Compact Power Supply Units

QUINT-PS-3x207AC/24DC/30 (... 30/F)

QUINT-PS-3x400AC/24DC/30 (... 30/F)

- **Electronically short-circuit/idle proof**
- **Extended input voltage range**
- **Reliable isolation (DIN VDE0100-410, EN 60 950)**
- **Mains buffer > 20 ms**
- **LED function display in primary and secondary circuit**
- **COMBICON connecting plug**
- **Redundant circuits can be set up**
- **Small depth of housing**
- **Sturdy high-grade steel housing**

1. Short Description

Compact power supply units from Phoenix Contact have proven themselves for years in the distributed power supply for electrotechnical components. Designed to supply 24 V peripheral devices, QUINT POWER provides output currents of 1, 2.5 and 10 A with a precisely regulated fixed-voltage of 24 V DC and 10, 20, 30 and 40 A, with a regulated, adjustable output voltage of 22.5 to 28.5 VDC. All devices from 10 A upwards have a U/I characteristic-curve-controlled output. Instead of switching off if a consumer short circuits, they reduce the output voltage if there is an overload, whilst still providing full output current. This ensures that both heavily capacitive loads and devices with DC/DC converters in the primary circuit can be fed without problems using QUINT POWER. Downstream fuses are also triggered reliably. Selectivity in the design of your system is thus guaranteed at all times.

2. Area of Application

The rail-mountable power supply unit QUINT POWER is designed as a primary switched-mode regulator and limits the heat loss to a minimum thanks to an efficiency of about 90%. The low design and high efficiency make the power supply units particularly suitable for installation in decentral distributor boards. Each module keeps the limit values for interference suppression class B, and can thus be used universally – in both extreme industrial conditions and in office and residential environments susceptible to interference.

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3. Technical Data

Type / Order No.

QUINT-PS-3x207AC/24DC/30	29 39 098
QUINT-PS-3x207AC/24DC/30/F	29 39 292
QUINT-PS-3x400AC/24DC/30	29 39 195
QUINT-PS-3x400AC/24DC/30/F	29 39 399

		QUINT-PS-3x207...30(... 30F)	**QUINT-PS-3x400...30(... 30F)**
Input data			
Input voltage		3x207 V AC	3x400 V AC
• input voltage range		168 -240 V AC	325 -460 V AC
• short-term input voltage range (1 min)		165 -250 V AC	320 -500 V AC
Frequency		47 - 63 Hz	47 - 63 Hz
Inrush surge current at 25 °C		< 54 A	< 29 A
Current consumption at nominal input voltage		approx. 5.4 A (approx. 3.0 A)	approx. 2.7 A (approx. 1.5 A)
Input fuse, external via 3~LS (power protection) switch		6 A, characteristic B	6 A, characteristic B
Power factor		0.4 (0.7)	0.4 (0.7)
Mains buffering		> 20 ms	> 20 ms
Transient surge voltage protection		varistor (response voltage 150 VAC)	varistor (response voltage 275 VAC)
Output data			
Nominal output voltage/current		24 V DC / 30 A	24 V DC / 30 A
Tolerance		± 1 %	± 1 %
Setting range		22.5 –28.5 V (>24 V constant capacity)	22.5 –28.5 V (>24 V constant capacity)
Starting delay			
• ohmic load / capacitive load		approx. 100 ms/300ms	approx. 100 ms/300ms
Switching on after applying the mains voltage		approx. 2.5 s	approx. 2.5 s
Startup of capacitive loads		unlimited	unlimited
Surge voltage protection against internal surge voltages		yes	yes
Function display		LED	LED
Connection in parallel		yes, for the design of redundant systems and to increase capacity	yes, for the design of redundant systems and to increase capacity
Current limitation		>1.1 X $I_{nominal}$ ± 5%	>1.1 X $I_{nominal}$ ± 5%
System deviation with change in load:			
Static 10 - 90 %		< 1 %	< 1 %
Dynamic 10 - 90 %		< 5 %	< 5 %
System deviation with change in input voltage ±10 %		< 0.1 %	< 0.1 %
Ascent time U out (10 % - 90 %)		100 ms	100 ms
Residual ripple / peak switching voltages (1.2 MHz)	idling	10 mV pp / 10 mV pp	10 mV pp / 10 mV pp
	nominal load	150 mV pp / 100 mV pp	150 mV pp / 100 mV pp
Maximum power dissipation	idling	9 W	9 W
	nominal load	98 W	98 W
Climatic Data			
Ambient temperature	Operation	0 °C to +50 °C	0 °C to +50 °C
	Storage	-25 °C to +85 °C	-25 °C to +85 °C
Moisture, without condensation		95 %, 25 °C	95 %, 25 °C
Vibration in acc. with IEC 68-2-6		10 Hz-150 Hz, 0.15 mm or 2 g	10 Hz-150 Hz, 0.15 mm or 2 g
Shock in acc. with IEC 68-2-27		30 g for 18 ms in 3 directions	30 g for 18 ms in 3 directions
Contamination class in acc. with EN 50 178		2	2

4. General Data

Insulation voltage input/output		1.8 kV (3 kV type test)	1.8 kV (3 kV type test)
Electric safety		VDE 0805, EN 60950 UL 1950, CSA 22.2 No. 950 VDE 160, EN 50178 UL 508 c, CSA 22.2 No. 14-M-91 VDE 0100-410 / DIN 57100-410 DIN VDE 0106-101	VDE 0805, EN 60950 UL 1950, CSA 22.2 No. 950 VDE 160, EN 50178 UL 508 c, CSA 22.2 No. 14-M-91 VDE 0100-410 / DIN 57100-410 DIN VDE 0106-101
Safe isolation		No (yes)	No (yes)
Limit for mains current harmonics in acc. with EN 61000-3-2			
Installation position		horizontal mounting rail	horizontal mounting rail
Mounting		NS 35 / 7,5 in acc. with EN 50022 can be aligned: distance vertical > 10cm horizontal without spacing	NS 35 / 7,5 in acc. with EN 50022 can be aligned: distance vertical > 10cm horizontal without spacing
Connection / Cross section	Input	COMBICON /0.2- 2.5 mm^2 (AWG 24-12)/rigid/flexible	COMBICON /0.2- 2.5 mm^2 (AWG 24-12)/rigid/flexible
	Output	Printed circuit terminal blocks/ 0.5 - 16/0.5 - 10 mm^2 (AWG 20-6)/rigid/flexible	Printed circuit terminal blocks/ 0.5 - 16/0.5 - 10 mm^2 (AWG 20-6)/rigid/flexible
Protection type		IP 20	IP 20
Protection class		I, with PE connection	I, with PE connection
MTBF		> 500 000 h in acc. with SN 29 500	> 500 000 h in acc. with SN 29 500
Efficiency		> 88 %	> 88 %
Weight		approx. 4.4 kg (approx. 4.8 kg)	approx. 4.4 kg (approx. 4.8 kg)
Approx. dimensions (W x H x D) in mm		230 x 150 x 156	230 x 150 x 156

Complies with EMC guideline 89/336/EEC and low voltage directive 73/23/EEC

Immunity to interference in acc. with EN 50082-2		
• Electrostatic discharge (ESD)	EN 61000-4-2	Level 3 (6/8 kV) [2]
• Electromagnetic HF field:	EN 61000-4-3	Level 3 (10 V/m) [1]
• Fast transients (Burst)	EN 61000-4-4	Level 3 (2 kV) [2]
• Surge voltage capacities (Surge)	EN 61000-4-5	Inst. class 3 (2 kV) [2] (1 kV normal/2 kV common) [2]
• Conducted disturbance	EN 61000-4-6	10 V, 150 kHz-80 MHz [1]
• Simulation mobile phones	ENV 50204	20 V/m, 900 MHz ± 5 MHz, 50 % VT
Noise emission in acc. with EN 50081-1		
• Emitted radio interference	EN 55022	Class B
• Radio interference voltage at mains input	EN 55022	Class B

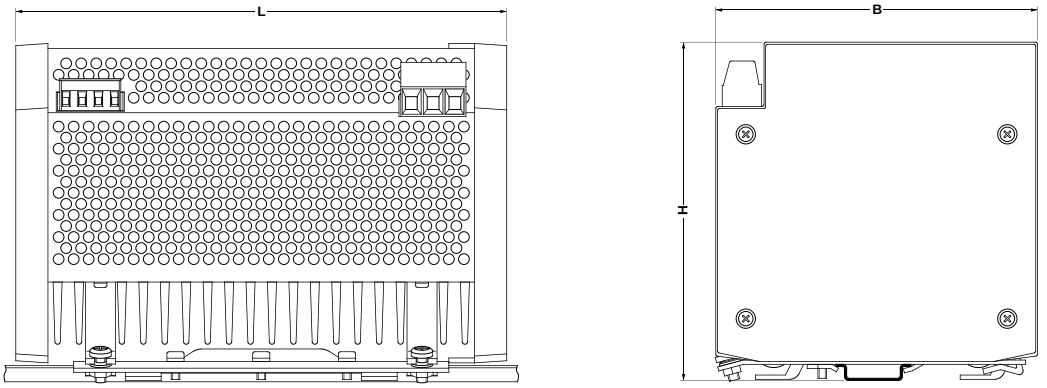
EN 61000 corresponds to IEC 1000 / EN 55011 corresponds to CISPR22

[1] Criterion A: Normal operating behavior within the defined limits.

[2] Criterion B: Temporary impairment to operational behavior that is corrected by the device itself.

Class B: Area of application industry and residential

5. Dimensioned Drawing



L= 230 mm
W= 150 mm
H= 156 mm

Fig. 2

6. Connection Scheme

Primary switched-mode compact power supply unit

QUINT-PS-3x207AC/24DC/30(... 30/F)

QUINT-PS-3x400AC/24DC/30(... 30/F)

① AC input
pluggable COMBICON screw terminal block
(0.2 mm^2 to 2.5 mm^2 rigid/flexible)
(AWG 24-12)

② DC output
Printed circuit terminal blocks
(0.5 to 16 mm^2/0.5 to 10 mm^2 rigid/flexible)
(AWG 20-6)

③ DC o.k. control lamp

④ Power o.k. control lamp

⑤ Potentiometer 22.5 -28.5 V

⑥ Mounting plate for
wall or rail mounting

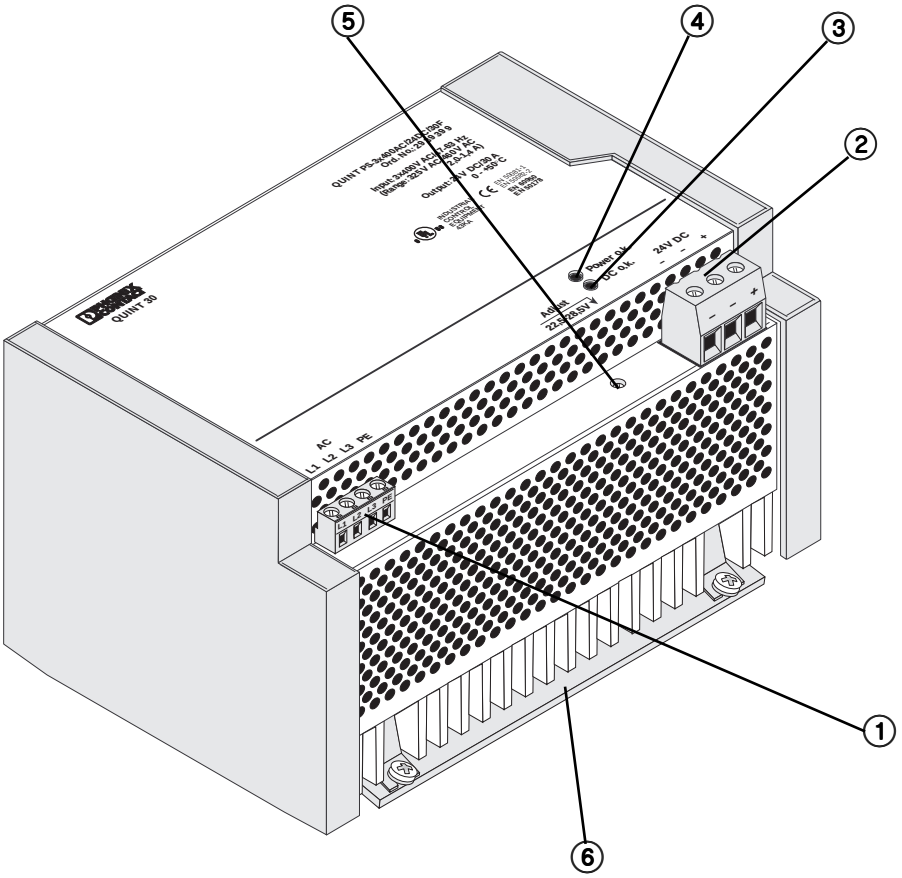


Fig. 3

7. Block Diagram: Primary Switched-Mode Power Supply Unit

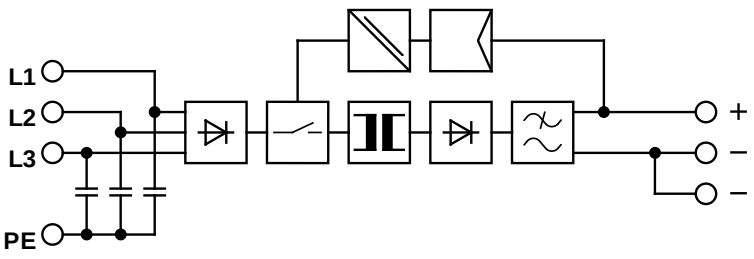


Fig. 4

8. Connection and Operating Instructions

In the vertical direction, a minimum distance of 10 cm between other modules and this power supply unit is necessary in order toguarantee sufficient convection. If they are lined up horizontally, no minimum distance must be observed!

8.1. The mounting plate

The mounting plate supplied makes the power supply unit ready for both wall and top hat rail mounting: NS 35/7,5 and NS 35/15 in acc. with EN 50022.
Remove the mounting plate from the rear of the device (fig. 5):
① Remove the captive retaining screws
② Remove the plate from the bracket

8.1.1. Screw/Wall mounting

Using the drilling template (final page) fix four M4 screws on the switch cabinet wall (fig. 6).

Hang the device onto the screws using the hinging lugs and tighten the screws with a screwdriver (torque 1.2 Nm) (fig. 7).

Assembly Instructions

The mounting plate

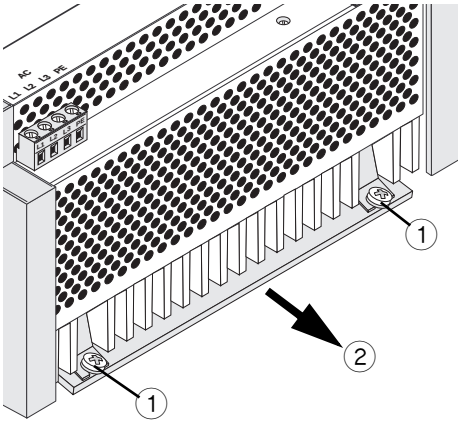


Fig. 5

Screw/Wall mounting

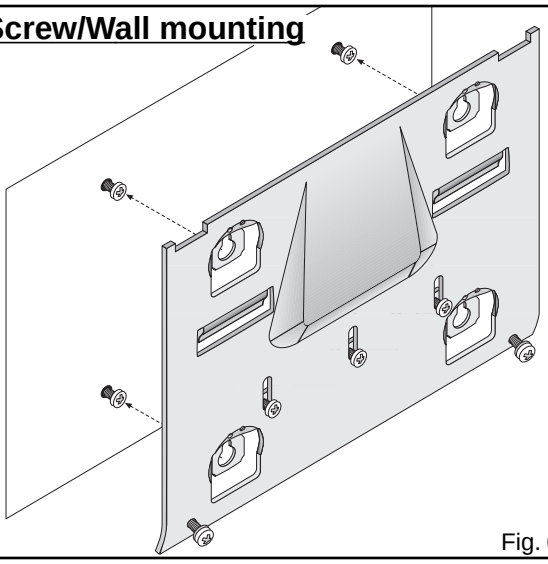


Fig. 6

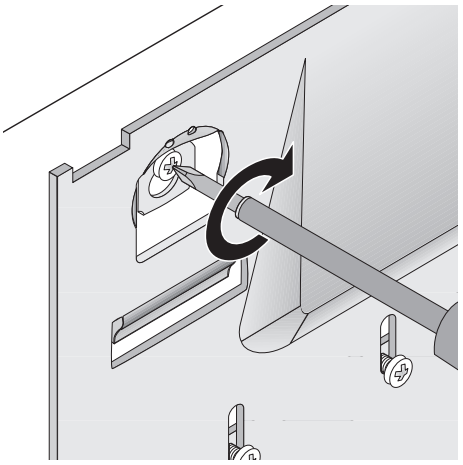


Fig. 7

8.1.2. Rail Mounting

Hinge the mounting plate into the mounting rail ①, slide the latch of the mounting rail upwards as far as it will go ② (fig. 8) and tighten the three screws of the latch of the mounting rail ③ (torque 1.5 Nm).

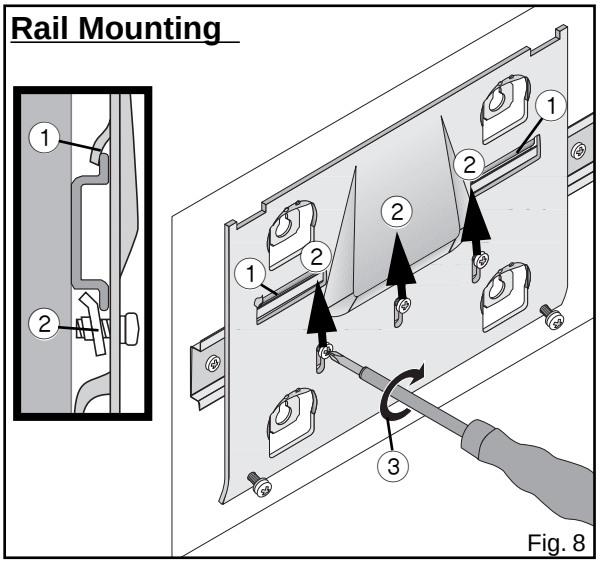


Fig. 8

8.2. Fixing the module to the mounting plate

Hinge the QUINT POWER power supply unit into the mounting plate in such a manner that the retaining hooks of the power supply unit (fig. 9 ④) are in the correct groove in the mounting plate and the screw hooks (fig. 9 ⑤) embrace the fixing screws. Tighten the fixing screws with a screwdriver (torque 1.5 Nm).

Check that the mounting plate and power supply unit are securely positioned!

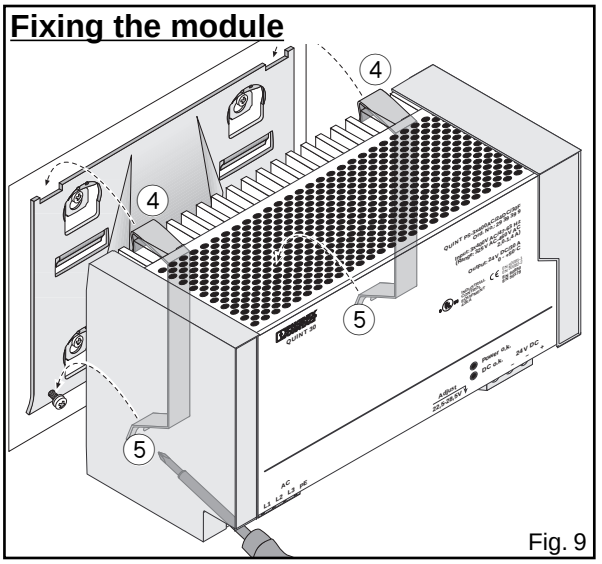


Fig. 9

8.3. Cable connection

The device is equipped with COMBICON plug connectors on the output side.
This method of connection, so convenient for installation, allows the electrical connection to be visibly separated.

Attention: Never carry out work on live parts Danger!

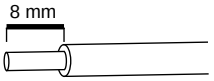
Network types:
TN-S network,TN-C network, TT network, iT network (see fig. 10)

Connecting cable:
You can use the following cable cross sections:

at the input from 0.2-2.5 mm^2 rigid/ flexible (AWG 24-12) and
at the output from 0.5-16 mm^2 rigid / 0.5-10 mm^2 flexible (AWG 20-6) .

In order to comply with the UL, use copper cables that are designed for operating temperatures of 75 °C.

For reliable and shock-proof contacts:
• Strip the connecting ends (8 mm)!



Input (fig. 11): The 207 V/400 V AC connection is made using the L1, L2, L3 and PE screw connections on the COMBICON plug connection (torque 0.5 Nm) (fig.11). The device is suited for operation with two phases. The mains buffering then drops from >20 ms to >7.5 ms.

The power o.k. control lamp signalizes that the device is functioning (fig.12 ③).

Output (fig. 12): The 24 V DC connection is made using the "+" and "–" screw connections on the output p.c.b. terminal block (torque 1.2 Nm).

At the time of delivery, the output voltage is 24 V DC. The output voltage can be set from 22.5 to 28.5 V DC on the potentiometer ①.
If the DC o.k. control lamp ②goes out, this signalizes a drop in the output voltage as set of more than 2 V DC. If the Power o.k. signal ③ is active and the D:C: o.k. control lamp is off, the device is in the overload range (see also point 9. short-circuit/overload). If both LEDs are off, the 207 V/400 V AC power supply is interrupted.

Network types

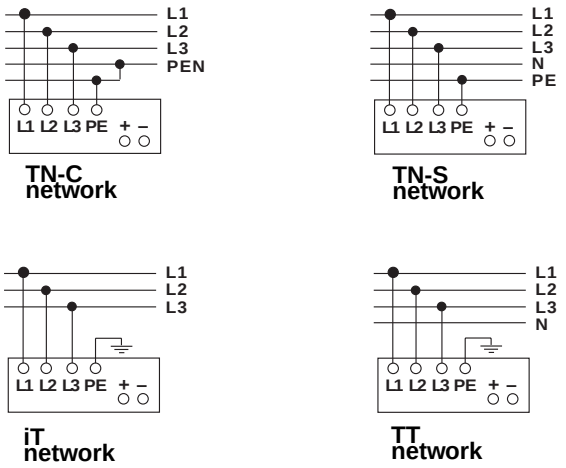


Fig. 10

AC cable connection

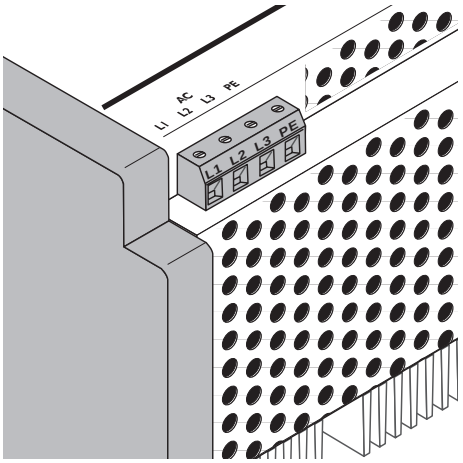


Fig. 11

DC cable connection

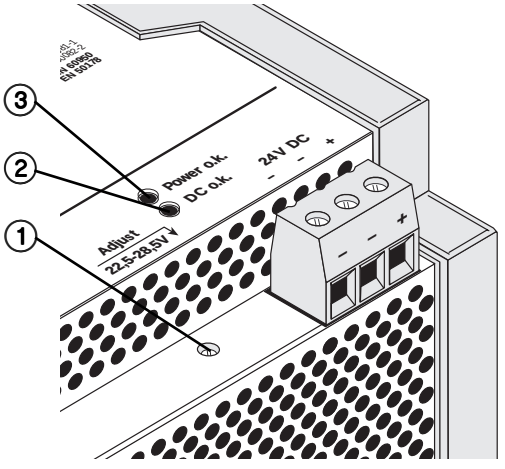


Fig. 12

8.4. Fusing

On the primary side: An external three-phase thermo-magnetic fuse is necessary as equipment protection (e.g. 3~LS (power protection) switch/6 A/characteristic B or identical function). The three single phase trip switches need not be mechanically coupled, two-phase operation is possible on a permanent basis.

If the internal fuse on the primary side is triggered, there is most probably a malfunction in the device.In this case, the device must be inspected in the factory!

Secondary side: The device is electronically protected against short-circuit and idling. In the event of a malfunction, the output voltage is limited to 35 V ± 5%.

8.5. Redundant operation

If a fault occurs in the primary circuit of device no. 1, device no. 2 automatically takes over the entire power supply, without interruption, and vice versa (fig. 13)

8.6. Parallel operation to increase capacity

There are no restrictions to parallel connection of the device. For **n** parallel connected devices, the output current can be increased to **n x I_N** (fig. 13).

9. Characteristic Curves

9.1. Short circuit/overload

The output of the device is **electronically** protected against overload and short-circuiting.
The device can provide 1.1x the nominal current, without switching off. In the event of a high overload, the operating point follows the curve depicted in figure 14. As the overload increases, the output voltage is reduced. The full output current of
33 A remains available.

The output voltage remains reduced until the short circuit on the secondary side has been remedied.

9.2. Thermal behavior

The device supplies a nominal output current of
30 A with ambient temperatures of up to 50 °C. In the case of ambient temperatures above 50 °C, the output current must be reduced by 1 % per Kelvin increase in temperature.
Depending on the load and the environmental conditions, the temperature of the housing can be up to 70 °C.

Redundant operation

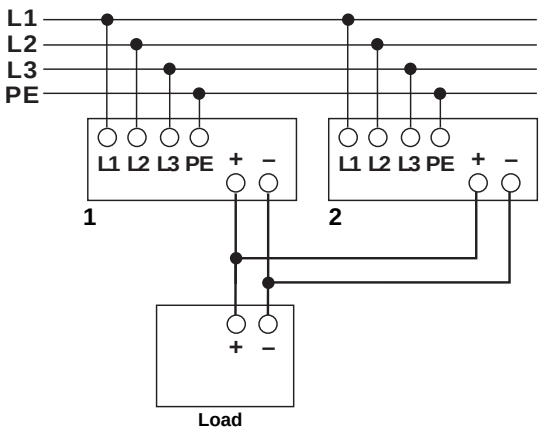


Fig. 13

Output characteristic curve

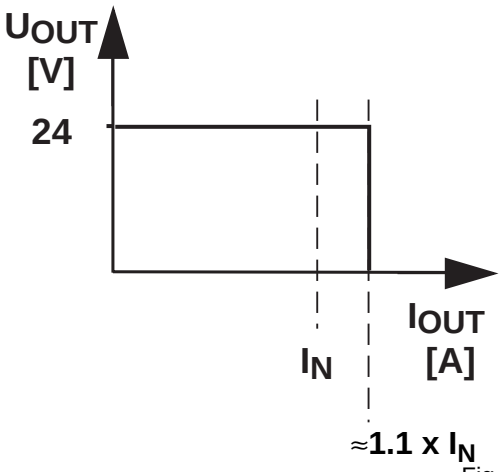


Fig. 14

Derating

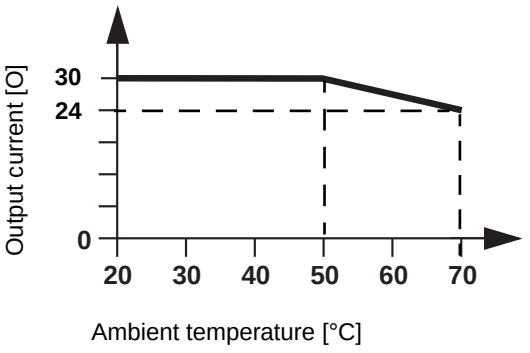


Fig. 15

10. Standards Certifications

10.1. Electric safety

Electrical safety is guaranteed by the construction of the device in acc. with EN 60950 (VDE 0805) and EN 50178 (VDE 0160). The device is certified in accordance with EN 60950/VDE 0805, UL 1950, CSA 22.2 No. 950, and EN 50178/VDE 0160, UL 508 c, CSA 22.2 No. 14-M-91. The requiremnts made of reliable isolation in accordance with VDE 0100-410 und VDE 0106-101 are fulfilled.

• Radio interference suppression in acc. with EN 55 022 class B (industry and residential area)

• Compliance with the EN 61 000-3-2 (mains harmonic currents) for all devices of type .../F (filtered).

The device must be installed in acc. with the regulations as in EN 60950. It must be possible to disconnect the device using a suitable **isolating facility outside the power supply unit**.

10.2. Mechanical safety

• The devices have been tested for shock resistance in acc. with IEC 68 part 2-27 and for vibrations in acc. with IEC 68 part 2-6.

• Protection class I, IP 20 protection.

11. Appendix

• Drilling template
(see following page)

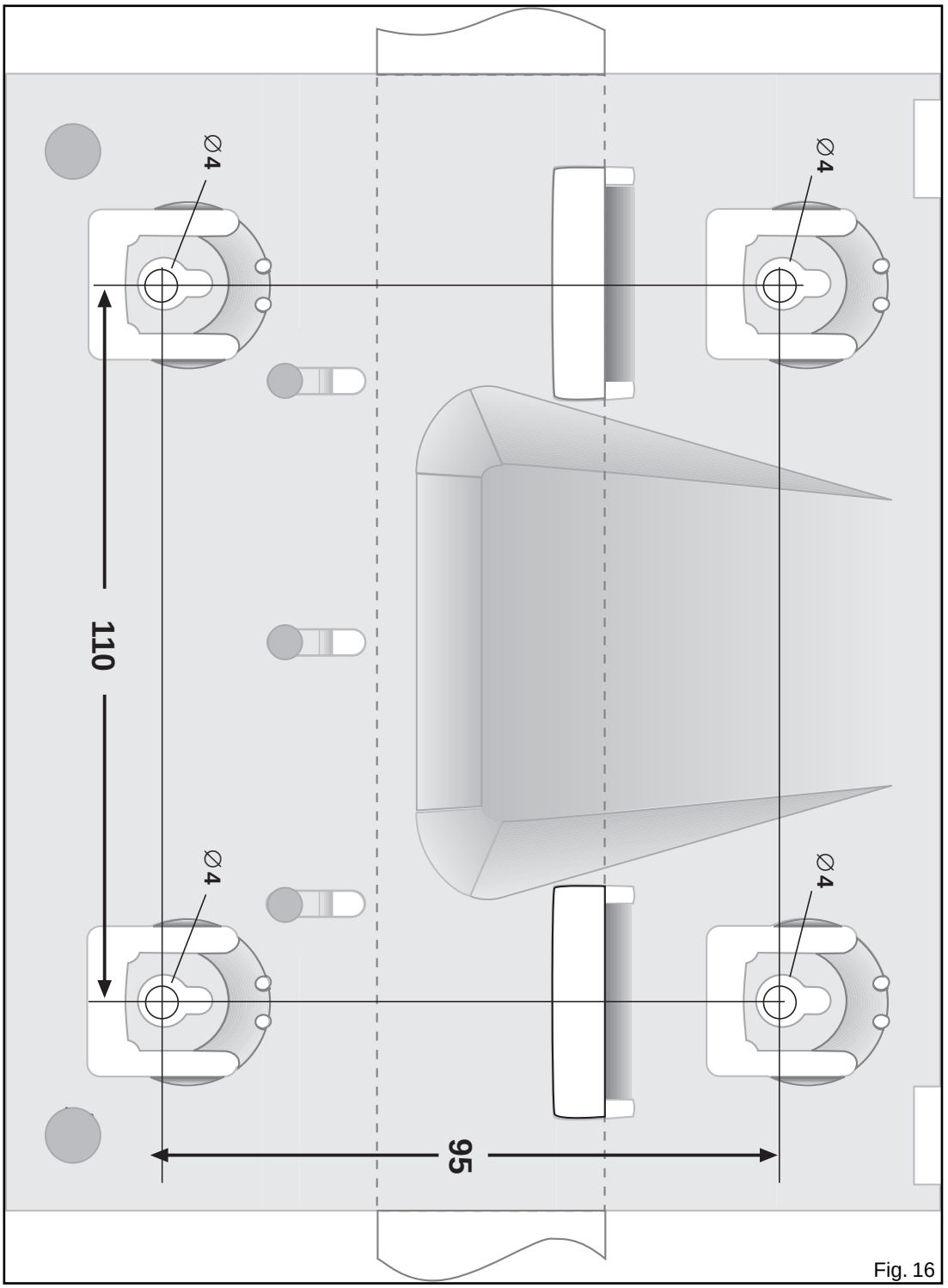


Fig. 16