

ALPHA HAND & CLOTHING MONITOR TYPE : AH733

Technical Data



FEATURES :

- ❑ State of art electronics design, using controllers with embedded code microcontroller, I2C bus, micro-wire bus based devices makes the equipment compact and highly reliable.
ZnS(Ag) scintillator coupled to suitable PMT for detection of α , light tightness being provided by aluminized mylar.
- ❑ Active area of ZnS screen for each side of the Hand 220mm x 127mm.
- ❑ User interface is through a 7.5" colour LCD display & 4x4 matrix keypad.
- ❑ Built-in Ethernet port provided facilitates networking for centralized monitoring and fault diagnostics purposes
- ❑ Monitor design ensures continuous maintenance free operation for a long time
- ❑ Monitor is designed to withstand the harsh atmospheric conditions in Radio-chemical plants
- ❑ Major controls including keypad that can be detached are inside the unit (behind lockable hinged doors) to prevent unauthorized tampering
- ❑ Plug-in type PCB design with EURO connectors facilitate easy replacements incase of failure.

Alpha Hand & Clothing Monitor AH733 manufactured by NUCEONIX SYSTEMS primarily serve as a personnel monitoring system for checking the contamination of hands, foot & clothing of radiation worker / technicians working in Nuclear Power Plants, reactors, Radiochemical plants and other similar installations.

This instrument uses state-of-art electronic devices including controllers with embedded code to perform powerful monitoring and fault diagnostic operations while monitoring.

Modular construction of hand assemblies, electronics & excellent engineering facilitate easy maintenance. Visual symbolic LED window displays for Left/Right Hand annunciation indication in the event contamination of that particular hand is a unique feature for NUCLEONIX make system.

SPECIFICATIONS

The Alpha Hand and clothing monitor shall comprise a set of detectors and an electronic unit.

Detectors:

Hand probes:

- Number of monitoring channels : 4 (Right hand upper & lower, Left hand upper & lower).
- Detector type : Scintillator combined with optically coupled Photo-multiplier.
- Scintillator : ZnS (Ag), 10 mg /cm² coated on a clear perspex.
- Photo-multiplier Tube : 3 inch Dia., The scintillator shall be optically coupled to the photomultiplier tube.
- Detection Efficiency : >25% for plutonium alphas with phantom source.
- Probe Construction : They shall be fabricated and fitted in the instrument so that they can be detached easily for maintenance.
- Sensitive Area : 300 sq. cm.
- Opaque window : The scintillator shall be covered by 0.8 mg/cm² aluminised, pin -hole free, light-resistant, alpha-transparent aluminised mylar film.
- Protection Grill : The whole detector assembly shall be protected by a suitable thin metallic grill.
- Detector dimensions and performance shall conform to IEC 61098 specifications.

Clothing probe:

- Number of monitoring channels: one
- Detector type : Scintillator combined with optically coupled Photo- multiplier.
- Scintillator : ZnS (Ag), 10 mg /cm² coated on a clear perspex.
- Photo-multiplier Tube : 2 inch Dia., The scintillator shall be optically coupled to the photomultiplier tube.
- Detection Efficiency : Better than 25% for plutonium alphas.
- Probe Construction : Hand-held type; Cylindrical, light weight. Viewing side to be provide with a removable cover. It shall be placed on a holder with optical sensor assembly on the side of the monitor. On lifting the detector, the monitoring shall be started.
- Sensitive Area. : 20 sq. cm

- Opaque window : The scintillator shall be covered by 0.8 mg/cm² aluminised, pin-hole free, light-resistant, alpha-transparent aluminised mylar film.
- Protection Grill : The whole detector assembly shall be protected by a suitable thin metallic grill.
- Detector dimensions and performance shall conform to IEC 61098 specifications.

Electronic Unit: The electronic unit shall consist of the Signal processing & Display unit and the power supplies required for the detectors and electronic circuits.

Signal processing and display unit:

It shall comprise the hardware and software to carry out the following functions:

- Signal conditioning including the pre-amplification, pulse shaping, pulse height discrimination etc.
- Signal processing, display of counts & messages and Alarm indication.
- Data communication to Remote Host PC through Ethernet port.
- Data storage of last 100 alarms & 100 data
- Background subtraction facility - ON/OFF
- Over range response
- Power ON self test.
- Diagnostic / fault reporting

Signal conditioning unit: The signal conditioning module shall receive the output from the detectors and condition the same to generate pulses of the required amplitude, width and shape for further processing.

Signal Processing Unit: The signal processing module shall be based on Intel Microcontroller / microprocessor and shall carry out the functions of counting, timing, comparison, alarm generation, data communication etc. The detailed technical specifications of the counter and timer shall be as follows.

- Counting Range :
0 to 9999 counts
0 to 9999 CPS
0 to 9999 Bq
0 to 99999 CPM
On overflow the display shall indicate 'OR'

- Timing range : Pre-settable from 1 to 99 seconds in 1 sec steps for COUNTS, Bq, CPS or CPM modes for Hand and Foot monitoring
Time constant for checking the Clothing monitoring is 5 seconds with display being refreshed every second.

Human Machine interface:

Indications & controls:

Mains switch :

The mains switch shall be provided inside the cabinet of the monitor.

Mains indication :

Red LED to indicate mains power ON is provided on the display panel.

Optical sensor :

The monitor shall be provided with optical sensor inside the detector cavities for initializing the counting.

Test switch :

Through detachable keypad, provision to check the background is given.

Visual alarm :

Each channel visual mimic indication on LED indicators and additionally color mimics for each channel are provided on the colour LCD display.

Audio Alarm : Loud audio tone.

Audio Instructions :

Audio instructions shall be generated for clear, contaminated, guidance messages before monitoring, and incomplete operation.

Multi-lingual messages shall be played back in either Hindi / Tamil / Marathi based on the selection.

Operational Guidance :

Operational guidance messages shall be displayed Before monitoring, On Clear, On Contamination and On Incomplete operations shall be generated in either Hindi / Tamil / Marathi apart from the primary language English.

Incomplete operation :

Yellow LED indicator along with Multi-lingual textual indication accompanied by audio alert are generated when counting is interrupted

Clear Indication :

Green LED indicator and LCD mimic indicator will be ON when all the channels are clear

EHT :

EHT ON/OFF control is through the keypad of the instrument.

Counting in progress Indication :

Busy LED indicator will be ON and Time left is displayed when counting is in progress.

Visual display : 7.5" colour LCD display.

Given below is a partial list of the functions being carried out by the visual display.

- Display normal status messages.
- Visual display of monitoring in progress (including count down of time in seconds)
- Display of individual channel readings
- Alarm annunciation
- Background checking and display
- Instructions for use.
- Self explanatory, language independent symbols / user instructions

Computer Interface module:

The instrument is provided with an Ethernet 10/100 Mbps port (RJ-45) for interfacing with a remote IBM-PC compatible computer. The features to be supported by the Ethernet port are given below:

- The PC and the instrument will operate in a host-slave configuration and the software protocol is Modbus/TCP.
- The PC as the host shall give commands and send queries. The monitor will carry out the various functions as per the required information in response to the queries.

- The firmware of the instrument will be able to send the instrument data like instrument ID, instrument type, alarm settings, alarm status, current reading, diagnostic status of EHT/ scintillation detector, etc to Host PC on demand.
- The firmware will be able to receive commands from Host PC and carryout the setting of different parameters like Instrument ID, Instrument type, Input range, alarm settings, Ack, Reset, Instrument address, etc.

Power supplies:

The monitor shall have a High voltage power supply unit for the detectors and a low voltage power supply unit which supplies the DC power supplies required for the Electronic unit. It shall have a very good line voltage and load regulation for all the supplies. It shall be fitted with Mains line filters to avoid line interferences.

The High voltage output shall be adjustable by handheld configurator or host PC and EHT should be displayed on the display on demand. The EHT shall adjustable from 300 V to 1500 V DC.

Instrument Fault indication :

Fault diagnostics are carried out periodically and any failures are reported on the display like LV, HV and detector failures.

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

Housing:

- Most of the modules of the Electronic unit and detectors shall be integrated into a column shaped cabinet with castor wheels.
- The hand probes shall be fitted so that both the hands can be inserted and the optical sensors inside the cavities are activated when hands are placed to start monitoring.
- The modules shall be plug in type with all the controls and display on the front panel.
- The cabinet shall be rat-proof, rugged & elegant.

Self Diagnostics :

The monitor shall have built-in self diagnostics. On being powered it shall perform tests to ensure that all components and sub systems are functioning properly. It shall check for the Power supply, High Voltage Supply, Detector, Counting and measuring circuits, Alarm Systems and Display Systems.

The firmware shall be designed for high reliability and availability. The software code shall be subjected to verification / validation.

Test points shall be 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 shall be provided with an indicator LED. Line filter and spike suppressor shall be provided.

Environment :

The instrument shall be able to withstand temperature upto 50°C and relative humidity upto 90% in radiation areas.

TYPICAL SCREEN SHOTS


INSTRUMENT READY....


LEFT	HAND
कृपया बाँया हाथ रखिये	



ACQUISITION ON

TIME LEFT	10	Sec
समय बाकी		सेकंद

LEFT HAND	बाँया हाथ	COUNT
	UPPER	00100
	LOWER	00100


RIGHT HAND	दाँया हाथ	COUNT
	UPPER	00000
	LOWER	00000

ACQUISITION STOPPED

LEFT	HAND
बाँया	हाथ


REMOVED
निकाल दिये


ACQUISITION COMPLETE




YOU ARE CLEAN
आप शुद्ध है

CLEAN

LEFT HAND	बाँया हाथ	COUNT
	UPPER	00500
	LOWER	00500


RIGHT HAND	दाँया हाथ	COUNT
	UPPER	00500
	LOWER	00500


ACQUISITION COMPLETE



YOU ARE CONTAMINATED
LEFT HAND
आप संदूषित है
बाँया हाथ

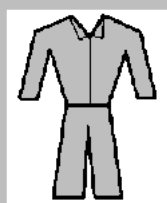
CONTAMINATED

LEFT HAND	बाँया हाथ	COUNT
	UPPER	04600
	LOWER	04600

RIGHT HAND	दाँया हाथ	COUNT
	UPPER	00000
	LOWER	00000

ACQUIRING FOR CLOTHING CPS

0000.0



ACQUIRING FOR CLOTHING **CPS**

0210.0



YOUR CLOTHES ARE CONTAMINATED

आपके कपडे रांदूषित है