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DC-DC CONVERTER **HPBC20-W/T**

RAILWAY CONVERTER

FOR DIN RAIL MOUNTING

HIGHLIGHTS

- **Output Power up to 10 Watts**
- **Efficiency up to 85 %**
- **Ultra Wide Input Range**
- **Wide Temperature Range**
- **Hold-up-time > 10 ms**
- **RoHS compliance**
- **According to EN50155**

INPUT

Input Voltage Nominal	24, 36, 48, 72, 96 and 110 VDC
Input Voltage Operating	16,8 - 137,5 VDC
Input Voltage Range	14,4 - 154 VDC (t ≤ 1,0 sec.) (Class 1c)
No Load Input Current	See table page 2

OUTPUT

Output Voltage	5,1 V, 12 V, 24 V
Initial Set Accuracy	< 2 % (no load)
Minimum Load	No minimum load
Short circuit	Continuous short circuit proof
Line Regulation	< 0,5 %
Load Regulation	< 2 % (0 % - 100 % load)
Ripple & Noise	< 2 % pk-pk, 20 MHz bandwidth
Start Time	< 900 ms
Max. Output Capacitance	1000 uF x $I_{out\ nom}$
Temperature Coefficient	< 0.01 %/°C

FEATURES

Reverse Polarity Protection	Max. 160 V
Active Inrush Current Limitation	Max.4 A (at t > 100 µs) < 1 A²s
Hold-up-time	> 10 ms at 20 W load (Class S2)

PROTECTION

Over Voltage Protection (OVP)	110-160 % $V_{out\ nom}$***
Over Current Protection (OCP)	See table page 2
Over Temperature Protection (OTP)	Shutdown at +110-115 °C PCB-temp. with about 5 °C hysteresis and auto recovery.

GENERAL

Product Standard	EN 50155:2017
Isolation	2200 VDC Input to Output
	1500 VDC Input to Earth (PE)
	750 VDC Output to Earth (PE)
Pollution Degree	PD2 according to EN 50124-1:2017
Switching Frequency	Typ. 120 kHz
Dimensions [mm]	64 x 73,5 x 105,4
Weight	approx. 300 g
MTBF / Useful Life	950.000 h acc. to MIL-HDBK-217F (GB, 45 °C) / L4
Fire & Smoke	EN 45545-2:2020, HL-HL2-HL3 (R25)

ENVIRONMENTAL

Operating Ambient Temp.	-40 °C to +85 °C* (Class OT4 + ST1, ST2)
Storage Temperature	-55 °C to +100 °C
Rapid Temperature Variation	Class H1
Altitude	Up to 2000 m
Vibration / Shock / Bump	EN 61373:2010, Cat. 1B

EMC

EMC Standard	EN 50121-3-2:2016
Conducted Emissions	EN 50121-3-2:2016**
Radiated Emissions	EN 55011:2016+A1:2017, Class A**
ESD Immunity	EN 61000-4-2:2009, level 3 (6kV/8kV), Criteria A
Burst	EN 61000-4-4:2012, level 3 (2kV), Criteria A
Surge	EN 50121-3-2:2016, line to line ±1kV, 42R, Crit. A
Conducted Immunity	EN 61000-4-6:2014, level 3 (10V), Criteria A
Radiated Immunity	EN 61000-4-3:2006+A1:2007+A2:2010, 20V/m, Criteria A
Safety Approvals	Designed to meet IEC 62368-1:2014+AC:2015

* +70 °C continuously, +85 °C max. 10 minutes. Natural convection should be assured.
** In built-in condition the devices may show different EMC properties.
*** At 4,7 V_{out} 115-140 % $V_{out\ nom}$

TECHNICAL DATA

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

SPECIFICATION Input 14,4 - 154 VDC

	TYPE		HPBC20-W/T				
	ORDER NUMBER		87 92 08 0011 4				
	CHARACTERISTIC	Unit					
INPUT	Input Voltage Nominal	V	24	36	48	72	110
	Input Voltage Range	V	14,4...36	21,6...51	28,8...67,2	43,2...101	66...154
	Under Voltage Turn-on	V	<15,0...16,8				
	Under Voltage Turn-off	V	<12,0...14,4 (14,4V < Vin < 16,8V at t > 1 sec.)				
	Input Current @ Full Load	A	0,5	0,33	0,25	0,17	0,11
	Input Current @ No Load	A	0,09	0,06	0,05	0,03	0,02
	Recommended External Fuse	A	2,0				
OUTPUT	Output Voltage Nominal	V	5,1				
	Output Current Nominal	A	2,0				
	Output Power	W	10				
	Efficiency @ Full Load (typical)	%	79	80	80	80	83
	Output Current limit	A	4,0...5,0				
	Short Circuit Current (typical)		8 (pulse approx. 3Hz)*				
	Transient Response 25 % / 75 % Load Step Recovery Time < 1 ms	mV	±150				

SPECIFICATION Input 14,4 - 154 VDC

	TYPE		HPBC20-W/T				
	ORDER NUMBER		87 92 12 0122 8				
	CHARACTERISTIC	Unit					
INPUT	Input Voltage Nominal	V	24	36	48	72	110
	Input Voltage Range	V	14,4...36	21,6...51	28,8...67,2	43,2...101	66...154
	Under Voltage Turn-on	V	<15,0...16,8				
	Under Voltage Turn-off	V	<12,0...14,4 (14,4V < Vin < 16,8V at t > 1 sec.)				
	Input Current @ Full Load	A	0,5	0,33	0,25	0,17	0,11
	Input Current @ No Load	A	0,05	0,035	0,03	0,015	0,01
	Recommended External Fuse	A	2,0				
OUTPUT	Output Voltage Nominal	V	12,0				
	Output Current Nominal	A	0,85				
	Output Power	W	10				
	Efficiency @ Full Load (typical)	%	80	80	80	81	83
	Output Current limit	A	1,9...2,8				
	Short Circuit Current (typical)		5 (pulse approx. 3Hz)*				
	Transient Response 25 % / 75 % Load Step Recovery Time < 1 ms	mV	±150				

SPECIFICATION Input 14,4 - 154 VDC

	TYPE		HPBC20-W/T				
	ORDER NUMBER		87 92 24 0122 4				
	CHARACTERISTIC	Unit					
INPUT	Input Voltage Nominal	V	24	36	48	72	110
	Input Voltage Range	V	14,4...36	21,6...51	28,8...67,2	43,2...101	66...154
	Under Voltage Turn-on	V	<15,0...16,8				
	Under Voltage Turn-off	V	<12,0...14,4 (14,4V < Vin < 16,8V at t > 1 sec.)				
	Input Current @ Full Load	A	0,5	0,33	0,25	0,17	0,11
	Input Current @ No Load	A	0,05	0,035	0,03	0,015	0,01
	Recommended External Fuse	A	2,0				
OUTPUT	Output Voltage Nominal	V	24,0				
	Output Current Nominal	A	0,42				
	Output Power	W	10				
	Efficiency @ Full Load (typical)	%	80	80	80	81	83
	Output Current limit	A	1,0...2,0				
	Short Circuit Current (typical)		3 (pulse approx. 3Hz)*				
	Transient Response 25 % / 75 % Load Step Recovery Time < 1 ms	mV	±200				

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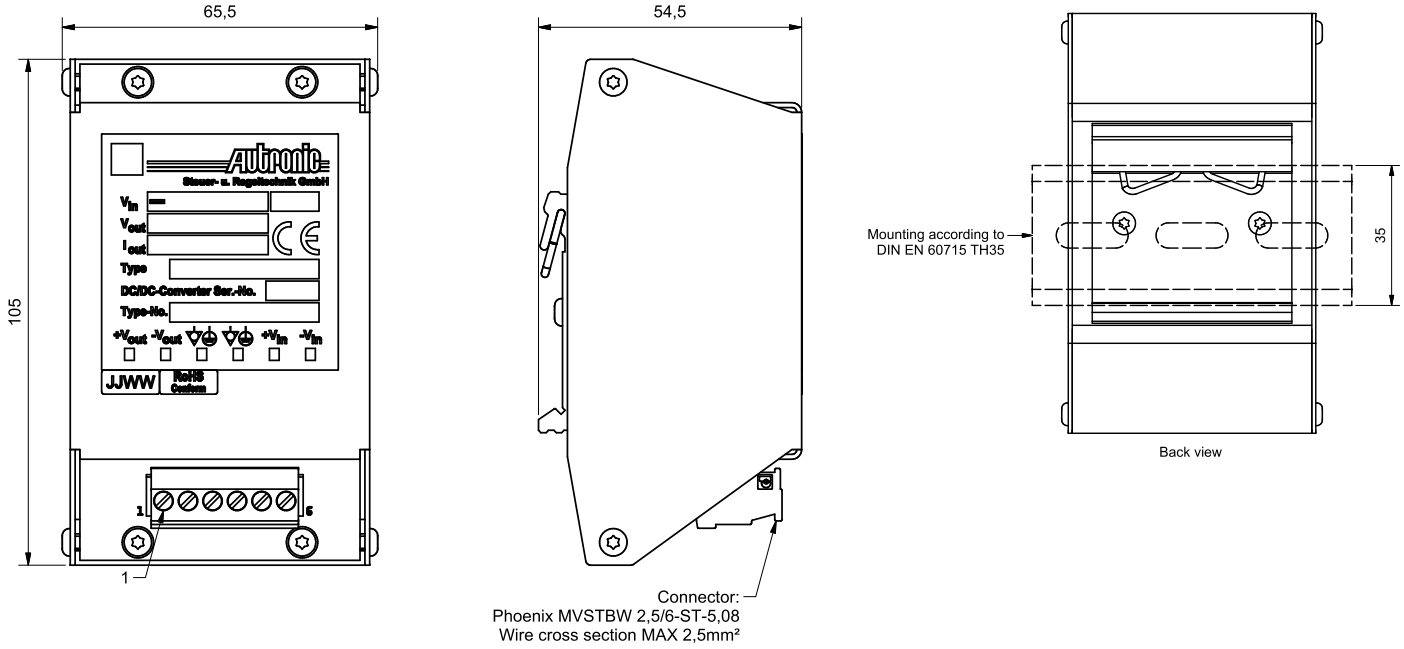
TECHNICAL DATA

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

MECHANICAL DETAILS

1. Dimensions are in mm.
2. General tolerances +/-1.

Coating: Lackwerke Peters ELPEGUARD SL 1307-FLZ/2
Protection Degree: IP20



Production acc. to IPC-A-610 (exception bonding)

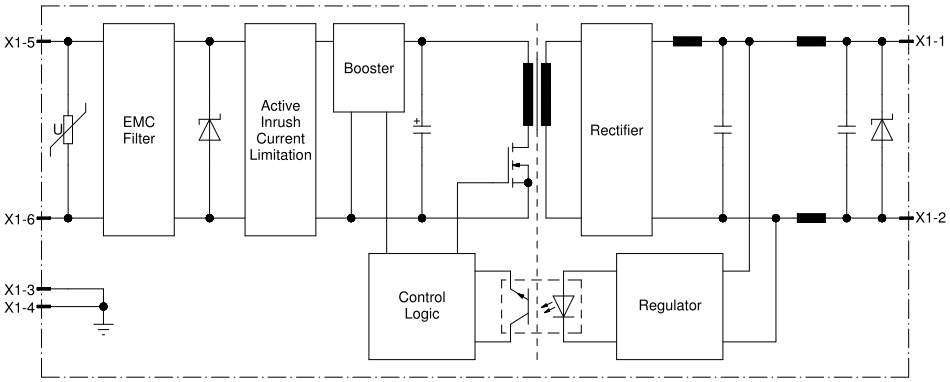
PINNING

Pin	Function
X1-1	$+V_{out}$
X1-2	$-V_{out}$
X1-3	PE
X1-4	PE
X1-5	$+V_{in}$
X1-6	$-V_{in}$

NOTES

Installation instructions:
The converters have to be installed according to the guidelines currently in force, like other open electronic component assemblies. Attention must be paid to sufficient ventilation, carry off heat, fastening and protection against accidential contact. Plug in not under voltage if converter connected parallel or in series.
Fault protection: For input protection a time-lag fuse corresponding to IEC 60127-2 must be installed. For recommended rating of the fuse refer to specification table above. Pay attention on sufficent current source in case of short circuit. In some applications 2 fuses would be necessary, one in each input line.

BLOCK DIAGRAM



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CHANGE HISTORY

Revision	Date	Author	Modification
a04	2021-02-01	Eigner	Change for new Product Standard EN50155:2017