

CPS-EC1500

1500W Precision DC Rectifier

DIN-Rail Battery Charger, A/V Adjustable Industrial Power



Specification:

- Real time output current monitoring
- Precision potentiometer f. voltage & current
- Power Good Relay AC & DC-ok
- C/V curve down to 0V, no fold back
- Sense control 2V per load line
- Electronic inrush current limiter 20,7Apeak
- Inhibit function (Interlock)
- External shutdown
- Boost Charge Mode
- Precise dynamic response to load change
- Designed for long life under full stress
- Strong input filters
- Hold up time >20ms
- High reliability, shock & vibration proof
- Overload and short circuit protection
- Efficiency up to 94%
- EMI/EMS EN61000-6-2,3, EN55032
- EN61010-1, EN61010-2-201, EN62368-1

| Models | Voltage | Voltage setting | Current setting |
|----------------|---------|-----------------|-----------------|
| CPS-EC1500.024 | 24Vdc | 24 – 30Vdc | 31,3 – 62,5A |
| CPS-EC1500.036 | 36Vdc | 36 – 45Vdc | 20,9 – 41,7A |
| CPS-EC1500.048 | 48Vdc | 48 – 58Vdc | 15,6 – 31,2A |
| CPS-EC1500.060 | 60Vdc | 60 – 75Vdc | 12,5 – 25,0A |
| CPS-EC1500.072 | 72Vdc | 72 – 90Vdc | 10,4 – 20,8A |
| CPS-EC1500.110 | 110Vdc | 110 – 137Vdc | 6,8 – 13,6A |
| CPS-EC1500.150 | 150Vdc | 132 – 180Vdc | 5,0 – 10,0A |
| CPS-EC1500.220 | 220Vdc | 220 – 264Vdc | 3,4 – 6,8A |
| CPS-EC1500.400 | 400Vdc | 330 – 400Vdc | 2,3 – 4,6A |



Technical Concept

The Camtec CPS-EC series is a high precision switch mode power supply for an upscale demand. The unit is C/V adjustable. It is engineered and manufactured by CAMTEC in Germany. The designed meets challenging applications like railway, complex drives, battery charging for DC-UPS, test-stands, machine-building and professional LED lighting. The power supply provides a low ripple-noise, a precise load-regulation and high efficiency up to 94%. High-end long-life capacitors guarantee an extended hold-up-time and an extraordinary lifetime of the power supply. The circuit design starts complex loads easily. The internal control circuit manages illegal operating conditions to prevent your system from damages. The CPS-EC series features active high input transients with suppressor diodes, X2-capacitors and varistors. All inputs, outputs and feature connections are galvanic isolated. The design rules set value on extended interference immunity and safety. The unit is designed in accordance with the EN60950-1, EN62368-1, EN61010-1, EN61010-2-201 and the EMC-compatibility with EN55032.

Features

Design Conception

The CPS-EC power supply series realizes very high-power efficiency in a space-saving housing. Latest generation electrical devices relate to the high reliability of all CAMTEC products. The CAMTEC philosophy is, to employ 125°C low ESR ultra long-life capacitors where expedient to achieve a superior lifetime of the product. The CPS-EC power supply is made for high reliable and demanding industrial applications, railway, unbreakable power supply charger (DC-UPS), professional high-power lighting (floodlight, production hall) and for telecom & demanding IT applications.

Voltage Setting Potentiometer

The output voltage limit can be adjusted with a 15 turns high precision potentiometer. The listed values are guaranteed by the factory. The tolerance of the upper margin is $-0/+5\%$. The tolerance of the lower margin is $-5%/+0\%$. The output voltages cover the typical cell voltage range of standard lead acid batteries.

Current Setting Potentiometer

The output current limit can be adjusted with a 15 turns high precision potentiometer. The listed values are guaranteed by the factory. The tolerance of the upper margin is $-0/+5\%$. The tolerance of the lower margin is $-5%/+0\%$.

Output Current Monitoring

The CPS-EC power supply features a 0-5Vdc signal output. It is a real-time linear signal and indicates the current consumption of the load. The measuring point is directly at the output connection of the device.

Boost Charge Mode

The CPS-EC1500 offers a boost charge mode. The defined current limiting can be triggered from an external signal to increase for 10% the set value.

Sensing

The device has a sense operation mode to compensate a voltage drop at the load line.

Inhibit contact (Interlock)

The inhibit inputs can be connected to a safety contact or a safety relay. When the contact is open the power supply will remain in a completely locked shut down mode. The unit powers up as soon as the contact is closed.

Remote Shutdown feature

All CPS-EC units are featured with a shutdown (switch/open collector).

DC-ok Power Good Relay

The PG Relay connection indicates over temperature, low DC-voltage at the output, low AC supply voltage at the input, inhibit and the shutdown mode.

Galvanic Isolation

The power supply is galvanic isolated between the input and the output. All features like Shut Down, Inhibit and the Power Good Relay are isolated from the DC-power outputs and the sense connections. Sensing and the Current Monitoring are connected to the DC power outputs.

Thermal shutdown

The CPS-EC series is featured with a thermal overload shut down and auto recovery behavior.

Over Voltage Protection

Ticker mode and auto recovery.

Short Circuit Protection

A continuous short circuit does not cause damage to the power supply. The CPS-EC delivers constant current and 0 output voltage. It recovers automatically after the short circuit is released.

Open Circuit Protection

The CPS-EC series is continuously open circuit protected. The device delivers a stable output voltage and no current. If a load is immediately connected to the device, the power supply stabilizes within 1ms. It does not overshoot the output voltage.

Power Up Ramp

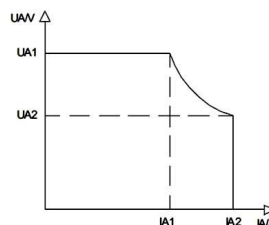
The devices have a soft start ramp when powering up. The device does not either overshoot the voltage nor does the output flutter – independent if a load is connected or not.

Inrush Limiter

The power supply provides an electronic inrush current limiter that works absolute accurately with a low inrush of only 14,7A RMS value. The limiter works independent from the ambient temperature and its tolerance is only $\pm 10\%$.

Current Voltage Chart, CV & CC mode

The CPS-EC series provides a perfect current voltage chart. It has no fold back or other abnormalities. The output voltage can drop down to zero volts when the power supply is overloaded. The unit delivers a stable and constant current to the outputs. The device can be used either in the CV or in the CC mode (auto switch).

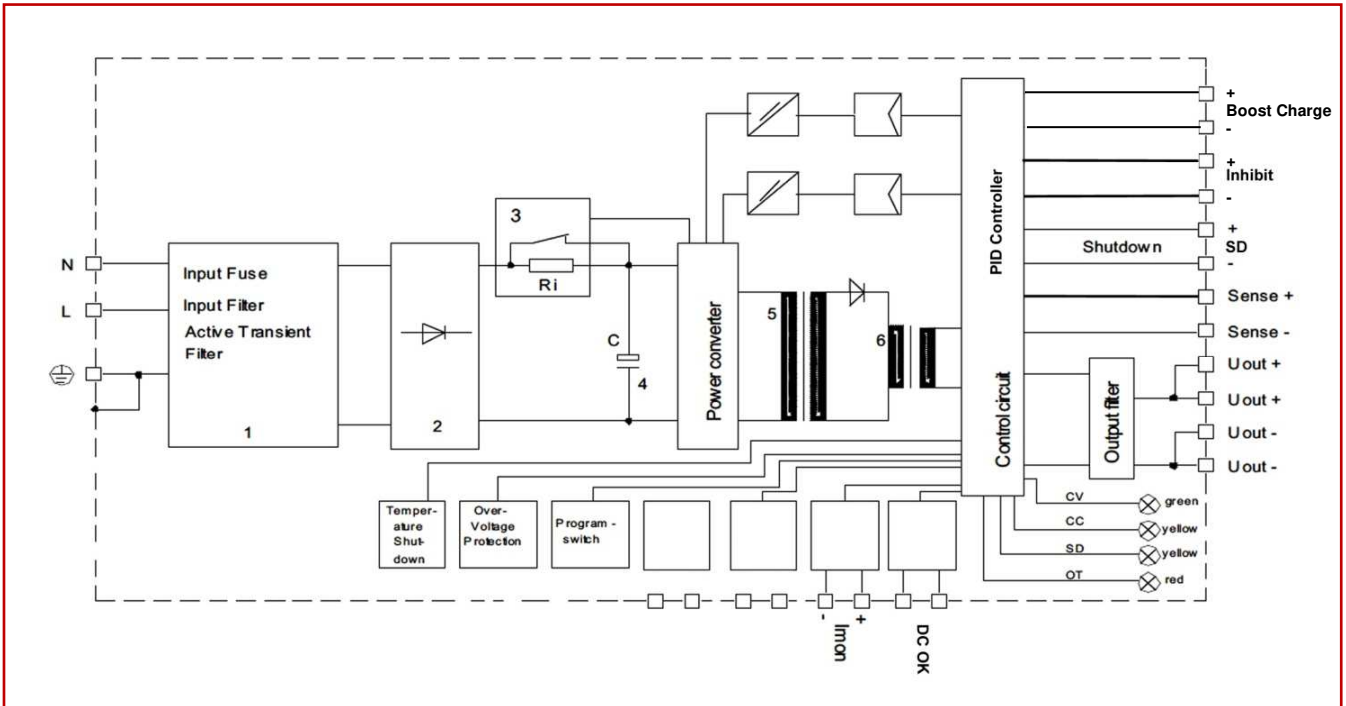




Technical Data Table

| | | | | | | | | | |
|------------------------------|---|--------------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|
| AC Input Range | 184 – 264Vac , 47 – 63Hz | | | | | | | | |
| DC Input Range | 250Vdc – 375Vdc | | | | | | | | |
| AC Input Rated | 230Vac<13,5A | | | | | | | | |
| DC Input Rated | 250Vdc<7,5A 375Vdc<5,0A | | | | | | | | |
| DC Output Voltage Rated | 24Vdc | 36Vdc | 48Vdc | 60Vdc | 72Vdc | 110Vdc | 150Vdc | 220Vdc | 400Vdc |
| DC Voltage Setting Range | 24 – 30Vdc | 36 – 45Vdc | 48 – 58Vdc | 60 – 75Vdc | 72 – 90Vdc | 110 – 137Vdc | 132 – 180Vdc | 220 – 264Vdc | 330 – 400Vdc |
| DC Current Setting Range | 31,3 – 62,5A | 20,9 – 41,7A | 15,6 – 31,2A | 12,5 – 25,0A | 10,4 – 20,8A | 6,8 – 13,6A | 5,0 – 10,0A | 3,4 – 6,8A | 2,3 – 4,6A |
| Over Voltage Protection | 34Vdc | 50Vdc | 67Vdc | 84Vdc | 100Vdc | 154Vdc | 210Vdc | 310Vdc | 450Vdc |
| Over Current Protection | 62,5A | 41,7A | 31,2A | 25,0A | 20,8A | 13,6A | 10,0A | 6,8A | 4,6A |
| Ripple Noise 230Vac 20MHz | 40mV | 80mV | 120mV | 150mV | 200mV | 300mV | 400mV | 400mV | 400mV |
| Power Rated | 1500W, 184-264Vac | | | | | | | | |
| Potentiometer C/V Setting | 15 turns high precision, protective forced isolation to the inputs and the output 3000Vac | | | | | | | | |
| Operation Failure Relay | Yes, break contact, protective forced isolation to the inputs and the output 3000Vac | | | | | | | | |
| Sense Function | Compensation 2V per load line | | | | | | | | |
| Remote Shutdown | Yes, protective forced isolation to the inputs and the output 3000Vac | | | | | | | | |
| Inhibit Function (Interlock) | Yes, protective forced isolation to the inputs and the output 3000Vac | | | | | | | | |
| Derating | +60°C...+70°C 2.5%/°C | | | | | | | | |
| Accuracy | < ± 1.5% interface | | | | | | | | |
| Load Regulation | < ± 0.05% 0-100% | | | | | | | | |
| Start up from Shutdown | Typ. 420ms | | | | | | | | |
| Start up from Inhibit | Typ. 420ms | | | | | | | | |
| Response to Load Change | <1ms 10-100%, 100-10% | | | | | | | | |
| Base Load | None required (open circuit proof) | | | | | | | | |
| Efficiency 230Vac | 92-94% at 90% load | | | | | | | | |
| Short Circuit Protection | Continuous | | | | | | | | |
| Open Circuit Proof | Continuous | | | | | | | | |
| Temperature Control | Yes, thermal shutdown with auto recovery (+70°C, metering distance 50mm) | | | | | | | | |
| Hold Up Time | >20ms 230Vac | | | | | | | | |
| Inrush Current ±5% | <14,7Aeff <20,7Apeak (230Vac) active inrush current limiter | | | | | | | | |
| MCB (Circuit Breaker) | 16A type B | | | | | | | | |
| Soft Start | 100ms typical | | | | | | | | |
| Cooling | Controlled and stepless fans from manufacturer EBM Papst (Germany) | | | | | | | | |
| Ambient Operating Temp. | - 25°C...+70°C | | | | | | | | |
| Ambient Storage Temp. | - 40°C...+85°C | | | | | | | | |
| Environment | Humidity 95% non-condensing @ 25°C, climate class. 3k3, pollution rate II | | | | | | | | |
| ROHS | 2011/65/EU, (EU)2015/863 | | | | | | | | |
| REACH | EG No. 1907/2006 | | | | | | | | |
| EMI | EN55032 conducted class B, radiated class A, EN61000-6-3 | | | | | | | | |
| EMS | EN61000-6-2 | | | | | | | | |
| Safety | EN61010-1, EN61010-2-201, EN62368-1 (not 400Vdc model), EN60950-1, EN60204-1 | | | | | | | | |
| Protection Class 1 | PE connection required | | | | | | | | |
| Isolation Paths | > 8mm creepage distance & clearance paths | | | | | | | | |
| Input to Output Isolation | 3000Vac | | | | | | | | |
| Input to Case Isolation | 2500Vac | | | | | | | | |
| Output to Case Isolation | 500Vdc , models ≥48Vdc=2800Vdc | | | | | | | | |
| MTBF (IEC61709) | 400000h (Meantime Between Failures: statistic time between failures after repairs) | | | | | | | | |
| MTTF (IEC61709) | 144006h (Meantime To Failure: statistic time to ever fails) | | | | | | | | |
| Dimensions (HxWxD) | 161x250x119.5mm | | | | | | | | |
| Weight | 4,1kg / 9,0lbs | | | | | | | | |
| AC Terminals | Input Screw Terminal 3x AWG22 – AWG6 / 0,5 – 16mm ² (L,N,PE) | | | | | | | | |
| DC Terminals | Output Screw Terminal 4x AWG22 – AWG6 / 0,5 – 16mm ² (+ + / - -) | | | | | | | | |

Manual and Technical Details



1) Active Transient Filter 2) Rectifier 3) Inrush Current Limiter 4) Load Capacitor 5) Power Transformer 6) Storage Choke
 LED: CV = constant voltage operation CC = constant current operation SD/INH = shutdown / inhibit OT = temperature failure >70°C

Technical Data Table - Analogue Interface & Voltage Current Control

| Feature | Technology | Details and Connections | Section | Isolation |
|-----------------------|------------------|--|-------------|---------------------------|
| Potentiometer Voltage | 15 turns | High precision | U adj | 3000Vac to input & output |
| Potentiometer Current | 15 turns | High precision | I adj | 3000Vac to input & output |
| Monitoring Current | 0...5Vdc/5mA | AWG22 – AWG6 / 0,25 – 1,5mm ² | I mon | 3000Vac to input |
| Shutdown | Open Collector * | AWG22 – AWG6 / 0,25 – 1,5mm ² | SD | 3000Vac to input & output |
| Inhibit (Interlock) | Open Collector * | AWG22 – AWG6 / 0,25 – 1,5mm ² | Inhibit | 3000Vac to input & output |
| Sense Compensation | 1V per load line | AWG22 – AWG6 / 0,25 – 1,5mm ² | Sense & Aux | 3000Vac to input |
| Boost Charge | Open Collector * | AWG22 – AWG6 / 0,25 – 1,5mm ² | BC | 3000Vac to input & output |
| Power Good Relay | "b" contact | AWG22 – AWG6 / 0,25 – 1,5mm ² | DC-OK | 3000Vac to input & output |

*can also be used with a simple passive switch

All potentiometers and all the inputs and the outputs of the analogue interface provide a forced isolation. It is to ensure a protective isolation for the 400Vdc.

DC Voltage & Current adjustment range

| Rated DC Voltage | 24Vdc | 36Vdc | 48Vdc | 60Vdc | 72Vdc | 110Vdc | 150Vdc | 220Vdc | 300Vdc |
|--------------------------|--------------|--------------|--------------|--------------|--------------|----------------|--------------|--------------|--------------|
| DC Voltage Setting Range | 24 – 30Vdc | 36 – 45Vdc | 48 – 58Vdc | 60 – 75Vdc | 72 – 90Vdc | 110 – 137,5Vdc | 132 – 180Vdc | 220 – 264Vdc | 330 – 400Vdc |
| DC Current Setting Range | 31,3 – 62,5A | 20,9 – 41,7A | 15,6 – 31,2A | 12,5 – 25,0A | 10,4 – 20,8A | 6,8 – 13,6A | 5,0 – 10,0A | 3,4 – 6,8A | 2,3 – 4,6A |

The DC voltage and the current can be adjusted with a high precision 15 turn potentiometer with low temperature fading. The factory setting is to the rated voltage & current from the table above. Due to the tolerances of the potentiometers, the lower margin of the output voltage can be adjusted below the upper threshold margin of the DC Power Good Relay (see p.6). To ensure a proper operation, the DC voltage setting must stay above the upper hysteresis level of the Power Good Relay. We guarantee the above given adjustment ranges with a tolerance of -5/0% for the lower margin and 0/+5% for the upper margin.

Monitoring of the Output Current Consumption

The Current Monitor I_{mon} output is buffered with OP-amplifiers, pre-resistors & parallel connected Zener diodes. The monitor output delivers 0-5Vdc 5mA control voltage. The signal is absolute proportional to the adjusted output current. The signal is real time, and the measuring point is exactly at the DC outputs of the power supply unit. The monitoring is directly connected with the DC power outputs.

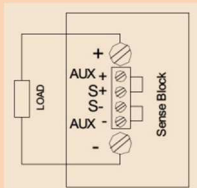
Sensing (Load Line Compensation)

The CPS-EC provides a sensing function to compensate a voltage drop from the load lines. The maximum compensation is 2V. Be aware that this operation mode may recommend extended preparations concerning interference elimination. If the sensing feature is not used the S +/- must be connected to AUX +/- with very short wires (factory setting).

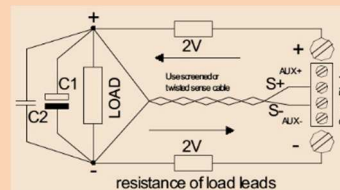
To use the sensing feature, please disconnect the local sensing wires from the AUX +/- and the S +/- connections. Connect the sense lines to the load. Make sure that +/- connections are matching!

WARNING! Reverse polarity of the sense lines can cause damages to the power supply unit.

To basically prevent from interferences, enable to twist sense compensation lines. To reduce inductive influences, make sure that the load wires are installed close to each other. Driving a pulsative load requires a large electrolytic and a ceramic capacitor. Make sure that C1 & C2 are not oscillating with load wires. It would cause ripple voltage into the load lines. The internal over voltage protection (OVP) controls the output voltage directly at the DC output connections. It opens automatically in case of a failure from the DC source (see OVP table).



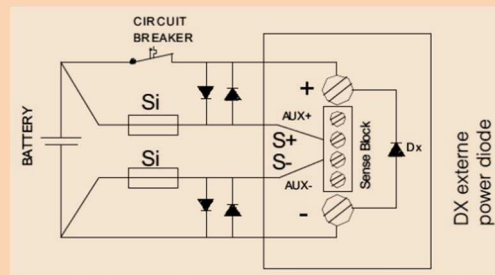
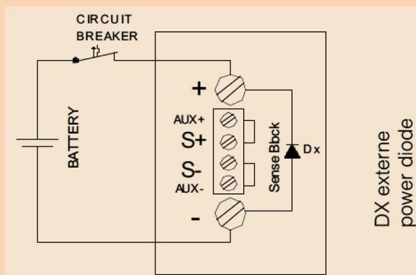
Local Sensing
(factory setting)



Remote Sensing
(twist wires)

Remote Sensing with Battery Charger

When using the CPS-EC as a battery charger please avoid the remote sensing operation mode. It may cause serious damage to the unit when the battery connections are being mixed up. If you really need to install a remote sensing apply to the below figure circuit. Good values are 250mA for the Si fuses and 3...5A capability for the diodes.



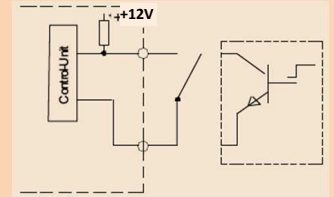
Inhibit (Interlock)

The inhibit inputs can be connected to a safety contact or a safety relay. When the contact is open the power supply will remain completely locked in a shutdown mode. The unit powers up immediately when the connection is closed. The current through the inhibit connection is typically 2mA.

WARNING! It is prohibited to apply an external voltage to the inhibit connection! The CPS-EC unit can be seriously damaged! Always use passive mechanical contacts from switchers or relays. Between control input INH, power input and power output is a reinforced Isolation of max. 400Vdc.

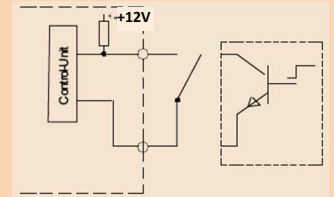
Shutdown

All CPS-EC units are featured with an external shutdown (switch/open collector). When the connection is open the power-supply operates. When the connection is closed the power supply goes into a standby mode (short-circuited). The power supply powers up as soon as the shutdown connections is opened. The signal through the connections is 1Vdc max. . The shutdown connections have an internal pull-up resistor with 4700 Ω at the plus line (max. +12V inserted).



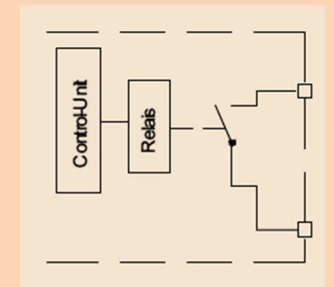
Boost Charge

The CPS-EC1500 features a boost charge mode (switch/open collector). When the connection is open the power-supply operates the set current. When it is closed (short-circuited) the power supply delivers +10% current boost. The overall power of 1500W cannot be exceeded. The boost charge is no power-boost, and it is recommended to set the current limiting to $\leq 90\%$. The factory set is 100%. The boost charge releases as soon as the connection is opened. The signal through the connection is 1Vdc max. . The boost charge connections have an internal pull-up resistor with 4700 Ω at the plus line (max. +12V inserted).



DC-OK (Power Good Relay)

The DC ok relay indicates if the output voltage is low and if the AC voltage is low. The contact is galvanic insulated to the AC input and the DC output connections. The isolation is 3000Vac with a forced isolation and covers the overall adjustment range of the CPS-EC series up to 400Vdc. If the DC voltage is ok the relay is closed, if the power supply unit is in false operation, in the shutdown or in the inhibit mode, the relay is open. Considering the lower and the upper margin of the AC voltage detection it is to say that the CPS-EC series starts at 150Vac. The unit starts with 210Vdc when a DC voltage applies to the input.



The below table of values shows the hysteresis of the lower and upper threshold margins where the DC OK Relay indicates a low voltage. The nominal voltage of the cell voltage of a typical lead acid battery VRLA & vented GEL & AGM is listed (OPsZ, OPzS, OPzV, OGi, OGiV, GiV types).
WARNING! Regarding the DC-output voltage setting range it is important to consider that this data sheet shows the guaranteed values. In practice the range will be wider and with some models the lower margin of the setting range will be below the DC ok high margin of the DC-ok relay. Make sure that the output voltage setting will properly stay above the DC ok high margin to avoid false messages from the relay. ^

Hysteresis & Threshold Margins

| Model | Nominal [V] | DC ok low | DC ok high | No. of Cells | Nominal Cell [V] | Input ok low | Input ok high |
|----------------|-------------|-----------|------------|--------------|--------------------|------------------|---|
| CPS-EC1500.024 | 24V | 21,6Vdc | 22,8Vdc | 12 | 26,76 – 28,80Vdc | 140Vac 175Vdc | 150Vac 210Vdc (the power supply unit starts at 150Vac/210Vdc) |
| CPS-EC1500.036 | 36V | 32,4Vdc | 34,2Vdc | 18 | 40,14 – 43,20Vdc | | |
| CPS-EC1500.048 | 48V | 43,2Vdc | 45,6Vdc | 24 | 53,52 – 57,60Vdc | | |
| CPS-EC1500.060 | 60V | 54,0Vdc | 57,0Vdc | 30 | 66,90 – 72,00Vdc | | |
| CPS-EC1500.072 | 72V | 64,8Vdc | 68,4Vdc | 36 | 80,28 – 86,40Vdc | | |
| CPS-EC1500.110 | 110V | 99,0Vdc | 104,5Vdc | 54 | 120,42 – 129,60Vdc | | |
| CPS-EC1500.150 | 150V | 118,8Vdc | 125,4Vdc | - | - | | |
| CPS-EC1500.220 | 220V | 198,0Vdc | 209,0Vdc | 108 | 240,84 – 259,20Vdc | | |
| CPS-EC1500.400 | 400V | 297,0Vdc | 313,5Vdc | 165 | 367,95 – 396,00Vdc | | |

DC OK Indication

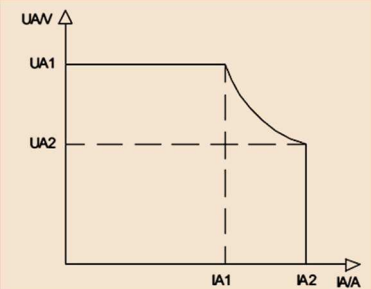
| Power Supply Status | Normal | Low [V] | Over Temperature | Shut Down Closed | Inhibit Open |
|------------------------|--------|---------|------------------|------------------|--------------|
| Relay Operation status | Closed | Open | Open | Open | Open |

LED Signal Indication

| LED | Low [V] | Over [V] | Over Temp. | Inhibit Open | Shut Down | Constant [V] | Constant [C] | Boost Charge |
|---------------|---------|----------|------------|--------------|-----------|--------------|--------------|--------------|
| CV | OFF | OFF | OFF | OFF | OFF | ON | OFF | ON |
| CC | OFF | OFF | OFF | OFF | OFF | OFF | ON | OFF |
| OT | OFF | OFF | ON | OFF | OFF | OFF | OFF | OFF |
| BC | OFF | OFF | OFF | OFF | OFF | OFF | OFF | ON |
| SD/INH | OFF | OFF | OFF | ON | ON | OFF | OFF | OFF |

C/V Chart and Operating Point

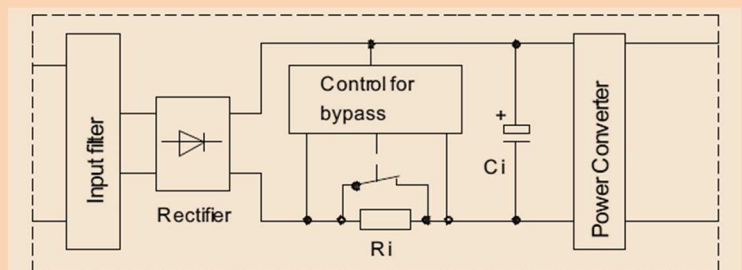
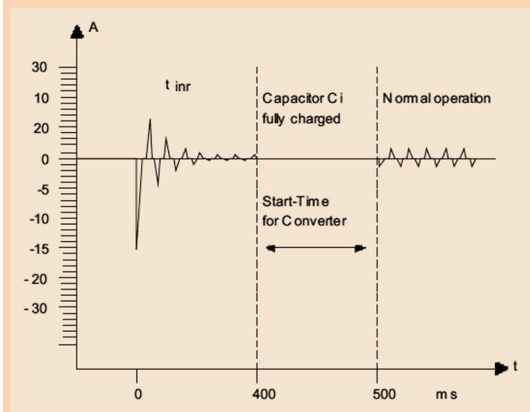
The CPS-EC series provides a perfect current voltage chart. It has no fold back or other abnormalities. The output voltage can drop down to zero volts when the power supply is overloaded. The unit delivers a stable and constant current to the outputs. The device can be used either in the CV or in the CC mode (automatic switch over). When the output voltage is set to the maximum demanded value and the current limit reaches its desired margin, the output voltage drops down and the unit delivers constant current. Similar is when the upper margin of the voltage allows the current to be dropped by the power reduction behavior of the CPS-EC series. The C/V setting must meet the $P_{max} = 1500W!$



| Model | Value UA1 (V) | Value IA1 (A) | Value UA2 (V) | Value IA2 (A) | Pmax |
|----------------|---------------|---------------|---------------|---------------|------------|
| CPS-EC1500.024 | 30 | 50,0 | 24 | 62,5 | 1500/1500W |
| CPS-EC1500.036 | 45 | 33,3 | 36 | 41,7 | 1500/1501W |
| CPS-EC1500.048 | 58 | 25,8 | 48 | 31,2 | 1500/1498W |
| CPS-EC1500.060 | 75 | 20,0 | 60 | 25,0 | 1500/1500W |
| CPS-EC1500.072 | 90 | 16,7 | 72 | 20,8 | 1500/1498W |
| CPS-EC1500.110 | 137,5 | 10,9 | 110 | 13,6 | 1500/1496W |
| CPS-EC1500.150 | 180 | 8,3 | 150 | 10,0 | 1500/1500W |
| CPS-EC1500.220 | 264 | 5,7 | 220 | 6,8 | 1500/1496W |
| CPS-EC1500.400 | 400 | 3,75 | 330 | 4,6 | 1500/1518W |

Inrush Current Limiter

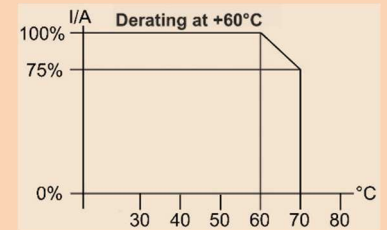
The unit is featured with an electronic inrush current limiter (ex. 230Vac = 14,7Arms / 20,7Apeak). The built-in circuit is a very precise limiter and no simple NTC thermistor solution. The circuit works with an accuracy of $\pm 10\%$. The accuracy is independent from the ambient temperature and from the number of power-on sequences. The quickest recommended MCB is B-type 16A (230Vac). The smallest power relay or a contactor in front of the CPS-EC1500 must cope 20,7A peak current. The inrush duration is 400ms and the overall power up time of the unit is 500ms. See the below drawings for technical information.



Overtemperature Thermal Shutdown, Over Voltage Protection & Derating

OT Over Temperature The maximum ambient temperature is +70°C. If the power supply exceeds this value (over temperature protection) it completely shuts down (metering point 50mm from outside device). The device restarts automatically into operation when the temperature drops to a normal value.

OVP Over Voltage Protection Exceeding the OVP results into ticker mode. Resuming the failure causes automatic restart into normal operation. For the values please read the Technical Table on page 2.



Baseplate Cooling & Temperature Management

The temperature management of the CPS-EC series provides a direct dissipation of the main energy losses. The internal coolers of the output diodes and the power FETs connect to the back-plate cooler. It is possible to dissipate about 40 – 50% of the energy losses out of a system while using the Baseplate cooling bundle 2201002001 to hard mount the unit to a plane and heat conductive surface.

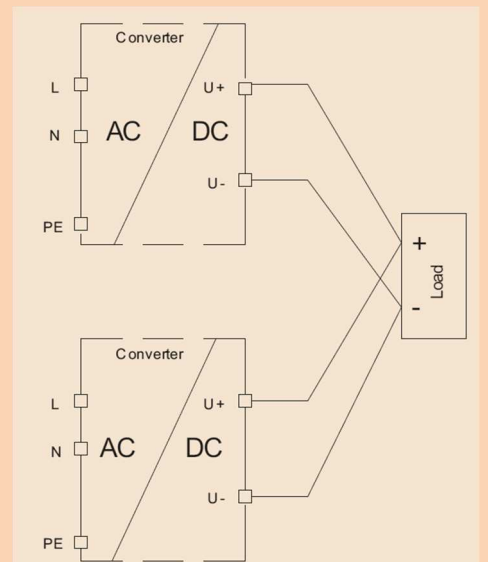
Series Operation

Two or more units of the same model and output voltage can be operated up to a total voltage of 600Vdc in series (not applicable with EN62368-1). The CPS-EC1500 models are to be operated with floating output when connected in series. Such the output terminals must not be connected to earth (GND/PE). Due to the dielectric strength of the internal components used, only the models with an output voltage of 90Vdc and later are approved for series operation. Other power supplies are not approved for series operation above 60Vdc. If the units are remotely controlled via the analog interface it is compulsory to use a potential-free control voltage!

Parallel Operation & Decoupling

To increase the overall power of the power supply, two or more devices of the same model with the same output voltage may be operated in parallel. We recommend using a busbar for the DC power connector. Make sure that the cable lengths and cable cross-sections of all power supplies to the busbar or to the star point are identical. If you want to use the sensing function, connect it also to the star point or busbar. To avoid measurement errors, select the line length from the neutral point or from the busbar to the load as short as possible and use the maximum possible conductor cross-section

The CPS-EC models have no internal O-ring diode, to operate the devices redundant N+1.



Coating Option

We offer the CPS-EC series with an optional coating. It is to be used in e.g. dusty, dirty, high humidity area or in awaiting quick temperature changes. Short circuit and corrosion at print board lines and at solder points can be prevented. The coat itself is a transparent acrylic resin.

Peters SL 1306 N-FLZ (transparent) IEC60216-1 2001, IPC-CC-830B, UL listed as permanent coating
File No.: E80315 , UL94V-0

Ordering Information: add extension **C** to the model name (example): CPS-EC1500.048**C**(R2)

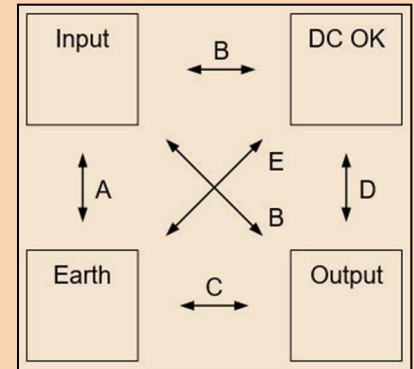
Electrical Safety (Factory-Test / Field-Test Owner)

| | T | A | B | C ¹⁾ | D | E |
|-------------------------|-------|---------|---------|-----------------|---------|--------|
| Type Test | 60s | 2500Vac | 3000Vac | 500Vdc | 3000Vac | 500Vdc |
| Factory Test | 5s | 2000Vac | 2000Vac | 500Vdc | 900Vdc | 500Vdc |
| Field Test | 2s | 2000Vac | 2000Vac | 500Vdc | 900Vdc | 500Vdc |
| Cut-off current setting | >25mA | >25mA | >1mA | >1mA | >1mA | >1mA |

¹⁾ $\geq 48V_{dc} = 2800V_{dc}$

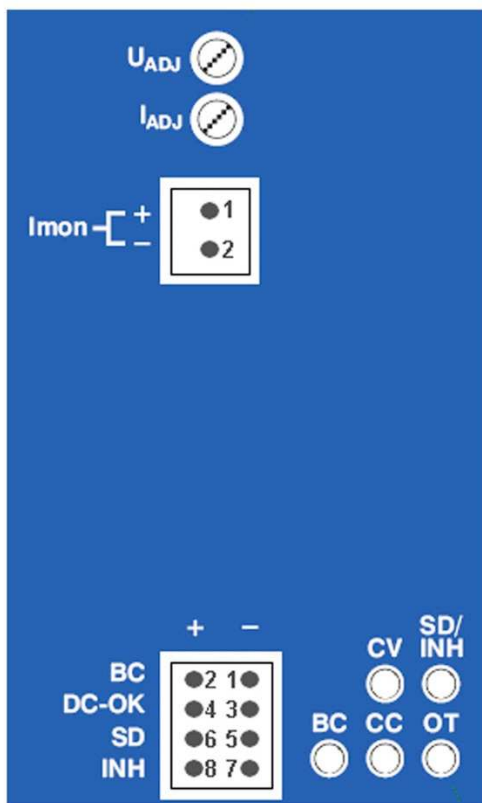
Type and factory test are the manufacturer. While repeating damage can happen to the power supply unit. For the field test (owner) follow the below instruction:

- Use suitable test equipment, raising the voltage slowly
- Short circuit L1 and N, and all the DC output terminals.
- Use only test voltages of 50/60Hz. The outputs are unearthed and therefore they have no resistance to GND/PE.
- If the residual voltage is $\geq 60V_{dc}$, observe the safety standards. Use only specially insulated screwdriver to trim the Ua/Ia.

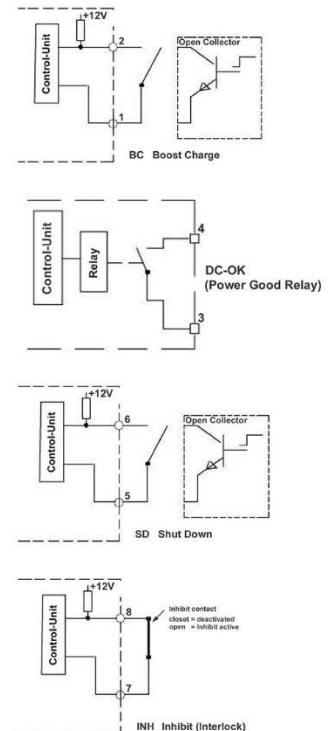


Connections

| AC Main Input | DC Mains | Inputs/Outputs | Sense |
|---------------|--------------|---|-----------------------------|
| PE - wire | DC + voltage | I _{mon} = current monitor output | B= sense connections (S+/-) |
| N - wire | DC + voltage | SD = shut down input | |
| L - wire | DC - voltage | INH = inhibit connection | |
| | DC - voltage | DC-ok = power good relay | |
| | | BC = boost charge | |



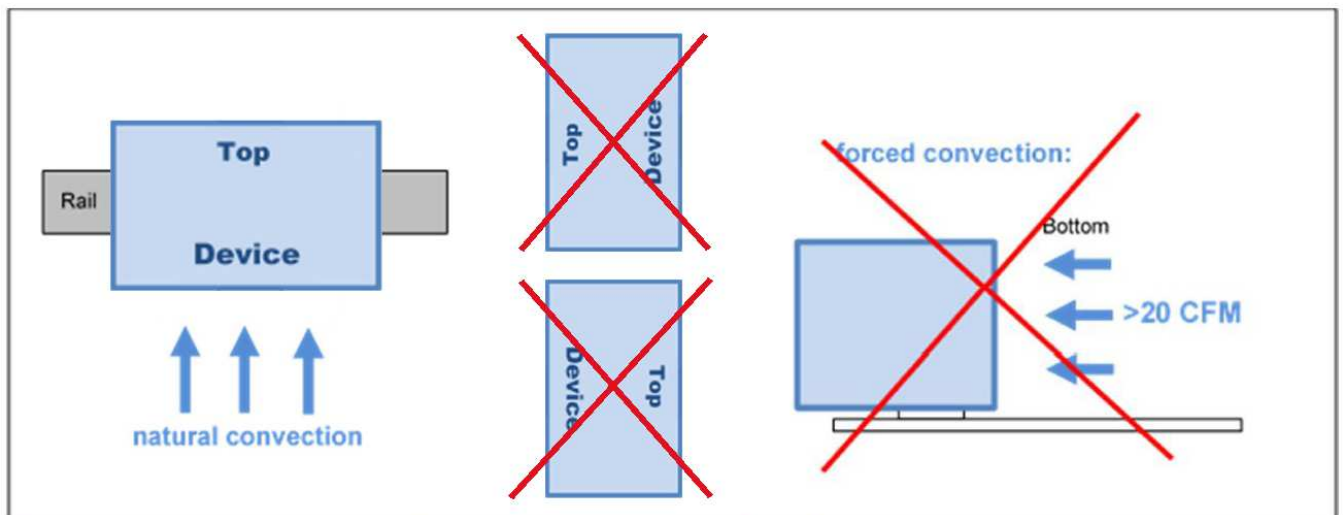
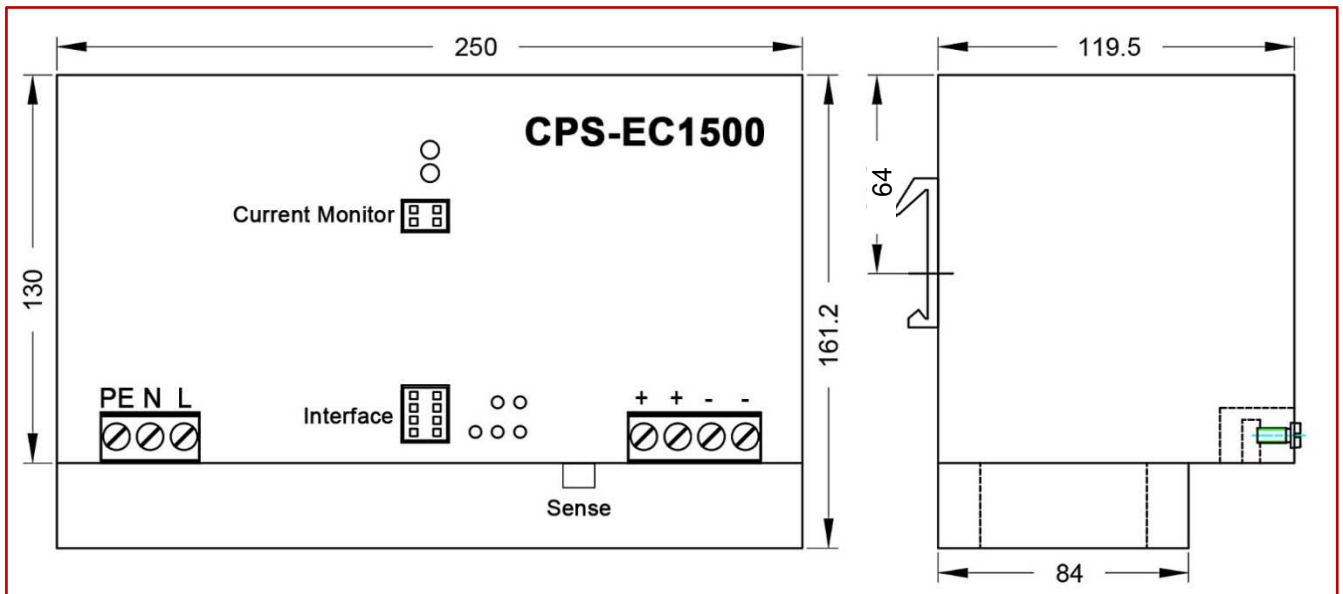
LED :
 CV Constant V
 CC Constant C
 BC Boost Charge
 OT Over Temperature Protection
 SD/INH Shut Down / Inhibit (Interlock)



Mechanics

Mechanics

Stable metal/aluminum housing IP20. To allow adequate convection, a free air space of 50mm (top/bottom) and 5mm (sidewalls) is required; for active devices 15mm space from the sidewalls. For free air convection it is necessary to install the unit horizontal. Use the DIN-Rail installation (equipped standard) with the patented 35mm DIN-Rail brackets according to EN60275. It is easy to mount/dismount while snapping it onto the 35mm DIN-Rail - no tools are necessary. A hard mount backplate (option) is available as well.

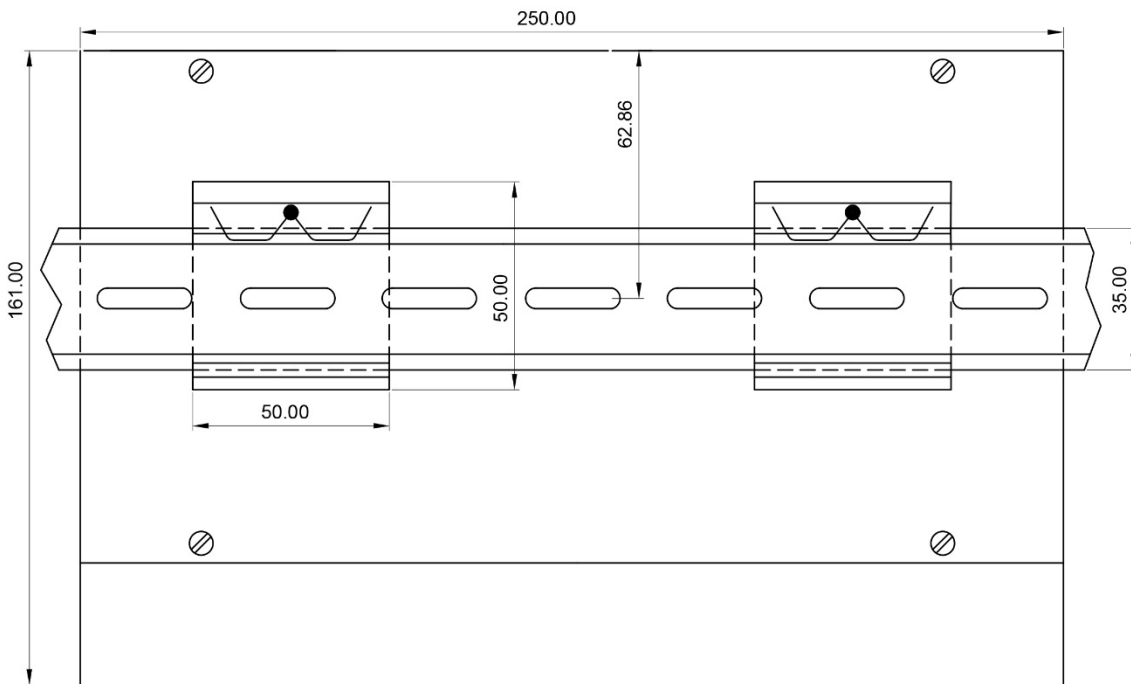


Mounting Instruction: recommended air flow space below and above is 50mm (2 Inch)

Mechanics & Installation Instruction of the CPS-EC1500

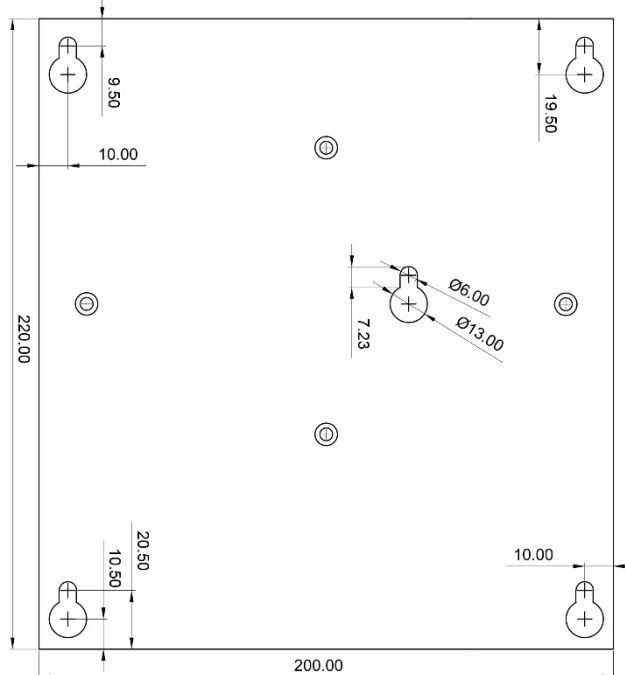
Stable metal/aluminum housing IP20. To allow adequate convection, a free air space of 50mm (top/bottom) and 10mm (sidewalls) is required; and for active devices 15mm space from the sidewalls. For proper air convection it is necessary to install the CPS-EC1500. One can use the DIN-Rail installation (equipped standard) with our patented 35mm DIN-Rail bracket according to EN60275. It is easy to mount/dismount while snapping it onto the 35mm DIN-Rail - no tools necessary. A wall mount back plate (option) is available, too.

It is not allowed to install the CPS-EC1500 in other mounting direction then as shown in the drawings.



Back Plate Option / DIN-Rail Standard

(The CPS-EC1500 is always delivered for DIN-rail mount, the back-plate is an optional part that shall be mounted from the customer. The threads from the DIN-rail mounting brackets shall be used. All screws are included into the Back-Plate Kit.)



Connections

Clamping Yoke Connector Specifications

| | Input / Output connections | Signal connections plugs |
|---|--|--|
| Tightening torque min. – max. | 1,2 – 2,2Nm (blade 1,0x5,5 DIN5264) | 0,2 – 0,25Nm (blade 0,4x2,2 DIN5264) |
| Touch-safe protection acc. to DIN VDE 0470 | IP20 plugged/ IP10 unplugged | Not applicable |
| Clamping range, min. – max. | 0,5 – 16mm ² / AWG26 – AWG6 | 0,2 – 1,5mm ² / AWG28 – AWG14 |
| Solid, H05(07) V-U min. – max. | 0,5 – 16mm ² | 0,2 – 1,5mm ² |
| Stranded, H05(07) V-U min. – max. | 6 – 16mm ² | 0,2 – 1,5mm ² |
| Flexible, H05(07) V-U min. – max. | 0,5 – 16mm ² | 0,2 – 1,5mm ² |
| w. plastic collar ferrule, DIN 46228 pt 4 min. – max. | 2,5 – 10mm ² | 0,2 – 1,5mm ² |
| w. wire end ferrule, DIN 46228 pt 1, min. – max. | 2,5 – 10mm ² | 0,2 – 1,5mm ² |
| Plug gauge in accordance with EN 60999 a x b; ø | 5,4 x 5,1mm; 5,3mm | 2,4 x 1,5mm; 2,3mm |
| Pitch (P) | 10,16mm | 3,5mm |

Wire Stripping Length (fine wired)

| Nominal Cross Section | Wire End Ferrule | Stripping Length | Wire End Ferrule | Stripping Length |
|-----------------------|------------------|------------------|------------------|------------------|
| 0,25mm ² | H0,25/5 | 5mm | H0,25/10 HBL | 8mm |
| 0,5mm ² | H0,5/6 | 6mm | H0,5/12 OR | 8mm |
| 1,0mm ² | H1,0/6 | 6mm | H1,0/12 GE | 8mm |
| 2,5mm ² | H2,5/12 | 12mm | H2,5/19D BL | 14mm |
| 4,0mm ² | H4,0/12 | 12mm | H4,0/20 GDR | 14mm |
| 6,0mm ² | H6,0/20 | 12mm | H6,0/20 SW | 14mm |
| 10,0mm ² | H10,0/12 | 12mm | H10,0/22 EB | 15mm |

The length of ferrules is to be chosen depending on the rated voltage. The outside diameter of the plastic collar should not be larger than the pitch (P)

Ordering Information

Ordering Codes

| Product Code | Information | Article Number |
|--------------------|--|----------------|
| CPS-EC1500.024(R2) | 24V | 3041400001CA |
| CPS-EC1500.036(R2) | 36V | 3041400002CA |
| CPS-EC1500.048(R2) | 48V | 3041400003CA |
| CPS-EC1500.060(R2) | 60V | 3041400004CA |
| CPS-EC1500.072(R2) | 72V | 3041400005CA |
| CPS-EC1500.110(R2) | 110V | 3041400006CA |
| CPS-EC1500.150(R2) | 150V | 3041400007CA |
| CPS-EC1500.220(R2) | 220V | 3041400008CA |
| CPS-EC1500.400(R2) | 400V | 3041400009CA |
| Back Plate Kit | Base Plate / Hart mount plate kit including screws | 2201002001CA |



Safety regulations: Please read these instructions completely before using the equipment. Keep these instructions on to hand. The device may only be operated by trained specialist staff.

Installation:

- 1) The device is designed for devices and systems that meet the standard requirements for hazardous voltages, power, and fire prevention.
- 2.) Installation and service only by trained persons. The AC power must be switched off. The work is to be labelled; accidental reconnection of the system must be prevented.
- 3.) Opening the device, its modification, loosening bolts, or operation outside the specified herein specification or in an unsuitable environment, has the immediate loss of warranty to follow. We disclaim any responsibility for any resulting damage to persons or things.
- 4.) Note: The device must not be operated without an upstream circuit breaker (CB). We recommend the use of B-Type 16A. It is prohibited to use the unit without PE. It may be necessary upstream device has a power switch.

Warning:

Non-compliance these warnings can result in fire and serious injury or death.

1. Never operate device without PE connection.
2. Before connecting the device to the AC network, make wires free of voltage and assure accidentally switch on.
3. Allow neat and professional cabling.
4. Never open nor try to repair the unit. Inside are dangerous voltages that can cause electrical shock hazard.
5. Avoid metal pieces or other conductive material to fall into the item
6. Do not operate the device in damp or wet conditions
7. Do not operate the unit under EX-conditions



All parameters base on 15 minutes run-in @ full load / 25°C / 230Vac 50/60Hz, as otherwise stated.