

# TRIO-PS-2G/3AC/72DC/14

## Power supply unit

Data sheet  
109785\_en\_00

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## 1 Description

TRIO POWER - power supplies with standard functionality  
The power supplies of the TRIO POWER family convince due to their slim and robust design. The dynamic boost (1.5 x I<sub>N</sub> for 5 seconds) absorbs starting currents and short overload situations securely during operation and without a drop in output voltage. The push-in connection technology on the front enables fast and tool-free wiring of the devices.

### Features

- Tool-free connection via push-in connection technology
- Safe operation, thanks to electrically and mechanically robust design
- Especially slim design
- Worldwide use, thanks to wide-range input
- Reliable starting of heavy loads, thanks to dynamic boost (1.5 x I<sub>N</sub> for 5 seconds)
- Simplified error diagnostics for remote signaling via DC-OK signal contact
- OVP (Over Voltage Protection) limits overvoltage to ≤100 V DC

### Technical data (short form)

Input voltage range	3x 400 V AC ... 500 V AC -20 % ... +15 %
Mains buffering	> 10 ms (400 V AC) > 20 ms (480 V AC)
Nominal output voltage (U <sub>N</sub> )	72 V DC ±1 %
Setting range of the output voltage (U <sub>Set</sub> )	70 V DC ... 85 V DC
Nominal output current (I <sub>N</sub> ) Dynamic Boost (I <sub>Dyn.Boost</sub> )	14 A 21 A (5 s)
Output power (P <sub>N</sub> ) Output power (P <sub>Dyn. Boost</sub> )	1008 W 1512 W
Efficiency	> 94.6 % (400 V AC) > 94.3 % (480 V AC)
Residual ripple	≤ 300 mV <sub>pp</sub>
MTBF (IEC 61709, SN 29500)	> 1730000 h (25 °C) > 1051000 h (40 °C) > 510000 h (60 °C)
Ambient temperature (operation)	-25 °C ... 70 °C (> 60 °C Derating: 2.5 %/K)
Startup type tested	-40 °C
Dimensions W/H/D	110 mm / 130 mm / 160 mm
Weight	2.5 kg



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### 3 Ordering data

Description	Type	Order No.	Pcs./Pkt.
Primary-switched TRIO power supply for DIN rail mounting, input: 3-phase, output: 72 V DC/14 A, dynamic boost, tool-free fast connection technology for rigid and flexible conductors with ferrule	TRIO-PS-2G/3AC/72DC/14	1076188	1

### 4 Technical data

#### Input data



Unless otherwise stated, all data applies for 25°C ambient temperature, 400 V AC input voltage, and nominal output current ( $I_N$ ).

Input voltage range	3x 400 V AC ... 500 V AC -20 % ...+15 %
Network type	Star network
Frequency range ( $f_N$ )	50 Hz ... 60 Hz $\pm$ 5 Hz
Current consumption (for nominal values) typ.	3x 1.9 A (400 V AC) 3x 1.7 A (500 V AC)
Discharge current to PE typ.	< 3.5 mA < 2.5 mA (550 V AC, 60 Hz)
Mains buffering	> 10 ms (400 V AC) > 20 ms (480 V AC)
Inrush current integral ( $I^2t$ )	< 1.1 A <sup>2</sup> s
Inrush current limitation after 1 ms	35 A



During the first few microseconds, the current flow into the filter capacitors is excluded.

Input fuse internal (device protection)	6.3 A
Recommended breaker for input protection	10 A ... 16 A (Characteristics B, C, D, K)



The external backup fuse must be approved for the (AC) supply voltage used and the voltage level.

#### Electric strength of the insulation

Insulation voltage input/output ( IEC/EN 61010-1 )	3 kV AC (type test) 1.5 kV AC (routine test)
Production test	2.5 kV DC

<b>Input connection data</b>	
Connection method	Push-in connection
Stripping length	10 mm
Conductor cross section, rigid	0.2 mm <sup>2</sup> ... 4 mm <sup>2</sup>
Conductor cross section, flexible	0.2 mm <sup>2</sup> ... 4 mm <sup>2</sup>
Conductor cross section flexible, with ferrule with plastic sleeve	0.2 mm <sup>2</sup> ... 2.5 mm <sup>2</sup>
Conductor cross section flexible, with ferrule without plastic sleeve	0.2 mm <sup>2</sup> ... 2.5 mm <sup>2</sup>
Cross section AWG	24 ... 12
<b>Output data</b>	
Nominal output voltage ( $U_N$ )	72 V DC $\pm$ 1 %
Setting range of the output voltage ( $U_{Set}$ ) (> 72 V DC, constant capacity restricted)	70 V DC ... 85 V DC
Nominal output current ( $I_N$ )	14 A
Dynamic Boost ( $I_{Dyn.Boost}$ )	21 A (5 s)
Short-circuit current	< 23.5 A DC (Permanent)
Control deviation change in load, static 10 % ... 90 %	< 1 %
Control deviation Dynamic load change 10 % ... 90 %, 10 Hz	< 3 %
Control deviation change in input voltage $\pm$ 10 %	< 0.1 %
Short-circuit-proof	yes
No-load proof	yes
Residual ripple	$\leq$ 300 mV <sub>PP</sub>
Connection in parallel	yes
Connection in series	yes
Feedback voltage resistance	< 105 V DC
Protection against overvoltage at the output (OVP)	$\leq$ 100 V DC
Rise time typical	$\leq$ 2 ms ( $U_{OUT}$ (10 % ... 90 %))
<b>Output connection data</b>	
Connection method	Push-in connection
Stripping length	18 mm
Conductor cross section, rigid	0.75 mm <sup>2</sup> ... 16 mm <sup>2</sup>
Conductor cross section, flexible	0.75 mm <sup>2</sup> ... 16 mm <sup>2</sup>
Conductor cross section flexible, with ferrule with plastic sleeve	0.75 mm <sup>2</sup> ... 10 mm <sup>2</sup>
Conductor cross section flexible, with ferrule without plastic sleeve	0.75 mm <sup>2</sup> ... 16 mm <sup>2</sup>
Conductor cross section AWG	20 ... 4

<b>LED signaling</b>		
Signalization designation	DC OK	
Status indicator	LED	
Color	green	
Signal threshold	$U_{OUT} > 0.95 \times U_N$ ( $U_N = 72 \text{ V DC}$ )	
<b>Relay output</b>		
Signalization designation	DC OK	
Contact assignment	13/14 ( closed )	
Maximum contact load	30 V AC / 30 V DC ( 100 mA )	
Signal threshold	$U_{OUT} > 0.95 \times U_N$ ( $U_N = 72 \text{ V DC}$ )	
<b>Signal connection data</b>		
Connection method	Push-in connection	
Stripping length	8 mm	
Conductor cross section, rigid	0.2 mm <sup>2</sup> ... 0.75 mm <sup>2</sup>	
Conductor cross section, flexible	0.2 mm <sup>2</sup> ... 1.5 mm <sup>2</sup>	
Conductor cross section flexible, with ferrule with plastic sleeve	0.2 mm <sup>2</sup> ... 0.75 mm <sup>2</sup>	
Conductor cross section flexible, with ferrule without plastic sleeve	0.2 mm <sup>2</sup> ... 1 mm <sup>2</sup>	
Conductor cross section AWG	24 ... 18	
<b>Reliability</b>	<b>400 V AC</b>	
MTBF (IEC 61709, SN 29500)	> 1730000 h (25 °C) > 1051000 h (40 °C) > 510000 h (60 °C)	
<b>General data</b>		
Degree of protection	IP20	
Protection class	I (in closed control cabinet)	
Inflammability class in acc. with UL 94 (housing / terminal blocks)	V0	
Type of housing	Aluminum (AlMg3)	
Hood version	Polycarbonate	
Dimensions W / H / D (state of delivery)	110 mm / 130 mm / 160 mm	
Weight	2.5 kg	
<b>Power dissipation</b>	<b>400 V AC</b>	
Maximum power dissipation in no-load condition	< 7 W	
Power loss nominal load max.	< 58 W	
<b>Efficiency</b>	<b>400 V AC</b>	<b>480 V AC</b>
	> 94.6 %	> 94.3 %

**Ambient conditions**

Ambient temperature (operation) -25 °C ... 70 °C (> 60 °C Derating: 2.5 %/K)



The ambient temperature (operation) refers to UL 508 surrounding air temperature.

Ambient temperature (start-up type tested) -40 °C

Ambient temperature (storage/transport) -40 °C ... 85 °C

Max. permissible relative humidity (operation) ≤ 95 % (at 25 °C, non-condensing)

Installation height ≤ 4000 m (> 2000 m, Derating: 10 %/1000 m)

Vibration (operation) < 15 Hz, amplitude ±2.5 mm (according to IEC 60068-2-6)  
15 Hz ... 150 Hz, 0.7g, 90 min.

Shock 11 ms, 15 g, in each space direction (according to IEC 60068-2-27)

Degree of pollution 2

Climatic class 3K3 (in acc. with EN 60721)

Overvoltage category  
EN 61010-1 II (≤ 2000 m)

**Standards**

Safety transformers for power supply units EN 61558-2-16 (air clearances and creepage distances only)

Electrical safety (of information technology equipment) IEC 61010-2-201

Safe isolation DIN VDE 0100-410

Limitation of mains harmonic currents EN 61000-3-2

**Approvals**

UL UL/C-UL Listed UL 61010-1



Current approvals/permissions for the product can be found in the download area under [phoenixcontact.net/products](http://phoenixcontact.net/products)

<b>Electromagnetic compatibility</b>		
<b>Conformance with EMC Directive 2014/30/EU</b>		
<b>Noise emission according to EN 61000-6-3 (residential and commercial) and EN 61000-6-4 (industrial)</b>		
<b>CE basic standard</b>	<b>Minimum normative requirements</b>	<b>Higher requirements in practice (covered)</b>
Conducted noise emission EN 55016-2-1	EN 61000-6-4 (Class A)	EN 61000-6-4 (Class A)
Noise emission EN 55016-2-3	EN 61000-6-4 (Class A)	EN 61000-6-4 (Class A)
Harmonic currents EN 61000-3-2	EN 61000-3-2	EN 61000-3-2 (Class A)
Flicker EN 61000-3-3	not required	EN 61000-3-3
<b>Immunity according to EN 61000-6-1 (residential), EN 61000-6-2 (industrial)</b>		
<b>CE basic standard</b>	<b>Minimum normative requirements of EN 61000-6-2 (CE) (immunity for industrial environments)</b>	<b>Higher requirements in practice (covered)</b>
Electrostatic discharge EN 61000-4-2		
Housing contact discharge	4 kV (Test Level 2)	6 kV (Test Level 3)
Housing air discharge	8 kV (Test Level 3)	8 kV (Test Level 3)
Comments	Criterion B	Criterion A
Electromagnetic HF field EN 61000-4-3		
Frequency range	80 MHz ... 1 GHz	80 MHz ... 1 GHz
Test field strength	10 V/m (Test Level 3)	10 V/m (Test Level 3)
Frequency range	1.4 GHz ... 2 GHz	1 GHz ... 2 GHz
Test field strength	3 V/m (Test Level 2)	10 V/m (Test Level 3)
Frequency range	2 GHz ... 2.7 GHz	2 GHz ... 6 GHz
Test field strength	1 V/m (Test Level 1)	10 V/m (Test Level 3)
Comments	Criterion B	Criterion A
Fast transients (burst) EN 61000-4-4		
Input	2 kV (Test Level 3 - asymmetrical)	4 kV (Test Level 3 - asymmetrical)
Output	2 kV (Test Level 3 - asymmetrical)	2 kV (Test Level 3 - asymmetrical)
Signal	1 kV (Test Level 3 - asymmetrical)	2 kV (Test Level 3 - asymmetrical)
Comments	Criterion B	Criterion A



Immunity according to EN 61000-6-1 (residential), EN 61000-6-2 (industrial)			
CE basic standard		Minimum normative requirements of EN 61000-6-2 (CE) (immunity for industrial environments)	Higher requirements in practice (covered)
Surge voltage load (surge) EN 61000-4-5			
	Input	1 kV (Test Level 1 - symmetrical) 2 kV (Test Level 1 - asymmetrical)	2 kV (Test Level 4 - symmetrical) 4 kV (Test Level 4 - asymmetrical)
	Output	0.5 kV (Test Level 1 - symmetrical) 0.5 kV (Test Level 1 - asymmetrical)	1 kV (Test Level 3 - symmetrical) 2 kV (Test Level 3 - asymmetrical)
	Signal	1 kV (Test Level 2 - asymmetrical)	1 kV (Test Level 2 - asymmetrical)
	Comments	Criterion B	Criterion A
Conducted interference EN 61000-4-6			
	Input/output	asymmetrical	asymmetrical
	Frequency range	0.15 MHz ... 80 MHz	0.15 MHz ... 80 MHz
	Voltage	10 V (Test Level 3)	10 V (Test Level 3)
	Comments	Criterion A	Criterion A
Voltage dips EN 61000-4-11			
Input voltage ( 400 V AC , 50 Hz )			
	Voltage dip	70 % , 25 periods	70 % , 25 periods
	Comments	Criterion C	Criterion A
	Voltage dip	40 % , 10 periods	40 % , 10 periods
	Comments	Criterion C	Criterion A
	Voltage dip	0 % , 1 period	0 % , 1 period
	Comments	Criterion B	Criterion A

**Key**

Criterion A	Normal operating behavior within the specified limits.
Criterion B	Temporary impairment to operational behavior that is corrected by the device itself.
Criterion C	Temporary adverse effects on the operating behavior, which the device corrects automatically or which can be restored by actuating the operating elements.

## 5 Symbols used

In this installation note symbols are used in order to call attention to notices and dangers.



This is the safety alert symbol. It is used to alert you to potential personal injury hazards. Obey all safety measures that follow this symbol to avoid possible personal injuries.

There are different categories of personal injury that are indicated by a signal word.



### WARNING

This indicates a hazardous situation which, if not avoided, could result in death or serious injury.



### CAUTION

This indicates a hazardous situation which, if not avoided, could result in minor or moderate injury.

The following symbols are used to indicate potential damage, malfunctions, or more detailed sources of information.



### NOTE

Indication of a required action which if it is not performed may cause damage or malfunction to the device, hardware/software, or surrounding property.



This symbol and the accompanying text provide the reader with additional information or refer to detailed sources of information.



This symbol and the accompanying text provide additional information on the correct disposal of used batteries.

## 6 Safety and installation notes

Only qualified electricians may install, start up, and operate the device. Observe the national safety and accident prevention regulations.

The specified technical characteristics relate to the factory setting of the standard device.

Configured devices may have different technical characteristics. The device behavior may also differ from the documentation.

**CAUTION: Before startup, observe the following**

Check the device for external damage. If the device is defective, it must not be used.

The power supply must be switched off from outside according to IEC 61010 (e.g., via the line protection on the primary side).

Preferably mount the power supply in the normal mounting position.

Ensure that the primary-side and secondary-side wiring of the power supply are the correct size and have sufficient fuse protection.

The power supply is a built-in device. The IP20 degree of protection of the power supply is intended for a clean and dry environment. The power supply is mounted in a control cabinet.

For the connection parameters for wiring the power supply, such as the required stripping length with and without ferrule, refer to the technical data section.

As a safety measure against shock currents, always wire the protective conductor device terminal block to the control cabinet ground connection.

To avoid accidental contact with live parts, always cover the termination area (e.g., installation in the control cabinet).

- The device is a built-in device.
- The IP20 degree of protection (IEC 60529/EN 60529) of the device is intended for use in a clean and dry environment. Do not subject the device to any load that exceeds the described limits.
- Do not subject the device to mechanical and/or thermal loads that exceed the specified limits.
- It is not permissible to open or modify the device. Do not repair the device yourself but replace it with an equivalent device. Repairs may only be carried out by the manufacturer. The manufacturer is not liable for damage resulting from violation.

**DANGER: Hazardous voltage**

The power supply contains components that have been designed for operation at potentially lethal voltages. The accumulated level of energy can also be high. Never carry out work when mains voltage is present.

- Connection must be performed by specialist personnel and protection against electric shock ensured.
- It must be possible to disconnect the device other than via the power supply in accordance with the regulations of EN 601010-1 (e.g., via line protection on the primary side).
- All feed lines are sufficiently protected and dimensioned!
- All output lines are dimensioned according to the maximum output current of the device or separately protected!
- Sufficient convection is guaranteed!

**CAUTION: Hot surface**

Depending on the ambient temperature and load on the power supply, the housing can become hot.

**DANGER**

Never carry out work on live parts! The housing can become very hot, depending on the ambient temperature and load!



The power supply is maintenance-free. Repairs may only be carried out by the manufacturer. The warranty no longer applies if the housing is opened.



The power supply may only be used for its intended use.



The continuous total output power may not exceed  $P_N$  at 60 °C ambient temperature and  $P_{Stat. Boost}$  at 40 °C ambient temperature. Observe all the maximum output powers for all operating conditions.

## 7 High-voltage test (HIPOT)

This protection class I power supply is subject to the Low Voltage Directive and is factory tested. During the HIPOT test (high-voltage test), the insulation between the input circuit and output circuit is tested for the prescribed electric strength values, for example. The test voltage in the high-voltage range is applied at the input and output terminal blocks of the power supply. The operating voltage used in normal operation is a lot lower than the test voltage used.



The test voltage should rise and fall in ramp form. The relevant rise and fall time of the ramp should be at least two seconds.

### 7.1 High-voltage dielectric test (dielectric strength test)

In order to protect the user, power supplies, as electronic components with a direct connection to potentially hazardous voltages, are subject to more stringent safety requirements. For this reason, permanent safe electrical isolation between the hazardous input voltage and the output voltage must always be ensured.

In order to ensure permanent safe isolation of the AC input circuit and DC output circuit, high-voltage testing is performed as part of the safety approval process (type test) and manufacturing (routine test).

### 7.2 High-voltage dielectric test during the manufacturing process

During the manufacturing process for the power supply, a high-voltage test is performed as part of the dielectric test in accordance with the specifications of IEC/UL/EN 61010-1. The high-voltage test is performed with a test voltage of at least 1.5 kV AC / 2.2 kV DC or higher. Routine manufacturing tests are inspected regularly by a certification authority.

### 7.3 High-voltage dielectric test performed by the customer

Apart from routine and type tests to guarantee electrical safety, the end user does not have to perform another high-voltage test on the power supply as an individual component. According to EN 60204-1 (Safety of machinery - Electrical equipment of machines) the power supply can be disconnected during the high-voltage test and only installed once the high-voltage test has been completed.

## 7.4 Performing high-voltage testing

If high-voltage testing of the control cabinet or the power supply as a stand-alone component is planned during final inspection and testing, the following features must be observed.

- The power supply wiring must be implemented as shown in the wiring diagram.
- The maximum permissible test voltages must not be exceeded.

Avoid unnecessary loading or damage to the power supply due to excessive test voltages.



For the relevant applicable test voltages and insulation distances, refer to the corresponding table (see technical data: electric strength of the insulation section).

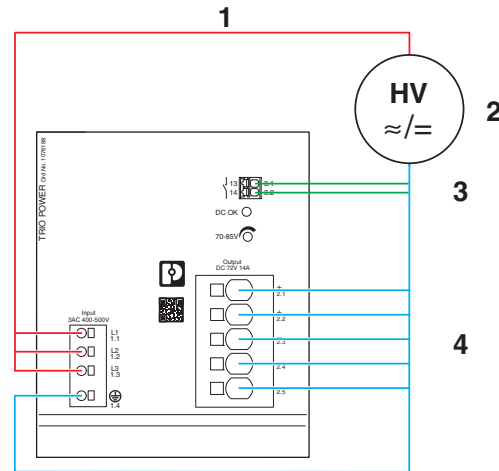


Figure 1 Potential-related wiring for the high-voltage test

### Key

No.	Designation	Color coding	Potential levels
1	AC input circuit	Red	Potential 1
2	High-voltage tester	--	--
3	Signal contacts	Green (optional)	Potential 2
4	DC output circuit	Blue	Potential 2

## 8 Design

### 8.1 Rating plate

In accordance with the German Product Safety Law (ProdSG) it is only permissible to make such products available on the market if they meet certain safety standards. It must be ensured at all times that users are not exposed to hazards.

In accordance with ProdSG, every device must therefore be fitted with a rating plate. All relevant information on the safe use of the device must also be included.



The power supply device rating plate is located on the right-hand side of the housing (as viewed from the front).

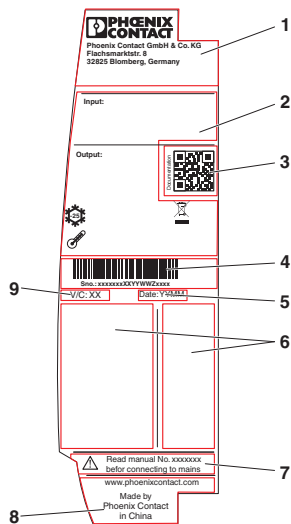


Figure 2 Rating plate information

#### Key

No.	Designation
1	Identification of the provider
2	Device connection data
3	QR code as web link to the device documentation
4	Bar code and serial number for device identification
5	Date of manufacture
6	Device approvals
7	Designation of product-related device documentation
8	Production site of the Phoenix Contact Group
9	Designation of device revision

### 8.2 Device connections and functional elements

Device connections are labeled with connection tags to ensure clear and definitive identification.

The connection tags are split into the following connection levels:

Connection level	Description
1.x	Input
2.x	Output
3.x	Signals

## 9 Block diagram

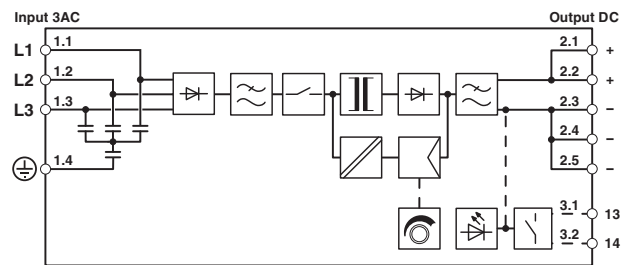


Figure 3 Basic circuit diagram

Key:	
	Rectification
	Switch
	Electrically isolated signal transmission
	Regulation
	Transformer
	Filter
	Floating switching output

## 10 Structure

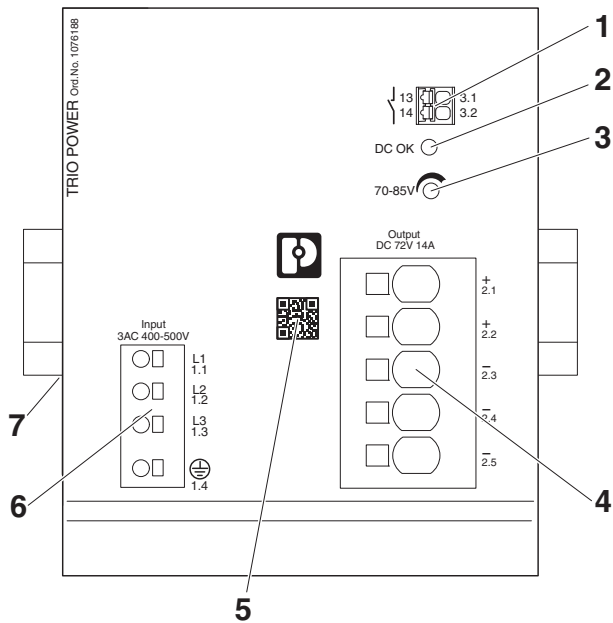


Figure 4 Function elements

No.	Designation	Connection labeling
1.	Floating switch contact: max. 30 V AC/DC, 100 mA	3.1 ... 3.2
2.	Signaling DC OK LED	
3.	Potentiometer, output voltage: 70 V DC ... 85 V DC	
4.	Connection terminal block output voltage: Output DC +/-	2.1 ... 2.5
5.	QR code web link	
6.	Connection terminal block input voltage: Input L1/L2/L3/⊕. There is increased isolation between input and output or signaling.	1.1 ... 1.4
7.	Integrated snap-on foot for carrier rail mounting	

## 11 Cooling

Heat is dissipated from the power supply via the heatsinks integrated into the housing surfaces. Convection to dissipate heat from the power supply only takes place in small dimensions above the housing openings.

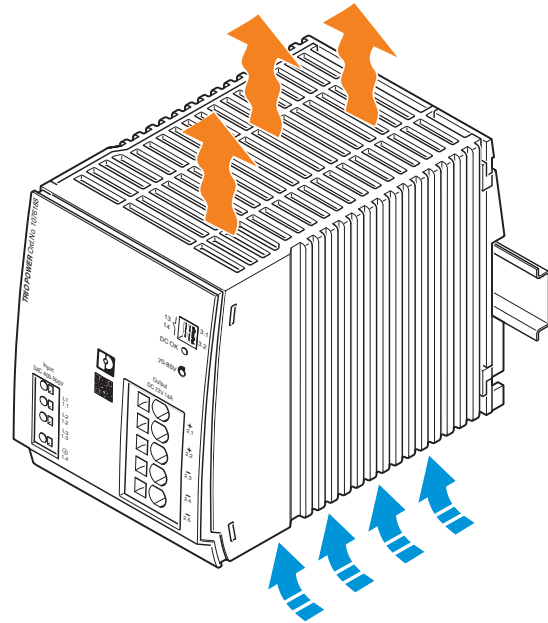


Figure 5 Convection



The power supply can be aligned without minimum lateral clearance up to an ambient temperature of 40°C. In a temperature range up to ≤ 70°C, a lateral minimum clearance of 10 mm between two active components (e.g., power supply) is required.



The device can be snapped onto all DIN rails in accordance with EN 60715 and should be mounted in the normal mounting position.



To ensure sufficient wiring space to wire the power supply, we recommend a vertical minimum clearance from other devices of 50 mm. Depending on the cable duct used, a smaller clearance may be possible.

## 12 Mounting position and dimensions

### 12.1 Mounting position

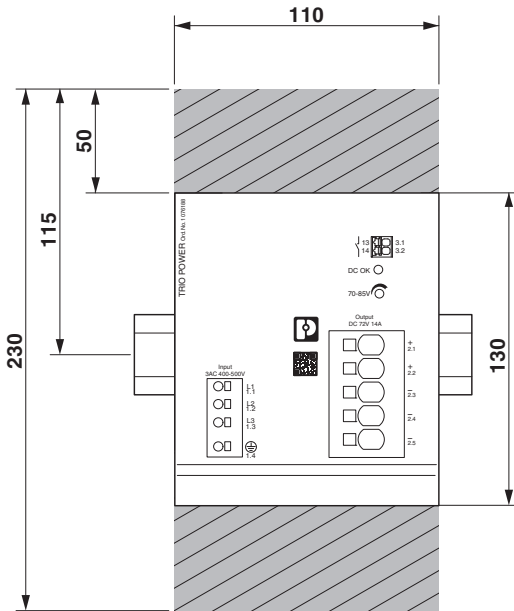


Figure 6 Keep-out areas

### Possible mounting positions:

Normal mounting position, installation depth 160 mm (+ DIN rail)

### 12.2 Device dimensions

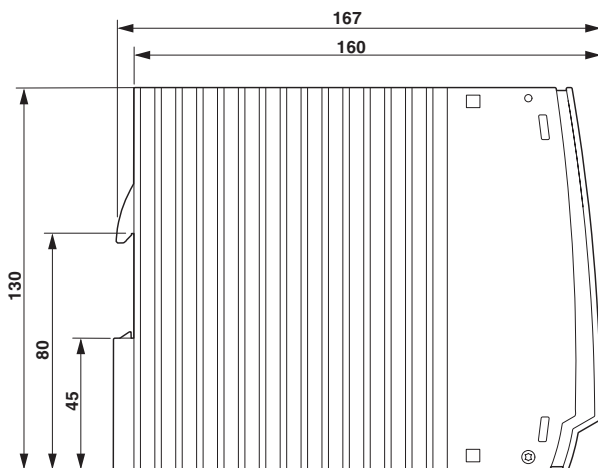


Figure 7 Device dimensions

## 13 Mounting/removal

### 13.1 Mounting

Position the module with the DIN rail guide on the upper edge of the DIN rail, and snap it in with a downward motion.

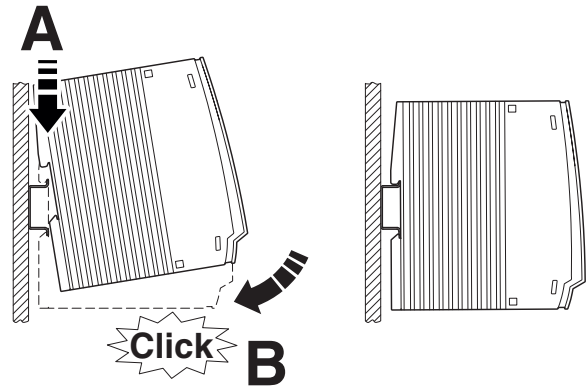


Figure 8 Mounting on standard DIN rail

### 13.2 Removal

Pull the snap lever open with the aid of a screwdriver and slide the module out at the lower edge of the DIN rail.

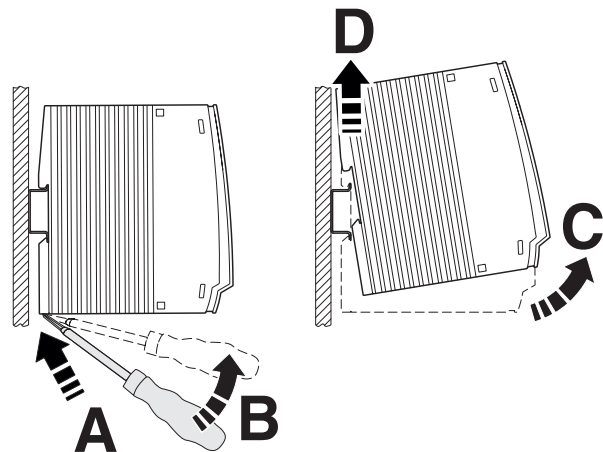


Figure 9 Removing the DIN rail

## 14 Device connection terminal blocks

### 14.1 Push-in connection technology

All connection terminal blocks on the power supply have push-in connection technology on the front. The power supply is wired by simply plugging in the connecting cables, no tools are required. For the necessary connection parameters for the terminal blocks, please refer to the technical data.

#### 14.1.1 Plug in connecting cable

The wiring is carried out by simply plugging the connecting cable into the contact opening provided. Insert the connecting cable as far as it will go.

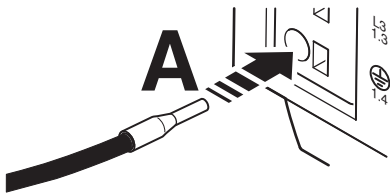


Figure 10 Insert connecting cable (push-in connection technology)

#### 14.1.2 Loosen the connecting cable

To disconnect the wiring, take a suitable screwdriver and insert it into the opening for release. Then carefully pull the connecting cable out of the contact opening.

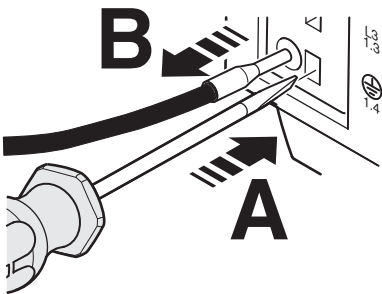


Figure 11 Release connecting cable (push-in connection technology)

## 15 Input

The power supply can be operated on three-phase AC power grids (star grid) in accordance with the nominal input voltage. Connection is via the INPUT L1/L2/L3/⊕ connection terminal blocks.

An all-pos. disconnecting device must be present for operation on three-phase systems.

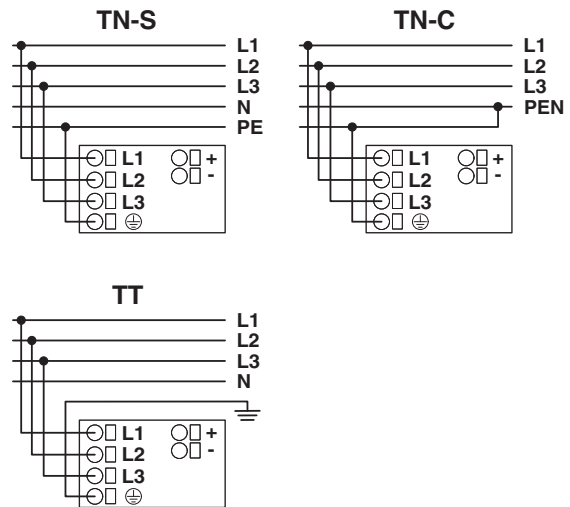


Figure 12 Network types

### 15.1 Position of input terminals

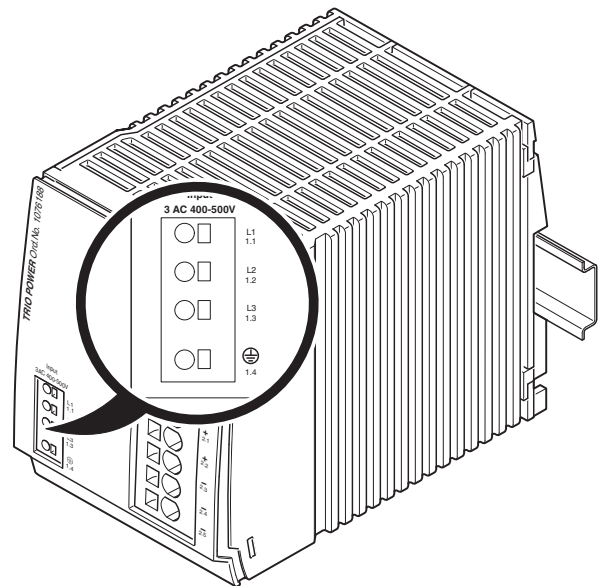


Figure 13 Position of input terminals



## 15.2 Protection of the primary side

Installation of the device must correspond to EN 61010 regulations. It must be possible to switch the device off using a suitable disconnection device outside the power supply. For example, the primary-side line protection is suitable for this (see technical data).

Two internal, approved AC fuses are provided for device protection. Additional device protection is not required.



If an internal fuse trips, this is due to a device fault. In this case, the device must be inspected in the factory. Opening the device or repairing it yourself is prohibited.

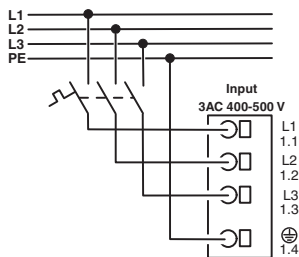


Figure 14 Schematic diagram, switching the input terminals

## 16 Output

A DC voltage for supplying the load is provided at the output of the power supply. The load is connected via the OUTPUT +/- connection terminal blocks.

Upon delivery, the power supply is preset to a nominal output voltage of 72 V DC.

The output voltage can also be set in the range from 70 V DC to 85 V DC using the potentiometer in order to compensate for a possible voltage drop due to the long cable lengths between the power supply and the load to be supplied.

### 16.1 Position of output terminals

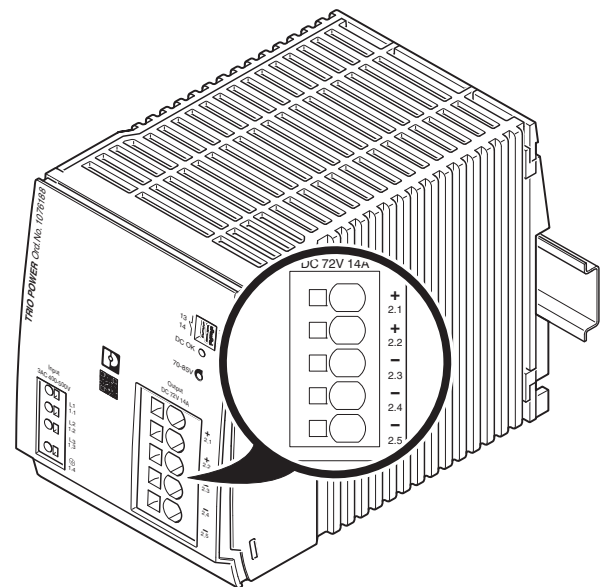


Figure 15 Position of output terminals

### 16.2 Protection of the secondary side

The power supply is electronically short-circuit-proof and idling-proof. In the event of an error, the output voltage is limited. It must be ensured that all output cables are dimensioned accordingly for the maximum output current or have separate protection.

The connecting cables on the secondary side should have large cross sections to keep the voltage drops in the cables as low as possible.

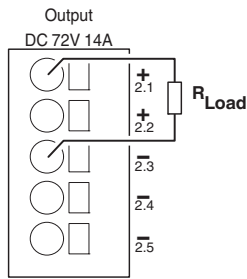


Figure 16 Schematic diagram, switching the output terminals

### 16.3 Output characteristic curve

The power supply works with a dynamic power reserve, the dynamic boost, as shown in the U/I characteristic curve in the figure. In the event of a secondary-side short circuit or overload, the output current is limited to max.  $1.5 \times I_N$  for 5 seconds. The secondary voltage is reduced beyond this time period until the short circuit is eliminated. The U/I characteristic curve with the dynamic power reserve enables high inrush currents of capacitive loads or inductive loads to be supplied reliably.

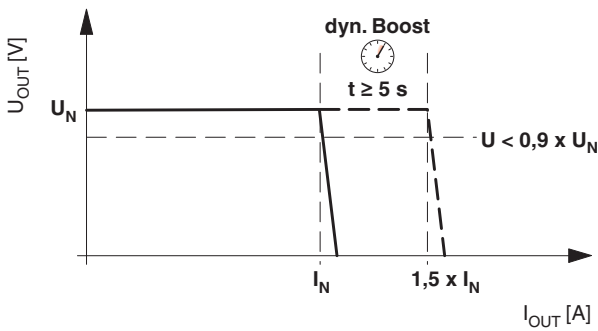


Figure 17 U/I characteristic curve with dynamic load reserve

- $U_N = 72 \text{ V DC}$
- $I_N = 14 \text{ A}$
- $I_{Dyn} = 21 \text{ A (5 s)}$
- $P_N = 1008 \text{ W}$
- $P_{Dyn.} = 1512 \text{ W}$

## 17 Signaling

### 17.1 DC OK-LED

The DC OK LED is available for function monitoring. The LED is continuously illuminated when the output voltage is  $>95\%$  of the nominal output voltage  $U_{OUT}$  (72 V DC).

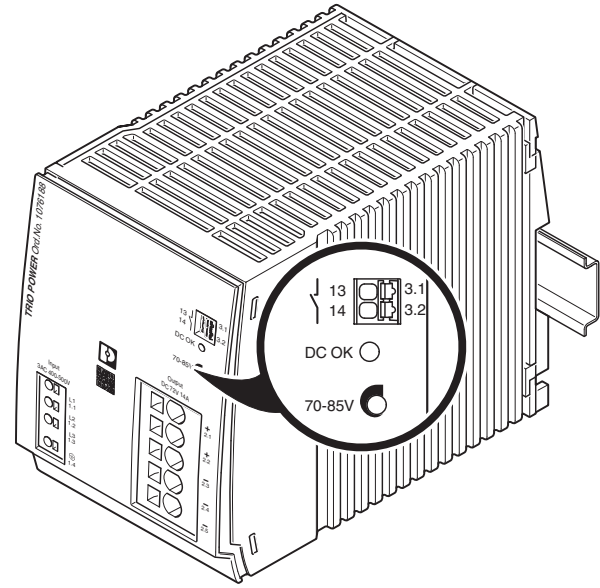


Figure 18 Location of the elements

### 17.2 Floating signal contact

A floating diagnostics contact can be used to forward data to a higher-level control system. When opened, the diagnostics contact signals a drop below the nominal output voltage of  $U_{OUT} < 95\%$ .

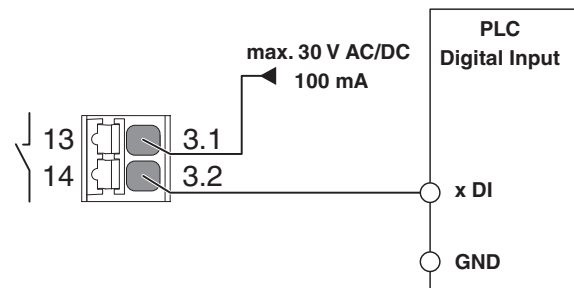


Figure 19 Wiring principle

## 18 Derating

### 18.1 Temperature-dependent derating

The device provides both the  $I_N$  nominal output current and the  $I_{\text{dyn. BOOST}}$  dynamic output current at ambient temperatures up to +60 °C. For ambient temperatures above +60 °C, the ambient power must be decreased by 2.5% per Kelvin increase in temperature. For ambient temperatures above +70 °C or in the event of a thermal overload, the device does not switch off. The output power will be decreased by enough to allow device protection. Once the device has cooled down, the output power will be increased again.

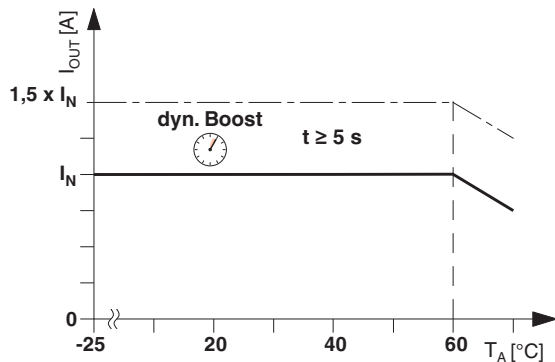


Figure 20 Temperature derating in normal mounting position

### 18.2 Installation height

The power supply can be operated at an installation height of up to 2000 m without any limitations. Different data applies for installation locations above 2000 m due to the differing air pressure and the reduced convection cooling associated with this (see technical data section). The data provided is based on the results of pressure chamber testing performed by an accredited test laboratory.

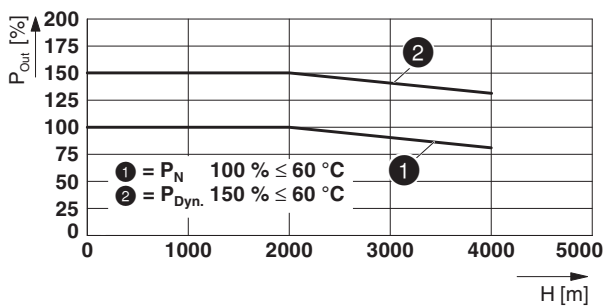


Figure 21 Output power depending on the installation height

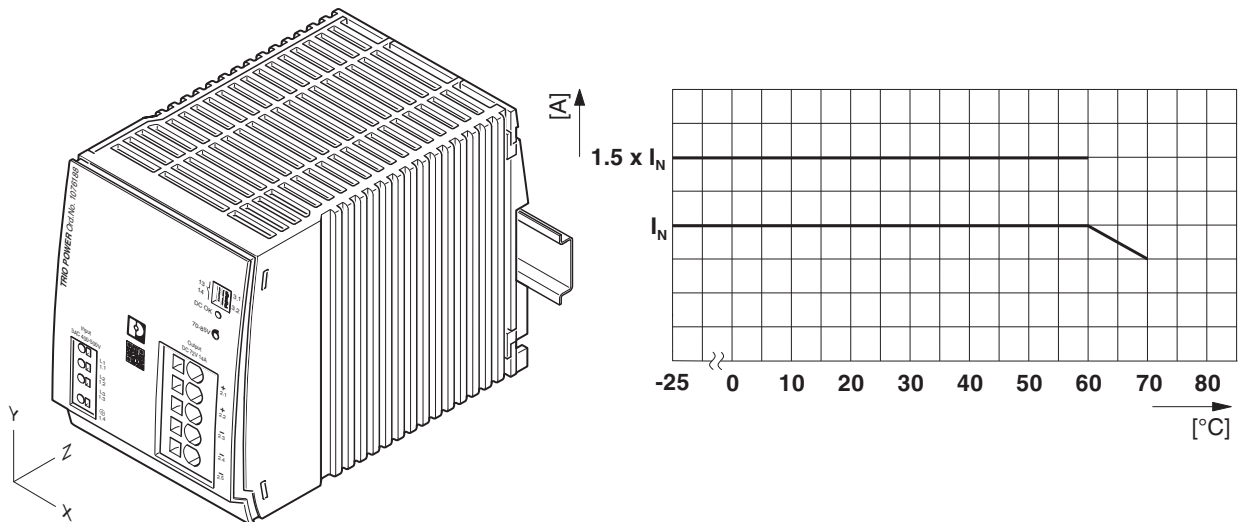
### 18.3 Position-dependent derating

The power supply can be installed onto all 35 mm DIN rails according to EN 60715. The normal mounting position of the power supply is horizontal.

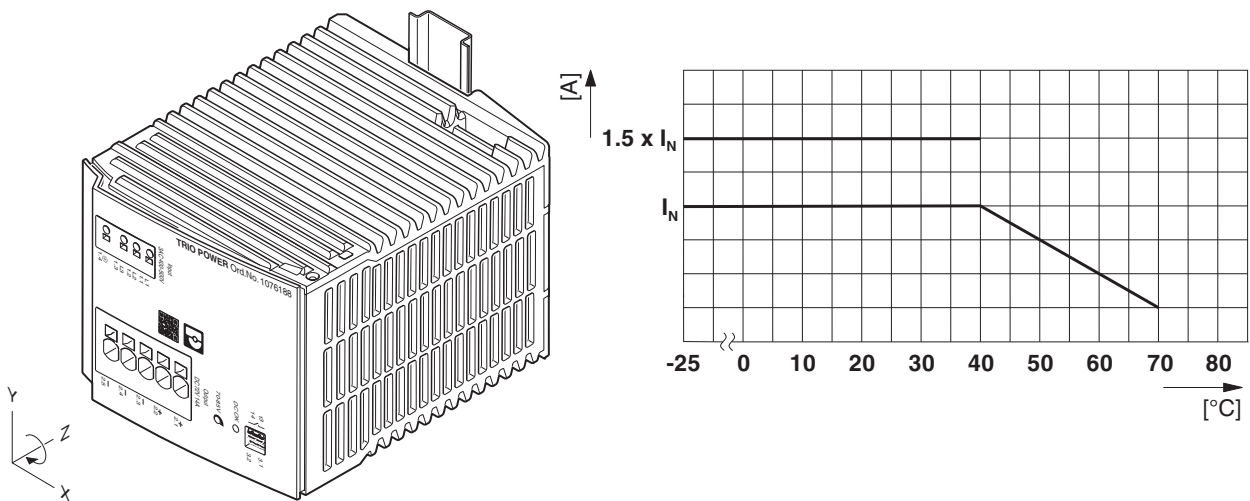
When installing in a different mounting position, derating should be adhered to.

The characteristic curve can be used to determine the maximal output power to be drawn for each ambient temperature for different mounting positions.

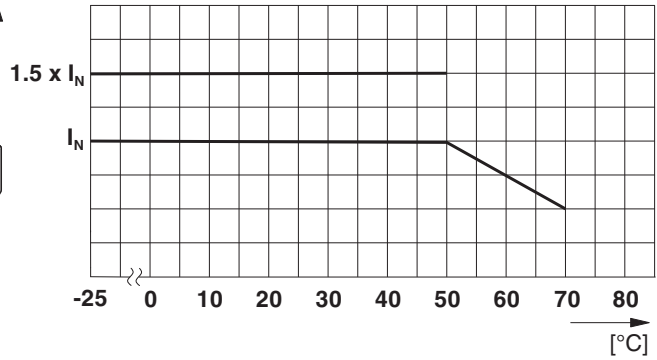
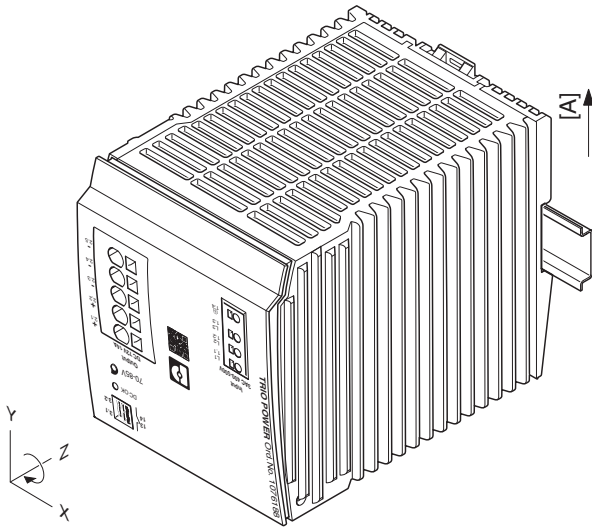
#### Normal mounting position



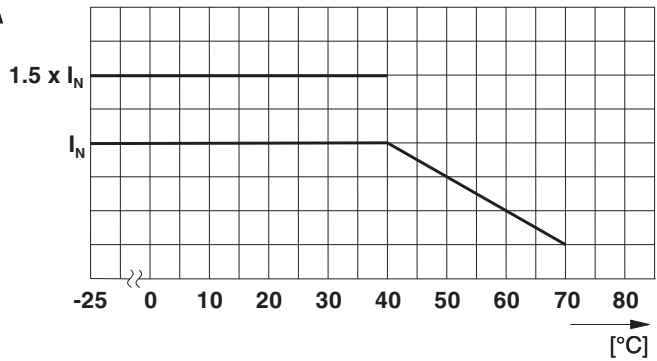
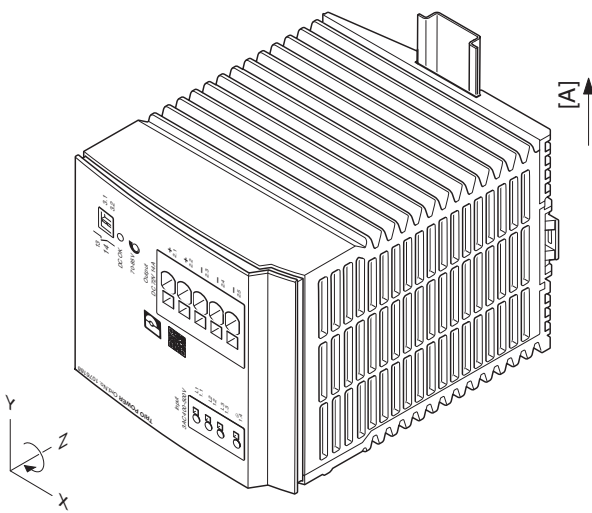
#### Rotated mounting position 90° Z-axis



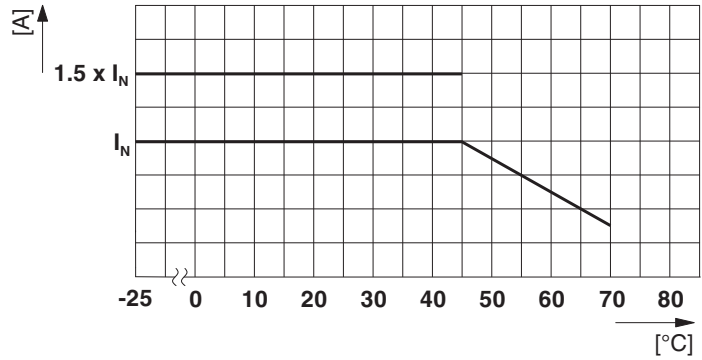
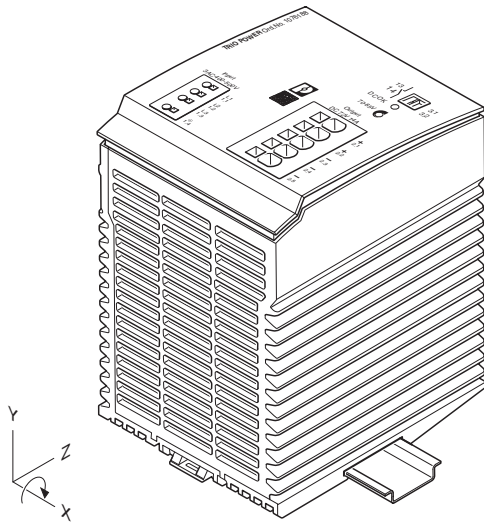
Rotated mounting position 180° Z-axis



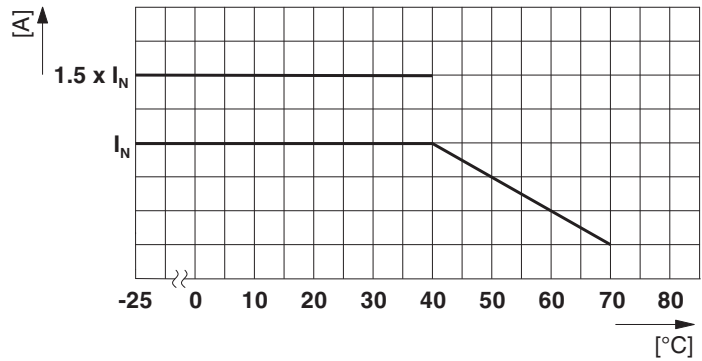
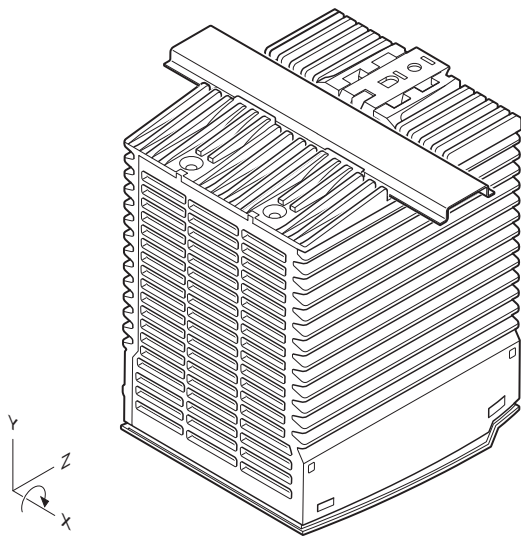
Rotated mounting position 270° Z-axis



Rotated mounting position 90° X-axis



Rotated mounting position 270° Z-axis



## 19 Connection versions

Depending on how you intend to use your power supply, there are different ways of connecting the DC output side.

A distinction is made between the following modes of use:

- Power increase through series operation
- Power increase through parallel operation

### 19.1 Increasing power

Depending on the respective mode of use, the power is increased either via the series- or parallel connection of two power supplies.

#### 19.1.1 Series operation

To increase the DC output power in dependence of the output voltage, connect two power supplies in series operation. Only use power supplies of the same type and performance class with identical configurations.

Depending on the common output-side ground reference point of the power supplies, the following DC output voltage potentials are possible:

- +144 V DC
- -144 V DC
- $\pm 72$  V DC

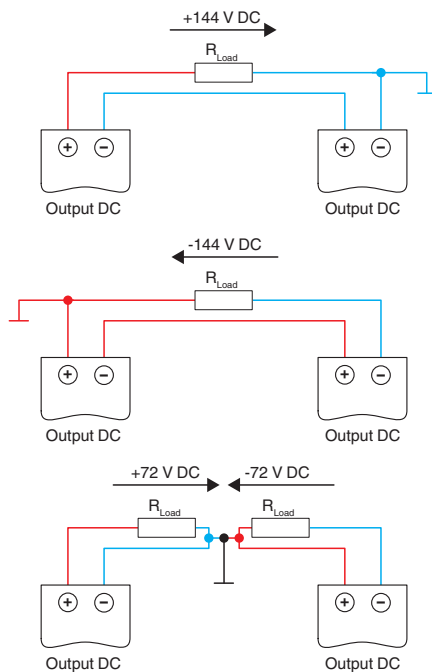


Figure 22 Schematic diagram, power increase in series operation

#### 19.1.2 Parallel operation

When  $n$  power supply DC outputs are connected in parallel, the output current is increased to  $n \times I_N$ . Parallel connection for increased power is used when extending existing systems. If the individual power supply does not cover the current consumption of the most powerful load, parallel connection of power supplies is recommended.

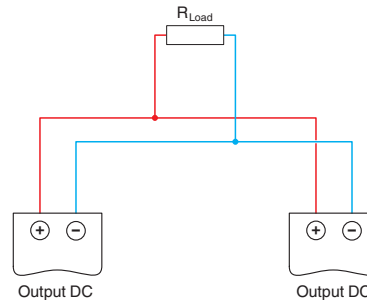


Figure 23 Schematic diagram, power increase in parallel operation

### 19.2 Fundamental prerequisites for parallel operation (power increase)

In order to ensure correct parallel operation, observe the following rules:

**DC output voltage:** On each of the power supplies, set the DC voltage in idle mode such that the voltage values are identical. Take any voltage drops occurring due to long cable lengths into consideration.

**Cable lengths:** To ensure the symmetrical utilization of the power supplies, the connecting cables for supplying the DC load must be identical in length.

**Cable cross-sections:** The connecting cables for supplying the DC load must be rated for the maximum occurring total current of all power supplies.

**Ambient conditions:** Select the installation location of the power supplies such that the prevailing ambient conditions are identical. This is of particular importance if the power supplies are installed in different mounting locations. Large temperature differences between the mounting locations have a negative effect on the operating points of the power supplies. This will result in the operating behavior of the power supplies no longer being identical.



If more than two power supplies are connected in parallel for the required power increase, fusing the DC outputs separately is recommended. Use appropriate miniature circuit breakers (MCBs) for this.