

# Mounting and Technical Data

## Sunny Main Box / Sunny Main Box Cabinet



## Content

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This document describes the technical data, the assembly and selection of cables for the DC main distribution Sunny Main Box and Sunny Main Box Cabinet.

# 1 System Overview

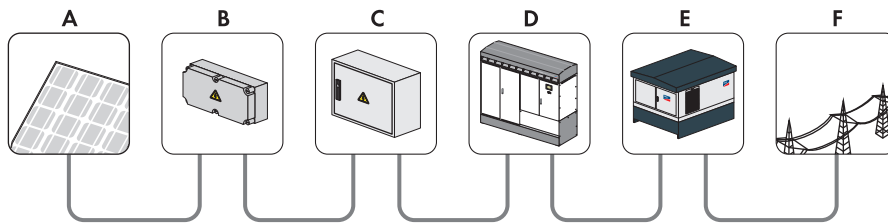


Figure 1: Overview of a PV plant with Sunny Main Boxes and Sunny Central

| Item | Designation  |
|------|--|
| A    | PV array   |
| B    | DC sub-distribution, e.g. Sunny String-Monitor         |
| C    | DC main distribution, e.g. Sunny Main Box              |
| D    | Sunny Central  |
| E    | Transformer stations, e.g. Transformer Compact Station |
| F    | Electricity grid                                       |

## 2 Technical Data

|                                    | Sunny Main Box | Sunny Main Box Cabinet   | Sunny Main Box Cabinet   | Sunny Main Box Cabinet   |
|------------------------------------|----------------|--------------------------|--------------------------|--------------------------|
| Option                             | 8 inputs       | 2 x 8 inputs             | 2 x 2 x 4 inputs         | 2 x 2 x 3 inputs         |
| <b>Enclosure</b>                   |                |                          |                          |                          |
| Outdoor installation               | Shaded         | Shaded                   | Shaded                   | Shaded                   |
| Base mounting                      | No             | Yes                      | Yes                      | Yes                      |
| Wall mounting                      | Yes            | No                       | No                       | No                       |
| <b>Mechanical data of the base</b> |                |                          |                          |                          |
| Width x height x depth             | –              | 785 mm x 950 mm x 480 mm | 785 mm x 950 mm x 480 mm | 785 mm x 950 mm x 480 mm |
| Burial depth of the base           | –              | 600 mm                   | 600 mm                   | 600 mm                   |
| Total weight, enclosure and base   | –              | 115 kg                   | 115 kg                   | 115 kg                   |

|   | <b>Sunny Main Box</b>      | <b>Sunny Main Box Cabinet</b> | <b>Sunny Main Box Cabinet</b> | <b>Sunny Main Box Cabinet</b>        |
|---|----------------------------|-------------------------------|-------------------------------|--------------------------------------|
| Option  | 8 inputs                   | 2 x 8 inputs                  | 2 x 2 x 4 inputs              | 2 x 2 x 3 inputs                     |
| <b>Mechanical data of the enclosure</b>                                   |                            |                               |                               |                                      |
| Width x height x depth  | 500 mm x 750 mm x 320 mm   | 800 mm x 950 mm x 550 mm      | 800 mm x 950 mm x 550 mm      | 800 mm x 950 mm x 550 mm             |
| Depth of the lock cylinder *  | 40 mm                      | 40 mm                         | 40 mm                         | 40 mm                                |
| Weight  | 35 kg                      | 115 kg                        | 115 kg                        | 115 kg                               |
| <b>DC input data</b>  |                            |                               |                               |                                      |
| Maximum permissible DC voltage  | 1,000 V                    | 1,000 V                       | 1,000 V                       | 1,000 V                              |
| Number of DC inputs   | 8                          | 2 x 8                         | 2 x 2 x 4                     | 2 x 2 x 3                            |
| Maximum number of LV/HRC fuses  | 8                          | 16                            | 16                            | 12                                   |
| Maximum number of disconnecting blades                                    | 8                          | 8                             | 8                             | 6                                    |
| Possible LV/HRC fuse sizes  | 80 A/100 A/<br>125 A/160 A | 80 A/100 A/<br>125 A/160 A    | 80 A/100 A/<br>125 A/160 A    | 80 A/100 A/<br>125 A/160 A/<br>200 A |
| Maximum operating current per measurement input with 80 A LV/HRC fuse **  | 52 A                       | 52 A                          | 52 A                          | 52 A                                 |
| Maximum operating current per measurement input with 100 A LV/HRC fuse ** | 65 A                       | 65 A                          | 65 A                          | 65 A                                 |
| Maximum operating current per measurement input with 125 A LV/HRC fuse ** | 81 A                       | 81 A                          | 81 A                          | 81 A                                 |
| Maximum operating current per measurement input with 160 A LV/HRC fuse ** | 104 A                      | 104 A                         | 104 A                         | 104 A                                |

|  | <b>Sunny Main Box</b>   | <b>Sunny Main Box Cabinet</b> | <b>Sunny Main Box Cabinet</b> | <b>Sunny Main Box Cabinet</b> |
|--|---|-------------------------------|-------------------------------|-------------------------------|
| Option   | 8 inputs  | 2 x 8 inputs                  | 2 x 2 x 4 inputs              | 2 x 2 x 3 inputs              |
| Maximum operating current per measurement input with 200 A LV/HRC fuse** | –   | –                             | –                             | 130 A                         |
| <b>DC input</b>  |   |                               |                               |                               |
| Screws for fuse holder   | M10   | M10                           | M10                           | M10                           |
| Torque   | 30 Nm ... 35 Nm   | 30 Nm ... 35 Nm               | 30 Nm ... 35 Nm               | 30 Nm ... 35 Nm               |
| Cable gland  | 8 x M40   | –                             | –                             | –                             |
| Sealing range  | 14 mm ... 28 mm   | –                             | –                             | –                             |
| Seal insert, pre-installed   | 14 mm ... 28 mm   | –                             | –                             | –                             |
| Seal inserts included in scope of delivery                               | 7 mm ... 20.5 mm /<br>20 mm ... 25 mm /<br>24 mm ... 28 mm  | –                             | –                             | –                             |
| Maximum cable cross-section  | 240 mm <sup>2</sup>   | 240 mm <sup>2</sup>           | 240 mm <sup>2</sup>           | 240 mm <sup>2</sup>           |
| <b>DC output</b>   |   |                               |                               |                               |
| Through-hole   | 2 x 13 x mm /<br>3 x 13 x mm  | 3 x 13 x mm                   | 2 x 2 x 13 mm                 | 2 x 2 x 13 mm                 |
| Maximum cross-section of standard terminal lug                           | 240 mm <sup>2</sup>   | 240 mm <sup>2</sup>           | 240 mm <sup>2</sup>           | 240 mm <sup>2</sup>           |
| Stud bolt  | 2 x M12 /<br>3 x M12  | 3 x M12                       | 2 x 2 x M12                   | 2 x 2 x M12                   |
| Torque   | 74 Nm   | 74 Nm                         | 74 Nm                         | 74 Nm                         |
| Cable gland  | 3 x M40 /<br>2 x M50  | –                             | –                             | –                             |
| Sealing range  | 14 mm ... 28 mm /<br>27 mm ... 36 mm  | –                             | –                             | –                             |
| Seal insert, pre-installed   | 14 mm ... 28 mm /<br>27 mm ... 36 mm  | –                             | –                             | –                             |
| Seal inserts included in scope of delivery                               | 17 mm ... 20.5 mm /<br>20 mm ... 25 mm /<br>24 mm ... 28 mm /<br>29 mm ... 34 mm /<br>32 mm ... 36 mm | –                             | –                             | –                             |

|  | <b>Sunny Main Box</b>  | <b>Sunny Main Box Cabinet</b> | <b>Sunny Main Box Cabinet</b> | <b>Sunny Main Box Cabinet</b> |
|--|--|-------------------------------|-------------------------------|-------------------------------|
| Option   | 8 inputs   | 2 x 8 inputs                  | 2 x 2 x 4 inputs              | 2 x 2 x 3 inputs              |
| <b>Protective conductor</b>                        |  |                               |                               |                               |
| Maximum cross-section of standard terminal lug     | 95 mm <sup>2</sup>   | 240 mm <sup>2</sup>           | 240 mm <sup>2</sup>           | 240 mm <sup>2</sup>           |
| Stud bolt  | M8   | M12                           | M12                           | M12                           |
| Torque   | 14 Nm  | 74 Nm                         | 74 Nm                         | 74 Nm                         |
| Cable gland  | M32  | –                             | –                             | –                             |
| Sealing range                                      | 9 mm ... 13 mm /<br>9 mm ... 20.5 mm                               | –                             | –                             | –                             |
| Seal insert, pre-installed                         | 9 mm ... 13 mm   | –                             | –                             | –                             |
| Seal inserts included in scope of delivery         | 11.5 mm ...<br>15.5 mm /<br>14 mm ... 18 mm /<br>17 mm ... 20.5 mm | –                             | –                             | –                             |
| <b>Degree of protection and ambient conditions</b> |  |                               |                               |                               |
| Degree of protection                               | IP54   | IP54                          | IP54                          | IP54                          |
| Permissible ambient temperatures                   | – 25°C ... +40°C   | – 25°C ... +40°C              | – 25°C ... +40°C              | – 25°C ... +40°C              |
| Relative humidity                                  | 15% ... 95%  | 15% ... 95%                   | 15% ... 95%                   | 15% ... 95%                   |
| Maximum altitude above sea level, MSL              | 1,000 m  | 1,000 m                       | 1,000 m                       | 1,000 m                       |

\* Prepared for customer mounting of a profile half cylinder

\*\* Screening factor 0.65

## 3 Mounting

### 3.1 Mounting Location

Select a mounting location for the Sunny Main Box where it stands level and is protected against direct solar irradiation. The mounting location should be accessible for maintenance work. In the case of a rack-mounted PV array, the Sunny Main Box can ideally be positioned directly behind the PV array in the shadow. Make sure that no rain flows over the enclosure of the Sunny Main Box from the module surface.

### 3.2 Wall Mounting: Sunny Main Box

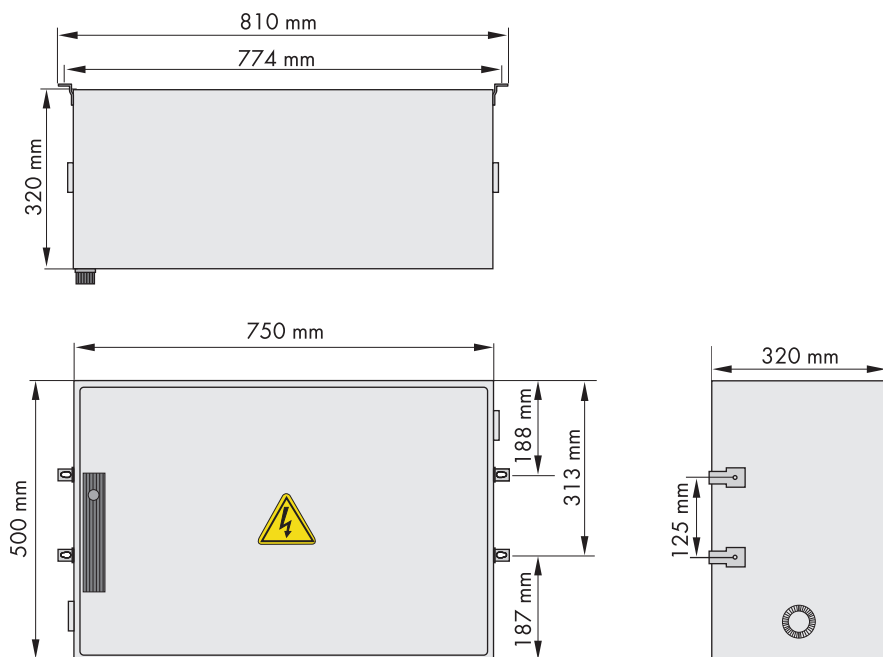


Figure 2: Dimensions of the Sunny Main Box for wall mounting

### 3.3 Base Mounting: Sunny Main Box Cabinet

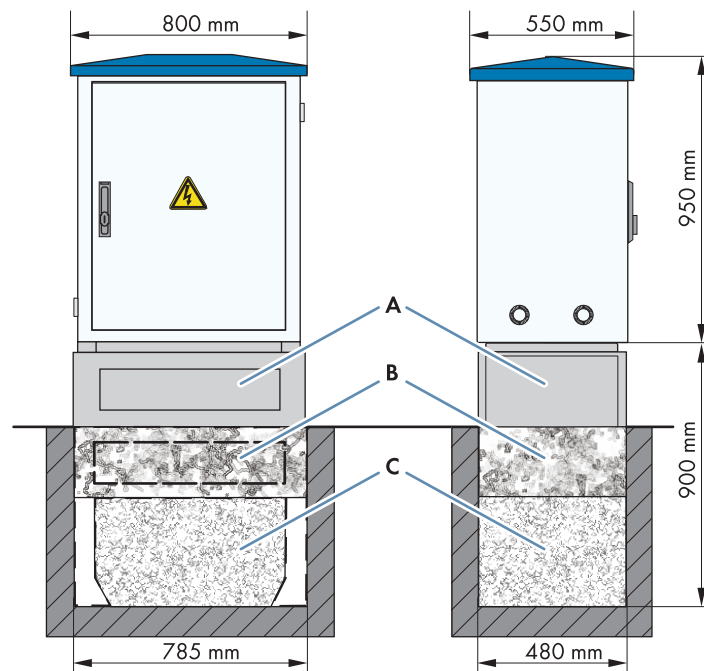


Figure 3: Dimensions of the Sunny Main Box Cabinet for base mounting

| Item | Designation   |
|------|---|
| A    | Upper kick plate  |
| B    | Base filler or coarse gravel with a grain size of 4 mm ... 8 mm |
| C    | Fine gravel or sand with a grain size of 2 mm ... 4 mm          |

## 4 Electrical Connection

### 4.1 Interior View: Sunny Main Box

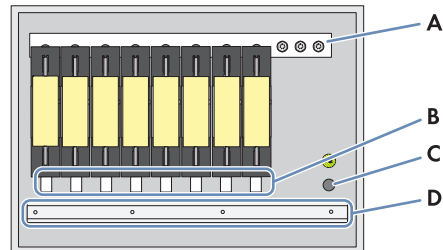


Figure 4: Interior view: Sunny Main Box

| Item | Designation                            |
|------|--|
| A    | Stud bolt of the DC output             |
| B    | DC input                               |
| C    | Stud bolt for the protective conductor |
| D    | Cable support rail                     |

### 4.2 Interior View: Sunny Main Box Cabinet with 2 x 8 Inputs

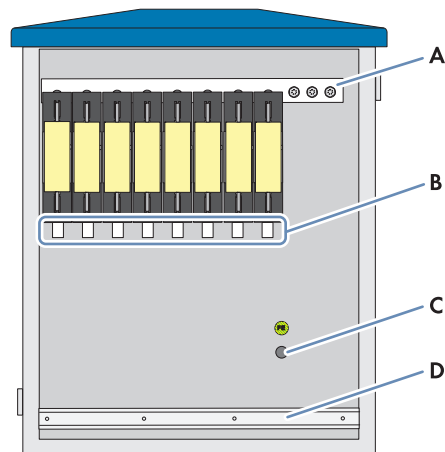


Figure 5: Interior view: Sunny Main Box Cabinet with 2 x 8 inputs

| Item | Designation                            |
|------|--|
| A    | Stud bolt of the DC output             |
| B    | DC input                               |
| C    | Stud bolt for the protective conductor |
| D    | Cable support rail                     |



### 4.3 Interior View: Sunny Main Box Cabinet with 2 x 2 x 4 Inputs

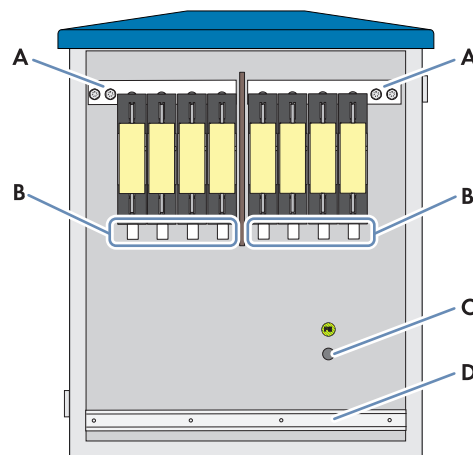


Figure 6: Interior view: Sunny Main Box Cabinet with 2 x 2 x 4 inputs

| Item | Designation                            |
|------|--|
| A    | Stud bolt of the DC output             |
| B    | DC input                               |
| C    | Stud bolt for the protective conductor |
| D    | Cable support rail                     |

### 4.4 Interior View: Sunny Main Box Cabinet with 2 x 2 x 3 Inputs

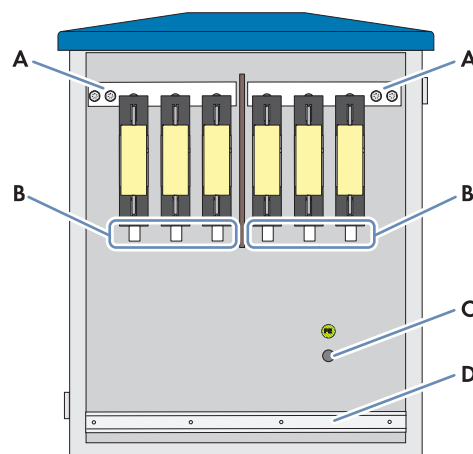


Figure 7: Interior view: Sunny Main Box Cabinet with 2 x 2 x 3 inputs

| Item | Designation                            |
|------|--|
| A    | Stud bolt of the DC output             |
| B    | DC input                               |
| C    | Stud bolt for the protective conductor |
| D    | Cable support rail                     |

## 4.5 Selecting the Cables

### Protective Conductor

|                             | Sunny Main Box     | Sunny Main Box Cabinet |
|-----------------------------|--------------------|------------------------|
| Maximum cable cross-section | 95 mm <sup>2</sup> | 240 mm <sup>2</sup>    |

### DC Input Cable

|                             | Sunny Main Box      | Sunny Main Box Cabinet |
|-----------------------------|---------------------|------------------------|
| Maximum cable cross-section | 240 mm <sup>2</sup> | 240 mm <sup>2</sup>    |

### DC Output Cable

|                             | Sunny Main Box                                 | Sunny Main Box Cabinet |
|-----------------------------|--|------------------------|
| Maximum cable cross-section | 400 mm <sup>2</sup> * / 240 mm <sup>2</sup> ** | 240 mm <sup>2</sup>    |

\* If 2 x M50 cable glands are used

\*\* If 3 x M40 cable glands are used

## 5 Technical Properties

The Sunny Main Box is a DC main distribution box, to which multiple Sunny String-Monitors can be connected in parallel. In earthed PV arrays, the positive or the negative pole can be earthed at the inverter. For this purpose, the fuses of the earthed pole are replaced by disconnecting blades in the Sunny Main Box. The following combinations are possible.

| Sunny Main Box                          | Sunny Main Box Cabinet with 2 x 8 inputs             | Sunny Main Box Cabinet with 2 x 2 x 4 inputs                 | Sunny Main Box-Cabinet with 2 x 2 x 3 inputs                 |
|---|--|--|--|
| 8 fuses or<br>8 disconnecting<br>blades | DC+: 8 LV/HRC fuses<br>DC - : 8 LV/HRC fuses         | DC+: 2 x 4 LV/HRC fuses<br>DC - : 2 x 4 LV/HRC fuses         | DC+: 2 x 3 LV/HRC fuses<br>DC - : 2 x 3 LV/HRC fuses         |
|   | DC+: 8 LV/HRC fuses<br>DC-: 8 disconnecting blades   | DC+: 2 x 4 LV/HRC fuses<br>DC - : 2 x 4 disconnecting blades | DC+: 2 x 3 LV/HRC fuses<br>DC - : 2 x 3 disconnecting blades |
|   | DC+: 8 disconnecting blades<br>DC - : 8 LV/HRC fuses | DC+: 2 x 4 disconnecting blades<br>DC - : 2 x 4 LV/HRC fuses | DC+: 2 x 3 disconnecting blades<br>DC - : 2 x 3 LV/HRC fuses |

## 6 Optional Components: SMB Connection Kit

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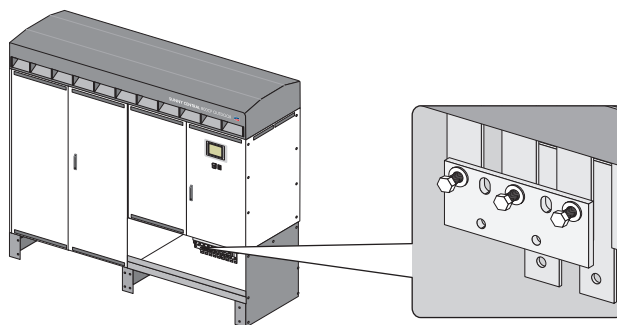


Figure 8: SMB connection kit

To connect the Sunny Main Box to the inverter, you need an SMB connection kit. The SMB connection kit contains a busbar which can be connected to an inverter with DC fuses. The busbar connects three DC terminals of the inverter and enables the connection of up to four DC cables.