Serie EE99-1

FEUCHTE / TEMPERATUR MESSUMFORMER

HUMIDITY / TEMPERATURE TRANSMITTER

TRANSMETTEUR DE MESURE D'HUMIDITE / DE TEMPERATURE

MANUAL

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USA

FCC Hinweis:

Dieses Gerät ist geprüft worden und stimmt mit den Bedingungen für ein Gerät der Kategorie B gemäß Teil 15 der FCC Richtlinien überein. Diese Bedingungen sind erstellt worden um einen angemessenen Schutz gegen EMV Störungen in einem Wohnbereich sicherzustellen. Dieses Gerät erzeugt, verbraucht und kann Hochfrequenzenergie ausstrahlen. Wenn es nicht in Übereinstimmung mit der Bedienungsanleitung installiert und verwendet wird, können EMV Störungen zu den Funkverbindungen verursacht werden. Jedoch gibt es keine Garantie, dass EM Störungen nicht in einer bestimmten Installation auftreten können. Wenn das Gerät EMV Störungen zum Radio oder Fernsehempfang verursacht (das kann festgestellt werden indem man das Gerät ein- und ausschaltet), wird dem Benutzer empfohlen die EMV Störungen durch folgende Maßnahmen zu beheben:

- Stellen Sie die Antenne neu ein oder verlagern Sie die empfangende Antenne.
- Erhöhen Sie den Abstand zwischen dem Gerät und dem Empfänger.
- Schließen Sie das Gerät an einem anderen Stromkreis als den Empfänger an.
- Fragen Sie den Händler oder einen erfahrenen Radio/TV Techniker.

Vorsicht:

Änderungen am Gerät die nicht ausdrücklich durch einen EMV Beauftragten genehmigt sind können dazu führen, dass der Betreiber das Gerät nicht mehr gebrauchen darf.

KANADA

ICES-003 Bescheid:

Dieses Gerät der Kategorie B entspricht der kanadischen Norm ICES-003.

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.

USA

FCC notice:

Cet équipement a été testé et homologué " appareil numérique de classe B ", conformément au chapitre 15 des règlements FCC. Les limites correspondantes sont conçues pour fournir une protection acceptable contre les interférences nuisibles au sein d'une installation résidentielle. Cet équipement génère, utilise et peut émettre une énergie haute fréquence et, s'il n'est pas installé et utilisé conformément aux instructions du manuel d'installation, il peut causer des interférences nuisibles aux radiocommunications. Cependant, l'absence d'interférences n'est pas garantie pour une installation particulière. Si cet équipement cause des interférences nuisibles à la radio- ou télé- réception, pouvant être décelées en éteignant puis rallumant l'appareil, l'utilisateur doit tenter de résoudre ce problème en appliquant l'une ou plusieurs des mesures suivantes :

- Réorienter ou repositionner l'antenne réceptrice.
- Augmenter l'éloignement entre l'équipement et le récepteur.
- Connecter l'équipement à une prise de courant située sur un autre circuit que celui où est connecté le récepteur.
- Consulter le fournisseur ou un technicien radio/TV expérimenté, afin d'obtenir une assistance.

Avertissement :

Tout changement ou modification, non expressément approuvé par la partie responsable de la conformité, peut annuler l'autorisation de l'utilisateur à utiliser cet appareil.

CANADA

Notification NMB-003 :

Cet appareil numérique de classe B est conforme à la norme canadienne NMB-003.

INHALTSVERZEICHNIS

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SOMMAIRE

1. GENERAL

The manual is a part of the scope of supply and serves to ensure proper handling and optimum functioning of the instrument.
E+E Elektronik® Ges.m.b.H. doesn't accept warranty and liability claims neither upon this publication nor in case of improper treatment of the described products.
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.

The document may contain technical inaccuracies and typographical errors. The content will be revised on a regular basis. These changes will be implemented in later versions. The described products can be improved and changed at any time without prior notice.

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 followed to achieve optimum functioning of the equipment.

1.2 Safety instructions

General safety instructions

- Extreme mechanical stress and improper use must be avoided.
- Be careful when removing the filter cap to avoid damage of the sensor element.
- The sensor is an Electro Static Discharge sensitive component (ESD). When touching the sensor element, ESD protective measures should be followed.
- Hold the sensor on its connection wires only.
- Installation, electrical connection, maintenance and start-up procedures should be executed by qualified technical personel only.

Safety instructions for using the alarm output module with voltages >50V

- For the separation of the alarm output module from the connecting terminals the therefor designated partition must be mounted in the bottom.
- During operation the housing of transmitter must be closed.
- Work on live parts is to be omitted basically and may only be executed by trained personnel. The protection class of the opened housing is IP00. Components with dangerous voltages can be touched directly.

2. PRODUCT DESRCRIPTION

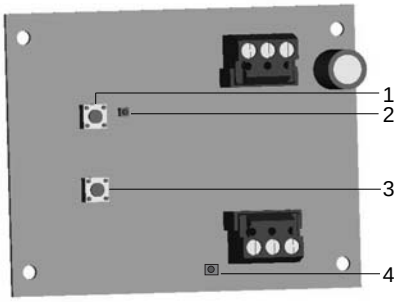
The EE99-1 transmitter series stands for multifunctionality, highest accuracy, easy mounting and service.

The EE99-1 can be employed in all common applications by choosing the appropriate housing combination.

Working temperature range of remote sensing probe is -50...180°C (-58...356°F).

The construction of the transmitter enables field calibration and local loop calibration in a simple way.

2.1 Operating elements



1...PUSHBUTTON S2: - for 1 point humidity calibration (humidity < 50%RH)
- for 2 point humidity calibration (low calibration point)
- for exit the calibration mode

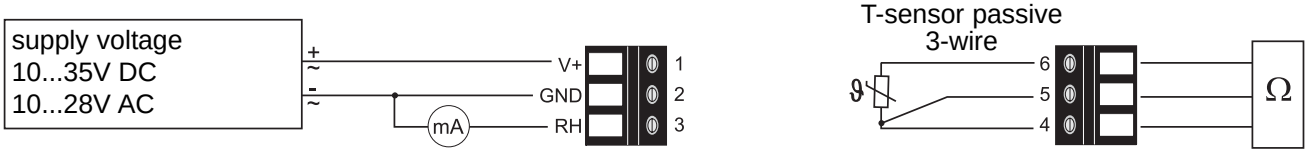
2...CALIB LED: - lit up permanently during the calibration mode
- lit up shortly when reset to factory calibration settings

3...PUSHBUTTON S1: - for 1 point humidity calibration (humidity > 50%RH)
- for 2 point humidity calibration (high calibration point)
- to store the calibration settings

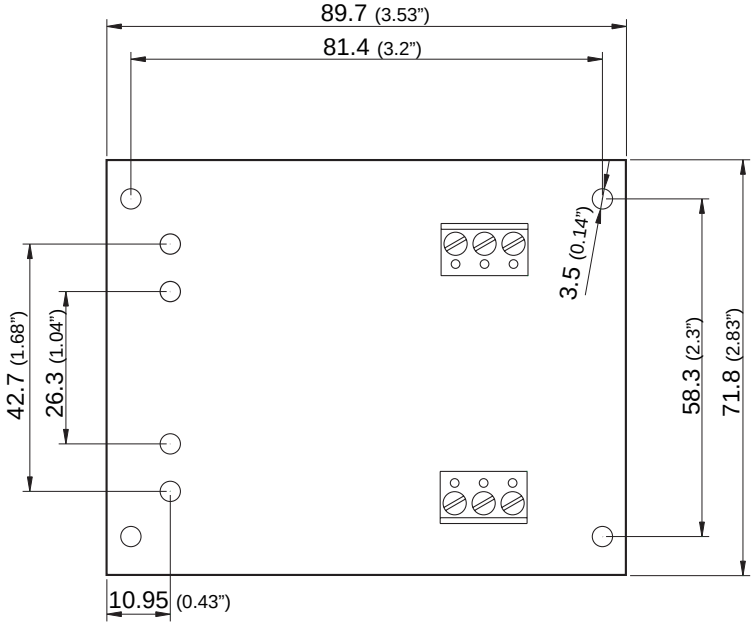
PUSHBUTTON S1+S2: - to reset to factory calibration settings

4...STATUS LED: - flashing ⇒ supply voltage applied / microprocessor is active
- constantly lit ⇒ humidity sensor element damaged

3. CONNECTION DIAGRAM



4. MOUNTING DIMENSIONS (mm)



5. HUMIDITY CALIBRATION

The EE99-1 transmitter series can be calibrated in two ways.

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

- 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 30 minutes into the reference chamber.
- Replace a used dirty filter cap before calibration!

5.1 2 point humidity calibration

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

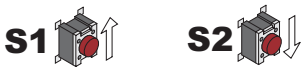
- Start calibration at the low humidity calibration point!
- The humidity difference between the two points should be > 30%RH

Procedure for 2 point humidity calibration (start at low calibration point)**:**

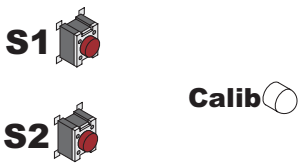
low calibration point:

1. Insert the sensor probe into the reference chamber 1 (low humidity calibration point) and stabilise for minimum 30 min.

2. PUSHBUTTON S2: Pressing the button for 3 seconds starts the procedure for the low calibration point. The calibration mode is indicated by the lit LED "Calib" and by the symbol "CAL" on the LC display.



3. PUSHBUTTON S1 (up) and **S2 (down)**: Pressing 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.



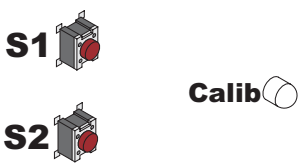
4. PUSHBUTTON S1: Pressing the button for 3 seconds the calibration value is stored and the procedure is ended. Exiting the calibration mode is indicated by deactivation of the LED "Calib" and the symbol "CAL" on the LC display.
or PUSHBUTTON S2: Pressing the button for 3 seconds the calibration procedure will be ended without storing the calibration values. Exiting the calibration mode is indicated by deactivation of the LED "Calib" and the symbol "CAL" on the LC display.

high calibration point:

5. Insert the sensor probe into the reference chamber 2 (high humidity calibration point) and stabilise for minimum 30 min.

6. PUSHBUTTON S1: Pressing the button for 3 seconds starts the procedure for the high calibration point. The calibration mode is indicated by the lit LED "Calib" and by the symbol "CAL" on the LC display.

7. PUSHBUTTON S1 (up) and **S2 (down)**: Pressing 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.



8. PUSHBUTTON S1: Pressing the button for 3 seconds stores the calibration value and the procedure is ended. Exiting the calibration mode is indicated by deactivation of the LED "Calib" and the symbol "CAL" on the LC display.
or PUSHBUTTON S2: Pressing the button for 3 seconds the calibration procedure will be ended without storing the calibration values. Exiting the calibration mode is indicated by deactivation of the LED "Calib" and the symbol "CAL" on the LC display.

5.2 1 point humidity calibration

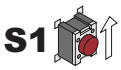
When the working range is limited to a certain more narrow range, a calibration at one humidity point is absolutely sufficient.

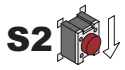
This calibration causes an extra inaccuracy for the rest of the working range.

Procedure for 1 point humidity calibration:

1. Insert the sensor probe into the reference chamber 1 (humidity calibration point) and stabilise for minimum 30 min.

2. PUSHBUTTON S1 (calibration point > 50%RH.): Pressing the button for 3 seconds starts the procedure for the low calibration point. The calibration mode is indicated by the lit LED "Calib" and by the symbol "CAL" on the LC display.
or
PUSHBUTTON S2 (calibration point < 50%RH): Pressing the button for 3 seconds starts the procedure for the low calibration point. The calibration mode is indicated by the lit LED "Calib" and by the symbol "CAL" on the LC display.





3. PUSHBUTTON S1 (up) und **S2 (down)**: Pressing 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.

4. PUSHBUTTON S1: Pressing the button for 3 seconds the calibration value and the procedure is ended. Exiting the calibration mode is indicated by deactivation of the LED "Calib" and the symbol "CAL" on the LC display.
or PUSHBUTTON S2: Pressing the button for 3 seconds the calibration procedure will be ended without storing the calibration values. Exiting the calibration mode is indicated by deactivation of the LED "Calib" and the symbol "CAL" on the LC display.

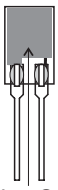
5.3 Reset the customised calibration to factory calibration:

PUSHBUTTON S1 and S2: In neutral mode pressing both buttons simultaneously for 5 seconds customer calibration settings are reset to factory calibration.
A short flash of the LED "Calib" indicates the reset.

6. MAINTENANCE

6.1 Sensor exchange

- After changing the sensor it is necessary to perform a two point calibration to reach the specified accuracy again!
- The factory calibration is no longer valid after performing a sensor exchange!
- Touch the sensor elements on the connection wires only!



1. Switch off the supply voltage
2. Unscrew the filter cap
3. Pull out the humidity sensor element with a tweezer
4. Put in the new humidity sensor - the active side (side with the sensor pads) has to face the inside. (see diagram)
5. Screw the filter cap on again (in case of pollution replace it by a new filter cap)
6. Switch on the supply voltage
7. Perform a humidity calibration (refer to 2 point humidity calibration)

6.2 Self diagnosis and error messages

Status LED on the circuit board:

- **Green LED**

flashing ⇒ Supply voltage applied / Microprocessor is active
constantly lit ⇒ Humidity sensor element damaged

Definitions:

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

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

  Filter soiled
  ⇒ *Replace filter*

  Sensor defective
  ⇒ *Replace sensor*

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

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

- **Transmitter failure**
  no supply voltage
  ⇒ *Check wiring and supply voltage*

- **High humidity values**
  Dew (condensation) in sensor probe head
  ⇒ *Dry probe head and check the sensor probe mounting type*

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

7. TECHNICAL DATA

Measured quantities

Relative humidity

Humidity sensor	HC1000-400	
Working range	0…100% RH	
Accuracy incl. hysteresis and nonlinearity with		
- special calibration against certified standards	±1% (0…90% RH)	±2% (90…100% RH)
- standard calibration	±2% (0…90% RH)	±3% (90…100% RH)
Output signal	4 - 20mA (3-wire)	
Response time with filter at 20°C (68°F) / t_{90}	< 15 sec.	

Temperature

Temperature sensor element[1)]	Pt100 resp. Pt1000 (class A, DIN EN 60751) see Ordering Guide	
Working range	-50...180°C (-58...356°F) / up to 200°C (392°F) short term	

General Data

Supply voltage	10 - 35V DC or 10 - 28V AC	
Load resistor for 4 - 20 mA output	10 - 35V DC	$R_L < \frac{U_V - 5V}{0.02\ A}$ [Ω] (max. 350 Ω)
	10 - 28V AC	R_L < 350 Ω
Current consumption	for DC supply < 32mA	for AC supply < 60mA_{eff}
Working temperature range electronics	-40…60°C (-40...140°F)	
Storage temperature range	-40…60°C (-40...140°F)	
Electrical connection	pluggable screw terminals up to max. 1.5mm² (AWG 16)	
Sensor protection	stainless steel grid filter	
Electromagnetic compatibility	Designed for installment in and with other equipment (OEM) Measurements according to EN61000-4-3 and EN61000-4-6 FCC Part15 ClassB ICES-003 ClassB	

1) max. power dissipation 1mW