

## Liquid Scintillation Counter

# TRI-CARB 5110TR

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### Description

The Tri-Carb 5110TR liquid scintillation counter is a fully loaded premium instrument capable of more accurately detecting Ultra Low Level counts in mixed and unknown samples using proprietary Dual Phase Separation and PSA Histogram technology.

### Exclusive Standard Features

- **TR-LSC (Time-resolved Liquid Scintillation Counting)** for high sensitivity, low background liquid scintillation counting
- **Single/Dual labeled color-corrected DPM** to determine absolute activity level of the sample
- **QuantaSmart™ Software** a robust multitasking, easy networking environment with unlimited assays in a secure multiuser environment
- **Alpha-Beta Separation** for efficient separation of Alpha and Beta counts in mixed samples
- **PSA Histogram** provides higher resolution of Alpha-Beta separation with up to 90% reduction in time required to count alpha/beta standards compared to legacy method
- **Dual PSA Discriminator** further reduces isotope spillover and increases Quality Metric for maximum sensitivity and lowest MDA
- **Ultralow level count mode** increases system sensitivity ( $E^2/B$ )
- **PAC (Pulse Amplitude Comparison)** decreases the component of background produced by optical crosstalk
- **SpectraWorks 2** spectral analysis package that determines optimal counting regions, and calculates figure of merit automatically
- **Enhanced IPA (Instrument Performance Assessment)** database monitors efficiencies, backgrounds,  $E^2/B$  and Chi-square values for  $^3\text{H}$  and  $^{14}\text{C}$  over the life of the instrument
- **Replay** reanalyzes sample counts without recounting samples
- **Dynamic Color Correction** ensures accuracy of tracking lower energy sample spectra over a wide quench range
- **Auxiliary Spectrum Memory** stores rejected events for future analysis
- **Bi-directional Sample Conveyor** with a capacity of up to 408 (20mL vials) or 720 (4 or 7 mL vials)
- **Varisette™** sample cassette for intermixing vial sizes without special adapters
- **Operational-status LED Indicator** for clear assay status updates at a glance

## Additional Standard Features

- **Direct DPM** determines single-label DPM without the use of quench standards
- **Luminescence Detection** flags percent luminescence to alert user of possible sample problems
- **Luminescence Correction** adjusts for chemiluminescence interference
- **Temperature Control** maintains optimum conditions for a variety of samples
- **60 Quick Count Protocol Flags** with the flexibility to define unlimited assays
- **Fold-away Ergonomic Arm** adaptable to enter data either sitting or standing
- **Built in Computer** with Windows 10 Operating System
- **Date and Time Clock** provides real time display and time-stamped printouts; battery supported
- **Anti-jam Recovery** protects samples, vials and the counting system from damage if obstructions occur
- **Automatic Power-fail Recovery** restarts counting when power is restored and the instrument has reinitialized itself
- **Positive Sample Identification** provides protocol number, cassette number, sample number, user-selectable printout and data file storage for the counting time and date on each sample
- **Multi-parameter Linear Multichannel Analyzer (MCA)** offers an extended dynamic quench range and provides multi-parameter spectrum analysis to correct for luminescence, color quenching and background radiation
- **<sup>133</sup>Ba Low Energy External Standard Source and tSIE** (transformed Spectral Index of External standard) eliminates the need for repeat counting of the external standard and negates the effect of isotope on quench monitoring accuracy and precision
- **AEC (Automatic Efficiency Control)** corrects for differential quenching effects in multi-label samples. The low energy spectrum of the external standard ensures accurate tracking of <sup>3</sup>H, <sup>14</sup>C and other low energy sample spectra over a very wide quench range
- **Precount Delay** permits dark adaptation of samples before counting
- **Coincidence Resolving Time** enables optimized counting for a variety of liquid, solid, or bead based scintillators
- **Spectral Unfolding** separates and displays the individual radionuclide spectra of dual label samples in color analysis of sample spectrum (requires color-corrected dual label DPM option)
- **3D (Three-dimensional) Spectral Mapping** displays in color the quench standard spectra together with the spectrum of the unknown for single label DPM counting (requires color-corrected dual label DPM option)
- **SpectraBase Counting and Data Management System** provides counting and storing of complete spectra
- **Decay Computations** automatically calculates decay corrected DPM values for commonly used radionuclides
- **Group PrioStat™ Interrupt Mode** prioritizes counting status and automatically restores the interrupted protocol
- **Background Subtraction** calculated by sample, entered value or stored IPA background spectrum
- **SIS (Spectral Index of Sample)** determines counting efficiency by analysis of sample spectrum
- **Programmable Single Photon Counting** enables luminescence assay counting with optimized signal-to- background ratios to overcome problems associated with excessive luminescence
- **Preset Time and Preset Error Coincidence Termination** optimizes counting accuracy in three counting regions
- **Automatic Spectrum Plot** allows spectral documentation per sample
- **Sample Screening** screens numeric fields on several criteria including background levels, a hard number or within a range of activities or values
- **Printed Header** contains instrument serial number, user ID, and drive and path of all electronic stored data for GLP compliance
- **Password Protection** prevents unwanted changes to saved assays
- **Half-life Correction** adjusts for decay to any date and time
- **Unit Conversion** activity can be reported in becquerels, microcuries, or picocuries
- **Auto QA (Automatic Quality Assurance)** automatically prints reports for backgrounds, efficiencies, E2/B, and Chi- square values, results can be transmitted via RS-232 for archiving.
- **Percent of Standard** calculations compared to single, dual or triple label samples
- **Automatic Processing** provides automatic, protocol specific data processing from count data to final results requiring no exporting of data to off board storage devices or computers
- **Independent Output Formatting**, provides flexibility in customizable data reporting for each protocol. Electronic data can be saved to disk in ASCII, RTF, or Microsoft® Excel® compatible format
- **Computer-aided Diagnostics** to verify all system functions
- **Sample Worklist** enables entry, editing and review of work lists for each assay

## Other Options

- **Printer** ink jet or laser jet
- **Automatic 2D Barcode Reader** reads 2D barcodes to be used to create the sample work list (sample work list option required)
- **Instrument Utility Cart** functionally designed general purpose laboratory cart that supports any PerkinElmer bench top system
- **Temperature Control**
- **Enhanced Security** providing 21CFR part 11 compatibility

## Physical Data

Dimensions	Height: 18.5 in (47 cm) Width: 40.5 in (103 cm) Depth: 32 in (81 cm)
	<i>with Temperature Control</i> Height: 18.5 in (47 cm) Width: 40.5 in (103 cm) Depth: 44 in (112 cm)
Weight	477 lb (238 kg) Shipping Weight Approximately 700 lbs (318 kg)
	<i>with Temperature Control</i> 523 lb (238 kg)
Electrical Requirements	100-240 Vac 50/60 HZ 3- prong grounded plug
Power Consumption	<800 VA
Environmental	Operating ambient temperature 15 to 32 °C (59-90 °F)

## Factory Performance Minimum

Energy Range	0-2,000 KeV
Efficiency Normal Count Mode (Minimum Acceptable)	<sup>3</sup> H 0 - 18.6 keV 63%
	<sup>14</sup> C 0 - 156 keV 95%
Observed Background, Normal Count Mode (Average)	<sup>3</sup> H 0 - 18.6 keV 17 CPM
	<sup>14</sup> C 0 - 156 keV 26 CPM
Figure of Merit (E <sup>2</sup> /B), Normal Count Mode	<sup>3</sup> H 1 - 18.6 keV 180
	<sup>14</sup> C 4 - 156 keV 360
Figure of Merit (E <sup>2</sup> /B), Ultra Low Level Count Mode (ULLCM)	<sup>3</sup> H 1 - 12.5 keV 500
	<sup>14</sup> C 14.5 - 97.5 keV 940

**Note:** The efficiencies, backgrounds, and E<sup>2</sup>/B values for the Normal Count Mode were determined using PerkinElmer sealed large vial glass standards set P.N. 6008500 verified with NIST standard activity. The ULLCM values are determined using PerkinElmer low level sealed large glass vial standards set P.N. 6018914 verified with NIST standard activity. No maximum is specified for background.

**Safety, Radiated Emissions and Immunity:** The Tri-Carb 5110TR has been tested and approved for safety, radiated emissions and immunity according to the standards of UL, IEC61010 and CE.

In the U.S.A. the UL approval satisfies the requirements of 29CFR 1910.399.