

DPP 4004 / DPP 4012 24V POWER SUPPLY - RACK UNIT



Performance Features

- 19" rack size with 2 HU
- primary sync switch-mode power supply; supports any 24 VDC modules in PA-systems
- covered mains switch
- status indicator LEDs (mains and battery)
- smooth initial current inrush
- short circuit protected
- forced ventilation
- mains voltage 104-127 / 207-253 VAC; internally switchable
- remote output for the remote switching of power amplifiers
- remote output for the remote switching of the battery supply of power amplifiers
- emergency power supply via battery input connector
- switched mains output, max. 1 A
- delayed control output for the release of alarm-gong and summing modules
- direct output, 24 V max. 4 A / 12 A
- switched 24 V output for the connection of modules
- continuous emergency power supply via external battery module
- output for the connection of modules that need persistent power supply (e. g. DPM 4000/4001); max. 4 A / 12 A
- output for power fail recognition

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WEEE Recycling/Disposal Instructions

The Wheelie Bin symbol found on the product or in the manual indicates that this product must not be disposed of with other waste. It is in our category the manufacturer's responsibility to properly dispose of their waste electrical and electronic equipment (WEEE) at the end of its life. Due to the differences in each EU country's management of WEEE, please contact your local distributor. We are committed to facilitate our own electronic-waste-management-system, for the free of charge return of all EVI Audio GmbH products: Telex, Dynacord, Electro-Voice, Midas Consoles, KlarkTeknik and RTS. Arrangements are made with the dealer where you purchased the equipment from, for the returning of all unusable equipment **at no cost**, to the factory in Straubing, for environmental protective disposal.

IMPORTANT SAFETY INSTRUCTIONS

	CAUTION RISK OF ELECTRIC SHOCK DO NOT OPEN	
WARNING: TO REDUCE THE RISK OF FIRE OR ELECTRIC SHOCK, DO NOT EXPOSE THIS APPLIANCE TO RAIN OR MOISTURE. AVIS: RISQUÉ DE CHOC ELECTRIQUE. NE PAS OUVRIR.		
WARNING: CONNECT ONLY TO MAINS SOCKET WITH PROTECTIVE EARTHING CONNECTION.		



The lightning flash with arrowhead symbol, within an equilateral triangle is intended to alert the user to the presence of uninsulated "dangerous voltage" within the product's enclosure that may be of sufficient magnitude to constitute a risk of electric shock to persons.



The exclamation point within an equilateral triangle is intended to alert the user to the presence of important operating and maintenance (servicing) instructions in the literature accompanying the appliance.

1. Read these instructions.
2. Keep these instructions.
3. Heed all warnings.
4. Follow all instructions.
5. Do not use this apparatus near water.
6. Clean only with a dry cloth.
7. Do not block any ventilation openings. Install in accordance with the manufacture's instructions.
8. Do not install near heat sources such as radiators, heat registers, stoves, or other apparatus (including amplifiers) that produce heat.
9. Do not defeat the safety purpose of the polarized or the grounding-type plug. A polarized plug has two blades with one wider than the other. A grounding type plug has two blades and a third grounding prong. The wide blade or the third prong are provided for your safety. If the provided plug does not fit into your outlet, consult an electrician for replacement of the obsolete outlet.
10. Protect the power cord from being walked on or pinched particularly at plugs, convenience receptacles, and the point where they exit from the apparatus.
11. Only use attachments/accessories specified by the manufacturer.
12. Use only with the cart, tripod, bracket, or table specified by the manufacturer, or sold with the apparatus. When a cart is used, use caution when moving the cart/apparatus combination to avoid injury from tip-over.



13. Unplug this apparatus during lightning storms or when unused for a long period of time.
14. Refer all servicing to qualified service personnel. Servicing is required when the apparatus has been damaged in any way, such as power-supply cord or plug is damaged, liquid has been spilled or objects have fallen into the apparatus, the apparatus has been exposed to rain or moisture, does not operate normally, or has been dropped.
15. Do not expose this equipment to dripping or splashing and ensure that no objects filled with liquids, such as vases, are placed on the equipment.
16. To completely disconnect this equipment from the AC Mains, disconnect the power plug from the AC receptacle.
17. The mains plug of the power supply cord shall remain readily operable.

IMPORTANT SERVICE INSTRUCTIONS

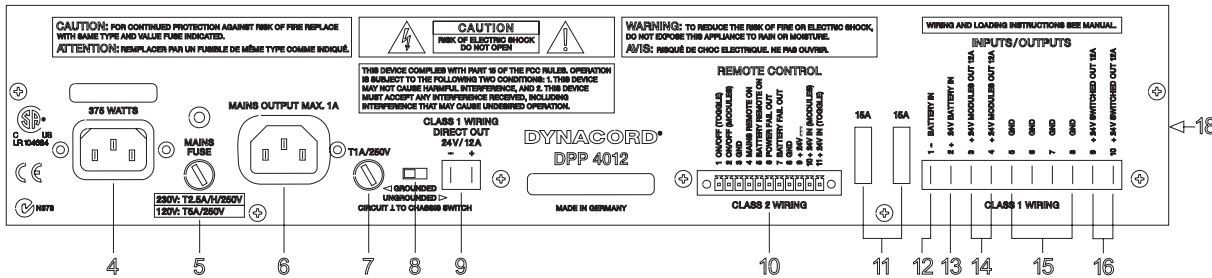
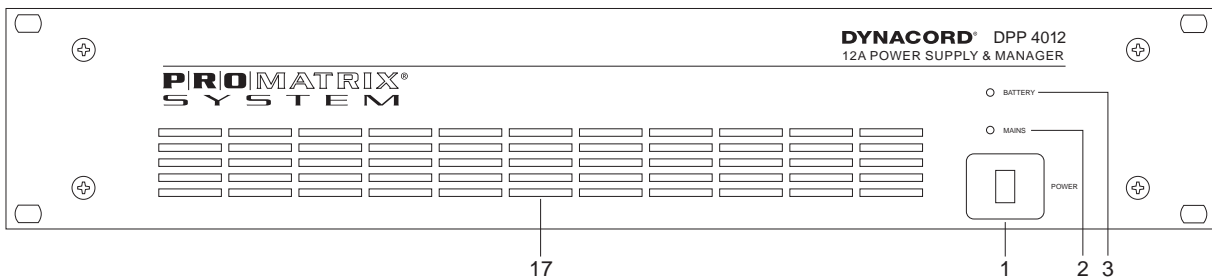
CAUTION: These servicing instructions are for use by qualified personnel only. To reduce the risk of electric shock, do not perform any servicing other than that contained in the Operating Instructions unless you are qualified to do so. Refer all servicing to qualified service personnel.

1. Security regulations as stated in the EN 60065 (VDE 0860 / IEC 65) and the CSA E65 - 94 have to be obeyed when servicing the appliance.
2. Use of a mains separator transformer is mandatory during maintenance while the appliance is opened, needs to be operated and is connected to the mains.
3. Switch off the power before retrofitting any extensions, changing the mains voltage or the output voltage.
4. The minimum distance between parts carrying mains voltage and any accessible metal piece (metal enclosure), respectively between the mains poles has to be 3 mm and needs to be minded at all times. The minimum distance between parts carrying mains voltage and any switches or breakers that are not connected to the mains (secondary parts) has to be 6 mm and needs to be minded at all times.
5. Replacing special components that are marked in the circuit diagram using the security symbol (Note) is only permissible when using original parts.
6. Altering the circuitry without prior consent or advice is not legitimate.
7. Any work security regulations that are applicable at the location where the appliance is being serviced have to be strictly obeyed. This applies also to any regulations about the work place itself.
8. All instructions concerning the handling of MOS - circuits have to be observed.

NOTE:



SAFETY COMPONENT (MUST BE REPLACED BY ORIGINAL PART)



- 1.) covered mains switch
- 2.) mains LED-indicator (off, when the mains switch is not engaged)
- 3.) battery LED-indicator (off, when the mains switch is not engaged)
- 4.) mains input connector
- 5.) mains fuse (input connector)
- 6.) mains output connector
- 7.) mains fuse (output connector)
- 8.) ground-lift switch
- 9.) DC-output via flat-connector: +24 V / 4 A (DPP4004) or +24 V / 12 A (DPP4012) direct / GROUND
- 10.) remote control connector – for pin-assignment refer to diagram 1
- 11a.) battery fuse – input – negative pole
- 11b.) battery fuse – input – positive pole
- 12.) battery flat-connector – input – negative pole
- 13.) battery flat-connector – input – +24 VDC
- 14.) DC-output via flat-connector: +24 V / 4 A (DPP4004) or +24 V / 12 A (DPP4012) switched
- 15.) DC-output via flat-connector – negative pole
- 16.) DC-output via flat-connector for the PROMATRIX SYSTEM; persistent power supply
- 17.) ventilation louvers – airflow in
- 18.) ventilation louvers – airflow out

1. Utilization

The switch-mode power supply rack units DPP4004/4012 are meant for the incorporation into 19" rack shelf systems and serve to supply PA-system installations with the operational voltage of 24 V. The switch-mode power supplies DPP4004/4012 can be operated as single units, together with the PA-system PROMATRIX, or battery-powered, as well as together with the DYNACORD DEM-system.

Caution: It is not permissible to expose this appliance to dripping or splashing water.

2. First Operation

The switch-mode power supply rack units DPP4004/4012 are to be operated on the 230 VAC mains supply. Internally switching the appliances to different voltages is possible (please refer to the paragraph 4: adjusting the mains voltage). Connecting the power supplies is only licit on a accurately installed 3-pole mains outlet. The mains outlet connector (6) is meant for convenient connection within rack shelf systems. It is possible to connect other devices to the mains output (6), using a common mains cord. A maximum power consumption of 1 A should not be exceeded.

3. Functions of the DPP4004/4012

The power supply rack units DPP 4004 and 4012 were designed to supply PA-systems with or without emergency battery power supply with the necessary power. They can also be used to remotely control (on/off) several functions. Managing the switching between mains and battery supply is performed automatically.

Using the mains switch (1) (main switch function) on the front of the appliance, it is possible to turn the system power off completely. To prevent inadvertent erroneous switching, a cover lid can be installed with the switch being in its ON-position.

When the switch is set to OFF, all outputs are without current and the MAINS (2) and BATTERY (3) LEDs are not lit. With the mains switch being engaged, the internal 24 V power supply is provided with mains voltage. At the same time, the mains output connector on the rear of the appliance gets mains supply (max. 1 A), allowing the connection of external low-level power consumers (tape decks, etc.). With the mains switch being engaged and when the appliance is correctly connected and the mains is present, the MAINS-LED will light. Correspondingly, the BATTERY-LED is lit when a battery power source providing 24 V is correctly connected to the BATTERY IN connectors – (12) and (13) – and with the mains switch being engaged.

The output voltage of the internal power supply is present at the DIRECT OUT (9) connector. With the DPP 4004 this connector's maximum power handling capacity is 4 A; the DPP 4012 provides 12 A. The output offers internal short-circuit protection and it can be operated without load. It also serves to use the appliance as plain power supply – without battery supply and without remote control.

The output SWITCHED OUT (16) is meant for the connection of the DPM 4000 or other external devices that need non-interrupted emergency power supply. With the DPP 4004 this connector's maximum power handling capacity is 4 A; the DPP 4012 provides 12 A. The output offers internal short-circuit protection and it can be operated without load. Usually, this output is connected to the internal switch-mode power supply, so that the connected load is supplied with the needed voltage. In case of temporarily insufficient mains supply, power failure, malfunctioning of the switch-mode power supply or thermal overload of the DPP 40xx, the SWITCHED OUT (16) is switched to battery supply (when present) within fractions of a second, providing gapless power supply to the connected devices. When the mains is present again or after solving the problem that caused the malfunction, the appliance automatically returns with a delay of 600 ms to mains operation. If there is no battery present during the occurrence of a mains complication, the DPP 40xx behave as if the front mains switch has been switched off; except for the fact that the MAINS LED is still lit.

The output MODULES OUT (14) is meant for the connection of devices (relay-fields, alarm-devices, voice reproduction, etc.) that can be switched off during a power outage – during which time the PA-system should operate in the stand-by mode. Switching off unnecessary devices during the occurrence of a power failure is preferable, otherwise the battery is unnecessarily strained. The output employs a “softstart” function that controls the initial current inrush, preventing the main supply from interference by possible control connector) or ON/OFF (MODULES) (pin 2). If the ON/OFF (MODULES) input is connected to the ground potential, the MODULES OUT output is constantly activated; otherwise it is constantly deactivated. The input is controlled from the DPM 4000 or from an alarm or gong signal module.

The input ON/OFF (TOGGLE) can be used for installations, where the PA-system has to be switched “on/off” via remote control (e. g. systems that include DEM-modules). A ground potential contact of the input switches the system “on”, another one switches the system “off”. The ON/OFF (MODULES) input’s priority in the “on” state overrides ON/OFF (TOGGLE). The ON/OFF (TOGGLE) condition is also stored for the time of power failure. Switching the appliance’s mains switch off always sets the TOGGLE-state to “off” as well. When utilizing the ON/OFF (TOGGLE) and ON/OFF (MODULES), it is important to remember that the pin-assignment of the floating inputs corresponds to the illustration in chapter 5 (figure 2).

The ON/OFF (TOGGLE) function is deactivated when the appliance is shipped from the factory. To activate the function, the appliance has to be separated from the mains and the internal jumper has to be set to “open”. This input can also be used to detect whether another phase failed. The corresponding jumper must be in place. When short-circuiting the contact and ground, the appliance reacts as if its own mains failed. In case external phase-monitoring is not wanted, leave this input unused.

The control output (pin 4) MAINS REMOTE ON on the REMOTE socket (10) carries ground potential when the output MODULES OUT (14) is switched on and with the mains supply being constantly present. This output can be used to switch remotely controllable power amplifiers of the PROMATRIX and the DEM Series to mains supply.

The control output (pin 5) BATTERY REMOTE ON on the REMOTE socket (10) carries ground potential when the output MODULES OUT (14) is switched on and with the mains supply being unstable. This output can be used to switch remotely controllable power amplifiers of the PROMATRIX and the DEM Series to battery supply.

The control output (pin 6) POWER FAIL OUT on the REMOTE socket (10) signals the loss of the mains supply (main under voltage, mains failure, temperature overload with insufficient output voltage of the switch-mode power supply). An output voltage of +24 V indicates that the mains supply is present and stable. The output’s internal resistance is 1 kW. It is meant for the connection of the DPM 4000, indicating mains failure conditions.

The control output (pin 7) BATTERY FAIL OUT on the REMOTE socket (10) indicates emergency power supply failure, while an output voltage of +24V signals that emergency power supply exists. Once the battery’s voltage value falls below the threshold of approx. 18V, the control output’s voltage drops to 0V DC.

Procedures with occurring mains failure

In a standard application with mains and emergency battery supply, the outputs SWITCHED OUT and MODULES OUT are switched to battery supply when a mains failure occurs. Despite, POWER FAIL OUT signals the loss of mains power and the connected power amplifiers are switched from mains supply to battery supply via the outputs MAINS REMOTE ON and BATTERY REMOTE ON. When the mains returns, these functions are reversed after a delay of approximately 600 ms.

In case the power is gone for a longer period of time, the battery serves as emergency power supply until the cut-off voltage of 21 V is reached. When declining that threshold for the first time, all outputs are being switched off. After the mains being present and stable again, the outputs are switched on again. This prevents over-discharging the battery.

4. Mains Voltage Selection (only to be carried out by a qualified service technician)

After adjusting the mains voltage, operating the DPP 4004/4012 power supplies with 115 V is also possible.

The adjustment has to be carried out before the operation:

- Remove the cover plate.
- Insert the flat wire bridge on the printed board assembly 86245 into the 115V~ position (red conductor).
- With the DPP 4004 additional switching of a switch-mode power supply is necessary. The correspondent switch is located inside the switch-mode power supply (see yellow label). Remove the front panel (4 screws). Using a suitable screwdriver (size 1), the mains voltage selector switch which is located behind the perforated coverage – has to be set to the 115V~ position.

A silver label stating different voltages is located on the right inside of the enclosure. After switching the appliance to 115V operation, the corresponding label has to be removed and attached to the rear panel, so that it covers the imprinted marking 230V~ below the mains connector.

The following only applies to the DPP4012:

Exchanging the mains fuses to operate the appliance with 115 V ~ AC:

- Replace the mains fuse (T2,5A/H for 230 V operation) located in the fuse socket (5) with a T5A-type fuse. The label on the rear panel T2,5A/H which is located below the fuse socket (5) has to be replaced by the T5A-label.

Lock the top cover plate and the front panel in place.

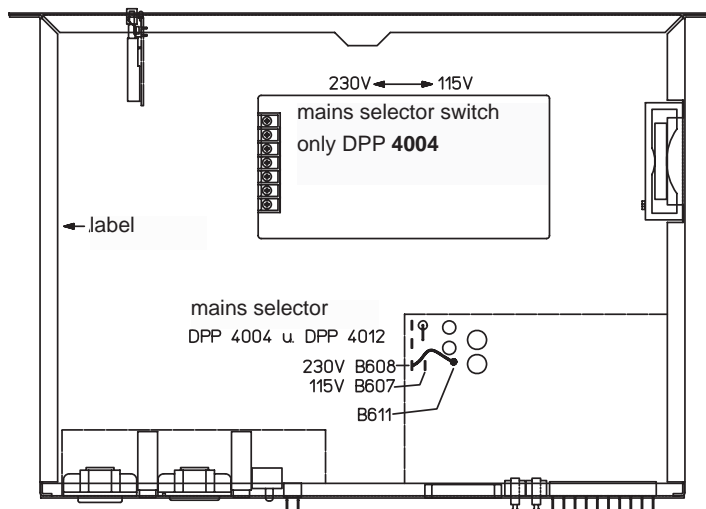
4.1 Fuses IEC 127, 5 x 20 mm

DPP 4012:

fuse socket (5) F501	230 V ~ AC mains fuse:	T2,5A/H/250V (H = high switching ability, 1500 A, has to be replaced using an original fuse only).
fuse socket (5) F501	115 V ~ AC mains fuse:	T5A/250V
fuse socket (7) F502	output mains fuse:	T1A/250V
fuse socket (11a) F602	(-) pole battery fuse:	15A/32V DC
fuse socket (11b) F601	(+) pole battery fuse:	15A/32V DC

DPP 4004:

fuse socket (5) F501	230 V ~ AC mains fuse:	T2A/250V
fuse socket (5) F501	115 V ~ AC mains fuse:	T2A/250V
fuse socket (7) F502	output mains fuse:	T1A/250V
fuse socket (11a) F602	(-) pole battery fuse:	7,5A/32V DC
fuse socket (11b) F601	(+) pole battery fuse:	7,5A/32V DC



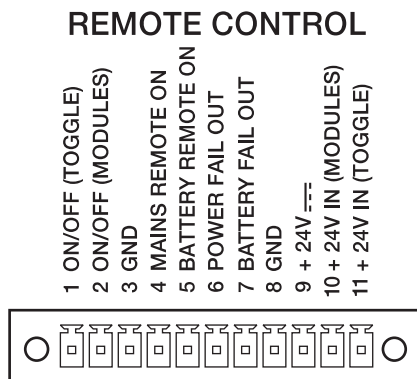


figure 1:
pin assignment of the remote control plug

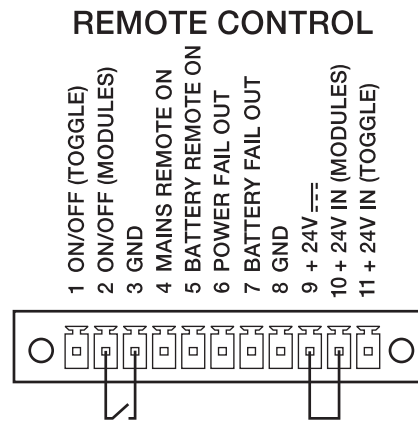


figure 2:
example for a remotely controlled application

- | | | |
|----|-------------------|--------|
| 1 | ON/OFF (TOGGLE) | INPUT |
| 2 | ON/OFF (MODULES) | INPUT |
| 3 | GND | |
| 4 | MAINS REMOTE ON | OUTPUT |
| 5 | BATTERY REMOTE ON | OUTPUT |
| 6 | POWER FAIL OUT | OUTPUT |
| 7 | BATTERY FAIL OUT | OUTPUT |
| 8 | GND | |
| 9 | +24V | OUTPUT |
| 10 | +24V IN (MODULES) | INPUT |
| 11 | +24V IN (TOGGLE) | INPUT |

ON/OFF function of the supply output for the modules MODULE OUT through the pulse contact to the negative potential. Only functions when pin 11 carries an analogous supply voltage and when the internal jumper J502 is set to “open”; can be used to remotely switch the PA-system ON/OFF. The external power-failure-recognition only functions, when the needed supply-voltage is connected to pin 11 and when the internal jumper J 502 is in place. It can also be used for controlling the PA-installation whenever another phase fails. In that case, identical functions are carried out, as if a failure in the mains supply of the DPP 40xx would occur. Contact connected to ground is equivalent with an ext. mains failure.

ON function of the supply output for the modules MODULE OUT through permanent contact to the negative potential. Only functions when pin 10 carries an analogous supply voltage; can be used to remotely switch the PA-system via the PROMATRIX System ON/OFF.

Negative potential for the inputs 1 and 2; in case the internal supply voltage is utilized for the remote control.

Control output for power amplifiers of the PROMATRIX SYSTEM without network operation and for power amplifiers of the DEM System; signals the switching-on command of the mains supply via contact to the ground potential.

Control output for power amplifiers of the PROMATRIX SYSTEM without network operation and for power amplifiers of the DEM System; signals the switching-on command of the battery supply via contact to the ground potential.

Signals the stable presence of the mains as well as internal 24 V supply voltage via 24 V output voltage; internal resistance 1 kW.

The presence of 24 V output voltage indicates normal operation of an emergency power supply.

Negative Potential for the output 7.

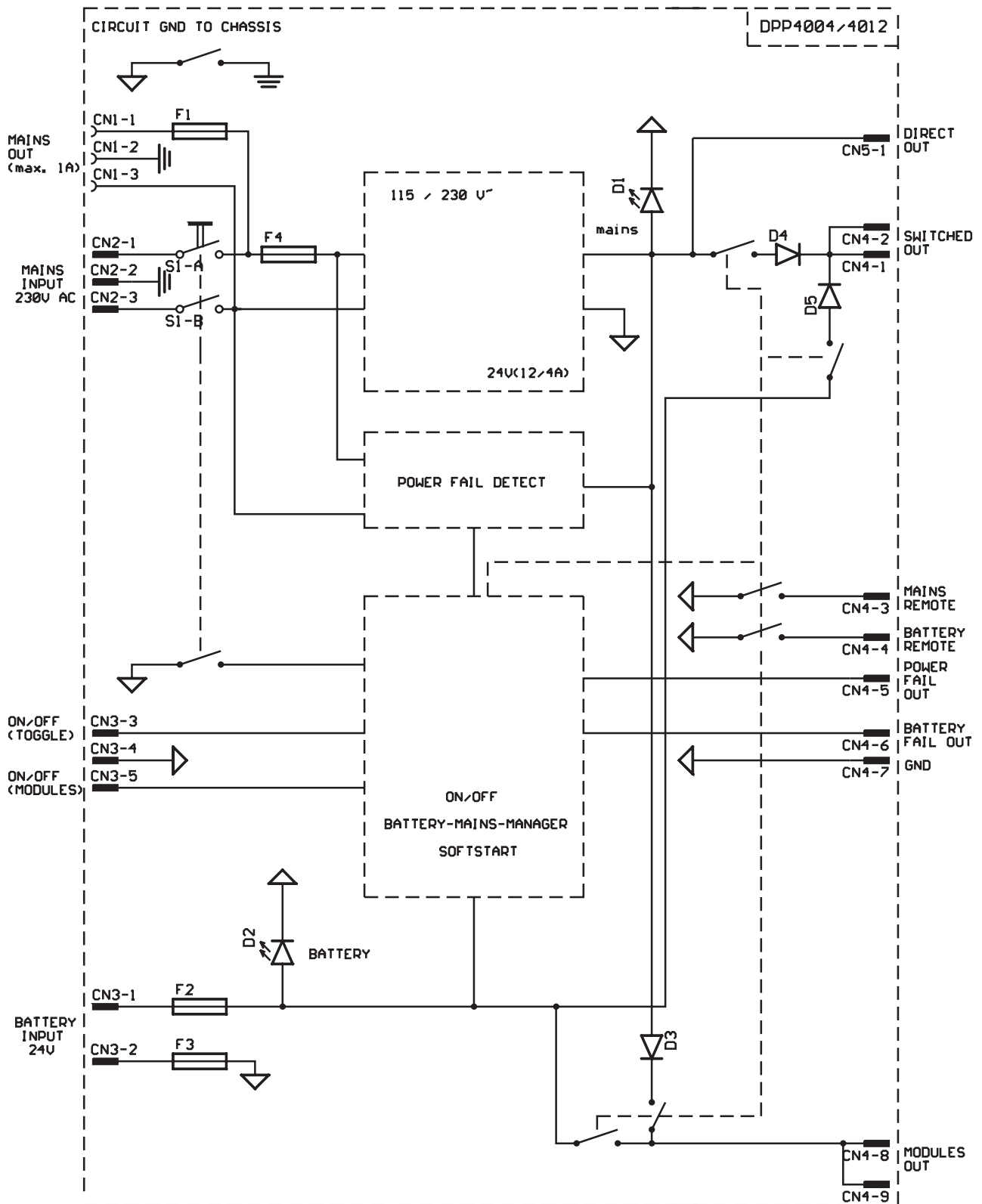
Supply output for the inputs 1 and 2; cannot be used for any other purpose.

Supply input for the MODULES input; has either to be connected to pin 9 or needs +24 V supply from an external source.

Supply input for the TOGGLE input; has either to be connected to pin 9 or needs +24 V supply from an external source.

SPECIFICATIONS

	DPP4004	DPP4012
Mains power supply		
Operational voltage internally selectable through bridging	230 VAC $\pm 10\%$ 115 VAC $\pm 10\%$	230 VAC $\pm 10\%$ 115 VAC $\pm 10\%$
Mains frequency range	50 ... 60 Hz	50 ... 60 Hz
Power consumption in idling mode	≤ 20 VA	≤ 20 VA
Power consumption at nominal load	≤ 120 VA	≤ 360 VA
Battery power supply		
Battery voltage	24 V $-10\%/+30\%$	24 V $-10\%/+30\%$
Current consumption in idling mode	≤ 0.17 A	≤ 0.17 A
Current consumption at nominal load	≤ 4.1 A	≤ 12.1 A
Current power handling capacity with MAINS REMOTE ON	1 A	1 A
Current power handling capacity with BATTERY REMOTE ON	1 A	1 A
Current power handling capacity with BATTERY FAIL OUT	0.1 A	0.1 A
Input current ON/OFF (TOGGLE)	> 2.2 mA = ACTIVE	< 1 mA = inactive
Input current ON/OFF (MODULES)	> 2.2 mA = ON	< 1 mA = OFF
Output data		
Nominal output voltage	24 V	24 V
Nominal output current with forced ventilation	4 A	12 A
Residual voltage standing wave d mV pp	< 100 mV pp	< 100 mV pp
Mains stabilization	$\pm 1\%$	$\pm 1\%$
Safety	EN 60065	EN 60065
Radio interference	EN 55022 (B) EN 50082 - 1 EN 61000 4-2....4-6 ENV 50204	EN 55022 (B) EN 50082 - 1 EN 61000 4-2....4-6 ENV 50204 EN 61000-3-2 EN 61000-3-3
Environmental temperature	$+5\text{ }^{\circ}\text{C} \dots +40\text{ }^{\circ}\text{C}$	$+5\text{ }^{\circ}\text{C} \dots +40\text{ }^{\circ}\text{C}$
Humidity	25% ... 75%	25% ... 75%
Air pressure	86kPa ... 106kPa	86kPa ... 106kPa
Dimensions (W x H x D)	19" x 2 HU = 483 x 88 x 330 mm	
Depth incl. connections	400 mm	400 mm
Weight	7 kg	7 kg



CIRCUIT DIAGRAM

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