

YD-850 Online Radiation Monitoring System



SYSTEM OVERVIEW

The YD-850 Online Radiation Monitoring System is an advanced, continuous-duty nuclear radiation surveillance and alarm platform engineered for mission-critical radiological safety applications. The system consolidates ambient dose equivalent rate measurement, environmental PM2.5 particulate concentration, and temperature/humidity monitoring into a unified architecture, delivering comprehensive workplace situational awareness to radiation protection personnel.

Designed for sustained, reliable operation in harsh and complex radiological environments, the YD-850 is suited for deployment across: nuclear fuel cycle facilities, radioisotope production plants, nuclear medicine departments, radiological device installations, nuclear power plants (NPPs), industrial irradiation facilities, environmental radiation protection agencies, and radiological health monitoring stations.

Features

- **8-inch 1280×800 IPS high-resolution color LCD** with an intuitive operator interface;
- **Real-time readout of radiation dose rate** with user-selectable units ($\mu\text{Sv/h}$, $\mu\text{Gy/h}$);
- **Dynamic real-time trending display** of dose rate curves from all connected probes;
- **Integrated laser-based particle sensor** for continuous real-time PM_{2.5} concentration monitoring at the host location;
- **Integrated high-accuracy temperature and humidity sensor** for real-time ambient

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condition monitoring at the host;

- **Multi-channel detector capacity** — the system host supports connection of multiple radiation detectors (X- γ probes, neutron probes);
- **Automatic detector identification (hot-swap)** for simplified field replacement and maintenance;
- **Real-time clock function** displaying year, month, and date; clock operation persists through power loss;
- **Adjustable alarm threshold** across the full measurement range, with multi-modal alarm outputs — **audible and visual alarm** as standard; optional **4-channel relay contact output** for external alarm actuation;
- **Automatic threshold alarm recording** with non-volatile onboard storage — data retained during power cycles; alarm history manually retrievable;
- **Probe communication:** RS485 (wired);
- **Supervisory interface:** RS485 and Ethernet, supporting **Modbus RTU** and **Modbus TCP** protocols respectively; data accessible via supervisory software (optional);

Detector Options

For X- γ : Configurable as GM detector, scintillation detector, or silicon semiconductor detector

For neutron: Configurable as ^3He proportional counter.



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Supervisory Radiation Monitoring Management Software (Optional / Customizable)

- **Real-time curve display** with Y-axis zoom, X-axis span adjustment, and auto-scaling;
- **Supports up to 32 probes or hosts**, with color-coded curves for each channel;
- **Parameter configuration** settings;
- **Adjustable transmission interval, data logging interval, and channel naming**;
- **Historical data functions**: query, delete, clear, archive, and export;
- **Automatic statistical computation** of maximum, minimum, and mean values from queried datasets;

Detector Specifications

GM Detector

Parameter	Specification
Detector	GM detector (energy-compensated)
Measurement Range	0.01 $\mu\text{Sv/h}$ $\sim$ 2.5 mSv/h (or 0.1 $\mu\text{Sv/h}$ $\sim$ 300 mSv/h)
Sensitivity	>5 CPS at 1 $\mu\text{Sv/h}$ (referenced to ^{137}Cs)
Response Time	$\leq 2\text{s}$
Relative Intrinsic Error	$\leq \pm 15\%$
Energy Response	48 keV $\sim$ 3 MeV, $\leq \pm 30\%$
Operating Conditions	Temperature: -10°C to $+50^{\circ}\text{C}$; Relative humidity: $\leq 98\%$ (at 40°C)
Dimensions	Host: $260 \times 160 \times 68$ mm (excl. stand); Probe: $\phi 60 \times 320$ mm

Scintillation Detector

Parameter	Specification
Detector	Scintillator + Photomultiplier Tube (PMT)

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Parameter	Specification
Energy Response	38 keV ~ 7 MeV
Detectable Radiation	X-rays, γ -rays
Measurement Range	Dose rate: 0.01 μ Sv/h ~ 1 Sv/h; Accumulated dose: 0 ~ 9999 mSv
Display	Desktop 8-inch color LCD touchscreen
Sensitivity	>50 CPS at 1 μ Sv/h (referenced to ^{137}Cs)
Relative Intrinsic Error	$\leq \pm 10\%$ (^{137}Cs , at 100 μ Sv/h)
Response Time	1 s
Refresh Rate	1 reading per second
Operating Environment	Temperature: -10°C to $+50^{\circ}\text{C}$; Relative humidity: $\leq 95\%$ (at 40°C)
Power Supply	AC mains, 220 V
Weight & Dimensions	Approx. 500 g; $\phi 58 \times 263$ mm

Ionization Chamber Detector

Parameter	Specification
Detector	Ionization chamber
Energy Range	60 keV ~ 7 MeV
Detectable Radiation	X-rays, γ -rays
Measurement Range	0.1 μ Gy/h ~ 1 Gy/h
Relative Intrinsic Error	$\leq \pm 15\%$ (^{137}Cs , 661 keV)
Response Time	≤ 2 s
Display	8-inch color LCD touchscreen
Operating Environment	Temperature: -10°C to $+50^{\circ}\text{C}$; Relative humidity: $\leq 95\%$ (at 40°C)

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Parameter	Specification
Power Supply	AC mains, 220 V

Semiconductor Detector

Parameter	Specification
Detector	Silicon semiconductor detector
Measurement Range	1 $\mu\text{Sv/h}$ ~ 2 Sv/h
Energy Response	28 keV ~ 5 MeV
Sampling Interval	5 s
Measurement Error	$\leq \pm 15\%$
Operating Environment	Temperature: -10°C to $+50^{\circ}\text{C}$; Relative humidity: $\leq 98\%$ (at 40°C)
Dimensions	Host: $320 \times 160 \times 68$ mm (excl. stand); Probe: $\phi 41 \times 210$ mm

Neutron Detector

Parameter	Specification
Detector	^3He proportional counter
Measurement Range	0.1 $\mu\text{Sv/h}$ ~ 100 mSv/h
Energy Response	0.025 eV ~ 16 MeV
Sensitivity	> 1.4 CPS per $\mu\text{Sv/h}$
Operating Environment	Temperature: -20°C to $+50^{\circ}\text{C}$; Relative humidity: $\leq 98\%$ (at 40°C)
Measurement Error	$\leq \pm 15\%$
Dimensions	Host: $260 \times 160 \times 68$ mm (excl. stand)

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Parameter	Specification
Probe	Spherical: $\varnothing 260 \times 280$ mm; Cylindrical: $\varnothing 200 \times 250$ mm
Weight	Approx. 9 kg (excl. mounting bracket)

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