

APPLIED KILOVOLTS

SHPR
March 08

SAFETY & INSTALLATION INSTRUCTIONS FOR HPR SERIES

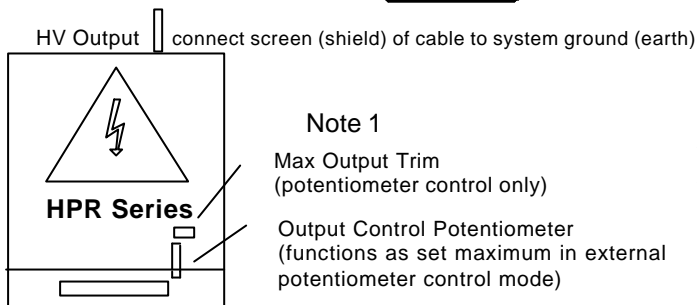
PLEASE READ CAREFULLY BEFORE INSTALLING OR OPERATING THIS POWER SUPPLY

Power Supply Warning Symbols

Caution,
Risk of electric shock

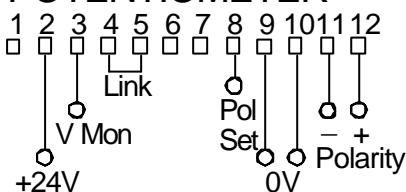


Caution
Refer to accompanying documentation

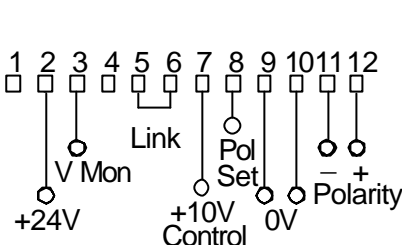


If the equipment is used in a manner not specified, the protection provided by the equipment may be impaired.

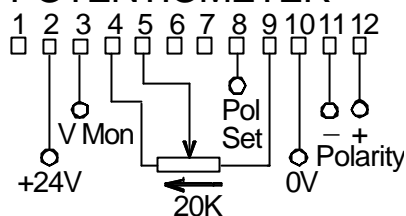
INTERNAL POTENTIOMETER



EXTERNAL POTENTIOMETER



EXTERNAL POTENTIOMETER



Pin 1	I monitor (if fitted). ³	Pin 7	Analogue voltage input 0 to +10V gives 0 to max. O/P. ² Input impedance > 100 kohms.
Pin 2	+ 24 Volt power input.	Pin 8	Polarity select, Low <0.8V = +ve o/p, High >2.5V or open circuit = -ve o/p. See Operating Note 4 overleaf.
Pin 3	Voltage monitor. 0 to +10V 0 to max. output. Tol ± 2% Source resistance 10 kohms.	Pin 9	Signal 0 volt return.
Pin 4	Control link, see diagrams above. ¹	Pin 10	Power 0 volt return.
Pin 5	Control link, see diagrams above. ¹	Pin 11	Polarity Indication, Low = -ve o/p, High = +ve o/p ⁴
Pin 6	Link to pin 5 for external control.	Pin 12	Polarity Indication, Low = +ve o/p, High = -ve o/p ⁴ (Low = 0V source 1k5 ohm, high = 24V source 2k2 ohm)

The Molex pins are part no 8500108 & the 12 pin socket 10011124.

- Notes
1. The internal reference and potentiometer to enable internal or external potentiometer programming of the HP Series, are only fitted when the 'Pot & Ref' option is requested with the order (See order codes below.)
 2. Control Voltage must be between -0.5V & 10.2V
 3. For units fitted with the 'Stack Return' simple current monitor option, it is **essential** that a resistor of the appropriate size, is fitted between Pin 1 & Pin 9.
 4. If more than 2.5mA is drawn from Pins 11, & 12, the module will latch up, and may be damaged.

SPECIFICATION

UNIT	OUTPUT	RIPPLE	SIZE (mm)
HP1R	10V to 1kV @ 10mA	< 10mV p/p	200 x 98 x 47
HP2.5R	10V to 2.5kV @ 4mA	< 20mV p/p	200 x 98 x 47
HP5R	10V to 5kV @ 2mA	< 40mV p/p	200 x 98 x 47
HP10R	20V to 10kV @ 1mA	< 50mV p/p	155 x 200 x 47
HP15R	35V to 15kV @ 0.4mA	<150mV p/p	240 x 216 x 52
HP20R	50V to 20kV @ 0.4mA	<200mV p/p	240 x 216 x 52
HP30R	100V to 30kV @ 0.25mA	<300mV p/p	240 x 216 x 52

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Input voltage: 24Vdc \pm 10% at 1 amp

Mounting:

HP001R to HP005R 2 off M4 studs. HP010R to HP030R by 4 off M4 clearance holes.

Cleaning:

Use a lint free cloth soaked with isopropyl alcohol, ensuring the unit is completely dry before use.

Environmental Conditions:

Indoor use only,

Altitude up to 2000m,

Operating Temperature 0°C to +50°C,

Storage Temperature -35°C to +85°C.

Maximum relative humidity 80% for temperatures up to 31°C, decreasing linearly to 50% relative humidity at 40° C,

The unit is to be supplied from a current limited supply providing 24Vdc, impulse limited to (overvoltage) Category I of IEC60364-4-443.

For use in an environment of pollution degree 2.

Order Code:

HP	o/p kV	Polarity	AA	TC
Series Code = HP	0.2 = 200V	R=Reversible	Options Code	Temp Co
	0.5 = 500V		AA= no options	025
	001= 1kV		IS = Stack Return Current Monitor	012
	2.5 = 2.5kV		IP = Precision Current Monitor	
	005= 5kV		PR= Pot & Reference fitted	
	010= 10kV		PS= Stack Return Imon + Pot & Reference	
	015= 15kV		PP= Precision Current Monitor +	
	020= 20kV		Pot & Reference	
	030= 30kV			

Reversible10kV HP series with Stack Return Current Monitor and Pot & Reference fitted: HP010RPS025

Notes

1/ Precision Current monitor is only available on HP015R, HP020R & HP030R units

2/ Temp Co <12ppm/° is available by special request

GENERAL

On receipt the unit should be carefully unpacked and inspected to ensure that no transit damage has occurred. Provided that this inspection is satisfactory and reveals no evidence of damage then installation can proceed.

If an electrical test is to be carried out prior to fitting the power supply, it is essential that the person undertaking this work has received appropriate technical training to be aware of the hazards to which that person may be exposed in performing the tests, and of measures to minimise the risks to themselves, and other personnel. Metallic or conductive tools should not be used to adjust any of the potentiometers. The unit has no user serviceable parts and should not be dismantled.

DO NOT HANDLE OR TOUCH THESE UNITS WHEN THE SUPPLY IS CONNECTED. AFTER DISCONNECTION FROM THE SUPPLY, ALLOW 30 SECONDS BEFORE HANDLING SO THAT ALL THE CAPACITORS CAN DISCHARGE. To ensure that the output is fully discharged short to ground before touching any high voltage circuit.

Care should be taken not to operate the unit outside the specified limits given above, failure to do so may damage the unit, and will invalidate the warranty.

COMPLIANCE WITH SAFETY STANDARDS

The unit is designed to meet Normalised European Safety Standards Standards for installation in equipment conforming to EN61010 and hence installation of the power supply unit into the equipment should comply with the following requirements.

- a. A PROTECTIVE EARTH must be provided for safety in accordance with EN61010 Part 1 : Clause 6.5.1. The case of the units must be bonded to this protective earth.
- b. The output is classed as hazardous and must therefore not be accessible to operators. The output must be isolated from accessible circuits by Double Insulation or a protective screen as defined in EN61010-1.
- c. It is intended to be installed in an electrical enclosure and the unit and its input connector should not be accessible to the operator. Access should be restricted to authorised service personnel only, with use of a tool. Care should be taken to prevent access to the interior of the unit and protect against items (e.g. tools or wires) inadvertently entering the interior of the unit.
- d. The unit is not fitted with a fuse and so should be operated from a limited supply of <2.5 amp.

INSTALLATION

The outputs of these units are considered hazardous and should be installed such that they cannot become accessible. The output should be connected such that the shortest creepage and clearance path is to a protective earth connection. ENSURE that a LOW IMPEDANCE connection is made to the unit chassis from the system PROTECTIVE EARTH. The safety earth conductor must not contain any switches or fuses.

Under worst case conditions the unit draws a current of 1.3A and any input supply cable must be of a suitable type and rating. The unit is not fitted with a fuse and so should be operated from a limited supply. Fuses may be fitted externally to the unit to protect unit and interconnecting wiring etc. but these should be rated to prevent nuisance failures. Care should be taken in the design of the interconnecting wiring within the system to ensure that connectors with hazardous voltages cannot be connected to accessible circuits.

Ensure that the output is connected to the load prior to operation of the unit and that a good low impedance high voltage joint is made. Sharp points on either the high voltage or return joint should be avoided as this will cause corona which will make the output appear noisy. In general a tracking distance (creepage distance) of 25mm (1 inch), per 10kV to earth is advised as a minimum to ensure no breakdown or corona occurs, a much greater distance will be required under adverse conditions. Care must be taken not to damage the cable inner when forming the connections.

During arcing currents exceeding 1000 Amps will flow. It is important that these currents return to the high voltage power supply by the shortest possible route using the screen (shield) of the output cable. Failure to observe this will result in the control terminals of the unit seeing large voltage spikes during arcing and radiation of electromagnetic interference.

Adequate ventilation should be provided to keep the unit cool and the ventilation inlets should not be covered in any way. The ambient air temperature around the inlet must not exceed 50°C. The unit will operate in any orientation, however it is not recommended to operate with the side fitted with the silk-screen as the lowest face.

OPERATING NOTES

- 1/ HIGH VOLTAGES ARE DANGEROUS. ENSURE THE OUTPUT IS FULLY DISCHARGED BY SHORTING TO GROUND BEFORE TOUCHING ANY HIGH VOLTAGE CIRCUIT.
- 2/ The unit is short circuit proof but care should be taken that the high voltage cannot be shorted into one of the control pin connections.
- 3/ POWER SUPPLIES ARE DISPATCHED WITH INTERNAL POTENTIOMETER SET TO MAXIMUM. TURN DOWN TO ZERO BEFORE CONNECTING TO 24 VOLT SUPPLY. MINIMUM INPUT VOLTAGE IS 21.6V.
- 4/ The output polarity can only be reversed when the output is set to zero and the output voltage has fallen to zero. When output voltage is present the polarity change over circuit is latched and cannot be changed.

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