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Key characteristics

To give you a quick overview of the essential product features, we have summarized these for you below. Detailed technical information and the full range of functions of the monitor can be found on the following pages. The offered device type fulfils all requirements mentioned by you.

Monitor characteristics	HFC-8
Type of monitor	Hand Foot Clothing Monitor
	In a compact housing our Hand Foot Clothing Monitor combines highest measurement safety through spring loaded hand detectors along with the latest technology development of electronics. The monitor has been developed to meet today´s needs of customers and corresponding official requirements. Our HFC-8 hand and foot monitor is supplied in various configurations depending upon customer´s requests. This version supports four hand detectors and two feet detectors on each side. The monitor features gasless beta plastic detectors with an optional extension to alpha discriminating detectors.
Hand Foot Monitor	For personnel measuring hands and feet after leaving a laboratory, a research facility or a controlled area, for example. One measurement step for hand palm / back and feet Removable hand probe Ergonomic detector positioning, with spring loaded detector arrangement at hands; conforms to IEC61098 Easy to move to other areas Easy to set up, maintain and service
Hardware version	2018, state of the art technology using latest electronic components
Detectors	Beta plastic detectors with integrated electronics and microprocessor; optionally: alpha discrimination by ZnS or gamma detectors Direct connection detector ⯆ PC via USB, thus providing unsurpassed easy and fast replacement of detectors By using JFN´s test tool software a broken detector can be analysed directly at the customers desk
Operating System	Linux, no licence needed
User software	Multi-Channel Energy Analysis (for plastic detector) Conforms to ISO11929 Fully automated measurement process with user guidance by voice prompts, indication of results at the LCD screen Modern touch operated display
James Fisher Nuclear Hamburg GmbH	Inhouse-competence ranging from product development to aftersales support: one-stop-services. Product made in Germany.

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1.   Task / Project

We are pleased to introduce to you our Hand, Foot, Clothing monitor HFC-8. The device not only meets all country-specific, technical requirements but has also been developed consistently according to customer needs. Should you have requirements that are not met by the standard components and options offered, we will gladly assist you with our engineering team to tailor your specific wishes to the measurement device.

The HFC-8 is optimized to measure personnel measuring hands and feet after leaving a laboratory, a research facility or a controlled area, for example.
The housing is completely made of stainless steel. All parts of design are optimized to have the biggest space for servicing reason. The monitor features highly sensitive 8 beta plastics or gas proportional detectors to heave in one step measurement the feet and palm and back of both hands. The detectors´ arrangement is optimized with spring-loaded hand detectors.

The ratio of different user sizes to detector distances fits with the geometry perfect and gives the best practically. In order to facilitate a comfortable and easy maintenance, the number of electronic components has been reduced to a minimum, the maintenance area is very easy to reach behind a service door.

The monitor is completely self-sufficient during operation and automatically starts to measure the background after switching on. The background information is continuously updated during non-measurement cycles and automatically subtracted from the measurement result.

If the monitor signals the status "Ready to measure", the person to be measured can step on the monitor. A detailed voice guidance guides the person through the monitor to ensure optimal and reproducible positioning. Of course, voice instructions for the measurement are also given during and after the measurement.

The user benefits from a measuring electronics that is not only state-of-the-art and on the newest technological stand, but also easy in operation and maintenance. Integrated maintenance tools help to optimize the system and minimize the device downtime.

The measuring and evaluation electronics are integrated behind the maintenance door of the monitor. Measurement results and parameter inputs are entered via the LCD touch screen display, alternatively an external keyboard can be used for input. The touch display is ergonomically located. The measurement result can be displayed in CPS and - if a nuclide efficiency calibration has been performed - also in Bq or Bq / cm².

The HFC-8 is equipped with a standard UPS that safely shuts down the monitor in the event of a power failure. The battery hold time is selected so that several measurements can be completed after power loss. After the monitor is safely shut down, it will power up automatically in the "ready for measuring" status after the power supply has been restored.

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2.   Standard monitor features

Technical Specifications	HFC-8
Dimensions	External: 1493 x 642 x 710 mm (H x W x D)
Weight	< 60 kg
Housing properties	The housing is completely made of stainless steel.
Detectors	8 beta plastic detectors with photo multiplier and microprocessor, thereof one hand detector removable as clothes detector, alpha discrimination by ZnS; (gas detectors optionally available) Active area per measurement: 2250 cm²
Sensors	2x foot, 2x hand, hand probe removable
Electronics	Latest technology with "Energy filter settings" for optimised background discrimination Industrial PC with LINUX operating system Network connection
Uninterruptable power supply	UPS to bridge loss of electrical power. Measurements may be performed during bridging time (depending upon UPS´ capacity)
Power supply	110-230V
Standards	Our monitors are compliant with international guidelines and standards, such as CE, CSA/UL and EMC. Evaluation of the measurement results according to ISO11929 and IEC61098 for the homogeneity of the detectors.

3.   Legal requirements

All components of the monitor as well as the measurement procedures and evaluation procedures comply with the requirements of the applicable regulations. The Hand, Foot, Clothing monitor HFC-8 is designed and parameterized according to the German "StrlSchV". The required certificates (CE certification) are provided with the delivery of the monitor.
The design of the monitor complies with the IEC61098 standard for fixed installed personal contamination monitors. Measurement results are determined in accordance with DIN ISO11929 for the determination of the characteristic limits (decision threshold, detection limit and limits of the confidence interval for measurements of ionizing radiation) for measurements of ionizing radiation - fundamentals and applications.

4.   Detectors

The HFC-8 is equipped with 8 detectors, which ensure excellent coverage due to their special design.
Position: 4x foot
                   4x hand, one detector detachable for clothing measurement

The design of the detectors is optimized to the greatest effective measurement area, feature very small dead zones by using novel wire fixing points. The detector connection is done via USB, therewith an easy and fast exchange is possible.

Optional:
The detectors will be operated with a gas mixture of 90/10 Ar/Co² or P10 Ar/Me (further on request) with a gas consumption of 5L/h. The gas flow will be digital measured and is processed directly into the PC. To use the full performance of the gas flow detector, it is also possible to optional unlock the discrimination feature to perform a lower alpha measurement.

5.   Minimum detectable activity

The monitor is suitable for use for beta energy ranges from 150 keV to 2 MeV. The detection limits are determined taking into account the environmental conditions and parameters specified below.

HFC-8			
False alarm probability		1,65	sigma
Detection probability		1,65	sigma
Background		0,1	µSv/h
Background measurement time		100	sec.
Measuring time (gas)		5	sec.
Measuring time (plast)		10	sec.
Nuclide	Gas Detector type	Beta Plastic Detector	ZnS Alpha/Beta Plastic Detector with Discrimination	Beta/Gamma Plastic Detector
Co-60	18 Bq	20 Bq	45 Bq	40 Bq
Am-241	4 Bq discriminated	23 Bq	6 Bq discriminated	35 Bq
Sr/Y-90	8 Bq	10 Bq	15 Bq	20 Bq

Detection limits are calculated in accordance with DIN ISO 11929, further information or nuclides on request.

Management System
ISO 9001:2015
TÜVRheinland
ZERTIFIZIERT
www.tuv.com
ID 9108644555

6. Software

The software concept is optimized for easy operation and handling of the monitor. All functions of the monitor can be accessed via the touch screen or alternatively via a remote keyboard. The operator software is divided into a measurement and a maintenance mode. When the monitor starts, it will automatically initialize and then performing a background measurement. The monitor ends in the automatic measuring mode with the status "ready to measure". The software constantly checks the status of the monitor, deviations from normal operation are displayed on the monitor.

Software: Example status of measurement
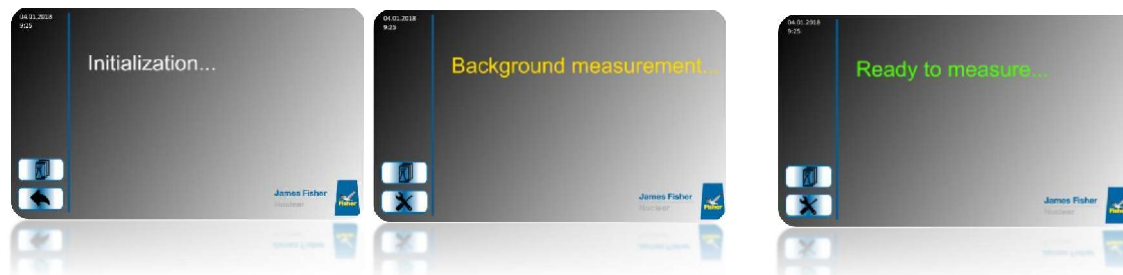
For parameter setting and service the monitor, the password protected maintenance mode can be reached. In the Maintenance mode the Service menu, the Settings menu and the Menu for database and user administration can be operated.

Software: Example maintenance mode

The highest password protected user level 'supervisor' will allow access to the following:

- In- and Output control for scale, detectors, sensors, initiator etc.
- Channel and background status
- Calibration tool and system check
- Internal database for measurement results
- User administration
- Export individual measurement results to a predefined media as for example USB stick
- Parameter/data storage in *.xml format for export un USB stick
- All standard printers and other peripheral hardware can be used in conjunction with Linux.

Also, all relevant settings to the monitor and the measurement can be done in the maintenance mode

- Measurement Parameter
- Background thresholds
- System parameters
- And the filter settings for the detectors

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Users with less rights can only perform parts of the functions contained in the above listing.

The operating system Linux used in our monitors, is widely used in technical applications because of its stability and compatibility with peripherals. It is used by both large government organizations and industrial companies. All standard printers, barcode scanners, and other peripheral hardware typically used in power plants can be used in conjunction with Linux.

7. Measurement procedure

Different units can be selected to be displayed for the measurement results. The simplest alarm trigger is performed by "CPS" (counts per second), whereby the number of pulses above the background causes the alarm. For nuclide-specific calculation and output, the display can be in Bq or Bq / cm², the measurement is based on previously applied calibrations and the selected parameters or inputs.

The measurement results are displayed on the device screen or can be viewed and archived as a paper version based on a log printout. In addition, the "PDF Print" function is available for displaying or archiving the measurement results.

8. Environmental conditions

The monitor can be operated in an ambient temperature between 5 ° C and 45 ° C with 85% humidity, up to 95%, without condensation. For transport and storage of the monitor, a temperature range of - 20 ° C to 55 ° C is permitted.

9. Technical handbook

One standard documentation is included. The documentation contains descriptions of all hardware and software components, including illustrations of the software menus and a description of the menu structure. The documentation is provided in English language.

The documentation covers the following topics:

- Technical Documentation
- Declaration of Conformity
- Transport, installation, commissioning of the monitor
- Monitor Description
- Operation manual
- Maintenance Manual
- Instruction and protocol design for periodic inspection
- Setting and calibration instructions
- Technical specifications
- Protocols of internal testing and acceptance test

10. Language

The business language is German. All correspondence, documents, documentation, technical instructions, training, technical support, service, etc. are written or hold in English.

11. Technical support

- Technical support and a long-term supply of spare parts are guaranteed
- Short-term customer service on-site will be offered by agreement
- Telephone support is free for all customers
- Remote maintenance is possible in principle, but requires individual technical coordination
- A maintenance contract can be offered as an option

We are happy to discuss the mentioned points above regarding your needs and an efficient implementation. For example, it might be a good idea to arrange special regulations for revision

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times in order to give you the best possible support. As this will generally not be reflected in our free services, special arrangements may be chargeable.

12.   Options

The standard monitor HFC-8 can be extended by a number of options and functions. Our experienced team will assist you in choosing appropriate options to maximize the system performance for your specific application.

12.1   Printer connection

12.1.1 Ink jet printer

For protocol printout.

12.1.2 Laser printer

For protocol printout.

12.2   Connection of external Systems

12.2.1 ID Card reader / Barcode scanner

The system can be combined with various card readers/Barcode scanners to e.g. authorize persons to measure or to store a personal ID number for measurement. If customer-specific card readers are used, the electrical and hardware interfaces must be precisely defined in advance. Of course, it is also possible to integrated an already existing standard card reader/Barcode scanner.

12.2.2 Alarm messages to the control room

Various alarm signals or status messages of the monitor available for external signalling:

- System error
- Contamination alarm (Alpha/Beta/Gamma)
- Vandalism

Since the type of signalling (optical / acoustic), the signal transmission (line length, signal technology used) and processing (single or collective message with / without acknowledgment) of above mentioned signals are generally customized, it requires detailed arrangements on the desired configuration. We are happy to make you an offer as soon as all technical details have been clarified.

12.2.3 Central Web Control

With aid of our central web visualization software it is possible to access from e.g. the central control room to visually inspect each monitor in your facility. All status information, measurement results, or calibration information are fully accessible through the Central Web Control. The system can be made available in different stages of development depending on your needs. If you are interested, please ask for more information.