

DC/DC Power Rack

DDR PSC305 LV/HV

USER MANUAL



Notes to this manual

ATTENTION! Read this manual very carefully before installing and commissioning the power rack. This manual is a part of the delivered power rack. Familiarity with the contents of this manual is required for installing and operating the power rack.

The rules for prevention of accidents for the specific country and the universal 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 unit 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 73/23 EWG (low voltage) and 89/339 EWG (electromagnetic compatibility) if the installation and operation instructions are followed.

Supplier:

	ELTEK VALERE INDUSTRIAL GmbH Schillerstraße 16 D-32052 Herford
	+ 49 (0) 5221 1708-210
FAX	+ 49 (0) 5221 1708-222
Email	Info.industrial@eltekvalere.com
Internet	http://www.eltekvalere-industrial.com

© Copyright ELTEK VALERE INDUSTRIAL 2008. All rights reserved.

DC/DC Power Rack
DDR PSC305 LV/HV

User Manual
Page 3 (24)



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

Revision: 04

Date: 2008-06-18

Revision	Description of change	Writer	Date
00	First edition	RTH	2007-12-03
01	Input/output voltage values corrected	RTH	2008-01-28
02	Minor text modifications	RTH	2008-02-01
03	Recommended wire cross section @ output voltage 24V _{DC} modified	RTH	2008-02-08
04	Index of figures inserted, minor text modifications, sections "Cooling and Air Flow Direction" and "Can-Bus Termination" reworked.	RTH	2008-06-18

Table of Contents

1. SAFETY INSTRUCTIONS AND WASTE DISPOSAL RULES	5
2. GENERAL INFORMATION	6
2.1 Block Diagram	6
2.2 Possible Rack Configurations.....	7
2.3 Front View	8
2.4 Available Options	8
2.5 Cooling and Air Flow Direction.....	9
3. HANDLING	10
3.1 Storage	10
3.2 Commissioning.....	10
3.2.1 Communication Interface.....	11
3.2.2 CAN-Bus Termination	11
3.2.3 CAN Address Designation	12
3.2.4 Assembling of the Modules	13
3.2.5 Assembling of the Fan Rack.....	13
3.2.5.1 Fan Rack LED Indicators.....	13
3.2.6 Rear View/Electrical Connectors	14
3.2.7 Connection Tables	15
3.2.8 Schematic Diagram (Example of use)	18
3.2.9 Recommended Input Fuses	18
4. MAINTENANCE	19
5. TECHNICAL SPECIFICATIONS	20
5.1 Dimensional Drawings.....	21
6. NOTES.....	22

Index of figures

Figure 1) - Block diagram	6
Figure 2) - Power rack fully equipped with six DC/DC converters PSC305	8
Figure 3) - Rack airflow, convection-cooled.....	9
Figure 4) - Rack airflow with fan rack.....	9
Figure 5) - Front view of the empty DC/DC rack.....	10
Figure 6) - CAN-Bus termination switches	10
Figure 7) - Input fuses for the fan rack	10
Figure 8) - Rotary switch= CAN address selector	10
Figure 9) - Fan rack, 1U high.....	13
Figure 10) - Rear view	14
Figure 11) - Schematic diagram.....	18
Figure 12) - Rack dimensions.....	21

1. Safety Instructions and Waste Disposal Rules



Warning!

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

- Operation and maintenance of electrical devices 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 device 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 devices 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 devices installed within EU countries.

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

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

2. General Information

The DC/DC power rack can be equipped with a maximum of six DC/DC converters of type PSC305 (HV or LV version is possible) and delivers an output power up to 2880W. Several DC/DC converters with different output voltages can be used in one sub rack because all outputs are provided on the backplane separately. The rack can be monitored over the CAN-Bus and is compatible with our DC controller UPC3. The use of the optional fan rack (1 U) is recommended because in most applications there is not enough space for sufficient natural airflow inside the power cabinet.

2.1 Block Diagram

DDR PSC305 LV/HV

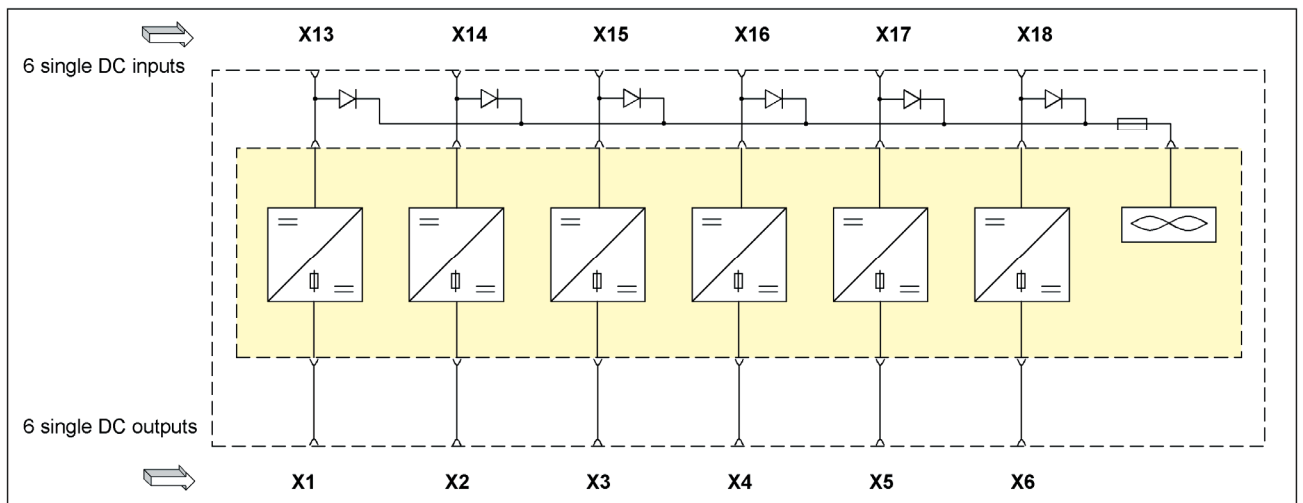


Figure 1) - Block diagram

2.2 Possible Rack Configurations

Up to six PSC 305-LV or PSC 305-HV with output voltages according to the table below can be integrated into one rack.

Designation of the rack/article code	Input voltage range	Available DC/DC converters PSC305/article code
DDR PSC 305-LV/ 202-305-607.00*	PSC305-LV: 18- 75V _{DC}	24V _{DC} /201-005-447.00
		48V _{DC} /201-005-457.00
		60V _{DC} /201-005-467.00
DDR PSC 305-HV/ 202-305-607.00*	PSC305-HV: 95- 270V _{DC}	24V _{DC} /201-005-747.00
		48V _{DC} /201-005-757.00
		60V _{DC} /201-005-767.00
		110V _{DC} /201-005-777.00
		220V _{DC} /201-005-787.00

* The article code of the empty rack is the same for the LV and HV usage.

Table: Output power

Number of installed DC/DC converters	Output power (without redundancy)	Output power (n + 1)	Output power (n + 2)
1	480W	---	---
2	960W	480W	---
3	1440W	960W	480W
4	1920W	1440W	960W
5	2400W	1920W	1440W
6	2880W	2400W	1920W

2.3 Front View



Figure 2) - Power rack fully equipped with six DC/DC converters PSC305.

1	Four screws M6 to fix the sub rack to the system cabinet	Components of the sub rack
2	Four screws M6 to fix the perforated cover to the sub rack and also to fix the sub rack to the cabinet.	
3	The sub rack is serially equipped with a perforated cover (air inlet for convection cooling)	
4	Two captive screws are used for each module to secure it to the sub rack (components of the modules)	

2.4 Available Options

Description	Article Code
Cover plate (with handle) to cover empty slots, 1/6 x 19", 3U, colour RAL 7035	881-MEC-BPL.03.14.B
Fan rack LV, 19", 1U (for supply voltage range of 18-80V _{DC})	102-308-FR1.LV02
Fan rack HV, 19", 1U (for supply voltage range of 80-320V _{DC})	102-308-FR1.HV02

2.5 Cooling and Air Flow Direction

Normally the DC/DC power rack is convection-cooled.
The cooling air flows through the perforated cover (see figure 3).

REMARK: We recommend the use of the optional **fan rack**, because in most applications there is not enough space for sufficient natural airflow inside the power supply cabinet. The fans are monitored and speed controlled by module temperature. The air flow is from bottom to top (see figure 4).

To provide sufficient air flow, a minimum space (see item “A” in figures 3) and 4) of 2 HU (approx. 90 mm) is required between the top of the sub rack and the roof of the power supply cabinet as well as an unobstructed supply of air.

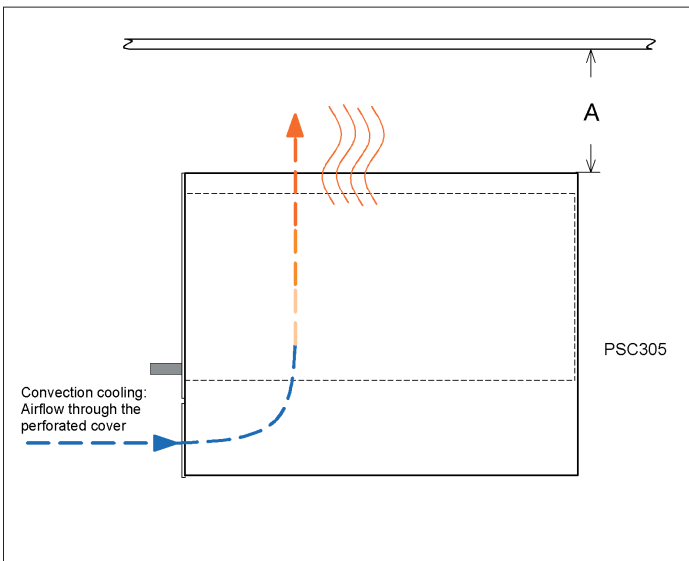


Figure 3) - Rack airflow, convection-cooled

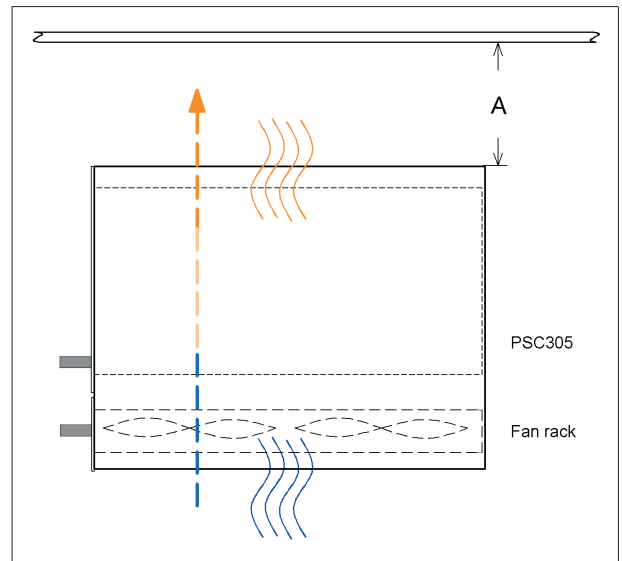


Figure 4) - Rack airflow with fan rack

3. Handling

3.1 Storage

Power racks must be stored in a dry, dust free environment with a storage temperature in accordance with the specific technical data (see section 5).

3.2 Commissioning

Carefully unpack the sub rack and mount it on your power supply cabinet (8 screws M6).

REMARK: Before assembling the modules, the following settings must be done on the empty rack:

1. CAN-Bus termination
2. CAN address designation

For details, see the following sections.

Figure 5) - Front view of the empty DC/DC rack

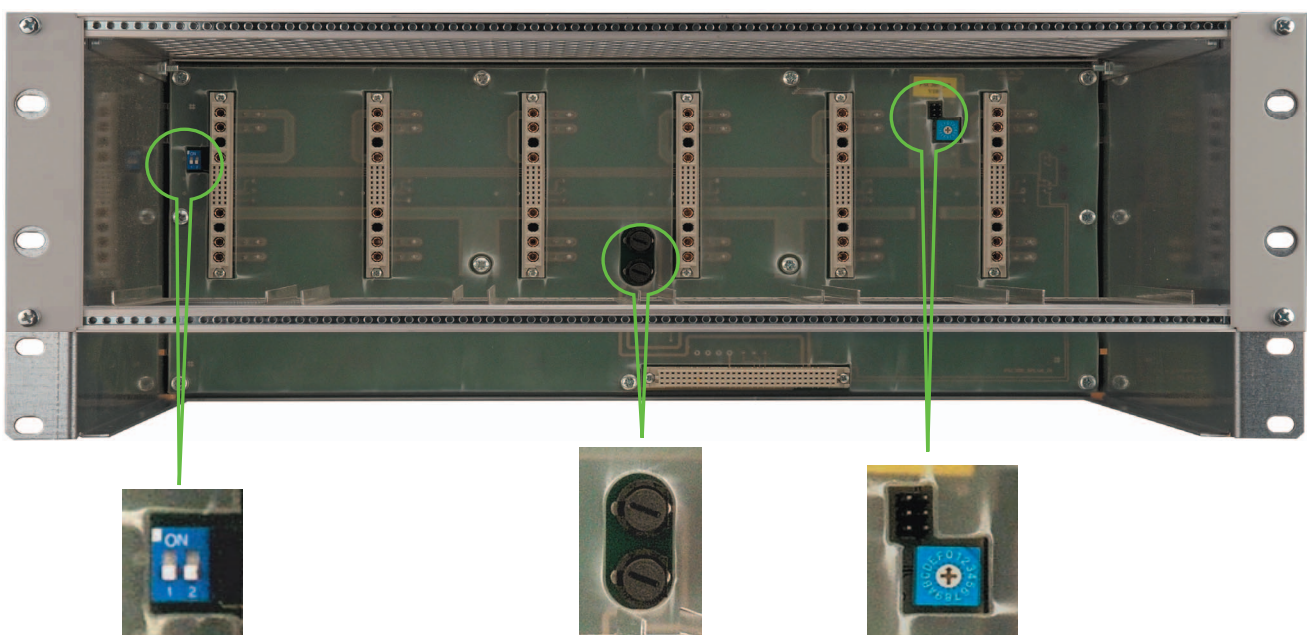


Figure 6) - CAN-Bus termination switches

(for details see the section 3.2.2 "CAN-Bus Termination")

Figure 7) - Input fuses for the fan rack

(2 x 3.15A)

Figure 8) - Rotary switch= CAN address selector

(for details see the section 3.2.3 "CAN Address Designation")

REMARK: The 6-pole connector located above the rotary switch is only used for service purposes.

3.2.1 Communication Interface

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

Several power racks and/or modules in a system can be controlled and monitored through the CAN-Bus by a central DC controller unit UPC3.

Two CAN-Bus connectors (X19= CAN1; X20= CAN 2) are located on the rear of the sub rack (see figure 10).

3.2.2 CAN-Bus Termination

The CAN-Bus must be terminated at both ends. If no other power rack and/or module is connected (CAN 2 not used), the CAN termination resistor must be enabled by setting the CAN termination switch 1, 2 or both (shown in figure 6) to “ON” position.

If CAN 2 is connected too, the CAN termination resistor must be disabled by setting the CAN termination switches 1 **and** 2 to “OFF” position. For switch functions in detail, see the table below.

Table “CAN-Bus termination switch functions”

Switch 1 position	Switch 2 position	CAN-Bus termination resistor:
ON	OFF	Enabled
OFF	ON	Enabled
ON	ON	Enabled
OFF	OFF	Disabled

ATTENTION: Missing terminations or too many terminations within the system can disturb the CAN-Bus communication. No more than two termination resistors should be activated on one bus and these should be located at both ends of the bus.

3.2.3 CAN Address Designation

All racks (modules) within a system must be addressed for a clear identification through the control unit.

The specific address for each rack must be designated with the CAN address selector (rotary switch) shown in figure 8).

Rotary switch position	Rack address
0	1
1	2
2	3
3	4
4	5
5	6
6	7
7	8
8	9
9	10
A	11
B	12
C	13
D	14
E	15
F	16

If only one rack is used within the power supply system, the rack must be addressed with the rack address 1 (rotary switch position “0” according to the table above).

A second used rack must be addressed with the rack address 2 (rotary switch position “1” according to the table above), etc.

The CAN addresses of the installed DC/DC converters are automatically designated by the rack.

3.2.4 Assembling of the Modules

After you have completed the settings, assemble the modules into the slots of the sub rack. Fill the rack beginning with the left slot. Unused PSC slots have to be covered with cover plates (see section 2.4 “Available Options”).

3.2.5 Assembling of the Fan Rack

If you prefer forced cooling (**recommended!**), mount the optional fan rack instead of the standard perforated cover (see figure 9).

The fan rack can be easily mounted into the 1U slot below the PSC units. The fan rack is equipped with a rear side connector for backplane connection.







Figure 9) - Fan rack, 1U high.

REMARK: Pay attention to the type of the fan rack to be used (high voltage/low voltage) because the fan rack is supplied by the input side DC voltage.

3.2.5.1 Fan Rack LED Indicators

The fan rack is equipped with two LED indicators which indicate the current operating status of the fan rack.

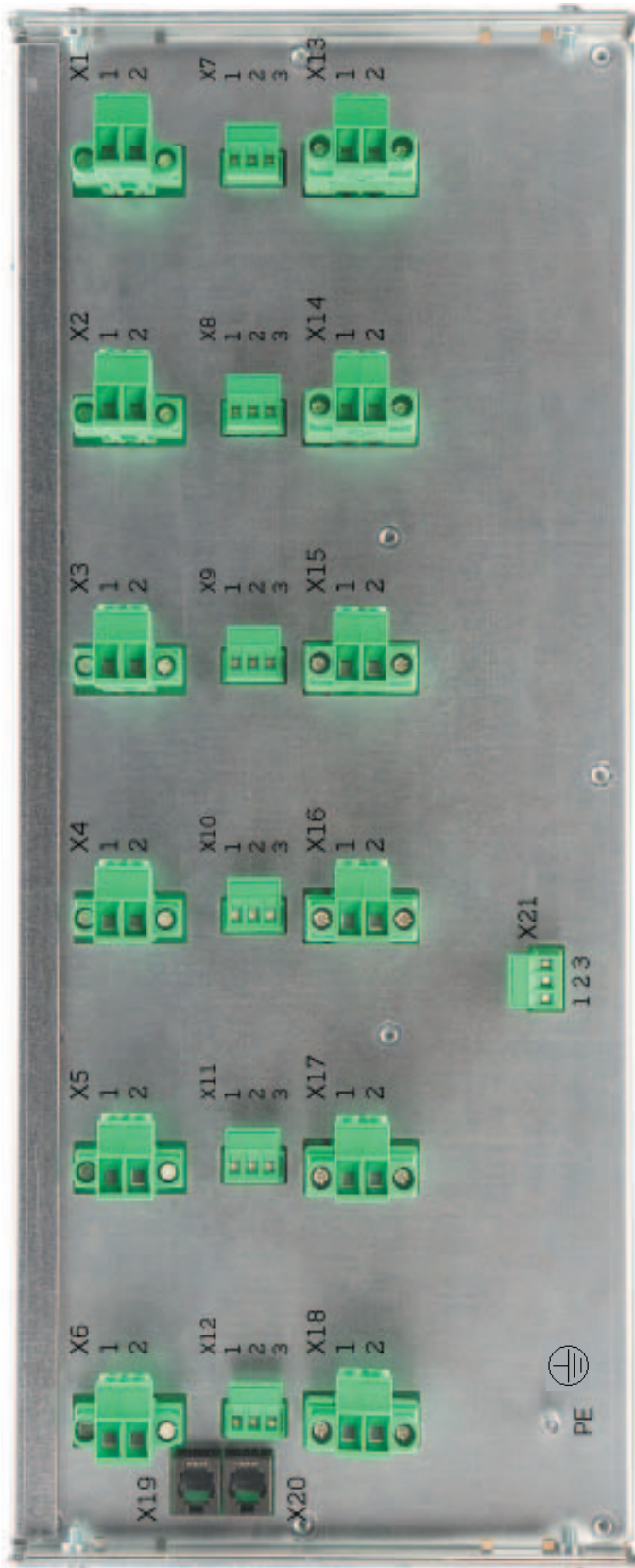
The following functions are indicated with the front side LED's:

LED	Colour	Function
 	green	Fan rack operating
 	red	Fan rack failure

DC/DC Power Rack DDR PSC305 LV/HV

User Manual
Page 14 (24)

3.2.6 Rear View/Electrical Connectors



The terminals are labelled (X1 ... X21) for a clear identification (see figure 10). Connect the input and output wires as well as the alarm wires to the rear terminals according to the connection tables on the following pages. The rack itself must be grounded with the cabinet frame (common PE of the system) on the special grounding bolt (PE ⊕).

Figure 10) - Rear view

3.2.7 Connection Tables

Assignment of the rear side connectors according to figure 10).

X1	Function	Recommended wire cross section @ output voltage:				
		24V _{DC}	48V _{DC}	60V _{DC}	110V _{DC}	220V _{DC}
1	+Vout (PSC module 1)	4 mm ²	1.5 mm ²	1.5 mm ²	1.5 mm ²	1.5 mm ²
2	-Vout (PSC module 1)	4 mm ²	1.5 mm ²	1.5 mm ²	1.5 mm ²	1.5 mm ²
X2						
1	+Vout (PSC module 2)	4 mm ²	1.5 mm ²	1.5 mm ²	1.5 mm ²	1.5 mm ²
2	-Vout (PSC module 2)	4 mm ²	1.5 mm ²	1.5 mm ²	1.5 mm ²	1.5 mm ²
X3						
1	+Vout (PSC module 3)	4 mm ²	1.5 mm ²	1.5 mm ²	1.5 mm ²	1.5 mm ²
2	-Vout (PSC module 3)	4 mm ²	1.5 mm ²	1.5 mm ²	1.5 mm ²	1.5 mm ²
X4						
1	+Vout (PSC module 4)	4 mm ²	1.5 mm ²	1.5 mm ²	1.5 mm ²	1.5 mm ²
2	-Vout (PSC module 4)	4 mm ²	1.5 mm ²	1.5 mm ²	1.5 mm ²	1.5 mm ²
X5						
1	+Vout (PSC module 5)	4 mm ²	1.5 mm ²	1.5 mm ²	1.5 mm ²	1.5 mm ²
2	-Vout (PSC module 5)	4 mm ²	1.5 mm ²	1.5 mm ²	1.5 mm ²	1.5 mm ²
X6						
1	+Vout (PSC module 6)	4 mm ²	1.5 mm ²	1.5 mm ²	1.5 mm ²	1.5 mm ²
2	-Vout (PSC module 6)	4 mm ²	1.5 mm ²	1.5 mm ²	1.5 mm ²	1.5 mm ²

DC/DC Power Rack

DDR PSC305 LV/HV

User Manual
Page 16 (24)

X7	Function	Recommended wire cross section
1	Alarm NO (PSC module 1)	0.75mm ²
2	Alarm COM* (PSC module 1)	0.75mm ²
3	Alarm NC (PSC module 1)	0.75mm ²
X8		
1	Alarm NO (PSC module 2)	0.75mm ²
2	Alarm COM* (PSC module 2)	0.75mm ²
3	Alarm NC (PSC module 2)	0.75mm ²
X9		
1	Alarm NO (PSC module 3)	0.75mm ²
2	Alarm COM* (PSC module 3)	0.75mm ²
3	Alarm NC (PSC module 3)	0.75mm ²
X10		
1	Alarm NO (PSC module 4)	0.75mm ²
2	Alarm COM* (PSC module 4)	0.75mm ²
3	Alarm NC (PSC module 4)	0.75mm ²
X11		
1	Alarm NO (PSC module 5)	0.75mm ²
2	Alarm COM* (PSC module 5)	0.75mm ²
3	Alarm NC (PSC module 5)	0.75mm ²
X12		
1	Alarm NO (PSC module 6)	0.75mm ²
2	Alarm COM* (PSC module 6)	0.75mm ²
3	Alarm NC (PSC module 6)	0.75mm ²
* COM and NO are closed during failure.		

DC/DC Power Rack DDR PSC305 LV/HV

User Manual
Page 17 (24)

X13	Function	Recommended wire cross section @ input voltage:				
		24V _{DC}	48V _{DC}	60V _{DC}	110V _{DC}	220V _{DC}
1	+Vin (PSC module 1)	6 mm ²	2.5 mm ²	1.5 mm ²	1.5 mm ²	1.5 mm ²
2	-Vin (PSC module 1)	6 mm ²	2.5 mm ²	1.5 mm ²	1.5 mm ²	1.5 mm ²
X14						
1	+Vin (PSC module 2)	6 mm ²	2.5 mm ²	1.5 mm ²	1.5 mm ²	1.5 mm ²
2	-Vin (PSC module 2)	6 mm ²	2.5 mm ²	1.5 mm ²	1.5 mm ²	1.5 mm ²
X15						
1	+Vin (PSC module 3)	6 mm ²	2.5 mm ²	1.5 mm ²	1.5 mm ²	1.5 mm ²
2	-Vin (PSC module 3)	6 mm ²	2.5 mm ²	1.5 mm ²	1.5 mm ²	1.5 mm ²
X16						
1	+Vin (PSC module 4)	6 mm ²	2.5 mm ²	1.5 mm ²	1.5 mm ²	1.5 mm ²
2	-Vin (PSC module 4)	6 mm ²	2.5 mm ²	1.5 mm ²	1.5 mm ²	1.5 mm ²
X17						
1	+Vin (PSC module 5)	6 mm ²	2.5 mm ²	1.5 mm ²	1.5 mm ²	1.5 mm ²
2	-Vin (PSC module 5)	6 mm ²	2.5 mm ²	1.5 mm ²	1.5 mm ²	1.5 mm ²
X18						
1	+Vin (PSC module 6)	6 mm ²	2.5 mm ²	1.5 mm ²	1.5 mm ²	1.5 mm ²
2	-Vin (PSC module 6)	6 mm ²	2.5 mm ²	1.5 mm ²	1.5 mm ²	1.5 mm ²

X19	CAN connector 1 (RJ11, 6-pole)
-----	--------------------------------

X20	CAN connector 2 (RJ11, 6-pole)
-----	--------------------------------

X21	Function	Recommended wire cross section
1	Alarm NO (Fan rack)	0.75mm ²
2	Alarm COM* (Fan rack)	0.75mm ²
3	Alarm NC (Fan rack)	0.75mm ²
* COM and NO are closed during failure.		

3.2.8 Schematic Diagram (Example of use)

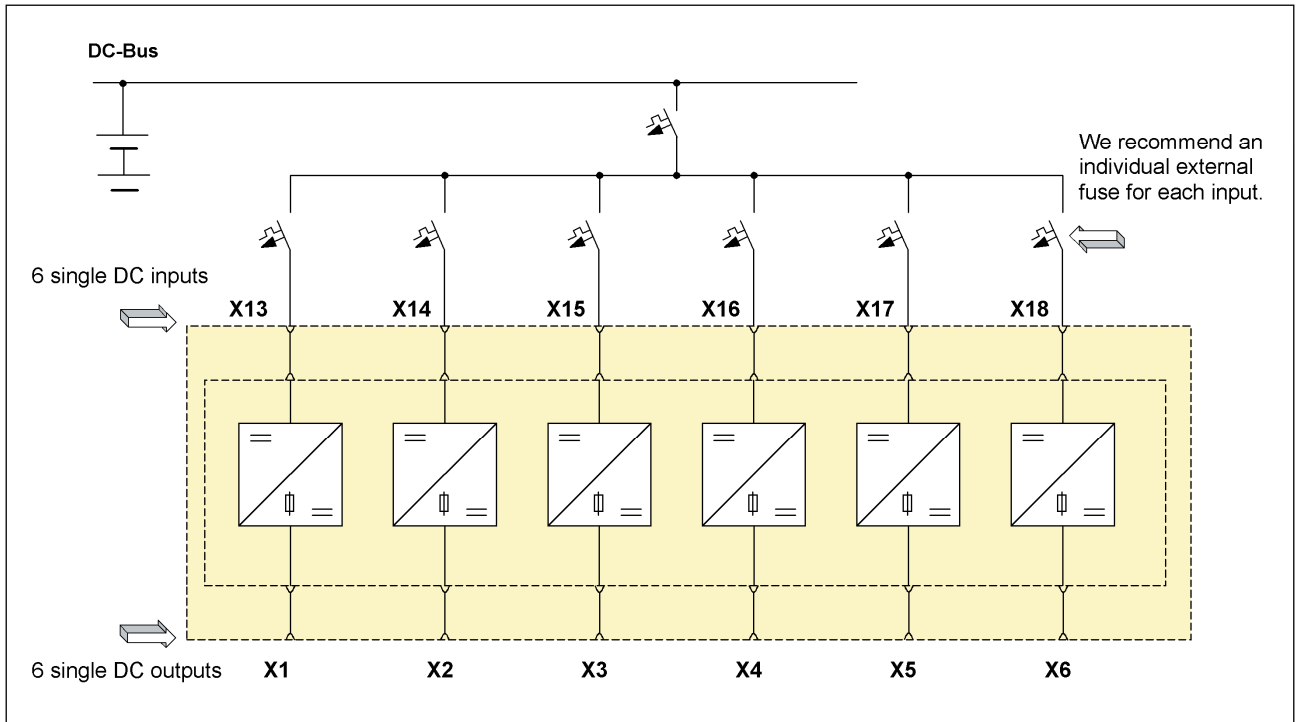


Figure 11) - Schematic diagram

REMARK: We recommend an individual fuse for each input (see figure 11).

With this fuse each module individually can be switched ON/OFF and therefore unused slots are isolated (higher safety level).

3.2.9 Recommended Input Fuses

The dimensioning of the input fuses depends on the maximum input current resulting from the input voltage:

Type of used DC/DC converter	Input voltage	Recommended fuse
PSC305 LV	24V _{dc}	32A MCB, characteristic "B"
	48V _{dc}	16A MCB, characteristic "B"
	60V _{dc}	16A MCB, characteristic "B"
PSC305 HV	110V _{dc}	10A MCB UC, characteristic "B"
	220V _{dc}	6A MCB UC, characteristic "B"

4. Maintenance

In general, the system is maintenance-free.

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

- Correct fan operation (fan rack)
- Mechanical inspection
- Removal of dust and dirt
- 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 intervals between the checks depend on the ambient conditions of the installed system.

For the exchange of defective fans in the 1U fan rack, an additional instruction manual is available on request.

5. Technical Specifications

Type designation	DDR PSC305 LV/HV
Article code	202-305-607.00
Main Data:	
Modules	Designed for the use of 1 up to max. 6 DC/DC converters of series PSC305 HV or PSC305 LV plus 1 fan rack (optional)
Input voltage	95- 270V _{DC} (HV-version) 18-75V _{DC} (LV-version)
Internal input fuses	There are no internal input fuses. We recommend an individual external fuse for each input.
Internal input fuses for the fan rack	2 x 3.15A
Output voltage	24, 48, 60, 110, 220V _{DC} (multi-output), depends on the used DC/DC converters; (for LV version only 24, 48, 60V _{DC} available).
Output power	480 up to max. 2880W
Electric connectors:	
DC input	6 x input (1 for each module)
DC output	6 x output (1 for each module)
Signalling contacts	Converter fault: Six potential free relay outputs NO, COM, NC (one for each module), contact load max. 60V _{DC} /max. 500mA; Fan rack fault: One relay output NO, COM, NC, contact load max. 60V _{DC} /max. 1A; 30V _{DC} /max. 5A; 240V _{AC} /max. 5A
Communication interface	2 x isolated CAN-Bus (DC/DC converter fault, fan rack fault), compatible with DC controller UPC3
Environmental:	
Max. installation altitude	≤1500 m
Ambient temperature	operation: -20°C...+55°C; storage: -40°C...+85°C
Audible noise	≤ 45dB(A) at 1m distance with fan rack
Mechanical:	
Type of construction	Sub rack, 19", 4U
Cooling	convection cooling (forced cooling with optional fan rack recommended)

Surfaces	powder coating RAL 7035 (front covers only), constructive parts: anodized metal
W/H/D	483/178/318mm (19", 4U)
Minimum installation depth	368 mm
Weight	approx. 4.8 kg (excluding PSC modules & fan rack)

Applicable standards:

Mechanical construction	acc. to VDE 0160 edition 5.88 chapter 7.2.2
Protection class	IP20
Climatic conditions	acc. to IEC 721-3-3 class 3K3/3Z1/3B1/3C2/3S2/3M2
RFI suppression / immunity	CE-label, (EN50081-1, EN55011/55022 class „B“, EN50082-2, EN61000-4 part 2/3/4/5)
Compliance to safety standards	acc. to EN60950-1, VDE0100 T410, VDE0110, EN60146

5.1 Dimensional Drawings

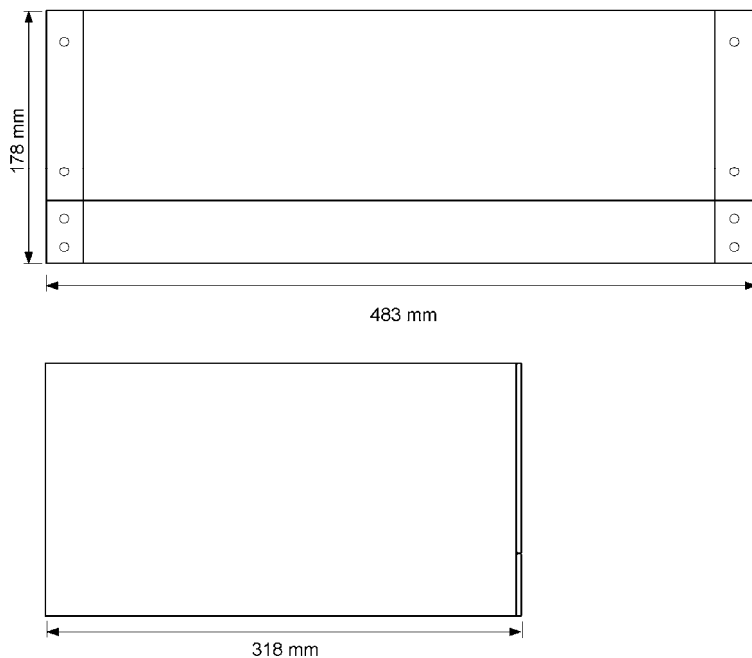


Figure 12) - Rack dimensions



Supplier:

	ELTEK VALERE INDUSTRIAL GmbH Schillerstraße 16 D-32052 Herford
	+ 49 (0) 5221 1708-210
FAX	+ 49 (0) 5221 1708-222
Email	Info.industrial@eltekvalere.com
Internet	http://www.eltekvalere-industrial.com