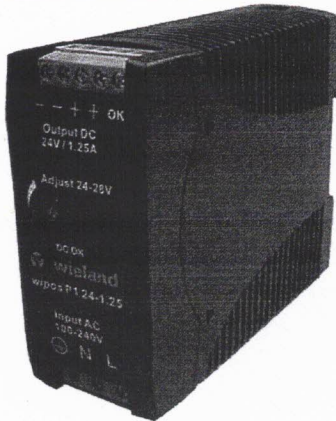
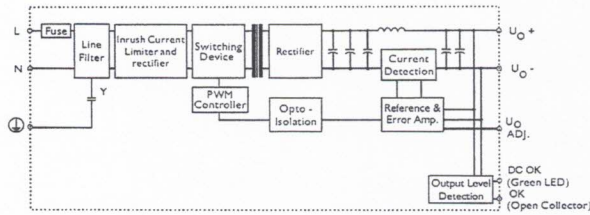


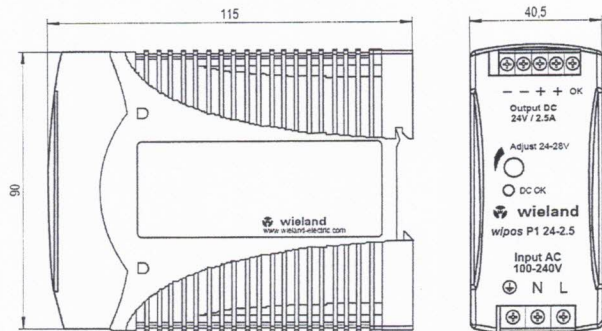
24V DC SWITCHED-MODE POWER SUPPLY SPECIFICATION

wipos P1 24-2.5

wipos P1 24-2.5
 Switching power supply
 24 V DC / 2.5 A
 81.000.6120.0

- Primary switching power supply, single phase
- Output: 24 V DC / 2.5 A (adjustable 24 - 28 V DC)
- Short circuit proof
- Input: 100 - 240 V AC; 90 - 375 V DC
- Full load up to 60 °C
- Vertical mount
- UL1310 class 2 power supply
- 100 % burn-in



Block diagram



Dimensional diagram

Technical data
wipos P1 24-2.5
Part number: 81.000.6120.0

Rated output power	[P _O]	60 W
Rated output voltage	[U _O]	24 V DC
Rated output current	[I _{ON}]	2.5 A DC
Efficiency typ. / min.		89 % / 86 %
Minimum load		none
Output voltage trim range (U _O , I _{ON})		24 V ... 28 V
Output voltage accuracy (I _{ON})		+1 %
Line regulation		0.5 %
Load regulation (U _O)		0.5 %
Temperature coefficient (U _O , I _{Omin})		± 0.03 % / K
Rated overload protection		110 % - 150 %
Output short circuit (U _O , I _{ON})		Current limited (fold forward)
Ripple & noise (U _O , I _{ON} , BW = 20 MHz)		<50 mV _{ss}
Operation indicator		Display range
Parallel operation		"DC OK", LED green (U _O 19.2 V)
Derating (61 °C ... 71 °C)		no
Overvoltage protection (U _O , I _{ON})		2.5 % / K (see Fig. 1 Derating)
DC OK indicator ("OK") switches on at		125 % ... 137.5 %
Supply for OK terminal		U _O > 19.2 V DC
Permissible load		from output voltage 24 V DC
		700 Ohm min.

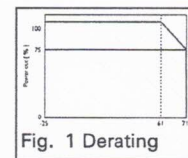


Fig. 1 Derating

**wipos P1 24-2.5****Technical data**

wipos P1 24-2.5		Part number: 81.000.6120.0	
Rated input voltage AC	[U _{IN,AC}]	100 - 240 V AC (85 ... 264 V AC)	
Line frequency AC		47 – 63 Hz	
Power factor correction filter (PFC)		not necessary	
Rated input voltage DC	[U _{IN,DC}]	90 – 375 V DC	
Rated input current		1.5 A	
Inrush current 115 V AC / 230 V AC		30 A / 60 A max.	
Input fuse		T2 A / 250 V (internal)	
Hold up time (at I _{ON})	U _{L,AC} = 115 V	> 20 ms	
	U _{L,AC} = 230 V	> 30 ms	
Isolation voltage (input/output)		3000 V AC / 4242 V DC	
Isolation resistance (input/output)		100 MOhm	
Ventilation / Cooling		free convection	
Mounting conditions (free space)		25 mm free space on all sides recommended for cooling / up to 50 °C no horizontal space required	
Operating ambient temperature	[T _U]	-40 °C ... +71 °C (UL: max. 50 °C)	
Humidity in operation		20 – 95 % RH	
Storage temperature	[T _U]	-40 °C ... +85 °C	
Mounting on		DIN rail 35 mm (EN 60715)	
Degree of protection		IP 20	
MTBF (Bellcore issue 6 @ 40 °C, GB)		550,000 h	
Dimensions (W x H x D)		40.5 x 88.5 x 115 mm	
Weight		ca. 360 g	
Housing material		Polycarbonate (PC)	
Connector cross section (min.)	solid	0.2 mm ²	(AWG26)
	stranded wire	0.2 mm ²	(AWG26)
Connector cross section (max.)	solid	2.5 mm ²	(AWG12)
	stranded wire	2.5 mm ²	(AWG12)
Strip length		4 ... 5 mm	
Torque		0.6 Nm max.	
Approvals and standards			
UL / cULus		UL 508 Listed, UL60950-1 Recognized UL 1310 Class 2 Power supply	
TUV / Safety		EN60950-1, EN61558-1, EN61558-2-16 (follow EN60204), IRAM	
CE		EN 55022 & EN61000-6-3, EN61000-3-2, EN61000-3-3, EN55024 & EN61000-6-2, EN61000-4-2, EN61000-4-3, EN61000-4-4, EN61000-4-5, EN61000-4-6, EN61000-4-8, EN61000-4-11, EN60204-1, EN61204-3	
Terminal connections			
-		2 x output voltage 24 V, negative output terminal (internally connected)	
+		2 x output voltage 24 V, positive output terminal (internally connected)	
OK		DC OK output (open collector output)	
L		AC: phase conductor, DC: no polarity	
N		AC: neutral conductor, DC: no polarity	
⊕ (PE)		PE (Ground), always connect	

LEVEL REGULATED CONDENSATE DRAIN SPECIFICATION

KONDRAIN®

Condensate Drains



Fully automatic condensate drainage from compressed air and gas systems without loss of compressed air



Premium cost effectiveness

Compressed air generation is as necessary as it is cost intensive. **KONDRAIN®** in a level-controlled, electronic version offers the most effective solution in order to make the most cost effective use possible:

- The intelligent level regulation ensures no unnecessary air loss and therefore no energy loss.
- Condensate is only removed safely and securely when it has accumulated in the drain.

This makes the best cost effectiveness for the compressed air system possible at the best price/performance ratio. As a result KSI **KONDRAIN®** condensate drains contribute globally to significantly increasing the efficiency of production sites.

Premium reliability

The **KONDRAIN®** series offers the highest level regulated, fully automated reliability. This helps to avoid condensate breaches and contamination in the compressed air system. At the same time **KONDRAIN®** reliably protects compressed air-driven

The KONDRAIN® Plus-Effects +++

- + no unnecessary compressed air loss saves operating costs
- + proven technology, suitable for every condensate type
- + maximizes operational reliability by protecting installations, processes and products
- + assures demand-appropriate compressed air quality
- + robust quality, long service life
- + intelligent control, fully automatic monitoring
- + immune to dirt because of integrated sieve filter
- + very service-friendly
- + excellent price/performance ratio

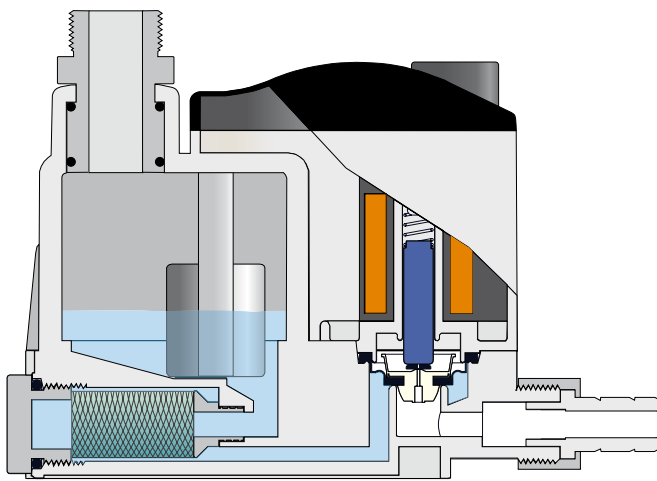
installations, control systems, production processes and, ultimately, product quality. The KSI series features an extreme performance spectrum and is therefore capable of reliably discharging condensate types ranging in consistency from 100% oil to 100% water. This provides the highest degree of safety for your compressed air system.

KONDRAIN® N

Level-regulated electronic condensate drain



KONDRAIN® N is a high-performance condensate drain that measures the condensate level internally and discharges it using level control, resulting completely without compressed air loss, at maximum condensate volume. The level regulation is reliably assured via the industrial reed contact and float technology that has proven itself millions of times all over the world. This means that a contact float unit that is process-conforming specifically for condensate technology triggers the opening of the release valve when the maximum level is reached for the exact duration until the drain minimum level is reached, allowing the valve to close again.



Performance features:

- flexible connection, a 90° rotatable connection facilitates flexible installation
- highly durable Viton membrane
 - ▶ more reliability and long service life
- maximum protection for membrane and function through integrated filter
- functional test is possible at any time via a test button, which can also be used for manual emptying
- self monitoring using intelligent control
- operational protection through auto reset function
- status message in the case of alarm (except model N1)
- zero-voltage contact (except model N1)
- voltage display (except model N1)
- consistent performance level for condensate ranging from 100% oil to 100% water
- just one service kit for the entire series
- ecologically & economically reasonable



KONDRAIN® KMT

Time-controlled condensate drain with free with freely selectable interval time



Features:

- simplest operation
- most compact dimension
- interval time can be optimized at any time
- opening interval can be seen at a glance
- manual emptying possible at any time via test switch
- highest functional safety
- available as **KONDRAIN® KMT-HP** for pressures of 50, 250, 350 and 500 bar



Specification Modell	N1	N5	N10	N30	N160	N300
Capacity: compressor	10 m ³ /min	7,5 m ³ /min	15 m ³ /min	30 m ³ /min	158 m ³ /min	300 m ³ /min
Capacity: dryer	20 m ³ /min	15 m ³ /min	30 m ³ /min	60 m ³ /min	316 m ³ /min	600 m ³ /min
Capacity: filter	100 m ³ /min	75 m ³ /min	150 m ³ /min	300 m ³ /min	1580 m ³ /min	3000 m ³ /min
Potential-free alarm output	no	yes	yes	yes	yes	yes
Operating pressure	0,2 to 16 bar					
Operating Temperature	1 to 60°C					
Available types of voltage	24 V ac (24 V dc on request) 115 V 50/60 Hz 230 V 50/60 Hz					
Safety class	IP 65					

Options



only one single spare part kit for the complete series



floor mounting kit

Further variations

KN5 with condensate inlet in tank
incl. connection for necessary pendant cable



Article nr: KN5LOW.(voltage)

KN5 compact design
for space-critical assemblies



Article nr: KN5SV.(voltage)

KONDRAIN® N-HP

Level- and Time-controlled Condensate Drains · High Pressure



Series N-HP
level-controlled – Hochdruck

KONDRAIN® KN100-HP50 (up to 50 bar) - Normally open level-controlled · drainage without pressure loss | incl. alarm

Type	Capacity* m ³ /min	Inflow	Voltage
KN100-HP50-230-NO	100	½"	230 V · 50-60 Hz
KN100-HP50-115-NO	100	½"	115 V · 50-60 Hz
KN100-HP50-24ac-NO	100	½"	24 V ac
KN100-HP50-24dc-NO	100	½"	24 V dc

* compressor connected load

KONDRAIN® KN100-HP50 (up to 50 bar) - Normally closed level-controlled · drainage without pressure loss | incl. alarm

Type	Capacity* m ³ /min	Inflow	Voltage
KN100-HP50-230-NC	100	½"	230 V · 50-60 Hz
KN100-HP50-115-NC	100	½"	115 V · 50-60 Hz
KN100-HP50-24ac-NC	100	½"	24 V ac
KN100-HP50-24dc-NC	100	½"	24 V dc

* compressor connected load

KONDRAIN® KMT

Time-controlled Condensate Drains with Free Adjustable Interval Times



Specification Model	KMT
Output: Compressor	60 m³/min
Output: Dryer	120 m³/min
Output: Filter	600 m³/min
Operating pressure	0,2 to 16 bar
Operating temperature	1 to 65°C
Available voltage classes	115 V 50/60 Hz 230 V 50/60 Hz
Protective class	IP 65



KONDRAIN® KMT-HP

Time-controlled Condensate Drain · High Pressure



KONDRAIN® KMT-HP80 (up to 80 bar · stainless steel valve) time-controlled with free adjustable intervals

Type	Capacity* m³/min	Inflow	Voltage
KMT-HP80-230	unlimited	1/4"	230 V · 50-60 Hz
KMT-HP80-115	unlimited	1/4"	115 V · 50-60 Hz
KMT-HP80-24ac	unlimited	1/4"	24 V ac
KMT-HP80-24dc	unlimited	1/4"	24 V dc

*Compressor capacity

KONDRAIN® KMT-HP250 (up to 250 bar · stainless steel valve) time-controlled with free adjustable intervals

Type	Capacity* m³/min	Inflow	Voltage
KMT-HP250-230	unlimited	1/4"	230 V · 50-60 Hz
KMT-HP250-115	unlimited	1/4"	115 V · 50-60 Hz
KMT-HP250-24ac	unlimited	1/4"	24 V ac
KMT-HP250-24dc	unlimited	1/4"	24 V dc

*Compressor capacity

KONDRAIN® KMT-HP350 (up to 350 bar · stainless steel valve) time-controlled with free adjustable intervals

Type	Capacity* m³/min	Inflow	Voltage
KMT-HP350-230	unlimited	1/4"	230 V · 50-60 Hz
KMT-HP350-115	unlimited	1/4"	115 V · 50-60 Hz
KMT-HP350-24ac	unlimited	1/4"	24 V ac
KMT-HP350-24dc	unlimited	1/4"	24 V dc

*Compressor capacity

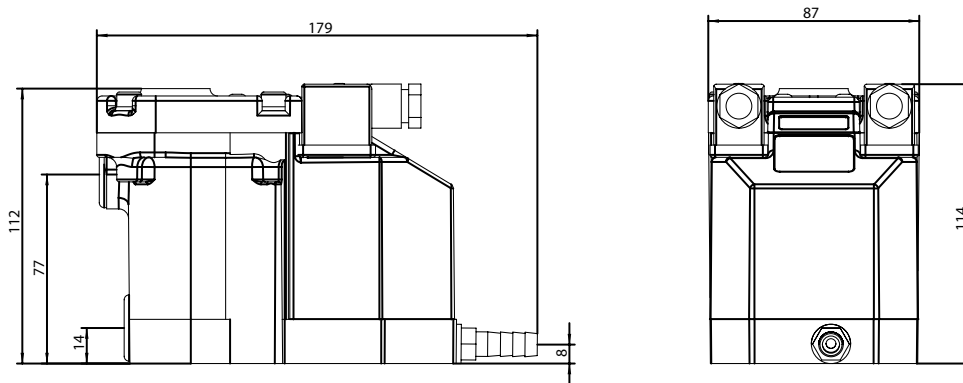
KONDRAIN® KMT-HP500 (up to 500 bar · stainless steel valve) time-controlled with free adjustable intervals

Type	Capacity* m³/min	Inflow	Voltage
KMT-HP500-230	unlimited	1/4"	230 V · 50-60 Hz
KMT-HP500-115	unlimited	1/4"	115 V · 50-60 Hz
KMT-HP500-24ac	unlimited	1/4"	24 V ac
KMT-HP500-24dc	unlimited	1/4"	24 V dc

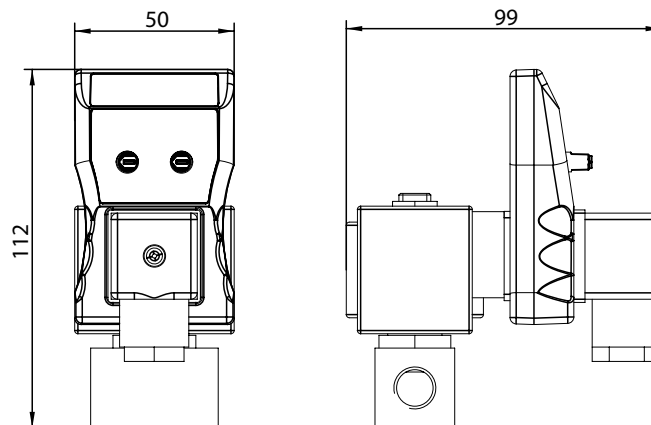
*Compressor capacity

Dimensional Drawings

KN100-HP50



KMT-HP80 | KMT-HP250 | KMT-HP350 | KMT-HP500



POWER SUPPLY SPECIFICATION

STEP-PS/ 1AC/24DC/0.5

Power supply unit

INTERFACE

Data sheet
104233_en_01



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1 Description

STEP POWER power supply units – for building automation

The new STEP POWER generation of compact power supply units is particularly suitable for installation distributors and flat control panels thanks to its design. The power supply units are available with 24 V DC output voltage in various performance classes and widths and with the special voltages 5, 12, 15 and 48 V DC. Their high degree of efficiency and the low standby losses make for high power efficiency.

Features

- Easy assembly on the DIN rail or panel
- Maximum energy efficiency thanks to low idling losses
- Quick startup with LED function monitoring
- High operating safety due to long mains buffering under full load and high MTBF (> 500,000 h)
- Can be used worldwide in all industrial sectors due to a wide-range input and an international approval package
- Wide temperature range of -25°C to +70°C
- Parallel connection possible for increased performance and redundancy
- Powerful in its particularly slim design (18 mm)



DANGER OF EXPLOSION!

Only remove equipment when it is disconnected and not in the potentially explosive area.



DANGER

The device contains dangerous live elements and high levels of stored energy. Never carry out work when the power is turned on.



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

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3 Ordering data

Description	Type	Order No.	Pcs. / Pkt.
24 V DC/0.5 A DIN rail power supply unit, primary-switched, single-phase.	STEP-PS/ 1AC/24DC/0.5	2868596	1

4 Technical data

Input data	
Nominal input voltage range	100 V AC ... 240 V AC
AC input voltage range	85 V AC ... 264 V AC
DC input voltage range	95 V DC ... 250 V DC
AC frequency range	45 Hz ... 65 Hz
DC frequency range	0 Hz
Current consumption	Approx. 0.28 A (120 V AC) Approx. 0.13 A (230 V AC)
Inrush current limitation	< 15 A (typical)
i^2t	< 0.1 A ² s
Power failure bypass	> 15 ms (120 V AC) > 90 ms (230 V AC)
Typical response time	< 0.5 s
Input fuse, integrated	1.25 A (slow-blow, internal)
Output data	
Nominal output voltage	24 V DC \pm 1%
Output current	0.5 A (-25°C to +55°C) 0.55 A (-25 °C ... 40 °C permanent) 1 A (maximum output current)
Control deviation	< 1 % (change in load, static 10% ... 90%) < 2 % (change in load, dynamic 10% ... 90%) < 0.1 % (change in input voltage \pm 10%)
Efficiency	> 84 % (for 230 V AC and nominal values)
Residual ripple	< 20 mV _{PP} (20 MHz)
Peak switching voltages	< 30 mV _{PP} (20 MHz)
Connection in parallel	Yes, for redundancy and increased capacity
Connection in series	Yes
Protection against internal surge voltages	Yes, limited to approx. 35 V DC
Resistance to reverse feed	\leq 35 V DC
Power consumption	
Maximum power dissipation idling	< 0.3 W
Power loss nominal load max.	< 2.2 W
LED status indicator	
Status display	"DC OK" LED green / U _{OUT} > 21.5 V: LED lights up

General data

Insulation voltage input/output	4 kV AC (type test) 2 kV AC (routine test)
Insulation voltage input / PE	3.5 kV AC (type test) 2 kV AC (routine test)
Insulation voltage output / PE	500 V DC (routine test)
Degree of protection	IP20
Protection class	II
MTBF (IEC 61709)	500000 h
Housing material	polycarbonate
Foot latch material	Plastic POM
Dimensions W / H / D (state of delivery)	18 mm / 90 mm / 61 mm
Weight	0.1 kg

Ambient conditions

Ambient temperature (operation)	-25 °C ... 70 °C (> 55° C derating)
Ambient temperature (storage/transport)	-40 °C ... 85 °C
Max. permissible relative humidity (operation)	≤ 95 % (at 25 °C, no condensation)
Vibration (operation)	< 15 Hz, amplitude ±2.5 mm 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)

Standards

Electrical Equipment for Machinery	EN 60204
Safety transformers for power supply units	IEC 61558-2-17
Electrical safety (of information technology equipment)	IEC 60950-1/VDE 0805 (SELV)
Electronic equipment for use in electrical power installations	EN 50178/VDE 0160 (PELV)
SELV	IEC 60950-1 (SELV) and EN 60204 (PELV)
Safe isolation	DIN VDE 0100-410 DIN VDE 0106-1010
Protection against electric shock	DIN 57100-410
Protection against electric shock, basic requirements for safe isolation in electrical equipment	DIN VDE 0106-101
Limitation of mains harmonic currents	EN 61000-3-2

Approvals

UL approvals	UL/C-UL listed UL 508 UL/C-UL Recognized UL 60950 NEC Class 2 as per UL 1310 UL/C-UL Listed ANSI/ISA-12.12.01 Class I, Division 2, Groups A, B, C, D
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Current approvals can be found for the product in the download area.

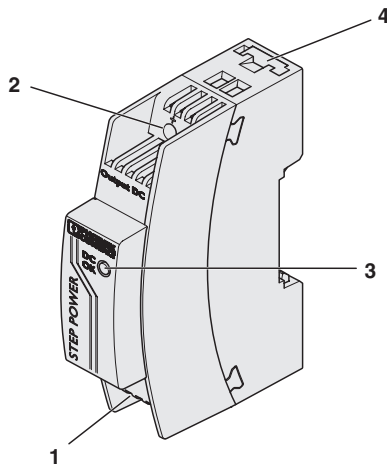
Conformance with EMC Directive 2004/108/EC**Noise immunity according to EN 61000-6-2**

Electrostatic discharge	EN 61000-4-2	
	Housing	Level 3
	Contact discharge	± 6 kV (Contact discharge)
	Discharge in air	± 8 kV (Air discharge)
	Comments	Criterion B
Electromagnetic HF field	EN 61000-4-3	
	Housing	Level 4
	Frequency range	80 MHz ... 3 GHz
	Field intensity	10 V/m
	Comments	Criterion A
Fast transients (burst)	EN 61000-4-4	
	Input	4 kV (level 4 - asymmetrical)
	Output	2 kV (Level 3 - asymmetrical)
	Comments	Criterion B
Surge current loads (surge)	EN 61000-4-5	
	Input	4 kV (asymmetrical: Conductor to ground) 2 kV (symmetrical: Conductor to conductor)
	Output	2 kV (level 3 - asymmetrical: conductor to ground) 1 kV (Level 3 - symmetrical: Conductor to conductor)
	Comments	Criterion B
Conducted interference	EN 61000-4-6	
	Input/output	Level 3 - asymmetrical
	Frequency range	10 kHz ... 80 MHz
	Voltage	10 V
	Comments	Criterion A
Voltage dips	EN 61000-4-11	
	Input	(mains buffering > 20 ms)
	Comments	Criterion A

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

Radio interference voltage in acc. with EN 55011	EN 55011 (EN 55022) class B used in industry and residential area / EMC 1
Emitted radio interference in acc. with EN 55011	EN 55011 (EN 55022) class B used in industry and residential area / EMC 1

5 Structure



- 1 AC input
- 2 DC output
- 3 "DC OK" LED, green
- 4 Universal snap-on foot for EN DIN rails and for wall mounting

	[mm ²]		AWG	[Nm] Torque
	solid	stranded		
Input	0.2 - 2.5	0.2 - 2.5	24 - 12	0.6 - 0.8
Output	0.2 - 2.5	0.2 - 2.5	24 - 12	0.6 - 0.8

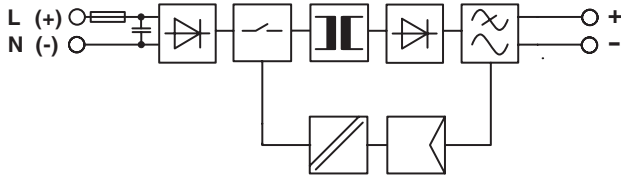
Input data

Nominal input voltage range	100 V AC ... 240 V AC
AC input voltage range	85 V AC ... 264 V AC
DC input voltage range	95 V DC ... 250 V DC
AC frequency range	45 Hz ... 65 Hz
DC frequency range	0 Hz
Input fuse, integrated	1.25 A (slow-blow, internal)
Connection method	Screw connection
Stripping length	6.5 mm

Output data

Nominal output voltage	24 V DC \pm 1%
Output current	0.5 A (-25°C to +55°C) 0.55 A (-25 °C ... 40 °C permanent) 1 A (maximum output current)
Connection method	Screw connection
Stripping length	6.5 mm

6 Block diagram



7 Safety notes



DANGER OF EXPLOSION!

Only remove equipment when it is disconnected and not in the potentially explosive area.

DANGER

The device contains dangerous live elements and high levels of stored energy.
Never carry out work when the power is turned on.



WARNING:

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!

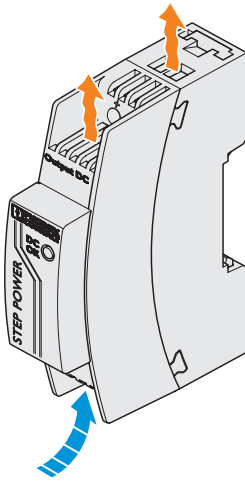
Sufficient convection must be guaranteed.



CAUTION:

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 must be observed.

8 Installation



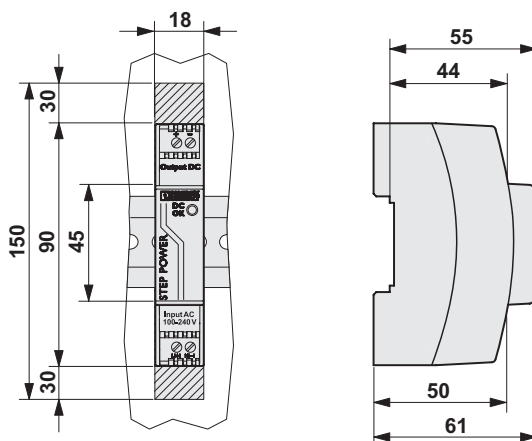
ATTENTION:

In order to ensure sufficient convection, we recommend a minimum vertical distance of 30 mm to the other devices.

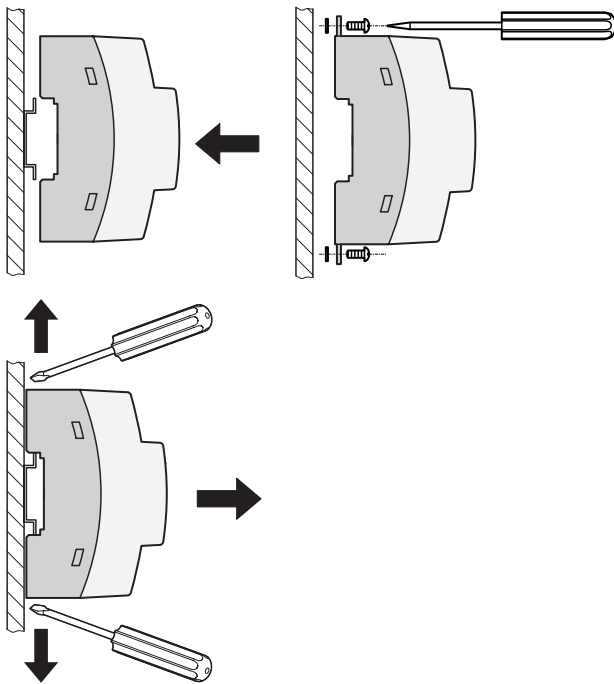


The power supply unit can be snapped onto all DIN rails as per EN 60715; it can also be mounted on walls. The device must be mounted vertically (connecting terminals above or below).

9 Mounting position



10 Mounting on DIN rails



Assembly

To mount on an EN DIN rail, snap the device straight onto the DIN rail.

If the power supply unit is to be fastened directly onto an even surface, press the orange base latch upward and down.

Place a washer between the pulled-out base latch and the even surface (max. outer diameter 8.5 mm, max. thickness 1.3 mm, e.g., spring washer for M4 in acc. with DIN 127-B or toothed lock washer in acc. with DIN 6797).

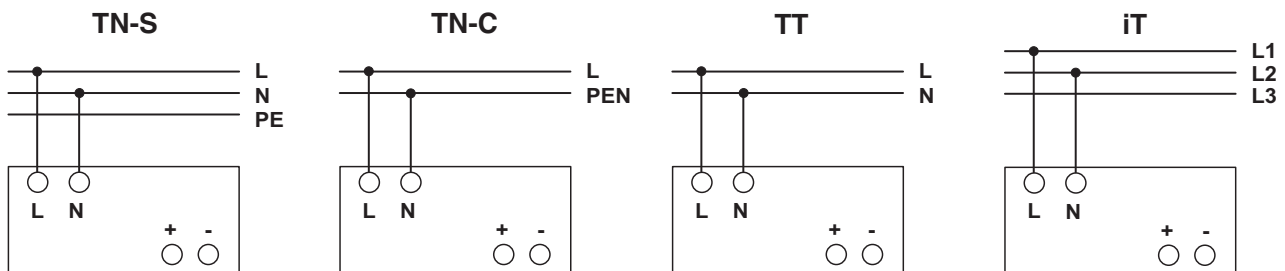
Then fasten the device with two screws (max. thread diameter 4 mm, max. head diameter 8.5 mm).

Removing

To dismantle from the EN DIN rail, press the orange base latch outward and pull the device off of the DIN rail.

In the case of wall mounting, loosen the screws and press the base latch inwards again.

11 Connection to various systems



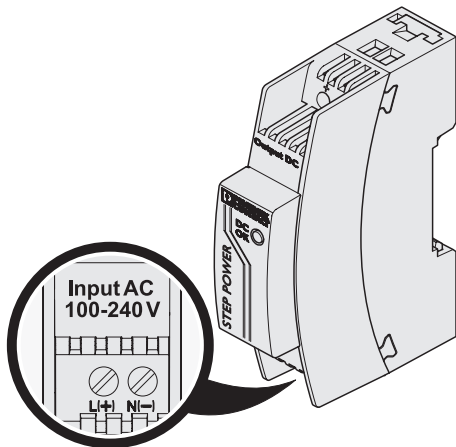
The 100 V AC ... 240 V AC connection is made using the L and N screw connections.

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



For operation on two of the phase conductors of a three-phase system, an isolating facility for all poles must be provided.

12 Input



CAUTION:

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

Protection of the primary side

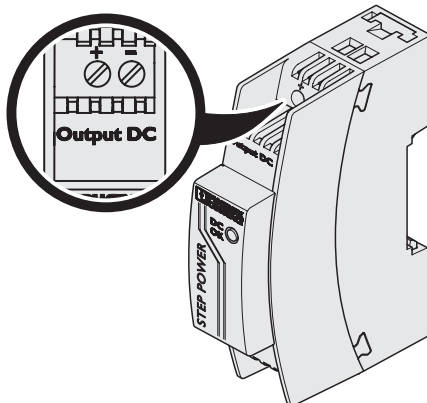
The device must be installed in acc. with the regulations as in EN 60950. It must be possible to disconnect the device using a suitable isolating facility outside the power supply.

The primary side line protection, for example, is suitable. For device protection, there is an internal fuse. Additional device protection is not necessary.

Permissible backup fuse for mains protection

Power circuit-breaker 6 A, 10 A or 16 A, characteristic B (or identical function). Connect a suitable fuse upstream for DC applications!

13 Output



CAUTION:

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 sufficiently 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. The set output voltage is 24 V DC at the time of delivery.

Protection of the secondary side

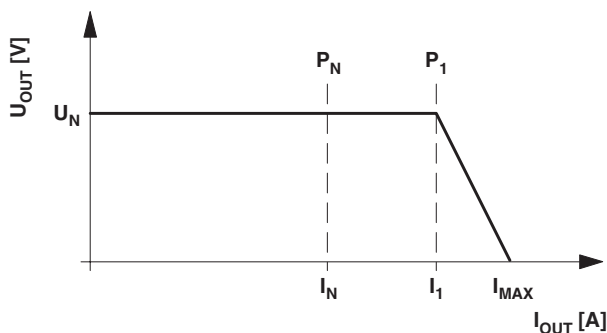
The device is electronically protected against short-circuit and idling. In the event of a malfunction, the output voltage is limited to 35 V DC.

14 Signaling

The "DC OK" LED enables evaluation of the function of the power supply directly on site.

	State 1	State 2
"DC OK" LED	ON	OFF
Cause	Output voltage > 21.5 V	Output voltage < 21,5 V or no voltage at the output
Meaning	Output voltage and output current OK	The device is in operation, but there is a fault in the consumer, the current consumption is greater than I_1 or the output is short-circuited. The device is out of operation because there is no mains voltage, the fuse on the primary side has been triggered, or the device is faulty.

15 Function



Output characteristic curve

The power supply works with a power reserve as shown in the U/I characteristic curve in the figure. At ambient temperatures $T_{AMB} < +40\text{ °C}$, I_1 is available continuously. At higher temperatures, it is available for a few minutes. In the event of a secondary-side short-circuit or overload, the output current is limited to I_{MAX} . Thereby, the module does not switch off, but rather supplies a continuous output current. The secondary voltage is reduced here until the short-circuit is eliminated. The U/I characteristic curve with the power reserve ensures that both high inrush currents of capacitive loads as well as loads with DC/DC converters in the primary circuit can be supplied.

$$U_N = 24\text{ V}$$

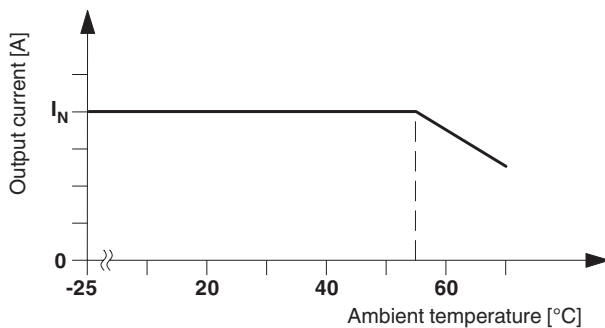
$$I_N = 0.5\text{ A}$$

$$P_N = 12\text{ W}$$

$$I_1 = 0.55\text{ A}$$

$$P_1 = 13.2\text{ W}$$

$$I_{MAX} = 1\text{ A (}U_{OUT} = 0\text{ V)}$$



Thermal behavior

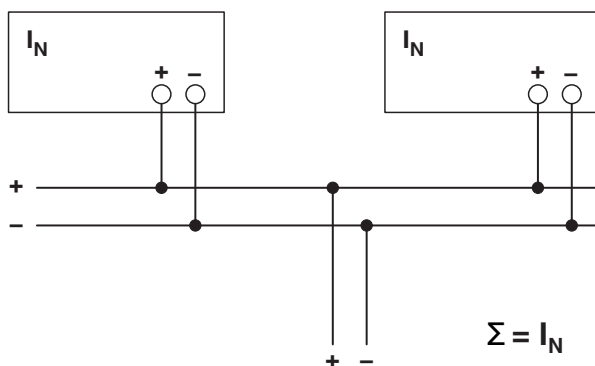
With an ambient temperature of up to +55°C, the device supplies the continuous output current of I_N . In the case of ambient temperatures above +55°C, the output current must be reduced by 2.5% per Kelvin increase in temperature. The device does not switch off at ambient temperatures of +70°C or thermal overload. The output capacity is reduced as far as necessary to provide device protection. After it has cooled down, the output capacity is increased again.

Parallel operation

Devices of the same type can be connected in parallel to increase both redundancy and power. By default upon delivery, no further adjustments are required.

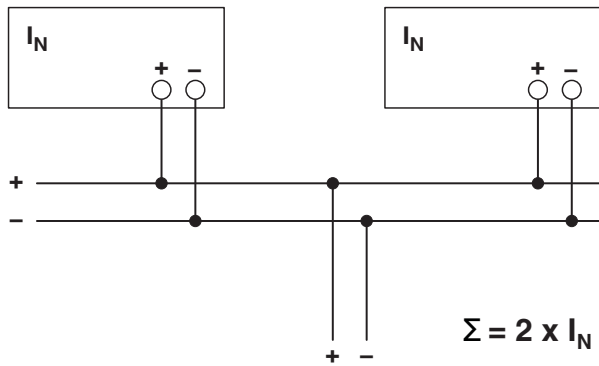
If the output voltage is adjusted, a uniform distribution of power is guaranteed by setting all parallel operated power supply units to exactly the same output voltage.

To ensure symmetrical current distribution we recommend that all cable connections from the power supply unit to the busbar are the same length and have the same cross section. Depending on the system, for parallel connection of more than two power supplies a protective circuit should be installed at each individual device output (e.g., decoupling diode, DC fuse or circuit breaker). This prevents high return currents in the event of a secondary device fault.



Redundant operation

Redundant circuits are suitable for supplying systems, which place particularly high demands on operational safety. If a fault occurs in the primary circuit of the first power supply unit, the second device automatically takes over the complete power supply without interruption, and vice versa. For this purpose, the power supply units to be connected in parallel must be large enough that the total current requirements of all loads can be fully met by one power supply unit. External decoupling diodes are required for 100% redundancy (ST 4-QUATTRO-DIO 1N 5408/L-R, Order No. 3037782, ST 4-QUATTRO-DIO 1N 5408/R-L, Order No. 3037795).

**Increased performance**

For n parallel connected devices, the output current can be increased to $n \times I_N$. Parallel connection for increasing power is used when extending existing systems. A parallel connection is recommended if the power supply unit does not cover the current consumption of the most powerful load. Otherwise, the load should be divided between individual devices that are independent from one another.

VERTICAL MULTISTAGE CENTRIFUGE PUMP SPECIFICATION

Grundfos CR 15-4 A-F-A-E-HQQE



Product Model : CR 15-4 A-F-A-E-HQQE
Product Brand : GRUNDFOS

Technical

Pump speed on which pump data are based	2917 rpm
Rated flow	17 m ³ /h
Rated head	44.8 m
Maximum head	56.8 m
Stages	4
Impellers	4
Number of reduced-diameter impellers	0
Low NPSH	N
Pump orientation	Vertical
Shaft seal arrangement	Single
Code for shaft seal	HQQE
Approvals on nameplate	CE, EAC,ACS
Curve tolerance	ISO9906:2012 3B
Pump version	A
Model	A

Materials

Base	Cast iron EN 1561 EN-GJL-200 ASTM A48-25B
Impeller	Stainless steel EN 1.4301 AISI 304
Material code	A
Code for rubber	E
Bearing	SIC

Installation

Maximum ambient temperature	60 °C
Maximum operating pressure	16 bar
Max pressure at stated temp	16 bar / 120 °C 16 bar / -20 °C
Type of connection	DIN
Size of inlet connection	DN 50
Size of outlet connection	DN 50
Pressure rating for connection	PN 25

Materials

Flange size for motor FT130
Connect code F

Liquid

Pumped liquid Water
Liquid temperature range -20 .. 120 °C
Selected liquid temperature 20 °C
Density 998.2 kg/m³

Electrical data

Motor standard IEC
Motor type 112MC
IE Efficiency class IE3
Rated power - P2 4 kW
Power (P2) required by pump 4 kW
Mains frequency 50 Hz
Rated voltage 3 x 220-240D/380-415Y V
Rated current 13.6/7.90 A
Starting current 1000-1110 %
Cos phi - power factor 0.87-0.87
Rated speed 2920-2940 rpm
Efficiency IE3 88,1%
Motor efficiency at full load 88.1 %
Motor efficiency at 3/4 load 88.6 %
Motor efficiency at 1/2 load 85.2 %
Number of poles 2
Enclosure class (IEC 34-5) 55 Dust/Jetting
Insulation class (IEC 85) F
Motor protec PTC
Motor No 85U05413

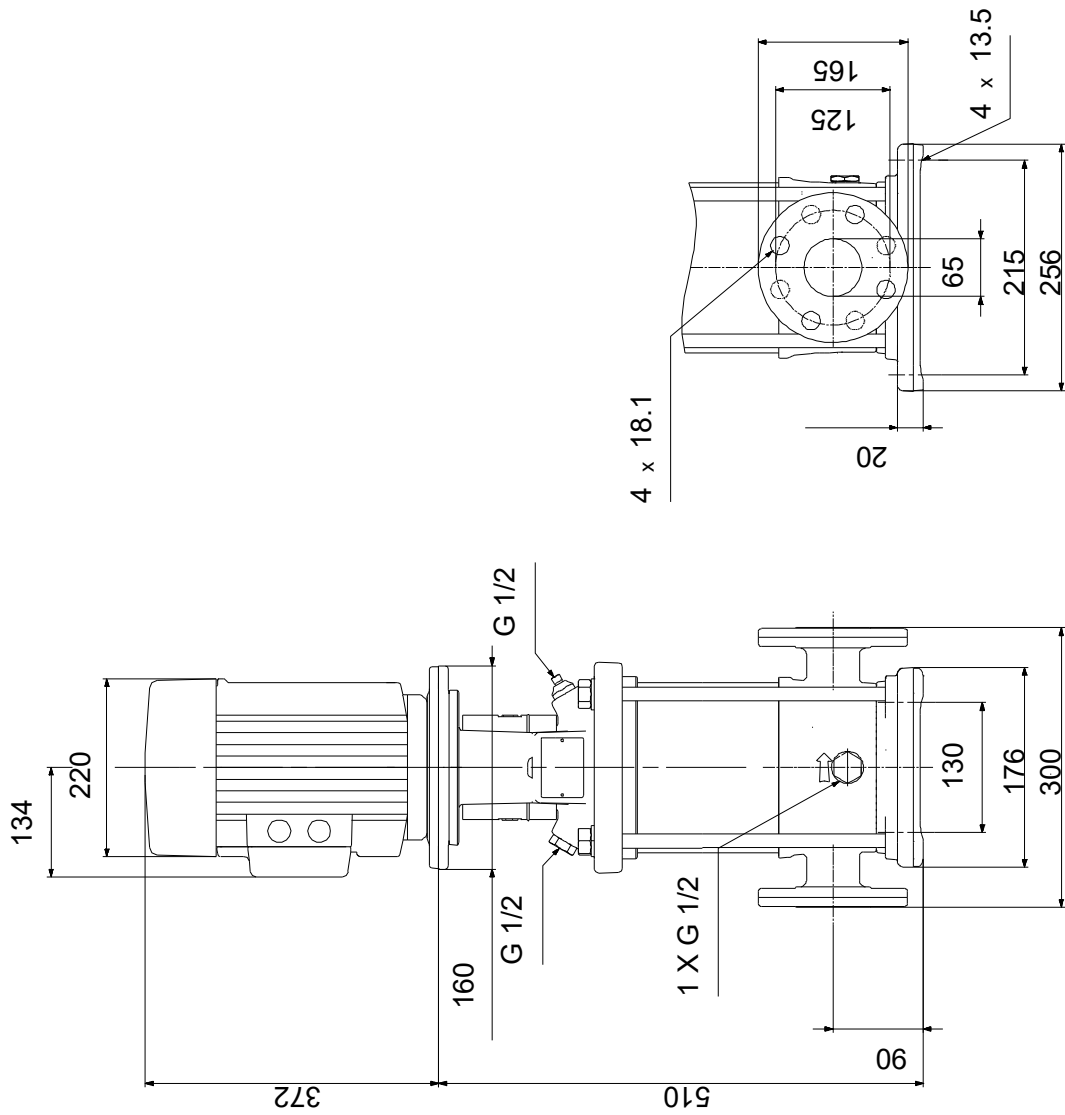
Controls

Frequency converter NONE

Others

Minimum efficiency index, MEI $\hat{\%} \neq 0.70$
Net weight 72 kg
Gross weight 94 kg
Shipping volume 0.234 m³

96501895 CR 15-4 A-F-A-E-HQQE 50 Hz



Note! All units are in [mm] unless others are stated.
Disclaimer: This simplified dimensional drawing does not show all details.