HMD Series

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0.5kV - 6kV; 12W
PRECISION REGULATED, REVERSIBLE POLARITY
HIGH VOLTAGE POWER SUPPLIES

FEATURES

- Precise high voltages up to 6kV at max. 12W
- Polarity electronically reversible
- Limit potentiometers for output voltage and current
- Remote On Input
- Patented resonance converter technology
- Very low ripple and noise
- Very low EMI
- Metal case
- Modified versions available on request
- Made in Germany

HMD modules are highly precise and highly stable analog controlled high voltage power supplies with reversible output polarity. The HMD series covers output voltages of up to 6kV in a compact metal box. A version in a 3U/8HP cassette is available too (HED series). The maximum output power is 12W.
The HV output is brought out via an HV cable or SHV connector (option R). The supply and control voltages are connected via a D-Sub 9 connector. Analog I/O is provided for remote monitoring of output voltage and current. The output voltage control is achieved by means of a potentiometer or a control voltage (internal reference voltage). Remote ON and output polarity control inputs are provided. The patented resonant converter technology and the metal box shielding guarantee high efficiency and low EMI.

The HMD modules can be used as standalone DC/DC converters or combined into THQ series multichannel AC/DC HV power supplies.

Output Voltage V_{NOM}	Max. Output Current I_{NOM}	Model	Internal Capacitance Nominal	Damping Resistor	Discharge Resistor
0 – 500V	10mA	**HMD-0.5R10-24-#-E**	450nF	0.22kΩ	12MΩ
0 – 1000V	10mA	**HMD-1R10-24-#-E**	240nF	0.22kΩ	12MΩ
0 – 1500V	8mA	**HMD-1.5R8-24-#-E**	130nF	0.22kΩ	12MΩ
0 – 2000V	6mA	**HMD-2R6-24-#-E**	20nF	0.22kΩ	25MΩ
0 – 3000V	4mA	**HMD-3R4-24-#-E**	22nF	0.22kΩ	25MΩ
0 – 4000V	3mA	**HMD-4R3-24-#-E**	27nF	0.22kΩ	30MΩ
0 – 5000V	2mA	**HMD-5R2-24-#-E**	10nF	0.68kΩ	30MΩ
0 – 6000V	1.5mA	**HMD-6R1.5-24-#-E**	10nF	0.68kΩ	30MΩ

#: set/monitor voltage range designator: "**5**" or "**10**" for 0-5V or 0-10V respectively
For units with SHV connector, please add „**R**" to the model name, eg. **HMD-2R6-24-5-ER**

SPECIFICATIONS

Input Supply Voltage (V_{IN}):	$+24V_{DC}$ ± 5%	
Input Supply Current:	120mA max. 800mA max.	(@ V_{OUT} = 0) (@ V_{OUT} = V_{NOM}, max load)
Output Limits:	set by built-in potentiometers LIMIT V and LIMIT I	
Line Regulation:	$< 1 * 10^{-5} * V_{NOM}$	($\Delta V_{OUT} / \Delta V_{IN}$ min to max supply voltage)
Load Regulation:	$< 5 * 10^{-5} * V_{NOM}$	($\Delta V_{OUT} / \Delta R_{LOAD}$ no load to rated load)
Temperature Coefficient:	50ppm/K	
Ripple:	typ. ⩽ $3mV_{PP}$, max. $7mV_{PP}$	(@ f>10Hz)
Supply / Control Connector:	D-Sub 9 male	
Output:	shielded HV cable (600mm) or SHV connector (option R)	
Control:	analog control signals: VSET, VMON, IMON 5V control inputs: POL, ON	

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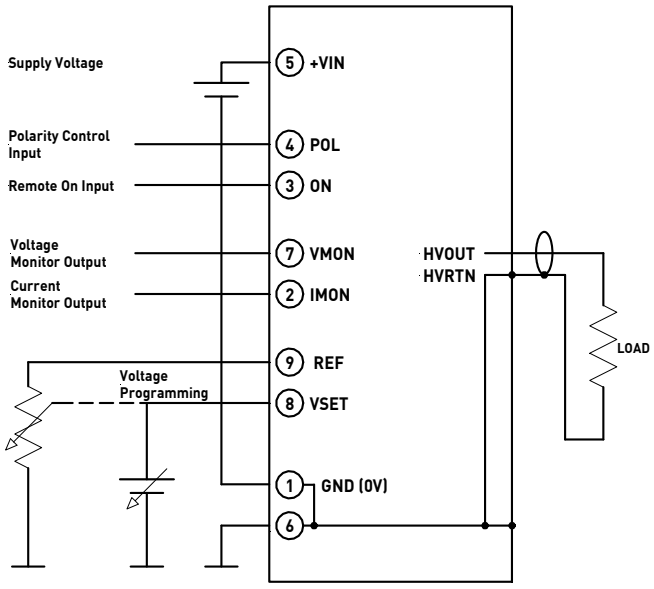
Reference Voltage (V_{REF}):	5V (1mA) or 10V (1mA) (model dependent). This reference voltage is intended for external potentiometer to program the output voltage (connect wiper to VSET)
Voltage Setting (VSET):	V_{VSET} = 0 to V_{REF} results in V_{OUT} = 0 to V_{NOM} ±1% (input impedance: 1MΩ)
Voltage Monitor (VMON)	V_{OUT} = 0 to V_{NOM} results in V_{VMON} = 0 to V_{REF} ±1% (output impedance: 10kΩ)
Current Monitor (IMON)	I_{OUT} = 0 to I_{NOM} results in V_{IMON} = 0 to V_{REF} ±1% (output impedance: 10kΩ)
Polarity Control (POL):	5V level, switchable at V_{OUT} = 0 High or open: V_{OUT} positive (red LED) Low: V_{OUT} negative (green LED) **The polarity may only be reversed when the output voltage is 0V!** Typical switching sequence: switch output off (ON -> High) **->** wait 4s for ramp down / discharge **->** reverse polarity (POL) **->** switch output on (ON -> Low)
Remote ON (ON)	5V level, active Low Low: V_{OUT} according to V_{VSET} with ramp ca. V_{NOM}/4s High or open: V_{OUT} = 0 with ramp ca. V_{NOM}/4s
Protection:	Overload, arc and output short circuit. **Only one short circuit or arc event per second allowed!** In case of higher arc/S.C. frequency the RMS output current must be limited to I_{NOM}
Temperature Range:	Operating: 0°C to +40°C Storage: -20°C to +85°C
Humidity:	≤ 70%
Dimensions:	see drawing

All voltages are referenced to GND.
Specifications for stability, ripple and noise are valid in the range 2% * V_{NOM} < V_{OUT} ≤ V_{NOM}, 25°C, after 1h warm up

▪ CONNECTION DIAGRAM



▪ PIN FUNCTION DESCRIPTIONS

Pin No.	Designation	Function
1	GND (0V)	Power 0V (connected to pin 6)
2	IMON	Current Monitor Output
3	ON	HV ON Input
4	POL	Polarity Control Input
5	+VIN	Input Supply Voltage
6	GND	Signal GND (connected to pin 1)
7	VMON	Voltage Monitor Output
8	VSET	Voltage Programming Input
9	REF	Reference Voltage Output

GND and HVRTN are internally connected;
the case is connected to GND.

▪ ORDERING INFORMATION

HMD	-	6	R	1.5	-	24	-	5	-	E	R
Base Part Designation		Output Voltage [kV_{DC}]	Reversible Output Polarity	Output Current [mA]		Input Supply Voltage [V_{DC}]		Set/Monitor Voltage Range [V_{DC}]		Polarity switching electronically	Option: SHV connector

Example: HMD-6R1.5-24-5-ER (HMD series, 6kV, reversible polarity, 1.5mA, 24V supply, 5V reference, polarity switching electronically, SHV connector)

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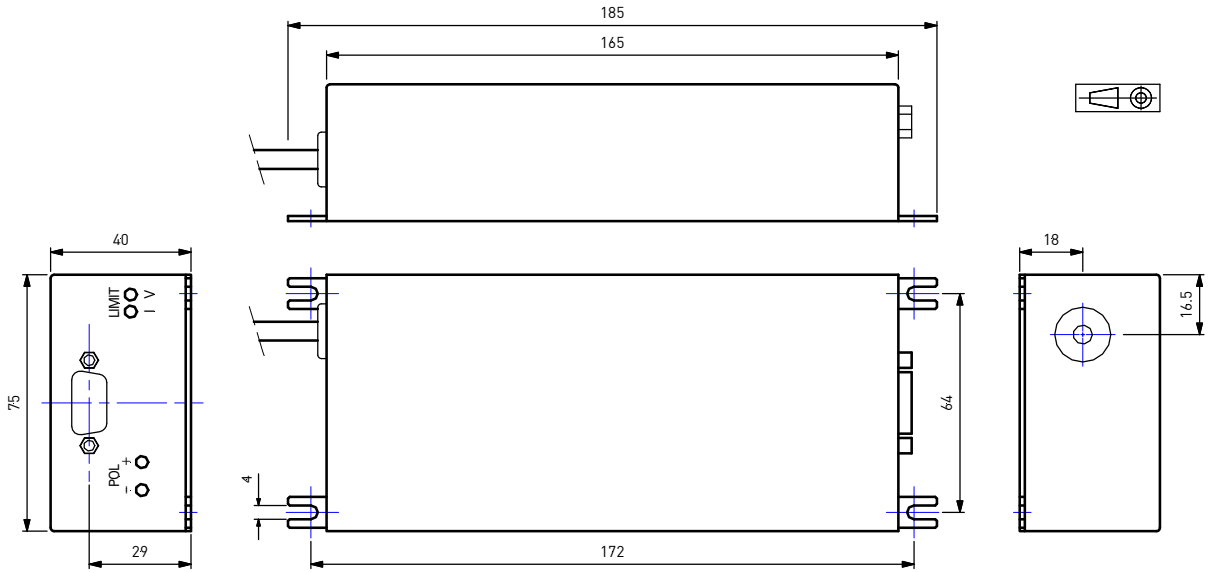
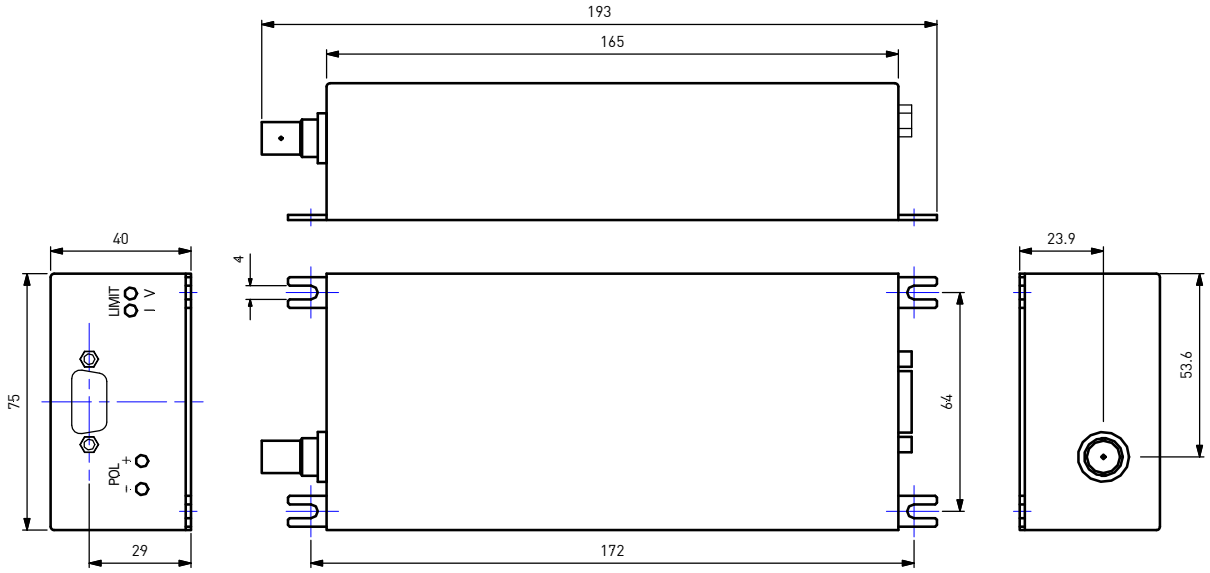
DIMENSIONS

Models with HV cable



Models with SHV connector



Dimensions in mm

Drawing not to scale

Disclaimer

The information given in this data sheet is technical data, not assured product characteristics. It has been carefully checked and is believed to be accurate; however, no responsibility is assumed for inaccuracies. The user has to ensure by adequate tests that the product is suitable for his application regarding safety and technical aspects.
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Safety Advice

Design, installation and inspection of machinery and devices carrying high voltage require accordingly trained and qualified personnel. Appropriate safety rules and directives must be complied with.
Improper handling of high voltage can mean severe injuries or death and may cause serious collateral damage!

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