



# USER MANUAL

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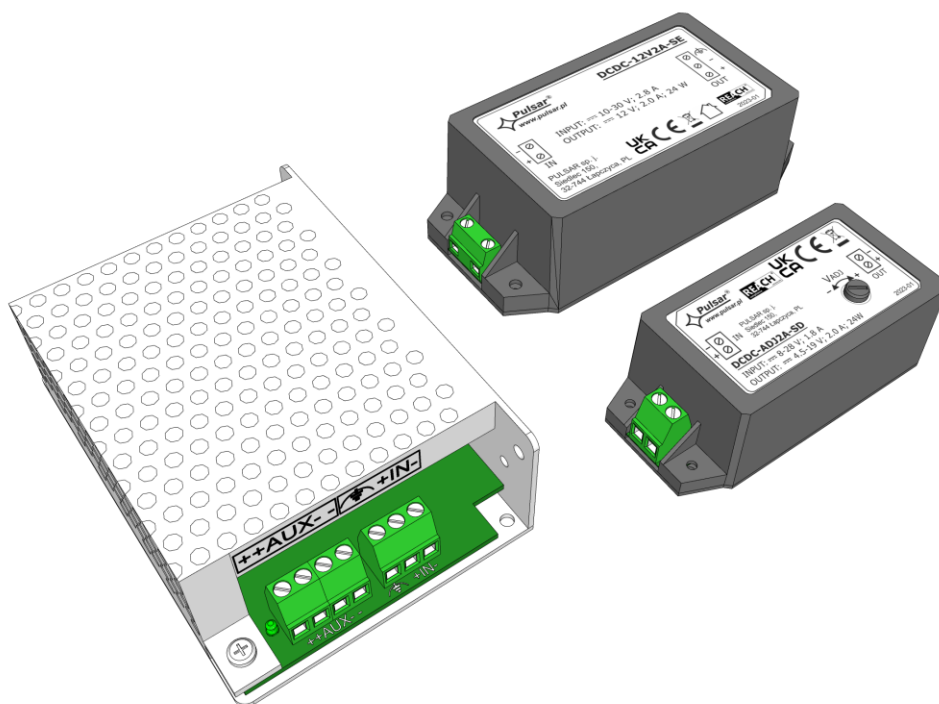
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Supersedes edition:

## Voltage converter modules DCDC

Step-down converters

Step-up/step-down converters

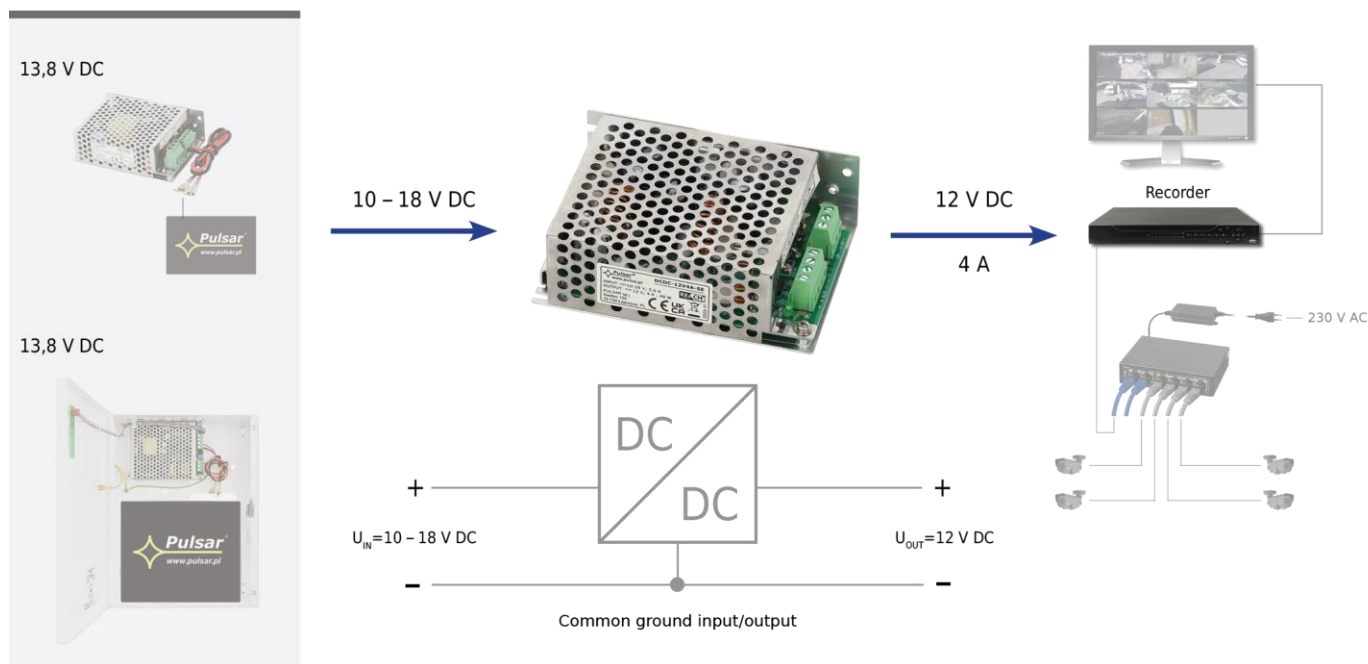


## Features:

- Two DC/DC converter topologies: voltage step-down and voltage step-up/step-down converters
- Adjustable output voltage – only for DCDC-ADJ2A-SD model
- Wide range of input voltage
- High efficiency: up to 94%
- Recommended for applications with low-tolerance supply voltage receivers
- Screw mounting
- Protections:
  - SCP short circuit protection
  - OLP overload protection
- LED optical indication
- Warranty – 2 years

## Example of use: DCDC-12V4A-SE

### Power supply units with battery backup



### 1. Technical description

DC/DC step-down and step-up/ step-down converters are used to adjust and stabilise the voltage, irrespective of any variations in the input voltage. Dedicated, among other things, to systems with buffer backup, where the output voltage is dependent on the battery charge level. Such solutions are particularly recommended for low-tolerance supply voltage devices. In step-down converters, the module's input voltage is stepped down to a level set at the output (adjustable in the DCDC-ADJ2A-SD). Input voltage must be higher than output voltage (min. 2 V). In step-up/step-down converters, on the other hand, the output voltage is stabilised over the entire input voltage range of the converter. For example, this makes it possible to stabilise the 12V voltage in a buffer system, irrespective of the battery charge level (10.5 - 13.8 V). Modules are not galvanically isolated between the inputs/outputs (IN-AUX, IN-OUT), so they operate on a common "ground".

### Basic parameters of converters

Model	Input voltage	Output voltage	Output current max.	Power	Topology
DCDC-ADJ2A-SD	8 – 28 V	4,5 – 19 V	2 A	24 W	Lowering
DCDC-12V2A-SD	20 – 60 V	12 V	2 A	24 W	Lowering
DCDC-12V5A-SD	20 – 60 V	12 V	5 A	60 W	Lowering
DCDC-12V2A-SE	10 – 30 V	12 V	2 A	24 W	Step-up/step-down converter
DCDC-12V4A-SE	10 – 18 V	12 V	4 A	48 W	Step-up/step-down converter
DCDC-24V1A-SE	10 – 30 V	24 V	1 A	24 W	Step-up/step-down converter
DCDC-24V2A-SE	18 – 30 V	24 V	2 A	48 W	Step-up/step-down converter

### 1.1. Block diagram (Fig. 1).

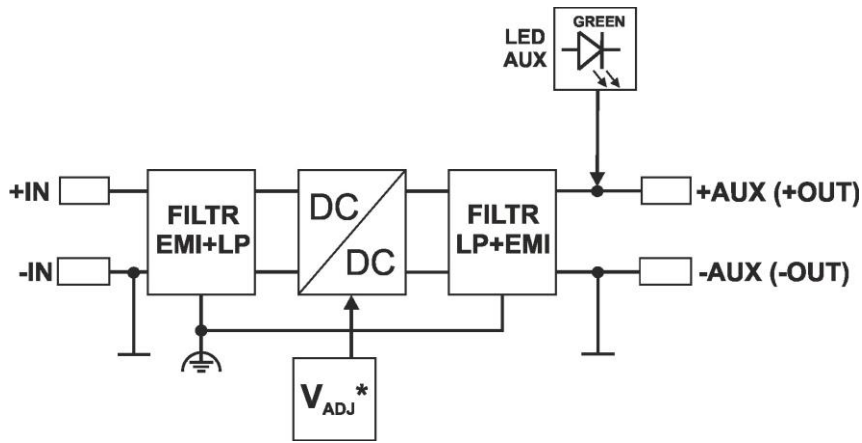


Fig. 1. Converter module block diagram.

\*- applies DCDC-ADJ2A-SD

### 1.2. Description of PSU components and connectors (Fig. 2a, Fig. 2b, Fig. 2c)

Table 1. Description components and connectors

Nr [Fig. 2]	Description
[1]	Converter input terminals (DC power input)
[2]	Converter output terminals (DC power output)
[3]	V <sub>ADJ</sub> voltage adjustment (4,5 – 19 V)
[4]	LED - green, indicating the presence of output voltage
[5]	Functional ground connector

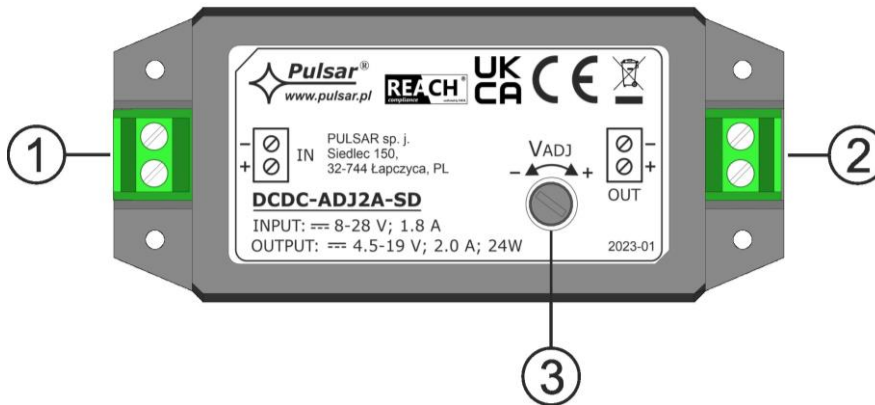


Fig. 2a. View of the DCDC-ADJ2A-SD converter module.

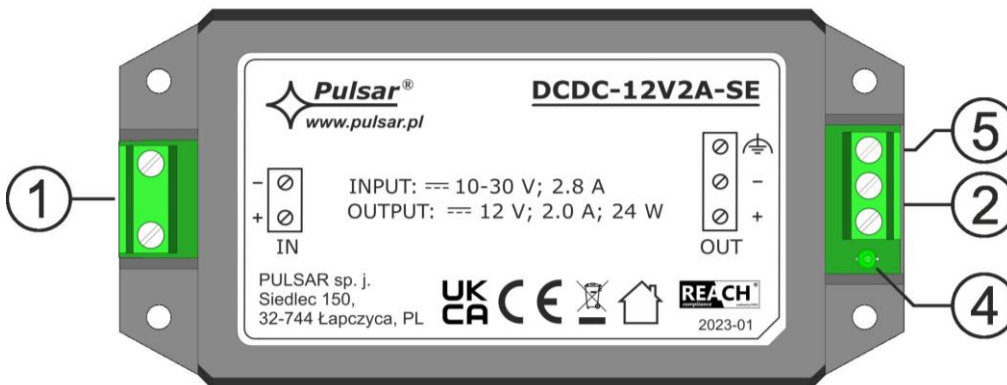


Fig. 2b. View of the DCDC-12V2A-SD; DCDC-12V2A-SE; DCDC-24V1A-SE converter module.

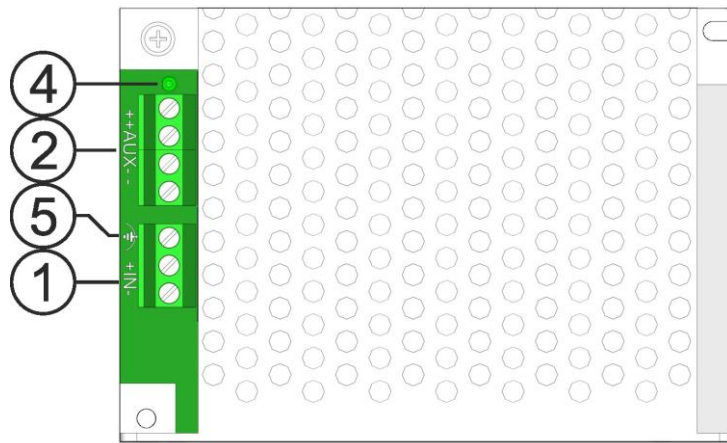


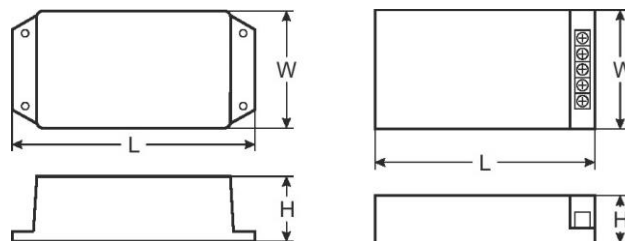
Fig. 2c. View of the DCDC-12V5A-SE; DCDC-12V4A-SE; DCDC-24V2A-SE converter module.

**1.1. Specifications:**

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

**Table 3. Electrical parameters**

Model	DCDC-ADJ2A-SD	DCDC-12V2A-SD	DCDC-12V5A-SD	DCDC-12V2A-SE	DCDC-12V4A-SE	DCDC-24V1A-SE	DCDC-24V2A-SE
Voltage adjustment range (power supply)	8 – 28 V	20 – 60 V	20 – 60 V	10 – 30 V	10 – 18 V	10 – 30 V	18 – 30 V
Input current	1,8 A	1,3 A	3,2 A	2,8 A	5,6 A	2,8 A	3 A
Output voltage	4,5 – 19 V	12 V	12 V	12 V	12 V	24 V	24 V
Output current	2 A	2 A	5 A	2 A	4 A	1 A	2 A
Module power P	24 W	24 W	60 W	24 W	48 W	24 W	48 W
Topology	Lowering			Step-up/step-down converter			
Energy efficiency	92%	91%	94%	89%	89%	92%	93%
Ripple voltage	20 mV p-p	20 mV p-p	20 mV p-p	20 mV p-p	20 mV p-p	20 mV p-p	50 mV p-p
Current consumption by module system	<10 mA	<10 mA	<40 mA	<20 mA	<30 mA	<30 mA	<40 mA
Short-circuit protection SCP	electronic, automatic recovery						
Overload protection OLP	110-150% module power @25°C, manual restart (failure requires disconnection of DC output circuit)						
Optical indication - a diode indicating DC power status at the PSU output	- n/a	- green, normal status: permanently illuminated					
Operating conditions	-10°C ÷40°C, air flow must be provided around the module for convection cooling						
Declarations, warranty	CE, 2 years						



**Table 4. Mechanical parameters**

Model	DCDC-ADJ2A-SD	DCDC-12V2A-SD DCDC-12V2A-SE DCDC-24V1A-SE	DCDC-12V5A-SD DCDC-12V4A-SE DCDC-24V2A-SE
Dimensions [+/- 2mm]:	L=92, W=40, H=31	L=110, W=53, H=35	L=110, W=78, H=36
Installation	mounting screws		
Connectors	Φ0,41±1,63 (AWG 26-14)		
Net/gross weight	0,05 / 0,07 [kg]	0,11 / 0,13 [kg]	0,18 / 0,21 [kg]

## 2. Installation.

### 2.1. Requirements.

DC/DC converters are intended for installation by a qualified installer, holding the appropriate permits and licenses (required and necessary for a specific country) for connecting (intervention) into low-voltage installations. Unit should be mounted in confined spaces, in accordance, with normal relative humidity (RH=90% maximum, without condensing) and temperature from -10°C to +40°C. The module should operate in a position that ensures free, convective air flow.

#### For DCDC-ADJ2A-SD model:

Prior to installation, a load balance should be prepared for the module. During normal operation, the sum of the currents consumed by the receivers must not exceed  $I=2A$  and the power consumed from the module  $P_{max}=24W$  according to fig.3.

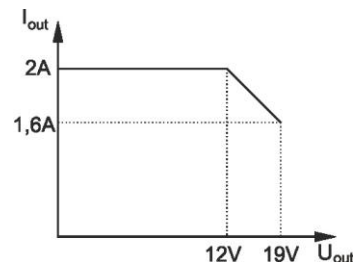


Fig. 3. Maximum output current depending on the output voltage.

For correct operation of the module it is necessary to ensure adequate current capacity of the power source, the power of the power source should be calculated from the formula:

$$P_{IN} = 1,2 \times P_{AUX}$$
$$(P_{IN} = 1,2 \times I_{AUX} \times U_{AUX})$$

#### An example:

The converter will supply  $P_{AUX} = 60W$  receivers consuming a total current of  $I_{AUX} = 5A$  at voltage  $U_{AUX} = 12V$ . The power of the power supply must therefore be at least  $P_{IN} = 1.2 \times 5A \times 12V = 72W$ .

The device should be mounted in a metal enclosure (cabinet, unit) and, in order to meet LVD and EMC directive requirements, the earthing should be connected to the functional earthing terminal (Tab.1) and the power supply, enclosure, shielding rules should be observed - as appropriate to the application.

### 2.2. Installation procedure.

1. Install the enclosure (cabinet etc.) and lead the cables through the cable ducts.
2. Install the DCDC module using the mounting screws.
3. Connect the supply the DC voltage to the +IN, -IN terminals, respecting polarity.
4. Switch on the DC voltage.
5. For model DCDC-ADJ2A-SD: set the required output voltage using the  $V_{ADJ}$  potentiometer.  
Factory setting: 12V.
6. Switch off the DC voltage.
7. Connect the wires of the receivers to the +AUX, -AUX (+OUT, -OUT) terminals of the terminal block on the module board.
8. Switch on the DC power - the green LED should be permanently on (does not apply to DCDC-ADJ2A-SD).
9. Once the tests and control operation have been completed, close the enclosure/cabinet.

## 3. Indication of the converter module operation.

### 3.1. Optical indication (not applicable DCDC-ADJ2A-SD).

The converter module has a LED signalling the operating status:

**Green LED: indicates the status of the DC power supply at the module output.** In normal state it is continuously on, in case of a short circuit or output overload, the LED goes off.

## 4. Operation and use.

### 4.1. Converter overload.

Converter output AUX (OUT) is equipped with electronic OLP protection. If the converter is loaded with a current exceeding  $I_{max}$ . (110% ÷ 150% load of the converter power @25°C) the output voltage is automatically cut off, which is signalled by the green LED going off. The output voltage will be restored automatically when the overload ceases.

## 5. Maintenance.

All maintenance operations can be carried out after disconnecting the converter module from the mains. The converter module does not require any special maintenance; however, if it is significantly dusted, it is advisable to blow the inside of the module with compressed air.



**WEEE LABEL**

**Waste electrical and electronic equipment must not be disposed of with normal household waste. According to European Union WEEE Directive, waste electrical and electronic equipment should be disposed of separately from normal household waste.**

**Pulsar sp. j.**  
Siedlec 150,  
32-744 Łapczyca, Poland  
Tel. (+48) 14-610-19-45  
e-mail: [sales@pulsar.pl](mailto:sales@pulsar.pl)  
[http:// www.pulsar.pl](http://www.pulsar.pl)

