

## HP Series Data Sheet

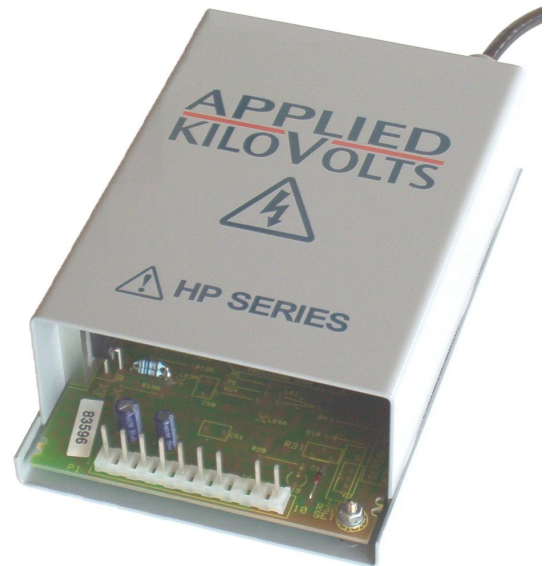
HP0.5, HP001, HP2.5, HP005, HP010, HP015, HP020, HP030

### PRECISION 10W HIGH VOLTAGE MODULES

#### Application:

Photomultiplier tubes, Mass spectrometers, Electron microscopes, Nuclear instruments, Surface Science analysis, Microchannel plates

- High Stability, Low Ripple
- Externally programmable or Internal control (option)
- Short circuit and flashover proof
- 24 hour burn in
- Low radiated magnetic field
- Positive, negative & remote reversible versions
- Unipolar units now UL recognised as a component under UL category OGTK2, evaluated under UL61010-1-2nd Edition File No E254121



This range of precision high voltage modules has outputs that provide a low ripple, high stability source of high voltage for photo-multiplier tubes, electron gun, nuclear and other applications. Control of the output voltage is by internal potentiometer or by an external 10 volt analogue control voltage. The units are pin compatible with the medium stability KS and 100watt HW ranges.

All units are short circuit proof and use proven linear regulator techniques to drive a high frequency FET oscillator and ferrite high voltage step-up transformer. The power supplies are constructed from conservatively rated components with the reliability further enhanced by information gained over many years of field operation.

| Unipolar Unit Type | Output Voltage | Output Current | Ripple at Full Load | Temp-Co ( / °C)     | Size (mm)      | Weight (kg) |
|--------------------|----------------|----------------|---------------------|---------------------|----------------|-------------|
| HP0.5xAA025        | 10V to 500V    | 20mA           | <20mV (pk-pk)       | <25ppm <sup>1</sup> | 147 x 98 x 47  | 0.8         |
| HP001xAA025        | 10V to 1kV     | 10mA           | <10mV (pk-pk)       | <25ppm <sup>1</sup> | 147 x 98 x 47  | 0.8         |
| HP2.5xAA025        | 10V to 2.5kV   | 4mA            | <10mV (pk-pk)       | <25ppm <sup>1</sup> | 147 x 98 x 47  | 0.8         |
| HP005xAA025        | 10V to 5kV     | 2mA            | <20mV (pk-pk)       | <25ppm <sup>1</sup> | 147 x 98 x 47  | 1.0         |
| HP010xAA025        | 20V to 10kV    | 1mA            | <50mV (pk-pk)       | <25ppm <sup>1</sup> | 200 x 98 x 47  | 1.2         |
| HP015xAA025        | 30V to 15kV    | 0.66mA         | <100mV (pk-pk)      | <25ppm <sup>1</sup> | 200 x 98 x 47  | 1.7         |
| HP020xAA020        | 50V to 20kV    | 0.4mA          | <200mV (pk-pk)      | <20ppm <sup>1</sup> | 210 x 120 x 55 | 1.7         |
| HP030xAA020        | 100V to 30kV   | 0.25mA         | <300mV (pk-pk)      | <20ppm <sup>1</sup> | 210 x 120 x 55 | 1.7         |

| Reversible Unit Type | Output Voltage | Output Current | Ripple at Full Load | Temp-Co ( / °C)     | Size (mm)      | Weight (kg) |
|----------------------|----------------|----------------|---------------------|---------------------|----------------|-------------|
| HP001RAA025          | ±10V to ±1kV   | 10mA           | <10mV (pk-pk)       | <25ppm <sup>1</sup> | 200 x 98 x 47  | 1.0         |
| HP2.5RAA025          | ±10V to ±2.5kV | 4mA            | <20mV (pk-pk)       | <25ppm <sup>1</sup> | 200 x 98 x 47  | 1.0         |
| HP005RAA025          | ±10V to ±5kV   | 2mA            | <40mV (pk-pk)       | <25ppm <sup>1</sup> | 200 x 98 x 47  | 1.2         |
| HP010RAA025          | ±20V to ±10kV  | 1mA            | <50mV (pk-pk)       | <25ppm <sup>1</sup> | 155 x 216 x 52 | 1.5         |
| HP015RAA025          | ±30V to ±15kV  | 0.4mA          | <150mV (pk-pk)      | <20ppm <sup>1</sup> | 240 x 216 x 52 | 3.6         |
| HP020RAA025          | ±50V to ±20kV  | 0.4mA          | <200mV (pk-pk)      | <20ppm <sup>1</sup> | 240 x 216 x 52 | 3.6         |
| HP030RAA025          | ±100V to ±30kV | 0.25mA         | <300mV (pk-pk)      | <20ppm <sup>1</sup> | 240 x 216 x 52 | 3.6         |

Note 1: <12ppm/°C is available by special request

## Electrical Specification

|                              |  |
|------------------------------|--|
| Input                        | +24V dc $\pm 10\%$ <1A. 0V input common to HV return and chassis.  |
| Control of output            | <ul style="list-style-type: none"> <li>• 0V to +10V for 0% to 100% <math>\pm 2\%</math>, (<math>Z_{in} = 200\text{Kohm}</math>)</li> <li>• INTERNAL or EXTERNAL potentiometer—see options</li> </ul> |
| Polarity Control             | Low <0.8V = +ve, High >2.5V or OC =-ve   |
| Voltage monitor              | 0V to +10V $\pm 2\%$ for 0% to 100%. ( $Z_{out} = 10\text{k}$ )  |
| Precision Current Monitor    | Option available on all unipolar units, HP015R, HP020R, and HP030R<br>0V to +10V $\pm 2\%$ , Offset $\pm 0.1\%$ of FS for 0% to 100%. ( $Z_{out} = 10\text{k}$ )                                     |
| Line regulation              | <10ppm for 1V change in input voltage  |
| Load regulation              | <10ppm for 100uA to maximum load   |
| Drift (after 1 hour warm up) | <0.01% per hour, <0.05 over an 8 hour period   |
| Protection (all outputs)     | Protected against intermittent arcing and continued short circuit to ground  |

## Mechanical Specification

|                  |   |
|------------------|---|
| Mounting centres | HP001P & N, HP001R, HP2.5P & N, HP2.5R, HP005P & N, HP005R, HP010P & N, HP015P & N - M4 studs.<br>The remainder— 2 off M4 clearance holes |
| Input / control  | Molex 0.2" 10 way (reversible units 12 way) connector   |
| Output           | By 1.0 metre screened cable (Unipolar HP series 15kV and below 0.5M)<br>N.B. Reducing cable length may increase the ripple voltage.       |

## Environmental Specification

|                        |                 |                                    |                                 |
|------------------------|-----------------|------------------------------------|---------------------------------|
| Temperature, operating | +10°C to +50°C. | Humidity (RH) <31°C non condensing | 80% maximum                     |
| Temperature, storage   | -35°C to +85°C. | Humidity (RH) >30°C non condensing | Decrease linearly to 50% @ 40°C |
| Altitude, operating    | Up to 2,000m.   | Altitude, storage                  | Up to 18,000m                   |

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.

## Pin Assignment

|  |   |  |
|--|---|--|
| 1 I monitor o/p (if fitted) (Reversible Units) | 5 Control Link: See diagram <sup>1</sup>  | 9 Signal ground                            |
| 2 +24V dc input                                | 6 Control Link: See diagram <sup>1</sup>  | 10 Supply 0V                               |
| 3 Voltage Monitor o/p                          | 7 Voltage Control i/p <sup>2</sup>  | 11 Pol Indication L=-ve (Reversible Units) |
| 4 Control Link: See diagram <sup>1</sup>       | 8 I Monitor o/p (Unipolar Units)<br>Polarity Select i/p (Reversible Units) <sup>3</sup> | 12 Pol Indication L=+e (Reversible Units)  |

- 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. External Potentiometer must be  $\geq 10\text{kohms}$
2. Control Voltage must be between -0.5V & 10.2V
3. Polarity Select Low <0.8V = +ve, High >2.5V or OC =-ve

## Part Number Selection

| Series Code | HP | o/p kV     | Polarity     | Options Code                                    | Temp Co                         |
|-------------|----|------------|--------------|---|---------------------------------|
|             |    | 0.5 = 500V | P= +ve       | AA= no options                                  | 025                             |
|             |    | 001= 1kV   | N= -ve       | IS = Stack Return Current Monitor               | 020 [20kV & 30kV unipolar only] |
|             |    | 015=15kV   | R=Reversible | IP = Precision Current Monitor                  | 012                             |
|             |    |            |              | PR= Pot & Reference fitted                      |                                 |
|             |    |            |              | PS= Stack Return Imon + Pot & Reference         |                                 |
|             |    |            |              | PP= Precision Current Monitor + Pot & Reference |                                 |

**We manufacture a large number of special versions of these units and would be pleased to discuss your application with you.**

# EXELIS

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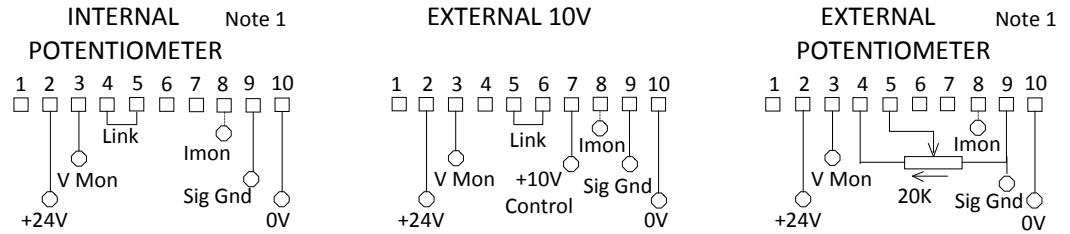
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## Input Connections

### Unipolar Units



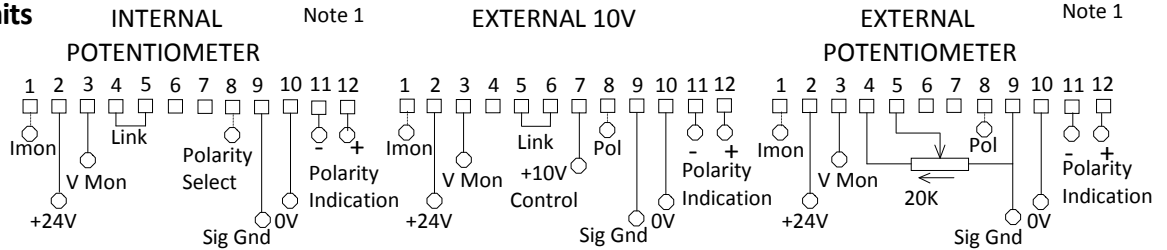
The Molex pins are part no 8500108 & the 10 pin socket 10011104.

- |  |                                    |
|--|------------------------------------|
| 1 Synchronisation i/p <sup>2</sup>       | 6 Control Link: See diagram        |
| 2 Supply, +24V                           | 7 Voltage Control i/p <sup>4</sup> |
| 3 Voltage Monitor o/p                    | 8 Imon (if fitted) <sup>3</sup>    |
| 4 Control Link: See diagram <sup>1</sup> | 9 Signal ground                    |
| 5 Control Link: See diagram <sup>1</sup> | 10 Supply 0V                       |

#### Notes

- The internal reference and potentiometer to enable internal or external potentiometer programming of the HP Series, are only fitted when the 'Plus Ref' option is requested with the order. External Potentiometer must be  $\geq 10$  kohms
- Sync input – if used – must be 56kHz  $\pm 1.5$ kHz, 0 to 15V square wave of duty cycle between 10:90 (H-L) & 50:50
- 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 8 & Pin 9.
- Control Voltage must be between -0.5V & 10.2V

### Reversible Units



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

- |  |                                      |
|--|--------------------------------------|
| 1 Imon (if fitted)                       | 7 Voltage Control i/p <sup>3</sup>   |
| 2 Supply, +24V                           | 8 Polarity Select <sup>4</sup>       |
| 3 Voltage Monitor o/p                    | 9 Signal ground                      |
| 4 Control Link: See diagram <sup>1</sup> | 10 Supply 0V                         |
| 5 Control Link: See diagram <sup>1</sup> | 11 -ve Polarity Monitor <sup>5</sup> |
| 6 Control Link: See diagram              | 12 +ve Polarity Monitor <sup>5</sup> |

#### Notes

- 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. External Potentiometer must be  $\geq 10$  kohms
- Control Voltage must be between -0.5V & 10.2V
- 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.
- Polarity Select Low <0.8V = +ve, High >2.5V or OC = -ve
- L=0V Zout=1k5 H = 24V Zout=2k2

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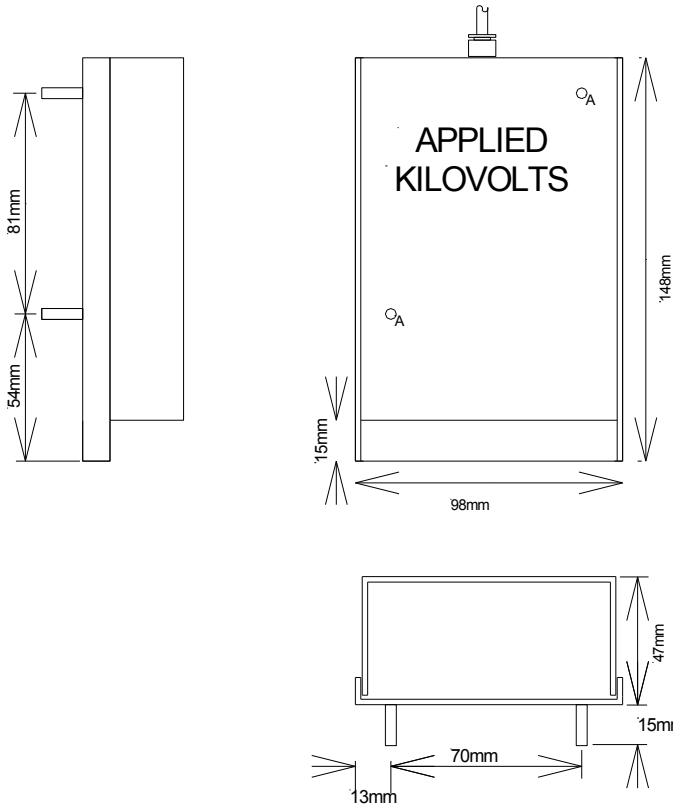
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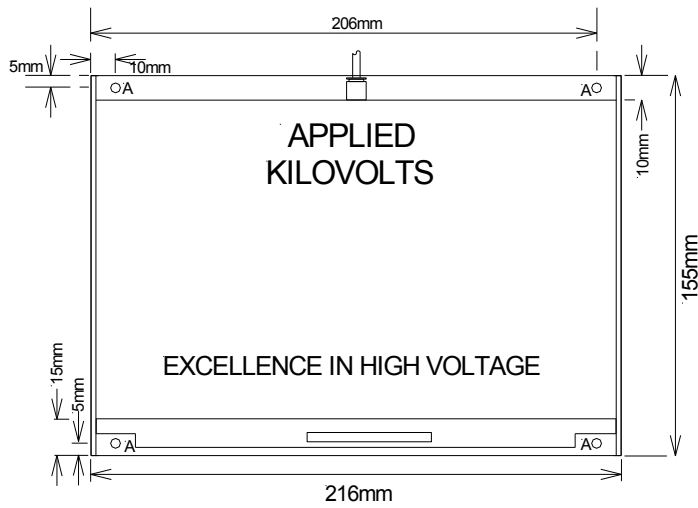
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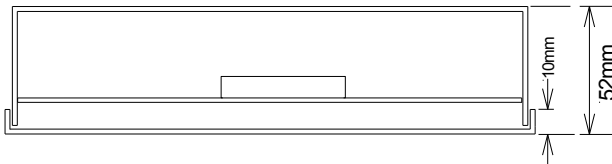
E-mail: PSinfo@exelisinc.com



HP001, HP2.5, & HP5 Unipolar  
Mounting 2 off M4 Studs to base



HP010R Reversible  
Mounting 4 off M4 Clearance marked A

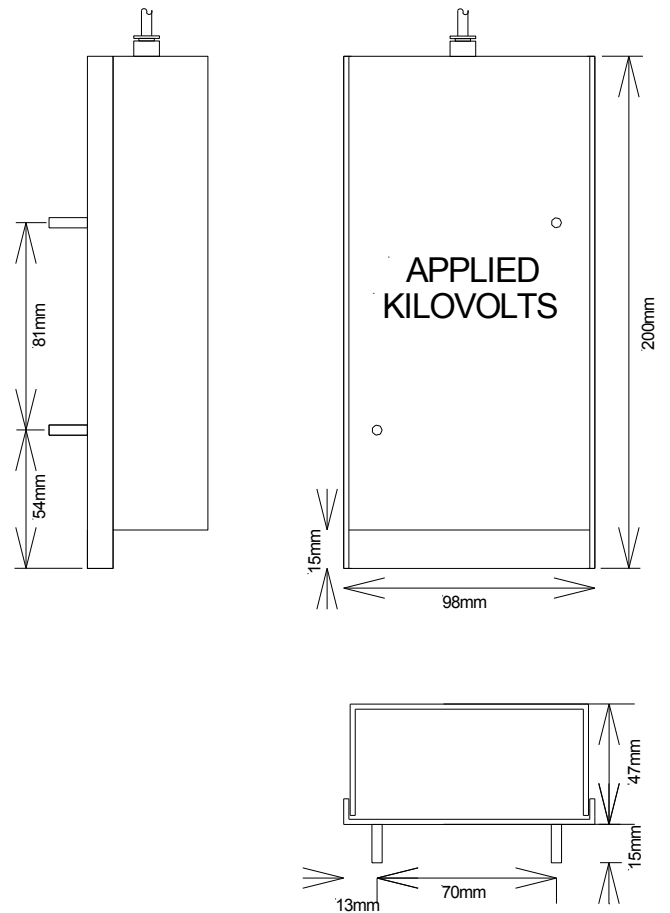


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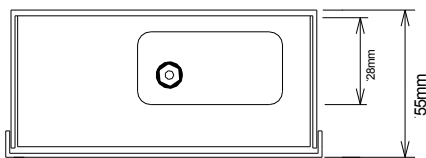
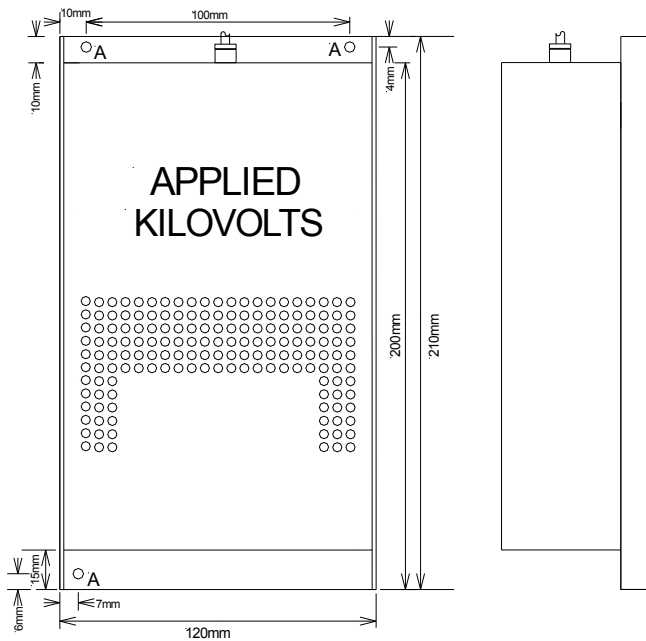


HP010 Unipolar, &  
HP001R, HP2.5R, & HP5R Reversible  
Mounting 2 off M4 Studs to base

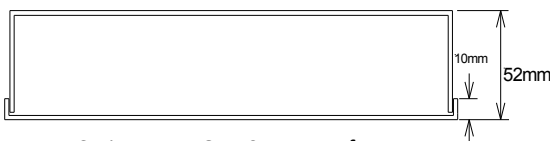
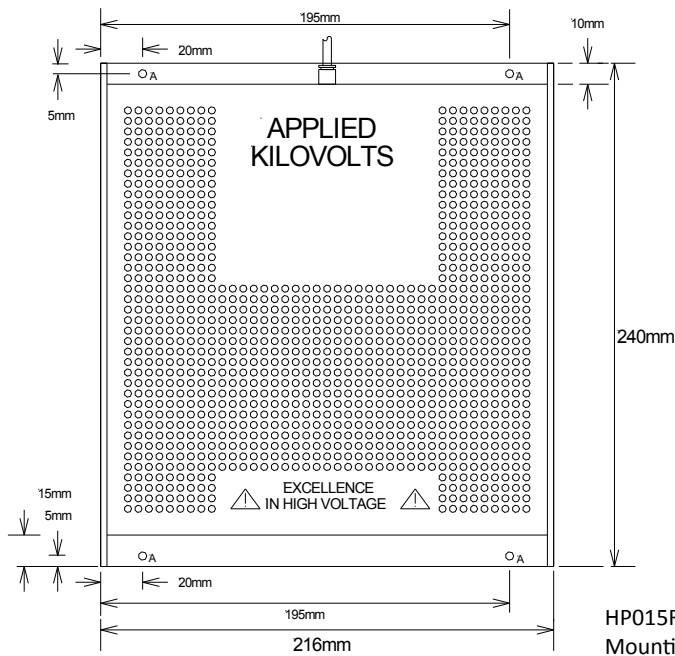
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HP020 & HP030 Unipolar  
Mounting 3 off M4 Clearance marked 'A'



HP015R, HP020R, & HP030R Reversible  
Mounting 4 off M4 Clearance marked 'A'



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