Filters for Power Lines

16 to 150 A,
100 dB from 14 kHz

Series/Type: **B84299*B003/B84299*E003**

Date: January 2004

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2- and 4-line-filters
16 to 150 A
Multi-stage
Stopband attenuation 14 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 mm^2) 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.

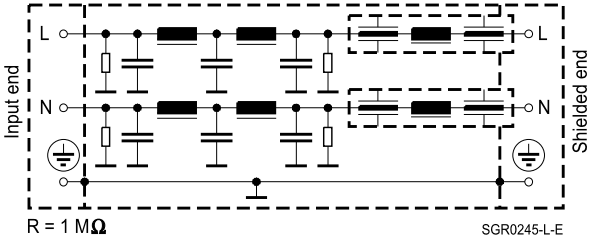
Tests

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.

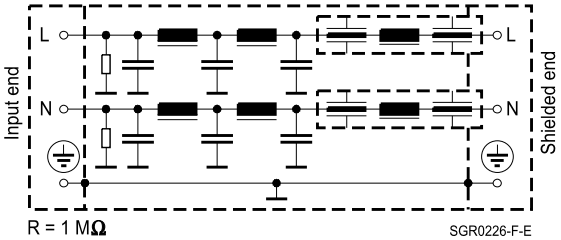
Circuit diagrams

2-line filters

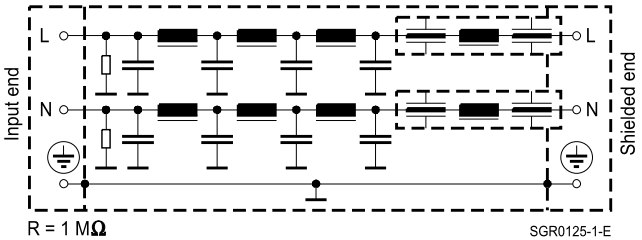
16 and 32 A



63 A

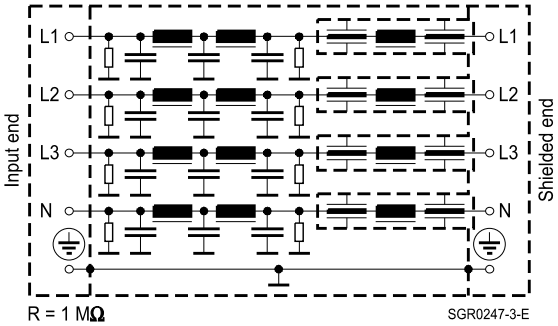


100 A

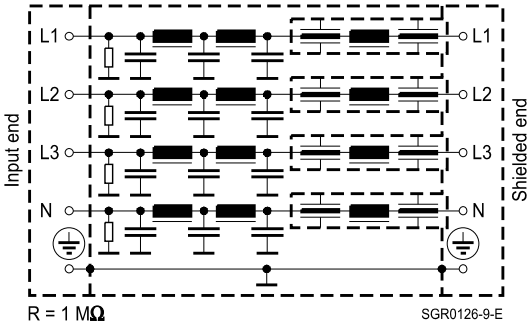


4-line filters

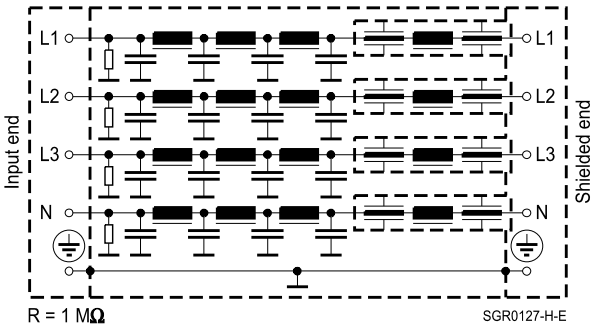
16 and 32 A



63 A

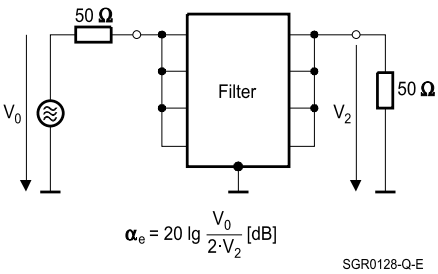


100 and 150 A

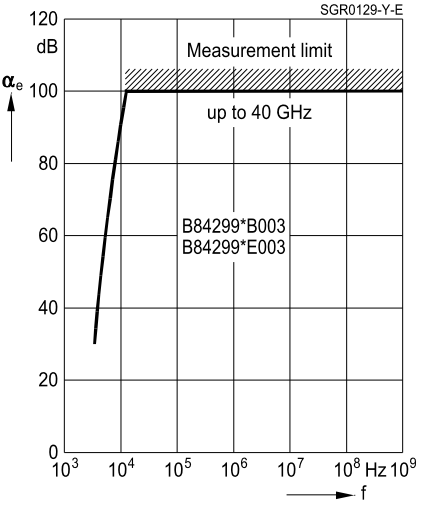


Insertion loss α_e (typical values at Z = 50 Ω)

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		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

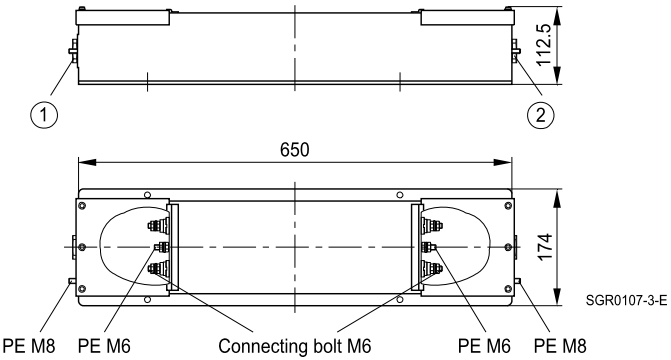
Characteristics and ordering codes

I_R	Mechanical version	R_{max}	P_D	$I_{reactive}$	Dimensional drawing	Page	Approx. weight	Ordering code
A		mΩ	W	A			kg	
2-line filters								
16	C	< 50	< 30	1.2	1	7	12	B84299C2160B003
16	D	< 50	< 30	1.2	2	8	12	B84299D2160B003
32	C	< 20	< 40	2.7	3	9	20	B84299C2320B003
32	D	< 20	< 40	2.7	4	10	20	B84299D2320B003
63	C	< 6.0	< 50	4.9	5	11	36	B84299C1630B003
63	D	< 6.0	< 50	4.9	6	12	36	B84299D1630B003
100	C	< 3.5	< 70	6.5	7	13	60	B84299C1101B003
100	D	< 3.5	< 70	6.5	8	14	60	B84299D1101B003
4-line filters								
16	C	< 50	< 30	1.2	9	15	24	B84299C2160E003
16	D	< 50	< 30	1.2	10	16	24	B84299D2160E003
32	C	< 20	< 40	2.7	11	17	30	B84299C2320E003
32	D	< 20	< 40	2.7	12	18	30	B84299D2320E003
63	C	< 6.0	< 70	4.9	5	11	40	B84299C1630E003
63	D	< 6.0	< 70	4.9	6	12	40	B84299D1630E003
100	C	< 3.5	< 100	6.5	7	13	60	B84299C1101E003
100	D	< 3.5	< 100	6.5	8	14	60	B84299D1101E003
150	C	< 2.0	< 140	6.5	13	19	95	B84299C1151E003
150	D	< 2.0	< 140	6.5	14	20	95	B84299D1151E003

Dimensional drawings

Dimensional drawing 1 (cable glands at both ends) **2 x 16 A**

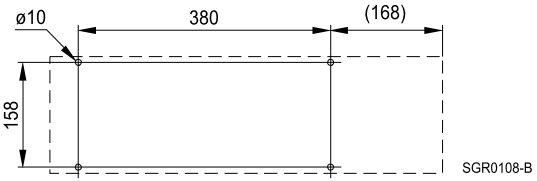
B84299C2160B003



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



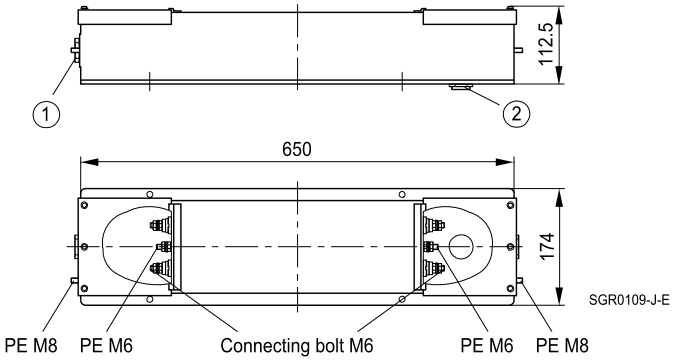
The cable glands (with cutout sealing ring) are suitable for the following overall cable diameter:

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 21.

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

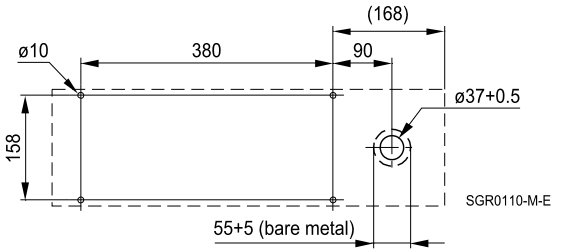
B84299D2160B003



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



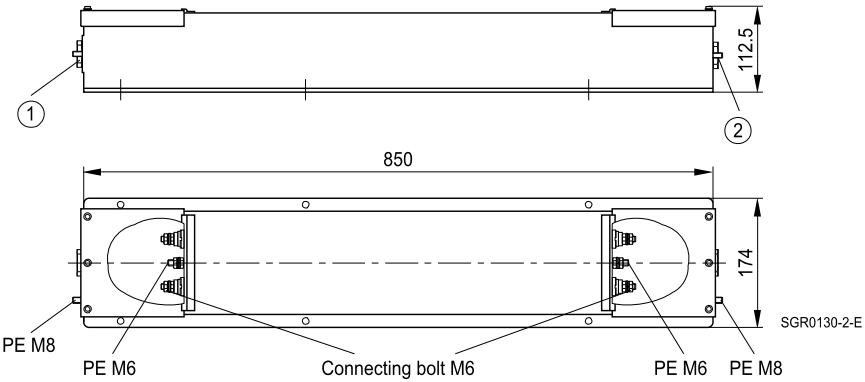
The cable glands (with cutout sealing ring) are suitable for the following overall cable diameter:

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 21.

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

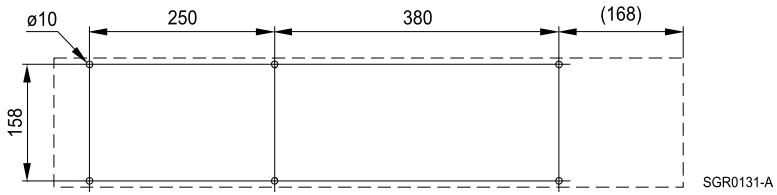
B84299C2320B003



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



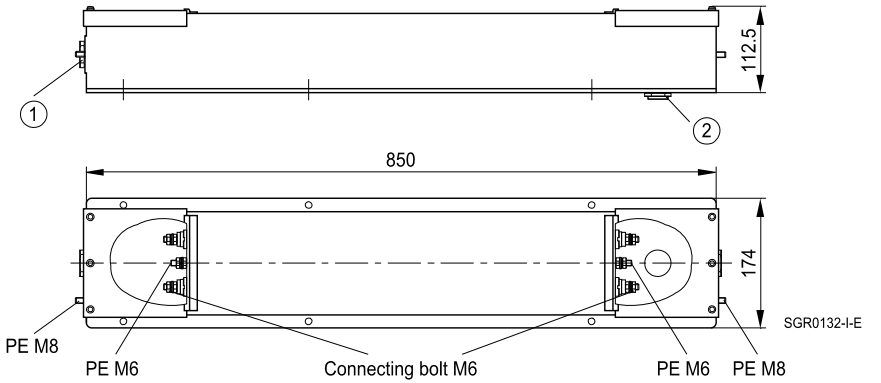
The cable glands (with cutout sealing ring) are suitable for the following overall cable diameter:

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 21.

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

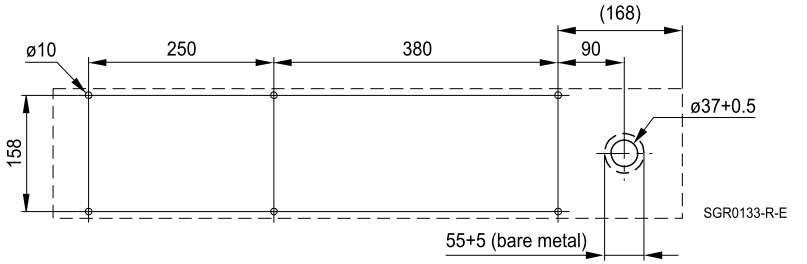
B84299D2320B003



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



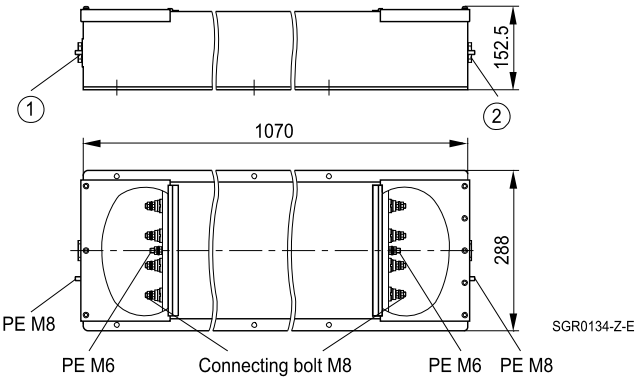
The cable glands (with cutout sealing ring) are suitable for the following overall cable diameter:

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 21.

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

B84299C1630B003, ...E003

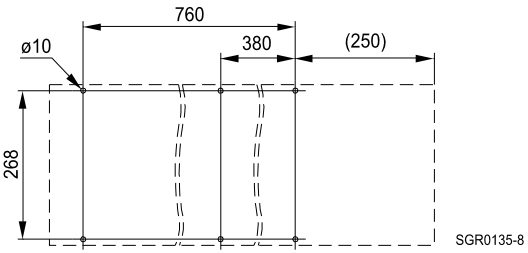


① Input end: Cable gland PG 29/21
(PG 29 mounted, PG 21 and reducer ring in accessory bag)

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



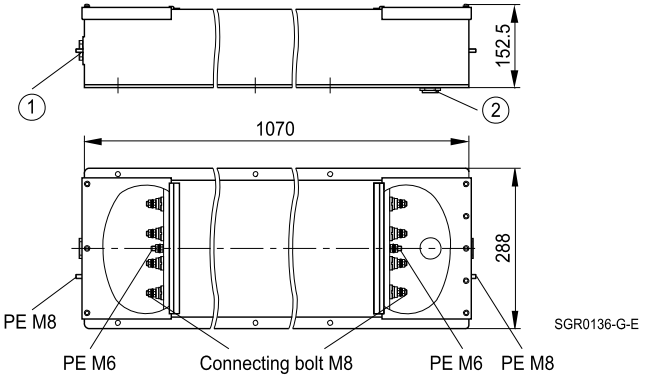
The cable glands (with cutout sealing ring) are suitable for the following overall cable diameter:

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 21.

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

B84299D1630B003, ...E003

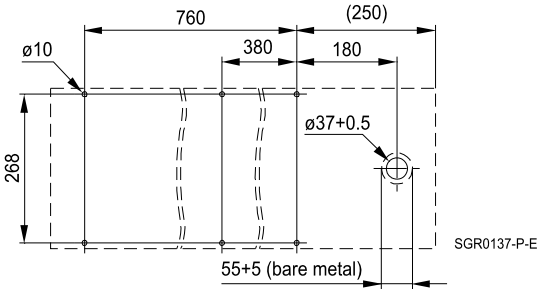


① Input end: Cable gland PG 29/21
(PG 29 mounted, PG 21 and reducer ring in accessory bag)

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



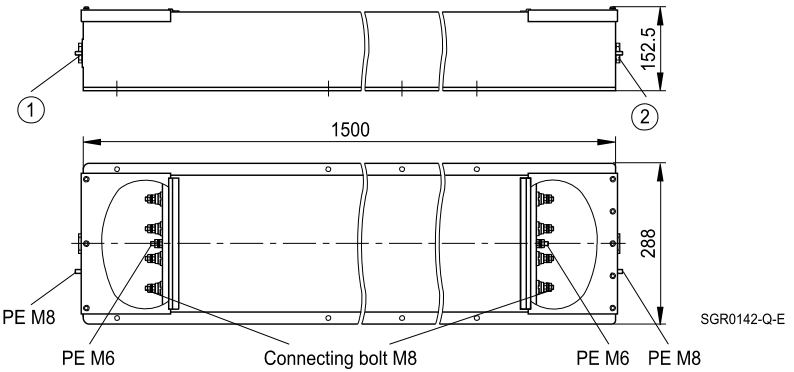
The cable glands (with cutout sealing ring) are suitable for the following overall cable diameter:

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 21.

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

B84299C1101B003, ...E003

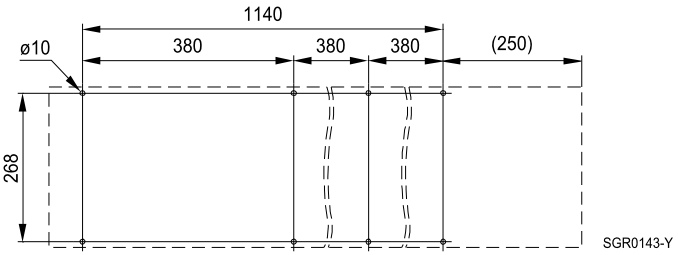


① Input end: Cable gland PG 42/29
(PG 42 mounted, PG 29 and reducer ring in accessory bag)

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



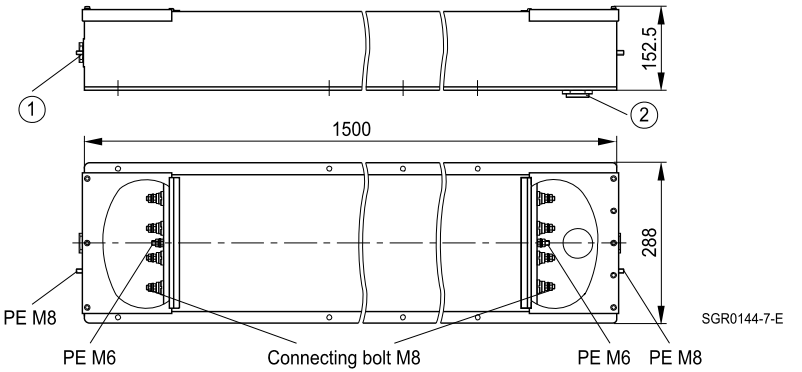
The cable glands (with cutout sealing ring) are suitable for the following overall cable diameter:

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 21.

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

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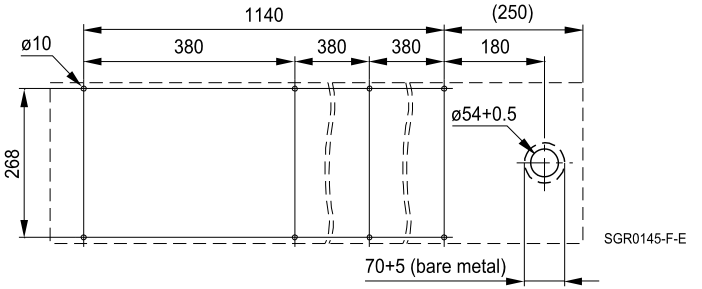


① Input end: Cable gland PG 42/29
(PG 42 mounted, PG 29 and reducer ring in accessory bag)

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



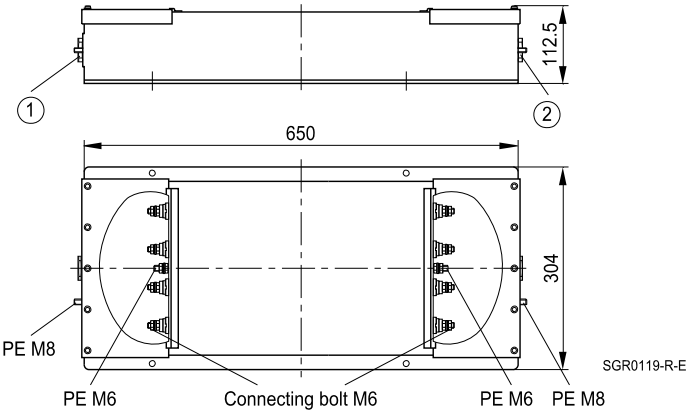
The cable glands (with cutout sealing ring) are suitable for the following overall cable diameter:

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 21.

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

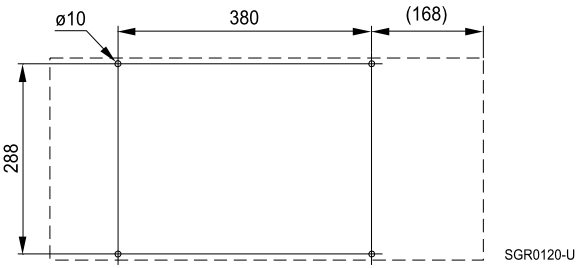
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① Input end: Cable gland PG 21 (mounted)
② Shielded end: Cable gland PG 29/21
(cable gland PG 29, PG 21 and reducer ring in accessory bag)

Paint color: RAL 7035 (light gray, semigloss)

Fixing dimensions



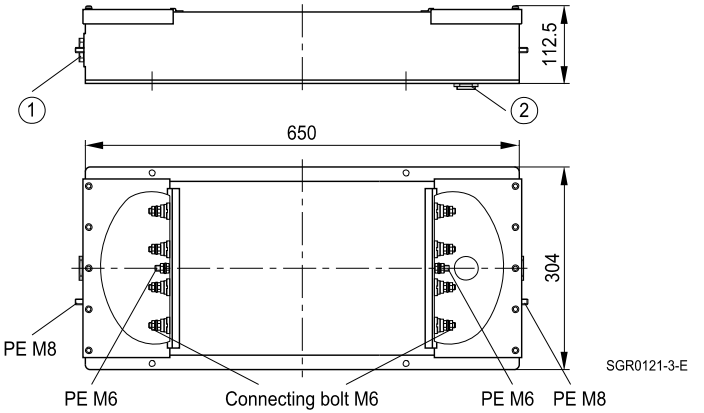
The cable glands (with cutout sealing ring) are suitable for the following overall cable diameter:

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 21.

Dimensional drawing 10 (direct connection to shielding wall) **4 x 16 A**

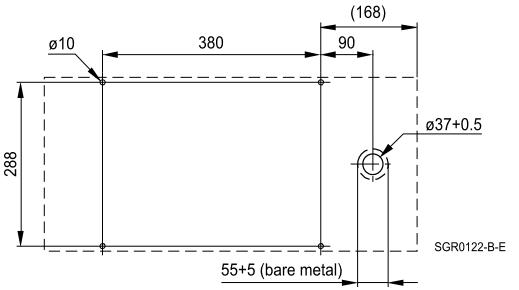
B84299D2160E003



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



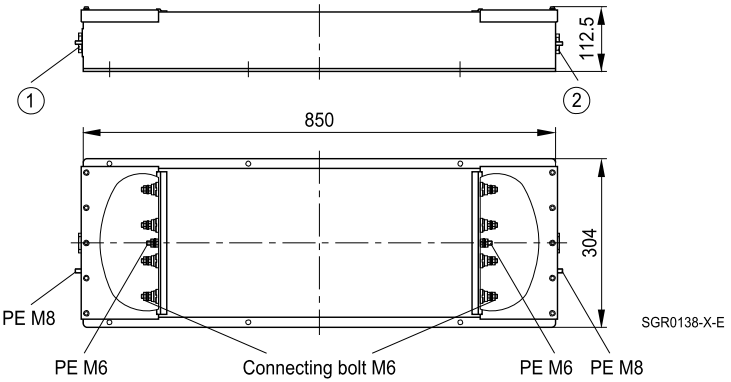
The cable glands (with cutout sealing ring) are suitable for the following overall cable diameter:

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 21.

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

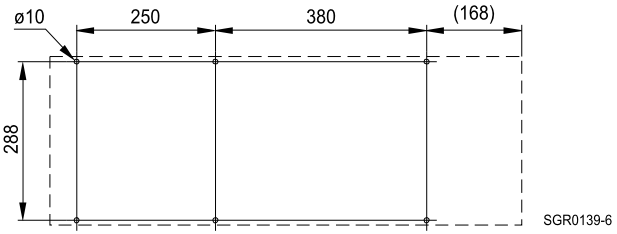
B84299C2320E003



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



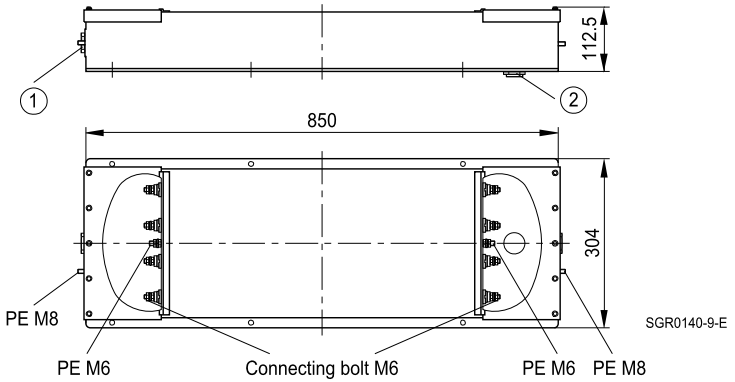
The cable glands (with cutout sealing ring) are suitable for the following overall cable diameter:

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 21.

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

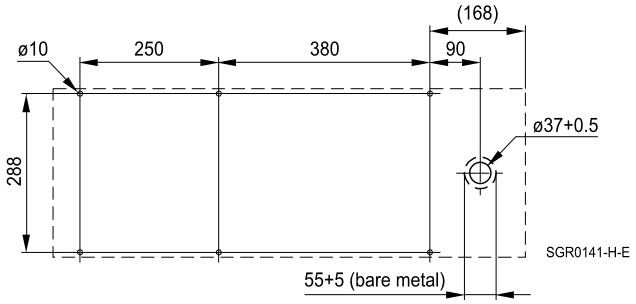
B84299D2320E003



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



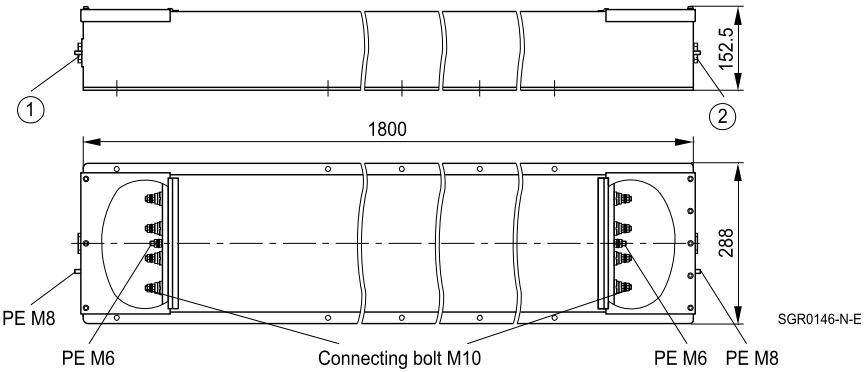
The cable glands (with cutout sealing ring) are suitable for the following overall cable diameter:

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 21.

Dimensional drawing 13 (cable glands at both ends) **4 x 150 A**

B84299C1151E003

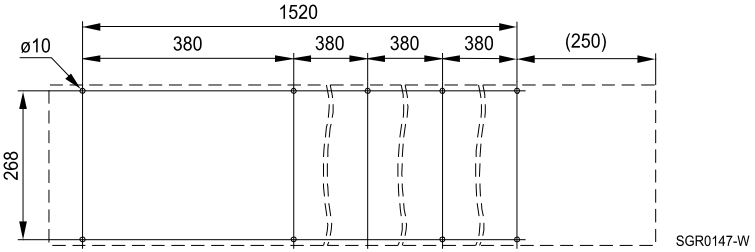


① Input end: Cable gland PG 42/29
(PG 42 mounted, PG 29 and reducer ring in accessory bag)

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



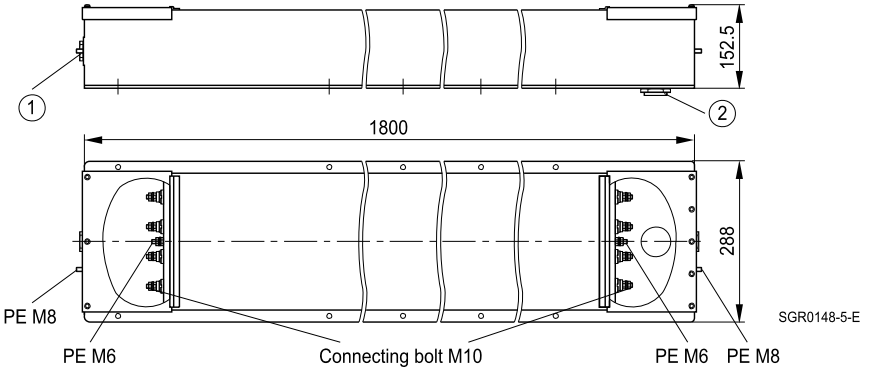
The cable glands (with cutout sealing ring) are suitable for the following overall cable diameter:

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 21.

Dimensional drawing 14 (direct connection to shielding wall) **4 x 150 A**

B84299D1151E003

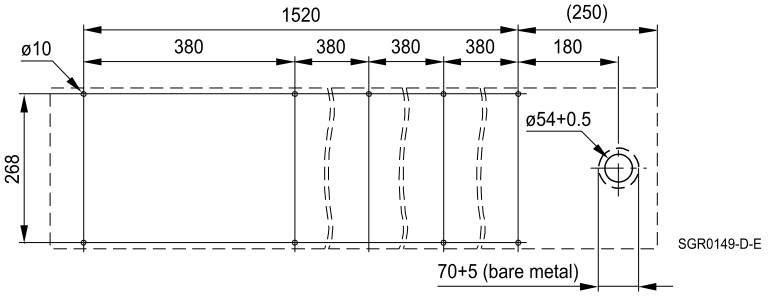


① Input end: Cable gland PG 42/29
(PG 42 mounted, PG 29 and reducer ring in accessory bag)

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

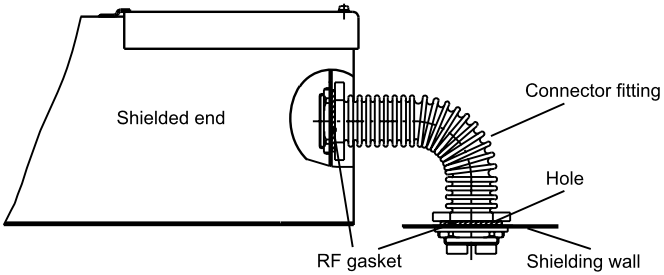


The cable glands (with cutout sealing ring) are suitable for the following overall cable diameter:

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 21.

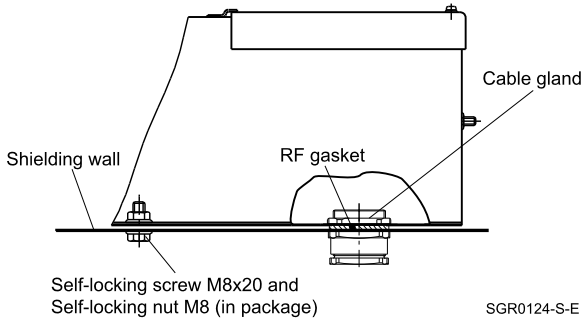
RF-tight connection to shielding wall with connector fitting (mechanical version C)



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	∅ 37 +0.5 mm	∅ 55 +5 mm
PG 29	long thread, RF gasket		
PG 42	and check nut.	∅ 54 +0.5 mm	∅ 70 +5 mm