

Humidity and Temperature transmitter with built-in PI-Control function

MF-HTT
version 3.x

Doc.No: Mi-201gb / 2009-09-18

NOTE !

Read the entire instruction carefully before start.

APPLICATION

MF-HTT is a humidity and temperature transmitter/controller for the measurement and indication of relative humidity, temperature, dewpoint and mixing ratio. With the four keys ∇ , \blacktriangle , **PGM** and **ESC** the desired function is selected as well as setting and scaling is done. The dual row LCD display clearly indicates the selected function

INSTALLATION

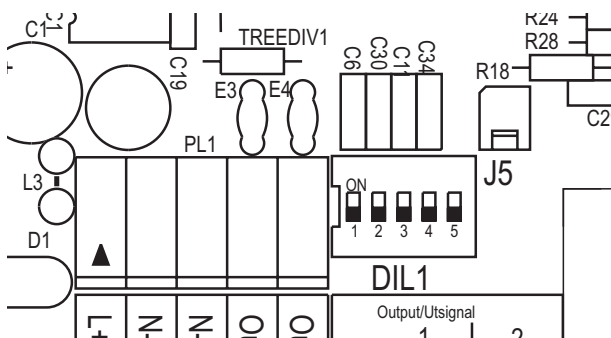
MF-HTT is designed to be placed on a wall or for recessed mounting through a wall or cabin door. When recessed mounting, a mounting kit, MFM-PANEL is used. The unit is fixed to the wall by four screws, max 4 mm. The location of the holes is shown at the back of the enclosure.

Unscrew the four screws of the front cover and use the bottom screws to attach the front cover on the upper end of the casing, see Fig 1. This makes installation and electrical connection easier. Connect power supply according to the electrical connection.

To each front cover the CPU is mounted, since the I/O calibration of the main circuit board is stored on the CPU-board, it is not possible to move the front cover between different units.

OUTPUT SIGNAL

MF-HTT has two analogue outputs to be used for RH, Temp, dewpoint, mixing ratio and PI-controller. VDC or mA output signal must be set by the DIL-switch (DIL1). The same programming must then also be done under "Outputs".



DIL 1:	1 on, 2 off	volt output 1
	3 on, 4 off	volt output 2
	1 off, 2 on	mA output 1
	3 off, 4 on	mA output 2

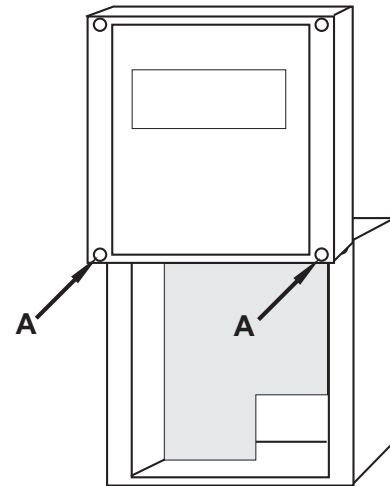


Fig 1

Use the front cover bottom screws (marked **A**) to fix the front cover at the enclosures top edge during installation.

START MENU

When the power supply is connected a start menu will be displayed. With ∇ / \blacktriangle it is possible to go through the different start menus. To always have the same start menu, the selection is programmed under "System settings". Pressing **ESC** when some other menu is displayed returns to the menu programmed under 'Display'.

PROGRAMMING

Press **PGM** until displayed text disappears. Display shows parameter group, see table on page 2. With ∇ / \blacktriangle it is possible to scroll through the parameter groups

1. Current values
2. System settings
3. Outputs
4. Humidity
5. Temperature
6. Alarms
7. PIR Controller
8. Communication
9. Internals

When the parameter group to be programmed is shown, press **PGM**.

The parameters are then shown, with ∇ / \blacktriangle select the parameter to be programmed and press **PGM**.

PARAMETER LIST

Par.no:	Par name	Range	Preset
Internals			
0	Progver	0,00...9,99	
Current values			
100	Humidity	0,0...100,0	
101	Temp	-30,0...80,0	
102	HR	0,0...25,0	
103	Tdp	-30,0...80,0	
104	PIR Out	0,00...100,00	
105	PIR CSP	-3276,8...3276,7	
System settings			
1	Display	RH TEMP T+RH T+HR T+TDP RH+PIR T+PIR HR+PIR TDP+PIR	T+RH
(99)	Access code	0...9999	0000
Outputs			
2	Source 1	RH TEMP HR TDP PIR	RH
3	Signal 1	0..10V 2..10V 0..20mA 4..20mA	0..10V
4	Minval 1	-3276,8...3276,7	0,0
5	Maxval 1	-3276,8...3276,7	100,0
6	Source 2	RH TEMP HR TDP PIR	TEMP
7	Signal 2	0..10V 2..10V 0..20mA 4..20mA	0..10V
8	Minval 2	-3276,8...3276,7	-30,0
9	Maxval 2	-3276,8...3276,7	80,0
Humidity			
10	0% RH[V]	0,500...1,100	0,800
11	75.3%RH[V]	2,834...3,434	3,134
12	Cal Tbl	FACTORY USER 2P USER 1P	FACTORY
13	UsrCalPt 1	0,0...100,0	0,0
14	UsrCalPt 2	0,0...100,0	75,3
15	SinglePt	0,0...100,0	0,0
Temperature			
16	Temp Unit	C F K	C
71	Offset Adj	-99,0...99,0	0,0
Alarms			
18	Alarm 1	OFF HIGH LOW	OFF

Par.no:	Par name	Range	Preset
19	Source 1	RH TEMP HR TDP	RH
20	Level 1	-3276,8...3276,7	0,0
21	Delay 1[s]	0...3600	0
22	Alarm 2	OFF HIGH LOW	OFF
23	Source 2	RH TEMP HR TDP	RH
24	Level 2	-32768...32767	0,0
25	Delay 2[s]	0...3600	0
PIR Controller			
46	Source	OFF RH TEMP HR TDP	OFF
47	Mode	AUTO HAND	AUTO
48	Output	DIRECT REVERSE	DIRECT
49	Set point	-3276,8...3276,7	0,0
50	NZ [%]	1...50	1
51	P-band	0,0...999,9	0,0
52	I-time[s]	0...999	0
Communication			
26	Address	1...247	21
27	Location	0...32767	0
28	Protocol	COMLI	COMLI
29	Baud	600 b 1200 b 2400 b 4800 b 9600 b	4800 b
30	Protect	NO YES	NO

Digit programming

Every digit is separately programmed. Press **▲** for 1...9, after 9 if negative values are accepted -9...0. Digit to be changed is flashing. When all digits are programmed press **PGM** and the entire row will flash. To stop incorrect programming press **ESC** and then **PGM** to execute new programming.

Unit or value programming

Press **▼▲** to change unit/value. When selected press **PGM** then the entire row will flash. Press **ESC** to return to parameter group. Press **ESC** to leave the parameter group and return to start menu. **NOTE!** It is always possible to cancel an incorrect programming with the **ESC**-key if you have not pressed **PGM** after the last digit or unit/value selection.

1. CURRENT VALUES

100	Humidity	0,0...100,0	
101	Temp	-30,0...80,0	
102	HR	0,0...25,0	
103	Tdp	-30,0...80,0	
104	PIR Out	0,00...100,00	
105	PIR CSP	-3276,8...3276,7	

Displays actual values of Humidity, Temperature, Mixing ratio, Dew point and PI-controller.

2. SYSTEM SETTINGS

1	Display	RH TEMP T+RH T+HR T+TDP RH+PIR T+PIR HR+PIR TDP+PIR	
99 (hidden)	Access code	0...9999	

Programme the preferred start menu under the parameter 'Display'.

For activating or inactivating the Key lock function in parameter 'Access code', see page 7.

3. OUTPUTS

2	Source 1	RH TEMP HR TDP PIR	
3	Signal 1	0..10V 2..10V 0..20mA 4..20mA	
4	Minval 1	-3276,8...3276,7	
5	Maxval 1	-3276,8...3276,7	
6	Source 2	RH TEMP HR TDP PIR	
7	Signal 2	0..10V 2..10V 0..20mA 4..20mA	
8	Minval 2	-3276,8...3276,7	
9	Maxval 2	-3276,8...3276,7	

Select engineering unit, type of output signal and scaling for both **Output 1** and **Output 2**.

Source determines the source used for the output signal (Humidity **RH**, Temperature **TEMP**, Mixing ratio **HR** or Dew point **TDP**).

Signal determines the type of output signal to be used for the output (Volt/mA).

Note ! In addition to the programmed output signal, the DIL-switch on the main circuit board must be set for the same output type.

Minval and **Maxval** allow scaling of the measurement range to achieve 0-100% output signal.

Measuring values \leq **Minval** equals 0 % output signal.

Measuring values \geq **Maxval** equals 100% output signal.

The values for '**Minval**' and '**Maxval**' are entered in their corresponding engineering units.

Humidity = % RH

Temperature = °C / °F / K.

Mixing ratio = g / kg.

Dew point = °C / °F / K.

Control signal = %

4. HUMIDITY

10	0% RH[V]	0,500 .. 1,100	
11	75.3%RH[V]	2,834 .. 3,434	
12	Cal Tbl	FACTORY USER 2P USER 1P	
13	UsrCalPt 1	0,0 .. 100,0	
14	UsrCalPt 2	0,0 .. 100,0	
15	SinglePt	0,0 .. 100,0	

Calibration of the Humidity Sensor

HTT is equipped with a humidity sensor with an accuracy of +/- 2% RH.

The sensor is delivered with a calibration protocol which state two reference voltage values which are programmed in parameters '0% RH' and '75,3% RH'.

Calibration table 'FACTORY' must have been selected.

If the sensor is exchanged the new reference values for the new sensor are programmed for 0 % RH and 75.3 % RH.

NOTE Save the sensor calibration protocol.

Calibration tables

MF-HTT include three tables to store different calibrations, default calibration table 'FACTORY' and two user programmable tables 'USER 2P' and 'USER 1P' for field calibration.

Factory calibration

The table 'FACTORY' must be selected to apply the calibration from factory.

Field calibration

HTT may be calibrated in field during operation. Calibration may be performed in 1 or 2 calibration points.

2 point calibration:

Normally this type of calibration is done with a salt solution with predefined humidity content.

- Select **Cal Tbl = USER 2 P**
- Place the probe in a chamber with defined humidity for the lower calibration point.
- Programme the defined value in % RH into the parameter **UsrCalPt1**.

When programming is finished by pressing the **PGM**-key the calibration starts for the lower calibration point.

It is important that the sensor is exposed to the same humidity level during the entire measuring cycle that is programmed in **UsrCalPt 1**.

The text **Calibration-Measuring** is shown.

Calibration
Measuring

When Calibration for the lower calibration point is completed the following display appear.

Calibration
DONE

Continue with the higher calibration point

- Place the probe in a chamber with defined humidity for the higher calibration point.
- Programme the defined value in % RH into the parameter **UsrCalPt2**.

When programming is finished by pressing the **PGM**-key the calibration starts for the higher calibration point. Display during calibration is the same as described for the lower point.

Each point can be recalibrated separately if necessary.

1 point calibration:

This type of calibration is possible to do with a reference instrument or similar

- Select **Cal Tbl = USER 1P**
- Programme the parameter **SinglePt** with the value in % RH indicated by the reference instrument.
- When programming is finished by pressing the **PGM**-key the calibration starts.

The text **Calibration-Measuring** is shown

Calibration
Measuring

When Calibration is completed the following display appear.

Calibration
DONE

All three calibration tables are stored separately which makes it possible to switch between the tables if they have been programmed with valid data.

5. TEMPERATURE

16	Temp Unit		C F K
71	Offset Adj	-99,0 .. 99,0	

Select the preferred unit for temperature.

Under certain conditions the indicated temperature may differ from a reference measurement reading. By programming the difference in parameter 'Offset Adj' the HTT's reading can be adjusted to conform with the reference measurement.

6. ALARMS

18	Alarm 1		OFF HIGH LOW
19	Source1		RH TEMP HR TDP
20	Level 1	-3276,8 .. 3276,7	
21	Delay 1[s]	0 .. 3600	
22	Alarm 2		OFF HIGH LOW
23	Source2		RH TEMP HR TDP
24	Level 2	-32768 .. 32767	
25	Delay 2[s]	0 .. 3600	

The MF-HTT is equipped with a visual alarm. The alarm is indicated in normal state with a green light emitting diode (LED) and in alarm state with a red LED. There are two separate alarms for high or low limit with a separate time delay function in each one.

If both alarm are used the red LED will lit when the first alarm state occurs.

In alarm state the red LED is lit and when the time delay has passed the LED starts flashing.

7. PIR CONTROLLER



46	Source		OFF RH TEMP HR TDP
47	Mode		AUTO HAND
48	Output		DIRECT REVERSE
49	Set point	-3276,8...3276,7	
50	NZ [%]	1...50	
51	P-band	0,0...999,9	
52	I-time[s]	0...999	

MF-HTT with programme version 3.x or later is equipped with a PI-control function for one selected measuring value. The PI-controller output signal is selected in parameter group "Outputs".

1. Select source, "Source", for the controller. The source can be RH, TEMP, HR or TDP.
2. Select "Hand" or "Auto" in parameter "Mode"
3. Select the direction for the output signal in group "Outputs", it can be either DIRECT or REVERSE.
e.g. Selecting REVERSE will result in a decreasing control signal if the actual value is above the set point value.

4. Enter a suitable value for the desired set point in parameter "Set point".
5. To achieve a stable control around the set point, a neutral zone, NZ, can be programmed. Min value is 1% of the selected source range. The neutral zone is equal on both sides of the set point.
6. Select a suitable value for the "P-band". If the value is set to 0 %, the P-band is deselected and the I-time is calculated using a P-band of 100 %.
7. Enter a suitable I-time in seconds in parameter "I-time", 0...999 seconds.

Manual operation of the PI-controller

Manual operation is selected in the start menu. Scroll using the   -keys until "HAND/AUTO" menu is displayed.

Humidity	38.2 %
AUTO	28.18 %

The top row display the control source and value and on the bottom row display "HAND" or "AUTO" together with the current control output signal.

Press the **PGM**-key to switch between HAND and AUTO position.

Press the **ESC**-key to select an other view, the manual operation mode is still active.

HAND/AUTO -mode can also be turned On and Off by programming parameter "Mode" in parameter group "PIR Controller".

Humidity 48.5 %
Temp 23.4 C

Display text:

RH = Humidity % **HR** = Mixing ratio g/kg
Temp = Temperature °C, K, F **Tdp** = Dewpoint °C, K, F

Scroll between start menus

Scroll in the opposite direction

Humidity 48.5 %
HR 8.6 g/kg

Humidity 48.5 %
Tdp 11.7 C

AB MICATRONE
Humidity 48.5 %

AB MICATRONE
Temp 23.4 C

Note. Serial number is also visible when scrolling the different start menus



(PGM) Press key until text MF-HTT PROGRAM-MENU is displayed

MF-HTT
PROGRAM-MENU

Current values

Scroll in the opposite direction

Scroll between parameter groups

System settings

example

Outputs

Humidity

Temperature

Alarms

PIR Controller

Communication
Internals

example



(PGM) Opens parameter group and allows the parameters to be selected.

Outputs
Source 1 RH

Outputs
Signal 1 0-10V

Outputs
Minval 1 010,0

Outputs
Maxval 1 090,0



Changes between the parameters according to the parameter list.



(PGM) Programming position for Unit/Value (Flashes).



Selection of Unit/Value.



(PGM) Programming of new value. Parameter Unit/Value is flashing. When programming a number value, each digit is programmed separately, until all digits have stopped flashing.



(ESC) Leaves parameters and returns to Parameter group.



(ESC) Leaves the parameter group and returns to startmenu.

MF-HTT

Always note the programmed data beside the parameter in the programming protocol for future reference

KEY LOCK

Key lock is a hidden parameter if the function is activated and no code has been entered. This function is available from program version 2.10 or higher.

The key lock is to be used when then transmitters settings must be protected from unwanted alteration. The 4-digit code must be entered before accessing the program and function menu. For Micaflex with built-in control function the code must also be entered to switch between AUTO and HAND operation.

Indication of the measured values and operating state is accessible without entering the code.

At delivery the code is programmed to "0000" unless nothing else is agreed to. With factory default code "0000" the key lock is in-active. I.e no protection for alternating the settings.

Activating the key lock

To activate the key lock settings must be programmed into the parameter 'Access code' which is found below the parameter group 'System settings'. The code must be different from "0000" unless the lock will be in-active. After programming a 4-digit code into the parameter this code must be used to access the program and function menus.

In-activating the key lock

The key lock can be in-activated by setting the value of parameter 'Access code' to "0000". Since the setting is done from the program menu the already programmed code must be known to inactivate the key lock.

Contact Micatrone if the code has been lost!

Entering code

To access the program or function menu or to switch between AUTO-HAND function the code must be entered.

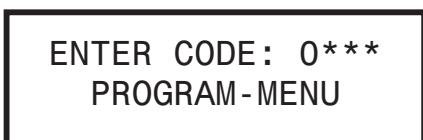
Example to access the program menu:

1. Press the **PGM**-key to open the program menu. Keep the key pressed until following screen appears.

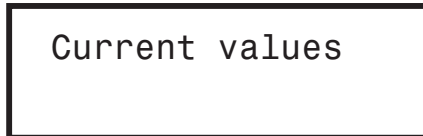


Instead of the text 'xxx' the actual model for the present type is indicated.

2. Release the **PGM**-key. If the key lock is activated the following screen appears.



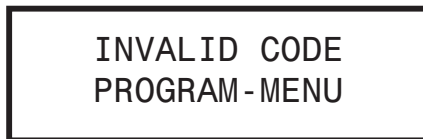
3. The first digit (0) is flashing to indicate that the first digit of the code must be entered by using the arrow-keys. Press the **PGM**-key to jump to the second digit, etc.
4. When all four digits are entered press a final time the **PGM**-key. The entered code is now compared with the settings in the parameter 'Access code'. If they match the program menu is accessed.



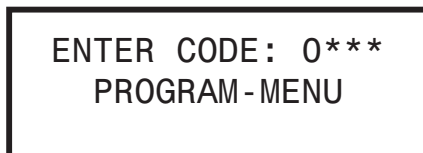
The menu is accessible until the **ESC**-key is pressed one or several times and the preset start menu is displayed. Example:



5. If the code does not match the programmed settings following screen appears



for a period of 2 second before shifting to the "Enter code" screen again.



6. By pressing the **ESC**-key during the operations the programming of the code is aborted and the preset start menu is displayed.



TECHNICAL DATA

Indicator: Alphanumeric LCD
2 rows, 2x16 characters

Power supply: 24 ±15 % VAC
20...32 VDC

Power consumption: Max 3 VA (24 VAC)

Measurement range,
- Temp: -30...80 °C
- Humidity 0...100 % not condensing
- Dew point: -30...80 °C
- Mixing ratio: 0...25 g/kg

Accuracy,
- Humidity: ±2 % RH
- RH stability: ±1 % typical at 50% RH in 5 year

Temperature: ±0.3 °C

Response time: 30 seconds in slow moving air

Outputs: Two analogue outputs
0/2...10 VDC, 0/4...20 mA selectable and scalable

Ambient temperature: 0...50 °C

Alarm (visible): Two separate alarms, high&low
Red LED alarm indication

Housing class: IP 65

Electric connections,
- rigid wire: 1 x 2.5 mm² / terminal
- flexible wire: 1 x 1.5 mm² / terminal

Cable entry: 2 pcs M16x1.5mm
(cable glands not included)

Dimensions-
[WxHxD]: 120 x 122 x 60 mm

Weight: 0.5 kg

SERVICE

Measurement in dirty applications, clean the sintered filter.

DELIVERY OPTIONS SENSOR MF-HTT:

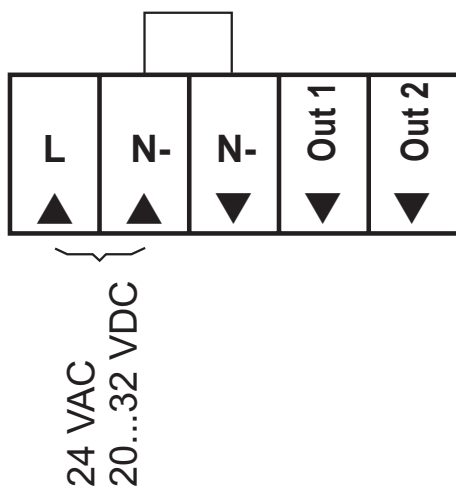
Art no	Probe	Cable	Note
60-5462-1	100 mm	0 m	"ROOM SENSOR"
60-5462-20	100 mm	2 m	
60-5462-21	200 mm	2 m	
60-5462-30	100 mm	5 m	
60-5462-31	200 mm	5 m	
60-5462-40	100 mm	10 m	
60-5462-41	200 mm	10 m	

ACCESSORIES

- Duct mounting plate
- Wall mounting bracket
- Kit for recessed mounting
- External transformer 24, 115, 230 VAC

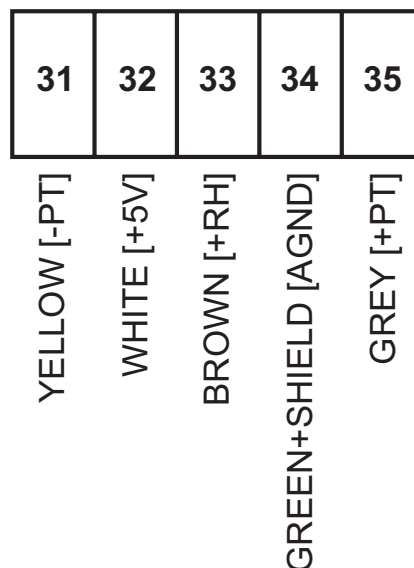
ELECTRICAL CONNECTION

24 VAC, 20...32 VDC

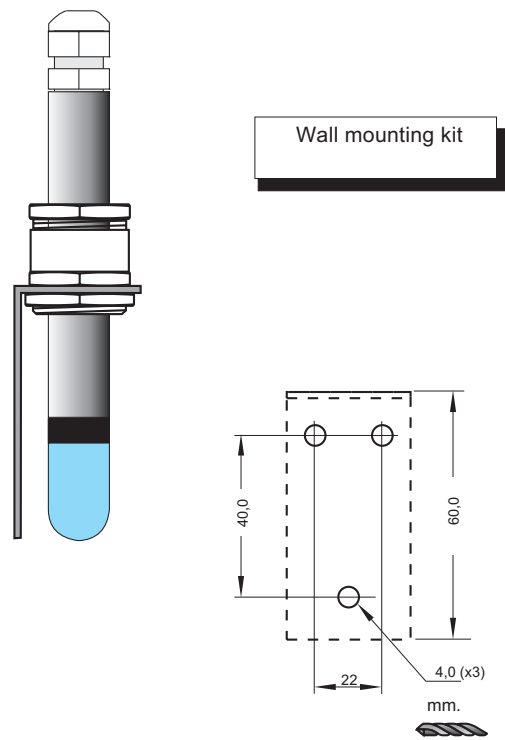
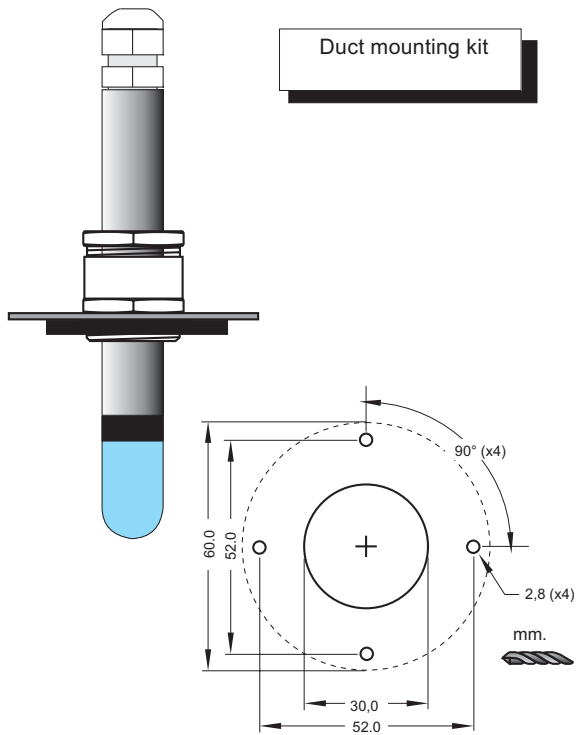


ELECTRICAL CONNECTION

Sensor



MOUNTING KITS



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