APANTEC

RM1R & RM1W Radiological Activity Monitor & Control Unit

INTERNET READY | **ETHERNET TCP/IP**

Features:

- **Distributed display & control unit**
- **Single board ARM processor**
- **Robust Communications including:**
  - → **RS485**
  - → **TCP/IP Ethernet**
- **Digital & Analog Input/Output circuitry**
- **Accepts up to Three (3) different types of detector inputs**
- **Simultaneous data processing**
- **2 x 20 character vacuum fluorescent display**
- **Normal, Fail, Alert Alarms**
- **Audible horn for alarm conditions**
- **Keypad for ease of controls**
- **Keylock security**

The RM Radiological Activity Monitor series instruments are used as distributed display and control units with multi-function capabilities. The units utilize a 32-bit ARM-based microcontroller that handles three timer/counter acquisition channels, user interface (display, keypad, indicators), analog I/O, digital I/O, robust communication capabilities such as RS-232 serial ports, RS485 serial ports, and or optional TCP/IP Ethernet communication for networking. Digital and analog Input/Output (I/O) circuitry is included to allow the RM units to operate as data concentrators and controllers for devices external to the RM unit. The RM design has three radiological counting channels, allowing simultaneous processing of radiological data from up to three “smart” sensor channels. Information is displayed on a 2 line by 20 character vacuum fluorescent display mounted on the front panel of the RM unit. In addition to the main display, the RM also provides discreet indicators for instrument status, such as High, Alert radiation alarms, and Fail/Malfunction conditions. An audible sounder is also included for audible annunciation of a radiological alarm on RM1W wall-mounted units. The RM series instruments are provided in two packaging arrangements. The RM1W is provided in a NEMA12 wall-mount enclosure and is typically used as the local display and control device. The RM1R is provided in a chassis mounted configuration and is typically used as the remote control room display and control unit. Both units are functionally equivalent and use common circuit board designs. Operators interface with the RM unit using a keypad switch that is protected using a key lock switch and/or password.

RM1R
Rack-mount model

The keypad switch is located on the front panel and provides controls for setting and viewing alarms, establishing parameters for detector operation, alarm acknowledgement, check source operation, and administrative functions such as setting the channel identification information. When used with process or effluent monitoring channels, the RM unit acts as a data concentrator and data processing unit, integrating external signals such as flow rate and pressure into the radiological measurement. Analog signals are integrated into the RM microprocessor circuit using analog-to-digital converters (ADC), which are 16 bit resolution devices. Five ADC circuits are included for external sensors.

The RM also accepts up to six digital input signals for operation with external digital devices. This feature is often used for such applications as normal and accident range noble gas monitoring, where a digital signal is used for automatic switchover between the normal range and accident range monitoring systems. Outputs from the RM include three RS485 serial communications ports (or optionally up to 2 Ethernet ports (Modbus over TCP/IP) , one RS232 communications port, four 4-20 mADC or 0-10 VDC analog outputs, eight digital output circuits and five DPDT (2 form C) relays and one SPDT (1 form C) relay. The relays are factory programmable to provide customized configuration. Typically this will include a relay for high radiation alarm, warning radiation alarm, fail conditions, check source activation, and miscellaneous alarm circuits such as low flow conditions. The analog outputs are scaled to the dynamic range of the measurement channel and are provided via a 16-bit resolution DAC device. The analog output signals are optically isolated. The RS485 serial communications ports and Ethernet TPC/IP port are provided for networking the RM units with database software or other remote display and control units. The RS232 port is provided on the front panel for ease of access and software configuration with portable devices. The RM series units operate from 24 VDC, which is supplied using an AC to DC converter. The converter accepts universal AC input power ranging from 90 VAC to 260 VAC, 47 Hz to 63 Hz, single-phase power. The power supply is UL and CE certified and is filtered to prevent disruptions due to dropouts, voltage variations, surges and spiking. Critical operating parameters are stored in non-volatile EEPROM memory to ensure that the system quickly recovers from power outages without operator intervention. Historical data is retained in battery-backed non-volatile memory for up to 100 hours after loss of primary power. Operating parameters are field configurable allowing customer personnel to use a common design platform for multi-function channel and display configurations.

The RM series ratemeters are qualified for seismic, EMI/RFI and environmental conditions per the latest Nuclear Industry Standards.

RM1W & RM1R SPECIFICATIONS

Processor:	32-Bit High Performance ARM-base Integrated Microcontroller, with three integrated timer/counter channels for data acquisition, four UARTs for serial communications, digital I/O for user interfaces, Real Time Clock, Watchdog Timer, Battery-backed RAM, Program FLASH memory, and real time clock.
Display:	2 x 20 character vacuum fluorescent display Analog/Digital Auto ranging and Auto zeroing
Alarm/Status Indicators:	
Red indicator:	HIGH
Amber indicator:	ALERT
White indicator:	FAIL
Green indicator:	NORMAL
Outputs:	Digital (1) RS232, (3) RS485, or optionally (2) Ethernet Analog (4) 0-10VDC, or (4) 4-20 mADC isolated Six DPDT and one SPDT relays for FAIL, ALERT, HIGH & other alarms contact rating 5A @ 115VAC resistive
Power:	90-260VAC, single phase, 47 to 63 Hz, 15 watts
Temp:	-10^0 to $+50^0$ C
Humidity:	0-95% RH, non-condensing

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