Steuer- und Regeltechnik / Sachsenheim

DC-DC CONVERTER **ACR 150-4DB/KE**

RAILWAY CONVERTER FOR COMPACT PCI®.

STANDARD EURO-RACK SIZE 19"

HIGHLIGHTS

- + **Output Power up to 100 Watts***
- + **Quad Output**
- + **High power density**
- + **Wide Input Range**
- + **Wide Temperature Range**
- + **Hold-up-time > 10ms**
- + **Coated Assembly**
- + **RoHS compliance**
- + **According to EN50155**

INPUT

Input Voltage Nominal	24 VDC, 110 VDC (other inputs on request)

OUTPUT

Output Voltage	5 V / 3,3 V / 12 V / -12 V **
Initial Set Accuracy	±0,4% ($V_{out\ 1,\ 2}$), ±0,2% ($V_{out\ 3,\ 4}$), no load
Minimum Load	No minimum load
Short circuit	Continuous short circuit proof
Line Regulation	< 0,5 %
Load Regulation	< 1 % (0% - 100% load)****
Ripple & Noise	< 50 mVpp, 20 MHz bandwidth (+25°C)
Start Time	< 1000 ms
Temperature Coefficient	< 0.01 %/°C

FEATURES

Active Reverse Polarity Protection	V_{in} max
Active Inrush Current Limitation	Max.12 A
Hold-up-time	> 10 ms at full load
Yellow LED	to indicate operating mode
Enable Signal Secondary	ON: EN connected to GND OFF: EN open
Inhibit Signal Secondary	OFF: INH connected to GND
Supply Fail Signal	Open-collector Output
Derating Signal	Open-collector Output
Sense +/-	Remote sense to compensate for lead drops of the output line up to 0,2 V. At $V_{out\ 1}$ and $V_{out\ 2}$

PROTECTION

Output Over Voltage Protection (OVP)	Typ.120% $V_{out\ nom}$, (external supply not permissible)
Over Current Protection (OCP)	I_{out} > 105%. The output switches-off when V_{out} < 80% (at V_{out3} <70%) and restarts automatically latest after 1 s of elimination of the overload.
Over Temperature Protection (OTP)	Shutdown at +97-103°C PCB-temp. with 5°C hysteresis and auto recovery.

GENERAL

Product Standard	EN 50155:2007
Isolation	2200 VDC Input to Output 1500 VDC Input to Earth (PE) 710 VDC Output to Earth (PE)
Switching Frequency	Typ. 340 / 200 / 260 kHz*****
Dimensions [mm]	166,5 x 40,3 x 111
Weight	approx. 930 g
MTBF	500.000h at 25°C

ENVIRONMENTAL

Operating Ambient Temp.	-40°C to +85°C*
Storage Temperature	-40°C to +100°C
Vibration / Shock / Bump	EN 61373:1999, Cat. 1B

EMC

EMC Standard	EN 50121-3-2:2006
Conducted Emissions	EN 55011:2007+A2:2007, Class A***
ESD Immunity	EN 61000-4-2:2009, level 3 (6kV/8kV), Criteria A
Burst	EN 61000-4-4:2004, level 3 (2kV), Criteria A******
Surge	EN 50121-3-2:2006, line to line ±1kV, 42R, and line to case ±2kV, 42R, Criteria B
Conducted Immunity	EN 61000-4-6:2007+A1:2001, level 3 (10V), Criteria A******

* Derating > +60°C; Derating-Factor: ca. 2W/K.
**3,3 V adjusted to 3,4 V and 5 V adjusted to 5,1 V
*** In built-in condition the devices may show different EMC properties
**** Value could be higher, depending on the voltage drop of the connector
***** Converter / Step-down $V_{out\ 1,\ 2}$ / Step-down $V_{out\ 3,4}$
******Criteria B with connected sense lines

TECHNICAL DATA

For T_{amb}=25°C,$V_{in\ nom}$,$I_{out\ nom}$, unless otherwise specified

SPECIFICATION Input 14,4 - 36 VDC (24 Vin nom)

	TYPE		ACR150-4DB/KE/L system slot left		ACR150-4DB/KE/R system slot right	
	ORDER NUMBER		72 81 89 0422 9		72 82 89 0422 5	
	CHARACTERISTIC	Unit				
INPUT	Input Voltage Nominal	V	24			
	Input Voltage Operating	V	16...30			
	Input Voltage Range	V	14,4...36 (t ≤ 1,0 sec.)			
	Under Voltage Turn-on	V	<16,8			
	Under Voltage Turn-off	V	<14,4			
	Input Current @ Full Load	A	5,0...5,5			
	Input Current @ No Load	mA	<250			
	Input Current disabled mode*	mA	<165			
	Recommended External Fuse	A	16 T			
OUTPUT			Output 1	Output 2	Output 3	Output 4
	Output Voltage	V	5,0**	3,3**	12,0	-12,0
	Output Current	A	0...14	0...14	0...2	0...1
	Output Power	W	71	47	24	12
	Output Power Max.	W	100****			
	Efficiency @ Full Load (typical)	%	81***			
	Output Current limit	A	14,7...18,2	14,7...18,2	2,1...3	1,05...1,5
	Transient Response 25 % / 75 % Load Step Recovery Time < 1 ms	mV	±105	±105	±90	±45

SPECIFICATION Input 66 - 154 VDC (110 Vin nom)

	TYPE		ACR150-4DB/KE/L system slot left		ACR150-4DB/KE/R system slot right	
	ORDER NUMBER		77 81 89 0522 3		77 82 89 0522 8	
	CHARACTERISTIC	Unit				
INPUT	Input Voltage Nominal	V	110			
	Input Voltage Operating	V	77...138			
	Input Voltage Range	V	66...154 (t ≤ 1,0 sec.)			
	Under Voltage Turn-on	V	<77			
	Under Voltage Turn-off	V	<66			
	Input Current @ Full Load	A	1,0...1,3			
	Input Current @ No Load	mA	<70			
	Input Current disabled mode*	mA	<50			
	Recommended External Fuse	A	3,15 T			
OUTPUT			Output 1	Output 2	Output 3	Output 4
	Output Voltage	V	5,0**	3,3**	12,0	-12,0
	Output Current	A	0...14	0...14	0...2	0...1
	Output Power	W	71	47	24	12
	Output Power Max.	W	100****			
	Efficiency @ Full Load (typical)	%	82***			
	Output Current limit	A	14,7...18,2	14,7...18,2	2,1...3	1,05...1,5
	Transient Response 25 % / 75 % Load Step Recovery Time < 1 ms	mV	±105	±105	±90	±45

* Enable signal open
**3,3 V adjusted to 3,4 V and 5 V adjusted to 5,1 V
*** Mix: $I_{out\ 1}$ = 10 A; $I_{out\ 2}$ = 8 A; $I_{out\ 3}$ = 1,3 A; $I_{out\ 4}$ = 0,6 A
**** Derating > +60°C; Derating-Factor: ca. 2W/K.

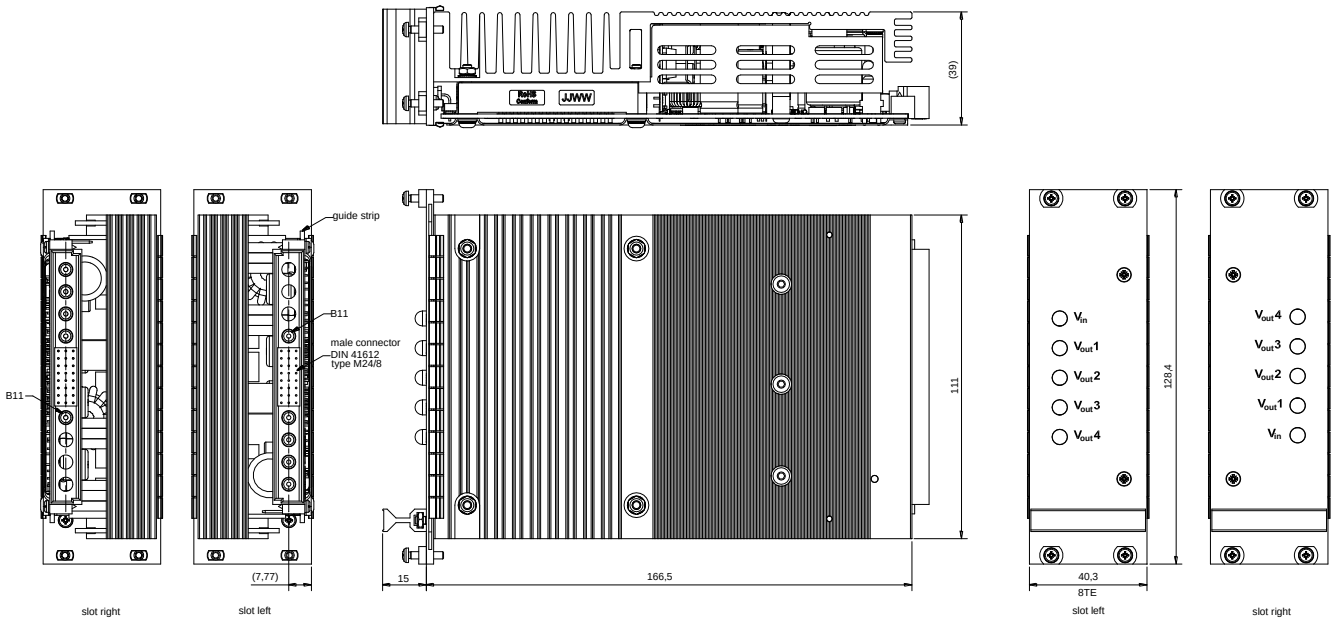
TECHNICAL DATA

For T_{amb}=25°C,$V_{in\ nom}$,$I_{out\ nom}$, unless otherwise specified

MECHANICAL DETAILS

1. Dimensions in mm
2. Unless otherwise specified, general tolerances +/-0,5 are for values in brackets (XX).
   Values not in brackets are according to ISO 2768-1m.

Coating: Lackwerke Peters ELPEGUARD SL 1307-FLZ/2



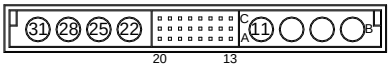
PINNING

Pin		Function	Pin		Function
A13	NC	Not connected	B17	V_{out2}	+3,3V OutputVoltage
A14	INH	Inhibit Signal	B18	V_{out2}	+3,3V OutputVoltage
A15	NC	Not connected	B19	V_{out3}	+12V OutputVoltage
A16	S return	Sense return	B20	V_{out4}	-12V OutputVoltage
A17	S+5V	Sense V_{out1}	B22	V_{out1}	+5V OutputVoltage
A18	S+3,3V	Sense V_{out2}	B25	GND	Ground
A19	V_{out3}	+12V OutputVoltage	B28	V_{in}+	+Input Voltage
A20	V_{out4}	-12V OutputVoltage	B31	V_{in}-	-Input Voltage
B2	NC	Not connected	C13	En	Enable Signal
B5	NC	Not connected	C14	DEG	Derate Signal
B8	NC	Not connected	C15	FAL	Supply Fail Signal
B11	⏚	Chassis Ground	C16	V_{out2}	+3,3V OutputVoltage
B13	V_{out2}	+3,3V OutputVoltage	C17	V_{out2}	+3,3V OutputVoltage
B14	V_{out2}	+3,3V OutputVoltage	C18	V_{out2}	+3,3V OutputVoltage
B15	V_{out2}	+3,3V OutputVoltage	C19	V_{out3}	+12V OutputVoltage
B16	V_{out2}	+3,3V OutputVoltage	C20	V_{out4}	-12V OutputVoltage

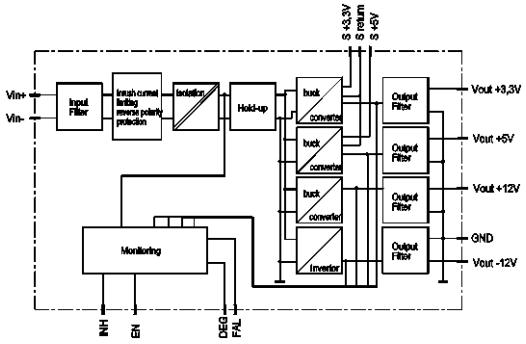
CONNECTION

Connector DIN M24/8

TOP VIEW CONNECTOR



BLOCK DIAGRAM



NOTES

Installation instructions:
The converters have to be installed according to the guidelines currently in force, like other open electronic component assemblies. Plug in not under voltage. Attention must be paid to sufficient ventilation, carry off heat, fastening and protection against accidential contact.
The pin B11, Case/PE : (⏚ / ⏚), has to be properly connected in order to assure operation.
External Fuse:
For input protection a time-lag fuse corresponding to IEC 60127-2 must be installed. For recommended rating of the fuse refer specification table above. Pay attention on sufficient current of current source in case of short-circuit!

DESCRIPTION OF FEATURES

For T_{amb}=25°C,$V_{in\ nom}$,$I_{out\ nom}$, unless otherwise specified

ENABLE SIGNAL / INHIBIT SIGNAL

Inputs

Reference to GND Low-Level: 0V...0,8V High-Level 2,8V...12V or open (Logic see table)

INH	Low	Low	High	High
EN	Low	High	Low	High
Power Status	"Off"	"Off"	"On"	"Off"

The pin sinks about 140 µA.

SUPPLY FAIL SIGNAL

The Supply Fail Signal is an open-collector output, emitter grounded (npn-Transistor). Active level: low.
Maximum current = 5 mA, maximum voltage = 5 V, saturation voltage < 1,2 V.
FAL switches Low, if one of the outputs is out of tolerance or if Vin breaks down. If Vin breaks down, it remains 5 ms between the edge of the FAL-Signal and the break down of Vout.

DERATE SIGNAL

The Derate Signal is an open-collector output, emitter grounded (npn-Transistor). Active level: low.
Maximum current = 5 mA, maximum voltage = 5 V, saturation voltage < 1,2 V.

SENSE

Sense connection is not required. If it is accomplished, the voltage at the load is reduced by ca. 100 mV. This feature provides compensation of voltage drops (max. 0,2 V each line) at Vout1 and Vout2 between power supply and load. The pins Sense return, Sense +5 V and Sense +3,3 V must be connected with the load. The sense signal should not be longer than 3m.

OVER CURRENT PROTECTION

If Vout1 is shut down due to overload, Vout2 will also be switched-off too.