

NOTE!

Read the entire instruction before installing.

Application

MF-HTC is a humidity and temperature transmitter and controller for the measurement, control and indication of relative humidity, temperature, dewpoint and mixing ratio. Programming and scaling is done with four keys, **▼▲**, **PGM** and **ESC**. A two line alpha numerical display shows both text and actual process readings

Installation

MF-HTC is designed to be placed on a wall or recessed through a wall or cabin-door. When recessed, a mounting kit, MFM-PANEL is used.

The unit is fixed to the wall by four screws, max 4 mm. The locations of the holes are shown on the back of the enclosure.

Unscrew the four screws of the front cover and use the lower screws to attach the front cover on the upper edge of the enclosure. This makes installation and electrical connection easier.

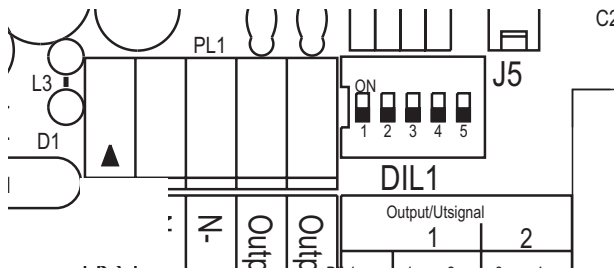
Connect power supply according to the electrical connection.

Output signal

MF-HTC has two analogue outputs to be used for Relative Humidity, Temperature, Dewpoint, Mixing Ratio and output from the PI-controller.

Voltage or mA output signal is set by the DIL-switch DIL1.

Programming must also be done under the parameter group "Outputs".



DIL 1, setting of output signal :

Output 1	Output 2
1 on, 2 offvoltage	3 on, 4 offvoltage
1 off, 2 onmA	3 off, 4 onmA

On/Off controller

MF-HTC has two potential free relay contacts to be used for 2-stage On/Off control. Individual programming for dehumidifying or humidifying can be set, on units with programme version 2.01 or higher, released 2004-08-31.

Start menu

When the power supply is connected a preset start menu will be shown. There are a total of 13 different display menus to select.

With **▼▲** it is possible to scroll through the different display menus. Pressing the **ESC** key, when another menu is displayed, returns to the preset start menu.

To change the menu displayed at start up, the selection is programmed into the parameter "Display" in the group "Systems settings".

Parameter groups

All the functions, PI-controller, outputs etc. are managed and programmed using a number of parameters all grouped together into the following 10 parameter groups.

1. Current values

Actual measuring and control values.

2. System settings

Start menus and access code.

3. Outputs

Sources that can be directed to the outputs, Relative humidity, Temperature, Mixing Ratio and Dewpoint, type of output signal, 0/2...10 V / 0/4...20 mA and scale values for min and max output signal.

4. Humidity

Calibration data for humidity sensor.

5. Temperature

Units °C, K and °F and programmable offset for the temperature measurement.

6. 2PC Controller

Two stage on/off controller.

7. Alarms

Programming of alarm limits and time delay for the visual alarm.

8. PI-Controller

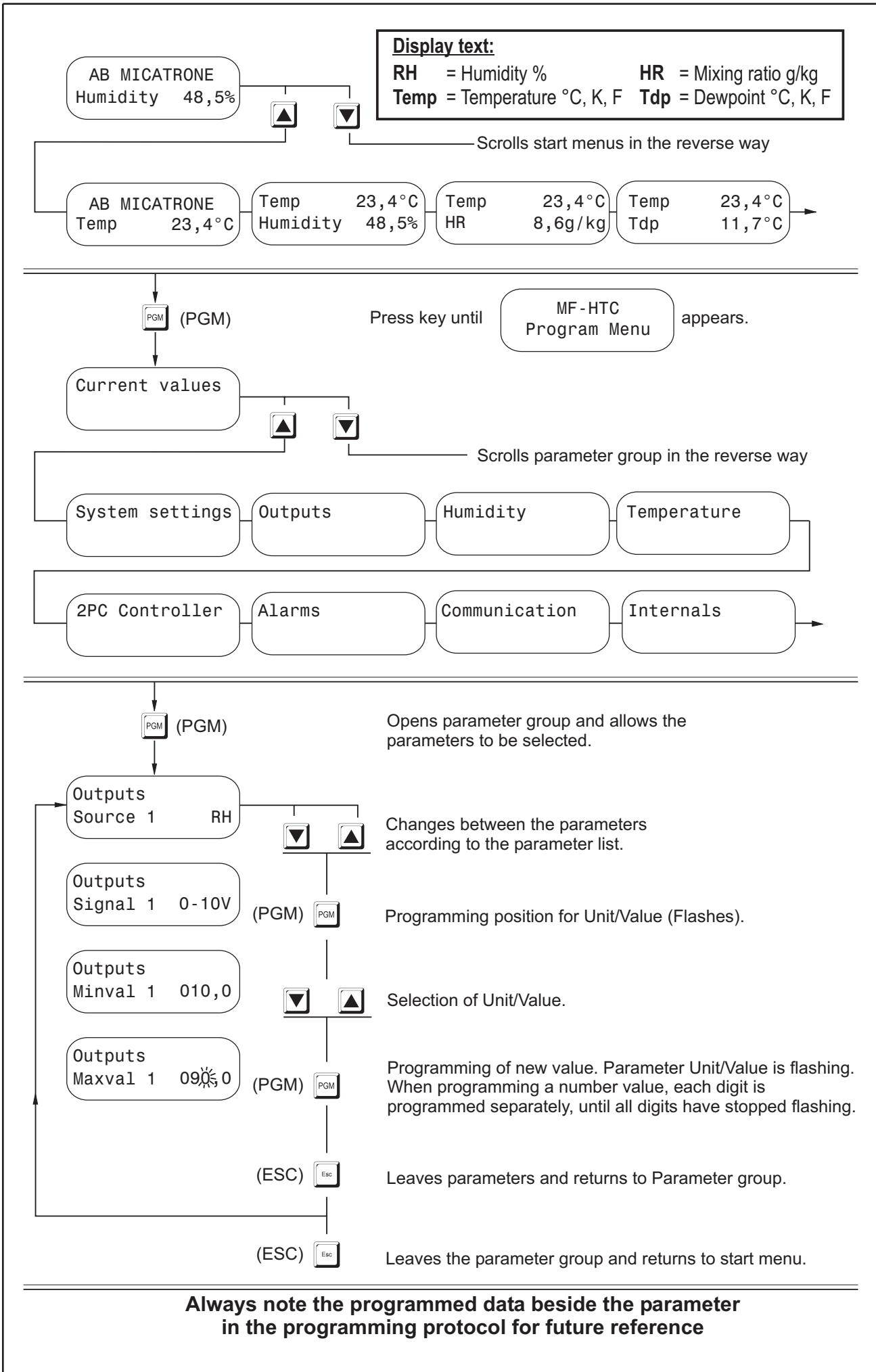
Continuous PI-Controller that has an output that can be directed to either or both of the V/mA outputs.

9. Communication

Optional accessory.

10. Internals

Displays current programme version.



2006-08-24 [H:\Apps \ Typeset \ Mira \ mi-240gb_060824.vp]

No	Description	Possible values	Default	New
Internals				
0	Progver	0.00 .. 9.99		
Current values				
100	Humidity	0.0 .. 100.0		
101	Temp	-99.9 .. 99.9		
102	HR	0.0 .. 999.9		
103	Tdp	-99.9 .. 99.9		
104	PIR Out	0.00 .. 100.00		
105	PIR CSP	-3276.8 .. 3276.7		
106	2PC	OFF CH1 CH2 CH1+CH2		
System settings				
1	Display	RH TEMP T+RH T+HR T+TDP RH+2PC T+2PC HR+2PC TDP+2PC RH+PIR T+PIR HR+PIR TDP+PIR	T+RH	
(99)	Access code		0..9999	
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	PIR	
7	Signal 2	0..10V 2..10V 0..20mA 4..20mA	0..10V	
8	Minval 2	-3276.8 .. 3276.7	0.0	
9	Maxval 2	-3276.8 .. 3276.7	100.0	
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	Usr Cal Pt 1	0.0 .. 100.0	0.0	
14	Usr Cal Pt 2	0.0 .. 100.0	75.3	
15	Single Pt	0.0 .. 100.0	0.0	
Temperature				
16	Temp Unit	C F K	C	
71	Offset Adj	-99,0...99,0	0	

No	Description	Possible values	Default	New
2PC Controller				
59	Ch1	OFF HIGH LOW	HIGH	
60	Ch1Src	RH TEMP HR TDP	RH	
61	Ch1 On	-3276.8 .. 3276.7	47.0	
62	Ch1 Diff	0.1 .. 3276.7	2.0	
63	Ch1 Delay	0 .. 3600	10	
64	Ch2	OFF HIGH LOW	HIGH	
65	Ch2 Src	RH TEMP HR TDP	RH	
66	Ch2 On	-3276.8 .. 3276.7	50.0	
67	Ch2 Diff	0.1 .. 3276.7	3.0	
68	Ch2 Delay	0 .. 3600	10	
Alarms				
18	Alarm 1	OFF HIGH LOW	HIGH	
19	Source	RH TEMP HR TDP	RH	
20	Level 1	-3276.8 .. 3276.7	55.0	
21	Delay 1[s]	0 .. 3600		
PI Controller				
46	Source	OFF RH TEMP HR TDP		
47	Mode	AUTO HAND		
48	Output	DIRECT REVERSE	DIRECT	
49	Set point	-3276.8 .. 3276.7	50.0	
50	NZ [%]	1 .. 50	2	
51	P-band	0.0 .. 999.9	14.0	
52	I-time[s]	0 .. 999	420	
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	

Accessing the program menu:

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

```
MF - HTC
PROGRAM - MENU
```

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

```
ENTER CODE: 0***
PROGRAM - MENU
```

The first digit (0) is flashing to indicate that the first digit of the code must be entered by using the **▼▲** keys. Press the **PGM** key to jump to the second digit, etc

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.

```
Current values
```

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

```
Temp      23,4°C
Humidity   48,5 %
```

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

```
INVALID CODE
PROGRAM - MENU
```

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

```
ENTER CODE: 0***
PROGRAM - MENU
```

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

```
Temp      23,4°C
Humidity   48,5 %
```

Programming a parameter value

This example shows how to change a parameter, here we reprogram parameter "Ch1 On" in the group "2PC Controller".

Select the desired program group "2PC controller" with the keys **▼▲**. You can scroll through the list with both keys. When you come to the end of the list it starts over from the beginning again.

```
2PC controller
```

Press **PGM** and select the parameter, "Ch1 On", you want to set with the **▼▲** keys. At the end the list starts over again.

```
2PC controller
Ch1 On      047,0
```

Press **PGM** and the first digit starts to flash. Set the desired value with the **▼▲** keys and confirm by pressing **PGM**. The next digit starts to flash, set desired value with **▼▲** and confirm by pressing **PGM**.

When the last digit is confirmed, with **PGM**, the entire row flashes 3 times.

Until programming of the last digit is confirmed the programming sequence can be aborted at any time by pressing **ESC**.

Pressing **ESC** once return to the current parameter group and pressing **ESC** again returns to the preset start menu.

```
Temp      23,4°C
Humidity   48,5 %
```

1. Current values

100	Humidity	0.0...100.0		
101	Temp	-99.9...99.9		
102	HR	0.0..999.9		
103	Tdp	-99.9...99.9		
104	PIR Out	0.00...100.00		
105	PIR CSP	-3276.8..3276.7		
106	2PC	OFF CH1 CH2 CH1+CH2		

Displays current values for

1. Relative Humidity in %.
2. Temperature in °C, °F or K.
3. Mixing Ratio in g/kg.
4. Dewpoint in °C, °F or K.
5. Control signal from PI-regulator in %.
6. Current Set Point for the PI-regulator in °C, °F, K or g/kg.
7. Status for the on/off controller:
 OFF, relays for stage 1 and stage 2 OFF
 CH1, relay for stage 1 ON.
 CH2, relay for stage 1 ON.
 CH1+CH2 relays for stage 1 and 2 ON.

The values are displayed in the current units, but the engineering units (°C, °F etc.) will not be displayed in this menu.

2. System settings

1	Display	RH TEMP T+RH T+HR T+TDP RH+2PC T+2PC HR+2PC TDP+2PC RH+PIR T+PIR HR+PIR TDP+PIR	T+RH	
(99)	Access code		0..9999	

MF-HTC has a number of display menus that can be viewed. The menu "T+RH" that displays Temperature and Relative humidity is factory preset.

You can however select and programme another start menu to be displayed on power on with the parameter "Display".

There are a total of 13 different display menus that can be programmed.

"RH", mean that "Seibu Giken DST" is displayed on the first row and Relative humidity is displayed on the second row.



"T+RH" means two parameters are displayed. Temperature on the first row and Relative Humidity on the second row.



Here are the choices explained.

- RH = Relative Humidity
- TEMP, T = Temperature
- HR = Mixing Ratio
- 2PC = Status for the On/Off or "2PC controller"
- Tdp = Dew point temperature
- PIR = Output for "PI controller"

Key lock

The key lock is to be used when settings must be protected from unwanted alteration. A 4-digit code must be entered before accessing the program and function menu. The code must also be entered to switch between the "HAND - AUTO" operation of the Pi-controller.

"Access code" is a hidden parameter if the key lock function is activated and the correct code has not been entered. This function is available from program version 2.02 or higher.

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. With factory default code "0000" the key lock is inactive. I.e no protection for alternating the settings.

Activating the key lock

To activate the key lock, the parameter "Access code" is programmed. The 4-digit access code you choose to programme into the parameter is then used to access the program and function menus.

Inactivating the key lock

The key lock can be inactivated 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 Seibu Giken if you loose the access code.

Entering code

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

3. 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	PIR	
7	Signal 2	0..10V 2..10V 0..20mA 4..20mA	0..10V	
8	Minval 2	-3276.8 .. 3276.7	0.0	
9	Maxval 2	-3276.8 .. 3276.7	100.0	

Output 1 is factory set to RH and output 2 to the PI-controller. Both are preset for 0..10 V output.

Start with programming Output 1.

1. Select source for the output , choose between
RH (Relative Humidity)
TEMP (Temperature)
HR (Mixing Ratio)
TDP (Dew Point)
PIR (PI-controller).
2. Select type of output signal:
0...10 V
2...10 V
0...20 mA
4...20 mA

NOTE ! To change the output between V/mA the DIL-switch near the terminals must also be set for V/mA.

3. You can scale the output signals. Simply programme the desired value in "MinVal" for a 0 % output and "MaxVal" that should give a 100% output signal for the output. Allowed min and max values depends on the selected source.
RH (%)
Temp (°C / °F / K)
HR (g/kg)
Tdp (°C / °F / K).

Example:

"Output 1" selected to "TEMP", °C, 0..10V.
"MinVal" = -10 sets the output at -10°C = 0 V.
"MaxVal" = 90 set the output at 90°C = 10 V.

Repeat the programming steps for Output 2.

4. 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	Usr Cal Pt 1	0.0 .. 100.0	0.0	
14	Usr Cal Pt 2	0.0 .. 100.0	75.3	
15	Single Pt	0.0 .. 100.0	0.0	

Calibration levels for the humidity sensor

MF-HTC has a humidity sensor with an accuracy of $\pm 2\%$ RH. The sensor is delivered with a calibration protocol and the calibration levels (in Volt) are stored in the parameters "0%" and "75,3%" (Factory calibration). If the sensor is exchanged, the new levels for the sensor are entered in parameters "0 %" and "75.3%" RH. This will give an accuracy $\pm 2\%$ RH after the exchange.

Field calibration

MF-HTC may be calibrated in field during operation. Calibration may be performed in 1 or 2 points.

2 point calibration

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

1. Set "Cal Tbl" to "USER 2P".
2. Point 1. Expose the sensor to the defined humidity and programme this into "Usr Cal Pt1".
3. Point 2. Expose the sensor to the defined humidity and programme this into "Usr Cal Pt2".
4. Press **ESC** twice to return to the preset start menu.

1 point calibration

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

1. Set "Cal Tbl" to "USER 1P".
2. Programme the actual %RH, that is displayed by the reference instrument, immediately into "Single Pt".
3. Press **ESC** twice to return to the preset start menu.

It is important that the %RH value programmed into "Single Pt" is the current. The MF-HTC adjusts its reading according to this new value.

Selecting "Cal Tbl" to "FACTORY", uses the factory set calibration table, provided that the values for the sensor has not been changed in the parameters "0%" and "75,3%".

Three sets of calibration tables can be stored and chosen with the parameter "Cal Tbl"; "FACTORY", "USER 2P" and "USER 1P". Changing between these three is possible at any time.

NOTE ! Always save sensor calibration protocol for future reference.

5. Temperature

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

1. Select unit for temperature, °C, °F or K.
2. If desired, offsetting the temperature measurement is possible, making the measurement able to follow a reference unit.

6. 2PC Controller

59	Ch1	OFF HIGH LOW	HIGH	
60	Ch1Src	RH TEMP HR TDP	RH	
61	Ch1 On	-3276.8 .. 3276.7	47.0	
62	Ch1 Diff	0.1 .. 3276.7	2.0	
63	Ch1 Delay	0 .. 3600	10	
64	Ch2	OFF HIGH LOW	HIGH	
65	Ch2 Src	RH TEMP HR TDP	RH	
66	Ch2 On	-3276.8 .. 3276.7	50.0	
67	Ch2 Diff	0.1 .. 3276.7	3.0	
68	Ch2 Delay	0 .. 3600	10	

MF-HTC is equipped with two potential free contacts for on/off control of two stages when dehumidifying, humidifying or controlling another parameter e.g temperature.

Dehumidifying

The relay closes when the value exceeds the limit and opens when the value minus (-) the value of "Ch Diff" is reached.

Ex. "Ch1 On" = 60 % RH, "Ch1 Diff" = 5 % RH
Dehumidifying begins when the humidity exceeds 60% and ends below 55% RH.

Humidifying

The relay closes when the value is below limit and opens when the value exceeds the limit plus (+) the value of "Ch1 Diff".

Ex. "Ch1 On" = 60 % RH, "Ch1 Diff" = 5% RH
Humidifying begins when the humidity is below 60% and ends when it exceeds 65% RH.

1. Select type of operation OFF, HIGH, LOW
High = dehumidifying, Low = humidifying.
2. Select source, the parameter to control, RH, TEMP, HR, TDP.
3. Programme the set point limit (Ch1 On).
4. Set the time delay (Ch1 delay) until contact closing after the set point limit is reached.
5. Relay 2 is programmed using the parameters for Ch2 instead of Ch1.

7. Alarm

18	Alarm 1	OFF HIGH LOW	HIGH	
19	Source	RH TEMP HR TDP	RH	
20	Level 1	-3276.8 .. 3276.7	55.0	
21	Delay 1[s]	0 .. 3600		

MF-HTC is equipped with a visual alarm. The visual alarm is displayed with green LED (normal) and red LED (alarm).

1. Select alarm function : OFF, HIGH or LOW
2. Select source, RH, TEMP, HR or TDP.
3. Programme the alarm limit.
4. Programme the alarm time delay.

8. PI Controller

46	Source	OFF RH TEMP HR TDP		
47	Mode	AUTO HAND		
48	Output	DIRECT REVERSE	DIRECT	
49	Set point	-3276.8 .. 3276.7	50.0	
50	NZ [%]	1 .. 50	2	
51	P-band	0.0 .. 999.9	14.0	
52	I-time[s]	0 .. 999	420	

MF-HTC has a continuous PI controller. Output from this controller can be directed to either or both of the two Volt/mA outputs and is programmed under the section "Outputs".

1. Select the "Source" to be controlled, RH, TEMP, HR or TDP.
2. Select the operating "Mode", HAND or AUTO.
3. Select direction for the "Output", Direct or Reverse. Ex. When REVERSE is selected the control output decreases when the actual value is greater than the set point.
4. Programme the desired "Set point".
5. To ensure stable regulation it is possible to programme a neutral zone "NZ". The smallest possible value is 1 %. The neutral zone is symmetrical around the set point.
6. Select a suitable "P-band", in the range of 0,0...999.9 %. When the P-band is programmed to 0 % there is no P-pulse and the I-time is calculated for 100 % P-band.
7. Programme the "I-time", 0...999 seconds.

“HAND - AUTO” mode of the PI-controller

The “HAND - AUTO” mode is selected from the start menu. Use the keys until the “HAND - AUTO” menu is displayed.

RH	47 %
AUTO	28 %

The controlled parameter is displayed on the first row and on the second row, the PI-control output 0...100 %, together with HAND or AUTO.

Press **PGM** for changing between the “HAND” and “AUTO” modes.

Press **ESC** to change to another menu, this does not terminate the “HAND” mode.

The “HAND - AUTO” mode can also be set in the “Mode” parameter under the “PI Controller” menu.

9. Communication (Not standard)

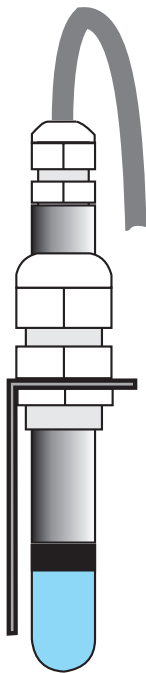
26	Address	1 .. 247	21	
27	Location	0 .. 32767	0	
28	Protocol	COMLI	COMLI	
29	Baud	600 b 1200 b 2400 b 4800 b 9600 b	4800 b	
30	Protect	NO YES	NO	

These parameter are only used for serial communication. Serial communication require that a communication board is installed. This board is an optional accessory.

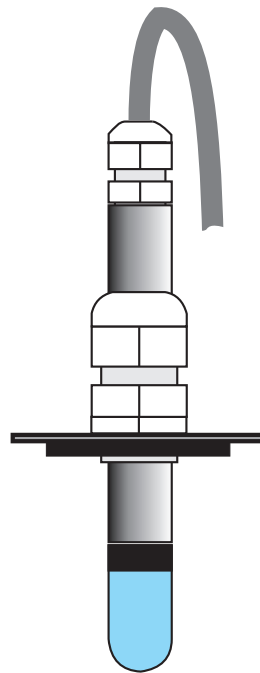
Optional accessories:



Optional accessory:
Duct sensor 100 or 200 mm.



Optional accessories:
1. Duct sensor with cable 2, 5 eller 10 m.
2. Wall mounting bracket.



Optional accessories:
1. Duct sensor with cable 2, 5 eller 10 m.
2. Duct mounting plate

Technical Data

Indicator:	Alpha numeric LCD, 2 rows, 2x16 characters
Measurement range,	
- Temp:	-30...80 °C, -22...176 °F
- Humidity	0...100 % non condensing
- Dew point:	-30...80 °C, -22...176 °F
- Maxing ratio:	0...600 g/kg
Accuracy,	
- Humidity:	±2 % RH
- RH stability:	±1 % typical at 50% RH in 5 year
- Temperature:	±0,5 °C
Response time:	30 s in slowly moving air
Outputs:	Two analogue outputs 0/2...10 VDC, 0/4...20 mA selectable and scalable.
Output relays:	2 pcs potential free, one for each stage.
Max. load, relays:	230 VAC, 16A, $\cos\varphi = 1$, 8A, $\cos\varphi = 0,4$; L/R = 7 ms
Alarm (visible):	High or low alarm limit. In- dicated with a red LED.
Ambient- temperature:	0...50 °C
Housing class:	IP 65
Sensor protection:	Sintered plastic filter.
Power supply:	230 VAC 50Hz, or 24 VAC 50 Hz (See marking on enclosure)
Electric terminals:	Max 1 x 1.5 mm ² , at each terminal.
Power consumption:	Max 5 VA (230VAC)
Cable entry:	4 pcs M16x1.5, one entry is reserved for the sensor cable
Dimensions (WxHxD):	122 x 120 x 90 mm
Weight:	0,7 kg

Maintenance

MF-HTC needs normally no maintenance. When using the sensor in a polluting environment, clean the sintered filter by removing it from the probe and clean with compressed air.

Include accessories

MF-HTC is supplied without external duct sensor.

Optional accessories

MF-Panel: Panel for recessed mount.

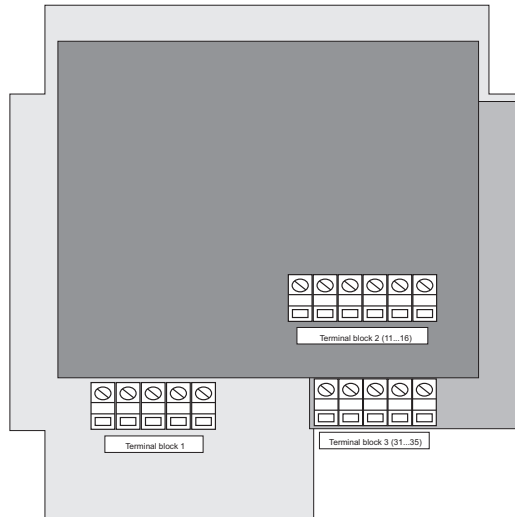
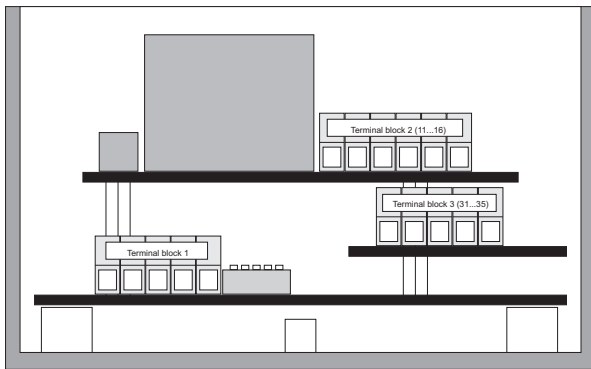
Duct sensor:

- Length of sensor: 100 and 200 mm.
- Cable length: 2, 5 and 10 meter.

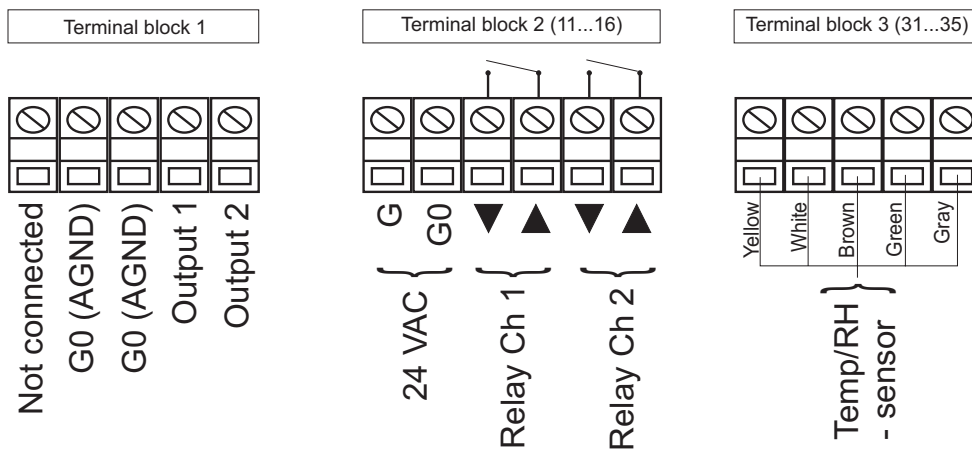
Mounting plates:

Wall and duct mount.

Placering av plintar

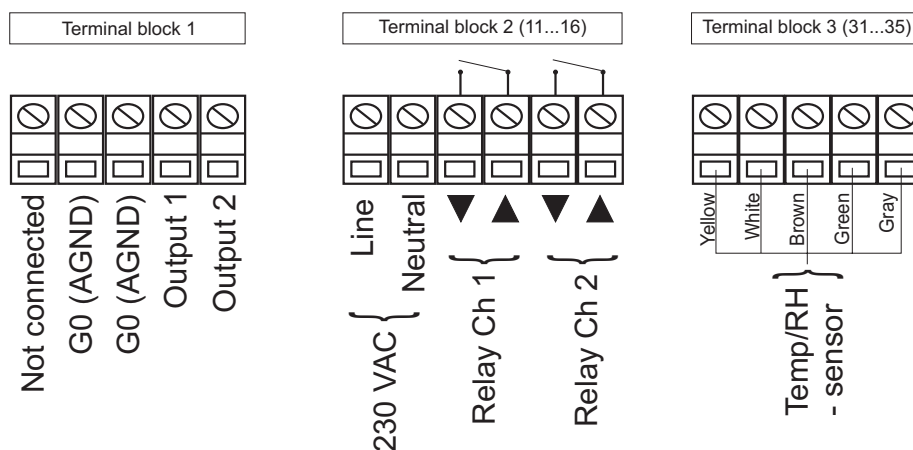


Electrical connection 24 VAC



*Electrical connection for 24 VAC,
has galvanical isolation, uses transformer.*

Electrical connection 230VAC



*Electrical connection for 230 VAC,
has galvanical isolation, uses transformer.*

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