TRIO-PS-2G/1500DC/24DC/8

Power supply unit

Data sheet
109809_en_00

1 Description

TRIO POWER - power supplies with standard functionality
The power supplies of the TRIO POWER range are distinguished by their robust design. They are ideal for use in photovoltaic energy systems thanks to the integrated wide-range DC input. The push-in connection technology on the front enables fast and tool-free wiring of the devices. The output voltage U_{OUT} is adjusted via a potentiometer on the front of the device.

Features

- Safe operation, thanks to electrically and mechanically robust design
- Simplified error diagnostics for remote signaling via DC-OK signal contact
- OVP (Over Voltage Protection) limits surge voltages to ≤30 V DC (EN 61131-2)
- Tool-free connection via push-in connection technology
- Supports positive, negative, or floating grounding

Technical data (short form)	
Nominal input voltage range	600 V DC ... 1500 V DC
Input voltage range	600 V DC ... 1500 V DC -15 % ... +10 %
Nominal output voltage (U_N)	24 V DC ±1 %
Setting range of the output voltage (U_{Set})	24 V DC ... 28 V DC
Nominal output current (I_N)	8 A
Output power (P_N)	192 W
Efficiency	typ. 90.9 % (900 V DC) typ. 89 % (1500 V DC)
Residual ripple Ripple Noise	 < 40 mV_{PP} < 50 mV_{PP}
MTBF (IEC 61709, SN 29500)	> 1500000 h (25 °C) > 900000 h (40 °C) > 400000 h (60 °C)
Ambient temperature (operation)	-25 °C ... 70 °C (>60°C derating: 1.2%/K)
Startup type tested	-40 °C
Dimensions W/H/D	88.5 mm / 130 mm / 160 mm
Weight	1.5 kg

2 Table of contents

3 Ordering data

Description	Type	Order No.	Pcs./Pkt.
Primary-switched TRIO POWER power supply with Push-in connection for DIN rail mounting, input: 1,500 V DC, output: 24 V DC / 8 A	TRIO-PS-2G/1500DC/24DC/8	1075240	1

Accessories	Type	Order No.	Pcs./Pkt.
Electronic device circuit breaker, number of positions: 1, mounting type: DIN rail: 35 mm, Color: light grey RAL 7035	CBM E4 24DC/0.5-10A NO-R	2905743	1
Electronic device circuit breaker, number of positions: 1, mounting type: DIN rail: 35 mm, Color: light grey RAL 7035	CBM E8 24DC/0.5-10A NO-R	2905744	1
VARIOFACE module, with two equipotential busbars (P1, P2) for potential distribution, for mounting on NS 35 rails. Module width: 70.4 mm	VIP-2/SC/PDM-2/24	2315269	1
VARIOFACE module with push-in connection and two equipotential busbars (P1, P2) for potential distribution, for mounting on NS 35 rails. Module width: 57.1 mm	VIP-3/PT/PDM-2/24	2903798	1
Surge arrester for 2-pos. isolated 1500 V DC voltage systems, for DIN rail mounting, 3-pos. base element, three plug-in temperature-monitored protective elements, status message on each plug.	VAL-MS 1500DC-PV/2+V	1033708	1
Lightning/surge arrester for 2-pos. isolated 1500 V DC voltage systems, for DIN rail mounting, temperature-monitored protective elements, status message on the module.	VAL-MB-T1/T2 1500DC-PV/2+V	2905641	1

Our range of accessories is being continually extended, our current range can be found in the download area.

4 Technical data

Input data	
All technical specifications are nominal values and are based on an ambient temperature of 25°C and 70% relative humidity at 2000 m above sea level.	
Nominal input voltage range	600 V DC ... 1500 V DC
Input voltage range	600 V DC ... 1500 V DC -15 % ... +10 %
Electric strength, max.	≤ 1800 V DC , 1 s
Current consumption (for nominal values) typ.	typ. 0.35 A (600 V DC) typ. 0.145 A (1500 V DC)
Recommended breaker for input protection	1500 V DC , 2 A (gPV)

Electric strength of the insulation	
Insulation voltage input/output	4.2 kV DC (type test) 2.6 kV DC (routine test)

POWER factor	600 V DC	1500 V DC
	> 0.9	> 0.9

Input connection data	
Connection method	Push-in connection
Stripping length	10 mm
Conductor cross section, rigid	1 mm² ... 4 mm²
Conductor cross section, flexible	1 mm² ... 2.5 mm²
Cross section AWG	18 ... 12

Output data	
Nominal output voltage (U_N)	24 V DC ±1 %
Setting range of the output voltage (U_{Set}) (> 24 V DC, constant capacity restricted)	24 V DC ... 28 V DC
Nominal output current (I_N)	8 A
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 ±10 %	< 0.1 %
Short-circuit-proof	yes
No-load proof	yes
Residual ripple	< 40 mV_{PP} (Ripple) < 50 mV_{PP} (Noise)
Connection in parallel	Yes, for redundancy and increased capacity
Connection in series	No

Output data	
Feedback voltage resistance	≤ 35 V DC
Protection against overvoltage at the output (OVP)	≤ 30 V DC
Rise time typical	≤ 30 ms (U_{OUT} (10 % ... 90 %))

Output connection data	
Connection method	Push-in connection
Stripping length	10 mm
Conductor cross section, rigid	1 mm² ... 4 mm²
Conductor cross section, flexible	1 mm² ... 2.5 mm²
Stranded conductor cross section with ferrule	0.2 mm² ... 6 mm²
Conductor cross section AWG	18 ... 12

LED signaling	
Signalization designation	DC OK
Status indicator	LED
Color	green
Signal threshold	U_{OUT} > 0.9 x U_N (U_N = 24 V DC)

Relay output	
Signalization designation	DC OK
Contact assignment	13/14 (closed)
Maximum contact load	30 V AC / 30 V DC (100 mA)
Signal threshold	U_{OUT} > 0.9 x U_N (U_N = 24 V DC)

Signal connection data	
Connection method	Push-in connection
Stripping length	8 mm
Conductor cross section, rigid	0.2 mm² ... 1.5 mm²
Conductor cross section, flexible	0.2 mm² ... 1.5 mm²
Stranded conductor cross section with ferrule	0.2 mm² ... 1.5 mm²
Conductor cross section AWG	24 ... 16

General data	
Degree of protection	IP20
Protection class	I
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)	88.5 mm / 130 mm / 160 mm
Weight	1.5 kg

Power dissipation	
Maximum power dissipation in no-load condition	< 9 W
Power loss nominal load max.	< 24 W

Efficiency	600 V DC	1500 V DC
	typ. 90.9 %	typ. 89 %

Ambient conditions	
Ambient temperature (operation)	-25 °C ... 70 °C (>60°C derating: 1.2%/K)
Ambient temperature (storage/transport)	-40 °C ... 85 °C
Max. permissible relative humidity (operation)	≤ 95 % (at 25 °C, non-condensing)
Vibration (operation)	< 15 Hz, amplitude ±2.5 mm (according to IEC 60068-2-6) 15 Hz ... 150 Hz, 2.3g, 90 min.
Shock	18 ms, 30g, in each space direction (according to IEC 60068-2-27)
Degree of pollution in acc. with EN 50178	2
Climatic class	3K3 (in acc. with EN 60721)

Standards	
Electrical safety (of information technology equipment)	EN 62109-1:2011
SELV	IEC 62109-1:2011 (SELV)
Safe isolation	DIN VDE 0100-410

Approvals	
UL	UL 62109-1:2014

Current approvals/permissions for the product can be found in the download area under phoenixcontact.net/products

Electromagnetic compatibility Conformance with EMC Directive 2014/30/EU		
CE basic standard	**Minimum normative requirements**	**Higher requirements in practice (covered)**
Conducted noise emission EN 55016	EN 61000-6-4 (Class A)	EN 61000-6-3 (Class B)
Noise emission EN 55016	EN 61000-6-4 (Class A)	EN 61000-6-3 (Class B)
Harmonic currents EN 61000-3-2	EN 61000-3-2 (Class A)	EN 61000-3-2 (Class A)

EN 61000-6-2:2005		
CE basic standard	**Minimum normative requirements of EN 61000-6-2 (CE) (immunity for industrial environments)**	**Higher requirements in practice (covered)**
Electrostatic discharge EN 61000-4-2		
Housing contact discharge	4 kV (Test Level 3)	4 kV (Test Level 2)
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)	20 V/m (> Test intensity 3)
Frequency range	1.4 GHz ... 2 GHz	1 GHz ... 2 GHz
Test field strength	3 V/m	10 V/m (Test Level 3)
Frequency range	2 GHz ... 2.7 GHz	2 GHz ... 3 GHz
Test field strength	1 V/m (Test Level 1)	10 V/m (Test Level 3)
Comments	Criterion A	Criterion A
Fast transients (burst) EN 61000-4-4		
Input	2 kV (Test Level 3 - asymmetrical)	4 kV (Test Level 4 - asymmetrical)
Output	2 kV (Test Level 3 - asymmetrical)	2 kV (Test Level 3 - asymmetrical)
Signal	1 kV (Test Level 3 - asymmetrical)	1 kV (Test Level 3 - asymmetrical)
Comments	Criterion B	Criterion B

EN 61000-6-2:2005		
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 3 - symmetrical) 2 kV (Test Level 3 - asymmetrical)	3 kV (Test intensity >4 - symmetrical) 6 kV (Test intensity >4 - asymmetrical)
Output	0.5 kV (Test Level 2 - 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 3 - symmetrical) 2 kV (Test Level 3 - asymmetrical)
Comments	Criterion B	Criterion B
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

Key	
Criterion A	Normal operating behavior within the specified limits.
Criterion B	Temporary impairment to operational behavior that is corrected by the device itself.

Interference emission EN 61000-6-4	
Radio interference voltage in acc. with EN 55011	EN 55011 (EN 55022) Class A industrial area of application
Emitted radio interference in acc. with EN 55011	EN 55011 (EN 55022) Class A industrial area of application

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

Before startup please ensure:

- Installation and startup may only be carried out by qualified personnel.
- The relevant country-specific regulations must be observed.

NOTE: Danger if used improperly

- 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.

CAUTION:

Before startup please ensure:

- 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 IEC 62109 (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!

EXPLOSION HAZARD!

Only remove equipment when it is disconnected and not in the potentially explosive area.

DANGER

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

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 electric 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 touch-proof output voltage as safety extra-low voltage (SELV) must always be ensured.

In order to ensure permanent safe isolation of the DC 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 power supply manufacturing process, a high-voltage test is performed as part of the dielectric test in accordance with the specifications of EN 62109-1. 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).

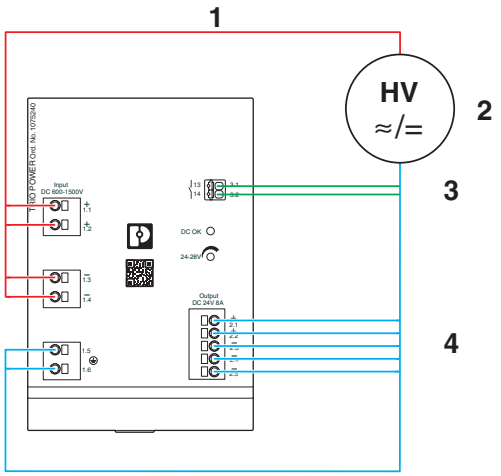


Figure 1 Potential-related wiring for the high-voltage test

Key

No.	Designation	Color coding	Potential levels
1	DC 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).

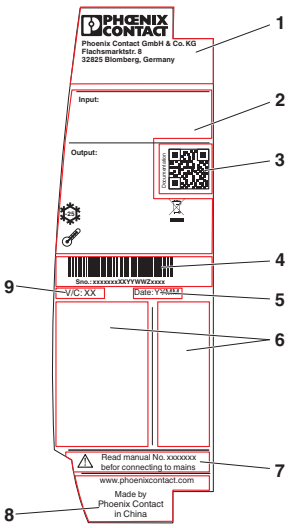


Figure 2 Rating plate information

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

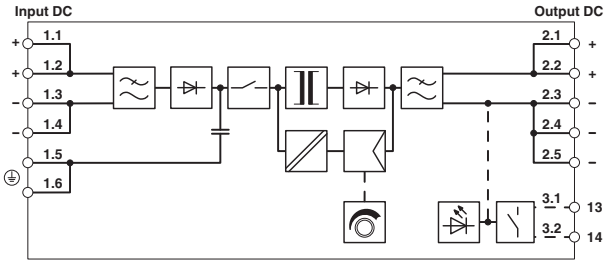


Figure 3 Block diagram

Key:	
	Rectification
active PFC	Power factor correction filter
	Switch
	Electrically isolated signal transmission
	Regulation
	Transformer
	Filter
	Floating switching output

10 Structure

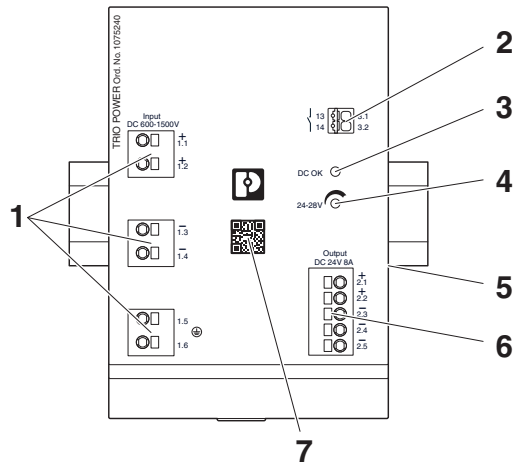


Figure 4 Function elements

No.	Description of the function elements
1.	Input voltage connection terminal blocks: Input DC +/ -/⏚
2.	Connection terminal block signaling 13/14: Floating signal contact (DC OK)
3.	Green LED: DC OK
4.	Potentiometer: 24 V DC ... 28 V DC
5.	Universal DIN rail adapter (rear of housing)
6.	Connection terminal blocks output voltage: Output DC +/-
7.	QR code web link

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.

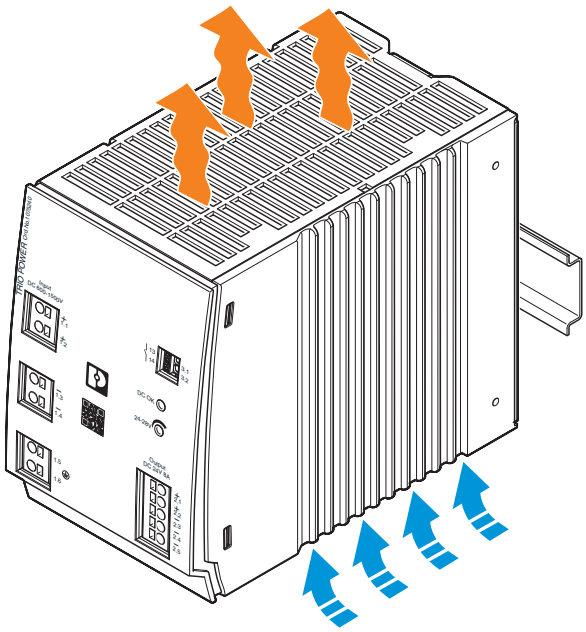


Figure 5 Convection

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

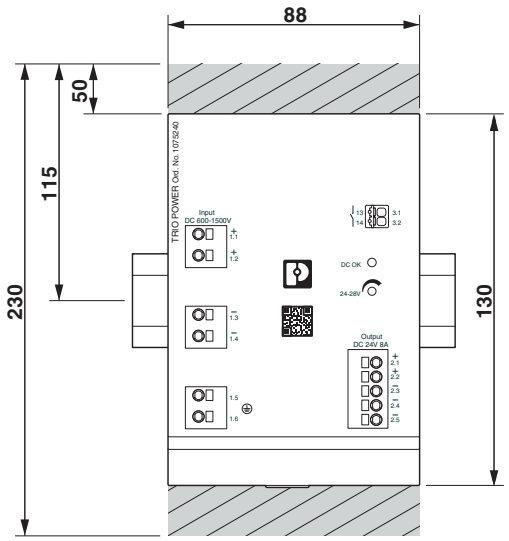


Figure 6 Keep-out areas

Possible mounting positions:

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

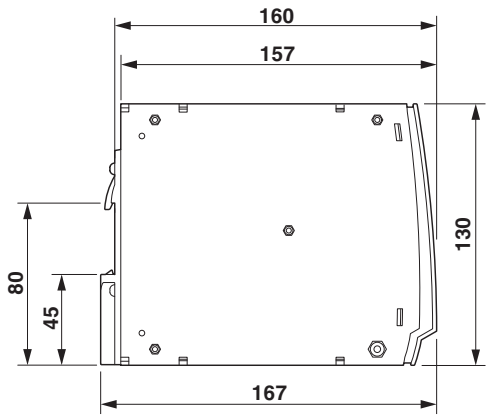


Figure 7 Device dimensions (dimensions in mm)

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.

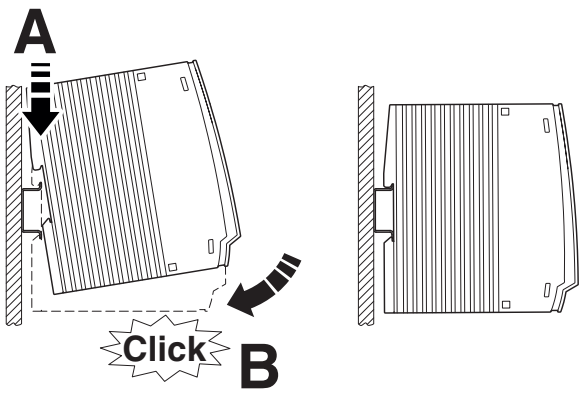


Figure 8 Mounting on standard DIN rail

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.

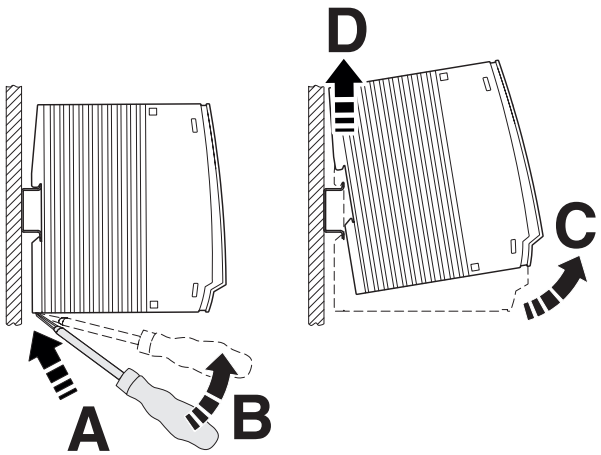


Figure 9 Removing the DIN rail

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.

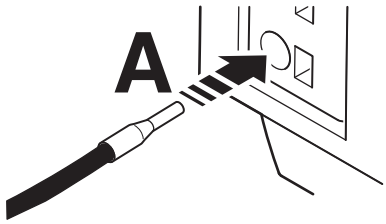


Figure 10 Insert connecting cable (push-in connection technology)

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.

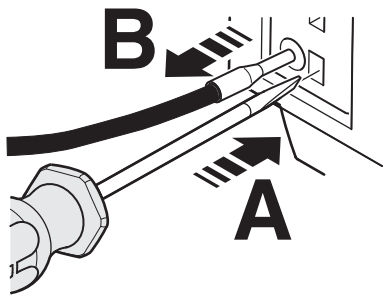


Figure 11 Release connecting cable (push-in connection technology)

15 Input

The input voltage is grounded (functional ground), depending on the design of the photovoltaic energy system. The power supply supports both positive and negative grounding. Potential-free grounding is also possible.

15.1 Position of input terminals

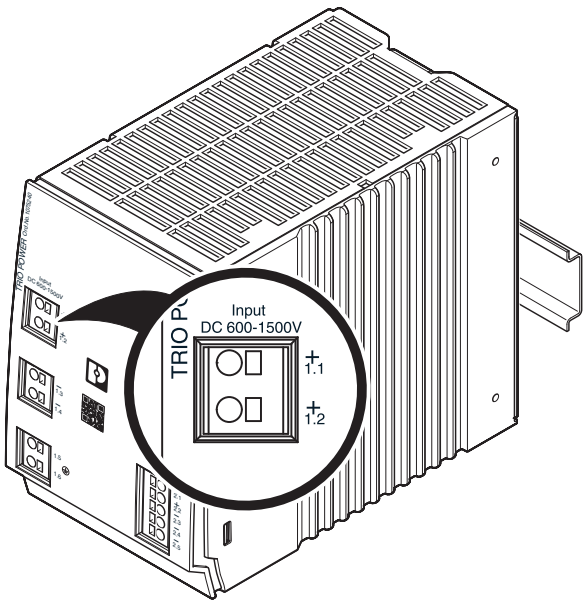


Figure 12 Position of input terminals

15.2 Protection of the primary side

Installation of the device must correspond to EN 62109-1 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).

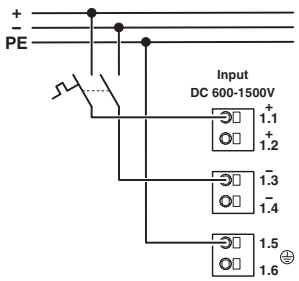


Figure 13 Schematic diagram, switching the input terminals

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.

By default, the power supply is pre-set to a nominal output voltage of 24 V DC.

The output voltage can also be set to the range from 24 V DC to 28 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

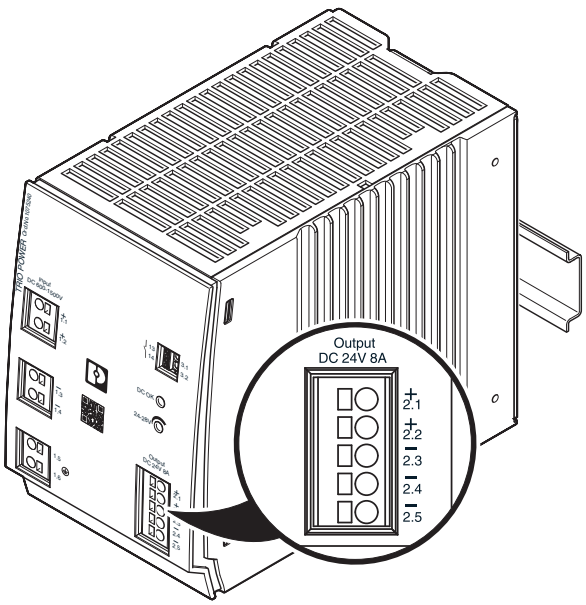


Figure 14 Position of output terminals

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.

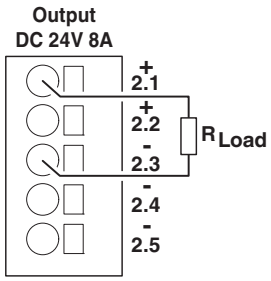


Figure 15 Schematic diagram, switching the output terminals

16.3 Output characteristic curve

The power supply operates according to the U/I characteristic curve shown in the figure. If a short circuit occurs on the output side, the output voltage is reduced until it is eliminated.

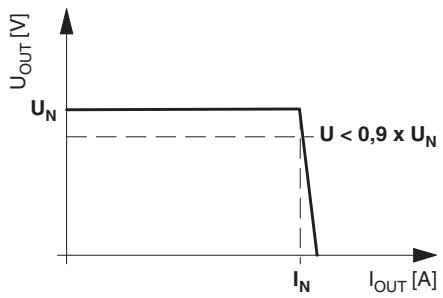


Figure 16 U/I characteristic curve

- U_N = 24 V
- I_N = 8 A
- P_N = 192 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 > 90 % of the nominal output voltage U_{OUT} (24 V DC).

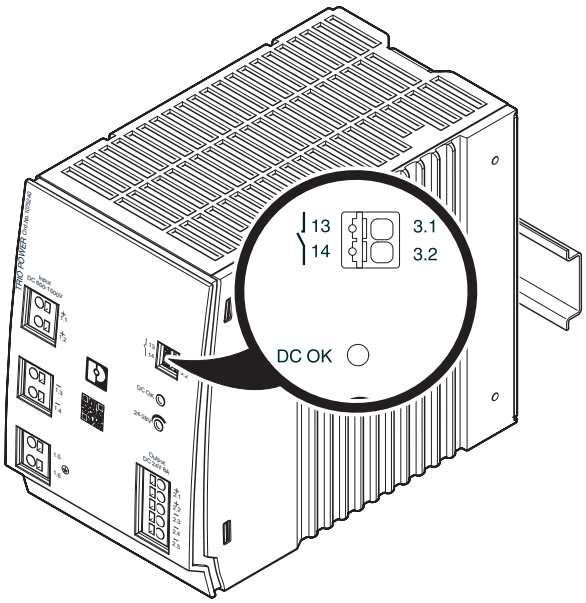


Figure 17 Location of the elements

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 indicates an underrange of more than 90% for the nominal output voltage U_{OUT}.

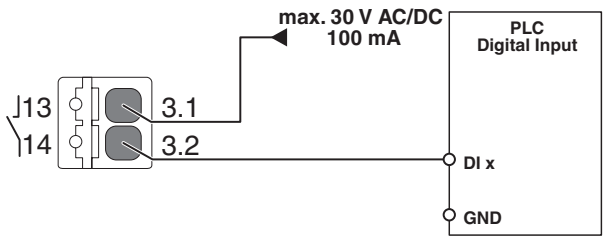


Figure 18 Wiring principle

18 Derating

18.1 Temperature-dependent derating

At ambient temperatures up to +60°C, the power supply supplies the nominal output current I_N constantly. If the ambient temperature at the installation site rises above +60°C, the output power is reduced by 1.2%/K. At ambient temperatures above +70°C or in the event of thermal overload, the power supply does not switch off. In these cases, the output power will be reduced enough to ensure that device protection is provided. Once the power supply has cooled down, the output power will be increased again.

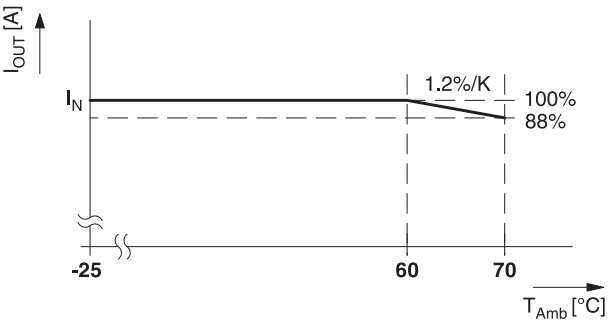


Figure 19 Temperature derating in normal mounting position

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.

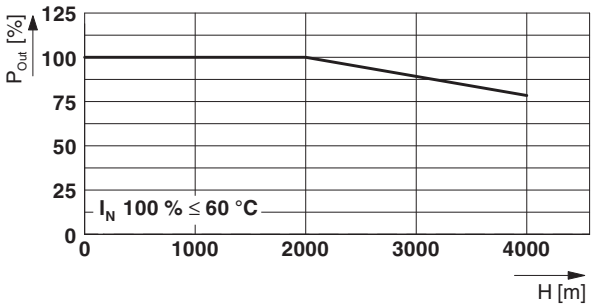


Figure 20 Output power depending on the installation height

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.

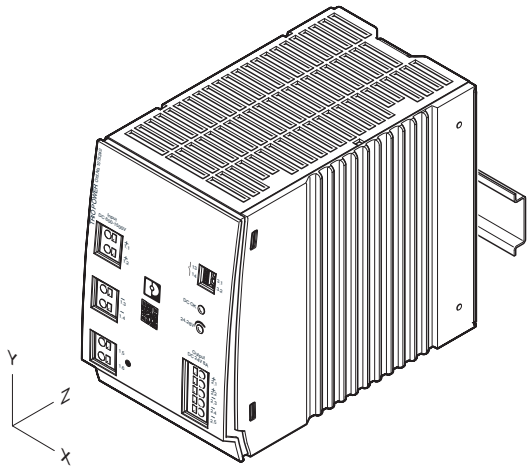
When installing in a different mounting position, derating should be adhered to.

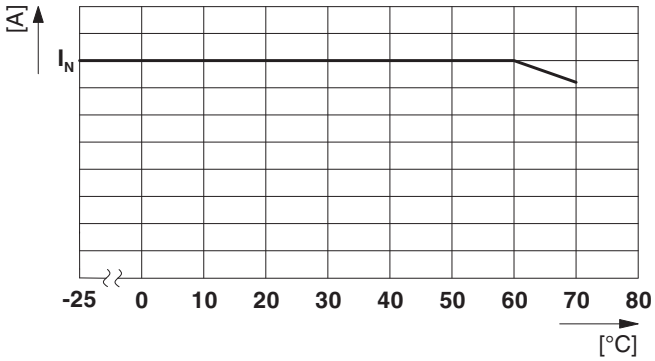
The characteristic curve can be used to determine the maximal output power to be drawn for each ambient temperature for different mounting positions.

NOTE: Thermal overload reduces the service life of the device

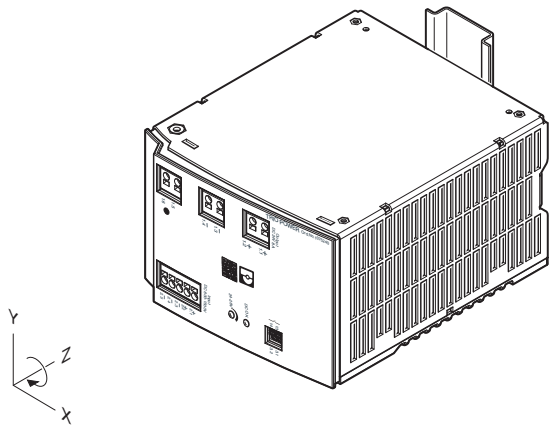
If the supply is mounted in a different mounting position, only a reduced amount of power can be drawn. Otherwise, the power supply will be thermally loaded disproportionately and the device service life significantly reduced.

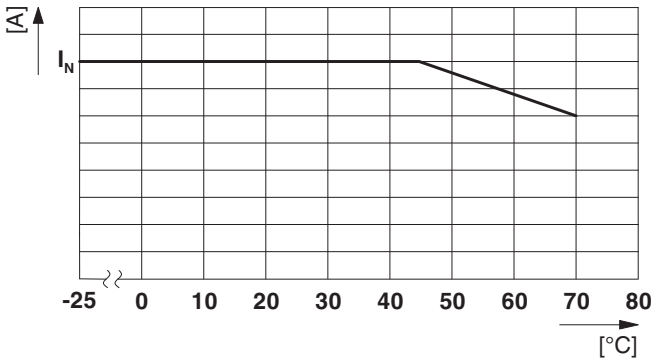
Normal mounting position



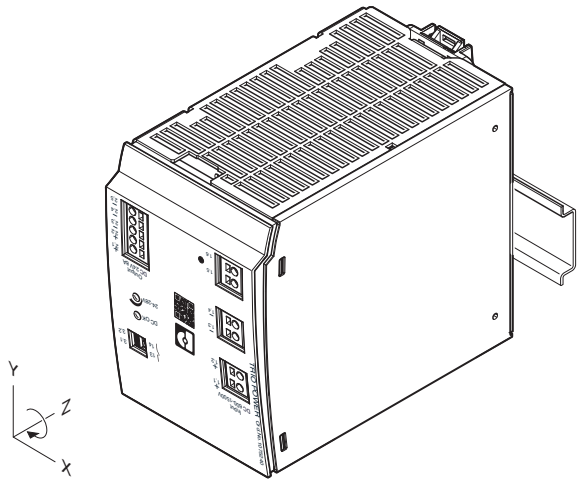


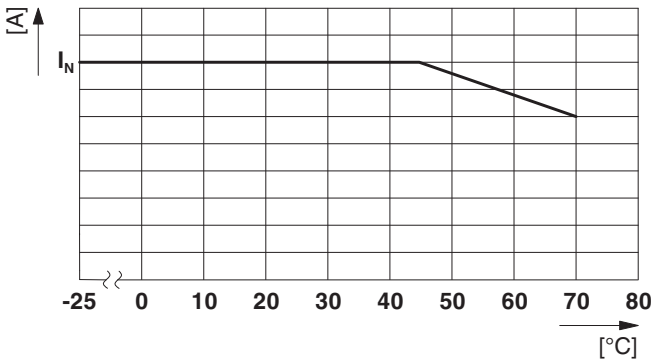
Rotated mounting position 90° Z-axis



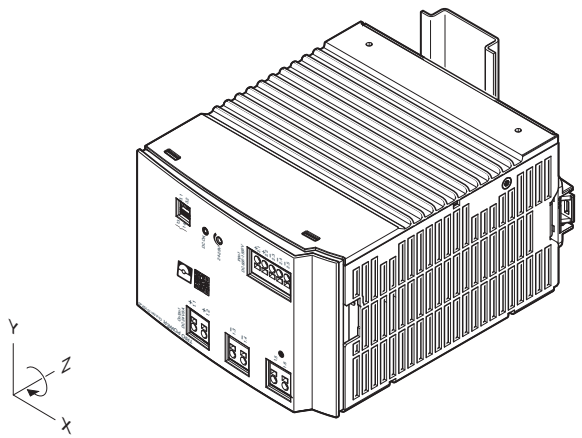


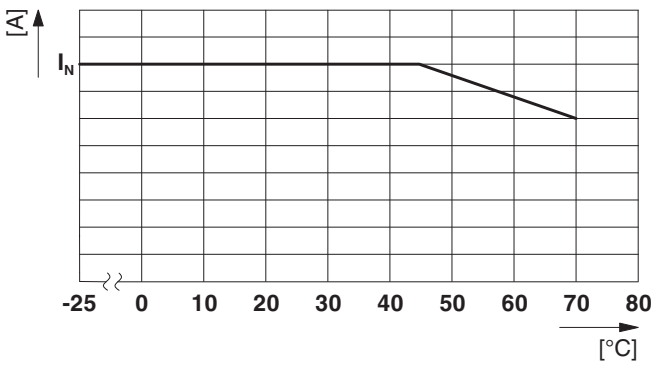
Rotated mounting position 180° Z-axis



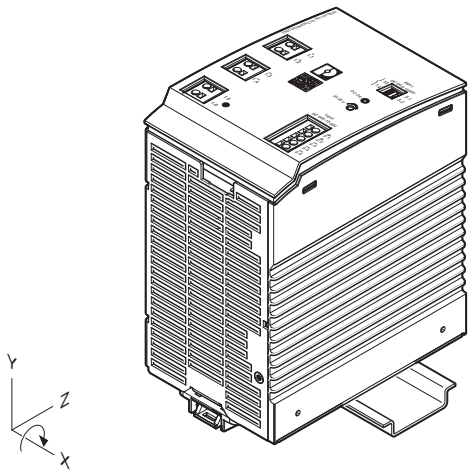


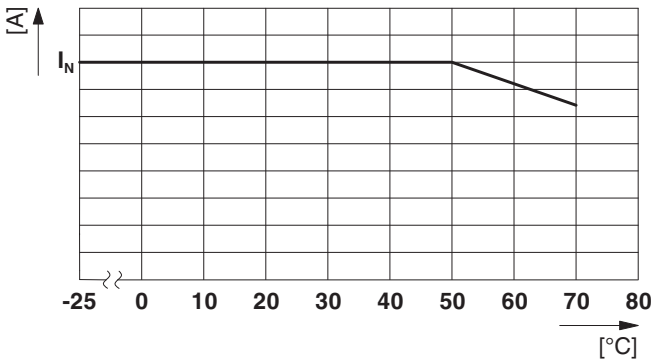
Rotated mounting position 270° Z-axis



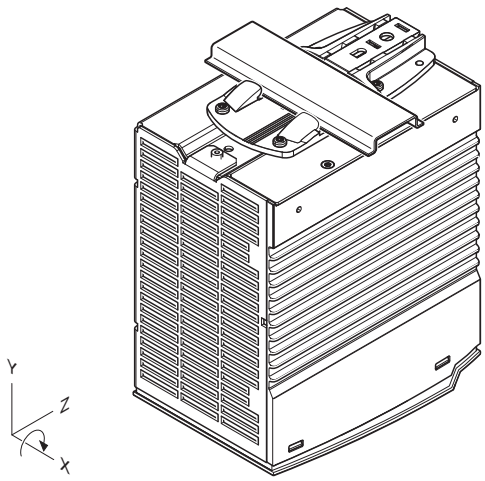


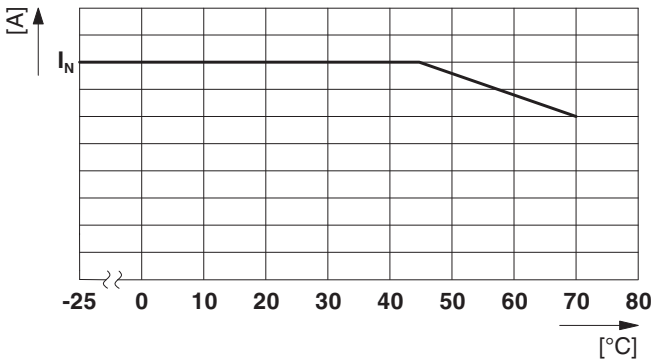
Rotated mounting position 90° X-axis





Rotated mounting position 270° X-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 parallel operation
– Redundancy operation

19.1 Parallel operation

When n power supply DC outputs are connected in parallel, the output current is increased to n x 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.

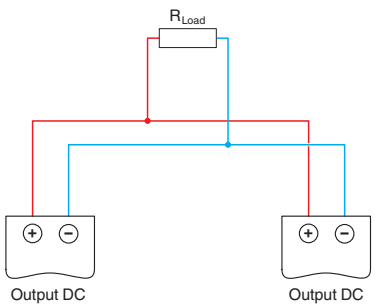


Figure 21 Schematic diagram, power increase in parallel operation

19.2 Redundant operation

Redundant circuits are suitable for the DC supply of systems and system parts which place particularly high demands on operational safety. If the DC load is to be supplied with 1+1 redundancy, two power supplies of the same type and performance class with identical configurations must be used.

In the event of an error, it must be ensured that one of the power supplies is able to provide the total required output power for the DC load to be supplied. The output power required for normal operation is thus provided by two power supplies connected in parallel on the output side. In normal operation, each of the two power supplies will be utilized by up to 50%.

A suitable selection of redundancy modules (active or passive) is to be found in the section: Ordering data, Accessories.

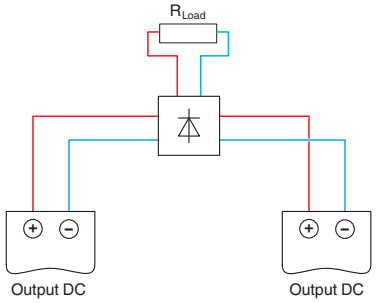


Figure 22 Schematic diagram, 1+1 redundancy with redundancy module (active or passive)

19.3 Fundamental prerequisites for parallel operation (power increase, redundancy operation)

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 he 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. This also applies for redundancy operation, whereby the individual power supply only supplies 50% of the DC load.

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 te DC outputs separately is recommended. Use appropriate miniature circuit breakers (MCBs) for this. As an alternative, the DC outputs can be decoupled from one another using redundancy modules (active or passive).

20 Disposal and recycling

Ensure the correct disposal of electronic components

Do not dispose of the power supply as household waste.

Observe the applicable national standards and regulations.

Ensure correct disposal or recycling

Dispose of or recycle packaging material that is no longer needed as household waste.

Observe the applicable national standards and regulations.