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QUINT4-PS/3AC/24DC/10

Power supply unit

Data sheet
107104_en_00

1 Description

QUINT POWER power supplies with integrated NFC interface and SFB technology ensure superior system availability.

Adaptable

– Signaling thresholds and characteristic curves can be set via NFC

Powerful

– SFB technology: 6 times the nominal current for 15 ms
– Power reserves:
Static boost of up to 125% (P_N) for a sustained period
Dynamic boost of up to 200% (P_N) for 5 s

Preventive

– Comprehensive signaling

Robust

– Mains buffering > 20 ms
– High degree of immunity, thanks to integrated gas-filled surge arrester (6 kV)

Technical data (short form)	
Input voltage range	3x 400 V AC ... 500 V AC -20 % ... +10 % 2x 400 V AC ... 500 V AC -10 % ... +10 %
Mains buffering	≥ 22 ms (3x 400 V AC) ≥ 22 ms (3x 480 V AC)
Nominal output voltage (U_N)	24 V DC
Setting range of the output voltage (U_{Set})	24 V DC ... 29.5 V DC
Residual ripple	< 75 mV_{PP}
Nominal output current (I_N) Static Boost ($I_{Stat.Boost}$) Dynamic Boost ($I_{Dyn.Boost}$) Selective Fuse Breaking (I_{SFB})	10 A 12.5 A 20 A (5 s) 60 A (15 ms)
Output power (P_N) Output power ($P_{Stat. Boost}$) Output power ($P_{Dyn. Boost}$)	240 W 300 W 480 W
Efficiency	typ. 93 % (400 V AC) typ. 92.6 % (480 V AC)
MTBF (IEC 61709, SN 29500)	> 654000 h (40°C)
Ambient temperature (operation)	-25 °C ... 70 °C -40°C (startup type tested) > 60 °C Derating: 2,5 %/K
Dimensions W/H/D	50 mm / 130 mm / 125 mm
Weight	0.9 kg

All technical specifications are nominal values and refer to a room temperature of 25 °C and 70 % relative humidity at 100 m above sea level.

2 Table of contents

3 Ordering data

Description	Type	Order No.	Pcs./Pkt.
Primary-switched QUINT POWER power supply with free choice of output characteristic curve, SFB (selective fuse breaking) technology, and NFC interface, input: 3-phase, output: 24 V DC/10 A	QUINT4-PS/3AC/24DC/10	2904621	1
Online configured version of the primary-switched QUINT POWER power supply with free choice of output characteristic curve, SFB (selective fuse breaking) technology, and NFC interface, input: 3-phase, output: 24 V DC/10 A	QUINT4-PS/3AC/24DC/10/...	2907872	1

Accessories	Type	Order No.	Pcs./Pkt.
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
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
Assembly adapter for QUINT-PS... power supply on S7-300 rail	QUINT-PS-ADAPTERS7/1	2938196	1
Near Field Communication (NFC) programming adapter with USB interface for the wireless configuration of NFC-capable products from PHOENIX CONTACT with software. No separate USB driver is required.	TWN4 MIFARE NFC USB ADAPTER	2909681	1
Fuse, for the photovoltaics industry according to UL 2579, Length: 38 mm, Diameter: 10.3 mm, Color: white	FUSE 10,3X38 6A PV A	3062778	10
Plug-in device protection, according to type 3/class III, for 3-phase power supply networks with separate N and PE (5-conductor system: L1, L2, L3, N, PE), with integrated surge-proof fuse and remote indication contact.	PLT-SEC-T3-3S-230-FM	2905230	1

The range of accessories is being continuously extended. The current range of accessories can be found in the download area for the product.

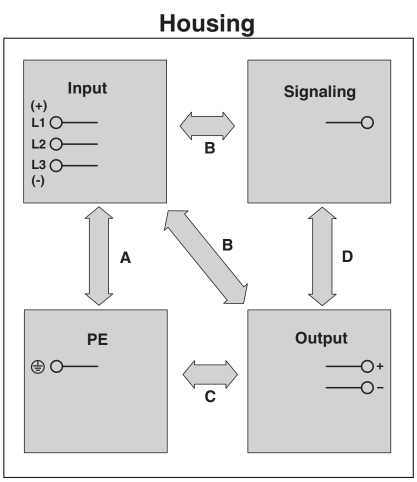
4 Technical data

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 % ... +10 % 2x 400 V AC ... 500 V AC -10 % ... +10 % ± 260 V DC ... 300 V DC -13 % ... +30 %
Frequency range (f_N)	50 Hz ... 60 Hz -10 % ... +10 %
Network type	Star network
Current consumption	3x 0.5 A (400 V AC) 3x 0.4 A (480 V AC) 2x 0.8 A (400 V AC) 2x 0.9 A (480 V AC) 3x 0.4 A (500 V AC) 2x 0.9 A (500 V AC) 0.7 A (± 260 V DC) 0.6 A (± 300 V DC)
The specified values for current consumption apply for operation in the static boost (P_N x 125%).	
Discharge current to PE typical	< 3.5 mA 1 mA (550 V AC, 60 Hz)
Mains buffering	≥ 22 ms (3x 400 V AC) ≥ 22 ms (3x 480 V AC)
Switch-on time	< 1 s
Typical response time from SLEEP MODE	300 ms
Protective circuit	Transient surge protection Varistor, gas-filled surge arrester
Switch-on current surge limitation typical after 1 ms	3 A
Inrush surge current I^2t	< 0.1 A^2s
During the first few microseconds, the current flow into the filter capacitors is excluded.	
The SCCR value (short-circuit current rating) of the power supply unit corresponds to the SCCR value of the backup fuse (see input protection table).	

AC Input protection (to be connected externally upstream)							
Input current I_{In} Input protection	Circuit breaker					Neozed fuse or equivalent	Power switch
Characteristics	A	B	C	D	K	gG	≤ 13 x I_{In} (maximum magnetic tripping)
4 A	✓	✓	✓	✓	✓	✓	✓
6 A	✓	✓	✓	✓	✓	✓	✓
8 A	✓	✓	✓	✓	✓	-	✓
10 A	✓	✓	✓	✓	✓	-	✓
13 A	✓	✓	✓	-	✓	-	✓
16 A	✓	✓	✓	-	-	-	-

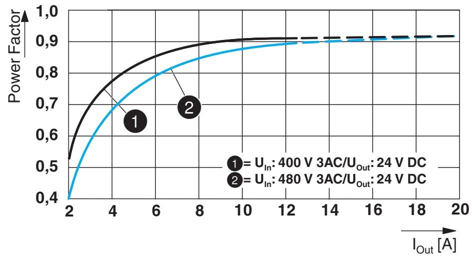
DC Input protection (to be connected externally upstream)	
Choice of suitable circuit breakers	1x 6 A (10 x 38 mm, 30 kA L/R = 2 ms) , ≥ 1000 V DC

Electric strength of the insulation



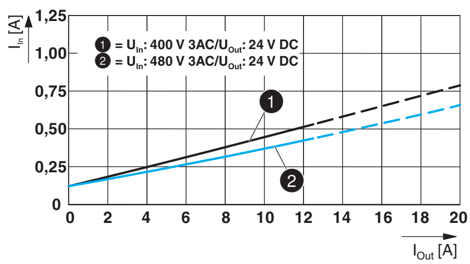
	A	B	C	D
Type test (IEC/EN 60950-1)	3.5 kV AC	4 kV AC	0.5 kV DC	0.5 kV DC
Production test	2.4 kV AC	2.4 kV AC	0.5 kV DC	0.5 kV DC
Field test (with gas-filled surge arrester)	0.8 kV AC 1.1 kV DC	0.8 kV AC 1.1 kV DC	0.5 kV DC	0.5 kV DC
Field test (gas-filled surge arrester de-contacted)	2 kV AC 2.83 kV DC	2 kV AC 2.83 kV DC	0.5 kV DC	0.5 kV DC

POWER factor



Crest factor	400 V AC	480 V AC
	typ. 1.8	typ. 2.25

Input current vs. output current



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
Tightening torque	0.5 Nm ... 0.6 Nm

Output data	
Nominal output voltage (U_N)	24 V DC
Setting range of the output voltage (U_{Set}) (constant capacity)	24 V DC ... 29.5 V DC
Nominal output current (I_N)	10 A
Static Boost ($I_{Stat.Boost}$)	12.5 A
Dynamic Boost ($I_{Dyn.Boost}$)	20 A (5 s)
Selective Fuse Breaking (I_{SFB})	60 A (15 ms)
Magnetic circuit breaker tripping	A1...A6 / B2...B6 / C1...C3 / Z1...Z6
Control deviation Static load change 10 % ... 90 %	< 0.5 %
Control deviation Dynamic load change 10 % ... 90 %, (10 Hz)	< 2 %
Control deviation change in input voltage ±10 %	< 0.25 %
Short-circuit-proof	yes
No-load proof	yes
Residual ripple (with nominal values)	< 75 mV_{PP}
Connection in parallel	Yes, for redundancy and increased capacity
Connection in series	yes
Feedback resistance	≤ 35 V DC
Circuit breaker against surge voltage at output by invasive foreign matter	≤ 32 V DC
Rise time typical	< 1 s (U_{Out} = 10 % ... 90 %)

Output connection data	
Connection method	Screw connection
Conductor cross section, solid	0.2 mm^2 ... 2.5 mm^2
Conductor cross section, flexible	0.2 mm^2 ... 2.5 mm^2
Conductor cross section AWG	30 ... 12
Stripping length	6.5 mm
Tightening torque	0.5 Nm ... 0.6 Nm

LED signaling	
P_{Out} > 100%	LED lights up yellow, output power > 240 W
P_{Out} > 75%	LED lights up green, output power > 180 W
P_{Out} > 50%	LED lights up green, output power > 120 W
U_{Out} > 0.9 x U_{Set}	LED lights up green
U_{Out} < 0.9 x U_{Set}	LED flashes green

Signal contact (configurable)	
Signal output (configurable) Out 1	
Digital	0 / 24 V DC , 20 mA
Default	24 V DC , 20 mA (24 V DC for U_{Out} > 0.9 x U_{Set})
Signal output (configurable) Out 2	
Digital	0 / 24 V DC , 20 mA
Analog	4 mA ... 20 mA ± 5 % (Load ≤400 Ω)
Default	24 V DC , 20 mA (24 V DC for P_{Out} < P_N)
Relay contact (configurable) 13/14	
Function	N/O contact
Default	closed (U_{out} > 0.9 U_{Set})
Control input (configurable) Rem	
Function	Output power ON/OFF (SLEEP MODE)
Default	Output power ON (> 1.5 kΩ/24 V DC/open bridge between Rem and SGnd)
Signal ground SGnd	Reference potential for Out1, Out2, and Rem

Signal connection data	
Connection method	Push-in 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	24 ... 16
Stripping length	8 mm

Reliability	400 V AC
MTBF (IEC 61709, SN 29500)	> 1034000 h (25 °C) > 654000 h (40°C) > 320000 h (60°C)

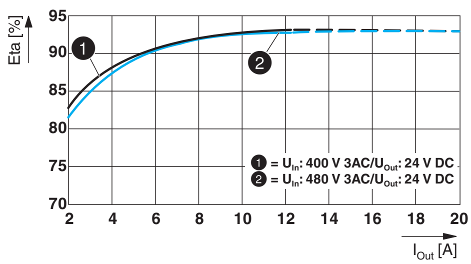
Life expectancy (electrolytic capacitors) Output current (I_{Out})	400 V AC	480 V AC
5 A	> 389000 h (40 °C)	> 364000 h (40 °C)
10 A	> 200000 h (40 °C)	> 183000 h (40 °C)
10 A	> 566000 h (25 °C)	> 520000 h (25 °C)

The expected service life is based on the capacitors used. If the capacitor specification is observed, the specified data will be ensured until the end of the stated service life. For runtimes beyond this time, error-free operation may be reduced. The specified service life of 15 years is simply a comparative value.

Switching frequency	Min.	Max.
PFC stage	25 kHz	500 kHz
Auxiliary converter stage	90 kHz	110 kHz
Main converter stage	56 kHz	500 kHz

General data	
Degree of protection	IP20
Protection class	I
Inflammability class in acc. with UL 94 (housing)	V0
Side element version	Aluminum
Hood version	Stainless steel X6Cr17
Weight	0.9 kg

Power dissipation	400 V AC	480 V AC
Maximum power dissipation in no-load condition	< 5 W	< 5 W
Power dissipation SLEEP MODE	< 5 W	< 5 W
Power loss nominal load max.	< 19 W	< 20 W

Efficiency	400 V AC	480 V AC
	typ. 93 %	typ. 92.6 %

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	≤ 5000 m (> 2000 m, observe derating)
Vibration (operation)	5 Hz - 100 Hz resonance search 2.3g, 90 min., resonance frequency 2.3g, 90 min. (according to DNV GL Class C)
Shock	18 ms, 30g, 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 60950-1	II
EN 61010-1	II
EN 62477-1	III

Standards	
Electrical safety (of information technology equipment)	IEC 60950-1/VDE 0805 (SELV)
SELV	IEC 60950-1 (SELV) and EN 60204-1 (PELV)
Rail applications	EN 50121-3-2 EN 50121-4 EN 50121-5 IEC 62236-3-2 IEC 62236-4 IEC 62236-5
Safety of power supply units up to 1100 V (insulation distances)	DIN EN 61558-2-16

Approvals	
UL	UL Listed UL 508 UL/C-UL Recognized UL 60950
CSA	CAN/CSA-C22.2 No. 60950-1-07 CSA-C22.2 No. 107.1-01

Electromagnetic compatibility		
Noise emission according to EN 61000-6-3 (residential and commercial) and EN 61000-6-4 (industrial)		
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	0 kHz ... 2 kHz	0 kHz ... 2 kHz
Flicker EN 61000-3-3	not required	0 kHz ... 2 kHz

Noise emission for marine approval	Minimum normative requirements of DNV GL	Higher requirements in practice of DNV GL (covered)
DNV GL conducted noise emission	Class A Area power distribution	Class A Area power distribution
DNV GL noise radiation	Class A Area power distribution	Class B Bridge and deck area

Immunity according to EN 61000-6-1 (residential), EN 61000-6-2 (industrial), and EN 61000-6-5 (power station equipment zone 1, 2)		
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 2)	8 kV (Test Level 4)
Housing air discharge	8 kV (Test Level 3)	15 kV (Test Level 4)
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 Level 3)
Frequency range	1.4 GHz ... 2 GHz	1 GHz ... 6 GHz
Test field strength	3 V/m (Test Level 2)	10 V/m (Test Level 3)
Frequency range	2 GHz ... 2.7 GHz	1 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 4 - 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 4 - asymmetrical)
Comments	Criterion B	Criterion A

Immunity according to EN 61000-6-1 (residential), EN 61000-6-2 (industrial), and EN 61000-6-5 (power station equipment zone 1, 2)		
CE basic standard	**Minimum normative requirements of EN 61000-6-2 (CE) (immunity for industrial environments)**	**Higher requirements in practice (covered)**
Surge current loads (surge) EN 61000-4-5		
Input	1 kV (Test Level 3 - symmetrical) 2 kV (Test Level 3 - asymmetrical)	3 kV (Test Level 4 - symmetrical) 6 kV (Test Level 4 - asymmetrical)
Output	0.5 kV (Test Level 2 - symmetrical) 0.5 kV (Test Level 1 - asymmetrical)	1 kV (Test Level 2 - symmetrical) 2 kV (Test Level 3 - asymmetrical)
Signal	0.5 kV (Test Level 1 - asymmetrical)	1 kV (Test Level 2 - asymmetrical)
Comments	Criterion B	Criterion A
Conducted interference EN 61000-4-6		
Input/Output/Signal	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
Power frequency magnetic field EN 61000-4-8		
	50 Hz , 60 Hz (30 A/m)	16.67 Hz , 50 Hz , 60 Hz (100 A/m , 60 s)
	not required	50 Hz , 60 Hz (1 kA/m , 3 s)
	not required	0 Hz (300 A/m , DC, 60 s)
Comments	Criterion A	Criterion A
Voltage dips EN 61000-4-11		
Input voltage (400 V AC , 50 Hz)		
Voltage dip	70 % , 25 periods (Test Level 2)	70 % , 0.5, 1 / 25 periods (Test Level 2)
Comments	Criterion C	Criterion A: 0.5, 1 period Criterion B: 25 periods
Voltage dip	40 % , 10 periods (Test Level 2)	40 % , 5, 10, 50 periods (Test Level 2)
Comments	Criterion C	Criterion B
Voltage dip	0 % , 1 period (Test Level 2)	0 % , 0.5, 1 / 5, 50 periods (Test Level 2)
Comments	Criterion B	Criterion A: 0.5, 1 period Criterion B: 5, 50 periods

Additional basic standard EN 61000-6-5 (immunity in power station)		
Basic standard	**Minimum normative requirements of EN 61000-6-5 (power station equipment, zone 1, 2)**	**Higher requirements in practice (covered)**
Pulse-shape magnetic field EN 61000-4-9		
	1000 A/m	1000 A/m
Comments	Criterion A	Criterion A
Attenuated sinusoidal oscillations (ring wave) EN 61000-4-12		
	not required	2 kV (Test Level 4 - symmetrical)
	not required	4 kV (Test Level 4 - asymmetrical)
Comments	none	Criterion A
Asymmetrical conducted disturbance variables EN 61000-4-16		
	50 Hz , 60 Hz , 10 V (Permanent) (Test Level 3)	50 Hz , 60 Hz , 10 V (Permanent) (Test Level 3)
	0 Hz , 16.67 Hz , 50 Hz , 60 Hz , 100 V (1 s) (Test Level 3)	0 Hz , 16.67 Hz , 50 Hz , 60 Hz , 100 V (1 s) (Test Level 3)
Comments	Criterion A	Criterion A
Attenuated oscillating wave EN 61000-4-18		
	0.5 kV (Test Level 2 - symmetrical)	0.5 kV (Test Level 2 - symmetrical)
	1 kV (Test Level 2 - asymmetrical)	1 kV (Test Level 2 - asymmetrical)
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.
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 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.

Check the device for damage before startup.

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.

CAUTION: Hot surface

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

CAUTION: Before startup, observe the following

The power supply must be switched off from outside according to EN 60950-1 (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 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.

6 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.

High-voltage tests up to 0.8 kV AC / 1.1 kV DC can be performed as described.

For high-voltage tests > 0.8 kV AC / 1.1 kV DC, the gas-filled surge arrester must be disconnected.

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

6.1 High-voltage dielectric test (dielectric strength test) and why must it be performed?

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 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).

6.2 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 60950-1. The high-voltage test is performed with a test voltage of at least 1.5 kV AC or higher. Routine manufacturing tests are inspected regularly by a certification body.

6.3 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.

6.3.1 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).

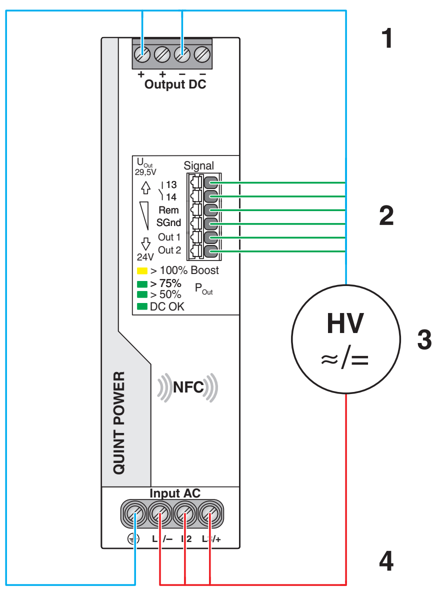


Figure 1 Potential-related wiring for the high-voltage test

Key

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

6.3.2 Disconnecting the gas-filled surge arrester

The built-in gas-filled surge arrester inside the device ensures that the power supply is effectively protected against asymmetrical disturbance variables (e.g., EN 61000-4-5).

Each surge voltage test represents a very high load for the power supply. Therefore avoid unnecessary loading or damage to the power supply due to excessive test voltages. If necessary, the gas-filled surge arrester inside the device can be disconnected in order to use higher test voltages. Following successful completion of testing, please reconnect the gas-filled surge arrester.

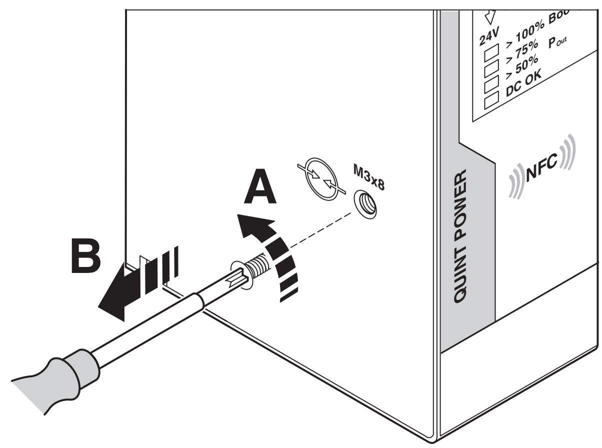


Figure 2 Disconnect gas-filled surge arrester

To disconnect the gas-filled surge arrester, proceed as follows:

1. Disconnect the power to the device.
2. Unscrew the Phillips head screw completely and keep the gas-filled surge arrester screw in a safe place. The gas-filled surge arrester is now disconnected and is no longer functional.
3. Perform the surge voltage test on the power supply.
4. Following successful high-voltage testing, screw the gas-filled surge arrester screw fully back into the power supply.

> **DANGER: Risk of electric shock or damage to the power supply due to using the wrong gas-filled surge arrester screw**
>
> To connect the gas-filled surge arrester, only use the gas-filled surge arrester screw that was originally installed in the power supply.

7 Structure of the power supply

The fanless convection-cooled power supply can be snapped onto all DIN rails according to EN 60715.

7.1 Function elements

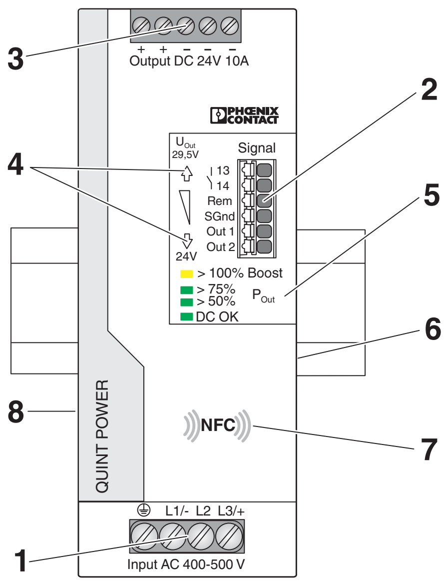


Figure 3 Operating and indication elements

Key

No.	Designation
1	AC input voltage connection terminal blocks
2	Signaling connection terminal blocks
3	DC output voltage connection terminal blocks
4	Output voltage button ⬇(-) / ⬆(+)
5	Status and diagnostics indicators
6	Universal DIN rail adapter (rear of housing)
7	NFC interface (Near Field Communication)
8	Gas-filled surge arrester for surge protection (left side of housing)

7.2 Device dimensions and keepout areas

Nominal output capacity	Ambient temperature	Distance	
		lateral	top/ bottom
0 ... 50 %	-25 ... 70 °C	0 mm	40 mm / 20 mm
≥ 50% ... 125%	-25 ... ≤40 °C	5 mm	50 mm
≥ 50 % ... 100 %	>40 ... 70 °C	15 mm	

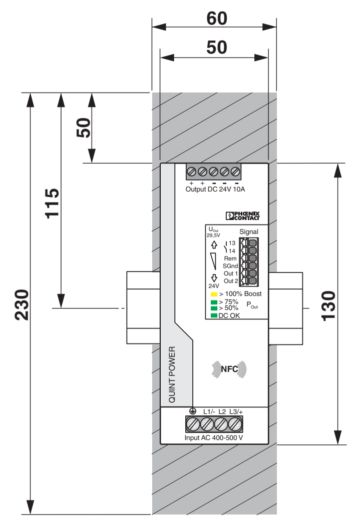


Figure 4 Device dimensions and maximum keepout areas (in mm)

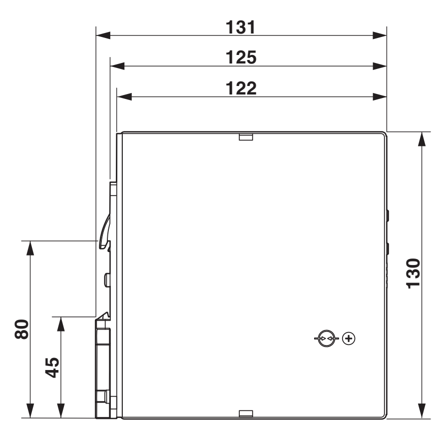


Figure 5 Device dimensions (in mm)

7.3 Block diagram

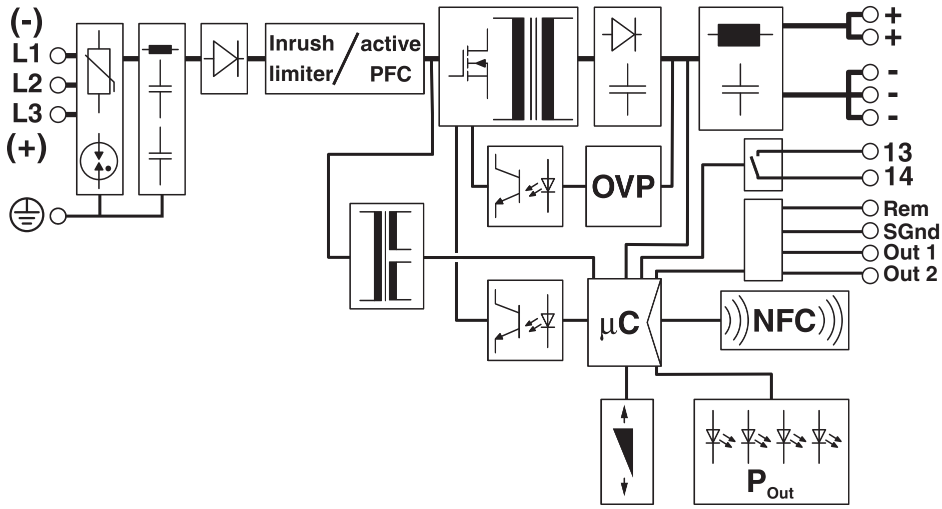
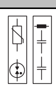
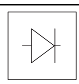
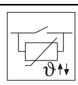
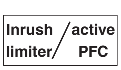
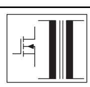
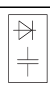
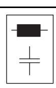
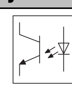
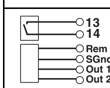
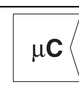
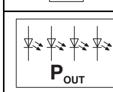


Figure 6 Block diagram

Key

Symbol	Designation
	Surge protection (varistor, gas-filled surge arrester) with filter
	Bridge rectifier
	Inrush current limitation
	Power factor correction (PFC)
	Switching transistor and main transmitter (electrically isolating)
	Secondary rectification and smoothing
	Filter
	Auxiliary converter (electrically isolating)

Symbol	Designation
	Optocoupler (electrically isolating)
	Additional regulatory protection against surge voltage
	Relay contact and signal contacts
	Microcontroller
	NFC interface (Near Field Communication)
	Output voltage button ⬇(-) / ⬆(+)
	Signal/display LEDs (P_{Out}, DC OK)

8 Mounting/removing the power supply

8.1 Mounting the power supply unit

Proceed as follows to mount the power supply:

1. In the normal mounting position the power supply 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 power supply down until the universal DIN rail adapter audibly latches into place (B).
3. Check that the power supply is securely attached to the DIN rail.

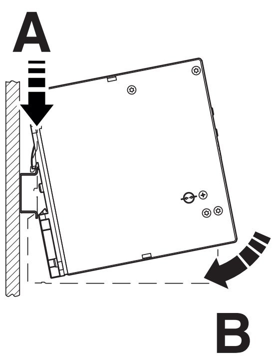


Figure 7 Snapping the power supply onto the DIN rail

8.2 Removing the power supply unit

Proceed as follows to remove the power supply:

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 power supply forward (C) so that the lock slides back into the starting position.
4. Then separate the power supply from the DIN rail.

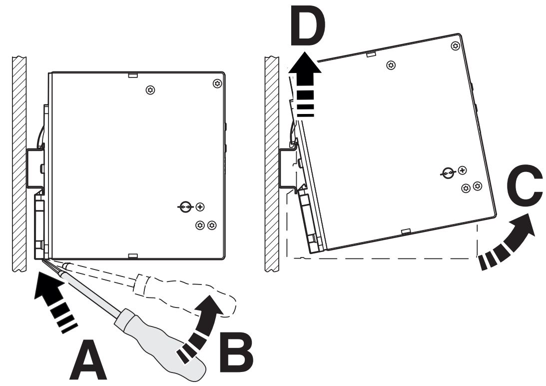


Figure 8 Removing the power supply from the DIN rail

8.3 Retrofitting the universal DIN rail adapter

For installation in horizontal terminal boxes it is possible to mount the power supply at a 90° angle to the DIN rail.

No additional mounting material is required.

i	Use the Torx screws provided to attach the universal DIN rail adapter to the side of the power supply.

8.3.1 Disassembling 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. Separate the universal DIN rail adapter from the rear of the power supply.

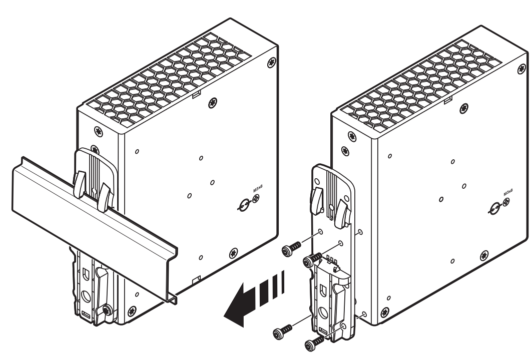


Figure 9 Disassembling the universal DIN rail adapter

8.3.2 Mounting the universal DIN rail adapter

To mount the universal DIN rail adapter on the left side of the device, proceed as follows:

1. Position the universal DIN rail adapter on the left side of the housing so that the mounting holes are congruent with the hole pattern for the mounting holes.
2. Insert the Torx screws that were removed earlier into the appropriate hole pattern on the universal DIN rail adapter so that the necessary drill holes on the power supply can be accessed.
3. Screw the universal DIN rail adapter onto the power supply.

> The maximum tightening torque of the Torx screw (Torx® T10) is 0.7 Nm.

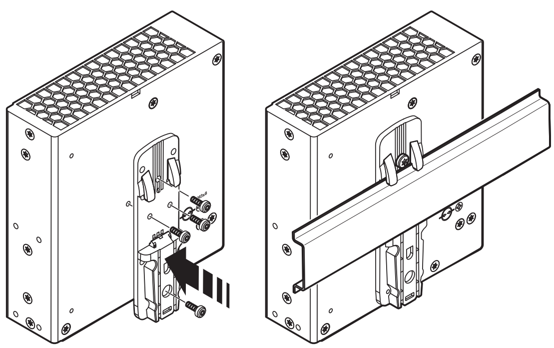


Figure 10 Mounting the universal DIN rail adapter

8.4 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 power supply directly to the mounting surface.

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

> The power supply is attached to the UWA 182 or UWA 130 universal wall adapter by means of the Torx screws of the universal DIN rail adapter.

8.4.1 Mounting the UWA 182/52 universal wall 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. Separate the universal DIN rail adapter from the rear of the power supply.
3. Position the universal wall adapter in such a way that the keyholes or oval tapers face up. The mounting surface for the power supply is the raised section of the universal wall adapter.
4. Place the power supply on the universal wall adapter in the normal mounting position (input voltage connection terminal blocks below).
5. Insert the Torx screws into the appropriate hole pattern on the universal wall adapter so that the necessary mounting holes on the power supply can be accessed.
6. Screw the universal wall adapter onto the power supply.

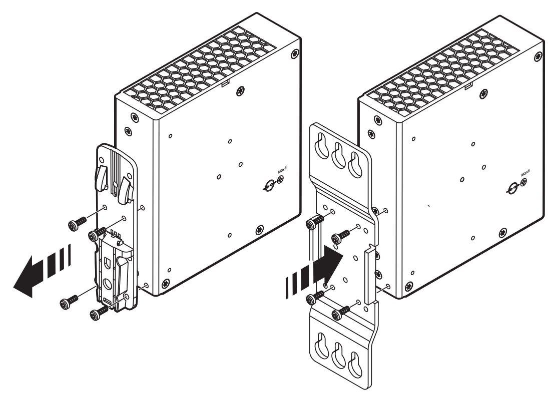


Figure 11 Mounting the UWA 182/52 universal wall adapter

> The maximum tightening torque of the Torx screw (Torx® T10) is 0.7 Nm.

> Make sure you use suitable mounting material when attaching to the mounting surface.

8.4.2 Mounting the UWA 130 2-piece universal wall 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. Separate the universal DIN rail adapter from the rear of the power supply.
3. Position the universal wall adapter. The mounting surface for the power supply is the raised section of the universal wall adapter.
4. Place the power supply on the universal wall adapter in the normal mounting position (input voltage connection terminal blocks below).
5. Insert the Torx screws into the appropriate hole pattern on the universal wall adapter so that the necessary mounting holes in the side flanges of the power supply can be accessed.
6. Screw the two-piece universal wall adapter onto the power supply.

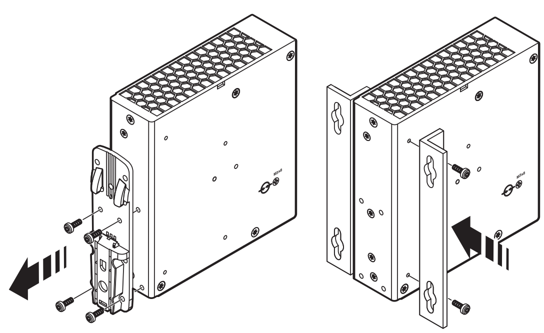


Figure 12 Mounting the UWA 130 universal wall adapter

9 Device connection terminal blocks

The AC input and DC output terminal blocks on the front of the power supply feature screw connection technology. The signal level is wired without tools by means of Push-in connection technology.

> For the necessary connection parameters for the connection terminal blocks, refer to the technical data section.

9.1 Input

The power supply is operated in a three-phase AC power grid (star network). The power supply is connected on the primary side via the INPUT L1/L2/L3/⏚connection terminal blocks.

> The power supply is approved for connection to TN, TT, and IT power grids (star networks) with a maximum phase-to-phase voltage of 500 V AC.

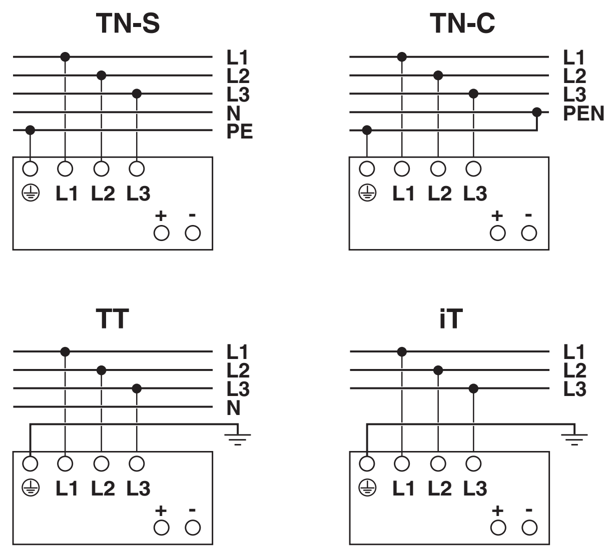


Figure 13 Network configurations in star network

9.2 Protection of the primary side

Installation of the device must correspond to EN 60950-1 regulations. It must be possible to switch off the device using a suitable disconnecting device outside the power supply. The line protection on the primary side is suitable for this (see technical data section).

> **DANGER: Hazardous voltage**
> An all-pos. fuse must be present for operation on three-phase and DC systems.

Protection for AC supply

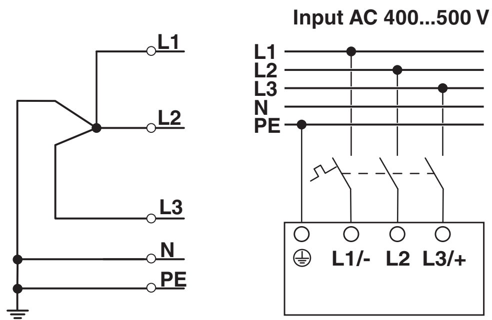


Figure 14 Pin assignment for AC supply voltage

Protection for DC supply

> If the power supply is operated with a DC voltage, the star point of the DC supply system used for supply must be grounded.

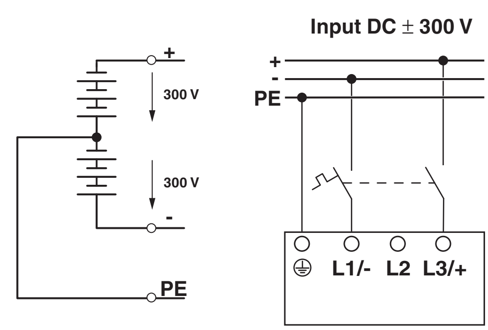


Figure 15 Pin assignment for DC supply voltage

9.3 Output

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

The output voltage is adjusted via the two arrow keys ⬇(-) and ⬆(+) on the front of the power supply.

When you press the arrow key once briefly, the output voltage is reduced ⬇(-) or increased ⬆(+) by 3 mV. When you press the arrow key for longer, the voltage is adjusted in 100 mV increments.

9.4 Protection of the secondary side

The power supply is electronically short-circuit-proof and no-load-proof. In the event of an error, the output voltage is limited

> If sufficiently long connecting cables are used, fuse protection does not have to be provided for each individual load.
>
> If each load is protected separately with its own protective device, the selective shutdown in the event of a fault enables the system to remain operational.

10 Output characteristic curves

This section describes the various output characteristic curves together with their areas of application for customization to your specific application. The U/I Advanced characteristic curve is set by default.

Application	U/I Advanced	Smart HICCUP	FUSE MODE
Normal load (nominal operating area)	✓	✓	✓
System extension (static boost)	✓	✓	✓
Load with high switch-on current (dynamic boost)	✓	✓	--
Energy storage charging (e.g., of batteries)	✓	✓	--
Tripping of fuses (SFB technology)	✓	--	--
Keeping cable heating at a low level in the event of an error	--	✓	--
Configuration without protection on the secondary side	--	✓	✓

Key

Symbol	Designation
✓	Suitable for the application
--	Not suitable for the application

10.1 U/I Advanced output characteristic curve

The preset U/I Advanced output characteristic curve is optimized for the following applications:

– For selective tripping of standard circuit breakers (SFB technology). The power supply supplies up to 6 times the nominal current for 15 ms. Loads connected in parallel continue working.
– When supplying loads with high switch-on currents, such as motors. The dynamic boost of the power supply supplies up to 200% of the nominal power for 5 s. This ensures that sufficient reserve energy is available; overdimensioning of the power supply is not necessary.
– For system extension. With the static boost, up to 125% of the nominal output power is available for a sustained period (up to 40°C).
– For fast energy storage charging (e.g., of batteries) to supply a wide range of loads. The power supply operates in the nominal operating range. Energy supply to the load is ensured.

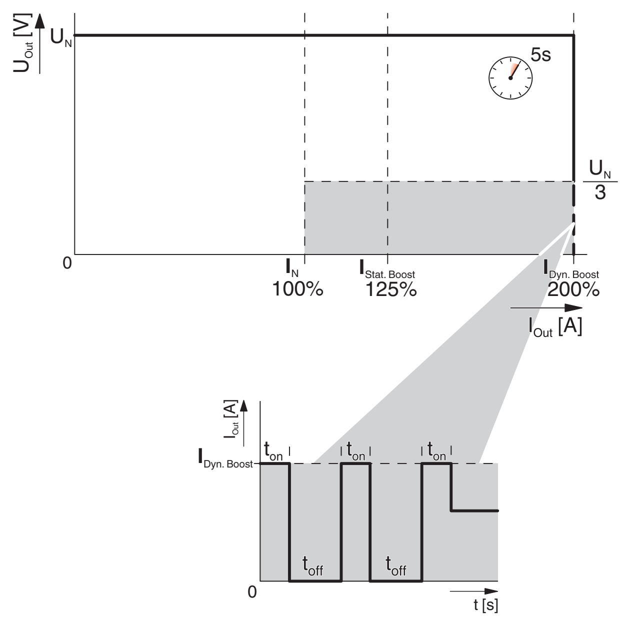


Figure 16 U/I Advanced output characteristic curve

10.2 Smart HICCUP output characteristic curve

The SMART HICCUP output characteristic curve keeps the thermal load of the connecting cables at a low level in the event of a sustained overload. If loads are not protected or are protected in a way that is not permitted, the loads are supplied for 2 s. The DC output of the power supply is then switched off for 8 s. This procedure is repeated until the cause of the overload has been remedied.

The preset Smart HICCUP output characteristic curve is optimized for the following applications:

– If only a low short-circuit current is permitted.
– If following an overload or short circuit the output voltage should be made available again automatically.

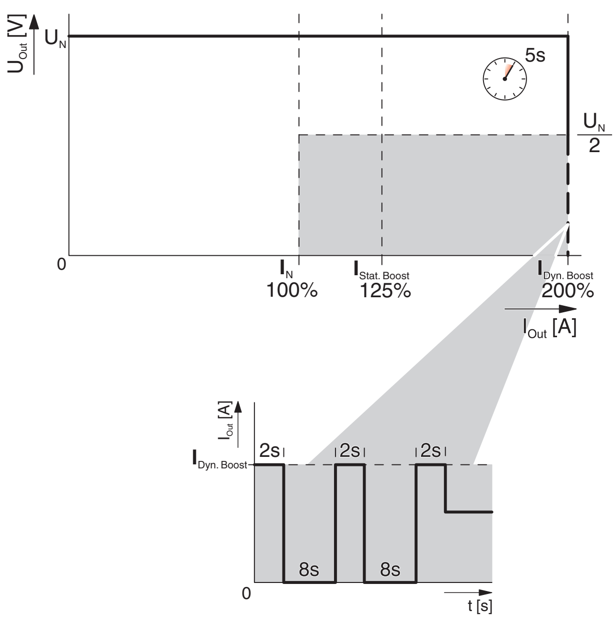


Figure 17 Smart HICCUP output characteristic curve

10.3 FUSE MODE output characteristic curve

In the event of an overload (e.g., short circuit), the power supply switches off the DC output permanently. The value of the switch-off threshold and the time period for which it may be exceeded can be freely selected. The power supply is restarted via the remote contact. As an option, the power supply can be switched on by switching the supply voltage on the primary side off and on.

Selecting the FUSE MODE output characteristic curve sets the following default values.

– t_{Fuse} = 100 ms
– $I_{Fuse} = I_N$

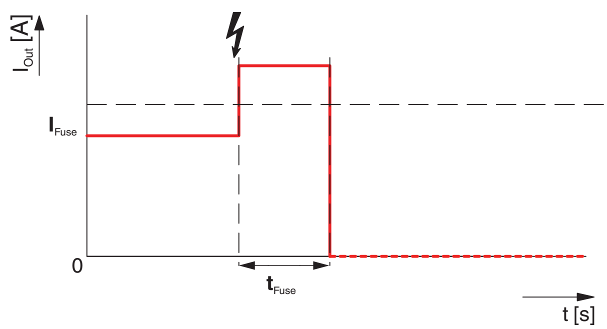


Figure 18 FUSE MODE output characteristic curve