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# Datasheet EE354

Dew Point Sensor  
down to  $-20\text{ }^{\circ}\text{C Td}$  ( $-4\text{ }^{\circ}\text{F Td}$ )



# EE354

## Dew Point Sensor down to $-20\text{ }^{\circ}\text{C}$ Td ( $-4\text{ }^{\circ}\text{F}$ Td)

The compact EE354 sensor measures dew point temperature (Td) down to  $-20\text{ }^{\circ}\text{C}$  ( $-4\text{ }^{\circ}\text{F}$ ) at pressure up to 80 bar (1 160 psi). Besides Td, the sensor supplies also frost point temperature (Tf) and volume concentration (Wv) data and is ideal for monitoring compressed air networks and industrial drying processes.

### Functionality and Reliability

The small size, robust stainless steel enclosure and wettable sensing element, together with various process connections and accessories lead to best performance even in challenging measurement tasks.

### Measurement Performance

The well proven E+E humidity sensing element enables excellent long term stability and resistance against pollutants, factors that minimize the EE354 maintenance needs and allow trouble-free operation.

### Analogue and Digital Outputs

The Td, Tf and Wv measured data is available on the 4 - 20 mA analogue output and on the RS485 interface with Modbus RTU protocol. The wide scaling range of the analogue output simplifies the EE354 implementation in existing monitoring and control systems.

### User Configurable and Adjustable

The free EE-PCS Product Configuration Software together with an optional adapter cable facilitates the configuration and adjustment of the EE354.



EE354 - ISO



EE354 - NPT

# Features

## Enclosure

- IP65/NEMA 4X protection rating
- Stainless steel 1.4404

## Measurement performance

- Dew point, frost point, volume concentration
- Dew point measurement range -20...+50 °C (-4...+122 °F)
- Accuracy ±1 °C (±1.8 °F)
- Condensation resistant

## Process connection

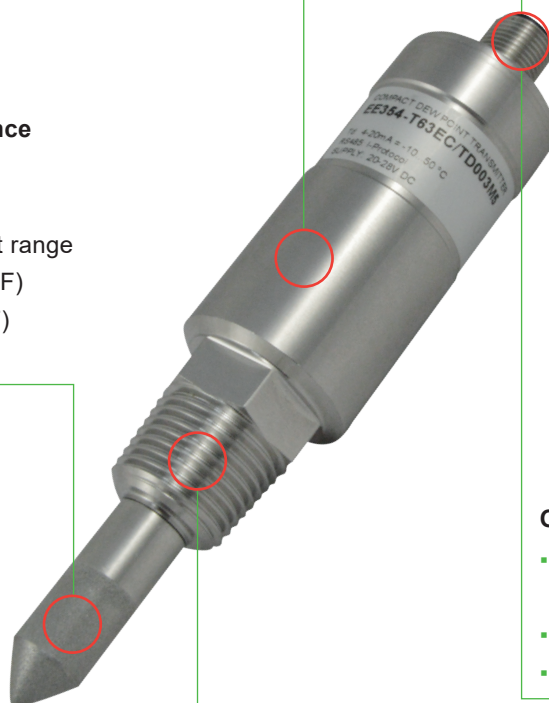
- Stainless steel
- G 1/2" ISO or 1/2" NPT
- Pressure rating 80 bar (1 160 psi)

## Configurable and adjustable

- Service interface
- Free EE-PCS Product Configuration Software

## Outputs

- Current output 4 - 20 mA, wide scaling range
- Modbus RTU
- Industrial M12x1 connector



## Inspection certificate

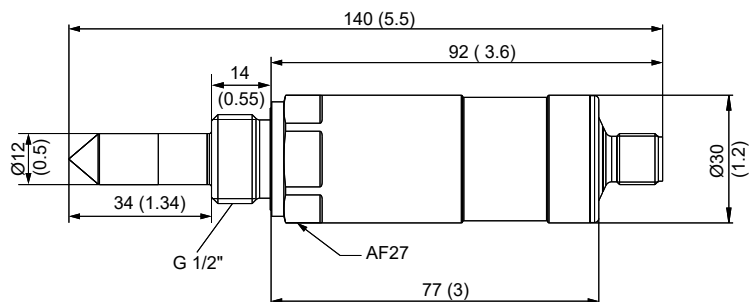
According to DIN EN 10204-3.1

# Dimensions

Values in mm (inch)

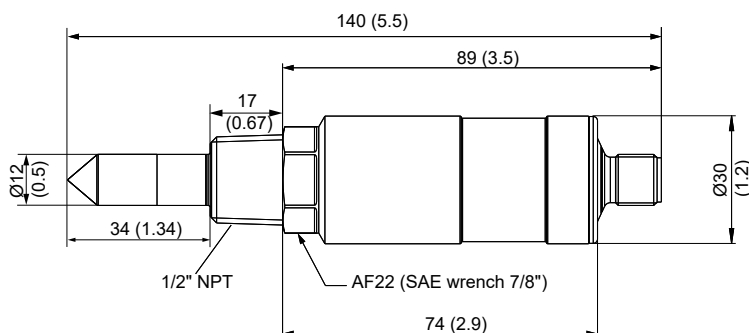
ISO

G1/2"



NPT

1/2"



# Technical Data

## Measurands

### Dew Point Temperature (Td)

|                                                  |                                 |
|--------------------------------------------------|---------------------------------|
| Measuring range                                  | -20...50 °C Td (-4...122 °F Td) |
| Accuracy <sup>1)</sup>                           |                                 |
| Response time $t_{90}$ , typ.<br>@ 20 °C (68 °F) | <30 s                           |

1) Traceable to intern. standards, administrated by NIST, PTB, BEV,...  
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).

# Technical Data

## Measurands

### Volume Concentration (Wv)

|                                                             |                                    |
|-------------------------------------------------------------|------------------------------------|
| <b>Measuring range</b><br>@ 1013 mbar (14.7 psi)            | 1 250...125 000 ppm                |
| <b>Accuracy</b><br>@ 20 °C (68 °F) and 1013 mbar (14.7 psi) | ±(50 ppm + 10 % of measured value) |

## Outputs

### Analogue

|                                                     |                                  |                    |                                |
|-----------------------------------------------------|----------------------------------|--------------------|--------------------------------|
| <b>Scalable output<sup>1)</sup></b><br>Td, Tf or Wv | 4 - 20 mA 3-wire                 | $R_L < 500 \Omega$ | $R_L = \text{load resistance}$ |
| <b>Max. configurable scaling</b>                    | -40...80 °C Td (-40...176 °F Td) | 0...125 000 ppm    |                                |
| <b>Resolution</b>                                   | 2 µA                             |                    |                                |




1) The EE354 simultaneously features an analogue current output and the RS485 interface.

### Digital

|                                                                                                                      |                                                                                                                        |
|----------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------|
| <b>Digital interface</b>                                                                                             | RS485 (EE354 = 1 unit load)                                                                                            |
| <b>Protocol</b><br><b>Factory settings<sup>1)</sup></b><br><b>Supported Baud rates</b><br><b>Measured data types</b> | Modbus RTU<br>9 600 Baud, parity even, 1 stop bit, Modbus address 243<br>9 600, 19 200 and 38 400<br>FLOAT32 and INT16 |

1) Find more details about communication setting in the User Manual and the Modbus Application Note at [www.epluse.com/ee354](http://www.epluse.com/ee354).

## General

|                                                                                                                                                             |                                                                                                                                                                         |
|-------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Power supply</b> class III <br>USA & Canada: Class 2 supply necessary | 10 <sup>1)</sup> - 28 V DC                                                                                                                                              |
| <b>Current consumption</b> , typ.<br>@ 24 V DC                                                                                                              | <20 mA + load current                                                                                                                                                   |
| <b>Electrical connection</b>                                                                                                                                | M12x1, 5 poles, stainless steel 1.4404                                                                                                                                  |
| <b>Filter</b> <b>Material</b>                                                                                                                               | Stainless steel sintered                                                                                                                                                |
| <b>Pressure working range</b>                                                                                                                               | 0...80 bar (0...1 160 psi)                                                                                                                                              |
| <b>Humidity working range</b>                                                                                                                               | 0...100 %RH                                                                                                                                                             |
| <b>Temperature working range</b>                                                                                                                            | -40...+60 °C (-40...+140 °F)                                                                                                                                            |
| <b>Storage conditions</b>                                                                                                                                   | -40...+60 °C (-40...+140 °F)<br>0...95 %RH, non-condensing                                                                                                              |
| <b>Enclosure</b> <b>Material</b><br><b>Protection rating</b>                                                                                                | Stainless steel 1.4404 (AISI 316L)<br>IP65/NEMA 4X                                                                                                                      |
| <b>Electromagnetic compatibility</b>                                                                                                                        | EN 61326-1 EN 61326-2-3 Industrial environment<br>FCC Part15 Class B ICES-003 Class B                                                                                   |
| <b>Conformity</b>                                                                                                                                           |   |
| <b>Configuration and adjustment</b>                                                                                                                         | EE-PCS Product Configuration Software (free download: <a href="http://www.epluse.com/configurator">www.epluse.com/configurator</a> ) and configuration adapter          |

1) 10 V + 0.02·R<sub>L</sub>

# Sampling Cells

## Basic Sampling Cell

The basic sampling cell is suitable for the pressure range 0...64 bar (0...928 psi). It allows for easy installation of the dew point sensor into an existing or self-constructed sampling system.

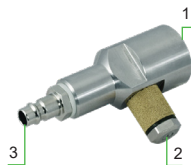


HA050103 ISO / HA050105 NPT

| Number | HA050103 ISO | HA050105 NPT |
|--------|--------------|--------------|
| 1      | G 1/2"       | 1/2"         |
| 2      | G 1/4"       | 1/4"         |
| 3      | G 1/4"       | 1/4"         |

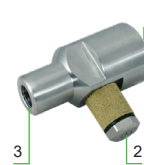
## Sampling Cell with Quick Connector and Bleed Screw

The sampling cell is optimized for the pressure range 0...10 bar (0...145 psi). The air flow can be adjusted with the bleed screw. The G 1/2" ISO version features a quick connector suitable for standard DN 7.2 connection, which allows for the sampling cell to be mounted and removed without process interruption.



HA050102 ISO

| Number | HA050102 ISO     |
|--------|------------------|
| 1      | G 1/2"           |
| 2      | Bleed screw      |
| 3      | Quick connection |



HA050107 NPT

| Number | HA050107 NPT |
|--------|--------------|
| 1      | 1/2"         |
| 2      | Bleed screw  |
| 3      | 1/4"         |

# Ordering Guide

| Feature                  | Description           | Code                                                          |                          |
|--------------------------|-----------------------|---------------------------------------------------------------|--------------------------|
| Hardw. Conf.             |                       | <b>EE354-</b>                                                 |                          |
|                          | Process connection    | G 1/2" ISO thread<br>1/2" NPT thread                          | <b>PA1</b><br><b>PA2</b> |
|                          | Accessories           | No accessories                                                | <b>AC0</b>               |
|                          |                       | M12x1 cable mount connector, socket (plug)                    | <b>AC2</b>               |
| Software Setup - Outputs | Output 1 measurand    | Dew point temperature Td [°C]                                 | <b>No code</b>           |
|                          |                       | Dew point temperature Td [°F]                                 | <b>MA53</b>              |
|                          |                       | Frost point temperature Tf [°C] (for Td > 0 °C output is Td)  | <b>MA65</b>              |
|                          |                       | Frost point temperature Tf [°F] (for Td > 32 °F output is Td) | <b>MA66</b>              |
|                          |                       | Volume fraction of water vapour Wv [ppm]                      | <b>MA75</b>              |
|                          | Output 1 scaling low  | -20                                                           | <b>No code</b>           |
|                          |                       | Value                                                         | <b>SALValue</b>          |
|                          | Output 1 scaling high | 50                                                            | <b>No code</b>           |
|                          |                       | Value                                                         | <b>SAHValue</b>          |
|                          | Units (Modbus RTU)    | Metric (SI)                                                   | <b>No code</b>           |
| Non metric (US/GB)       |                       | <b>U2</b>                                                     |                          |

## Order Example

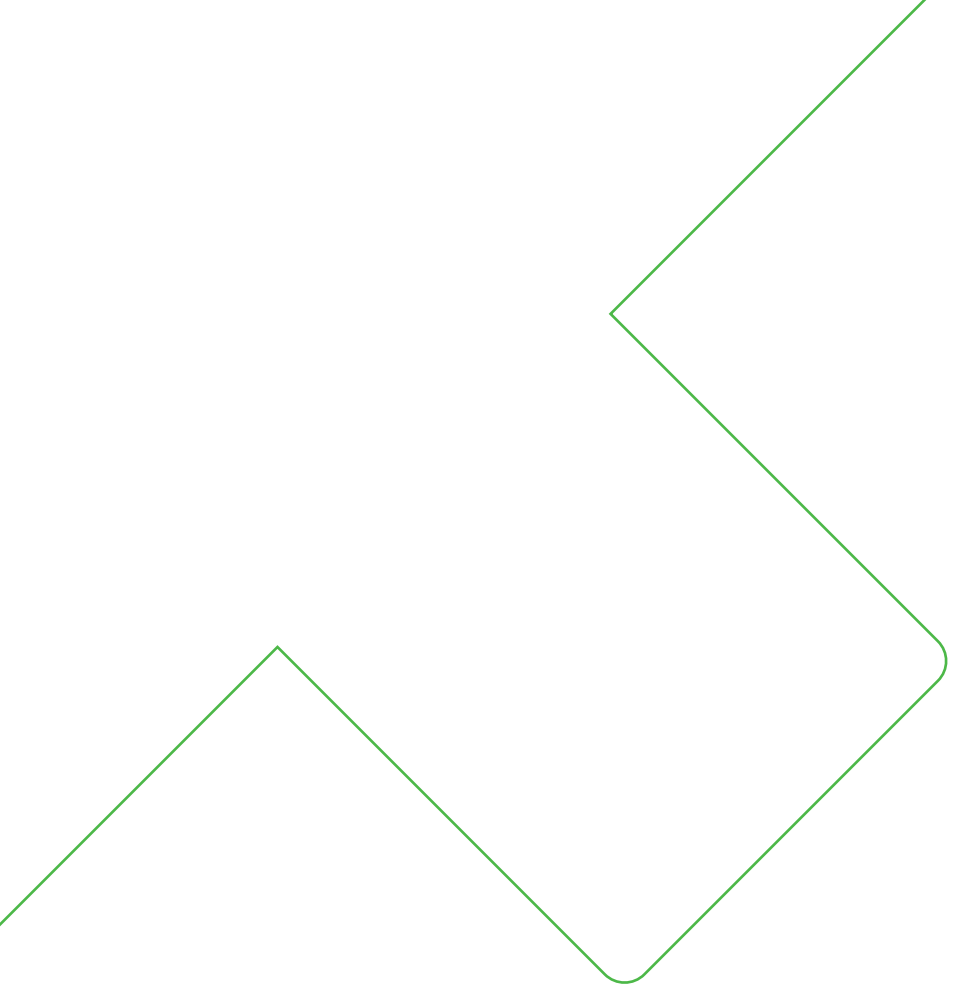
**EE354-PA1AC0SAH20**

| Feature               | Code           | Description                   |
|-----------------------|----------------|-------------------------------|
| Process connection    | <b>PA1</b>     | G 1/2" ISO thread             |
| Accessories           | <b>AC0</b>     | No accessories                |
| Output 1 measurand    | <b>No code</b> | Dew point temperature Td [°C] |
| Output 1 scaling low  | <b>No code</b> | -20                           |
| Output 1 scaling high | <b>SAH20</b>   | 20                            |
| Units (Modbus RTU)    | <b>No code</b> | Metric (SI)                   |

## Accessories

For further information see datasheet [Accessories](#).

| Description                                             | Code            |
|---------------------------------------------------------|-----------------|
| Connection Cable M12x1 Socket 5 Poles / Free Cable Ends |                 |
| 1.5 m (4.9 ft)                                          | <b>HA010819</b> |
| 5 m (16.4 ft)                                           | <b>HA010820</b> |
| 10 m (32.8 ft)                                          | <b>HA010821</b> |
| Modbus Configuration Adapter                            | <b>HA011013</b> |
| Sampling cell G 1/2" with quick connector               | <b>HA050102</b> |
| Sampling cell NPT with bleed screw                      | <b>HA050107</b> |
| Basic sampling cell G 1/2"                              | <b>HA050103</b> |
| Basic sampling cell NPT                                 | <b>HA050105</b> |



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