



Manual

EE371

Dew Point Transmitter / Switch

down to -60 °C Td

YOUR PARTNER IN SENSOR TECHNOLOGY



ELEKTRONIK®
Ges.m.b.H.

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EMC note USA (FCC):

This equipment has been tested and found to comply with the limits for a Class A digital device, pursuant to part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference when the equipment is operated in a commercial environment. This equipment generates, uses, and can radiate radio frequency energy and, if not installed and used in accordance with the instruction manual, may cause harmful interference to radio communications. Operation of this equipment in a residential area is likely to cause harmful interference in which case the user will be required to correct the interference at his own expense.

EMC note Canada (ICES-003):

CAN ICES-3 (A) / NMB-3 (A)

INHALT

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1 General

This operation manual is part of the scope of supply and serves for ensuring proper handling and optimal functioning of the device.

The operation manual shall be read before commissioning the equipment and it shall be provided to all staff involved in transport, installation, operation, maintenance and repair.

The operation manual may not be used for the purposes of competition without the written consent of E+E Elektronik® and may not be forwarded to third parties. Copies may be made for internal purposes. All information, technical data and diagrams included in these instructions are based on the information available at the time of writing.

1.1 Explanation of symbols



This symbol indicates safety information.

It is essential that all safety information is strictly observed. Failure to comply with this information can lead to personal injuries or damage to property. E+E Elektronik® assumes no liability if this happens.



This symbol indicates instructions.

The instructions shall be observed in order to reach optimal performance of the device.

1.2 Safety Instructions

1.2.1 General safety instructions



- Avoid any unnecessary mechanical stress and inappropriate use.
- When replacing the filter cap make sure not to touch the sensing elements.
- For sensor cleaning and filter cap replacement please see "Cleaning instructions" at www.epluse.com.
- Installation, electrical connection, maintenance and commissioning shall be performed by qualified personnel only.

1.2.2 Mounting, start-up and operation

The device has been produced under state of the art manufacturing conditions, has been thoroughly tested and has left the factory fulfilling all safety criteria.

The manufacturer has taken all precautions to ensure safe operation of the device. The user must ensure that the device is set up and installed in a manner that does not have a negative effect on its safe use.

The user is responsible for observing all applicable safety guidelines, local and international, with respect to safe installation and operation on the device. This operating manual contains information and warnings that must be observed by the user in order to ensure safe operation.

- Mounting, start-up, operation and maintenance of the device may be performed by qualified staff only. Such staff must be authorized by the plant operator to carry out the mentioned activities.
- The qualified staff must have read and understood this operating manual and must follow the instructions contained within.
- All process and electrical connections shall be thoroughly checked by authorized staff before putting the system into operation.
- Do not install or start start-up a device supposed to be faulty. Make sure that such devices are not accidentally used by marking them clearly as faulty.
- A faulty device may only be investigated and possibly repaired by qualified, trained and authorized staff. If the fault cannot be fixed, the device shall be removed from the system.
- Service operations other than described in this operating manual may only be performed by the manufacturer.

1.2.3 Intended Use

The EE371 is intended for the measurement of dew point temperature (Td), frost point temperature (Tf) and volume concentration (Wv) in air (compressed air) and other non-corrosive and non-flammable gasses, depending on the model up to 20 bar (290 psi) respectively 100 bar (1450 psi). The use of the EE371 other than described in this manual is not allowed.

The manufacturer cannot be held responsible for damages as a result of incorrect handling, installation and maintenance of the device.

Unauthorized modifications of the product lead to loss of all warranty claims. The device may only be powered with separated extra-low voltage (SELV).

Disclaimer

The manufacturer or his authorized agent can be only be held liable in case of willful or gross negligence. In any case, the scope of liability is limited to the corresponding amount of the order issued to the manufacturer. The manufacturer assumes no liability for damages incurred due to failure to comply with the applicable regulations, operating instructions or the operating conditions. Consequential damages are excluded from the liability.

1.3 Environmental aspects



Products from E+E Elektronik® are developed and manufactured observing of all relevant requirements with respect to environment protection. Please observe local regulations for the device disposal.



For disposal, the individual components of the device must be separated according to local recycling regulations. The electronics shall be disposed of correctly as electronics waste.

2 Product description

2.1 General

Modell T:

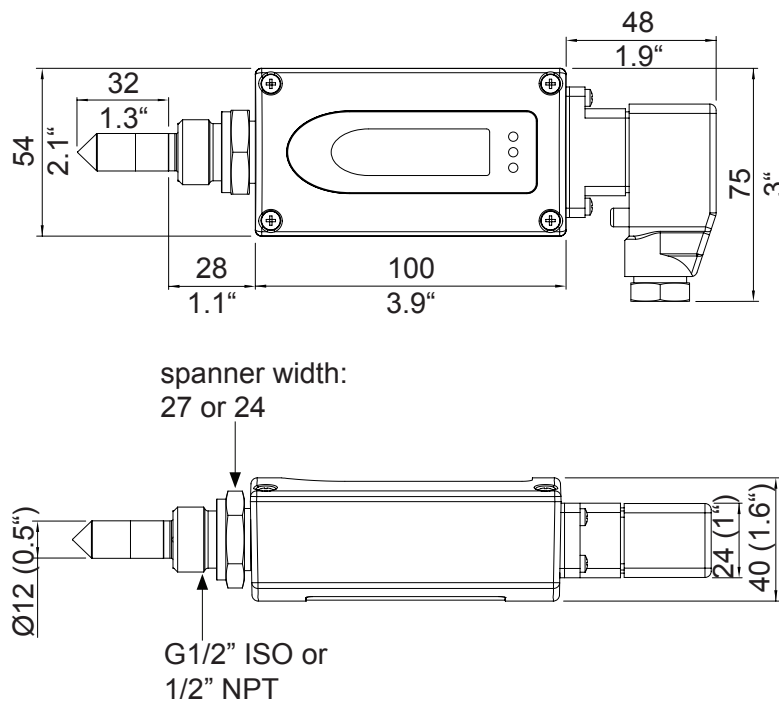
The EE371 transmitter features two freely selectable and scalable outputs for Td, Tf or Wv.

Modell S:

The EE371 switch has two relay outputs for control and alarm purposes. The status of the two relays (configured for instance for early warning and main alarm) is indicated by LEDs.

The analogue outputs as well as the Td/Tf switch threshold and hysteresis can be set with the EE-PCS Product Configuration Software, free download from www.epluse.com/configurator.

2.2 Dimensions in mm (inch)



2.3 Auto-calibration

A special auto-calibration procedure leads to high-precision measurement even in the low Td range. The auto-calibration is performed every 30 minutes and takes approx. 3 minutes. During the auto-calibration, the analogue outputs are frozen at the last measured value.

2.4 Output scale; Output signal limitation

The Td analogue output can be scaled within the range -100...80 °C (-148...176 °F).

For air (gas) temperature $T_a \leq 20$ °C (≤ 68 °F), the output is limited at $T_d = -80$ °C (-112 °F)

For air (gas) temperature $T_a > 20$ °C (≤ 68 °F), the output is limited at $T_d = T_a - 100$ °C ($T_a - 180$ °F)

Example (see also Fig.1):

For air (gas) temperature $T_a = 30$ °C (86 °F) the output is limited at $T_d = 30$ °C - 100 °C = -70 °C (86 °F - 180 °F = -94 °F).

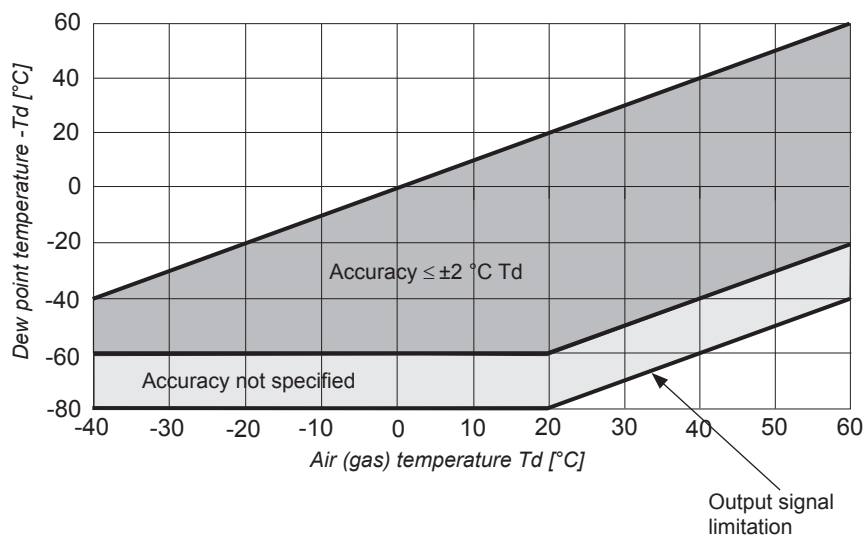


Fig. 1 Dew point measurement range and specified accuracy

The maximum scaling of the analogue output is -100...80 °C (-148...176 °F) dew point.

3 Installation

3.1 Installation location



Upon delivery the sensor is protected by a cap that keeps the dew point sensor dry. The cap should only be removed immediately before installation into the application.

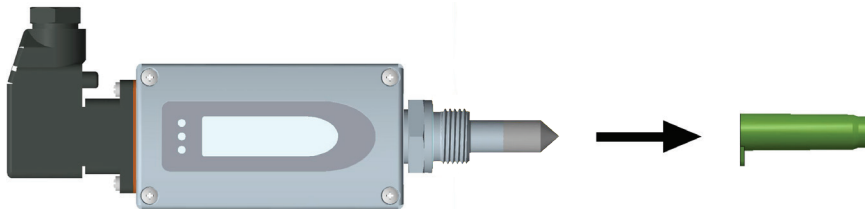


Fig. 2 Remove protection cap

For accurate measurement and short response time, the sensing head shall be immersed in the air or gas to be monitored. The mounting of EE371 shall be tight; moisture ingress from the surroundings falsify the measurement results.

Temperature gradients in the process do not affect the Td measurement. Pressure gradients and variations have a strong impact on the Td measurement. For evaluating these influences the E+E Humidity Calculator, free download from www.humidity-calculator-online.com or as free App for iOS and Android.

3.2 Direct mounting into the process

For direct mounting (without a sampling cell) of the EE371 into the process, it is highly recommended to install stop valves on both sides of the mounting location. This facilitates removing the transmitter for maintenance and calibration.

Insert the probe into the process and screw it first by hand, check the correct positioning of the sealing ring. Use an appropriate wrench to tighten with a torque of 30 Nm.

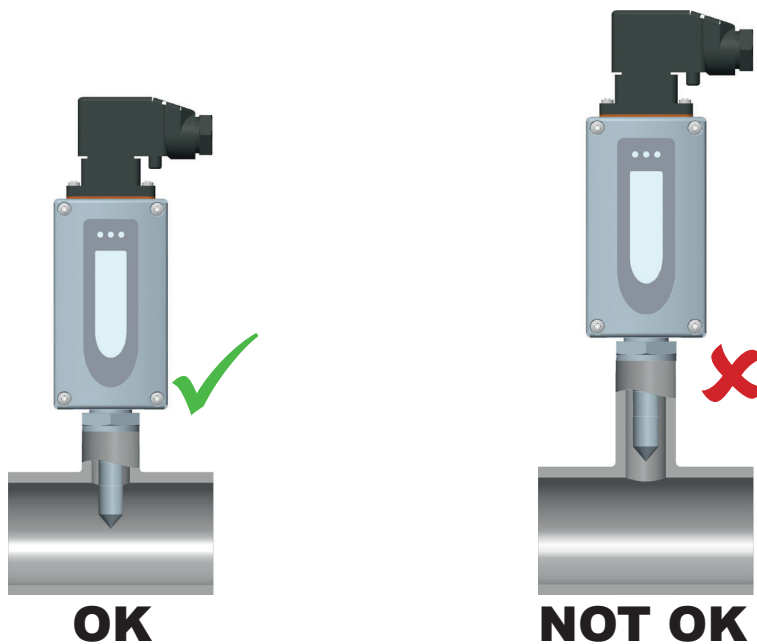


Fig. 3 Direct mounting into the pipe



Sealing rings may not be used with a NPT 1/2" thread. Use appropriate PTFE sealing tape or sealant.

3.3 Mounting with a sampling cell

EE371 mounting with a sampling cell is recommended:

- in case of high process temperature
- for keeping the sensing head out of the main air (gas) stream
- for easy installing / removing the probe without process disruption.

Please note:

- Pressure gradients between the process and the sampling chamber lead to significant measuring errors.
- The mounting of EE371 with sampling cell shall be tight; moisture ingress from the surroundings falsify the measurement results. Do not employ any hygroscopic materials for mounting EE371 or the sampling cell.
- Keep the sampling line as short as possible.
- The response time increases for air (gas) flow < 1 l/min (0.25 gpm).
- A too low gas flow can result in back-diffusion of humidity from the environment and consequently to false measurement.

3.3.1 Basic sampling cell

Pressure range: 0...64 bar (0...928 psi)

Order code: HA050103 (ISO) HA050105 (NPT)

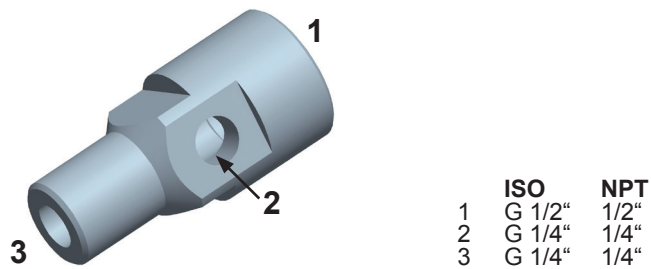


Fig. 4 Basic sampling cell

3.3.2 Sampling cell with quick connector

The sampling cell features a quick-connector suitable for standard compressed air connections DN7.2. It allows the cell to be installed and removed without process interruption.

The air (gas) flow along the sensing head of EE371 can be adjusted using the bleed screw.

Pressure range: 0...10 bar (0...145 psi)

Order code: HA050102

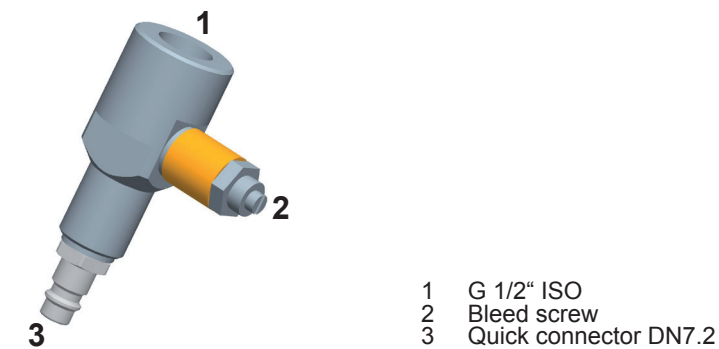
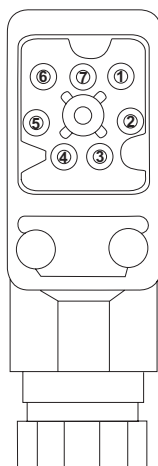


Fig. 5 Sampling cell with quick connector

4 Electrical Connection

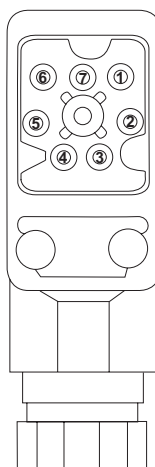
The electrical connection is made via the 7-pin connector DIN VDE 0627 / IEC 61984. An mating connector is included in scope of supply.

Analogue output



- 1 V+ 10...30V DC
- 2 GND
- 3 GND
- 4 OUT1
- 5 OUT2
- 6 NC
- 7 NC

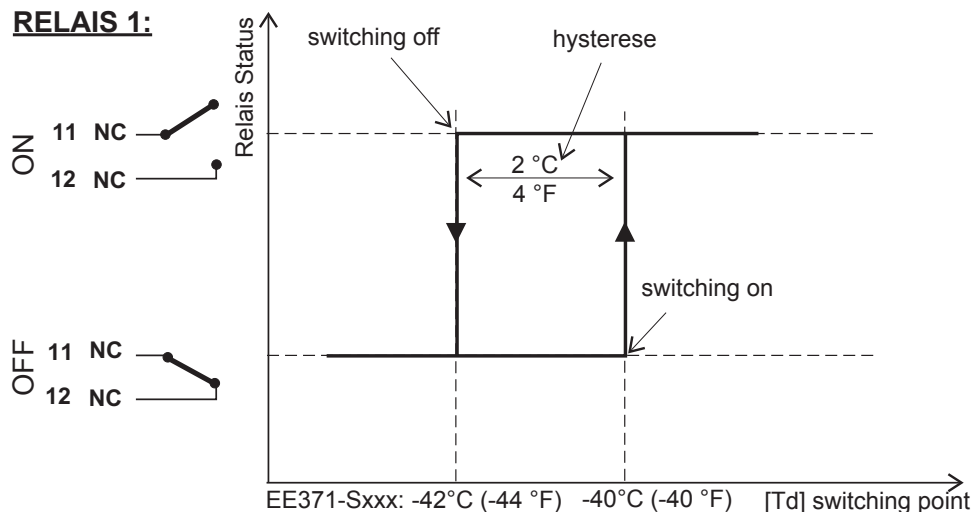
Relay output



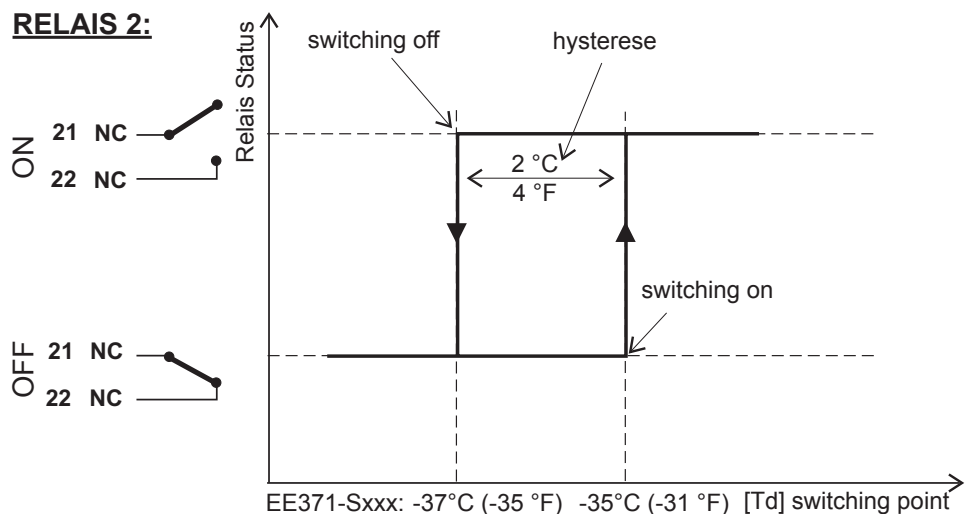
- 1 V+ 10...30V DC
- 2 GND
- 3 NC11
- 4 NC12
- 5 NC21
- 6 NC22
- 7 not connected

The switching thresholds are factory set:

RELAIS 1:

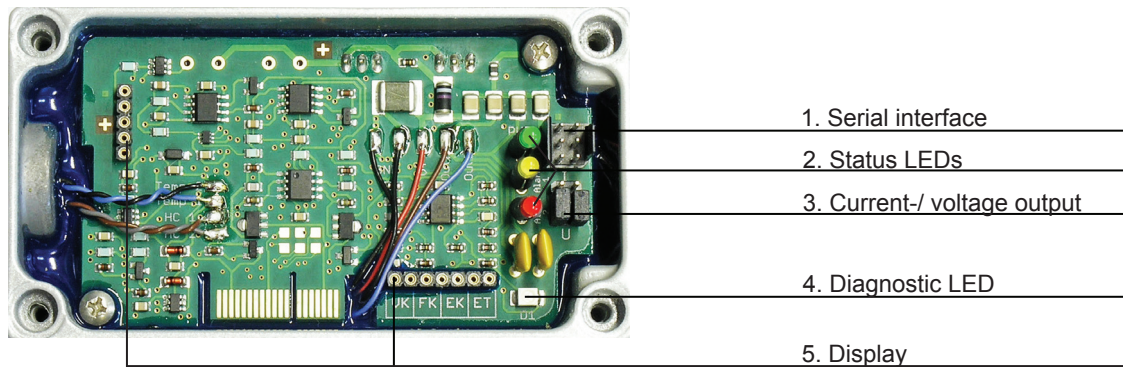


RELAIS 2:



5 Operating components

5.1 Electronics board



1. Serial interface:

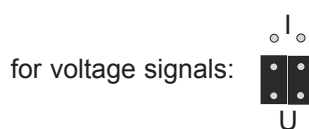
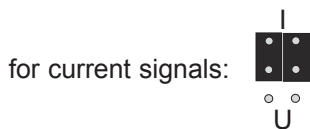
Connector for serial interface cable HA010604 or EE-PCA Product Configuration Adapter with HA011063. See data sheets EE371, Accessories and EE-PCA at www.epluse.com/ee371.

2. Status LEDs:

Provide information on the status of the EE371. See chapter „5.2 Status LEDs“.

3. Current-/ voltage output:

Jumpers for selecting the analogue output signal. The change from voltage to current or vice versa shall be performed both via hardware (jumpers) and software (with the EE-PCS Product Configuration Software).



4. Diagnostic LED:

Error indication. See chapter „8.2 Self-diagnostic and error messages“.

5. Display:

Connectors for the optional display module.

5.2 Status LEDs



Green (Power LED):

flashing = EE371 is correctly powered

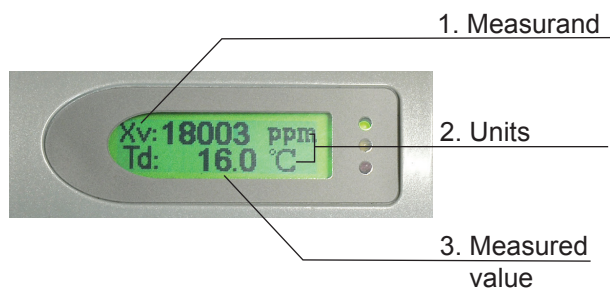
Yellow / Red :

The yellow and red LEDs are only enabled at model S (switch output):

- yellow LED on continuously: relay 1 is activated
- red LED on continuously: relay 2 is activated

The yellow and red LEDs have no function at model T (analogue output).

5.3 Display Module (Option)



1. Measurand:		2. Units:	
		SI	US
Td	dew point temperature	°C	°F
Tf	frost point temperature	°C	°F
Wv	volume concentration	ppm	ppm

3. Measured value:	
EE371	
Td	-60...60 °C Td (-112...140 °F Td)
Tf	-60...0 °C Tf *) (-112...32 °F Tf)
Wv	20...200 000 ppm

*) over 0 °C dew point will be displayed

6 Setup

The EE371 probe is ready to use and does not require any configuration by the user. The factory setup of EE371 corresponds to the type number ordered.

The scaling of the analogue output and settings of the relay thresholds can be changed with the free EE-PCS Product Configuration Software, free download at www.epluse.com/configurator

Use either the serial interface cable HA010604 or the EE-PCA Product Configuration Adapter with the cable HA011063 to connect the EE371 to a PC.

7 Calibration / Adjustment

7.1 Definitions

Calibration

The calibration documents the accuracy of a measurement device. The device under test (specimen) is compared with the reference and the deviations are documented in a calibration certificate. During the calibration, the specimen is not changed or improved in any way.

Adjustment

The adjustment improves the measurement accuracy of a device. The specimen is compared with the reference and brought in line with it. An adjustment can be followed by a calibration which documents the accuracy of the adjusted specimen.

The dew point temperature adjustment of EE371 can be performed with the free EE-PCS Product Configuration Software, free download at www.epluse.com/configurator

7.2 Customer adjustment - Dew Point

The dew point adjustment can only be performed if the span between the air or gas temperature Ta and the reference dew point temperature Td is higher 60 °C (108 °F).

Example:

For Ta = 20 °C (68 °F), the reference Td must be < -40 °C (-40 °F).

8 Maintenance

8.1 Sensor cleaning and filter replacement



Please see "Cleaning instructions" at www.epluse.com.

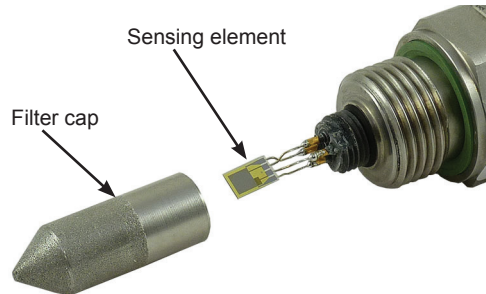


Fig. 6 EE371 Filter and Sensor

8.2 Self-diagnostic and error messages

Self-diagnostic via LED on the circuit board:

Power LED (green):

- flashing => EE371 is correctly powered / the microprocessor is active
- constantly lit => Electronics defect => please contact the producer

LED D1 (blue):

- constantly lit => The sensing element is damaged
- flashing => The sensing element is wet (condensation)

Self-diagnostic via display (option):

- Error 1 => The humidity sensing element is damaged
- Error 2 => The sensing element is wet (condensation)
- Error 3 => The temperature sensing element is damaged
- Error 4 => Short circuit on the temperature sensing element

9 Accessories

Description

Sampling cell with quick connector
Basic sampling cell ISO
Basic sampling cell NPT
Sampling cell for ambient pressure
Stainless steel sintered filter (included in the scope of supply)

Order code

HA050102
HA050103
HA050105
HA050106
HA010103

9.1 Scope of Supply

- Dew point transmitter
- Mating connector
- Quick user guide
- Calibration Certificate acc. DIN EN 10204-3.1

10 Technical Data

Measuring Quantities

Dew point (Td)

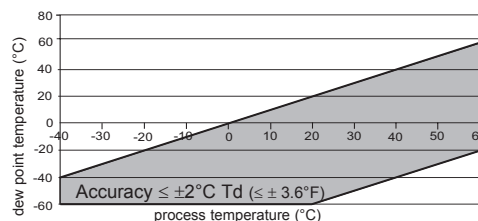
Dew point sensor

Measuring range

Accuracy

HMC01

-60...60 °C Td (-76...140°F Td)



Response time t_{90}

80 sec. -20 °C Td → -40°C Td (-4 °F Td → -40 °F Td)
10 sec. -40 °C Td → -20°C Td (-40 °F Td → -4 °F Td)

Volume concentration

Measuring range

20...200,000ppm

Accuracy at 20°C (68°F) and 1013mbar

±(5 ppm + 9 % from measured value)

Outputs

EE371-Tx two freely selectable and scaleable analogue outputs for Td, Tf, Wv

0 - 1 V / 0 - 5 V / 0 - 10 V¹⁾ -1 mA < I_L < 1 mA
4 - 20 mA / 0 - 20 mA R_L < 500 Ohm¹⁾

EE371-Sx Alarm output

2 potential-free relays (NC)
30 V DC 0.6 A / 35V AC 0.3 A (resistive)

General

Supply voltage

10...30 V DC

Current consumption at 24V DC

voltage output: typ. 40 mA / during auto-calibration: 100 mA
current output: typ. 80 mA / during auto-calibration: 140 mA

Pressure range

0...20 bar (0...290 psi) / 0...100 bar (0...1450 psi)

System requirements for software

WINDOWS 2000 or later; serial interface

Serial interface for configuration

RS232C

Housing / protection class

Al Si 9 Cu 3 / IP65

Electrical connection

7-pole industrial plug: DIN VDE 0627 / IEC 61984
cable cross-section: 0.25 - 1 mm²
cable connection: PG 11

Sensor protection

stainless steel sintered filter

Working temperature range

probe: -40...70 °C (-40...158 °F)
electronic: -40...60 °C (-40...140 °F)
with LC display: -20...50 °C (-4...122 °F)

Storage temperature range

-40...60 °C (-40...140 °F)

Electromagnetic compatibility according to

EN 61326-1 EN61326-2-3 ICES-003 ClassB
Industrial Environment FCC Part15 ClassB

1) minimum supply voltage 15 V DC



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