



Trusted
radiation
monitoring.

Technical Data

1055

Geiger-Mueller (GM) Area Monitor

The 1055 is a single-channel area radiation monitoring system capable of operating over the ranges of 10^{-2} to 10^3 mR/h, 10^{-1} to 10^4 mR/h, or 10^0 to 10^5 mR/h, depending on the detector selected. The system monitors gamma radiation over a 5-decade range and provides indication when the radiation level decreases below a fail threshold, exceeds a warn set point, exceeds a high set point, or exceeds an overrange set point. The overrange feature provides two significant benefits. First, it prevents the system from displaying an on-scale, but inaccurate, reading should the detector become saturated. Second, it lessens the risk of damaging the detector by disabling it during an overrange condition. Relay outputs are available to activate alarm annunciators. Analog outputs are available for trend display on a st-

rip chart recorder or computer. In addition, the monitoring system has an integral check source to verify operational integrity. The system consists of an 897A Series GM Detector with integral preamplifier, radioactive check source, and a 1056 Universal Digital Ratemeter (UDR). Area monitoring is used for the detection of x-ray or gamma radiation in a selected area. The monitor should be used in any location where personnel may be exposed to an adverse amount of radiation.

Applications include nuclear reactors, accelerators, hot cells, irradiators, and any area where radiation sources are handled. These monitors can be used as single channel monitors or grouped together as a multi-channel area monitoring system.



897A GM Area Detector



1056WM UDR
(wallmount version)

Key features

- Range: 5 decades between 10^{-2} and 10^5 mR/h
- Energy response: 15% from 80 keV to 1.5 MeV
- No external power needed at detector location
- Analog preamplifier integral with detector
- Ratemeter may be remotely located up to 2000 feet (using 50-100 cable or equivalent)
- Single cable between ratemeter and detector
- 8 μ Ci ^{36}Cl check source
- Life expectancy: up to 10^5 rads (for detector)
- Seismically tested with high reliability options available
- LCD graphical display showing radiation value
- Wallmount version rated IP65



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Universal Digital Ratemeter

The 1056 UDR, when connected to a 897A Series GM Detector, comprises a monitoring system that operates over a five-decade range. The UDR provides display, control and annunciation functions for the monitoring system, and will display readings in the range of 10^{-2} to 10^5 mR/h. Standard features for the instrument consists of a five-digit display of the radiation value and a multicolor bargraph indicator that covers the entire range of the UDR. In the event of an alarm condition, the bargraph changes color (green for normal, amber for warning and red for high). Display alarm indicators and rear-panel relay outputs for alarm annunciation are also included. Front panel push-buttons are provided to apply power, select functions, display alarm limit set points, acknowledge alarms and activate the check source. Analog outputs of (1) 0 V_{DC} to 10 V_{DC} and (2) 4mA to 20mA are provided for recording and computer monitoring.

The outputs may also be used to drive a remote meter or a local indicator(i.e. near the detector). All electronics required to interface with an 897A Series detector are included within the 1056 UDR. The electronics consist of a high-voltage power supply, low-voltage DC power supply and the hardware/software required for UDR operation. The system also includes range indicator to preclude the possibility of on-scale readings when the radiation field is beyond the range of the detector.

Default units are in mR/h. Alternate units selectable with conversion factor (e.g. Sv/h, uCi/cc, Bq/m³, etc.)

Technical Specifications

The 1056 Universal Digital Ratemeters (UDR) feature a color LCD digital display and tricolor simulated bar graph, both of which are easily read from a distance of 20 feet. The bar graph changes color with changes in alarm status, providing instantaneous recognition of relative levels and alarm status.

Main 3.5" LCD Display

7 digits with double digit exponent units display; X.XXE+XX.

Bargraph Display

LCD simulated display, selectable range changes color with alarm status: green (normal), amber (warn) and red (alarm).

Alarm Indicators

- HIGH (red)
- WARN (amber)
- FAIL (red)
- RANGE (red). HIGH and WARN flash until acknowledged

Navigation Pushbuttons

Six (6) button navigation panel for menu selections: check source activation (with associated indicator), test, high voltage display, alarm acknowledge, and alarm silence.

Outputs

Contact outputs: rated 3.5A @ 240Vac, for High Alarm, Warn Alarm, and Fail Alarm.

Recorder/computer outputs: two 4mA to 20mA_{dc} (1000 ohms, max) and one 0-10V_{dc} (1000 ohms, min)

Ports

- RS485 (3)
- Ethernet (1)
- USB (1)

Dimensions (w x d x h)

1056A (rackmount)
5.6 x 15 x 3.5 in
(14.2 x 38.1 x 8.9 cm)

1056WM (wallmount)
12.0 x 9.8 x 7.9
(30 x 25 x 20 cm)

Weight

5.0 lb (2.27 kg), rackmount
20 lb (9.08 kg), wallmount

Power requirements

100 - 240 V_{AC} ± 10%,
50/60 Hz, 24 VA

Environmental

- Operating temperature: 32 °F to 122 °F (0 to 50 °C)
- Storage temperature:
32 °F to 122 °F (0 to 50 °C)
- Relative humidity: 0 to 95%, non-condensing

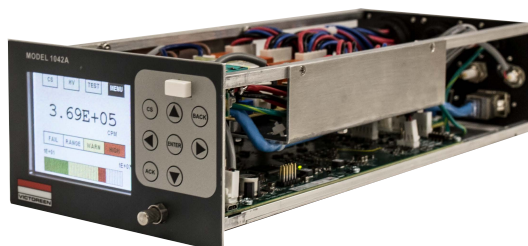
Standard Features

Computer interfaces:

- (3) RS-485 (1 read/write, 2 read-only)
- (1) Modbus TCP (non-safety version only)
- (3) Selectable analog outputs
- (1) HIGH alarm relay contacts, SPDT
- (1) WARN alarm relay contacts, SPDT
- (1) FAIL alarm relay contacts, SPDT

The 1056 Series UDRs serve as a direct replacement for the following models:

- Model 956A-200 Series UDR
- Model 956A-201 Series UDR
- Victoreen 856 Series Analog Ratemeters



Rack-mounted version of UDR



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Detector

The 897A Series detectors use a thin-walled energy compensated GM tube to detect ionizing radiation. Each 897A series detector has a GM tube, a check source and a preamplifier. The check source is a low-level radioactive source actuated by a + 15 V_{DC} meter movement. For positive operation, the check source is electrically driven in both the ON and OFF positions.

The preamplifier provides the pulse conditioning and cable driving capability necessary to drive a 1056A UDR. All 897A Series detectors are functionally identical. They differ only in housing material, tube type and range. The 897A series detectors operate in the voltage range between 500 V dc to 650 V dc.

The 897A Series detector operates with the 1056A UDR or with other readouts. Each detector measures a five-decade range. Three measurement ranges are available: low, medium, and high. The low range covers 10⁻² to 10³ mR/h, the medium covers 10⁻¹ to 10⁴ mR/h, and the high covers 10⁰ to 10⁵ mR/h.

Technical Specifications

Detector

Dimensions

7.12 x 3 in dia
(18.1 cm x 7.6 cm)

Weight

1 lb (0.45 kg)

Housing Material

- Aluminum:
897A-210/220/230
- Stainless steel:
897A-211/221/231

Fill Gas

- Neon/Argon/Halogen
897A-210-211
- Helium/Neon/Halogen
897A-220/221/230/231

Mounting

Wall mount (bracket included)

Mating Connectors

- 897A-2x0 (aluminum)
92-7005-17A, 12 pin female
92-7005-12A, bushing
92-7005-9A, clamp
- 897A-2x1 (stainless steel)
92-7005-15A, 12 pin female
92-7005-12A, bushing
92-7005-13A, bushing

Wall Thickness (bare tube)

- 32 to 40 mg/cm²:
897A-210/211
- 80 to 100 mg/cm²:
897A-220/221/230/231

Field Cable

50-100 or equivalent with two coaxial conductors, two twisted pairs, and overall shield

Max External Pressure

30 psig

Environmental

- Storage temperature
10 °F to 122 °F (- 23 °C to 50 °C)
- Operating temperature: 1
0 °F to 122 °F (- 23 °C to 50 °C)
- Relative Humidity:
0 to 95%, non-condensing

Operating Voltage

500 V_{DC} to 650 V_{DC}
(supplied by digital ratemeter)

Plateau Length

100 V_{DC} to 150 V_{DC}

Plateau Slope

- 0.1 %/V: 897A-210/211
- 0.2 %/V: 897A-220/221
- 0.3 %/V: 897A-230/231

Nominal Dead Time

- 45 microseconds:
897A-210/211
- 28 microseconds:
897A-220/221
- 20 microseconds:
897A-230/231

Measurable Radiation

- 10⁻² to 10³ mR/h:
897A-210/211
- 10⁻¹ to 10⁴ mR/h:
897A-220/221
- 10⁰ to 10⁵ mR/h:
897A-230/231

Detector Element Life

Exceeds 100 hours at full-scale

Typical Energy Dependence

± 15% from 80 keV to 1.5 MeV

Detector Accuracy

± 20% of actual dose for ¹³⁷Cs

Radiation Detected

Gamma rays and x-rays



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Preamplifier

Input Impedance

> 100 kohms

Output Impedance

50 ohms

Output pulse polarity

Positive

Output signal (50 ohm)

+ 5 V_{DC} square wave

Low voltage

$\pm 15 V_{DC}$ (optional + 10 V_{DC} is jumper selectable)

Power requirements

$\pm 15 V_{DC}$ @ 20 mA

Maximum field cable length

2000 ft (610 m)

Electronics life expectancy

Approximately 10^5 rads

Discriminator level

Adjustable from 0 to +2 V_{DC} (nominal value = 0.5 V_{DC})

Anti-jam level

Adjustable from 0 to +3 V_{DC}

Anti-jam Oscillator Frequency

Approximately 50 kHz

Analog and Digital Monitor Configuration

Divide by 2, square wave output

Optional Monitor Configuration

Raw pulse output (jumper selectable)

Ordering information

Model

1055X-Y-Z: GM Area Monitor

X

A: Rack-mounted UDR

WM: Wall-mounted UDR

Y

1: Non-safety, commercial use

2: Nuclear safety-related use

Z

210: Low Range GM Detector

220: Mid Range GM Detector

230: High Range GM Detector

Example:

1055A-1-210: Commercial GM area monitor with rack-mounted UDR and low range GM detector

Optional accessories

848-8: Field Test Source

848-4-105: Adapter

948-1: Rack Chassis

1056WM-KIT: Connector Kit

1056A-KIT: Connector Kit



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