

## Photovoltaic combiner box cable model



### Overview

Cost-efficiency is also important factor from the point of view of profitability the PV business investment.

### Key Takeaways

PV combiner boxes use standardized DC cables compatible with string fuses, busbars, and isolators, with models varying by manufacturer, string count, voltage, and current rating. Overview of PV Combiner Box Cables

Photovoltaic combiner boxes consolidate multiple solar panel strings into a single output to the inverter. The cables used inside these boxes are DC-rated, UV-resistant, and suitable for outdoor installation, typically sized according to the string current, voltage, and distance to the inverter . They connect:

- Individual PV strings to fuses or DC MCBs
- Fuses to the DC busbar
- Busbar to the DC isolator switch
- Isolator to the output cable leading to the inverter Cables must comply with IEC 60269-6 for DC fuses and IEC 61643-31 for surge protection compatibility .

#### Common Cable Types and Models

While exact model numbers vary by manufacturer, the following are widely used in PV combiner boxes:

- Single-core PV cables: 4 mm<sup>2</sup> to 16 mm<sup>2</sup>, rated 600–1500V DC, UV-resistant, double-insulated
- Multi-core pre-assembled cables: Used in plug-and-play combiner boxes for ABB and LS Electric systems, often prewired with connectors for string inputs
- MC4-compatible cables: Standard for connecting PV modules to combiner boxes, available in 2.5 mm<sup>2</sup>, 4 mm<sup>2</sup>, 6 mm<sup>2</sup>, and 10 mm<sup>2</sup>
- Flexible copper busbar jumpers: For internal connections between fuses and busbars, rated for the string current (10–40 A typical)
- Output cables to inverter: Larger cross-section (16–35 mm<sup>2</sup>) to handle combined string current, often with double insulation and weatherproof sheathing

#### Manufacturer-Specific Examples

- ABB Solar String Combiner Boxes: Pre-assembled with plug & play cables, rated for 600–1000V DC, supporting 4–12 strings per box
- LS Electric PV Combiner Boxes: Metal enclosures (SS304) with prewired DC cables, compliant with IEC 61439-1/2, suitable for 20–40 A string currents
- Custom or modular combiner boxes: Allow selection of cable cross-section and length based on project requirements, often including monitoring cables for current, voltage, and temperature sensors

#### Key Considerations

- Voltage Rating: Ensure cables match the maximum string voltage (600–1500V DC).
- Current Rating: Cable cross-section must handle the string current without overheating.
- Environmental Resistance: UV, moisture, and temperature resistance are critical for outdoor installations.
- Connector Compatibility: MC4 or manufacturer-specific connectors for string inputs.
- Pre-assembled vs Field Wiring: Prewired combiner boxes reduce installation errors and save time, while field-wired boxes allow flexible cable selection. In summary, PV combiner box cables are standardized by voltage, current, and connector type, with specific models provided by manufacturers like ABB and LS Electric. For a complete project-specific list, consult the manufacturer catalogs and datasheets, which detail compatible cable sizes, types, and pre-assembled options .

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