

CHEMICAL, BIOLOGICAL AND RADIATION SENSORS

ROBUST WATER SAFETY MONITOR

Model # SSS-33-5FT-R Water Security
Model # SSS-33-5A Water Purity

CHEMIST-IN-A-BOX™

FEATURES:

- Simplify Your Testing – All In One System
- 7 Major Chemical Tests Provided
- From 4 To 10 Radiation Tests Provided
- Large Number of Microbes Detected
- Worlds Only Alpha-Beta In Water Sensors
- REAL TIME, IN-LINE, CONTINUOUS
- TRUE FAIL SAFE DESIGN WITH ALARM
- DETECTS ALPHAS, BETAS AND GAMMAS, TRITIUM, RADON, RADIUM URANIUM
- DETECTS CHLORINE, NITROGEN, TOC
- NO REAGENTS REQUIRED
- EASY INSTALLATION, CALIBRATION

APPLICATION:

- Monitor community drinking, wastewater, both in ground and surface waters, against radioactive and other contaminants.
- Terrorist contamination
- Industrial contaminates: laboratory, power plant, agricultural
- Industrial accident/illegal dumping
- Residual treatment additives

PROBLEM: Water sources are vulnerable to: accidental or knowing contamination by individuals, groups, industry and medical labs/hospitals, terrorist, naturally occurring radioactive materials (NORM) and residual treatment additives. Water districts and wastewater facilities have not had the option of a robust real-time monitor for radio nuclides and other contaminates. To date, no real time monitor has been available for radio nuclides and only individual monitors for specific chemical and biological contaminants have been available. This lack of a comprehensive, robust detection monitor has seriously hampered the development of an Online Contaminant Monitoring System (OSMS), required to protect the nation's water.

SOLUTION: Model SSS-33-5FT-R combines several detection goals into one monitor. The SSS-33-5FT-R continuously monitors radio nuclides using both ion exchange resin beads and charcoal filter. Chlorine, TOC, and Nitrogen are monitored with detectors integrated within the SSS-33-5FT-R system. Additional monitoring is available and will be tailored to specific needs on request. .

Measurements are logged 24 hr/day 7 day/week, with alarm, and a universal read out adaptable to mainframe infrastructure computers.

All Chemical and Biological Technology is provided by Data Rangers LLC



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TA TECHNICAL ASSOCIATES

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PHYSICAL:

MEASUREMENT	SENSITIVITY	TOP OF RANGE	SENSOR	Maintenance	Comments
FLOW	0.5% of Reading	0.06gpm - 2gpm	Volumetric Flow	None	10 - 36 VDC Input
TEMPERATURE	0.15	32 - 100 ^o F	RTD	Periodic Calibration	10 - 36 VDC Input
PRESSURE	0.2% Full Range	0-60 psi	Ceramic Diaphragm	None	10 - 36 VDC Input

System flow rate

- Standard:** 100 to 1,000 ml/minute
- Optional:** Wide range of flow rates available
- Sample temperature standard:** Up to 80° F liquid. (Optional to 115° F)
- Ambient temperature** 65 - 100 ° F
- Optional:** Cooler model **Cool-33** for detector & sample is used in case of higher sample or ambient temperatures.

Size and Weight:

- Dimensions:** 29" WIDE X 31" deep X 41" high including wheels, plus wall or cabinet mounted Sensor Panels
- Wheels:** 5" dia, high capacity, rugged wheels with lock & rubber tires.
- Shipping weight:** Standard unit: 300kg

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CHEMICAL Model # SSS-33-5FT-R Water Security

MEASUREMENT	SENSITIVITY	RANGE	SENSOR/ METHOD USED	MAINTENANCE TIME - ACTION	POTENTIAL MAINTENANCE COSTS - COMMENTS
TOTAL CHLORINE	0.01 mg/l	0.01 - 10 mg/l	Amperametric Electrode Sterilizable	Every 12 months Replace gel caps And add Electrolyte Every 2 years Replace Sensor	Sensor - \$1630 Gel Cap Cartridges - \$90 Electrolytic Gel - \$45 2 Year Costs \$1900
PH	0.2	0 - 14	Amperametric Electrode Sterilizable	Every 2 Years - Replace Sensor	2 Year Costs \$530
CONDUCTIVITY	10uS/cm ³	20mS/Cm ³	Amperametric Electrode	Every 2 Years - Replace Sensor Calibrate Monthly. Easy to calibrate so it could be calibrated on the chlorine Schedule	2 Year Costs \$630
TURBIDITY	0.001	0.00 to 10,000FNU	UV Spectrometer	Periodic Calibration and Cleaning	
OXIDATION REDUCTION POTENTIAL (ORP)	1mV Resolution	-1.500mV to +1.500mV	Amperametric Electrode Sterilizable	Every 2 Years - Replace Sensor Calibrate Monthly. Replace Reference KCl cartridge	2 Year Costs - \$480
TOTAL ORGANIC CARBON (TOC)	0.1 mg/l	10mg/l - 10,000mg/l	UV Spectrometer	Replace UV Lamp when needed. Spare Lamps are supplied	
LEAD	200 ppb	200 - 20,700 ppb(mg/l)	Solid State Detector	Replace Sensor annually Calibrate weekly for beat results	2 Year costs sensor - \$1634 EPA max limit 15ppb Other Dissolved metals may interfere with LEAD Measurement

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Radiological – ANALYTICAL, WATER-PURITY Model SSS-33-5A

MEASUREMENT	SENSITIVITY RANGE	TOP OF RANGE	SENSOR/METHOD USED	MAINTENANCE TIME - ACTION	EPA MAX LEVELS FOR DRINKING WATER
Gross Alpha Excluding Radon & Uranium	15pCi/liter	10,000pCi/liter	Crushed Scintillation Bed of Crystals preceded by Radon and Uranium Traps	6 Months for Finished Water. Replace De-ionizer Cartridges	15pCi/liter
Beta	4mRem/yr	50µCi/liter	Crushed Scintillation Bed of Crystals	6 Months for Finished Water. Replace De-ionizer Cartridges	4mRem/yr
Gamma	4mRem/yr	50µCi/liter	Nal Gamma Spec Scintillation Crystal	3-6 Months for Finished Water Replace Particulate Filter Cartridge	4mRem/yr
Uranium	20pCi/liter	2000pCi/liter	An-Ion Concentrator & Scintillation Crystal	3 Months Replace An-Ion Beads	20pCi/liter
Combined Ra-226 and Ra-228	5pCi/liter Combined	1,000pCi/liter	Cat-Ion Concentrator & Scintillation Crystal	3 Months Replace Cat-Ion Beads	5pCi/liter Combined

OPTIONAL:

MEASUREMENT	SENSITIVITY RANGE	TOP OF RANGE	SENSOR/METHOD USED	MAINTENANCE TIME - ACTION	EPA MAX LEVELS FOR DRINKING WATER
Tritium	20,000pCi/liter	1Ci/liter	Crushed Scintillation Bed of Crystals	6 Months for Finished Water Replace De-ionizer Cartridges	20,000pCi/liter
Radon	100pCi/liter	2000pCi/liter	Ion Chamber with Water Bubbler--Agitator	3 Months Clean Vapor Trap	Unregulated

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Biological - Model SSS-33-5FT-R

MEASUREMENT	SENSITIVITY RANGE	TOP OF RANGE	SENSOR/METHOD USED	MAINTENANCE TIME - ACTION	COMMENTS
Realtime Continuous Monitoring yield results in seconds to <4 hours depending on desired sensitivity. Cryptosporidium parvum & Giardia Lambilia are classified as Protozoa. Pseudomonas, Sammonella, Shigelia, E.Coli & Legionella are classified as Bacteria. B.Subtilis, B. Thuingiensis & B. Globilgi are classified as Spores	1,000 liter to 150/mL for Protozoa and Spores. 500/mL to 3,000/mL for Bacteria	Performance improves significantly as Particulates in the Range of 500nm Range decreases.	Multi-angle light scattering with 2D high frequency cameral yielding real time and continuous results.	Flow Cell Cleaning up to a maximum of weekly to every 8 weeks. Takes 30 minutes to perform this task with unskilled labor.	R&D Programs are in progress to systematically improve the sensitivity to the 100/L level in most potable waters by early 2008.
Future Classification Bacillus Cereus Yeasts, Molds Algae (various) pneumophila Yersinia pestis					

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RADIOLOGICAL – WATER SECURITY – MODEL - SSS-33-5FT-R

MEASUREMENT	SENSITIVITY	TOP OF RANGE	SENSOR METHOD USED	MAINTENANCE	COMMENTS
Gross Alpha	15pCi/liter	10,000pCi/liter	Crushed Scintillation Bed of Crystals preceded by Radon and Uranium traps	6 months for finished water Replace De-ionizer cartridges	
Beta	1,000pCi/liter	50µCi/liter	Crushed Scintillation Bed of Crystals	6 months for finished water Replace De-ionizer cartridges	
Gamma Dissolved	5,000pCi/liter	50µCi/liter	Nal Gamma Spec Scintillation Crystal	3 to 6 months for finished water. Replace Particulate Filter Cartridge	
Gamma Particulate	5,000pCi/liter	50µCi/liter	Nal Gamma Spec Scintillation Crystal	3 to 6 months for finished water. Replace Particulate Filter Cartridge	

Optional (see model SSS-33-5A. The ANALYTICAL, WATER-PURITY System)

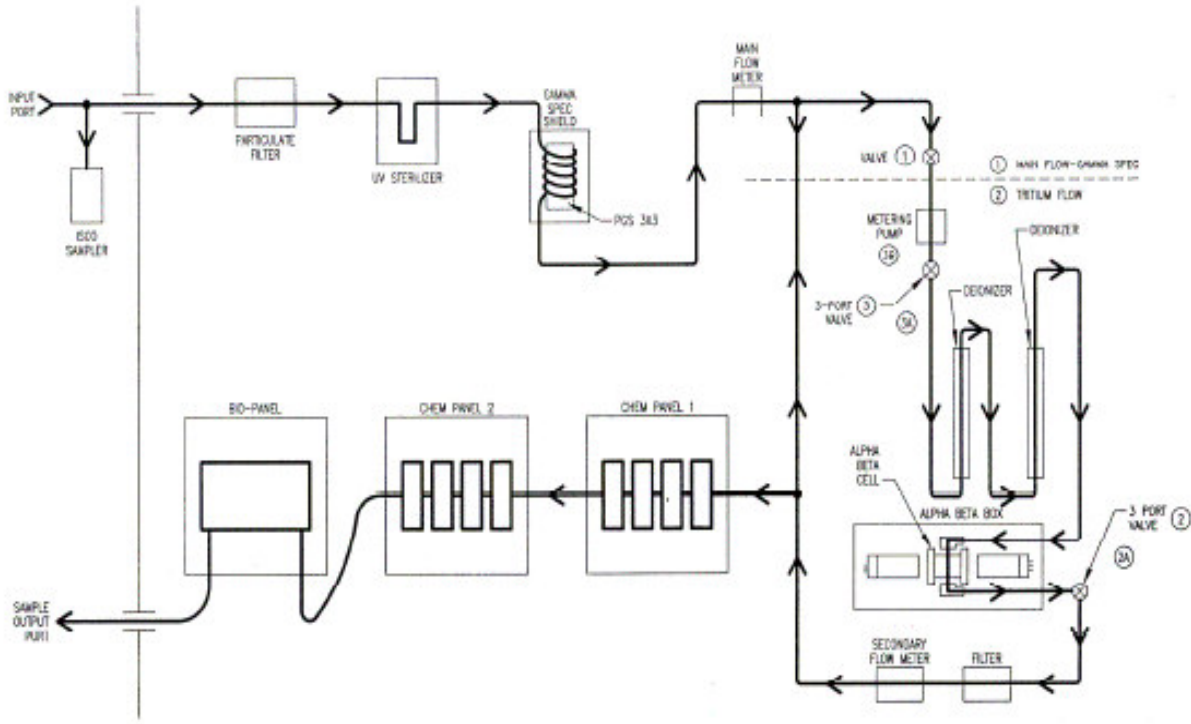
MEASUREMENT			SENSOR/ METHOD USED	MAINTENANCE TIME - ACTION	
Tritium			Crushed Scintillation Crystals	6 Months for finished water Replace De-ionizer Cartridges	
Combined Radium 226 & 228			Cat Ion Concentrator & Scintillation Crystal	3 Months Replace Cat Ion Beads	
Radon			Ion Chamber with Water Bubbler-Agitator	3 Months Clean the Vapor Trap	

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SSS-33-5FT-R - FLOW CHART DIAGRAM



Flow Chart Diagram of System

The following two pages shows the four screen shot displays of the SSS-33-5FT-R System for “**Calibration, Testing, and Operations.**”

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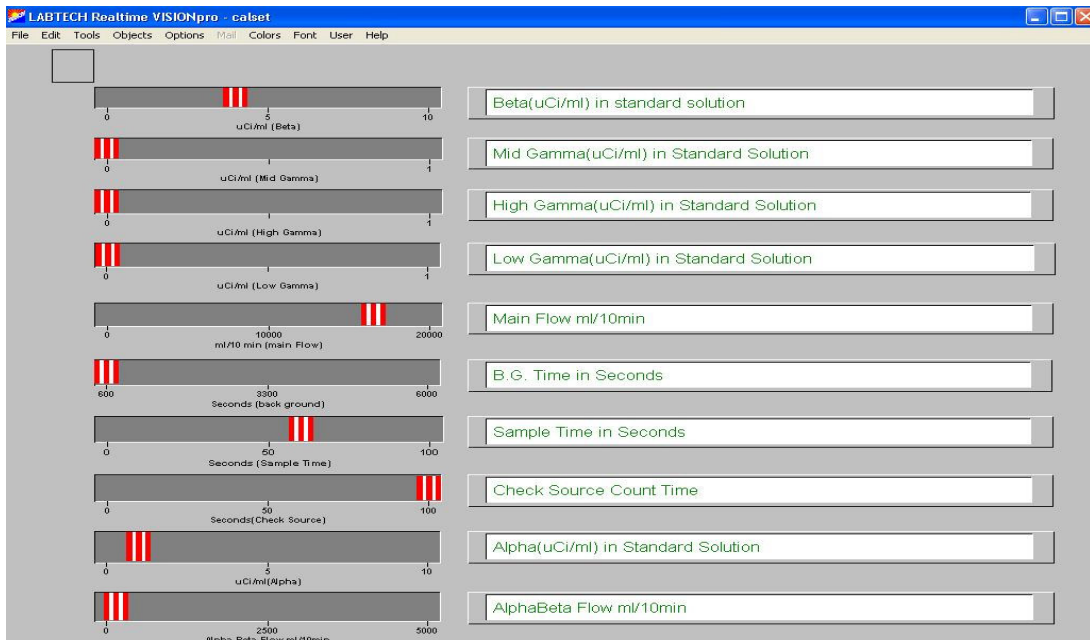
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ALARM SET SCREEN



This screenshot allows the user to set all "Alarm Set Points" for all Detector Chambers.

CALIBRATION SET SCREEN



This screenshot Displays & finds both **Background & Source Counts**, and sets Parameters.

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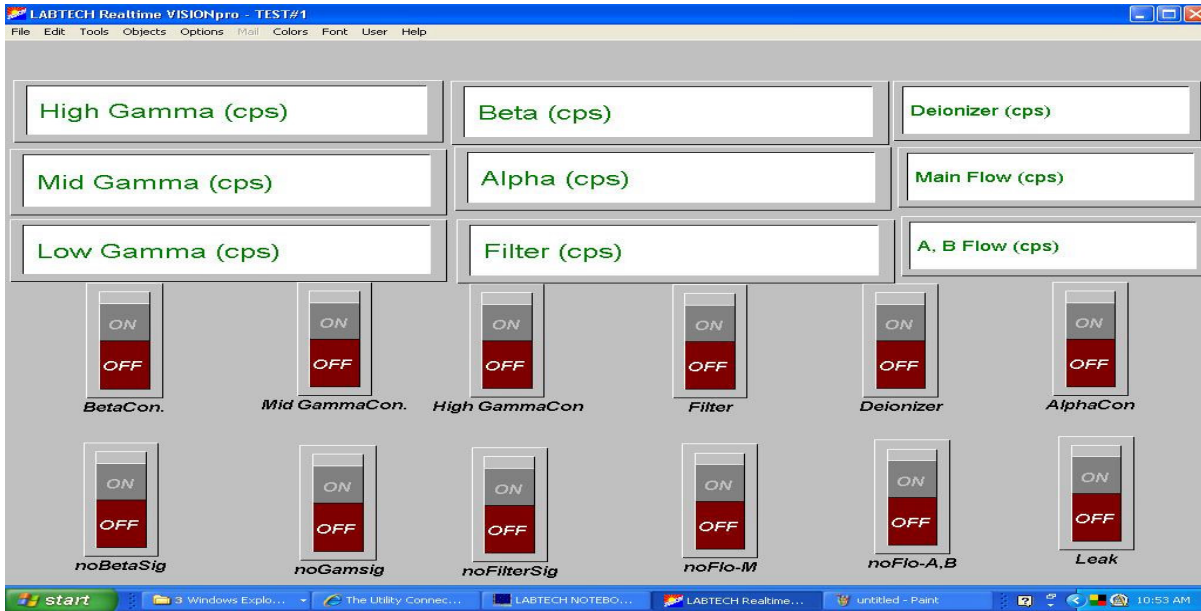
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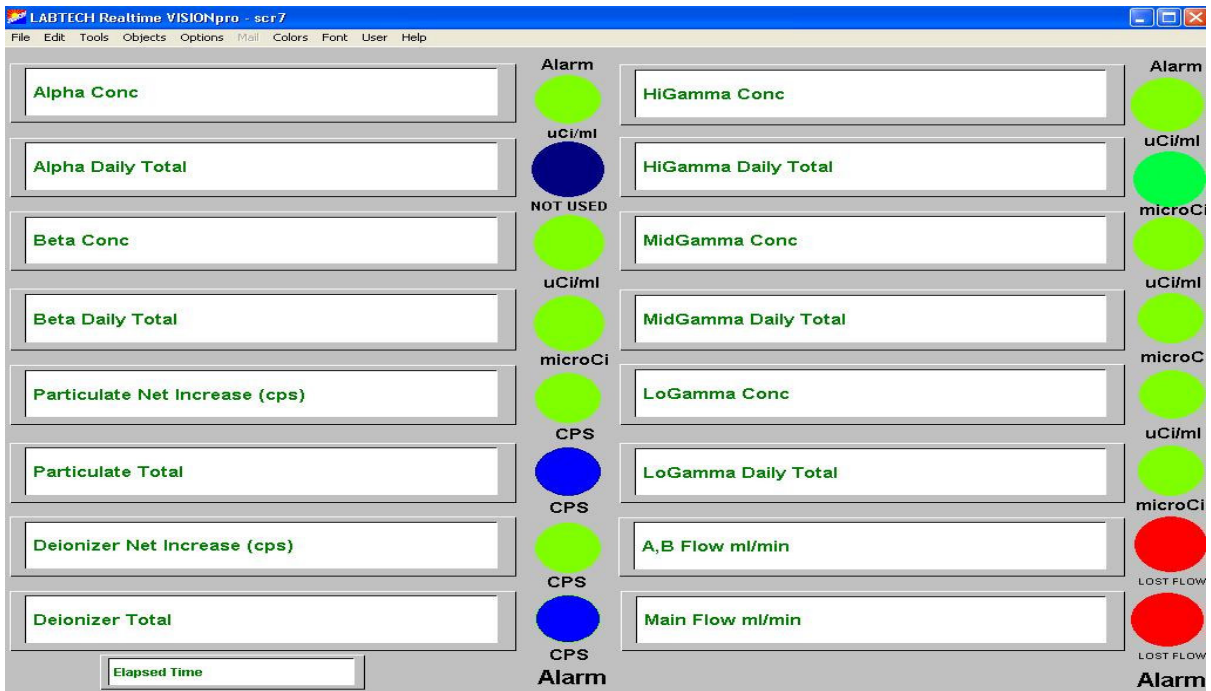
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TEST SCREEN



This is “**Test Screen**” which allows the user to test Primary Detectors and Functions.

OPERATE SCREEN



This is the “**Main Screenshot**” displaying All Functions of the System.

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