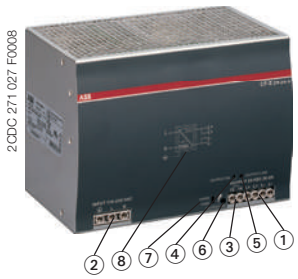
# Power supply CP-E 24/20.0

Primary switch mode power supply

Data sheet




① OUTPUT L+, L+, L-, L-: terminals - output

② INPUT L, N, PE: terminals - input

③ 13-14: terminals - signalling contact

④ OUTPUT OK: green LED - output voltage OK

⑤ OUTPUT LOW: red LED - output voltage too low

⑥ OUTPUT Adj: potentiometer - adjustment of the output voltage

⑦ single/parallel: sliding switch - adjustment of single or parallel operation

⑧ Circuit diagram

## Features

- Rated output voltage 24 V DC
- Output voltage adjustable via front-face rotary potentiometer “OUTPUT Adj”
- Rated output current 20 A
- Rated output power 480 W
- Wide range input 115-230 V AC (90-264 V AC, 120-375 V DC)
- Typical efficiency of 89 %
- Low power dissipation and low heating
- Free convection cooling (no forced cooling with ventilators)
- Ambient temperature range during operation -40...+70 °C
- Open-circuit, overload and short-circuit stable
- Integrated input fuse
- Redundancy unit CP-A RU offering true redundancy, available as accessory
- Signalling contact "13-14" (solid-state) for output voltage OK
- LEDs for status indication

## Approvals

| | | |
|---|---|---|
| | UL 508, CAN/CSA C22.2 No.14 | Approval refers to rated input voltage $U_{in}$ |
| | ANSI/ISA-12.12 (Class I, Div. 2, hazardous locations) | |
| | UL 60950, CAN/CSA C22.2 No.60950 | Approval refers to rated input voltage $U_{in}$ |
| | GOST | |
| | CCC | Approval refers to rated input voltage $U_{in}$ |

## Marks

CE

C-Tick

## Order data

| Type | Input voltage range | Rated output voltage / current | Order code |
|---|---|---|---|
| CP-E 24/20.0 | 90-264 V AC / 120-375 V DC | 24 V DC / 20 A | 1SVR 427 036 R0000 |

## Order data - Accessories

| Type | Description | Order code |
|---|---|---|
| CP-A RU | **Redundancy unit**<br>The CP-A RU provides decoupling of two CP-E power supply units ≤ 40 V and ≥ 5 A. | 1SVR 427 071 R0000 |

## Application

The primary switch mode power supply offers two voltage input ranges. This enables the supply with AC or DC. Furthermore it is equipped with two generous capacitors, which ensure mains buffering of at least 30 ms (at 230 V AC). That is why the devices can be used worldwide also in high fluctuating networks and battery-powered plants.

## Operating mode

By means of the potentiometer „OUTPUT Adj“ the output voltage can be adjusted within a range of 22.5 to 28.5 V DC. Thus, the power supply can be optimally adapted to the application, e.g. compensating the voltage drop caused by a long line length.

The green LED „OUTPUT OK“ is lightening during proper operation.
The red LED „OUTPUT LOW“ is lightening when the output voltage is too low.

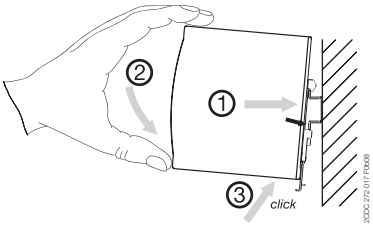
Switch „single/parallel“ for selection of single or parallel operation.

Signalling contact 13-14 (max. 60 V DC / 0.3 A) is ON when the output voltage is more than 75 %.

## Installation

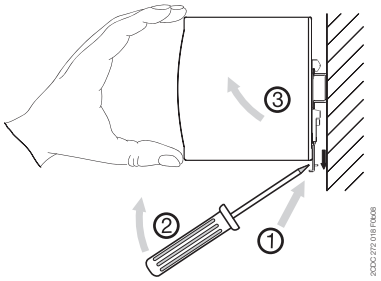
**Mounting**

The switch mode power supply can be snapped on a DIN rail according to IEC/EN 60715 as shown in the accompanying picture. For that the device is set with its mounting rail slide on the upper edge of the mounting rail and locked by lifting it downwards.



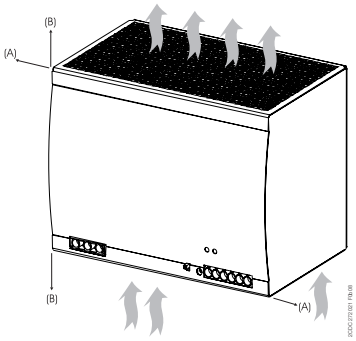

**Demounting**

Remove the switch mode power supply as shown in the accompanying picture. For that the latching lever is pulled downwards by means of the screwdriver. Alternatively you can press the unlock button to release the device. Then in both cases the device can be unhinged from the mounting rail edge and removed.




**Mounting position**

The devices have to be mounted horizontally with the input terminals on the bottom. In order to ensure a sufficient convection, the minimum distance to other modules should not be less than 25 mm in vertical and horizontal direction.



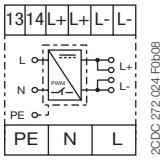
## Installation

**Electrical connection**

Connect the input terminals L and N. The protective earth conductor PE must be connected. The installation must be executed acc. to EN 60950, provide a suitable disconnecting device (e. g. line protection switch) in the supply line. The input side is protected by an internal input fuse.

Rate the lines for the maximum output current (considering the short-circuit current) or provide a separate fuse protection. We recommend to choose the cable section as large as possible in order to minimize voltage drops. Observe the polarity. The device is overload, short-circuit and open-circuit proof. The secondary side of the power supply unit is electrically isolated from the input and internally not earthed (SELV) and can therefore be earthed by the user according to the needs with L+ or L- (PELV).

## Connection diagram




| | |
|---|---|
| L+, L- | Output voltage |
| L, N | Input voltage |
| 13-14 | Signalling contact for output voltage OK |
| PE | Protective earth |

## Safety instructions and warnings



The device must be installed by qualified persons only and in accordance with the specific national regulations (e.g., VDE, etc.). The devices are maintenance-free chassis-mounted units.

**Disconnect system from supply network!**

Before any installation, maintenance or modification work: Disconnect the system from the supply network and protect against switching on.

**Before start of operation:**

Attention! Improper installation/operation may impair safety and cause operational difficulties or destruction of the unit. Before operation the following must be ensured:

- Connect to main according to the specific national regulations.
- Power supply cables and unit must be sufficiently fused. A disconnecting device has to be provided for the power supply to disengage unit and supply cables from supply mains if required.
- The protective earth conductor must be connected to the terminal PE (Protection class I)
- The secondary side of the power supply unit is not earthed and can be earthed by the user according to the needs with L+ or L-.
- Rate the output lines for the output current of the power supply and connect them with the correct polarity.
- In order to ensure sufficient air-cooling the distance to other devices has to be considered.

**In operation:**

- Do not modify the installation (primary and secondary side)! High current! Risk of electric arcs and electric shocks (danger to life)!
- Risk of burns: Depending on the operation conditions the enclosure can become very hot.
- The internal fuse is not user-replaceable. If the internal fuse blows, most probably the device is defective. In this case, an examination of the switch mode power supply by the manufacturer is necessary.

## Attention! High voltage! Danger to life!



The power supplies contain components with high stored energy and circuits with high voltage! Do not introduce any objects into the unit, and do not open the unit. With some units of this range the output is capable of providing hazardous energy. Ensure that the service personnel is protected against inadvertent contact with parts carrying energy.

# Power supply CP-E 24/20.0

Primary switch mode power supply

Data sheet

## Technical data

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

| **Type** | | **CP-E 24/20.0** |
|---|---|---|
| **Input circuit** | | **L, N** |
| Rated input voltage $U_{in}$ | | 115-230 V AC |
| Input voltage range | | 90-264 V AC,<br>120-375 V DC |
| Frequency range AC | | 47-63 Hz |
| Typical input current | at 115 V AC | 4.9 A |
| | at 230 V AC | 2.5 A |
| Typical power consumption | | 539 W |
| Inrush current limiting | at 115 V AC | 25 A (max. 5 ms) |
| | at 230 V AC | 50 A (max. 5 ms) |
| Discharge current | input / output | 0.25 mA |
| | input / PE | 3.5 mA |
| Power failure buffering time | at 115 V AC | min. 25 ms |
| | at 230 V AC | min. 30 ms |
| Internal input fuse | | 10 A slow-acting / 250 V AC |
| Power factor correction (PFC) | | yes, active, 115 V AC: 0.99 / 230 V AC: 0.97 |
| **Indication of operational states** | | |
| Output voltage | OUTPUT OK: green LED | ⎍: output voltage OK |
| | OUTPUT LOW: red LED | ⎍: output voltage too low |
| **Output circuit** | | **L+, L+, L-, L-** |
| Rated output voltage | | 24 V DC |
| Tolerance of the output voltage | | 0...+1 % |
| Adjustment range of the output voltage | | 22.5-28.5 V DC |
| Rated output power | | 480 W |
| Rated output current $I_r$ | $T_a \leq 55$ °C | 20 A |
| Derating of the output current | 55 °C < $T_a \leq$ 70 °C | 2.5 %/°C |
| Signalling contact for output voltage OK | 13-14 | solid-state (max. 60 V DC, 0.3 A) |
| Minimum fuse rating to achieve short-circuit protection | 13-14 | ≥ 60 V DC, ≤ 0.3 A fast-acting |
| Maximum deviation with | load change statical | ±1 % (single mode)<br>±5 % (parallel mode) |
| | change of input voltage within the input voltage range | ±0.5 % |
| Control time | | < 2 ms |
| Starting time after applying the supply voltage | at $I_r$ | max. 1 s |
| | with 7000 µF | max. 1.5 s |
| Rise time | at $I_r$ | max. 150 ms |
| | with 7000 µF | max. 500 ms |
| Fall time | | max. 150 ms |
| Residual ripple and switching peaks | BW = 20 MHz | 100 mV |
| Parallel connection | | configurable, to increase power, up to 3 devices,<br>min. 0.1 $I_r$ - max. 0.9 $I_r$ |
| Series connection | | yes, to increase voltage, max. 2 devices |
| Resistance to reverse feed | | max. 35 V DC |
| **Output circuit - No-load, overload and short-circuit behaviour** | | |
| Characteristic curve of output | | U/I characteristic curve |
| Short-circuit protection | | continuous short-circuit proof |
| Short-circuit behaviour | | continuation with output power limiting |

# Power supply CP-E 24/20.0

Primary switch mode power supply

Data sheet

| **Type** | | **CP-E 24/20.0** |
|---|---|---|
| Overload protection | | output power limiting |
| No-load protection | | continuous no-load stability |
| Starting of capacitive loads | | 7000 µF |
| **General data** | | |
| Power dissipation | | typ. 63 W |
| Efficiency | | typ. 89 % |
| Duty time | | 100 % |
| Dimensions (W x H x D) | | 175 x 123.6 x 123.6 mm<br>(6.89 x 4.87 x 4.87 in) |
| Weight | | 1.850 kg (4.079 lb) |
| Material of housing | | metal |
| Mounting | | DIN rail (IEC/EN 60715), snap-on mounting without any tool |
| Mounting position | | horizontal |
| Minimum distance to other units | horizontal / vertical | 25 mm / 25 mm (0.98 in / 0.98 in) |
| Degree of protection | housing / terminals | IP20 / IP20 |
| Protection class | | I |
| **Electrical connection - input circuit / output circuit** | | |
| Wire size | fine-strand with wire end ferrule | 0.2-4 mm² (24-11 AWG) |
| | fine-strand without wire end ferrule | 0.2-6 mm² (24-10 AWG) |
| | rigid | |
| Stripping length | | 8 mm (0.31 in) |
| Tightening torque | input / output | 1.0 Nm (9 lb.in) / 0.62 Nm (5.5 lb.in) |
| **Environmental data** | | |
| Ambient temperature range | operation | -40…+70 °C |
| | rated load | -40...+55 °C |
| | storage | -40…+85 °C |
| Damp heat | | 95 % RH, without condensation |
| Vibration (sinusoidal) (IEC/EN 60068-2-6) | | 10-500 Hz, 2 G, along X, Y, Z each axis, 60 min. for each axis |
| Shock (half-sine) (IEC/EN 60068-2-27) | | 15 G, 11 ms, 3 axis, 6 faces, 3 times for each face |
| **Isolation data** | | |
| Rated insulation voltage $U_i$ | input / output | 3 kV AC |
| | input / PE | 1.5 kV AC |
| Pollution degree | | 2 |
| Overvoltage category (UL/IEC/EN 60950-1) | | II |
| **Standards** | | |
| Product standard | | EN 61204-3 |
| Low Voltage Directive | | 2006/95/EC |
| EMC directive | | 2004/108/EC |
| RoHS directive | | 2002/95/EC |
| Electrical safety | | EN 60950-1, UL 60950-1, UL 508,<br>EN 61558-1, EN 61558-2-17, EN 60204-1 |
| Protective low voltage | | SELV (EN 60950) |
| **Electromagnetic compatibility** | | |
| Interference immunity to | | IEC/EN 61000-6-2 |
| electrostatic discharge | IEC/EN 61000-4-2 | Level 4 (air discharge 15 kV / contact discharge 8 kV) |
| radiated, radio-frequency, electro-magnetic field | IEC/EN 61000-4-3 | Level 3 (10 V/m) |
| electrical fast transient / burst | IEC/EN 61000-4-4 | Level 4 (4 kV / 2.5 kHz) |
| surge | IEC/EN 61000-4-5 | L-L Level 3 (2 kV) / L-PE Level 4 (4 kV) |

# Power supply CP-E 24/20.0

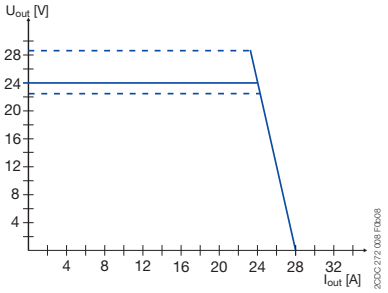
Primary switch mode power supply

Data sheet

| Type | | CP-E 24/20.0 |
|---|---|---|
| conducted disturbances, induced by radio-frequency fields | IEC/EN 61000-4-6 | Level 3 (10 V) |
| power frequency magnetic fields | IEC/EN 61000-4-8 | Level 4 (30 A/m) |
| voltage dips, short interruptions and voltage variations | IEC/EN 61000-4-11 | dip: >95 % 10 ms / >30 % 500 ms<br>interruptions: >95 % 5000 ms |
| Interference emission | | IEC/EN 61000-6-3 |
| high-frequency radiated | IEC/CISPR 22, EN 55022 | Class B |
| high-frequency conducted | IEC/CISPR 22, EN 55022 | Class B |
| limits for harmonic current emissions | IEC/EN 61000-3-2 | Class D |

## Technical diagrams

**Output behaviour**



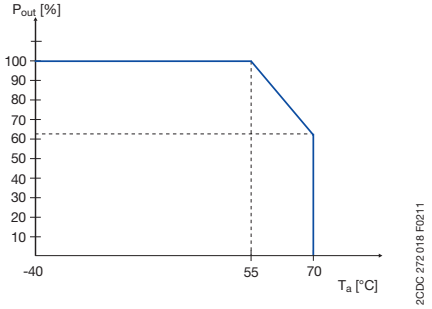

Characteristic curve of output at $T_a$ = 25 °C

The switch mode power supply CP-E 24/20.0 is able to supply at 24 V DC output voltage and

- at an ambient temperature of:
  ≤ 55 °C a continuous output current of approx. 20 A
- at ambient temperatures of:
  55 °C < $T_a$ ≤ 70 °C the output power has to be reduced by 2.5 % per °C temperature increase.

If the switch mode power supply is loaded with an output current > 20 A, the operating point is passing through the U/I characteristic curve shown.

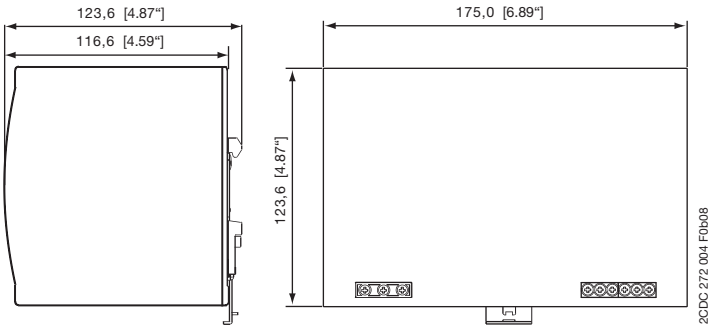
**Temperature behaviour**




Characteristic curve of temperature at rated load

## Dimensions

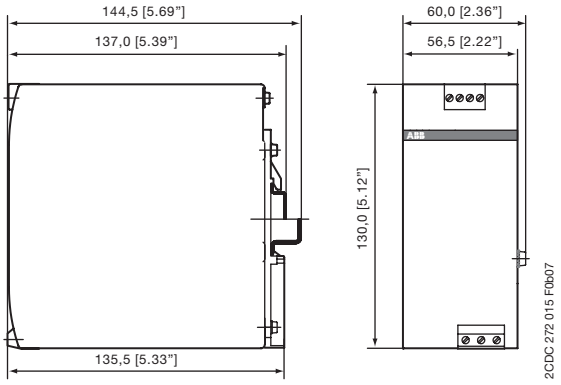
in mm




**CP-E 24/20.0**

## Dimensions accessories

in mm




**CP-A RU**

## Further Documentation

| Document title | Document type | Document number |
|---|---|---|
| Electronic Products and Relays | Technical catalogue | 2CDC 110 004 C020x |
| Power Supply Units | Application manual | 2CDC 114 048 M020x |
| Redundancy unit CP-A RU | Data sheet | 2CDC 114 036 D0202 |

You can find the documentation on the internet at www.abb.com/lowvoltage → Control Products → Power Supplies

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