

D-IPS501...1001C

Deutronic Intelligent Power System



Abbildung ähnlich / device similar to figure



D-IPS501...1001C-derivate table

Type	Input voltage		Output voltage	Output current	Cat. No.
	Nom.	Tol.	Nom.	Continuous	
D-IPS501C-24	115 VAC 230 VAC	90 - 132 VAC 184 - 264 VAC	0 - 30 VDC	0 - 24 A	101120
D-IPS1001C-24	115 VAC 230 VAC	90 - 132 VAC 184 - 264 VAC	0 - 30 VDC	0 - 42 A	101121

1 Input

Input voltage AC	90 - 132 VAC 184 - 264 VAC	valid for continuous operation
Input frequency	47 - 63 Hz	-
Input voltage DC	250 - 375 VDC	-
Inrush current	< 9,8 Arms, < 13,8 Apeak 230 VAC active electronic inrush protection (no simple NTC)	-
Max. input current at AC input voltage	< 9,0 A @ 115 VAC < 4,9 A @ 230 VAC < 17,2 A @ 115 VAC < 9,8 A @ 230 VAC	@D-IPS501C-24 @D-IPS1001C-24
Max. input current at DC input voltage	< 2,4 A @ 250 VDC < 1,6 A @ 375 VDC < 5,0 A @ 250 VDC < 3,3 A @ 375 VDC	@D-IPS501C-24 @D-IPS1001C-24
Hold up time	> 50ms > 30 ms	@D-IPS501C-24 @D-IPS1001C-24
Start up delay	typ. 420 ms @ 230 VAC typ. 540 ms @ 115 VAC typ. 420 ms @ 230 VAC typ. 590 ms @ 115 VAC	@D-IPS501C-24 @D-IPS1001C-24
Start-up from Shutdown	typ. 330 ms	-
Softstart	typ. 100 ms	-

2 Output

Output voltage U_{nom}	0 - 30 VDC	valid for continuous operation
Load regulation tolerance N_{load}	$U_{nom} \pm 0,05\%$	-
Max. continuous output current I_{nom}	24 A 42 A	@D-IPS501C-24 @D-IPS1001C-24
Max. continuous output power P_{nom}	480 W 1000 W	@D-IPS501C-24 @D-IPS1001C-24
Current limiting	$< I_{max} + 10 \%$	-
Over voltage protection	35 VDC	-
Accuracy	$U_{reg} \leq \pm 0,5\%$ $I_{reg} \leq \pm 1,5\%$ $U_{mon} \leq \pm 0,5\%$ $I_{mon} \leq \pm 1,5\%$ $U_{ref} \leq \pm 1,0\%$	-
Recovery time	$< 1ms$	Duration from leaving the overall tolerance until the permanently return to the tolerance band after a load step
Ripple & Noise	typ. $< 40 mV_{pp}$	measurement bandwidth = 20 MHz
Short circuit resistance	yes	-
Open circuit protected	yes	-
Base load (OCP)	not required (open circuit pro- tected)	-

3 Environment

Ambient temperature	-20°C ... +70°C	derating 2,5 %/°C > 60°C
Cooling	Natural Convection Controlled Fan	@D-IPS501C-24 @D-IPS1001C-24
Storage temperature	-40°C ... +85°C	-
Humidity	< 95%	-
Temperature control	-	thermal shutdown & autorecovery

4 General data

Insulation strength	2,5 kVAC 3 kVAC 500 VDC	Input / Enclosure Input / Output Output / Enclosure
Efficiency	Up to 90,0%	-
Protection class	class I (PE connection required)	-
Pollution degree	2	-
Climate class	3K3	-
MCB (Circuit Breaker)	16 A curve B @ 115 VAC 16 A curve B @ 230 VAC 32 A curve B @ 115 VAC 16 A curve B @ 230 VAC	@D-IPS501C-24 @D-IPS1001C-24
ROHS	2011/65/EU, (EU)2015/863	-
REACH	EG No. 1907/2006	-
Dimensions (LxWxH)	130 x 200 x 115 mm 156 x 200 x 115 mm	@D-IPS501C-24 @D-IPS1001C-24
Weight	approx. 2,9 kg approx. 3,3 kg	@D-IPS501C-24 @D-IPS1001C-24
MTBF (IEC61709)	400.000 h	-
MTTF (IEC61709)	149.023 h 148.023 h	@D-IPS501C-24 @D-IPS1001C-24

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5 Standards

EMC (Electromagnetic Compatibility)

Title	Standard	Data
Emitted interference	EN55011	Class A
EMS	EN61000-6-2	-

Electrical safety

Title	Standard	Data
Safety	EN61010-1 EN61010-2-201	-

6 Connection Data

Conductor cross section input	3x 0,5 - 16 mm ² AWG26 - AWG6 (L,N,PE)	-
Conductor cross section output	4x 0,5 - 16 mm ² AWG26 - AWG6 (++)	-

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7 Programming Time Vout [ms]

Model	0-30V D-IPS501C-24	0-30V D-IPS1001C-24
Rise Time 0-100%, 10/100% load, [ms] typ.	15/15	15/15
Slew Rate 90-10%, 10/100% load, [ms] typ.	155/15,5	75/7,5
Slew Rate PS-Option 100-0%, 0% load, [ms] typ.	100	100
Output Capacity, [mF] typ.	10,4	10,4

8 Analog Interface CON-A*

Pin	Name	Type	Function	Signal	Remarks
1	Ureg+	Input	Voltage Programming	Select 0-5V, 0-10V, 0-20mA, 4-20mA	1 M Ω working resistance with Vprog 500 Ω working resistance with Iprog
2	Ureg-	Input	Voltage Programming	Select 0-5V, 0-10V, 0-20mA, 4-20mA	1 M Ω working resistance with Vprog 500 Ω working resistance with Iprog
3	Ireg+	Input	Current Programming	Select 0-5V, 0-10V, 0-20mA, 4-20mA	1 M Ω working resistance with Vprog 500 Ω working resistance with Iprog
4	Ireg-	Input	Current Programming	Select 0-5V, 0-10V, 0-20mA, 4-20mA	1 M Ω working resistance with Vprog 500 Ω working resistance with Iprog
5	Umon+	Output	Voltage Monitor	Select 0-5VDC/5mA, 0-10VDC/5mA	
6	Umon-	Output	Voltage Monitor	Select 0-5VDC/5mA, 0-10VDC/5mA	
7	Imon+	Output	Current Monitor	Select 0-5VDC/5mA, 0-10VDC/5mA	
8	Imon-	Output	Current Monitor	Select 0-5VDC/5mA, 0-10VDC/5mA	
9	SD+	Input	Control Signal Shutdown	Switch / Open Collector	
10	SD-	Input	Control Signal Shutdown	Switch / Open Collector	
11	Uref+	Output	Reference Voltage	Select 5,2 VDC or 10,4 VDC 5mA	
12	Uref-	Output	Reference Voltage	Select 5,2 VDC or 10,4 VDC 5mA	

*Connector Model Weidmueller 1597460000 = included

9 Analog Interface CON-B*

Pin	Name	Type	Function	Signal	Remarks
1	DC-OK	Output	Closers, Signal DC OK	Relay	Potential-free break contact
2	DC-OK	Output	Closers, Signal DC OK	Relay	Potential-free break contact
3	AUX+	Output			
4	Sense+	Input			
5	Sense-	Input			
6	AUX-	Output			

*Connector Model Weidmueller 159740000 = included

10 Analog Interface CON-C*

PS+	PS+	Output	External Power-Sink	Trigger
PS-	PS-	Output	External Power-Sink	Trigger

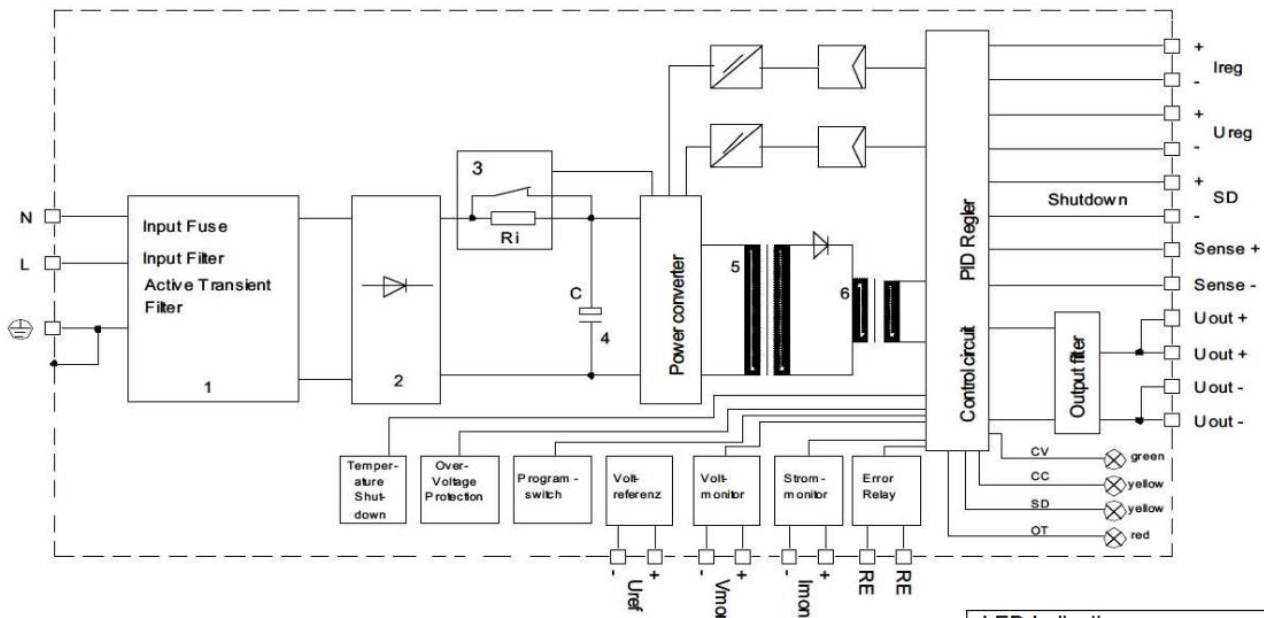
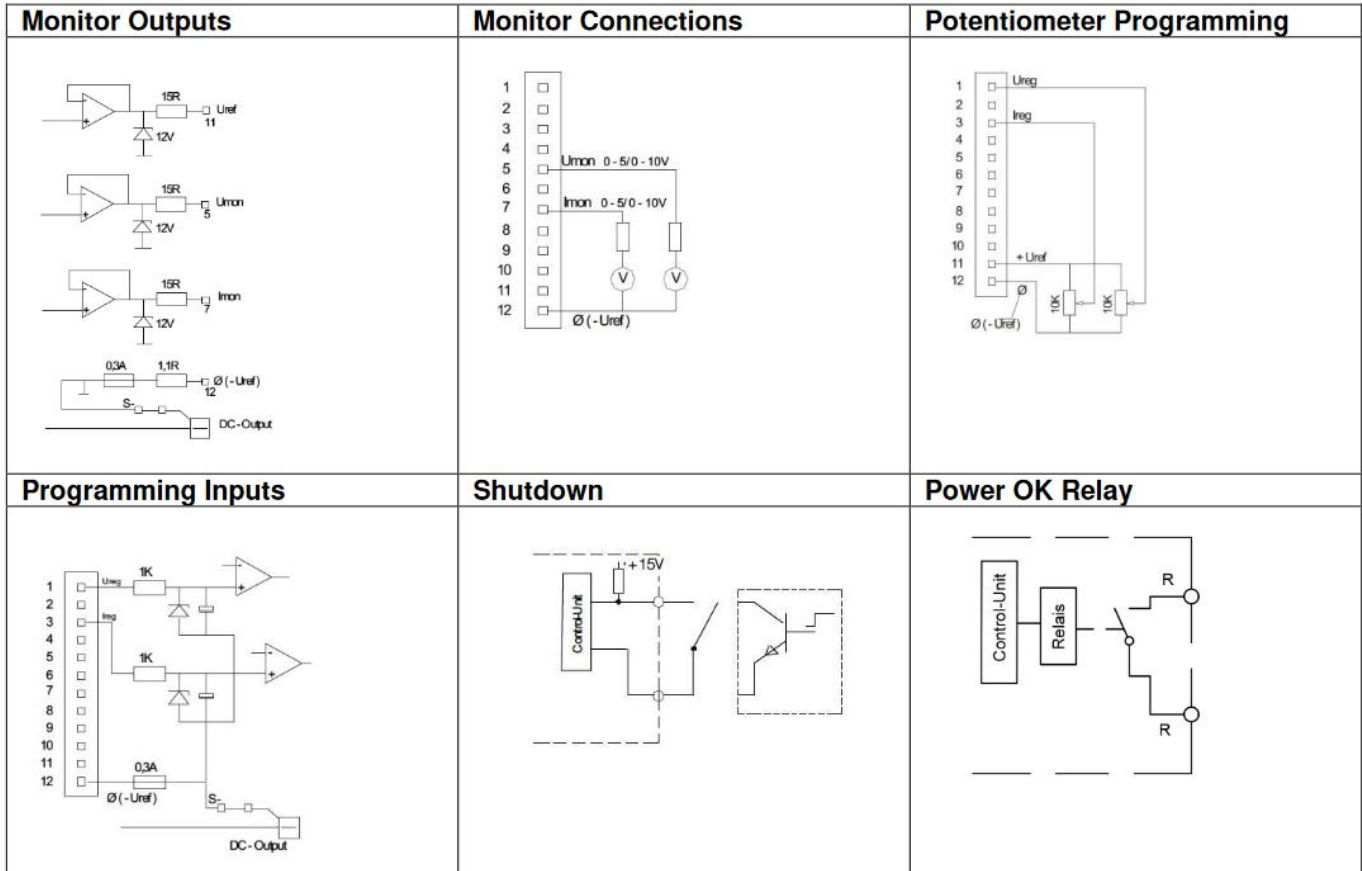
*Connector Model Weidmueller 1597360000 = not included

11 Configuration of the Analog Interface via Dip-Switch

Mode	S1	S2	S3	S4	S5	S6	S7	S8	S9	S10
0-5V	0	0	0	0	0	1	0	0	0	0
0-10V	0	1	0	0	1	0	0	1	1	1
0-20mA	1	1	0	1	1	0	0	1	1	1
4-20mA	1	0	1	1	0	0	1	1	1	1

12 LED Signal Indication

LED	Over Temperature	Shut Down	Constant [V]	Constant [C]
CV	OFF	OFF	ON	OFF
CC	OFF	OFF	OFF	ON
OT	ON	OFF	OFF	OFF
SD	OFF	ON	OFF	OFF



LED Indication		
CV	GRN	Constant voltage
CC	YEL	Constant current
SD	YEL	Shutdown
OT	RED	Over temperature

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13 Programming/Monitoring V/C Analog Interface (Ureg /Ireg) (Umon/Imon)

The standard programming of these devices is an analog interface. The output voltage is linearly proportional to the adjusted analog control signal. If the control signal 0V and/or 0A applies the power supply delivers 0V at the output. The power supply is already working from 0V output voltage and low load with high precision. The monitor signal is analog linear to the output voltage. The monitor signal for current and voltage is the real value that is measured directly at the output of the power supply. If a sense line is connected to compensate for the voltage drop across the load lines, the monitor signal is exactly the value that is measured at the connection point of the sense line. The description of the power supply in the sense operation is carried out in a separate section. The analog inputs and outputs are non-floating. The mass is connected to the DC negative output. The adapter provides the ability to select the desired input / output via a DIP switch. The burden of the control voltages is 1MΩ. The burden of the current interface is 500Ω. The latency to full compensation of V/C on the interface from 0-100% is 15ms for all models. If the power supply is operated with a low load, the down-programming time up to the desired set point may be very long. The power supply has large built-in capacitors and an enormous energy reserve. A similar effect occurs by skidding input energy, which is not easily removed from the power supply.

14 Compensation of Load Line Drop Voltage (Sense +/-), standard operation mode

The power supply has a Sense Mode to compensate for the voltage drop over long load lines. The compensation amounts to a maximum of 2V per load line. Under certain circumstances, it can be expected to apply more complicated external interference suppression. If sense is not used, Sense + and Sense - shall necessarily be connected by short bridges to AUX + and AUX - (factory setup). Make sure that +/- connections are matching! **WARNING!** Reverse polarity of the sense lines can cause damages to the power supply unit.

Sense operation: Remove the bridges between Sense +, Sense -. Connect the sense lines directly to the load. Pay attention to the polarity of plus and minus of the load to prevent damage to the power supply. To avoid interference, twist the sense lines. To reduce inductive effects, we recommend that the load lines position is close to each other. To supply a pulsating load, the use of an electrolytic capacitor and a ceramic capacitor has proved. The internal Over Voltage Protection (OVP) of the power supply controls the DC power directly to the DC output terminals. In case of an error the OVP acts automatically (see OVP values corresponding table). The sense terminals are directly connected to the power outputs.

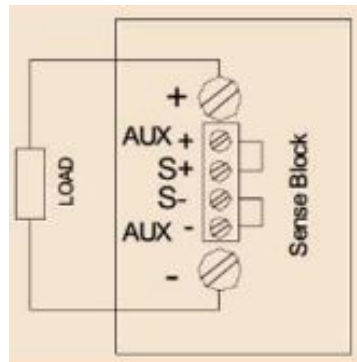


Figure 14.1: Local Sensing (factory setup)

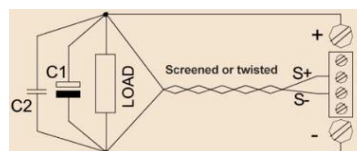
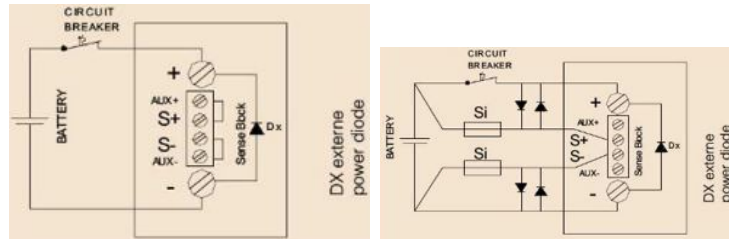


Figure 14.2: Remote Sensing (twisted sense lines)

15 Compensation Load Line Voltage Drop (Sense +/-) battery charger operation mode

Remote Sensing as a battery charger

If the power supply unit is used as a battery charger, it is recommended to refrain from sensing. It can lead to severe damage to the power supply, if the polarity of the sense line is confused (field experience: such error often occurs when system service is required, e.g., when the batteries are changed). If it is necessary to use sensing, proceed as described in the figure below. Proven approaches are 250mA for the fuses and 3...5A load capacity of diodes. **WARNING!** Reverse polarity of the sense lines can cause damages to the power supply unit.



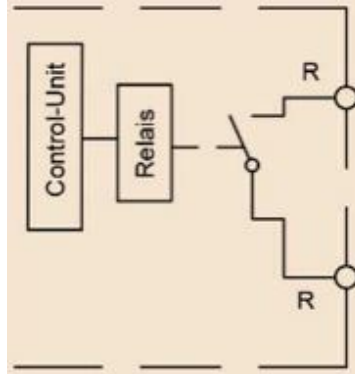
16 External Shutdown (SD)

The power supply is set to the Shutdown mode, when the control input is either shorted via a relay contact, a switch contact or an NPN transistor with open collector (voltage drop <1V, current typ. 2mA). If the shutdown repeats the power supply starts again. Using the soft-start, the current and the voltage rises within continuously to the default set values.



17 Power-OK Relay (DC Power Good)

The alarm signal DC OK has potential-free relay contacts. The contacts are closed (relay coil is energized) when the power output is active. In shut down mode (SD) the contacts are closed. The contacts are open when the power output is inhibited by OT or low AC supply voltage at the AC inputs. Contact load (resistive load): 30Vdc/1A, 60Vdc/0.3A, 30Vac/0.5A.



18 Over Voltage Protection (OVP)

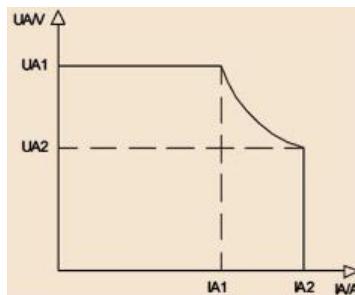
If an over-voltage occurs to the output (for example, defective components, external feed voltage), it is followed by the shutdown of the power output. A periodic restart attempts (ticker operation period 400ms).

19 Over Temperature Shutdown (OT)

The alarm LED OT lits when the temperature of the power supply is higher than the over-temperature protection threshold.

20 C/V Chart and Operating Point

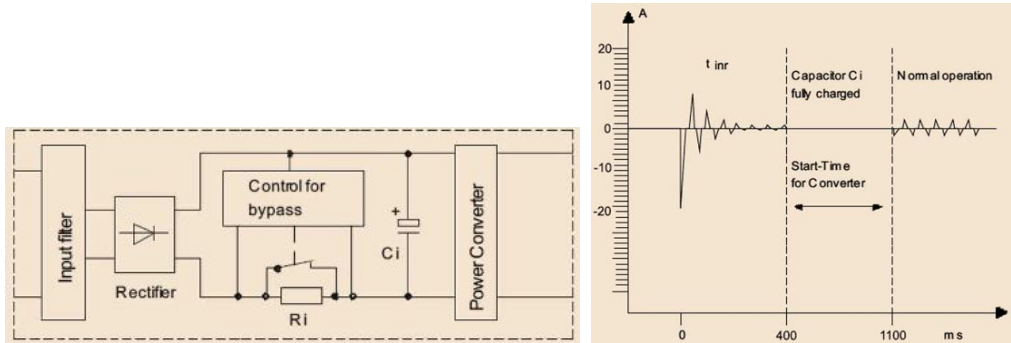
The output voltage set V_{out} is always linear proportional to the control signal U_{reg} . The desired control signal is selected via the DIP switcher: 0-5V, 0-10V, 0-20mA oder 4-20mA.



Model	UA1 (V)	IA1 (A)	UA2 (V)	IA2 (A)	Pmax (IA1/IA2)
D-IPS501C-24	30 VDC	16,0 A	20 VDC	24,0 A	480/480 W
D-IPS1001C-24	30 VDC	33,3 A	24 VDC	42,0 A	999/1008 W

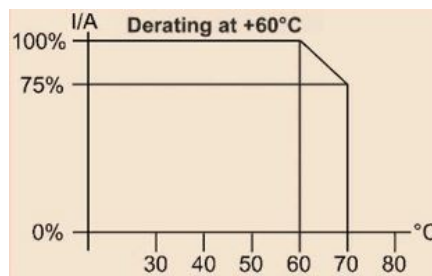
21 Inrush Current Protection (electronic)

The power supply unit has an electronic current limiter (230Vac=9,8Arms/13,8Apeak). It is a precisely working circuit instead of a usual simple NTC solution. The accuracy is $\pm 10\%$, regardless of the operating temperature and the duty cycles (interval $\geq 10s$). We recommend the smallest circuit breaker a characteristic B with 16A (@D-IPS501C-24) respectively 32A (@D-IPS1001C-24) for 115Vac and with 16A for 230Vac.



22 Temperature Derating

The maximum ambient temperature during operation is $+ 70^{\circ}C$. If the overtemperature protection is activated, the power supply is switched off. The measuring point is 50mm outside the power supply. The power supply unit starts automatically when it has cooled down.

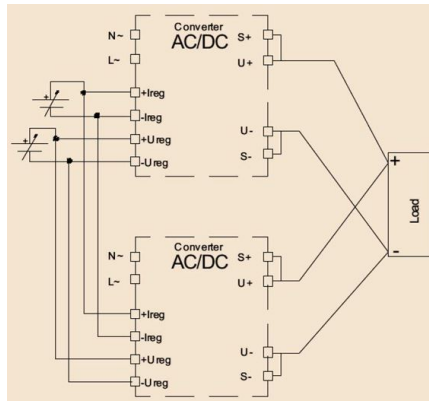


23 Series Operation

Two or more units of the same model and output voltage can be operated up to a total voltage of 60V in series. If the units are remotely controlled via the analog interface it is compulsory to use a potential-free control voltage!

24 Parallel Operation & N+1 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. Allow proper connection for low contact resistance. 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. Up to 5 pcs D-IPS can be paralleled. The D-IPS models have no internal O-ring diode, to operate the devices redundant N+1.

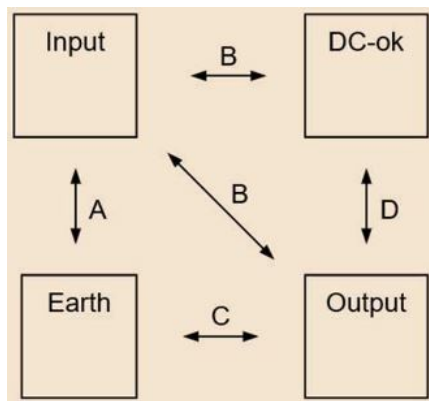


25 Electrical Safety (Factory-Test / Field-Test Owner)

	T	A	B	C*	D
Type Test	60 s	2500 VAC	3000 VAC	500 VDC	500 VDC
Factory Test	5 s	2000 VAC	2000 VAC	500 VDC	500 VDC
Field Test	2 s	2000 VAC	2000 VAC	500 VDC	500 VDC
Cut-off current setting		> 20 mA	> 20 mA	> 1 mA	> 1 mA

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.



26 Temperature Management

The temperature management of the D-IPS 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.

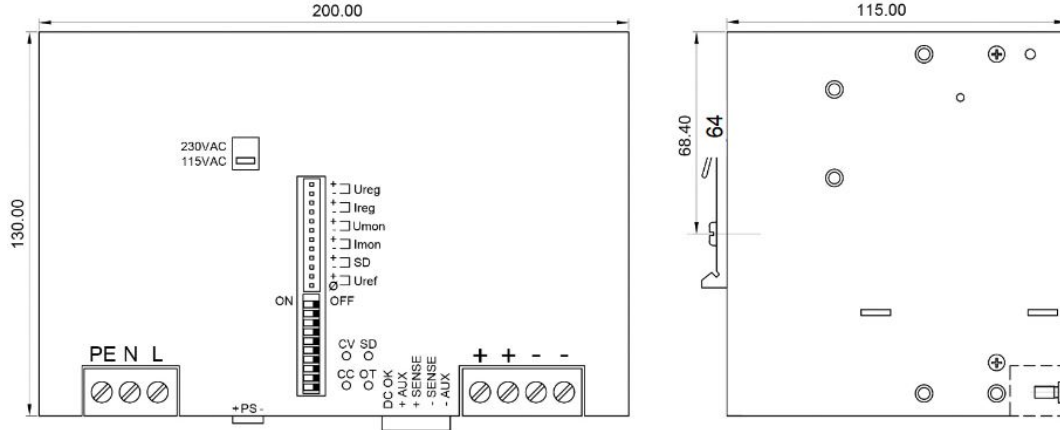


Figure 26.1: D-IPS501C-24

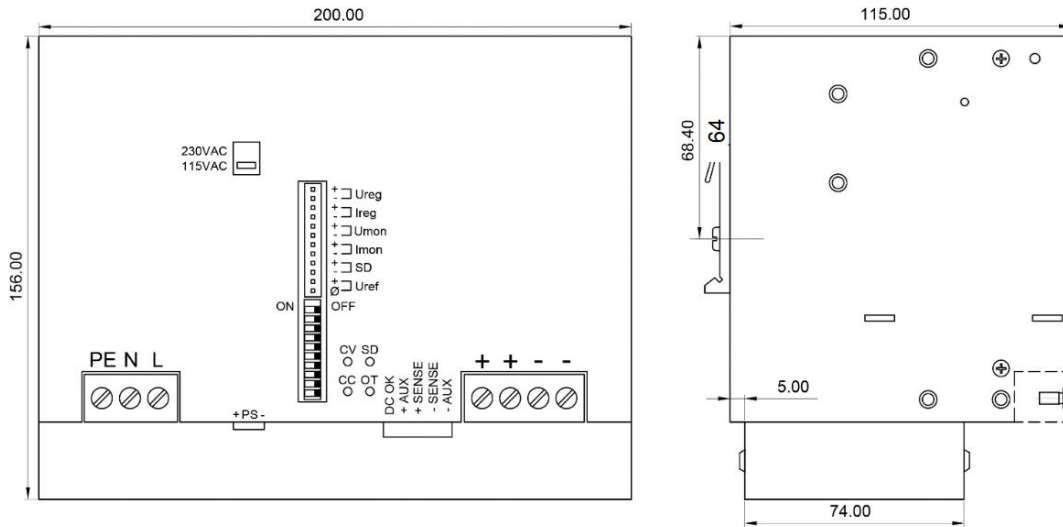


Figure 26.2: D-IPS1001C-24

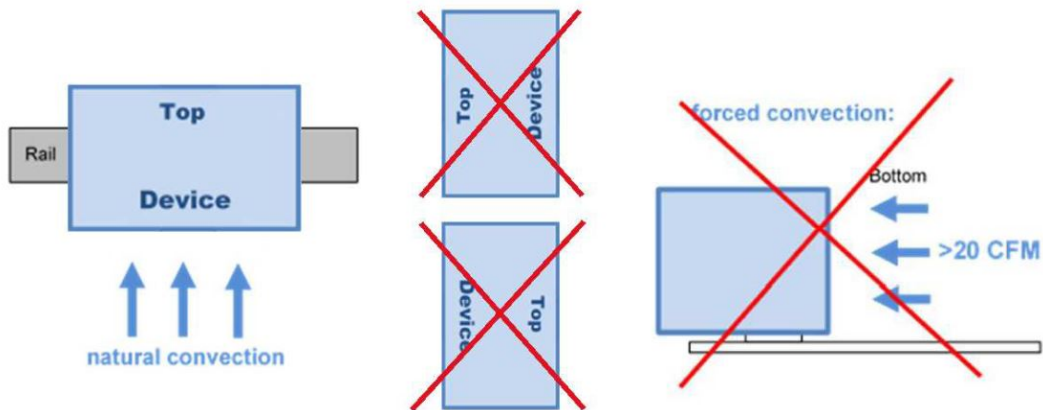


Figure 26.3: Mounting Instruction: recommended airflow space below and above is 50mm

27 Mechanics & Installation Instruction of the device

Stable metal/aluminium 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 D-IPS. One can use the DIN-Rail installation (equipped standard) with 35mm DIN-Rail bracket according to EN60715. It is easy to mount/dismount while snapping it onto the 35mm DIN-Rail - no tools necessary. It is not allowed to install the D-IPS in other mounting direction then as shown in the drawings.

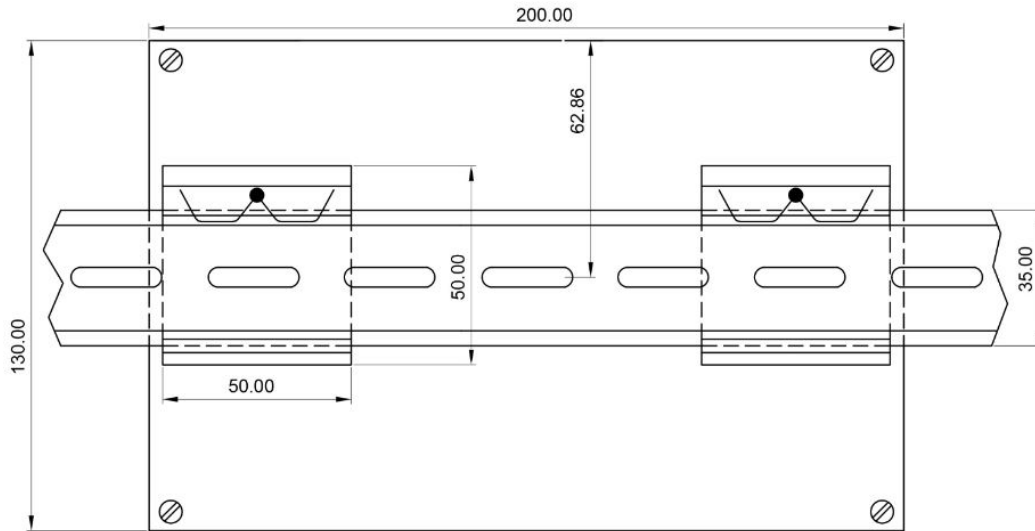


Figure 27.1: D-IPS501C-24

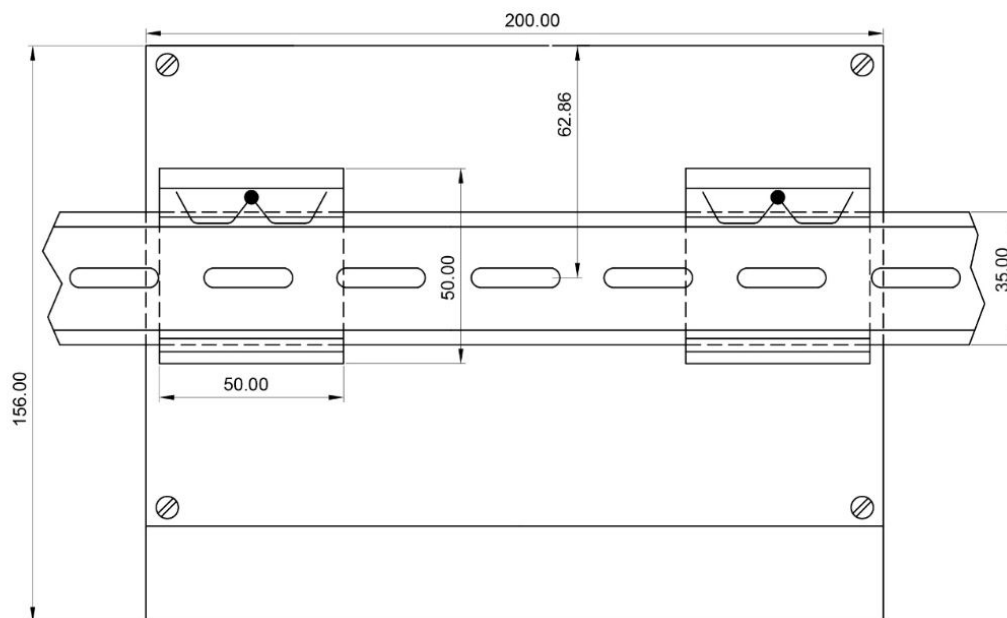


Figure 27.2: D-IPS1001C-24

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28 Connections

Clamp Connector Specifications

	Input / Output connections	Signal connections plugs
Tightening torque min. - max.	1,2 - 2,2 Nm (blade 1,0x5,5 DIN5264)	0,2 - 0,25 Nm (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 - 16 mm ² / AWG26 - AWG6	0,2 - 1,5 mm ² / AWG28 - AWG14
Solid, H05(07) V-U min. - max.	0,5 - 16 mm ²	0,2 - 1,5 mm ²
Stranded, H05(07) V-U min. - max.	6 - 16 mm ²	0,2 - 1,5 mm ²
Flexible, H05(07) V-U min. - max.	0,5 - 16 mm ²	0,2 - 1,5 mm ²
w. plastic collar ferrule, DIN 46228 pt 4 min. - max.	2,5 - 10 mm ²	0,2 - 1,5 mm ²
w. wire end ferrule, DIN 46228 pt 1, min. - max.	2,5 - 10 mm ²	0,2 - 1,5 mm ²
Plug gauge in accordance with EN 60999 a x b; Ø	5,4 x 5,1 mm; 5,3 mm	2,4 x 1,5 mm; 2,3 mm
Pitch (P)	10,16 mm	3,5 mm

Wire Stripping Length (fine wired)

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

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)

29 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 specialists. 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 for 230Vac and 16A (@D-IPS501C-24) respectively 32A (@D-IPS1001C-24) for 115Vac. 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 ensure that it cannot 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