



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

RAILWAY CONVERTER.

## FOR CHASSIS MOUNTING



## HIGHLIGHTS

- + Output Power up to 150 Watts
- + Efficiency up to 92%
- + Ultra Wide Input Range
- + Wide Temperature Range
- + RoHS compliance
- + According to EN50155

## INPUT

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

## OUTPUT

<b>Output Voltage</b>	± 15 V, ± 24 V, 24 V
<b>Initial Set Accuracy</b>	< 1 %*
<b>Minimum Load</b>	No minimum load
<b>Short circuit</b>	Continuous short circuit proof
<b>Line Regulation</b>	< 0,1 % typical
<b>Load Regulation</b>	< 1 % (0% - 100% load)
<b>Ripple &amp; Noise</b>	< 1 % pk-pk, 20 MHz bandwidth*
<b>Start Time</b>	< 1,5 s
<b>Max. Output Capacitance</b>	500 µF x I <sub>out nom</sub>
<b>Temperature Coefficient</b>	< 0.01 %/°C

## FEATURES

<b>Active Reverse Polarity Protection</b>	Max. 160 V
<b>Active Inrush Current Limitation</b>	< 3,0 A²S
<b>Hold-up-time</b>	>10 ms (only for V <sub>in</sub> = 110 V)

## PROTECTION

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

## GENERAL

<b>Product Standard</b>	EN 50155:2007
<b>Isolation</b>	4700 VDC Input to Output and Earth (87742401258) 3000 VDC Input to Output and Earth 2200 VDC Input to Earth (PE) 750 VDC Output to Earth (PE)
<b>Switching Frequency</b>	125 kHz
<b>Dimensions [mm]</b>	245 x 75 x 47
<b>Weight</b>	approx. 710 g
<b>MTBF</b>	683.830h acc. to MIL-HDBK-217F (GB, 45°C)****
<b>Fire &amp; Smoke</b>	EN 45545-2:2016-02 HL3 (R25)

## ENVIRONMENTAL

<b>Operating Ambient Temp.</b>	-40°C to +85°C** (Class TX)
<b>Storage Temperature</b>	-40°C to +85°C
<b>Altitude</b>	up to 2000m
<b>Vibration / Shock / Bump</b>	EN 61373:1999, Cat. 1B

## EMC & SAFETY

<b>EMC Standard</b>	EN 50121-3-2:2016
<b>Emissions</b>	EN 50121-3-2:2016
<b>ESD Immunity</b>	EN 61000-4-2:2009 level 3 (6kV/8kV), Criteria B
<b>Burst</b>	EN 61000-4-4:2012, level 3 (2kV), Criteria A
<b>Surge</b>	EN 50121-3-2:2016, line to line ±1kV, 42R, and line to case ±2kV, 42R, Criteria A
<b>Conducted Immunity</b>	EN 61000-4-6:2014, level 3 (10V), Criteria A
<b>Radiated Immunity</b>	EN 61000-4-3:2006+A1:2008+A2:2010, 20V/m, Criteria A
<b>Safety</b>	Designed to meet EN 61204-7:2006

\* For T<sub>amb</sub> = 25°C, V<sub>in nom</sub>, I<sub>out nom</sub>  
 \*\* +70°C continuously, +85°C max. 10 minutes at full load  
 \*\*\* In built-in condition our devices may show different EMC properties  
 \*\*\*\* Calculated with order number 87 74 87 0125 3

# TECHNICAL DATA

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

## SPECIFICATION Input 14,4 - 154 VDC

		HFC150-2BW/G					
		87 74 87 0125 3					
CHARACTERISTIC		Unit					
INPUT	Input Voltage Nominal	V	24	36	48	72	110
	Input Voltage Operating	V	16,8...36	21,6...51	28,8...67,2	43,2...101	66...138
	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	4,7	3,5	2,3	1,5
	Input Current @ No Load	A	0,05	0,04	0,03	0,02	0,02
	Recommended External 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	90	90	90
	Output Current limit	A	5,25...6,50		-5,25...-6,50		
	Short Circuit Current (typical)	A	14 (pulse approx.2,0Hz)*		14 (pulse approx.2,0Hz)*		
	Transient Response 25 % / 75 % Load Step Recovery Time < 1 ms	mV	±150		±150		

## SPECIFICATION Input 14,4 - 154 VDC

		HFC150-2BW/G					
		87 74 98 0125 9					
CHARACTERISTIC		Unit					
INPUT	Input Voltage Nominal	V	24	36	48	72	110
	Input Voltage Operating	V	16,8...36	21,6...51	28,8...67,2	43,2...101	66...138
	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	1,5
	Input Current @ No Load	A	0,05	0,04	0,03	0,02	0,02
	Recommended External 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)	%	90	91	92	92	91
	Output Current limit	A	3,25...4,0		-3,25...-4,0		
	Short Circuit Current (typical)	A	13 (pulse approx.2,0Hz)*		13 (pulse approx.2,0Hz)*		
	Transient Response 25 % / 75 % Load Step Recovery Time < 1 ms	mV	±150		±150		

## SPECIFICATION Input 14,4 - 154 VDC

		HFC150-W/G					
		87 74 24 0125 9					
CHARACTERISTIC		Unit					
INPUT	Input Voltage Nominal	V	24	36	48	72	110
	Input Voltage Operating	V	16,8...36	21,6...51	28,8...67,2	43,2...101	66...138
	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	1,5
	Input Current @ No Load	A	0,05	0,03	0,03	0,02	0,02
	Recommended External 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	92	91	91
	Output Current limit	A	6,6...8,0				
	Short Circuit Current (typical)	A	23 (pulse approx. 2,0Hz)*				
	Transient Response 25 % / 75 % Load Step Recovery Time < 1 ms	mV	±200				

\* Peak current pulsating



## TECHNICAL DATA

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

### SPECIFICATION Input 14,4 - 154 VDC

		HFC150-W/G					
ORDER NUMBER		87 74 48 0125 1					
CHARACTERISTIC		Unit					
INPUT	Input Voltage Nominal	V	24	36	48	72	110
	Input Voltage Operating	V	16,8...36	21,6...51	28,8...67,2	43,2...101	66...138
	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	6,8	4,5	3,4	2,2	1,5
	Input Current @ No Load	A	0,05	0,04	0,03	0,02	0,02
	Recommended External Fuse	A	12				
	Output Voltage Nominal	V	48				
	Output Current Nominal	A	3,1				
OUTPUT	Output Power	W	150				
	Efficiency @ Full Load (typical)	%	90	91	92	92	91
	Output Current limit	A	3,25...4,0				
	Short Circuit Current (typical)	A	13 (pulse approx. 2,0Hz)*				
	Transient Response 25 % / 75 % Load Step Recovery Time < 1 ms	mV	±200				



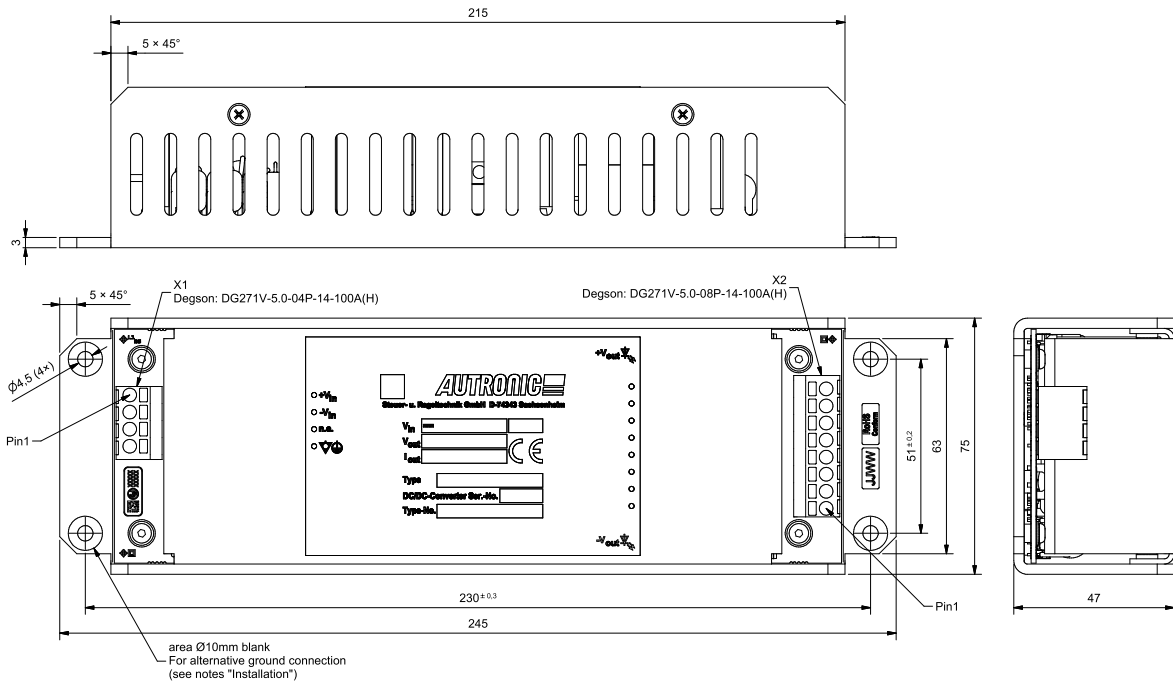
# TECHNICAL DATA

For  $T_{amb} = 25^{\circ}C, V_{in\ nom}, I_{out\ nom}$  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  
Protection Degree: IP20



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

## PINNING

Pin	Function	Pin	Function
X1-1	+V <sub>in</sub>	X2-1	GND ( 87742401259 )
X1-2	-V <sub>in</sub>	X2-2	GND ( 87742401259 )
X1-3	n.c.	X2-3	+V <sub>out1</sub>
X1-4	PE	X2-4	+V <sub>out1</sub>
		X2-5	GND (only for 2BW)
		X2-6	GND (only for 2BW)
		X2-7	-V <sub>out2</sub> (only for 2BW) or GND ( 87744801251 )
		X2-8	-V <sub>out2</sub> (only for 2BW) or GND ( 87744801251 )

## 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 or the 4 mounting holes. The mounting surface must be flat and able to remove the thermal energy of the Converter.

### Fault protection:

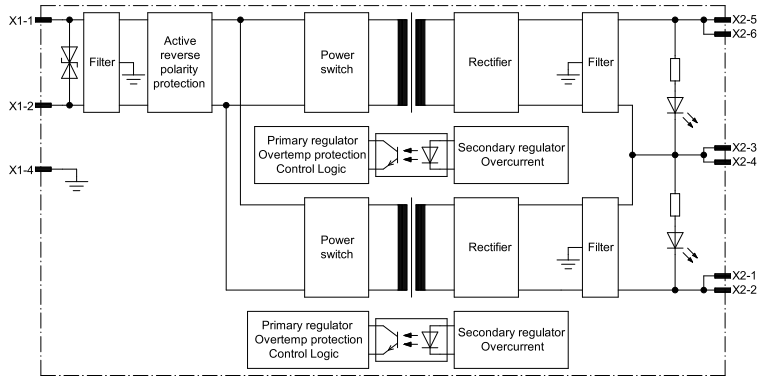
For input protection a time-lag fuse corresponding to IEC 60127-2 must be installed. In case of fault the supplying current source must be capable to blow the fuse.

# TECHNICAL DATA

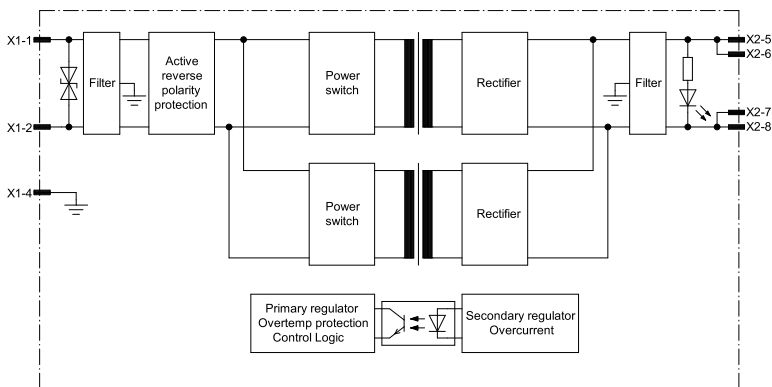
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## BLOCK DIAGRAM

HFC150-W / 87 74 24 0125 9:



HFC150-2BW:



HFC150-W / 87 74 48 0125 1:

