

## MINI-PS-100-240AC/24DC/1.3

**Primary switched power supply, 1-phase,  
output current: 1.3 A**



### INTERFACE

Data sheet

© PHOENIX CONTACT - 05/2006

### Description

MINI POWER is the extremely slim power supply unit with constructional widths of 22.5 mm, 45 mm and 67.5 mm.

In addition to a 24 V version with output currents of 1.3 A, 2 A and 4 A, special voltages with 5 V/3 A and  $\pm 15$  V/1 A and 10 V...15 V/2 A are also available.

A reliable starting of complex loads is ensured by a power reserve of up to 100% – the POWER BOOST.

The high operational reliability is thus dependably guaranteed in complex global networks as well. MINI POWER also functions in applications where static voltage dips, transient failures of the supply voltage or phase failure are to be expected.

Generously dimensioned capacitors guarantee a mains buffering of more than 20 ms under full load.

Worldwide use is realized by the consistent implementation of a wide-range input.

In this way, your whole system can be tested at any manufacturing location in the world and be delivered to global destinations without switching over the input voltage, often a source of faults. This saves storage costs and reduces the logistical work.

An international approval package including UL 60950 for information technology equipment and UL 508 for industrial regulating devices pave the way for worldwide applications.



#### Danger!

**Components with dangerously high voltage and high stored energy are located in the device!  
Never carry out work on live parts!  
Depending on the ambient temperature and the load, the housing can become very hot!**



Make sure you always use the the latest documentation.  
It can be downloaded at [www.download.phoenixcontact.com](http://www.download.phoenixcontact.com).  
A conversion table is available on the Internet at  
[www.download.phoenixcontact.com/general/7000\\_en\\_00.pdf](http://www.download.phoenixcontact.com/general/7000_en_00.pdf).



This data sheet is valid for the following products listed on the following page:

## Order data

Description	Type	Order No.	Pcs./pkt.
Primary switched power supply, 1-phase, output current: 1.3 A	MINI-PS-100-240AC/24DC/1.3	2866446	1

## Technical data

Input data	
Input nominal voltage range	100 V AC ... 240 V AC
AC input voltage range	85 V AC ... 264 V AC
DC input voltage range	90 V DC ... 350 V DC
AC frequency range	45 Hz ... 65 Hz
DC frequency range	0 Hz
Current consumption	Approx. 0.6 A (120 V AC) Approx. 0.4 A (230 V AC)
Inrush current limitation/ $I^2t$	< 15 A (< 0.6 A <sup>2</sup> s)
Power failure bypass	> 20 ms (120 V AC) > 110 ms (230 V AC)
Typical response time	< 1 s
Protective circuitry	Transient surge protection Varistor
Input fuse	Internal, 1.25 A T
Recommended backup fuse	6 A (power circuit-breaker, characteristic B) 10 A (power circuit-breaker, characteristic B) 16 A (power circuit-breaker, characteristic B)
Output data	
Nominal output voltage	24 V DC $\pm$ 1%
Setting range of the output voltage	22.5 V DC ... 28.5 V DC
Output current	1.3 A (-25 °C ... 60 °C) 1.6 A (with POWER BOOST, -25 °C ... 40 °C)
Derating	From +60°C 2.5% per Kelvin
Current limitation	Approx. 5 A (for short circuit)
Max. capacitive load	Unlimited
Control deviation	< 1 % (change in load, static 10% ... 90%) < 3 % (change in load, dynamic 10% ... 90%) < 0.1 % (change in input voltage $\pm$ 10%)
Power loss nominal load max.	4.5 W
Maximum power dissipation idling	0.9 W
Efficiency	> 80 %
Ascent time	< 1.2 ms
Residual ripple	< 100 mV <sub>SS</sub>
Peak switching voltages	< 100 mV <sub>SS</sub>
Connection in parallel	Yes, for redundancy and increased capacity
Surge protection against internal surge voltages	Yes, < 35 V DC
Resistance to reverse feed	35 V DC
Status indication	
Status display	"DC OK" LED green $U_{OUT} > 21.5$ V: LED lights up

### Signal output

DC OK active	
Output description	$U_{OUT} > 21.5 \text{ V}$ : High signal
Continuous current	Max. 20 mA
Output voltage	+ 24 V DC

### Ratings / standards

Electrical Equipment for Machinery	EN 60204
Safety transformers for power supply units	EN 61558-2-17
Electrical safety (of information technology equipment)	EN 60950/VDE 0805 (SELV)
	UL/C-UL recognized UL 60950
Industrial control equipment	UL/C-UL Listed UL 508
Electronic equipment for use in electrical power installations	EN 50178/VDE 0160 (PELV)
SELV	EN 60950 (SELV)
	EN 60204 (PELV)
Safe isolation	DIN VDE 0100-410
	DIN VDE 0106-1010
Protection against electric shock, basic requirements for safe isolation in electrical equipment	DIN VDE 0106-101
Limitation of mains harmonic currents	In acc. with EN 61000-3-2

### General data

Insulation voltage input/output	4 kV AC (type test)
	3 kV AC (routine test)
Installation position	Horizontal DIN rail NS 35, EN 60715
Degree of protection	IP20
Class of protection	Class 2 (in an enclosed control cabinet)
MTBF	> 500 000 h in acc. with IEC 61709 (SN 29500)
Housing version	Polyamide PA, color: green
Width	22.5 mm
Height	99 mm
Depth	107 mm
Weight	0.21 kg

### Climatic data

Ambient temperature (operation)	-25 °C ... 70 °C (> 60°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 $\pm 2.5 \text{ mm}$ in acc. with IEC 60068-2-6
	15 Hz ... 150 Hz, 2.3g, 90 min.
Shock	30g 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)

**Conformance with EMC directive 89/336/EEC**

**Immunity to interference in acc. with EN 61000-6-2**

Discharge of static electricity in acc. with EN 61000-4-2

	Housing	Level 3
	Contact discharge	8 kV
	Discharge in air	8 kV
	Comments	Criterion B

Electromagnetic HF field in acc. with EN 61000-4-3

	Housing	Level 3
	Frequency range	80 MHz ... 1 GHz
	Field intensity	10 V/m
	Comments	Criterion A

Fast transients (burst) in acc. with EN 61000-4-4

	Input	4 kV (Level 4 - asymmetrical: Conductor to ground)
	Output	2 kV (Level 3 - asymmetrical: Conductor to ground)
	Signal	1 kV (Level 2 - asymmetrical: Conductor to ground)
	Comments	Criterion B

Surge voltage capacities (surge) in acc. with EN 61000-4-5

	Input	4 kV (Level 4 - asymmetrical: Conductor to ground)
		2 kV (Level 4 - symmetrical: Conductor to conductor)
	Output	0.5 kV (Level 1 - asymmetrical: Conductor to ground)
		0.5 kV (Level 1 - symmetrical: Conductor to conductor)
	Signal	0.5 kV (Level 1 - asymmetrical: Conductor to ground)
	Comments	Criterion B

Conducted disturbance in acc. with EN 61000-4-6

	Input/Output/Signal	Level 3 - asymmetrical
	Frequency range	0.15 MHz ... 80 MHz
	Voltage	10 V
	Comments	Criterion A

Voltage dips in acc. with EN 61000-4-11

	Input	(Mains buffering >20 ms)
	Comments	Criterion B

**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

Note:

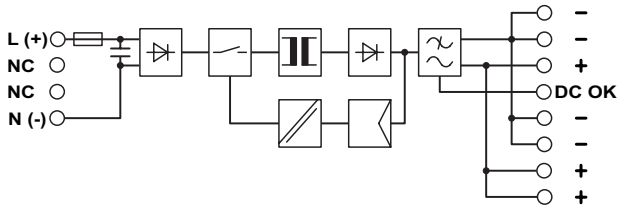
Criterion A: Normal operating behavior within the defined limits.

Criterion B: Temporary impairment to operational behavior that is corrected by the device itself

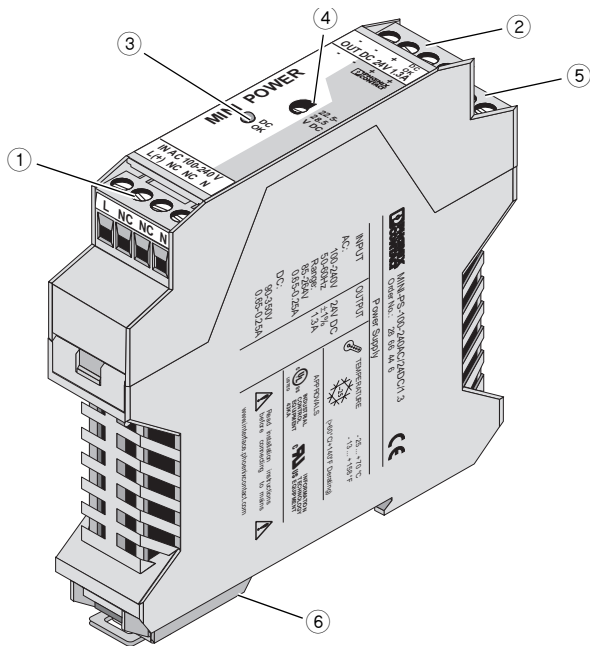
EN 55011 corresponds to CISPR11 / EN 55022 corresponds to CISPR22

EN 61000 corresponds to IEC 1000

**Block diagram**



**Structure**



- 1 - AC input
- 2 - DC output
- 3 - DC OK control lamp
- 4 - Potentiometer 22.5 V DC ... 28.5 V DC
- 5 - DC OK output active
- 6 - Universal DIN rail adapter UTA 107

	[mm <sup>2</sup> ]		AWG	[Nm] Torque
	solid	stranded		
Input	0.2 - 2.5	0.2 - 2.5	24 - 14	0.5 - 0.6
Output	0.2 - 2.5	0.2 - 2.5	24 - 14	0.5 - 0.6
signal	0.2 - 2.5	0.2 - 2.5	24 - 14	0.5 - 0.6

**Input data**

Input nominal voltage range	100 V AC ... 240 V AC
AC input voltage range	85 V AC ... 264 V AC
DC input voltage range	90 V DC ... 350 V DC
AC frequency range	45 Hz ... 65 Hz
DC frequency range	0 Hz
Recommended backup fuse	6 A (power circuit-breaker, characteristic B) 10 A (power circuit-breaker, characteristic B) 16 A (power circuit-breaker, characteristic B)
Type of connection	COMBICON screw/plug connection
Stripping length	7 mm

**Output data**

Nominal output voltage	24 V DC ±1%
Setting range of the output voltage	22.5 V DC ... 28.5 V DC
Output current	1.3 A (-25 °C ... 60 °C) 1.6 A (with POWER BOOST, -25 °C ... 40 °C)
Type of connection	COMBICON screw/plug connection
Stripping length	7 mm

## Safety and warning notes



The power supply units are built-in devices. The device may only be installed and put into operation by qualified personnel. The corresponding national regulations (e.g. VDE, DIN) must be observed.



### Danger!

**Components with dangerously high voltage and high stored energy are located in the device!  
Never carry out work on live parts!  
Depending on the ambient temperature and the load, the housing can become very hot!**



### Before startup please ensure:

**The mains connection has been carried out by a competent person and protection against electric shock is guaranteed!**

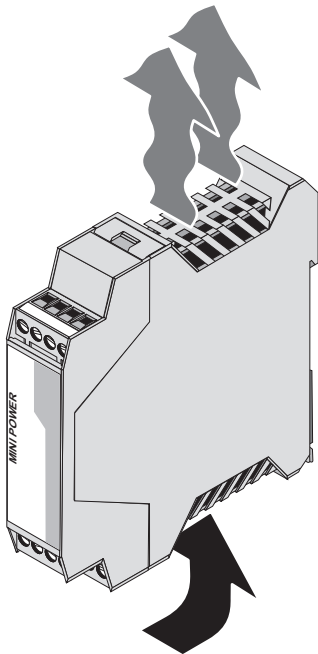
**The device can be disconnected outside the power supply unit in accordance with the regulations as in EN 60950 (e.g. through primary side line protection)!**

**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!**

## Installation

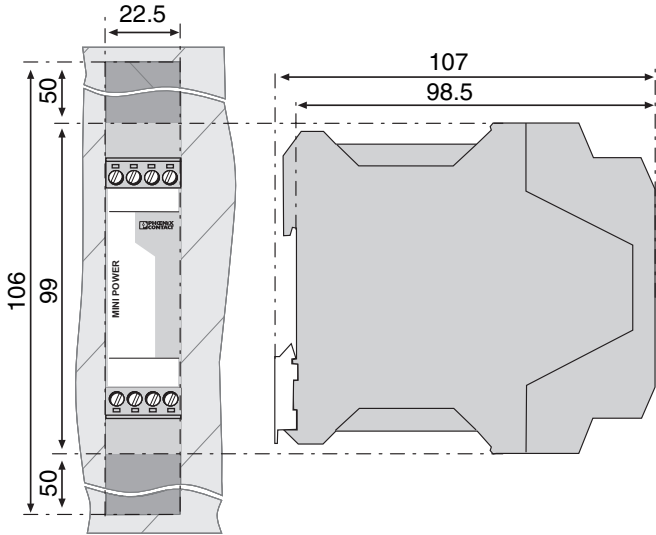


In order to guarantee sufficient convection, we recommend observing the following minimum distance to other modules: 5 cm in a vertical direction and 0 cm in a horizontal direction.

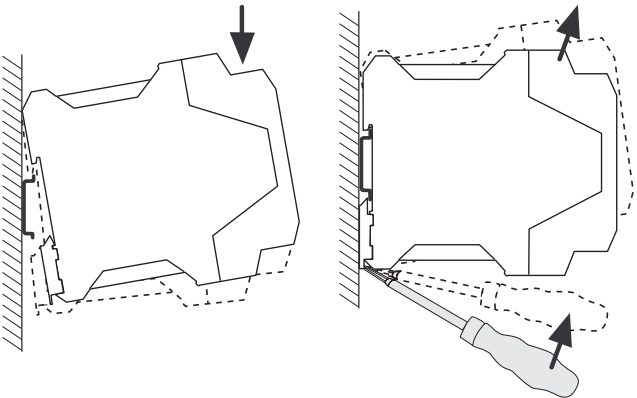


The power supply unit can be snapped onto all DIN rails in acc. with EN 60715.

**Installation position**



Installation: Installation depth 98.5 mm (+ DIN rail)



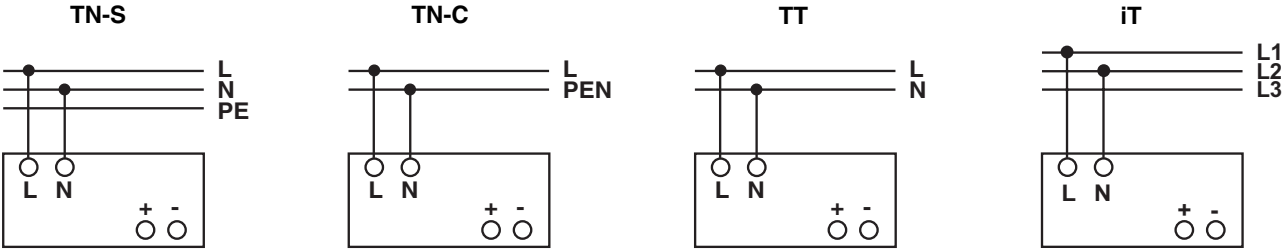
**Assembly**

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

**Dismantling**

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

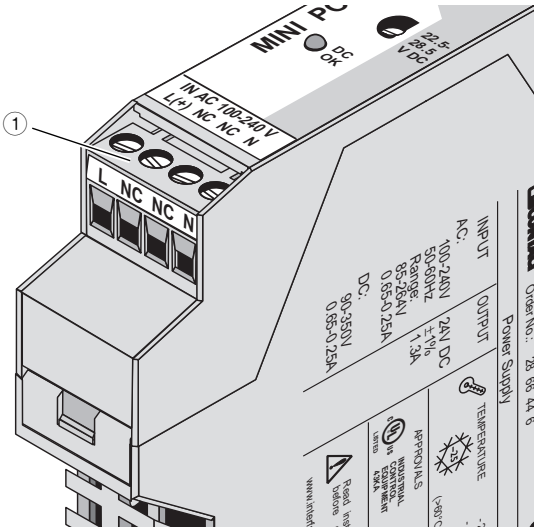
**Connection, network forms 100...240 V AC networks**



The 100...240 V AC connection is made using the L and N screw connections.

The device can be connected to 1-phase AC networks or to two of the phase conductors of 3-phase networks (TN, TT or IT networks in acc. with VDE 0100-300/IEC 60364-3) with nominal voltages of 100 V AC ... 240 V AC.

**Input**



**Protection of the primary side**

The device must be installed in acc. with the regulations as in EN 60950. It must be possible to disconnect the device using a suitable isolating facility outside the power supply. The primary side line protection, for example, is suitable. For device protection, there is an internal fuse. Additional device protection is not necessary.

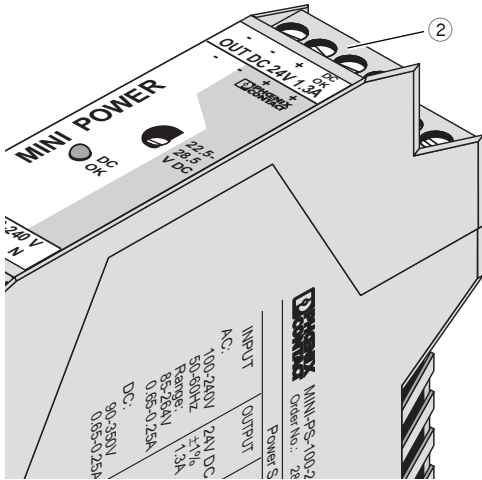
**Recommended backup fuse**

Power circuit-breaker 6 A, 10 A or 16 A, characteristic B (or identical function).



If an internal fuse is triggered, there is most probably a malfunction in the device. In this case, the device must be inspected in the factory!

## Output



Make sure that all output lines are dimensioned according to the maximum output current or are separately protected! The cables on the secondary side must have large cross sections in order to keep the voltage drops on the lines as low as possible.

The connection is made using the "+" and "-" screw connections on the screw connection of the DC output. At the time of delivery, the output voltage is 24 V DC. The output voltage can be set on the potentiometer.

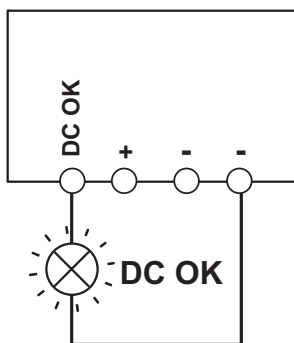
### Protection of the secondary side

The device is electronically protected against short circuit and idling. In the event of a malfunction, the output voltage is limited to 35 V DC.

### Signaling

For function monitoring, there is the active DC OK switching output and the DC OK LED.

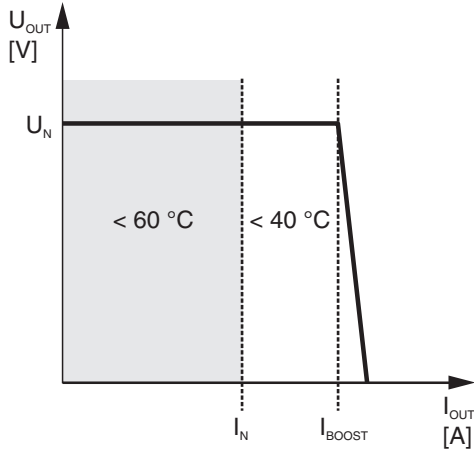
	State 1	State 2
DC OK LED	ON	OFF
Active DC OK switching output	U = +24 V (in reference to "-")	U = 0 V (in reference to "-")
Meaning	Normal operation of the power supply ( $U_{OUT} > 21.5$ V)	1. The output voltage is less than 21.5 V. There is a secondary consumer short circuit or overload. 2. There is no input voltage or there is a device fault.



### Active signal output

The 24 V DC signal is applied between the "DC OK" and "-" connecting terminal blocks and can carry up to 20 mA. When the output voltage drops below 21.5 V DC, this signal output signals by switching from "active high" to "low". The DC OK signal is decoupled from the power output. It is thus not possible for parallel switched devices to provide external supply. The 24 V DC signal can be directly connected to a logic input for evaluation.

**Function**



**Output characteristic curve**

The device can supply a nominal output current of 1.3 A with ambient temperatures of up to 60°C. At an ambient temperature of up to 40°C, the device supplies a continuous output current of 1.6 A. At temperatures up to 60°C, the POWER BOOST provides a transient output current of 1.6 A for a few minutes. In the event of a higher load, the operating point follows the U/I characteristic curve depicted in the figure.

In the case of overload or short-circuit, the full output current  $I_{BOOST}$  is supplied permanently with reduced output voltage, the device does not switch off. As soon as the overload or short-circuit is no longer present, the full secondary voltage is once again available.

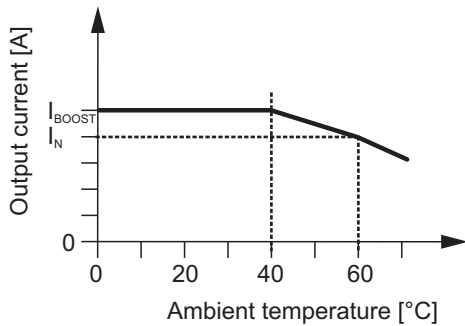
The U/I characteristic curve ensures that both heavily capacitive loads and devices with DC/DC converters in the primary circuit can be fed without problems using MINI POWER.

Downstream fuses are triggered reliably. Selectivity in the design of your system is guaranteed at all times.

$U_N = 24\text{ V}$

$I_N = 1.3\text{ A}$

$I_{BOOST} = 1.6\text{ A}$



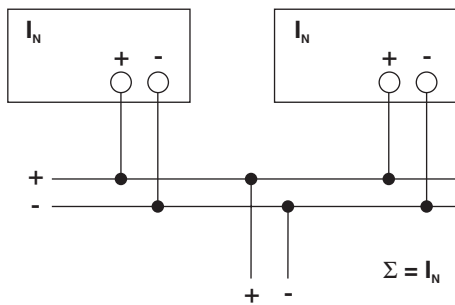
**Thermal behavior**

The device can supply a nominal output current of 1.3 A with ambient temperatures of up to 60°C. At an ambient temperature of up to 40°C, the device supplies a continuous output current of 1.6 A. At temperatures up to 60°C, the POWER BOOST provides a transient output current of 1.6 A for a few minutes.

For ambient temperatures above 60°C, the output current must be reduced by 2.5% per Kelvin increase in temperature. From 70°C onwards or in the case of thermal overload, the device reduces the output capacity for its own protection, and returns to normal operation when it has cooled down.

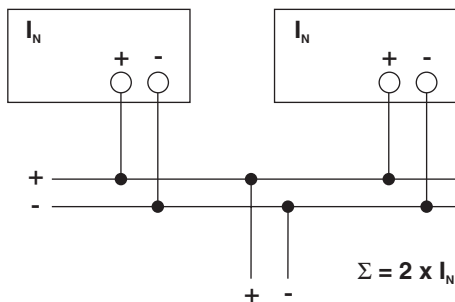
**Parallel operation**

Devices of the same type can be connected in parallel to enable both redundancy and an increase in efficiency. No other alignment is necessary when in the state of delivery. If the output voltage is adjusted, a uniform distribution of power is guaranteed by setting all parallel operated power supply units to exactly the same output voltage. To ensure symmetrical distribution of power, we recommend designing all cable connections from the power supply unit to a busbar of the same length and with the same conductor cross section. The system makes it advisable to install a protective circuit at the output of each device when more than two power supply units are connected in parallel (e.g. decoupling diode or DC fuse). This prevents high reverse feed currents in the event of a secondary device fault.



**Redundant operation**

Redundant circuits are suitable for the supply of systems which make especially high requirements on the operational safety. If a fault occurs in the primary circuit of the first power supply unit, the second device automatically takes over the entire power supply, without interruption, and vice versa. For this reason, the power supply units to be connected in parallel are dimensioned in such a way that the total current requirement of all consumers can be completely covered by one power supply unit. 100% redundancy makes external decoupling diodes necessary (QUINT-DIODE/40, Order No. 2938963)!



**Increased performance**

For  $n$  parallel connected devices, the output current can be increased to  $n \times I_N$ . Parallel connection to increase efficiency is used for the expansion of existing systems. It is advisable to use parallel connection if the power supply unit does not cover the current requirement of the most powerful consumer. Otherwise the consumers should be spread among individual devices independent of one another. A maximum of five devices can be connected in parallel!