdriver into the square holes. Lightly press the screwdriver toward the associated wire slot until the clamp opens. Remove the conductors.

Step 2. Install the power supply on the DIN rail.

Step 3. Using the small screwdriver remove and replace terminal 1 and 2 with the provided terminals. Be sure to install the terminal block cover on the terminal 1 prior to mounting it on the DIN rail (PV models only). The photos below show the two terminal blocks in place.

Step 4. Replace the inverter conductors in the top positions of the terminal blocks using the same procedure used to remove the conductors.

Step 5. Connect the ground (green) conductor provided to the ground terminal of the power supply and the green terminal block using the previous wiring procedure. Connect one end of a black conductor provided to terminal 1 of the power supply and the other end to the center position of terminal block 1 as discussed above. Connect one end of the second black conductor provided to terminal 2 of the power supply and connect the other end to the central position of terminal block 2 as discussed above. The photos below show the two terminal blocks in place.

Step 6. Connect the terminal block to the existing conductors. The terminal block is equipped with an integrated DC disconnect. A number ofensity devices may be used to initiate rapid shutdown, many of which are already required to be installed within a PV system by the authority having jurisdiction (AHJ) or utility company. Some of these devices may not be required in all jurisdictions and one device may serve multiple purposes.

1. The back-fed PV breaker
2. The building’s main circuit breaker
3. The PV system disconnect switch
4. An inverter AC-equipment disconnect switch
5. An optional E-stop installed with the ABB rapid shutdown system

After testing the PV system, the PV input strings and PV output circuits must return to their proper positions. Reinstall the original DC disconnect, reconnect the DC conductors to the appropriate DC inputs, and reconnect the AC conductors to the inverter. If a second set of back-fed conductors is needed, this will be done at this time. Close all disconnects and circuit breakers to begin back-feeding power to the grid. Once the inverter has gone through the startup process and is connected to the grid, perform the following steps to test the rapid shutdown system. A meter will be required to measure the output voltage and current, and proper PPE shall be worn in all steps while working with this equipment.

• If the RSD box contains a disconnect switch, turn the switch to the OFF position and monitor the output conductors of the RSD box for voltage and current.
• Turn the RSD disconnect switch back to the ON position to resume operation.
• With one person monitoring the output of the rooftop RSD box, initiate rapid shutdown by one of the methods previously listed by removing AC power to the PV system to resume operation.

System Testing

Testing Rapid Shutdown within the PV System

Once the PV system has been installed, test the RSD system by first turning on the PV system. Close all disconnects and circuit breakers to begin back-feeding power to the grid. Once the inverter has gone through the startup process and is connected to the grid, perform the following steps to test the rapid shutdown system. A meter will be required to measure the output voltage and current, and proper PPE shall be worn in all steps while working with this equipment.

• If the RSD box contains a disconnect switch, turn the switch to the OFF position and monitor the output conductors of the RSD box for voltage and current.
• Turn the RSD disconnect switch back to the ON position to resume operation.
• With one person monitoring the output of the rooftop RSD box, initiate rapid shutdown by one of the methods previously listed by removing AC power to the PV system to resume operation.

Testing the PV System Independent of Rapid Shutdown

It is necessary to test the PV system without Rapid Shutdown operational, bypass the rooftop RSD box using one of the following methods:

• In the RS2-1CN6 and RS4-2CN6 models, connect the string inputs and PV output circuits on the SB terminals. These are three-position terminals that combine the input strings. By utilizing one position for an input and the other for the inverter output, the conductions are made continuous. The RS2-1CN6 would bypass the RSD contactor and allow for PV system testing with one PV string only. The RS4-2CN6 would bypass the RSD contactors and allow for PV system testing with two PV strings only.
• The RSD ESP model does not utilize three-position input terminals and therefore cannot be bypassed in the same manner as stated above. It is recommended to join the PV string input with the PV output conductor by joining these conductors together with approved wire nuts, or using some other means.

After testing the PV system, the PV input strings and PV output circuits must return to their proper terminals prior to commissioning of the PV system.

Contact us

www.abb.com/solarinverters

Rapid Shutdown System for Residential and Commercial - Quick Installation Guide

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Specifications subject to change without notice.