APTEC-NRC

HEALTH PHYSICS

ADM-606M

MULTI-PURPOSE RADIATION MONITOR

Model ADM-606M ten-decade radiation monitor is both a ratemeter and dose ratemeter. Using an optional gamma detector, the ADM-606M can measure wide ranges of intensity from background levels of 10 µR/hr to accident levels up to 10,000 R/hr. Designed for commercial nuclear facilities and hospitals, the ADM-606M is technically flexible and aesthetically appealing for use in a wide variety of applications. This device will work with up to three different detectors simultaneously and has the following features and components:

- **Easy to use push button keypad**
- **Dose and dose rate alarms (visual and audible)**
- **Nonvolatile data retention**
- **Advanced digital filtering**
- **Real time data**
- **CMOS low power technology**
- **Three detector capability**
- **Internal self-diagnostics**
- **Programmable alarm and event relays**
- **Analog and digital outputs**
- **Key-lock access control**
- **Vacuum fluorescent display 2 x 20 character alpha-numeric**

• Overview

Aptec-NRC's model ADM-606M is a microprocessor-based ratemeter with an auto-ranging digital/analog display that provides both high accuracy and trending of results. When used with an optional GM Gamma probe, the ADM-606M overcomes limitations such as saturation, foldover, and dead time. Using a patented "Time-To-Count" detection technique, the detector can be calibrated using a single point license-free source, thereby simplifying and expediting routine maintenance and periodic calibration.

The ADM-606M interfaces with "Smart" probes for monitoring all types of radiation including alpha, beta, gamma, X-ray, and neutron. This multi-detector capability allows it to be configured as an area, process, or effluent monitoring system. Using "Smart" probes allows the ADM-606M to automatically interrogate the probe and determine probe type and the relative operation and calibration constants. The readout display units are automatically adjusted to correspond to the probe type. The ADM-606M is capable of utilizing simultaneous inputs from up to three separate detectors.

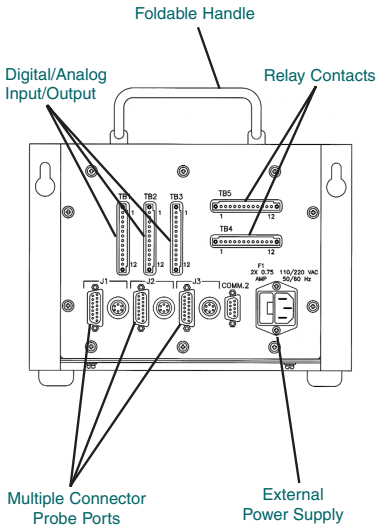
"Time-To-Count"™
This patented technique removes limitations such as dead time, coincidence loss, fold-over, and saturation in high fields associated with conventional GM detectors. This allows wide range detection with unsurpassed accuracy and linearity.

• Displays

The ADM-606M has a bright, sharp vacuum fluorescent display which permits easy viewing of the radiation reading, both from a distance and at an acute angle. The use of a floating decimal point and auto-ranging units of measurement reduce the possibility of operator error when determining the amount of radiation. The type of radiation being measured is a function of the detector type (e.g., beta, gamma, neutron, etc.) and is displayed in conjunction with the radiation measurement. The display features a "scrolling" two detector display of any two user-selectable detector inputs at one time and will default to probe one during normal use. When used to display two channels, the information is digitally displayed. When a single channel is displayed, both a digital and analog bargraph are used. This allows all pertinent measurement information to be displayed as desired. Both visual and audible alarms occur when radiation levels exceed user-selectable set-points. Other user-selectable modes provide display and control functions such as accumulated dose, dose rate and scaler function. Units may be displayed in either R/hr, Ci/cc or si units (e.g., Sv/hr, Bq/l).

• Controls

The ADM-606M has only two basic controls; a key-lock switch and a keypad. The key-lock switch provides the primary OFF/KEYPAD/ON control of the ratemeter, and incorporates a "lock out" position to eliminate tampering by unauthorized personnel. When the key-lock switch is in the KEYPAD position, the key cannot be removed and operational parameters may be modified. When the key is in the ON position, the key may be removed and the operational parameters can only be interrogated but not modified. A software password may also be entered to provide an additional level of security.



• Input/Output Interface

The input/output interface offers the user various methods to interface the ADM-606M with ancillary or peripheral equipment. These various methods include relay contacts analog outputs, and serial communications. Each High, Warn, and Fail alarm has a separate SPDT relay for interfacing to external devices. The ADM-606M may be configured to operate in either of two alarm modes; alarm relay normally energized (failsafe mode) and alarm relay not energized on alarm (non-failsafe mode). The ADM-606M has three standard analog outputs which may be configured in any combination of 0-10 V DC and 4-20 mA DC. The analog outputs may be scaled either lin-log (linear between log decades) or log-log (log between log decades). The serial communications port may be used to change the algorithm from a log-lin analog output to a log-log analog output. Two serial ports are available for remote communications. These serial ports allow the ADM-606M to be linked to a host computer and other ancillary and peripheral instrumentation over a bi-directional local area network. Standard communications protocol available at the serial ports is RS-485 and RS-232C. The RS-485 protocol is used for networking and moderate distance communications. The RS-232C protocol is used for limited distance communications with a recorder or a printer. It may also be used with a portable computer to do system debug diagnostics or to change stored operational data.

• Historical Data

Historical data is stored within the memory of the ADM-606M. Historical data consists of stored data points for radiation, alarms, and loss of power. Stored data includes 30 data points each of one minute, ten-minute, one hour, and one-day readings. Historical data is stored in a non-volatile 16 kByte memory, and is backed up by a lithium battery. Each historical data point contains the measurement data and time, the data collection period, and the accumulated dose and counts. Historical data stored within the ADM-606M may be downloaded to a computer for report generation or analysis.

• Software Interface

Two software programs are available to interface an ADM-606M with a computer.

RAD-600 is a simple program used to provide a remote readout capability for the ADM-606M and control over functions such as alarm set-point adjustment, historical data collection, and time-keeping.

RADACS is a comprehensive Radiological Assessment Display and Control Software program used for connecting multiple serial communication devices to a single computer. RADACS creates a complete monitoring network with custom graphical displays depicting facility layouts and complete “real time” tracking and trending functions.

• Optional Configurations

Another version of Model ADM-606M is a “wireless” unit Model WRMS-100 that uses the RS-232C port connected to an RF (Radio Frequency) module for communication with a wireless probe or for connection to a host computer. The ratemeter receives the “serial packets” from the detector and analyzes data for display, alarms and analog output. With the RF communication link, the ADM-606M is used as a “wireless” ratemeter which has RF communication links in two different configurations. The first provides wireless communications between the probe and display unit and the second has the rate-meter and probe hard-wired with wireless RF communications to the computer display receiver.

ADM-606M

SPECIFICATIONS

• Environment

Temperature: 14°F to 122° F (-10° C to +50°C)
Storage: -4°F to 140°F (-20°C to +60°C)
Humidity: 95% RH (non-condensing)
Pressure: Atmospheric (1 bar absolute)

• Outputs

Digital: (1) RS-485 and (1) RS-232 Serial Communications
Analog: (4) 4-20 mA DC
Alarms: (5) SPDT relay contacts
Relay: Contact rating 0.5 a at 115 V AC resistive or 1 A at 24 V DAC

• Power

115 V AC or 220 V AC single phase, 50/60 Hz, 16 W
40 W maximum, internal rechargeable 24 V battery is available

• Battery Life

8 hr (wireless unit only)

• Physical

Dimensions: 6.5 in. (16 cm) H x 10.5 in. (27 cm) W x 7.0 in. (18 cm) D
Weight: 7.5 lbs (3.4 kg)
Mounting: Wall, panel, and tabletop

• Display

2 x 20 character Alpha-Numeric, analog/digital, autoranging analog 6-decades trending bar and digital in engineering units (ie., X.XXE ± X) Vacuum fluorescent

• Optional Probes

Model Number	Detector Type
GP-100	Gamma (GM) - see above
GSP-100	Gamma NaI(Tl) Scintillator 1.5 in. x 0.5 in.
IP-100	Ion Chamber IP (V2)
NP-100	Neutron BF_3 or HE_3 Proportional
ICP-100	Ion Chamber (Nitrogen)
ICP-100	Ion Chamber (Xenon)

Note:
Other probes are available in combination with model ADM-606M including use with model PA-300E (pre-amp), model MD-55 gamma scintillation 1 in. x 1 in. NaI(Tl) probe, or model MD-45 beta scintillation probe, (and others used in system applications) with modification of application specific software.

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