

## Display Unit FHT 6020



- Local display of measurements with up to 16 intelligent dose rate probes and amplifiers
- Local display of measurements with up to 2 probes of the FH 40 G probe range
- Local release of audible and visual alarms
- Connection to a local PC via RS-232 interface
- Incorporation in measuring networks via RS-485 interface
- Analog input/output
- Digital bit input/output
- Measurement memory for probes of the FH 40 G probe range
- Robust and compact design
- Various options for power supply

## 0. General

The display and communication unit FHT 6020 is the latest product from the series of proven Area Monitors manufactured by Thermo Eberline ESM. The advantages of the FHT 6020 over the previous models FHT 155 and FHT 6010 are, that it can be integrated in networks, and that a larger selection and number of probes can be connected. Other advantages are a shorter response time in the transparent mode as well as a more compact design.

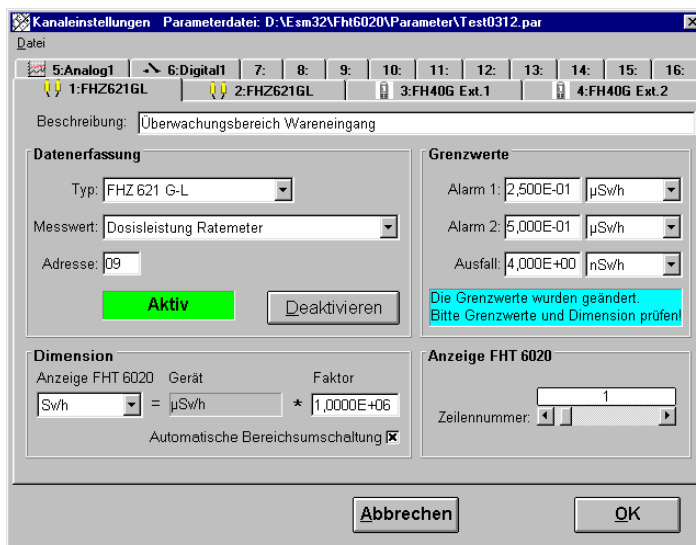
In stand-alone operation, the FHT 6020 can be used for the local display of measurements from intelligent probes as well as from probes of the FH 40 G range.

In network operation, the FHT 6020 can be operated and analyzed together with the intelligent probes by remote control via an RS-485 bus.

A "mixed operation" with intelligent probes and probes of the FH 40 G probe range is possible.

The FHT 6020 is equipped with a flash EPROM for storing the firmware. Thus updates of the basic version as well as customer-specific programs can be loaded on site later.

The FHT 6020 can be easily and conveniently configured by means of a PC via the serial interface. For this purpose, the configuration program "FHT 6020.exe" is used. This 32-bit Windows program in conjunction with the options for the equipment of the FHT 6020 offers an almost unlimited freedom of tailoring the FHT 6020 exactly to a measuring task.



"Channel Settings" mask of the "FHT6020.exe" program

## 0.1 Features

Basic equipment:

- 1x interface to PC, RS-232, 9.6 / 19.2 / 38.4 kbits/s
- 1x display, resolution 128 x 64 pixels, dim.: W x H = 62 mm x 44 mm
- 1x battery-buffered real-time clock
- 1x button
- 4x LED (1x green, 2x yellow, 1x red)
- 1x beeper, 85 dB(A) at a distance of 30 cm
- 1x digital bit output, 5 bits, isolated
- 1x digital bit input, 4 bits, isolated
- 80 KB history memory for measurement data from FH 40 G probes and analog inputs
- Connector for external 9 – 36 VDC power supply

Optional equipment:

- 1x RS-485 interface to PC instead of RS-232
- 1x RS-485 interface for intelligent probes
- 1x or 2x interface for FH 40 G probes
- 1x isolation for analog output
- 1x analog output: 0 or 4 to 20 mA, DC-coupled
- 1x additional analog output, 0 or 4 up to 20 mA, without isolation <sup>1)</sup>
- 1x or 2x analog input, unipolar, 0 to 4.5 VDC <sup>1)</sup>
- 1x AC wide-range power supply 100-240VAC, 50/60Hz <sup>1)</sup>

<sup>1)</sup> requires "high" housing design (dimensions see "Dimensions and weights"), HSx types

**0.2 Technical data:****Dimensions and weights**

	W [mm]	L [mm]	H1 / H2 [mm] 1)	M1 / M2 [kg] 2)
Table	105	182	44.5 / 65	0.8 / 1.3
Wall	130	182	45.5 / 66	0.8 / 1.3

- 1) H1 : "Flat" housing design, H2 : "High" housing design  
2) M1: "Flat" housing design, M2 : "High" housing design with internal power pack

**Connectors**

Detector 40G 1	Socket, 6-pin, Fischer DEE103
Detector 40G 2	Socket, 6-pin, Fischer DEE 103
PC	Socket, 9-pin, D-sub
Bit I/O	Socket, 15-pin, D-sub, High Density ("VGA version")
Probe	Plug, 9-pin, D-sub
Analog I/O	Socket, 15-pin, D-sub (HSx types only )

**Electrical characteristics**

Name	min.	typ.	max.	Dim.	Conditions
Supply voltage	9		36	VDC	
Current input, primary		30 31 32 75 100 102 180		mA	UB = 15 VDC, at 25°C no probes connected without RS-485 and analog I/O with 1 FHZ 612 / 632 with 2 FHZ 612 / 632 with 1 FHZ 621 G-L4 with 2 FHZ 621 G-L4 with 2 FHZ 632 + 2 FHZ 621 G-L4 with 1 FHT 191
Buffer battery life		10		a	
Measurement display			4-digit 6-digit		Setting "with pre-dimension" Setting "without pre-dimension"
Displayable measurement			999 M 999 999		Setting "with pre-dimension" Setting "without pre-dimension"
Digital outputs (electronic relays)					
Voltage rating	0 0		± 36 26.4	VDC VAC	Direct current voltage Effective value at sinusoidal alternating voltage (50/60 Hz AC)
Current rating	0		± 400	mA	at ambient temperature of 25°C
Fuse protection per output			500	mA (T)	self-resetting (PTC behaviour)
"ON" resistance		0.8	1.5	Ω	I = I <sub>Max</sub>
Digital inputs					
Input current	± 3 ± 6		± 60 ± 30	mA	at ambient temperature of 25°C:  at ambient temperature of 60°C:
Input resistance		1		kΩ	
Analog outputs					
Load resistance (working resistance)			250	Ω	without module for isolation
Current	0		20	mA	
Resolution			4.9	uA	12 bits
Error		± 20		uA	
Analog inputs					
Voltage	0		4.5	V	
Resolution			17.6	mV	8 bits
Error		± 45		mV	

Order items:

Order No. FS-0-2-0-0  
**1. Area Monitor FHT 6020 in flat wall housing (Dim. H1)**

Basic unit in "flat" housing design with lugs for wall mounting,  
RS-232 interface to PC, external 15VDC power supply required

Order No. HSx-0-2-0-0-0  
**2. Area Monitor FHT 6020 in high wall housing (Dim. H2)**

Basic unit in "high" housing design with lugs for wall mounting,  
RS-232 interface to PC, external 15 VDC power supply or power supply by  
means of internal 100-240 VAC power pack required

**3. Probe connections**

**3.1 Connection for FH 40 G probes**

Front plate with one socket for a FH 40 G probe, optionally on the left or on the  
right, with a blind plug on the other side

or

front plate with two sockets for FH 40 G probes

or

retrofit kit for replacement of blind plug

**3.2 Connection for intelligent probes / amplifiers of the series FHZ 621 G,  
FHT 671 S and FHT 641 D**

RS-485 interface, isolated

## 4. Options

### 4.1 Bus-capable RS-485 interface for PC connection

Replaces the RS-232 interface to the PC

### 4.2 Analog output

- -FS types ("flat" housing design): max. 1 analog output, optionally with / without isolation
- HSx types ("high" housing design): max. 2 analog outputs, with a maximum of 1 isolated analog output

#### 4.2.1 Analog output

Output current 0 or 4 of up to 20 mA (configurable by means of PC program "FHT 6020.exe"), 12 bit resolution, max. working resistance 250  $\Omega$ , without isolation

#### 4.2.2 Analog output

Output current 0 or 4 of up to 20 mA (configurable by means of PC program "FHT 6020.exe"), 12 bit resolution, max. working resistance 500  $\Omega$ , with isolation

### 4.3 Analog input

for HSx types only ("high" housing design): max. 2 analog inputs, input voltage of 0 - 4.5 VDC, unipolar, 8 bit resolution, without isolation

### 4.4 Internal power pack

for HSx types only ("high" housing design),  
Primary: 100 to 240 VAC, 50/60 Hz, secondary: 15 VDC, 5 W,  
a maximum of 2 probes of the type FHZ 621 G plus 2 probes of the type FHZ 632 / 612 can be connected

**4.5 External power supply**

Order No. 42510421010

**4.5.1 Plug power pack**

Primary: 100 to 240 VAC, 50/60 Hz, secondary: 15 VDC, approx. 8 W, Euro plug on supply side, 7-pin DIN pin plug on output side, matching the ESM plug adapter 425426001 and the ESM interface converter, a maximum of 3 probes of the type FHZ 621 G plus 2 probes of the type FHZ 632 / 612 can be connected

Order No. 425426001

**4.5.2 Adapter with gender changer**

9-pin D-sub pin plug to 25-pin D-sub socket plug for the power supply of one FHT 6020 via the RS 232 interface

**5. Connection cables**

Order No. SM168535223

**5.1 Connection cable, 2m,**

9-pin D-sub, plug/socket, 1:1, for the connection of FHT 6020 to 1 intelligent probe or the connection FHT 6020 to PC with units that have an internal power pack

Order No. SM168535225

**5.2 Connection cable, 5m,**

9-pin D-sub, plug/socket, 1:1, for the connection of FHT 6020 to 1 intelligent probe or the connection FHT 6020 to PC with units that have an internal power pack



Order No. 42559 / 0130  
**5.3 Connection cable for digital I/O and analog output**

Digital input 4 not available, length approx. 1.5 m, one end: 15-pin D-sub HD plug (3 rows), other end: individual wires connected to nylon terminal strips

Order No. 42559 / 0230  
**5.4 Connection cable for analog I/O**

Length approx. 1.5 m, one end: 15-pin D-sub HD plug (2 rows), other end: individual wires connected to nylon terminal strips, HSx types only

**6. PC program**

Windows 95/98, configuration of the FHT 6020 by means of PC via serial interface: unit address, probe types, probe addresses, alarm and failure thresholds, and many more

**7. Accessories**

Order No. 42559/06  
**7.1 Alarm unit FHT 6025 without mains-adapter**

Alarm unit with three optical (three colors: red, yellow, green) and acoustical alarms to connect to FHT 6020. It requires a 24V-DC supply.

## Features:

- Supply locally by 24V-DC, from FHT 6020 or by an optional built-in mains-adapter (input 110 – 240 V-AC)
- 3 x optical alarms by a continuous light (1x red, 1x yellow, 1x green), 5W (max. 7W)
- 1x beeper, 90 dB(A) at a distance of 1m
- 2x buttons, 1x to quit beeper, 1x for internal test
- Aluminium box for buttons and internals, IP 54
- Cable with 15-pin plug for electrical connection to FHT 6020 (connection bit I/O), length 2m, other lengths on request.

Order No. 42559/07

**7.2 Alarm unit FHT 6025 mains-adapter**

Alarm unit with three optical (three colors: red, yellow, green) and acoustical alarms to connect to FHT 6020.

Mains adapter (input 110 – 240V-AC) to supply FHT 6025 and a connected FHT 6020.

## Features:

- Supply locally by 24V-DC, from FHT 6020 or by an optional built-in mains-adapter (input 110 – 240 V-AC)
- 3 x optical alarms by a continuous light (1x red, 1x yellow, 1x green), 5W (max. 7W)
- 1x beeper, 90 dB(A) at a distance of 1m
- 2x buttons, 1x to quit beeper, 1x for internal test
- Aluminium box for buttons and internals, IP 54
- Cable with 15-pin plug for electrical connection to FHT 6020 (connection bit I/O), length 2m, other lengths on request
- Usable as mains-adapter for networks up to 10 users.

## 8. FH 40 G range probes that can be connected

### 8.1 Dose rate probes

Designation	Unit	FHZ 302	FHZ 312	FHZ 612	FHZ 632 L
Order No.		42540/44	42540/40	42540/52	42540/35
Indication range	uSv/h	1 - 1 x 10 <sup>6</sup>	10 - 100 x 10 <sup>6</sup>	0.1 - 9.99x10 <sup>6</sup>	0.01 - 100x10 <sup>3</sup>
Energy range	keV	82 - 3,000	82 - 3,000	82 - 3,000	36 - 1,300

### 8.2 Neutron dose rate probes

Designation	Unit	FHT 752	FHT 752 H
Order No.		42540/20	42540/21
Indication range	uSv/h	0.001 - 400,000	0.001 - 110,000
Energy range	keV	0.025 x 10 <sup>-3</sup> - 10,000	0.025 x 10 <sup>-3</sup> - 10,000

### 8.3 Gamma detection probes

Designation	Unit	FHZ 672 E	FHZ 512	FHZ 502	FHZ 502 P-/E	FHZ 503
Order No.		42540/61	42540/32	42540/3301	42540/33 -/45	42540/63
Indication range	cps or uSv/h	0.01 - 100	0.01 - 0.1x10 <sup>6</sup>	0.01 - 0.1x10 <sup>6</sup>	0.01 - 0.1x10 <sup>6</sup>	0.01 - 0.1x10 <sup>6</sup>
Energy range	keV	> approx. 60	> approx. 30	> approx. 30	> approx. 30	> approx. 30

### 8.4 Contamination probes

Designation	Unit	FHZ 732	FHZ 742
Order No.		42540/34	42540/37
Indication range	cps	0.01 - 100,000	0.01 - 100,000
Sensitivity	cps/Bq	0.25 for <sup>204</sup> Tl	0.16 for <sup>204</sup> Tl

Environmental Instruments Division  
Radiation Measurement & Security  
[www.thermo.com](http://www.thermo.com)  
[info.rmp.erlangen@thermofisher.com](mailto:info.rmp.erlangen@thermofisher.com)

**Thermo Electron (Erlangen) GmbH**  
Fraunauracher Straße 96  
D-91056 Erlangen, Germany  
+49 (0)9131 909-0  
+49 (0)9131 909 475 fax

Postfach/P.O. Box 16 60  
D-91051 Erlangen, Germany