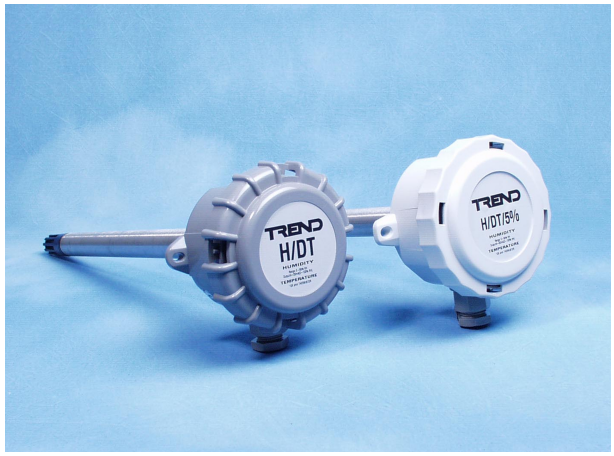
Data Sheet

H/DT

Duct Humidity and Temperature Sensors

DUCT HUMIDITY AND TEMPERATURE SENSORS



Description

Duct mounted relative humidity and temperature sensors for HVAC applications. Provide high quality humidity measurement combined with temperature monitoring. The technologies used offer excellent linearity and stability over time. Matched diode temperature compensation maintains accuracy over the operating range.

These sensors are available in a range of RH measurement accuracies so that cost effective solutions can be found; the certified 2% high accuracy (/2CC) and standard 3% versions maintain accuracy over a wide humidity range (20 to 90 %RH) and are robust and resistant to contamination so can be used in aggressive environments (e.g. swimming pools).

The lower accuracy version (/5%) is cost effective for applications requiring 5% accuracy over a limited humidity range (30 to 70 %RH), and for use in relatively clean environments.

Features

- Precalibrated for ease of commissioning
- IP67 housing
- Operate over 0 to 95 %RH range
- ± 2%, 3%, and 5% accuracy versions

2% and 3% versions

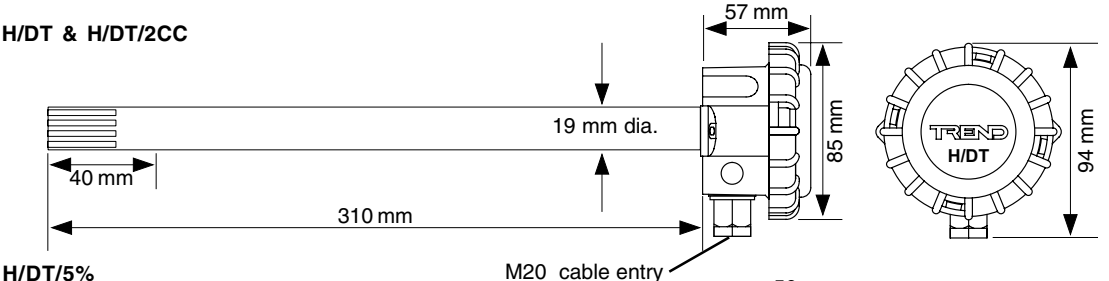
- Accuracy quoted over 20 to 90 %RH
- Resistive bulk polymer technology
- Standard Trend duct sensor mounting
- Resistant to surface contamination
- 2 part connectors for ease of installation

5% version

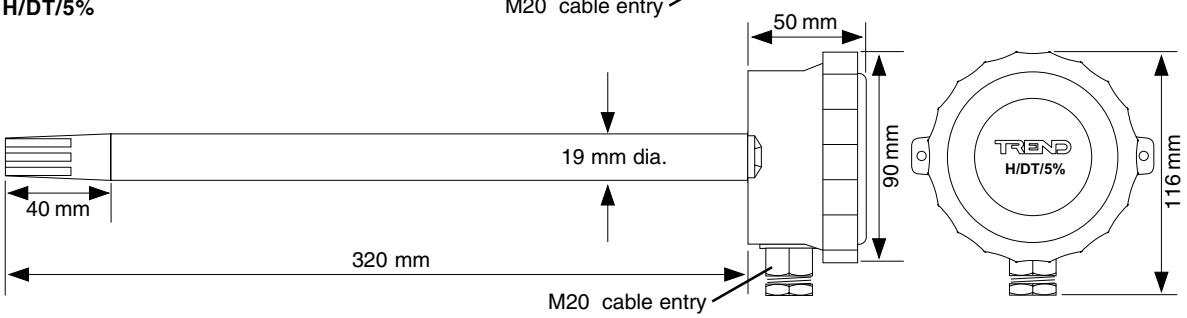
- Accuracy quoted over 30 to 70 %RH

Physical

H/DT & H/DT/2CC



H/DT/5%



FUNCTIONALITY

The comprehensive range of H/DT humidity and temperature sensors covers a wide range of technical and commercial requirements, and enables the most suitable sensor to be used. All the sensors operate over a 0 to 90 %RH range.
The H/DT/2CC and H/DT sensors exhibit 2% and 3% humidity measurement accuracy respectively over a 20 to 90 %RH range. They employ Bulk Polymer Resistive (BPR) technology and are relatively immune to surface contamination and able to operate for extended periods of time in aggressive and condensing atmospheres. They consist of an insulating ceramic substrate on which a grid of interdigitated electrodes is deposited. These electrodes are coated with a humidity sensitive salt imbedded in a polymer resin. The resin is then covered by a protective coating that is permeable to water vapour. Ideally, for optimum performance across all applications, these senors should be deployed.
However, when commercial pressures dictate and the application permits, the H/DT/5%, thin film polymer capacitance sensor based product, may be used. It exhibits 5% humidity measurement accuracy over the range 30 to 70 %RH. In comparison with the BPR sensors, the surface mount technology of the H/DT/5% does not provide the same tolerance to contamination, nor does it lend itself to as broad a measurement range. Its use therefore should be limited to the clean atmospheres and human comfort zone measurements that are associated with normal, commercial building environments. If applied appropriately, the H/DT/5% will provide reliable, drift-free measurement in accordance with the measurement range and accuracy specification.

The H/DT/2CC version incorporates a platinum resistance temperature (PRT) sensor, whereas the H/DT and H/DT/5% versions incorporate a thermistor temperature sensor. The humidity and PRT temperature signals are converted to 4 to 20 mA signals by the sensor electronics.

INSTALLATION

The H/DT and H/DT/2CC can be used in a swimming pool environment if chlorine is the sterilising agent but not if ozone is used. *Note that if used in a swimming pool application the drift rate of the sensor may be higher due to the aggressive environment.*

> **Caution**: Ammonia should not be used to clean the duct as it may affect the sensor.

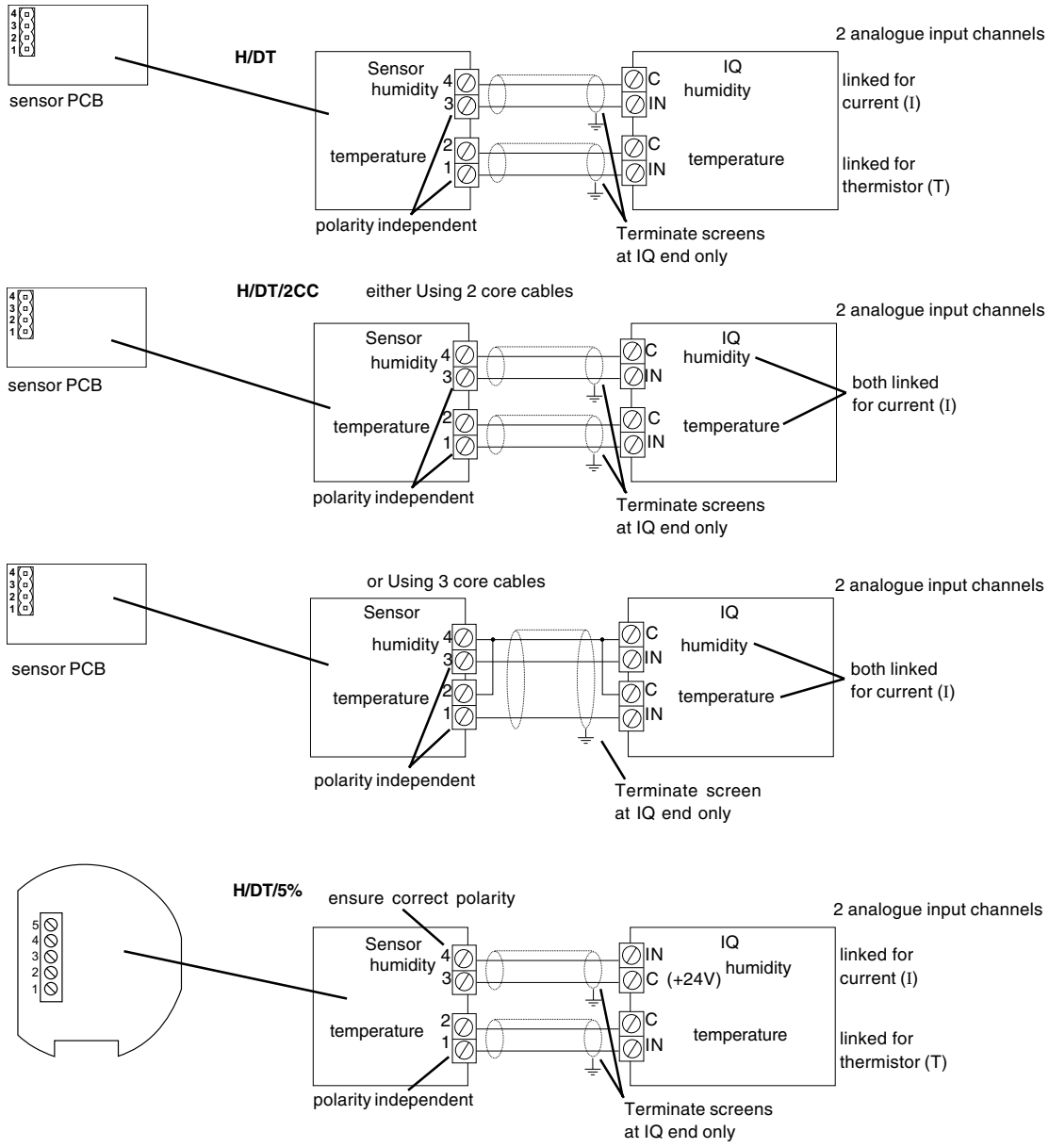
Use filter sock if the environment is excessively dirty.

The installation involves:

Choose location
Drill sensor probe hole
Drill fixing holes
Fix box
Remove sensor lid
Feed IQ cable through gland
Wire cables
Set up IQ channels for current (I) (all humidity channels, and H/DT/2CC temperature)
or thermistor (T) (H/DT and H/DT/5% temperature)
Configure IQ sensor modules
Test sensor

Full installation details are given in the H/DT and H/DT/2CC Installation Instructions, 91-2509, and in the H/DT/5% installation instructions, TG200426

CONNECTIONS



FIELD MAINTENANCE

The removal of dust, and accuracy checking is covered in the appropriate H/DT installation instructions.

PRODUCT CODE

H/DT/2CC	Duct humidity and PRT temperature sensor with ±2% humidity accuracy over 0 to 95 %RH and calibration certificate
H/DT	Duct humidity and thermistor temperature sensor, ±3% humidity accuracy over 0 to 95 %RH
H/DT/5%	Duct humidity and thermistorntemperature sensor, ±5% humidity accuracy over 30 to 70 %RH
ACC/FILTER SOCK	Filter socks for H/DT sensors (box of 25)

SPECIFICATIONS

Electrical

Humidity measurement range
:0 to 95 %RH non-condensing
Temperature measurement range
:-10 to +70 °C
Humidity element :
H/DT, H/DT/2CC :Resistance change through bulk polymer
H/DT/5% :Capacitance change across polymer
Humidity accuracy :of sensor (at 25 °C) including hysteresis, linearity, and repeatability.
H/DT :±3 %RH (20 to 90 %RH)
H/DT/2CC :±2 %RH (20 to 90 %RH
H/DT/5% :±5 %RH (30 to 70 %RH)
Temperature effect on RH :less than 0.11% per °C
Sensitivity :0.1 %RH
Hysteresis :less than 1 %
Repeatability :0.5 %RH
Temperature element
H/DT, H/DT/5% :Thermistor 10 kΩ at 25 °C
H/DT/2CC :Platinum 100 Ω
Temperature accuracy :of sensor
H/DT, H/DT/5% :±0.5 °C
H/DT/2CC :±0.5 °C
Humidity output signal :4 to 20 mA for 0 to 100 %RH
Temperature output signal
H/DT, H/DT/5% :Thermistor 10 kΩ at 25 °C
H/DT/2CC :4 to 20 mA for -10 to +70 °C
Supply Voltage
H/DT, H/DT/2CC :12 to 36 Vdc
H/DT/5% :15 to 36 Vdc

Input channels and sensor scaling

The IQ controller's input channels must be set up correctly, and the sensor type modules must be set up with the correct scaling. For all IQ2 series controllers with firmware of version 2.1 or greater use the following tables; for all other IQ controllers see the Sensor Scaling Reference Card TB100521A.

Humidity

For all H/ST versions, link input channel for current, I, and use sensor type scaling mode 5, characterise, with the input type set to 2 (current, mA) and the table below:

System Accuracy (including controller)
:same as sensor accuracy

Y	Input type	2 (curr mA)
E	Exponent	3
U	Upper	100
L	Lower	0
P	Points	2
x	**Ix**	**Ox**
1	4	0
2	20	100

Temperature

H/DT/2CC
Link input channel for current, I, and use sensor type scaling mode 5, characterise, with the input type set to 2 (current, mA) and the table below:

System Accuracy (including controller)
:±0.7 °C (-10 to +70 °C)

Y	Input type	2 (curr mA)
E	Exponent	3
U	Upper	+70
L	Lower	-10
P	Points	2
x	**Ix**	**Ox**
1	4	-10
2	20	+70

H/DT, H/DT/5%
Link input channel for thermistor, T, and use sensor type scaling mode 5, characterise, with the input type set to 1 (thermistor volts, V) as in the table below.

System Accuracy (including controller)
:±1.5 °C (-10 to +70 °C)

Y	Input type	1 (therm V)
E	Exponent	3
U	Upper	110
L	Lower	-40
P	Points	20
x	**Ix**	**Ox**
1	0.486	110
2	0.555	105
3	0.636	100
4	0.73	95
5	0.839	90
6	1.116	79.8
7	1.49	69.8
8	1.992	59.8
9	2.648	49.9
10	3.475	39.9
11	4.462	30
12	6.656	10
13	7.656	0
14	8.33	-8
15	8.795	-15
16	9.066	-20
17	9.288	-25
18	9.465	-30
19	9.604	-35
20	9.711	-40

Mechanical

Dimensions
H/DT, H/DT/2CC
Duct probe :310 x 19 mm
Head :94 x 57 x 85 mm
Fixing centres :85 mm
H/DT/5%
Duct probe :320 x 19 mm
Head :116 x 57 x 90 mm
Fixing centres :92 mm
Cable entry :M20
Material
Enclosure :Impact resistant ABS
Duct probe :Stainless Steel
Connectors
H/DT, H/DT/2CC :2 part screw terminals for 0.5 to 5 mm² cable.
H/DT/5% :single part terminals for 0.5 to 5 mm² cable.
Weight :286 gm

Environmental

Ambient limits
temperature :-10 to +70 °C
humidity :0 to 95 %RH non-condensing
Protection :IP67

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