

15W

DC-HVDC
converter 

The HRF15 series of 15W precision high voltage DC-DC converters provide fully adjustable output voltages up to 15kV, with built-in short-circuit and overload protection. HRF15's precise load and line regulation, stability, and low ripple ensure reliable and accurate power delivery for critical, noise-sensitive applications.

In addition to standard analog monitoring and control, the HRF15 is also available in a digital version with both output voltage and current programming through PMBus via I²C. The digital interface simplifies system integration through an intuitive UI and improves reliability with advanced monitoring features, including status flags, multi-unit operation, and statistical data logging.

HRF15 features voltage and current monitoring and 0 to 100% voltage control for increased safety, flexibility, and enhanced efficiency. Its advanced functionality, technical specifications, and safety approvals allow easy integration into a wide range of high voltage applications in analytical instruments and semiconductor wafer inspection equipment.



Features

- ▶ Output voltages up to 15kV
- ▶ Output ripple as low as 0.001%
- ▶ Stability as low as 10ppm/hr, 25ppm/8hrs
- ▶ Temperature coefficient of 25ppm/°C
- ▶ +24VDC input voltage
- ▶ Output voltage and current regulated
- ▶ 0 to 100% programmable output voltage and current
- ▶ Voltage and current control and monitoring
- ▶ Digital communication via PMBus
- ▶ Arc, short circuit and overload protections
- ▶ Intuitive UI for easy configuration
- ▶ Black Box reporting
- ▶ UL61010 and 62368 approved
- ▶ Operating temperature: 0°C to +50°C (ambient)
- ▶ 3 year warranty

Applications



- ▶ Scanning electron microscopy
- ▶ E-beam/ion beam
- ▶ Mass spectrometry
- ▶ Electrophoresis
- ▶ Capacitor charging
- ▶ High voltage bias
- ▶ Photo multiplier tube

Dimensions

162.6 x 72.4 x 33 mm (6.40" x 2.85" x 1.30")

Models & ratings

Analog

Model ⁽¹⁾	Output voltage	Model ⁽¹⁾	Output voltage	Output current
HRF1524S10K0P	0 to +10kV	HRF1524S10K0N	0 to -10kV	1.5mA
HRF1524S12K0P	0 to +12kV	HRF1524S12K0N	0 to -12kV	1.25mA
HRF1524S15K0P	0 to +15kV	HRF1524S15K0N	0 to -15kV	1mA

Continued on page 2

Notes:

1. Other voltages available upon request.

Models & ratings

Digital

Model ⁽¹⁾	Output voltage	Model ⁽¹⁾	Output voltage	Output current
HRF1524S10K0P-D	0 to +10kV	HRF1524S10K0N-D	0 to -10kV	1.5mA
HRF1524S12K0P-D	0 to +12kV	HRF1524S12K0N-D	0 to -12kV	1.25mA
HRF1524S15K0P-D	0 to +15kV	HRF1524S15K0N-D	0 to -15kV	1mA

Notes:

1. Other voltages available upon request.

Input

Characteristic	Minimum	Typical	Maximum	Units	Notes & conditions
Input voltage range	21.6	24	26.4	VDC	24VDC nominal
Input current			1	A	See models & ratings table
Input undervoltage lockout	OFF/Shutdown @ <20.5VDC, ON/Restart @ >21.5VDC				
Input overvoltage protection	OFF/Shutdown @ >28VDC, ON/Restart @ <27.5VDC				

Output

Characteristic	Minimum	Typical	Maximum	Units	Notes & conditions
Output voltage			15000	VDC	See models & ratings table
Output current			1.5	mA	See models & ratings table
Output programming	0		100	%	Output voltage/current is programmable via Analog DC Voltage Programming Input (Vpgm)
Initial set point accuracy		±1		%	At maximum Vpgm, no load
Linearity: output vs. program			1	%	10 to 100% output
Minimum load	No minimum load required				
Start up response	See application notes				
Line regulation			0.001	%	100% Vpgm, full load, (min to max input)
Load regulation			0.001	%	100% Vpgm, 24VDCin, (no load to full load)
Transient response	Overshoot <5%, (For 50% - 100% - 50% load change).				
Ripple and noise			0.001	%	1MHz bandwidth, see models & ratings table
Temperature coefficient		25		ppm/°C	Applicable to analog programming mode
Stability		10		ppm/1hr	After 1 hour warm up
		25		ppm/8hrs	After 1 hour warm up
Short circuit, overload	Rectangular V/I characteristics				
Overtemperature protection		+55		°C	Shutdown @ +55°C typical, ±5% at the hot spot

General

Characteristic	Minimum	Typical	Maximum	Units	Notes & conditions
Efficiency	65			%	Max Vp _{gm} , full load
Isolation: input to output	N/A - input ground is internally connected to output ground				
Construction	Aluminium chassis and cover				
Switching frequencies		60		kHz	
Mean time between failure	TBD			Mhrs	MIL-HDBK-217F, +25°C GB
Weight		465 (1.03)		g (lb)	

Environmental

Characteristic	Minimum	Typical	Maximum	Units	Notes & conditions
Operating temperature	0		+50	°C	
Storage temperature	-40		+85	°C	
Cooling	Natural convection				
Humidity			95	%RH	Non-condensing

Safety approvals

Certification	Standard	Notes & conditions
UL	IEC/UL/CSA/EN 61010, 62368	61010 pending
CE	Meets all applicable directives	
UKCA	Meets all applicable legislation	

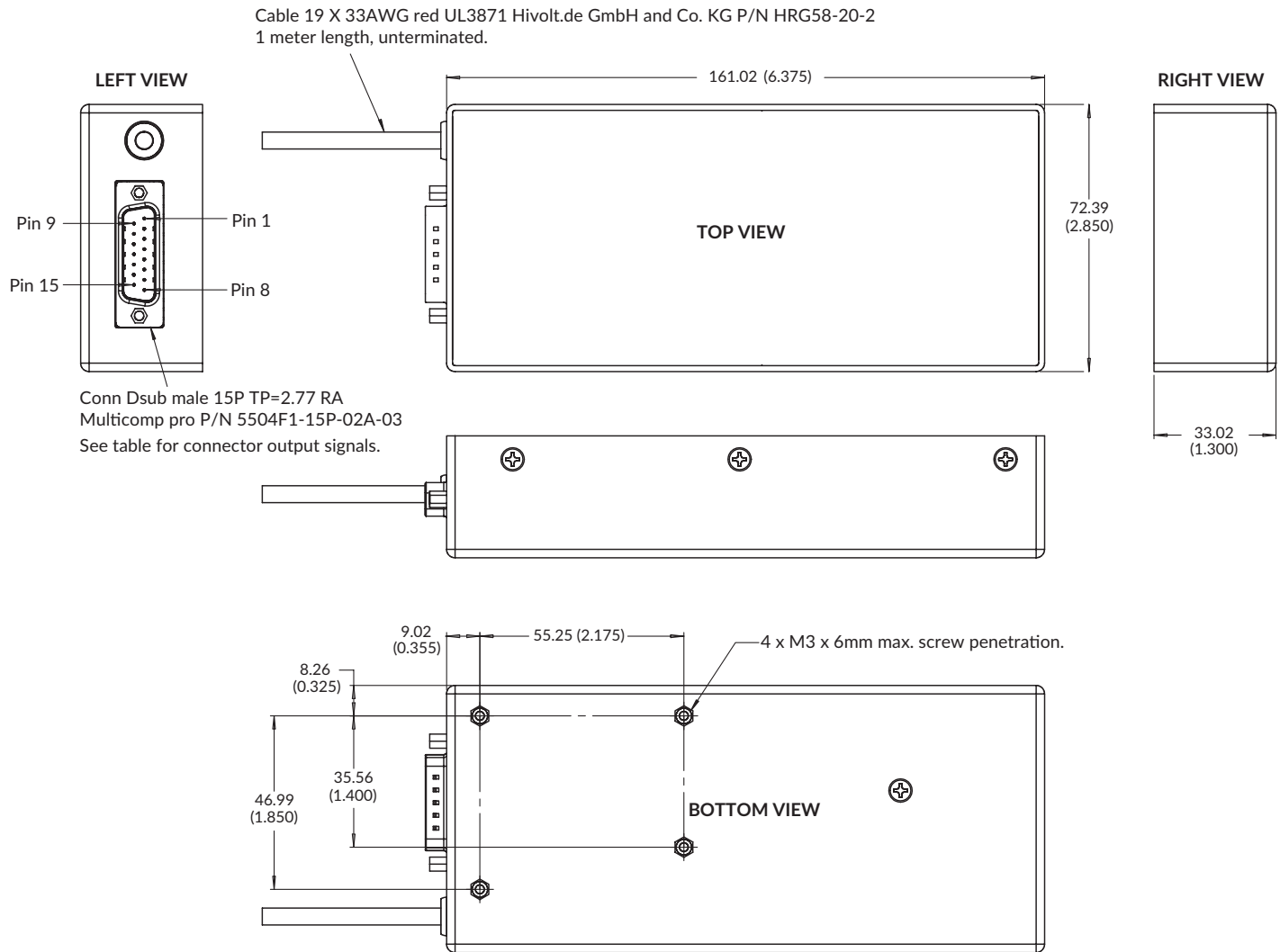
Signals

Characteristic	Pin	Function	Description
IMON	1	Output: current monitor	0V to +10VDC output measures 0 to 100% I _{out} , 1% accuracy of full scale
UVP	2	Output: Undervoltage protection monitor	Signal low = Fault
OTP	3	Output: Overtemperature protection monitor	Signal low = Fault
VPGM ⁽³⁾	4	Input: voltage programming	0V to +10VDC signal programs V _{out} from 0 to 100%, Z=100kΩ
REF	5	Output: voltage reference	+10VDC, ±0.5% - current <10mA
VMON	6	Output: voltage monitor	0V to +10VDC output measures 0 to 100% V _{out} , 1% accuracy of full scale
VIN	7	Input: 24VIN	+24VDC, 1A maximum
PGND	8	Input ground	Power ground
AGND	9	Analog ground	Analog ground for control and monitoring
I2C SCL	10	Serial Clock wrt Pin 8	No Connect for analog version
I2C SDA	11	Serial Data wrt Pin 8	No Connect for analog version
DISABLE	12	Input: remote disable	Open or No Connect turns unit ON. Ground connection turns unit OFF
IPGM ⁽³⁾	13	Input: current programming	0VDC to +10VDC signal programs I _{out} from 0 to 100%, Z=100Ω ⁽¹⁾
N/C	14	N/A	
OVP	15	Input: Overvoltage protection monitor	Signal low = Fault

Notes:

- 0 to +10VDC, preset current limit 105%.
- Digital communication available upon request.
- No Connect for digital models.

Mechanical details



Notes:

1. Dimensions are in mm (inches).
2. Weight: 465g (1.03lb) approx.

Specifications subject to change without notice.