Series EE32/33

HUMIDITY/TEMPERATURE TRANSMITTER

MANUAL
Hardware and Software

YOUR PARTNER IN SENSOR TECHNOLOGY

E+E ELEKTRONIK® Ges.m.b.H.

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.
- The devices are constructed for the operation of separated extra-low voltage (SELV).

Safety instructions for use of the alarm module with voltages >50V
- To insulate the optional alarm module from the low-voltage side of the transmitter, the partition provided for this purpose must be fitted in the lower section.
- During operation of the instrument the modular housing must be completely closed.
- The protection class of an opened housing corresponds to IP00 and direct contact with components carrying dangerous voltages is therefore possible. In general, work on live components should be avoided and when absolutely necessary, should be performed by qualified personnel only.

Safety instructions for use of the integrated power supply (option V01)
- During operation of the instrument the modular housing must be completely closed.
- The protection class of an opened housing corresponds to IP00. In general, work on live components should be avoided and when absolutely necessary, should be performed by qualified personnel only.
- The bottom part and the middle part of the housing must be grounded during operation.

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 metal (aluminium, Al Si 9 Cu 3). The electronics must be collected as electronic scrap and disposed of according to the regulations in force.

2.   PRODUCT DESCRIPTION

The EE32/33 series provides all the functions of a multifunctional humidity/temperature transmitter with one major difference - it is equipped with a heated measurement cell.

The heated measurement cell contains a combined (monolithic) humidity/temperature sensor element and enables reliable long-term measurements in extremely humid or chemically polluted environments.
With a special high-pressure probe the transmitter can be used at process pressures up to 100bar (1450psi).

The operating modes of the heated measurement cell depend on the conditions. The parameters of the different operating modes are as follows:

Heat intensity:
Automatic recover: The measurement cell can be heated intensively to evaporate chemical residue or temporary condensation.
Warming: The measurement cell can be warmed slightly to prevent condensation in environments with continuous high humidity.

Heating time:
The measurement cell can either be heated briefly (the heating time can be defined in the configuration software) before returning to the ambient temperature or it can be warmed continuously.

Start of heating:
Manual: Heating is started by a control element on the PCB.

Automatic: Heating is triggered when a defined humidity set point is exceeded (configuration software).

Recurrent: Heating is recurrent and triggered after a defined cycle time (configuration software).

Distinctive models, sensing probes and mounting versions allow for the EE32/33 series to be utilized in numerous applications.

2.1   Operating modes and conditions

2.1.1 Automatic ReCover (ARC)

Chemical pollution:
When capacitive humidity sensors are exposed to chemical pollution (e.g. detergent residue), the presence of foreign molecules can distort the measurement reading.

The foreign molecules can be evaporated by heating the measurement cell briefly and intensively. Reconditioning helps to minimize distorted measurement readings during the calibration interval.

Temporary condensation:
Temporary dew (e.g. in misty environments) is identified by defining a humidity set point value (e.g. 99%) and can be evaporated by heating the measurement cell intensively for 10 seconds.

Thanks to its monolithic structure, the measurement cell cools off quickly (approx. 3 minutes) to reach once again the same humidity content as the environment.

If condensation is still detected at the end of the heating and cool-down times, the process starts again after a defined cycle time (30 minutes).

2.1.2 Overheating / Warming (OH = Overheating)

Continuous high humidity:
Even the smallest deviation between the temperature of the sensor head and the ambient temperature can cause dew on the sensor element in conditions of continuous high humidity (e.g. in mushroom drying). Dew on the humidity sensor element prevents accurate measurement of the actual humidity.

However, the EE32/33 series minimizes the relative humidity on the measurement cell through regularly warming. The relative humidity and temperature of the warmed measurement cell can be determined precisely thanks to its monolithic structure. The dew point of the environment is calculated from the measuring values.

If the relative humidity has to be determined near condensation, the ambient temperature can be measured with an additional temperature sensor to calculate the relative humidity.

2.1.3 High process pressure up to 100 bar (1450psi) / high-pressure probe (HPP = High Pressure Probe)

Thanks to the combination of the heated measurement cell with a new high-pressure probe, the transmitter can be used in applications with high process pressure and wide working range in humidity and temperature.

The special high-pressure probe's innovative pressure tight feed through sets it apart from the remote probes in other models.

Special ball valves enable assembly without interrupting the process and are available on request.

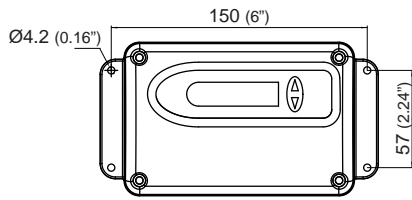## 2.2 Survey: Model / Environmental Condition / Operating mode

Order Code	Model	Environmental Conditions	ARC	OH	HPP
EE32/33-MFTA	wall mounting	temporary condensation, chemical pollution	✓		
EE32/33-MFTB	duct mounting	temporary condensation, chemical pollution	✓		
EE32/33-MFTC	remote sensing probe (up to 120°C (248°F))	temporary condensation, chemical pollution	✓		
EE32/33-MFTD	remote sensing probe	temporary condensation, chemical pollution	✓		
EE32/33-MFTE	pressure tight probe	temporary condensation, chemical pollution, process pressure up to 20bar (300psi)	✓		
EE32/33-MFTI	high pressure probe	temporary condensation, chemical pollution, process pressure up to 100bar (1450psi)	✓		✓
EE32/33-MFTJ	2 remote sensing probes	continuous high humidity, condensation (RH-measurement), process pressure up to 20bar (300psi)	✓	✓	
EE33-MFTK	remote sensing probe	continuous high humidity, condensation (Td-measurement), process pressure up to 20bar (300psi)	✓	✓	

2.3 Product Comparison EE32 - EE33

Functions	Comment	EE32	EE33
Measurement of humidity and temperature		✓	✓
Calculation h, r, dv, Tw, Td, Tf, e			✓
2 freely scaleable and configurable analogue outputs		✓	✓
On-site adjustment for relative humidity and temperature		✓	✓
LED indication of transmitter status / error diagnosis of probes		✓	✓
RS232 for transmitter configuration via PC		✓	✓
Configuration software	standard supply	✓	✓
Alternating display with MIN/MAX indication	optional	✓	✓
2 freely configurable alarm outputs	optional	✓	✓
Connectable sensing probe	optional	✓	✓
Data output via RS232 interface			✓
Data output via RS485 interface	optional		✓
RS485 für Vernetzung von bis zu 32 Geräten	optional		✓
Ethernet interface for networking and remote monitoring	optional		✓
Data logging and analysis PC software	optional		✓
ARC-Module for external triggering of sensor-heating	optional		✓

Hardware

3. MOUNTING / INSTALLATION

Drilling with round hole:

150 (6")
Ø4.2 (0.16")
57 (2.24")

Drilling with long hole:
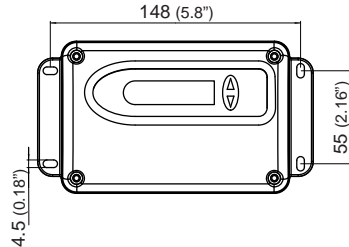
148 (5.8")
55 (2.16")
4.5 (0.18")

3.1   Model A (wall mounting)

90 (3.5")
135 (5.3")
Ø12 (0.5")

1. Drill the mounting holes according to the mounting template (see drawing at the beginning of the chapter "Drilling/Mounting Template") .
2. The bottom part of the housing is mounted with 4 screws (screw diameter: < 4.2mm (0.2") ; not included in the scope of supply).
3. Connection of the transmitter (see *Hardware, chapter 4 "Electrical connections"*).
4. Mounting of the middle part and cover with 4 screws (included in the scope of supply).

ℹ The transmitter must be mounted with the sensing probe pointing downwards!

Working range: -40...60°C (-40...140°F)
with display: -20...50°C (-4...122°F)

3.2 Model B (duct mounting)

Ø12 (0.5")
X
Ø14 (0.55")
Y
90 (3.5")
135 (5.3")

1. Drill the mounting holes according to the mounting template (see drawing at the beginning of the chapter "Drilling/Mounting Template") .
2. The bottom part of the housing is mounted with 4 screws (screw diameter: < 4.2mm (0.2") ; not included in the scope of supply).
3. Connection of the transmitter (see *Hardware, chapter 4 "Electrical connections"*).
4. Mounting of the middle part and cover with 4 screws (included in the scope of supply).

Positioning of bore holes top left to center line of the probe:
x = 28.5mm (1.1") y = 37.5mm (1.5")

ℹ The sensing probe must point horizontal or downwards in the duct.

Working range sensing probe: -40...80°C (-40...176°F)

Hardware

3.3   Model C (remote sensing probe up to 120°C (248°F))
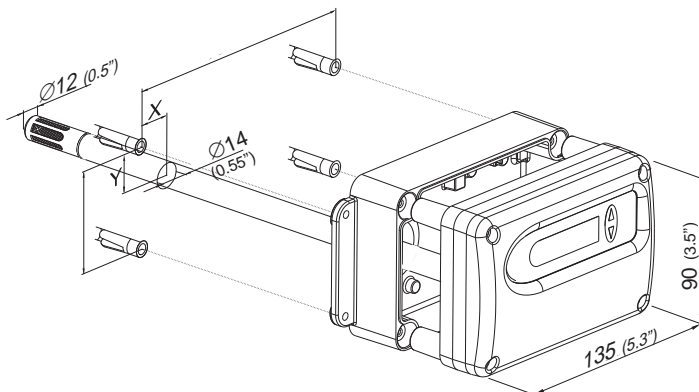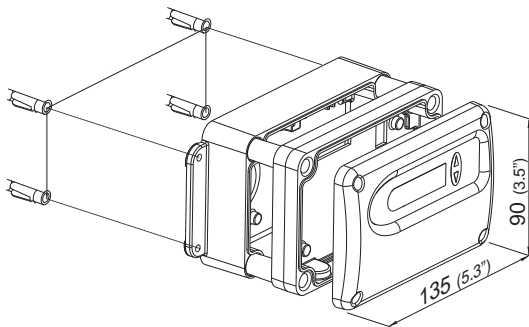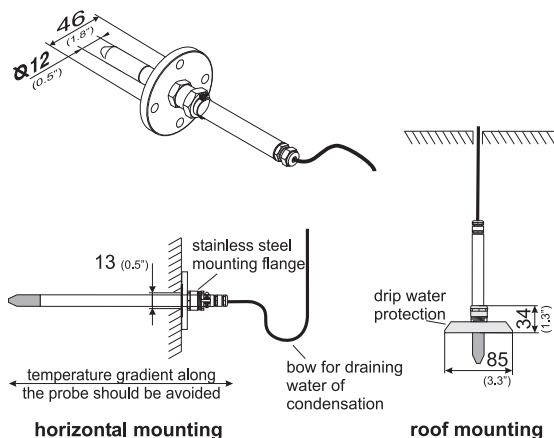
Mounting of transmitter:

1. Drill the mounting holes according to the mounting template (see drawing at the beginning of the chapter "Drilling/Mounting Template") .

2. The bottom part of the housing is mounted with 4 screws (screw diameter: < 4.2mm (0.2") ; not included in the scope of supply).

3. Connection of the transmitter (see *Hardware, chapter 4 "Electrical connections"*).

4. Mounting of the middle part and cover with 4 screws (included in the scope of supply).

Mounting of sensing probe:

stainless steel mounting flange

13 (0.5")

drip water protection

temperature gradient along the probe should be avoided

bow for draining water of condensation

34 (1.3")

85 (3.3")

horizontal mounting   **roof mounting**

Using the stainless steel mounting flange (refer to accessories) it is possible to mount the probe on the outer wall of the measuring chamber.
The depth of immersion is adjustable.
For roof installations use the drip water protection (refer to accessories) to protect the sensor head and elements against condensed water.
The sensing probe must be mounted horizontally or vertically, pointing downwards. When possible, a drip sheet should be fitted for each mounting.

Working range of sensing probe: -40...120°C (-40...248°F)

3.4   Model D (remote sensing probe)

Mounting of transmitter:

1. Drill the mounting holes according to the mounting template (see drawing at the beginning of the chapter "Drilling/Mounting Template") .

2. The bottom part of the housing is mounted with 4 screws (screw diameter: < 4.2mm (0.2") ; not included in the scope of supply).

3. Connection of the transmitter (see *Hardware, chapter 4 "Electrical connections"*).

4. Mounting of the middle part and cover with 4 screws (included in the scope of supply).

Mounting of sensing probe:

stainless steel mounting flange

13 (0.5")

drip water protection

temperature gradient along the probe should be avoided

bow for draining water of condensation

34 (1.3")

85 (3.3")

horizontal mounting   **roof mounting**

Using the stainless steel mounting flange (refer to accessories) it is possible to mount the probe on the outer wall of the measuring chamber.
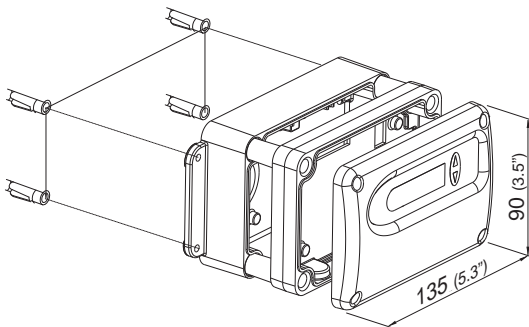The depth of immersion is adjustable.
For roof installations use the drip water protection (refer to accessories) to protect the sensor head and elements against condensed water.
The sensing probe must be mounted horizontally or vertically, pointing downwards. When possible, a drip sheet should be fitted for each mounting.

Working range of sensing probe: -40...180°C (-40...356°F)

3.5 Model E (remote sensing probe, pressure tight up to 20bar (300psi))

Mounting of transmitter:

1. Drill the mounting holes according to the mounting template (see drawing at the beginning of the chapter "Drilling/Mounting Template") .

2. The bottom part of the housing is mounted with 4 screws (screw diameter: < 4.2mm (0.2") ; not included in the scope of supply).

3. Connection of the transmitter (see *Hardware, chapter 4 "Electrical connections"*).

4. Mounting of the middle part and cover with 4 screws (included in the scope of supply).

Mounting of sensing probe:

i The sensing probe must be mounted horizontally or vertically, pointing downwards. When possible, a drip sheet should be fitted for each mounting.
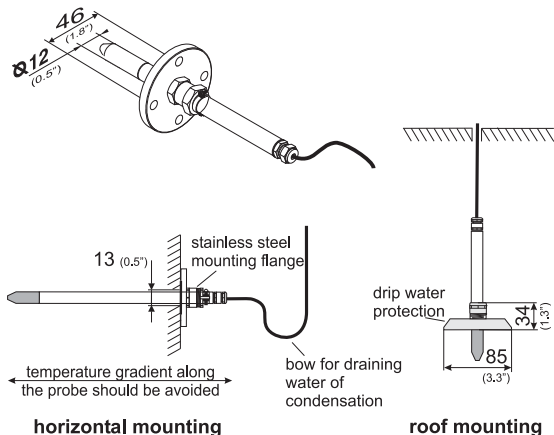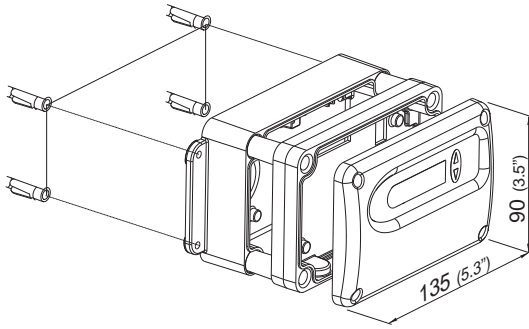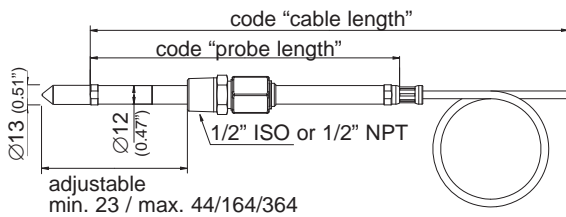
Working range sensing probe: -40...180°C (-40...356°F)
Pressure range model: 0.01...20bar (0.15...300psi)

! *General safety instructions for installation*

Because the sensing probe can be exposed to very high pressures in the measurement environment, there is the risk of sudden, unintentional expulsion of the probe during or after improper installation. Therefore, special precautions should be taken when working on the sensing probe or in its vicinity. Bending over the sensing probe should be avoided underany circumstances!

During the installation of the sensor probe, make sure that the surface of the sensing probe is not damaged! Damaging the probe could lead to damaged seals (consequence: leakage and pressure loss) and to problems during removal (jamming).

Installation of the probe directly in the process

For direct probe installation, a stop valve should be provided on both sides of the probe insert. This allows the sensor probe to be removed for maintenance and calibration without any problems.

If the sensor probe is installed in a pressure chamber, make sure that the pressure in the chamber and the ambient pressure are in equilibrium before you remove the probe.

The temperature during installation may not vary more than ±4°C (±72°F) from the operating temperature.

1st step:
Install the probe with the stop valves closed.
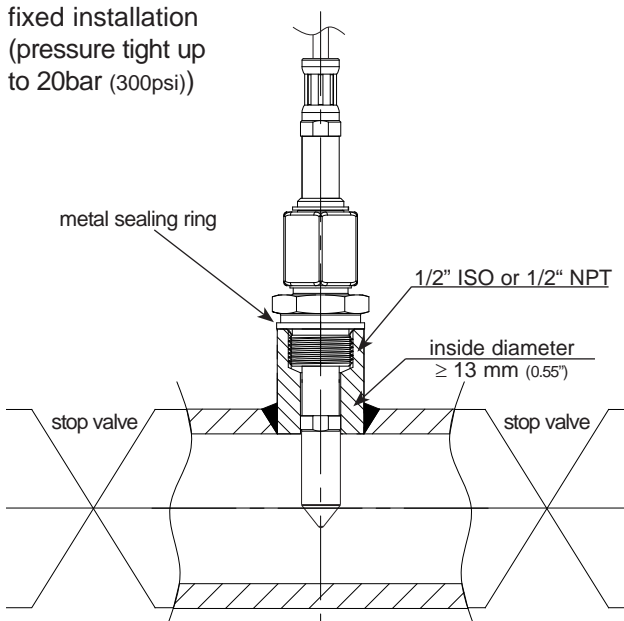
2nd step:
Insert the sensor probe into the process.

3rd step:
To ensure a secure installation of the probe, the lock nut must be tightened to a defined torque of 30 Nm.
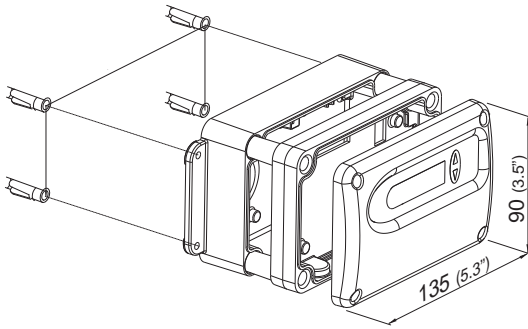If no torque-spanner is available tighten the lock nut by hand as far as possible. Continue to turn with an open-ended spanner ~50°.

fixed installation (pressure tight up to 20bar (300psi))

Hardware

3.6   Model I (remote sensing probe, pressure tight up to 100bar (1450psi))

Mounting of transmitter:

1. Drill the mounting holes according to the mounting template (see drawing at the beginning of the chapter "Drilling/Mounting Template") .

2. The bottom part of the housing is mounted with 4 screws (screw diameter: < 4.2mm (0.2") ; not included in the scope of supply).

3. Connection of the transmitter (see *Hardware, chapter 4 "Electrical connections"*).

4. Mounting of the middle part and cover with 4 screws (included in the scope of supply).

Mounting of sensing probe:

The sensing probe must be mounted horizontally or vertically, pointing downwards. When possible, a drip sheet should be fitted for each mounting.

Working range sensing probe: -40...180°C (-40...356°F)
Pressure range model I: 0...100bar (0...1450psi)

Safety Precautions for pressure tight screw connection
- Do not bleed system by loosening fitting nut or fitting plug.
- Do not make up and tighten fittings when system is pressurized.
- Always use proper thread sealants on tapered pipe threads.
- Never turn fitting body. Instead, hold fitting body and turn nut.
- Avoid unnecessary disassembly of unused fittings.

Installation instruction

Rotate the nut finger-tight.
Mark the nut at the 6 o'clock position.
While holding the fitting body steady, tighten the nut one and one-quarter turns to the 9 o'clock position.

Installation in High-Pressure Applications and High Safety-Factor Systems

1. Rotate the nut finger-tight.
2. Tighten the nut until the tuwbing will not turn by hand or move axially in the fitting.
3. Mark the nut at the 6 o'clock position.
4. While holding fitting body steady, tighten the nut one and one-quarter turns to the 9 o'clock position.
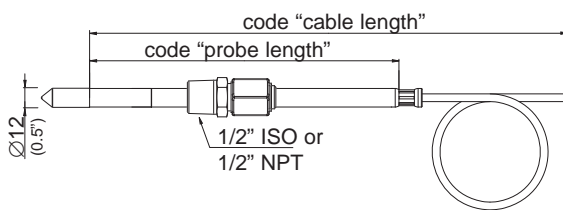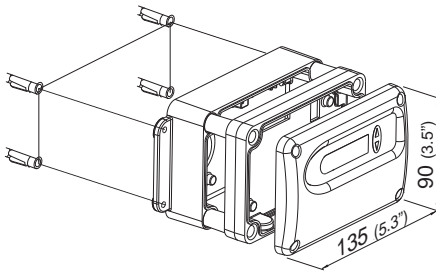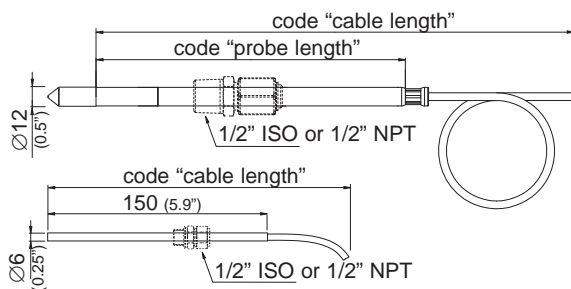
3.7 Model J (2 remote sensing probes, pressure tight up to 20bar (300psi))

Mounting of transmitter:

1. Drill the mounting holes according to the mounting template (see drawing at the beginning of the chapter "Drilling/Mounting Template") .

2. The bottom part of the housing is mounted with 4 screws (screw diameter: < 4.2mm (0.2") ; not included in the scope of supply).

3. Connection of the transmitter (see *Hardware, chapter 4 "Electrical connections"*).

4. Mounting of the middle part and cover with 4 screws (included in the scope of supply).

Mounting of sensing probe:

i The sensing probe must be mounted horizontally or vertically, pointing downwards. When possible, a drip sheet should be fitted for each mounting.

Working range sensing probe: -40...180°C (-40...356°F)
Pressure range: 0.01...20bar (0.15...300psi)

Pressure tight screw connections:

The screw connections for pressure tight installation up to 20bar (300psi) are available as accessories (see *Hardware chapter 10. "Replacement Parts/Acceccories"*). For screw assembly refer to *Hardware chapter 3.5 "Model E (remote sensing probe, pressure tight up to 20bar (300psi))"*.

i **Instructions for installation in a high-humidity environment:**

If the process temperature differs significantly from the ambient temperature, the sensing probe should be fully emerged in the process to avoid incorrect measurements and condensation problems on the sensor head due to thermal conductivity.

It is recommended not to bring the sensing probe and colder metal parts in direct contact in order to avoid condensation problems caused by thermal conductivity.

The humidity probe (12mm (1/2")) and the temperature probe (6mm (1/4")) must be mounted at the same temperature level respectively same installation height.

Mounting of sensing probe with flange (accessories):

A mounting flange 12mm (1/2") for the humidity probe and a mounting flange 6mm (1/4") for for the temperature probe are available as accessories.

Order codes:

	RH probe (12mm (1/2"))	T probe (6mm (1/4"))
flange	HA010201	HA010207

Mounting of sensing probe with screw connection (accessories):

A 1/2" ISO resp. a 1/2" NPT screw connection is available as an accessories for mounting both sensing probes (6mm (1/4") and 12mm (1/2")).

Order codes:

	RH probe (12mm (1/2"))	T probe (6mm (1/4"))
1/2" ISO	HA011102	HA011104
1/2" NPT	HA011103	HA011105

Hardware

3.8   Model K (remote sensing probe, pressure tight up to 15bar (218psi))

Mounting of transmitter:

1. Drill the mounting holes according to the mounting template (see drawing at the beginning of the chapter "Drilling/Mounting Template") .

2. The bottom part of the housing is mounted with 4 screws (screw diameter: < 4.2mm (0.2") ; not included in the scope of supply).

3. Connection of the transmitter (see *Hardware, chapter 4 "Electrical connections"*).

4. Mounting of the middle part and cover with 4 screws (included in the scope of supply).

Mounting of sensing probe:

horizontal mounting   **roof mounting**

Using the stainless steel mounting flange (refer to accessories) it is possible to mount the probe on the outer wall of the measuring chamber.
The depth of immersion is adjustable.
For roof installations use the drip water protection (refer to accessories) to protect the sensor head and elements against condensed water.
The sensing probe must be mounted horizontally or vertically, pointing downwards. When possible, a drip sheet should be fitted for each mounting.

Working range of sensing probe: -40...180°C (-40...356°F)
Pressure range: 0.01...20bar (0.15...300psi)

Pressure tight screw connection:

The screw connection for pressure tight installation up to 15bar (218psi) is available as an accessory (see *Hardware chapter 10. "Replacement Parts/Acceccories"*). For screw assembly refer to *Hardware chapter 3.5 "Model E (remote sensing probe, pressure tight up to 20bar (300psi))"*.

i   **Instructions for installation in a high-humidity environment:**

If the process temperature differs significantly from the ambient temperature, the sensing probe should be fully emerged in the process to avoid incorrect measurements and condensation problems on the sensor head due to thermal conductivity.

It is recommended not to bring the sensing probe and colder metal parts in direct contact in order to avoid condensation problems caused by thermal conductivity.
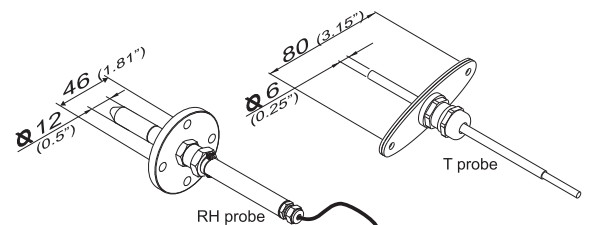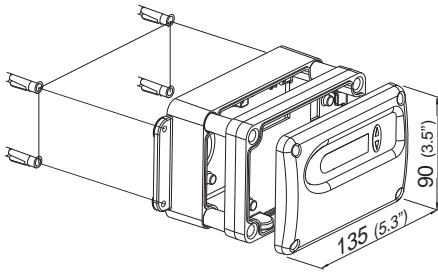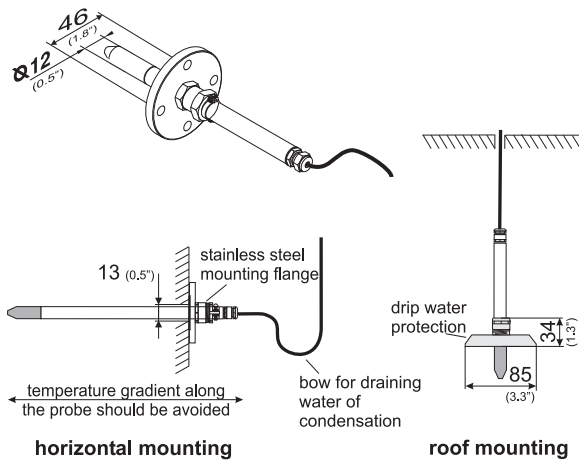
Mounting of sensing probe with flange (accessories):

A 12mm (1/2") mounting flange (HA010201) for the humidity probe is available as an accessories.

Mounting of sensing probe with screw connection (accessories):

A 1/2" ISO (HA011102) and 1/2" NPT (HA011103) screw connection for the sensing probe is available as an accessories.

4. ELECTRICAL CONNECTIONS

4.1 Connection diagram
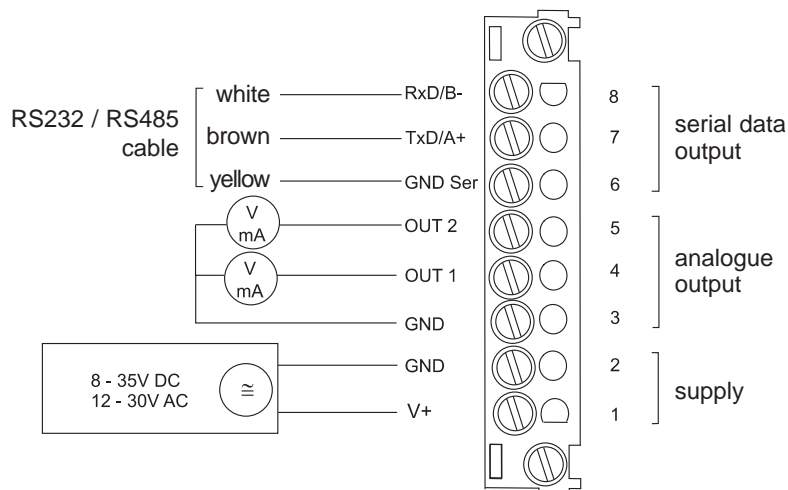
4.2 Alarm module connection diagram (option)

4.3 Connection configuration of bottom part of the housing with plug connections / 8...35V DC; 12...30V AC (option C03/C06/C07/C08)

Plug for supply and analogue output (front view)

Euro-Standard

Description:	Connection assignment:
V+	5
GND	4
GND	3
OUT1	2
OUT2	1

C03

C07
C08

Plug for RS232 resp. RS484 connection (front view)

Euro-Standard

Description:	Connection assignment:
GND-Ser	5
Rxd/B-	3
Txd/A+	1
not assigned	2, 4

C06

i The cable should be connected according to the number stamped in the plug as shown in the above drawings!

4.4 Connection configuration of bottom part of the housing with integrated power supply / 100...240V AC (option V01)

Plug for RS232 and analogue output (front view)

Euro-Standard

Description:	Connection assignment:
RxD / B-	5
TxD / A+	4
GND	3
OUT1	2
OUT2	1

Plug for 100-240V metal housing (front view)

Description:	Connection assignment:
grounding	PE
phase (L1)	1
neutral wire (N)	3

Plug for 100-240V polycarbonate housing (front view)

Description:	Connection assignment:
phase (L1)	1
neutral wire (N)	3

⚠ External diameter of supply cable: 10-12mm (0.39-0.47")
Maximum wire cross section: 1,5mm² (AWG 16)
The protection of the supply cable against excess current and short-circuit shall be in accordance with national and local codes.
Bottom and middle part of the housing shall be grounded!

Hardware

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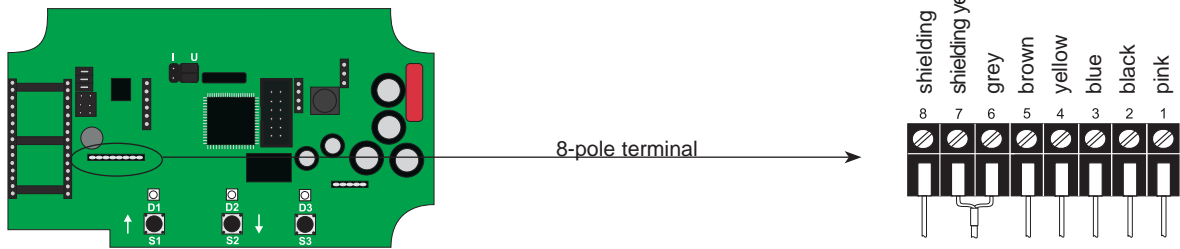## 4.5   Connection configuration of connectable sensing probe (option P03)

12mm (0.5") sensing probe:

8-pole terminal

8	7	6	5	4	3	2	1
shielding	shielding yellow/green	grey	brown	yellow	blue	black	pink

6mm (0.25") sensing probe:

5-pole terminal

5	4	3	2	1
shielding	blue	grey	black	brown
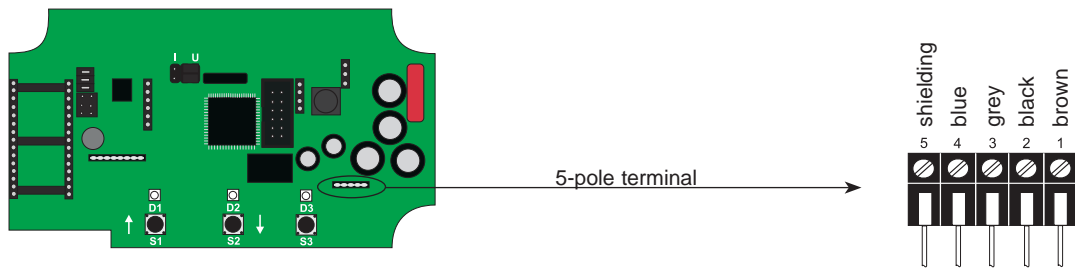
5.   OPERATING COMPONENTS

5.1   Circuit board

After removal the housing cover, the following operating components on the circuit board may be accessed.

1. current/voltage   output
2. RS232/RS485
3. fitting of the network chip
4. display
5. diagnosis LEDS
6. push-button (heated measurement cell)
7. push-buttons (calibration)
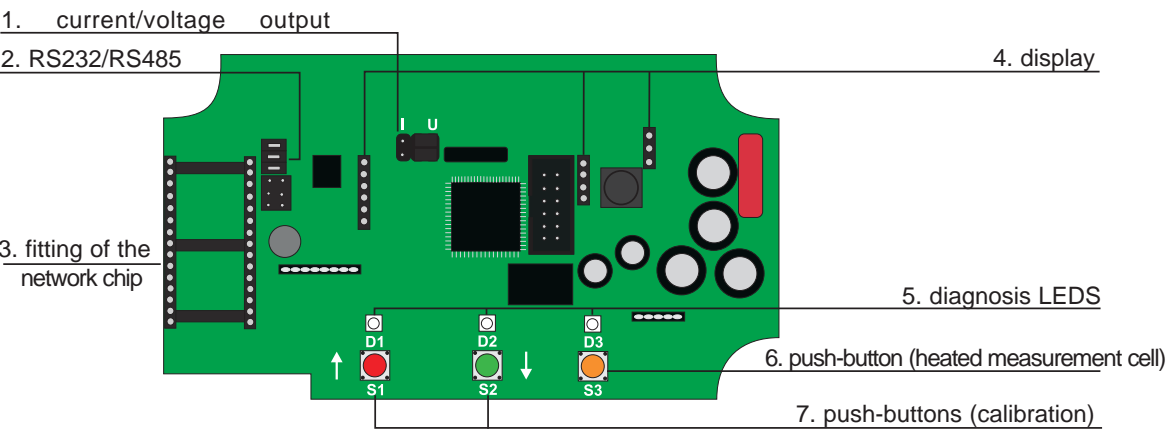
1. Current/voltage output: If the transmitter will be switched from current to voltage output signals using the configuration software supplied, then two jumpers must also be positioned as follows:

for current signal: for voltage signal:

2. RS232/RS485:   jumper set - RS232:   jumper removed - RS485:

3. Fitting of the network chip: For refitting to RS485, an IC must be used (available as an option).

⚠ The notch on the chip must match the receiver slot!

4. Display: Pinboards for connecting the display module.

5. Diagnosis LEDS: refer to *Hardware, chapter 7 "Humidity/Temperature Calibration"*
refer to *Hardware, chapter 8.4 "Self-diagnosis and error messages"*

6. Push-button (heated measurement cell):   refer to *Hardware, chapter 8.2 "Automatic ReCover (ARC)"*

7. Push-buttons (calibration):   refer to *Hardware, chapter 7 "Humidity/Temperature Calibration"*

5.2   Display module (Option)

1. Physical quantity
2. Units
3. Selection of physical quantity and
4. Min/Max function
5. Measured values
6. Status line
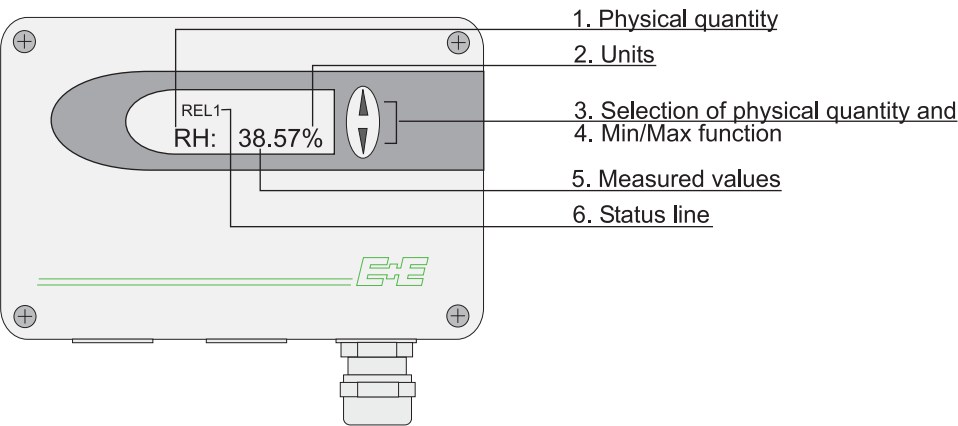
1. PHYSICAL QUANTITY:		**2. UNITS:**		**3. SELECTION OF PHYSICAL QUANTITY:**
		SI	US	
RH	Rel. humidity	%	%	EE32
T	Temperature	°C	°F	Press the Δ or ∇
e	Water vapour partial pressure	mbar	psi	button to select the
Td	Dew point temperature	°C	°F	desired physical
Tw	Wet bulb temperature	°C	°F	quantity. EE33
dv	Absolute humidity	g/m³	gr/ft³	
r	Mixture ratio	g/kg	gr/lb	
h	Enthalphy	kJ/kg	ftlbf/lb	
Tf	Frost point temperature	°C	°F	

4. MIN / MAX FUNCTION:

The MIN / MAX function saves and displays the highest and lowest measured value since the last reset resp. the last interruption of the supply voltage.
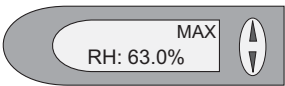
Highest measured value:
1.   Select the desired physical quantity.
2.   To display the maximum value of the selected physical quantity, press the Δ button for at   least five seconds.
3.1. To reset the transmitter to its normal operating status, press the Δ button once again for five seconds.
3.2. If 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).
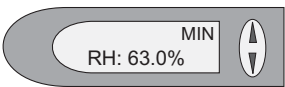
Lowest measured value:
1.   Select the desired physical quantity.
2.   To display the minimum value of the selected physical quantity, press the ∇ button for at   least five seconds.
3.1. To reset the transmitter to its normal operating status, press the ∇ button once again for five seconds.
3.2. If 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).

Hardware

5. MEASURED VALUES / MAX. MEASUREMENT RANGE:

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	EE32/33-A	EE32/33-B	EE32/33-C	EE23/33-D/E/I/J	EE33-K	unit	
Humidity	RH	0	100	100	100	100			% rF	
Temperature	T	-40 (-40)	60 (140)	80 (176)	120 (248)	180 (356)		/	°C (°F)	EE32
Dew point temperature	Td	-40 (-40)	60 (140)	80 (176)	100 (212)	100 (212)	100 (212)	°C (°F)	
Frost point temperature	Tf	-40 (-40)	0 (32)	0 (32)	0 (32)	0 (32)	0 (32)	°C (°F)	
Wet bulb temperature	Tw	0 (32)	60 (140)	80 (176)	100 (212)	100 (212)		°C (°F)	EE33
Water vapour partial pressure	e	0 (0)	200 (3)	500 (7.5)	1100 (15)	1100 (15)	/	mbar (psi)	
Mixture ratio	r	0 (0)	425 (2900)	999 (9999)	999 (9999)	999 (9999)	/	g/kg (gr/lb)	
Absolute humidity	dv	0 (0)	150 (60)	300 (120)	700 (300)	700 (300)	/	g/m³ (gr/f³)	
Specific enthalpy	h	0 (0)	400 (50000)	1000 (375000)	2800 (999999)	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 5.2 "Display module"*
CALIB LOW; CALIB HIGH: indicates the low or high humidity/temperature calibration point.
REL1 / REL2: status relay 1/ relay 2
"ERROR 01....06": see *Hardware, chapter 8.4 "Self-diagnosis and error messages"*

6. OPTIONAL MODULES

The optional modules are mounted in the lower part, that's why always only one optional module can be selected.

6.1   Alarm Module (Option)

The optional alarm module can be used for alarm and error issues and other simple control functions. This module can be configured using the configuration software supplied.
The user thus has the option of setting the physical quantity to be monitored (RH, T, Td,...) and the threshold and hysteresis for each relay. (For the procedure, see the *Configuration sofware, chapter 5.2 "Relay"*)

Max. switched voltage / max. switched current: 250 VAC / 6A
                                                                                28 VDC / 6A
Minimum load: >100mA / 12V

Switching relay 1:
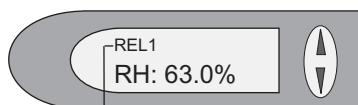
If relay 1 has tripped (ON), then REL1 is displayed.
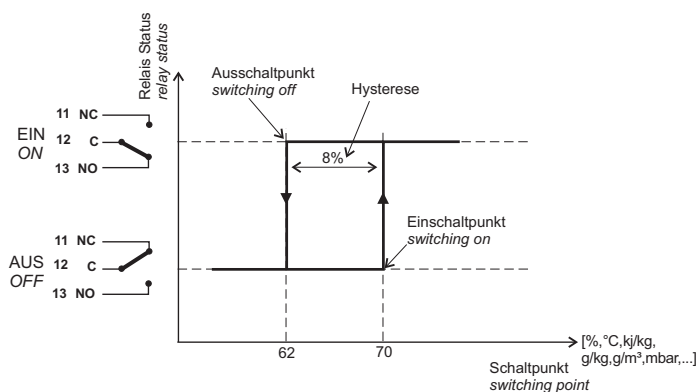
Switching relay 2:
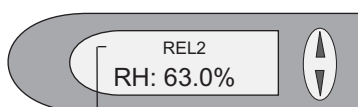
If relay 2 has tripped (ON), then REL2 is displayed.
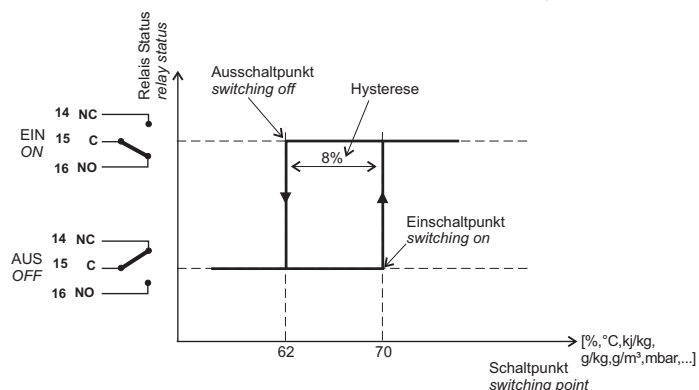
6.2 Integrated Power Supply (Option)

see Hardware, chapter 4.4 Connection configuration of bottom part of the housing with integrated power supply 100...240V AC (option V01)

6.3 Ethernet Module (Option)

see Hardware, chapter 9.2 Ethernet - Module (Option)

6.4 ARC-Module (Option)
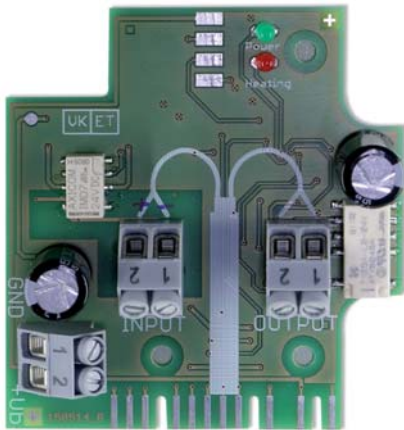
The additional printed circuit board located in the lower part of the housing offers the possibiliy to start the ARC heating function with external signal.

During the heating process the orange LED D3 flashes at the main printed circuit board. At the ARC-Module the red LED "heating" flashes and the relay contact (terminal "output") is closed.

General information of the ARC function see Hardware, chapter 2.1.1 Automatic ReCover (ARC).

For changes of the parameter of the heating process, see Software, chapter 5.5 Parameter.

6.4.1 Connection / Operating elements

Terminal „+Ub":
supply voltage: 24V AC/DC +/-20%
1 GND
2 +Ub

Terminal „Input":
1 GND
2 signal (24V DC; 10mA)

Terminal „Output":
1 REL_com
2 Rel_NO
Feedback signal to the external control.
The relay contact is closed during the heating process, otherwise opened.

Operating elements:
- LED green: LED flashes = supply voltage is switched on
- LED red: LED flashes = heating process is active

Timing of switching status
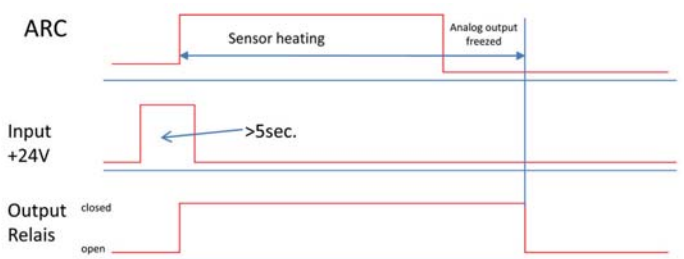
7. HUMIDITY / TEMPERATURE CALIBRATION

The EE32/33 transmitter series 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> calibration for accurate measuring results over the whole humidity/temperature working range.

ℹ️
- To reach a temperature balance it is recommended to keep the transmitter and the reference chamber (e.g. HUMOR 20,...) for minimum 4 hours in the same room.
- During stabilisation period and calibration procedure it is important to keep the temperature constant in the reference climate chamber.
- 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   2-point humidity calibration

For accurate adjustment over the whole humidity working range a 2-point calibration is recommended.

ℹ️
- 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
- 2-point calibration may be performed directly on the circuit board, or using the configuration software supplied (for more details, see *Configuration Software, chapter 5.4 "2-point humidity 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" flashes when pressing S1 or S2.

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.

high calibration point:

D2 🟢 green

S2 ▢

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

7. 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.
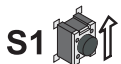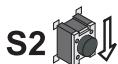
D2 🟢 green

S1 ▢

"CALIB HIGH"

8. BUTTON S1: Pressing the button for 5 seconds starts the procedure for the <u>high calibration point</u>. 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" flashes when pressing S1 or S2.

D2 🟢 flashing green

S1 ▢

D2 🟢 flashing green

S2 ▢

10. 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 HIGH" will disappear from the optional LC display.
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 HIGH" will disappear from the optional LC display.

7.2   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 (86°F)!
- Low temperature point < high temperature point
- <u>Attention:</u> A 2-point temperature calibration is not supported by the configuration software and must therefore be done directly on the circuit board! (see following page)

Hardware

2-point temperature calibration procedure on the circuit board:

low calibration point:

D1 🔴 **red**

S1 ⬛

S2 ⬛   **"CALIB LOW"**

1. Insert the sensor probe into the reference temperature 1 (<u>low calibration point</u>) and stabilise for at least 10 minutes.

2. BUTTON S1: Pressing the button for 5 seconds starts the procedure for the <u>calibration mode temperature</u>. 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 <u>low calibration point</u>. The calibration mode is indicated by the symbol "CALIB LOW" on the optional LC display.

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 0.1 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" flashes when pressing S1 or S2.

D2 🟢 **flashing green**

S1 ⬛

D2 🟢 **flashing green**

S2 ⬛

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.
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.

high calibration point:

D1 🔴 **red**

S1 ⬛

S1 ⬛   **"CALIB HIGH"**

D1 🔴 **red**

S1 ⬛⬆   **S2** ⬛⬇

6. Insert the sensor probe into the reference temperature 2 (<u>high calibration point</u>) and stabilise for at least 10 minutes.

7. BUTTON S1: Pressing the button for 5 seconds starts the procedure for the <u>calibration mode temperature</u>. 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 <u>high calibration point</u>. 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°C 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" flashes when pressing S1 or S2.

D2 🟢 **flashing green**

S1 ⬛

D2 🟢 **flashing green**

S2 ⬛

Hardware

10. 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 HIGH" will disappear from the optional LC display.
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 HIGH" will disappear from the optional LC display.

7.3   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 1-point humidity calibration may be done directly on the circuit board, or for convenience, using the configuration software supplied. (for more details, see *Configuration software, chapter 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"

D2 green

S2   "CALIB LOW"

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
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.

7.4   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.

i

- In accordance with the working range, either the high or low calibration point should be selected. (CP ≥ or < 45 degC / 113°F)

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

- The 1-point temperature calibration may be performed directly on the circuit board, or using the configuration software supplied. (for more details, see *Calibration software, chapter 5.4 "Calibration" / 1-point humidity 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 30 minutes.

D1 red

S1

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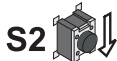
S1   "CALIB HIGH"

S2   "CALIB LOW"

3. BUTTON S1: Pressing the button for 5 seconds starts the procedure. The calibration mode is indicated by the symbol <u>"CALIB HIGH"</u> on the optional LC display (CP ≥ 45°C / 113°F).
or
BUTTON S2: Pressing the button for 5 seconds starts the procedure. The calibration mode is indicated by the symbol <u>"CALIB LOW"</u> on the optional LC display (CP < 45°C / 113°F).

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 0.1°C 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 <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" or "CALIB HIGH" will disappear from the optional LC display.
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" or "CALIB HIGH" will disappear from the optional LC display.

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

D1 short flash red

S1

D2 flashing green

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 procedure for the calibration mode RH. Pressing both buttons simultanously for 10 seconds customer calibration settings are reset to factory calibration.
A short flash of the LED "D1" indicates the reset.
or

D1 red

S1

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

D2 short flash green

S1

S2

7.6   Adjustment/Calibration EE33 model J

7.6.1   Adjustment/Calibration with humidity calibrator HUMOR 20

To be able to calibrate the transmitter of the series EE33-MFTJ, with the dual probes (Td-probe and T–probe), a separate available adapter is needed (siehe Hardware, chapter 10. replacement parts/accessories - adapter for EE33 - model J, HA020401) to achieve the highest possible calibration result. The following steps describe how the series EE33-MFTJ should be calibrated correctly.

1.   Plug both air vents of the cover of the measurement chamber with the plugs supplied with the adapter (see left picture).
2.   Insert the Td-probe (Ø12mm) in the measuring chamber through one of the feed-throughs of the cover and tighten the nut.
3.   Insert and tighten the T-probe (Ø6mm) in the adapter and insert in the measuring chamber through one of the feed-throughs of the cover and tighten the nut.
4.   In case that feed-throughs are not in use, close them with the blind plugs delivered with the cover.

i   Transmitters delivered after June 2009 have the possibility to heat the tube of the probe continuously to avoid condensation. This function must be disabled prior to calibration, by detaching the cover of the transmitter and removing the "heat"-jumper in the left top corner of the PCB
(see left picture).

5.   Connect the test unit to the supply connections of HUMOR 20.
6.   Connect the output signal of the test unit(s) to the internal measuring inputs of HUMOR 20 (Unit1 RH, Unit2 RH).
7.   Select the measuring ranges in accordance with the output signal of the test units. The temperature of the measuring chamber can be displayed by selecting "Temp." on the measuring range switch.
8.   Use the humidity controller to select the setpoint of the humidity.
9.   For information on the standard deviations and stabilisation times of the test unit, refer to the manufacturer's documentation (however, a minimum of 20 mins is recommended).
10.   Compare the values shown in the display with the output signal of the transmitter.

!   After calibration, make sure that the plugs in the air vents in the cover of the measuring chamber are removed.

7.6.2   Adjustment/Calibration with various calibrators

For an exact calibration, note especially point 4 in the above chapter.

8.   MAINTENANCE

8.1   Sensor cleaning

It is easy to clean the sensor if there are particle deposits (e.g. dust) on the surface of the heated measurement cell.

Commercially available isopropyl alcohol is used for cleaning. Unscrew the filter cap and submerge the sensor element in the alcohol for 2 minutes.
Allow the sensor element to dry or blow it dry with oil-free compressed air.

⚠️ Caution: In order to avoid destroying the active sensor coating, avoid using mechanical aids (e.g. cotton swabs or cloths) for cleaning!

8.2   Automatic ReCover (ARC)

When capacitive humidity sensors are exposed to chemical pollution (e.g. detergent residue), the presence of foreign molecules can distort the measurement reading.
The foreign molecules can be evaporated by heating the measurement cell briefly and intensively. Reconditioning helps to minimize distorted measurement readings during the calibration interval.

It is recommended to heat the measurement cell by choosing Manual after the cleaning or sterilization process or if distorted measurement readings are suspected.

To start heating, remove the housing cover and press the pushbutton S3 or trigger the ARC-module with the external signal (see Hardware, chapter 6.4 ARC-Module).
The orange LED D3 is illuminated during heating.

8.3   Fuse replacement

If the green LED on the PCB is not flashing with the supply voltage switched on, check the fuse and replace if required.

Fuse secondary: 250mA / T UL248-14
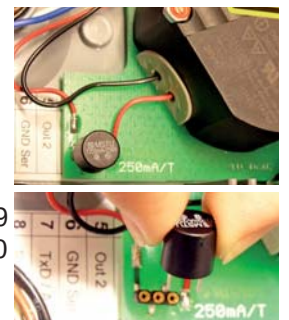Nominal voltage: 250V
Replacement types:
Series: MSTU 250   Manufacturer: Schurter   Order No.: 0034.7109
Series: 374   Manufacturer: Littelfuse   Order No.: 374 0250

8.4   Self diagnosis and error messages

Self diagnosis via LEDs on the circuit board:

- **LED D2 (green)**

  Flashing $\Rightarrow$ Supply voltage applied / Microprocessor is active

- **LED D1 (red)**

  Constantly lit $\Rightarrow$ Humidity sensor element damaged

  Flashing $\Rightarrow$ Dew (condensation) at the humidity sensor element

- **LED D3 (orange)**

  Constantly lit $\Rightarrow$ Humidity sensor element will be heated (Automatic ReCover)

  Flashing $\Rightarrow$ Sensor and threaded element soiled

Self diagnosis via display (optional):

Error 1 $\Rightarrow$ Humidity sensor element damaged
Error 2 $\Rightarrow$ Humidity sensor element moistened (condensation!)
Error 3 $\Rightarrow$ Temperature sensor element damaged
Error 4 $\Rightarrow$ Temperature sensor short-circuit
Error 5 $\Rightarrow$ Pt1000-probe element is damaged ⎤
Error 6 $\Rightarrow$ Pt1000-probe short-circuit   ⎦ EE32/33-MFTJ

Further self diagnosis:

- **Error**
  Possible cause
  $\Rightarrow$ *Measures / Help*

- **Display shows incorrect values**
  Error during re-adjustment of the transmitter
  $\Rightarrow$ *Reset to factory calibration and repeat the calibration routine*

  Filter soiled
  $\Rightarrow$ *Replace filter*

  Measuring cell contaminated
  $\Rightarrow$ *Automatic ReCover (ARC)*

  Output configured incorrectly
  $\Rightarrow$ *Check output range and output signals in the configuration*

- **Long response time**
  Filter soiled
  $\Rightarrow$ *Replace filter*

  Incorrect filter type
  $\Rightarrow$ *Filter type should match the application*

- **Transmitter failure**
  No supply voltage
  $\Rightarrow$ *Check wiring and supply voltage*
  $\Rightarrow$ Only green LED is illuminated continuously $\Rightarrow$ electronics defect $\Rightarrow$
      contact the manufacturer

- **High humidity values - red LED blinks**
  Dew (condensation) in the sensor probe head
  $\Rightarrow$ *heat the measurement cell and check the mounting of sensor probe*

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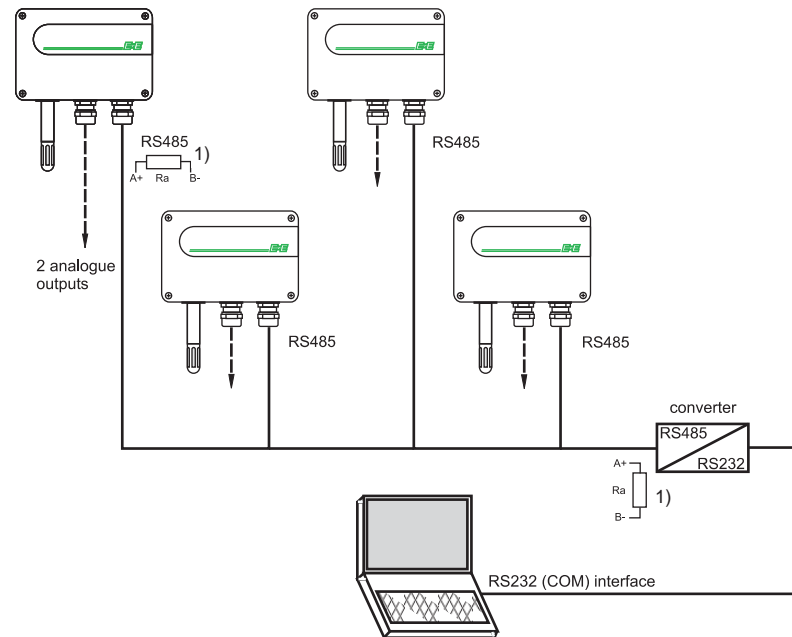
Hardware

9. NETWORK (EE33 only)

9.1 RS485 Network (option)

EE33 transmitters (additional "N" in order code) can be connected in a RS485 bus system to a single PC interface.

Using the software which is included in the scope of supply the transmitters can be configurated individually or in the entire network group.

Network configuration:

1) Note: to enable optimum expansion, both ends of the network must be terminated with a terminating resistorwith Ra 100 Ohm.

Technical Data:

- Max. network size: 32 transmitters
- Communication: with COM-Port (serial interface) of PC
- Max. network expansion: 1200m (3937ft) total length
- Transmission rate: 9600 Baud

Mounting notes:

Data cables: - external diameter < 4mm (0.16")
                  - 2-core twisted pair
                  - Typ. 50 pF/m, impedance 100 Ohm, non-shielded
                  - In accordance with the RS485 standard, cables in category 5 (UTP), specified according to EIA/TIA/ANSI 568, meet these requirements.
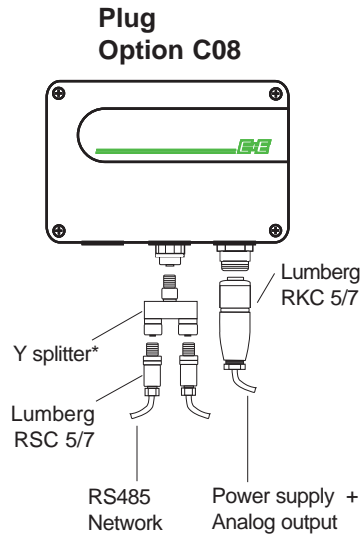
[i] For high noise emissions, especially for large cable lengths, the use of shielded cables is recommended. (Shield laid at GND Ser)

Plug connecors: To achieve a more flexible network configuration, the transmitters should be equipped with plug connectors. (Option C08)

For the network configuration, the following plug connectors are also necessary:

- Y splitter: Siemens 6ES7 194-1KA01-0XA0
- Plug: Lumberg RSC 5/7

**Plug
Option C08**

Lumberg
RKC 5/7

Y splitter*

Lumberg
RSC 5/7

RS485
Network

Power supply +
Analog output

* Siemens 6ES7 194-1KA01-0XA0

RS232/485 converter: To adapt the RS232 interface on the PC to the RS485 network protocol, a signal converter (see schematic "network configuration" Hardware, chapter 9) is required.

USB to RS232 converter: For connecting an EE32/33 transmitter to an USB-interface, following USB to R232 converter had been tested under MS Windows 2000®:

- inside out networks: edgeport/1 1 port USB to RS-232 converter

- keyspan: high speed usb serial adapter (p/n: USA-19QW)

9.2   Ethernet - Module (Option)

An additional PCB, located in the bottom part of the housing, allows the EE33-series to be connected to a standardized 10/100 MBit-Ethernet network.

The standardized interface allows to integrate the transmitters in a network. It is than possible to communicate from several remote workstations and the central administration with different transmitters.

Attention:
Use the Harting RJ Industrial IP67 Push Pull Connector - in the scope of supply - or identical types only!
It is possible that the conventional RJ45 connectors, typically used in office environments, cannot be removed from RJ Industrial IP67 bushing!

9.2.1 Electrical Connection / Operating Components

Screw Terminals:
supply voltage: 8...48VDC / 12...35VAC
1   GND / ~
2   V+ / ~

Power - LED (Red):
LED glowing = power supply on

LNK (Link) - LED (Green):
LED glowing = connection with Ethernet switch established

ACT (Active) - LED (Green):
LED flashing = data transfer active

RESET- button:
Press reset button for 3-5 seconds and the Ethernet module will be reset (the microcontroller is restarted). The LNK-LED is temporary off.

DHCP / STATIC - Jumper:
The jumper setting (DHCP / Static) determines the way the IP-address is assigned.

DHCP: IP-address will be assigned automatically by the DHCP server
STATIC: IP-address will be assigned manually by the network administrator

What is preferred / technical possible, should be discussed with the network administrator. For further details please refer to chapter "9.2.3 Ethernet-interface".

9.2.2 Technical data:

- 10/100 MBit Ethernet Interface RJ45 (Harting IP67 Push-Pull bushing)
- Cable length from transmitter to Ethernet-Switch: max. 100m
- Recommended type of cable: Harting ProfiNet Cat5-cable STP 2x2xAWG22/7
- Max. number of transmitters in a network: unlimited

9.2.3 Ethernet-interface

9.2.3.1 ComCenter

ComCenter (Communication Center) software is the communication link between the transmitter, the Ethernet-network and the existing EE33 configuration-, data logging- and visualization software.

The ComCenter provides the following functions:

Discovery tool:
ComCenter supports the detection and administration (Web-Interface) of all transmitters in the network.

Creation of virtual interfaces (Com-Ports):
ComCenter allows to assign each and every detected IP-address (e.g. transmitter) with a corresponding virtual interface (Com-Port). With MS Windows® not more than 255 virtual Com-Ports are possible!

Communication with existing software:
The created virtual Com-Ports can be addressed by the existing EE33 configuration-, data logging and visualization software, as long as the ComCenter software is running (active).

9.2.3.2 Installation of the ComCenter

- Insert Ethernet CD-Rom into your CD-ROM drive
- Choose "Install ComCenter Ethernet Software"
- Run the setup.exe
- Choose language and follow the installation wizard
- Complete installation
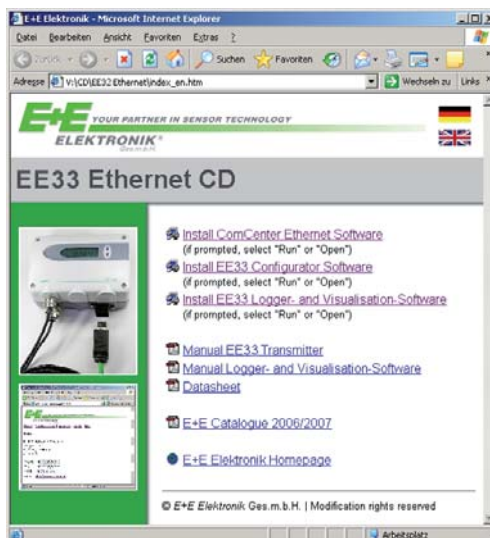
9.2.3.3 Ethernet Connection

- Connect the transmitter to the Ethernet-network using the provided Harting RJ Industrial IP67 Push Pull Connector and a standardized Ethernet Cat5-cable.
- Hook up the Ethernet module with the supply voltage (8...48VDC / 12...35VAC), Power LED glowing, LNK - LED glowing.
- Choose mode of IP-address assignment (DHCP /STATIC) by jumper setting at the Ethernet module.

DHCP:
- Change jumper setting to DHCP.
- Press reset-button for 3-5 seconds (LNK - LED temporary off).
- Ethernet module changes to DHCP - mode and requests an IP - address from the DHCP server.
- Transmitter will be detected as soon as ComCenter is active.

STATIC:
- Default jumper setting is STATIC.
- Factory settings for the transmitters are the static IP - address 192.168.0.64 with the subnet-mask 255.255.255.0
- Networking settings of the used personal computer might need to be changed in order to use same subnet-mask (255.255.255.0) as the connected transmitter.
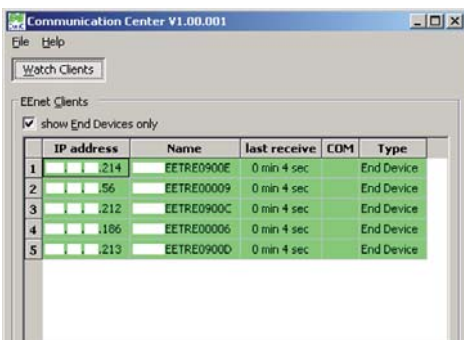
Hardware
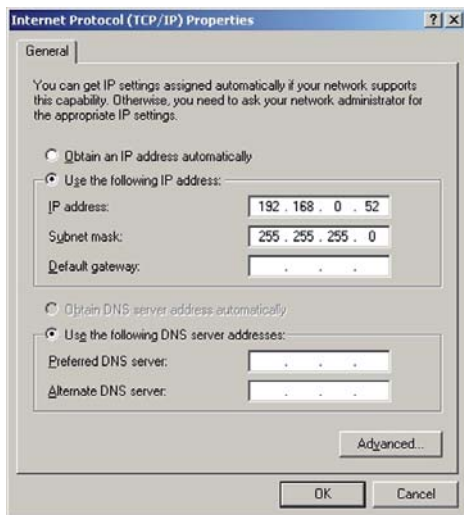
E.g. Windows XP - Start / Settings / Network Connections / Local Area Connection / General / Properties / Internet Protocol (TCP/IP) / Properties ....

> **Note:**
> In case of further questions about the assignment of IP-addresses in DHCP or STATIC mode kindly contact the network administrator. Otherwise please do not hesitate to contact E+E Elektronik for support.

9.2.3.4 Working with the ComCenter

Open ComCenter by either using the corresponding icon on the desktop or the path defined during the installation.

Check the box "show End Devices only". In the list only EE33 transmitters (End Devices) within the network will be shown.

> **Note:**
> If the box "show End Devices only" is not checked the ComCenter will show all other network devices as well (e.g. PC's).

Press the button "Watch Clients" and the time passed since the last successful communication with each network device is recorded and listed. If a network device can not be reached, it will be highlighted in red!
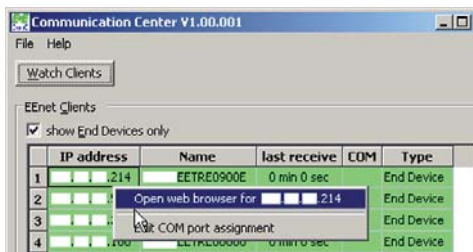
With a click of the right mouse button either the web-interface or the editor for Com-Port assignment can be selected.
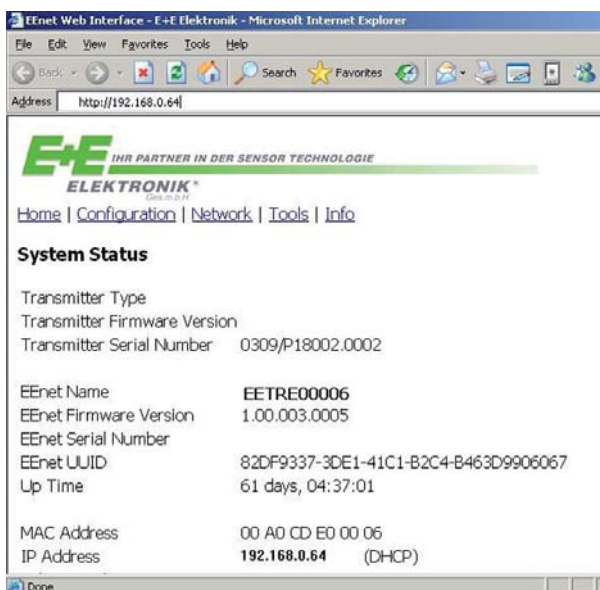
Web-Interface:

Home:
Overview of system settings

Configuration:
EENet Name: LAN name of the selected transmitter (End Device) can be defined / changed

Transmission Mode:
Transparent: fast transmission of data bytes via Ethernet (high network load)
EE33 Protocol Frames: standard setting (low network load)

IP-Address Assignment:
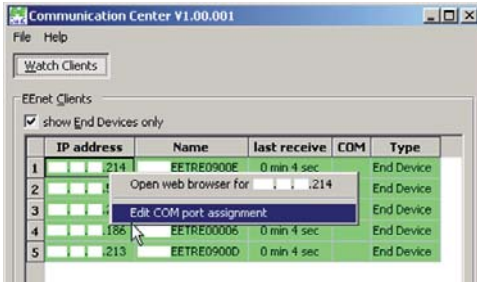STATIC: IP-address is manually assigned
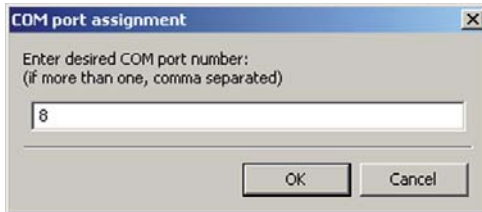DHCP: IP-address is assigned by DCHP server

Tools:
Possibility to either introduce or change the passwords for each and every transmitter (End Device)
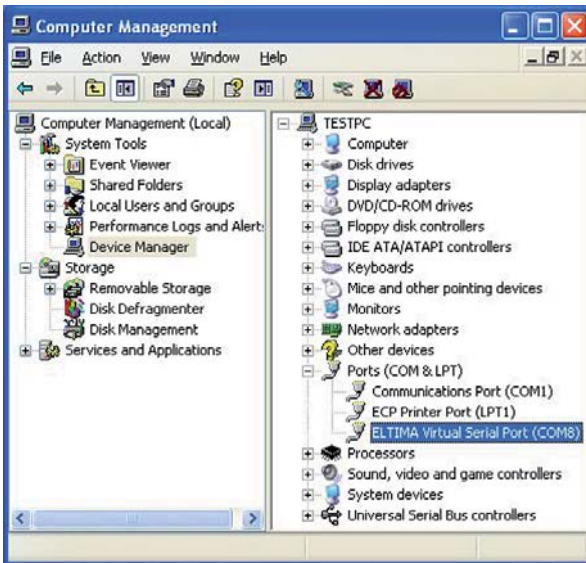
Info:
Contact address of the manufacturer

Hardware

Edit COM Port assignment

Enter a desired Com-Port number (1...255). The Com-Port number will be assigned to the corresponding IP-address.

Note:
If a number of an existing Hardware Com-Port (COM1, COM2) is entered, than this will be assigned. Otherwise a virtual Com-Port will be created.

Attention:
ComCenter needs to be active (running) as long as the virtual Com-Ports are in use!
If the ComCenter window is minimized, it will be hidden in the "System Tray" (right bottom, next to the system time), but it remains active (running)!

9.2.3.5 Communication without ComCenter

Transmitters with an Ethernet module can also be used straight without the ComCenter.
Please contact E+E Elektronik if you need information regarding the EE33 protocol for Ethernet communication.

10. REPLACEMENT PARTS / ACCESSORIES

Description	Order code
Description	**Order code**
- Filter	
- Sintered stainless steel filter	HA010103
- PTFE Filter	HA010105
- Metal grid filter	HA010106
- Display + housing cover in metal	D05M
- Interface cable for PCB	HA010304
- Interface cable for plug option C06	HA010311
- Mounting flange 12mm (1/2")	HA010201
- Mounting flange 6mm (1/4")	HA010207
- 1/2" ISO screw connection 12mm (1/2")	HA011102
- 1/2" ISO screw connection 6mm (1/4")	HA011104
- 1/2" NPT screw connection 12mm (1/2")	HA011103
- 1/2" NPT screw connection 6mm (1/4")	HA011105
- M16x1.5 => 1/2" NPT adapter for conduit fittings	HA011101
- Drip water protection	HA010503
- 1% calibration	EE90/3H
- Calibration set	HA0104xx
- RS485 Kit (HW + SW) for networking	HA010601
- Datalogging and analysis software	HA010602
- Adapter M16x1.5 to NPT 1/2	HA011101
- Radiation shield for 12mm rH-probe	HA010502
- Radiation shield for 6mm T-probe	HA010506
- HUMOR 20 adapter for EE33 - model J	HA020401

11. TECHNICAL DATA

Technical Data EE33

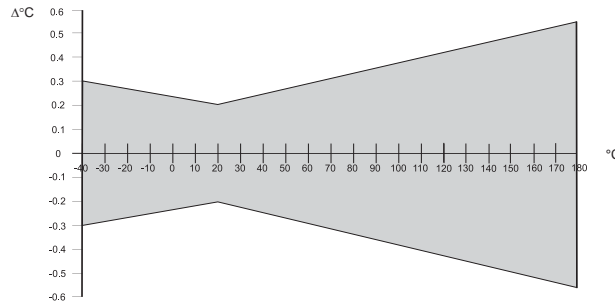### Measurement values

Relative humidity

Humidity sensor[1]	heated, monolithic measurement cell HMC1
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 (0.0055% RH/°F)
Response time with metal grid filter at 20°C (68°F) / t_{90}	< 15s

Temperature

Temperature sensor element	monolithic measurement cell HMC1

Working range sensing head
EE33-MFTA: -40...60°C (-40...140°F)   EE33-MFTB: -40...80°C (-40...176°F)
EE33-MFTC: -40...120°C (-40...248°F)   EE33-MFTD/E/I/J/K: -40...180°C (-40...356°F)

Accuracy (typ.)

Temperature dependence of electronics	typ. ± 0.005°C/°C
External temperature probe	Pt1000 (DIN A)

Outputs[2]

Two freely selectable and scaleable analogue outputs	0 - 1V	$-1mA < I_L < 1mA$
	0 - 5V	$-1mA < I_L < 1mA$
	0 - 10V	$-1mA < I_L < 1mA$
	4 - 20mA	$R_L < 500$ Ohm
	0 - 20mA	$R_L < 500$ Ohm
Digital interface	RS232	optional: RS485 or ethernet

Max. adjustable measurement range[2][3]

		from		EE33-A	EE33-B	EE33-C	EE33-D/E/I/J	EE33-K	unit	
						to				
Humidity	RH	0		100	100	100	100	/	% rF	
Temperature	T	-40 (-40)		60 (140)	80 (176)	120 (248)	180 (356)	/	°C	(°F)
Dew point temperature	Td	-40 (-40)		60 (140)	80 (176)	100 (212)	100 (212)	100 (212)	°C	(°F)
Frost point temperature	Tf	-40 (-40)		0 (32)	0 (32)	0 (32)	0 (32)	0 (32)	°C	(°F)
Wet bulb temperature	Tw	0 (32)		60 (140)	80 (176)	100 (212)	100 (212)	/	°C	(°F)
Water vapour partial pressure	e	0 (0)		200 (3)	500 (7.5)	1100 (15)	1100 (15)	/	mbar	(psi)
Mixture ratio	r	0 (0)		425 (2900)	999 (9999)	999 (9999)	999 (9999)	/	g/kg	(gr/lb)
Absolute humidity	dv	0 (0)		150 (60)	300 (120)	700 (300)	700 (300)	/	g/m³	(gr/f³)
Specific enthalpy	h	0 (0)		400 (50000)	1000 (375000)	2800 (999999)	2800 (999999)	/	kJ/kg	(lbf/lb)

General

Supply voltage	SELV 8...35V DC	SELV = Safety Extra Low Voltage
	SELV 12...30V AC	(optional 100...240V AC, 50/60Hz)
Current consumption - 2x voltage output	for 24V DC/AC: typ. 40mA / 80mA	
- 2x current output	typ. 80mA / 160mA	
Pressure range for pressure tight probe	EE33-MFTEx/Jx/Kx: 0.01...20bar (0.15...300psi)	
	EE33-MFTIx: 0...100bar (0...1450psi)	
System requirements for software	WINDOWS 2000 or later; serial interface	
Housing / protection class	Al Si 9 Cu 3 / IP65; (Nema 4)	
Cable gland	M16 x 1.5	cable Ø 4.5 - 10 mm (0.18 - 0.39")
Electrical connection	screw terminals up to max. 1.5mm² (AWG 16)	
Working and storage temperature range of electronics	-40...60°C (-40...140°F)	
	-20...50°C (-4...122°F) - housing with display	
Electromagnetic compatibility according to	EN61326-1 EN61326-2-3 ICES-003 ClassB	CE
	Industrial Environment FCC Part15 ClassB	

1) Refer to the working range of the humidity sensor.   2) Can be easily changed by software. 3) Refer to accuracies of calculated values (page 140)
*) The accuracy statement includes the uncertainty of the factory calibration with an enhancement factor k=2 (2-times standard deviation). The accuracy was calculated in accordance with EA-4/02 and with regard to GUM (Guide to the Expression of Uncertainty in Measurement).
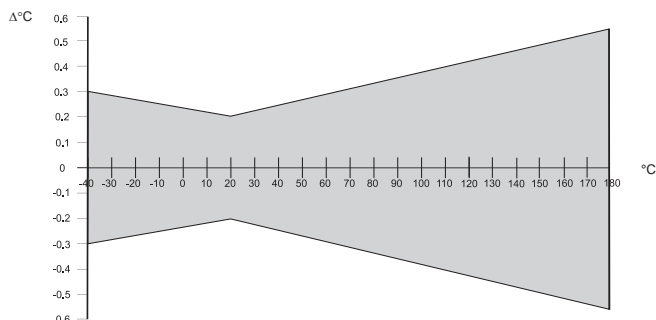
Hardware

Technical Data EE32

Measurement values
Relative humidity

Humidity sensor[1]	heated, monolithic measurement cell HMC1
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 (0.0055% RH/°F)
Response time with metal grid filter at 20°C (68°F) / t_{90}	< 15s

Temperature

Temperature sensor element	monolithic measurement cell HMC1

Working range sensing head	EE32-MFTA: -40...60°C (-40...140°F)	EE32-MFTB: -40...80°C (-40...176°F)
	EE32-MFTC: -40...120°C (-40...248°F)	EE32-MFTD/E/I/J: -40...180°C (-40...356°F)

Accuracy (typ.)

Temperature dependence of electronics	typ. ± 0.005°C/°C
External temperature probe	Pt1000 (DIN A)

Outputs [2]

Two freely selectable and scaleable analogue outputs		
	0 - 1V	-1mA < I_L < 1mA
	0 - 5V	-1mA < I_L < 1mA
	0 - 10V	-1mA < I_L < 1mA
	4 - 20mA	R_L < 500 Ohm
	0 - 20mA	R_L < 500 Ohm

Max. adjustable measurement range [2][3]

		from	to				unit
			EE32-A	EE32-B	EE32-C	EE32-D/E/I/J	
Humidity	RH	0	100	100	100	100	% RH
Temperature	T	-40 (-40)	60 (140)	80	120 (248)	180 (356)	°C

General

Supply voltage	SELV 8...35V DC	SELV = Safety Extra Low Voltage
	SELV 12...30V AC	(optional 100...240V AC, 50/60Hz)
Current consumption - 2x voltage output	for 24V DC/AC: typ. 40mA / 80mA	
- 2x current output	typ. 80mA / 160mA	
Pressure range for pressure tight probe	EE32-MFTEx/Jx: 0.01...20bar (0.15...300psi)	
	EE32-MFTIx: 0...100bar (0...1450psi)	
System requirements for software	WINDOWS 2000 or later; serial interface	
Housing / protection class	Al Si 9 Cu 3 / IP65; (Nema 4)	
Cable gland	M16 x 1.5	cable Ø 4.5 - 10 mm (0.18 - 0.39")
Electrical connection	screw terminals up to max. 1.5mm² (AWG 16)	
Working and storage temperature range of electronics	-40...60°C (-40...140°F)	
	-20...50°C (-4...122°F) - housing with display	
Electromagnetic compatibility according to	EN61326-1 EN61326-2-3 ICES-003 ClassB	CE
	Industrial Environment FCC Part15 ClassB	

1) Refer to the working range of the humidity sensor.   2) Can be easily changed by software.   3) Refer to accuracies of calculated values
*) The accuracy statement includes the uncertainty of the factory calibration with an enhancement factor k=2 (2-times standard deviation). The accuracy was calculated in accordance with EA-4/02 and with regard to GUM (Guide to the Expression of Uncertainty in Measurement).

Hardware

Technical Data for Options

Display	graphical LC display (128x32 pixels), with integrated push-buttons for selecting parameters and MIN/MAX function
Alarm outputs	2 x 1 switch contact 250V AC / 6A 28V DC / 6A threshold + hysteresis: can be adjusted with configuration software switching parameters:

freely selectable between	EE32-MFTA/B/D/E/I/J		EE32-MFTK
RH Relative humidity	✓		
T Temperature	✓		
Td Dew point temperature	✓	(EE33 only)	✓
Tf Frost point temperature	✓	(EE33 only)	✓
Tw Wet bulb temperature	✓	(EE33 only)	
e Water vapour partial pressure	✓	(EE33 only)	
r Mixture ratio	✓	(EE33 only)	
dv Absolute humidity	✓	(EE33 only)	
h Specific enthalpy	✓	(EE33 only)	

Working Range Humidity Sensor
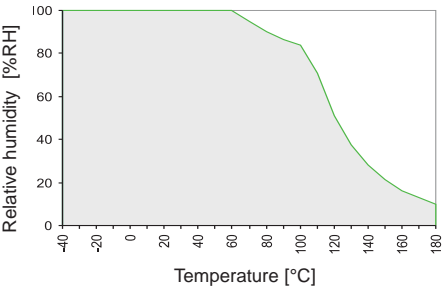
The grey area shows the allowed measurement range for the humidity sensor.

Operating points outside of this range do not lead to destruction of the sensor, 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 transmitters as well as of transmitter networks.

This software tool is included in delivery.
System requirements: MS WINDOWS 98® or higher; RS232 serial interface

2. INSTALLATION

Insert the CD-ROM supplied with the transmitter 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.

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 EE32/33 Configurator by clicking on the appropriate button and then install the upgrade.

3. ICONS ON THE TOOLS BAR

3.1 File
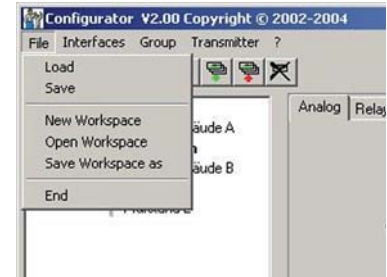
Load: Loads a file with a saved transmitter configuration.

Save: Saves the current transmitter configuration in a file.

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

Open Workspace: Opens existing trees (networks).

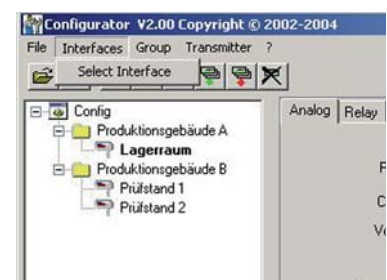**Save Workspace:**   Saves the current trees (networks) in an archive file.

Note:
The functions "Save Workspace" and "Open Workspace" apply to the tree structure only, not to the configurations of individual transmitters!
Therefore only the network structure is saved. Transmitters configurations must be reloaded using the command "Read All Transmitters."

3.2 Interfaces

Select: Selects the serial interface (COM port) for communication with the transmitters. 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

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3.3 Group
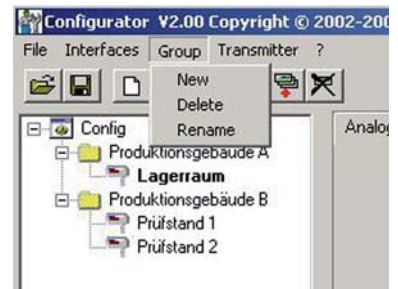
The icon "Group" provides the option of combining transmitters in groups.
A group may consist of transmitters used in the same application, for instance assigned to a building, or belonging to the same transmitter network.

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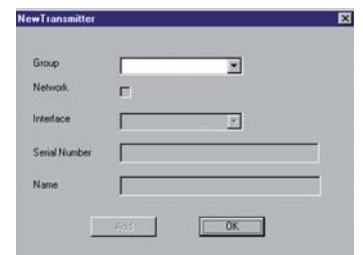
Delete: Deletes groups within a tree.

Rename: Changes the name of a transmitter group.

3.4 Transmitter
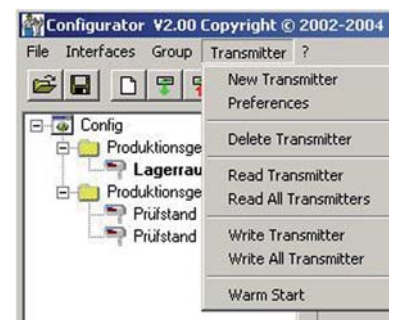
New transmitter:

A new transmitter is created in the tree.
This procedure requires the input of a number of parameters:

Group: Assigns a transmitter to a group.

Network: The check box "network" must be selected when several transmitters are opera-
ted   in a network (EE33 series).

Interface: Selects the interface for connecting the transmitter to the 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 the EE33 transmitter for unique assignment within

                          the network (see label on the transmitter housing).

Name: Assigns a meaningful name coresponding to the transmitter. This name is
                          displayed in the tree under the relevant group (e.g.: Clean Room).

Configuration software

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

Delete transmitter: Deletes from the tree structure the selected transmitters, or the selected groups.

Read: Reads and displays the configuration parameters of the selected transmitter.

Read All: Reads the configuration for all transmitters.

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

Write: Writes the current configuration into the selected transmitter.

Write All: Writes the current configuration to all selected transmitters.

i Set the configuration for a transmitter, then select the appropriate network in the tree 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 transmitter.

3.5 ? - Information

Version: Displays the version number of the EE32/33 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
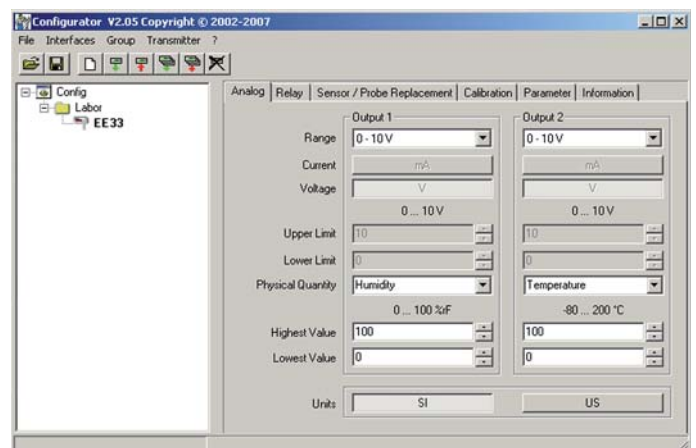
For easy configuration of both analogue outputs.

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).

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   Relay
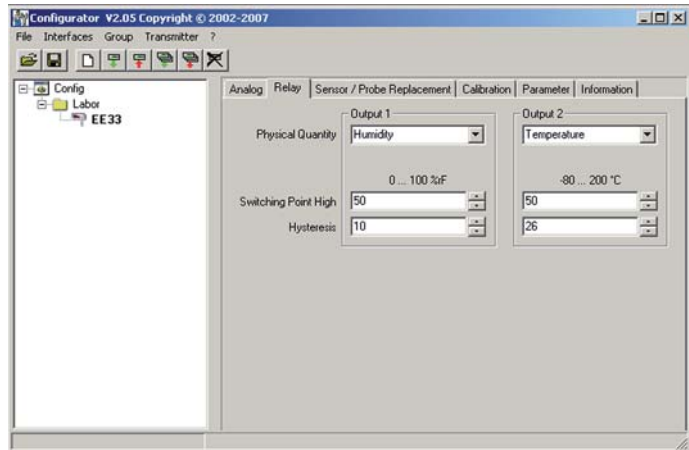
It is used to set both optional alarm outputs.

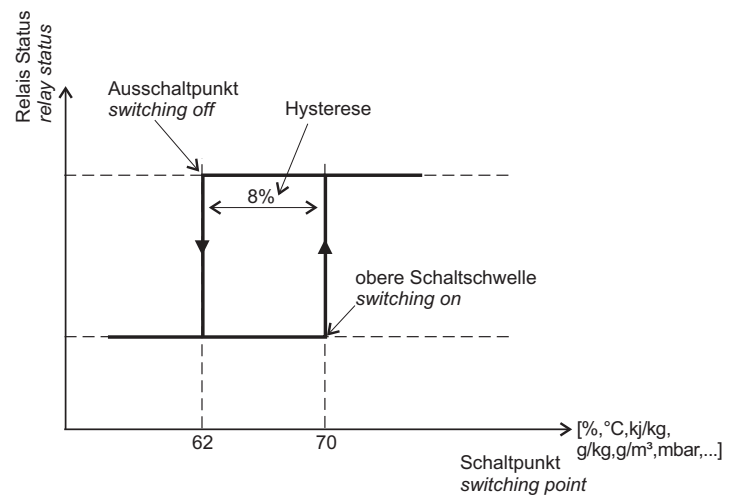Physical Quantity: Selects the physical quantity for each alarm output.

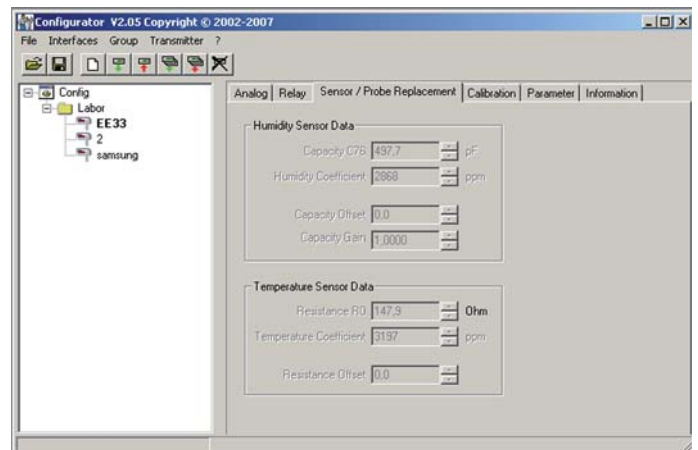Switching Point High: Sets the high switching point.

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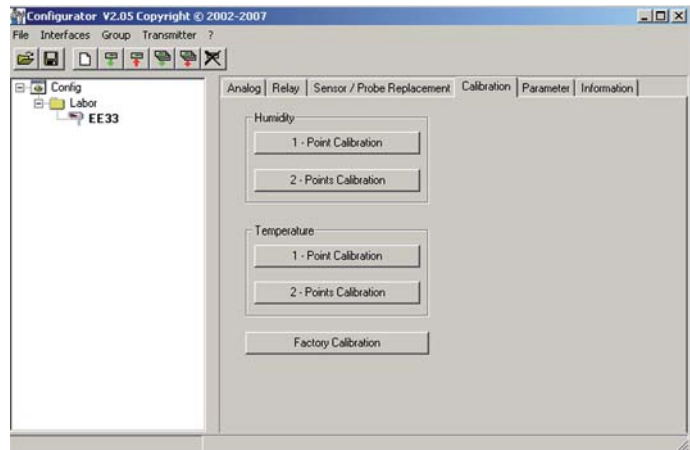   below the upper switching threshold.

5.3 Sensor / Probe Replacement

The possibility of a sensor / probe replacement is not implemented at this moment in time.

5.4 Calibration

Hardware,

In addition to the manual calibration procedure on the circuit board (see *chapter 7 "Humidity/Temperature Calibration"*), new calibrations can be performed using the EE32/33 software.

1-point calibration **Humidity**:

Fast and easy calibration for accurate measurement results at a defined humidity working point (e.g: 40...60% RH => 1 point calibration at 50% RH).

[i]

For calibration procedure see *Hardware, chapter 7. "Humidity/Temperature Calibration"*
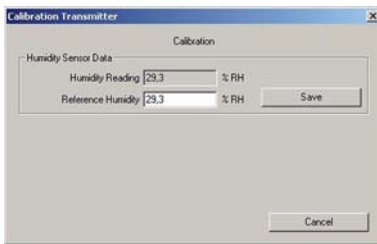
1) Stabilise the probe of the desired humidity for min. 30 minutes.
2) Click on the Humidity "1-point calibration" button. The measured values will now appear in both input fields.
3) Replace the value in the input field "Humidity Reading" with the reference humidity (value of the saline solution or display of HUMOR 20).
4) By clicking on "Save", the humidity reading for the transmitter will be adjusted to the reference humidity.
5) The process is complete when the message "Calibration Successful" appears.

Configuration software

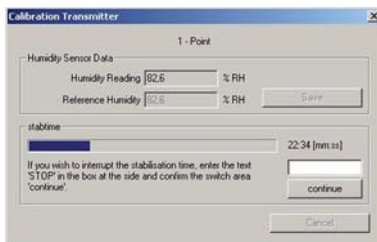2-point calibration **Humidity**: Calibration for accurate results over the entire measurement range.
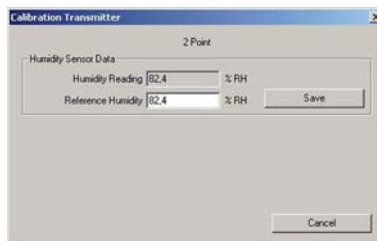
| **i** | For calibration procedure, see *Hardware, chapter 7 "Humidity/Temperature Calibration"*. |
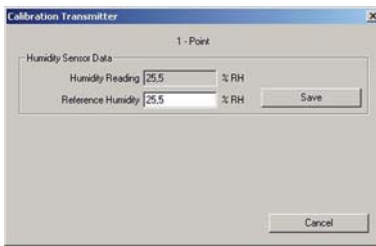
1) Place the probe at the reference humidity (lower point).
2) Click on the "Humidity Two-Point Calibration" button.
   (In a separate window, the measured values will appear in both input fields)
3) Replace the value in the input field "Humidity Reading" with the reference humidity. (Value of the saline solution or display of HUMOR 20)
4) By clicking on "Save", the humidity reading of the transmitter will be adjusted to the reference humidity. Now the 30-minute stabilisation period starts.
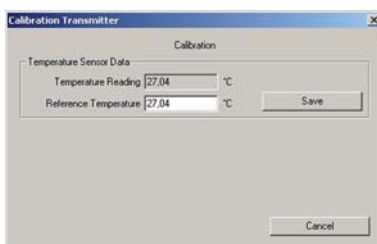
5) Place the probe at the reference humidity (high point).
6) Before starting the calibration, wait untill the 30 minutes stabilisation period is over.
7) Replace the value in the input field "Humidity Reading" with the reference humidity. (Value of the saline solution or display of HUMOR 20)
8) By clicking on "Save", the humidity reading of the transmitter will be adjusted to the reference humidity.
9) The process is complete when the message "Two-point calibration successful" appears.

1-point calibration **Temperature**: If the working range is limited to a narrow temperature range, 1-point calibration will be sufficient within this working range.
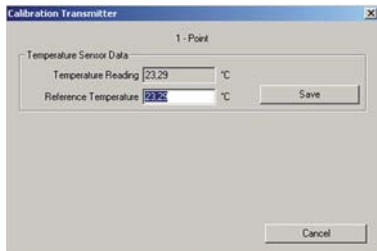
1) Place the probe at the reference temperature and allow stabilisation for approx. 30 minutes.
2) Click on the "Temperature 1-Point Calibration" button.
   The measured value will appear in both input fields. (see additional window)
3) Replace the value in the input field "Temperature Reading" with the reference temperature.
4) By clicking on "Save", the temperature reading of the transmitter will be adjusted to the reference temperature.
5) The process is complete when the message "Calibration Successful" appears.

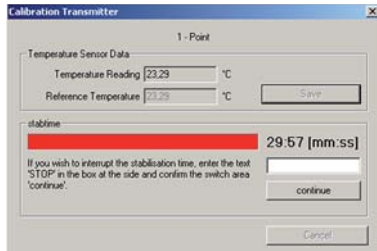2-point calibration **Temperature**: Calibration for accurate results over the entire measurement range.

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

1) Place the probe at the reference temperature and allow stabilisation for approx. 30 minutes (lower point).
2) Click on the "Temperature 2-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 transmitter will be adjusted to the reference temperature.

Now the 30-minute stabilisation period starts.

5) Place the probe at the reference temperature (high point).
6) Before starting the calibration, wait untill the 30 minutes stabilisation period is over.
7) Replace the value in the input field "Temperature Reading" with the reference temperature.
8) By clicking on "Save", the temperature reading of the transmitter will be adjusted to the reference temperature.
9) The process is complete when the message "Two-point calibration successful" appears.
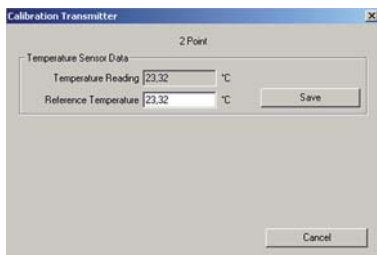
Factory Calibration:

With the button "factory calibration" the parameters of the humidity and temperature measurement can be reset to factory calibration after a successful customer calibration / adjustment.

Configuration software

5.5   Parameter

Air pressure:

If a transmitter of the EE32/33 series is operated far above sea level or a measurement is required at high process pressure, the prevailing ambient pressure can be entered to increase the accuracy of the derived values / computing functions.

Automatic ReCover (ARC):

These input fields define the main heating parameters.
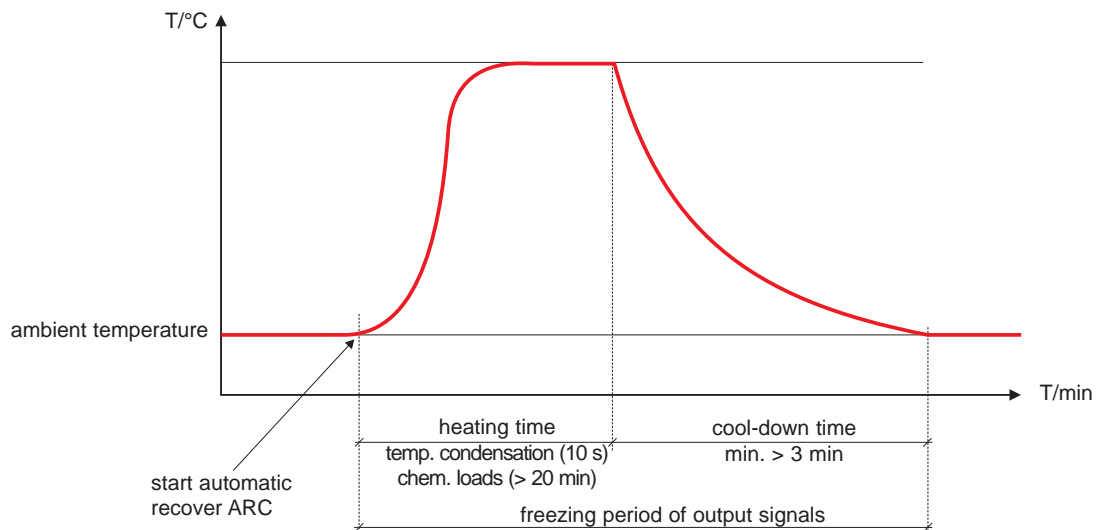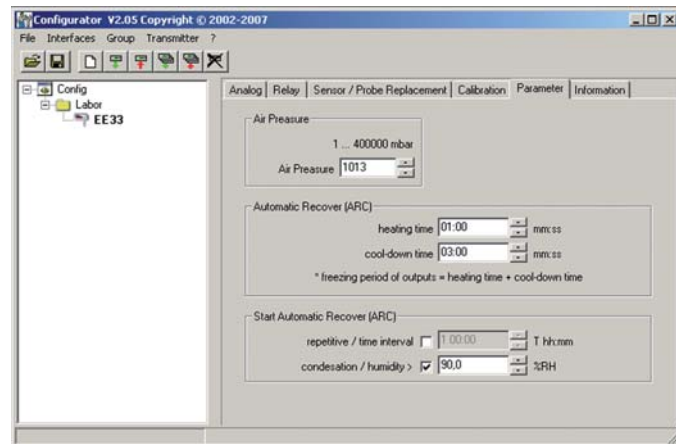
Heating time:

Defines the time in which the monolithic measurement cell is intensively heated. A heating time of at least 20 minutes is recommended if chemical pollution has led to the presence of foreign molecules. A simple evaporation of temporary condensation, the default heating time of 10 seconds is sufficient.

Cool-down time:

The cool-down time is the length of time the monolithic measurement cell is allowed to cool back down to the ambient temperature. The cool-down time should be >3 min. in order to prevent measurement errors.

Freezing period of outputs = heating time + cool-down time:

During the complete heating and cool-down process, the 2 analog outputs are frozen. In other words, the measuring values at the analog outputs are kept constant during the freezing period.

i **Note:** If the defined cool-down time is too short, the measurements may be incorrect.


Configuration software

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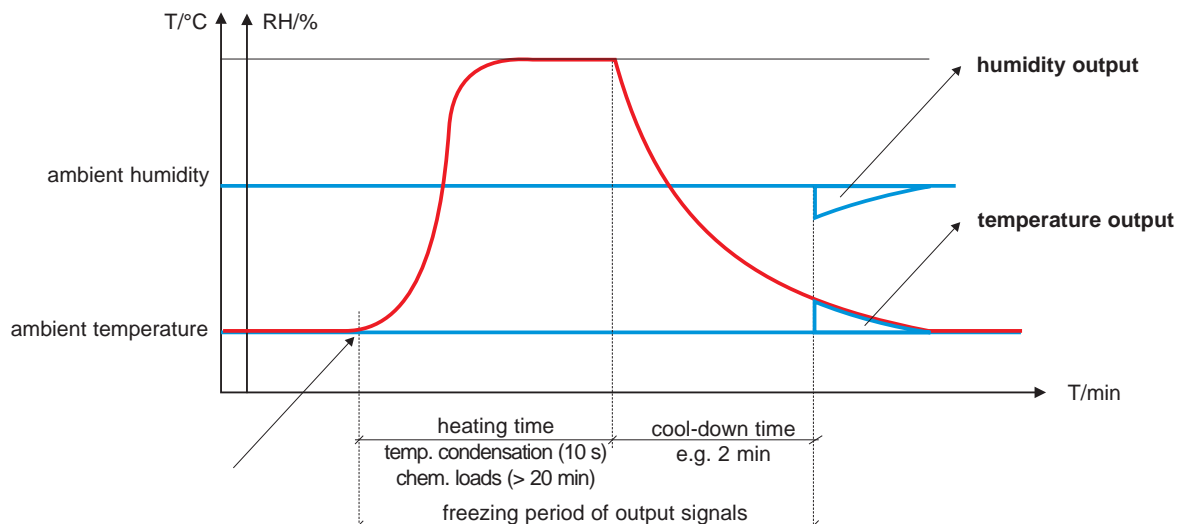
<u>Start Automatic Recover (ARC):</u> Heating can be started/triggered by various events.

Manual: Heating is started by choosing the S3 pushbutton on the PCB. A request should be made e.g. after chemical pollution (cleaning/sterilization) or when the measurement readings deviate significantly from comparable measurements.

External signal: To start the heating with external triggering, an (optional) ARC-module is required, see chapter Hardware 6.4.

Repetitive/time interval: A cycle time can be defined when the checkbox is flagged. Heating is started automatically and recurrent at the end of the cycle time.
Periodic heating can be used to minimize any drifting of conventional capacitive humidity sensors caused by chemical pollution in applications.
The ideal cycle time depends on the type of pollution and its concentration and has to be determined empirically.
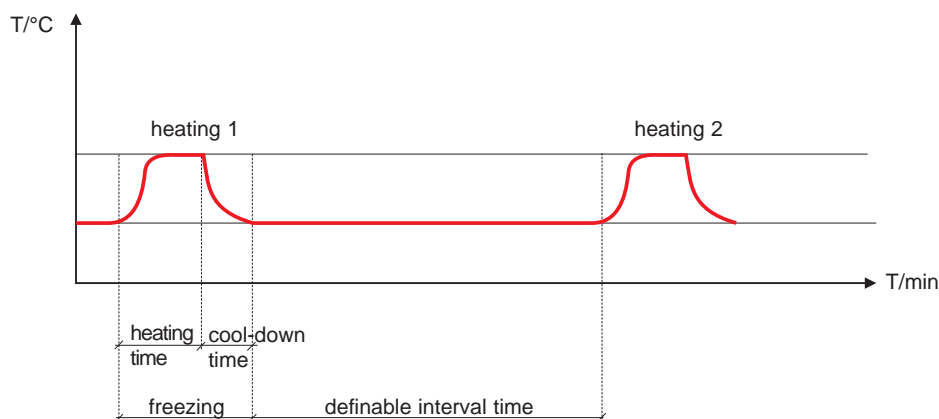
Condensation/humidity: If the checkbox is flagged, a humidity set point > 90% RH (indicator for temporary condensation / dew) can be defined.
If the set point is exceeded, heating is started automatically.
Heating is automatically limited to 10 seconds. This time interval is sufficient to evaporate temporary condensation/dew.
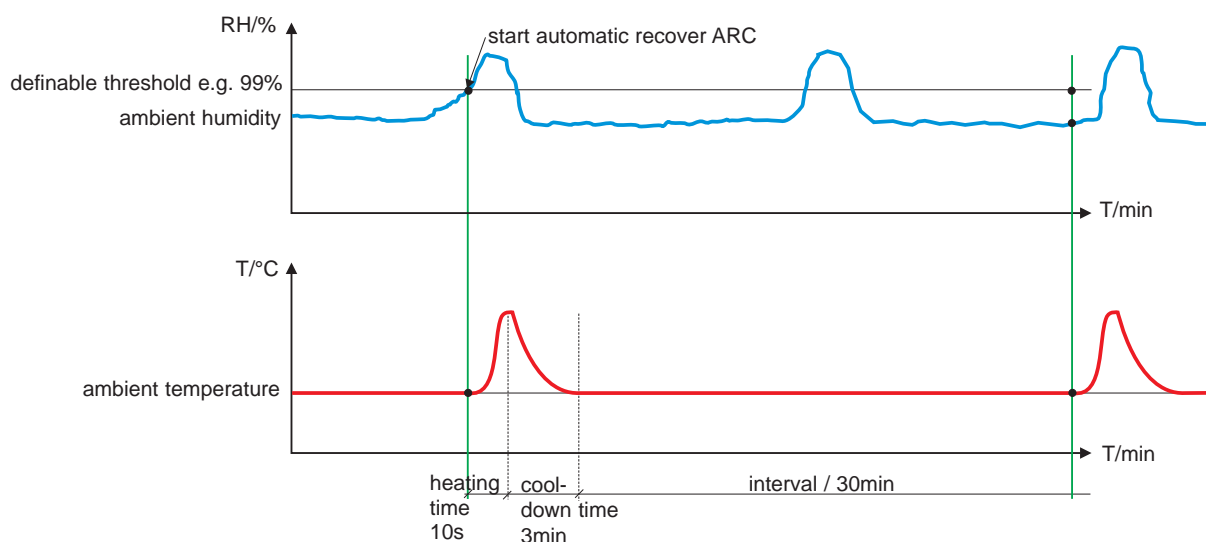

Note: When heating has ended, the system blocks any subsequent heating for 30 minutes. In other words, if the ambient humidity remains above the defined set point after the initial heating, heating only begins again after 30 minutes.

This ensures that the transmitter once again displays measuring values that accurately reflect the humidity level of the environment no longer than approx. 3 minutes after temporary condensation.

Configuration software

5.5   Information

Here you will find
information on the
selected transmitter.
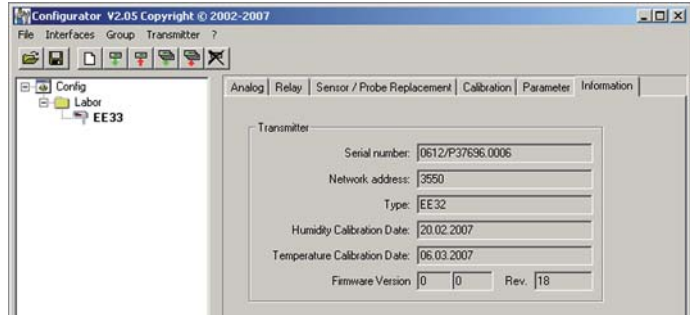
Network address:	Each measuring transmitter is assigned a unique network address at the factory for precise identification within the network.
Type:	Specifies the transmitter series.
Humidity Calibration Date:	Provides information on the date of the last humidity calibration, but only where this was 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 where 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 transmitter.
Version / Revision:	Provides information on the software version implemented in the transmitter (internal).

6.   OVERVIEW

6.1   How to set-up a new transmitter?

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 transmitter using the pull-down menu "Group."

If the transmitter is from the EE33 series and will belong to a transmitter network, then select the box "Network" and enter the network address assigned by E+E (can be found on the housing label) 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 transmitter in the "Name" field.

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

6.2   How to read the configuration of a transmitter?

The current configuration of the selected transmitter 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 transmitter?

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."

Configuration software

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