

External Black Bulb Sensors

Features



- Wide range of element types
- IP65 Housing

Specification

Output types:

Thermistor	Resistive
Active	4-20mA or 0-10Vdc (selectable)

Accuracy:

Thermistor	±0.2°C (0°C to 70°C)
PT100a	±0.35°C (0°C to 100°C)
PT1000a	±0.35°C (0°C to 100°C)
NI1000	±0.35°C (0°C to 100°C)

Housing:

Material	ABS (flame retardant)
Dimensions	55 x 90mm dia.

Black bulb:

Material	Anodised aluminium
Dimensions	17.5 x 37mm dia.

Ambient range -10 to 60°C

Country of origin UK

Product Codes

TT-535-A	(10K3A1) Trend, Seachange, Honeywell Aquatrol
TT-535-B	(10K4A1) Andover, Delta Controls, York <40°C, Siebe
TT-535-C	(20K6A1) Honeywell
TT-535-D	(PT100a) Serck
TT-535-E	(PT1000a) Cylon
TT-535-F	(NI1000a) Sauter
TT-535-G	(Ni1000a/TCR(LAN1)) Siemens, Landis & Staefa
TT-535-H	(SAT1) Satchwell
TT-535-K	(STA1) Landis & Staefa
TT-535-L	(TAC1) TAC
TT-535-M	(2.2K3A1) Johnson Controls
TT-535-N	(3K3A1) Alerton
TT-535-P	(30K6A1) Drayton
TT-535-Q	(50K6A1) Ambiflex
TT-535-S	(SAT2) Satchwell
TT-535-T	(SAT3) Satchwell
TT-535-W	(SIE1) Siebe
TT-535-Y	(STA2) Landis & Staefa

Active output:

TT-535-CVO

4-20mA/0-10Vdc selectable output

TT-535-CVO-C

4-20mA/0-10Vdc selectable output custom temp. scaling

Comfort Temperature

Comfort temperature measurement is best achieved by taking into account the radiant effect of surfaces within the controlled space. The comfort temperature is specified as the average of the conductive temperature and the radiant temperature.

$$T_{\text{comfort}} = \frac{T_{\text{radiant}} + T_{\text{conductive}}}{2}$$

Technical Overview

The TT-535 is a black bulb temperature sensor used for radiant heat in outdoor spaces.

Black bulb temperature sensors are used to calculate comfort temperature which is specified as the average of the conductive temperature and the radiant temperature.

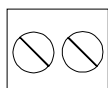
Units contain either a high quality thermistor, Platinum or Nickel sensing element. Sensor types compatible with most controls manufacturers' equipment are available.

Installation

1. It is recommended that the unit be mounted with the cable entry at the bottom.
2. If the cable is fed from above then into the cable gland at the bottom, it is recommended that a rain loop be placed in the cable before entry into the sensor.
3. Remove the front cover by twisting the lid and separating from the main body.
4. Using the base of the housing as a template mark the hole centres. Drill two pilot holes at 85mm centres in the surface to which the sensor is to be mounted.
5. Fix the sensor to the wall using appropriate screws.
6. The housing is designed to make it easy for an electrical screwdriver to be used if desired.
7. Feed the cable through the waterproof gland and terminate at the terminal block. Leaving some slack inside the housing, tighten the cable gland onto the cable to ensure water tightness.
8. Replace the lid after the electrical connections have been made.

Connections

Resistive output:



Connections are made via the 2-way terminal block. Connections for the thermistor/platinum and nickel elements are polarity independent.

Connections (continued)

4-20mA/0-10Vdc:

For full connection and specification please refer to the TT-CVO datasheet.

Trend Scaling

IQ1xx and early IQ2x series (without type 5, characterise)
Thermistor A (10K3A1 TYPE 2 linearise thermistor volts)

(-10 to +40°)

Brange	-10
Trange	40
F	8.47
G	7.42
H	6.11
I	4.73
J	3.48

Q2xx and early IQ3 series (with type 5, characterise)

(-10 to +40°C)

	Resistance Input	Temp. Output
1	5.32	40.0
2	5.89	37.5
3	6.53	35.0
4	7.24	32.5
5	8.05	30.0
6	8.96	27.5
7	10.00	25.0
8	11.16	22.5
9	12.49	20.0
10	14.00	17.5
11	15.71	15.0
12	17.67	12.5
13	19.90	10.0
14	22.47	7.5
15	25.40	5.0
16	28.79	2.5
17	32.66	0.0
18	37.18	-2.5
19	42.35	-5.0
20	55.30	-10.0

Upper	40.0
Lower	-10.0
Exp	3
Points used	20
Input type	3(kohms)