DC Disconnect Switch

For Sunny Boy 3300U/3800U Inverters

IMPORTANT SAFETY INSTRUCTIONS
Save These Instructions

This manual contains important instructions for the DC Disconnect that must be followed during the installation and use of the DC Disconnect.

The DC Disconnects are designed and tested according to international safety requirements, but as with all electrical and electronic equipment, certain precautions must be observed when installing the DC Disconnects. To reduce the risk of personal injury and to ensure the safe installation and operation of the DC Disconnects, you must carefully read and follow all instructions and warnings in this *Installation Guide*.

Safety and Hazard Symbols

This symbol is used to call attention to important information that you must have when installing and/or operating a DC Disconnect. Failure to read and follow instructions marked with this symbol could result in serious injury and/or damage to the equipment.

This symbol appears beside instructions and warnings that deal with dangerous voltages that can injure people who come in contact with them.

Warnings

WARNING: A Warning describes a hazard to equipment or personnel. It calls attention to a procedure or practice which, if not correctly performed or adhered to, could result in damage to or destruction of part or all of the SMA equipment and/or other equipment connected to the SMA equipment or personal injury.

Warnings may also be accompanied by one or more of the safety and hazard symbols described above to indicate the type of hazard described therein.

Other Symbols

In addition to the safety and hazard symbols described previously, the following symbol is also used in this *Installation Guide*:

This symbol accompanies notes that call attention to supplementary information that you should know to ensure optimal operation of the system.

Warranty

All DC Disconnects sold in the USA have a five-year warranty, as indicated on the warranty card included in the shipping container. For warranty coverage, or if you have questions about the DC Disconnect warranty, contact SMA America at the mailing address, email address, telephone number, or Web site listed in the Contact section of this manual.

WARNING: All electrical installation must be done in accordance with the National Electrical Code ANSI/NFPA 70, local building codes and the requirements of the authority having jurisdiction.

To prevent electrical shock or injury, all wiring and commissioning procedures must be performed only by qualified personnel.

WARNING: Before installing or using the DC Disconnect, read all of the instructions and warnings regarding the DC Disconnect in this Installation Guide.

WARNING: PV arrays produce electrical energy when exposed to light and thus create an electrical shock hazard. Ensure that there is no AC or DC voltage present when you install the DC Disconnect.

Make sure that there is no DC and no AC voltage present before you remove the cover of the DC Disconnect.

This GROUND symbol marks areas in the DC Disconnect that are used for connecting equipment grounds only.

1 Introduction

SMA America's DC Disconnect integrates PV series string fuses into a standard heavy-duty DC disconnect switch.

DC Disconnect features include:

- Visible position, lockable DC disconnect switch
- Four 15A, 600 VDC Fuses (included)
- NEMA 3R enclosure

To prevent electrical shock or injury, all wiring and commissioning procedures must be performed only by qualified personnel.

WARNING: All electrical installation must be done in accordance with the National Electrical Code ANSI/NFPA 70, local building codes and the requirements of the authority having jurisdiction.

WARNING: PV arrays produce electrical energy when exposed to light and thus create an electrical shock hazard.

Application

The DC Disconnect is designed for use with the SB3300U or the 3800U inverters. Use of the DC Disconnect for other applications is not recommended nor supported by SMA America.

2 Unpacking and Inspection

All products from SMA are thoroughly checked before they are packaged and shipped. Although they are shipped in sturdy packaging, damage can still occur during shipping and delivery. It is important to carefully inspect the shipping container and contents prior to installation. If you detect any external damage after unpacking, report the damage immediately to your SMA dealer and shipping company that delivered the unit. If it becomes necessary to return the product use the original packing material.

If you need assistance with a damaged unit, contact SMA America at 530.273.4895 8 AM to 5 PM Pacific Time.

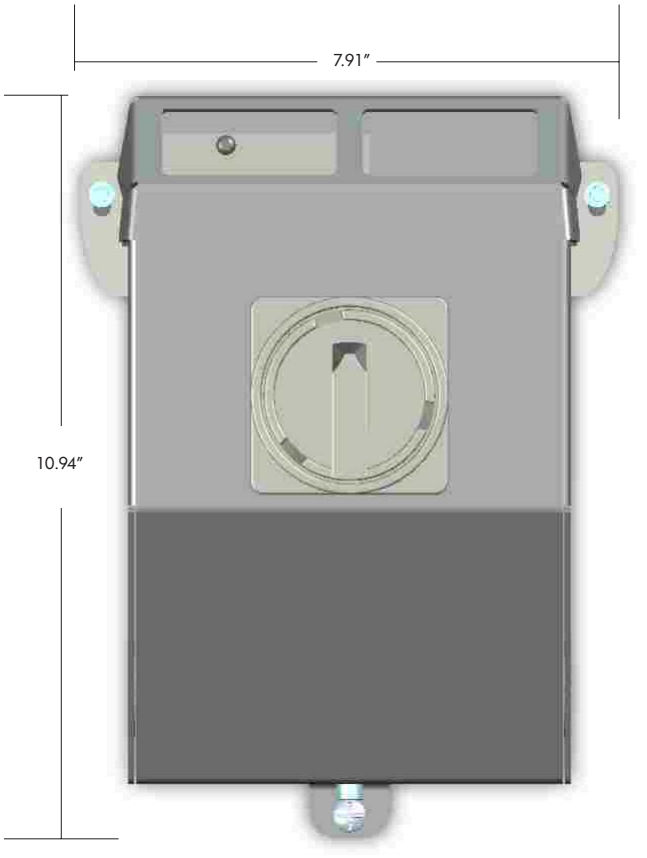


Figure 1-1: Dimensions of the DC Disconnect

Dimensions: 10.94 x 7.91 x 8.50 (Height x Width x Depth in.)

3 Wiring

NOTE: Use only the hole templates that are in the DC Disconnect for making entry holes in the enclosure of the DC Disconnect.

WARNING: All electrical installation must be done in accordance with the National Electrical Code ANSI/NFPA 70, local building codes and the requirements of the authority having jurisdiction.

WARNING: PV arrays produce electrical energy when exposed to light and thus create an electrical shock hazard.

3.0.1 General Information on Wiring

The output wiring terminal blocks are rated for 14 to 6 AWG wire sizes. The size of the output conductors should be made in accordance with NEC Article 310. Conductor size should be compensated for temperature and voltage drop considerations. Be sure to use wire with insulation properly rated for the installation environment.

3.0.2 Fuse Sizing

In any electrical system, fuses are used to protect wiring and equipment from excessive currents that can cause damage, heating or in extreme cases even fire. If the fuse rating is too small it could open during normal operation. If the fuse rating is too large, it cannot provide the needed protection. In PV systems, the minimum and maximum size of the series fuse is determined by the electrical ratings of the PV module as well as by UL and National Electrical Code (NEC) requirements. Be sure to consult with your PV module manufacturer for appropriate fuse ratings.

The minimum size of fuses and wiring are calculated using the Short Circuit Current Rating (Isc) of the PV module. The NEC requires that all fuses and wiring be sized for a minimum of 1.56 times the Isc of the PV module used in the system.

The proper size PV string fuse is determined by calculating 1.56 x Isc (of the PV module) and then rounding up to the next standard fuse size.

Example: If the Isc of the PV module equals 6.9 Adc, then the fuse size is determined by 1.56 x 6.9 = 10.76. The next standard fuse size would be a 12A, 600Vdc fuse.

WARNING: The string fuse size must not be greater than the maximum fuse size rating of the PV module.

3.0.3 DC Disconnect Requirements

NEC 690.15-18 allows the use of fuse holders as a suitable means of disconnecting PV arrays for servicing. Additional DC disconnects external to the inverter may be required by the local authority having jurisdiction.

WARNING: Never remove a fuse while it is under load. Electrical arcing and damage to the fuse holder will occur if a fuse removed under load.

3.0.4 PV String Fuses

The DC Disconnect is shipped with 15A, 600Vdc fuses in the fuse holders. (Other fuse sizes are available from SMA America. Be sure to specify alternate fuse sizes when ordering the DC Disconnect from you distributor.) The illustration below shows the string fuse holders and their corresponding terminals.

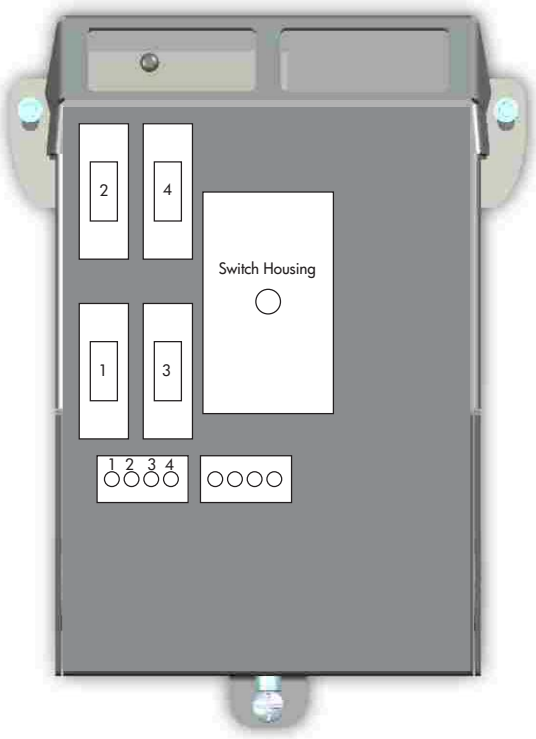


Figure 1-2: String Fuse Terminal Locations

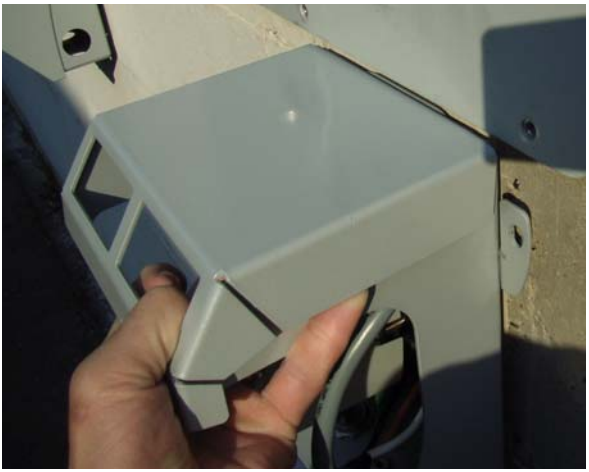
4 Installation

Prepare the DC Disconnect for installation by removing its cover. To remove the cover, ensure that the switch is in the OFF (0) position, remove the 2.5 mm mounting screw from the handle and remove the handle of the switch. Then, remove the screw from the bottom of the cover and remove the cover from the DC Disconnect. Once the DC Disconnect is prepared, use the following instructions to complete the installation.

1

Mount the backplate of the SB3300U / SB3800U as described in the installation manual for the inverter.

2



Slide the DC Disconnect into place on the lower right of the backplate. The left and right tabs go in front of the backplate, the center tab goes behind it.

3

Align the holes for the mounting screws.

4

Using the supplied screws and lockwashers, mount the DC Disconnect to the backplate.

Leave the screws loose to allow for proper alignment. (They will be tightened in a later step.)

For proper grounding, ensure that the teeth of the lockwashers face the tab, not the screw.

5

Hang the inverter on the two tabs at the top of the backplate.

Be careful not to set the full weight of the inverter on top of the DC Disconnect.

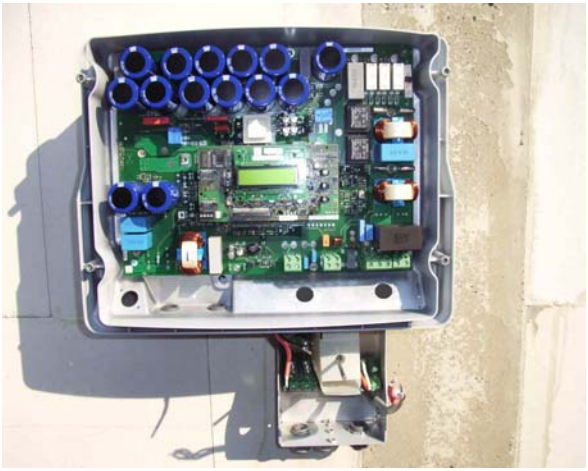
Use extra care when setting the inverter in place not to injure your fingers.

6

Insert the grounding screw and lockwasher on the bottom of the inverter and tighten to a torque of 44 in. lb. For proper grounding, ensure that the teeth of the lockwasher face the tab, not the screw.

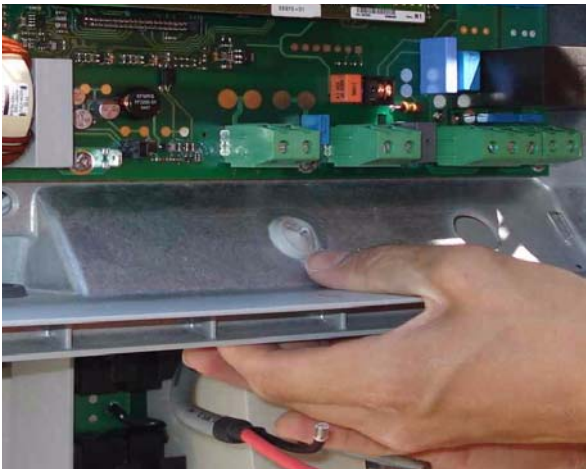
Hold the DC Disconnect against the bottom of the inverter and tighten the mounting screws to a torque of 44 in. lb.

7



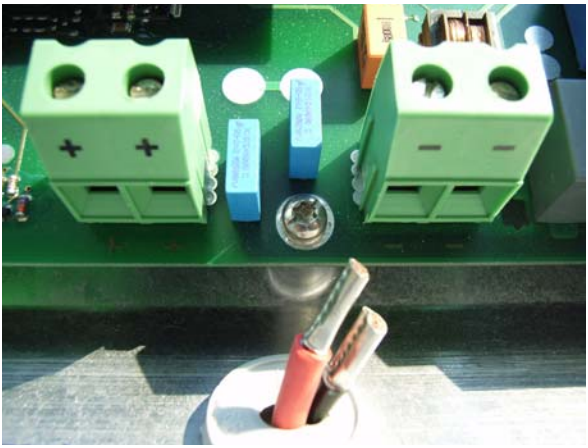
Remove the cover of the inverter as described in the Sunny Boy installation manual.

8



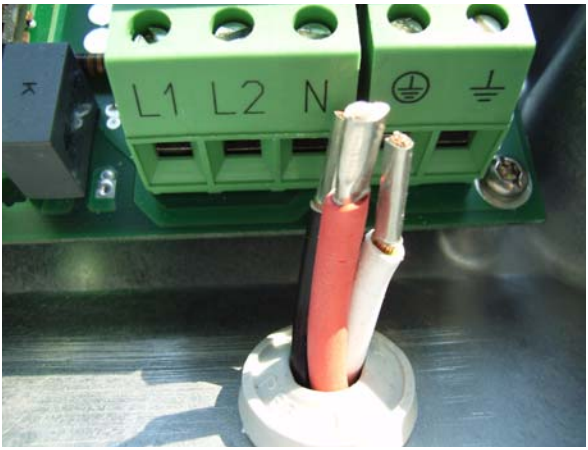
Insert the grommets supplied with the DC Disconnect into the two openings in the bottom of the inverter enclosure.

9



Insert the DC wires through the left grommet. Connect the red wire to the terminal block marked "+" and the black wire to the terminal block marked "-". Mark the grounded conductor according to NEC 250.

10



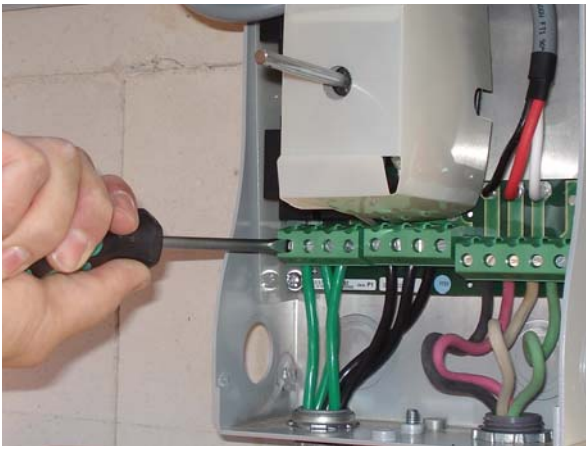
Insert the AC wires through the right grommet. Connect the black wire to L1, the red wire to L2 and the white wire to N. NOTE: the earth-ground conductor does not need to be connected to the terminal in the inverter. Ground is obtained via the enclosure.

11

Tighten each of the wires to a torque of 15 in. lb.

Once the wiring is complete, replace the cover of the inverter. Tighten the cover mounting screws to the torque specified in the Sunny Boy installation manual.

12



Connect the AC and DC field wiring to the DC Disconnect. Refer to the Sunny Boy installation manual for details. NOTE: Earth-ground connects to the right-most terminal block.

Tighten field wiring to a torque of 15 in. lb.

13

Inserting the top edge first, replace the cover of the DC Disconnect.

14

Keep the upper edge of the cover against the bottom of the inverter to act as guide and pivot the cover downwards.

15

The shaft of the switch should protrude from the center of the switch housing as shown, once the cover is in place.

16

Place the handle of the switch onto the shaft and align the hole in the handle with the hole in the shaft. Insert the screw and tighten using the supplied 2.5 mm Allen wrench. (Switch must be in OFF (0) position to access the mounting screw.)

17

Insert the screw and lockwasher into the bottom of the cover.

Tighten to a torque of 44 in. lb. using a 5 mm Allen wrench.

For proper grounding, ensure that the teeth of the lockwasher face the enclosure, not the screw.

18

Loosen the screws in the bottom mounting bracket and slide the bracket back until it is flush with the wall.

Tighten the bracket screws to a torque of 44 in. lb. using a 5 mm Allen wrench.

Mount bracket to wall using hardware appropriate for the mounting surface.

5 Replacing the Fuses

The DC Disconnect is equipped with internal DC fuses to protect against damage in the event of a fault. These fuses may easily be replaced by a qualified technician if needed.

Any work within the DC Disconnect must be performed by a qualified technician.

Make sure that there are no DC or AC voltages present before removing the cover of the DC Disconnect.

Warning: PV arrays produce electrical energy when exposed to light and thus create an electrical shock hazard.

Replace fuses only with fuses of the same type and rating.

1

Place the switch in the OFF (0) position. Using a 2.5 mm Allen wrench, remove the handle of the switch.

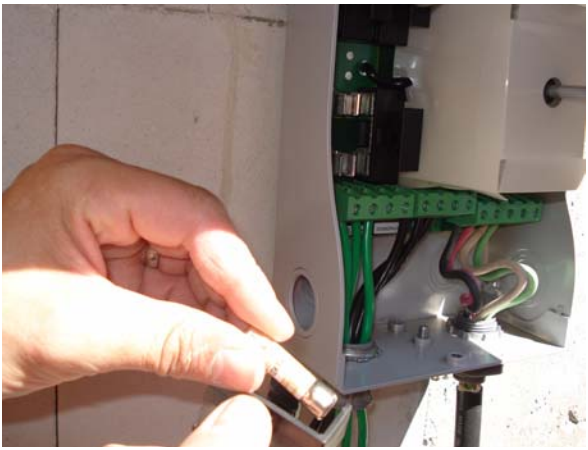
Then, remove the screw and lockwasher and remove the cover.

2

Remove the fuse holder containing the fuse.

For safety, never remove more than one fuse holder at the same time.

3



Place a new fuse in the fuse holder and reinsert.

Once the fuse has been replaced, install the cover by following the previous steps in reverse order.

6 Specifications

Switch Orientation	0 = OFF, 1 = ON
Number of Inputs	4 Strings
Input and Output Wire Sizes	14 - 6 AWG, 75°C Minimum
Max Input Fuse Rating	15 A
Max Output Current	37.5 A
Max Continuous Output Current	25 A
Number of Outputs	1 Positive, 1 Negative, 1 AC
Terminal Torque Values	15 in. lb.
Enclosure Type	NEMA 3R
Weight	4.85 lb.
Dimensions	10.94 x 7.91 x 8.58 in. (height x width x depth)
Compliance	UL1741 (When used with a Sunny Boy 3300U/3800U inverter.)

7 Contact

If you have any questions or technical problems concerning the DC Disconnect, please contact our hot-line. Have the following information available when you contact SMA:

- Inverter type
- Type and number of modules connected

Address:
SMA America, Inc.
12438 Loma Rica Drive
Grass Valley, California 95945
Tel 530.273.4895
Fax 530.274.7271
www.sma-america.com

The information contained in this document is the property of SMA Technologie AG. Publishing its content, either partially or in full, requires the written permision of SMA Technologie AG. Any internal company copying of the document for the purposes of evaluating the product or its correct implementation is allowed and does not require permission.

Exclusion of liability

The general terms and conditions of delivery of SMA Technologie AG shall apply.

The content of these documents is continually checked and amended, where necessary. However, discrepancies cannot be excluded. No guarantee is made for the completeness of these documents. The latest version is available on the Internet at www.SMA.de or from the usual sales channels.

Guarantee or liability claims for damages of any kind are exlcuded if they are caused by one or more of the following:

- Improper or inappropriate use of the product
- Operating the product in an unintended environment
- Operating the product whilst ignoring relevant, statutory safety regulations in the deployment location
- Ignoring safety warnings and instructions contained in all documents relevant to the product
- Operating the product under incorrect safety or protection conditions
- Altering the product or supplied software without authority
- The product malfunctions due to operating attached or neighboring devices beyond statutory limit values
- In case of unforeseen calamity or force majeure

Software licensing

The use of supplied software produced by SMA Technologie AG is subject to the following conditions:

This software may be copied for internal company purposes and may be installed on any number of computers. Supplied source codes may be changed or adapted for internal company purposes on your own responsibility. Drivers may also be transferred to other operating systems. Source codes may only be published with the written permission of SMA Technologie AG. Sub-licensing of software is not permissible.

Limitation of liability: SMA Technologie AG rejects any liability for direct or indirect damages arising from the use of software developed by SMA Technologie AG. This also applies to the provision or non-provision of support activities.

Supplied software not developed by SMA Technologie AG is subject to the respective licensing and liability agreements of the manufacturer.

Trademarks

All trademarks are recognized even if these are not marked separately. Missing designations do not mean that a product or brand is not a registered trademark.

SMA Technologie AG

Hannoversche Straße 1-5

34266 Niestetal

Germany

Tel. +49 561 9522-0

Fax +49 561 9522-100

www.SMA.de

E-mail: info@SMA.de

SMA America. Inc.

www.sma-america.com

12438-C Loma Rica Drive
Grass Valley, CA 95945
USA
Phone +1 530 273 4895
Fax +1 530 274 7271
www.sma-america.com

Headquarters:
Hannoversche Str. 1-5
34266 Niestetal
Deutschland
Phone +49 561 9522 0
Fax +49 561 9522 100
www.SMA.de