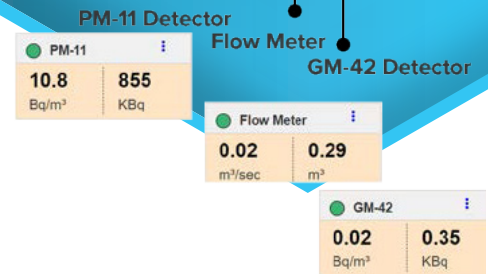




RADIATION DETECTION

Stack & Area Monitoring

Part of the WebiSmarts System



Stack Monitoring

DESCRIPTION

Stack monitoring provides a site with the ability to determine the amount of radioactive material release from the ventilation exhaust of the facility producing the isotopes.

The PM-11 detector is the main component along with a flow meter to know the volume of the air being released. Because the PM-11 detector is very sensitive, a separate higher range dose rate probe can be added in case the PM-11 unit is over ranged. In addition, there is a new option to add a beta component to the PM-11 detector to allow coincidence counting.

ORDERING INFORMATION

- BAK-0173: WebiSmarts PM-11 Coincidence Detector Retrofit 5 m
- BAK-0174: WebiSmarts PM-11 Coincidence Detector Retrofit 30 m

Stack Monitoring Components



PM-11 Detector
BAK-1510



Beta Detector
BAK-0177



Stainless Steel Bracket
BAK-1573



Cable to Conn. Unit
BAK-0790



Connection Unit
BAK-1000



Communications Cable
BAK-0198



Beta Det. Cable
BAK-0901
PM-11 Det. Cable
BAK-0720



Coincidence Conn. Box
BAK-1564



Monitoring Ch. Connection Unit
BAK-2401

The Coincidence Exhaust Stack System is designed to be installed on existing MediSmarts Systems as an upgrade and will be included with the WebiSmarts System as the standard Effluent Detector.

TECHNICAL DATA

PM-11 Highly Sensitive 2x2 NaI Detector

- Radiation Detected: Gamma above 50 keV
- Detector: NaI(Tl) 2" X 2"
- Energy Calibration: Optional factory calibrated single channel analyzer (SCA) within the energy range
- Count Rate Range: 0 to 50,000 CPS
- Sensitivity (Cs-137): 20,000 cps/mR/h
- Output Signals: TTL Pulses
- Temperature Range:
 - Operation: -10 °C to +50 °C (15 °F to 122 °F)
 - Storage: -20 °C to +60 °C (-5 °F to 140 °F)
- Humidity Range: 40% to 95% RH (non-condensing)
- Dimensions: 340 x 70 mm (13.4 x 2.75 in.) (L x D)
- Weight: 1.75 kg (3.9 lb)
- Casing: Aluminum, splash proof
- Sensitivity:

Radionuclide	Sensitivity (cpm/Bq/cm ²)	MDL (Bq/cm ²)
F-18	350	10 (511 keV Window)
I-131	320	12 (Open Window)
Tc-99m	315	12 (Open Window)
Cr-51	27	140 (Open Window)
Cs-137	300	1.2 (Open Window)

** Minimum detectable level calculations are based on background reading of 600 CPM*

Includes:



PM-11 Detector
BAK-1510



Weatherproof Bracket
BAK-1563

Related product:



Rotem RadMon Detector Cable

TECHNICAL DATA

Wide Range NEMA rated Flow Meter

- Range: 0 to 30,000 Cubic feet per minute
- Service: Clean air and compatible, non-combustible gases
- Accuracy: 3% FS Process gas: 32 to 122 °F (0 to 50 °C); 4% FS Process gas: -40 to 32 °F and 122 to 212 °F (-40 to 0 °C and 50 to 100 °C)
- Response Time: Flow: 1.5 s to 95% of final value (output filter set to min.)
- Temperature Limits: Process: -40 to 212 °F (-40 to 100 °C). Ambient: 32 to 140 °F (0 to 60 °C)
- Pressure Limit: 100 psi (6.89 bar) maximum
- Humidity Limit: Non-condensing
- Power Requirements: 12 to 35 V dc, 10 to 16 V ac. 1.5 A rating required on supply due to initial power surge drawn by transmitter
- Output Signal: 4 to 20 mA, isolated 24 V source, 3 or 4-wire connection
- Output Filter: Selectable 0.5-15 s
- Loop Resistance: 600 Ω max
- Current Consumption: 300 mA max
- Electrical Connections: Screw terminal
- Process Connections: ½ in. male NPT
- Enclosure Rating: Designed to meet NEMA 4X (IP66) for non-LED models only
- Mounting Orientation: Unit not position-sensitive. Probe must be aligned with airflow
- Weight: 357.2 g (12.6 oz)
- Agency Approvals: CE
- Display: 4-1/2 digit ½ in. red LED
- Resolution: 1 FPM, 0.01 MPS (10 FPM @ 10,000 and 15,000 FPM ranges)
- Weight: 377 g. (13.3 oz)



Wide Range NEMA rated Flow Meter

Area Monitoring Equipment



The WebiSmarts DPU-3 meter allows the connection to several different probes:

- GM tube-based dose rate probes
- Ion Chamber dose rate probes
- Neutron probes
- Scintillation spectroscopy probes
- Contamination probes



TECHNICAL DATA

Area Monitor IC-10 Ion Chamber

- Measuring Range: 1 $\mu\text{Sv/h}$ to 250 mSv/h (0.1 mR/h to 25 R/h)
- Display Range: 0.1 $\mu\text{Sv/h}$ to 250 mSv/h (0.1 mR/h to 25 R/h)
- Gamma Sensitivity: 0.04 pA/mR/h
- Accuracy: $\pm 15\%$ of reading within measuring range
- Gamma Energy Dependence: Better than $\pm 20\%$ at 20 keV to 1.2 MeV (Cs-137)
- Angular Dependence: Less than $\pm 5\%$ (for $\pm 120^\circ$ of front direction (Cs-137))
- Ion Chamber Volume: 500 cc
- Chamber Wall and Cover Thickness: 300 mg/cm² (tissue equivalent)

Scale	Time	Range
0.1 $\mu\text{Sv/h}$ to 10 $\mu\text{Sv/h}$	12 sec	low
10 $\mu\text{Sv/h}$ to 100 $\mu\text{Sv/h}$	8 sec	low
100 $\mu\text{Sv/hr}$ to 2 mSv/h	4 sec	low
2 mSv/h to 250 mSv/h	2 sec	high

- End Window Thickness: 7 mg/cm²
- Response Time:
- Input Signals: Offset/operation – control, High/low - range control
- Output Signals: TTL pulses, Detector status: ID, chamber voltage malfunction
- Temperature Range: Operation: -10 °C to +50 °C (15 °F to 122 °F), Storage: -20 °C to +60 °C (-5 °F to 140 °F)
- Humidity Range: 40% to 95% RH (non-condensing)
- Dimensions: Chamber: 11.7 x 8.9 cm (4.6 x 3.5 in.) (L x D)
- Handle: 14.3 x 5.2 cm (5.6 x 2 in.) (L x D)
- Weight: 470 g (1 lb)
- Chamber: Polypropylene

TECHNICAL DATA

Area Gamma GM-41 Detector (High Range)

- Geiger Type: ZP-1313 or equivalent
- Measuring Range: 1 $\mu\text{Sv/h}$ –1 Sv/h (0.1 mR/h –100 R/h)
- Sensitivity: 1.7 cps/mR/h
- Accuracy: $\pm 10\%$ reading within the measuring range
- Energy Range: 50 keV - 1.3 MeV
- Energy Dependence: $\pm 15\%$
- Angular Dependence: Less than $\pm 20\%$ for $\pm 45^\circ$ of preferred direction
- Temperature Range: Operation: -10 °C to +50 °C
- Storage: -20 °C to +60 °C
- Humidity Range: 40% to 95% RH (non-condensing)
- Dimensions: 170 x 38 mm (6.7 x 1.5 in.) (L x D)
- Weight: 250 g (0.55 lb)
- Casing: Aluminum, splash proof
- Hook-up cable length: Up to 100 m



Area Gamma GM-42 Detector (Low Range)

- Geiger Type: ZP-1201 or equivalent
- Measuring Range: 0.1 $\mu\text{Sv/h}$ to 10 mSv/h (0.01 mR/h to 1 R/h)
- Sensitivity: 17 cps/mR/h
- Accuracy: $\pm 10\%$ reading within the measuring range
- Energy Range: 50 keV - 1.3 MeV
- Energy Dependence: $\pm 20\%$
- Angular Dependence: Less than $\pm 20\%$ for $\pm 45^\circ$ of preferred direction
- Temperature Range: Operation: -10 °C to +50 °C
- Storage: -20 °C to +60 °C
- Humidity Range: 40% to 95% RH (non-condensing)
- Dimensions: 197 x 38 mm (7.75 x 1.5 in.) (L x D)
- Weight: 250 g (0.55 lb)
- Casing: Aluminum, splash proof
- Hook-up cable length: Up to 100 m

Advanced Universal Detector Bracket

WebiSmarts system utilizes an Advanced Detector Bracket to provide local feedback of radiation levels for those detectors that are installed away from the DPU-3 monitor.

The bracket is compatible to the full range of Rotem external detectors which fit comfortably into the bracket using a hard sponge inner lining.

The bracket is controlled directly by the DPU-3 monitor and provides visual feedback of the dose rate levels by lighting one of the three LEDs, green, yellow or red, using the same threshold levels as set in the DPU-3 monitor.

Audio feedback is provided by a volume adjustable buzzer on the bottom of the bracket. Each time a threshold level is breached the buzzer will sound to alert users nearby. Users can mute the buzzer by pressing on the LED cover.

If the buzzer is not required than the red button can be pushed to permanently mute the buzzer, and in this case the button will light up to indicate to users that no audible alarm will be issued.

The bracket also contains a bank of optocoupler relays for each threshold level that can be used to interface with external controllers.

Optocoupler Relay Configuration

Each Relay can handle up to 220 V (AC or DC) (0.12 A)



- N.C. Green OPTO Relay 1
- OPTO Relay 1
- N.O Amber OPTO Relay 2
- OPTO Relay 2
- NOT IN USE
- N.O. RED OPTO Relay 4
- N.O. RED OPTO Relay 4
- NOT IN USE

