AREA GAMMA MONITOR

TYPE NXG_AGM4

Technical Data

Features:

- Uses SoC, based on ARM Cortex A5 400MHz ,1.5MB SRAM,128MB Flash,extensive use of peripheral devices & Ethernet interface has been employed.
- Uses Microcontroller for counting radiation pulses, fault diagnostics, setting HV etc.
- Dose rate, range covered is (0.01 - 100) mR/hr by default, with option of selection of other three 'units' namely µSv/hr, CPS & CPM. Range can be extended to 10R/h on request.
- Auto ranging & auto TC selection in the range of 30 sec to 0.5 sec depending upon detector count rate.
- 5" TFT display indication for dose rate, alarm status & configuration settings.
- Designed using GM tube type LND 713 or its equivalent.
- Large size WINDOW indication on TFT display for NORMAL & ACTIVE alarm condition.
- Alarm set point & ACK / RST through touch screen.

AREA GAMMA MONITOR Type NXG_AGM4, manufactured & supplied by Nuceonix Systems is primarily designed to indicate dose rates in the measuring unit selected & produces audio/visual alarms, if the dose rate exceeds preset value. By default the unit is set to be in mR/hr & the range is (0.01 - 100mR/hr). It uses latest state-of-art electronic devices including SoC based on ARM cortex A5 400MHz CPU with associated peripheral devices and other discrete ICs & components. Use of these devices makes it compact & highly reliable. Powerful embedded code adds-up and enhances its performance and gives extra advantage from the angle of fault diagnostics, programmable features & measurement of dose rate & data communication under networked environment.

This AREA GAMMA MONITOR type NXG_AGM4 will be useful for monitoring Low Gamma dose rate levels in µR/hr working areas of Radio Isotope Laboratories, Radiotheraphy departments, Medical & Industrial Radiological installations apart from its usefulness in Atomic Power Stations, radiochemical plants, waste immobilization plants etc.,

With power ON, initialization of SoC, peripheral devices, 5" TFT display/timers, counter etc, takes place. Followed by this, dose rate, calculation takes place in the selected unit such as mR/hr. Additionally, hardware & fault diagnostic check will be carried out. Display updating will take place every 1 sec. Time constant (TC) for doserate will be computed depending upon the detector output count rate.

AREA GAMMA MONITOR NXG_AGM4 indicates dose rate digitally on TFT display. There are a visual annunciator window GREEN & RED for NORMAL & ACTIVE conditions respectively, shown on TFT display. The entire screen flashes, when the dose rate alarm occurs and in normal condition the NORMAL window glows.

For NXG_AGM4, User interface is through Radgrid Software by using Ethernet Communication, Multiple Units can be networked.

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In Application that require External probe a Smart Probe is provided with RS485 interface. It can be installed in the measurement area, where as the display unit can be in the Operations / Control Room.

SPECIFICATIONS

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

Range :
0.01 −100 mR/hr
0.1- 1mSv/hr
0- 50000 CPM
Range and Unit are configurable.

Detector : Energy compensated Halogen -quenched G. M. Tube LND713 or equivalent having a sensitivity of 7.5 cps / mR/ hr.

Energy response : +/-25% from 100keV upto 1.25MeV.

Accuracy : +/ - 10% Full scale with Cesium source.

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

Display : 5"TFT is used for display of doserate, hardware status information & also for visualization of preset alarm and other parameters.

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

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 "OVR"

Time Constant : First Stable reading on Power ON within 1 min. Normal (Slow) : 30 sec to 0.5 sec automaticallyvarying inverselywith the radiation level.

Abrupt detection: Update the current reading within 2 sec.

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

Alarm range :
0.01 mR/Hr to 99.99 mR/hr.
0.1 µSv/Hr to 999 µSv/hr.
1-50000 CPM .
The alarm level setting will be carried out through Radgrid Software by Ethernet Communication.

Alarm Indication :

a) Red Mimic flashing large area on TFT display & Tower LED.
b) Loud alternating audio tone (Dual frequency tone).

Alarm annunciation scheme
As tabulated below :

Parameter Status	Visual indication	Audio
Normal	OFF	OFF
Preset Alarm	Flashing Red	ON
On ACK	Steady Red	OFF
Back to normal	Steady Red	OFF
Reset on Preset Alarm	Steady Red	OFF
Reset on normal	Steady Green	OFF

Instrument Controls :

a) Acknowledgement icon / button for muting audio alarm.

b) Reset icon / button for resetting the Alarm indication and alarm relay.

Instrument Fault indication :
HV failure : Visual alarm with flashing yellow MIMIC indication & "HV" message on display & Tower LED.

Detector failure : Visual alarm with flashing yellow MIMIC & "Detector Failure" message on TFT display & flashing yellow on Tower LED Fault indications shall be cleared automatically if normal status is resumed.

Tower LED : A Tray color Tower LED comprises RED, GREEN,YELLOW is provided for indication of Alarm & Fault Status.

Detector Housing : In case of External Probe:

a. The Smart Probe is located external to theDisplay Unit.
b. It is housed in a suitable, air-tight SS shell with built-in pre-amplifier, HV & Microcontroller with RS485 interface.
c. The instrument is provided with 10 mtr cable between Smart Probe and themonitor.
d. The detector housing qualifies industrial protection Class IP-54.
e. A separate mounting bracket for detector housing is provided.

Remote / External Console: The instrument is provided with a remote console connector for the following.

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 will be energized on normal condition and de-energised under alarm condition.

c) Remote alarm acknowledgement and reset signals for the field instruments.

d) Indication of instrumentfault condition (detector, EHT & LV supplies failure), over range &

e) Overload conditions byup-scale of 4-20 mA. (22.5 mA).

f) All these signals will be terminated on 17 pin sockets (Allied Connectors). The corresponding mating plug will be supplied with the monitor.

RJ 45 connector for Ethernet port .

Computer Interface:
The monitor shall have a Ethernet 10/ 100 Mbps port for interfacing with a remote Windows. The features supported by Ethernet port are given below.

- The PC and the monitor shall operate in a client-server configuration and the software protocol will be MODBUS/TCP.
- The PC as the host shall give commands and send queries. The monitor will carry out various functions in response to the queries.
- The firmware of the monitor shall be able to send / receive the instrument data to/from the Host PC on demand.

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. It will check for the Power supply, High Voltage Supply, Detector, Counting and measuring circuits, Alarm Systems and Display Systems.

- The firmware is designed for high reliability and availability.
- Test points are provided for checking the EHT voltage and for connecting external input pulse signals.

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

Environment : The instrument is designed to be able to withstand temperature up to 50^0 C and relative humidity upto 90% in radiation areas.

Environmental compliance: As per IS 9000 Part III & IV

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

Mechanical Enclosure:

Size: 270H x 185W x 90D.

Weight: 4Kg approx.

NXG_AGM4_I

Ordering Info:

Part No	Key Features
NXG_AGM4	AREA GAMMA MONITOR with Ethernet Port, Networkable works with Radgrid Software for configuration, Remote display of data every sec, Remote ACK & RESET from Radgrid Software etc.
NXG_AGM4_Housing	IP 54 outdoor SS housing with transparent window.
Eth_Switch_12 or Eth_Switch_24	12 or 24 port Ethernet Switch.
Eth_Cable	UL approved CAT6 Ethernet Cable.
Eth_Cable laying	Laying & Networking of Ethernet Cable as per site requirements.
Remote & External Console	• 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 200mtrs. of twisted pair of wires. • 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. • Remote alarm acknowledgment and reset signals for the field instruments (normally open contact). • The monitor will optionally have a RS485 port for interfacing with a remote IBM PC-compatible computer. All these signals are terminated on a 17pin MS connector
SW_RADGRID	PC Software based on LAN that networks multiple NXG Series Radiation instruments of Nucleonix make & display the Radiation data, fault diagnostics, Calibration due etc .