

CMS NEUTRON

The **CMS-NEUTRON** is a new generation continuous monitoring station for measurement of neutron radiation. The systems provide essential, reliable information to personnel when radiation levels are above normal.

The CMS-NEUTRON is a compact, mains-powered, neutron monitor designed specifically for area monitoring in nuclear facilities.

The monitor utilises He3 proportional counter in a 208mm Ø Moderator with a range of 1 $\mu\text{Sv}\cdot\text{h}^{-1}$ to 100,000 $\mu\text{Sv}\cdot\text{h}^{-1}$ (ICRP74).

The CMS-NEUTRON is intended for installed applications, but can also be used with a transportable frame or trolley to provide temporary monitoring or to supplement permanently installed monitors during site maintenance procedures.

The only requirements of the CMS-NEUTRON monitor is that it and its associated detector is suitably mounted and has mains power supply in the range 85- 260 VAC.

Two major advantages of the CMS-NEUTRON against its nearest competitor are: 1) internal back up battery which enables full operation for up to 1 hour in the event of mains failure and 2) the detector arrangement can be installed at distances of up to 1000 (3,280ft) from the CMS station.

Operation and Security

The CMS-NEUTRON performs a self-test on power up and then commences continuous monitoring. All system parameters are password and key protected and can be modified using the local keypad and display. In addition to this, all operating parameters can be read and updated via FTP using a personal computer. Current alarm status, parameter settings and recent count and event log data can be read using a web browser ensuring that all key personnel can have 24 hour access to data remotely.

The following actions may be passcode/keyswitch protected:

- Clear Historic Count data
- Clear Event Log
- Reset Pass codes
- Modify Pass code
- Reset Instrument.
- Test / Calibrate analogue I/O.
- Test Digital Outputs.



Information and specifications may change without notice

- **Highly Sensitive Installed Neutron Monitor**
- **Neutron Energy: Thermal to 14.7MeV**
- **Installed or Transportable**
- **Full Network Capability Applications**



Laboratory Impex Systems. 21 Harwell Road, Poole, Dorset, BH17 0GE, UK.
Tel: +44 (0) 1202 684848 Fax: +44 (0) 1202 683571

Laboratory Impex Systems Inc. Suite C4, 103 Rio Rancho Dr. NE,
Rio Rancho, NM 87124-1442 Tel: (505) 892 9654 Fax: (505) 890 8319

sales@lab-impex-systems.com www.lab-impex-systems.com

Dose Rate Indicators

The CMS-NEUTRON provides two separate indications of dose rate:-

- An analogue vertical graph representing the percentage of the alarm level selected on the LCD display (which is visible from a distance of 9m (30 ft.)
- An LCD display with LED backlighting which provides a numerical indication of the dose rate.

Both indicate the current alarm level setting simultaneously.

The display (viewing area 114mm x 64mm (4.5" x 2.5")), also allows sixteen rows of text to be visible at any one time when the user is locally changing parameters or viewing historical results.

When the CMS-NEUTRON is operating normally, the green beacon is constantly illuminated. During alarm conditions, the red beacon flashes.

In addition to the beacon, two LED's located above the display indicate normal operation or fault.

Alarms and Annunciators

The CMS-NEUTRON has four alarms (three alarm thresholds and fail alarm), all of which are user settable via the display and keypad or Ethernet connection (TCP/IP).

The 'Alert' and 'High' alarms are triggered when the ambient radiation level exceeds these thresholds. The 'Low' failure alarm is triggered if the radiation falls below this level. Its main purpose is to identify a detector failure.

Alarm annunciation is by means of:

- The red beacon (can be configured to flash or remain on constantly)
- The sounder

The user may suppress alarm annunciation for each or all of the activity alarms if required (this facility is pass code protected). In the event of a sustained mains failure, dose rate measurement continues supported by an internal battery for up to 30 minutes.

Outputs and Communications

Connections to the CMS-NEUTRON are located on the underside of the instrument.

The CMS-NEUTRON enables the user to control external devices and to transmit data to local (or remote) locations via:

- Four relay outputs (Alarm 1, Alarm 2, Alarm 3 and Fault) (NB: Relays operate in the fail-safe mode - they are energised during normal operation)
- One RS-485 (or RS-232) serial port for communication with remote monitoring systems
- Ethernet(TCP/IP)
- 4 – 20mA analogue output

Safety Integrity SIL Applications

The CMS NEUTRON can be used in conjunction with the Lab Impex SIL Safeguard Monitor (SSM) for applications that require a high level of safety integrity.

More information on the SSM board, CMS Interlock and the CMS Process, all of which have been designed to meet the specifications of IEC61508, can be obtained by requesting the datasheets L327, L328 and L333 respectively.

Self Test Facilities

The CMS-NEUTRON continuously self-monitors for faults. Conditions checked include:-

- Detector Failure
- Power Failure
- Detector Over range
- Alarm Beacon Failure
- Incorrect Detector Fitted
- Low Battery Voltage

Occurrence of any of these conditions will cause the green beacon to flash and the nature of the fault will be displayed on the LCD.



Laboratory Impex Systems. 21 Harwell Road, Poole, Dorset, BH17 0GE, UK,
Tel: +44 (0) 1202 684848 Fax: +44 (0) 1202 683571

Laboratory Impex Systems Inc. Suite C4, 103 Rio Rancho Dr. NE,
Rio Rancho, NM 87124-1442 Tel: (505) 892 9654 Fax: (505) 890 8319

sales@lab-impex-systems.com www.lab-impex-systems.com

CMS-NEUTRON SPECIFICATIONS

NEUTRON DETECTOR SPECIFICATIONS (JCS NMS010)

Dose Rate:

1 $\mu\text{Svh-1}$ to 100,000 $\mu\text{Svh-1}$ ICRP74

Gamma Rejection:

γ Rejection ratio is $> 1 \times 10^6:1$ for γ energies $< 1.2\text{MeV}$

Energy Response:

Thermal to 14.7 MeV

Polar Response: $\pm 30\%$

Calibration:

Linearity, overload, gamma rejection and polar response. Linearity calibrated using ^{241}Am and ^{252}Cf sources. Gamma rejection 3000:1

Display:

Meter reading in a dose of $\mu\text{Svh-1}$

Analogue Meter:

Large four decade logarithmic display in dose rate from $1\mu\text{Svh-1}$ to 100,000 $\mu\text{Svh-1}$

Detector: He_3 proportional counter in a 208mm \varnothing Moderator

Environmental: EMC compliant to EN50081 part 2

Temperature Range: -10°C to 45°C

Alarm Level: Factory set to 10 $\mu\text{Svh-1}$

User Controls:

The main on/off key switch is adjacent to the analogue meter on the front panel of the display / processing unit. There are 3 position with audible alarm, 2) Mute, 3) Test. (There are no other controls on the instrument)

Power Supplies:

The power for the instrument is derived from an intelligent AC PSU housed in the display / processing unit, with 20mm 1A quick blow fuse.

Power Requirements: Mains voltage 90 - 264 VAC

Weight Meter Unit: 3.2 kg

Weight Amp Unit: 0.7 kg

Dimensions Analogue Unit: 300 x 150 x 100 mm

Dimensions Amplifier Unit: 160 x 100 x 45 mm

Maintenance: No maintenance required by user. All repairs and calibrations carried out by an authorised service organisation.

Testing & Certification: Test Certificates supplied

CMS PHYSICAL CHARACTERISTICS

- 304 Stainless steel enclosure
- Wall, trolley and transport frame
- Designed for quick low cost installation with easy access

ENVIRONMENTAL PROTECTION

IP54 (IP65 option available*)

OPERATING ENVIRONMENT

- Indoor use (or suitably enclosed)
- Operating temperature range -10 to 50°C (-4°F - 122°F)
- Maximum relative humidity 95% (up to 30°C)

POWER DETAILS

- Mains AC single phase connection (85-260 V ac)
- Battery: Internal 1hr back-up rechargeable battery (facilitates full operation for 1 hour with single GM detector option/ CMS monitors the battery voltage)
- Frequency: 47 to 60 Hz
- Max. Current: 500mA
- Internal 1A anti surge fuse

DIMENSIONS (Height x Depth x Width)

H = 458 mm (18") including LED beacon and cable connectors

D = 150mm (5½") including sounder projection

W = 200 mm (8")

WEIGHT approx. 7 kg (15 ½ lb)

DISPLAY

- Large LCD graphic display (114mm x 64mm (4.5" x 2.5")) with backlight.
- Fully sealed membrane keypad
- Both digital and analogue display
- Large dose range
- Key switch.
- Two layer status light column (Totem Pole, Red + Green LED).

ALARM FACILITIES

- Fast, accurate warning of high activity or faults
- Tower light configuration: Visual alarm (12v LED totem pole).
- Audible alarm sounder: 2 tones alternating at $1.2\text{Hz} > 100\text{dB}$ (other tones optional)
- Alarm clearly visible from 9m (33ft)
- Optional relay outputs for remote audible/visual alarms
- Three activity alarm thresholds and other parameters can be set by the user and pass-code protected.

Information and specifications may change without notice



Laboratory Impex Systems. 21 Harwell Road, Poole, Dorset, BH17 0GE, UK.
Tel: +44 (0) 1202 684848 Fax: +44 (0) 1202 683571

Laboratory Impex Systems Inc. Suite C4, 103 Rio Rancho Dr. NE,
Rio Rancho, NM 87124-1442 Tel: (505) 892 9654 Fax: (505) 890 8319

sales@lab-impex-systems.com www.lab-impex-systems.com