CANBERRA

# Model 2000
# NIM Bin/Power Supply

## User's Manual

9230962B 1/99

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# Table of Contents



**List of Figures**

# 1. Introduction

The Canberra Model 2000 Bin/Power Supply provides mounting space and power sources for up to 12 standard Nuclear Instrument Modules (NIM) conforming to DOE/ER-0457T. Multiple width NIM modules are also accommodated in any combination up to a total of 12 single widths. Modern circuit design and thermal management allow a high level of performance to be delivered in an adjustment-free, low-profile package that allows easy access to the NIM rear panels.

Connectors for each module position provide the standard NIM power supply voltages of ±12 and ±24 V dc, and 117 V ac. 96 W of total dc power is available to a balanced load at ambient temperatures up to 50 °C, with derating up to 60 °C. The power supply is EMI filtered, short-circuit proof, thermally protected, tightly regulated and exceptionally stable.

The control panel includes an on/off switch, a power monitor lamp, voltage test points and a temperature warning lamp which indicates temperatures approaching the design limit of the power supply.

The 2000 is preconfigured at the factory for the standard line power of the destination country. However, an externally accessible line-entry module facilitates selection of 100, 120, 230 or 240 V ac nominal input power.

# 2. Controls and Connectors

## 2.1 Front Panel

TEMP - The temperature light turns on when the heat sink's temperature limit has been exceeded; the power supply is about to turn itself off.

POWER (1/0) - The power switch closes/opens both sides of the input power line; the power indicator lights when the power is on.

TEST POINTS - The pin jacks provide a convenient monitor of the four internal regulated power supply output voltages, referenced to chassis ground.

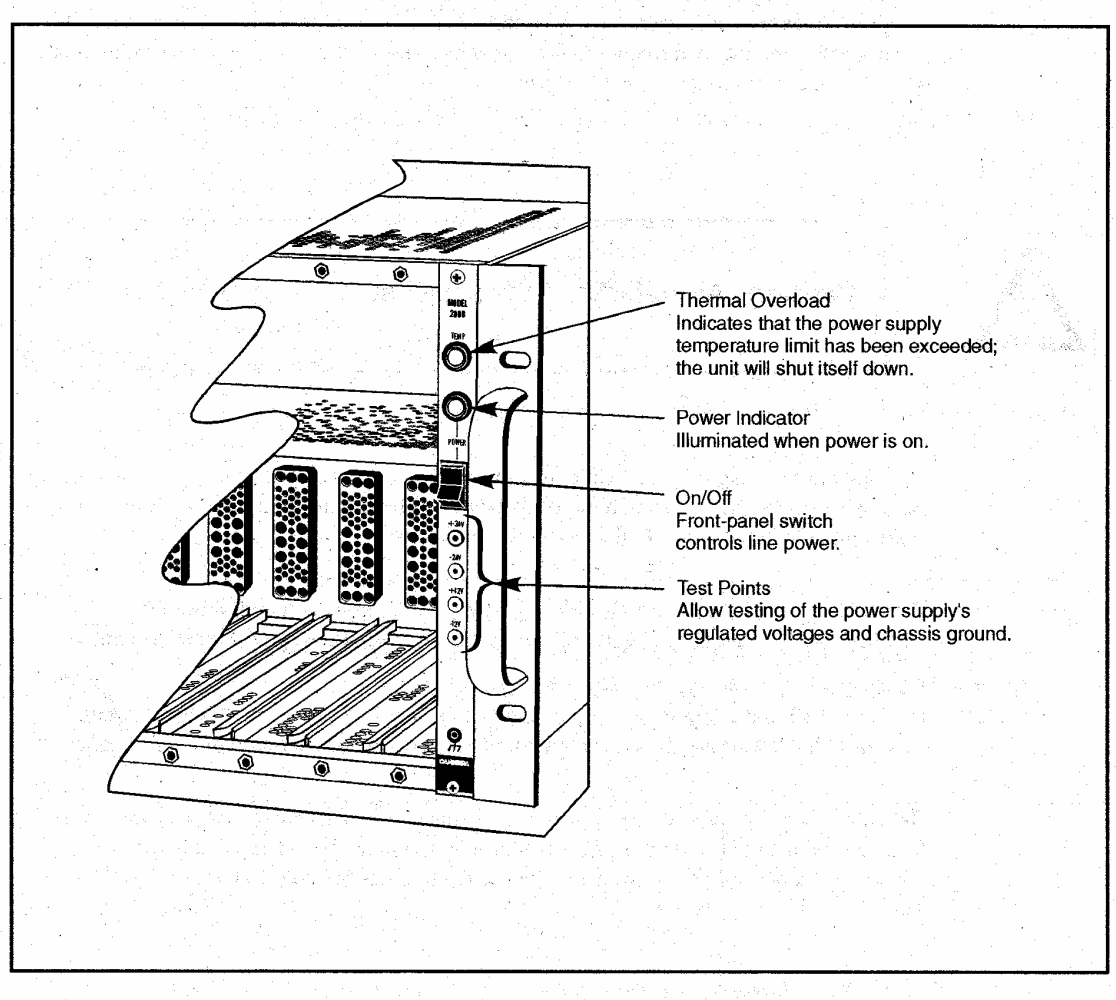



Figure 2.1 Front Panel

# 3. Operation

**Caution** Use both hands when moving the NIM Bin/Power Supply. Use both handles provided on the front of the unit.

The 2000 Bin may be operated on a bench or installed in a standard 19 inch (48 cm) equipment rack. In either case, provide at least 2 cm of space below the Bin to ventilate the power supply and the instrument modules. In a rack installation, provide the same amount of space above the Bin to allow heat to escape.

**Caution** All surfaces of the power supply may be hot.

Inserting or removing modules while the power is on will not damage the Bin. However, it is good operating practice to switch the Bin's power *off* before inserting or removing a module to prevent potential damage to the module's circuits.

The 2000 Bin is fully compatible with any NIM power supply that complies with DOE/ER-0457T. Similarly, the power supply can be used with any NIM-standard bin.

Note The 2000's CE mark applies to the Bin and Power Supply as a system. Combining either the Bin or the Power Supply with another unit may void the Declaration of Conformance.

The 2000's IEC 320 power entry module accommodates a detachable 3-wire power cord designed for ac outlets having a protective ground terminal. To maintain CE (European) safety compliance, a power cord meeting specification EN 60320/C13 (10 A, 250 V) must be used.

## 3.1 Setup Verification

Following this procedure will assure you that the Model 2000 Bin/Power Supply is operating properly.

1. Verify that the line-entry module is properly configured for the ac input power (see illustration).
2. The 2000 is factory set for the standard line power of the destination country. To change the 2000 to another input power, refer to Section 3.2.
3. Connect the power plug to the ac main supply and turn on the Bin's power switch.
4. Verify proper operation of the power supply by measuring the voltages at the front-panel test jacks. They should be within 0.1% of nominal with no modules installed in the Bin.
5. Verify that the total current drain of the modules or load to be used does not exceed the rated output of the supplies (refer to Appendix A.2, Outputs).

### Maintenance

Turn the 2000's power supply *off* and detach the power cord from the ac main supply before starting maintenance operations.

In normal service, the only maintenance required is to periodically vacuum dust off of the heat sink fins, the ventilation holes and the module connectors. Stains or smudges can be removed with a cloth dampened with a mild soap solution.

## 3.2 Voltage Selection

To change the 2000's input voltage, turn the power supply *off* and detach the power cord from the ac main supply.[1]

**WARNING** Leaving the ac input power connected while working with the power entry module can result in serious injury or death.

1. Section 3.2 text and Figures 3.1-3.5 reproduced with the permission of Corcom Power Entry Products, Libertyville, Illinois, USA.

### 3.2.1 Removing the Power Entry Module

1. Open the power entry module's cover, using a small blade screwdriver or similar tool.

2. Set aside the cover/fuse block assembly and pull voltage selector card straight out of the housing, using the indicator pin (Figure 3.1).

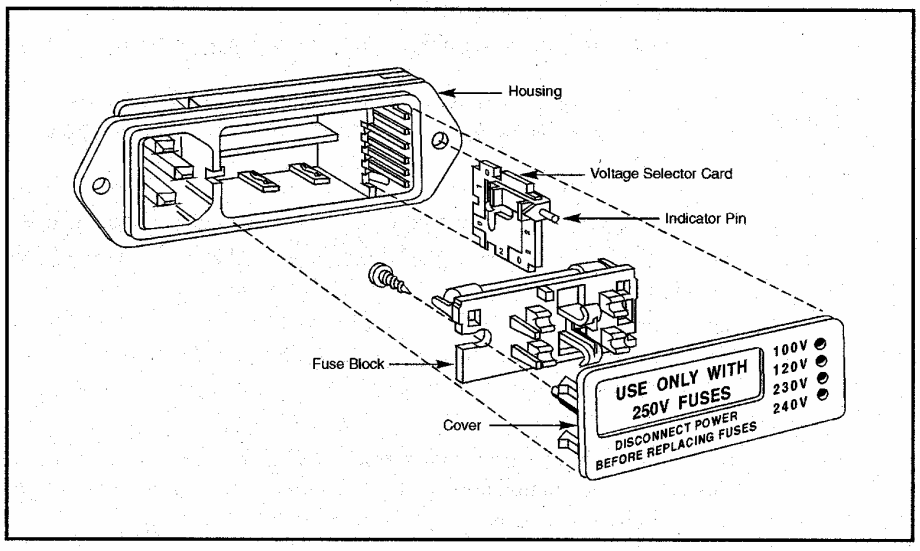



Figure 3.1 Removing the Selector Card

3. Change the selector card so that desired voltage is readable at the bottom of the card (Figure 3.2).

4. Orient the indicator pin so that it points up when the desired voltage is readable, as shown in Figure 3.2. Note that when the indicator pin is fixed, successive voltages are selected by rotating the card 90 degrees clockwise.

5. Insert the voltage selector card into the housing, with the printed side of card facing toward the IEC connector, and the edge containing the desired voltage first (Figure 3.1).

6. Replace the cover, and verify that indicator pin shows the desired voltage.

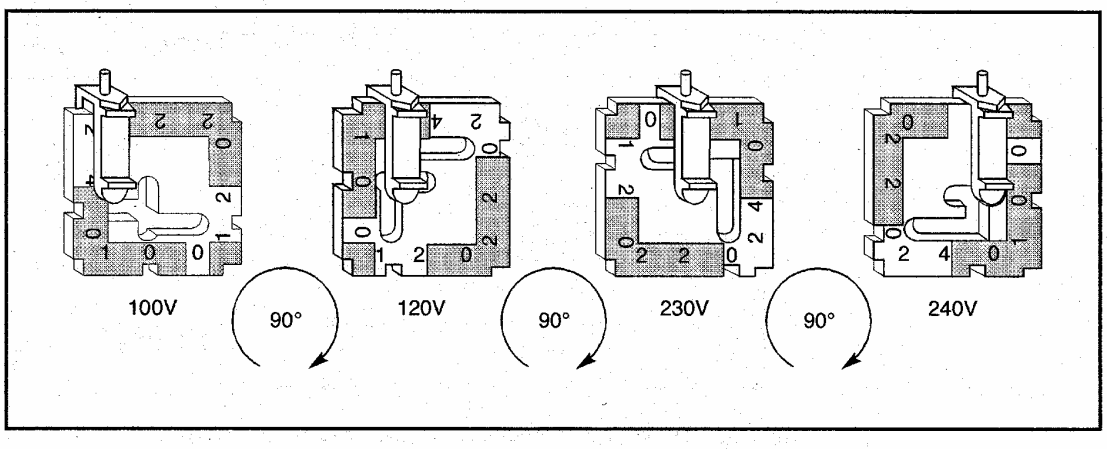



Figure 3.2 Selecting the Voltage

The following table shows the the ac input voltage ranges for each selector card setting.

| Card Setting | Voltage Range |
|---|---|
| 100 | 90 - 113 |
| 120 | 103 - 130 |
| 230 | 193 - 243 |
| 240 | 220 - 260 |

Note that the ranges have some overlap. If the mains voltage is included in two ranges, select the higher setting for best efficiency and lowest temperature rise.

### 3.2.2 Fusing

To change from North American to European fusing:

1. Referring to "Removing the Power Entry Module" on page 4, open the power entry module's cover and remove the fuse block.

2. Loosen the Phillips screw two turns and remove fuse block by sliding up, then away from Phillips screw and lifting up from the pedestal (Figure 3.3).

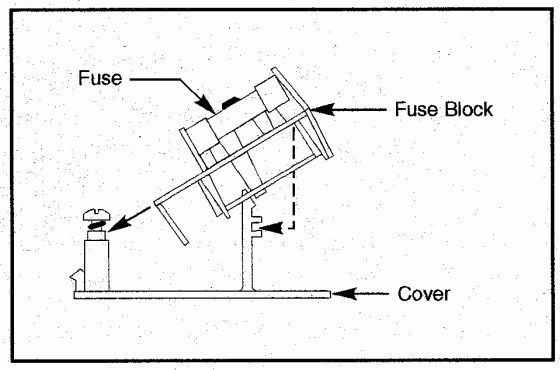



Figure 3.3 Removing the Fuse Block

3. Change the fuses. Note that two European fuses are required, although a dummy fuse may be used in the neutral (lower) holder (Figures 3.4 and 3.5).

4. Invert the fuse block and slide it back onto the Phillips screw and pedestal.

5. Tighten the Phillips screw and replace the cover (note that fuse(s) that go into the housing first are the active set).

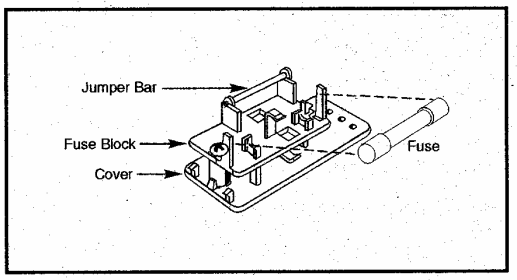



Figure 3.4 North American Fusing Arrangement

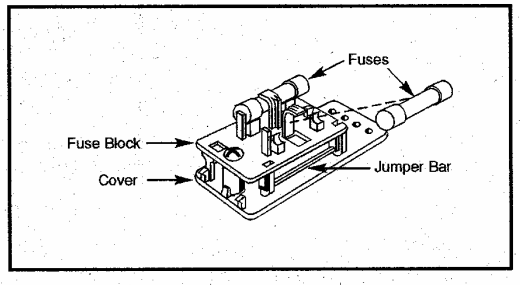



Figure 3.5 European Fusing Arrangement

**Fuse Types**

The fuse to be used depends on the ac input power.

- For 90-130 volt operation, use a single 4 A fast-acting 3AG fuse.
- For 193-260 volt operation, use two 2 A, 5 mm x 20 mm slow-blow, low-break fuses (IEC 127 Type T, sheet 3).

# A. Specifications

## A.1 Input

90-113 V, 103-130 V, 193-243 V or 220-260 V (externally selectable); 47-63 Hz, 220 VA. EMI filtered per IEC 801. Overvoltage category: II; Pollution degree: 2.

## A.2 Outputs

REGULATED DC – 96 W balanced, 72 W unbalanced as follows:

±12 V dc at 0-3 A; total of both, 4 A

±24 V dc at 0-1.5 A; total of both, 2 A

Loads may be floated between any positive and any negative supply at currents up to that of the lower rated supply. All dc outputs are available simultaneously at maximum indicated current up to power limits up to 50 °C ambient. Total output power is derated 3%/°C up to 60 °C.

UNREGULATED AC – 117 V nominal, 0.5 A maximum.

TEST POINTS – The four regulated voltages (ESD protected per IEC 801) and chassis ground are brought out to front panel jacks for test purposes.

## A.3 Performance

REGULATION – Load variations of 0 to 100% and/or line variations over the defined input ranges will cause a dc output voltage change (measured at test points) of 0.05% or less.

TIME/TEMPERATURE STABILITY – After a 60-minute warmup at constant ambient temperature, the dc output voltages will not vary more than 0.05% during any 24-hour period. The temperature coefficient is less than ± 0.01% (±100 ppm)/ °C over the 0-60 °C ambient temperature range. In addition, the dc output voltages will remain within 0.1% of nominal over the entire range.

TRANSIENT RESPONSE TIME – 100 µs for recovery to within 0.1% of the steady-state voltage for any line change within the defined ranges or a 10%-100% load change.

NOISE AND RIPPLE – < 3 mV peak to peak (50 MHz bandwidth).

OVERLOAD PROTECTION – Electronic protection for overloads exceeding the maximum current ratings (automatic recovery). Each supply has at least 0.2 A of headroom.

SIGNAL INTEGRITY – The ac input is EMI filtered per IEC 801. The chassis forms an integral electrostatic shield. Removable panels are secured by screws spaced no more than 7.6 cm (3 in.) apart. Ventilating holes are less than 4 mm (0.16 in.) in diameter. Chassis bonding impedance is less than 0.01 ohm.

## A.4 Controls

THERMAL OVERLOAD – Internal switch disables input power when the temperature limit is exceeded (automatic recovery). A warning light indicates the approach of thermal shutdown.

ON/OFF – Front-panel switch controls line power; a pilot light signals power ON condition.

## A.5 Connectors

AC INPUT – VDE-approved IEC 320 connector for detachable 3-wire power cords.

BIN CONNECTORS – Twelve female connector blocks per DOE/ER-0457T.

TEST POINTS – Pin jacks for dc voltages and ground accept common voltmeter probes.

## A.6 Physical

DIMENSIONS (H x W x D) – 21.9 X 48.3 X 51.1 cm (8.7 X 19 X 20.2 in.)

NET WEIGHT – 9 kg (19 lb)

SHIPPING WEIGHT – 13 kg (29 lb)

## A.7 Environmental

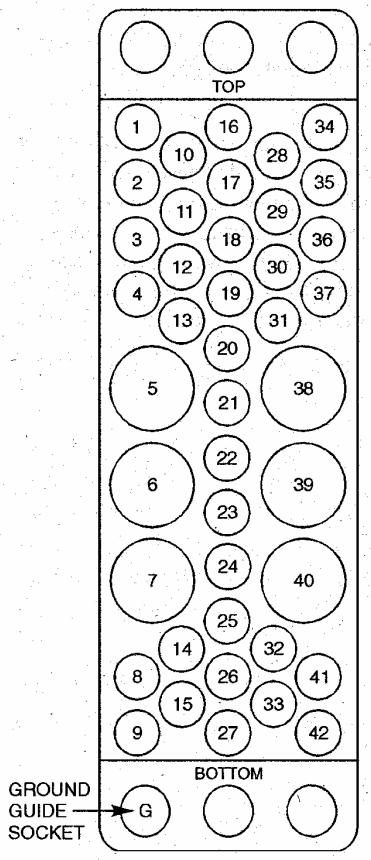
TEMPERATURE – 0-50 °C (0-60 °C with derating)

HUMIDITY – 80% max. R.H. up to 31 °C, decreasing linearly to 50% R.H. at 40 °C.

ALTITUDE – To be used under 2000 m (consult factory for higher altitudes).

# B. Block Connectors

The following table lists the pinouts for the 2000's power blocks.




| Pin | Function | |
|---|---|---|
| 10 | + 6 volts | Pins 10 and 11 are used for distribution of voltages provided by a plug-in supply module. |
| 11 | – 6 volts | |
| 16 | + 12 volts | |
| 17 | – 12 volts | |
| 28 | + 24 volts | |
| 29 | – 24 volts | |
| 33 | 117 volts ac (HOT) | |
| 34 | Power return ground* | |
| 41 | 117 volts ac (NEUTRAL) | |
| 42 | High quality ground* | |
| G | Ground guide socket* | |

*Also connected to the chassis and to line ground

The hot and neutral labels for pins 33 and 41 apply only when the unit is connected to a North American 120 volt or European 240 volt power outlet. Connecting the unit to a power source wired to a different convention (for example, North American split-phase 240 volts) can result in a reversal of the hot and neutral functions of pins 33 and 41. This can create a hazard in NIMs or other loads that may be fused or switched only in the ac line that is connected to pin 33.

The module connectors are intended for direct insertion of NIMs. If a remote load is connected through a cable, any conductors connected to pins 33 and 41 must be insulated for at least 300 volts. The Canberra C-1403 Extender Cable is recommended for this purpose.