



Edition: 4 from 16.09.2013
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Features of the module:

- Step-down DC/DC converter module
- Wide range of output voltages: 4.5-19V
- DC power supply range 8-28V
- Maximum current load 2A
- AW emergency output triggered by:
 - Output short
 - Output overload
- Protection:
 - SCP short circuit protection
 - OLP overload protection
 - OHP overheating protection
- High efficiency: 80- 90%
- Optical LED indicator
- warranty – 5 year from the production date

1. Technical description

The step-down DC/DC converter module **DC/DC-2.0A (DCDC20)** is used for powering devices that require stabilized voltage in the range of **4,5÷19 V DC**. The maximum current load is **2.0 A (Pmax= 24W)**. This module does not have galvanic insulation between the input and output (IN-AUX), and operates on a common ground potential (IN and AUX terminals are connected galvanically = common terminal).

1.1. Block diagram (fig1).

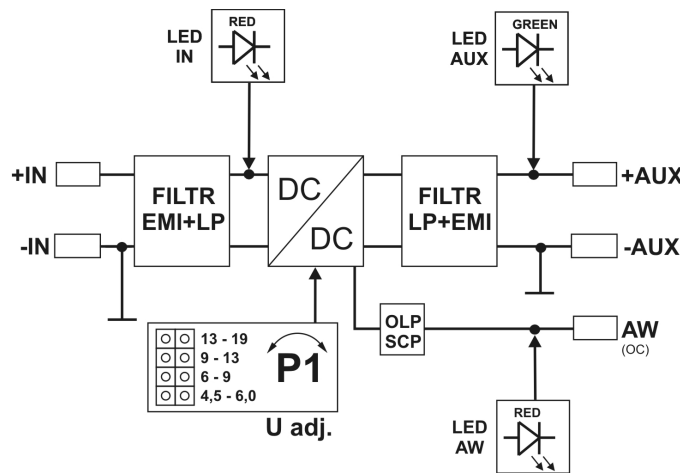


Fig.1. Block diagram of the converter module.

1.2. Description of elements and connection links of the power-supply unit (fig.2, tab.1, tab.2).

Table 1.

No. [fig. 2]	Description of element
[1]	IN LED - red
[2]	DC/DC module power connectors
[3]	P1 voltage regulation (4.5-19.0V)
[4]	Jumper- voltage range switching
[5]	AUX LED - green
[6]	DC/DC module terminal connectors (power and AW)
[7]	AW LED - red
[8]	Assembly base

Table 2.

[2], [6]	Description of module connectors
+IN - IN	DC power terminal (8V-28V DC, see voltage selection from power source)
+AUX - AUX	DC power terminal (+AUX= +U, -AUX=GND)
AW	Failure technical output: OLP/SCP (overcurrent protection, overload protection) Failure state : hi-Z (High impedance), normal state: L (0V, GND) type OC

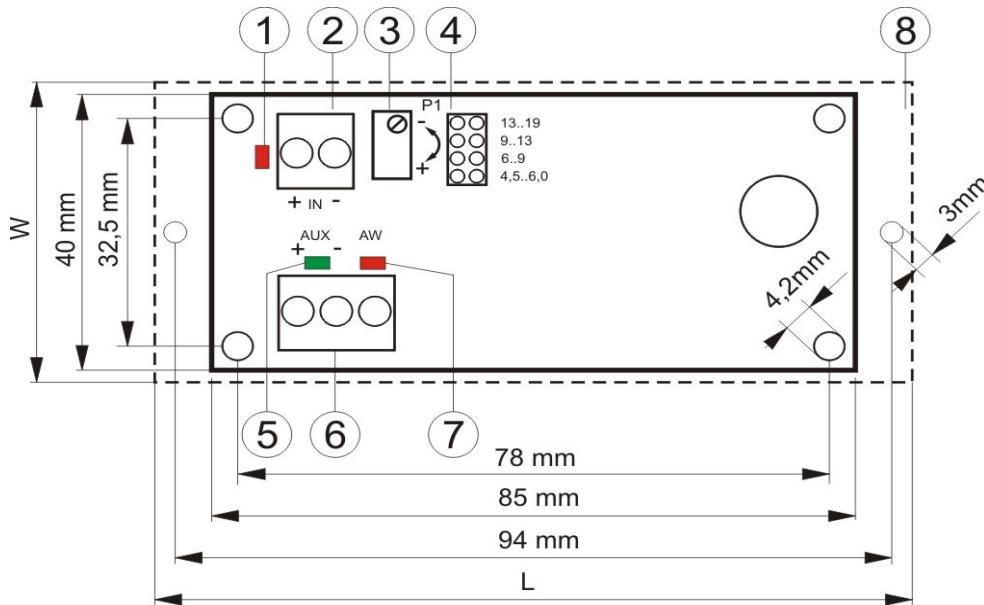


Fig.2. View of converter module.

1.3. Technical specifications:

- electrical specifications (tab.3)
- mechanical specifications (tab.4)

Table 3.

Power voltage	8V-28V/DC depending on the range set by the jumper
Module P Power	24W max. (see fig.3)
Efficiency	80%-90% for full range of power and loads
Output voltage	4,5V÷6V, 6V÷9V, 9V÷13V, 13V÷19V Switching ranges of jumper Factory settings: 12 V
Ripple voltage	20mV p-p...50mV p-p...
Output current	2.0 A max. (see fig.3)
Current consumption by module systems	10 mA max.
Protection against short circuits (SCP) and overloads (OLP)	180% - 200% of module power – output power limit, automatic return after elimination of short circuit
Technical output - AW terminal indicating failure:	- type OC, 50mA max. Failure state: hi-Z (high impedance) level, normal state: L (0V) level
Optical induction - IN diode indicating DC power state - AUX diode indicating DC power state at output - AW diode indicating failure	- red, continuous light indicates normal state - green, continuous light indicates normal state - red, in normal state is not lit, continuous light indicates failure
Operating conditions:	class II environment, -10°C - +40°C, ensure that air flows freely around module to ensure consistent cooling
Declarations, warranty	CE, RoHS, 5 year from the production date

Table 4.

Dimensions:	100 x 43 x 27 (LxWxH)
Mounting	Mounting pins x 4, mounting tape or mounting screw x2
Connectors	Φ0.41-1.63 (AWG 26-14)
Net/gross weight	0,05/0,08 kg

2. Installation.

2.1. Requirements.

The module of converter shall be mounted by the qualified installer having appropriate (required and necessary for a given country) permissions and qualifications for connecting (operating) low-voltage installations. The device shall be mounted in closed rooms, according to the environment class II, of the normal air humidity (RH=90% max. without condensation) and the temperature within the range from -10°C to +40°C. The module shall operate in a position so that free and convectional air flow around the module is guaranteed.

Before beginning installation, the load balance of the module should be checked. During normal use the sum of current consumed by the receivers should not exceed **I=2A** and power consumed from the module **Pmax=24W** according to fig. 3

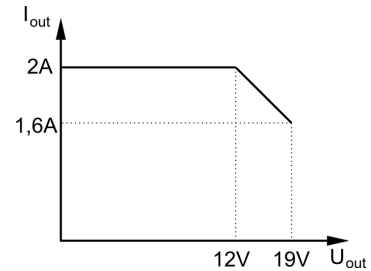


Fig.3. Maximum output current depends on output voltage

For proper operation of the module, the proper current output of the power supply must be ensured; the power of the power source should be calculated using the formula:

$$P_{IN}=P_{AUX} \times 1,15 \quad (I_{IN} \times U_{IN} = I_{AUX} \times U_{AUX} \times 1,15)$$

The device should be mounted on a metal case (cabinet, appliance) and in order to meet LVD and EMC requirements, the power, construction, and shielding principles appropriate to the application should be followed.

2.2. Installation procedure.

1. Install the case (cabinet, etc.) and insert the cables through the cable openings.
2. Install the DC/DC module on the mounting pins (the pins should be installed before the installation of the case or cabinet).
3. Attach the DC voltage to the +IN and –IN according to polarity. The supplying voltage, regarding the output voltage, should be matched in accordance with the table below:

DC input voltage	DC output voltage
8÷28	4,5÷6
12÷28	4,5÷9
16÷28	4,5÷13
22÷28	4,5÷19

4. Connect DC voltage.
5. Using the jumper, set the required voltage range and using the potentiometer Factory setting: 12 V.
6. Disconnect DC voltage.
7. Connect the receiver cables to the +AUX, -AUX pugs in the front plate of the module.
8. If necessary, connect the cables form the devices (alarm centre, controller, indicator, LED, etc.) to the AW service terminal.
9. Connect the DC power (the red IN diode should be continuously lit, and the green AUX diode should be continuously).
10. After the performance of test and function checks, close the case, cabinet, etc.

3. The converter module operation indication.

3.1. Optical signalling.

The **module of converter** has three LED's indicating an operation state, i.e. IN, AW or AUX.

- **Red IN LED:** the LED lights continuously in the normal state (DC supply). No DC supply is indicated by IN LED switching-off.
- **Green AUX LED:** indicates DC supply state at the module output. The LED lights continuously in the normal state, and if a fault or overload occurs, the LED is switched-off.

- **Red AW LED:** indicates overload of the module. The LED does not light in the normal state, and if a fault or overload occurs, the LED lights continuously.

3.2. Service terminals.

The converter module has two service terminals, allowing for the transmission of information concerning the emergency state of the DC/DC module.

- **AW- OLP/SCP terminals (overcurrent/ short circuit):** - at OC-type indicates overload or short circuit of the output of the module.

In the normal state, the terminal is a state of short to AUX- (0V). In the case of failure the module disconnects the terminal and it is in a hi-Z (high impedance) during the failure.

4. Service and operation.

4.1. Overloads of the module.

The module construction is based on the modern DC/DC converter system (step-down). It features a complete short-circuit (SCP), overload (OLP) and overheat (OHP) protection. In case of a fault or an overload of the AUX output, an automatic isolation of output voltage occurs that is indicated by the AW LED and the AW output. After a fault or an overload is eliminated, voltage at the AUX output recovers automatically (the module does not require reset).

5. Maintenance.

All maintenance operations shall be performed after the module is disconnected from the power network. As for the module, it is not necessary to perform any special maintenance operations, but if the module interior is significantly dusty, it shall be vacuum-cleaned by compressed air. In case of fuse replacement, the spare parts shall be the same as original ones.



WEEE-MARK

According to the EU WEE Directive – It is required not to dispose of electric or electronic waste as unsorted municipal waste and to collect such WEEE separately.

GENERAL WARRANTY CONDITIONS

1. Pulsar K. Bogusz Sp.j. (the manufacturer) grants a five-years warranty for the equipment, counted from the device's production date.
2. The warranty includes free-of-charge repair or replacement with an appropriate equivalent (the selection is at the manufacturer's discretion) if the malfunction is due to the manufacturer, includes manufacturing or material defects, unless such defects have been reported within the warranty period (item 1).
3. The equipment subject to warranty is to be brought to the place where it was purchased, or directly to the main office of the manufacturer.
4. The warranty applies to complete equipment, accompanied by a properly filled warranty claim with a description of the defect.
5. Should the claim be accepted, the manufacturer is obliged to provide warranty repairs, at the earliest convenience, however not later than within 14 days from the delivery to the service centre of the manufacturer.
6. The repair period mentioned in item 5 may be prolonged, if there are no technical possibilities to carry out the repairs, or if the equipment has been conditionally accepted, due to the breaking warranty terms by the claimant.
7. All the services rendered by force of the warranty are carried out at the service centre of the manufacturer, exclusively.
8. The warranty does not cover the defects of the equipment, resulting from:
 - reasons beyond the manufacturer's control,
 - mechanical damage,
 - improper storage and transport,
 - use that violates the operation manual or equipment's intended use
 - fortuitous events, including lightning discharges, power failures, fire, flood, high temperatures and chemical agents,
 - improper installation and configuration (in defiance with the manual),
9. The warranty is void in any of the following circumstances:
 - construction changes
 - repairs carried out by any unauthorized service center
 - damage or removal of warranty labels
 - modifications of the serial number
10. The liability of the manufacturer towards the buyer is limited to the value of the equipment, determined according to the wholesale prices suggested by the manufacturer on the day of purchase.
11. The manufacturer takes no responsibility for the defects that result from:
 - the damaging, malfunctioning or inability to operate the equipment
 - defects that result from using the equipment outside its stated specifications and operating parameters failing to abide by the recommendations and requirements contained in the manual, or the use of the equipment.

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