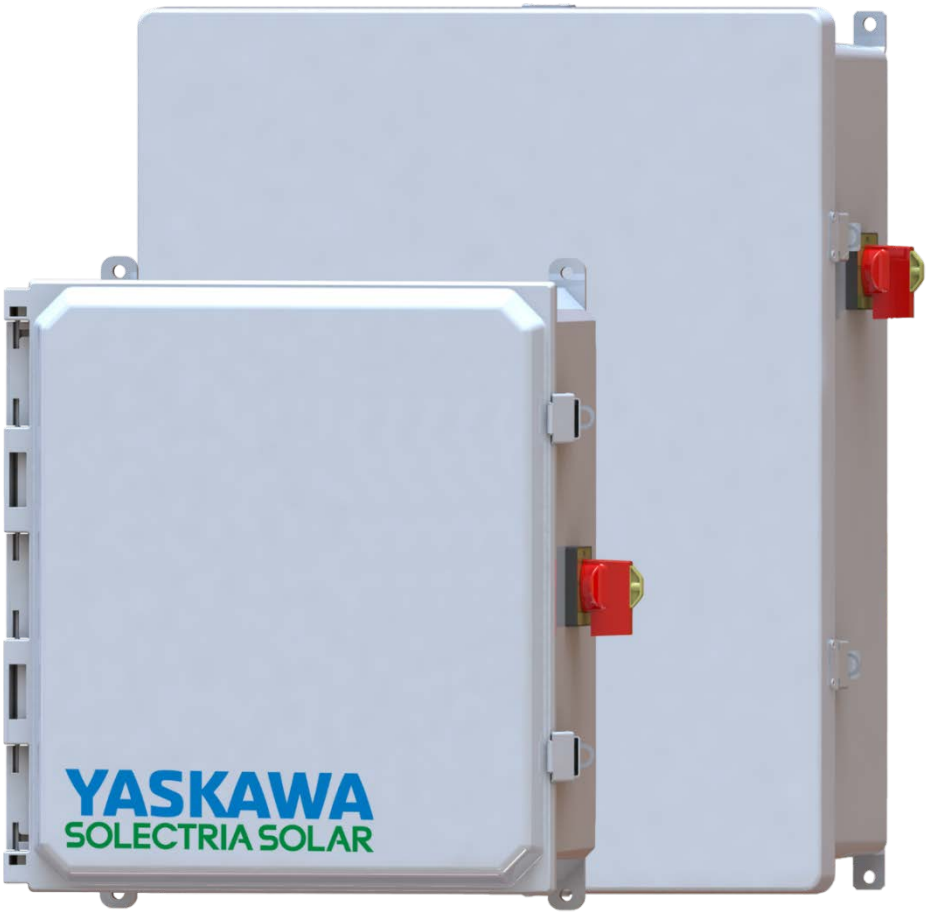
YASKAWA SOLECTRIA SOLAR

Commercial Rapid Shutdown Combiner

RSDCOM

Installation and Operation Guide

Models:	RSDCOM M-1Z-4F	RSDCOM M-2Z-4F-24V
	RSDCOM M-1Z-5F	RSDCOM M-2Z-5F-24V
	RSDCOM M-2Z-4F	RSDCOM M-2Z-4F-24V
	RSDCOM M-2Z-5F	RSDCOM M-2Z-5F-24V



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RSDCOM Installation and Operation Guide

IMPORTANT SAFETY INSTRUCTIONS
SAVE THESE INSTRUCTIONS

INSTRUCTIONS IMPORTANTES
CONCERNANT LA SÉCURITÉ

Before installing or using the Commercial Rapid Shutdown Combiner (RSDCOM), please read all instructions and caution markings in this manual and on the combiner, as well as on the PV modules, PV inverter, and Charge Controller.

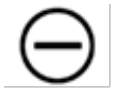
This manual contains important instructions that shall be followed during installation and operation of RSDCOM. To reduce the risk of electrical shock, and to ensure the safe installation and operation of the combiner, the following safety symbols are used to indicate dangerous conditions and important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

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

WARNING
Could Injure Personnel or Damage Equipment

Instructions for Qualified Personnel Only

Positive Connection Point Symbol



Negative Connection Point Symbol

Ground Connection Point Symbol

DC Electrical Connection Point Symbol

WARNING: The RSDCOM contains no user serviceable parts. For maintenance, please contact Yaskawa – Solectria Solar 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 RSDCOM 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 RSDCOM is designed to be used with a transformerless (TL) PV string inverter or other ungrounded inverter or system. This guide assumes a floating, ungrounded PV system. Both positive and negative polarities are fused and switched.

1.0 Introduction

1.1 Product Overview

The Commercial Rapid Shutdown Combiner (RSDCOM) is a rapid shutdown, fused string combiner that meets the array-level rapid shutdown requirements of NEC 2014 and NEC 2017 Article 690.12. The unit integrates with Yaskawa – Solectria Solar PVI 14/20/23/28/36/50/60TL three-phase transformerless, string inverters. The combiner may be used with additional string inverters with an MPPT zone input capacitance of 65 µF or less. The RSDCOM allows for operation of 1 or 2 Maximum Power Point Tracking (MPPT) zone configurations with up to 5 strings per MPPT zone, depending on the model.

Array disconnect is automatic upon loss of AC power at the site, per NEC 690.12. The unit uses a 208-277 VAC input or a 24VDC input for the control power. A disconnect can also be located remotely from the combiner as an additional shutdown method. A local, lockable disconnect is provided on the unit as well.

1.2 Part Number Matrix

Part number example

RSDCOM-M-1Z-5F-24V

Rapid shutdown combiner, customer-supplied external 24VDC supply to be wired into the unit, 1 MPPT zone, 5 string, no fuses

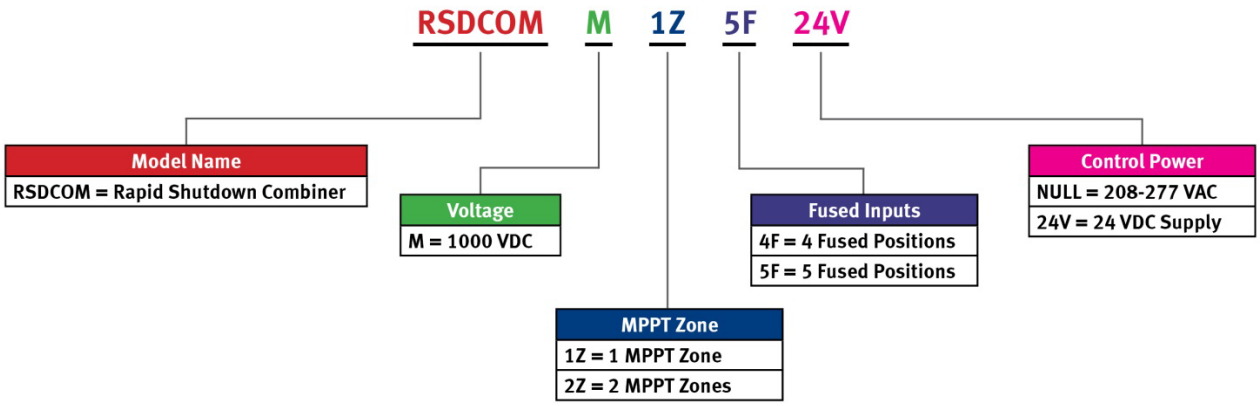
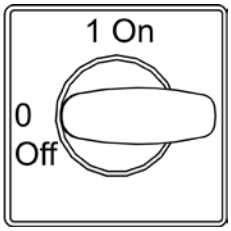


Table 1-1 – RSDCOM Part Number Matrix

1.3 Disconnect Switch Operation

OFF

No output power



ON

Output power if control power present

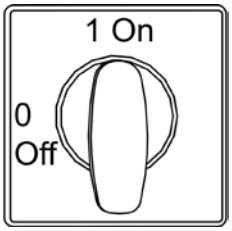


Figure 1-1 – Disconnect Switch (lockable)

The disconnect switch can be locked when in the OFF position.

2.0 Ratings Table

	1 MPPT Zone		2 MPPT Zones	
Max Voltage	1000 VDC			
Control Power	208-277 VAC / 0.6 A max or 24 VDC			
Enclosure Rating	4 or 4X			
Ambient Operating Temp	-40°F to +122°F (-40°C to +50°C)			
Weight	18 lbs (8.2 kg)		29 lbs (13.2 kg)	
Dimensions	14 x 12 x 6 in (356 x 309 x 152 mm)		20 x 16 x 8 in (508 x 406 x 203 mm)	
Number of Fused Inputs	**4**	**5**	**4**	**5**
15 A Fuse Value	4 Fuses	5 Fuses	8 Fuses	10 Fuses
20 A Fuse Value	3 Fuses	N/A	6 Fuses	N/A
30 A Fuse Value	2 Fuses	N/A	4 Fuses	N/A

Table 2-1 – RSDCOM 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 RSDCOM models that shall be followed during installation of the Combiner.

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

3.1 Unpacking and Inspection

The RSDCOM 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 the units may become damaged during shipping. Upon receiving, 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.

When unpacking, remove any cardboard shipping aids and the tape inside the enclosure. The mounting tabs and associated hardware may be inside the unit.

3.2 Mounting

The RSDCOM may be mounted vertically with input conductors exiting the bottom-left side of the unit. It may 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 may also be mounted at any angle between vertical and flat, as shown in Figure 3-1 at 90°, 45°, and 0°.

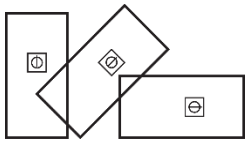


Figure 3-1 Mounting Angle

The string combiner box weight is 18-29 lbs, depending on the model number. Be sure to verify the load capacity of a wall mounting area.

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

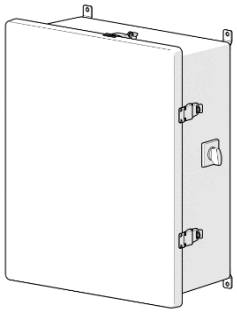


Figure 3-2 Mounting Tabs

Although not required, the RSDCOM will achieve a maximum lifetime if located in the shade or partial shade.

Ensure the disconnect switch is set to OFF, as shown below.

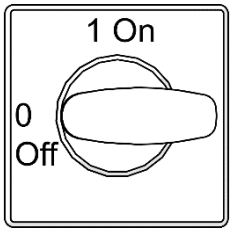


Figure 3-3 Disconnect Switch

3.3 Install Conduits

WARNING: Do not create conduit entrances and exits in a place that interferes with the internal components.

The use of UL514B or equivalent conduit fittings and UL50 installation methods are required to maintain the Type 4 or 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 Figure 3-4 for conduit entries. Installing conduit entries in other places may interfere with internal components. Output conductor conduits must be installed on the bottom. Source circuit conduits may be installed in any of the shaded regions. Do not use the top wall for conduit entry.

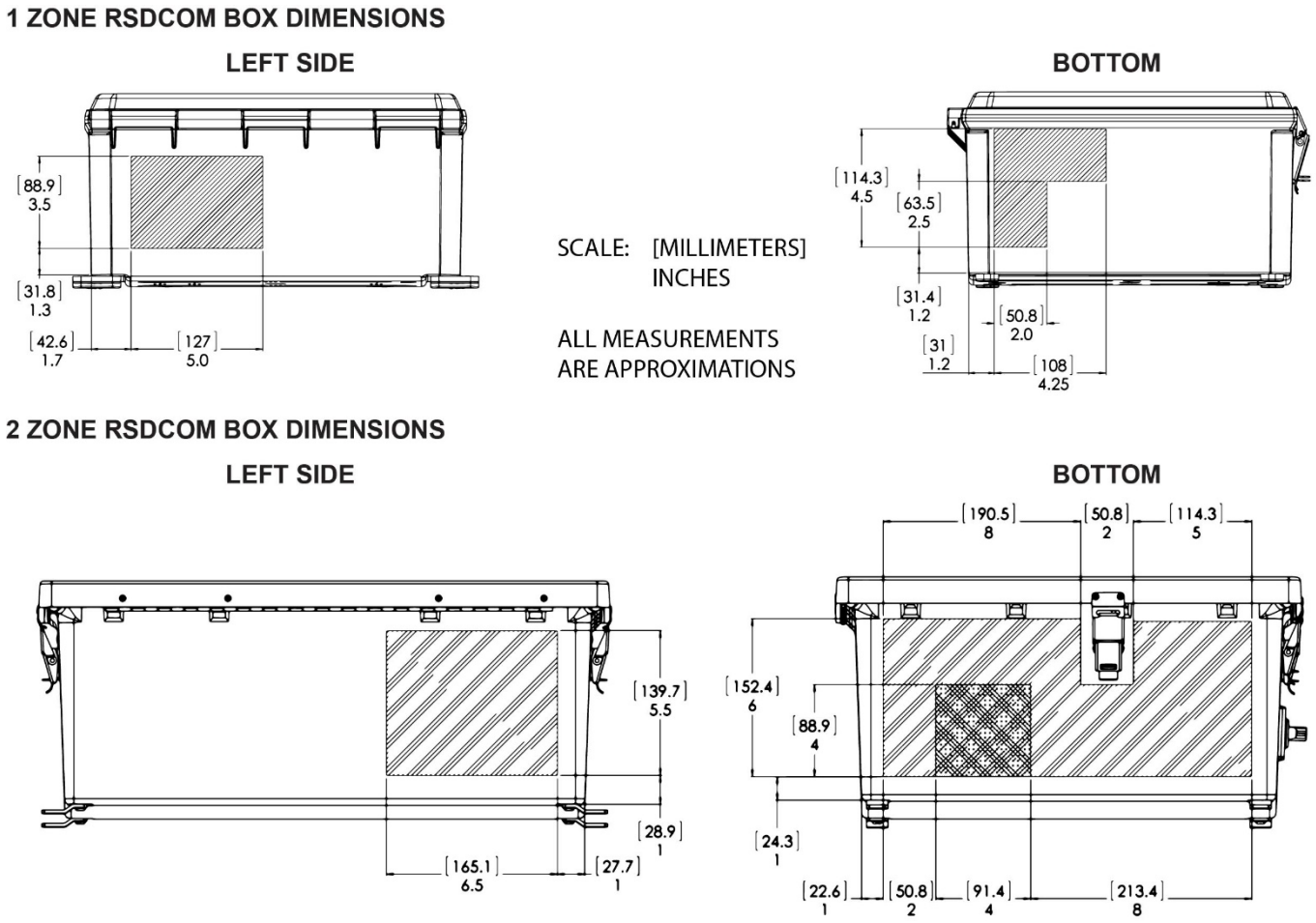


Figure 3-4 Conduit Entries

3.4 Wiring

The RSDCOM requires copper PV source circuit conductors only. For the PV output circuit feeders, either copper or aluminum conductors may be used. Due to terminal size restrictions, aluminum wiring may not be an option in all cases. As with any aluminum wiring, follow best industry practices to ensure a reliable connection by thoroughly cleaning the conductor just prior to making the electrical connection and using an oxide inhibitor to prevent the formation of aluminum oxide. Both input and output terminations for all models 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.

Note: The unit is not shipped with fuses unless the fuses option is ordered. Refer to section **5.1 – Fuses**. Remove all fuses as shown in Figure 3-5.

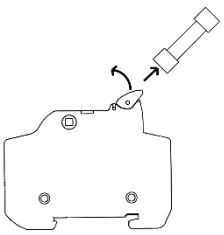


Figure 3-5 Removal of Fuses

3.4.2 Grounding

Connect both input and output equipment DC ground wires to the ground terminal on the left, hinge side of the box.

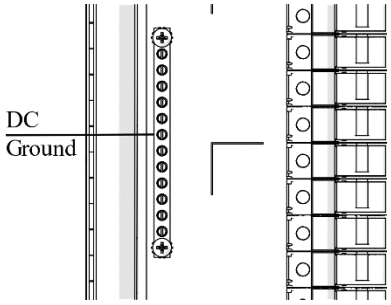


Figure 3-6 DC Ground

Use 14AWG – 4AWG copper wire. Attach only 1 wire per terminal. Tighten with a slotted screwdriver to 20 in-lbs. Use of oxide inhibitor paste is recommended.

3.4.3 PV Source Conductors

Connect PV source circuit conductors to fuse holders. Shown in Figure 3-7 are connections for 2 MPPT zones with 4 strings. The zones are kept separate with positive (+) on top and negative (-) below. Ensure polarity matches.

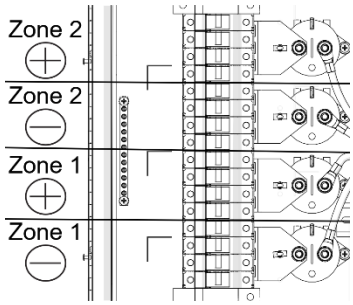


Figure 3-7 Fuse Holder Connections – 2MPPT Zones with 4 Inputs

Keep all strings within the MPPT zone desired. Be sure to never connect positive (+) of a string in one zone and the negative (-) to a different zone.

1 or 2 wires may be attached at each fuse holder. For 1 wire, use 12AWG – 6AWG wire. For 2 wires, use 12 AWG – 10 AWG wire. Tighten with a Phillips #2, 6mm diameter shank screwdriver to 20 in-lbs.

Note: Use the 2 wires per terminal only when connecting 2 strings and 30A fuses are in use.

3.4.4 PV Output Circuit Conductors

Connect the output circuit conductors to the terminal blocks. Shown in Figure 3-8 are the connections for the 2 MPPT zone unit with the AC power supply. With the 1 MPPT zone unit, there will be only one pair of positive and negative terminals. Ensure that the polarity matches.

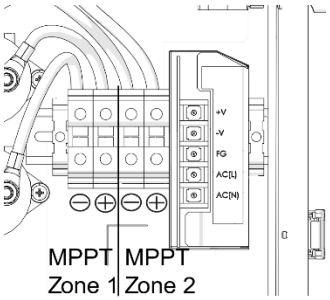


Figure 3-8 Fuse Holder Connections – 2MPPT Zones with Power Supply

Use 6AWG – 2AWG copper or aluminum wire. Attach only 1 wire per terminal. Tighten with a slotted screwdriver to 28 in-lbs.

3.4.5 Control Power

The RSDCOM offers control power from two sources. This is determined by the model number. RSDCOM models ending with "-24V", refer to 24 VDC control power, supplied by the customer. This is explained in section **3.4.5.b – Customer Provided 24VDC Input**. For all other models, refer to the section **3.4.5.a – AC Power Supply**.

3.4.5.a AC Power Supply

Connect AC control power circuit conductors to the power supply at terminals marked AC(L) and AC(N). Shown in Figure 3-9 is the 2 MPPT zone unit with the power supply. The power supply is in a different place in the 1 MPPT zone unit. Use 208, 240, or 277 VAC.

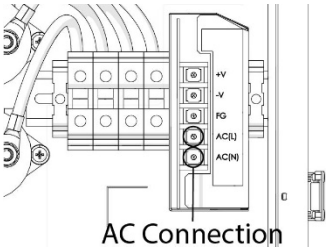


Figure 3-9 – 2 MPPT Zone Unit with the AC Power Supply

Use a 14AWG – 10AWG wire with matching #6 stud fork terminal. Tighten with a Phillips screwdriver to 5 in-lbs.

Note: Having multiple units using the same input control wires or running the wires long distances may affect the minimum wire size. Make sure that at least 208VAC reaches all units.

3.4.5.b Customer Provided 24VDC Input

Connect the 24VDC control power circuit conductors to the push-in terminal.

Use 16AWG-12AWG wire. Push a slotted instrument screwdriver in the square hole and then insert the wire into the round hole. Tug the wire to ensure it is connected.

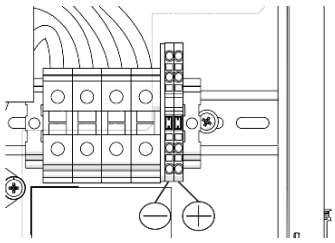


Figure 3-10 – 2 MPPT Zone Unit with Customer Provided 24VDC Input

Note: Having multiple units using the same input control wires or running the wires long distances may affect the minimum wire size. Make sure that at least 21±0.1VDC reaches all units and account for 3.9A (0.08s) surge (turn-on) current.

3.4.6 Connecting to PVI 14-60TL

WARNING: Wiring to or removing fuses from a live circuit may create dangerous arc-flash and shock hazards.

De-energize the string inverter before installing RSDCOM inputs.

3.4.6.a Connecting to PVI 14-20TL

Fuse bypass kits are not supported for these models. Connect directly to the terminals above fuses.

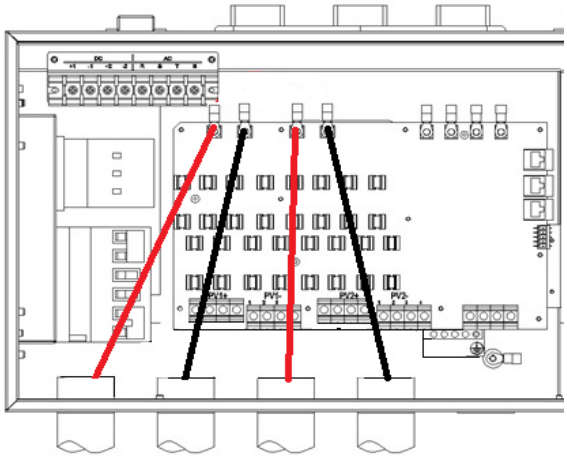


Figure 3-11 – PVI 14-20TL Bypass 2 MPPTS

For 1 MPPT (paralleling) zone bypass (to combine 2 MPPTs to 1), add jumpers connecting the 2 negatives (black) to each other and the 2 positives (red) to each other. Refer to DC Connections from the PV Array in the PVI 14/20TL-Installation and Operation Manual. Do not use zone bypass jumpers (paralleling of the two zones) if using the 1MPPT RSDCOM product. Zone bypass (paralleling) is only allowed in PVI 14-36TL units in combination with the 2-Zone RSDCOM unit. In all cases, it is recommended to operate in the individual MPPT mode.

WARNING: Ensure that the polarity matches before powering on inverter. Polarity mismatch will create an arc-flash hazard once power is applied.

3.4.6.b Connecting Output to PVI 23-60TL

Remove fuses before installing the bypass.

Install the bypass kit that corresponds to the string inverter, as shown below.

Inverter Model	Bypass Kit Part Number	Kits for 1 MPPT Zone	Kits for 2 MPPT Zones
PVI 23TL, PVI 28TL, PVI 36TL	OPT-FUSEBYPASS-PVI-23-36TL	1	2
PVI 50TL, PVI 60TL	OPT-FUSEBYPASS-PVI-50-60TL	1	2

Table 3-1 – Inverter Bypass Kits

Attach the output from the RSDCOM to the screw of the bypass kit. Use a stud ring terminal with an inner diameter of at least 6 mm or ¼ inch that matches the size of the PV Output Circuit Conductors of the RSDCOM Installation Summary Table.

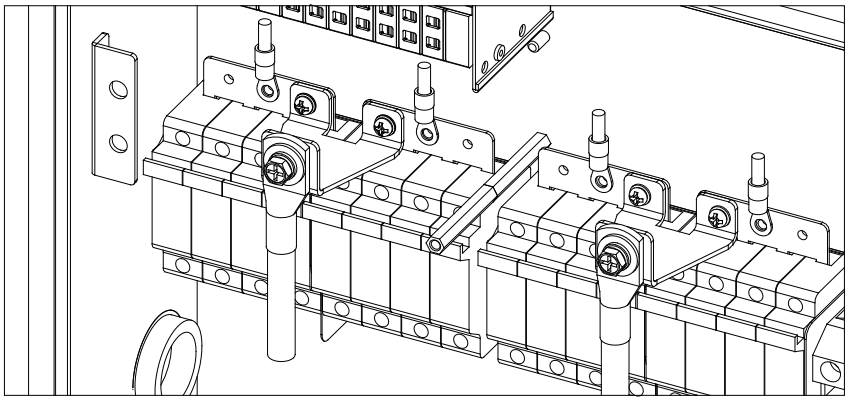


Figure 3-12 – FUSEBYPASS-PVI-23-36TL 1 MPPT

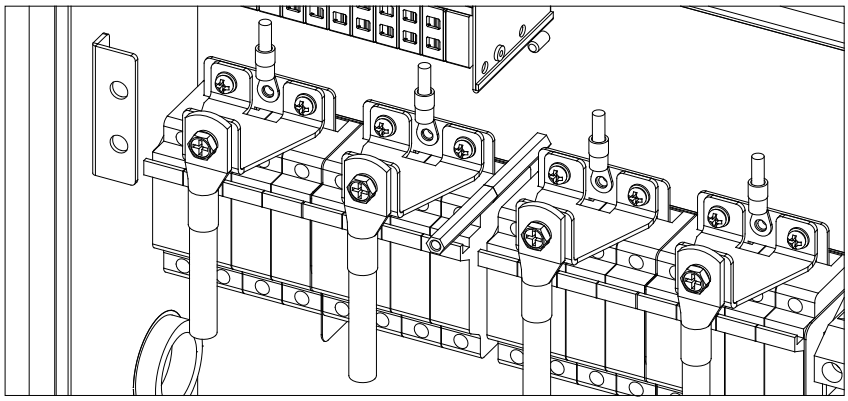


Figure 3-12 – FUSEBYPASS-PVI-23-36TL 2 MPPTs

Figure 3-13 FUSEBYPASS-PVI-50-60-TL 3 MPPTS

For 1 MPPT zone bypass (paralleling), keep the jumpers connecting the 2 negative (black) to each other and the 2 positives (red) to each other. Refer to DC Connections from the PV Array in the PVI 23-36TL-Installation and Operation Manual. If you want to operate in the individual MPPT mode, remove these zone bypass (paralleling) jumpers. Do not use zone bypass jumpers (paralleling of the two zones) if using the 1MPPT RSDCOM product. Zone bypass (paralleling) is only allowed in PVI 14-36TL units in combination with the 2-Zone RSDCOM unit. In all cases, it is recommended to operate in the individual MPPT mode.

WARNING: Ensure that the polarity matches before powering on inverter. Polarity mismatch will create an arc-flash hazard once power is applied.

3.4.7 Wiring Summary Tables

Connection	Wire Size	Torque	Screwdriver	Notes
Ground	14AWG-4AWG	20 in-lbs	Slotted	Copper only
PV Source Conductors	12AWG-6AWG (1) 12AWG-10AWG (2)	20 in-lbs	Phillips	1 or 2 wires per terminal, see number in parentheses Copper only
PV Output Circuit Conductors	6AWG-2AWG	28 in-lbs	Slotted	Copper or aluminum
Control Power – Power Supply	14AWG-10AWG	5 in-lbs	Phillips	208-277 VAC, use matching #6 stud fork terminals
Control Power – Customer Provided 24 VDC Input	16AWG-12AWG	N/A	Instrument slotted	Round hole: wire Square hole: screwdriver

Table 3-2 – RSDCOM Installation Summary Table

	AC Power Supply	24VDC
Voltage Range	208 – 277 V	21±0.1 – 26 V
Surge Current	N/A	2.8A (0.04s)
Continuous Current	0.087A(rms)	0.6A

Table 3-3 – RSDCOM Control Inputs 1 MPPT Zone

	AC Power Supply	24VDC
Voltage Range	208 – 277 V	21 – 26 V
Surge Current	N/A	3.9A (0.08s)
Continuous Current	0.17A(rms)	1.2A

Table 3-4 – RSDCOM Control Inputs 2 MPPT Zones

3.4.8 Final Steps

WARNING: Verify the proper polarity of each source conductor and correct matching MPPT zone. 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.

WARNING: Installing fuses in a live circuit may create dangerous arc-flash and shock hazards.

1. Verify all connections meet the requirements of this Installation and Operations Guide.
2. Check all source circuit voltages and polarities.
3. Ensure the disconnect switch is set to OFF.
4. Install all fuses as shown on right.

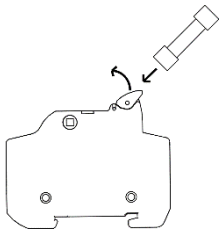


Figure 3-11 Installation of Fuses

5. Close RSDCOM door, ensuring door is securely closed using enclosure latches.
6. Apply both nylon 7 inch tie-wraps to the rings of 2 door latches to lock enclosure.

4.0 Operating Instructions

The combiner box is controlled by the disconnect switch and either the power supply or a 24VDC control power input.

The disconnect switch is user operable. When both the control power is present and the disconnect switch is on, a red LED on the circuit board will illuminate. This indicates the RSDCOM enables the flow of power from the input to output conductors.

If either the control power is absent or the disconnect switch is set to off, the RSDCOM prevents the flow of power from the input to the output conductors.

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. See Disconnect Switch Operation for positioning the switch.

5.0 Options

Additional options are available for order with the RSDCOM. These must be included in an order as they are factory installed options.

5.1 Fuses

The RSDCOM will be shipped with 15A, 20A, or 30A fuses installed. Fuses are typically moved from inverter to combiner and not included with combiner.

5.2 Surge Arrestor

The RSDCOM will be shipped with one surge arrestor next to each zone (1 installed in 1 zone combiner, 2 installed in 2 zone combiner) to protect against abnormal voltage. Specify either 600V or 1000V.

5.3 MC4 or H4 Whips

The RSDCOM will be shipped with MC4 or H4 whips, making the source circuit connections easier.

6.0 Warranty and RMA Instructions

For all warranty information, please visit:

http://solectria.com/support/documentation/warranty-information/grid-tied-inverter-warranty-letter/

7.0 Appendices

7.1 Appendix A: Datasheet

https://solectria.com/support/documentation/inverter-datasheets/commercial-rapid-shutdown-combiner/

7.2 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
Technical Support and Service: 978.683.9700
Website: www.solectria.com

7.3 Appendix C: Authorized Distributors

https://solectria.com/pv-inverters/how-to-buy/