

## SPECIAL PURPOSE AREA GAMMA MONITOR TYPE : GA720P

### Technical Data



#### FEATURES :

- Performance specifications confirm to ANSI N42.17A
- EMI/EMC compliance as per IEC 61000.
- Structural design seismic qualified confirming to IEEE-344 STD.
- Instrument enclosure and detector assembly are IP-54 compliant.
- Radiation tolerant upto  $10^4$  R.
- Firmware tested based on IEEE std : 1012.
- Microcontroller based design has been employed
- Dose rate range covered (0.01mR/hr - 99.99mR/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
- Offered with two options - 1" x 1" plastic scintillator based and GM detector GM130E.
- Large size WINDOWS for NORMAL & ACTIVE alarm condition
- 4 to 20 mA current loop / 0-5V analog. Output is available for remote indication on a I/O connector (optional)
- 16x2 LCD dotmatrix display for visualization of other parameters.

Special purpose Area Gamma Monitor GA720P, manufactured by NUCLEONIX SYSTEMS employs state-of-art microcontroller based design and is primarily meant to serve as a Gamma Monitor to indicate dose rates and give alarm, visual and aural, once the dose rates exceed the preset level fixed by the user. Also relays will be activated on alarm.

This monitor is required for mounting certain process systems like process cooling water system, steam handler condensate system, effluent discharge lines, etc. for any leak of radioactive solution. It comprises of a wall mounted electronic unit and an external detector probe. Basically GA720P, detector probe with appropriate lead shielding coverage is mounted on pipe lines of different size to monitor doserate level in a radiochemical plant.

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 HV 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. RS485 port.

**FILE\_NAME : NSPL/DOC / DS / GA720P/01**

**VER\_20120224**

**SPECIFICATIONS**

**Radiation to be detected :** X-Ray and Gamma Radiation.

**Range :** 0.01 -99.99 mR/hr or 0.1 -999  $\mu$ Sv/hr  
0 -50000 CPS

**Detector probe:** GM detector LND71210 or equivalent with a sensitivity of 18 cps / mR/hr, in a SS probe covered with lead shielding arrangement for mounting on a pipe lines.

**Energy Dependence :** Within +/- 15% of true dose rate from 100 keV to 1.33 MeV gamma rays.

**Accuracy :** +/- 10% full scale with Cs-137 above 1mR/h

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

**Display :** Auto-ranging direct reading, 6 digit 7 segment LED display & 16x2 LCD display. 6x7 segment display is interfaced using multiplexed display driver IC. This is used for display of dose-rate and hardware status indication. 16x2 LCD display is used for visualization of preset alarm and other parameters

**Display Resolution :** 0.01mR/hr / 0.1  $\mu$ Sv/hr / 1 CPS / 1 CPM

**Overload :** Senses overload above 200% of fullscale and upto 10R/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 "OF"

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

**Recorder output stability**

- a) Non-linearity : Max = 0.025% of Span
- b) Offset current (I<sub>o</sub>=4mA) : Max = 0.0005% of Span / °C
- c) Span Error (I<sub>o</sub>=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% throughout the range.

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

**Alarm range :**  
0.1 mR/hr to 99.9 mR/hr OR  
1  $\mu$ Sv/Hr to 999  $\mu$ Sv/hr  
1 to 50000 CPM OR  
1 to 2000 CPS

The alarm level setting will be carried out through front panel keypad / Ethernet 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 (Active)	Flashing	ON
On ACK After being abnormal	Steady Red	OFF
Reset after returning to 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 :**

EHT failure : Visual alarm with flashing red LED indication & "Eht" message on display

Detector failure: Visual alarm with flashing red LED & "d-FL" message on display.

Microprocessor / microcontroller failure : Visual alarm with flashing green lamp.

Fault indications will be cleared automatically if normal status is resumed.

**Detector Housing :**

- The Detector will be located external to the Monitor. It will be provided with an adjustable SS strap for fixing on the pipeline.
- It shall be housed in a suitable, air-tight SS shell with built-in pre-amplifier to drive upto 50 mtrs long cable.
- The detector assembly shall be mounted on the pipe line with 20 mm lead shield assembly to reduce the background radiation.
- The instrument shall be provided with 30 mtr cable between detector and the monitor.
- The detector housing shall qualify minimum industrial protection Class IP-54.
- The monitor shall have clamps on the top for fixing the detector assembly.
- Provision to connect the detector with short cable also shall be available.
- A separate bracket for detector housing will be provided.

**Monitor Enclosure :**

- Vapour-tight, rugged & elegant.
- The door is provided with lock and key arrangement
- The enclosure shall qualify minimum industrial protection Class IP-54.
- 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 shall be supplied along with the equipment.

**Self Diagnostics :**

The monitor has built-in self diagnostics. On being powered it will perform tests to ensure that all components and sub systems are functioning properly. On being powered ON it will perform tests to ensure that all components and sub systems are functioning properly. It will check for the high voltage supply, Detector and pulse processing electronics.

**Input Power :**

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

**OPTIONAL ACCESSORIES :**

Include lead shielding assemblies with SS brackets for external detector probe to be attached onto pipe lines which are required to be monitored for activity levels in a Radiochemical plant or a similar facility. A typical assembly is shown below. These lead shielding assemblies with SS fixing clamp for external detector probe can be offered to suit user specific design requirements..

**Environment :**

The instrument will be able to withstand temperature upto 50 deg C and relative humidity upto 95% in radiation areas.

The instrument enclosure and detector assembly shall comply with IP-54.

Electronic units will withstand cumulative radiation dose of 10000 Rad. (30 years of operation).

**Mechanical Enclosure :**

**Size :** 357H x 380W x 140D

**Weight :** 8.5kg approx

**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 conform to Seismic tests. One mains supply board with required sockets, indicators and switches shall be provided.