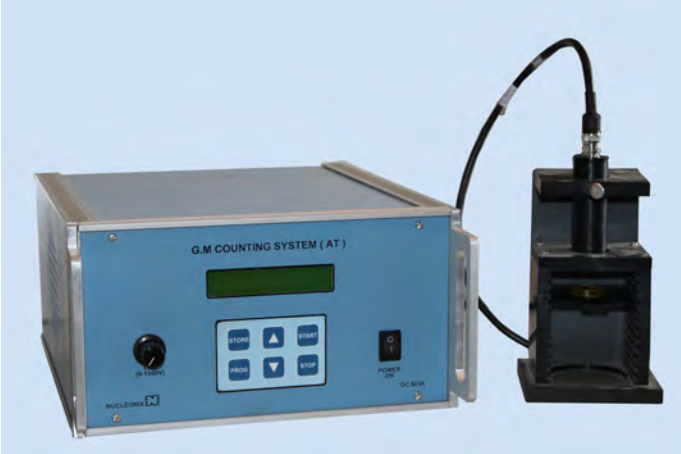
Technical Data

GEIGER COUNTING SYSTEM
TYPE: GC 601A



FEATURES:

- Ideal choice for teaching labs in physics stream.
- 20 x 2 LCD dotmatrix display for counts, elapsed time and HV.
- Single board design approach.
- Counts capacity 999999, preset time 9999 sec.
- Variable HV (0-1500V), 1mA.
- Store and Recall facility for data counts.

Geiger Counting System, type **GC601A** manufactured by NUCLEONIX is an Advanced Technology based, **economy** model, designed around eight bit microcontroller chip. This system with accessories is an ideal choice for teaching / demonstrating various G.M. Experiments, as part of Experimental Physics lab to U.G., P.G. Science, U.G. Engineering Physics students. Other streams such as Radiation Physics, Radiochemistry, Radiation Biology and Agricultural Sciences can also use this system.

This counting system can be used for carrying out a number of Nuclear Physics experiments such as Characteristics curve of a G.M. Counter, to verify the inverse square law for Gamma Radiation, Absorption of Beta Radiations, efficiency of G.M. Counter for Beta Radiation, determination of the back scattering factor of a material for beta rays etc,.

SPECIFICATIONS

G.M. Input (From G.M.Counter) :

(a) Polarity : Negative

(b) Amplitude : 250 mV (min)

Resolving Time : 6 micro sec (approx)

HV Output : Variable HV using tenturn pot upto a maximum of 1500 volts at 1 mA. Line and load regulation better than 0.05%. Ripple less than 10mV (rms).

Display : 20 x 2 LCD dotmatrix display has been provided to indicate data counts, Elapsed Time and HV.

Counts Capacity: 999999 counts

Preset time: (0-9999) sec.

Command Buttons : START, STOP, PROG, STORE, INC & DEC Command buttons have been provided on the front panel key pad.

Programmability: Includes selection of Preset Time, Storing / Recalling of data, starting and stopping of acquisition etc,.

GM Socket: MHV connector for connecting to G.M. Detector.

Power: Unit is powered works on 230V, AC, 50Hz through power / adapter which delivers +12V input to unit.

Mechanical Dimensions

236mm (W) X133mm (H) X246mm (D) Approx.

Recommended Accessories for G.M counter kit : G.M Stand, G.M Detector, Radioactive source kit, Aluminium Absorber set, Lead shielding (Optional).

ACCESSORIES FOR GEIGER COUNTING SYSTEM
TYPE : GC601A

(a) End Window G.M. Detector [Type : GM 120]

GM 120 is a Halogen Quenched End Window GM Detector, supplied by NUCLEONIX. It is suitable for general purpose GM Counting applications and for conducting G.M. experiments.

Its operating voltage is approximately 500V. It has got a very wide plateau length and plateau slope is better than 6% per 100V. It is enclosed in a PVC cylindrical enclosure for protection & supplied. An MHV socket provided on one side of the PVC enclosure facilitates one to connect to detector socket on rear panel of the counting system.

SPECIFICATIONS

Application : Suitable for Beta sample Counting
Operating Voltage : Range : (450 - 650V)
Tube Dimensions : Max. over all length 2.125 inches.
Max. Diameter : 0.59 inches
Gas filled : Ne + Hal
End Window : mica 2.0 mg/cm sq. density
Gamma Sensitivity : 18 cps / mR/hr

(b) End window G.M. Detector [Type : GM 125]

GM 125 is a Halogen Quenched, wide End Window GM Detector, supplied by NUCLEONIX. It is highly recommended for swipe sample counting of Beta samples by health Physics labs. Its operating voltage is approximately 500V. It has good plateau length and plateau slope. Its operating voltage is approximately 500V. It is enclosed in a PVC cylindrical enclosure for protection & supplied. An MHV socket provided on one side of the PVC enclosure facilitates one to connect to detector socket on rear panel of the counting system.

SPECIFICATIONS :

Application : Suitable for Beta sample Counting

Operating Voltage : Range : 450 - 750 V

Tube Dimensions : Max. over all length 1.93 inches.

Gamma Sensitivity : 50 cps / mR/hr with Co-60

Background with 40mm lead shielding : < 20cpm

Efficiency at (1 cm): (typical) (a) For Tl-204 $\simeq$ 5% (b) Sr-90 +Y90 $\simeq$ 20% (combined)

Max. Diameter : 1.13 inches

Gas filled : Ne + Hal

End Window : mica 2.0 mg/cm sq. density.

(c) Stand for G.M. Detector [Type: SG200]

Stand for G.M. tube type SG 200 has been designed to hold end window G.M. tubes. This stand can be housed inside the lead shielding if required. It has both sample and absorber trays. The position of these trays can be adjusted from the end window of the detector. The stand made up of acrylic sheet is precisely milled for sliding-in of sample and absorber trays.

Sample tray is designed to hold Planchets or disc type radioactive standard source (Beta or Gamma). Aluminum absorber discs can be interposed between the source and the detector for attenuating the radiation as seen by the detector.

This stand is an essential accessory for connecting end window G.M. tube to any of the G.M. counting systems manufactured by NUCLEONIX. For universities and colleges sliding bench type SB205 is recommended.

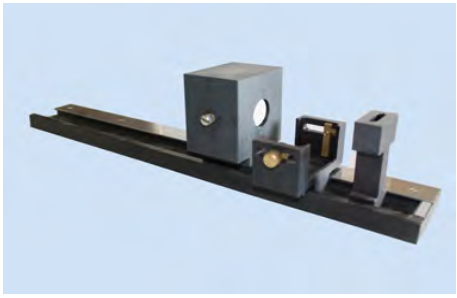
(d) Lead castle with door for G.M detector LS- 240

This consists of 40mm lead shielding cylindrical rings assembly with a total required number of lead assembly parts. There is a hinged door in the bottom ring through which sample can be loaded in to the G.M stand sample tray.

A 1mm aluminum lining is provided on the inside surface of the lead shielding. When it is dispatched from here usually it is packed in a wooden boxes. So, on unpacking there parts could be assembled as shown in the enclosed drawing.

(e) Sliding Bench [Type: SB201/SB205]

SB201 is meant for use with GM120 Detector.
SB207 is meant for use with GM125 Detector.



Sliding bench SB207 is designed specially for the purpose of mounting bench the G.M counter accessories for doing the experiments in a most convenient fashion. This essentially consists of a bench with sliding groves with a graduated S.S scale fixed on one side of it. Scale has graduations both in cm & inches upto 50cm/20 inches. There are three vertical sliding mounts, one for mounting of End Window G.M detector, Second is 'Absorber Holder' & Third is 'Source Holder' & source mounts. Each of these mounts can be positioned along the slide scale to have required distance between the end window to the source with absorber mount interposed in between. End window detector is housed in PVC enclosure with MHV socket fixed on to it.

(f) Source Kit – 1[Type: SK210]

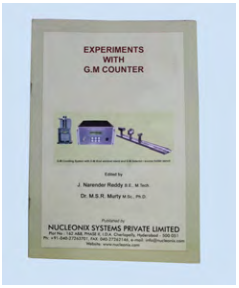
Source Kit-1 type SK 210 offered by NUCLEONIX contains one each of Beta and Gamma sources. These are low active disc sources of the order of 2 to 10 micro curie for Gamma & Beta. Gamma source disc is evaporated and sealed on 25mm dia X 5mm thick plastic disc. Whereas Beta source disc is evaporated & sealed on 25mm X 10mm thick plastic disc and covered with 10mg/sq.cm aluminized mylar film. This source kit is an ideal choice along with G.M. counting system for educational institutions & Research labs. Source kit containing the disc sources is offered in an acrylic box of dimensions 86mm X 46mm X 25mm (approx).

(g) Aluminimum Absorber Set [Type: AA 270]

Aluminimum Absorber Set Type: AA 270 offered by NUCLEONIX consists of absorber discs in different thicknesses ranging from 20 to 300 mg/cm.sq. Each of these absorbers is mounted in an individual plastic frame, which exactly fits into the absorber tray of the G.M. stand.

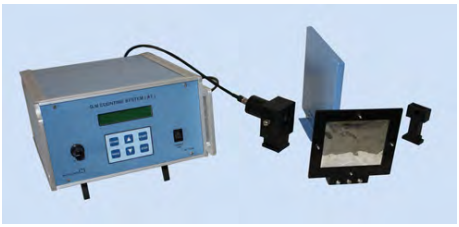
The diameter of each disc is approximately 50 mm including the frame. There is identification number for each disc printed on it. A chart showing the identification number and thicknesses of the disc in grms per unit area is given in the absorber box which is made up of acrylic sheet. All these discs are housed in this acrylic box. This absorber set will be useful in studying the Beta particle range and maximum energy by half thickness method using G.M. Counting systems.

(h) Free Experimental booklet :



(A booklet called "Experiments with G.M counter" will be supplied with each G.M counter kit, when you purchase. This illustrates in details about the experiments that can be done using this kit. Each experiment write-up contains, list of items required, experimental procedure, experimental data, analysis & computations, graphs etc.

(i) Absorber set for back scattering of beta particles experiment :



The following accessories are required to carry out this experiment, apart from the G.M Counting System GC601A / GC602A

a. Aluminium Absorber set with scatter stand.
b. 1" Wide End Window G.M detector GM125 with detector holder.
c. Lead block to prevent direct counts into detector.
d. Detector Holder & Source Holder.

(j) Accessories & setup for Bremsstrahlung experiment:

The following accessories have been used for this experiments, apart from G.M counting system GC601A/GC602A.

a. Perspex absorber (1.8mm).
b. Aluminium absorber (0.7mm).
c. Copper absorber (0.3mm).
d. Absorber holder.
e. 1" wide end window detector GM125.
f. Sliding Bench with Source Holder & Detector Holder.
g. Sr-90/Y-90 Beta Source.

Head of the Dept.

Approved By