

# Primary switch mode power supplies

## CP-E range - Economy

### Technical data

Data at  $T_a = 25\text{ °C}$ ,  $U_{IN} = 230\text{ V AC}$  and rated values, if nothing else indicated

| Type  |                                     | CP-E 5/3.0  | CP-E 12/2.5   | CP-E 24/0.75  | CP-E 24/1.25  |
|---|-------------------------------------|---|---|---|---|
| <b>Input circuit</b>  | <b>L, N</b>                         |   |   |   |   |
| Rated input voltage $U_{IN}$  |                                     | 100-240 V AC  |   |   |   |
| Input voltage range   | AC                                  | 90-265 V AC   | 85-264 V AC   | 90-265 V AC   | 85-264 V AC   |
|   | DC                                  | 120-370 V DC  | 90-375 V DC   | 120-370 V DC  | 90-375 V DC   |
| Frequency range   | AC                                  | 47-63 Hz  |   |   |   |
|   | DC                                  | 0 Hz  |   |   |   |
| typical current / power consumption                                   | at 110 V AC                         | 308 mA / 19.5 VA  | 577 mA / 37.3 VA  | 344 mA / 22.2 VA  | 565 mA / 36.5 VA  |
|   | at 240 V AC                         | 188 mA / 19.7 VA  | 335 mA / 36.6 VA  | 214 mA / 22.9 VA  | 336 mA / 37.2 VA  |
| Inrush current  |                                     | 18 A  | 40 A  | 18 A  | 40 A  |
| Power failure buffering   |                                     | > 75 ms   | > 30 ms   | > 75 ms   | > 30 ms   |
| Internal input fuse   |                                     | 2 A slow-acting / 250 V AC  |   |   |   |
| <b>Indication of operational states</b>                               |                                     |   |   |   |   |
| Output voltage  | OUTPUT OK: green LED                | ┌───┐: output voltage applied                                     |   |   |   |
|   | OUTPUT LOW: red LED                 | ┌───┐:<br>output voltage<br>too low                               | -   | ┌───┐:<br>output voltage<br>too low                               | -   |
| <b>Output circuit</b>   | <b>L+,L-</b>                        |   |   |   |   |
| Rated output voltage  |                                     | 5 V DC  | 12 V DC   | 24 V DC   |   |
| Tolerance of the output voltage                                       |                                     | ±1 %  |   |   |   |
| Adjustment range of the output voltage                                |                                     | 4.5-5.75 V DC   | 12-14 V DC  | 21.6-28.8 V DC  | 24-28 V DC  |
| Rated output power  |                                     | 15 W  | 30 W  | 18 W  | 30 W  |
| Rated output current $I_o$  | $T_a < 60\text{ °C}$                | 3,0 A   | 2,5 A   | 0,75 A  | 1,25 A  |
| Derating of the output current  | $60\text{ °C} < T_a < 70\text{ °C}$ | 3 %/K   | 2.5 %/K   | 3 %/K   | 2.5 %/K   |
| Signal output for output voltage OK                                   | DC OK                               | -   |   |   | yes   |
| Deviation with load change 10-90%                                     | statical                            | max. ±2 %   | max. 0.5 %  | max. ±2 %   | max. 0.5 %  |
|   | dynamical                           |   |   |   |   |
| change of input voltage within the input voltage range                |                                     | max. ±1 %   | max. 0.5 %  | max. ±1 %   | max. 0.5 %  |
| Control time  |                                     | < 2 ms  |   |   |   |
| Starting time after applying the supply voltage                       | at $I_o$                            | max. 1 s  |   |   |   |
| Response time   | at rated load                       | max. 150 ms   |   |   |   |
| Residual ripple and switching peaks                                   | BW = 20 MHz                         | 50 mV   |   |   |   |
| Parallel connection   |                                     | yes, to enable redundancy   |   |   |   |
| Series connection to increase voltage                                 |                                     | yes, for decoupling   |   |   |   |
| Resistance to reverse feed  |                                     | yes, limited to approx. 9 V DC                                    | yes, limited to approx. 18 V DC                                   | yes, limited to approx. 35 V DC                                   |   |
| Power factor correction (PFC)   |                                     | no  |   |   |   |
| <b>Output circuit - No-load, overload and short-circuit behaviour</b> |                                     |   |   |   |   |
| Output curve  |                                     | Hiccup-mode   | U/I curve   | Hiccup-mode   | U/I curve   |
| Short-circuit protection  |                                     | continuous short circuit stability                                |   |   |   |
| Short-circuit behaviour   |                                     | Hiccup-mode   | continuation with current limitation                              | Hiccup-mode   | continuation with current limitation                              |
| Overload protection   |                                     | thermal protection with switch-off and restart                    | current limitation  | thermal protection with switch-off and restart                    | current limitation  |
| No-load protection  |                                     | continuous no-load stability                                      |   |   |   |
| Starting of capacitive loads  |                                     | not possible  | unlimited   | not possible  | unlimited   |
| <b>General data</b>   |                                     |   |   |   |   |
| typical efficiency  |                                     | 75 %  | 84 %  | 77 %  | 86 %  |
| Duty time   |                                     | 100 %   |   |   |   |
| Dimensions (WxHxD)  |                                     | 23.9 mm x 88.5 mm x 115 mm<br>[0.94 inch x 3.48 inch x 4.53 inch] | 43.5 mm x 88.5 mm x 115 mm<br>[1.71 inch x 3.48 inch x 4.53 inch] | 23.9 mm x 88.5 mm x 115 mm<br>[0.94 inch x 3.48 inch x 4.53 inch] | 43.5 mm x 88.5 mm x 115 mm<br>[1.71 inch x 3.48 inch x 4.53 inch] |
| Weight  |                                     | 0.15 kg (0.33 lb)   | 0.29 kg (0.64 lb)   | 0.15 kg (0.33 lb)   | 0.29 kg (0.64 lb)   |
| Material of enclosure   |                                     | plastic   |   |   |   |
| Mounting  |                                     | DIN rail (EN 60715), snap-on mounting without any tool            |   |   |   |
| Mounting position   |                                     | horizontal  |   |   |   |
| Minimum distance to other units                                       | horizontal / vertical               | 25 mm / 25 mm   |   |   |   |

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Data at  $T_a = 25\text{ °C}$ ,  $U_{IN} = 230\text{ V AC}$  and rated values, if nothing else indicated

| Type  |                                      | CP-E 5/3.0   | CP-E 12/2.5 | CP-E 24/0.75 | CP-E 24/1.25 |
|---|--------------------------------------|--|-------------|--------------|--------------|
| Degree of protection                            | enclosure / terminals                | IP 20 / IP 20                                      |             |              |              |
| Protection class                                |                                      | 1  |             |              |              |
| <b>Electrical connection - input circuit</b>    |                                      |  |             |              |              |
| Wire size<br>min. / max.                        | fine-strand with wire end ferrule    | 0.2-2.0 mm <sup>2</sup> (24-14 AWG)                |             |              |              |
|   | fine-strand without wire end ferrule | 0.2-2.0 mm <sup>2</sup> (24-14 AWG)                |             |              |              |
|   | rigid                                | 0.2-2.0 mm <sup>2</sup> (24-14 AWG)                |             |              |              |
| Stripping length                                |                                      | 6 mm   |             |              |              |
| Torque  |                                      | 0.5-0.6 Nm   |             |              |              |
| <b>Electrical connection - output circuit</b>   |                                      |  |             |              |              |
| Wire size<br>min. / max.                        | fine-strand with wire end ferrule    | 0.2-2.0 mm <sup>2</sup> (24-14 AWG)                |             |              |              |
|   | fine-strand without wire end ferrule | 0.2-2.0 mm <sup>2</sup> (24-14 AWG)                |             |              |              |
|   | rigid                                | 0.2-2.0 mm <sup>2</sup> (24-14 AWG)                |             |              |              |
| Stripping length                                |                                      | 6 mm   |             |              |              |
| Torque  |                                      | 0.5-0.6 Nm   |             |              |              |
| <b>Environmental data</b>                       |                                      |  |             |              |              |
| Ambient temperature range                       | operation                            | -10...+70 °C (from + 60...70 °C derating 2,5 %/°C) |             |              |              |
|   | full load                            | -10...+60 °C                                       |             |              |              |
|   | storage                              | -25...+85 °C                                       |             |              |              |
| Humidity (cyclic) (IEC/EN 60068-2-30)           |                                      | 4x24 cycle, 40 °C, 95 % RH                         |             |              |              |
| Vibration (sinusoidal) (IEC/EN 60068-2-6)       |                                      | 10 m/s <sup>2</sup> , 10...500 Hz                  |             |              |              |
| Shock (half-sine) (IEC/EN 60068-2-27)           |                                      | 40 m/s <sup>2</sup> , 22 ms, all directions        |             |              |              |
| <b>Isolation data</b>                           |                                      |  |             |              |              |
| Rated insulation voltage $U_i$                  | input circuit / output circuit       | 3 kV AC  |             |              |              |
| Pollution category                              |                                      | 2  |             |              |              |
| <b>Standards</b>                                |                                      |  |             |              |              |
| Product standard                                |                                      | IEC/EN 61204                                       |             |              |              |
| Low Voltage Directive                           |                                      | 73/23/EEC  |             |              |              |
| EMC directive                                   |                                      | 89/336/EEC   |             |              |              |
| Electrical safety                               |                                      | EN 60950-1, UL 60950-1, UL 508                     |             |              |              |
| Protective low voltage                          |                                      | SELV (EN 60950)                                    |             |              |              |
| <b>Electromagnetic compatibility</b>            |                                      |  |             |              |              |
| Interference immunity                           |                                      | IEC/EN 61000-6-2                                   |             |              |              |
| electrostatic discharge (ESD)                   | IEC/EN 61000-4-2                     | Level 4 (8 kV / 15 kV)                             |             |              |              |
| electromagnetic field (HF radiation resistance) | IEC/EN 61000-4-3                     | Level 3 (10 V/m)                                   |             |              |              |
| fast transients (Burst)                         | IEC/EN 61000-4-4                     | Level 4 (4 kV)                                     |             |              |              |
| powerful impulses (Surge)                       | IEC/EN 61000-4-5                     | Level 4 (2kV / 4 kV)                               |             |              |              |
| HF line emission                                | IEC/EN 61000-4-6                     | Level 3 (10 V)                                     |             |              |              |
| Interference emission                           |                                      | IEC/EN 61000-6-3                                   |             |              |              |
| electromagnetic field (HF radiation resistance) | IEC/CISPR 22, EN 55022               | Class B  |             |              |              |
| HF line emission                                | IEC/CISPR 22, EN 55022               | Class B  |             |              |              |

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Data at  $T_a = 25\text{ °C}$ ,  $U_{IN} = 230\text{ V AC}$  and rated values, if nothing else indicated

| Type  |                                     | CP-E 24/2.5   | CP-E 48/0.62      | CP-E 48/1.25      |
|---|-------------------------------------|---|-------------------|-------------------|
| <b>Input circuit</b>  | <b>L, N</b>                         |   |                   |                   |
| Rated input voltage $U_{IN}$  |                                     | 100-240 V AC  |                   |                   |
| Input voltage range   | AC                                  | 85-264 V AC   |                   |                   |
|   | DC                                  | 90-375 V DC   |                   |                   |
| Frequency range   | AC                                  | 47-63 Hz  |                   |                   |
|   | DC                                  | 0 Hz  |                   |                   |
| typical current / power consumption                                   | at 110 V AC                         | 1.1 A / 70.5 VA   | 563 mA / 35.8 VA  | 1.1 A / 69.7 VA   |
|   | at 240 V AC                         | 620 mA / 71 VA  | 334 mA / 35.6 VA  | 620 mA / 69.9 VA  |
| Inrush current  |                                     | 60 A  | 40 A              | 60 A              |
| Power failure buffering   |                                     | > 30 ms   |                   |                   |
| Internal input fuse   |                                     | 2 A slow-acting / 250 V AC  |                   |                   |
| <b>Indication of operational states</b>                               |                                     |   |                   |                   |
| Output voltage  | OUTPUT OK: green LED                | ┌───┐: output voltage applied                                     |                   |                   |
|   | OUTPUT LOW: LED rot                 | -   |                   |                   |
| <b>Output circuit</b>   | <b>L+,L-</b>                        |   |                   |                   |
| Rated output voltage  |                                     | 24 V DC   | 48 V DC           | 48 V DC           |
| Tolerance of the output voltage                                       |                                     | ±1 %  |                   |                   |
| Adjustment range of the output voltage                                |                                     | 24-28 V DC  | 48-55 V DC        |                   |
| Rated output power  |                                     | 60 W  | 30 W              | 60 W              |
| Rated output current $I_o$  | $T_a < 60\text{ °C}$                | 2.5 A   | 0.625 A           | 1.25 A            |
| Derating of the output current  | $60\text{ °C} < T_a < 70\text{ °C}$ | 2.5 %/K   |                   |                   |
| Signal output for output voltage OK                                   | DC OK                               | yes   | -                 |                   |
| Deviation with load change 10-90%                                     | statical                            | max. 0.5 %  |                   |                   |
|   | dynamical                           |   |                   |                   |
| change of input voltage within the input voltage range                |                                     | max. ±1 %   | max. 0.5 %        | max. ±1 %         |
| Control time  |                                     | < 2 ms  |                   |                   |
| Starting time after applying the supply voltage                       | at $I_o$                            | max. 1 s  |                   |                   |
| Response time   | at rated load                       | max. 150 ms   |                   |                   |
| Residual ripple and switching peaks                                   | BW = 20 MHz                         | 50 mV   |                   |                   |
| Parallel connection   |                                     | yes, to enable redundancy   |                   |                   |
| Series connection to increase voltage                                 |                                     | yes, for decoupling   |                   |                   |
| Resistance to reverse feed  |                                     | yes, limited to approx. 35 V DC                                   |                   |                   |
| Power factor correction (PFC)   |                                     | no  |                   |                   |
| <b>Output circuit - No-load, overload and short-circuit behaviour</b> |                                     |   |                   |                   |
| Output curve  |                                     | U/I curve   |                   |                   |
| Short-circuit protection  |                                     | continuous short circuit proof                                    |                   |                   |
| Short-circuit behaviour   |                                     | continuation with current limitation                              |                   |                   |
| Overload protection   |                                     | current limitation  |                   |                   |
| No-load protection  |                                     | continuous no-load stability                                      |                   |                   |
| Starting of capacitive loads  |                                     | unlimited   |                   |                   |
| <b>General data</b>   |                                     |   |                   |                   |
| typical efficiency  |                                     | 89 %  | 86 %              | 89 %              |
| Duty time   |                                     | 100 %   |                   |                   |
| Dimensions (WxHxD)  |                                     | 43.5 mm x 88.5 mm x 115 mm<br>(1.71 inch x 3.48 inch x 4.53 inch) |                   |                   |
| Weight  |                                     | 0.36 kg (0.79 lb)   | 0.29 kg (0.64 lb) | 0.36 kg (0.79 lb) |
| Material of enclosure   |                                     | plastic   |                   |                   |
| Mounting  |                                     | DIN rail (EN 60715),<br>snap-on mounting without any tool         |                   |                   |
| Mounting position   |                                     | horizontal  |                   |                   |
| Minimum distance to other units                                       | horizontal / vertical               | 25 mm / 25 mm   |                   |                   |
| Degree of protection  | enclosure / terminals               | IP 20 / IP 20   |                   |                   |
| Protection class  |                                     | 1   |                   |                   |

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### Technical data

Data at  $T_a = 25\text{ °C}$ ,  $U_{IN} = 230\text{ V AC}$  and rated values, if nothing else indicated

| Type  |                                      | CP-E 24/2.5 | CP-E 48/0.62                                      | CP-E 48/1.25 |
|---|--------------------------------------|-------------|---|--------------|
| <b>Electrical connection - input circuit</b>    |                                      |             |   |              |
| Wire size<br>min. / max.                        | fine-strand with wire end ferrule    |             | 0.2-2.0 mm <sup>2</sup> (24-14 AWG)               |              |
|   | fine-strand without wire end ferrule |             | 0.2-2.0 mm <sup>2</sup> (24-14 AWG)               |              |
|   | rigid                                |             | 0.2-2.0 mm <sup>2</sup> (24-14 AWG)               |              |
| Stripping length                                |                                      |             | 6 mm  |              |
| Torque  |                                      |             | 0.5-0.6 Nm  |              |
| <b>Electrical connection - output circuit</b>   |                                      |             |   |              |
| Wire size<br>min. / max.                        | fine-strand with wire end ferrule    |             | 0.2-2.0 mm <sup>2</sup> (24-14 AWG)               |              |
|   | fine-strand without wire end ferrule |             | 0.2-2.0 mm <sup>2</sup> (24-14 AWG)               |              |
|   | rigid                                |             | 0.2-2.0 mm <sup>2</sup> (24-14 AWG)               |              |
| Stripping length                                |                                      |             | 6 mm  |              |
| Torque  |                                      |             | 0.5-0.6 Nm  |              |
| <b>Environmental data</b>                       |                                      |             |   |              |
| Ambient temperature range                       | operation                            |             | -10...+70 °C (from +60...70 °C derating 2,5 %/°C) |              |
|   | full load                            |             | -10...+60 °C                                      |              |
|   | storage                              |             | -25...+85 °C                                      |              |
| Humidity (cyclic) (IEC/EN 60068-2-30)           |                                      |             | 4 x 24 cycle, 40 °C, 95 % RH                      |              |
| Vibration (sinusoidal) (IEC/EN 60068-2-6)       |                                      |             | 10 m/s <sup>2</sup> , 10...500 Hz                 |              |
| Shock (half-sine) (IEC/EN 60068-2-27)           |                                      |             | 40 m/s <sup>2</sup> , 22 ms, all directions       |              |
| <b>Isolation data</b>                           |                                      |             |   |              |
| Rated insulation voltage $U_i$                  | input circuit / output circuit       |             | 3 kV AC   |              |
| Pollution category                              |                                      |             | 2   |              |
| <b>Standards</b>                                |                                      |             |   |              |
| Product standard                                |                                      |             | IEC/EN 61204                                      |              |
| Low Voltage Directive                           |                                      |             | 73/23/EEC   |              |
| EMC directive                                   |                                      |             | 89/336/EEC  |              |
| Electrical safety                               |                                      |             | EN 60950-1, UL 60950-1, UL 508                    |              |
| Protective low voltage                          |                                      |             | SELV (EN 60950)                                   |              |
| <b>Electromagnetic compatibility</b>            |                                      |             |   |              |
| Interference immunity                           |                                      |             | IEC/EN 61000-6-2                                  |              |
| electrostatic discharge (ESD)                   | IEC/EN 61000-4-2                     |             | Level 4 (8 kV / 15 kV)                            |              |
| electromagnetic field (HF radiation resistance) | IEC/EN 61000-4-3                     |             | Level 3 (10 V/m)                                  |              |
| fast transients (Burst)                         | IEC/EN 61000-4-4                     |             | Level 4 (4 kV)                                    |              |
| powerful impulses (Surge)                       | IEC/EN 61000-4-5                     |             | Level 4 (2 kV / 4 kV)                             |              |
| HF line emission                                | IEC/EN 61000-4-6                     |             | Level 3 (10 V)                                    |              |
| Interference emission                           |                                      |             | IEC/EN 61000-6-3                                  |              |
| electromagnetic field (HF radiation resistance) | IEC/CISPR 22, EN 55022               |             | Class B   |              |
| HF line emission                                | IEC/CISPR 22, EN 55022               |             | Class B   |              |