

DC-DC CONVERTER HPBC20

RAILWAY CONVERTER.

FOR PCB MOUNTING



HIGHLIGHTS

- + Output Power up to 20 Watts*
- + Efficiency up to 88%
- + Ultra Wide Input Range
- + Wide Temperature Range
- + Hold-up-time > 10ms
- + 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 ($t \leq 1,0$ sec.) (Class C1)
No Load Input Current	See table page 2

OUTPUT

Output Voltage	4,7 V, 5,1 V, 12 V and 24 V (other voltages on request)
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	< 500 ms
Max. Output Capacitance	500 μ F x $I_{out\ nom}$
Temperature Coefficient	< 0.01 %/°C

FEATURES

Active Inrush Current Limitation	Max 8 A (at $t > 100 \mu$ s) < 1,1 A ² s
Hold-up-time	> 10 ms at full load (Class 2)

PROTECTION

Over Voltage Protection (OVP)	110-130 % $V_{out\ nom}$ ***
Over Current Protection (OCP)	See table page 2
Over Temperature Protection (OTP)	Shutdown at +105-110°C PCB-temp. with about 5°C hysteresis and auto recovery.

GENERAL

Product Standard	EN 50155:2022
Isolation	2200 VDC Input to Output
Pollution Degree	PD2 acc. to EN50124-1:2017
Switching Frequency	Typ. 120 kHz
Dimensions [mm]	63 x 54 x 25
Weight	approx. 75 g
MTBF / useful life	950.000h acc. to MIL-HDBK-217F (GB, 45°C) / Class L4 (20 years)
Fire & Smoke	UNI CEI 11170-3 Ed.2005 + FA 2007, LR4 NF F 16-101:1988 and NF F16-102:1988, F1 I2 EN 45545-2:2020, HL-HL2-HL3 (R24, R25)

ENVIRONMENTAL

Operating Ambient Temp.	-40°C to +85°C* (Class 0T4 + 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 55011:2022-05 Class A**
Radiated Emissions	EN 55011:2022-05 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-line \pm 1kV, 42R, line-case \pm 2kV, 42R, Crit. A + 61000-4-5:2014 + A1:2017 line-line \pm 0,5kV, line-case \pm 1kV Crit. A
Conducted Immunity	EN 61000-4-6:2014, level 3 (10V), Criteria A
Radiated Immunity	EN 61000-4-3:2020, 20V/m, Criteria A
Safety Approvals	Designed to meet IEC 62368-1:2020 + A11:2020

* +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} , 5,1 V_{out} and 12 V_{out} 115-170% $V_{out\ nom}$

TECHNICAL DATA

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

SPECIFICATION Input 14,4 - 154 VDC

TYPE		HPBC20-W/O						
ORDER NUMBER		87 62 08 0119 8						
CHARACTERISTIC		Unit						
INPUT	Input Voltage Nominal	V	24	36	48	72	96	110
	Input Voltage Range	V	14,4...36	21,6...51	28,8...67,2	43,2...101	57...135	66...154
	Under Voltage Turn-on	V	15,0...16,8					
	Under Voltage Turn-off	V	12,0...14,4					
	Input Current @ Full Load	A	1,1	0,7	0,5	0,35	0,25	0,22
	Input Current @ No Load	A	0,08	0,05	0,04	0,03	0,02	0,01
	Recommended External Fuse	A	2,0					
	OUTPUT	Output Voltage Nominal	V	4,7				
Output Current Nominal		A	4,0					
Output Power		W	20					
Efficiency @ Full Load (typical)		%	83	85	85	86	86	88
Output Current limit		A	4,4...6,5					
Short Circuit Current (typical)		A	10 (pulse approx. 3 Hz)*					
Transient Response 25 % / 75 % Load Step Recovery Time < 1 ms		mV	±150					

SPECIFICATION Input 14,4 - 154 VDC

TYPE		HPBC20-W/O						
ORDER NUMBER		87 62 08 0112 7						
CHARACTERISTIC		Unit						
INPUT	Input Voltage Nominal	V	24	36	48	72	96	110
	Input Voltage Range	V	14,4...36	21,6...51	28,8...67,2	43,2...101	57...135	66...154
	Under Voltage Turn-on	V	15,0...16,8					
	Under Voltage Turn-off	V	11,7...14,4					
	Input Current @ Full Load	A	1,1	0,7	0,5	0,35	0,25	0,22
	Input Current @ No Load	A	0,08	0,05	0,04	0,03	0,02	0,01
	Recommended External Fuse	A	2,0					
	OUTPUT	Output Voltage Nominal	V	5,1				
Output Current Nominal		A	4,0					
Output Power		W	20					
Efficiency @ Full Load (typical)		%	83	84	84	84,5	85	87
Output Current limit		A	4,5...6,5					
Short Circuit Current (typical)		A	8 (pulse approx. 3 Hz)*					
Transient Response 25 % / 75 % Load Step Recovery Time < 1 ms		mV	±150					

SPECIFICATION Input 14,4 - 154 VDC

TYPE		HPBC20-W/O						
ORDER NUMBER		87 62 12 0112 2 / 87 62 12 0152 5						
CHARACTERISTIC		Unit						
INPUT	Input Voltage Nominal	V	24	36	48	72	96	110
	Input Voltage Range	V	14,4...36	21,6...51	28,8...67,2	43,2...101	57...135	66...154
	Under Voltage Turn-on	V	15,0...16,8					
	Under Voltage Turn-off	V	12,0...14,4					
	Input Current @ Full Load	A	1,1	0,7	0,5	0,35	0,25	0,22
	Input Current @ No Load	A	0,08	0,05	0,04	0,03	0,02	0,01
	Recommended External Fuse	A	2,0					
	OUTPUT	Output Voltage Nominal	V	12				
Output Current Nominal		A	1,7					
Output Power		W	20					
Efficiency @ Full Load (typical)		%	83	84	84	85	85	87
Output Current limit		A	1,9...2,8					
Short Circuit Current (typical)		A	5 (pulse approx. 3 Hz)*					
Transient Response 25 % / 75 % Load Step Recovery Time < 1 ms		mV	±150					

TECHNICAL DATA

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

SPECIFICATION Input 14,4 - 154 VDC

TYPE		HPBC20-W/O						
ORDER NUMBER		87 62 24 0112 7						
CHARACTERISTIC		Unit						
INPUT	Input Voltage Nominal	V	24	36	48	72	96	110
	Input Voltage Range	V	14,4...36	21,6...51	28,8...67,2	43,2...101	57...135	66...154
	Under Voltage Turn-on	V	<15,0...16,8					
	Under Voltage Turn-off	V	<12,0...14,4 (14,4V < V_{in} < 16,8V at $t > 1$ sec.)					
	Input Current @ Full Load	A	1,0	0,65	0,5	0,33	0,25	0,21
	Input Current @ No Load	A	0,05	0,03	0,025	0,015	0,02	0,01
	Recommended External Fuse	A	2,0					
	Output Voltage Nominal	V	24					
OUTPUT	Output Current Nominal	A	0,85					
	Output Power	W	20					
	Efficiency @ Full Load (typical)	%	85	86	86	86,5	86,5	88
	Output Current limit	A	1,0...2,0					
	Short Circuit Current (typical)	A	4 (pulse approx. 3 Hz)*					
	Transient Response 25 % / 75 % Load Step Recovery Time < 1 ms	mV	± 150					

* Pulsating current time duration 10 ms

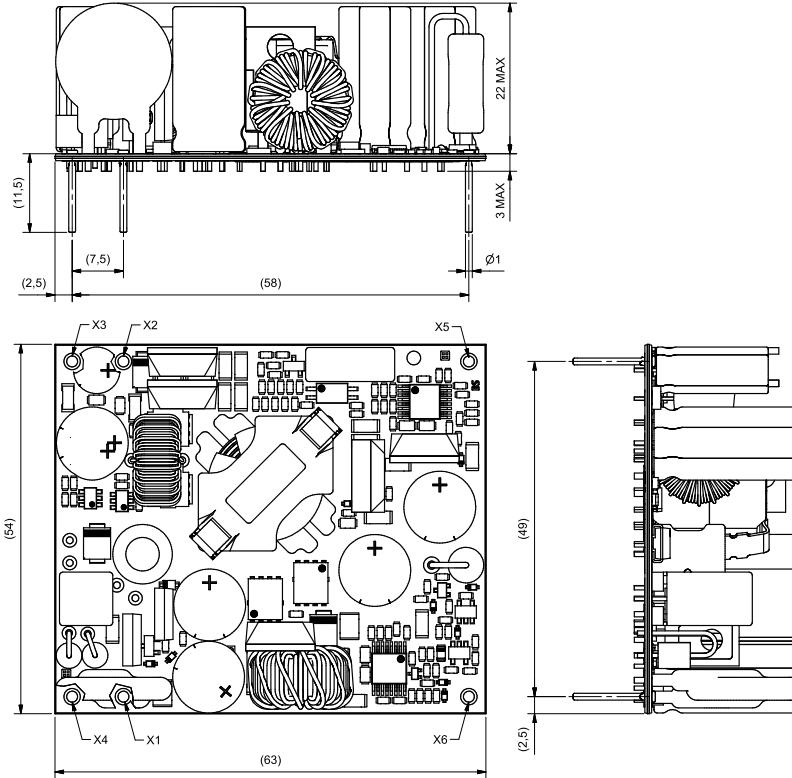
TECHNICAL DATA

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

MECHANICAL DETAILS

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

Coating: Lackwerke Peters ELPEGUARD SL 1307-FLZ/2



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

PINNING

Pin	Function
X1	$+V_{in}$
X2	$+V_{out}$
X3	$-V_{out}$
X4	$-V_{in}$
X5	n.c.
X6	n.c.

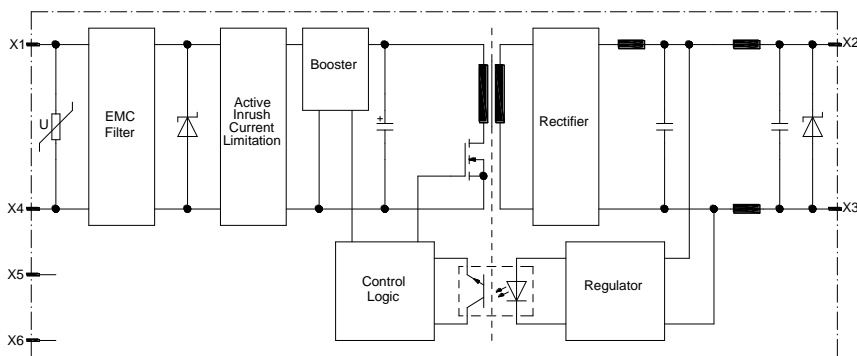
NOTES

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 accidental 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 sufficient current source in case of short circuit.

BLOCK DIAGRAM



CHANGE HISTORY

Revision	Date	Author	Modification
a07	2023-07-25	Eigner	Several changes for updated versions