OPERATION MANUAL

HM309 portable measuring device

Description

Features

- for measuring relative humidity and temperature
- temperature resistant to 80°C (briefly to 130°C)
- measurement range 0 ... 100% RH and 40 ... 80°C
- absolute humidity calculation, dew point calculation
- min./max. value memory
- hold function
- automatic shutoff and configuration
- calibration function
- USB port
- cordless or plug-in operation

Applications

- conditioning chamber
- hop kiln
- stationary installation
- dryers
- quality assurance
- climate monitoring (indoor)

Technical data

Humidity measurement (depending on sensor, data apply to 1308 STD)	
Humidity measurement range	0 ... 100% RH
Humidity resolution (display)	0.1% RH
Humidity resolution (interface)	0.01% RH
Precision	±2% RH
Reaction time	10 sec.
Temperature measurement (depending on sensor, data apply to 1308 STD)	
Temperature measurement range	-40 ... 80°C
Temperature resolution	0.1°C or 0.1°F
Temperature resolution (interface)	0.01°C
Precision	±0.5°K
Reaction time	10 sec.
General	
Measurement rate	2 measurements per second (2 Hz)
Special function	Measurement of absolute humidity and dew point (also pressure dew point), measurement value storage, minimum and maximum value storage, USB port, battery monitoring automatic shutoff
Battery	9 V, alkaline IEC 6252 approx. 100 hours operating time
Operating temperature	0 ... +50°C
Display	two-line LCD display 37 mm x 42 mm
Interface	4800 Bd, 8N1 (RS232 compatible)
Dimensions	181 x 71 x 38 mm (without plug)
Housing	ABS, black
Scope of delivery	Battery, operating manual
Accessories	Special sensor, pressure dew point sensor, carrying case, calibration sets, PC cable, software, battery set, charger, power adapter Note: suitable probes on site 6
CE conformity	2014/30/EU
EMC emitted interference	EN 61000-6-3:2011
EMC interference immunity	EN 61000-3-1:2007
Item	**Item No.**
HM309 portable measuring device	HM309-USB

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Description

Relative air humidity plays a crucial role in many industrial fields and in quality assurance. In an industrial environment, very high demands are placed on a humidity measurement device when it comes to measurement precision, long-term stability and equipment. Often, sensors are needed that are specially adapted to the application. The series HM 309 portable devices are developed for these criteria: These robust, high-quality devices are suitable for connection to capacitative humidity sensors and offer outstanding measurement precision of up to ±1% RH. The external sensor is pluggable and replaceable. In addition to the standard sensor with measurement precision of ±2%, special sensors for many special applications are available for the device. Examples include a pressure-resistant dew point sensor for pneumatics, various sensors for bulk goods, and stationary built-in sensors. Customer-specific sensors can be created to cover almost any application.

View of the device

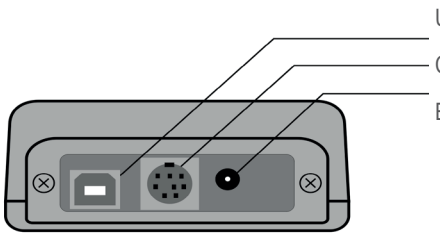
Key functions

The keys have the following basic functions:

Description	Function
ON	Turning the device on and off
HOLD	Value on the display remains stable
°C/°F	Switching between °C and °F
td/aH	Display of dew point and absolute humidity
MIN/ MAX	Display of minimum and maximum values determined
RST	Reset the minimum and maximum values

Connections on the device

The top of the HM 309 Hygro thermometer has several connections:

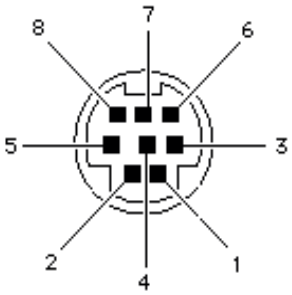


Pin assignment external power supply

Positive polarity

Note: Usable with ø2.1 mm or ø2.5 mm DC plug.

Pin assignment



Pin 1: Vcc (5 V DC)
Pin 2 : GND
Pin 3: DALLAS
Pin 4: unoccupied
Pin 5: SDA
Pin 6: SCL
Pin 7: unoccupied
Pin 8: unoccupied

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OPERATION MANUAL

HM309 portable measuring device

Instructions for use

Starting the device for the first time

Caution! Connect the sensor when the device is shut off. First shut the device off if you intend to change the measurement sensor. Plugging in during operation can damage the sensor or the device!

The device is delivered calibrated and ready to operate. To start the measuring device for the first time, first use a screwdriver to open the battery compartment on the back of the device and insert the battery.
Then connect the sensor's connection cable to the appropriate socket on the front of the device. The arrow shown on the plug or the flat side of the plug must point downward.

Prevent static charges and do not touch the electrical contacts. Electrostatic charges can damage the device or the sensor!
Turn the device on with the ON button. The current humidity and temperature values are shown on the display.

Setting up the display

In normal mode, the two-line LCD display of the controls is for showing the currently measured temperature and humidity values.

Operation in normal mode	Display
Relative humidity as a percent	
Temperature in °C	

Operating the HM 309 portable measuring device

Key functions

The keys have the following basic functions:

Function	Description
Turning the device on and off	ON
Value on the display remains stable	HOLD
Switching between °C and °F	°C/°F
Display of dew point and absolute humidity	td/aH
Display of minimum and maximum values determined	MIN/ MAX
Reset the minimum and maximum values	RST

OPERATION MANUAL

HM309 portable measuring device

Display of minimum and maximum values measured

The device automatically determines the largest and smallest measured values. These “MIN/MAX” values can be displayed when needed.

Operation of keys	Feedback	Display
	Device is in normal mode	
MIN/ MAX	Press MIN/MAX key	Display the minimum values measured “MIN” appears on the display	
MIN/ MAX	Press MIN/MAX key again	Display the maximum values measured “MAX” appears on the display	
td/aH	If necessary: The td/aH key can be used to show the dew point or absolute humidity angezeigt werden.	
MIN/ MAX	Press the MIN/MAX key to choose the min./max/ value of the factor selected gewählten Größe	
td/aH	Press the td/aH key and MIN/MAX key until the device is back in normal mode. Normalbetrieb ist	
MIN/ MAX		
RST	The RST key can be pressed at any time	This resets the min./max. values measured werden dadurch zurückgesetzt

OPERATION MANUAL

HM309 portable measuring device

Display the dew point and absolute humidity

The dew point temperature or the absolute humidity can be shown instead of the temperature value.

Operation of keys	Feedback	Display
Device is in normal mode		
td/aH Press the [td/aH] key	Dew point shown; display shows “td”	
td/aH Press the [td/aH] key again	The absolute humidity displays Absolute humidity is shown in g/m3	
td/aH Press the [td/aH] key again	Normal mode display of temperature and relative humidity	

Switching the temperature scale

The temperature display can be switched between the physical units °C and °F

Operation of keys	Feedback	Display
Device is in normal mode		
°C/°F Press the °C / °F key	The temperature scale switches to °F. The display shows the measurement value in “°F”	
°C/°F Press the °C / °F key	The temperature scale switches to °C. The display shows the measurement value in “°C”	

Note: The measurement scale chosen applies to all temperature factors, as well as for the dew point temperature
The output format on the serial port does not change. Output is always in °C.

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HM309 portable measuring device

HOLD function

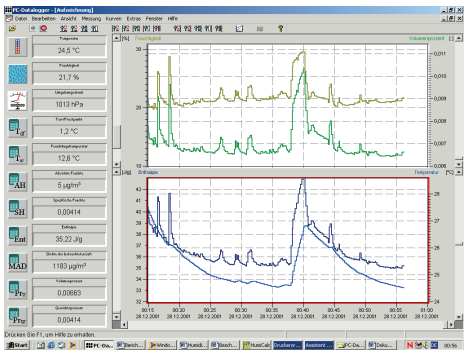
The device allows the measured values to be held on the display. For example, if the values are measured in a place where the light is bad, they can be read at another location.

Operation of keys	Feedback	Display
	Device is in normal mode	
HOLD	Press the HOLD key	The current measurement value display is retained "HOLD" appears on the display	
td/aH	If necessary: With the td/aH key, the last measured dew point or absolute humidity can be shown	
MIN/ MAX	Pressing the MIN/MAX key displays the minimum/maximum value of the desired factor.	
HOLD	Press the HOLD key again	The display shows the current measurement values again	

Accessories (Optional)

Software PCLOG

Besides storing data on hard disk, the software offers a very important feature of graphical repre-sentation of all measured and recorded channels in the form of humidity and temperature Vs time chart (online scriber function). By means of Drag & Click, the window section can be enlarged and the time or temperature axis can be scaled as desired. Besides the graphic view, representation is also possible in the form of a table. The in-between space is used for capturing measured data series into a spreadsheet program (for example EXCELTM) or for word processing. All tables and graphic representations can be printed out in colour. In addition, simple monitoring and control functions are also integrated in the software. Limits can be set for each channel. An acoustic signal (Wave file) is given out when the values are exceeded. Control of up to eight external users is possible by a relay card, which is to be attached at the parallel port.
A speciality of the program is the integrated hx-calculator. This calculates further fifteen parameters like dew point, absolute humidity, enthalpy, the wet bulb temperature, the vapour pressure and saturated vapour pressure etc. from the measured values of relative humidity and temperature.



OPERATION MANUAL

HM309 portable measuring device

Format of Data transfer

The USB-port works as a so-called COM-Port emulation and from a programmer‘s point of view, it behaves like a serial interface.
The transfer of useful data takes place in lines. All characters are ASCII coded. All information is sent continuously without separation characters. In one line, only information of one channel is transferred. At the end of the line, the last two ASCII characters are sent for the check sum(CRC) of the current line. Each line closes with the character ‘Carriage return’ ‘<CR>´. Several lines form a data-block. A data-block can have the following contents, for example:

```
@<CR>
I01010100B00725030178<CR>
V010892A1<CR>
I02020100B00725030148<CR>
V0216B0EA<CR>
$<CR>
```

The data block has a following structure:

- A synchronization pattern for the beginning of a Data block. For synchronization, the sequence ´@ <CR>´ is used.
- The configuration data (´Identifier´) of a channel. The data line begins with the character ‘I’, followed by the logical channel number, and then followed by configuration data and the sensor serial number. The line is closed with the check sum and the character ‘<CR>’.
- The measured values of a channel. The data line begins with the character ´V´, followed by the logical channel number, followed by useful data. Only numerical measurement values and the check sum (CRC) at the end of the line, are transferred. All other information like number format, number of characters, physical unit, etc. are contained in the configuration data (probe code).
- The configuration data and measurement values follow the same scheme for all other channels.
- The continuation character ´$´ <CR>´ is sent at the end of a data-block.

Structure of configuration data line

- The configuration data line contains all infor-mation of the sensor working on the corre-sponding channel. The line has a following structure:
- Identification character ´I´ at the beginning of the line.
- 8 bits (two ASCII characters) logical channel number. The logical channel number is used to co-relate configuration data with the measured values. In the Humidity-Temperature module, the temperature values are transmitted through channel 01 and humidity values are transmitted through channel 02.
- 8 bits (two ASCII characters) physical probe coding. Based on probe coding, the number format, scale, physical unit and allowable range of values are specified. For the described device, probe coding is 01 for temperature channel and 02 for humidity channel.
- 8 bits (two ASCII characters) hardware coding (type of the measurement probe). The Tem-perature/Humidity module has the code num-ber 01.
- 48 bits (twelve ASCII characters) serial number of the sensor. Each serial number is allotted only once.
- 8 bits (two ASCII characters) CRC (check sum)
- ´<CR>´ as line termination

Structure of measured value data lines

The measured value data line contains the current measurements of the sensor operating on the corresponding channel. All information is represented in binary and is transferred in ASCII coded format without separation characters. For the probe code 01, the line has following a structure:

- Identification character ´V´ at the beginning of the line
- 8 bits (two ASCII characters) logical channel number (01 for temperature, 02 for humidity)
- 2 Byte (4 ASCII-characters) measurement data. For the temperature with 0.01°C resolu-tion. The hexadecimal value is to be converted into a decimal number and to be divided by 100. With this, the temperature value is ob-tained in °C with two decimals. For humidity value with 0.005 % resolution. The hexadecimal value is to be converted into a decimal number and to be divided by 200. With this, the relative humidity rH value is ob-tained in % with two decimals.
- 8 bits (two ASCII characters) check sum (CRC)
- ´ <CR>´ as line termination

In the example given in opposite column, the measured temperature is equal to 21.94° C and humidity of air is 29.04 % RH.

WINDOWS-Software RECORDER

With the help of this program, which is covered in the scope of supply, the measured values can be received through the USB-interface and displayed on the PC. The displayed file is compatible with any desired spreadsheet program, with which it is possible to further process, statistically evaluate or visualise the measurement data.
In addition, the PC-Software also calculates dew point, absolute humidity, enthalpy and vapour pressure from the measured values of relative humidity and temperature. The calculated figures can also be stored.

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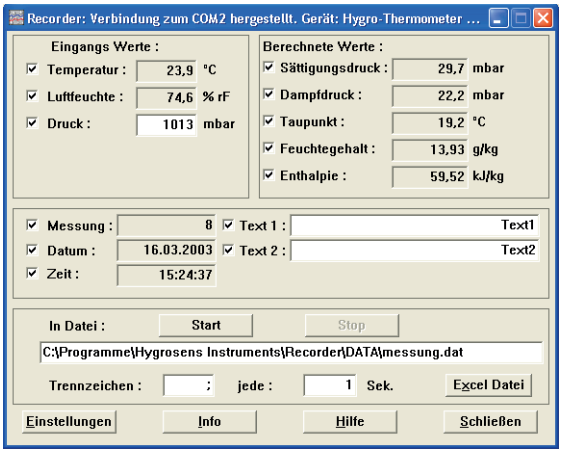

View of the Software “RECORDER“

System requirements

Windows 98, 2000 or XP, RS232 or USB-interface. Generally, older PCs are also suitable.
Important hint: First connect the USB-Version to the PC after installing the software. This simplifies driver installation and enables “Plug&Play“ feature.

Installation

A detailed installation instruction is provided on the CD, which automatically gets started on inserting the CD (prerequisites: Internet-Explorer 5.0 or higher). Follow these instructions for installation:

Manual Installation

Insert the enclosed CD into your drive and select „Run“ in the start-menu and then browse to select the file ‚setup.exe‘ under the path LW:\software\RECORDER\TEMPLOG\disk1. Then follow the instructions of the installation program.

Data recording

First activate all the hooked up measurement channels that are to be recorded. In ‚Text 1‘ and ‚Text 2‘, you can enter a description, which has to appear as heading on the top of data file. The data is recorded in a file, which is de-clared as path in the ‚Start‘ button. The recording begins with the ‚Start‘ button.

EXCEL™

The created file is compatible with CSV-Format. In order to display the measured data, you can use graphic tools, for example, the diagram-assistant. However, other programs can also be used to graphically represent or evaluate the measured data.

Calibration service

Of course, we offer service. If the product malfunctions, just send it to us with a short description of the problem. Please don’t forget to include your
telephone number, in case we have questions.
We will tell you the cost of repairs before we start. The cost estimate is free of charge. Charges for return shipping and packaging are calculated
based on cost.
Our calibration laboratory can also calibrate your measuring and testing devices from other manufacturers based on national standards. Just con-
tact us. We will be happy to make you a no-obligation offer.

Index of order numbers

Artikel	Art.-Nr.
Measuring device HM309	HM309-USB
Sensor for measurements in the air	FF-HM309-LC
Sensor for aggressive media	FF-HM309-HQ2
Sensor for measurment in bulk freight/granulate	FF-HM309-HQ2-SG
Calibration set 11.3 % RH and 32.9 % RH	REFZ-12Z-SET1
Calibration set 11,3 % RH, 32,9 % RH, 75,4 % RH	REFZ-12Z-SET2
USB cable	0409 0672
Software	PCLOG
Power adapter	0554 0451

Attention

Please avoid extreme mechanical and inappropriate exposure.
The device/product is not suitble for potential explosive areas and medical-technical applications.

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