

# DC/DC CONVERTER

## PSC305-LV

# USER MANUAL



## Notes to this manual

**ATTENTION!** Read this manual very carefully before installing and commissioning the specified module. This manual is a part of the delivered module. Familiarity with the contents of this manual is required for installing and operating the specified module. The rules for prevention of accidents for the specific country and the general safety rules in accordance with IEC 364 must be observed.

The function description in this manual corresponds to the date of publishing. Technical changes and changes in form and content can be made at any time by the manufacturer without notice. There are no obligations to update the manual continually.

The module is manufactured in accordance with applicable DIN and VDE standards such as VDE 0106 (part 100) and VDE 0100 (part 410). The CE marking on the module confirms compliance with EU standards 2006-95-EG (low voltage) and 89/339 EWG (electromagnetic compatibility) if the installation and operation instructions are followed.

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The current revision status of this user manual is the following:

Revision: 2.0

Date: 2009-03-24

Revision	Description of change	Writer	Date
00	First edition	RTH	2007-11-06
01	Section "Commissioning" reworked, minor text modifications	RTH	2008-02-15
1.0	Minor layout & text modifications, new revision status numbering (X.X) introduced, index of figures inserted.	RTH	2009-01-05
2.0	Default values in section 4.6 changed, minor text modifications.	RTH	2009-03-24

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## 1. Safety Instructions/Waste Disposal Rules



### Warning!

Because several components of operating electrical modules are charged by dangerous voltage, the improper handling of electrical modules may be the cause of accidents involving electrocution, injury, or material damages.

- Operation and maintenance of electrical modules must be performed by qualified skilled personnel such as electricians in accordance with EN 50110-1 or IEC 60950.
- Install the module only in areas with limited access to unskilled personnel.
- Before starting work, the electrical module must be disconnected from mains. Make sure that the module is earthed.
- Do not touch connector pins as they can hold dangerous voltage up to 30 seconds after disconnection.
- Only spare parts approved by the manufacturer must be used.

All electric modules must be disposed of separate from domestic waste at collecting points that have been set up by the government or municipal authority.

“Separate collection is the precondition to ensure specific treatment and recycling of WEEE and is necessary to achieve the chosen level of protection of human health and the environment in the Community.”

The above statement from EU directive 2002/96/EC applies to all electric modules installed within EU countries.

In countries outside the EU, different rules may apply regarding waste disposal of electric modules.

For more information about waste disposal of your discarded equipment, contact your ELTEK VALERE INDUSTRIAL partner.

## 2. General Information

The PSC305 is a module with rear side connectors and is designed to be mounted in an assembly set 19" sub rack according to [section 3.2](#). Due to its state-of-the-art circuit design, the unit has very low losses and therefore very compact dimensions, low weight and a very high power density.

The PSC305 can be used as electrically isolated DC power supply.

The nominal output power per unit is 480 W. Several units can be switched in parallel to increase the system output power or to build redundant power supply systems (n + 1-principle)

## 3. Type Range/Equipment

Type Designation	Article Code	Nominal Output Voltage	Nominal Output Current
PSC305-LV/24-20	201-005-447.00	24V <sub>DC</sub>	20A <sub>DC</sub>
PSC305-LV/48-10	201-005-457.00	48V <sub>DC</sub>	10A <sub>DC</sub>
PSC305-LV/60-8	201-005-467.00	60V <sub>DC</sub>	8.0A <sub>DC</sub>

### 3.1 Main Data

DC input voltage range: 18 to 75V<sub>DC</sub>

DC input current: 22.5A<sub>DC</sub> @24V<sub>DC</sub>/11.3A<sub>DC</sub> @48V<sub>DC</sub>/9.0A<sub>DC</sub> @60V<sub>DC</sub>

Nominal Output Power: 480W

For more specific data, see [section 7](#).

### 3.2 Available Options and Assembly Equipment

Designation	Material Code
DC/DC power rack DDR PSC305-LV (assembly set 19" sub rack 4U incl. backplane) for six DC/DC converters PSC305 (single input/output connection for each module)	202-305-607.00
Cover plate (with handle) to cover not used PSC slots, 3U; RAL 7035	881-MEC-BPL.03.14.B
Fan rack (recommended)	102-308-FR1.LV02

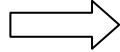


Figure 1.) DC/DC power rack fully equipped with six DC/DC converters PSC305



Figure 2.) Fan rack (recommended)

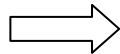
### 3.3 Front view/Front side LED panel



The PSC305-LV is equipped with the following three LED indicators:

- INPUT OK
- OUTPUT OK
- ALARM

For more information about the LED indicators, see [section 4.4](#).



Two captive screws are used for each module to secure it to the subrack (components of the module)

Figure 3.) Front view



### 3.4 Rear Side Connection

Socket outlet (DC-Input, DC-Output & Signals):

Pin assignment of the rear side connector:

Pin	Function
2b	(+) Output
5b	(-) Output
8b	PE
11b	-
13a	CAN-CVpp
13c	(-) output voltage sense link
14a	CAN-H
14c	CAN-L
15a	-
15c	CAN-CVCC
16a	AGND
16c	-
17a	-
17c	Hardwarecoding CODE1
18a	General alarm NC
18c	General alarm COM
19a	General alarm NO
19c	-
20a	-
20c	(+) output voltage sense link
22b	PE
25b	-
28b	(+) DC input
31b	(-) DC input

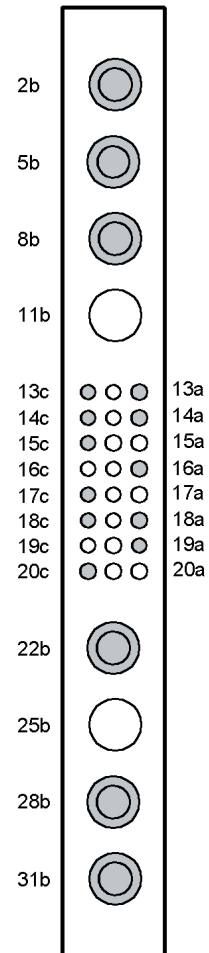



Figure 4.) Rear side connector (shown from the rear side of the module).

### 3.5 Cooling/Air flow direction

The PSC305 is convection cooled. The cooling air flows through the device in vertical direction. To provide sufficient air flow, a minimum space (A) of 2U (approx. 90 mm) is required between the unit and the top cover of the cabinet as well as an unobstructed supply of air from below.

 In Systems with high packing rate and limited airflow we recommend to use the fan rack for cooling.

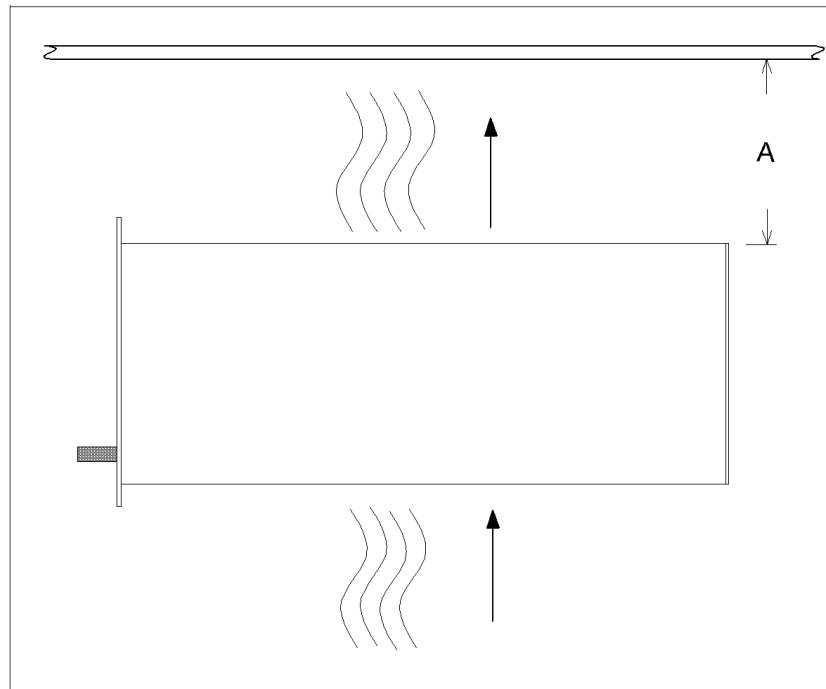


Figure 5.) Module airflow

### 3.6 Communication Interface

The DC/DC converter PSC305 is equipped with a serial data interface in accordance with the Controller Area Network (CAN) specification.

The CAN-Bus connection is integrated in the rear side connector.

Several modules in a system or parallel connection can be controlled and monitored through the CAN-Bus by a central DC controller unit UPC3S.

Following parameters of a specific DC/DC converter unit can be controlled or monitored:

- Output voltage
- Output current
- Module temperature
- Module status

## 4. Handling

### 4.1 Storage

The modules must be stored in a dry, dust free room with a storage temperature in accordance with the specific technical data (see [section 7](#)).

### 4.2 Commissioning

**Note:** Before commissioning the module make sure that the input voltage corresponds to the input voltage range of the unit as specified on the type plate and that the output voltage of paralleled units matches.

1. Carefully unpack the unit
2. Fill the rack beginning with the left slot.
3. Put the unit into an empty slot.
4. Carefully slide in the unit until the module connector touched the backplane connector.
5. Increase the force until the unit fits in completely. Avoid using too much force. If the unit does not fit in, begin again at Step 3.
6. Secure the unit using the two captive screws (M3x12) provided with the module.

**Note:** The PSC305 serially is equipped with an internal output side decoupling diode. This ensures hot plug-in capability of the unit and enables the operator to **add** modules under operating conditions.

**Note:** But if the module is to be **removed** it previously must be **switched off** by the input fuse!

**Caution:** After switching off the module the internal capacitors are still fully charged. Do not touch connector pins as they can still be charged with dangerous voltage after disconnection.

### 4.3 Output Power Diagram

The output characteristic of the PSC305 is a power limited IV characteristic curve in accordance with DIN 41772/DIN 41773.

For modules in parallel operation mode, a load balance of approximately  $\pm 10\%$  is attained due to a sloping output voltage line (-1% at 100%  $I_{nom}$ ).

The module is sustained short-circuit proof due to constant current control.

#### Output power (example PSC305-LV/48-10)

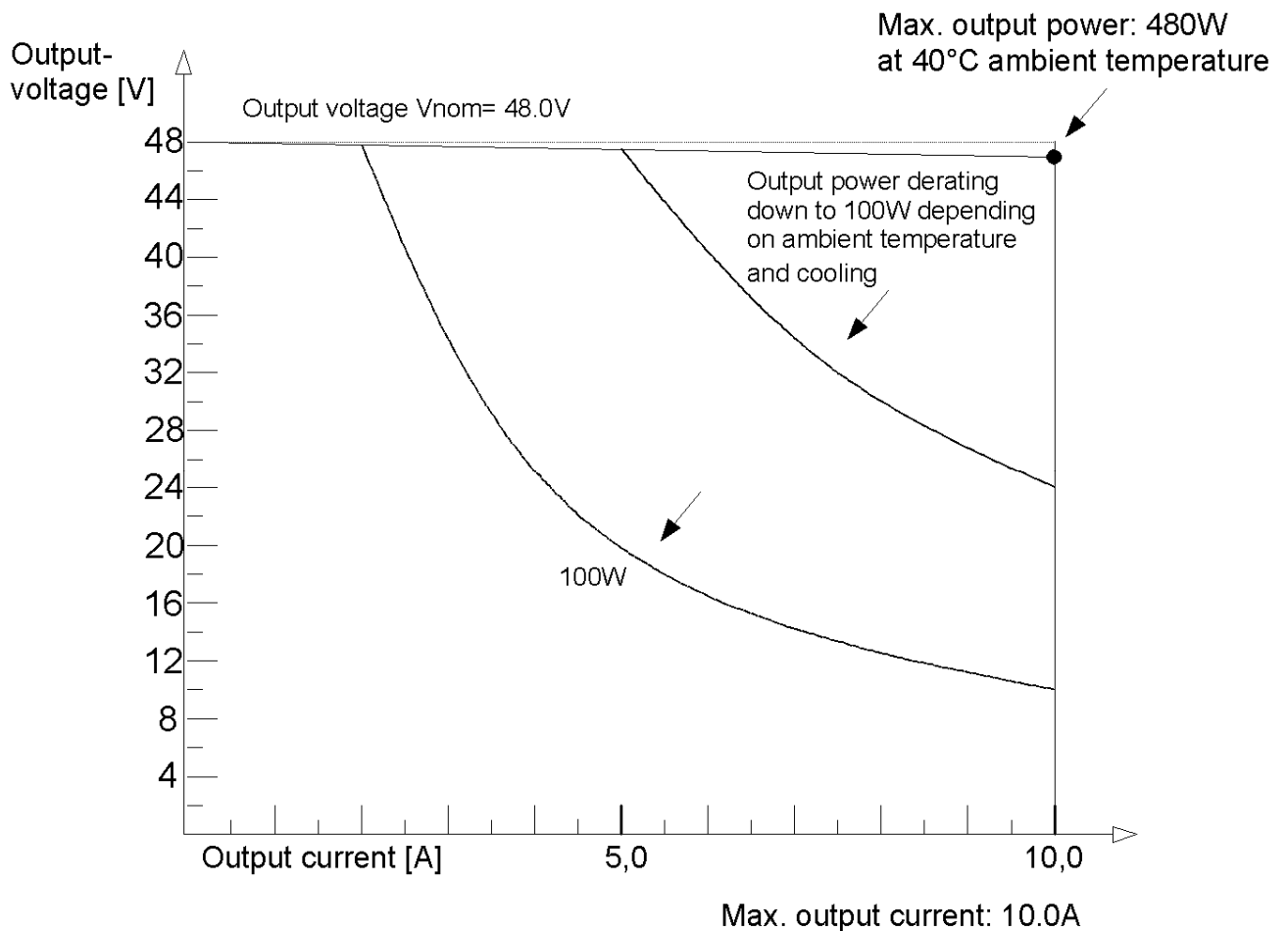





Figure 6.) Output power diagram

## 4.4 LED Indications

Functions of front panel LED indicators

LED	Colour	Function
	green	Input voltage ok (criterion: $V_i = 20V_{DC}$ to $75V_{DC}$ )
	green	Vout ok (criterion: $V_{out} \geq 85\%$ of adjusted value)*
	red	General fault**: $V_{in}$ incorrect, $V_{out}$ incorrect, module overtemperature, short circuit

\*For the output voltage threshold values (factory-set), see section 4.6

\*\*The module is equipped with an isolated signalling contact (normally open contact). The maximum load is  $60V_{DC}/500$  mA. The contact is time-delayed and reacts after approximately 10 seconds.

## 4.5 Monitoring

Monitored values	Criteria	Function
DC input voltage	Input voltage less than 20V; higher 75V	The module automatically switches off.
DC output voltage	Output voltage higher than the adjusted operating threshold*	The module automatically switches off (self locking). The module must be manually restarted.
Module temperature	Heat sink temperature $\geq 80^\circ C$	The module automatically switches off. It automatically switches on when the heat sink cools down to $\leq 70^\circ C$ .

\*For the output voltage threshold values (factory-set), see section 4.6

## 4.6 Default Values

The following factory-set default values are stored in PSC305 modules:

Default values	24V version	48V version	60V version
$V_o$ ( $V_{DC}$ )	24.0	48.0	60.0
$V >$ ( $V_{DC}$ )	25.2	50.4	63.0
$I_{const}$ ( $A_{DC}$ )	20.0	10.0	8.0
$V <$ ( $V_{DC}$ )	22.8	45.6	57.0

## 5. Maintenance

In general, the module is maintenance free.

A yearly inspection with following checks is recommended checking the following:

- Mechanical inspection
- Removal of dust and dirt, especially on radiator surfaces
- Check for internal dust or humidity

**Attention!** Dust combined with moisture or water may influence or destroy the internal electronic circuits. Dust inside the unit can be blown out with dry compressed air.

The interval between the checks depends on ambient conditions of the installed module.

## 6. Trouble Shooting

Symptom	Possible reason	Corrective action
No output voltage	<ul style="list-style-type: none"><li>• Is the input voltage present?</li><li>• PSC305 module plugged in securely?</li><li>• Incorrect polarity of input voltage?</li><li>• Short circuit at the output?</li></ul>	<p>→ Check</p> <p>→ Check</p> <p>→ Check</p> <p>→ Check</p>
Deviation of the output voltage	<ul style="list-style-type: none"><li>• Is the unit operating in current limiting mode due to overload?</li><li>• If an external sensor lead is used for the output voltage, is the connection faultless?</li></ul>	<p>→ Reduce the load</p> <p>→ Check</p>

If the unit still does not work even though all checks have been done, contact your sales agent or the ELTEK VALERE INDUSTRIAL service department.

## 7. Technical Specifications

Type designation	PSC305-LV/24-20	PSC305-LV/48-10	PSC305-LV/60-8
Article code	201-005-447.00	201-005-457.00	201-005-467.00
<b>DC input:</b>			
DC input voltage range	18-75V <sub>DC</sub>		
Input current	22.5A <sub>DC</sub> @ 24V <sub>DC</sub> /11.3A <sub>DC</sub> @ 48V <sub>DC</sub> /9.0A <sub>DC</sub> @ 60V <sub>DC</sub>		
Efficiency	≥89%		
Internal input fusing	40A		
<b>DC output:</b>			
Nominal output voltage	24V <sub>DC</sub>	48V <sub>DC</sub>	60V <sub>DC</sub>
Nominal output current	20.0A <sub>DC</sub>	10.0A <sub>DC</sub>	8.0A <sub>DC</sub>
Nominal output power	480W		
Voltage ripple	≤20mV <sub>pp</sub>	≤20mV <sub>pp</sub>	≤20mV <sub>pp</sub>
Psophometric acc. to CCITT-A	≤1.8mV	≤1.8mV	≤1.8mV
Dynamic accuracy of the charge voltage	≤3% V <sub>nom</sub> at load changes between 10%-90%-10% I <sub>nom</sub> ; transient time ≤1.5ms		
Short circuit protection	sustained short-circuit proof; 1 x I <sub>nom</sub>		
Parallel operation	yes (max. 24 units with DC controller unit UPC3S); current balance ±10% I <sub>nom</sub>		
Internal decoupling at the output	yes; active low loss decoupling circuit in the negative output line		
Internal output fuse	40A	25A	20A
<b>Standard Features:</b>			
LED signalling	Operation (green), Vo OK (green), Alarm (red)		
Isolated signalling contact	"General fault"; maximum load: 60 V <sub>DC</sub> /500 mA		
Communications interface	CAN- Bus, proprietary protocol		
<b>Environmental:</b>			
Ambient temperature	Operation: -20°C to +55°C; storage: -40°C to +85°C; output power derating down to 100W depending on ambient temperature and cooling		
Climatic conditions	according to IEC 721-3-3 class 3K3/3Z1/3B1/3C2/3S2/3M2		
Max. installation altitude	≤1500m		
Noise emission	≤30dBA		

**Mechanical:**

Type of construction	1/6 x 19", 3U		
Cooling	Convection cooling, bottom to top airflow (forced cooling recommended)		
Connections	DC input, DC output and signalization: DIN41612-M-connector		
Dimensions (W/H/D)	71/128/285mm		
Weight	approx. 2.2 kg	approx. 2.2 kg	approx. 2.2 kg
Type of enclosure / Protection class	IP20 (front panel)/1		
Colour (front panel)	RAL 7035, black print		

**Compliances:**

CE conformity	yes
Compliance to safety standards	EN60950-1; VDE0100 T410; VDE0110; EN50178; EN60146
Compliance to EMC standards	EN55011/22 class "B"; EN61000-4 T2-5

**7.1 Dimensional drawings:**

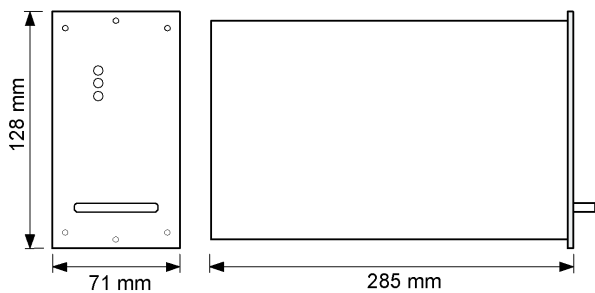


Figure 7.) Module dimensions