

DC-DC CONVERTER HFC150-W, HFC150-2BW

RAILWAY CONVERTER.

FOR CHASSIS MOUNTING



HIGHLIGHTS

- + Output Power up to 150 Watts
- + Efficiency up to 93 %
- + Ultra Wide Input Range
- + Wide Temperature Range
- + Hold-up-time >10 ms
- + RoHS compliance
- + According to EN 50155

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.)
Input Over Voltage Protection	V _{in} > 162 V output voltage are switched off and switched on again when V _{in} < 158 V
No Load Input Current	See table page 2
Internal Fusing	16,0 AT

OUTPUT

Output Voltage	±15 V, ±24 V, 24 V, 48 V (other voltages on request)
Initial Set Accuracy	<2 %
Minimum Load	No minimum load
Short circuit	Continuous short circuit proof
Line Regulation	<0,1 % typical
Load Regulation	<1 % (0 % - 100 % load)
Ripple & Noise	<1 % pk-pk, 20 MHz bandwidth
Start Time	<0,5 s
Max. Output Capacitance	500 uF x I _{out nom}
Temperature Coefficient	0.02 %/°C

FEATURES

Active Reverse Polarity Protection	Max. 160 V
Active Inrush Current Limitation	Max. 20 A / at t > 0,5 ms / < 5,0 A ² S
Hold-up-time	>10 ms

PROTECTION

Over Voltage Protection (OVP)	110 - 130 % V _{out nom} . The output switches off and restarts after 500 ms time.
Over Current Protection (OCP)	I _{out} > 105 %. The output switches-off when V _{out} < 80 % and restarts automatically latest after 500 ms of elimination of the overload.
Over Temperature Protection (OTP)	Shutdown at +98 - 105 °C case with approx. 5 °C hysteresis and auto recovery.

GENERAL

Product Standard	EN 50155:2021
Isolation	3000 VDC Input to Output 2200 VDC Input to Earth (PE) 750 VDC Output to Earth (PE)
Pollution Degree	PD2 according to EN 50124-1:2017
Protective Coating	Class PC2
Switching Frequency	Typ. 100/120 kHz
Dimensions [mm]	245 x 75 x 47
Weight	approx. 710 g
MTBF / Useful Life	TBD / L4 (20 years)
Fire & Smoke	EN 45545:2013 HL3 / R25

ENVIRONMENTAL

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

EMC & SAFETY

EMC Standard	EN 50121-3-2:2016
Emissions	EN 55011:2016+A1:2017, Class A** and meets specification EMV06 rangierfunk 02**
Burst	EN 61000-4-4:2012, level 3 (2 kV), Crit. A
Surge	EN 50121-3-2:2016, line to line ±1kV, 42R, 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), Crit. A
Radiated Immunity	EN 61000-4-3:2006+A1:2008+A2:2010, 20 V/m, Criteria A
Safety	IEC 62368-1:2014, EN 50124-1:2017

*+70 °C continuously, +85 °C max. 10 minutes at full load

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

TECHNICAL DATA

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

SPECIFICATION Input 14,4 - 154 VDC

TYPE		HFC150-2BW/G							
ORDER NUMBER		87 74 87 0125 3							
CHARACTERISTIC		Unit							
INPUT	Input Voltage Nominal	V	24	36	48	72	96	110	
	Input Voltage Operating	V	16,8...36	21,6...51	28,8...67,2	43,2...101	57,6...134,4	66...154	
	Input Voltage Range	V	14,4...154 (t ≤ 1,0 sec.)						
	Under Voltage Turn-on	V	<16,8						
	Under Voltage Turn-off	V	<14,4						
	Input Current @ Full Load	A	7,0	4,5	3,4	2,3	1,70	1,5	
	Input Current @ No Load	A	0,10	0,07	0,05	0,03	0,02	0,02	
	Internal Fuse	A	12						
OUTPUT			Output 1			Output 2			
	Output Voltage Nominal	V	15			-15			
	Output Current	A	5			-5			
	Output Power	W	75			75			
	Efficiency @ Full Load (typical)	%	89	90	91	91	92	92	
	Output Current limit	A	5,25...7,5			-5,25...-7,5			
	Short Circuit Current (typical)	A	16 (pulse approx.2,0 Hz)*			16 (pulse approx.2,0 Hz)*			
	Transient Response 25 % / 75 % Load Step Recovery Time <1 ms	mV	±100			±100			

SPECIFICATION Input 14,4 - 154 VDC

TYPE		HFC150-2BW/G							
ORDER NUMBER		87 74 98 0125 9							
CHARACTERISTIC		Unit							
INPUT	Input Voltage Nominal	V	24	36	48	72	96	110	
	Input Voltage Operating	V	16,8...36	21,6...51	28,8...67,2	43,2...101	57,6...134,4	66...154	
	Input Voltage Range	V	14,4...154 (t ≤ 1,0 sec.)						
	Under Voltage Turn-on	V	<16,8						
	Under Voltage Turn-off	V	<14,4						
	Input Current @ Full Load	A	6,8	4,5	3,4	2,2	1,70	1,5	
	Input Current @ No Load	A	0,05	0,04	0,03	0,02	0,02	0,02	
	Internal Fuse	A	12						
OUTPUT			Output 1			Output 2			
	Output Voltage Nominal	V	24			-24			
	Output Current	A	3,1			-3,1			
	Output Power	W	75			75			
	Efficiency @ Full Load (typical)	%	91	91	92	92	92	93	
	Output Current limit	A	3,25...5,0			-3,25...-5,0			
	Short Circuit Current (typical)	A	13 (pulse approx.2,0 Hz)*			13 (pulse approx.2,0 Hz)*			
	Transient Response 25 % / 75 % Load Step Recovery Time <1 ms	mV	±150			±150			

Pulsating current time duration 10 ms

TECHNICAL DATA

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

SPECIFICATION Input 14,4 - 154 VDC

TYPE		HFC150-W/G / HFC150-W/O-C						
ORDER NUMBER		87 74 24 0125 9 / 87 74 24 0124 5						
CHARACTERISTIC		Unit						
INPUT	Input Voltage Nominal	V	24	36	48	72	96	110
	Input Voltage Operating	V	16,8...36	21,6...51	28,8...67,2	43,2...101	57,6...134,4	66...154
	Input Voltage Range		14,4...154 (t ≤ 1,0 sec.)					
	Under Voltage Turn-on	V	<16,8					
	Under Voltage Turn-off	V	<14,4					
	Input Current @ Full Load	A	6,9	4,5	3,4	2,2	1,70	1,5
	Input Current @ No Load	A	0,09	0,06	0,05	0,03	0,02	0,02
	Internal Fuse	A	12					
OUTPUT	Output Voltage Nominal	V	24					
	Output Current Nominal	A	6,25					
	Output Power	W	150					
	Efficiency @ Full Load (typical)	%	90	91	91	92	92	93
	Output Current limit	A	6,6...10,0					
	Short Circuit Current (typical)	A	23 (pulse approx. 2,0 Hz)*					
	Transient Response 25 % / 75 % Load Step Recovery Time <1 ms	mV	±200					

SPECIFICATION Input 14,4 - 154 VDC

TYPE		HFC150-W/G						
ORDER NUMBER		87 74 48 0125 1						
CHARACTERISTIC		Unit						
INPUT	Input Voltage Nominal	V	24	36	48	72	96	110
	Input Voltage Operating	V	16,8...36	21,6...51	28,8...67,2	43,2...101	57,6...134,4	66...154
	Input Voltage Range		14,4...154 (t ≤ 1,0 sec.)					
	Under Voltage Turn-on	V	<16,8					
	Under Voltage Turn-off	V	<14,4					
	Input Current @ Full Load	A	6,9	4,5	3,4	2,2	1,7	1,5
	Input Current @ No Load	A	0,09	0,06	0,05	0,03	0,02	0,02
	Internal Fuse	A	12					
OUTPUT	Output Voltage Nominal	V	48					
	Output Current Nominal	A	3,1					
	Output Power	W	150					
	Efficiency @ Full Load (typical)	%	90	91	91	92	92	92
	Output Current limit	A	3,25...4,0					
	Short Circuit Current (typical)	A	13 (pulse approx. 2,0 Hz)*					
	Transient Response 25 % / 75 % Load Step Recovery Time <1 ms	mV	±400					

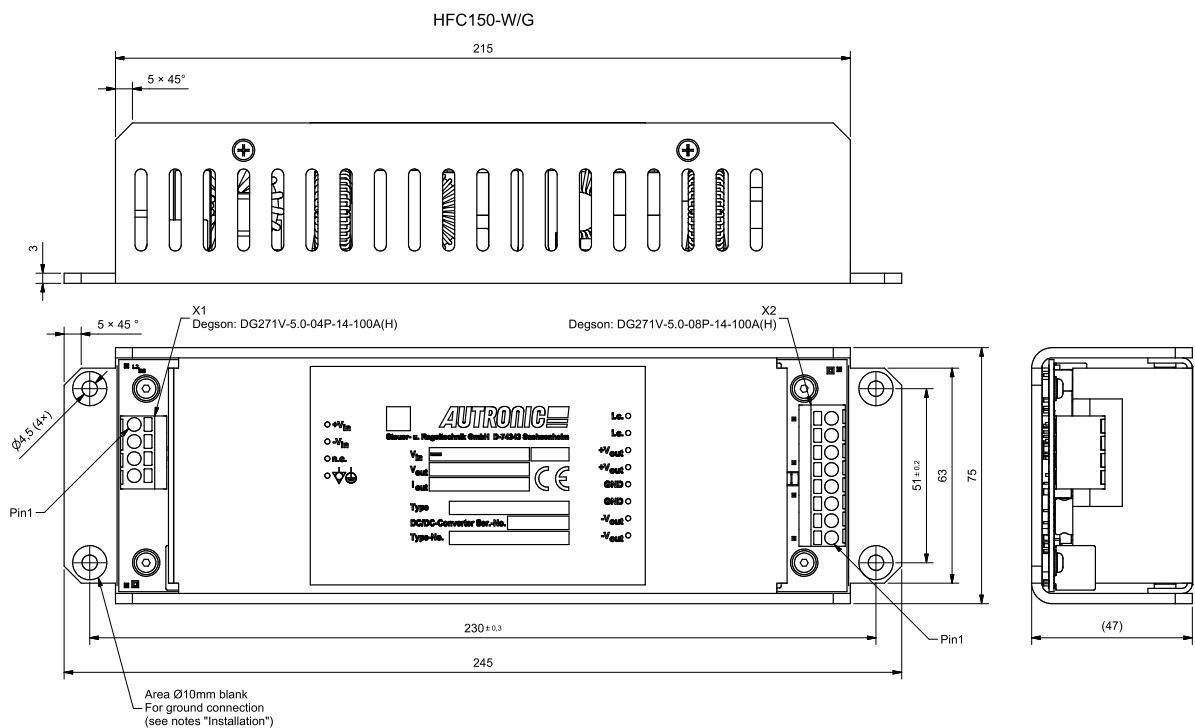
Pulsating current time duration 10 ms

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-2768-1 m.



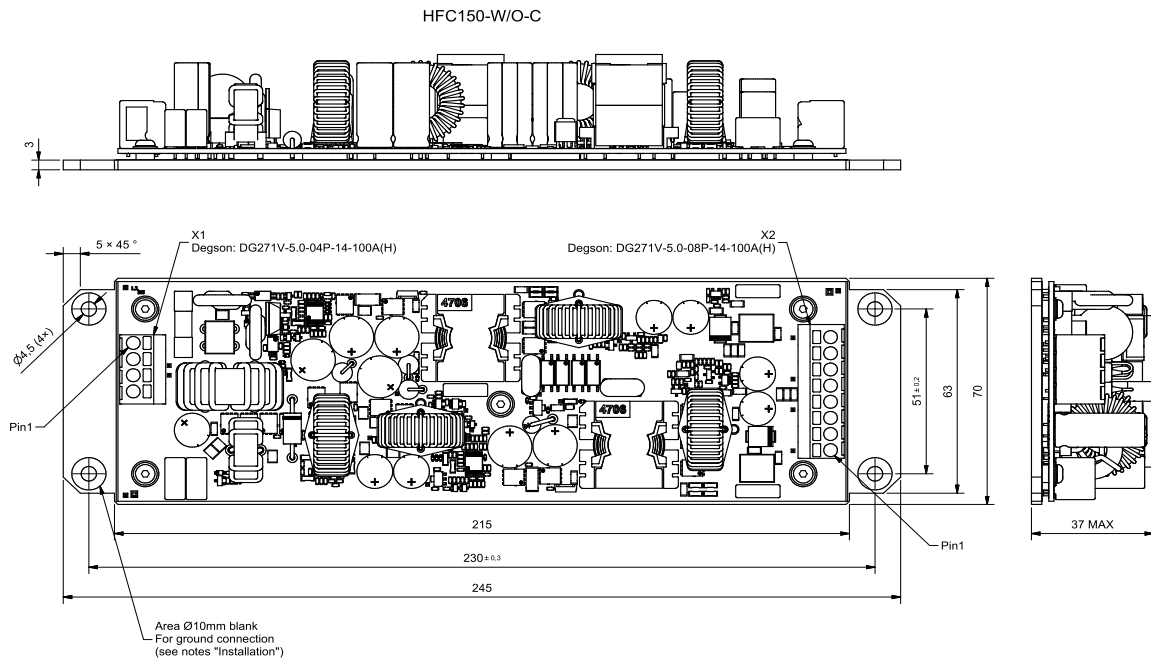
Coating: Lackwerke Peters ELPEGUARD SL 1307-FLZ/2
 Protection Degree: IP20
 Production acc. to IPC-A-610 (exception bonding)

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-2768-1 m.



Coating: Lackwerke Peters ELPEGUARD SL 1307-FLZ/2

Protection Degree: IP00

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

PINNING

Pin	Function	Pin	Function
X1-1	+V _{in}	X2-1	GND (only for W)
X1-2	-V _{in}	X2-2	GND (only for W)
X1-3	n.c.	X2-3	+V _{out1}
X1-4	PE	X2-4	+V _{out1}
		X2-5	GND (only for 2BW)
		X2-6	GND (only for 2BW)
		X2-7	-V _{out2} (only for 2BW)
		X2-8	-V _{out2} (only for 2BW)

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. The connection to earth/chassis ground has to be done by the pin X1-4 and the 4 mounting holes. The mounting surface must be flat and able to remove the thermal energy of the Converter. (mounting surface must not exceed +90 °C).

Fault protection:

The converters are equipped with a soldered-in-time-lag fuse corresponding to IEC 60127-2 for input protection. In case at fault the supplying current source must be capable to blow the fuse.

Caution for HFC150-W/O-C:

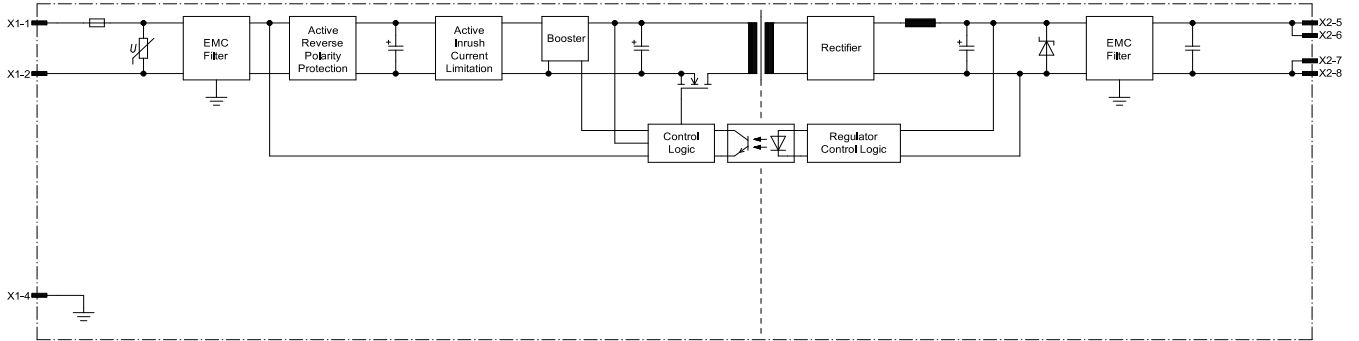
1. No protection against touching, dangerous voltage
2. After power off, wait 10 s before disconnecting or touching

DESCRIPTION OF FEATURES

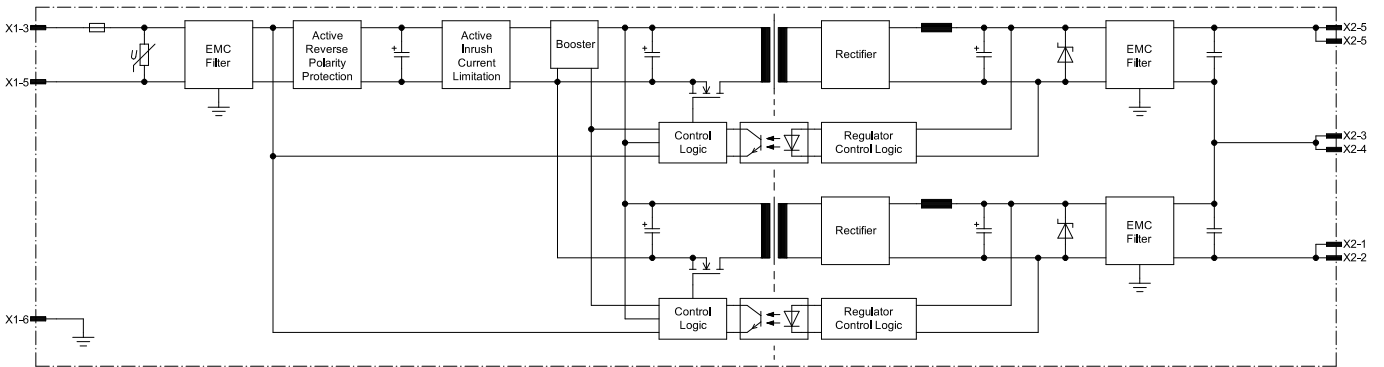
For $T_{amb}=25^{\circ}\text{C}$, $V_{in\ nom}$, $I_{out\ nom}$, unless otherwise specified

BLOCK DIAGRAM

HFC150-W



HFC150-2BW



CHANGE HISTORY

Revision	Date	Author	Modification
a02	2025-01-20	Ehrhardt	Redesign, hold-up >10 ms