



PRS-7-DSC  
Electronics SSS-22P  
and LR-



SSS-22PAL  
Suitcase Version  
ALL-IN-ONE



PRS-7  
Electronics SSS-12P-1



SSS-12P-1

# Portable Liquid Scintillation Counting System

Model Series - SSS-12P-1, SSS-22P,  
SSS-22-PAL, SSS-22-MCA, SSS-22-LR

Carbon-14 and most other radioactive materials.  
The **SSS-22P also measures** Tritium and Exceptional for  
measuring low levels of Tritium, C-14, and S-35.  
**SSS-22-LR** for Ultra Low-Level Tritium detection.

## Features

- Measures All Alpha – Beta Emitters and Low Energy Gamma Emitters – Including
  - Tritium, Carbon-14, and Sulphur-35
- Alpha / Beta Separation
- **Optional:** MCA Includes Gamma Isotope Identifier
- Dual PM Tube Design For Coincidence Verification
- SSS-12P-1 – Single Sample Holder
- SSS-22P – Three Sample Holder
- Settable Window Can Be Set For Any Isotope
- Diverse Sample Type: Water, Food, Soil, Fabric, etc.
- All In One Unit – **SSS-22-PAL**
- **R-232 PC** Interface
- **IP65**

## Application

A Liquid Scintillation Counting System is useful for measurement of radionuclides in many materials including food, soil, water, blood, etc.

The **SSS-12P-1 and SSS-22P** Manual Liquid Scintillation Counting Systems accurately quantitatively measures

## Description

**Measuring Principal:** The most sensitive method of detecting and quantitating Beta emitting isotopes is to intimately mix the sample with liquid scintillation fluor and count each individual scintillation event with a photomultiplier counter.

**Alpha / Beta Separation.**

**Count Verification** for Tritium.

**An Energy Analyzer** further selects the pulses and delivers the true signal.

**A Detection cell** is optically coupled to selected photomultiplier tubes.

**SSS-12P-1** has a **1 Vial Capacity – 1 PM Tube.**

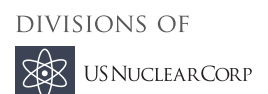
**SSS-22P** has a **3 Vial Capacity** providing faster thru-put and easy comparison of sample to calibration standard or to background – **2 PM Tubes**

**SSS-22PAL** has a **3 Vial Capacity** as does the SSS-22P providing faster thru-put and easy comparison of sample to calibration standard or to background. It is an **ALL-IN-ONE** SSS-22P contained within a suitcase with electronics, detectors, and sample holders for your convenience.

**A User Manual is provided.**



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## Gamma Background Radiation Rejection Features

- Energy analyzer window rejects pulses with energies outside the window setting
- Optional Lead Shielding around detector

## Counting Assembly Features

- Excellent repeatability
- Fully light tight system
- Fail safe interlock to protect PM tubes
- High transmission optical coupling to PM tube

## PM Tube and Pre-Amp Noise Elimination Features

- Coincidence Verification with High quality Dual PM tubes and preamps.
- Fully adjustable energy analyzer window rejects low energy pulses.
- **SSS-12P-1:** 1 Vial Capacity – 1 PM Tube
- **SSS-22P:** 3 Vial capacity for faster thru-put and easy comparison of sample to calibration standard or to the background – 2 PM Tubes
- **SSS-22P:** 3 Vial capacity provides less wait time for dark adaption of phosphor

## Data Analysis and Presentation


- Scintillation counts detected by PM tubes are processed by a fully adjustable single channel analyzer which is centered on the energy peak of the isotope being measured. This deletes both higher energy pulses from background radiation and lower energy counts from the PM tube or circuit noise. The pulses feed to a digital scaler and optional digital printer.
- This process allows long count times for measurement of very minute samples.
- USB interface to computers or data stations.

## Specifications

|                              |   |
|------------------------------|---|
| <b>H-3 Gross Efficiency:</b> | >50% Gross, Coincidence efficiency >10% Verified.   |
| <b>H-3 Gross Efficiency:</b> | >20% Gross, Coincidence efficiency >10% Verified ( <b>SSS-22-LR</b> )   |
| <b>H-3 Sensitivity:</b>      | 20,000pCi/l in 30 minutes; Below 10,000 pCi/l in 3 hours ( <b>SSS-22-LR</b> )   |
| <b>Count Times:</b>          | 1 sec. thru 99 sec. (1 sec. increments), and 1 min. thru 99 min. (in 1 min. increments).  |
| <b>Voltage:</b>              | 0-1500 Volts - fully user settable.   |
| <b>Readout:</b>              | Digital - 6 digit LCD, (LED optional).  |
| <b>Outputs:</b>              | Standard: Serial pulse output and R-232.  |
| <b>Power:</b>                | Rechargeable Lithium batteries and AC adapter   |
| <b>Sample Size:</b>          | Accepts standard Liquid Scintillation vials 20-25 ml.   |
| <b>SSS-22 PAL Case:</b>      | Weather-tight NEMA rated tough, durable, lightweight.<br>A "tongue-in-groove" continuous "O"-ring system makes the case water, moisture, and dust tight. Plus a low profile pressure release valve. |
| <b>Optional:</b>             | <b>SSS-22P:</b> Accepts 6-7 ml vials with Optional adapter.   |
| <b>Scintillation Fluors:</b> | Accepts most scintillation fluors. Perkin-Elmer Ultima Gold-LLT is recommended for H-3 counting   |



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| MODEL SUBASSEMBLY                      | SSS-12P-1<br>DETECTORS | SSS-12P-1<br>SSS-22P<br>SSS-22-LR<br>ELECTRONICS | SSS-22P<br>SSS-22-LR<br>DETECTORS | SSS-22-PAL<br>ALL-IN-ONE<br>(Includes Electronics) |
|--|------------------------|--|-----------------------------------|--|
| MODEL                                  | DT-S-12P               | PRS-7-DSC  | DT-S-22P<br>DT-S-22-LR            | SEE SSS-22P  |
| Case Dimensions                        | 18" L x 7" W x 7"H     | 10" L x 7" W x 7"H<br>includes handle            | 18" L x 14" W x 7"H               | 22" L x 16" W x 7"H                                |
| Weight                                 | 3.6 Kg (8 lbs)         | 3 Kg (7 lbs)<br>includes batteries               | 6.8 Kg (15 lbs)                   | 10 Kg (22 lbs)                                     |
|  |                        | <b>PRS-7</b>                                     |                                   |  |
| Case Dimensions                        |                        | 10" L x 4.1" W x 7"H<br>includes handle          | 18" L x 14" W x 7"H               | 22" L x 16" W x 7"H                                |
| Weight                                 |                        | 2.5 Kg (5 lbs)<br>includes batteries             | 6.8 Kg (15 lbs)                   | 10 Kg (22 lbs)                                     |
| # PM Tubes                             | 1                      |  | 2                                 | 2  |
| # Amplifiers                           |                        | 2  |                                   | 2  |
| Coincidence Counting                   |                        | Yes  |                                   | Yes  |
| Detected Emitters –<br>Alpha-Beta PLUS | H-3, C-14, S-35        | H-3, C-14, S-35                                  | H-3, C-14, S-35                   | H-3, C-14, S-35                                    |
| Capacity                               | 1 Vial                 |  | 3 Vials                           | 3 Vials  |

## PRS-7 and PRS-7-DSC


- Single Channel Analyzer
- Detects: Alpha, Beta, Gamma, X-Ray, Tritium, Positron, Meson, Cosmic Rays – Depending on Detector Selected
- Versatile AC and Rechargeable Battery
- Three Presettable Window Positions
- Switch Selectable
- Six Decades
- Crystal Controlled
- Splash Proof
- IP65

## PRS-7-DSC

- Dual Single Channel Analyzer
- 2 Independent Detector Inputs
- Coincidence Circuit Signals if Both Detectors See a Pulse at the Same Time



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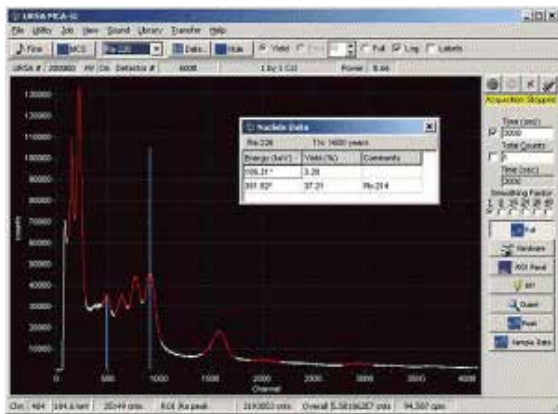
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## Gamma Detection

Gamma emitter content is measured using a Scintillation detector with the MCA (Multi Channel Analyzer) with greater than 512 channels with a user settable energy range and readout. For example the MCA can be set to show Gamma peaks from 15 KeV to 3.5 MeV.

## Isotope Identification System – TA SMART-PEAK™

Software detects even low Gamma concentrations. The isotope identifier specifies & displays radioactive nuclides.



Sample Screen Shot  
MCA Gamma Isotope Identifier

## MCA Electronic System Description (Microprocessor based)


|                                   |   |
|-----------------------------------|---|
| <b>Electronics:</b>               | <b>High Quality Windows PC including:</b>                               |
| <b>Operating Software:</b>        | <b>TAcquire™</b> custom software plus Excel Spread Sheet                |
| <b>Radionuclide Library:</b>      | Radionuclide Library Tailored to Customer Request                       |
| <b>Data:</b>                      | Stores Data to MS ACCESS Database. Data Files are Importable into Excel |
| <b>CPU with Data Acquisition:</b> | High Resolution COLOR display, Audio                                    |
| <b>Data Ports:</b>                | USB and Ethernet  |
| <b>USB-Flash Drive:</b>           | For data storage – 10 years storage                                     |
| <b>Terabyte Hard Drive:</b>       | Stores programs and 20 Year's of detailed Data plus alarm record.       |
| <b>Power:</b>                     | 110 VAC - 60 Hz, 220 VAC  |
| <b>Optional</b>                   | 50/60 Hz Internal Battery Backup, Fail Safe                             |

## Options

- Set of 3 calibrated liquid standards, H-3, C-14 and S-35. User must mix TA solutions with liquid scintillant.
- Optional Interfaces and Outputs: Clear instructions with all interfaces.
- Data logging software, Model #ORO-22P
- Data acquisition interface and cable with driver, Model #DAQ-3
- Increase from 3 to 6 sample capacity
- MCA Electronics for Gamma Isotope Identification
- Printer



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| TA LIQUID SCINTILLATION COUNT RANGE |            |                 |               |              |
|-------------------------------------|------------|-----------------|---------------|--------------|
|                                     | COUNT TIME | SSS-12P-1 pCi/L | SSS-22P pCi/L | MAX KEV BETA |
|                                     |            |                 |               |              |
| TRITIUM                             | 2 min      | N/A             | 10,000        | 18.6         |
|                                     | 10 min     |                 | 5,0000        |              |
|                                     | 60 min     |                 | 2,000         |              |
|                                     |            |                 |               |              |
| C-14                                | 2 min      | 2,500           | 1,250         | 156          |
|                                     | 10 min     | 1,250           | 625           |              |
|                                     | 60 min     | 500             | 250           |              |
|                                     |            |                 |               |              |
| S-35                                | 2 min      | 2,500           | 1,250         | 167          |
|                                     | 10 min     | 1,250           | 625           |              |
|                                     | 60 min     | 500             | 250           |              |



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