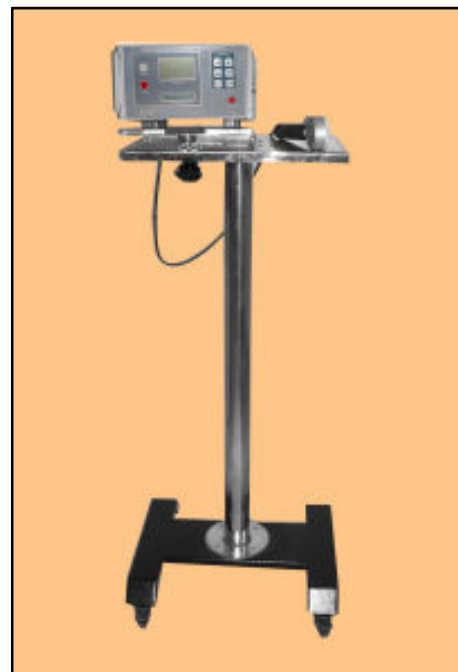


**CONTAMINATION MONITOR  
(BENCH MODEL)  
TYPE : CM 712**

**Technical Data**

**FEATURES :**

- State of art electronics, uses microcontroller
- Compact, light weight & elegant
- Choice of Beta / Alpha contamination probes
- Counting accuracy +/-15% with contamination probes
- Alpha/Beta contamination in CPS / CPM with autoranging
- Time Constants : LO, MED, HI
- Modes : CPS / CPM / Preset Scaler
- Built-in serial port & parallel port



Contamination Monitor Type : CM 712 manufactured by NUCLEONIX SYSTEMS is primarily designed to measure Alpha, Beta & Gamma contamination, on work benches, clothing, hands etc., in Radiochemical plants, Nuclear Power plants and other similar installations. It is designed to be table top model or it can be mounted on a pedestal stand. It operates on AC mains 230V, 50 Hz. This unit has a choice of two types of contamination probes for Beta-gamma and two types for Alpha. Unit has built-in memory and can store upto 1000 readings of contamination data. Data stored can be printed or downloaded into PC if required and can be recalled onto display.

**SPECIFICATIONS**

**Radiation/Contamination detected:** Alpha, Beta & Gamma

trend in CPS can be provided optionally.

1-8 sec for cps, 4-32 sec for CPM

**Display :**  
20x2 Dotmatrix LCD display

**Contamination Probes :**  
Choice of Alpha & Beta-gamma contamination probes. (refer to accessories)

**Preset Levels:** Adjustable in steps of 1 between 0-999999 counts / countrate

**HV :** HV (0-1000V) @0.5mA continuously variable through front panel keypad, ripple less than 20mV, line & load regulation better than 0.05%.

**Memory Storage :**  
Built-in EEPROM facilitates the user to store the contamination readings upto a maximum of 1000.

**Detector Probes :**  
a. Beta-gamma contamination probe (two types)  
b. Alpha contamination probe

**Audio :**  
Unit has the built-in buzzer to give beeps for every radiation event detected and to generate loud audio alarm in the event of countrate exceeding preset levels.

**Modes (for measurements) :**  
a. CPS b. CPM C. Preset Scaler

**HV indication :**  
On LCD dotmatrix provided.

**Time Constant : (TC)**  
LO, MED and HI in CPS/CPM

**Ranges : (CPS/CPM/ Preset Scaler)**  
0-10<sup>6</sup> - Autoranging  
**Trend Indication :** A3 decade LED bar scale display for indication of countrate

Unit can be operated in preset scaler mode where one can count contamination for a preset time.  
Time constant selected in the range of

**Alarms:**  
Clean & contamination conditions are indicated by 2 large area RED & GREEN LEDs.

**Test Facilities:**

- (a) The instrument has provision to check GM detector response with voltage. Once the start voltage, Voltage step, Preset time are set, User can acquire for plateau generation.

Instrument at the end of acquisition can calculate the slope depending upon the start voltage and end voltage selected and the counts obtained at corresponding voltages.

- (b) Instrument is provided with a test mode where in a fixed frequency of pulses are fed to the counter for routine testing.

**Instrument Fault Indications:** Fault indications of EHT and detector failure are indicated on front panel display and will reset automatically on recovery.

**Remote/ External console:**

4-20mA full scale output is brought out on a 17pin MS connector to drive a load of 600 Ohms.

2 sets of potential free contacts of alarm relay with a rating of 3A @ 250VAC are brought out on the MS connector. The relay is deenergized on normal condition and activated on contamination / active condition.

**RS-485 Interface :**

The monitor is provided with RS485 port below specifications to facilitate remote monitoring and diagnostics

**RS-485 Specification :**

Type : Isolated Multi-drop serial communication port, half duplex bi-directional communication

Address : User configurable from 0 to 255

Protocol : MODBUS RTU

Bit Rate : user 19200

Connector : 9 Pin D – Type Connector

**Keypad commands :**

Unit has intelligent keypad with command buttons as PROG, INC, DEC, STORE, STOP, etc.,

**Serial Port :**

Built-in RS485 port facilitates data downloading into PC Using Modbus RTU Protocol

**Self-Diagnostics:**

The monitor will have 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 High voltage supply, Detector and pulse processing electronics .

Fault Indications of EHT & detector are indicated on front panel and will reset automatically on recovery.

**Hand held Configurator (Optional)**

- It facilitates reading monitor ID, fault Diagnostics, current count rate, preset alarm levels, current alarm status, baud rate etc.
- It uses 20x4 LCD character display.
- 2x3 tactile keypad for data counting / setting & parameters viewing.
- Uses dry cells 1.5V x 4.

**Data Communication Software :****(Optional at extra cost)**

Can be provided for serial transfer of data readings into PC.

**Dimensions :**

236mm (W) x 246mm (D) x 133mm (ht)

**Power :**

230V AC, +/-10%,50 Hz supply. Power ON/OFF switch has been provided unit has built in spike protection circuit.

**Environment:**

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

**Compliance :** Instrument will meet all requirements applicable

(a) ANSI N 42.17

(b) IS -9000 part III & V

(c) Interference test as per IEC61000 or equ.

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**ACCESSORIES**

**Beta - Gamma Contamination Probe**

**(a) G.M. Detector : (BCP1) (thin walled)**

Thin walled GM detector (Type : with GM 137) housed in S.S.envelope having handle and sliding window for Beta radiation discrimination.

Cable length : One Meter  
 Operating Voltage : 500V  
 Cathode wall thickness : 40-60 mg/cm<sup>2</sup>  
 Probe dimension: 210L x 32D in mm  
 Gamma sensitivity : 45 c/s / mR/hr.



**BCP-1**

**b) End window G.M. Detector Probe : (BCP2)**

Uses GM125 detector with 1" end window thickness 1.5 - 2 mg/cm<sup>2</sup>. End

cap is to be removed for Beta Contamination measurement. For Gamma radiation measurement, end cap is to be retained.



**BCP-2**

**(c)Beta - Gamma Contamination Probe (BCP3)**

:This probe is offered as a part of Beta-Gamma Radiation Survey Meter type RM703E. \*\* This uses a thin walled GM tube which is housed in a cylindrical shell made of Aluminum. Detector side of the cable has a cable gland arrangement with cable length being 1.0 meters. There is a rotating shutter arrangement made of SS shell, which is kept open for Beta measurement.

Detector : Thin wall Beta-Gamma detector GM133 or its equivalent.  
 Detector Probe : 35cm L x 3.2cm Dia

Operating Voltage : +900V

Cable Length : 1.0 meter

\*\* This also serves as a clothing probe, for Beta-Gamma hand, foot & clothing monitor or as a Contamination probe for bench model Contamination Monitor.



**BCP-3**

**(d) Alpha Contamination Probe type**

**ACP2** of Nucleonix make serves as a Alpha Contamination Probe with a viewing area of approx. 20 sq.cm (2" dia). It is designed to work with Nucleonix make **Contamination Monitor (Bench Model) CM712** or its equivalent.

PMT : 2" PMT of Hamamatsu or ETL or Equivalent.

Viewing area : 20 sq.cm Approx

Operating Voltage Range : 800V to 900V

Efficiency : Better than 25%

Cable length : One meter (by default)

Application: Recommended for use where viewing area of the order of 2" dia is adequate.



**ACP-2**

**Alpha Scintillator Screen:**

Circular Scintillator ZnS screen covered with aluminized mylar foil of 25mm dia will be used.

**(e) Pan Cake Detector Probe type PCP-1**, manufactured & supplied by NUCLEONIX SYSTEMS is an ideal choice for Contamination Monitor both with bench model & portable type of units. It has a wide circular viewing area of 1.75" dia window to allow Beta. Detector body is enclosed in a thin SS enclosure having a lid which is closed for gamma dose rate measurements. This probe measures gamma dose rates upto 500mR/hr & Beta contamination both CPS & CPM.

Probe has a nice handle to hold made in black nylon.

Detector Type : Pan Cake-1  
 Gamma Sensitivity :  
 C/S/mR/hr (Co<sup>60</sup>) : 60  
 Dimensions (Detector) :  
 Length : 3.0 Inches  
 Effective Depth : 0.5 Inches  
 Maximum Dia : 2.11 Inches



**PCP-1**

Application: This is offered both for Beta / Gamma Contamination Monitors.

**(f) Pan Cake Detector Probe type PCP-2**, manufactured & supplied by NUCLEONIX SYSTEMS is an ideal choice for Contamination Monitor both with bench model & portable type of units. Probe has a nice handle to hold made in black nylon.

Gamma Sensitivity  
**C/S/mR/hr (Co<sup>60</sup>)** : 60 per detector  
**Dimensions (Detector) :**  
 Length : 4.72 Inches  
 Effective Depth : 0.90 Inches  
 Maximum Dia : 1.96 Inches



**PCP-2**

**Detector Type** : 2no.s of Pan Cake detectors.

**Probe size** : 6.5 X 11.5 cm

**Active area** : 75 sq.cm (approx)

**Application:** This is offered both for Beta / Gamma Contamination Monitors.

**(g) Alpha Contamination Probe : (ACP1)**

Alpha Contamination Probe type ACP1 of Nucleonix make serves as a large area (Approx. 100 sq.cm) alpha contamination probe. It is designed to work with Nucleonix make contamination monitor CM712 or its equivalent.

**Alpha Scintillator :**

ZnS (Ag) Scintillation film covered with aluminized mylar foil for light tightness is used as the detector  
 PMT : 2" PMT of EMI make 9266B  
 Viewing area : 100 sq.cm Approx  
 (A ZnS Scintillator screen of 10x100mm will be used) with a conical light guide for 2" PMT.  
 Operating Voltage Range : 950V to 1050V  
 Efficiency : Better than 25%  
 Cable length : One Meter (by default)



**ACP-1**

**(h) Mobile Stand (MS-1):** Mobile stand with a base plate fitted with lockable caster wheels & an SS cylindrical column to support the top base plate & the instrument has been designed & made available as an accessory to the bench model contamination monitor.

Top base plate onto which instrument is mounted can be tilted slightly so that viewing angular face of the instrument is convenient to the user. This top base plate can

accommodate contamination probe also. Mains supply board with required sockets and switches are provided on the trolley.  
 Mobile Stand Material: Fabricated in SS  
 Base Plate Size: 52 cm Length x 43cm Depth  
 SS column  
 a) Height : 101 cm  
 b) Diameter : 16 cm  
 Top plate size : 43.5 L x 29 D cm  
 Adjustable Angle: 20°

