HUMIMAP 20

MULTI-CHANNEL MEASURING SYSTEM

MANUAL
Hardware and Software

YOUR PARTNER IN SENSOR TECHNOLOGY

E+E ELEKTRONIK® Ges.m.b.H.

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USA
FCC notice:

This equipment has been tested and found to comply with the limits for a Class B digital device, pursuant to part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference in a residential installation. This equipment generates, uses and can radiate radio frequency energy and, if not installed and used in accordance with the installation manual, may cause harmful interference to radio communications. However, there is no guarantee that interference will not occur in a particular installation. If this equipment does cause harmful interference to radio or television reception, which can be determined by turning the equipment off and on, the user is encouraged to try to correct the interference by one or more of the following measures:

- Reorient or relocate the receiving antenna.
- Increase the separation between the equipment and receiver.
- Connect the equipment into an outlet on a circuit different from that to which the receiver is connected.
- Consult the dealer or an experienced radio/TV technician for help.

Caution:
Any changes or modifications not expressly approved by the party responsible for compliance could void the user's authority to operate this device.

CANADIAN
ICES-003 notification:

This Device B digital apparatus complies with Canadian ICES-003.
Cet appareil numérique de la classe B est conforme à la norme NMB-003 du Canada.

TABLE OF CONTENTS

1. GENERAL

The manual is a part of the scope of supply and serves to ensure proper handling and optimum functioning of the instrument. For this reason, the manual must be read before start-up.

In addition, the manual is for all personnel who require knowledge concerning transport, setup, operation, maintenance and repair.

The manual must not be used for the purpose of competition without a written consent from E+E Elektronik® and must also not be forwarded to third parties.

Copies for personal use are permitted.

All information, technical data and illustrations contained in these instructions are based on information available at the time of publication.

1.1 Symbol assertion

This symbol indicates a safety instruction.
These safety instructions should always be followed carefully.
By not following these instructions injuries of persons or material damage could happen.
Therefore E+E Elektronik® does not accept liability.

This symbol indicates a note.
These notes should be observed to achieve optimum functioning of the equipment.

1.2 Safety instructions

General Safety Instructions

- Excessive mechanical loads and incorrect usage should always be avoided.
- Take care when unscrewing the filter cap as the sensor element could be damaged.
- The sensor is an Electro Static Discharge sensitive component (ESD). When touching the sensor element, ESD protective measures should be followed.
- Grip sensors only at the lead wires.
- Installation, electrical connection, maintenance and commissioning should be performed by qualified personnel only.
- Do not cover the ventilation slots.

1.3 Environmental aspects

Equipment from E+E Elektronik® is developed with due consideration to all resultant environmental issues. When you dispose the equipment you should avoid environmental pollution. For disposal of the transmitter the individual components must be sorted with care. The housing consists of recyclable aluminium. The electronics must be collected as electronic scrap and disposed of according to the regulations in force.

2. SCOPE OF SUPPLY

- 19" housing with plug-in module, power supply and RS485 to RS232 converter
- manual
- power cable
- RS232 cable
- RS485 uplink cable
- RS485 Y-splitter
- replacement fuse
- CD with configurator software
- CD with logger- and visualisation software
- CD with datasheet, manual and demo

- adapter PCB
- 19" plug-in module(s) according to order code
- calibration certificate for each plug-in module
- 2mm plugs for analogue outputs on front side
- M12 connector for analogue outputs on back side

Hardware

3. PRODUCT DESCRIPTION

The HUMIMAP 20 validation system provides multifunctionality, highest accuracy and simple installation and maintainance. The modular housing enables a user-friendly operation and a fast replacement of plug-in modules for service purposes.
The HUMIMAP 20 system is designed for validation and mapping of RH/T circumstanced in climate and environmental chambers.
The number of measurement points in a HUMIMAP 20 system can be selected individually by simply adding / removing plug-in modules to / from the rack.
The HUMIMAP 20 is a portable device for interior applications.

4. DIMENSIONS

4.1 Rack (mm)

463 (18.2")
362 (14.3")
150 (6")

4.2 Modules (mm)

Plug-in module

70.8 (2.8")

0502/P00502.004
NETWORKADR:2422

ERROR: 03
T:180.00 °C

Out 2
Out 1
GND

128.4 (5")

Data converter module

30.1 (1.2")

Data Converter

RS232

Power supply module

40.3 (1.6")

Power Supply Unit

Power

4.3 Probe (mm)

code "cable length"
code "probe length"
32
Ø12

Hardware

5
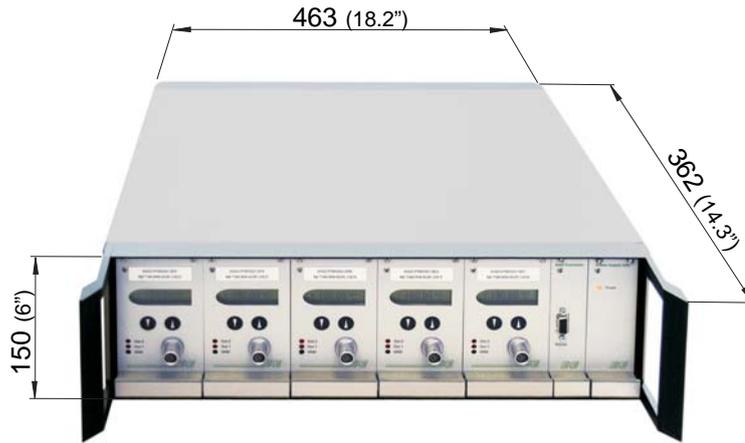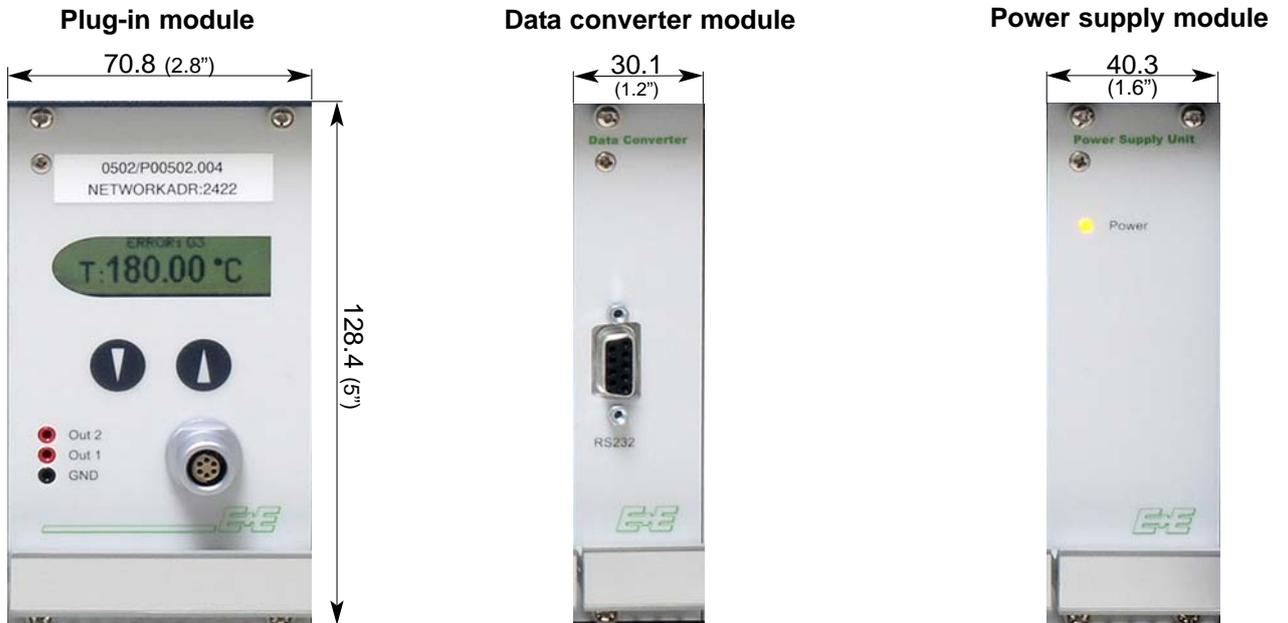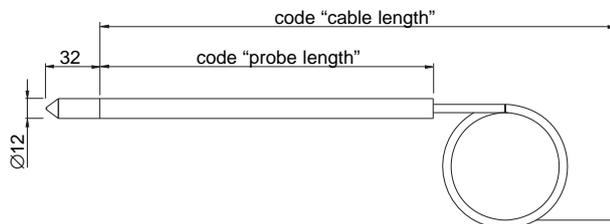
5. ELECTRICAL CONNECTIONS

5.1 Power supply / Data interface

RS232 / PC with data logging + analysis software

analogue outputs on back side

RS485

90...250V AC 50/60Hz / power supply

fuse T1A/250V
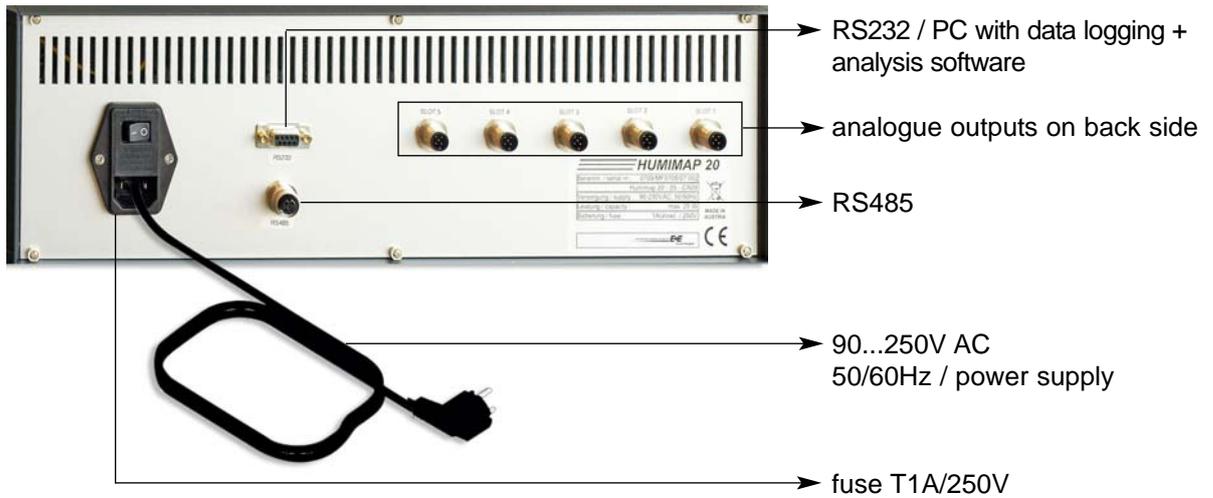
Plug connection for analogue output

Description:	Connection assignment:
not connected	5
GND	4
GND	3
OUT1	2
OUT2	1

⚠ Use screened cable for analogue outputs.
Ground shielding at connector of analogue output.
The analogue outputs correspond to measuring category "CAT II".
Voltages over 50V AC resp. 120V DC must not be connected against earthing.

5.2 Remote probe
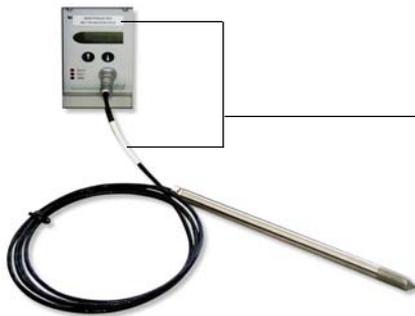
⚠ Each remote probe is strictly assigned to a specific plug-in module.

Serial number (e.g.: 0802/P00502.001) mentioned on the front panel and on the remote probe have to match each other.

5.3 Analogue output

Additionally analogue outputs are accessible on the front panel of each plug-in module.

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6. OPERATING COMPONENTS

6.1 Plug-in module

Label	Description
0502/P00502.001 NETWORKADR:2419	serial number + networking address
	1. measurand
MIN RH: 38.57%	2. units
	3. measurand selection and
	4. MIN/MAX function
	5. measured values
output 2 — Out 2	plugable remote probe
output 1 — Out 1	
GND — GND	6. status line

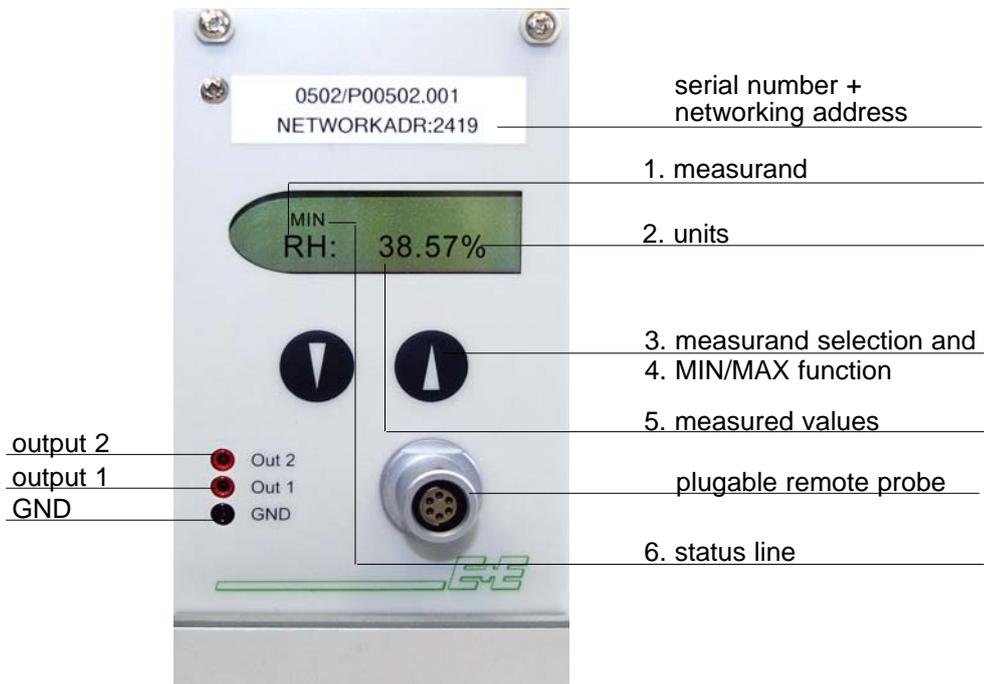| 1. MEASURAND:		2. UNITS:		3. MEASURAND SELECTION:
SI		SI	US	
RH	Rel. humidity	%	%	Press the Δ or ∇ button to select the desired physical quantity.
T	Temperature	°C	°F	
h	Enthalpy	kJ/kg	ftlbf/lb	
r	Mixture ratio	g/kg	gr/lb	
dv	Absolute humidity	g/m³	gr/ft	
Tw	Wet-bulb temperature	°C	°F	
Td	Dew-point temperature	°C	°F	
e	Water vapour partial pres.	mbar	psi	

4. MIN / MAX FUNCTION:

Plug-in modules of the HUMIMAP 20 series can display the highest and lowest measured value measured since the last reset.
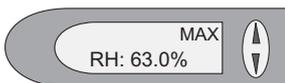
Highest measured value:
1. Select the desired measurand.
2. To display the maximum value of the selected measurand, press the Δ button for at least five seconds.
3.1. To reset the instrument to its normal operating status, press the Δ button once again for five seconds.
3.2. If both buttons are pressed for at least five seconds while the maximum value is displayed → the "MAX" symbol disappears → the maximum value will be deleted (Reset).
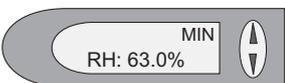
Lowest measured value:
1. Select the desired measurand.
2. To display the minimum value of the selected quantity, press the ∇ button for at least five seconds.
3.1. To reset the instrument to its normal operating status, press the ∇ button once again for five seconds.
3.2. If both buttons are pressed for at least five seconds while the minimum value is displayed → the "MIN" symbol disappears → the minimum value will be deleted (Reset).

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5. MEASURED VALUES:

The dominant value of the appropriate quantity is displayed in this field. For the factory configuration, the measured values may fall between the measurement ranges shown below.

		from		to		units	
Humidity	RH	0		100		% RH	
Temperature	T	-40	(-40)	180	(356)	degC	(°F)
Dew-point temperature	Td	-80	(-112)	100	(212)	degC	(°F)
Frost-point temperature	Tf	-80	(-112)	0	(32)	degC	(°F)
Wet-bulb temperature	Tw	0	(32)	100	(212)	degC	(°F)
Water vapour partial pressure	e	0	(0)	1100	(15)	mbar	(psi)
Mixture ratio	r	0	(0)	999	(9999)	g/kg	(gr/lb)
Absolute humidity	dv	0	(0)	700	(300)	g/m³	(gr/f³)
Specific enthalpy	h	0	(0)	2800	(999999)	kJ/kg	(lbf/lb)

The measurement ranges indicated above can be set to individual requirements using the configuration software supplied (see Configuration software, chapter 5 "Index - Index Cards").

6. STATUS LINE:

- MIN; MAX: see Point "MIN/MAX Function", see Hardware, chapter 6.1 "Plug-in module"
- CALIB LOW; CALIB HIGH: indicates the low or high humidity/temperature calibration point.
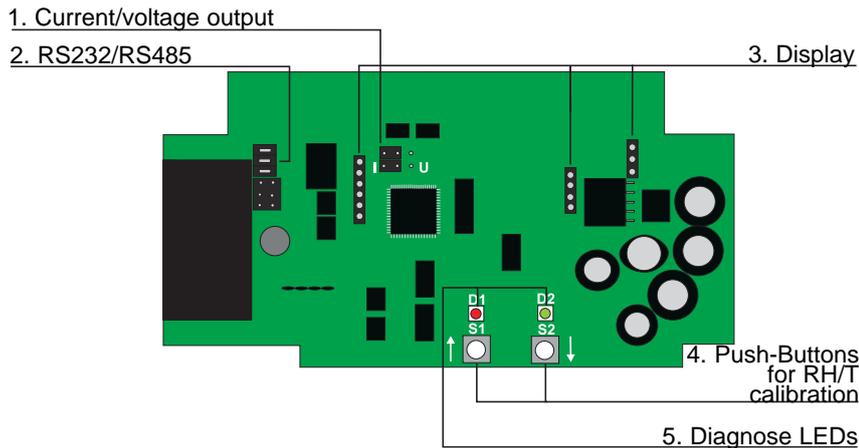- "ERROR 01....04": see Hardware, chapter 8.3 "Self-diagnosis and error messages"

6.2   Data converter module

RS232 interface communication with PC (datalogger- /visualisation software)

6.3   Power supply module

status LED power ON /OFF

6.4   Circuit board in each plug-in module

1. Current/voltage output
2. RS232/RS485
3. Display

4. Push-Buttons for RH/T calibration
5. Diagnose LEDs

1. Current/voltage output: When the device will be switched from current to voltage output signals using the configuration software supplied, then two jumpers must also be positioned as follows.

for current signals:

for voltage signals:

2. RS232/RS485:   These jumpers must be removed.

3. Display: These pinboards are determined for connecting the display in the front panel of the plug-in module.

4. Push-Buttons for calibration purposes: see Hardware, chapter 7 "Humidity/Temperature calibration"

5. Diagnosis LEDs: see Harware, chapter 7 "Humidity/Temperature calibration," and chapter 8.3 "Self diagnosis and error messages"

7.   HUMIDITY / TEMPERATURE CALIBRATION

Basically all plug-in modules of HUMIAMP 20 can easily be calibrated via the integrated RS485 network by using the provided configuration software (details see Software, chapter 5.4 "Calibration").

On the other hand each HUMIMAP 20 plug-in module can be calibrated manually by accessing the push buttons on the PCB of each plug-in module. To keep the plug-in module hooked up, an adapter PCB is necessary (see picture below).
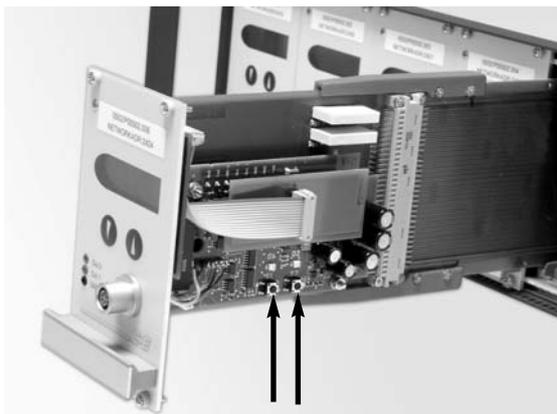
7.1 Humidity / temperature calibration via push buttons

Each HUMIMAP 20 plug-in module can be calibrated in two ways:

- <u>1-point humidity/temperature calibration</u>: quick and simple calibration on a defined humidity/temperature point (working point).
- <u>2-point humidity/temperature calibration:</u> simple calibration for accurate measuring results over the whole humidity/temperature working range.

> **i**
> - To reach a temperature balance it is recommended to keep the remote probe of the plug-in module and the reference chamber (e.g. HUMOR 20,...) for minimum 4 hours in the same room condition.
> - During stabilisation period and calibration procedure it is important to keep the temperature in the reference climate chamber constant.
> - For calibration the humidity sensor probe must be stabilised at least 20 minutes into the reference chamber.
> - Replace an used dirty filter cap before calibration!

7.1.1 2-point humidity calibration

For accurate adjustment over the whole working range or in case of sensor exchanges a two point calibration is recommended.

> **i**
> - Start calibration at the low humidity calibration point!
> - The humidity difference between the two points should be > 30%RH
> - Low humidity point < high humidity point
> - Two point calibration may be performed directly on the circuit board, or for convenience, using the configuration software supplied (for more details, see Configuration Software, chapter 5.4 "Calibration")

2-point humidity calibration procedure on the circuit board

low calibration point:

1. Insert the sensor probe into the reference humidity 1 (<u>low calibration point</u>) and stabilise for at least 20 minutes.

D2 green
S2

2. BUTTON S2: Pressing the button for 5 seconds starts the procedure for the <u>calibration mode RH</u>. The calibration mode is indicated by the lit LED "D2" on the circuit board.

D2 green
S2   "CALIB LOW"

3. BUTTON S2: Pressing the button for 5 seconds starts the procedure for the <u>low calibration point</u>. The calibration mode is indicated by the lit LED "D2" and the symbol "CALIB LOW" will appear on the optional LC display.

D1 red   D2 green
S1   S2

4. BUTTON S1 (up) and **S2 (down)**: Pressing one of the two buttons will adjust the measuring value in steps of 0.1% up or down to the reference value. The actual measuring value is indicated on the display or can be measured with the analogue output. As soon as the measured value is changed, "D1" is flashing.

D2 flashing green
S1

5. BUTTON S1 (store): Pressing the button for 5 seconds <u>stores the calibration value</u> and the procedure is ended. LED "D2" flashes to indicate exiting of the calibration mode and the symbol "CALIB LOW" will disappear from the optional LC display.

D2 flashing green
S2

BUTTON S2 (cancel): Pressing the button for 5 seconds the <u>calibration procedure will be ended without storing</u> the calibration values. LED "D2" flashes to indicate exiting of the calibration mode and the symbol "CALIB LOW" will disappear from the optional LC display.

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high calibration point:

D2 green

S2

6. Insert the sensor probe into the reference humidity 2 (high calibration point) and stabilise for at least 20 minutes.

7. BUTTON S2: Pressing the button for 5 seconds starts the procedure for the calibration mode RH. The calibration mode is indicated by the lit LED "D2" on the circuit board.

D2 green

S1

"CALIB HIGH"

8. BUTTON S1: Pressing the button for 5 seconds starts the procedure for the high calibration point. The calibration mode is indicated by the lit LED "D2" and the symbol "CALIB HIGH" will appear on the optional LC display.

D1 red **D2** green

S1 **S2**

9. BUTTON S1 (up) and **S2 (down)**: Pressing one of the two buttons will adjust the measuring value in steps of 0.1% up or down to the reference value. The actual measuring value is indicated on the display or can be measured with the analogue output. As soon as the measured value is changed, "D1" is flashing.

D2 flashing green

S1

D2 flashing green

S2

10. BUTTON S1 (store): Pressing the button for 5 seconds stores the calibration value and the procedure is ended. LED "D2" flashes to indicate exiting of the calibration mode and the symbol "CALIB HIGH" will disappear from the optional LC display.
BUTTON S2 (cancel): Pressing the button for 5 seconds the calibration procedure will be ended without storing the calibration values. LED "D2" flashes to indicate exiting of the calibration mode and the symbol "CALIB HIGH" will disappear from the optional LC display.

7.1.2 2-point temperature calibration

| i |

- Start calibration at the low calibration point!
- The temperature difference between the two points should be at least 30°C!
- Low temperature point < high temperature point
- Attention: A two point temperature calibration is not supported by the configuration software and must therefore be done directly on the circuit board! (see the following procedure)

2-point temperature calibration procedure on the circuit board

low calibration point:

D1 🔴 **red**

S1

S2 **"CALIB LOW"**

D1 🔴 **red**

S1 ⬆ **S2** ⬇

D2 🟢 **flashing green**

S1

D2 🟢 **flashing green**

S2
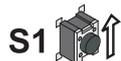
1. Insert the sensor probe into the reference temperature 1 (low calibration point) and stabilise for at least 20 minutes.

2. BUTTON S1: Pressing the button for 5 seconds starts the procedure for the calibration mode temperature. The calibration mode is indicated by the lit LED "D1" on the circuit board.

3. BUTTON S2: Pressing the button for 5 seconds starts the procedure for the low calibration point. The calibration mode is indicated by the symbol "CALIB LOW" on the optional LC display.

4. BUTTON S1 (up) and **S2 (down):** Pressing one of the two buttons will adjust the measuring value in steps of 0.1 degC up or down to the reference value. The actual measuring value is indicated on the display or can be measured with the analogue output. As soon as the measured value is changed, "D1" is flashing.

5. BUTTON S1 (store): Pressing the button for 5 seconds stores the calibration value and the procedure is ended. LED "D2" flashes to indicate exiting of the calibration mode and the symbol "CALIB LOW" will disappear from the optional LC display.
BUTTON S2 (cancel): Pressing the button for 5 seconds the calibration procedure will be ended without storing the calibration values. LED "D2" flashes to indicate exiting of the calibration mode and the symbol "CALIB LOW" will disappear from the optional LC display.

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high calibration point:

D1 🔴 **red**

S1

S1 **"CALIB HIGH"**

D1 🔴 **red**

S1 ⬆ **S2** ⬇

D2 🟢 **flashing green**

S1

D2 🟢 **flashing green**

S2

6. Insert the sensor probe into the reference temperature 2 (high calibration point) and stabilise for at least 20 minutes.

7. BUTTON S1: Pressing the button for 5 seconds starts the procedure for the calibration mode temperature. The calibration mode is indicated by the lit LED "D1" on the circuit board.

8. BUTTON S1: Pressing the button for 5 seconds starts the procedure for the high calibration point. The calibration mode is indicated by the symbol "CALIB HIGH" on the optional LC display.

9. BUTTON S1 (up) and **S2 (down):** Pressing one of the two buttons will adjust the measuring value in steps of 0.1 degC up or down to the reference value. The actual measuring value is indicated on the display or can be measured with the analogue output. As soon as the measured value is changed, "D1" is flashing.

10. BUTTON S1 (store): Pressing the button for 5 seconds stores the calibration value and the procedure is ended. LED "D2" flashes to indicate exiting of the calibration mode and the symbol "CALIB HIGH" will disappear from the optional LC display.
BUTTON S2 (cancel): Pressing the button for 5 seconds the calibration procedure will be ended without storing the calibration values. LED "D2" flashes to indicate exiting of the calibration mode and the symbol "CALIB HIGH" will disappear from the optional LC display.

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7.1.3 1-point humidity calibration

When the working range is limited to a certain more narrow range, a calibration at one humidity point is absolutely sufficient.

- In accordance with the working range, either the high or low calibration point should be selected. (CP > or < 50% RH)

- This calibration causes an extra inaccuracy for the rest of the working range.

- The one point humidity calibration may be done directly on the circuit board, or for convenience, using the configuration software supplied. (for more details, see the Configuration software, 5.4 "Calibration" / 1-point humidity calibration)

1-point humidity calibration procedure on the circuit board

1. Insert the sensor probe into the reference humidity (calibration point) and stabilise for at least 20 minutes.

D2 green
S2

2. BUTTON S2: Pressing the button for 5 seconds starts the procedure for the calibration mode RH. The calibration mode is indicated by the lit LED "D2" on the circuit board.

D2 green
S1   **"CALIB HIGH"**

3. BUTTON S1: Pressing the button for 5 seconds starts the procedure. The calibration mode is indicated by the lit LED "D2" and the symbol "CALIB HIGH" will appear on the optional LC display (CP = 50% RH).
or

D2 green
S2   **"CALIB LOW"**

BUTTON S2: Pressing the button for 5 seconds starts the procedure. The calibration mode is indicated by the lit LED "D2" and the symbol "CALIB LOW" will appear on the optional LCD (CP < 50% RH).

D1 red **D2** green
S1   **S2**

4. BUTTON S1 (up) and **S2 (down)**: Pressing one of the two buttons will adjust the measuring value in steps of 0.1% up or down to the reference value. The actual measuring value is indicated on the display or can be measured with the analogue output.

D2 flashing green
S1

D2 flashing green
S2

5. BUTTON S1 (store): Pressing the button for 5 seconds stores the calibration value and the procedure is ended. LED "D2" flashes to indicate exiting of the calibration mode and the symbol "CALIB LOW" or "CALIB HIGH" will disappear from the optional LC display.
BUTTON S2 (cancel): Pressing the button for 5 seconds the calibration procedure will be ended without storing the calibration values. LED "D2" flashes to indicate exiting of the calibration mode and the symbol "CALIB LOW" or "CALIB HIGH" will disappear from the optional LC display.

7.1.4 1-point temperature calibration

When the working range is limited to a certain more narrow range, a calibration at one temperature point is absolutely sufficient.

- In accordance with the working range, either the high or low calibration point should be selected. (CP ≥ or < 45 degC)

- This calibration causes an extra inaccuracy for the rest of the working range.

- The one point temperature calibration may be performed directly on the circuit board, or for convenience, using the configuration software supplied. (for more details, see "Software" manual, 5.4 1-point temperature calibration)

1-point temperature calibration procedure on the circuit board

1. Insert the sensor probe into the reference temperature (calibration point) and stabilise for at least 20 minutes.

D1 red

S1

2. BUTTON S1: Pressing the button for 5 seconds starts the procedure for the calibration mode temperature. The calibration mode is indicated by the lit LED "D1" on the circuit board

S1   **"CALIB HIGH"**

S2   **"CALIB LOW"**

3. BUTTON S1: Pressing the button for 5 seconds starts the procedure. The calibration mode is indicated by the symbol "CALIB HIGH" on the optional LC display (CP ≥ 45 degC).
or
BUTTON S2: Pressing the button for 5 seconds starts the procedure. The calibration mode is indicated by the symbol "CALIB LOW" on the optional LC display (CP ≥ 45 degC).

D1 red

S1   **S2**

4. BUTTON S1 (up) and **S2 (down)**: Pressing one of the two buttons will adjust the measuring value in steps of 0.1degC up or down to the reference value. The actual measuring value is indicated on the display or can be measured with the analogue output.

D2 flashing green

S1

D2 flashing green

S2

5. BUTTON S1 (store): Pressing the button for 5 seconds stores the calibration value and the procedure is ended. LED "D2" flashes to indicate exiting of the calibration mode and the symbol "CALIB LOW" or "CALIB HIGH" will disappear from the optional LC display.
BUTTON S2 (cancel): Pressing the button for 5 seconds the calibration procedure will be ended without storing the calibration values. LED "D2" flashes to indicate exiting of the calibration mode and the symbol "CALIB LOW" or "CALIB HIGH" will disappear from the optional LC display.

7.1.5 Resetting the customer calibration to the factory calibration on the circuit board:

D1 short flash red   **D2** flashing green

S1   **S2**

1. RH + T RESET: BUTTON S1 and S2: In neutral mode pressing both buttons simultaneously for 10 seconds customer calibration settings are reset to factory calibration.
A short flash of the LED "D1" indicates the reset.
or

D2 green

S2

D1 short flash red

S1   **S2**

2. RH RESET: BUTTON S2: Pressing the button for 5 seconds starts the <u>procedure for the calibration mode RH</u>. <u>Pressing both buttons simultanously for 10 seconds customer calibration settings are reset to factory calibration</u>.
A short flash of the LED "D1" indicates the reset.
or

D1 red

S1

D2 short flash green

S1   **S2**

3. Temp. RESET: BUTTON S1: Pressing the button for 5 seconds starts the <u>procedure for the calibration mode T.</u> <u>Pressing both buttons simultanously for 10 seconds customer calibration settings are reset to factory calibration</u>.
 A short flash of the LED "D2" indicates the reset.

8. MAINTENANCE

8.1 Probe replacement

If the remote probe gets damaged (damage to the cable, mechanical destruction of the sensor probe) it is possible to replace the probe without re-adjustment.
The replacement probe can be ordered at the manufacturer (see Hardware, chapter 10. "Replacement parts/Accessories").

Note:
− This will invalidate the factory calibration.

Sensor probe replacement procedure:
1) Switch off supply voltage.
2) Remove damaged sensor probe.
3) Plug in replacement probe to the front panel of the plug-in module
4) Establish connection to PC (RS232).
5) Switch on power supply voltage.
6) Start configuration software on PC.
7) For further instructions, see Configuration software, chapter 5.3 "Sensor/Probe replacement"

8.2 Sensor replacement

Under several circumstances, the capacitive humidity sensor element can get damged.
To avoid the costly return to the manufacturer, a replacement of the sensor without re-adjustment is possible.

Note:
− This will invalidate the factory calibration.
− The sensor elements should be touched by the lead wires only (use tweezers).

Sensor replacement procedure:
1) Switch off supply voltage
2) Unscrew the filter cap
3) Solder off the damaged humidity sensor
4) Put in the new humidity sensor and solder it on - the active side (side with the sensor pads) has to face the inside (see diagram).
5) Screw on the filter cap (in case of pollution replace it by a new filter cap).
6) Establish connection to PC (RS232)
7) Switch on supply voltage
8) Start configuration software on PC
9) For further instructions, see Configuration software, chapter 5.3 "Sensor/Probe replacement"

solder
points

active side

Hardware
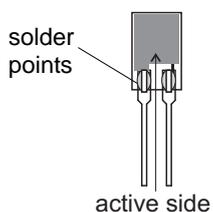
8.3   Self diagnosis and error messages

Self diagnosis via LEDS on the plug-in module:

- **Green LED**
  flashing ⟹ Supply voltage applied / Microprocessor is active and working

- **Red LED**
  constantly lit ⟹ Humidity sensor element damaged
  flashing ⟹ Humidity sensor element accruing moist (condensation!)

Self diagnosis via display:

Error 1 ⟹ Humidity sensor element damaged
Error 2 ⟹ Humidity sensor element moistened (condensation!)
Error 3 ⟹ Temperature sensor element damaged
Error 4 ⟹ Temperature input short circuit
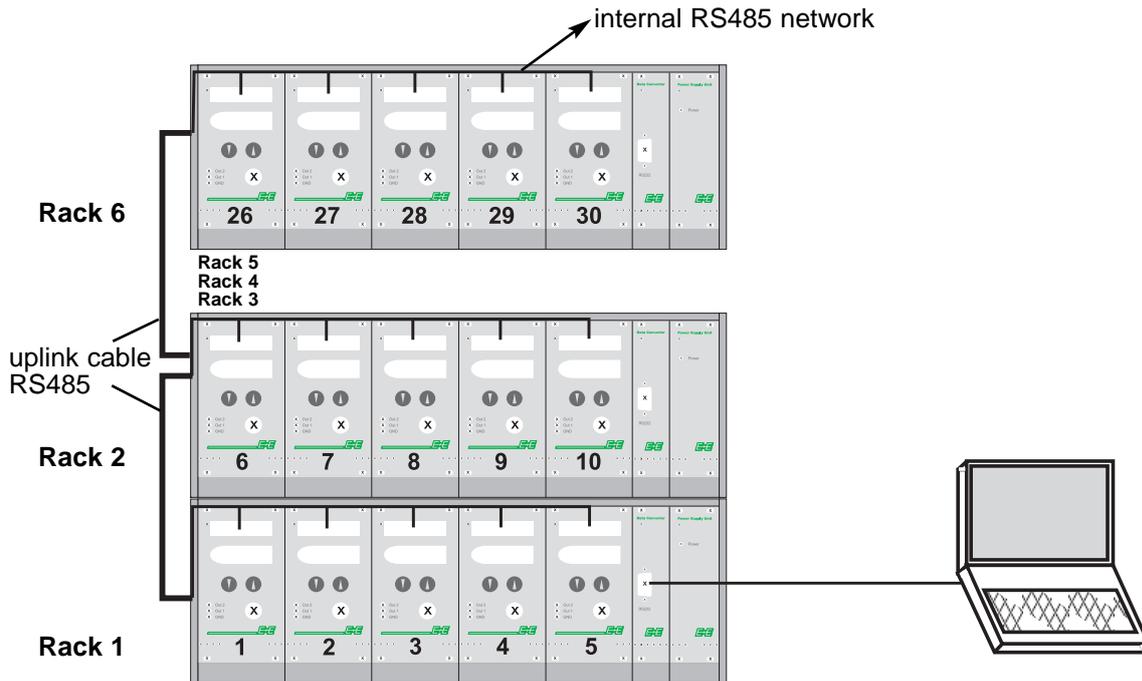
i   *Definitions:*

- **Error**
  possible cause
  ⟹ *Measures / Help*

- **Display shows incorrect values**
  Error during re-adjustment of plug-in module
  ⟹ *Reset to factory calibration and repeat the calibration routine*

  Filter soiled
  ⟹ *Replace filter*

  Sensor defective
  ⟹ *Replace sensor*

  Output configured incorrectly
  ⟹ *PC - Software*

- **Long response time**
  Filter soiled
  ⟹ *Replace filter*

  Incorrect filter type
  ⟹ *Filter type should match the application*

- **HUMIMAP failure**
  no supply voltage
  ⟹ *Check wiring and supply voltage*
  ⟹ *fuse defective* ⟹ fuse replacement

- **High humidity values - red LED blinks**
  Dew (condensation) in sensor probe head
  ⟹ *Dry probe head and check the sensor probe mounting type*

  Incorrect filter type (e.g. storage of humidity after stainless steel sintered filter condensation)
  ⟹ *Filter type should match the application*

9. NETWORK

Up to 32 plug-in modules of the MUMIMAP 20 series (5 pc. / rack, totally 6 racks) can be connected via the integrated RS-485 bus system to a single PC interface (RS232).

Using the software package included in the scope of supply the plug-in modules can easily be added / removed and configured, either individually or in the entire network group.

Network configuration:

internal RS485 network

Rack 6   26 27 28 29 30

Rack 5
Rack 4
Rack 3

uplink cable
RS485

Rack 2   6 7 8 9 10

Rack 1   1 2 3 4 5

Technical Data:

- Max. network size: 32 plug-in modules / COM-PORT of PC
- Transmission rate: 9600 Baud

10. REPLACEMENT PARTS / ACCESSORIES

Description	Order code
- Filter	
- Metal grid filter up to 180°C (356°F)	HA010109
- Replacement probe	
- for HUMIMAP 20 with 2 m cable	P02D
- for HUMIMAP 20 with 5 m cable	P05D
- for HUMIMAP 20 with 10 m cable	P10D
- Replacement sensors	
- Replacement humidity sensor with sensor data	FE10
- Replacement humidity sensor with coating and sensor data	FE10-HC01
- Replacement temperature sensor with sensor data	TE38
- Mounting flange (stainless steel)	HA010201
- Drip water protection	HA010503

11. TECHNICAL DATA

Measuring values

Relative humidity

Humidity sensor[1]	HC1000-400
Working range[1]	0...100% RH

Accuracy[*] (including hysteresis, non-linearity and repeatability, traceable to intern. standards, administrated by NIST, PTB, BEV...)

-15...40°C (5...104°F)	<90% RH	± (1.3 + 0.3%*mv) % RH
-15...40°C (5...104°F)	>90% RH	± 2.3% RH
-25...70°C (-13...158°F)		± (1.4 + 1%*mv) % RH
-40...180°C (-40...356°F)		± (1.5 + 1.5%*mv) % RH

Temperature dependence of electronics	typ. ± 0.01% RH/°C
Temperature dependence of sensing probe	typ. ± (0.002 + 0.0002 x RH[%]) x ΔT [°C] $\Delta T = T - 20°C$
Response time with metal grid filter 20°C (68°F) / t_{90}	< 15s

Temperature

Temperature sensor element	Pt1000 (Tolerance class A, DIN EN 60751)
Working range sensing head	-40...180°C (-40...356°F)
Accuracy	
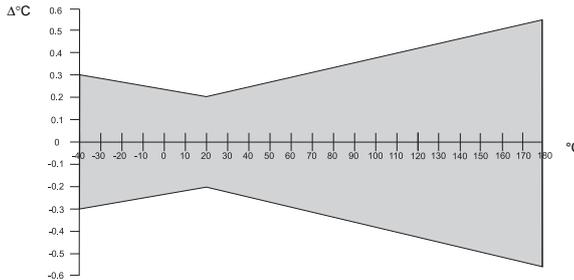
Temperature dependence of electronics	typ. ± 0.005°C/°C

Outputs

Digital output	RS232	
Two freely selectable and scaleable analogue outputs [2]	0 - 5V / 0 - 10V	-1mA < I_L < 1mA
	4 - 20mA / 0 - 20mA	R_L < 500 Ohm

Max. adjustable measurment range [2)3]

|		from		up to		units	
Humidity	RH	0		100		% RH	
Temperature	T	-40	(-40)	180	(356)	°C	(°F)
Dew point temperature	Td	-80	(-112)	100	(212)	°C	(°F)
Frost point temperature	Tf	-80	(-112)	0	(32)	°C	(°F)
Wet bulb temperature	Tw	0	(32)	100	(212)	°C	(°F)
Water vapour partial pressure	e	0	(0)	1100	(15)	mbar	(psi)
Mixture ratio	r	0	(0)	999	(9999)	g/kg	(gr/lb)
Absolute humidity	dv	0	(0)	700	(300)	g/m³	(gr/f³)
Specific enthalpy	h	0	(0)	2800	(999999)	kJ/kg	(lbf/lb)

General

Supply voltage	90...250V AC (50/60 Hz)
Power consumption	20W
System requirements for software	WINDOWS 2000 or later; serial interface
Sensor protection	metal grid filter up to 180°C (356°F)
Operating temperature range of electronics	-20...+50°C (-4...122°F)
Storage temperature range	-40...+60°C (-40...140°F)
Degree of pollution	2
Device of measuring category	II
Protection category	I
Maximum height of mounting	up to 2000m above sea level
Protection class	IP20
Electromagnetic compatibility according to	EN61000-6-2 EN61000-6-4 CE
	EN61010-1
Display	graphical LC display (128x32 pixels), with integrated push-buttons for selecting parameters and MIN/MAX function
Dimensions	463 x 150 x 362mm (18.2 x 6 x 14.3") (w x h x d)

[1] Refer to working range of the humidity sensor!   [2] Can be easily changed by software.   [3] Refer to accuracies of calculated values.

Operating range humidity sensor
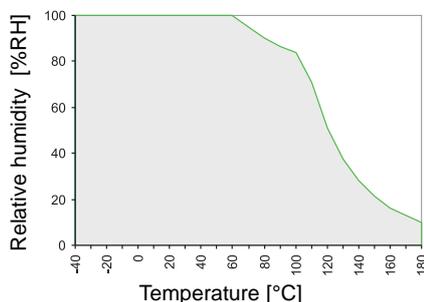
The gray area shows the allowed measurement range for the humidity sensor.

Operating points outside of this range do not lead to destruction of the element, but the specified measurement accuracy cannot be guaranteed.

Hardware

CONFIGURATION SOFTWARE

LIMITED LIABILITY

E+E Elektronik® is not liable for any damages or consequential damages (for example, but not restricted to loss of earnings, interruption of business, loss of information and data or any other pecuniary damages), that result from the installation, usage and also impossibility of usage of a software product from E+E Elektronik® and supportservices possibly associated with it or non-performance of support.

1.   GENERAL INFORMATION

The configuration software was developed by E+E Elektronik Ges.m.b.H to allow fast and easy configuration of individual plug-in modules as well as entire plug-in module networks at the HUMIMAP 20 series.

This software tool is included in delivery.
System requirements: MS WINDOWS 2000 or higher; RS232 serial interface

2.   INSTALLATION

Insert the CD-ROM supplied with the HUMIMAP 20 system into your PC and open the set-up application. Follow the instructions of the dialogue menus to set the desired language and all further parameter for installation. At the end of the routine, the software is installed and the Readme file or the program will be automatically opened.

i

Note:
If the configuration software has already been installed, or for upgrade only, the older version must first be uninstalled (the user will be notified during the installation routine and the process will be interrupted automatically).

To remove the previous version, open the software folder in the system control panel. All of the programs installed on your system are located here. Uninstall the HUMIMAP 20 Configurator by clicking on the appropriate button and then install the upgrade.

3. ICONS ON THE TOOLS BAR

3.1 File
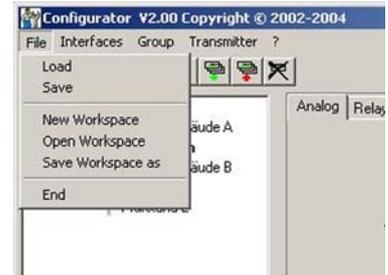
Load: Loads a file with a saved configuration of a specific plug-in module.

Save: Saves the current configuration of a plug-in module in a file.

New Workspace: Opens a file for a new tree structure (new network).

Open Workspace: Opens existing trees structures (networks).

Save Workspace: Saves the current trees structures (networks) in an archive file.
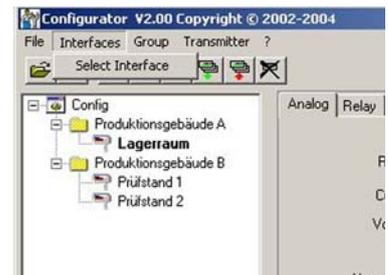
Note:
The functions "Save Workspace" and "Open Workspace" apply to the tree structure only, not to the configurations of individual plug-in modules! Therefore only the network structure is saved. The configuration of plug-in modules must be reloaded using the command "Read All Transmitters".

3.2 Interfaces

Select: Selects the serial interface (COM port) for communication with the plug-in modules. Following functions are available:
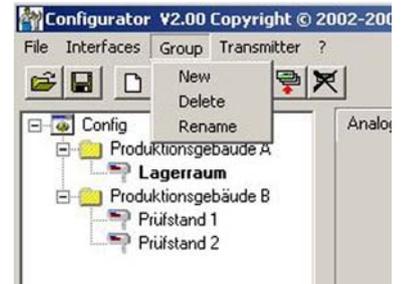
use / do not use: Marked COM ports are greyed out and deactivated for the configuration software (e.g., COM for integrated Notebook Modem).

Note:
A disabled interface (shaded = do not use), can be enabled by clicking on the "use" button.

Configuration software
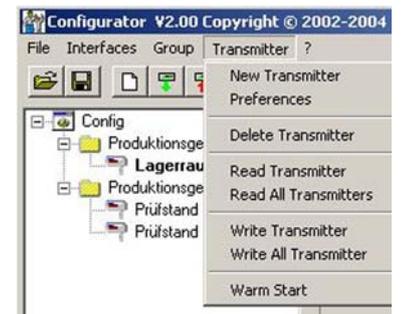
3.3   Group

The icon "Group" provides the option of combining plug-in modules in groups.

New: Creates a group or adds another group into an existing structure.
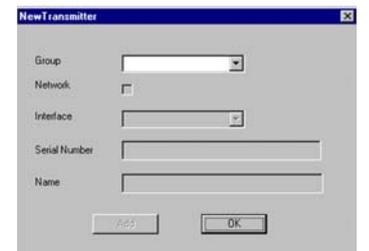
Delete: Deletes groups within a tree structure.

Rename: Changes the name of a transmitter group.

3.4   Transmitter

New transmitter:

A new plug-in module is created in the tree structure.
This procedure requires the input of a number of parameters:

Group: Assigns a plug-in module to a group.

Network: The check box "network" must always be selected when several plug-in moduls
                      are operated in a RS485 network.

Interface: Selects the interface for connecting the plug-in modules to a network.
                      (For information on how to set up a COM port, see Configuration Software, Chapter
                      3.2 Interfaces).

Network address: Input of the network address for specific plug-in module for unique assignment
                      within the network (see label on front panel of plug-in module).

Name: Assigns a meaningful name coresponding to the plug-in module. This name is
                      displayed in the tree under the relevant group (e.g., module 1 / rack 1).

Configuration software

Preferences: Displays the preferences for all plug-in modules that have been set-up. The preferences may also be changed here.

Delete transmitter: Deletes the selected plug-in modules, or the selected groups from the tree structure.

Read: Reads and displays the configuration parameters of the selected plug-in module.

Read All: Reads the configuration for all plug-in modules in the network.

| i | Note: Only those parameters that have the same value for all plug-in modules in the network will be displayed. Other values are shaded and can not be selected or changed. |

Write: Writes the current configuration into the selected plug-in module.

Write All: Writes the current configuration into all selected plug-in modules in the network.

| i | Set the configuration for a plug-in module, then select the appropriate network in the tree structure and write the configuration all transmitters of the target group using the command "Write All". |

Warm Start: Resets and restarts the microprocessor of the selected plug-in module.

3.5   ? - Information

Version: Displays the version number of the software currently installed and the contact information for E+E Elektronik.

Configuration software

4.   ICON LIST

|	
	"Load File" (see Configuration Software, chapter 3.1 File)
	"Save File" (see Configuration Software, chapter 3.1 File)
	"New Transmitter" (see Configuration Software, chapter 3.4 Transmitter)
	"Read Transmitter" (see Configuration Software, chapter 3.4 Transmitter)
	"Save Transmitter" (see Configuration Software, chapter 3.4 Transmitter)
	"Read All Transmitters" (see Configuration Software, chapter 3.4 Transmitter)
	"Write All Transmitters" (see Configuration Software, chapter 3.4 Transmitter)
	"Delete Transmitter" (see Configuration Software, chapter 3.4 Transmitter)

5.   INDEX - INDEX CARDS

5.1   Analogue
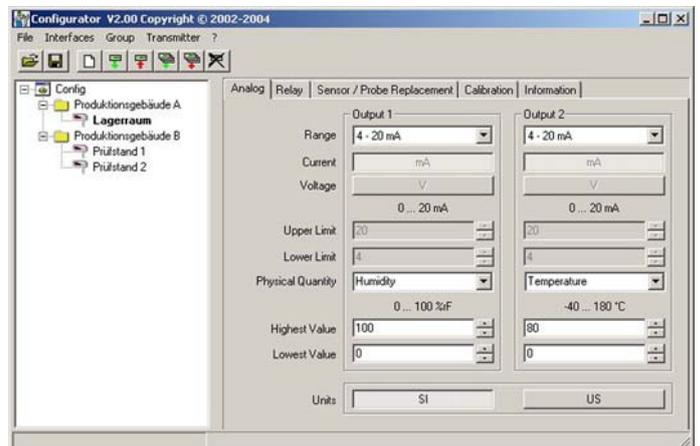
For easy configuration of both analogue outputs (accessable on front or back panel of the plug-in module).

Range: Using the drop-down input field, select either a standardized output signal (0-5V, 0-10V, 0-20mA, 4-20mA) or a user-defined current/voltage output range (upper and lower limits may be selected as required between the limits indicated).

 Note: If output signal is changed from current (I) to voltage (U) signals, jumper setting on the PCB of the plug-in module has to be changed accordingly. (see Hardware, chapter 6.4 "Circuit board")

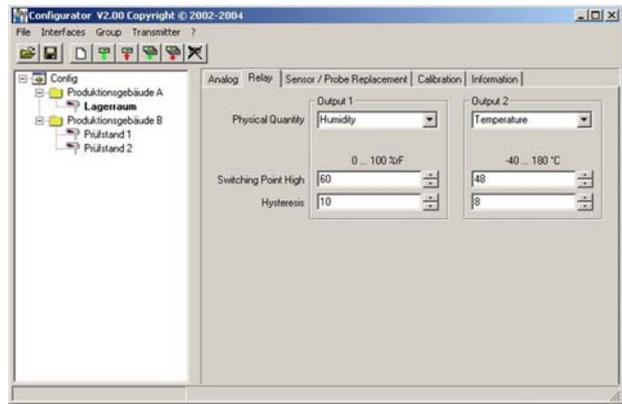Physical Quantity: Selects the output physical quantities.

Upper / Lower Limit: Sets the desired scaleing of the output. The limits must fall within the operating range indicated above.

Units: Selects between SI or US units.

Configuration software

5.2 Relais

The menue is used to configure both of the optional alarm relais.
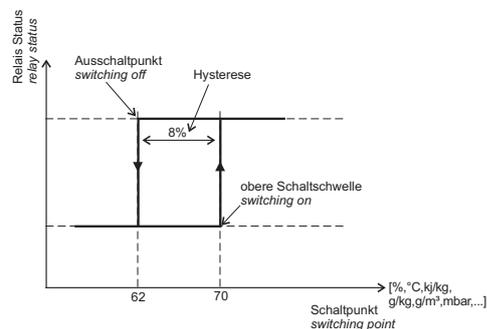
Physical Quantity: Selects the physical quantity for each alarm output.
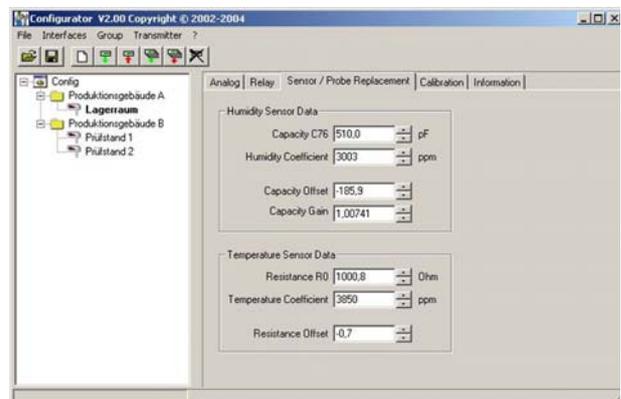
Switching Point High: Sets the high switching point.

Hysteresis: Sets the switching hysteresis that should be maintained each time the signal falls below the upper switching threshold.

5.3 Sensor / Probe Replacement

In case of sensor or probe replacement, the characteristic values for the replacement sensor/probe must be saved in the plug-in module. So the plug-in module will operate within the specified accuracy range without the need for a costly time consuming calibration process.

Replacement - Humidity Sensor:
1) Open the configuration of the selected plug-in module by clicking on the button "Read Transmitter".
2) Replace the humidity sensor by a new one (see Hardware, chapter 8.2 Sensor Replacement).
3) Enter the nominal capacity C76 and the humidity coefficient in the corresponding input fields.
4) Save the settings in the selected plug-in module by clicking on the button "Save Transmitter".

Replacement - Probe:
1) Open the configuration of the selected plug-in module by clicking on the button "Read Transmitter."
2) Replace the remote probe by a new one (see Hardware, chapter 8.1 Probe Replacement.
3) Enter the nominal capacity C76, the humidity coefficient, the offset, the gain, the resistor R0, the temperature coeffcients, and the resistor offset in the corresponding input fields.
4) Save the settings in the selected plug-in module by clicking on the button "Save Transmitter."

Configuration software
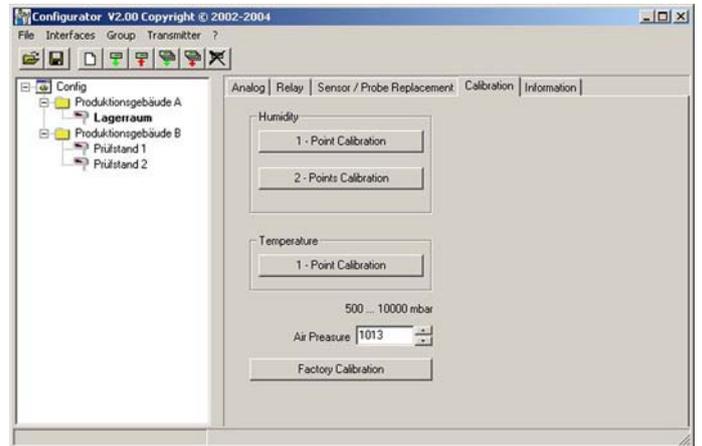
5.4   Calibration

In addition to the manual calibration procedure on the circuit board (see Hardware, chapter 7 "Humidity/Temperature Calibration"), calibration can be performed using the software as well.
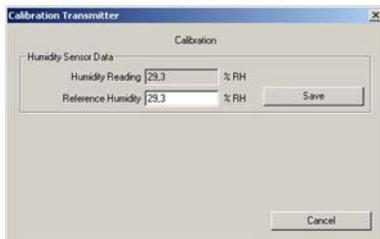
i   Note: A two-point calibration for temperature is only possible on the circuit board and is not supported by the software.

1-point calibration **Humidity**:   Fast and easy calibration for accurate measurement results at a defined working point (humidity point).

**i**   For calibration procedure see Hardware, chapter 7. "Humidity/Temperature Calibration"

1) Stabilise the probe at the desired humidity for min. 30 minutes.
2) Click on the Humidity "1-point calibration" button. The measured values will now appear in both input fields.
3) Replace the value in the input field "Humidity Reading" with the reference humidity (value of the saline solution or display of HUMOR 20).
4) By clicking on "Save", the humidity reading for the transmitter will be adjusted to the reference humidity.

<u>2-point calibration **Humidity**</u>:   Calibration for accurate results over the entire measurement range.


For calibration procedure, see Hardware, chapter 7 "Humidity/Temperature Calibration".
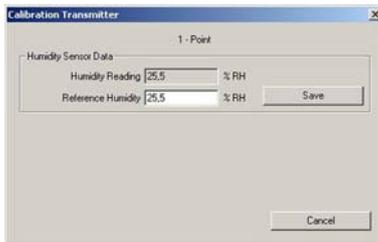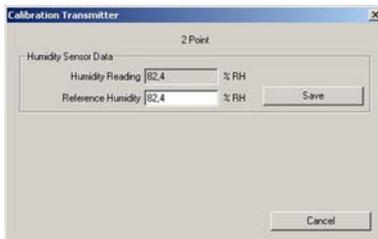

1) Place the probe at the reference humidity (lower point).
2) Click on the Humidity Two-Point Calibration button.
   (In a separate window, the measured values will appear in both input fields)
3) Replace the value in the input field "Humidity Reading" with the reference humidity. (Value of the saline solution or display of HUMOR 20)
4) By clicking on "Save", the humidity reading of the selected plug-in module will be adjusted to the reference humidity. Now the 30-minute stabilisation period starts.
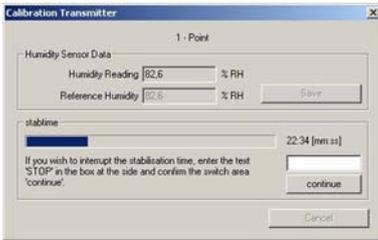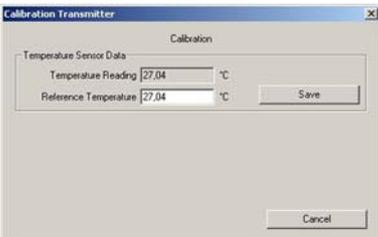

5) Place the probe at the reference humidity (high point).
6) Before continuing wait till the 30-minute stabilisation period is over.
7) Replace the value in the input field "Humidity Reading" with the reference humidity. (Value of the saline solution or display of HUMOR 20)
8) By clicking on "Save", the humidity reading of the plug-in module will be adjusted to the reference humidity.
9) The process is complete when the message "Two-point calibration successful" appears.

<u>1-point calibration **Temperature**</u>:   If the working range is limited to a narrow temperature range, one-point calibration will be sufficient within this working range.

1) Place the probe at the reference temperature and allow stabilisation for approx. 30 minutes.
2) Click on the Temperature 1-Point Calibration button.
   The measured value will appear in both input fields. (see additional window)
3) Replace the value in the input field "Temperature Reading" with the reference temperature.
4) By clicking on "Save", the temperature reading of the plug-in module will be adjusted to the reference temperature.
5) The process is complete when the message "Calibration Successful" appears.

Configuration software
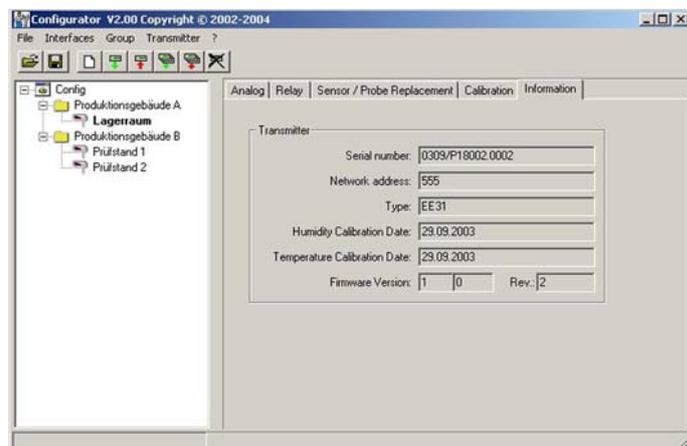
5.5   Information

Here you will find information on the selected plug-in module.

Network address: Each measuring plug-in module of HUMIMAP 20 series is assigned an unique network address at the factory for precise identification within the network.

Humidity Calibration Date: Provides information on the date of the last humidity calibration, but only when this was performed using the configuration software.

> **i**   Note:
> Manual calibration processes performed directly on the circuit board are not recorded!

Temperature Calibration Date: Provides information on the date of the last temperature calibration, but only when this was performed using the configuration software.

> **i**   Note:
> Manual calibration processes performed directly on the circuit board are not recorded here!

Productionnumber: Used to track the manufacturing data of the plug-in module.

Version / Revision: Provides information on the firm ware version implemented in the plug-in module (internal).

Configuration software

6. OVERVIEW

6.1 How to set-up a new plug-in module?

Menu "File" --> "New Workspace"
Assign a name to the file and select the location to save the file

Menu "Group" --> "New Group"
Assign and add a name, then click on "Finish"

Menu " Transmitter" --> "New Transmitter" or Button "New Transmitter"
Select the group for the plug-in module using the pull-down menu "Group."

If the plug-in module should belong to a network, then select the box "Network" and enter the network address assigned by E+E (can be found on the front panel) in the "Network Address" field.

Specify the COM port (serial interface) of the PC / Notebook in the pull-down menu "Interface".

Enter the name for the plug-in module in the "Name" field.

Complete the "New Transmitter" process by clicking on the button "Add".

6.2 How to read the configuration of a plug-in module?

The current configuration of the selected plug-in module can be read by clicking on the button "Read Transmitter" or by selecting "Transmitter" **-->** "Read Transmitter."

If the configuration is already loaded, the configuration data in the Index- index cards can be modified or adapted.

6.3 How to save the configuration in a plug-in module?

A modified configuration in the Index - index cards can be saved to the selected transmitter by clicking on the button "Save Transmitter" or by selecting "Transmitter" **-->** "Save Transmitter."

YOUR PARTNER IN SENSOR TECHNOLOGY

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