

DC-DC CONVERTER USB20-W/G

RAILWAY CONVERTER.

FOR CHASSIS MOUNTING



HIGHLIGHTS

- + **Output Power up to 20 Watts***
- + **Supports all mobile devices with USB-BC 1.2**
- + **Positive voltage droop behavior for higher charge current**
- + **Efficiency up to 85 %**
- + **Ultra Wide Input Range**
- + **Wide Temperature Range**
- + **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 C1)
No Load Input Current	See table page 2

OUTPUT

Output Voltage	5 V / 5V
Output Current	2 A (full load for each USB-Output)
Initial Set Accuracy	< 2 % (no load)
Minimum Load	No minimum load
Short circuit	Continuous short circuit proof
Line Regulation	< 0,5 %
Load Regulation	0...-2 % positive voltage droop behavior
Ripple & Noise	< 2 % pk-pk, 20 MHz bandwidth
Start Time	< 600 ms
Max. Output Capacitance	100 uF x I _{out nom}
Temperature Coefficient	< 0.01 %/°C

FEATURES

Reserve Polarity Protection	Max. 160 V
Active Inrush Current Limitation	Max. 6 A (at t > 100 us) < 0,1 A ² s
Maintenance	Easy to maintain with changeable USB connector front module

PROTECTION

Over Voltage Protection (OVP)	110 - 130 % V _{out nom}
Over Current Protection (OCP)	See table page 2
Over Temperature Protection (OTP)	Shutdown at +110 - 115 °C PCB-temp. with about 10 °C hysteresis and auto recovery

* +70 °C continuously, +85 °C max. 10 minutes. Natural convection should be assured.

** In built-in condition the devices may show different EMC properties.

GENERAL

Product Standard	EN 50155:2017
Isolation	2200 VDC Input to Output 2200 VDC Input to Case (PE) 750 VDC Output to Case (PE)
Pollution Degree	PD2 according to EN 50124-1:2017
Switching Frequency	Typ. 120 kHz
Dimensions [mm]	105 x 80 x 40 see page 3
Weight	approx. 170 g
MTBF / Useful Life	TBD / L4 (20 years)
Fire & Smoke	EN 45545-2:2020, HL-HL2-HL3 (R24, 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 55011:2016+A1:2017, Class A**
Radiated Emissions	EN 55011:2016+A1:2017, Class A**
ESD Immunity	EN 61000-4-2:2009, level 3 (6 kV/8 kV), Criteria A
Burst	EN 61000-4-4:2012, level 3 (2 kV), Criteria A
Surge	EN 50121-3-2:2016, line to line ±1 kV, 42 R, line to case ±2 kV, 42 R, Criteria A EN 61000-4-5:2014+A1:2017 line to line ±0,5 kV, line to case ±1 kV Criteria A
Conducted Immunity	EN 61000-4-6:2014, level 3 (10 V), Criteria A
Radiated Immunity	EN 61000-4-3:2006+A1:2007+A2:2010, 20 V/m, Criteria A
Safety Approvals	Designed to meet IEC 62368-1:2014 + AC:2015

TECHNICAL DATA

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

SPECIFICATION Input 14,4 - 154 VDC

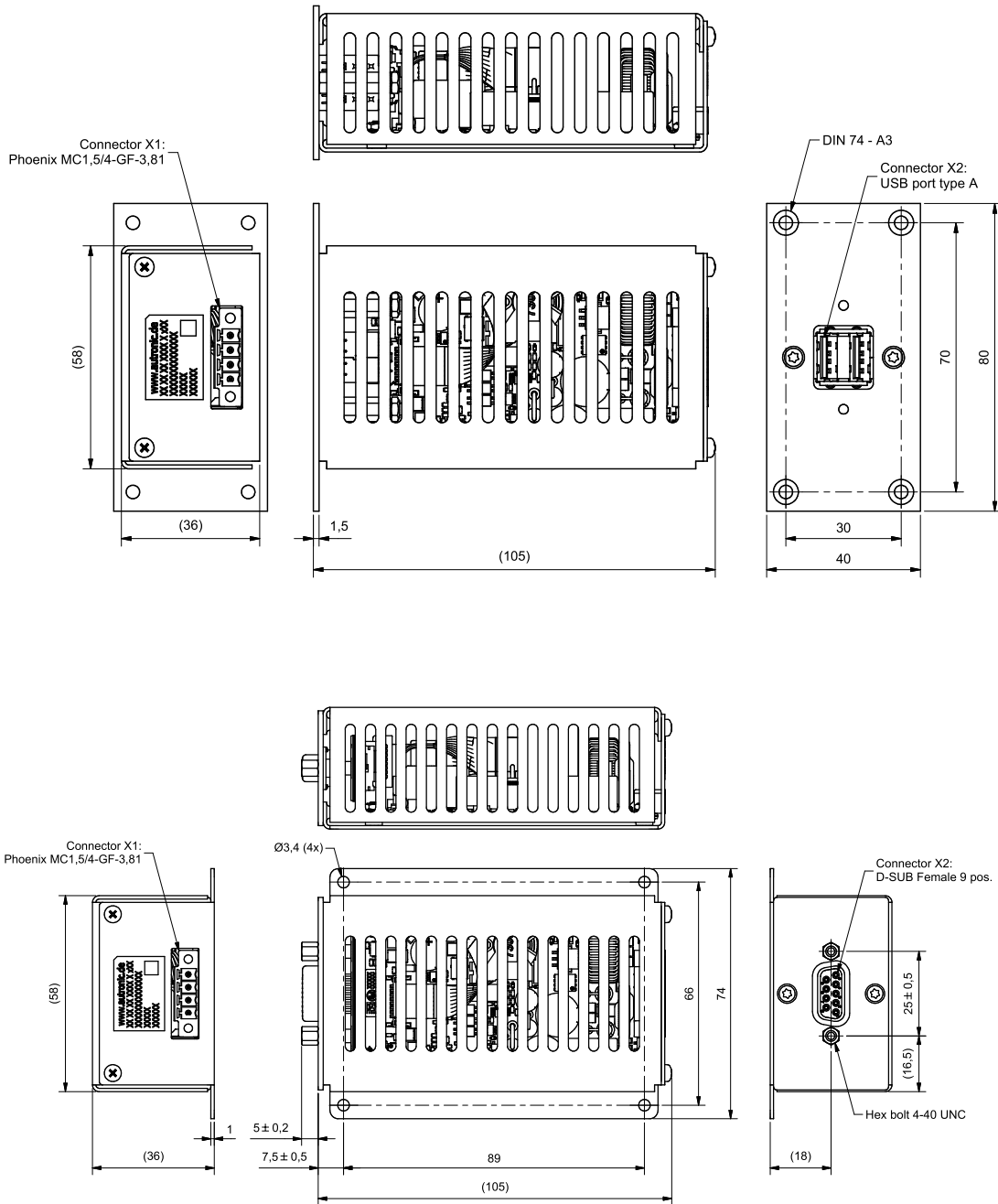
TYPE		USB20-W/G / SubD20-W/G					
ORDER NUMBER		87 73 08 0125 4 / 87 73 08 0135 7					
CHARACTERISTIC		Unit					
INPUT	Input Voltage Nominal	V	24	36	48	72	110
	Input Voltage Range	V	14,4...36	21,6...51	28,8...67,2	43,2...101	66...154
	Under Voltage Turn-on	V	<14,4...15,5				
	Under Voltage Turn-off	V	<12,0...14,4				
	Input Current @ Full Load	A	1,1	0,7	0,5	0,35	0,23
	Input Current @ No Load	A	0,03	0,02	0,015	0,01	0,01
	Recommended External Fuse	A	2,0 T				
OUTPUT			Output 1		Output 2		
	Output Voltage Nominal	V	5,0		5,0		
	Output Current Nominal	A	2		2		
	Output Power	W	10		10		
	Efficiency @ Full Load (typical)	%	83	84	84	83	82
	Output Current limit	A	2,5...2,9				
	Short Circuit Current (typical)	A	2 (pulse approx. 0,12Hz)				
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

MECHANICAL DETAILS

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



Protection Degree: IP20

Coating: Lackwerke Peters ELPEGUARD SL 1307-FLZ/2

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

TECHNICAL DATA

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

PINNING

Pin	Function
X1-1	+V _{in}
X1-2	-V _{in}
X1-3	PE
X1-4	PE

(for SubD20-W/G variant)

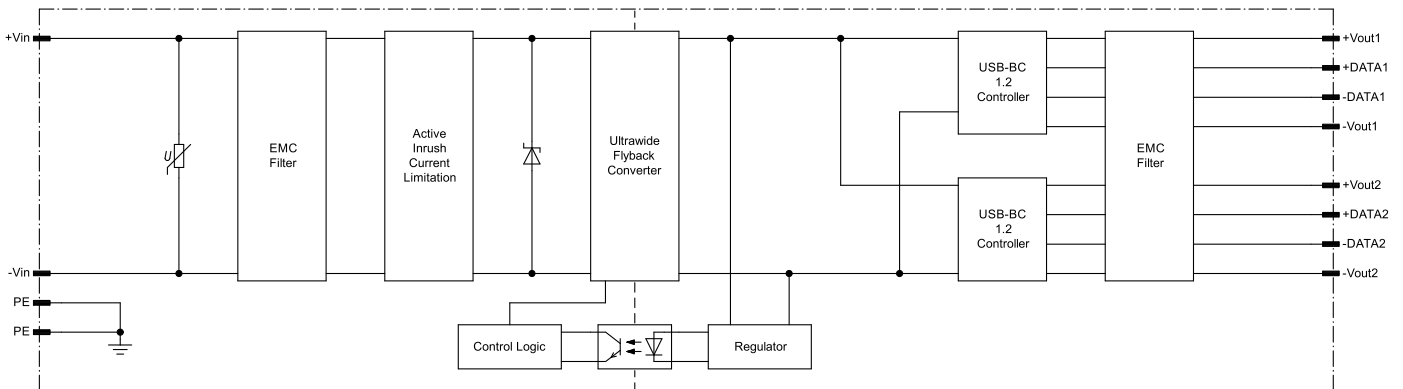
X2-1	+V _{out2}
X2-2	-DATA2
X2-3	n.c.
X2-4	+DATA2
X2-5	-V _{out2}
X2-6	+V _{out1}
X2-7	-DATA1
X2-8	+DATA1
X2-9	-V _{out1}

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. Front plate has to be connected to protective earth. 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. In some applications 2 fuses would be necessary, one in each input line.

BLOCK DIAGRAM



CHANGE HISTORY

Revision	Date	Author	Modification
a00	2021-11-11	Eigner	First edition