



# AM-IP100

## Area Monitors

**SafePoint® RMS: SUSTAINABLE » COMMITTED » SECURE**



Nuclear



Healthcare



Homeland  
Security  
& Defense



Labs and  
Education



Industrial and  
Manufacturing



AM-IP100  
Area Monitor

### KEY FEATURES

- AM-IP100 series area monitors are ideal for pulsed radiation applications in addition to general gamma area monitoring applications
- Fully tested and calibrated, ready to deploy package ideal for demanding area monitoring applications
- Configurable design enhances operational flexibility and minimizes cost of deployment and retasking of monitors
- Virtual Channel™ capability allows tracking of trends or auxiliary conditions in addition to normal channel monitoring
- Enhanced source check functionality for verification of long-term performance and stability of IP100C2 check-source enabled detector
- IP100 series ion chamber gamma probes retain probe information in non-volatile memory for seamless interchangeability without the need for field recalibration
- Integrated detachable termination panel simplifies installation and maintenance
- Powerful self-test functionality continuously confirms reliable operation and supports proactive maintenance
- Bright, easy to read color touch screen display with intuitive user interface for simplified operation in harsh environments

### TYPICAL APPLICATIONS

- Synchrotrons, Cyclotrons, accelerators, etc...



### DESCRIPTION

CANBERRA's SafePoint® AM-IP100 Area Monitor is a technological integration of CANBERRA's powerful iR7040 intelligent ratemeter, proven IP100 Series Ion Chamber Gamma Probe with or without an integrated check source, and interconnecting cable in a fully calibrated, tested and ready to deploy package for your demanding radiation monitoring application. The configurable design of the AM-IP100 area monitor eliminates the need for costly customization and minimizes maintenance requirements, thus saving time and radiation exposure for users. This versatile package is suitable for use in Nuclear Power Plants, Research Reactors and other facilities that can benefit from advanced radiation monitoring.

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The AM-IP100 is available, in both US and international conventions with CANBERRA's proven IP100 Ion Chamber Gamma detector and/or, the IP100C2 Gamma detector incorporating an integrated (nominal) 3.7 kBq (0.1  $\mu$ Ci)  $^{90}\text{Sr}$  check source to allow performance testing of the instrument in operation without removing it from service. Both span an operating range of 1  $\mu\text{Sv/h}$  to 1 Sv/h (100  $\mu\text{R/h}$  to 100 R/h).

CANBERRA's AM-IP100 Area Monitor utilizes the iR7040 advanced digital ratemeter designed to power and control up to four CANBERRA radiation detectors of any style or application. The iR7040 will support any reporting requirement and radiation or activity unit of measure. Its large industrial color touch-screen interface is easily readable under all conditions. An integrated termination panel makes installation and servicing quick and simple. All data is captured and stored in a 2 GB flash memory providing a complete history of all parameters, readings, alarms and functions, source check readings and calibrations. System reliability is enhanced through the iR7040's rigorous self test functionality.



- Configuration not customization!**  
 The iR7040 set-up is performed through the on-board menu or with a PC-based utility. One hardware configuration accommodates all detectors and applications. Configurations, once established, may be saved to a database for back-up and then used to rapidly configure a replacement should that need arise.
- Virtual Channels.** A feature unique to the CANBERRA iR series ratemeters is the virtual channel, 32 user configurable channels that can be used to marry any or all of the four probe inputs and external measurement inputs to monitor and control parameters and processes normally done through an attached control system.
- Termination Panel.** The iR7040 incorporates an integrated, deportable termination panel on the rear of the ratemeter. This unique feature speeds installation and any subsequent maintenance.
- Unparalleled measurement and data integrity via redundant internal processing and error checking.
- Color touch screen display, provides bright and easy to read display of ratemeter data. The touch screen interface provides a fluid, intuitive interaction without the need for another laptop to interface or the tedium of scrolling through menus.
- Enhanced Calibration Capabilities simplify calibration routines, reduce error-likely situations, improve traceability and maximize equipment availability.
- See iR7040 Intelligent Ratemeter specification sheet for further details.



## iR7040 SPECIFICATIONS

### Range:

- Dependant on probe(s) attached.

### Performance:

- Total Integrated Dose – iR7040 =1500 Rad (15 Gy).

### Microprocessors:

- One Embedded PC (EPC) running Windows® CE, display operations.
- One Control Processor, receives and processes probe and analog data from probe processor.
- One Probe Processor, processes probe inputs.

### Channels:

- Four external detector inputs.
- Thirty-two virtual channels, user configurable incorporating any ratemeter input, external input or algorithm.

### USER INPUT/OUTPUT

- User input and communications served by:
  - Direct input from the touch sensitive screen.
  - Via USB, from a laptop computer or keyboard.

### Controls:

- Easily configured with key switch security.
- Installed Pulsar for test (manual or automatic).



### INPUT/OUTPUT

#### Inputs:

- Optionally up to four detectors (any of CANBERRA's line of RMS detectors including, GM detector, ion chamber, scintillation, neutron, gas proportional and specialty), each with:
  - TTL/current signal.
  - Analog 0-10 V, 10 bit resolution.
  - RS-422 serial.
  - +5 V, ±15 V and 24 V dc power outputs.
  - Switched 24 V dc (check source control).
- Each channel uses a 12-bit DAC capable of high resolution and good linearity.
- Five analog, fully isolated: 4-20 mA or 0-10 V 12 bit resolution. (Flow measurement, temperature, etc.).
- Eighteen digital (TTL logic) (flow switches, sample changers, etc.).

#### Outputs:

- Ten Digital – TTL 0-5 V. (Pump/purge/heat trace control, sample changers, etc.).
- Six Isolated Analog – 4-20 mA or 0-10 V. (Data reporting, flow control, temperature, etc.).
- Eight safety relays. One for faults, seven for alarms, test, etc.
- Each safety relay has four contacts that mechanically move together with one monitored to detect failure. Remaining three contacts consist of two normally open (form A) and one normally closed (form B). Form C function is met using one Form A and one Form B. Relays may be configured to be normally energized or deenergized.

#### Communications:

- One Ethernet (10Base-T).
- Three RS-485 serial ports, two isolated.
- Two RS-232 serial.

### Data Handling:

- Two External USB ports (for exporting log data, importing and exporting system configuration and for internal firmware updates).
- Two GB Flash Memory (histogram).

### Displays and Alarms:

- Large, 21 cm (8.25 in.), diagonal industrial, hardened, color touch-screen display.
- Bright, tricolor LED.
- Front panel embedded audible alarm annunciator.
- Tricolor light tower for optimum visibility and indication of status.

### ELECTRICAL

#### Power:

- AC (90 to 260 V, 47 to 63 Hz at 100 VA) or DC, 24 V dc (±10% at 120 W).

### PHYSICAL

- Configuration – wall-mounted.
- Construction – stainless steel, IP65 enclosure, NEMA4X.
- Termination panel for connecting plant wiring interface is located in the rear of the ratemeter in a separate hinged, IP65 enclosure to conserve wall space. Opening the termination panel does not open the main Ratemeter case, which has a separate hinged and sealed door.
- Operating Temperature Range – 0 °C to 60 °C (32 °F to 140 °F).
- Size – 320 mm high x 275 mm wide x 250 mm deep (13 x 11 x 10 in.); light tower adds 263 mm (10.4 in.) height.
- Weight – 10 kg (22 lb).

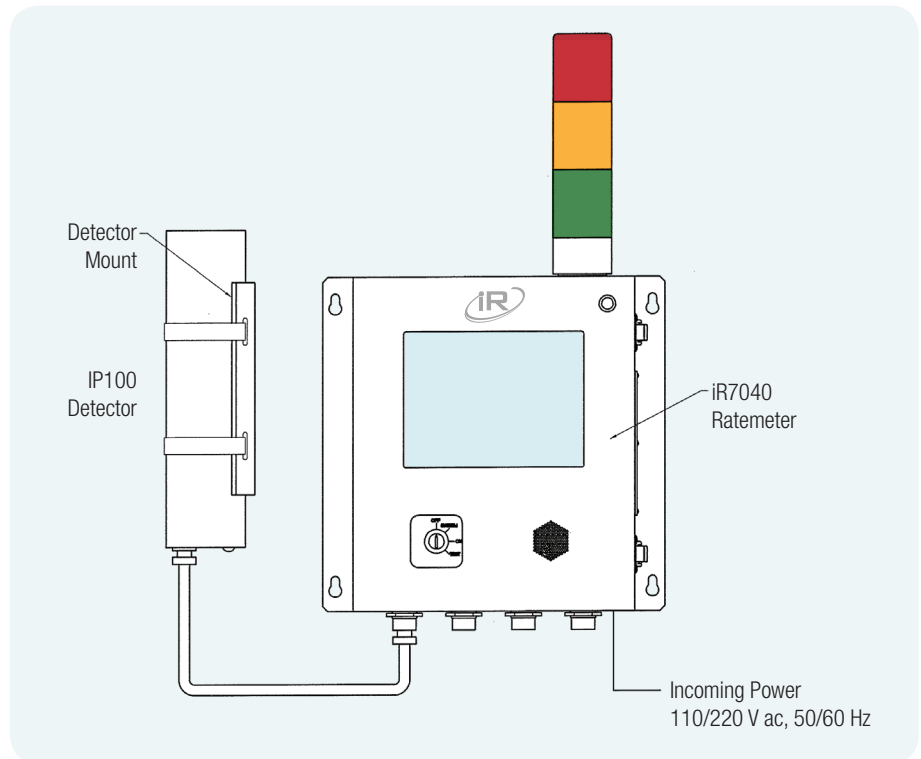
**DETECTOR OPTIONS**

Each IP100 series detector incorporates a single ion chamber spanning a gamma radiation measurement range of 1 µSv/h to 1 Sv/h (100 µR/h to 100 R/h). The IP Series of detectors are SMART probes, which retain probe information in non-volatile memory. When calibrated, data such as probe calibration constants and identifying information are stored and verified in the EEPROM memory in the probe circuitry. This arrangement allows the CANBERRA IP Series detectors to be interchangeable. The IP100 Series of detectors are “maintenance free” in design and require no routine servicing or preventive maintenance. The IP100C2 detector has an internally mounted (nominal) 3.7 kBq (0.1 µCi) <sup>90</sup>Sr Check Source Assembly.

The IP Series ion chamber detectors are ideally suited for measurement of gamma fields. This series is especially suited for applications where accurate measurements of pulsed or burst radiation are needed and where the Geiger Mueller detectors become ineffective.

**Ion Chamber Detectors – IP Series**

Type/Characteristics	IP100	IP100C2
<b>Detector Sensitivities</b>	LOW RANGE: 4.3 nR/pulse or 43 pSv/pulse (typical) HIGH RANGE: 2.4 µR/pulse or 24 nSv/pulse (typical)	
<b>Detector Range, Low</b>	100 µR/h or 1 µSv/h	
<b>Detector Range, High</b>	100 R/h or 1 Sv/h	
<b>Energy Range</b>	50 keV to 3 MeV	60 keV to 3 MeV
<b>Weight kg (lb)</b>	1.5 kg (3.25 lb)	2.3 kg (5 lb)
<b>Size, Dia. x L</b>	63.5 x 317.5 mm (2.5 x 12.5 in.)	63.5 x 364.5 mm (2.5 x 14.35 in.)
<b>Built-in Check Source Assembly</b>	No	Yes



## SPECIFICATIONS

(Applicable to IP100 and IP100C2)

- Detector Type – Guard Ring Ion Chamber – Xenon filled.
- Dynamic Range – 100  $\mu$ R/h – 100 R/h or 1  $\mu$ Sv/h – 1 Sv/h (6 decades).
- Background – less than 5 CPM.
- Linearity:
  - Up to 10 R/h (0.1 Sv/h):  $\pm 10\%$
  - From 10 to 100 R/h (0.1 to 1 Sv/h):  $+10\% / -15\%$
- Operating Temperature Range –  $-10\text{ }^{\circ}\text{C}$  to  $+50\text{ }^{\circ}\text{C}$  ( $+14\text{ }^{\circ}\text{F}$  to  $+122\text{ }^{\circ}\text{F}$ ).
- Operating Humidity – 0-99% non-condensing.
- Housing – Moisture Proof Aluminum.

The **IP100C2** detector has an internally mounted (nominal) 3.7 kBq (0.1  $\mu$ Ci)  $^{90}\text{Sr}$  Check Source Assembly.

This assembly is solenoid actuated and is controlled from the check source function of the iR7040. It will provide an input (nominally) between 10 to 60  $\mu$ Sv/h (1 and 6 mR/h) depending on the age of the source.

## QUALITY

- Seismic – Qualification in accordance with IEEE Std 344-2004, IEEE Recommended Practice for Seismic Qualification of Class 1E Equipment for Nuclear Power Generating Stations
- EMC – Tested to IEC 61010-1:2001 (Second Edition)/EN 61010-1:2001
- ISO 9001
- 10CFR50, Appendix “B”
- IEEE-730
- ANSI/ASME NQA-1, ANSI/ASME NQA-2, Part 2.7
- CE
- NRTL

## ORDERING INFORMATION

The AM-IP100 Area Monitor is available in the following configurations with the listed equipment.

### Models:

- **AM-IP100** – iR7040 ratemeter, IP100 Ion Chamber Gamma Probe, 6 ft probe to ratemeter cable, calibration and manual.
- **AM-IP100SI** – SI configuration of AM-IP100, includes: iR7040 ratemeter, IP100 Ion Chamber Gamma Probe, 1.8 m probe to ratemeter cable, calibration and manual.
- **AM-IP100C2** – iR7040 ratemeter, IP100C2 Gamma Probe with (nominal) 0.1  $\mu\text{C}$   $^{90}\text{Sr}$  check source, 6 ft probe to ratemeter cable, calibration and manual.
- **AM-IP100C2S** – SI configuration of AM-IP100C2, includes: iR7040 ratemeter, IP100C2 Ion Chamber Gamma Probe with (nominal) 3.7 kBq  $^{90}\text{Sr}$  check source, 1.8 m probe to ratemeter cable, calibration and manual.

### OPTIONS

#### Additional Detectors:

(up to four total per iR7040)

- IP100
- IP100C2

#### Cable:

- C1760T-6 – 6 ft, probe to ratemeter.
- C1760T-X [(1000 ft or 300 meters max for IP100) (660 ft or 200 meters max for IP100C2)], probe to ratemeter.

#### Other:

- M100 Probe Holder, Cylindrical, all IP series detectors.
- IR-TPC – Termination Panel Cover.

#### Power Cord Options:

- iR7040 Intelligent Ratemeter includes the ratemeter, wall mounting bracket and manual
  - The ratemeter is not supplied with a power cord in its standard configuration. Instead, a gland is incorporated on the termination panel of the ratemeter for the user to route power.
  - If a power cord is desired it may be ordered by selecting the appropriate model number from the power cord options list.
- IR-PCUS – Power cord, US Plug, 6 ft (1.8 m)
- IR-PCUK – Power cord, UK Plug, 6 ft (1.8 m)
- IR-PCEU – Power cord, European Plug, 6 ft (1.8 m)

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