PNS – 2

PARA NUCLEAR SPECTROMETER

INSTRUCTION MANUAL

Para electronics

3. INDICATORS/ CONTROLS / CONNECTORS

Front Panel

INDICATOR

MENU DISPLAY : 16 x 2 Large Character LCD Display

CONTROL

4 KEYS PAD : For Multifunction Operations

HV ADJUST : Helipot with graduated dial to set HV.
(10.00 Dial Setting = 1000 Volts)

SPECTROSCOPY AMPLIFIER : Gain: X 1 or X 2 by the 10 Turn Helipot with graduated dial

SIGNAL CHANNEL ANALYSER : Base Line: - 10 Turn Helipot with graduated dial for setting base line between 0to 10 V
Window: - 10 Turn Helipot with graduated dial for setting Window line between 0 to 2 V
Mode: - Switch Selectable between Threshold or Window

Rear Panel

CONTROLS

TEST POINTS : AMP INPUT
AMP OUTPUT
SCA OUTPUT

ON/OFF SWITCH : Mains ON/OFF switch

FUSE : Mains fuse slow blow type – 250 mA

CONNECTORS

MAINS : Mains cable receptacle with built-in fuse holder

RS232 CONNCTOR : 9 pin D type PC Interface connector

PRINTER OUTPUT : 25 Pin D type Printer interface connector

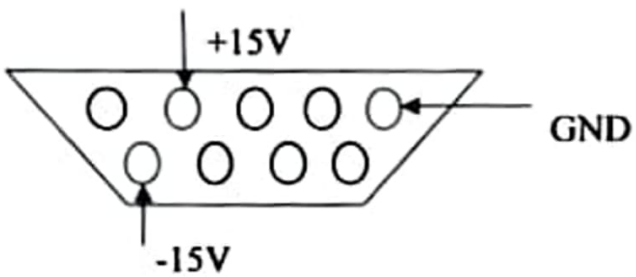
AMPLIFIER INPUT : BNC Connector for connecting Preamp output as input to Amplifier

AMPLIFIER OUTPUT : BNC Connector for connecting external Amplifier (Internally connected to SCA Input)

CA OUTPUT : BNC Connector for monitoring SCA gated output

H.V. OUTPUT : BNC Connector for connecting HV to detector (0 to +1000 V)

9 Pin Minrack connector : Preamplifier Power Connector
Pin No 1: GND
Pin No 4: +15V
Pin No 9: -15V



5. OPERATION

5.1 OPERATING PROCEDURE

Following procedure should be adopted for trouble free operation of **PNS-2**.

1. Connect Mains cable to the mains cable receptable mounted on rear panel of the instrument.
2. Mount NaI(Tl) / PMT detector on 14 Pin base of Preamplifier Unit (NETS-0)
3. Connect Preamplifier Power cable, Preamplifier Signal cable and H. V. cable between instrument and Preamplifier. (NETS-0). **Incorrect HV connection will lead to damage to the internally circuits of preamplifier as well as in the main instrument.**
4. Ensure that H. V. adjust potentiometer is at zero setting prior to turning on mains power.
5. Turn ON mains power.
6. Set HV voltage as mentioned in NaI(Tl) / PMT based detector using HV adjustment helipot.
7. Keep nuclear source in front of the detector.
8. Set Base line and Window as desired. Select appropriate Mode either Threshold or Window.
9. Press any key and follow the operating instructions as prompted by LCD Menu.
10. Load default parameter, Select preset timer Mode and Start Counter.
11. Refer the details on Set Up, Modes of operation, Data Recall and Transfer described in OPERATIONAL DETAILS.
12. At the end of the experiment, set High Voltage to 0 volts by turning the HV Adjust dial completely counter clockwise to 0.00 setting.

5.2 OPERATIONAL DETAILS

Para Nuclear spectrometer Model **PNS-2** is a versatile instrument, including the HV supply and front-end electronics required by the NaI (Tl)/ PMT based Detector. For each of these configurations, it is necessary to set certain parameters such as Preset Time, Number of Runs (repetitions). These parameters values will be loaded when the particular mode of operation is activated.

Model **PNS-2** has following default values for these parameters. These default values can be loaded if required.

5.2.1 DEFAULT PARAMETERS

PRESET TIMER

TIME : 30 seconds (0030)

Number of RUNS : 10 (0010)

5.2.2 BASIC KEY FUNCTIONS

Following table shows the Basic Keys Symbol and their function. These key symbols are used for displaying the keys.

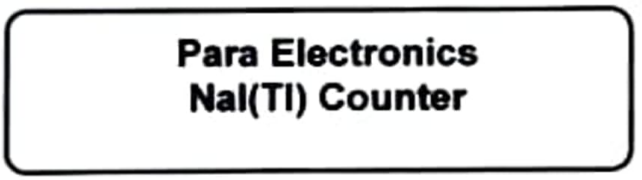
Key Symbol	Functions
S	**SKIP KEY** for changing Operating Mode or jump to next Mode
B	**BACK KEY** to go back without making any changes
E	**ENTER KEY** to confirm the parameter entry
+	**INCREMENT KEY** to increment the digit under cursor
>	**SHIFT KEY** to move the cursor to next digit position
II	**STOP or HALT KEY**

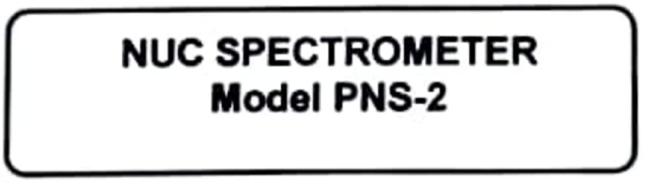
Apart from these Basic Key functions, there are many other key symbols used for displaying the options. These key symbols are indicated while describing the particular parameter/operation.

5.2.3 SET PARAMETERS

In this mode, user can set the parameters such as Preset Time, Number of Runs etc. Counts per Run are stored automatically in the memory and can be retrieved in RECALL MODE.

While the Menu is indicating





1. Default Mode

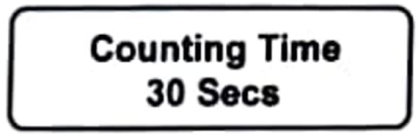
D Key: - Set Default Parameters
E Key: - To enter into Setup mode
S Key: - Go to Back.

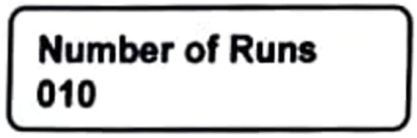
2. Setup Mode

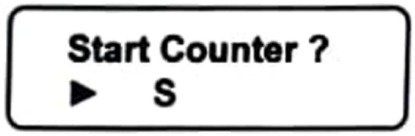
D Key: - Set Default Parameters
E Key: - To enter into Setup mode
S Key: - Go to Back.

1. Default Mode

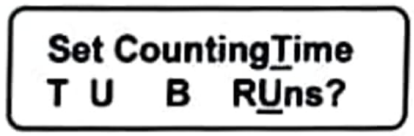
After Press E key instrument will loaded following values and ready for Start Counter.





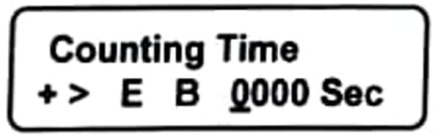


2. Setup Mode



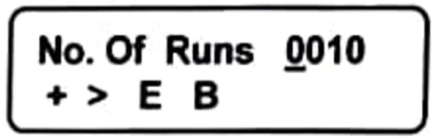
T Key :- Set Preset Time.
U Key:- Set Number of Runs
B Key:- Go to Back

If **T** Key is pressed, following menu will appear on LCD



Counting Time can be set between 1 to 9999 Seconds

If **U** Key is pressed, following menu will appear on LCD



Number of Runs can be set between 1 to 1000.

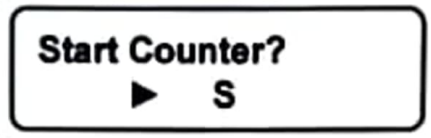
Note :

Menu indicates blinking underlined digit that can be modified. To increment this digit, press + Key, to shift cursor to next digit press > Key E Key to accept the set parameter and B Key to exit from this Mode.

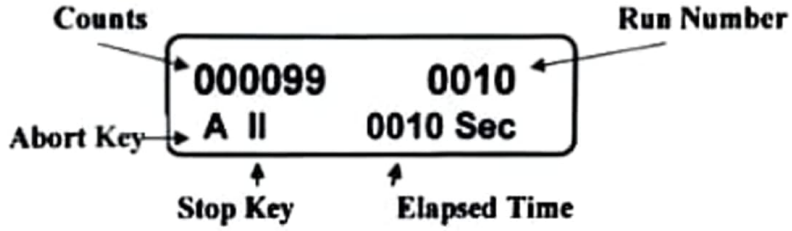
If Counting Time or Number of Runs are set to 0000, PNS-2 will load Counting Time as 1 Second and Number of Runs as 1.

5.2.4 RUN MODE

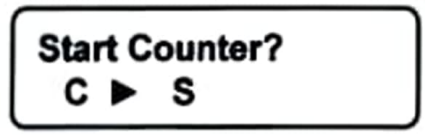
S Key will bring up menu as below



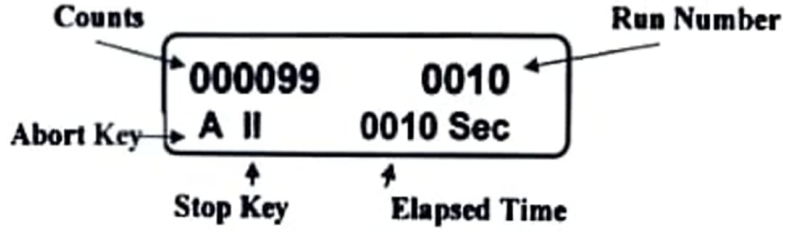
While counting, Counting Time, Number of Runs and counts as shown on LCD display. All these three values of the current run are stored in EEPROM. The maximum storage is upto 1000 Runs.



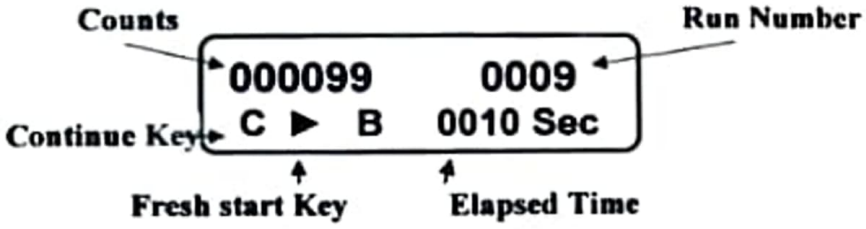
A Key :- Abort key will terminate the current Run and halt counting immediately. The data of the current Run is ignored by PNS-2.



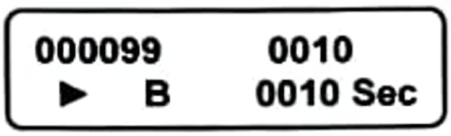
C Key:- To continue run from where the run was stopped.
▶ Key:- To start run from fresh.
S Key:- To change Mode.



A Run can be halted / stopped by pressing **II** key. However, the stopping will occur only when current Run is completed. On halt, instrument will prompt user whether to continue or to start fresh/new run.



When preset numbers of Runs are completed the menu will change to



▶ Key:- To start run from fresh.
B Key:- To change Mode.

5.2.5 RECALL DATA MODE

In this mode, the Counts Data (as stored in Preset Timer Run) can be retrieved and transferred to LCD or COM Port or Printer Port. It also allows user to select the data range which will be transferred to the set device.

Press → S Key to get this mode. Menu will indicate

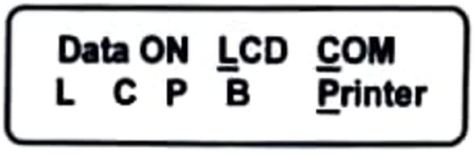
Press **E** :- To recall Counts Data
Press **S**:- To go back

Pressing of **E** key will prompt the selection of Data Range which can be Entire or Partial.

F Key:- To select data "From Run" (beginning of data range)
T Key:- To select data " To Run" (end of data range)
E Key:- To select Entire data range (all the Runs)
B Key:- Back to Recall Data

It is necessary to enter valid range of data. **PNS-2** will not accept invalid range.

Next selection is for the Device where the data is to be transferred, i.e. either on LCD display or on Printer or on COM port for transfer to PC.



L Key:- To view data on LCD display.
C Key:- To transfer data on PC com port.
P Key :- To transfer data on any standard Printer.
B Key:- To go back.

Run PNS-2 data transfer program on PC. Click on 'Receive data' button to receive all data from the instrument to PC. User cannot receive data only when instrument is counting.