# PET Cyclotron Stack activity monitor (based on Scintillation Detector)

**TYPE: NXG_STK3_SD**

## Technical Data



**FEATURES:**

- ❑ Measures stack duct activity using Gamma Scintillation Probe.
- ❑ Gamma Scintillation Probe measures gamma activity in CPS.
- ❑ 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 & configration is provided.
- ❑ Large size WINDOW indication on TFT display for NORMAL & ACTIVE alarm condition.

**PET Cyclotron Stack activity monitor TYPE: NXG_STK3_SD** designed and offered by 'Nucleonix Systems' is primarily meant to measure the radio-activity release levels from the stack into the atmosphere. Cyclotrons are commonly used for production of radioactive isotopes utilized for Positron Emission Tomography (PET) imaging and other purposes. During the isotopes production process, there are routine releases of non hazardous amounts of radioactive isotopes into atmosphere. The activity concentration of radioactive effluents, released into the atmosphere are subjected to restrictions by national regulations based on international recommendations. Uncontrolled isotopes emission through the ventilation system would increase the radiation hazard potential to nearby population. In order to control and prevent such emissions, monitoring and assessment of the released activity concentration is required.

**NXG_STK3_SD comprises of the following**

a) Electronic unit STK3_EU
b) Smart Gamma Scintillation Probe_STK3_SD
c) RADGRID Networking Software SW_RADGRID

This measuring unit, electronics facilitates connection to a smart detector probe. It is also possible to have the detector probe unit kept farther away up to a maximum of 100 meters. In case of **PET stack activity monitor** these probes will be installed in the stack exhaust area.

The user interface is through touch screen display,for Reset mode (auto or manual) and other system settings.Fault diagnostic info is shown directly on touch screen.

Stack activity monitor's measuring unit uses state-of-art electronic devices including SBC running on WIN CE6 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 & dose rate & measurement of data communication under networked environment. This unit is primarily designed to indicate dose rates in the measuring unit selected & produces audio / visual alarms, if the dose rate exceeds preset value.

# SPECIFICATIONS

**Radiation detected:** Gamma Radiation.

**Range:**
0- 20000 CPS
Range and Unit are configurable

**Detector Probes:**

Smart Gamma Scintillation Probe.
For detailed specifications of the above smart probes, refer to the following pages attached.

## NORMAL & ACTIVE WINDOWS

The NORMAL WINDOWS (GREEN) glows during acquisition mode until the dose rate exceeds alarm, preset value. Once dose rate exceeds alarm preset value, then the NORMAL WINDOW turns OFF and the ACTIVE WINDOW (RED) blinks.
Once the dose rate falls below the preset level, then

**ETHERNET PORT :**

User can inter face with PC by using RADGRID software through Ethernet (RJ 45 CONNECTOR ).

**POWER CONNECTOR :**

This is used to connect the supply to monitor through 5v adapter.

(i) if Reset mode is AUTO then it comes back to Normal mode. (ii) if RESET mode is MANUAL, then it comes back to NORMAL mode only after RESET key is pressed on Touch Display.

**DOSERATE WINDOW :**
This gives the visual display of the current dose rate in acquisition mode in the 'unit' selected. By default it shows in µR/hr unit.

**5" LCD TOUCH DISPLAY :**

**RESET key:** Reset key is used to reset the alarm, condition. In auto reset once dose rate falls below the preset alarm level, audio & visual alarms reset, automatically. In 'manual' reset mode alarm active condition is reset only when the user presses 'Reset' button.

**ACK key:** This key is used to 'ACK' the alarm, by the user (this function is explained, in detail, under operating instructions).

**Electronic Unit :**

**Dimensions :** 270L x 185H x 90D.

**Weight :** 4Kg approx.

## SMART GAMMA SCINTILLATION PROBE

### TYPE : PROBE_STK3_SD

## Technical Data

### FEATURES :

- Primarily serves as a Smart Gamma probe to measure gamma activity in CPS also recommended for installation This smart gamma scintillation probe is part of the stack activity monitor in medical cyclotron facility.

- Multiple G.M & Gamma Scintillation probes can be networked for centralized monitoring of doserate & alarm status through software.

- Calibration accuracy within +/- 10% with Co-60 source.

- Energy response within +/-25% from 50 keV upto 2 MeV.

- Measures gamma activity in CPS.

- Auto ranging & auto TC selection in the range of 16 sec to 0.5 sec depending upon the count rate.

- Designed using 2"x2" NaI Scintillation detector.

**Smart Gamma Scintillation Probe Type PROBE_STK3_SD**, designed & manufactured by Nucleonix Systems is primarily meant to serve as a Gamma Monitoring probe and communicate over RS 485 port the count rate in CPS & health information to main electronics measuring unit, which in turns sends data to central computer system Via Ethernet under the control of Radgrid Software.

This probe is powered by +12VDC and can be well mounted in working areas of Radiological facilities like Radiotheraphy installations, medical cyclotrons facilities and other medical / industries installations.

This probe is provided with an +12V AC Adaptor and DB9 connector pair for connection to a RS 485 Daisy Chain network RS 485 protocol supported is MODBUS RTU.

FILE NAME : **NSPL / DS / NXG_STK3_SD /01**
**VER_20170927**

**Smart Gamma Scintillation Probe**

# SPECIFICATIONS

**Radiation detected :**
X – ray & Gamma Radiation

**Range :**
0 - 20000 CPS

**Detector :**
2"X2" NaI Scintillation detector

**Calibration Accuracy :** (CPS)
+/-10% throughout the range.

**Time Constant :**
Time constant varies continuously from 16 sec to 0.5 sec depending upon countrate.

**Probe Enclosure :**
Vapour-tight, rugged & elegant is designed to be compliant to required IP 54.

Approx Dimensions are 60mm Dia X 160mmL.

**Self Diagnostics :** The probe has built-in self diagnostics. On being powered it performs tests to ensure that all components and sub-systems are functioning properly.It checks for the Power supply, High Voltage Supply, Detector and pulse processing electronics.

**RS485 Interface:**Probe communicates over RS485 interface using proprietary protocal with simple hand-shake commander for easy adoptor by third party users.

**Environment:** This instrument can with stand temperature upto $50^0$C and relative humidity upto 90% in radiation areas.

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