

0.2kV - 6kV; 12W
PRECISION REGULATED, REVERSIBLE POLARITY
HIGH VOLTAGE POWER SUPPLIES

▪ **FEATURES**

- Precise high voltages up to 6kV at max. 12W
- Polarity electronically reversible
- Patented resonance converter technology
- Very low ripple and noise
- Very low EMI
- 3U/8HP cassette
- Modified versions available on request
- Made in Germany



HED modules are highly precise and highly stable analog controlled high voltage power supplies with reversible output polarity. The HED series covers output voltages of up to 6 kV in a 3U/8HP cassette. A version in a compact metal box is available too (HMD series). The maximum output power is 12W

The HV output is brought out via a SHV connector. The supply and control voltages are connected via an H15 connector. Analog I/O is provided for remote monitoring and control of output voltage and current by means of analog control voltages or potentiometers (internal reference voltage). Output Polarity control as well as Inhibit, Kill Enable and remote ON inputs are provided.

The patented resonant converter technology guarantees high efficiency and low EMI.

Output Voltage V_{NOM}	Output Current I_{NOM}	Model Control/Monitor Level: 5V	Model Control/Monitor Level: 10V **
0 - 200V *	10mA	HED-0.2R10-24-5-E	HED-0.2R10-24-10-E
0 - 500V	10mA	HED-0.5R10-24-5-E	HED-0.5R10-24-10-E
0 - 1 000V	10mA	HED-1R10-24-5-E	HED-1R10-24-10-E
0 - 1 500V	8mA	HED-1.5R8-24-5-E	HED-1.5R8-24-10-E
0 - 2 000V	6mA	HED-2R6-24-5-E	HED-2R6-24-10-E
0 - 3 000V	4mA	HED-3R4-24-5-E	HED-3R4-24-10-E
0 - 4 000V	3mA	HED-4R3-24-5-E	HED-4R3-24-10-E
0 - 5 000V	2mA	HED-5R2-24-5-E	HED-5R2-24-10-E
0 - 6 000V	1.5mA	HED-6R1.5-24-5-E	HED-6R1.5-24-10-E

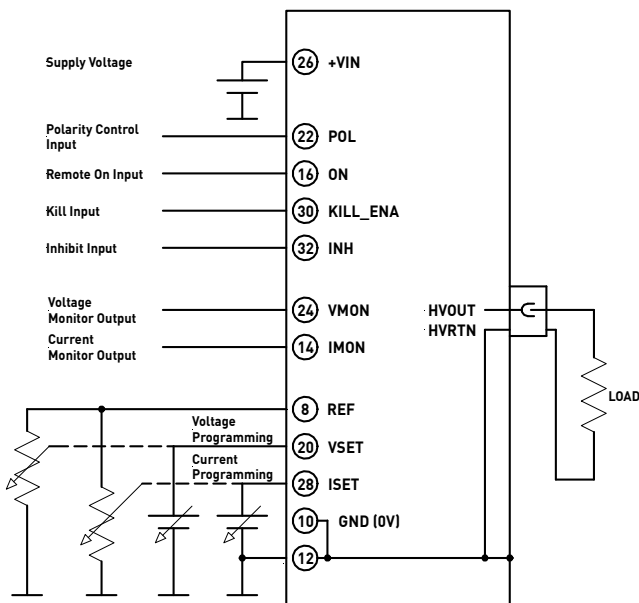
▪ **SPECIFICATIONS**

- Input Supply Voltage (V_{IN}): +24V_{DC} ± 5% (max 0.8A)
- Output Current Limit: (1.02-1.04) * I_{NOM}
- Output Current Limit Control: 0 - I_{NOM}
- 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: $5 * 10^{-5}/K$
- Ripple: typ. $\leq 2mV_{PP}$, max. $7mV_{PP}$
- Supply / Control Connector: DIN 41612 H15 male
- Output Connector: SHV (front panel)
- Control: analog control signals: VSET, ISET, VMON, IMON
5V control inputs: POL, ON, KILL_ENA, INH

- Reference Voltage (V_{REF}): 5V (1mA) or 10V (1mA) (model dependent).
This reference voltage is intended for external potentiometers to program the output voltage and/or current (connect wipers to VSET, ISET respectively)
- Voltage Setting (VSET): $V_{VSET} = 0$ to V_{REF} results in $V_{OUT} = 0$ to $V_{NOM} \pm 1\%$ (input impedance: 4.7M Ω)
- Current Limit Setting (ISET): $V_{ISET} = 0$ to V_{REF} results in $I_{OUT} = 0$ to $I_{NOM} \pm 1\%$
Connecting ISET to REF through a 10k Ω resistor results in current limit = I_{NOM}
- Voltage Monitor (VMON) $V_{OUT} = 0$ to V_{NOM} results in $V_{VMON} = 0$ to $V_{REF} \pm 1\%$ (output impedance: 10k Ω /100nF)
- Current Monitor (IMON) $I_{OUT} = 0$ to I_{NOM} results in $V_{IMON} = 0$ to $V_{REF} \pm 1\%$ (output impedance: 10k Ω /100nF)
- 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} or V_{ISET} with ramp ca. $V_{NOM}/4s$
High or open: $V_{OUT} = 0$ with ramp ca. $V_{NOM}/4s$
- Kill (KILL_ENA) 5V level, active High
High: $V_{OUT} = 0$ without ramp if signal INHIBIT is active
Restoring the output voltage is only possible after applying KILL_ENA or ON again
- Inhibit (INH) 5V level, active Low
Low: $V_{OUT} = 0$
High or open: V_{OUT} according to V_{VSET} 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}
- Cooling: Convection cooling; has to be sufficient under load conditions
- Dimensions: Euro cassette 3U x 8HP x 160mm

All voltages are referenced to GND

CONNECTION DIAGRAM

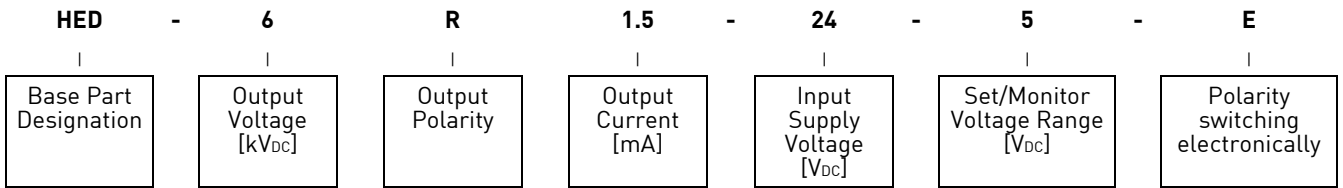


PIN FUNCTION DESCRIPTIONS

Pin No.	Designation	Function
8	REF	Reference Voltage Output
10, 12	GND (0V)	Ground Reference
14	IMON	Current Monitor Output
16	ON	Remote On Input
20	VSET	Voltage Programming Input
22	POL	Polarity Control Input
24	VMON	Voltage Monitor Output
26	+VIN	Input Supply Voltage
28	ISET	Current Programming Input
30	KILL_ENA	Kill Input
32	INH	Inhibit Input

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

▪ ORDERING INFORMATION



Example: HED-6R1.5-24-5-E (HED series, 6kV, reversible polarity, 1.5mA, 24V supply, 5V reference) polarity switching electronically)

* Models with 200V output voltage range on request only. Minimum quantities may apply.

** Models with 10V control/monitor voltage level on request only. Minimum quantities may apply.

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. hivolt.de GmbH & Co. KG does not assume any liability arising out of the application or use of any product described.

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!