Redundancy Module
QUINT-DIODE/40

QUINT DIODE provides:

- **100% decoupling** of power supplies connected in parallel
- Can be **installed in potentially explosive areas**
- **Load currents up to 60 A** supported
- **Easy assembly** by snapping onto the DIN rail



1. Short Description

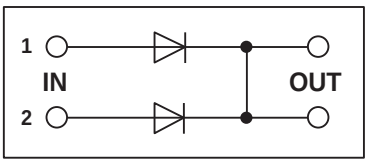
The redundancy module can be used to 100% decouple two power supplies of the same type, which are connected in parallel on the output side to increase power or provide redundancy.

The reliability of a power supply determines the availability of individual components in a system and whether complex systems can function safely. Redundant connections are designed for supplying systems, which place particularly high requirements on operational safety. The redundant configuration of the power supply ensures continuous system availability.

The power supply of a system can be configured redundantly through the connection of at least two power supply units in parallel. Together they then supply the connected devices. The connected power supplies must be large enough that the total current requirements of all devices can be fully met by one power supply. In the event of an internal fault on one device or a mains voltage supply failure on the primary side, the other device automatically takes over the complete power supply without interruption and vice versa. In this way the operational reliability of the system can be increased effectively.

Phoenix Contact GmbH & Co. KG • 32825 Blomberg, Germany
Phone +49 - 52 35 - 30 0 • Fax +49 - 52 35 - 34 12 00 • www.phoenixcontact.com
Local Contact: www.phoenixcontact.com/salesnetwork

2. Technical Data





QUINT-DIODE/40

10 mm (0.39 in.)	solid [mm²]	flexible [mm²]	AWG	torque [Nm]	torque [lb in.]
	0.5 - 16	0.5 - 10	20 - 6	1.2 - 1.5	10.6 -13.3

Redundancy module

Description	Type	Order No.	Pcs. Pkt.
Redundancy module	**QUINT-DIODE/40**	**29 38 96 3**	1

Technical Data

Input Data		
Input voltage	U_N/U_{max}	24 V DC/< 30 V DC
Input current	I_N	2 x 20 A, 1 x 40 A
(Cable cross section 6 mm² [10 AWG])	I_{max}	2 x 19 A, 1 x 39 A (< 40°C [104°F]), 2 x 16 A, 1 x 32 A (< 60°C [140°F])
(Cable cross section 10 mm² [8 AWG])	I_{max}	2 x 27 A, 1 x 54 A (< 40°C [104°F]), 2 x 21 A, 1 x 43 A (< 60°C [140°F])
(Cable cross section 16 mm² [6 AWG])	I_{max}	2 x 30 A, 1 x 60 A (< 40°C [104°F]), 2 x 24 A, 1 x 48 A (< 60°C [140°F])
Transient surge voltage protection using Transil diode		Yes
Protection against polarity reversal with diode		Yes, < 60 V
Input/output voltage drop		0.5 V, approximately
Maximum power dissipation with nominal load		20 W, approximately

General Data		
Insulation voltage:	Input, output/housing	1 kV
Mounting position		NS 35 DIN rail according to EN 50 022
Can be mounted with spacing	- Vertical	5 cm (1.969 in.)
	- Horizontal	2 cm (0.787 in.)
Degree of protection		IP20
Protection class (without PE connection)		II
Efficiency		> 97%
Housing version		AlMg (enclosure), GD-ZnAlCu (heatsink)
Dimensions (W x H x D) + DIN rail		(62 x 84 x 102 mm [2.441 x 3.307 x 4.016 in.])
Weight		0.7 kg, approximately

Climatic Data		
Ambient temperature	- Operation	-25°C to +70°C (-13˚F to +158˚F) -25°C to +60°C (-13°F to +140°F)
	- Storage	-40°C to +85°C (-40˚F to +185˚F)
Humidity		> 95%
Vibration	according to IEC 68-2-6	3 - 15 Hz, amplitude ±2.5 mm/15 Hz - 150 Hz, 2.3 g
Shock	according to IEC 68-2-27	30 g, 18 ms
Degree of pollution	according to EN 50 178	2
Climatic category		
Certification/Standards		
Electrical safety (of IT equipment) Industrial control equipment		EN 60 950/VDE 0805, EN 50 178/VDE 0160 c UL us UL/C-UL Recognized UL 60 950 c UL us LISTED UL/C-UL Listed UL 508
Conformance mark according to EN 50 021 Electrical equipment for potentially explosive areas		Ex II 3G EEx nA IIC T4 KEMA 03 ATEX 1197X UL/C-UL Recognized UL 1604 Class I, Division 2, Groups A, B, C, D
Electromagnetic compatibility		
CE Conformance with EMC directive:		89/336/EEC
• Noise immunity		EN 61 000-6-2
• Noise emission		EN 55 011/EN 55 022 B[1])

[1]) Class B: Industrial and domestic applications

EN 55 011 ≙ CISPR 11; EN 50 022 ≙ CISPR 22; EN 61 000 ≙ IEC 1000

3. Device View, Connections, and Control Elements

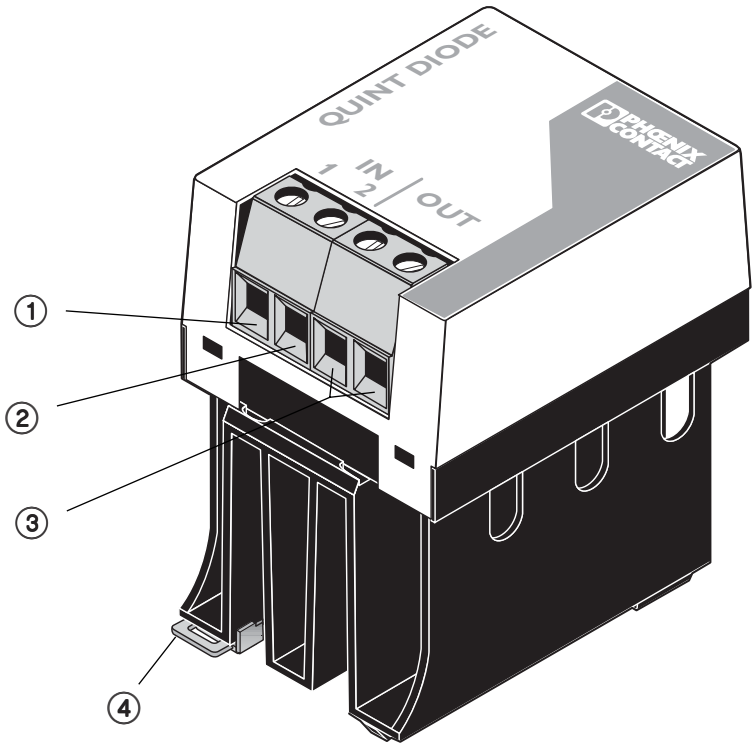


Figure 04

① DC input 1:U_N = 24 V, I_N = 20 A, I_{max} = 28 A
② DC input 2:U_N = 24 V, I_N = 20 A, I_{max} = 28 A
③ DC output
④ Universal latching foot for NS 35 DIN rails according to EN 50 022

4. Safety Notes and Warning Instructions

To ensure that the device can be operated safely and all functions can be used, please read these instructions carefully.

Installation and startup must only be carried out by qualified personnel. The relevant country-specific regulations (e.g., VDE, DIN) must also be observed.

Before startup it is particularly important to ensure that:

- All supply lines have sufficient fuse protection and are the correct size.
- All output cables are the correct size for the maximum device output current or have separate fuse protection.
- Sufficient convection is ensured.
- To protect the device, the input current of 56 A must not be exceeded. This is ensured if the supply is provided from an automatic current limiting source (e.g., QUINT POWER) or if a suitable fuse is connected.

To meet directive 94/9/EU (ATEX), the following safety notes must be observed:

- The QUINT-DIODE/40 redundancy module corresponds to standard EN 50 021.
- This redundancy module may be installed within a potentially explosive area, in which Category 3 equipment is required.
- When working on the redundancy module, observe the national safety rules and regulations for the prevention of accidents.
- The module must only be installed and operated by qualified personnel.
- Installation should be carried out following the instructions given in this data sheet.
- The QUINT-DIODE/40 redundancy module should be installed in the control cabinet so that IP54 protection according to EN 60 529 or higher is ensured.
- If dust is present, the device must be installed in suitable housing. The device must not be subject to mechanical strain or thermal load, which exceed the limits described in this data sheet.
- To ensure sufficient convection, the following minimum spacing should be provided between other modules: 5 cm (1.969 in.) for vertical installation and 2 cm (0.787 in.) for horizontal installation.
- During operation only devices, which are suitable for operation in potentially explosive areas of zone 2, can be connected to the redundancy module.
- The redundancy module does not require maintenance, is closed ex works, and should not be opened. Repairs can only be carried out by the manufacturer.
- The safety data and features provided according to the valid conformance mark are listed after the technical data.

5. Installation

5.1. Mounting

The redundancy module can be snapped onto all DIN rails according to EN 50 022-35. The module can be mounted horizontally (input terminal blocks facing upwards or downwards) or vertically on the DIN rail.

Installation Dimensions

To ensure sufficient convection, we recommend the following minimum spacing be used between modules:

5 cm (1.969 in.) for vertical installation
2 cm (0.787 in.) for horizontal installation

Mounting:

Place the module with the DIN rail guideway on the **top edge** of the DIN rail and then snap it **downwards**.

Removal:

Release the snap-on catch using a screwdriver and then detach the module from the **bottom edge** of the DIN rail.

Connection Cable:

The following cable cross sections can be connected:

	Solid [mm²]	Flexible [mm²]	AWG	Torque [Nm]	[lb in.]
① ② ③	0.2 - 16	0.5 - 10	20 - 6	1.2 - 1.5	10.6 - 13.3

10 mm (0.39 in.)
mm

For reliable and safe-to-touch connection: Strip 10 mm (0.39 in.) from the connector ends.

To maintain UL approvals, use copper cables, which are designed for operating temperatures of at least 75°C (167°F).

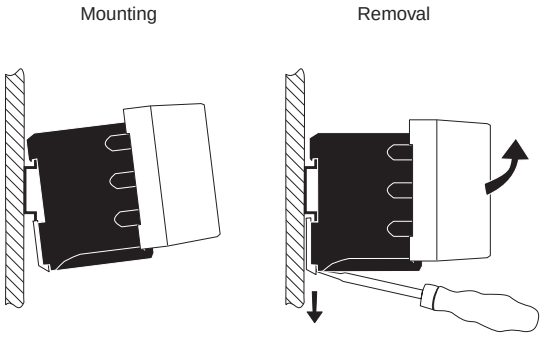


Figure 05

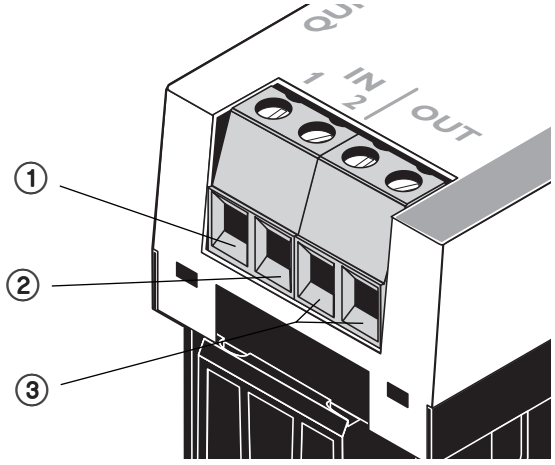


Figure 06

6. Function

6.1 Input

The maximum permissible current depends on the cross section of the connected cables and the ambient temperature (see Table 1).

Only one redundancy module is required to decouple two power supplies that are connected in parallel (A and B) with nominal currents up to 20 A. The individual modules are wired together as shown in Figure 7.

One redundancy module per power supply is required to decouple power supplies with nominal currents from 20 A to 40 A. Both inputs "1" and "2" of the redundancy module must be connected to the power supply via two cables as shown in Figure 8. This is required as the maximum current carrying capacity of 30 A per input must not be exceeded. For connecting the redundancy module to the power supply, we recommend using two cables of the same length and with identical cross sections.

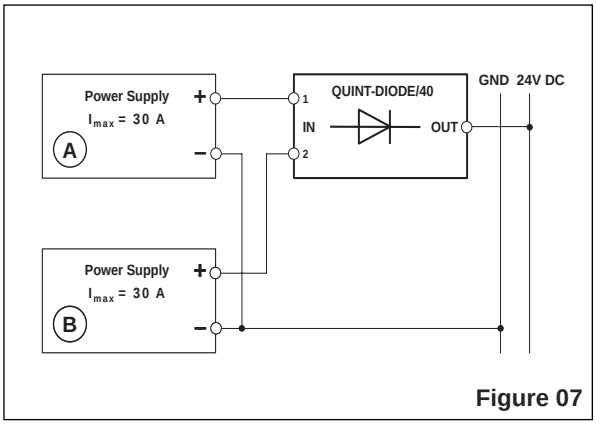


Figure 07

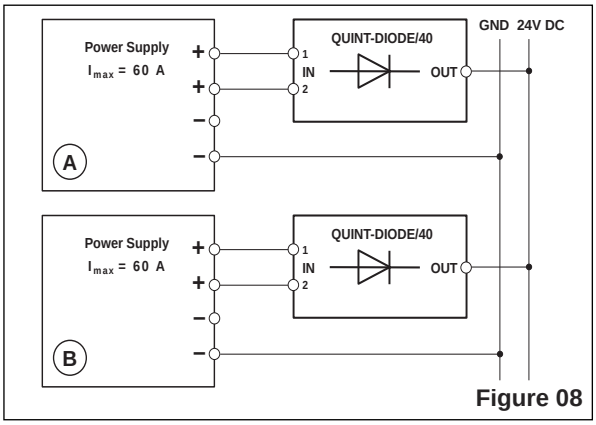


Figure 08

6.2 Output

During operation only devices, which are suitable for operation in potentially explosive areas of Zone 2, can be connected to the output of the redundancy module in Zone 2.

The plus pole of the device is wired to the output of the redundancy module as shown in Figure 7/8.

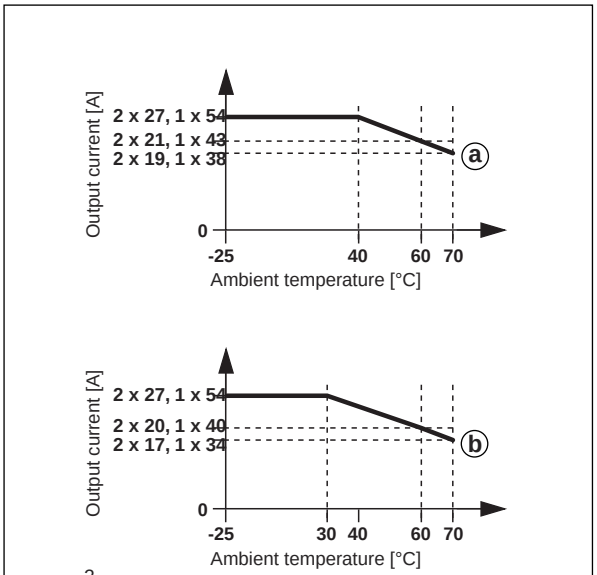
6.3 Temperature Response

In the **horizontal mounting position** (input terminal blocks facing upwards or downwards), the redundancy module can lead maximum continuous load currents of 2 x 27 A or 1 x 54 A at ambient temperatures of up to 40°C (104˚F). The permissible current carrying capacity reduces according to the ambient temperature as shown in Figure 9, curve ⓐ for a cable cross section of 10 mm^2 (8 AWG).

At an ambient temperature of 60°C (140˚F), the module can lead maximum continuous load currents of 2 x 21 A or 1 x 43 A.

In the **vertical mounting position**, the redundancy module can lead maximum continuous load currents of 2 x 27 A or 1 x 54 A at ambient temperatures of up to 30°C (86˚F). The permissible current carrying capacity reduces according to the ambient temperature as shown in Figure 9, curve ⓑ for a cable cross section of 10 mm^2 (8 AWG).

At an ambient temperature of 60°C (140˚F), the module can lead maximum continuous load currents of 2 x 20 A or 1 x 40 A.



10 mm^2/8 AWG

Figure 09

Table 1

Cable Cross Section	Ambient Temperature		
	40°C (104˚F)	50°C (122˚F)	60°C (140˚F)
6 mm^2/10 AWG	2 x 19 A 1 x 39 A	2 x 18 A 1 x 36 A	2 x 16 A 1 x 32 A
10 mm^2/8 AWG	2 x 27 A 1 x 54 A	2 x 25 A 1 x 50 A	2 x 21 A 1 x 43 A
16 mm^2/6 AWG	2 x 30 A 1 x 60 A	2 x 27 A 1 x 55 A	2 x 24 A 1 x 48 A

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