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Cable from photovoltaic combiner box to inverter



Overview

A solar combiner box wiring diagram shows how multiple PV strings connect through the combiner box to the inverter.

Key Takeaways

The cable from a PV inverter to a combiner box should be properly sized, fused, and grounded to safely combine multiple DC strings into a single output for the inverter.Cable Selection and Sizing

The cable connecting the PV inverter to the combiner box must be rated for DC voltage, current, and environmental conditions. Use solar-rated wires such as THWN-2 or USE-2, which are suitable for both indoor and outdoor installations and can withstand UV exposure and high temperatures . The wire gauge should be chosen based on the total current from all combined strings to minimize voltage drop and prevent overheating .

Wiring Configuration

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Each PV string connects to the combiner box through its own fuse or DC breaker, which provides overcurrent protection and isolates individual strings in case of a fault . The positive conductors from each string are routed to the line side of the overcurrent device, and the load side connects to the positive busbar. Negative conductors typically connect directly to the negative busbar without fusing . From the combiner box, a single pair of positive and negative cables runs to the inverter input, ensuring a clean, consolidated connection .

Grounding and Surge Protection

Proper grounding is essential for safety. Connect the bare copper grounding wire to all metallic parts of the PV system, including the combiner box, inverter, and array frames . Surge Protection Devices (SPDs) should be installed in the combiner box to protect against transient overvoltages caused by lightning or grid switching events . SPDs must be connected to the grounding system according to standards such as IEC 60364-7-712 and IEC 61643-11 .

Installation Best Practices
• Follow the wiring diagram provided by the combiner box manufacturer to ensure correct polarity and connections .

• Ensure the combiner box is rated for outdoor use (NEMA 3 or NEMA 4) if installed outside .

• Verify that the fuse or breaker ratings match the string current to prevent nuisance trips or damage.

• Maintain adequate spacing and secure cable routing to avoid mechanical stress and reduce the risk of short circuits .

• Double-check all connections before energizing the system to ensure compliance with NEC Article 690 and local electrical codes . By following these guidelines, the cable from the PV inverter to the combiner box will safely handle the combined current from multiple strings, protect the system from faults, and ensure reliable long-term operation of the solar installation .

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Connection points: EGC must connect to: (1) combiner box enclosure grounding lug, (2) bonding busbar if present, (3)

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