PROCESS RADIATION MONITOR
TYPE: PRM722

Technical Data

FEATURES :

- ❑ Performance specifications confirm to ANSI N42.17A
- ❑ EMI/EMC compliance as per IEC 61000.
- ❑ Radiation tolerant upto 10^4 Rad.
- ❑ Microcontroller based design has been employed
- ❑ Dose rate range covered 0.01 - 100.00 mR/hr
- ❑ Auto ranging & auto TC selection in the range of 16 sec to 0.5 sec depending upon dose rate
- ❑ Large size 4x7 segment LED indication for dose rate is provided
- ❑ Designed using Halogen quenched G.M. tube GM 130E or Equivalent.
- ❑ Large size WINDOWS for NORMAL & ACTIVE alarm condition
- ❑ 4 to 20 mA current loop is available for remote indication on a I/O connector (optional)
- ❑ 16x2 LCD display dot-matrix display for visualization & other parameters.

Process Radiation Monitor Type PRM722, manufactured by NUCLEONIX SYSTEMS employs state-of-art micro-controller based design and is primarily meant to serve as a Gamma Zone Monitor to indicate dose rates and gives audio, visual alarms once the dose rates exceed the preset level fixed by the user. Additionally relay contacts will be activated on alarm condition.

This unit will be useful for monitoring Gamma dose rate levels in working areas of Radiochemical plants / Reprocessing plants waste immobilization plants & other similar radiological installations.

This unit indicates the dose rate digitally on a 4 x 7 segment LED display. Each of the annunciator windows for NORMAL and ACTIVE conditions has LED array. Once alarm triggers ACTIVE window starts blinking.

Unit can be programmed / configured using front panel keypad which can be deactivated after completion of programming. Configuring the unit namely setting preset level, setting reset mode - AUTO/MANUAL etc are achieved by this keypad.

Unit also performs self-diagnostics for EHT failure, pulse processing electronics failure & detectors failure on power up.
Alarm acknowledge and reset pins are provided on the circular I/O connector for remote acknowledge & reset.

SPECIFICATIONS

Radiation to be detected : X -ray & Gamma Radiation.

Range :
0.01 mR/hr to 100.00 R/hr
0.1 µSv/hr to 1000.0 mSv/hr
Unit is configurable
Range selection is automatic

Detector probe :
Energy compensated Halogen quenched G.M.
Tubes LND71210 with biasing HV & pre-amplifier is mounted in a SS probe.

Energy Dependence :
Within +/- 25% of true dose rate from 100 keV to 1.3 MeV gammas.

Accuracy : +/ - 10% Full Scale

EHT : 400 V to 700 V DC adjustable (Typical 500V)

Display :
Auto-ranging direct reading, 6 digit 7 segment LED display and 16x2 LCD display. 6x7 segment display is used for display of dose-rate information and hardware status information & 16x2 LCD display is used for visualization of preset alarm and other parameters.

Overload :
Senses overload above 200% of fullscale and upto 1 R/h & indicates on display "OL"

Over-range :
Senses if the radiation field being measured has exceeded the measurement range of the instrument and upto 200% of the instrument and displays "OFl"

Recorder output :
4 to 20 mA, with 600 ohm load.

Recorder output stability :
a) Non-linearity : Max = 0.025% of Span
b) Offset current (Io=4mA) : Max = 0.0005% of Span / °C
c) Span Error (Io=20mA) : Max = 0.005% of Span / ° C

Time Constant : First reading on Power ON within 5 secs.

Normal (Slow) : 30 sec to 0.5 sec automatically varying inversely with the radiation level.
Abrupt detection : Update the current reading within 2 sec and return to normal mode.

Calibration Accuracy :
+/- 10% through out the range.

Instrument "ON" Indication : Large Area Green LED Lamp. This will indicate the Normal condition also.

Alarm range :
0.1 - 100.00 mR/hr (1 µSv/hr to 1000.0 µSv/hr)
The alarm level setting will be carried out through front panel keypad / RS485 port using handheld configurator / PC with password protection. Front panel keypad is provided with DIP switch de-activation.

Alarm Indication :
a) RED (LED) flashing large area window display
b)Loud audio tone (dual frequency tone)

Alarm annunciation scheme : As tabulated below

Parameter Status	Visual indication (Red LED)	Audio
Normal	OFF	OFF
Abnormal	Flashing	ON
On ACK After being abnormal	Steady Red	OFF
Back to Normal	Steady RED	OFF
Reset on abnormal	Steady RED	OFF
Reset on normal	OFF	OFF

Instrument Controls:
a) Acknowledgement switch for muting audio
b) Reset switch for resetting the Alarm indication and alarm relay.
c) Power ON/OFF switch (This is inside the cabinet) with Power ON indication

Instrument Fault indication:
a) EHT failure: Visual alarm with flashing RED LED indication & "Eht" message on display
b) Detector failure: Visual alarm with flashing red LED & "d-FL" message on display.
c) Microprocessor / microcontroller failure: Visual alarm with flashing green lamp.
d) Fault indications are cleared automatically if normal status is resumed.

(A) Detector Housing:
a) The G. M. Detector will be located external to the Monitor.
b) It is housed in a suitable, air-tight SS shell with built-in pre-amplifier to drive upto 50 mtrs long cable.
c) The instrument will be provided with 10 mtr cable between detector and the monitor.
d) The detector housing will qualify minimum industrial protection Class IP-54.
e) The monitor has a clamp on the top for fixing the detector assembly.
f) Provision to connect the detector with short cable also will be available.
g) A separate bracket for wall mounting of detector housing will be provided.

(B) Alarm unit : Remote Audio / visual alarms are provided on the alarms unit. Active & Normal LED's are provided for indication of alarm status. Speaker is provided for aural annunciation.

Monitor Enclosure:
a) Vapor-tight, rugged & elegant.
b) The door is provided with lock and key arrangement
c) Decorative with visual aesthetics, prominent alarm display and good readability.

Mounting :
Detector housing is mounted using clamps on top of the monitor.
The monitor is wall mountable type. Brackets for the monitor & detector housing will be supplied along with the equipment.

Remote /External Console :
a) 4 - 20 mA linear proportional to full scale display output. Current output will be able to drive load of 600 ohms. Output circuitry will be able to drive 200 mtrs.of twisted pair of wires.
b) Two sets of potential free contacts of Alarm relay (Change over). Contact rating 3 Amp at 250 VAC. The relay is energized on normal condition and de-energised under alarm condition.
c) Remote alarm acknowledgement and reset signals for the field instruments (Normally open contact).
d) Indication of instrument fault condition (detector, EHT & LV supplies failure), overflow & overload condition by up-scale 4-20 mA. (22.5 mA).
e) All these signals are terminated on a 17 pin socket (Allied Connectors). The corresponding mating plug with 5 mtr cable will be supplied with the monitor.

Computer Interface :
The monitor will have a RS485 port for interfacing with a remote IBM PC-compatible computer. The features supported by RS485 port are given below.
a) The PC and the monitor will operate in a host-slave configuration and the software protocol will be RS485 port.
b) The PC as the host will give commands and send queries. The monitor will carry out various functions in response to the queries.
c) The firmware of the monitor will be able to send the instrument data like instrument ID, instrument type, input range, display range, alarm settings, alarm status, current reading, diagnostic status of EHT/GM tube etc. to the Host PC on demand.
d) The firmware will be able to receive commands from Host PC and carry out the setting of different parameters like instrument ID, instrument type, input range, display range, alarm settings, Ack, Reset, instrument address etc.

Self Diagnostics :
The monitor will have built-in self diagnostics. On being powered it will perform tests to ensure that all components and sub systems are functioning properly. It will check for the Power supply, High Voltage Supply, Detector and pulse processing electronics.

Input Power :
230VAC +/-10%, 50Hz, single phase supply. Power ON/OFF switch will be provided with a neon indicator. Spike suppressor and line filter are also provided.

Environment:
This instrument can withstand temperature upto 50 deg C and relative humidity upto 90% in radiation areas.
Environmental compliance : As per IS 9000 / ANSI N 42.17
The instrument enclosure and detector assembly are IP-54 compliant.. Electronic unit will withstand cumulative radiation dose of 10000 Rad. (30 years of operation).

Mechanical Enclosure: Size : 357H x 380W x 140D, Weight : 8.5kg approx

EMI / EMC compliance:
As per IEC 61000 / ANSI N42.17

Instrument Trolley : (offered separately)
A suitable stand for fixing area monitor will be supplied optionally. This will be made of MS and will be provided with brackets for mounting the instrument. This stand will be designed to confirm to Seismic tests. One mains supply board with required sockets, indicators and switches will be provided. One mains supply board with required sockets, indicators and switches / MCBs will be provided on the trolley.