

FUJI PRODUCT CATALOG

# Radiation Monitoring Equipment

**Radiation  
Monitoring  
Equipment**

# Radiation Monitoring Equipment

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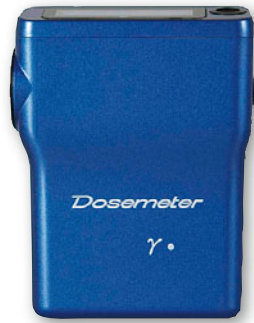
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# Electronic Personal Dosimeters

## Electronic Personal Dosimeter (NRF30)

A highly-reliable model for gamma-ray measurements



<b>Radiation detected</b>	Gamma (X) rays
<b>Detector</b>	Silicon semiconductor detector
<b>Dose equivalent range</b>	0 $\mu$ Sv to 999 $\mu$ Sv, 1.000mSv to 999.9mSv, 1.000Sv to 9.999Sv, 0.0mrem to 999.9mrem, 1.000 rem to 999.9rem
<b>Accuracy</b>	$\pm$ 10% (0.1mSv to 9.999Sv, <sup>137</sup> Cs)
<b>Energy range</b>	30keV to 6MeV
<b>Energy response</b>	$\pm$ 20%
<b>Angular response</b>	$\pm$ 20%
<b>Battery life</b>	1 year or more (when used for 8 hours a day) or 4 months or more (when used for continuous monitoring)
<b>Size</b>	60 (W) x 78 (H) x 33 (D) mm
<b>Mass</b>	< 100g

## Electronic Personal Dosimeter (NRF31)

A highly-reliable model for gamma-ray and neutron measurements

<b>Radiation detected</b>	Gamma (X) rays, Neutron
<b>Detector</b>	Silicon semiconductor detector
<b>Dose equivalent range</b>	0 $\mu$ Sv to 999 $\mu$ Sv, 1.000mSv to 999.9mSv, 1.000Sv to 9.999Sv, 0.0mrem to 999.9mrem, 1.000rem to 999.9rem
<b>Accuracy</b>	Gamma (X) rays : $\pm$ 10% (0.1mSv to 9.999Sv, <sup>137</sup> Cs) Neutron : $\pm$ 15% (0.5mSv to 9.999Sv, <sup>252</sup> Cf)
<b>Energy range</b>	Gamma (X) rays : 30keV to 6MeV Neutron : 0.025eV to 15MeV
<b>Energy response</b>	Gamma (X) rays : $\pm$ 20% Neutron : $\pm$ 50%
<b>Angular response</b>	Gamma (X) rays : $\pm$ 20% Neutron : $\pm$ 30%
<b>Battery life</b>	1 year or more (when used for 8 hours a day) or 4 months or more (when used for continuous monitoring)
<b>Size</b>	60 (W) x 78 (H) x 33 (D) mm
<b>Mass</b>	< 120 g



## Electronic Personal Dosimeter (NRF34)

A highly-reliable model for gamma and beta-ray measurements



<b>Radiation detected</b>	Gamma (X) rays, Beta rays
<b>Detector</b>	Silicon semiconductor detector
<b>Dose equivalent range</b>	0 $\mu$ Sv to 999 $\mu$ Sv, 1.000mSv to 999.9mSv, 1.000Sv to 9.999Sv, 0.0 mrem to 999.9 mrem, 1.000 rem to 999.9rem
<b>Accuracy</b>	Gamma(X) rays : $\pm$ 10% (0.1mSv to 9.999Sv, <sup>137</sup> Cs) Beta rays : $\pm$ 15% (0.1mSv to 9.999Sv, <sup>90</sup> Sr/ <sup>90</sup> Y)
<b>Energy range</b>	Gamma(X) rays : 30keV to 6MeV Beta rays : 250keV to 2.3MeV
<b>Energy response</b>	Gamma(X) rays : $\pm$ 20% Beta rays : $\pm$ 30%
<b>Angular response</b>	Gamma(X) rays : $\pm$ 20% Beta rays : $\pm$ 30%
<b>Battery life</b>	1 year or more (when used for 8 hours a day) or 4 months or more (when used for continuous monitoring)
<b>Size</b>	60 (W) x 78 (H) x 33 (D) mm
<b>Mass</b>	< 105 g

## Electronic Personal Dosimeter (NRF40)

An environmental resistance model for gamma-ray measurements

<b>Radiation detected</b>	Gamma (X) rays
<b>Detector</b>	Silicon semiconductor detector
<b>Dose equivalent range</b>	0 $\mu$ Sv to 999 $\mu$ Sv, 1.000mSv to 999.9mSv, 1.000Sv to 9.999Sv, 0.0mrem to 999.9mrem, 1.000rem to 999.9rem
<b>Accuracy</b>	$\pm$ 10% (0.1mSv to 9.999Sv, <sup>137</sup> Cs)
<b>Energy range</b>	30keV to 6MeV
<b>Energy response</b>	$\pm$ 20%
<b>Angular response</b>	$\pm$ 20%
<b>Battery life</b>	1 year or more (when used for 8 hours a day) or 4 months or more (when used for continuous monitoring)
<b>Size</b>	62 (W) x 82 (H) x 33 (D) mm
<b>Mass</b>	< 115g



# Electronic Personal Dosimeter Related Equipment



## Dosimeter Reader (NMR)

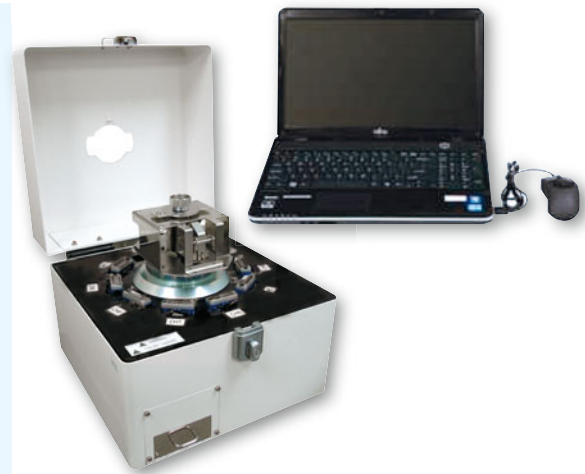
Features an easy-to-use large color LCD with touch screen and keyboard-less maintenance

<b>Function</b>	Dosimeter, ID card reader, alarm setting, operation guidance, data storage (1000 data records), maintenance operation
<b>Screen size</b>	5.7" color LCD (touch screen operation) or 8.4" color LCD (optional)
<b>Communication method</b>	Ethernet (computer system) Digital I/O (Portal monitor, turnstile, etc.) RS485 / RS232C Infrared (Dosimeter)
<b>Size</b>	Approx. 200 (W) x 250 (H) x 105 (D) mm (5.7" LCD type) Approx. 250 (W) x 285 (H) x 115 (D) mm (8.4" LCD type)
<b>Mass</b>	Approx. 3.0kg (5.7" LCD type) Approx. 4.0kg (8.4" LCD type)
<b>Power</b>	supply 24 V DC $\pm$ 10% (with specified AC adapter)

## Dosimeter Calibrator (NRK)

Easy and efficient automatic calibration for gamma-ray or beta-ray dosimeters

<b>Number of simultaneously calibrated dosimeter</b>	Gamma rays : 10units Beta rays : 1unit
<b>Processing capability</b>	Gamma rays : over 200units/h Beta rays : over 40units/h
<b>Sources</b>	Gamma rays : <sup>137</sup> Cs 370MBq Beta rays : <sup>90</sup> Sr/ <sup>90</sup> Y 74MBq
<b>Dose irradiated</b>	Gamma rays : 30 $\mu$ Sv or more Beta rays : 30mSv or more
<b>Leakage dose rate</b>	20 $\mu$ Sv/h (equipment surface) or less
<b>Size</b>	430 (W) x 350 (H) x 430 (D) mm
<b>Mass</b>	Approx. 95kg



**DOSE*i***

## Electronic Personal Dosimeter (Dosei-y / Dosei-ny)

Small and lightweight electronic personal dosimeter which can be used easily

<b>Radiation detected</b>	Gamma and X rays / Gamma (X) rays, Neutron
<b>Detector</b>	Silicon semiconductor detector
<b>Measurement range</b>	Dose : Gamma (X) rays 0.001mSv to 999.9mSv Neutron 0.1mSv to 999.9mSv Dose rate : Gamma (X) rays 0.001mSv/h to 999.9mSv/h Neutron 0.1mSv/h to 999.9mSv/h
<b>Accuracy</b>	Gamma (X) rays $\pm$ 10% ((0.01mSv to 999.9mSv, <sup>137</sup> Cs) Neutron $\pm$ 40% (0.1mSv to 999.9mSv, <sup>241</sup> Am-Be)
<b>Energy range</b>	Gamma (X) rays 35eV to 3MeV Neutron 0.025eV to 15MeV
<b>Battery life</b>	720 hours or more / 240 hours or more
<b>Size</b>	30 (W) x 110 (H) x 23 (D) mm 30 (W) x 140 (H) x 23 (D) mm
<b>Mass</b>	60g / 80g

## High-performance Integrating Dosimeter (Dose-e)

The integration of dose measurement in daily living environment and dose rate measurement in daily living environment

<b>Radiation detected</b>	Gamma and X rays
<b>Detector</b>	Silicon semiconductor detector
<b>Measurement range</b>	dose : 0.000mSv to 99.99mSv dose rate : 0.00 $\mu$ Sv/h to 999.9 $\mu$ Sv/h
<b>Accuracy</b>	dose : $\leq$ $\pm$ 10% (0.001mSv or more, <sup>137</sup> Cs) dose rate : $\leq$ $\pm$ 15% (1 $\mu$ Sv/h or more, <sup>137</sup> Cs)
<b>Energy range</b>	60keV to 1.5MeV
<b>Angular response</b>	$\pm$ 25%
<b>Size</b>	Approx. 120 (W) x 46 (H) x 15 (D) mm
<b>Mass</b>	Approx. 110g



**DOSE*e***

# Whole Body Counters



## Chair-Type Whole Body Counter (NLW)

Capable of screening the subject as well as assessing internal exposure

<b>Radiation detected</b>	Gamma rays
<b>Detector</b>	2 NaI(Tl) scintillation detectors (one for whole body and one for thyroid)
<b>Sensitivity</b>	<sup>60</sup> Co 150Bq or less (when measured for 1 minute)
<b>Measured energy range</b>	0.1MeV to 2MeV
<b>Size</b>	Approx. 1500 (W) x 1500 (H) x 2100 (D) mm
<b>Mass</b>	Approx. 3000kg (main body)
<b>Optional</b>	Thyroid measurement assembly, shielding of front surface

## Bed-Type Whole Body Counter (NMW)

A bed-type counter for increased subject comfort in the assessment of internal exposure

<b>Radiation detected</b>	Gamma rays
<b>Detector</b>	Plastic scintillation detector (for screening measurement) NaI(Tl) scintillation detector (for both screening and detailed measurements)
<b>Sensitivity</b>	Plastic scintillation detector (when measured for 60s) <sup>137</sup> Cs 370Bq or less <sup>60</sup> Co 185Bq or less NaI(Tl) scintillation detector (when measured for 120s) <sup>137</sup> Cs 370Bq or less <sup>60</sup> Co 185Bq or less
<b>Measured energy range</b>	0.1MeV to 2MeV
<b>Size</b>	Approx. 4300 (W) x 1200 (H) x 1020 (D) mm
<b>Mass</b>	Approx. 6500kg (main body)



# Portal Monitors



## Two-Step Portal Monitor (NMA6)

A highly-sensitive model which offers faster measurement with a detector arrangement which allows for high body surface coverage

<b>Radiation detected</b>	Beta rays
<b>Detector</b>	Plastic scintillation detector
<b>Number of detectors</b>	24 units (total sensitive area. approx.15000cm <sup>2</sup> )
<b>Measured regions</b>	Head (top, front, back, sides), face, chest, abdomen, back, sides of the body, shoulders, upper and lower arms, legs (fronts: backs, sides), insteps, bottoms of the feet, palms and backs of the hands
<b>Minimum detection sensitivity</b>	0.17Bq/cm <sup>2</sup> (at a distance of 1 cm, when measured for 10 seconds, <sup>90</sup> Sr/ <sup>90</sup> Y)
<b>Size</b>	Approx. 1000 (W) x 2280 (H) x 1100 (D) mm
<b>Mass</b>	Approx. 330kg

## Two-Step Portal Monitor (NMA8)

A monitor with performance equivalent to a PL scintillation model

<b>Radiation detected</b>	Beta rays
<b>Detector</b>	Gas flow detector
<b>Number of detectors</b>	20 units
<b>Measured regions</b>	Head (top, front, back, sides), face, chest, abdomen, back, sides of the body, shoulders, upper and lower arms, legs (fronts, backs, sides), insteps, bottoms of the feet, palms and backs of the hands
<b>Minimum detection sensitivity</b>	0.17 Bq/cm <sup>2</sup> (at a distance of 1 cm, when measured for 10 seconds, <sup>90</sup> Sr/ <sup>90</sup> Y)
<b>Size</b>	Approx. 1100 (W) x 2280 (H) x 1150 (D) mm
<b>Mass</b>	Approx. 400kg



## One-Step Portal Monitor (NMA5)

Able to simultaneously measure the whole body surface in a short time (approx. 7 seconds)

<b>Radiation detected</b>	Beta rays
<b>Detector</b>	Plastic scintillation detector
<b>Number of detectors</b>	13 units
<b>Measured regions</b>	Top of the head, face, chest, abdomen, fronts of the legs, back of the head, back, backs of the legs, bottoms of the feet, palms and backs of the hands
<b>Minimum detection sensitivity</b>	0.35Bq/cm <sup>2</sup> (at a distance of 5cm, when measured for 10 seconds, <sup>36</sup> Cl)
<b>Size</b>	Approx.1000 (W) x 2300 (H) x 1000 (D) mm
<b>Mass</b>	Approx. 400kg



# Hand and Foot Surface Contamination Monitors



## Hand and Foot Surface Contamination Monitor (NHP12)

A significant Mass reduction has been achieved by adopting a semiconductor detector

<b>Radiation detected</b>	Beta rays
<b>Detector</b>	Silicon semiconductor detector
<b>Minimum detection emission rate</b>	10.4s <sup>-1</sup> (hands), 28.2s <sup>-1</sup> (feet), 9.6s <sup>-1</sup> (clothing) s <sup>-1</sup>
<b>Measurement range</b>	0 count to 99999 counts (hands and feet) 0 s <sup>-1</sup> to 999.9 s <sup>-1</sup> (clothing ) (optional)
<b>Measured regions</b>	Hands (palms, backs of the hands), bottoms of the feet and clothing (optional)
<b>Display</b>	Color LCD (touch screen)
<b>Size</b>	Approx. 630 (W) × 1270 (H) × 800 (D) mm Approx. 630 (W) × 855 (H) × 450 (D) mm (when folded)
<b>Mass</b>	Approx. 35kg

## Alpha/Beta-ray Hand and Foot Surface Contamination Monitor (NHP21)

The maintenance is simplified with the adoption of a plastic scintillation detector

<b>Radiation detected</b>	Beta rays, Alpha rays
<b>Detector</b>	Beta rays Plastic scintillation detector Alpha rays ZnS(Ag) detector
<b>Minimum detection emission rate</b>	Beta rays 17.2s <sup>-1</sup> (hands), 18.8s <sup>-1</sup> (feet), 5.93s <sup>-1</sup> (clothing)s <sup>-1</sup> Alpha rays 0.74s <sup>-1</sup> (hands), 2.78s <sup>-1</sup> (feet), 0.27s <sup>-1</sup> (clothing)s <sup>-1</sup>
<b>Measurement range</b>	0.0min <sup>-1</sup> to 999999.9min <sup>-1</sup>
<b>Measured regions</b>	Hands (palms, backs of the hands) and bottoms of the feet
<b>Display</b>	Color LCD (touch screen)
<b>Size</b>	Approx. 730 (W) × 1490 (H) × 790 (D) mm
<b>Mass</b>	Approx. 95kg



## Alpha/Beta-ray Hand and Foot Surface Contamination Monitor (NHP23)

A widely-used model with the adoption of a gas flow detector

<b>Radiation detected</b>	Beta rays, Alpha rays
<b>Detector</b>	Gas flow detector
<b>Minimum detection emission rate</b>	Beta rays 25.0s <sup>-1</sup> (hands), 37.5s <sup>-1</sup> (feet), 16.7s <sup>-1</sup> (clothing) s <sup>-1</sup> ( <sup>90</sup> Sr) Alpha rays 2.2s <sup>-1</sup> (hands), 2.8s <sup>-1</sup> (feet), 1.3s <sup>-1</sup> (clothing) s <sup>-1</sup> ( <sup>241</sup> Am)
<b>Measurement range</b>	0.0min <sup>-1</sup> to 999999.9min <sup>-1</sup>
<b>Measured regions</b>	Hands (palms, backs of the hands), bottoms of the feet and clothing (optional)
<b>Display</b>	Color LCD (touch screen)
<b>Size</b>	Approx. 720 (W) × 1320 (H) × 780 (D) mm
<b>Mass</b>	Approx. 80kg



# Laundry Monitors



## Gamma-ray Laundry Monitor (NML6)

Detects the surface contamination on clothing before and after washing

<b>Radiation detected</b>	Gamma rays
<b>Detector</b>	Plastic scintillation detector
<b>Sensitivity</b>	Less than $4.6 \times 10^3$ Bq ( $^{60}\text{Co}$ gamma rays)
<b>Measuring object</b>	Coverall, undergarments, cold weather gear, socks, gloves, and cotton caps
<b>Conveyer width</b>	Approx. 450mm
<b>Throughput</b>	300 clothing/h or more
<b>Belt speed</b>	5m/min or more (belt material can be decontaminate)
<b>Display</b>	Color LCD (touch screen)
<b>Operating temperature</b>	0°C to 40°C
<b>Measured energy range</b>	0.1MeV to 2MeV
<b>Size</b>	Approx. 2500 (W) x 1700 (H) x 900 (D) mm
<b>Mass</b>	Approx. 1000kg
<b>Operating environment</b>	Temperature 0°C to 40°C, Relative humidity less than 90% (non-condensing)
<b>Option</b>	Sorting table

## Well Type Gamma-ray Laundry Monitor (NMK)

A simplified clothing contamination screening monitor that is easy to operate by the user

<b>Radiation detected</b>	Gamma rays
<b>Detector</b>	Plastic scintillation detector
<b>Sensitivity</b>	2.0Bq or less ( $^{60}\text{Co}$ gamma rays)
<b>Measuring object</b>	Maximum size Refer to internal size of chamber Mass 10kg or less
<b>Display</b>	Color LCD (touch screen)
<b>Measured energy range</b>	0.1MeV to 2MeV
<b>Internal size of chamber</b>	Approx. 420 (W) x 400 (H) x 300 (D) mm
<b>External size</b>	Approx. 800 (W) x 1200 (H) x 650 (D) mm
<b>Mass</b>	Approx. 200kg
<b>Operating environment</b>	Temperature 0°C to 40°C, Relative humidity less than 90% (non-condensing)



## Beta-ray Laundry Monitor (NML5)

Detects clothing contamination after washing

<b>Radiation detected</b>	Beta rays
<b>Detector</b>	Plastic scintillation detector
<b>Sensitivity</b>	Less than $4.6 \times 10^3$ Bq ( $^{90}\text{Sr}$ beta rays)
<b>Measuring object</b>	Coverall, undergarments, cold weather gear, socks, gloves, and cotton caps
<b>Conveyer width</b>	Approx. 450mm
<b>Throughput</b>	300 clothing/h or more
<b>Belt speed</b>	5m/min or more (belt material can be decontaminate)
<b>Display</b>	Color LCD (touch screen)
<b>Measured energy rangy</b>	0.1MeV to 2MeV
<b>Size</b>	Approx. 2500 (W) x 1700 (H) x 900 (D) mm
<b>Mass</b>	Approx. 1000kg
<b>Operating environment</b>	Temperature 0°C to 40°C, Relative humidity less than 90% (non-condensing)
<b>Option</b>	Sorting table



# Small Object Monitors



## Portable Small Object Monitor (NLF4)

A compact portable small object monitor

<b>Radiation detected</b>	Beta rays
<b>Detector</b>	Plastic scintillation detector
<b>Sensitivity</b>	Less than 0.4Bq/cm <sup>2</sup> , <sup>60</sup> Co, when measured for 10 seconds (background 0.1μSv/h or less)
<b>Measuring object</b>	Notebooks, tools, survey meters, etc.
<b>Maximum size of measuring object</b>	Approx. 420 (W) x 270 (H) x 300 (D) mm
<b>Mass of measuring object</b>	5kg or less
<b>Size</b>	Approx. 560 (W) x 750 (H) x 550 (D) mm
<b>Mass</b>	Approx. 60kg
<b>Operating environment</b>	Temperature 0°C to 40°C, Relative humidity less than 90% (non-condensing)

## Portable Small Object Monitor (small type) (NLF5)

A compact portable small object monitor

<b>Radiation detected</b>	Beta rays
<b>Detector</b>	Plastic scintillation detector
<b>Sensitivity</b>	Less than 0.4Bq/cm <sup>2</sup> , <sup>60</sup> Co, when measured for 10 seconds (background 0.1μSv/h or less)
<b>Measuring object</b>	Notebooks, tools, survey meters, etc.
<b>Maximum size of measuring object</b>	Approx. 310 (W) x 120 (H) x 220 (D) mm
<b>Weight of measuring object</b>	5kg or less
<b>Size</b>	Approx. 400 (W) x 470 (H) x 315 (D) mm
<b>Mass</b>	Approx. 18kg
<b>Operating environment</b>	Temperature 0°C to 40°C, Relative humidity less than 90% (non-condensing)



## Portable Small Object Monitor (NLF1)

Capable of simultaneous measurement of beta and gamma rays

<b>Radiation detected</b>	Beta rays, Gamma rays
<b>Detector</b>	Plastic scintillation detector
<b>Sensitivity</b>	Beta rays 1.0Bq/cm <sup>2</sup> or less, <sup>60</sup> Co, when measured for 15 seconds Gamma rays 1.0 Bq/cm <sup>2</sup> or less, <sup>60</sup> Co, when measured for 15 seconds
<b>Measuring object</b>	Notebooks, tools, survey meters, etc.
<b>Maximum size of measuring object</b>	Approx. 420 (W) x 100 (H) x 300 (D) mm
<b>Mass of measuring object</b>	5kg or less
<b>Size</b>	Main body Approx. 550 (W) x 906 (H) x 493 (D) mm Drawer Approx. 550 (W) x 374 (H) x 493 (D) mm External shielding Approx. 780 (W) x 1272 (H) x 565 (D) mm
<b>Mass</b>	Main body Approx. 220kg Drawer Approx. 35kg External shielding Approx. 560kg (with lead mounted)
<b>Operating environment</b>	Temperature 0°C to 40°C, Relative humidity less than 90 % (non-condensing)

# Gamma-ray Survey Meters



## X-Gamma Silicon Survey Meter (NHE2)

A compact and highly sensitive model with the capability of measuring even low background level

<b>Radiation detected</b>	Gamma rays, X-rays
<b>Detector</b>	Silicon semiconductor detector
<b>Display range</b>	0.01µSv/h to 99.9mSv/h
<b>Accuracy</b>	≤ ±15% (1µSv/h to 99.9mSv/h)
<b>Measured energy range</b>	60keV to 6 MeV
<b>Data output</b>	Infrared communication (up to 600 data records.)
<b>Size</b>	Approx. 66 (W) x 146 (H) x 32 (D) mm
<b>Mass</b>	Approx. 400g

## Energy Compensated Scintillation Survey Meter (NHC7)

Achieve high-precision dose rate measurement by good energy response with energy compensation

<b>Radiation detected</b>	Gamma rays, X- rays
<b>Detector</b>	NaI(Tl) scintillation detector
<b>Display range</b>	0.000mSv/h to 75.000mSv/h 0kcount to 99999kcount 0.000mSv/h to 999.999mSv/h
<b>Accuracy</b>	≤ ±20 %
<b>Energy range</b>	50keV to 3MeV
<b>Trend data storage</b>	Approx. 1500 data records (USB output)
<b>Size</b>	Approx. 95 (W) x 124 (H) x 220 (D) mm
<b>Mass</b>	Approx. 1kg



## Ionization Chamber Survey Meter (NHA)

Measurement capability of 1 cm dose equivalent rate and beta rays over a wide range

<b>Radiation detected</b>	Gamma rays, X-rays and Beta rays
<b>Detector</b>	Ionization chamber detector
<b>Measurement range</b>	Dose rate 1µSv/h to 500mSv/h Dose 0.1µSv to 10µSv
<b>Accuracy</b>	≤ ±10%
<b>Energy range</b>	25keV to 3MeV
<b>Size</b>	Approx. 116 (W) x 198 (H) x 116 (D) mm
<b>Mass</b>	Approx. 1kg





## Neutron Survey Meter (NSN3)

A highly-sensitive survey meter that is the industry's lightest model by utilizing mixed gas

<b>Radiation detected</b>	Neutron
<b>Detector</b>	Gas detector
<b>Measurement range</b>	Dose rate : 0.1 $\mu$ Sv/h to 99.99mSv/h Dose : 0.01 $\mu$ Sv to 99.99mSv
<b>Accuracy</b>	Dose rate : $\leq \pm 15\%$ at 10mSv/h Dose : $\leq \pm 25\%$ at 0.05mSv
<b>Energy range</b>	0.025eV to 15MeV
<b>Size</b>	Approx. $\Phi 164 \times 290$ mm
<b>Mass</b>	Approx. 2kg

## Neutron Survey Meter (NSN2)

A highly-sensitive Neutron survey meter

<b>Radiation detected</b>	Neutron
<b>Detector</b>	$^3\text{He}$ gas proportional counter
<b>Measurement range</b>	Dose rate : 0.01 $\mu$ Sv/h to 9.999mSv/h Dose : 0.01 $\mu$ Sv to 9.999mSv
<b>Energy range</b>	0.025eV to 15MeV
<b>Accuracy</b>	$\pm 20\%$ , $^{252}\text{Cf}$
<b>Size</b>	Approx. $\Phi 210 \times 320$ mm
<b>Mass</b>	Approx. 7kg



## Alpha-Beta Silicon Survey Meter (NHJ2)

Capable of efficient detection of beta and alpha ray contamination with the adoption of a large-area detector

<b>Radiation detected</b>	Beta rays, Alpha rays
<b>Detector</b>	Silicon semiconductor detector
<b>Measurement range</b>	0 $\text{min}^{-1}$ to 99990 $\text{min}^{-1}$
<b>Display range</b>	0 $\text{min}^{-1}$ to 99990 $\text{min}^{-1}$ 0 count to 9999000 count
<b>Detection efficiency</b>	Beta rays $^{36}\text{Cl}$ 25% Alpha rays $^{241}\text{Am}$ 20%
<b>Data output</b>	USB output (trend data approx. 1200 data records)
<b>Size</b>	Approx. 120 (W) x 56 (H) x 293 (D) mm
<b>Mass</b>	Approx. 0.75kg

# Portable Monitors



## Portable Area Monitor (NAH5)

A portable area monitor with high sensitivity and a large screen

<b>Radiation detected</b>	Gamma (X) rays
<b>Detector</b>	Silicon semiconductor detector
<b>Energy range</b>	60keV to 1.25MeV
<b>Display range</b>	0.01μSv/h to 999.9 mSv/h
<b>Size</b>	Detection assembly : Approx. 66 (W) x 145 (H) x 25 (D) mm Display : Approx. 352 (W) x 270 (H) x 90 (D) mm
<b>Mass</b>	Approx. 6kg
<b>Operating environment</b>	Temperature 0°C to 40°C, Relative humidity less than 90%
<b>Major functions</b>	Dose equivalent rate display, time-series data storage (one month), alarm output (audible and visible)

## Portable Particulate Monitor (NAV54)

An easy-to-handle dust monitor even on uneven surfaces

<b>Radiation detected</b>	Beta rays, Alpha rays
<b>Detector</b>	Plastic scintillation detector, ZnS detector
<b>Energy range</b>	Beta rays 80keV to 2.5MeV Alpha rays 2MeV to 10MeV
<b>Measurement range</b>	Alpha rays $3.7 \times 10^{-2}$ Bq/m <sup>3</sup> to $3.7 \times 10^6$ Bq/m <sup>3</sup> Beta rays 1Bq/m <sup>3</sup> to $3.7 \times 10^6$ Bq/m <sup>3</sup>
<b>Size</b>	Approx. 525 (W) x 1310 (H) x 800 (D) mm
<b>Mass</b>	Approx. 95kg (Main body Approx. 80kg)
<b>Operating environment</b>	Temperature 0°C to 40°C, Relative humidity less than 90%



## Portable Iodine Monitor (NAL2)

An easy-to-handle iodine monitor even on uneven surfaces

<b>Radiation detected</b>	Gamma rays ( <sup>131</sup> I)
<b>Detector</b>	NaI(Tl) scintillation detector
<b>Energy range</b>	360keV ± 10%
<b>Measurement range</b>	3.7Bq/m <sup>3</sup> to $3.7 \times 10^6$ Bq/m <sup>3</sup>
<b>Size</b>	Approx. 525 (W) x 1310 (H) x 800 (D) mm
<b>Mass</b>	Approx. 95kg (Main body Approx. 80kg)
<b>Operating environment</b>	Temperature 0°C to 40°C, Relative humidity less than 90%



## Semiconductor Gamma-ray Area Monitor (NEM)

A state-of-the-art model which utilizes a semiconductor detector

<b>Radiation detected</b>	Airborne gamma rays
<b>Detector</b>	Silicon semiconductor detector
<b>Measurement range</b>	$10^{-1}\mu\text{Sv/h}$ to $10^4\mu\text{Sv/h}$
<b>Measured energy range</b>	80keV to 6MeV
<b>Size</b>	360 (W) x 285 (H) x 60 (D) mm
<b>Mass</b>	Approx. 5kg

## Neutron Area Monitor (NDN1)

A Neutron area monitor which covers wide-range dose rate

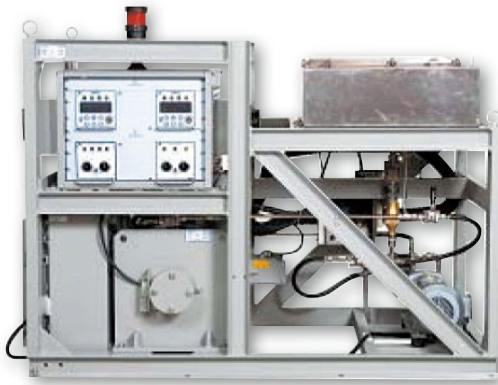
<b>Radiation detected</b>	Neutron
<b>Detector</b>	$^3\text{He}$ gas proportional counter
<b>Measurement range</b>	$10^{-1}\mu\text{Sv/h}$ to $10^4\mu\text{Sv/h}$
<b>Dose rate characteristics</b>	Within $\pm 20\%$ ( $10\mu\text{Sv/h}$ , $^{252}\text{Cf}$ reference source)
<b>Measured energy range</b>	0.025eV to 15MeV
<b>Size</b>	$\phi 250 \times 388$ (H) x $\phi 250$ (base) mm
<b>Mass</b>	Approx. 12kg



## Continuous Particulate Monitor (NAD27)

Utilizing a continuous filter, this model is capable of long hours of continuous measurements

<b>Radiation detected</b>	Beta (Gamma) rays
<b>Detector</b>	Semiconductor detector
<b>Detection sensitivity</b>	$3.7\mu\text{Bq/cm}^3$ or less
<b>Filter feed rate</b>	Intermittent feed 75mm/min, continuous feed 25mm/h
<b>Flow rate</b>	130 L/min
<b>Size</b>	1000 (W) x 1200 (H) x 640 (D) mm
<b>Mass</b>	Approx. 400kg



## Stack Particulate/Iodine/Noble Gas Monitor (AM3F)

A compact model with the capability of measuring roof ventilation dust, iodine and noble gas

<b>● Particulate</b>	
Radiation detected	Beta rays
Detector	NE102 beta-ray plastic scintillation detector
Measurement range	$3.7 \times 10^{-1} \text{Bq/m}^3$ to $3.7 \times 10^5 \text{Bq/m}^3$ ( $^{137}\text{Cs}$ )
<b>● Iodine, Noble gas</b>	
Radiation detected	Gamma rays
Detector	NaI(Tl)scintillation detector: $\Phi 2'' \times 2''$
Measurement range	$3.7 \times 10^{-1} \text{Bq/m}^3$ to $3.7 \times 10^5 \text{Bq/m}^3$ ( $^{131}\text{I}$ ) $3.7 \times 10^3 \text{Bq/m}^3$ to $3.7 \times 10^8 \text{Bq/m}^3$ ( $^{133}\text{Xe}$ )
<b>Accuracy</b>	$\pm 15\%$
<b>Size</b>	Approx. 1830 (W) $\times$ 1370(H) $\times$ 820 (D) mm
<b>Mass</b>	Approx. 820kg

## Beta Air Monitor (BAM100)

Continuous measurement of low energy alpha and beta activity in a sample airstream

<b>Radiation detected</b>	Gaseous beta rays ( $^3\text{H}$ , noble gas, etc.)
<b>Detector</b>	Flow-through ion chamber
<b>Detection capacity</b>	2.4L
<b>Measurement range</b>	$18 \text{kBq/m}^3$ to $3.7 \times 10^4 \text{MBq/m}^3$ ( $^3\text{H}$ )
<b>Accuracy</b>	$\pm 10\%$ of known concentration
<b>Size</b>	Approx. 350 (W) $\times$ 240 (H) $\times$ 330 (D) mm
<b>Mass</b>	Approx. 11.4kg



## Water Effluent Monitor (NAW)

A soaking model and a sampling model are available for various drainage systems

<b>● Immersion model</b>	
Radiation detected	Gamma rays
Detector	NaI(Tl)scintillation detector: $\Phi 2'' \times 2''$
Detection sensitivity	$7.0 \times 10^3 \text{Bq/m}^3$ or less ( $^{137}\text{Cs}$ )
Measurement range	$0.1 \text{s}^{-1}$ to $2 \times 10^6 \text{s}^{-1}$
Measured energy range	50keV to 3MeV
<b>● Water sampling model</b>	
Radiation detected	Gamma rays
Detector	NaI(Tl)scintillation detector: $\Phi 2'' \times 2''$
Measurement range	$1 \text{s}^{-1}$ to $10^5 \text{s}^{-1}$
Measured energy range	50keV to 3MeV
Monitor tank	Approx. 260L
Lead shielding	Approx. 4cm thickness
Sampling flow rate	25 L/min.
Size	Approx. 2490 (W) $\times$ 1050 (D) $\times$ 1860 (H) mm
Mass	Approx. 3100kg



# Process Monitors



## Ionization Chamber Detector for CAMS (NDK367)

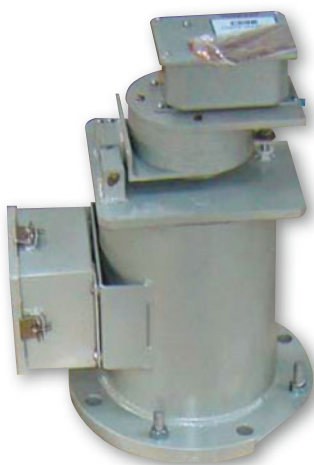
Measures atmospheric radiation level in the containment vessel

<b>Radiation detected</b>	Atmospheric gamma rays
<b>Detector</b>	Cylindrical type ionization detector
<b>Measurement range</b>	$10^{-2}$ Sv/h to $10^5$ Sv/h
<b>Measured energy range</b>	50keV to 7MeV
<b>Energy response</b>	Within $\pm 20\%$ (80keV to 1.3MeV)
<b>Size</b>	Approx. $\Phi 89 \times 290$ (H) mm, Flange $\Phi 150$ mm
<b>Mass</b>	Approx. 5kg

## Ionization Chamber Detector (CIC1) for CAMS

Operates during a LOCA condition

<b>Radiation detected</b>	Atmospheric gamma rays
<b>Detector</b>	Cylindrical ionization chamber detector
<b>Measurement range</b>	$10^{-2}$ Gy/h to $10^5$ Gy/h
<b>Size</b>	Approx. $\Phi 63.5 \times 242$ mm



## N-16 Gamma-ray Monitor (MSL)

Detects low amounts of leakage, 0.1 L/h

<b>Radiation detected</b>	Gamma rays
<b>Detector</b>	BGO crystal $\Phi 2'' \times 2''$
<b>Minimum detection concentration</b>	$1.85 \times 10^9$ Bq/m <sup>3</sup>
<b>Measurement range</b>	Gamma rays : $3.7 \times 10^9$ Bq/m <sup>3</sup> to $3.7 \times 10^{13}$ Bq/m <sup>3</sup> N16 : 113 L/d to 757 L/d leakage
<b>Size</b>	Approx. 510 (W) x 350 (H) x 400 (D) mm
<b>Mass</b>	Approx. 380kg

## Liquid Monitor (NZU)

Offers highly-sensitive detection of liquid in various kinds of pipes.

<b>Radiation detected</b>	Gamma rays
<b>Detector</b>	NaI(Tl) scintillation detector
<b>Measurement range</b>	$3.7 \times 10^3$ Bq/m <sup>3</sup> to $3.7 \times 10^9$ Bq/m <sup>3</sup>
<b>Measured energy range</b>	50keV to 1.5MeV
<b>Size</b>	Inline type: Approx. 1125 x 580 x 570 mm (including lead shielding of 5cm) Approx. 640 x 1325 x 480 mm (including lead shielding of 10cm) Adjacent-to-line type: Approx. 950 x 635 x 620 mm
<b>Mass</b>	Inline type: Approx. 450kg (including lead shielding 5cm) Approx. 1100kg (including lead shielding of 10cm) Adjacent-to-line type: Approx. 910kg (including lead shielding 5cm)



## Monitoring Post (Self-contained) (NAH7)

A self-contained model with the capability of measuring from BG level to high dose rate in the case of an accident

<b>Radiation detected</b>	Airborne gamma rays
<b>Detector</b>	Low range : NaI(Tl) scintillation detector High range : Ionization chamber detector
<b>Display range</b>	Low range : Dose rate 10nGy/h to 10 <sup>5</sup> nGy/h Counting rate 1s <sup>-1</sup> to 10 <sup>8</sup> s <sup>-1</sup> High range : 10nGy/h to 10 <sup>6</sup> nGy/h
<b>Measured energy range</b>	50keV to 3MeV
<b>Data storage</b>	6 months
<b>Data transfer</b>	Via Ethernet (dose rates, energy spectrum, equipment condition, etc.)
<b>Size</b>	1000 (W) x 1225 (H) x 600 (D) mm
<b>Mass</b>	Approx. 80kg



## Portable Monitoring Post (2 channel type) (NAH3)

A compact model which covers the same dose rate range as that of a self-contained model

<b>Radiation detected</b>	Airborne gamma rays
<b>Detector</b>	Low range : NaI(Tl) scintillation detector High range : Silicon semiconductor detector
<b>Display range</b>	Low range : 10nGy/h to 10 <sup>4</sup> nGy/h High range : 10nGy/h to 10 <sup>8</sup> nGy/h
<b>Measured energy range</b>	50keV to 3MeV
<b>Data transfer</b>	Via Ethernet
<b>Size</b>	Approx. 400 (W) x 680 (H) x 300 (D) mm
<b>Mass</b>	Approx. 25kg (main body)



# Environmental Monitors



## Monitoring Post (Inside Installation Model) (NAH79)

Features stable and long-term monitoring of environmental radiation

<b>Radiation detected</b>	Airborne gamma rays
<b>Detector</b>	Low range : NaI(Tl) scintillation detector High range : Ionization chamber detector
<b>Display range</b>	Low range : Dose rate 10nGy/h to 10 <sup>6</sup> nGy/h Counting rate 1s <sup>-1</sup> to 10 <sup>6</sup> s <sup>-1</sup> (full range) Counting rate 1s <sup>-1</sup> to 10 <sup>4</sup> s <sup>-1</sup> (each energy range of SCA)
<b>Measured energy range</b>	High range : 10nGy/h to 10 <sup>6</sup> nGy/h 50keV to 3MeV
<b>Recorded data</b>	Spectrum data, dose rates, counting rates, high voltages, low voltages, detector temperatures

## Monitoring Vehicle (NAH78)

A positioning information display linked with GPS and report generation are available

### ● Environment gamma-ray measuring equipment

**Detector** Low range : NaI(Tl) scintillation detector  
High range: Spherical pressurized ionization chamber detector

**Measurement range** BG to 10<sup>6</sup>nGy/h

**Measured energy range** 50keV to 3MeV

### ● Airborn radioactive substance measuring equipment

**Radiation detected** Alpha rays, Beta rays, Gamma rays

**Detector** ZnS(Ag) PL scintillation detector for alpha rays and beta rays, NaI(Tl) scintillation detector for gamma rays

**Detection sensitivity** Alpha rays : 2.4 x 10<sup>-6</sup>Bq/cm<sup>3</sup>  
Beta rays, Gamma rays : 1.2 x 10<sup>-3</sup>Bq/cm<sup>3</sup>



## Real-time Dose Monitoring System (NAH2)

Measures the gamma-ray dose rate at 1m or 50cm from the ground

<b>Radiation detected</b>	Gamma (X) rays
<b>Detector</b>	Silicon semiconductor detector
<b>Measurement range</b>	0.001μSv/h to 99.99μSv/h
<b>Measured energy range</b>	60keV to 1.25MeV
<b>Size</b>	Approx. 700 (W) x 2100 (H) x 800 (D) mm
<b>Mass</b>	Approx. 80kg



## Gatehouse Monitor (NAJ59)

Monitors for radioactive substances carried or transported out from nuclear power plants

<b>Radiation detected</b>	Gamma rays
<b>Detector</b>	Nal(Tl) scintillation detector
<b>Measurement energy</b>	50keV or more
<b>Detection limit source strength</b>	$3.7 \times 10^6$ Bq or less
<b>Size</b>	Approx. $\Phi 320 \times 1525$ mm
<b>Mass</b>	Approx. 100kg

## Waste Drum Inspection Equipment (N90)

Measures surface contamination density and surface dose rate of radioactive waste

- **Surface contamination density measurement assembly**

Radiation detected	Beta (Gamma) rays
Detector	Silicon semiconductor detector
Detection sensitivity	$3.7 \times 10^{-2}$ Bq/cm <sup>2</sup> or less

- **Surface dose rate measurement assembly**

Radiation detected	Gamma rays
Detector	GM tube
Measurement range	$10^{-3}$ mSv/h to 10mSv/h



## Gamma-ray Calibration Equipment (NRU1)

Calibrates various gamma-ray instruments

- **Gamma-ray irradiation equipment**

Sources	<sup>137</sup> Cs (1.85TBq, 74GBq, 3.7GBq, 185MBq, 3.7MBq)
Shielding performance	20 $\mu$ Sv/h or less

- **Mounting cart for calibration (with ITV camera for reading indication values)**

Moving distance	500mm to 8000mm (gamma source is placed in the center position)
Moving speed	40mm/s, 10mm/s, 4mm/s
Function	Remote control





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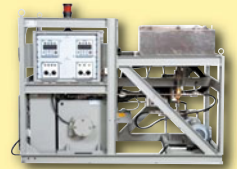
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