IMPORTANT SAFETY INSTRUCTIONS

SAVE THESE INSTRUCTIONS

Before installing or using the DISCOM 1500 String Combiner Box, please read all instructions and caution markings in this manual and on the string combiner, as well as on the PV modules, PV inverter, and Charge Controller.

This manual contains important instructions that shall be followed during installation and operation of DISCOM 1500 String Combiner Boxes. To reduce the risk of electrical shock, and to ensure the safe installation and operation of the combiner, the following safety symbols are used to indicate dangerous conditions and important safety instructions.

CONSERVER CES INSTRUCTIONS. CETTE NOTICE CONTIENT DES INSTRUCTIONS IMPORTANTES CONCERNANT LA SÉCURITÉ.

WARNING: The DISCOM 1500 fused string combiner contains no user serviceable parts. For maintenance, please contact Solectria or an authorized installer by visiting http://www.solectria.com or by calling +1-978-683-9700.

WARNING: Disconnect all PV modules or completely cover the surface of all PV arrays with opaque (dark) material before wiring. PV arrays produce electrical energy when exposed to light and could create a hazardous condition.

AVERTISSEMENT: Couper Toutes Les Sources d’alimentation Avant Le Dépannage.

WARNING: Connection of the DISCOM 1500 String Combiner Box with PV modules and a PV inverter to the electric utility grid must be done after receiving prior approval from the utility company and performed only by qualified personnel.

WARNING: The DISCOM 1500 String Combiner Box is designed to be used with a PV system where one of the two DC source conductors is grounded at the inverter. This guide assumes a negative grounded PV system.

For positive grounded PV systems, consult the full product manual or exchange the terms “negative” and “positive” below.

NOTE: If connecting the DISCOM 1500 String Combiner Box to a charge controller, substitute the term “charge controller” for “inverter” throughout this guide.
1.0 Introduction

The DISCOM 1500 is a commercial disconnecting fused string combiner for combining multiple strings of Photovoltaic (PV) modules for connection to an inverter. In a large PV array, each string of PV modules must be fused before being paralleled and connected to an inverter. The DISCOM 1500 is available in configurations from 8 to 24 PV source circuits and each source circuit is designed to utilize a fuse that is rated at least 156% of its short circuit current rating of the respective PV string source circuit. The fuse value for any source circuit should not exceed the PV module fuse rating. The DISCOM 1500 combiner box is rated for a maximum voltage of 1500VDC. Part numbers for the DISCOM 1500 are listed as:

### Part Number Matrix

Part number example  
**DISCOM15PS8X15A**  
*DISCOM Combiner box, 1500 VDC, Type 4 Powder Coated Steel, 8 Fused Positions, 15 A Fuse Installed*

**Model Name**  
DISCOM = DISCOM Disconnecting Combiner box

**Voltage**  
15 = 1500 VDC

**Enclosure Type**  
PS = Powder Coated Steel - Type 4
FG = Fiberglass - Type 4X

**Fuse Amperage**  
15A = 15 A

**Fused Positions**  
8X = 8 Fused Positions
10X = 10 Fused Positions
12X = 12 Fused Positions
14X = 14 Fused Positions
15X = 15 Fused Positions
16X = 16 Fused Positions
18X = 18 Fused Positions
20X = 20 Fused Positions
21X = 21 Fused Positions
24X = 24 Fused Positions

### 1.1 Disconnect Switch Operation

The DISCOM 1500 String Combiner Box contains a user-operable disconnect switch. When the disconnect switch handle is in the OFF position, the circuit is open between the ungrounded source conductors and the ungrounded output conductor(s). When the disconnect switch is in the ON position, the circuit is closed between the ungrounded source conductors and the ungrounded output conductor(s). The disconnect switch is fully load-break rated and can be safely operated under normal operating conditions when installation is per this guide and all warnings and ratings are observed.
### 2.0 Ratings Table

<table>
<thead>
<tr>
<th>Max Voltage</th>
<th>1500 VDC</th>
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<td>Type Rating</td>
<td>4, 4X</td>
</tr>
<tr>
<td>Ambient Operating Temp</td>
<td>-40°F to +122°F (-40°C to +50°C)</td>
</tr>
<tr>
<td>Weight</td>
<td>75 lbs (34kg)</td>
</tr>
<tr>
<td>Dimensions</td>
<td>30 x 24 x 8 in (762 x 610 x 203 mm)</td>
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</table>

<table>
<thead>
<tr>
<th>Number of Fused Inputs</th>
<th>8</th>
<th>10</th>
<th>12</th>
<th>14</th>
<th>15</th>
<th>16</th>
<th>18</th>
<th>20</th>
<th>21</th>
<th>24</th>
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<tbody>
<tr>
<td>Fuse Value (A)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>20</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Disconnect Ratings (A)</td>
<td>250-275</td>
<td>275-325</td>
<td>325-400</td>
<td>400</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Continuous Current (A)</td>
<td>96</td>
<td>120</td>
<td>144</td>
<td>168</td>
<td>180</td>
<td>192</td>
<td>216</td>
<td>240</td>
<td>252</td>
<td>288</td>
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<table>
<thead>
<tr>
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<th>10</th>
<th>12</th>
<th>14</th>
<th>15</th>
<th>16</th>
<th>18</th>
<th>20</th>
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</tr>
</thead>
<tbody>
<tr>
<td>Fuse Value (A)</td>
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<td></td>
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<td></td>
<td></td>
<td></td>
<td></td>
<td>20</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Disconnect Ratings (A)</td>
<td>250-275</td>
<td>275-325</td>
<td>325-400</td>
<td>400</td>
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<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Continuous Current (A)</td>
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<td>224</td>
<td>240</td>
<td>256</td>
<td>288</td>
<td>320</td>
<td>336</td>
<td>384</td>
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</table>

<table>
<thead>
<tr>
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<th>10</th>
<th>12</th>
<th>14</th>
<th>15</th>
<th>16</th>
<th>18</th>
<th>n/a</th>
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<th>n/a</th>
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<tbody>
<tr>
<td>Fuse Value (A)</td>
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<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>25</td>
<td>n/a</td>
<td>n/a</td>
</tr>
<tr>
<td>Disconnect Ratings (A)</td>
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<td>325-400</td>
<td>400</td>
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<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Continuous Current (A)</td>
<td>160</td>
<td>200</td>
<td>240</td>
<td>280</td>
<td>300</td>
<td>320</td>
<td>360</td>
<td>n/a</td>
<td>n/a</td>
<td>n/a</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Number of Fused Inputs</th>
<th>8</th>
<th>10</th>
<th>12</th>
<th>14</th>
<th>15</th>
<th>16</th>
<th>n/a</th>
<th>n/a</th>
<th>n/a</th>
<th>n/a</th>
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<tbody>
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<td>Fuse Value (A)</td>
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<td></td>
<td></td>
<td></td>
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<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Disconnect Ratings (A)</td>
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<td>325-400</td>
<td>400</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Continuous Current (A)</td>
<td>192</td>
<td>240</td>
<td>288</td>
<td>336</td>
<td>360</td>
<td>384</td>
<td>n/a</td>
<td>n/a</td>
<td>n/a</td>
<td>n/a</td>
</tr>
</tbody>
</table>

Table 2 – DISCOM 1500 Ratings Table
3.0 Installation

**WARNING:** These installation instructions are for use by qualified personnel only. To reduce the risk of electric shock, do not perform any installation unless qualified to do so.

**WARNING:** This manual contains important instructions for all DISCOM 1500 models that shall be followed during installation of the String Combiner Box.

The necessary steps to installing the DISCOM 1500 are unpacking, inspecting, mounting, conduit installation, wiring, testing, and commissioning.

3.1 Unpacking and Inspection

The DISCOM 1500s are thoroughly inspected and rigorously tested before they are shipped. Even though units are delivered in rugged cardboard packaging when shipped individually or on a pallet, it is possible that the units may become damaged during shipping. Inspect the combiner thoroughly after it is unpackaged. If any damage is noticed, document the damage with digital photos and immediately report the damage to the shipping company. If there is any question about potential shipping damage, contact Yaskawa – Solectria Solar. If it is determined that the unit must be returned, an RMA number must be obtained from Yaskawa – Solectria Solar prior to returning the unit. Take care not to set the combiner on a gravel roof or floor that may scratch the paint.

When unpacking, remove the cardboard shipping aids and the tape inside the enclosure.

3.2 Mounting

The DISCOM 1500 enclosure is rated either Type 4 or Type 4X and will maintain the rating with appropriate installation methods. “PS” is Type 4, powder-coated steel, and “FG” is Type 4X, fiberglass.

The string combiner box can be mounted vertically with the output conductors exiting the bottom of the unit. It can also be mounted flat on the enclosure back such that the back of the unit is parallel to the mounting surface and the door opens upward. The combiner can also be mounted at any angle between vertical and flat. See Diagrams 1 and 2 for string combiner box orientation and mounting positions.

The string combiner box weight is 56 or 75 lbs, depending on the model number. Be sure to verify the load capacity of a wall mounting area.

Mounting tabs allow simple mounting to a wall, array racking, or posts. Install the combiner in an accessible location following NEC codes for enclosure door and disconnect switch clearances and proximity to other equipment. Although not required, installation at waist or chest height allows easiest access and keeps the unit above potential snow line or drifts. Installers sometimes prefer lower installation heights for aesthetics or wind-loading reasons.

Although not required, the DISCOM 1500 String Combiner Box will achieve a maximum lifetime if located in the shade or partial shade.

Mount the combiner using the mounting tabs, shown in Figure 1.

3.3 Install Conduits

The use of UL514B or equivalent conduit fittings and UL50 installation methods are required to maintain the Type 4 or Type 4X rating of the enclosure. Failure to follow these standards may result in water intrusion into the unit through conduit connections and will void the warranty. Consult the Figures on following page for conduit entrances and exits. Output conductor conduits must be installed on the bottom of the unit. Source circuit conduits may be installed in any of the shaded regions. If mounted upright, it is not recommended to use the top wall conduit entry.
DISCOM 1500 Fuse Dimensions and Conduit Entry

Figure 1—Dimensions

Figure 2—Conduit Entry Locations, Bottom (Left) and Top (Right)

Figure 3—Conduit Entry Locations, Left (Left) and Right (Right)
3.4 Wiring

The DISCOM 1500 string combiner box must use copper source conductors only. For the PV output circuit feeders, either copper or aluminum conductors may be used, although due to terminal size restrictions, aluminum wiring may not be an option in all cases. As with any aluminum wiring exercise, follow best industry practices to ensure a reliable connection: thoroughly clean the conductor just prior to making the electrical connection and use an oxide inhibitor to prevent the formation of aluminum oxide. The input terminations for all models are rated for 90°C. The output terminations for the DISCOM 1500 are rated for 90°C. All wiring must be in accordance with local and national electrical codes.

3.4.1 Remove Fuses

⚠️ WARNING: Removing fuses from a live circuit may create dangerous arc-flash and shock hazards.

1. Confirm that the disconnect switch is in the OFF position. The window on the disconnect switch BODY should show the “O” (Off) switch status.
2. Remove each fuse from the touch-safe fuse holder for each source circuit. Store the fuses for later reinstallation (some orders are built with fuses separate, uninstalled).

3.4.2 Guard Removal

⚠️ WARNING: Removing the plastic guard exposes the installer to dangerous voltage and shock hazards.

⚠️ WARNING: Remove all fuses before proceeding with steps 3.4.2 through 3.4.7.

1. Hold the plastic guard.
2. Remove the two #10 screws using a Phillips #2 screw driver.
3. Gently remove plastic guard and store for reinstallation.
4. Store the two screws for reinstallation of the plastic guard.
3.4.3 Grounding

See NEC Article 690 for grounding instructions. A busbar has been provided for grounding module Equipment Grounding Conductors (EGCs). Torque each module EGC per the Torque table. The DISCOM 1500 String Combiner Box has a ground lug that should be used to connect the unit to the inverter EGC circuit. Torque the ground lug(s) per the Ratings Table in Section 2.0.

<table>
<thead>
<tr>
<th>Equipment Grounding Terminals</th>
<th>PV Output Circuit Equipment Grounding Terminals</th>
</tr>
</thead>
<tbody>
<tr>
<td>14 AWG – 4 AWG</td>
<td>14 AWG – 1/0 AWG</td>
</tr>
<tr>
<td>Torque to 20 in-lb, use Flathead screwdriver</td>
<td>Torque to 50 in-lb, use 3/16 in Allen Hex</td>
</tr>
<tr>
<td>Cu or Al Conductors</td>
<td>Cu or Al Conductors</td>
</tr>
</tbody>
</table>

Table 3 – Grounding Terminals

Under no circumstance is the factory-installed door bonding-wire, nor associated door bonding posts, to be used for any other grounding/bonding purposes.

3.4.4 PV Source Conductors

See NEC Articles 310 and 690 for proper source circuit conductor sizing.

Acceptable DISCOM 1500 inputs are restricted to copper for both ungrounded and grounded source circuit inputs.

<table>
<thead>
<tr>
<th>Positive Conductor</th>
<th>Negative Conductor</th>
</tr>
</thead>
<tbody>
<tr>
<td>14 AWG – 6 AWG</td>
<td>14 AWG – 6 AWG</td>
</tr>
<tr>
<td>Torque to 18 in-lb, use Phillipshead screwdriver</td>
<td>Torque to 20 in-lb, use Flathead screwdriver</td>
</tr>
<tr>
<td>90°C Terminations, Cu Conductors Only</td>
<td>90°C Terminations, Cu Conductors Only</td>
</tr>
</tbody>
</table>

Table 4 – Conductors

Connect the ungrounded source circuit conductors to the touch-safe fuse holders, one conductor per fuse holder; torque each source circuit conductor as described above. Route all ungrounded source circuit conductors such that the installation is neat and orderly.

Connect the grounded source circuit conductors to the grounded source circuit terminal block, one conductor per screw terminal; torque each grounded source circuit conductor as described above. Route all grounded source circuit conductors such that the installation is neat and orderly.
3.4.5 PV Output Circuit Conductors for Crimp Lugs

Yaskawa – Solectria Solar provides stud plates with 3/8 in studs for customer supplied compression lugs for both positive and negative output. This option must be ordered from the factory at the time of the DISCOM 1500 order. The terminals are rated for 90°C. The wiring ranges in the table below are based off of the 75°C portion of NEC Table 310.15(B)(16). Refer to NEC Articles 310 and 690 for proper sizing of output conductors for use in DISCOM 1500 units. One or two lugs allowed.

NOTE: Yaskawa – Solectria Solar requires a back-up wrench to hold the negative terminal block while tightening the nut for the crimp lug to reach the required torque value of 280in-lb. Failure to do so will result in damage to the insulated negative terminal support and will void warranty. See Picture 1 below.

![Figure 5 – Crimp Lug Locations](image1)

![Picture 1 – Crimp Lug with Backup Wrench](image2)

<table>
<thead>
<tr>
<th>Negative Output Conductors</th>
<th>Positive Output Conductors</th>
</tr>
</thead>
<tbody>
<tr>
<td>Use Hardware Provided (2 nuts, 2 Belleville washers, 2 flat washers)</td>
<td>Use Hardware Provided (2 nuts, 2 Belleville washers, 2 flat washers)</td>
</tr>
<tr>
<td>Torque to 280in-lb, use 9/16” Socket</td>
<td>Torque to 280in-lb, use 9/16” Socket</td>
</tr>
<tr>
<td>90°C Terminations, Cu or Al Conductors</td>
<td>90°C Terminations, Cu or Al Conductors</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Number of Fused Inputs</th>
<th>Wire Terminal Temperature Rating</th>
<th>Number of Terminals</th>
<th>Number of Wires per Terminal Allowed</th>
<th>Max Conductor Size Allowed (Copper or Aluminum Conductors)</th>
</tr>
</thead>
<tbody>
<tr>
<td>8 – 24</td>
<td>90°C</td>
<td>1</td>
<td>1-2</td>
<td>(2) 600 kcmil or (1) 750 kcmil</td>
</tr>
</tbody>
</table>

Table 5 – Output Conductors
No compression lugs are provided with the DISCOM 1500 string combiner box unit. The lugs must conform to the specifications given in the table below:

<table>
<thead>
<tr>
<th>Lug Type</th>
<th>Hole Spacing</th>
<th>Plating</th>
<th>Max. Tongue Width</th>
</tr>
</thead>
<tbody>
<tr>
<td>Two-Hole</td>
<td>1.75in</td>
<td>Tin Plated</td>
<td>1.95in</td>
</tr>
</tbody>
</table>

**Table 6 – Lug Specifications**

**NOTE:** If using aluminum conductors, only use lugs that are explicitly listed for use with aluminum conductors. Use wire cleaning and anti-corrosive paste as specified by lug manufacturer.

For the hardware on the crimp lug option, use the following stack-up for each stud. Studs on positive or negative output plate, crimp lug, 1 flat washer, 1 Belleville washer, and 1 nut (negative output shown).

![Figure 6 – Compression Lug Hardware Stack-up](image)

![Figure 7 – Compression Lug Hardware Stack-up for Two Parallel Conductors](image)

### 3.4.6 Final Steps

**WARNING:** Verify the proper polarity of each source conductor. Polarity reversal can lead to dangerous arc-flash conditions capable of harming personnel and equipment.

**WARNING:** Check the string combiner box for tools and ensure the unit is clean and orderly.

1. Verify all connections meet the requirements of this Installation and Operations Guide.
2. Check all source circuit voltages and polarities.
3. Reinstall the plastic guard.
4. Install all fuses.
5. Close the string combiner door, ensuring that the door is securely closed using the enclosure latches.
4.0 Operating Instructions

⚠️ WARNING: Do not operate the disconnect handle switch with the String Combiner Box door open.

The DISCOM 1500 String Combiner Box contains a user-operable disconnect switch. When this disconnect switch handle is in the OFF position, the circuit is open between the ungrounded source conductors and the ungrounded output conductor(s). When the disconnect switch is in the ON position, the circuit is closed between the ungrounded source conductors and the ungrounded output conductor(s) (see Diagram 3).

The disconnect switch is fully load-break rated and can be safely operated under normal operating conditions when installation is per this manual and all warnings and ratings are observed.

5.0 Warranty & RMA Instructions


6.0 Appendices

6.1 Appendix A – DISCOM Datasheet


6.2 Appendix B – Contact Information

Yaskawa – Solectria Solar
360 Merrimack Street
Building 9, 2nd Floor
Lawrence, Massachusetts 01843
USA

Tel: 978.683.9700
Fax: 978.683.9702

Sales/General Info: inverters@solectria.com
Customer Support: service@solectria.com
Website: [www.solectria.com](http://www.solectria.com)

6.3 Appendix C – Authorized Distributors

7.0 UL1741/CAS Certification Letter

AUTHORIZATION TO MARK

This authorizes the application of the Certification Mark(s) shown below to the models described in the Product(s) covered when made in accordance with the conditions set forth in the Certification Agreement and Listing Report. This authorization also applies to multiple listee model(s) identified on the correlation page of the Listing Report.

This document is the property of Intertek Testing Services and is not transferable. The certification mark(s) may be applied only at the location of the Party Authorized To Apply Mark.

Applicant: Solectria Renewables, LLC
Manufacturer: Solectria Renewables, LLC
Address: Bldg 9, Floor 2
Bldg 9, Floor 2
LAWRENCE, MA 01843
LAWRENCE, MA 01843

Country: USA
Contact: Jihua Ma (primary)
Phone: (978) 683-9700
Fax: (978) 683-9702
Email: jihua.ma@solectria.com

Party Authorized To Apply Mark: Same as Manufacturer
Report Issuing Office: Cortland NY 13045
Control Number: 3058249
Authorized by: [Signature]
for Dean Davidson, Certification Manager

This document supersedes all previous Authorizations to Mark for the noted Report Number.

Intertek Testing Services NA Inc.
545 East Algonquin Road, Arlington Heights, IL 60005
Telephone 800-345-3851 or 847-436-9867 Fax 312-283-1672

UL Standard for Safety for Inverters, Converters, Controllers and Interconnection System Equipment for Use With Distributed Energy Resources, UL 1741

CSA C22.2 #107.1 2001/06/01 Ed.3 General Use Power Supplies - (R2011)

Product: String Disconnecting PV Combiner Box

<table>
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<th>Models:</th>
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<tbody>
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<td>DISCOM 1500 Installation and Operations Guide</td>
</tr>
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Yaskawa – Solectria Solar
Yaskawa – Solectria Solar

DISCOM 1500 Installation and Operations Guide

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