

## 750Vdc Input, 400W Rugged DC-DC Converter for Railway and other Heavy-duty Applications HVI-400R-FX Series

- Field-proven rugged design
- For train and mobile applications
- Full electronic protection
- Conduction/convection cooled (no fans)
- Wide input range (EN50155)
- N+1 redundancy available



This rugged, railway quality DC-DC converter utilizes field-proven technology to generate the required output power. It is a mature design with a track record in numerous applications. The converter is designed to meet EN50155 for electronic equipment used on railway rolling stock. It accepts an input voltage of 750Vdc (525V-975Vdc range) input voltage. This is the traction voltage typically required for mass transit vehicles such as trams, metros and light rail, and for mining locomotives. An optional built-in redundancy diode allows for a number of units to be connected in parallel to achieve higher output power or N+1 redundancy. The output separation diode also makes the unit suitable for battery charging applications. Cooling is by conduction via baseplate. Additional cooling is achieved by natural convection through the cooling slots. All heat generating components are installed on aluminum heatsink blocks which are thermally connected to the base plate. This also provides exceptional mechanical ruggedness. Conformal coating provides protection against humidity and airborne contaminants. Full electronic protection, low component count, large design headroom and the exclusive use of components with established reliability contribute to a high MTBF. It is manufactured at our plant under strict quality control.

### SPECIFICATIONS

#### Input Voltage

750Vdc nominal  
525V-975Vdc operating range  
Other input voltage ranges are available on request

#### Input Protection

Inrush current limiting  
Varistors  
Reverse polarity protection  
Internal safety fuse  
Lower voltage than the specified minimum input will not damage the unit

#### Isolation

3000Vdc input to chassis  
3000Vdc input to output  
5600Vdc type test  
1000Vdc output to chassis

#### Standards

Designed to meet EN60950-1 and EN50155

#### Immunity

Meets criteria as requested in EN50155 and EN50121-3-2 according to:  
EN61000-4-2 (ESD)  
EN61000-4-3 (RF Immunity)  
EN61000-4-4 (Fast Transients)  
EN50155 (Surge)  
EN61000-4-6 (Conducted Imm.)  
EN50155 (Voltage Variations)

#### EMI

EN50121-3-2

#### Switching Frequency

55kHz ± 3kHz

#### Output Voltage

24V, 36V, 48V or 110Vdc  
Output is floating; either terminal can be grounded  
Other outputs on request

#### Redundancy Diode

None  
Available as option

#### Line/Load Regulation

±1% combined from zero load to full load

#### Dynamic Response

Max 5% voltage deviation for 10% to 50% load step, with better than 1msec recovery time

#### Output Ripple/Noise

Better than 0.2% rms or 1% pp (@ 20MHz BW)

#### Output Overload Protection

Rectangular current limiting with short-circuit protection (no hiccup)  
Thermal shutdown in case of insufficient airflow (self-resetting)

#### Output Overvoltage Protection

Second regulator loop, completely stable and independent of main regulator loop

#### Efficiency

Typically better than 80% at full load

#### Operating Temperature Range

-25°C to +55°C for full specification  
Extended temperature ranges available

#### Temperature Drift

0.03% per °C over operating temperature range

#### Cooling

Conduction to customer heatsink or chassis and natural convection

#### Environmental Protection

Ruggedizing  
Conformal coating

#### Shock/Vibration

IEC 61373 Cat 1 A&B

#### Humidity

5 – 95% non-condensing

#### MTBF

150,000 hours at 45°C  
Demonstrated MTBF is significantly higher.

#### Indicators

Green "Output ON" LED visible through cooling slots

#### Control Input

None on standard version  
Available as option

#### Alarm Outputs

None.  
Available as option

#### Dimensions (W x H x D)

FX: 153 x 67 x 358 mm  
(6" x 2.7" x 14.2") including mounting flanges and terminals

#### Weight

2.2 kg (4.9 lb)

#### Connections

12-pole barrier type terminal block with 3/8" spacing

#### RoHS Compliance

Compliant

#### Warranty

Two years subject to application within good engineering practice

#### Terminal Block Pin-out

ALARM (option)			DC OUTPUT				DC INPUT				
FAIL OPEN	COM	FAIL CLOSED	+	+	-	-	GND	N/C	+	N/C	-
1	2	3	4	5	6	7	8	9	10	11	12

**Enhancements to these general specifications and customizing can be accommodated upon request. Specifications are subject to change.**

*Designer and manufacturer of quality ac-dc power supplies and battery chargers, converters, inverters, dc-output UPS systems, and complete rack mount systems in 19" or 23" racks. Custom or standard. ABSOPULSE is a BABT-approved Facility.*



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