Data Sheet

HT/O

Outside Humidity and Temperature Sensors

HT/O

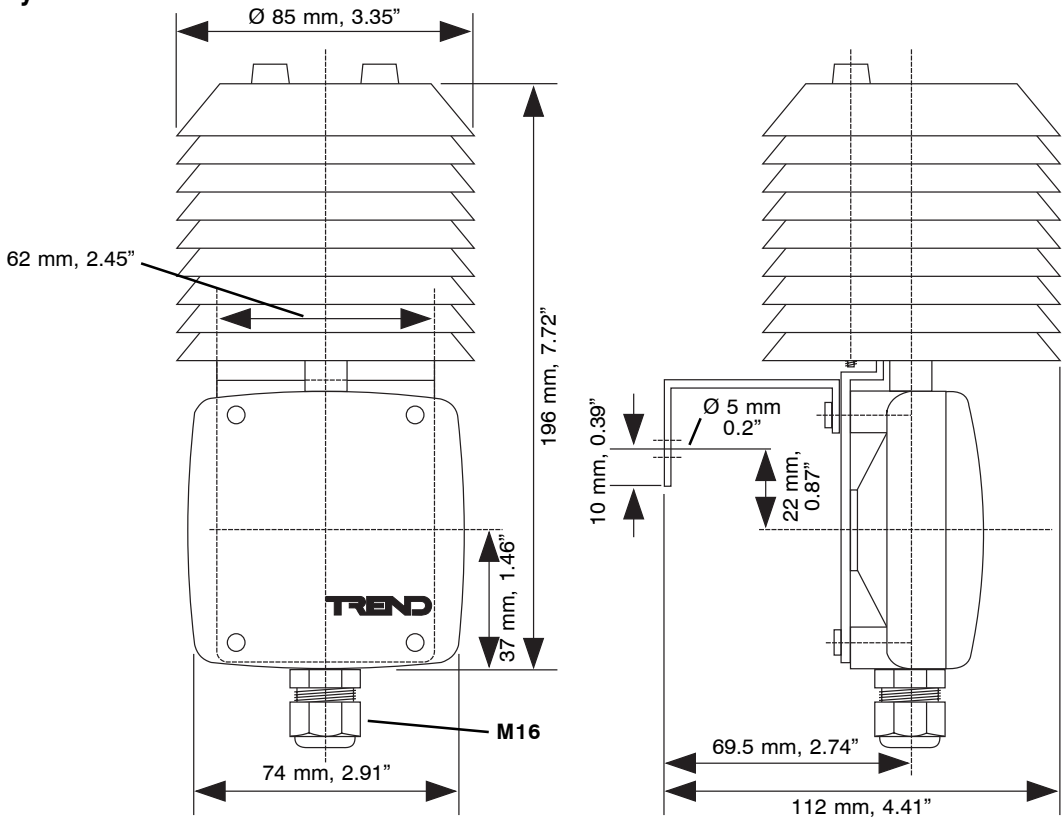
Description

Relative humidity and temperature sensors for outside air measurement applications, providing high quality humidity sensing combined with temperature monitoring. The HT/O offers excellent linearity and stability over a wide humidity range (0 to 100 %RH). This sensor is fitted with a radiation shield to avoid solar, rain and wind effects. Electronics are mounted in an IP65 (NEMA4) housing with M20 conduit entry with M16 cable gland.

Features

- Precalibrated for ease of commissioning
- IP65 housing
- Operates over 0 to 100 %RH non-condensing
- Humidity element protected by replaceable filter
- Capacitive humidity sensing element provides excellent long term stability
- Radiation shield reduces solar, rain, and wind effects

Physical



FUNCTIONALITY

The sensor contains a capacitive humidity sensing element, and a thermistor temperature sensing element. The humidity signal is converted to a 4 to 20 mA signal by the sensor electronics.

CALIBRATION

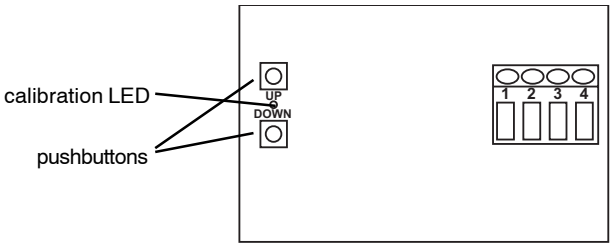
The humidity sensing part of the HT/O sensor may be manually calibrated by the user. This involves keeping the sensor and the humidity reference chamber in the same room for at least 4 hours prior to the calibration.
The humidity chamber should be thoroughly cleaned before use.
The humidity sensing probe should be placed in the humidity chamber (ACC/CAL/HT) at least 30 mins prior to the calibration.
A dirty filter cap should be replaced prior to calibration.
During calibration the temperature must be kept constant.

The sensor may be calibrated in two ways:

One point humidity calibration: This is quick and simple. It should be used when the working range is limited to a narrow range around the nominal humidity point. This form of calibration decreases accuracy over remainder of working range.

Two point humidity calibration: This should be used for accurate adjustment over the whole working range of the sensor, or for calibration if the sensor as been replaced. The sensor is calibrated, first at the bottom of the humidity range, and then at the top of the humidity range. The difference between the levels should be greater than 30 %RH.

The calibration is performed by using the 2 pushbuttons on the rear of the sensor pcb. The calibration LED will illuminate while the calibration is in progress. The procedure is described in the HT/O installation instructions TG200992.



INSTALLATION

The HT/O sensor should be located in a relatively sheltered environment, out of direct sunlight, preferably by a north or north west facing wall. The HT/O sensor should be mounted so that the 'beehive' is vertical.

Supply Voltage: The minimum supply voltage is 15 V when used with an IQ controller; if used with another device, the minimum voltage should be calculated from the equation:

minimum voltage = 10 + 0.02xR_{in} (where R_{in} is input resistance)

e.g. if R_{in} = 500 ohms

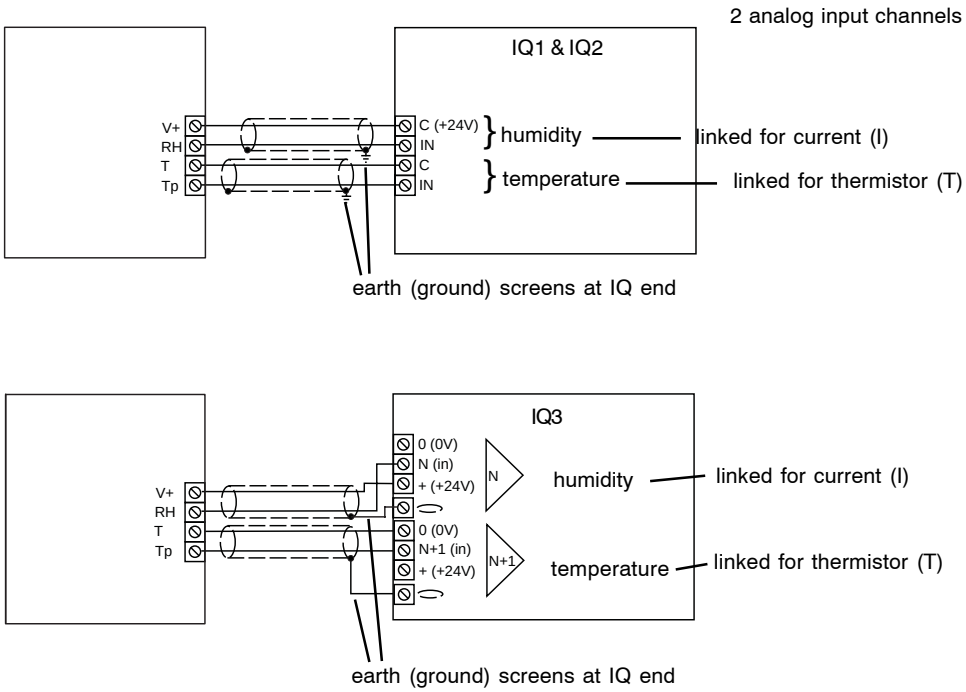
minimum voltage = 10 + 0.02x500 = 10 + 10 = 20 V

The installation involves:

- choose location
- mount on wall using screws and wall plugs supplied
- insert probe in shield gland
- remove sensor lid
- feed IQ cable through gland
- wire cables
- replace lid
- setup IQ channels (current (I) for humidity, and thermistor (T) for temperature
- configure IQ sensor modules
- test sensor

Full installation details are given in the HT/O Installation Instructions, TG200992.

CONNECTIONS



FIELD MAINTENANCE

The removal of dust, accuracy checking, and calibration is covered in the HT/O Installation Instructions, TG200992.

The accuracy of the sensor should be checked annually. If the sensor falls outside the quoted accuracy replace the filter and recalibrate.

PRODUCT CODE

HT/O	Outside humidity and temperature sensor with radiation shield incuding mounting bracket, screws, and wall plugs
ACC/HTO/FILTER	Replacement metal grid filter for HT/O (pack of 5 filters)
ACC/CAL/HT	Calibration chamber
ACC/CAL/HT/35%	Calibration solution - 35%RH
ACC/CAL/HT/80%	Calibration solution - 80%RH

DISPOSAL

WEEE Directive :

At the end of their useful life the packaging and product should be disposed of by a suitable recycling centre.
Do not dispose of with normal household waste.
Do not burn.

SPECIFICATIONS

Electrical

Humidity

Humidity measuring range :0 to 100 %RH
Humidity element :Capacitive RH element
Linearity :(0 to 98 %RH) less than ±1.5 %RH
Stability :(20 to 30 °C, 68 to 86 °F, 20 to 80 %RH) drift <1 %/year
Humidity accuracy :of sensor (at 23 °C, 73.5 °F, and 24 Vdc supply) ±2 %RH (0 to 90 %RH), ±3 %RH (90 to 100 %RH)
Temperature dependence
probe :typically 0.03%RH/°C (0.02%RH/°F)
electronics :typically 0.03%RH/°C (0.02%RH/°F
Hysteresis :(10% to 80% to 10%) typically 1.7 %RH
Resolution :0.05 %RH
Response time :(at 23 °C, 73.5 °F) t_{90} less than 30 s
Load resistance :Less than 500 Ω
Humidity output signal :4 to 20 mA for 0 to 100 %RH

Temperature

Temperature measuring range :-30 to +50 °C, -22 to + +122 °F
Temperature element :Thermistor 10 kΩ at 25 °C
Temperature accuracy :± 1 °C, ± 1.8 °F
Temperature output signal :Thermistor 10 kΩ at 25 °C
Supply voltage :15* to 30 Vdc
* see calculation on page 2 if connected to a non-IQ device

Input channels and sensor scaling

The IQ controller's input channels must be set up correctly as described below, and the sensor type modules must be set up with the correct scaling. It is recommended to use SET (software tool) for the setting of sensor type modules. For all IQ2 series controllers with firmware of version 2.1 or greater, or IQ3 series controllers, the SET Unique Sensor References should be used.

If not using SET, use the appropriate manual settings and tables described below for all IQ2 series controllers with firmware version 2.1 or greater or IQ3; for all other IQ controllers see the

Humidity
Link input channel for current, I.
SET Unique Sensor Reference: **Humidity I**
Manual setting: 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 humidity accuracy of sensor

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
Link input channel for thermistor, T.
SET Unique Sensor References:
Thermistor HTOT DT (°C)
Thermistor HTOT DT F (°F)

Manual setting: 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 °C, ±1.8 °F (0 to +40 °C, 32 to 104 °F)

Units:		°C	°F
Y	Input type	1 (therm V)	
E	Exponent	3	
U	Upper	55	131
L	Lower	-35	-31
P	Points	11	
x	Ix	Ox	
1	2.641	50	122
2	3.470	40	104
3	4.460	30	86
4	6.663	10	50
5	7.668	0	32
6	8.102	-5	23
7	8.482	-10	14
8	8.807	-15	5
9	9.078	-20	-4
10	9.299	-25	-13
11	9.476	-30	-22

*Note that for IQ3 the scaling mode and exponent do not need to be set up.

Mechanical

Dimensions :irregular (see 'Physical' page 1)
Cable entry :M16(Pg9)
Material
Probe :Polycarbonate (flammability HB)
Housing :Polycarbonate (flammability HB)
Filter :Metal grid (stainless steel wire mesh)
Radiation Shield Louvres :ABS (UV stabilisd)
Radiation Shield Brackets :Stainless steel
Connectors :1 part screw terminals for 0.2 to 1.5 mm² (16 to 24 AWG) max. cable.
Weight :424 gm, 14.9 ozs

Environmental

CE Compatibility :EN61000-6-2, EN61000-6-3
Working ambient limits
probe temperature :-40 °C (-40 °F) to +60 °C (140 °F)
electronics temperature :-40 °C (-40 °F) to +60 °C (140 °F)
humidity :0 to 100 %RH non-condensing
Storage temperature :-25 °C (-13 °F) to +60 °C (140°F)
Protection (housing) :IP65

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Trend Control Systems Limited
P.O. Box 34, Horsham, West Sussex, RH12 2YF, UK. Tel:+44 (0)1403 211888 Fax:+44 (0)1403 241608 www.trend-controls.com

Trend Control Systems USA
6670 185th Avenue NE, Redmond, Washington 98052, USA. Tel: (425)897-3900, Fax: (425)869-8445 www.trend-controls.com