QUINT4-BUFFER/24DC/20

Buffer module



Data sheet
107871_en_00

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1 Description

The QUINT4 buffer module combines an electronic switch-over unit and energy storage in the same housing. The buffer module stores the energy required to bridge mains failures in maintenance-free capacitors. Long mains buffering is possible depending on the required load current.

- High level of system availability due to high capacitor service life
- Maintenance-free due to electrolytic capacitors
- Space savings, thanks to the compact design
- Electronic switchover unit and energy storage device in one housing
- Maximum energy efficiency
- Large temperature range
- Thanks to soft start, can be used with power supplies in the low power range

Technical data (short form)	
Input voltage range	22.5 V DC ... 30 V DC
Current consumption (idling/ charging process/max.)	0.2 A / 0.6 A / 26 A
Activation threshold	< 22 V DC
Buffer period	0.2 s / 20 A ; 2 s / 2 A
Nominal output voltage (U_N)	24 V DC (depending on the input voltage)
Nominal output current I_N / $I_{Stat. Boost}$	20 A / 25 A
Max. Power dissipation	< 6 W
Efficiency with charged energy storage device	> 98 %
MTBF (IEC 61709, SN 29500)	2497464 h (40 °C)
Ambient temperature (operation)	-25 °C ... 70 °C (> 40 °C Derating: 1 %/K / > 60 °C Derating: 2.5 %/K)
Dimensions W/H/D	56 mm / 130 mm / 125 mm
Weight	1 kg

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

2 Table of contents

1 Description ... 1
2 Table of contents ... 2
3 Ordering data ... 3
4 Technical data ... 4
5 Safety regulations and installation notes ... 9
5.1 Symbols used ... 9
5.2 Safety and warning notes ... 9
6 Structure ... 11
6.1 Function elements ... 11
6.2 Device dimensions and keep-out areas ... 11
6.3 Block diagram ... 12
7 Mounting/removing the buffer module ... 12
7.1 Convection ... 12
7.2 Normal mounting position ... 13
7.3 Mounting buffer module ... 13
7.4 Removing the buffer module ... 13
7.5 Retrofitting the universal wall adapter ... 13
8 Device connection terminal blocks ... 15
8.1 DC input ... 15
8.2 DC output ... 15
8.3 Connection terminal block signaling ... 15
9 Buffer period ... 15
10 Signaling ... 16
10.1 LED indicators and signal outputs ... 16
11 Derating ... 17
11.1 Ambient temperature ... 17
11.2 Installation height ... 17

3 Ordering data

Description	Type	Order No.	Pcs./Pkt.
QUINT buffer module with maintenance-free capacitor-based energy storage for DIN rail mounting, input: 24 V DC, output: 24 V DC/20 A, including mounted UTA 107 universal DIN rail adapter.	QUINT4-BUFFER/24DC/20	2907913	1

Accessories	Type	Order No.	Pcs./Pkt.
2-piece universal wall adapter for securely mounting the power supply in the event of strong vibrations. The profiles that are screwed onto the side of the power supply are screwed directly onto the mounting surface. The universal wall adapter is attached on the left/right.	UWA 130	2901664	1
Universal wall adapter for securely mounting the power supply in the event of strong vibrations. The power supply is screwed directly onto the mounting surface. The universal wall adapter is attached at the top/bottom.	UWA 182/52	2938235	1

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

4 Technical data

Input data	
Nominal input voltage	24 V DC SELV
Input voltage range	22.5 V DC ... 30 V DC
Buffer period	0.2 s / 20 A ; 2 s / 2 A
Activation threshold	< 22 V DC
Current consumption	0.2 A (No-load) 0.6 A (charging process) 26 A (max.)
Input connection data	
Connection method	Screw connection
Conductor cross section, solid	0.2 mm² ... 6 mm²
Conductor cross section, flexible	0.2 mm² ... 4 mm²
Conductor cross section AWG	30 ... 10
Stripping length	8 mm
General output data	
Nominal output voltage U_N (depending on the input voltage)	24 V DC
Connection in parallel	no
Connection in series	no
Output data (mains operation)	
Nominal output voltage U_N (depending on the input voltage)	24 V DC
Nominal output current I_N / $I_{Stat. Boost}$	20 A / 25 A
Power loss nominal load max.	< 6 W
Efficiency (with charged energy storage device)	> 98 %
Output data (battery operation)	
Nominal output voltage U_N (typical)	22 V DC
Nominal output current I_N / $I_{Stat. Boost}$	20 A / 25 A
Output connection data	
Connection method	Screw connection
Conductor cross section, solid	0.2 mm² ... 6 mm²
Conductor cross section, flexible	0.2 mm² ... 4 mm²
Conductor cross section AWG	30 ... 10
Stripping length	8 mm

Status and diagnostic indicators/signal outputs U_{In} OK	
Switching output , floating 13/14	Electronic relay (photorelay)
Switching voltage	30 V DC
Continuous load current	200 mA
Status display	LED (green)
Signal threshold	Input voltage in the valid range

Status and diagnostic indicators/signal outputs Ready	
Switching output	Transistor output, active
Output voltage	24 V (U_N - 2 V (typical))
Continuous load current	20 mA
Status display	LED (green)
Signal threshold	Charging state = 100% or buffer mode

Status and diagnostic indicators/signal outputs SGnd
Reference potential for Ready

Signal connection data	
Connection method	Screw connection
Conductor cross section, solid	0.2 mm² ... 1.5 mm²
Conductor cross section, flexible	0.2 mm² ... 1.5 mm²
Conductor cross section AWG/kcmil	24 ... 16
Stripping length	8 mm

General data	
Memory medium	Electrolytic capacitor
Insulation voltage input, output / housing	500 V
Degree of protection	IP20
Protection class	Special application (SELV input voltage, hazardous voltages are generated in the device).
MTBF (EN 29500, 40°C)	2497464 h (40 °C)
Mounting position	horizontal DIN rail NS 35, EN 60715
Dimensions W / H / D (state of delivery)	56 mm / 130 mm / 125 mm
Weight	1 kg

Ambient conditions	
Ambient temperature (operation)	-25 °C ... 70 °C (> 40 °C Derating: 1 %/K / > 60 °C Derating: 2.5 %/K)
Ambient temperature (start-up type tested)	-40 °C
Ambient temperature (storage/transport)	-40 °C ... 70 °C
Max. permissible relative humidity (operation)	≤ 95 %
Degree of pollution	2
Climatic class	3K3 (in acc. with EN 60721)

Approvals

UL	UL Listed UL 508 UL/C-UL Recognized UL 60950-1

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

Electromagnetic compatibility		
Emitted interference in acc. with EN 61000-6-3		
CE basic standard	**Minimum normative requirements**	**Higher requirements in practice (covered)**
Noise emission EN 55016	EN 61000-6-4	EN 61000-6-3

Noise immunity according to EN 61000-6-2		
CE basic standard	**Minimum normative requirements of EN 61000-6-2 (CE)**	**Higher requirements in practice (covered)**
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 ... 6 GHz
Test field strength	10 V/m	10 V/m
Comments	Criterion A	Criterion A
Fast transients (burst) EN 61000-4-4		
Input	2 kV (Test Level 3 - asymmetrical)	2 kV (Test Level 3 - asymmetrical)
Output	2 kV (Test Level 3 - asymmetrical)	2 kV (Test Level 3 - asymmetrical)
Signal	2 kV (Test Level 3 - asymmetrical)	2 kV (Test Level 3 - asymmetrical)
Comments	Criterion B	Criterion A
Surge current loads (surge) EN 61000-4-5		
Input	1 kV (Test Level 2 - symmetrical) 2 kV (Test Level 3 - asymmetrical)	1 kV (Test Level 2 - symmetrical) 2 kV (Test Level 3 - asymmetrical)
Output	1 kV (Test Level 2 - symmetrical) 2 kV (Test Level 3 - asymmetrical)	1 kV (Test Level 2 - 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		
Frequency range	0.15 MHz ... 80 MHz	0.15 MHz ... 80 MHz
Voltage	10 V	10 V
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.



All technical specifications are nominal and refer to a room temperature of 25 °C and 70% relative humidity at 2000 m above sea level.

5 Safety regulations and installation notes

5.1 Symbols used

Instructions and possible hazards are indicated by corresponding symbols in this document.



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.



NOTE

This symbol together with the signal word NOTE and the accompanying text alert the reader to a situation which 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.

5.2 Safety and warning notes



WARNING: Danger to life by electric shock!

- Only skilled persons may install, start up, and operate the device.
- Never carry out work when voltage is present.
- Only remove equipment when it is disconnected and not in the potentially explosive area.
- Establish connection correctly and ensure protection against electric shock.
- Cover termination area after installation in order to avoid accidental contact with live parts (e. g., installation in control cabinet).
- Keep flames, embers or sparks away from the module.
- Use copper cables for operating temperatures of >75 °C.



CAUTION: Hot surface

The housing can become hot, depending on the ambient temperature and device load.

NOTE

- Observe the national safety and accident prevention regulations.
- Assembly and electrical installation must correspond to the state of the art.
- The buffer module is a built-in device. The IP20 degree of protection of the device is intended for use in a clean and dry environment.
- The device must be installed in a control cabinet that can be locked and only opened by specialist staff.
- Horizontal mounting position (normal mounting position)
- Observe mechanical and thermal limits.
- Ensure sufficient convection (minimum gap above/ below: 50 mm). Housing can become hot.
- Ensure that the primary-side wiring and secondary-side wiring are the correct size and have sufficient fuse protection.
- You can find the connection parameters, such as the necessary stripping length for the wiring with and without ferrule, in the associated table.
- Protect the device against foreign bodies penetrating it, e.g., paper clips or metal parts.
- The device may only be used for its intended use.
- Improper use invalidates the device protection.
- The buffer module is maintenance-free and may not be opened.
- If the buffer module is disconnected from the energy supply, a residual charge/residual voltage may still be present.
- Before transport, the buffer module must be completely discharged.
- Use ferrules for flexible cables.
- A suitable fire and electrical enclosure must be provided in the end application.

More follows

- Do not exceed max. input/output current of 30 A. Use current-limited source, e. g., QUINT POWER or suitable fuse.
- Keep these instructions in a safe place – this data sheet contains important safety notes which must be observed during installation and maintenance of the device.

6 Structure

6.1 Function elements

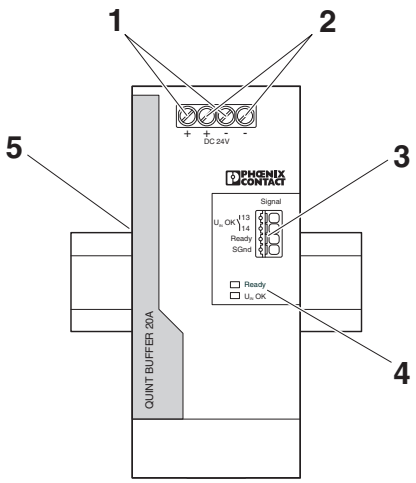


Figure 1 Position of the function elements

Key

No.	Designation
1	Connection terminal blocks for DC input (+ / -)
2	Connection terminal blocks for DC output (+ / -)
3	Signaling connection terminal blocks
4	Status and diagnostics indicators
5	Universal DIN rail adapter (rear of housing)

6.2 Device dimensions and keep-out areas

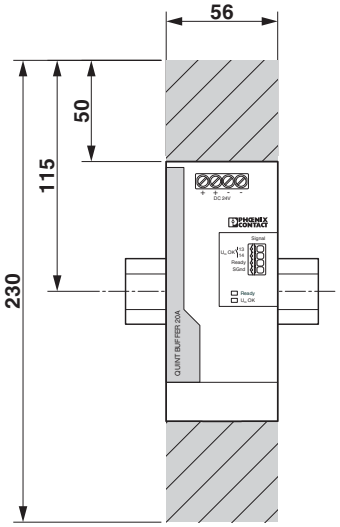


Figure 2 Keep-out areas

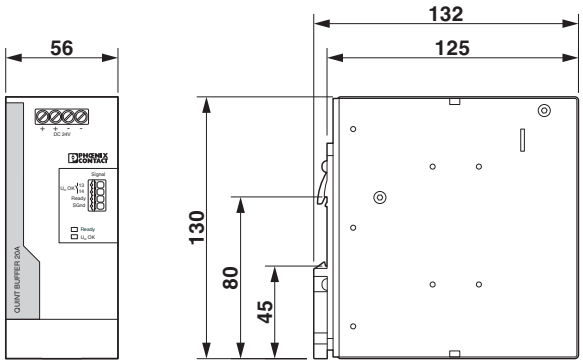


Figure 3 Device dimensions

6.3 Block diagram

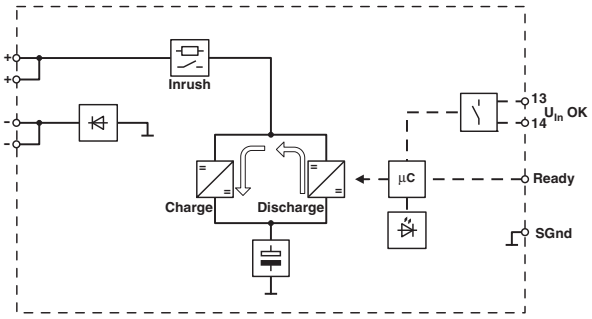


Figure 4 Block diagram

Key

Symbol	Meaning
	Inrush current limitation
	DC/DC converter
	Electrolytic capacitor
µC	Microprocessor
	LED
	Switch
	Reverse polarity protection

7 Mounting/removing the buffer module

The device must be installed in a control cabinet that can be locked and only opened by specialist staff.

7.1 Convection

NOTE: enable convection

The housing can become very hot, depending on the ambient temperature and module load.

In order to ensure sufficient convection, we recommend a minimum vertical distance of 50 mm to the other devices.

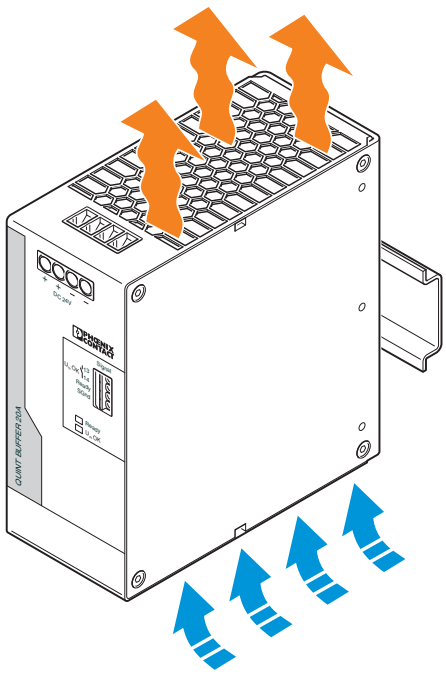


Figure 5 Convection

7.2 Normal mounting position

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

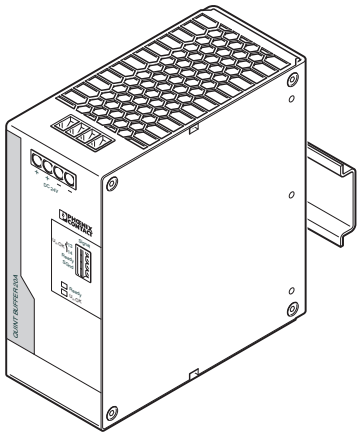


Figure 6 Normal mounting position

7.3 Mounting buffer module

Proceed as follows to mount the buffer module:

1. In the normal mounting position the device is mounted on the DIN rail from above. Make sure that the universal DIN rail adapter is in the correct position behind the DIN rail (A).
2. Then press the device down until the universal DIN rail adapter audibly latches into place (B).
3. Check that the device is securely attached to the DIN rail.

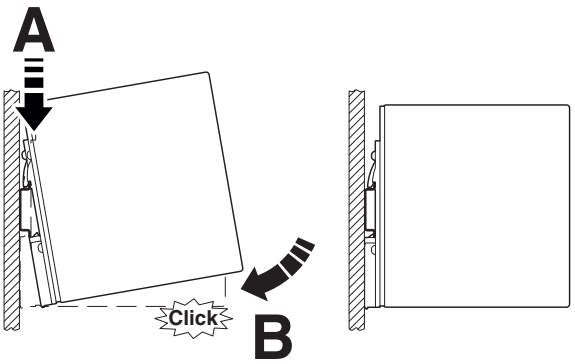


Figure 7 Snapping onto the DIN rail

7.4 Removing the buffer module

Proceed as follows to remove the buffer module:

1. Take a suitable screwdriver and insert this into the lock hole on the universal DIN rail adapter (A).
2. Release the lock by lifting the screwdriver (B).
3. Carefully swivel the device forward (C) so that the lock slides back into the starting position.
4. Then separate the device from the DIN rail (D).

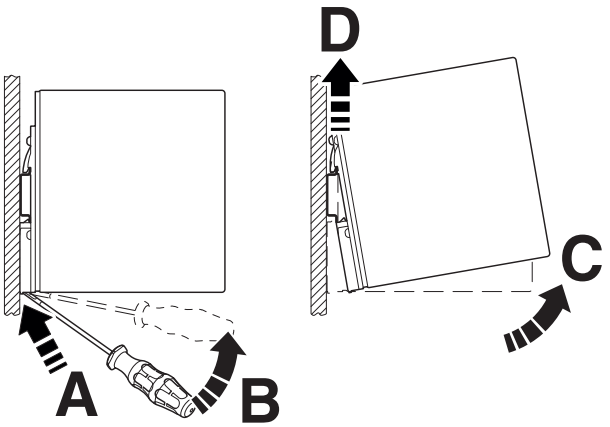


Figure 8 Removing from the DIN rail

7.5 Retrofitting the universal wall adapter

The UWA 182/52 universal wall adapter (Order No. 2938235) or UWA 130 universal wall adapter (Order No. 2901664) is used to attach the device directly to the mounting surface.

The use of the universal wall adapter is recommended under extreme ambient conditions, e.g., strong vibrations. Thanks to the tight screw connection between the device and the universal wall adapter or the actual mounting surface, an extremely high level of mechanical stability is ensured.

7.5.1 Mounting the UWA 182/52 universal wall adapter

The UWA 182/52 universal wall adapter (Order No. 2938235) is attached to the device by means of the Torx screws of the universal DIN rail adapter.

Proceed as follows to disassemble the universal DIN rail adapter that comes pre-mounted:

1. Remove the screws for the universal DIN rail adapter using a suitable screwdriver (Torx 10).
2. Remove the universal DIN rail adapter from the rear of the device.
3. Position the universal wall adapter in such a way that the keyholes or oval tapers face up. The mounting surface for the device is the raised section of the universal wall adapter.
4. Insert the Torx screws into the appropriate hole pattern on the universal wall adapter so that the necessary mounting holes of the device can be accessed.
5. Screw the universal wall adapter onto the device.

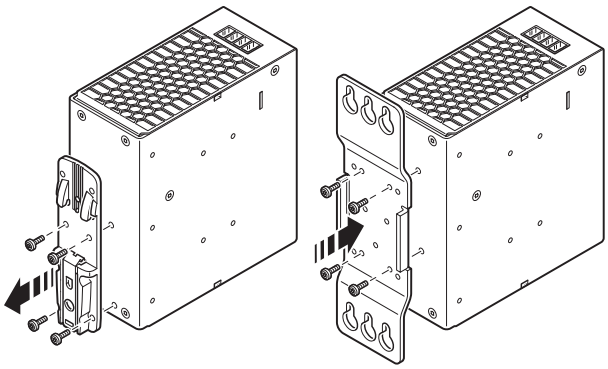


Figure 9 Mounting the UWA 182/52 universal wall adapter

7.5.2 Mounting the UWA 130 2-piece universal wall adapter

The UWA 130 universal wall adapter (Order No. 2901664) is attached to the device using the Torx screws provided.

Proceed as follows to disassemble the universal DIN rail adapter that comes pre-mounted:

1. Remove the screws for the universal DIN rail adapter using a suitable screwdriver (Torx 10).
2. Remove the universal DIN rail adapter from the rear of the device.
3. Position the two-piece universal wall adapter on the right and left side of the housing.
4. Insert the Torx screws into the appropriate hole pattern on the universal wall adapter so that the necessary mounting holes of the device can be accessed.
5. Screw the two-piece universal wall adapter onto the device.

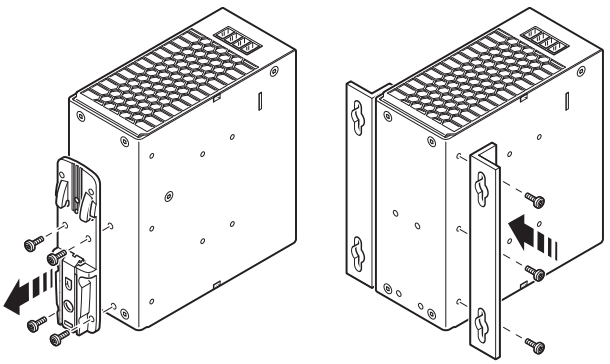


Figure 10 Mounting the UWA 130 universal wall adapter

8 Device connection terminal blocks

8.1 DC input

The supply voltage is connected via DC + / - connection terminal blocks.

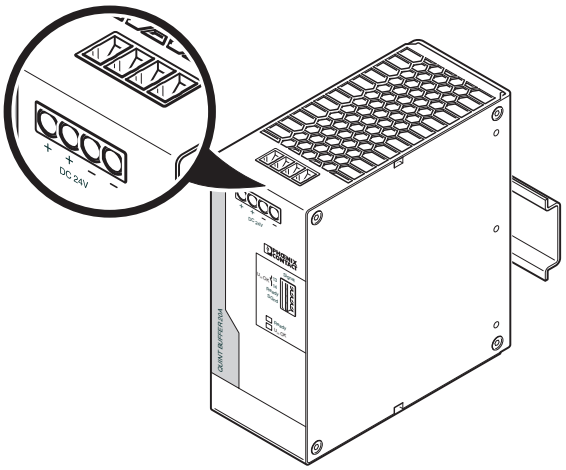


Figure 11 Input

Protection of the input side

Do not exceed max. input/output current of 30 A. Use current-limited source, e. g., QUINT POWER or suitable fuse.

8.2 DC output

The supply voltage is connected via DC + / - connection terminal blocks.

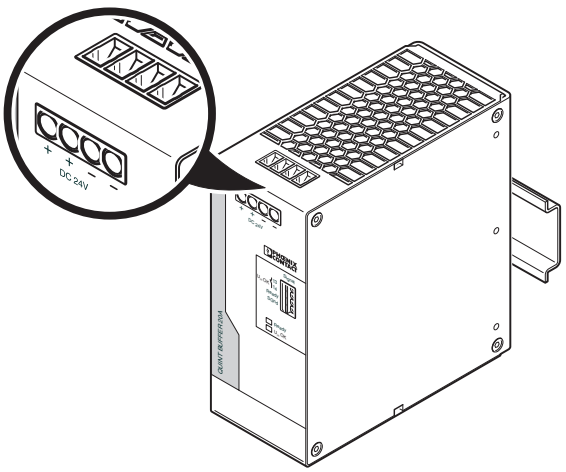


Figure 12 Output

8.3 Connection terminal block signaling

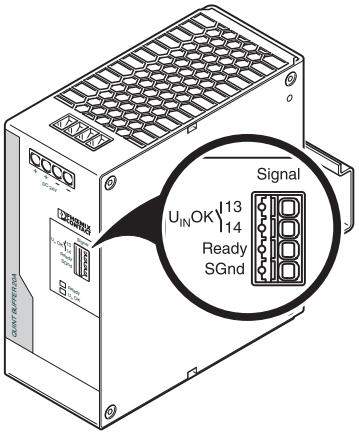


Figure 13 Connection terminal block signaling

9 Buffer period

Refer to the following diagram for possible buffer times for varying discharge currents.

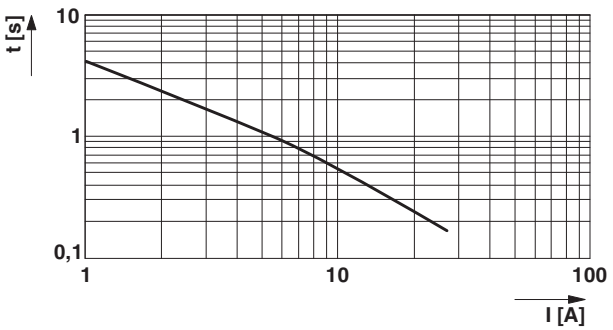


Figure 14 Buffer time/discharge current diagram

10 Signaling

Various LED indicators are available for visual function monitoring of the module. Active signal outputs can be used to forward this data to a higher-level control system.

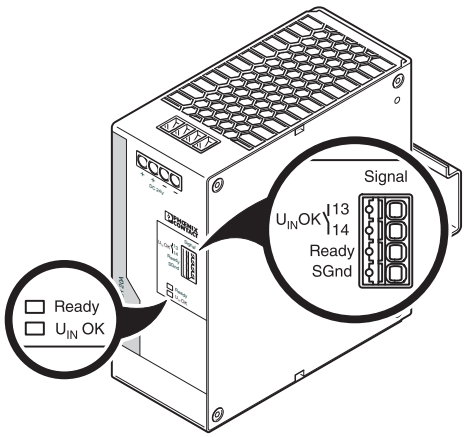


Figure 15 LED indicators and signal outputs

10.1 LED indicators and signal outputs

U_{In} OK (13/14)

- If the input voltage is in the valid range, the signal output is active (closed).
- A floating N/O contact (implemented with a photorelay) is available as a signal contact.
- This signal is indicated visually by a green LED.

Ready

- When the storage capacitors are fully charged or the device is in buffer mode, the signal output is active (High level).
- A digital transistor output is available as a signal contact.
- This signal is indicated visually by a green LED.

For device signaling and the corresponding states, please refer to the table below.

Status LED		Switching output		Note
U_{In} OK	Ready	U_{In} OK	Ready	
○	○	open	low	Device off
●	●	closed	high	Mains operation, buffer is ready
	✳ D = 50%	closed	low	Mains operation, charging in process
	○	closed	low	Mains operation (Startup)
○	●	open	high	Buffer mode

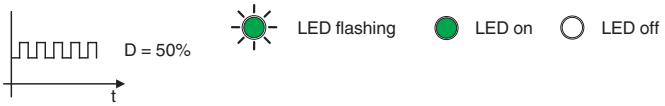


Figure 16 Signaling

11 Derating

11.1 Ambient temperature

At an ambient temperature of up to +40°C, the device supplies the output current $I_{Stat.\ Boost}$.

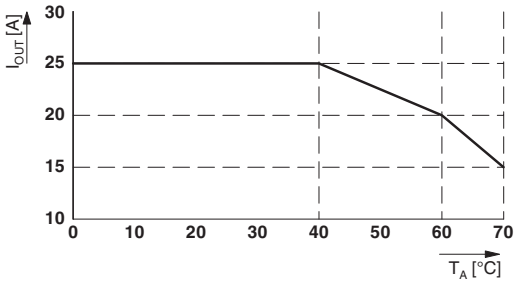


Figure 17 Temperature-dependent derating

11.2 Installation height

The device can be operated at an installation height of up to 4000 m without any limitations.

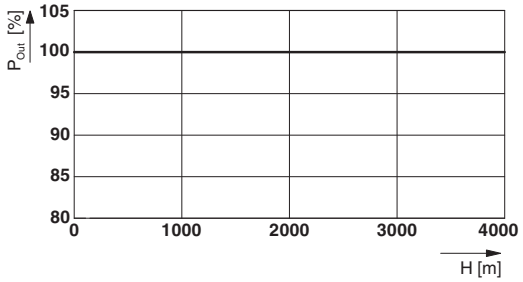


Figure 18 Altitude-dependent derating