

## Technical data

Data at  $T_a = 25\text{ °C}$ ,  $U_{in} = 230\text{ V AC}$  and rated values, typical values unless otherwise indicated

### Input circuits

Supply circuit	L (+), N (-)	
Rated input voltage $U_{in}$	100-240 V AC	
Input voltage range	AC	85-264 V AC
	DC	90-350 V DC (UL 508;UL/IEC 60950 approved up to 300 V DC)
Typical input current	at 115 V AC	typ. 2.3 A
	at 230 V AC	typ. 1.2 A
Typical power consumption	256 W	
Frequency range	AC	45-65Hz
Inrush current limiting, cold state	at 115 V AC	13 A
	at 230 V AC	20 A
$I^2t$	at cold start	1 A <sup>2</sup> s, typical
Discharge current towards PE	0.7 mA	
Hold-up time	at 115 V AC	min. 50 ms
	at 230 V AC	min. 50 ms
Internal input fuse	T6.3A	
Recommended backup fuse for wire protection at 1.5 mm <sup>2</sup>	1 pole miniature circuit breaker ABB type S 200	
	characteristic	B or C
	max. rating	16 A
Power factor correction (PFC)	yes	
Transient overvoltage protection	yes, varistor	

### User interface

Indication of operational states			
Output voltage	LED 'OUTPUT OK' (green)	ON	> 22.0 V DC (>92 % of set output voltage)
		Flashing	< 21.5 V DC (<90 % of set output voltage)
Power reserve	LED 'I > I <sub>R</sub> ' yellow	OFF	$I \leq I_R$
		ON	$I > I_R$

### Output circuits - power output, L+, L-

Power output,	L+, L-	
Rated output voltage	24 V DC	
Tolerance of the output voltage	± 1 %	
Adjustment range of the output voltage	22.5-28.5 V DC	
Rated output power	240 W	
Rated output current $I_r$	$T_a \leq 60\text{ °C}$	10.0 A
	$T_a \leq 40\text{ °C}$	15.0 A continuously
Reserve current	$T_a \leq 60\text{ °C}$	
Peak short-circuit current	$6 \times I_R$	
Short-circuit current limit	15.2-15.5 A	
Derating of the output current above 60 °C	2.5 %/°C	
Maximum deviation with of output voltage	load change statical 10-90%	< 1 %
	dynamical 10-90%	3.33 %
	change of input voltage within the input voltage range	< 0.1 %
Control time	at rated load	< 1 ms
Starting time after applying the supply voltage	at rated load	< 250 ms
	with 3500 µF	
Rise time	at rated load	< 5 ms
	with 3500 µF	
Fall time	13 ms	
Residual ripple and switching peaks	BW = 20 MHz	17.4 mVpp
Parallel connection	yes, up to 5 devices, to enable redundancy and to increase power, current not symmetrical	
Series connection	yes, max. 2 devices to increase voltage	

<b>No-load, overload and short-circuit behavior</b>	
Characteristic curve of output	U/I characteristic curve with power reserve
Short-circuit protection	continuous short-circuit stability
Short-circuit behavior	current limiting
Current limiting at short circuit	15.2-15.5 A
Resistance to reverse feed	35 V DC
Overload protection	constant current limitation
Overtemperature protection	protection by automatic switch off in case of overtemperature (thermal protection)
No-load protection	continuous no-load stability
Starting of capacitive loads	

## Signaling outputs

<b>OUTPUT OK signaling output</b>	
Type of output	relay, n/o contact
Contact material	Cd free
ON (contact closed)	> 22.0 V DC (>92 % of set output voltage)
OFF (contact open)	< 21.5 V DC (<90 % of set output voltage)
Contact ratings	max. switching voltage / current min. switching voltage / current
	30 V AC - 0.5 A / 24 V DC - 1 A (resistive load) 5 V DC / 1 mA
Isolation voltage to any other electrical circuits	see isolation data
<b>POWER RESERVE signaling output</b>	
Type of output	transistor
Active / ON (closed)	$I \leq I_R$
OFF (open)	$I > I_R$
Ratings	voltage current
	+24 V DC (same potential as power supply output L+) 20 mA limited at 24 V

## General data

Efficiency	at rated load	> 94 %
Power losses	at rated load	14 W
	at 50% of rated load	9 W
	at no load	< 3.5 W
Duty time		100 %
MTBF	acc. to MIL 217 HDBK	
Dimensions (W x H x D)		60.0 x 129.4 x 136.0 mm (2.36 x 5.094 x 5.354 in)
Weight	gross weight, with packaging and instruction sheet	1.3 kg (2.646 lb)
	net weight	1.2 kg (2.866 lb)
Material of housing	cover	zinc-coated sheet-steel
	enclosure shell	aluminium
	front	plastic, PA6, V-0
Mounting		DIN rail (EN 60715), snap-on mounting without any tool
Mounting position		horizontal
Minimum distance to other units	horizontal	max. 25 mm (0.98 in)
	vertical	max. 25 mm (0.98 in)
Degree of protection (IEC/EN 60529)	enclosure / terminals	IP20 / IP20
Protection class (EN 61140)		I

## Electrical connection

Input circuits (L1, N, PE)		
Wire size	fine-strand with(out) wire end ferrule / rigid	0.5-2.5 mm <sup>2</sup> (20-12 AWG) / 0.5-4.0 mm <sup>2</sup> (20-1 AWG)
Stripping length		8 mm (0.315 in)
Tightening torque		0.5 Nm (4.4 lb-in)
Output circuits (L+, L+, L-, L-)		
Wire size	fine-strand with(out) wire end ferrule / rigid	0.5-2.5 mm <sup>2</sup> (20-12 AWG) / 0.5-4.0 mm <sup>2</sup> (20-1 AWG)
Stripping length		8 mm (0.315 in)
Tightening torque		0.5 Nm (4.4 lb-in)
Signaling output (13-14, I > I <sub>1</sub> )		
Wire size	fine-strand with(out) wire end ferrule / rigid	0.5-2.5 mm <sup>2</sup> (20-12 AWG) / 0.5-4.0 mm <sup>2</sup> (20-1 AWG)
Stripping length		8 mm (0.315 in)
Tightening torque		0.5 Nm (4.4 lb-in)

## Environmental data

Ambient temperature range	operation	-25...+70 °C (-13 ... +158°F)
	rated load	-25...+60 °C (-13 ... +140°F)
	storage	-25...+85 °C (-13 ...+185°F)
	transportation	-40...+85 °C (-40 ...+185°F)
Climatic category (IEC/EN 60721-3-1)	storage	1K2 (-40...+85°C)
Climatic category (IEC/EN 60721-3-2)	transportation	2K2 (-40°C...85°C)
Climatic category (IEC/EN 60721-3-3)	operation	3K3
Damp heat, cyclic (IEC/EN 60068-2-30)		95 % RH without condensation
Vibration, half-sine (IEC/EN 60068-2-6)		< 15 Hz, amplitude ±2.5 mm/15 Hz - 150 Hz, 2.3 g
Shock, half-sine (IEC/EN 60068-2-27)		30 g, all directions

## Isolation data

Rated impulse withstand voltage U <sub>imp</sub> (EN 50178)	input circuit / output circuit	4 kV (1.2/50μs)
	input circuit / PE	4 kV (1.2/50μs)
	input circuit / relay contact	4 kV (1.2/50μs)
	output circuit / relay contact	0.5 kV (1.2/50μs)
	relay contact / PE	0.5 kV (1.2/50μs)
	output circuit / PE	0.5 kV (1.2/50μs)
Overvoltage category (EN 50178)	< 2000m	III
	2000...5000m	II
Overvoltage category (EN 60950-1)	< 2000m	II
	2000...5000m	I
Pollution degree IEC/EN 60950-1; EN 50178		2
Test voltage between all isolated circuits, type test (IEC/EN 60950-1)	input circuit / output circuit	3 kV (AC); 4242 (DC)
	input circuit / PE	1.5 kV (AC); 2121 (DC)
	relay contact / output circuit	0.5 kV (AC); 707 (DC)
	output circuit / PE	0.5 kV (AC); 707 (DC)
Test voltage between all isolated circuits, routine test	input circuit / output circuit	1.5 kV (AC); 2121 (DC)
	input circuit / PE	1.5 kV (AC); 2121 (DC)
	relay contact / output circuit	1.5 kV (AC); 2121 (DC)
	output circuit / PE	0.5 kV (DC)
Protective separation IEC/EN 60950-1	input circuit / output circuit	Yes
	input circuit / relay contact	Yes

## Standard

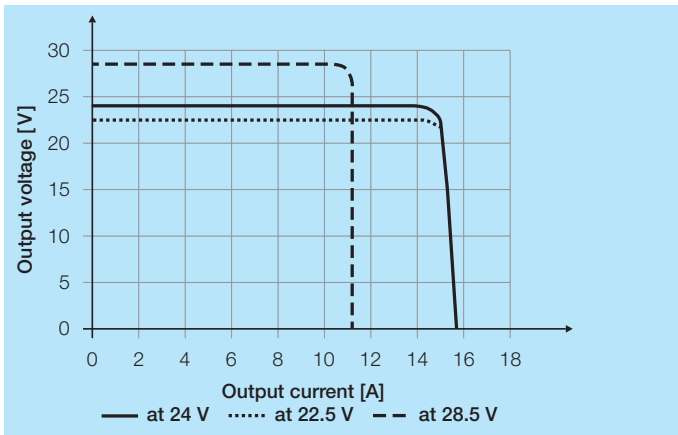
Product standard	IEC/EN 61204
Low Voltage Directive	2006/95/EC
EMC directive	2004/108/EC
RoHS directive	2011/65/EC
Electrical safety	IEC/EN 60950-1, IEC/EN 61204-7, UL/cUL Recognized UL 60950-1
Safety of ..., power supply units ...Particular requirements and tests for switch mode power supply units and transformers for switch mode power supply units	IEC/EN 61558-2-16 covered by IEC 60950-1
Electrical equipment of machines	
Industrial control equipment	UL/cUL Listed UL 508 and CSA 22.2 No 107.1
Programmable controllers – Part 2: Equipment requirements and test references	IEC/EN 61131-2 applicable parts
Electronic equipment for use in power installations	EN 50178/VDE 0160
Protective extra low voltage	PELV (IEC/EN 61204)
Safety extra low voltage	SELV (IEC/EN 60950-1)
Protection for safety – Protection against electric shock	VDE 0100-410, IEC 60364-4-41
Limitation of harmonic line currents	According to IEC/EN 61000-3-2

## Electromagnetic compatibility

Low-voltage power supplies, d.c. output – Part 3: Electromagnetic compatibility (EMC)	IEC/EN 61204-3	
Interference immunity to		IEC/EN 61000-6-1 and IEC/EN 61000-6-2
Electrostatic discharge (ESD)	IEC/EN 61000-4-2	Level 4, 8kV / 15 kV
Radiated, radio-frequency, electromagnetic field	IEC/EN 61000-4-3	Level 3, 10 V/m
Electrical fast transient/burst	IEC/EN 61000-4-4	Level 4, 4 kV
Surge	IEC/EN 61000-4-5	L-N 2 kV (Level 3), L / N-VPE 4 kV (Level 3)
Conducted disturbances, induced by radio-frequency fields	IEC/EN 61000-4-6	Level 3, 10 V
Power frequency magnetic field immunity test	IEC/EN 61000-4-8	1000 A/m (A)
Damped oscillatory magnetic field immunity test	IEC/EN 61000-4-10	30 A/m (A)
Voltage dips, short interruptions and voltage variations immunity tests	IEC/EN 61000-4-11	Class 3
Voltage variations harmonics and interharmonics	IEC/EN 61000-4-13	
Test for immunity to conducted, common mode disturbances in the frequency range 0 Hz to 150 kHz	IEC/EN 61000-4-16	10 V (A)
Dumped oscillatory wave immunity test	IEC/EN 61000-4-18	
Interference emission		IEC/EN 61000-6-3 and IEC/EN 61000-6-4
Emission standard for residential commercial and light-industrial environments	IEC/EN 61000-6-3	
Limits – Limits for harmonic current emissions (equipment input current $\leq 16$ A per phase)	IEC/EN 61000-3-2	Class A
Limits – Limitation of voltage changes „voltage fluctuations and flicker in public low-voltage supply systems, „for equipment with rated current $\leq 16$ A per phase and not subject“ to conditional connection	IEC/EN 61000-3-3	pass
Emission standard for industrial environments	IEC/EN 61000-6-4	
Information technology equipment Radio disturbance characteristics Limits and methods of measurement	IEC/EN 61000-3-2	Class B
Industrial scientific and medical (ISM) radio-frequency equipment Electromagnetic disturbance characteristics Limits and methods of measurement	IEC/CISPR 22, EN 55022	Class B
Voltage sags	SEMI F47	pass

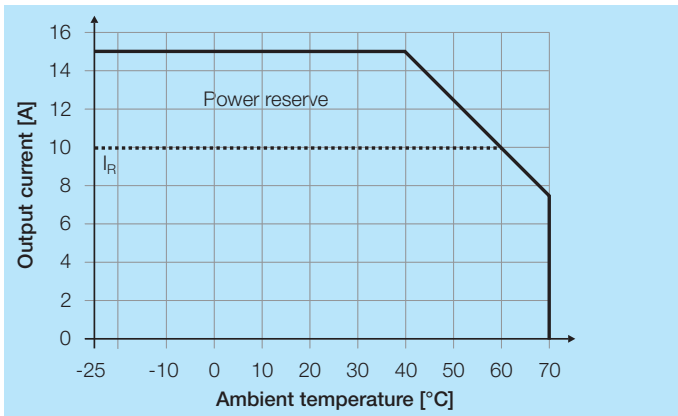
## Technical diagrams

### Characteristic curve of output



Characteristic curve of output at  $T_a = 25\text{ °C}$

### Characteristic curve of temperature



Characteristic curve of temperature at  $U_{out} = 24\text{ V}$

The switch mode power supply CP-C 24/10.0 is able to supply at 24 V DC output voltage and at an ambient temperature of

- $\leq 40\text{ °C}$  a continuous output current of  $\text{typ. } \leq 15\text{ A}$
- $\leq 60\text{ °C}$  the rated current of 10 A

At ambient temperatures of:

- $> 60\text{ °C}$  the output power has to be reduced by 2.5 % per Celcius temperature increase
- $> 70\text{ °C}$  i.e. thermal overload <sup>1)</sup>

<sup>1)</sup> The device will switch-off as soon as the internal temperature exceeds the acceptable levels. The exact ambient temperature of when this occurs depends on positioning, orientation and placement of the power supply i.e. which heat dissipation is allowed.

If the switch mode power supply is loaded with an output current  $> 15\text{ A}$ , the operating point is passing through the U/I characteristic curve shown.