

TRIO-DIODE/12-24DC/2X10/1X20

Redundancy module

INTERFACE

Data sheet
104278_en_00



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1 Description

TRIO DIODE is the DIN-rail mountable redundancy module from the TRIO POWER product range.

Using the redundancy module, it is possible for two power supply units of the same type connected in parallel on the output side to increase performance or for redundancy to be 100% isolated from one another.

Redundant systems are used in systems that place particularly high demands on operational reliability. The connected power supply units must be large enough that the total current requirements of all loads can be met by one power supply unit. The redundant structure of the power supply therefore ensures long-term, permanent system availability.

In the event of an internal device fault or failure of the mains power supply on the primary side, the other device automatically takes over the entire power supply of the loads without interruption. The floating signal contact and LED immediately indicate the loss of redundancy.

Features

- 100% decoupling of power supply units connected in parallel
- Reliable signaling of redundancy
- Load currents up to 30 A supported
- Easy, space-saving DIN rail mounting
- High level of safety with regard to supply due to MTBF > 10 million h
- Reverse polarity protection



Make sure you always use the latest documentation.
It can be downloaded from the product at www.phoenixcontact.net/catalog.

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2 Table of Contents

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3 Ordering data

| Description | Type | Order No. | Pcs. / Pkt. |
|--|------------------------------|-----------|-------------|
| Redundancy module with function monitoring, 12-24 V DC, 2x 10 A, 1x 20 A | TRIO-DIODE/12-24DC/2X10/1X20 | 2866514 | 1 |

4 Technical data

| Input data/output data | |
|--|--|
| Input nominal voltage range | 12 V DC ... 24 V DC |
| DC input voltage range | 10 V DC ... 30 V DC |
| Voltage drop, input/output | Approx. 0.5 V |
| Nominal current | 2x 10 A (-25°C to +55°C) 1x 20 A (-25°C to +55°C) |
| Maximum current | 2x 15 A (-25°C to +40°C) 1x 30 A (-25°C to +40°C) |
| Derating | From +55°C to 70°C: 2.5% per Kelvin |
| Efficiency | > 97 % |
| Transient surge protection | Varistor |
| Protection against polarity reversal | Yes, with integrated diode, < 60 V |
| Power consumption | |
| Power loss nominal load max. | Approx. 10 W |
| Floating redundancy OK | |
| Output description | Contact closed when U_{IN1} & $U_{IN2} > 8$ V |
| Voltage | + 60 V DC |
| Current | ≤ 100 mA (short circuit resistant) |
| Status display | LED redundancy OK / U_{IN1} & $U_{IN2} > 8$ V: LED lights up green |
| General data | |
| Insulation voltage input / PE | 500 V |
| Insulation voltage output / PE | 500 V |
| Degree of protection | IP20 |
| Class of protection | III, without PE connection |
| MTBF | > 10000000 h |
| Type of housing | Steel sheet, zinc-plated |
| Side element version | Aluminum |
| Dimensions W / H / D (state of delivery) | 32 mm / 130 mm / 115 mm |
| Weight | 0.37 kg |
| Ambient conditions | |
| Ambient temperature (operation) | -25 °C ... 70 °C (> 55°C derating) |
| Ambient temperature (storage/transport) | -40 °C ... 85 °C |
| Max. permissible relative humidity (operation) | ≤ 95 % (at 25 °C, no condensation) |
| Vibration (operation) | < 15 Hz, amplitude ±2.5 mm 15 Hz ... 150 Hz, 2.3g, 90 min. |
| Shock | 15g in all directions in acc. with IEC 60068-2-27 |
| Pollution degree in acc. with EN 50178 | 2 |
| Climatic class | 3K3 (in acc. with EN 60721) |

Standards

| | |
|--|---------------------------------------|
| Electrical Equipment for Machinery | EN 60204 |
| Electrical safety (of information technology equipment) | EN 60950/VDE 0805 (SELV) |
| Electronic equipment for use in electrical power installations | EN 50178/VDE 0160 (PELV) |
| SELV | IEC 60950 (SELV) and EN 60204 (PELV) |
| Safe isolation | DIN VDE 0100-410 DIN VDE 0106-1010 |
| Protection against electric shock | DIN 57100-410 |
| Protection against electric shock, basic requirements for safe isolation in electrical equipment | DIN VDE 0106-101 |

Approvals

| | |
|--------------|--|
| UL approvals | UL/C-UL listed UL 508 UL/C-UL Recognized UL 60950 |
|--------------|--|



Current approvals can be found for the product in the download area.

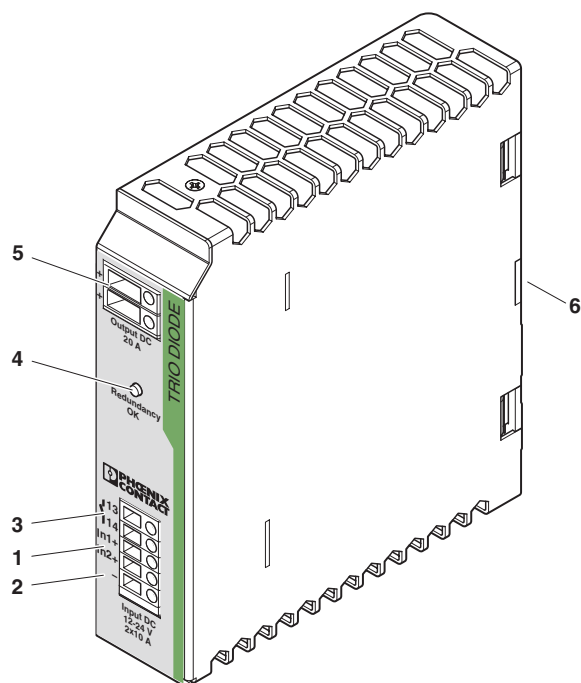
Conformance with EMC guideline 2004/108/EC and for low-voltage guideline 2006/95/EC**Noise immunity according to EN 61000-6-2**

| | | |
|-----------------------------|-------------------|--|
| Electrostatic discharge | EN 61000-4-2 | |
| | Housing | Level 3 |
| | Contact discharge | 6 kV (Contact discharge) |
| | Discharge in air | 8 kV (Air discharge) |
| Electromagnetic HF field | EN 61000-4-3 | |
| | Housing | Level 3 |
| | Frequency range | 80 MHz ... 3 GHz |
| | Field intensity | 10 V/m |
| Fast transients (burst) | EN 61000-4-4 | |
| | Input | 2 kV (level 3 - asymmetrical: conductor to ground) |
| | Output | 2 kV (level 3 - asymmetrical: conductor to ground) |
| | Comments | Criterion B |
| Surge current loads (surge) | EN 61000-4-5 | |
| | Input | 2 kV (level 3 - asymmetrical: conductor to ground) 1 kV (Level 2 - symmetrical: Conductor to conductor) |
| | Output | 2 kV (level 3 - asymmetrical: conductor to ground) 1 kV (Level 2 - symmetrical: Conductor to conductor) |
| | Comments | Criterion B |
| Conducted interference | EN 61000-4-6 | |
| | Input/output | Level 3 |
| | Frequency range | 150 kHz ... 80 MHz |
| | Voltage | 10 V |
| | Comments | Criterion A |

Emitted interference in acc. with EN 61000-6-3

| | |
|--|--|
| Radio interference voltage in acc. with EN 55011 | EN 55011 (EN 55022) Class B, area of application: Industry and residential |
| Emitted radio interference in acc. with EN 55011 | EN 55011 (EN 55022) Class B, area of application: Industry and residential |

5 Structure



- 1 DC input In1/In2:
Input voltage 12 ... 24 V, $I_N = 2 \times 10 \text{ A}$
- 2 GND signal
- 3 Floating relay contact
(maximum 60 V, 100 mA, short-circuit-proof)
- 4 "Redundancy OK" LED, green
- 5 DC output approximately $0.5 \text{ V} < \text{DC input}$
- 6 Universal snap-on foot for EN DIN rails

| | [mm ²] | | AWG | [Nm] Torque |
|--------|--------------------|-----------|---------|----------------|
| | solid | stranded | | |
| Input | 0.2 - 2.5 | 0.2 - 2.5 | 24 - 14 | 0.4 - 0.5 |
| Output | 0.5 - 6 | 0.5 - 4 | 20 - 10 | 0.5 - 0.6 |
| Signal | 0.2 - 2.5 | 0.2 - 2.5 | 24 - 14 | 0.4 - 0.5 |

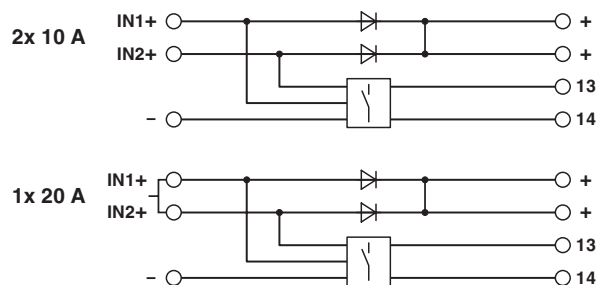
Input data

| | |
|-----------------------------|---------------------|
| Input nominal voltage range | 12 V DC ... 24 V DC |
| DC input voltage range | 10 V DC ... 30 V DC |
| Type of connection | Screw connection |
| Stripping length | 9 mm |

Output data

| | |
|------------------------|-----------------------------------|
| Nominal output voltage | $0.5 \text{ V} < \text{DC input}$ |
| Type of connection | Screw connection |
| Stripping length | 14 mm |

6 Block diagram



7 Safety and warning notes



The redundancy modules are built-in devices. Installation and startup must only be carried out by qualified personnel. The country-specific regulations (e.g., VDE, DIN) must be observed.



Danger

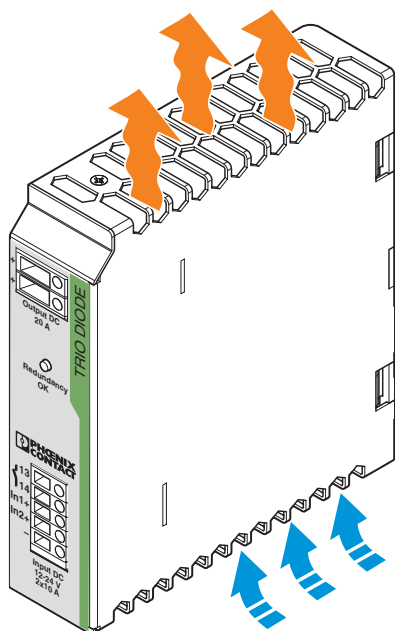
Never carry out work when the power is turned on.
Depending on the ambient temperature and the load, the housing can become very hot.



CAUTION

Before startup please ensure:
The connection must be carried out by a competent person and protection against electric shock guaranteed.
All input and output lines are dimensioned according to the maximum output current of the device or separately protected.
Sufficient convection must be guaranteed.

8 Installation



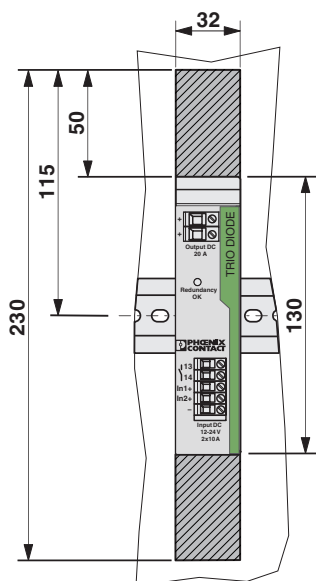
ATTENTION

To ensure sufficient convection, we recommend the following minimum spacing be used between modules: 5 cm for vertical installation and 0 cm for horizontal installation.



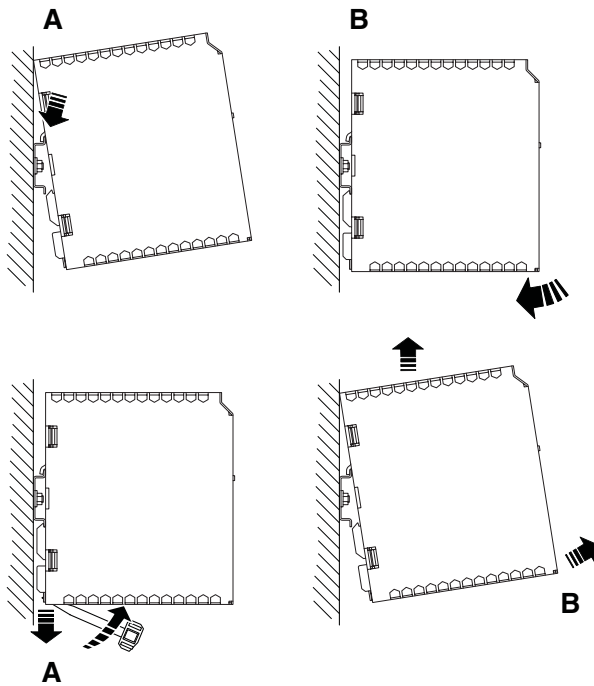
The redundancy module can be snapped onto all DIN rails in accordance with EN 60715 and must be mounted horizontally (connecting terminal blocks on top and bottom).

9 Installation position



Mounting position: Installation depth 115 mm (+ DIN rail)

10 Mounting on DIN rails



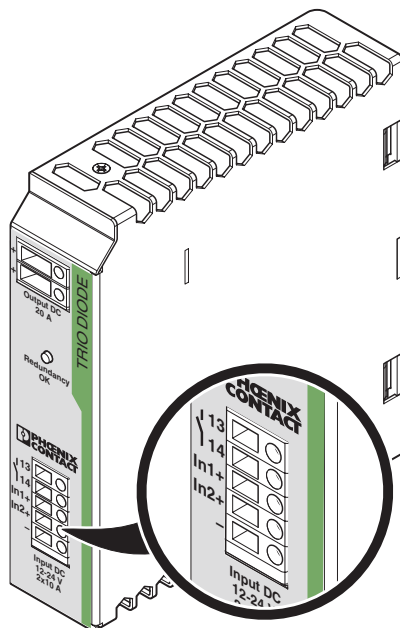
Assembly

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

Removing

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

11 Input



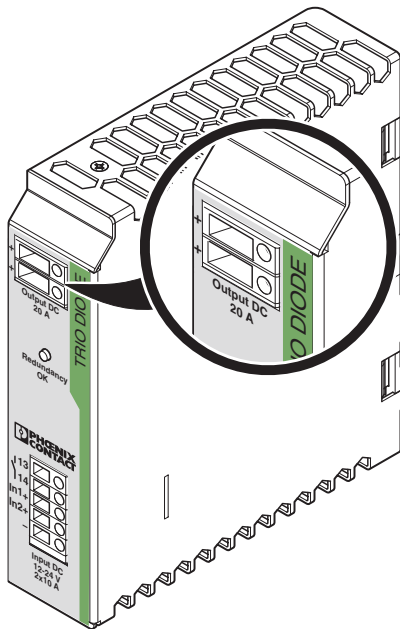
You can fasten the connection cables to the housing using cable binders.

Make sure that the connecting cables and cable binders used are designed for the surface temperatures on the housing.

When tightening the cable binders, the insulation of the connecting cables must not be damaged.

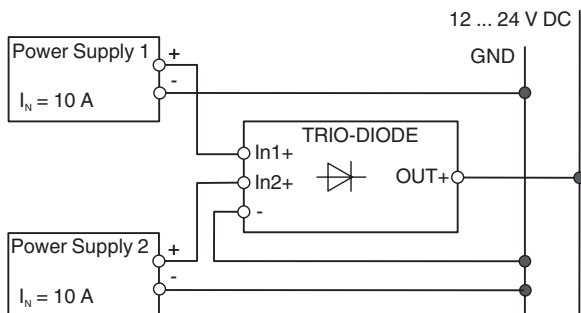
Connection of the input is made via connection terminal blocks "In1+" and "In2+". The "-" terminal is then only connected when signaling is necessary.

12 Output



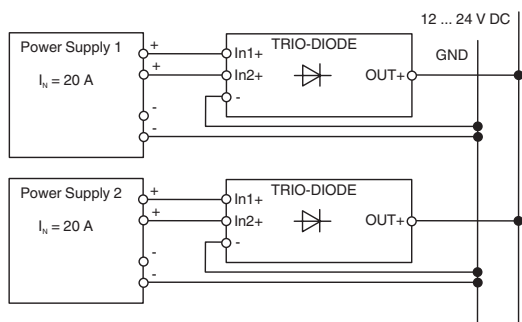
The output is connected via the internally connected "+" terminals.

13 Function

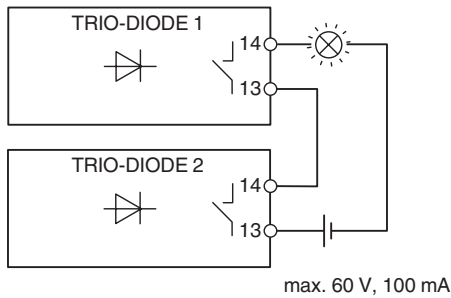
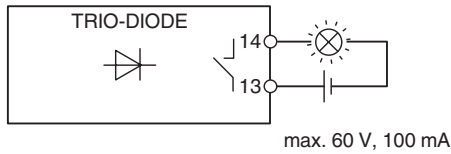


Input/output

To decouple two parallel connected power supplies 1 and 2 with nominal currents of up to 10 A, one redundancy module is necessary.



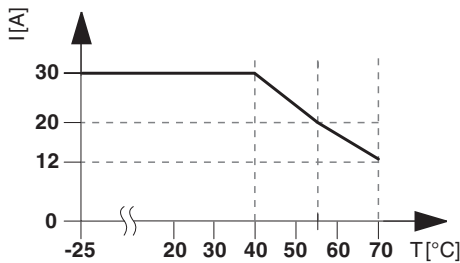
One redundancy module per power supply is required to decouple power supplies with nominal currents from 10 A to 20 A. Inputs "In1+" and "In2+" of the redundancy module must be connected to the power supply unit using two conductors. This is necessary because the maximum current carrying capacity of 15 A per input must not be exceeded. For connecting the redundancy module to the power supply unit, we recommend using two identical connecting cables (cable length/cable cross sections).



Signaling

A floating relay contact and "Redundancy OK" LED are available for monitoring redundancy. In normal operation where input voltage > 8 V DC at input terminals "IN1+" and "IN2+", the relay contact (13/14) is closed and the "Redundancy OK" LED lights up. If the input voltage falls to below the value of 8 V DC at one of the input terminals, the floating relay contact opens and the "Redundancy OK" LED goes out.

Floating, current-limited "Redundancy OK" signal contacts are to be connected in series for monitoring redundancy. If monitoring the redundancy is not necessary, the "GND signal" does not need to be connected.



Thermal behavior

The device can be operated at an ambient temperature of -25 °C to +70 °C. For ambient temperatures above +55, the output current must be reduced by 2.5% per Kelvin increase in temperature.

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