



Filters for Power Lines

16 to 100 A,
100 dB from 150 kHz

Series/Type: B84299*B001/B84299*E001

Date: January 2004

© EPCOS AG 2004. Reproduction, publication and dissemination of this data sheet, enclosures hereto and the information contained therein without EPCOS' prior express consent is prohibited.

Purchase orders are subject to the General Conditions for the Supply of Products and Services of the Electrical and Electronics Industry recommended by the ZVEI (German Electrical and Electronic Manufacturers' Association), unless otherwise agreed.

2- and 4-line-filters

Standard filters for measuring cabins

Single-stage

Stopband attenuation 150 kHz to 40 GHz



Features

- General-purpose use through design with separate lines without intercoupling
- Use of single chokes. Thus the insertion loss values are not reduced under all operating current conditions and not when operated with artificial mains networks (AMN) or other equipment with high leakage currents.
- Insertion loss to CISPR 17

Design

The electrical components are incorporated in an RF-tight case of stainless steel. The cables enter through glands. The RF-tight termination of the openings is produced by specially shaped lids.

The conductors and equipment grounding conductor are connected by threaded bolts. The surface around the fixing holes is left as bare metal (unpainted) to ensure good RF contact with metal surfaces (chassis, ground).

Protective measures (grounding)

The high capacitances between the lines and ground require special protective measures. If there are no product-specific requirements, protection with a secondary ground wire (cross section min. 10 mm²) in accordance with EN 50178 is necessary. For this purpose the filter case have connecting bolts at each end.

Resistors are incorporated in the filter to discharge capacitors after turn-off.

Scope of supply

Filters are supplied complete with all parts required for RF-tight installation (fixing screws, flanges, RF gaskets, cable glands) and installation instructions.

Installation

No welding is needed on the shielding wall, so any subsequent installation is quite simple.

Accessories and special versions

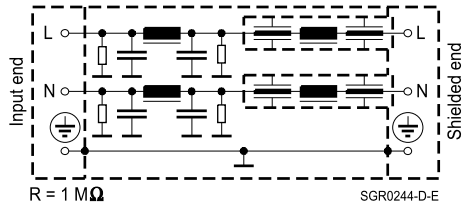
RF-tight flexible connector fittings are available for installation spaced away from the shielding wall. Filters with an EMP protection add-on for surge currents up to 100 kA per line are available on request. To match requirements, filters can be supplied with different kinds of EMC or shielding cable glands.

Tests

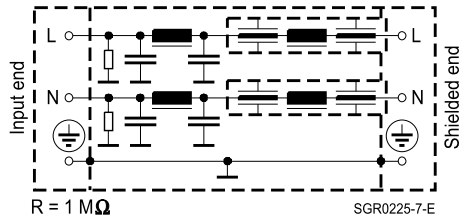
All filters are 100% tested and the results are archived under a filter's serial number. If required, a test report can be generated for the serial number.

Circuit diagrams
2-line filters

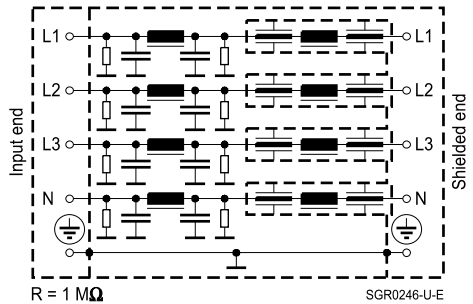
16 and 32 A



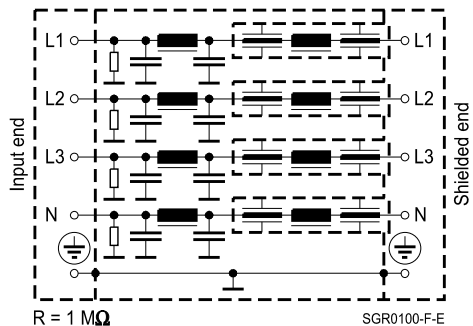
63 and 100 A


4-line filters

16 and 32 A

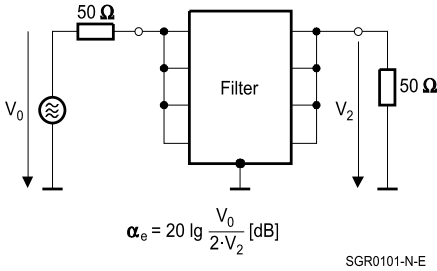
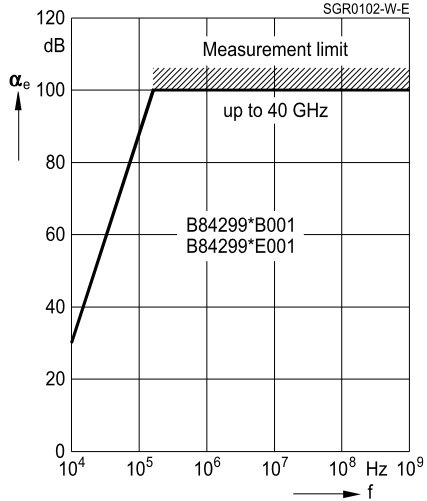


63 and 100 A



Insertion loss α_e (typical values at $Z = 50 \Omega$)

Measurement circuit


 Asymmetrical measurement circuit
to MIL-STD-220A

General technical data

| | | | | |
|---------------------------------|------------|---|--------|--|
| Rated voltage 2-line filters | V_R | 250 | V | Line/line Line/case |
| Rated voltage 4-line filters | V_R | 440 250 | V V | Line/line Line/case |
| Rated frequency | f_R | 50/60 | Hz | |
| Rated current | I_R | See characteristics | | Referred to +40 °C ambient temperature |
| Maximum admissible overcurrent | I_{over} | 75 · I_R for 50 ms 10 · I_R for 1 s 2 · I_R for 1 min 1.4 · I_R for 15 min | | |
| Test voltage | V_{test} | 1200 VDC, 2 s 1200 VDC, 2 s | | Line/line Line/case |
| Voltage drop/phase | ΔV | <1 | % | Of V_R at 50 Hz and I_R |
| Maximum DC resistance | R_{max} | See characteristics | | Per line |

General technical data (continued)

| | | | |
|--|-----------------------|---------------------|---|
| Power dissipation | P_D | See characteristics | At rated current I_R |
| Capacitive reactive current/line | I_{reactive} | See characteristics | At 400/230 V and 50 Hz (typical value) |
| Max. permissible harmonic distortion (THD) | | 8 % | To EN 50160 |
| Permissible ambient temperature | T_A | -25/+40 °C | |
| Climatic category (EN 60068-1) | | 25/085/56 | -25 °C/+85 °C/56 days damp heat test |
| Mechanical version | | C | Cable glands at both ends or flexible connector fitting |
| | | D | Direct connection to shielding wall |

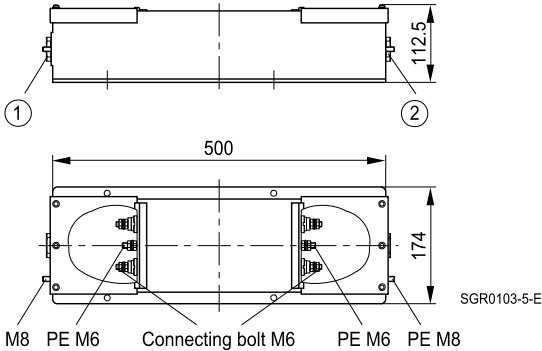
Characteristics and ordering codes

| I_R | Mechanical version | R_{max} | P_D | I_{reactive} | Dimensional drawing | Page | Approx. weight kg | Ordering code |
|-----------------------|--------------------|------------------|-------|-----------------------|---------------------|------|-------------------|-----------------|
| A | | mΩ | W | A | | | | |
| 2-line filters | | | | | | | | |
| 16 | C | < 25 | < 15 | 0.7 | 1 | 6 | 8 | B84299C2160B001 |
| 16 | D | < 25 | < 15 | 0.7 | 2 | 7 | 8 | B84299D2160B001 |
| 32 | C | < 20 | < 40 | 1.0 | 3 | 8 | 15 | B84299C2320B001 |
| 32 | D | < 20 | < 40 | 1.0 | 4 | 9 | 15 | B84299D2320B001 |
| 63 | C | < 3.0 | < 25 | 1.0 | 5 | 10 | 18 | B84299C1630B001 |
| 63 | D | < 3.0 | < 25 | 1.0 | 6 | 11 | 18 | B84299D1630B001 |
| 100 | C | < 1.5 | < 30 | 1.0 | 7 | 12 | 18 | B84299C1101B001 |
| 100 | D | < 1.5 | < 30 | 1.0 | 8 | 13 | 18 | B84299D1101B001 |
| 4-line filters | | | | | | | | |
| 16 | C | < 50 | < 30 | 0.7 | 9 | 14 | 16 | B84299C2160E001 |
| 16 | D | < 50 | < 30 | 0.7 | 10 | 15 | 16 | B84299D2160E001 |
| 32 | C | < 20 | < 40 | 1.0 | 11 | 16 | 20 | B84299C2320E001 |
| 32 | D | < 20 | < 40 | 1.0 | 12 | 17 | 20 | B84299D2320E001 |
| 63 | C | < 3.0 | < 35 | 1.0 | 5 | 10 | 20 | B84299C1630E001 |
| 63 | D | < 3.0 | < 35 | 1.0 | 6 | 11 | 20 | B84299D1630E001 |
| 100 | C | < 1.5 | < 45 | 1.0 | 7 | 12 | 20 | B84299C1101E001 |
| 100 | D | < 1.5 | < 45 | 1.0 | 8 | 13 | 20 | B84299D1101E001 |

Dimensional drawings
Dimensional drawing 1 (cable glands at both ends)

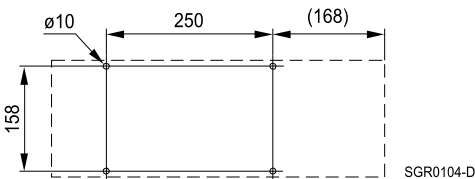
2 x 16 A

B84299C2160B001



- ① Input end: Cable gland PG 21 (mounted)
 ② Shielded end: Cable gland PG 29/21
 (cable gland PG 29, PG 21 and reducer ring in accessory bag)

Paint color: RAL 7035 (light gray, semigloss)

Fixing dimensions


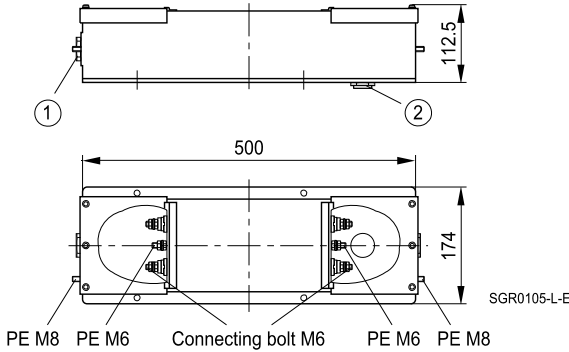
The cable glands (with cutout sealing ring) are suitable for the following overall cable diameter:

| | | | | |
|-------|-------------|-------------|-------------|-------------|
| PG 29 | 17 to 19 mm | 20 to 22 mm | 23 to 25 mm | 26 to 28 mm |
| PG 21 | 9 to 11 mm | 12 to 14 mm | 15 to 17 mm | 18 to 20 mm |

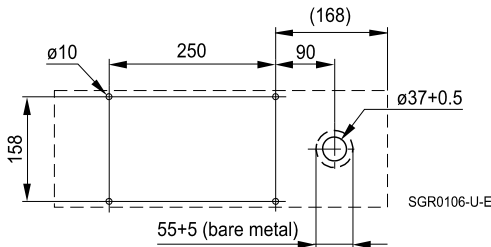
RF-tight connection to shielding wall with connector fitting, see page 18.

Dimensional drawing 2 (direct connection to shielding wall)
2 x 16 A

B84299D2160B001



- ① Input end: Cable gland PG 21 (mounted)
 ② Shielded end: Cable gland PG 29/21
 (cable gland PG 29, PG 21 and reducer ring in accessory bag)
- Paint color: RAL 7035 (light gray, semigloss)

Fixing dimensions


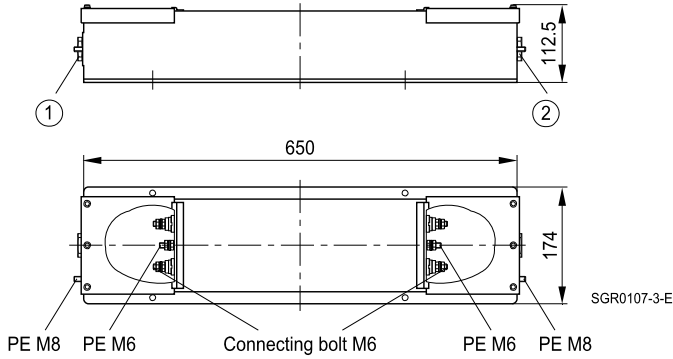
The cable glands (with cutout sealing ring) are suitable for the following overall cable diameter:

| | | | | |
|-------|-------------|-------------|-------------|-------------|
| PG 29 | 17 to 19 mm | 20 to 22 mm | 23 to 25 mm | 26 to 28 mm |
| PG 21 | 9 to 11 mm | 12 to 14 mm | 15 to 17 mm | 18 to 20 mm |

RF-tight connection to shielding wall, see page 18.

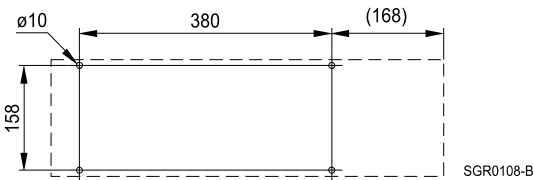
Dimensional drawing 3 (cable glands at both ends)
2 x 32 A

B84299C2320B001



- ① Input end: Cable gland PG 21 (mounted)
 ② Shielded end: Cable gland PG 29/21
 (cable gland PG 29, PG 21 and reducer ring in accessory bag)

Paint color: RAL 7035 (light gray, semigloss)

Fixing dimensions


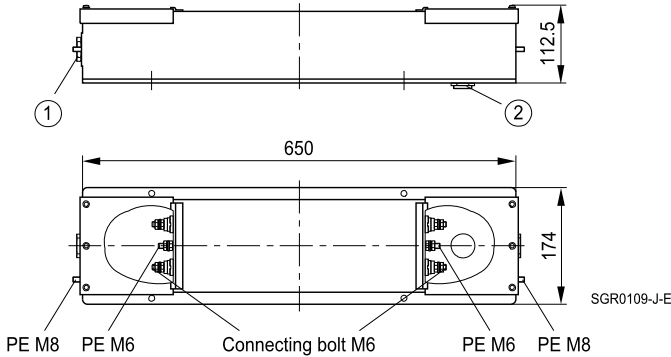
The cable glands (with cutout sealing ring) are suitable for the following overall cable diameter:

| | | | | |
|-------|-------------|-------------|-------------|-------------|
| PG 29 | 17 to 19 mm | 20 to 22 mm | 23 to 25 mm | 26 to 28 mm |
| PG 21 | 9 to 11 mm | 12 to 14 mm | 15 to 17 mm | 18 to 20 mm |

RF-tight connection to shielding wall with connector fitting, see page 18.

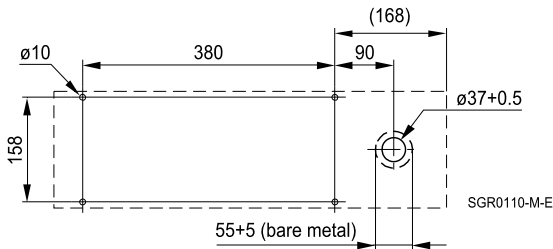
Dimensional drawing 4 (direct connection to shielding wall)
2 x 32 A

B84299D2320B001



- ① Input end: Cable gland PG 21 (mounted)
- ② Shielded end: Cable gland PG 29/21
(cable gland PG 29, PG 21 and reducer ring in accessory bag)

Paint color: RAL 7035 (light gray, semigloss)

Fixing dimensions


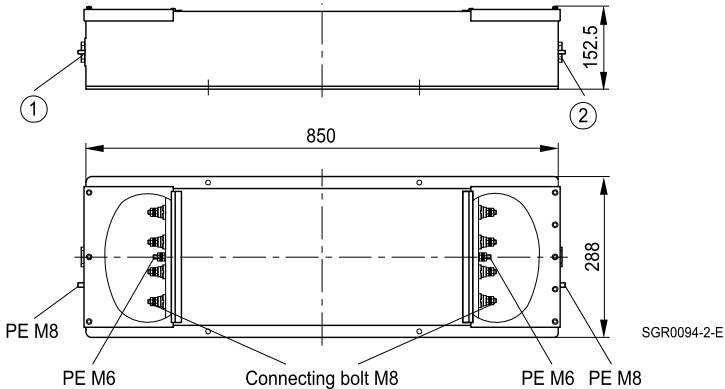
The cable glands (with cutout sealing ring) are suitable for the following overall cable diameter:

| | | | | |
|-------|-------------|-------------|-------------|-------------|
| PG 29 | 17 to 19 mm | 20 to 22 mm | 23 to 25 mm | 26 to 28 mm |
| PG 21 | 9 to 11 mm | 12 to 14 mm | 15 to 17 mm | 18 to 20 mm |

RF-tight connection to shielding wall, see page 18.

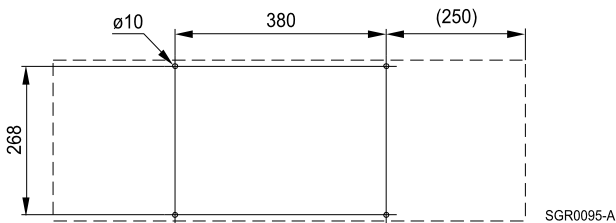
Dimensional drawing 5 (cable glands at both ends)
2 x 63 A / 4 x 63 A

B84299C1630B001, ...E001



- ① Input end: Cable gland PG 29/21
(PG 29 mounted, PG 21 and reducer ring in accessory bag)
- ② Shielded end: Cable gland PG 29/21
(cable gland PG 29, PG 21 and reducer ring in accessory bag)

Paint color: RAL 7035 (light gray, semigloss)

Fixing dimensions


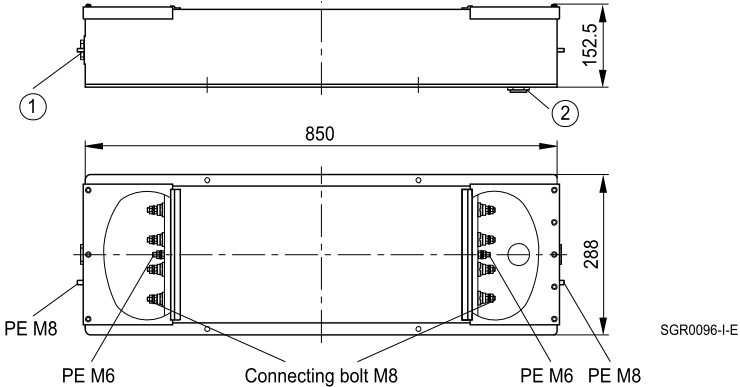
The cable glands (with cutout sealing ring) are suitable for the following overall cable diameter:

| | | | | |
|-------|-------------|-------------|-------------|-------------|
| PG 29 | 17 to 19 mm | 20 to 22 mm | 23 to 25 mm | 26 to 28 mm |
| PG 21 | 9 to 11 mm | 12 to 14 mm | 15 to 17 mm | 18 to 20 mm |

RF-tight connection to shielding wall with connector fitting, see page 18.

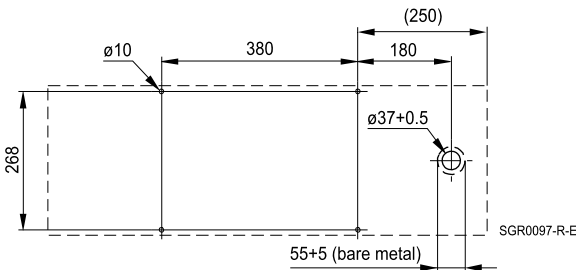
Dimensional drawing 6 (direct connection to shielding wall)
2 x 63 A / 4 x 63 A

B84299D1630B001, ...E001



- ① Input end: Cable gland PG 29/21
(PG 29 mounted, PG 21 and reducer ring in accessory bag)
- ② Shielded end: Cable gland PG 29/21
(cable gland PG 29, PG 21 and reducer ring in accessory bag)

Paint color: RAL 7035 (light gray, semigloss)

Fixing dimensions


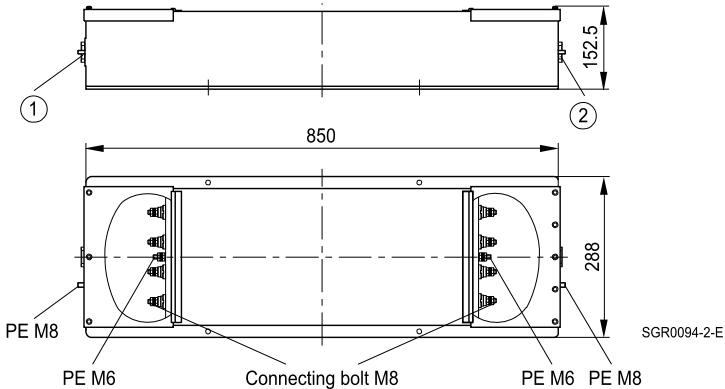
The cable glands (with cutout sealing ring) are suitable for the following overall cable diameter:

| | | | | |
|-------|-------------|-------------|-------------|-------------|
| PG 29 | 17 to 19 mm | 20 to 22 mm | 23 to 25 mm | 26 to 28 mm |
| PG 21 | 9 to 11 mm | 12 to 14 mm | 15 to 17 mm | 18 to 20 mm |

RF-tight connection to shielding wall, see page 18.

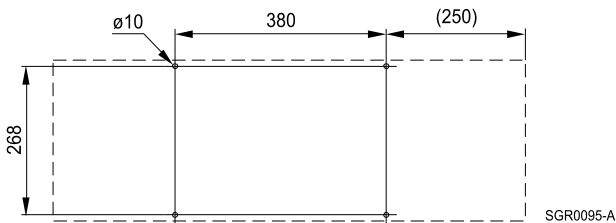
Dimensional drawing 7 (cable glands at both ends)
2 x 100 A / 4 x 100 A

B84299C1101B001, ...E001



- ① Input end: Cable gland PG 42/29
(PG 42 mounted, PG 29 and reducer ring in accessory bag)
- ② Shielded end: Cable gland PG 42/29
(cable gland PG 42, PG 29 and reducer ring in accessory bag)

Paint color: RAL 7035 (light gray, semigloss)

Fixing dimensions


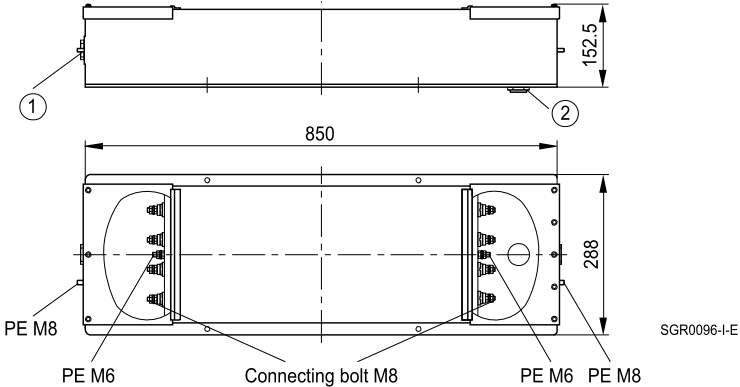
The cable glands (with cutout sealing ring) are suitable for the following overall cable diameter:

| | | | | |
|-------|-------------|-------------|-------------|-------------|
| PG 42 | 29 to 31 mm | 32 to 34 mm | 35 to 37 mm | 38 to 40 mm |
| PG 29 | 17 to 19 mm | 20 to 22 mm | 23 to 25 mm | 26 to 28 mm |

RF-tight connection to shielding wall with connector fitting, see page 18.

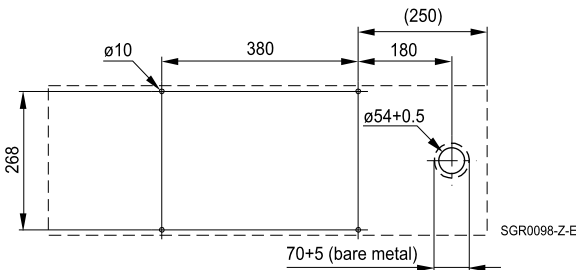
Dimensional drawing 8 (direct connection to shielding wall)
2 x 100 A / 4 x 100 A

B84299D1101B001, ...E001



- ① Input end: Cable gland PG 42/29
(PG 42 mounted, PG 29 and reducer ring in accessory bag)
- ② Shielded end: Cable gland PG 42/29
(cable gland PG 42, PG 29 and reducer ring in accessory bag)

Paint color: RAL 7035 (light gray, semigloss)

Fixing dimensions


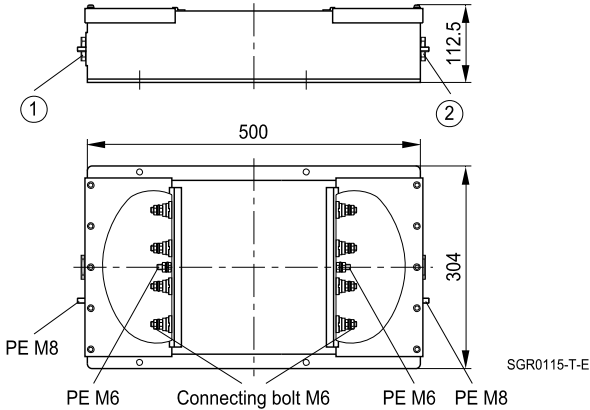
The cable glands (with cutout sealing ring) are suitable for the following overall cable diameter:

| | | | | |
|-------|-------------|-------------|-------------|-------------|
| PG 42 | 29 to 31 mm | 32 to 34 mm | 35 to 37 mm | 38 to 40 mm |
| PG 29 | 17 to 19 mm | 20 to 22 mm | 23 to 25 mm | 26 to 28 mm |

RF-tight connection to shielding wall, see page 18.

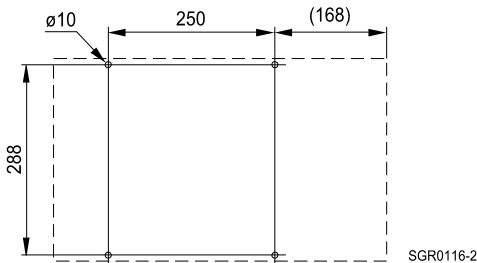
Dimensional drawing 9 (cable glands at both ends)
4 x 16 A

B84299C2160E001



- ① Input end: Cable gland PG 21 (mounted)
 ② Shielded end: Cable gland PG 29/21
 (cable gland PG 29, PG 21 and reducer ring in accessory bag)

Paint color: RAL 7035 (light gray, semigloss)

Fixing dimensions


The cable glands (with cutout sealing ring) are suitable for the following overall cable diameter:

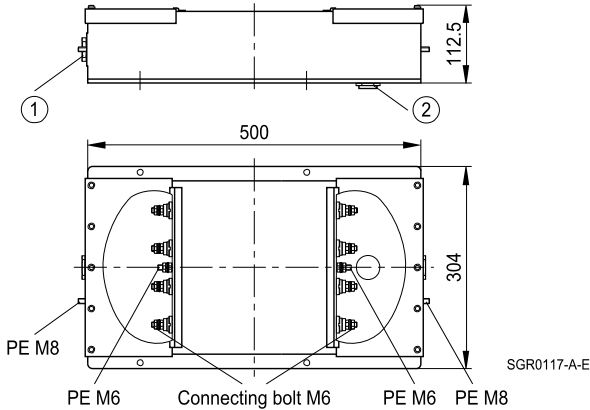
| | | | | |
|-------|-------------|-------------|-------------|-------------|
| PG 29 | 17 to 19 mm | 20 to 22 mm | 23 to 25 mm | 26 to 28 mm |
| PG 21 | 9 to 11 mm | 12 to 14 mm | 15 to 17 mm | 18 to 20 mm |

RF-tight connection to shielding wall with connector fitting, see page 18.

Dimensional drawing 10 (direct connection to shielding wall)

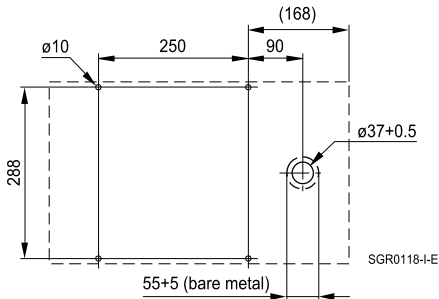
4 x 16 A

B84299D2160E001



- ① Input end: Cable gland PG 21 (mounted)
 ② Shielded end: Cable gland PG 29/21
 (cable gland PG 29, PG 21 and reducer ring in accessory bag)

Paint color: RAL 7035 (light gray, semigloss)

Fixing dimensions


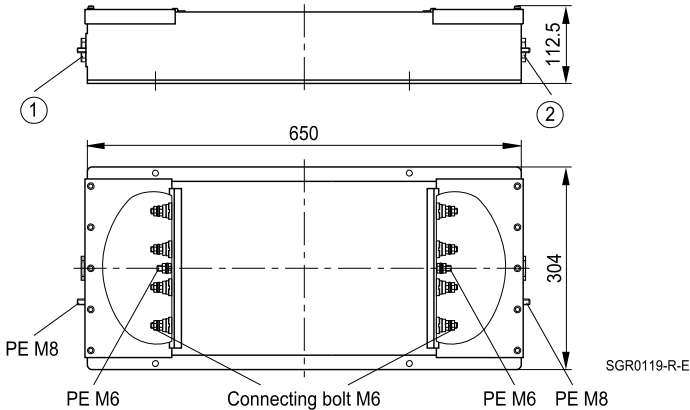
The cable glands (with cutout sealing ring) are suitable for the following overall cable diameter:

| | | | | |
|-------|-------------|-------------|-------------|-------------|
| PG 29 | 17 to 19 mm | 20 to 22 mm | 23 to 25 mm | 26 to 28 mm |
| PG 21 | 9 to 11 mm | 12 to 14 mm | 15 to 17 mm | 18 to 20 mm |

RF-tight connection to shielding wall, see page 18.

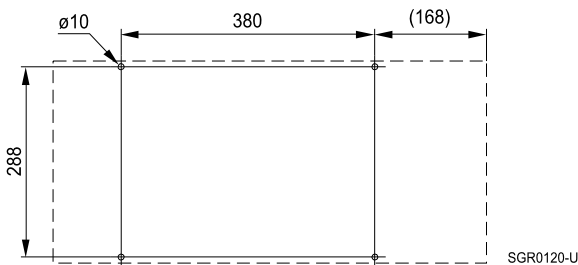
Dimensional drawing 11 (cable glands at both ends)
4 x 32 A

B84299C2320E001



- ① Input end: Cable gland PG 21 (mounted)
 ② Shielded end: Cable gland PG 29/21
 (cable gland PG 29, PG 21 and reducer ring in accessory bag)

Paint color: RAL 7035 (light gray, semigloss)

Fixing dimensions


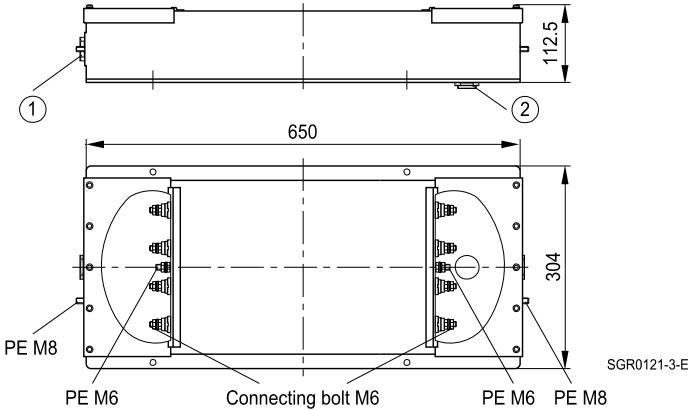
The cable glands (with cutout sealing ring) are suitable for the following overall cable diameter:

| | | | | |
|-------|-------------|-------------|-------------|-------------|
| PG 29 | 17 to 19 mm | 20 to 22 mm | 23 to 25 mm | 26 to 28 mm |
| PG 21 | 9 to 11 mm | 12 to 14 mm | 15 to 17 mm | 18 to 20 mm |

RF-tight connection to shielding wall with connector fitting, see page 18.

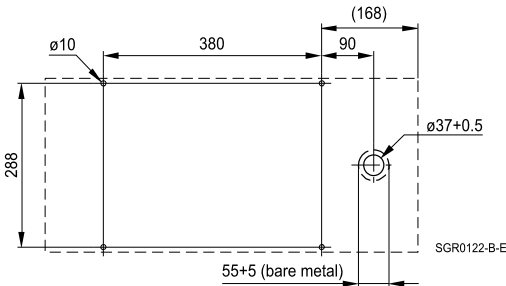
Dimensional drawing 12 (direct connection to shielding wall)
4 x 32 A

B84299D2320E001



- ① Input end: Cable gland PG 21 (mounted)
- ② Shielded end: Cable gland PG 29/21
(cable gland PG 29, PG 21 and reducer ring in accessory bag)

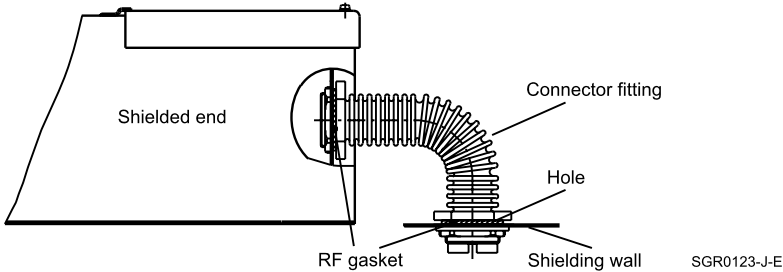
Paint color: RAL 7035 (light gray, semigloss)

Fixing dimensions


The cable glands (with cutout sealing ring) are suitable for the following overall cable diameter:

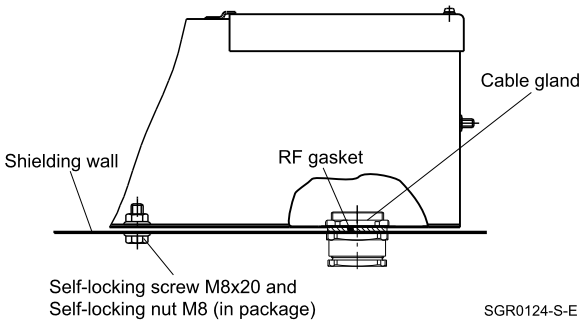
| | | | | |
|-------|-------------|-------------|-------------|-------------|
| PG 29 | 17 to 19 mm | 20 to 22 mm | 23 to 25 mm | 26 to 28 mm |
| PG 21 | 9 to 11 mm | 12 to 14 mm | 15 to 17 mm | 18 to 20 mm |

RF-tight connection to shielding wall, see page 18.

RF-tight connection to shielding wall with connector fitting (mechanical version C)


| Cable gland | Connector fitting (must be ordered separately) | Ordering code | Hole in shielding wall | Bare metal area on shielding wall |
|-------------|--|-----------------|------------------------|-----------------------------------|
| PG 29 | Nominal width 25 mm | B84298A0042L*** | ∅ 37 +0.5 mm | ∅ 55 +5 mm |
| PG 42 | Nominal width 40 mm | B84298A0044L*** | ∅ 54 +0.5 mm | ∅ 70 +5 mm |

(***: add required length in cm (see also chapter "Installation accessories").

RF-tight connection to shielding wall (mechanical version D)


| Cable gland | Parts for RF-tight mounting (in accessory bag) | Required hole in shielding wall | Bare metal area on shielding wall |
|-------------|---|---------------------------------|-----------------------------------|
| PG 21 | Suitable cable gland with long thread, RF gasket and check nut. | ∅ 37 +0.5 mm | ∅ 55 +5 mm |
| PG 29 | | ∅ 54 +0.5 mm | ∅ 70 +5 mm |
| PG 42 | | | |