

DUAL CONVEYOR AND SORTING LAUNDRY MONITORING SYSTEM

Model ~ LIM-64S & Model ~ LIM-23C-55 Series

FEATURES:

- DUAL CONVEYORS
- AUTOMATIC CONVEYOR FOR LAUNDRY AUTOMATICALLY SEPARATES CLOTHES INTO "CLEAN" & "CONTAMINATED" BASKETS
- DETECTS BETA/GAMMA AND GAMMA
- BUILT-IN COMPUTER, DATA ARCHIVE & RETRIEVAL
- EACH DETECTOR HAS OWN ELECTRONICS FOR GREATEST SENSITIVITY
- CONTAMINATION TRIGGER POINT IS CONTINUOUSLY ADJUSTABLE
- MANUAL OVERRIDE
- USB /ETHERNET PORTS
- COLOR LCD MONITOR
- GRAPHICS PRINTER

LIM-64S ~ 10 DETECTORS

UPPER DETECTORS

- COUNTS ENTIRE GARMENT SIMULTANEOUSLY VIA (SIX) 8" x 8" PLASTIC SCINTILLATION BETA DETECTORS

LOWER DETECTORS

- COUNTS ENTIRE GARMENT SIMULTANEOUSLY VIA (FOUR) 2" x 12" NaI(Tl) GAMMA DETECTORS

LIM-23C-55 Series ~ 4 DETECTORS

UPPER DETECTORS

- COUNTS ENTIRE GARMENT SIMULTANEOUSLY VIA (FOUR) 6" x 6" PLASTIC SCINTILLATION BETA/GAMMA DETECTORS
- **OPTIONAL:** DETECTOR CONFIGURATIONS



LIM-64S AND LIM-23C-55

DESCRIPTION:

The **LIM-64S** & the **LIM-23C-55** monitor laundry including pants, shirts, overalls etc., as they pass on the conveyor belt. The system automatically sorts laundry into contaminated and clean baskets by way of the dual conveyor belt system.

The **LIM-64S** & the **LIM-23C-55 Series** Laundry Contamination Monitors are sturdy, dependable, long life mechanical systems with advanced computer and data processing.

The **LIM-64S** & the **LIM-23C-55 Series** systems are suitable for use in Nuclear Power Plants.

PLEASE SEE FOLLOWING CHART FOR DETAILS



TECHNICAL ASSOCIATES

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OTCB-UCLC

DUAL CONVEYOR AND SORTING LAUNDRY MONITORING SYSTEM

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	Detectors	Placement	Detector Type	Electronics	Detector Shielding
LIM-64S	10 Total	6 Detectors Above	412 cm ² Beta Plastic Scintillator 8" x 8" (20.3 cm x 20.3 cm)	High Quality PreAmp	.24 in (.63 cm) Lead
		4 Detectors Below	155 cm ² NaI(Tl) Gamma Scintillator 2" x 12" (5 cm x 30.5 cm)	Single Channel Energy Analyzer	N/A
LIM-23C-55 Series	4 Total	4 Detectors Above	230 cm ² Beta / Gamma Plastic Scintillator 6" x 6" (15.2 cm x 15.2 cm) OPTIONAL Detector configurations	Counting Sensitivity	.78 in (2 cm) Lead

LIM-64S:

- (6) TOP 8" x 8" (20.3 cm x 20.3 cm) Plastic Scintillator detectors each have 412 cm² active area
- (4) BELOW detectors are each 2" x 12" (5 cm x 30.5 cm) NaI(Tl) detectors
- (10) Channels
- Each has its own electronics to give greatest sensitivity.
- Garments are carried by a conveyor.
- They pass under a bridge with six detectors above and four detectors below.
- Garments are physically sorted by the second conveyor into baskets or users containers, one for CLEAN and the other for CONTAMINATED garments.

LIM-23C-55 Series

- (4) TOP 6" x 6" (15.2 cm x 15.2 cm) Plastic Scintillator detectors each have 230 cm² active area
- (4) Channels
- Each has its own electronics to give greatest sensitivity.
- Garments are carried by a conveyor.
- They pass under a bridge with four detectors above
- Garments are physically sorted by the second conveyor into baskets or users containers, one for CLEAN and the other for CONTAMINATED garments.



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DESCRIPTION (CONTINUED)

LIM-64S & LIM-23C-55 Series

DATA:

Numerical measurement results are saved to a high capacity hard drive easily accessible for all garments: clean and contaminated.

DISPLAY:

Color LCD computer monitor shows measurement values from all detectors.

Indicating lights show:

- STATUS or STEP OF OPERATION and BACKGROUND.
- READY TO COUNT
- NEW GARMENT MOVING INTO POSITION
- COUNT IN PROGRESS
- COUNT OK-CLEAN, OR COUNT ALARM-CONTAMINATED, ETC.
- The DATE, TIME & RESULTS of each garment measured in that batch, that DAY, THAT WEEK & the YEAR are available for display, print-out and safe storage.
- Statistical reports are also created.

BATCH MODE: PARAMETERS

Authorized user sets alarm level, count time, motor speed, location where clothing was used, work group who wore them, etc., number of garments to be measured.

AUTOMATIC (CONTINUOUS) MODE is very similar to batch mode, but in Automatic Mode the garments are checked automatically, all day, or until there are no more garments to check.

The test parameters can be changed in automatic mode, at the beginning of the day, or by activating the manual override.

Accessories: One set of calibration sources is supplied with both the LIM-64S & the LIM-23C-55 Series Laundry Monitors. This consists of one (1) each Ba-133, Cs-137, Co-60 calibration source standards. Each Source comes with NIST Traceable calibration certificate, test data, and Calibration Factors.

SPECIFICATIONS:

DETECTORS:

LIM-64S

- TOP:** Six (6) each Beta / Gamma plastic scintillators.
412 cm² active area for each detector.(8" x 8") .
- BOTTOM:** Four (4) each 2" dia x 12" Long NaI(Tl)
Single channel energy analyzer allows narrow focus on 511 Kev or other Isotopes or wide window for all Isotopes.
- Sensitivity:** To all nuclides mentioned below down to 1,000 dpm/100 cm² at a speed of 8 to 10 feet per minute
- Sensitive** to wide range of Gamma emitters with low to high energies including: Tl-201, In-111, Ga-67, Mo-99, Tc-99m, I-131, I-123, etc.



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LIM-23C-55

TOP: Four (4) Beta / Gamma plastic scintillators (**Standard**).
OPTION: various detector configurations such as (1) Alpha, (1) Beta, (2) Gamma, etc. 230 cm² active area for each of the four detectors.

Counting Sensitivity Sees 22,000 dpm/100cm² in less than 20 sec.

Ultimate Sensitivity: 1.0 Bq/cm² based on 100 x 100 mm Co60 distributed source.
Background of 0.3 Sv/h. Conveyor of 50 mm/sec.

LIM-64S & LIM-23C-55

CONVEYORS: Clothing passes under the detectors.
Clothing is physically sorted onto "CONTAMINATED" basket & "CLEAN " basket.

Conveyor System: 2 each conveyors.
Belt #1 is 6 ft. long, (typical) belt carries clothes under detector.
Belt #2 is 4 ft. long, (typical) reversible direction conveyor, drops off CLEAN clothes to one side and drops off CONTAMINATED clothes on the other side.

Conveyor Speed: Continuously variable, user settable. 150 mm/sec typical.

Useful Width: 24" (610mm).

Background: Automatically subtracted.

SHIELDING:

LIM-23C-55

.78 " (2 cm) lead over greater than 2 pi. Lead shield is modular and easy to assemble (no piece over 65kg)

LIM-64S ¼" (.63cm) lead over greater than 2 pi. Lead shield is modular (no piece over 65kg)

DETECTOR ELECTRONICS:

Each plastic scintillator has its own PM tube. PMT base (dynode string circuit) Independent Modular high voltage pre-amp and discriminator. This provides improved sensitivity and easier maintenance if a PM tube is replaced.

Alarms: Alarm threshold is continuously adjustable.
High level alarm is user settable.
AUDIO & VISUAL alarms plus screen display.

Operation Modes: Batch or Automatic (Continuous) or Calibration

Display: Color LCD screen monitor.

Data: All data automatically stored on HIGH-CAPACITY hard drive.
USB / Ethernet ports.
Graphics printer included.
User can print tabular or graphical records of current day, week, month or year.

System Weight: 175 Kg plus Shielding

ENVIRONMENT:

Temperature: 32^oF to 122^oF, (0^o to 50^oC)

Humidity: 10% to 95% relative humidity, non-condensing



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- Energy Threshold:** Continuously adjustable for each detector.
- Data Analysis:** First in individual channels and then combined channels. Noise rejection Background subtraction Energy Analysis Calibration and unit conversion. Statistical significance check. Alarm point trip level
- Open Source:** All Technical Associates generated software is provided with source code to users.
- Software:** Technical Associates utilizes "Labtech notebook" software which allows user to make changes in System operation without being a programmer.

SYSTEM ELECTRONICS:

- Power Supply:** 100 - 120 V AC or 220 V 50/60 Hz with UPS
- Battery Backup:** Uninterruptable "UPS" battery backup is supplied.

Electronics:

- Photo Multiplier Tube And Base
- Detector HV bias.
- Amplifier with Adjustable Energy Threshold.
- Data Sent To & Acquired By PC.
- Data Analysis.
- Alarm Trigger.
- Data Storage.
- Data Printout.
- Optional Data Transmission (Ethernet).
- Conveyor Control.
- Conveyor Status Indicators.
- System Power UPS Battery Back-Up.

OPTIONS:

- Conveyor Extensions.
- Outlet Annunciator Panel.
- Spare detector plus other spare parts.
- Inlet Annunciator Panel.
- Calibration Jig.
- Accessory Control Panel.
- Bar-code System .
- Single Conveyor



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LIM-64S

