

# Model 3002D

## 0-3 kV H.V. Power Supply

### Features

- Digital display of voltage and current
- Regulated 0 to  $\pm 3000$  V dc, 0 to 10 mA output
- External control of output voltage over full range
- Polarity indication with preview
- Noise and ripple <10 mV peak-to-peak
- Overload and short circuit protected

### Description

The CANBERRA Model 3002D is a NIM Bin compatible high voltage power supply designed for operation with essentially all types of nuclear radiation detectors. Particularly well-suited for use with scintillation detectors, the standard double-width NIM module provides a well regulated output up to 10 mA at 0 to  $\pm 3000$  V dc.

A recessed switch on the bottom panel is used to select either 115 or 230 V ac input power furnished through a power line cord and connector. The Model 3002D can also be operated outside the NIM Bin from any ac power receptacle, since it requires no power from the Bin. The power supply will withstand any overload or direct output short-circuit for an indefinite period of time and provide normal output automatically upon removal of the fault.

Output voltage is continuously adjustable by means of the calibrated front panel control over the full range from 0 to  $\pm 3000$  V. The output voltage can also be controlled over its full range by application of an external input dc level of 0 to  $-5$  V through a rear panel BNC connector. A 3-1/2 digit liquid crystal display meter measures output voltage with a resolution of 10 V, and output current with a resolution of 10 mA.

A polarity reversal switch provides selection of positive or negative output polarity. To prevent inadvertent polarity reversal, the switch is top panel mounted and screwdriver activated. In addition, the setting of the polarity selector switch is indicated by illumination of a front panel LED which can be previewed in the STANDBY mode.



### Specifications

#### INPUTS

- AC POWER LINE – 115/230 V ac  $\pm 10\%$ , 50-60 Hz; power supplied through rear panel 3-wire captive line cord with standard NEMA male connector; fully loaded input current 0.6A, nominal.
- PROGRAM (BNC-J2) – Accepts external reference input to determine output voltage when program switch is in REMOTE; 0 to  $-5$  V input provides 0 to  $\pm 3000$  V dc output; no output for positive voltages;  $Z_{in} > 2$  M $\Omega$ ;  $\pm 12$  V maximum, rear panel BNC connector. Remote programming is independent of selected output polarity.

#### OUTPUTS

- HV (Regulated High Voltage Output) – 0 to  $\pm 3000$  V dc, continuously adjustable; 0 to 10 mA output current capability; two rear panel SHV high voltage coaxial connectors.

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## CONTROLS

- **POWER** – Front panel 3-position switch (OFF-STANDBY-ON) for main ac power input.
- **METER SWITCH** – Front panel rocker switch selects current or voltage display.
- **OUTPUT VOLTAGE** – Front panel 3-turn (direct reading) locking potentiometer sets output voltage when rear panel program switch is in the local position; 0 to 3.00 kV.
- **LOCAL/REMOTE** – Rear panel toggle switch selects LOCAL (manual) operation or REMOTE (external) reference input to determine output voltage.
- **POLARITY** – Top panel 2-position screwdriver switch selects either POSitive or NEGative output polarity.
- **115/230 V ac** – Recessed slide switch on the bottom panel permits operation on either 115 or 230 V ac nominal input power.

## INDICATORS

- **METER** – 3-1/2 digit LCD meter indicates output voltage, 0-3.00 kV, or output current, 0 to 10.00 mA.
- **LEDs** – Indicate selected polarity (positive or negative); operate in ON and STANDBY.

## PERFORMANCE

- **RIPPLE AND NOISE** – <10 mV peak-to-peak at full load.
- **OUTPUT STABILITY** – Long term drift of output voltage is <0.01%/hr. and <0.02%/8 hr. period, at constant input line voltage, load, and ambient temperature, after a 30 minute warmup.
- **TEMPERATURE COEFFICIENT** –  $\leq \pm 50$  ppm/°C after 30 minute warmup, operating range 0 to 50 °C.
- **REGULATION** –  $\leq 0.002\%$  variation in output voltage over the load range and  $\leq 0.001\%$  for a  $\pm 10\%$  line voltage change within the operating range at constant ambient temperature.
- **OVERLOAD PROTECTION** – Power supply will withstand any overload, including a short circuit, for an indefinite period, and will automatically resume normal operation upon removal of the fault.

- **CURRENT LIMIT** – The output current will fold back to approximately 5 mA when current draw exceeds 12 mA.
- **DIAL ACCURACY** –  $\pm 0.5\%$  of full scale.
- **METER ACCURACY** –  $\pm 1.0\%$  of full scale output range plus 10 V or 10  $\mu$ A for selected voltage or current, respectively.
- **OUTPUT LOAD CAPACITY** – 0 to 10 mA. Forced air cooling of the rear panel heat sinks may be required if the output current exceeds the following current (mA)/voltage (kV) relationship:
  - $I_{out} \text{ (mA)} = 5 + 1.7 \times V_{out} \text{ (kV)}$ .

## CONNECTORS

- **INPUT POWER** – Rear panel 3-wire captive ac line cord with standard NEMA male connector.
- **OUTPUT VOLTAGE** – Two rear panel type SHV high voltage coaxial connectors.
- **REMOTE CONTROL** – Rear panel BNC.

## POWER REQUIREMENTS

115/230 V ac, 50-60 Hz; no dc power requirements; ac power line protection via rear panel 1 amp slow blow fuse (0.5 amp slow blow for 230 V ac).

## PHYSICAL

- **SIZE** – Standard double-width NIM module 6.86 x 22.12 cm (2.70 x 8.71 in.) per DOE/ER-0457T.
- **NET WEIGHT** – 4.4 kg (9.7 lb).
- **SHIPPING WEIGHT** – 5.9 kg (13 lb).

## ENVIRONMENTAL

- **OPERATING TEMPERATURE** – 0 to 50 °C.
- **OPERATING HUMIDITY** – 0 to 80% relative, non-condensing.
- Meets the environmental conditions specified by EN 61010, Installation Category I, Pollution Degree 2.

