

## LN Series

### Application:

Designed for ease of integration into complex multi-psu applications requiring exceptional performance, such as mass spectrometers, electron microscopes, surface science and analysis equipment, nuclear instruments, photomultiplier tubes and micro-channel plates.

### Features:

- Exceptionally low levels of low frequency (LF) noise and drift
- High stability, low ripple, low microphony
- Fast recovery from load transients
- Analogue or digital control options
- Differential analogue input
- Short circuit and flashover proof
- Positive, negative and remote reversible versions
- <10ppm/°C temperature co-efficient (tighter temp-co available upon request)



This range of precision high voltage modules has outputs that provide exceptionally low levels of noise, microphony and drift and is specifically designed for easy integration into systems requiring multiple high voltages. The modules are the ideal HV sources for mass-spectrometry, electron gun, ion gun, photomultiplier, nuclear and other applications.

All units are short circuit proof and use proprietary low noise techniques to achieve a very low ripple and exceptional low frequency noise performance. The power supplies are designed for reliability, building on the data gained from many years of field operation of LN predecessors.

Standard units have a 1m low noise screened cable for the high voltage output. Options are available for internal high voltage sockets at the rear of the PSU.

Several options are available for control: digital interface, external differential analogue input (to eliminate noise from ground return offset voltages) or potentiometer.

### SPECIFICATIONS FOR: LN SERIES

| UNIPOLAR UNIT TYPE | MAX OUTPUT VOLTAGE | OUTPUT CURRENT | LF NOISE      | RIPPLE AT FULL LOAD | TEMP-CO (/ °C) | SIZE (mm)      | WEIGHT (kg) |
|--------------------|--------------------|----------------|---------------|---------------------|----------------|----------------|-------------|
| LN001xIP010        | 1kV                | 5mA            | <2mV (pk-pk)  | <2mV (pk-pk)        | <10ppm         | 147 x 98 x 40  | 0.8         |
| LN2.5xIP010        | 2.5kV              | 2mA            | <5mV (pk-pk)  | <5mV (pk-pk)        | <10ppm         | 147 x 98 x 40  | 0.8         |
| LN005xIP010        | 5kV                | 1mA            | <10mV (pk-pk) | <10mV (pk-pk)       | <10ppm         | 147 x 98 x 40  | 1.0         |
| LN010xIP010        | 10kV               | 0.5mA          | <20mV (pk-pk) | <20mV (pk-pk)       | <10ppm         | 200 x 98 x 40  | 1.2         |
| LN015xIP010        | 15kV               | 0.33mA         | <30mV (pk-pk) | <30mV (pk-pk)       | <10ppm         | 200 x 98 x 40  | 1.7         |
| LN020RIP010        | 20kV               | 0.25mA         | <40mV (pk-pk) | <40mV (pk-pk)       | <10ppm         | 210 x 120 x 55 | 1.7         |
| LN030RIP010        | 30kV               | 0.166mA        | <60mV (pk-pk) | <60mV (pk-pk)       | <10ppm         | 210 x 120 x 55 | 1.7         |

| REVERSIBLE UNIT TYPE | MAX OUTPUT VOLTAGE | OUTPUT CURRENT | LF NOISE      | RIPPLE AT FULL LOAD | TEMP-CO (/ °C) | SIZE (mm)      | WEIGHT (kg) |
|----------------------|--------------------|----------------|---------------|---------------------|----------------|----------------|-------------|
| LN001RIP010          | ±1kV               | 5mA            | <2mV (pk-pk)  | <2mV (pk-pk)        | <10ppm         | 147 x 98 x 40  | 1.0         |
| LN2.5RIP010          | ±2.5kV             | 2mA            | <5mV (pk-pk)  | <5mV (pk-pk)        | <10ppm         | 147 x 98 x 40  | 1.0         |
| LN005RIP010          | ±5kV               | 1mA            | <10mV (pk-pk) | <10mV (pk-pk)       | <10ppm         | 147 x 98 x 40  | 1.2         |
| LN010RIP010          | ±10kV              | 0.5mA          | <20mV (pk-pk) | <20mV (pk-pk)       | <10ppm         | 195 x 140 x 48 | 1.5         |
| LN015RIP010          | ±15kV              | 0.33mA         | <30mV (pk-pk) | <30mV (pk-pk)       | <10ppm         | 240 x 165 x 52 | 3.5         |
| LN020RIP010          | ±20kV              | 0.25mA         | <40mV (pk-pk) | <40mV (pk-pk)       | <10ppm         | 240 x 165 x 52 | 3.5         |
| LN030RIP010          | ±30kV              | 0.166mA        | <60mV (pk-pk) | <60mV (pk-pk)       | <10ppm         | 240 x 165 x 52 | 3.5         |

Minimum adjustable output voltage is 10% when operating at full output current. Derate linearly down to 1% of maximum output voltage.

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## ELECTRICAL SPECIFICATION

|                               |  |                 |
|-------------------------------|--|-----------------|
| Input:                        | +24 volt dc $\pm 5\%$ <0.7A 0V input common to HV return and chassis   | Max inrush <10A |
| Control of output:            | 50mV to 5V for 1% to 100% $\pm 2\%$ $Z_{in} > 100K\Omega$ Trimmed Option $\pm 0.2\%$<br>Internal or external potentiometer—see options |                 |
| Voltage monitor:              | 0V to +5V $\pm 2\%$ for 0% to 100% ( $Z_{out} < 1R$ $I_{out} \leq 2mA$ )   |                 |
| Current monitor:              | 0V to +5V $\pm 2\%$ for 0% to 100%, Offset $\pm 0.1\%$ of FS ( $Z_{out} = 1R$ $I_{out} \leq 2mA$ )                                     |                 |
| Reference option:             | +5V $\pm 2\%$ $\leq 3ppm/^{\circ}C$ temp-co $I_{out} \leq 1mA$   |                 |
| Polarity control:             | Low or <1V = -ve, >4.0V or OC = +ve  |                 |
| Inhibit:                      | Low or <1V = Enabled >4.0V or OC = inhibited   |                 |
| Line regulation:              | <10ppm over full input voltage range   |                 |
| Load regulation:              | <10ppm for load changes from 10% to 100% load  |                 |
| Drift (after 1 hour warm up): | <10ppm per hour, <50ppm over an 8 hour period  |                 |
| Protection (all outputs):     | Protected against intermittent arcing and continued short circuit to ground  |                 |

## MECHANICAL SPECIFICATION

|                  |   |  |
|------------------|---|--|
| Mountings:       | 4 off M4 mounting holes in base                     |  |
| Input / control: | 15W D-type male connector - analogue versions       | Digital versions - Comms connector plus 2 pin Molex 5569 series for power  |
| Output:          | SHV BNC up to 5kV,<br>GES HB30T for 10kV and higher | OR 1m, low noise shielded cable<br>The ripple maybe higher than specified if used with less than 1m of o/p cable |

## ENVIRONMENTAL SPECIFICATION

|                         |                 |                                     |                                  |
|-------------------------|-----------------|-------------------------------------|----------------------------------|
| Temperature, operating: | 10°C to +50°C   | Humidity (RH) <30°C non-condensing: | 80% maximum non-condensing       |
| Temperature, storage:   | -35°C to +85°C  | Humidity (RH) >30°C non-condensing: | Decrease linearly to 50% at 40°C |
| Altitude, operating:    | -100m to 2,000m | Altitude, storage:                  | -100m to 18,000m                 |

The unit is to be supplied from a current limited supply providing 24V dc, impulse limited to overvoltage Category I (of IEC60364-4-443).  
For use in an environment of pollution degree 2.

## PIN ASSIGNMENT (ANALOGUE I/P VERSIONS)

|                                       |                       |                        |                  |
|---------------------------------------|-----------------------|------------------------|------------------|
| 1 +ve Control input                   | 5 0V Power return     | 9 -ve Control input    | 13 +24V dc input |
| 2 +5V Reference/Pot Wiper (if fitted) | 6 0V Power return     | 10 Current monitor o/p | 14 +24V dc input |
| 3 Signal ground                       | 7 0V Power return     | 11 Voltage monitor o/p | 15 +24V dc input |
| 4 Signal ground                       | 8 Polarity select i/p | 12 Inhibit             |                  |

## PART NUMBER SELECTION

### SERIES CODE: LN

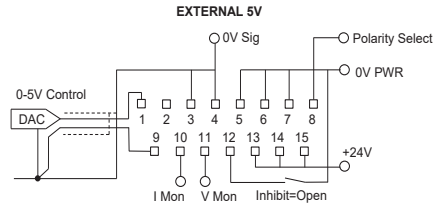
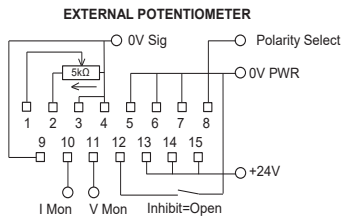
| O/P kV    | POLARITY      | OPTIONS CODE               | TEMP CO   | O/P CONN/LEAD LENGTH |
|-----------|---------------|----------------------------|-----------|----------------------|
| 001= 1kV  | P= +ve        | IP = current monitor only  | <10ppm/°C | 00=o/p connector     |
| 010= 10kV | N= -ve        | PR= Pot & reference fitted |           | 0.5=0.5              |
| 030= 30kV | R= Reversible | IR = Reference only fitted |           | 1.0=1 m              |
|           |               | DP= Digital control option |           | 2.0=2 m              |
|           |               | DT= Digital trimmed        |           | 3.0=3 m              |

Example: LN005NIP010-1.0 = -5kV LN series + current monitor, <10ppm/°C tempco with 1m output cable  
Tighter temp-co is available upon request

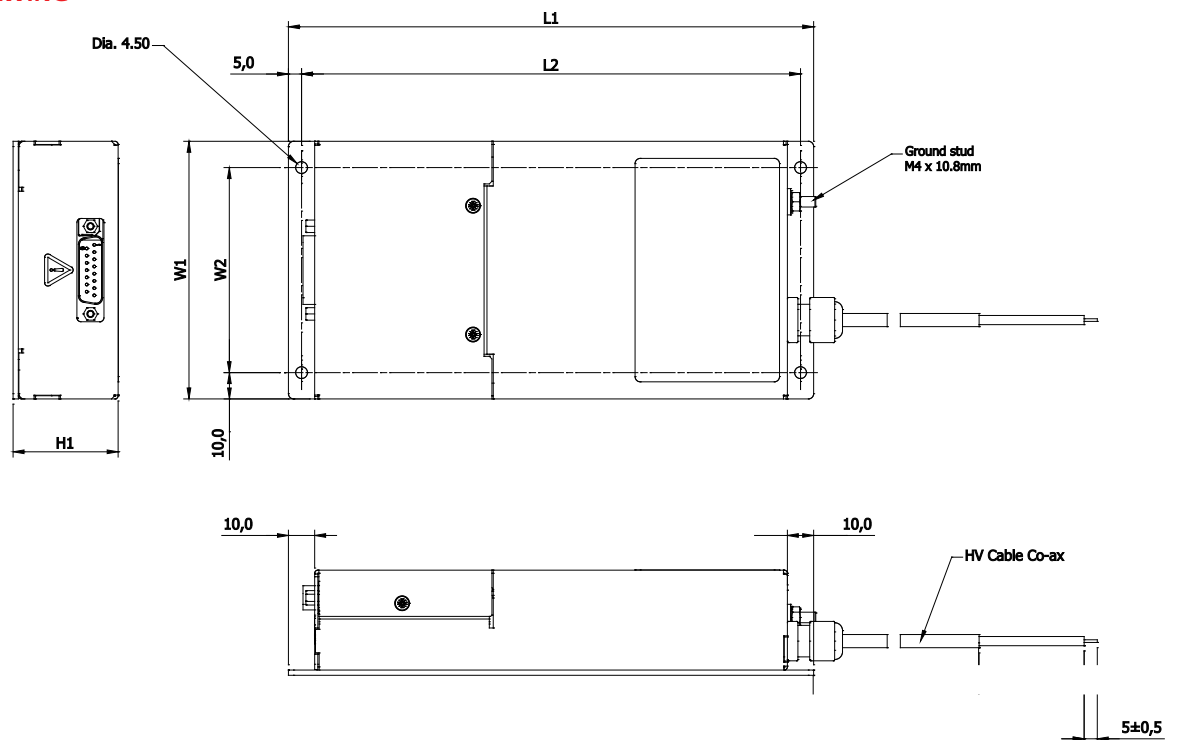
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## PIN CONNECTIONS

## ANALOGUE VERSIONS



## LN SERIES OUTLINE DRAWING



| Unit                   | L1  | L2  | W1  | W2  | H1 |
|------------------------|-----|-----|-----|-----|----|
| LN001-LN005 unipolar   | 147 | 137 | 98  | 78  | 40 |
| LN010-LN015 unipolar   | 200 | 190 | 98  | 78  | 40 |
| LN020-LN030 unipolar   | 210 | 200 | 120 | 100 | 55 |
| LN001-LN005 reversible | 147 | 137 | 98  | 78  | 40 |
| LN010 reversible       | 195 | 185 | 140 | 120 | 48 |
| LN015 reversible       | 240 | 230 | 165 | 145 | 52 |
| LN020-LN030 reversible | 240 | 230 | 165 | 145 | 52 |

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