Health Physics Instruments
For Radiation Detection and Analysis

North American Technical Services
Bridging Technology With Latest in Radiation Detection Systems & Solutions

The Center For Innovative Solutions in Radiation Detection
North American Technical Services (NATS, Inc.) is a US corporation providing advanced technological innovations in radiation detection and measurement systems.

For over a decade NATS has introduced cutting edge tools in the areas of radiation and analysis. NATS provides solutions in the areas of Nuclear Power, Research, Environmental Measurements, Homeland Security, Radiation Monitoring Systems, Radiation Dosimetry, Nuclear Educational Systems and Health Physics. Working in over 30 countries and 4 continents.

NATS continues to bridge technology with innovations in radiation detection and analysis.

NATS offers complete solutions in:

- Portable High Resolution Gamma Spectroscopy Systems with Imaging capability
- High Purity Germanium Detector Based Electrically or Liquid Nitrogen Cooled Field Gamma Spectrometry System with Smart Phone Technology for Base reach back
- New Optimum Resolution Field Radionuclide Analysis Systems using LanBr, CeBr, CZT, and NaI Detection Technology
- Advanced Analysis Algorithms
- Underwater Spectroscopy Systems and Portable Systems for Alpha, Beta, Tritium Measurements
- Hand Held Survey Instruments for Alpha, Beta, Gamma & Neutron Radiation
- Personal Radiation Monitors
- Systems for Food and Water analysis
Hand Held Radiation Detection Instruments

Personal Radiation Survey Meters: Gamma, Alpha, X-Ray, Neutrons

Personal Radiation Dosimeters

**Gamma or Gamma and Beta**

**NEW! Compact Style!**

Neutron Detection & Survey Instruments

Neutron Search Device – H3 Tube

3. Innovative Solutions in Radiation Detection and Analysis
GM Meters

- Model 2401-EC
  - GM Meters
  - Budget
  - 0-200 mR/hr (0-2100 cpm)
  - 3-Decade Analog Meter
  - Energy Compensated Internal GM Detector

- Model 2401-EC2
  - GM Meters
  - Budget
  - 0-2000 mR/hr
  - 3-Decade Analog Meter
  - Energy Compensated Internal GM Detector

- Model 2401-ECX
  - GM Meters
  - Budget
  - 0-20,000 mR/hr
  - 5-Decade Analog Meter
  - Dual Energy Compensated GM Detectors

- Model 6
  - GM Meters
  - Traditional
  - 0-1000 mR/hr
  - 3-Decade Analog Meter
  - Internal Energy Compensated GM Detector

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GM Meters for Exposure Rate

- Model 5
  - Traditional
  - 0-2000 mR/hr
  - 5-Decade Analog Meter
  - Dual Energy Compensated GM Detectors

- Model 2242
  - Traditional
  - 0.1 mR/hr-999.9 R/hr
  - 7-Decade Digital Meter
  - Dual Energy Compensated GM Detectors
  - RS-232 Port

- Model 3 w/ 44-38
  - Traditional
  - 0.20 mR/hr
  - 4-Decade Analog Meter
  - External Energy Compensated GM Detector

- Model 14C w/ 44-38
  - Traditional
  - 0-2000 mR/hr
  - 5-Decade Analog Meter
  - Dual Energy Compensated GM Detectors

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4. Innovative Solutions in Radiation Detection and Analysis
5. Innovative Solutions in Radiation Detection and Analysis

Pressurized & Ambient Air Ion Chambers

<table>
<thead>
<tr>
<th>Model</th>
<th>Chamber Volume</th>
<th>Energy Response</th>
<th>Range Multipliers</th>
<th>Battery Life</th>
<th>Part Number</th>
</tr>
</thead>
<tbody>
<tr>
<td>9-3</td>
<td>220 cm$^3$ (13.4 in$^3$)</td>
<td>$\approx 20%$ of true value from 40 keV to 2 MeV</td>
<td>x1, x10, x100, x1k, x10k</td>
<td>100-300 hours (scale dependent)</td>
<td>48-3633</td>
</tr>
<tr>
<td>9-4</td>
<td>220 cm$^3$ (13.4 in$^3$)</td>
<td>$\approx 20%$ of true value from 40 keV to 2 MeV</td>
<td>x1, x10, x100, x1k, x10k</td>
<td>100-400 hours (scale dependent)</td>
<td>48-3739</td>
</tr>
<tr>
<td>9DP</td>
<td>230 cm$^3$</td>
<td>beta $&gt; 1$ MeV, gamma &amp; X-ray $&gt; 25$ keV</td>
<td>auto-ranging</td>
<td>12-24 hours between charges</td>
<td>48-3742</td>
</tr>
</tbody>
</table>

Advanced Pressurized Ion Chamber

**FEATURES:**
- 0.50 mSv/h (0–5 R/hr) Range with μR/hr Sensitivity
- Sunlight Readable Color Display
- Auto Zeroing & Ranging
- Rechargeable Batteries
- Alarming Capability
- Simultaneous Rate and Integrate or Peak Hold Readouts
- Data Logging
- USB Connectivity
- Free Firmware Updates through Internet
Pressurized & Ambient Air Ion Chambers

Model 9-3
- Atmospheric
- 0-50 R/hr, 5 Ranges
- Temperature Compensated
- 1000 mg/cm² Beta Shield
- High Background Zero Capability
- Proportional Audio Output

Model 9-4
- Atmospheric
- 0-50 R/hr, 5 Ranges
- Temperature & Pressure Compensated
- 1000 mg/cm² Beta Shield
- High Background Zero Capability
- PC-Controlled Calibration

Model 9DP
- Pressurized
- 0-5 R/hr, 125 PSI Detector
- Rate, Integrate & Peak Readings
- Auto Zeroing & Ranging
- Data Logging
- Operator Friendly Digital Meter with Color LCD
- Rechargeable Batteries
- USB Connectivity

Model 9DP-1
- Pressurized Non-Hazmat
- 0-5 R/hr, 25 PSI Detector
- Measures Pulsed Fields
- Rate, Integrate & Peak Readings
- Auto Zeroing & Ranging
- Data Logging
- Operator Friendly Digital Meter with Color LCD
- Rechargeable Batteries
- USB Connectivity

<table>
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<tr>
<th>Model</th>
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<tr>
<td>9-3</td>
<td>220 cm³ (13.4 in³)</td>
<td>± 20% of true value from 40 keV to 2 MeV</td>
<td>x1, x10, x100, x1k, x10k</td>
<td>100-300 hours (scale dependent)</td>
<td>48-3033</td>
</tr>
<tr>
<td>9-4</td>
<td>220 cm³ (13.4 in³)</td>
<td>± 20% of true value from 40 keV to 2 MeV</td>
<td>x1, x10, x100, x1k, x10k</td>
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</tr>
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<td>beta &gt; 1 MeV, gamma &amp; X-ray &gt; 25 keV</td>
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Advanced Pressurized Ion Chamber

Features:
- 0-50 mSv/h (0-5 R/hr) Range with µR/hr Sensitivity
- Sunlight Readable Color Display
- Auto Zeroing & Ranging
- Rechargeable Batteries
- Alarming Capability
- Simultaneous Rate and Integrate or Peak Hold Readouts
- Data Logging
- USB Connectivity
- Free Firmware Updates through Internet

6. Innovative Solutions in Radiation Detection and Analysis
New Digital Frisker Model 26 & 26-1

**FEATURES:**
- Integrated, Lightweight Design Simplifies Frisking
- Protective Rubber Covering Enhances Ruggedness, Water Resistance, and Non-Slip Comfort
- Employs Standard 15 cm² GM Pancake Detector
- Ratemeter, Peak, and Scaler Operating Modes
- Simple Two-Button Operation
- Count Rate and Scaler Alarms

New Digital Survey Meter

7. Innovative Solutions in Radiation Detection and Analysis
Intrinsically Safe Meters (Explosive Proof)

- **Model 3-1S**: GM Exposure Meter
  - 4-Decade Analog Meter
  - 0-1000 mR/hr
  - Internal Energy Compensated GM Detector

- **Model 3-IS**: Versatile Survey Meter
  - 4-Decade Analog Meter
  - Supports external GM & Scintillator Detectors (see qualifying list in table below)

- **Model 25-IS**: Radiation Monitor
  - Digital Meter
  - 0-1600 R/hr Dose Rate
  - 0-1999 R Dose
  - Internal Energy Compensated GM Detector
  - Adjustable Alarms

- **Model 25-IS-1**: Radiation Monitor
  - Digital Meter
  - 0.001 mSv/h-10 Sv/h Dose Rate
  - 0-1999 Sv Dose
  - Internal Energy Compensated GM Detector
  - Adjustable Alarms

**Micro-R Meters**

- **Model 2401-S**: Budget
  - Internal Detector
  - Sensitivity: 120 cpn/μR/hr
  - 3-Decade Analog Meter

- **Model 19**: Traditional
  - Internal Detector
  - Sensitivity: 175 cpn/μR/hr
  - 3-Selectable Ranges
  - Analog Meter with Backlight
  - Fast & Slow Response Switch

- **Model 19A**: Traditional
  - Internal Detector
  - Sensitivity: 175 cpn/μR/hr
  - Logarithmic Analog Meter
  - Audio & Visual Alarming

- **Model 192**: Traditional
  - Internal Detector
  - Sensitivity: 650 cpn/μR/hr
  - 4-Decade Analog Meter
  - Fast & Slow Response Switch
  - Meter Reset

- **Model 193-6**: Traditional
  - External Detector on Pole
  - Sensitivity: 1500 cpn/μR/hr
  - 4-Decade Analog Meter
  - Special Deviation Alarm

- **Model 3 w/44-2**: Traditional
  - External, Detachable Detector
  - Sensitivity: 175 cpn/μR/hr
  - 4-Decade Analog Meter

- **Model 193 w/44-2**: Traditional
  - External, Detachable Detector
  - Sensitivity: 175 cpn/μR/hr
  - 4-Decade Analog Meter
  - Special Deviation Alarm

- **Model 193 w/44-10**: Traditional
  - External, Detachable Detector
  - Sensitivity: 1000 cpn/μR/hr
  - 4-Decade Analog Meter
  - Special Deviation Alarm

8. Innovative Solutions in Radiation Detection and Analysis
Tools for Emergency Response Kits

Model 14C-RK

* Analog Meter
* Ready-to-Go Kit includes:
  * Model 14C Analog Meter with internal GM (0-2000 mR/hr)
  * Model 44-9, GM Pancake Detector
  * Model 44-2, 1 x 1 in. NaI Scintillator Detector
  * Carrying Case
  * Check Source

Model 2241-3RK

* Digital Meter
* Ready-to-Go Kit includes:
  * Model 2241 Digital Meter
  * Model 44-9, GM Pancake Detector
  * Model 44-2 1 x 1 in. NaI Scintillator Detector
  * Model 133-7 Energy Compensated GM
  * Carrying Case
  * Check Source

Collection of Meters

Model 2242

* Digital Meter
  * Model 25: 0-1000 R/hr Dose Rate
  * 0-1999 R/hr Model 25-1
  * 0.001 mR/hr-1 mR/hr Dose Rate
  * Internal Energy Compensated GM Detector
  * Adjustable Alarm

Model 25 & 25-1

* Digital Meter

Model 192

* 2 x 1 inch NaI Detector

Model 193-6

* Internal Detector
  * Sensitivity: 700 cpm/mR/hr
  * 4-Decode Analog Meter
  * Fast & Slow Response Switch
  * Meter Reset

Deployable Portal Monitors

Model 52-1

* Highly Portable
* Sets up in Minutes
* Plastic Scintillator Detectors
* Easy to Operate
* Wheeled transport Case
* Meets FEMA-REP-21

Model 52-1-1

* Highly Portable
* Sets up in Minutes
* Plastic Scintillator Detectors
* Easy to Operate
* Wheeled transport Case
* Meets FEMA-REP-21

9. Innovative Solutions in Radiation Detection and Analysis
Hand Held Nuclide Identification Systems

SAM 945  ANSI compliant Medium Resolution Identifier

FEATURES
- Real-Time Background Correction -- "New Feature"
- First Smart-Phone Enabled RIID
- Industry Largest Internal Detector
- Detachable Screen for Stand-Off Applications
- Networking with N42.42 Data Transmission
- Append Alarms with Notes, Images, Videos, Voice Memo
- Charge Your Battery from DC (Vehicle, etc)
- >8 Hours with Bluetooth Earpiece
- Auto Stabilized from -20°C to 50°C
- CamBio, Peak Easy or SAM-Viewer Compatible

Transfer of Data from Unit To Base

For the next generation of Isotope Identifier users, the SAM III should be considered.

Vertical Orientation for Fast Dial

Display Closed for Transport, Unmanned

Touch Peaks to Obtain Supporting Information

Horizontal Orientation for Spectra

Display Indicators (BKG, Library, Mode, Alarm State)

Tripod Mount for Radiation

Color Coded Isotope Class and Details

10. Innovative Solutions in Radiation Detection and Analysis
Local, Networked, and Wireless Area Monitors

Gamma Area Monitoring Systems

The Model 375 is a versatile, compact and very affordable digital electronic controller designed for monitoring radiation in areas. Its simple design accommodates many different detectors suited to a wide variety of applications and is equipped with a local readout and alarm. These versatile units may also be connected to an optional remote indicator annunciator for alerting personnel at other locations. The user-friendly, digital design enhances setup and operation. These units may also be networked to a central PC-based station where data are logged and alarms posted.

<table>
<thead>
<tr>
<th>Model</th>
<th>Detector Range</th>
<th>Detector</th>
<th>Part Number</th>
</tr>
</thead>
<tbody>
<tr>
<td>375</td>
<td>Controller only, no detector included</td>
<td>Support: GM, scintillator or proportional detector types</td>
<td>48-2230</td>
</tr>
<tr>
<td>375/1</td>
<td>0.001-99.99 μSv/h (0.1-9999 μR/hr)</td>
<td>18 mm Cd Scintillator</td>
<td>48-3831</td>
</tr>
<tr>
<td>375/2</td>
<td>1 μSv/h-10 mSv/h (0.1 mR/hr-1.0 R/hr)</td>
<td>Energy compensated GM</td>
<td>48-2410</td>
</tr>
<tr>
<td>375/4</td>
<td>10 μSv/h-100 mSv/h (1.0 mR/hr-10 R/hr)</td>
<td>Energy compensated GM</td>
<td>48-2411</td>
</tr>
<tr>
<td>375-9</td>
<td>Any 5 consecutive decades between 1 μSv/h-10 Sv/h (0.1 mR/hr-1.0 kR/hr)</td>
<td>Ion chamber</td>
<td>48-3036 &amp; 47-3324</td>
</tr>
<tr>
<td>375-10</td>
<td>1 μSv/h-20 mSv/h (100 μR/hr-2.0 R/hr)</td>
<td>5.1 x 5.1 cm (2.0 x 2.0 in) NaI Scintillator with removable shield</td>
<td>48-3443</td>
</tr>
</tbody>
</table>

Wireless Area Monitors Network

FEATURES:

→ Wireless Radiation Area Monitor
→ Gamma & X-Ray Detector
→ Indoor & Outdoor Use
→ Detection and Receiver Pair
→ Single Receiver for Multiple Detectors
→ 1-2 KM Range
→ Radio Communication (915 MHZ)
→ Includes Display Software

11. Innovative Solutions in Radiation Detection and Analysis
Networked Area Monitors Systems with Advanced Software

The DORA-I SERIES ratemeter can operate with APANTEC Area Monitor type detectors and Process Monitor type preamplifiers and detectors. It can also be equipped with an internal G-M detector and optional checksource. With either detector type, the ratemeter provides all detector power and control signals required for operation. The Area Monitor type detectors consist of detectors designed for area detection of gamma or neutron radiation. The Process Monitor type detectors consist of detectors designed to be mounted in fluid or gas flow streams such as liquid piping systems, ventilation ducts and stacks.

12. Innovative Solutions in Radiation Detection and Analysis
Hand & Feet Contamination Monitoring

The Model 4906-Series are low-cost, industrial duty, alpha and alpha/beta contamination monitoring systems for checking personnel hands and feet. A large color, touch-screen LCD presents users with the system status and points out any potential contamination. The system employs six proportional detectors with counting activated by optical switches.

Alarms are annunciated locally and can be augmented with optional relays and/or a light stack. The built-in Ethernet interface supports connection to a network for gathering all count cycles and remote monitoring of the status. All maintenance can be performed from the front of the instrument. Detector access for quick replacement or repair is facilitated by hinged top covers.

<table>
<thead>
<tr>
<th>Model</th>
<th>Detection</th>
<th>Detector Type</th>
<th>Part Number</th>
</tr>
</thead>
<tbody>
<tr>
<td>4906A</td>
<td>Alpha</td>
<td>Air Proportional</td>
<td>48-3687</td>
</tr>
<tr>
<td>4906AB</td>
<td>Alpha &amp; Beta</td>
<td>Gas Flow Proportional</td>
<td>48-3688</td>
</tr>
</tbody>
</table>

Gamma Personnel Portal Monitor

This highly sensitive system detects gamma radiation in or on personnel passing through the portal in either direction. It utilizes eight large plastic scintillation detectors, and is shielded with either the standard 2.5 cm (1 in.) or optional 5 cm (2 in.) of lead. A user-friendly interface guides personnel through the portal monitor via automated voice prompts (customized to any language), and is accompanied with color LCD articulating screens presenting the instrument readiness and status at the ingress and egress. Alarms are manifested both audibly and visually, and can be silenced and acknowledged via convenient control buttons. Three statistical counting modes are available to maximize throughput, maximize sensitivity, or fix the count time. Operational modes include a walk-through mode, a pause mode, and a pause-and-turn mode. Accessible USB ports facilitate connecting a keyboard to implement changes, input user ID, or upload revised software. The system also includes an Ethernet link. Ludlum’s optional Universal network software can be used to log instrument status, user activity, and other information from one or more portals.

Small Article Contamination Checking

The Model 54 and 54A are new designs incorporating best practices employed over the past couple of decades. These monitors feature true 4π counting to provide a more uniform response throughout the large 130.3 L (4.6 ft³) volume of the Model 54 and the smaller 45 L (1.6 ft³) volume of the Model 54A. Both models utilize a stainless steel liner. The user-interface is via a color touch-screen LCD. Ludlum’s QPASS counting technology delivers consistent and accurate results in the shortest time. This system is available with either four or six detectors and 2.5 or 5.1 cm (1 or 2 in.) lead shielding.

<table>
<thead>
<tr>
<th>Number of Detectors</th>
<th>Shielding</th>
<th>Model 54 Part No.</th>
<th>Model 54A Part No.</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>2.5 cm (1.0 in.)</td>
<td>48-3728</td>
<td>48-3803</td>
</tr>
<tr>
<td>4</td>
<td>5.1 cm (2.0 in.)</td>
<td>48-3727</td>
<td>48-3802</td>
</tr>
<tr>
<td>6</td>
<td>2.5 cm (1.0 in.)</td>
<td>48-3726</td>
<td>48-3793</td>
</tr>
<tr>
<td>6</td>
<td>5.1 cm (2.0 in.)</td>
<td>48-3263</td>
<td>48-3792</td>
</tr>
</tbody>
</table>
Spectroscopy Based Whole Body Counter

**FEATURES**
- One large 7.6 x 12.7 x 40.6 cm sodium iodide, NaI(Tl) detectors
- Rapid analysis and reading results
- Easy to use
- Full spectroscopy
- WBC and IMBA software included for comprehensive operation and management
- System ready for operation as soon as installation is complete

AccuCount whole body counter for rapid and accurate monitor people for internal contamination of radionuclides. It is intended for use in power plants and other facilities where the possible contamination spectra are well known and uncomplicated. Also, AccuCount will be conveniently ready for operation as soon as the installation is completed. The system is easy to use: the operator simply positions the person to be counted inside the shield and in front of the detectors, and then begins the count with the software. The software starts the count, completes the count, stores the data, displays the spectral data, performs the analysis and prints the report. WBC-01 can be used to achieve low minimum detectable activities with count times as fast as one minute.

Mobile Survey and Mapping System

**Features:**
- High Efficiency Detection
- Miniaturized Integrated GPS and Weather Station
- Dual Detector Capable
- Vehicle or Helicopter Deployable
- Data Logging and Full Spectroscopic Capability
Ultra Sensitive Low Dose Environmental Detection Systems (RS Detection*)

Enhanced sensitivity and performance
- <10 seconds response time
- Gain stability: ±3% < 35 μR/hr, ±0.5% > 35 μR/hr

Improved reliability and stability
- Upgraded electrometer & processing electronics
- Embedded sensors to monitor product health
- Onboard EEPROM for electrometer configuration

Extended battery life
- 48 hours life**, built in charger
- Easy external replacement

Fixed and Mobile Stack Monitors

FEATURES:
- INTEGRATED EXPOSURE
- REAL TIME ALARM
- LINE OPERATED
- PORTABLE
- STANDARD FM-9 MODULES
- CAN DRAW AIR FROM HOOD, DUCT, ETC.
- QUICK CHANGE FILTER CARTRIDGE
- REAL TIME AIR FLOW MEASUREMENT DISPLAY
- COMPUTER INTERFACE – USB OR ETHERNET
- DATA ARCHIVE & RETRIEVAL

15. Innovative Solutions in Radiation Detection and Analysis
WHY NATS?

- Single Source for all radiation detection applications
- Single Source for accumulated knowledge of over dozen Nuclear Manufacturers
- Single Source for integrated knowledge from a network of over hundred Nuclear Specialists worldwide
- Only Company to offer multiple solutions objectively for an application without bias towards a specific system
- Bridging technology with latest innovations in radiation detection & analysis