RAND PV
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Solar Combiner Installation Manual

Model No.: CBDC-2P-16L-1-25A

16 string - 1500V 400A – Dual Fused Polarity

Table of Contents

1. Introduction
    - Purpose and Functionality
    - Specifications of the Solar Combiner Box
2. Safety Precautions
    - Symbols and Meanings
        - Hazard
        - Warning
    - General Precautions
3. Component Layout
4. Recommended Installation/Maintenance Tools
5. Mounting, Enclosure
    - Mounting Bracket Device
    - Mounting Hardware
    - Pre-Installation Checks
    - Positioning
    - Attachment
    - Grounding
    - Clearance
    - Final Inspection Note
6. Electrical Connections
    - Installing Fuses
    - Output Connections
    - Grounding and Bonding
    - Input Connections
        - Connecting the MC4 Connectors
        - Disconnecting MC4 Connectors
7. Torque Values
    - General Torque Values
    - Wire Torque Guidelines
8. Operating the Disconnect Switch
    - Importance and Functionality
9. Maintenance and Troubleshooting
    - Inspection and Fuse Check
10. Warranty and Contact Information
    - Warranty Details
    - Contacting Customer Support
11. Additional Safety Warnings and Precautions
    - Precautionary Measures

Field Installation Manual for Solar Combiner Box

1. **Introduction** This manual provides instructions for the installation and operation of the solar combiner box. The combiner box is designed to collect and combine the output of multiple photovoltaic (PV) strings, provide overcurrent protection, and facilitate safe disconnection from the PV system. It is rated for 1500V DC 400A.

2. **Safety Precautions**

- Symbols

1. Hazard: This icon is displayed next to instructions and warnings related to high voltage locations that can harm the person doing the installation and maintenance.

2.  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 the RAND PV equipment and/or other equipment connected to the RAND PV equipment or personal injury.

- CAUTION: Risk of electric shock. Always disconnect all power sources before working on the solar combiner box.

- Only trained and qualified personnel should install, operate, and maintain the solar combiner box.

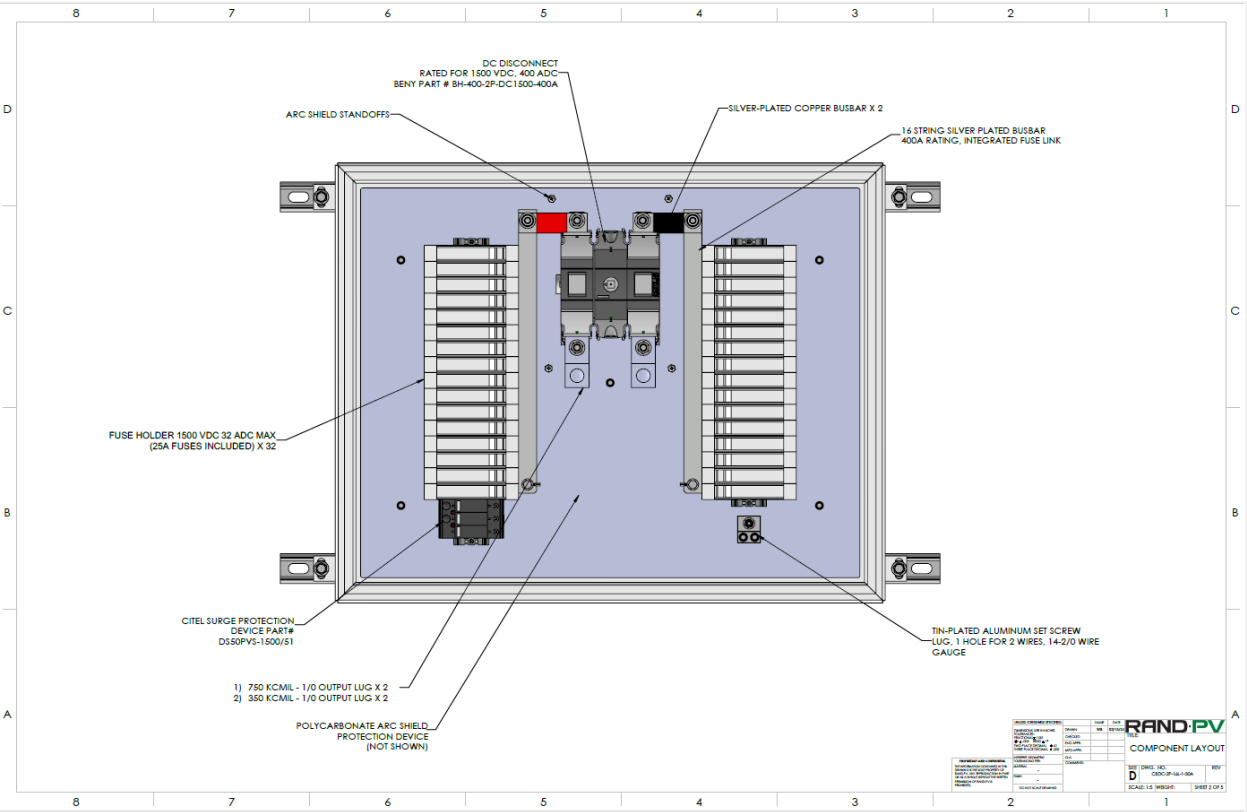
- Follow all local electrical codes and safety guidelines during installation, operation, and maintenance.

- Use appropriate personal protective equipment (PPE), such as safety glasses, gloves, and insulated tools.

- Do not attempt to install or operate the combiner box if you are not a qualified electrician or installer.

- Inspect the solar combiner box for damage or revisions of the origin before installation and operation. Do not use damaged equipment.

3. Component Layout



4. Recommended Installation/Maintenance Tools

- Torque Screwdrivers (5-25 in. lbs.)
- No. 1 & 2 Phillips head screwdriver/bits
- Torque wrench (20-100 in. lbs.)
- 17mm Socket (Bolt)
- 15mm Open-end wrench (Nut)
- Cable cutter
- Wire stripper
- Multimeter
- Appropriate mounting hardware
- Marking paint pen

5. Mounting

- When mounting the solar combiner box, follow these guidelines to ensure a secure and stable installation:

    1. Choose a mounting bracket design that is compatible with the weight and dimensions of the solar combiner box. The mounting device should have sufficient load-bearing capacity to support the combiner box and any additional accessories or wiring.

- Mounting Hardware

    1. Select appropriate mounting hardware, such as bolts, nuts, washers, and spring nuts, that are compatible with the chosen mounting devices and the combiner box's mounting brackets.

    2. Ensure that the mounting hardware is made of durable and corrosion-resistant materials suitable for outdoor use to maintain long-term stability and safety.

- Pre-Installation Checks

    1. Inspect the Combiner Box enclosure surface for shipping damage, corrosion, or any deformation that could compromise the structural integrity. Replace any damaged or compromised mounting devices before proceeding with the installation.

    2. Confirm the mounting device can be securely attached to the mounting post using appropriate anchors or fasteners.

- Positioning

    1. Place the solar combiner box on the mounting post, aligning the height and position of the combiner box. Use the mounting holes on the enclosure bracket flange with the holes of the mounting device. Ensure that the combiner box is positioned correctly, and all conduits and cable entries are accessible and unobstructed.

- Attachment

    1. Insert the mounting bolts through the combiner box's mounting flange with the corresponding hardware and mounting design.

    2. Add washers and nuts to the backside of the flange bracket and tighten them securely using the appropriate tools, such as a socket wrench.

    3. Ensure that the combiner box is level and aligned properly before fully tightening all mounting hardware.

- Grounding

1. Maintain proper grounding of the solar combiner box with the mounting bracket. The combiner box should be bonded to the grounding conductor and follow NEC or local electrical codes for grounding requirements.

- Clearance

1. Ensure that there is adequate clearance between the combiner box and any nearby objects or surfaces, as specified in the NEC and/or local electrical codes.
2. Please be aware of flood zones or means of a water rise issue.

- Final Inspection

1. After mounting, conduct a visual inspection to verify that the combiner box is securely attached to the mounting post, strut channel, or other mounting devices without any loose connections or signs of damage.
2. Confirm that the combiner box is properly oriented and positioned for easy access during maintenance and inspections.

Note: The mounting process may vary based on the specific combiner box model. If you encounter any difficulties or uncertainties during the installation process, seek assistance from qualified personnel or contact the manufacturer's customer support for further guidance.

6. **Electrical Connections**

- *Installing Fuses*

1. Determine the appropriate fuse rating for each input circuit based on the PV string's maximum current and NEC or local electrical code requirements. The proper fuse rating will be posted on the inside of the combiner box door.

2. Install the fuses in the designated fuse holders or terminals, ensuring proper seating and secure connections.

- *Output Connections*

1. Connect the output wires from the combiner box to the inverter or other downstream equipment, following the manufacturer's recommendations for wire sizing and routing.

2. Ensure that the output wires are properly sized, torqued, secured, and strain relieved.

- *Grounding and Bonding*

1. Connect the combiner box to the system grounding conductor and grounding electrode, following the NEC or other relevant electrical codes.

2. Ensure that all accessory components are properly bonded to maintain electrical continuity and prevent potential differences between conductive parts.

- *Input Connections*

1. Connecting the MC4 Connectors
    a. Align the male and female MC4 connectors. Ensure they are free from dirt or debris.
    b. Push the connectors together. You should hear a click sound, indicating they are securely connected.
    c. To ensure a secure connection, you can use the MC4 assembly/disassembly tool or a pair of needle-nose pliers. This tool will help you properly engage the connectors and will also be useful if you need to disconnect them later.

2. To Disconnect MC4 Connectors
    a. If you need to disconnect the MC4 connectors, use the MC4 assembly/disassembly tool. Insert the tool into the slots on the sides of the connected MC4 connectors and slide it in until it unlocks the mechanism, then pull the connectors apart.

7. Torque Values

Torque Values

Output Lug to Disconnect	40-45 ft.-lbs.
Disconnect to Busbar	40-45 ft.-lbs.
Fuse Busbar to Switch Busbar	40-45 ft.-lbs.
SPD Wires to Busbar	15-18 ft.-lbs.
SPD Terminals	18-22 in.-lbs. 2.5 Nm
Fuse Holder Terminals	18-22 in.-lbs. 2.5 Nm
Bulkhead MC4 Connectors	1.4 Nm
Ground Lug Hardware	15-20 ft.-lbs.
Ground Bar Wire	15-20 ft.-lbs.
Output Wires	See Manual

Bolt & Nut = ft.- lbs. Screws = in.- lbs. or Nm

8. Operating the Disconnect Switch

- The disconnect switch allows for safe isolation of the PV system during installation, maintenance, or emergency situations.

- Operation of the disconnect switch should be performed by qualified personnel only.

9. Maintenance and Troubleshooting

- Inspect the solar combiner box regularly for signs of damage, wear, or loose connections.
- Check the fuses for signs of damage or failure and replace them as needed.

10. Warranty and Contact Information

- The solar combiner box comes with a five-year warranty, covering defects in materials and workmanship. Refer to the warranty documentation for specific terms and conditions.
- If you have any questions or need technical assistance, contact the manufacturer's customer support using the provided contact information.

11. Additional Safety Warnings and Precautions

- WARNING: This solar combiner box is intended for use in photovoltaic systems only. Do not use it for any other purpose.

- WARNING: Electricity generated by solar panels can be dangerous. PV arrays can produce high voltages even in low light conditions. Always treat PV arrays as live electrical equipment.

- Ensure that the solar combiner box is appropriately rated for the system voltage and current.
- Do not modify or alter the solar combiner box in any way that is not explicitly approved by the manufacturer.
- Keep the solar combiner box enclosure closed and secure at all times, except when accessing it for installation, maintenance, or inspection.

- Do not attempt to bypass any safety features or devices, such as fuses or disconnect switches.
- Ensure proper ventilation around the solar combiner box to avoid overheating.
- In case of any abnormal behavior, such as smoke or unusual noises from the solar combiner box, immediately turn off the system and contact a qualified technician for assistance.

- Remember that the safety of the installation and operation of the solar combiner box depends on following all the necessary precautions, guidelines, and local electrical codes. Always prioritize safety and consult with qualified personnel for assistance when needed.