

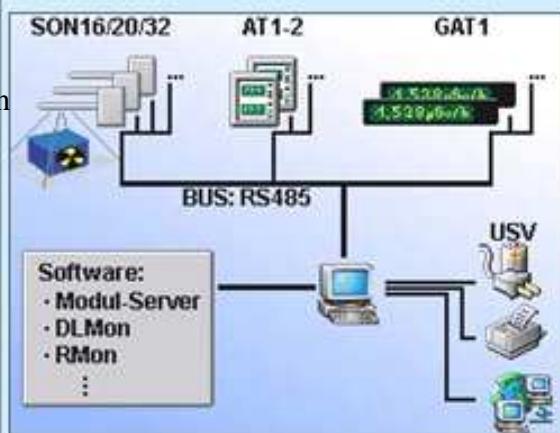
Radiation Monitoring System DLMon

Fields of Application:

- Dose rate monitoring system for use in nuclear medicine
- Area monitoring (e.g. manufacturing of radionuclides, laboratories, nuclear power plants, or storage facilities of radioactive materials)

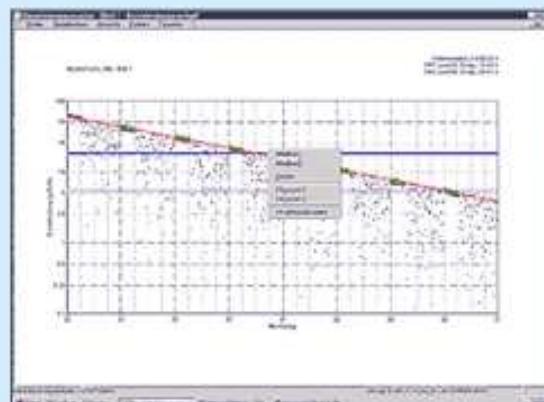
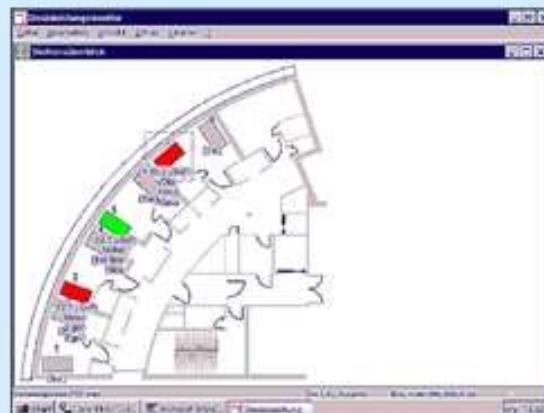
Features:

- Custom-oriented measuring system consisting of intelligent radiation detectors and displays (up to 255 single elements).
- Data transfer with RS485 bus system
- Analysis software based on advanced Client-Server-Concept (custom-designed analysis of acquired data)
- Data storage with Microsoft SQL-SERVER
- Customization of software



System - Components:

- intelligent detector with internal micro-controller
- intelligent single and double displays with internal micro-controller and selectable thresholds
- intelligent large-scale displays with special features
- data acquisition and processing unit (consisting of computer, printer, no-break power supply and RS-485 interface)
- Client-Server-Software (operating system: Windows NT, 2000)



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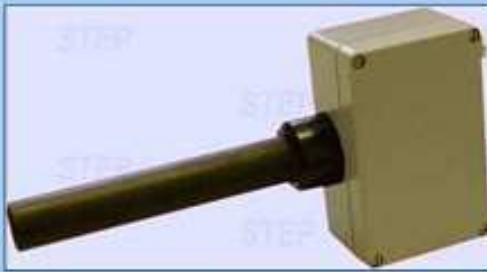
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| <u>Intelligent radiation Detector:</u> <u>SON16</u> |  |
| Measuring value: | Photon dose equivalent rate or ambient dose equivalent rate |
| Detector: | Geiger-Muller tube Typ 70004 |
| Measurement range: | 1 µSv/h* ... 500 µSv/h *(Measurement time 200 s, Measurement uncertainty < 3 %) |
| Energy range: | 35 keV ... 1.3 MeV |
| Collimator: | Material: Lead Acceptance angle: ± 30 ° |
| Electronics: | <ul style="list-style-type: none"> • micro-controller with internal memory • 128-kByte-Flash-EPROM • data transfer by RS-485 interface • calculation of dose rate from counting rate • correction for detector dead time and background counting rate • data memory (up to 9088) values including date and time in a non-volatile cyclic memory • acquisition parameters (acquisition time, number of cycles) can be defined • continuous self-monitoring of all internal and external operating voltages; • functional tests of the detectors, interfaces and memories |

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Intelligent radiation Detector:

SON20



| | |
|--------------------|--|
| Measuring value: | Photon dose equivalent rate or ambient dose equivalent rate |
| Detectors: | Geiger-Muller tube Typ 70013E (*) |
| Measurement range: | 0.5 µSv/h* ... 200 µSv/h * (Measurement time 200 s, Measurement uncertainty < 3 %) |
| Energy range: | 35 KeV ... 1.3 MeV |
| Collimator: | none |
| Electronics: | <ul style="list-style-type: none"> • micro-controller with internal memory • 128-kByte-Flash-EPROM • data transfer by RS-485 interface • calculation of dose rate from counting rate • correction for detector dead time and background counting rate • data memory (up to 9088) values including date and time in a non-volatile cyclic memory • acquisition parameters (acquisition time, number of cycles) can be defined • continuous self-monitoring of all internal and external operating voltages; • functional tests of the detectors, interfaces and memories |

(*) The Type SON20 is available in versions with different GM-Tubes and several measurement ranges.

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| | |
|--|--|
| <u>Intelligent radiation Detector:</u> <u>SON31</u> | |
| Measuring value: | Photon dose equivalent rate or ambient dose equivalent rate |
| Detectors: | Geiger-Muller tube Typ 70031 |
| Measurement range: | 0.1 $\mu\text{Sv/h}$ * ... 2000 $\mu\text{Sv/h}$ * (Measurement time 200 s, Measurement uncertainty < 3 %) |
| Energy range: | 45 KeV ... 1.3 MeV |
| Collimator: | none |
| Degree of protection: | IP 65 (die-cast case / weatherproof protection) |
| Electronics: | <ul style="list-style-type: none"> • micro-controller with internal memory • 128-kByte-Flash-EPROM • data transfer by RS-485 interface • calculation of dose rate from counting rate • correction for detector dead time and background counting rate • data memory (up to 9088) values including date and time in a non-volatile cyclic memory • acquisition parameters (acquisition time, number of cycles) can be defined • continuous self-monitoring of all internal and external operating voltages; • functional tests of the detectors, interfaces and memories |

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| | |
|---|---|
| <p><u>Intelligent display unit:</u></p> <p>AT1 - 1</p> <p>AT1 - 2</p> |  |
| <p><u>Intelligent big display unit:</u></p> <p>GAT-1</p> |  |
| <p>Single display for each detector or double display for two detectors, resp.</p> <p>Display of the measuring value:</p> <ul style="list-style-type: none"> • 3 1/2 - digit display (height of digits: 17.8 mm), LCD with backlighting • quasi-analogue bar graph (20 elements) • optical and acoustic error signalling (reset by software) • 3 LED (red, yellow, green) for rapid signalling of the health risk for staff (AT1-x) • 3 different colors for rapid signalling of the health risk for staff (GAT1) • data transfer by RS-485 interface • EPROM for data storage <p>Electronics:</p> | <ul style="list-style-type: none"> • micro-controller with internal memory • 128-kByte-Flash-EPROM • data transfer by RS-485 interface • data memory (up to 9088) values including date and time in a non-volatile cyclic memory • internal functional tests |

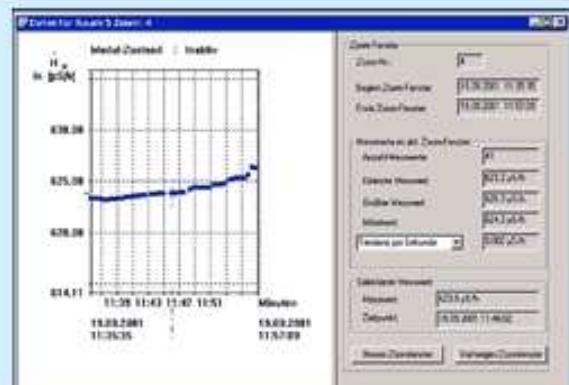
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RMon-client -software:

Analysis software for room monitoring for use in laboratories and exposed rooms.

- Windows based software for PC (Window 2000, XP, 7)
- Display of the arrangement of each detector in the rooms / process to be monitored (customized ground view / floor plan)
- Detector overview: display current dose rate of all detectors as bar chart as well as by a colour code
- Display the diagram with dose rate vs. time for each detector
- Calculate the dose
- Detector calibration
- Marginal check: if pre-selected thresholds are exceeded-emission of warning signals and/or activation of safety facilities



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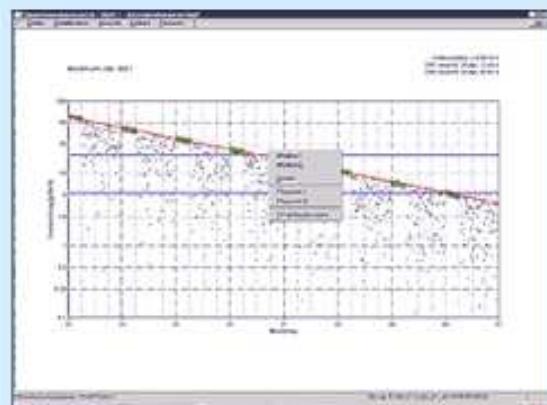
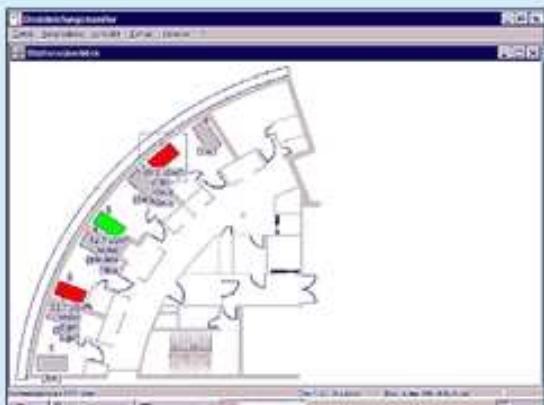
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DLMon-client-software:

Analysis software for patient monitoring for use in radioiodine therapy.

- Display of the arrangement of each detector in the rooms to be monitored
- Detector overview: display of the current dose rate digitally as well as by a colour code
- Dose rate histogram
- Long-term archiving of acquired data
- Detector calibration
- Automatic monitoring of all components and functions
- Marginal check: if pre-selected thresholds are exceeded - emission of warning signals and/or activation of safety facilities
- Patient check-in (optional: chip-card reader)
- Patient data base
- Diagrams including the display of discharge-thresholds (user programmable)
- Data fit to estimate the effective half-life of the incorporated nuclide
- Transfer of patients by mouse-click
- Printing forms for patient discharge
- Drawing up reports on chosen periods



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