

Power supply CP-E 24/5.0

Primary switch mode power supply

The CP-E range offers enhanced functionality while the number of different types has been considerably reduced. Now all power supply units can be operated at an ambient temperature of up to +70 °C.



2CDC 271 025 F0008

Characteristics

- Rated output voltage 24 V DC
- Output voltage adjustable via front-face rotary potentiometer "OUTPUT Adjust"
- Rated output current 5 A
- Rated output power 120 W
- Supply range 115/230 V AC (90-132 V AC, 180-264 V AC, 210-375 V DC), auto select
- Typical efficiency of 86 %
- Low power dissipation and low heating
- Free convection cooling (no forced cooling with ventilators)
- Ambient temperature range during operation -35...+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
- Various certifications and approvals (see overview, document no. [2CDC114098D0201](#))

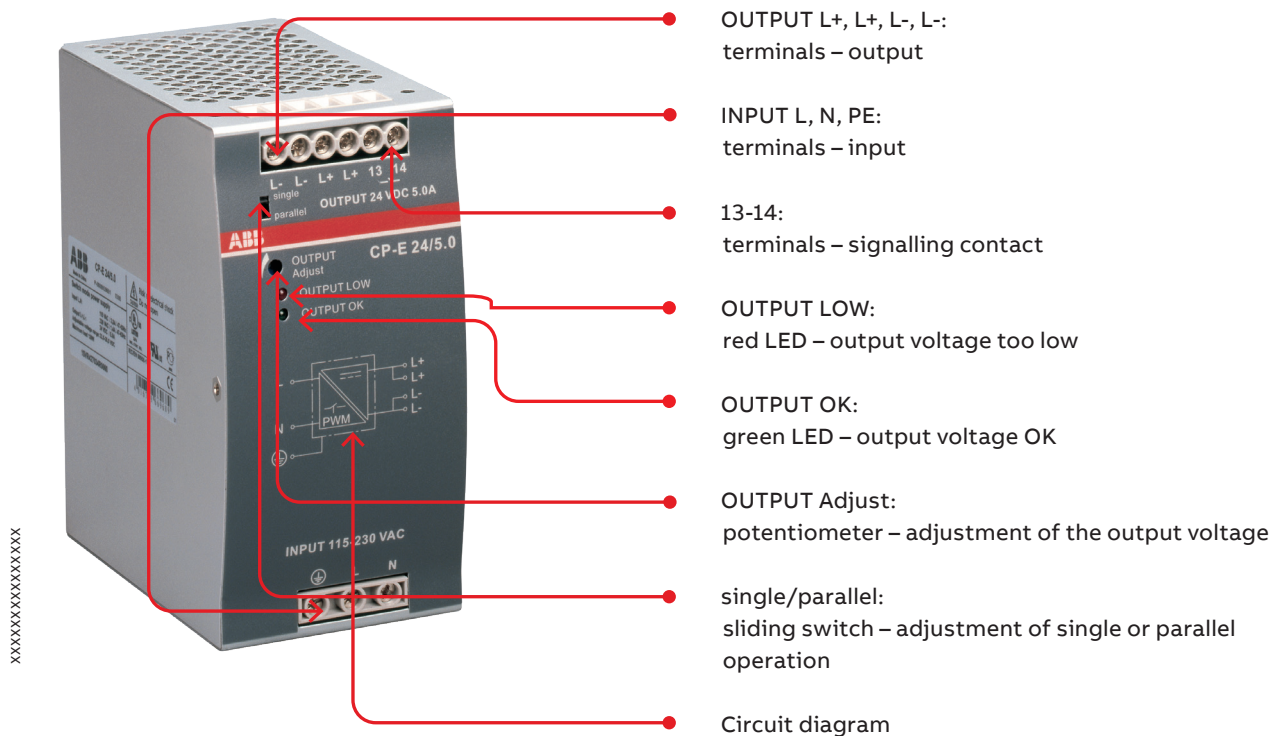
Order data

| Type | Input voltage range | Rated output voltage / current | Order code |
|-------------|--|--------------------------------|--------------------|
| CP-E 24/5.0 | 90-132 V AC / 180-264 V AC 210-375 V DC | 24 V DC / 5 A | 1SVR 427 034 R0000 |

Order data – accessories

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

Functions



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 Adjust” 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.

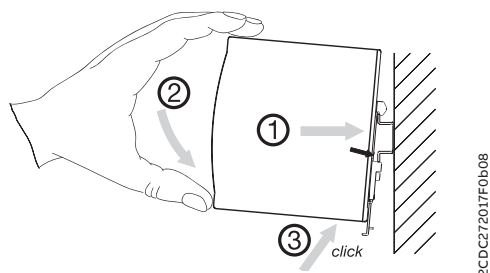
Switch “single/parallel” for selection of single or parallel operation.

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

Installation

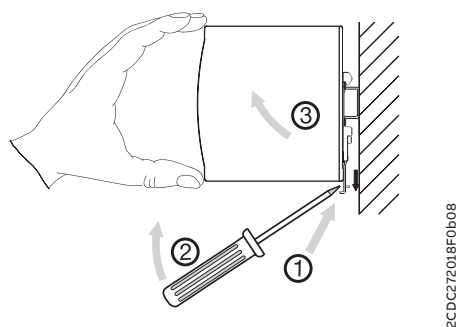
Mounting

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.



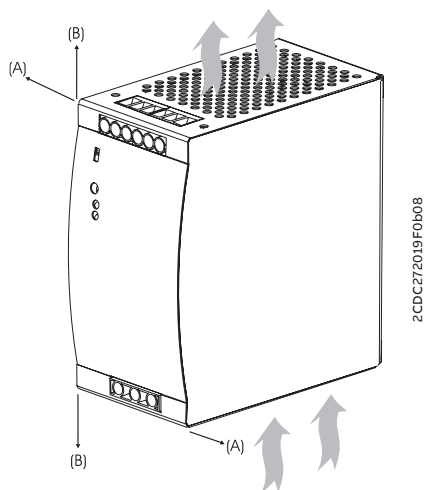
Demounting

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.

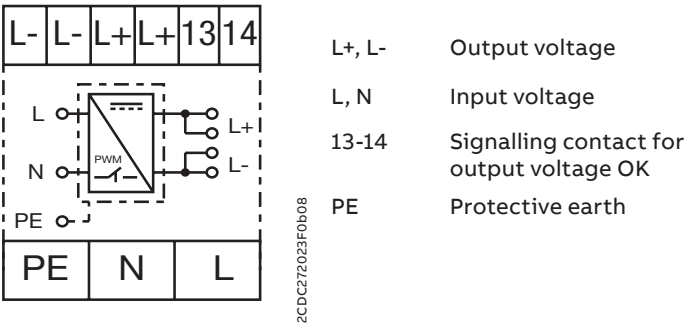


Electrical connection

Connect the input terminals L and N. The protective earth conductor PE must be connected. The installation must be executed acc. to EN 62368-1, 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



Safety instructions and warnings

**In operation pay attention to:**

- Do not modify the installation (primary and secondary side)! High current!
Risk of electric arcs and electric shock (danger to life)!
- Risk of burns: Depending on the operation conditions the housing can become hot.
- The device contains no user serviceable parts. In any case of device malfunction please send the unit back to manufacturer.



The device must be installed by qualified persons only and in accordance with the specific national regulations (e. g. VDE, etc.).

The CP-E power supplies are chassis-mounted units. It is maintenance-free and does not contain any integral setting elements and should therefore not be opened.

**Before any installation, maintenance or modification work:**

- Read the operating and installation instructions carefully and completely!
- Disconnect the system from the supply network and protect against switching on!

**CAUTION**

Improper installation/operation may impair safety of personnel and cause operational difficulties or destruction of the unit.

**WARNING****Before start of operation the following must be ensured:**

- Connection to mains or DC supply according to the specific national regulations for class of protection I. Power supply cables and unit must be sufficiently fused. A disconnecting device has to be provided for the end product to disengage unit and supply cables from supply mains if required.
- Rate the output lines for the output current of the power supply and connect them with the correct polarity.
- In order to ensure sufficient convection the distance to the other devices has to be considered.

**WARNING****Danger to life!**

Never carry out work when voltage is present. The power supply contains 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. If the internal fuse is blown most probably the device is defect. In this case an examination of the device by the manufacturer is necessary.



Technical data

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

Input circuits

| Supply circuits | | |
|-------------------------------|----------------|-------------------------------|
| Rated input voltage U_{in} | L,N | 115 / 230 V AC auto select |
| Input voltage range | AC | 90-132 V, 180-264 V |
| | DC | 210-375 V |
| Frequency range | AC | 47-63 Hz |
| Typical input current | at 115 V AC | 2.2 A |
| | at 230 V AC | 0.83 A |
| Typical power consumption | | 140 W |
| Inrush current limiting | at 115 V AC | 24 A (max. 5 ms) |
| | at 230 V AC | 48 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 | | 3.15 A slow-acting / 250 V AC |
| Power factor correction (PFC) | | yes, passive, 0.7 |

User interface

| Indication of operational states | | |
|----------------------------------|----------------------|---|
| Output voltage | OUTPUT OK: green LED |  : output voltage OK |
| | OUTPUT LOW: red LED |  : output voltage too low |

Output circuit

| | | |
|---|---|--|
| Rated output voltage | L+, L+, L-, L- | 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 | | 120 W |
| Rated output current I_r | $T_a \leq 60\text{ °C}$ | 5 A |
| Derating of the output current | $60\text{ °C} < T_a \leq 70\text{ °C}$ | 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 | $\geq 60\text{ V DC}$, $\leq 0.3\text{ A}$ fast-acting |
| Maximum deviation with | load change statical | $\pm 1\%$ (single mode) $\pm 5\%$ (parallel mode) |
| | change of output voltage within the input voltage range | $\pm 0.5\%$ |
| Control time | | < 2 ms |
| Starting time after applying the supply voltage | at I_r | max. 1 s |
| | with 3500 μF | max. 1.5 s |
| Rise time | at I_r | max. 150 ms |
| | with 3500 μF | max. 500 ms |
| Fall time | | max. 150 ms |
| Residual ripple and switching peaks | BW = 20 MHz | 50 mV |
| Parallel connection | | configurable, to increase power, up to 3 devices, 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 |
| Overload protection | output power limiting |
| No-load protection | continuous no-load stability |
| Starting of capacitive loads | 3500 µF |

General data

| | | |
|---------------------------------|--|-----------------------------------|
| Power dissipation | typ. 20 W | |
| Efficiency | typ. 86 % | |
| Duty time | 100 % | |
| Dimensions (W x H x D) | 63.2 x 123.6 x 123.6 mm (2.49 x 4.87 x 4.87 in) | |
| Weight | 1 kg (2.20 lb) | |
| Material of housing | Plastic | |
| 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

| | | |
|---------------------|--------------------------------------|--|
| Connecting capacity | fine-strand with wire end ferrule | 0.2-4 mm ² (24-11 AWG) |
| | fine-strand without wire end ferrule | 0.2-6 mm ² (24-10 AWG) |
| | rigid | |
| Stripping length | | 8 mm (0.31 in) |
| Tightening torque | | 1.0 Nm (9 lb.in) / 0.62 Nm (5.5 lb.in) |

Environmental data

| | | |
|---|------------|--|
| Ambient temperature range | operation | -35...+70 °C (-31...+158 °F) |
| | rated load | -35...+60 °C (-31...+140 °F) |
| | storage | -40...+85 °C (-40...+185 °F) |
| 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 |
| | output / PE | 0.5 kV AC; 0.71 kV DC |
| | signalling contact / PE | 0.5 kV DC |
| Pollution degree | | 2 |
| Overvoltage category | | II |

Standards / Directives

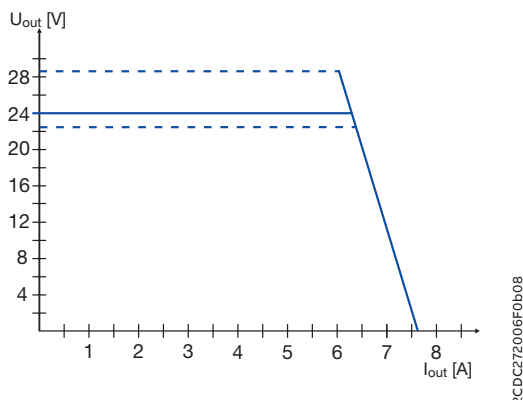
| | |
|------------------------|--------------------|
| Standards | IEC/EN 62368-1 |
| Low Voltage Directive | 2014/35/EU |
| Protective low voltage | SELV (IEC 60950-1) |
| EMC Directive | 2014/30/EU |
| RoHS Directive | 2011/65/EU |

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, 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 / 5 kHz) |
| surge | IEC/EN 61000-4-5 | L-L Level 3 (2 kV) / L-PE Level 4 (4 kV) |
| 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 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



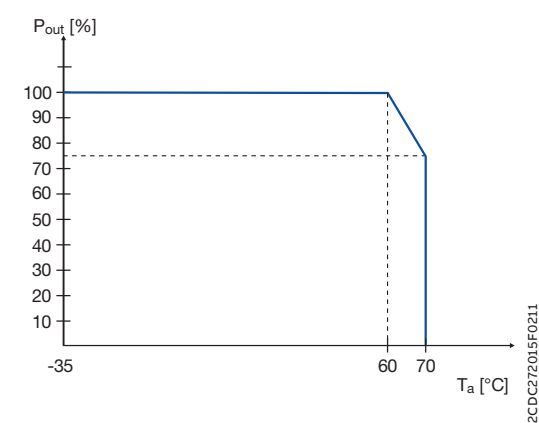
Characteristic curve of output at $T_a = 25\text{ °C}$

The switch mode power supply CP-E 24/5.0 is able to supply at 24 V DC output voltage and

- at an ambient temperature of:
 $\leq 60\text{ °C}$ a continuous output current of approx. 5 A
- at ambient temperatures of:
 $60\text{ °C} < T_a \leq 70\text{ °C}$ 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 $> 5\text{ A}$, the operating point is passing through the U/I characteristic curve shown.

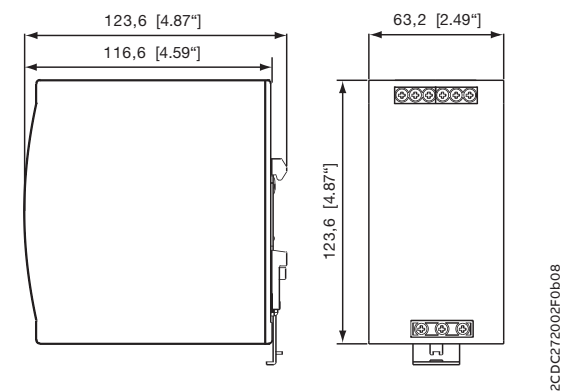
Temperature behaviour



Characteristic curve of temperature at rated load

Dimensions

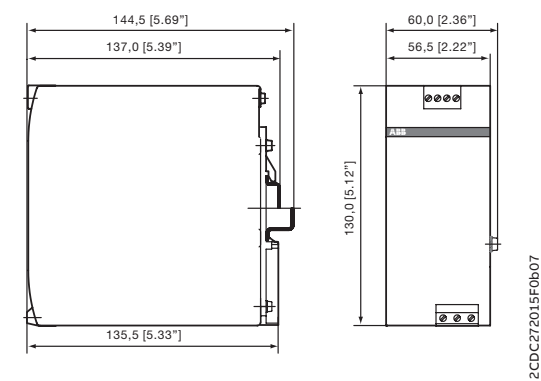
in mm [inches]



CP-E 24/5.0

Dimensions accessories

in mm [inches]



CP-A RU

Further documentation

| Document title | Document type | Document number |
|--------------------------------|---------------------|--------------------|
| Electronic Products and Relays | Technical catalogue | 2CDC 110 004 C02xx |
| 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

-> Automation, control and protection -> Power supplies.

CAD system files

You can find the CAD files for CAD systems at <http://abb-control-products.partcommunity.com>

-> Low Voltage Products & Systems -> Control Products -> Power Supplies.

