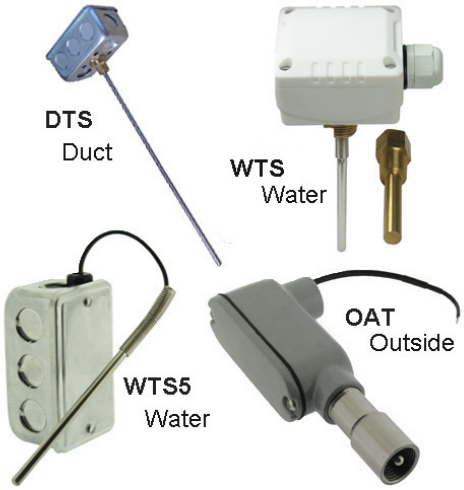
Description

Temperature sensors are used to measuring the temperature for the air conditioning industry.
This document shows the enclosures and temperature vs. resistance curves for the standard sensors.



General

The sensors employ precision interchangeable thermistors and RTD which are compatible with all the major building automation systems.

- Designed for temperature sensing in an HVAC and light industrial control applications.
- Precision interchangeability eliminates the necessity for individual circuit calibration.

There are several sensor element ranges to choose from, which guarantee compatibility with all popular DDC systems. The sensor elements are precision thermistors or platinum RTDs. Field calibration is not generally required. The probe is epoxy sealed to prevent moisture from migrating into the probe. Custom probe lengths, wire types and sensor elements are available for large OEM projects. Ask about our plastics & metal manufacturing capabilities for custom housings as well.

Part # Suffix	Sensor	Typical User
2	100 ohm Platinum 3-wire	Honeywell
5	1,801 ohm Thermistor	t.a.c. / CSI
6	3,000 ohm Thermistor	Alerton
7	10,000 ohm Thermistor ‘Type2’	Trane, Automated Logic, Temco, t.a.c., CSI, Solidyne, Alerton
9	100,000 ohm Thermistor	Siemens(Landis & Staefa)
11	LM334 IC sensor	t.a.c. / CSI
12	1000 ohm Platinum	Invensys(siebe), Honeywell, Johnson Controls, Siemens (Landis & Staefa)
13	1000 ohm Nickel	Johnson Controls
20	20,000 ohm Thermistor	Honeywell
21	LM335 IC Sensor	Solidyne, IECC
24	10,000 ohm Thermistor, ‘Type 3’	Andover, AAM, Teletrol, Invensys(Siebe), Multinet, Delta, Carrier, KMC, Temco

Specification

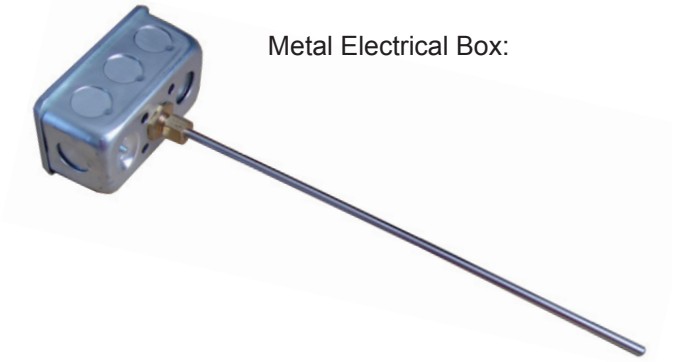
Sensor Type	Accuracy	Operating Temperature Range
10,000 ohm Thermistor ‘Type2’	+/- 0.2°C	-40°C to 125°C
10,000 ohm Thermistor, ‘Type 3’	+/- 0.2°C	-50°C to 105°C
100,000 ohm Thermistor	+/- 0.3°C	-40°C to 125°C
1000 ohm Platinum	+/- 0.4°C	-200°C to 600°C
100 ohm Platinum	+/- 0.4°C	-200°C to 300°C
Probe Material	Stainless Steel 304, 1mm thick wall	
Cable Property	FT4, 105°C, 300V standard or 200°C, 300V high temperature on request.	
Cable Material	PVC standard or High temperature silicon available on request.	
Exposure Rating	IP65, for outdoor use	

Temperature Curves:

Thermister Type, Ohms / Part Number Suffix						
Part # -> DegC	**3K 6**	**10K Type2 7**	**10K Type3 24**	**20K 20**	**100K 9**	**1K RTD 12**
-40	100,701	335,671	239,700	814,000	4,067,212	843
-35	72,658	242,195	187,500	578,600	2,890,843	863
-30	53,005	176,683	135,300	415,600	2,077,394	882
-25	39,073	130,243	107,105	301,000	1,508,530	902
-20	29,092	96,974	78,910	220,600	1,106,485	922
-15	21,868	72,895	63,225	163,600	819,378	941
-10	16,589	55,298	47,540	122,380	612,366	961
-5	12,694	42,314	38,515	92,300	461,683	980
0	9,795	32,650	29,490	70,200	351,017	1,000
5	7,618	25,395	23,460	53,800	269,041	1,020
10	5,971	19,903	18,790	41,560	207,807	1,039
15	4,714	15,714	15,130	32,340	161,702	1,059
20	3,748	12,493	12,260	25,340	126,729	1,078
25	3,000	10,000	10,000	20,000	100,000	1,105
30	2,416	8,056	8,194	15,884	79,428	1,117
35	1,959	6,530	6,752	12,696	63,489	1,136
40	1,597	5,324	5,592	10,210	51,058	1,155
45	1,310	4,366	4,655	8,258	41,301	1,175
50	1,080	3,601	3,893	6,718	33,598	1,194
55	896	2,985	3,327	5,494	27,479	1,205
60	746	2,487	2,760	4,518	22,593	1,232
65	625	2,082	2,375	3,734	18,669	1,244
70	526	1,751	1,990	3,100	15,502	1270.7
75	444	1,480	1,724	2,586	12,932	1,290
80	377	1,256	1,458	2,186	10,837	1308.9
85	321	1,070	1,271	1,824	9,121	1,328
90	275	916	1,084	1,542	7,709	1,347
95	236	787	950	1,308	6,542	1,366
100	204	679	817	1,114	5,574	1385
105	176	587	720	953	4,767	1,404
110	153	510	624	818	4,093	1422.9
115	133	445	553	705	3,525	1,442
120	117	389	481	609	3,046	1,460

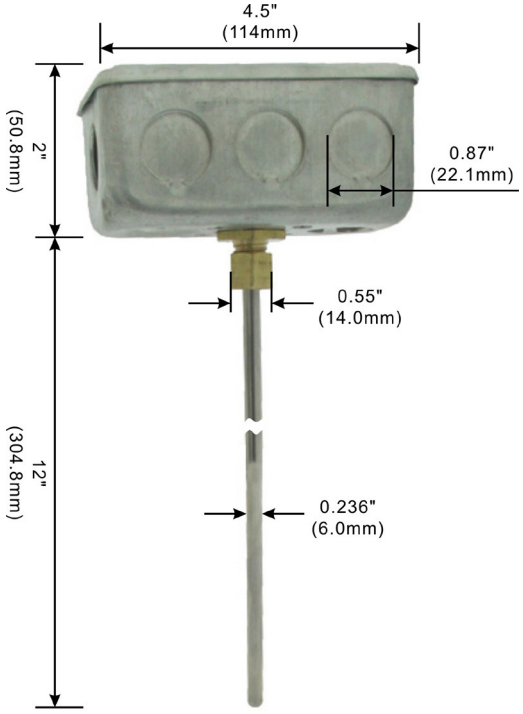
Duct Temperature Sensor

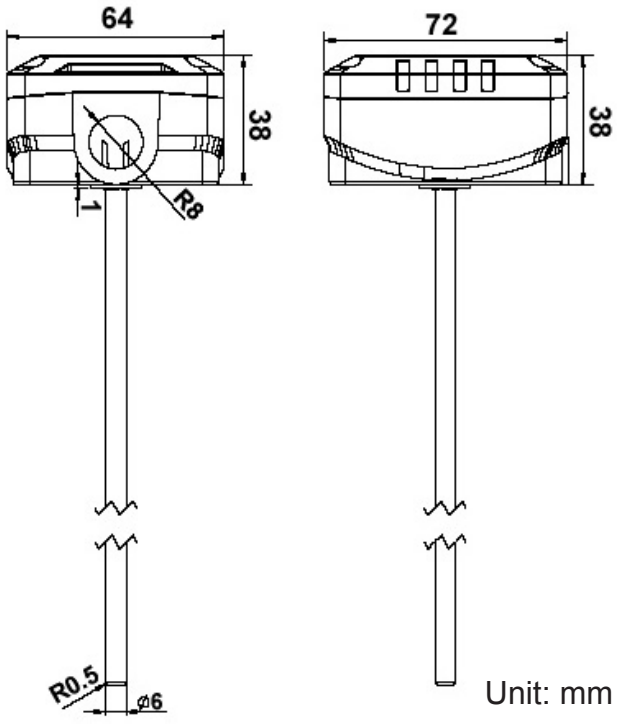
Metal Electrical Box:



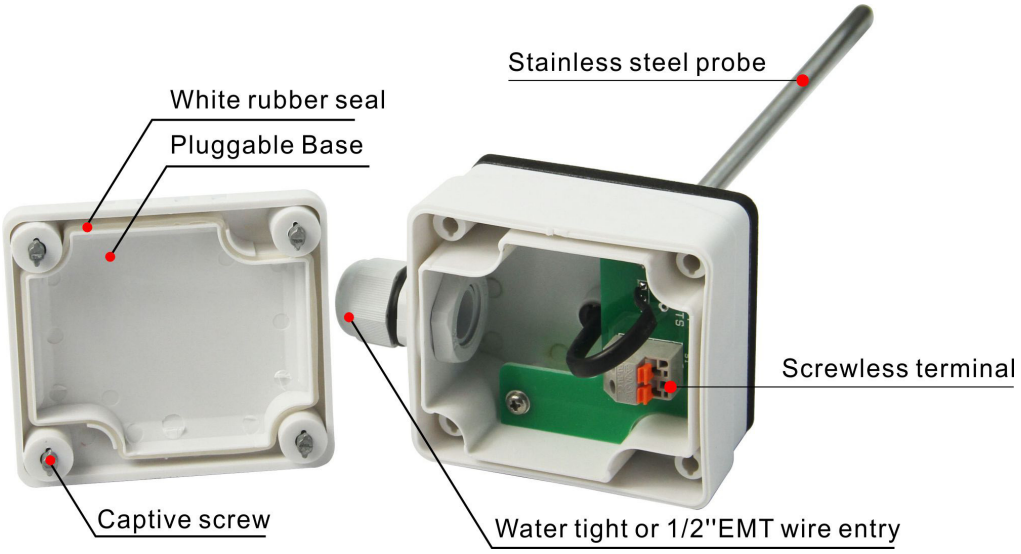
Plastic Water Resistant Box:

Dimension:





Unit: mm



Part Number Scheme:

DTS - WP - 12 - 7

Code	Description
DTS	Duct Temperature Sensor

Code	Enclosure
WP	Watertight Plastic Box
E	Metal Box

Code	Temperature Curve
2	100PT
7	10K type 2
12	1K PT

Code	Probe Length
4	4inch
6	6inch
8	8inch
12	12inch

*Thermistors, pt elements and probe sizes for all popular control systems are available, send us an email if you don’t see what you need online.

DTS-FL: Flange Mount Duct Temperature Sensor

Description:

This sensor is used to measure the supply and return temperature in HVAC system. The flange mount design makes it easy to install the sensor in tight quarters. There are several sensor elements to choose from which guarantee compatibility with all popular DDC systems. The probe in the photo is out standard model which is always in stock, it has a 8 inch probe and 6 inch long cable, and employs either a precision thermistor or platinum film sensor field calibration is not generally required. The 10ft(3m) cable is plenum rated.

Contruction:

The sensor is a high quality unit manufactured to high standards, using materials and assembly techniques. The probe material is stainless steel with a welded and ground tip.The DTS probe is baked and then epoxy sealed to eliminate long term moisture problems. The flange accepts two #6 screws, and is made from glavanized steel.

DTS - FL - 12 - 12 - 7

Code	Description
DTS	Duct Temperature Sensor

Code	Description
FL	Flange mount

Code	Probe Length
4	4inch
8	8inch
9	9inch
12	12inch

Code	Temperature Curve
6	3K
7	10K type 2
12	1K PT
24	10K type 3

Code	Wire Length
6	6inch
12	12inch(1ft)
120	120inch(10ft)

*Thermistors, pt elements and probe sizes for all popular control systems are available, send us an email if you don’t see what you need online.

DTS-PF: Plastic Flange Duct Temperature Sensor

This sensor is used to measure the supply and return temperature in HVAC system. The plastic flange mount design makes it easy to install the sensor in tight quarters. There are several sensor elements to choose from which guarantee compatibility with all popular DDC systems. The probe in the photo is out standard model which is always in stock, it has a 8 inch probe and 8 inch long cable, plenum rated cable, 10K type 2 thermistors.

Part Number Scheme:

DTS - PF - 8 - 8 - 7

Code	Description
DTS	Duct Temperature Sensor

Code	Description
PF	Plastic Flange

Code	Probe Length
4	4inch
6	6inch
8	8inch
12	12inch

Code	Temperature Curve
7	10K type 2
12	1K PT
24	10K type 3

Code	Wire Length
6	6inch
8	8inch
12	12inch(1ft)
120	120inch(10ft)

*Thermistors, pt elements and probe sizes for all popular control systems are available, send us an email if you don't see what you need online.

OAT: Outside Air Temperature Sensor

This sensor is used to measure the outside air temperature to allow the DDC system to coordinate the mechanical systems with actual building load conditions, enabling such strategies as free cooling, optimum start / stop, and supply temperature reset.

The housing is made from PVC electrical fittings which shield the probe from direct sunlight. The probe is manufactured to industrial standards. There are three thermistor based models, and one RTD version to provide compatibility with the majority of DDC systems. The sensors are accurate enough that calibration is not usually required.

Contruction:

The sensor probe is made from stainless steel which is welded, ground down, and finally pressure tested before assembling. The probe is then baked and epoxy sealed to provide long term protection from moisture.

The sensor housing is a PVC electrical enclosure which is UL approved for outdoor use. The housing extends over the probe to protect from sunlight radiation.

The sensor lead extends 12” from the enclosure, making it long enough to reach a junction box and terminate inside the building.

Installation:

The sensor probe is made from stainless steel which is welded, ground down, and finally pressure tested before assembling. The probe is then baked and epoxy sealed to provide long term protection from moisture.

The sensor housing is a PVC electrical enclosure which is UL approved for outdoor use. The housing extends over the probe to protect from sunlight radiation.

The sensor lead extends 12” from the enclosure, making it long enough to reach a junction box and terminate inside the building.

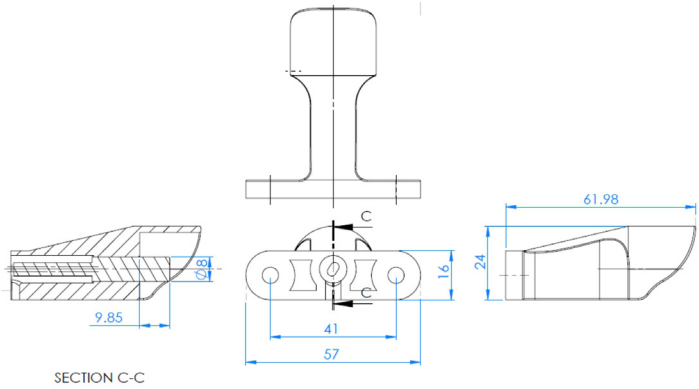
OAT: Outdoor Air Temperature Sensor

Description:

The temperature sensor is designed to measure outdoor air temperature. The sensor isdesigned for mounting in a standard ½" knock out.The temperature sensor uses a 10K Ω thermistor. The thermistor is enclosed in a plastic housing.The sensor has a short 20AWG black leads. It is designed for use in residential and commercial building automation controls. It features a fast response, precision thermistor sensing element that is totally sealed against the outdoor elements. The PVC sun-shield prevents false readings from direct sunlight. An optional weatherproof electrical box allows for simple installation and provides an extra rugged and reliable sensor for energy management and HVAC applications.

Features:

- General purpose outdoor air temperature sensor
- Available in threaded PVC version with rugged weatherproof electrical box
- Easy installation - just threads into mounting hole or standard handy box installation
- Fully potted metal housing protects sensing element and provides fast, accurate temperature sensing
- Cost efficient design
- Sturdy construction - all plastic housing with PVC solar shield with optional weatherproof electrical box



Part Number Scheme:

OAT - M - 7

Code	Description
OAT	Outdoor Air Temperature Sensor

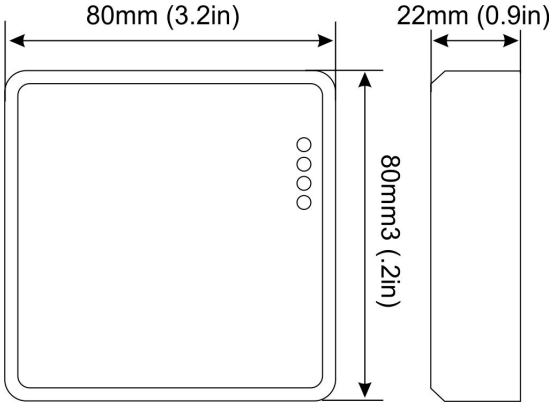
Code	Enclosure
M	Metal Enclosure
P	Plastic Enclosure

Code	Temperature Curve
6	3K
7	10K type 2
9	100K
12	1K PT
24	10K type 3

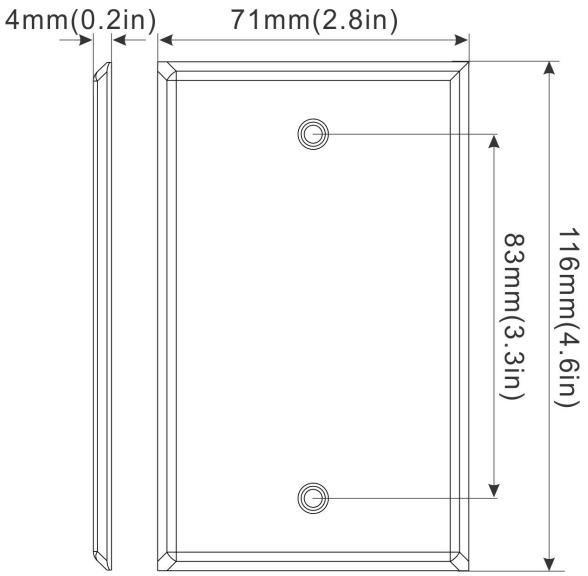
*Thermistors, pt elements and probe sizes for all popular control systems are available, send us an email if you don't see what you need online.

Room Temperature Sensor

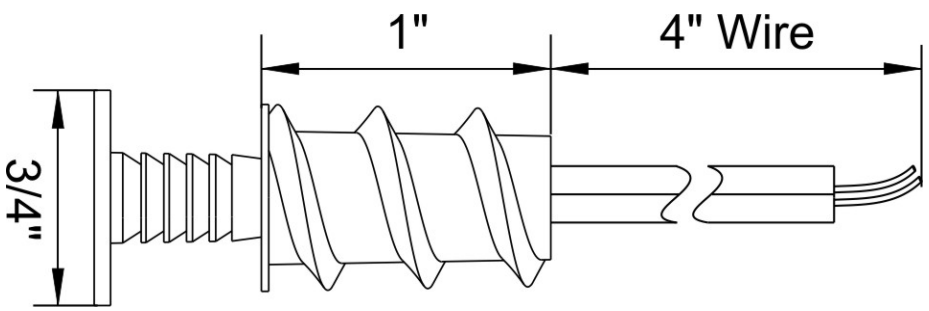
RTS: Room temperature sensor, 10K type 2



RTS1: Tamper proof room temperature sensor, 10K type 2

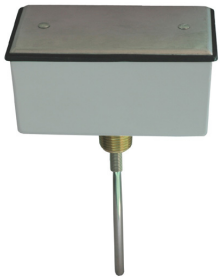


RTS3: Flush mounting sensor, 10K type 2



WTS Series Water Temperature Sensor

WTS-MO:



Outdoor Rated

WTS-WP:

Watertight Plastic

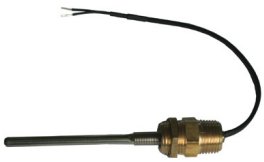
Plastic Fitting
Provided by Default

Electrical Fitting
Not Included

WTS-M1:

Metal

WTS-P:



Probe Only

Installation:

Locate water temperature sensor at least a few pipe diameters downstream any heat or cooling source:

- A 1/2” NPT female pipe fitting is welded into the pipe. These fittings are usually supplied and installed by the piping trade under direction of the controls trade.
- Choose an orientation where any condensation will not collect, such as the top of a horizontal pipe section or at a 45° angle from horizon.
- Before threading the sensor into the well, deposit some thermal paste in the bottom of the well to improve heat conduction between the metal parts.
- The sensor is wired with two conductors, normally 18ga unshielded twisted pair.

Part Number Scheme:

WTS - WP - 4-12

Code	Description
WTS	Water Temperature Sensor

FC11UiE-v2.pdf

Code	Probe Size
M1	Metal 11-10 electrical box
MO	Metal outdoor electrical box
P	Probe
WP	Watertight plastic box

Code	Temperature Curve
2	100PT
7	10K Type2
12	1K PT
24	10K Type3

Code	Probe Length
2	2 inch
4	4 inch
6	6 inch

*Thermistors, pt elements and probe sizes for all popular control systems are available, send us an email if you don’t see what you need online.

WTS5 Series Strap on Water Temperature Sensor

WTS5-WP:

Plastic Fitting
Provided by Default

Electrical Fitting
Not Included

WTS5-M1:

Installation:

For measuring water temperature, the probe is strapped with plastic tie wraps or a metal strap onto the outside of the pipe and covered with insulation. The electrical box is mounted on a strut bar or on the wall near the pipe. Two conductors are required, 18ga, unshielded twisted pair is common.

Part Number Scheme:

WTS5 - WP - 7

Code	Description
WTS5	Strap-on Water Temp Sensor

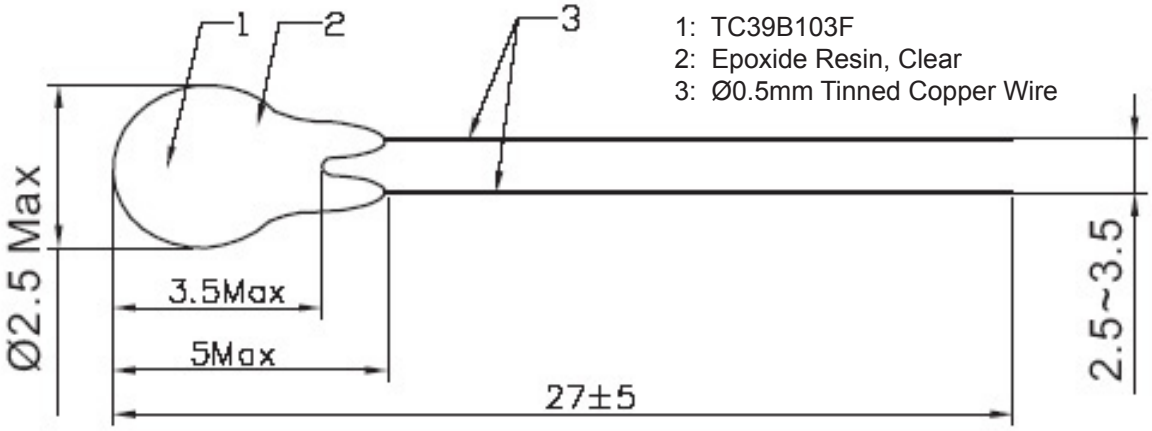
Code	Probe Size
M1	Metal 11-10 electrical box
WP	Watertight plastic box

Code	Temperature Curve
7	10K Type2

*Thermistors, pt elements and probe sizes for all popular control systems are available, send us an email if you don't see what you need online.

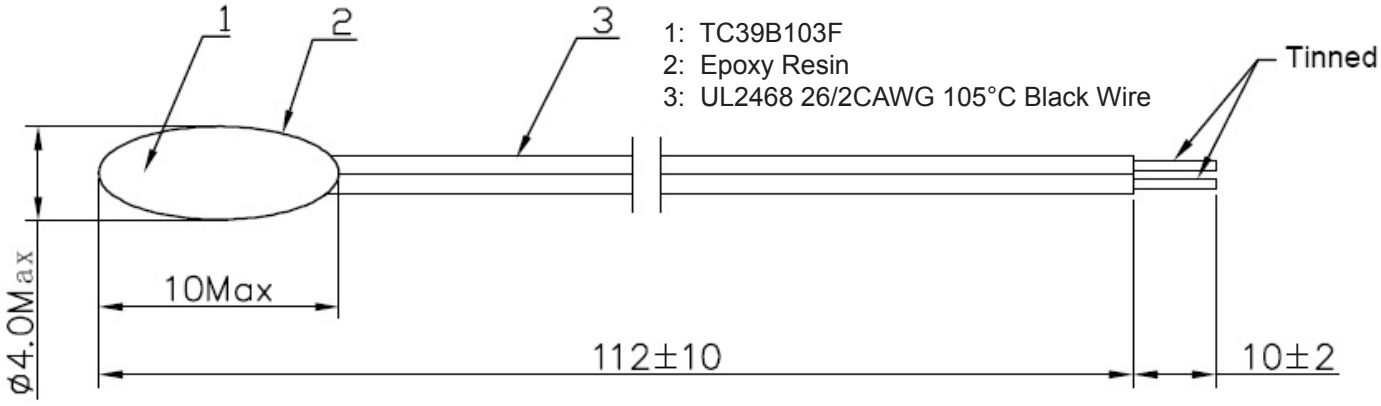
RTS-Raw 10K NTC Thermistor, Temco's standard thermistor element

Dimensions (mm):



RTS-Bead-4: Thermistor bead, 4"(10cm) lead, 10mm wire trimmed and tinned, 0.2DegC accuracy

Dimensions (mm):

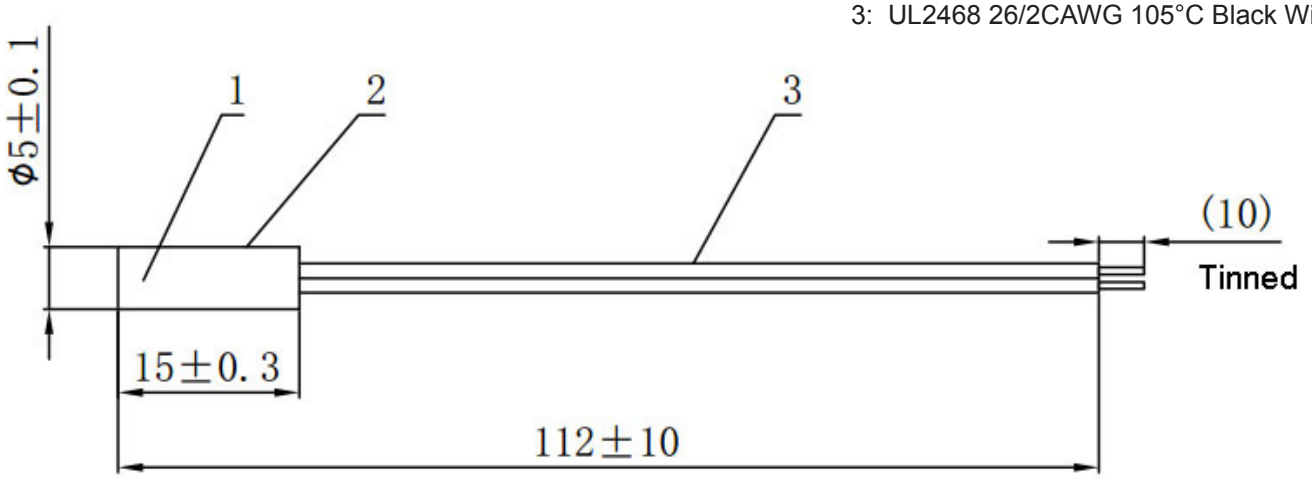


*Thermistors, pt elements and probe sizes for all popular control systems are available, send us an email if you don't see what you need online.

PRB-0.6-7 Temperature Sensor: 0.6” SS probe temp sensor, 10K thermistor, Type 2

Dimensions (mm):

1: TC39B103F
2: Ø5x15 Stainless Steel
3: UL2468 26/2CAWG 105°C Black Wire



Part Number Scheme:

PRB - 0.6 - 7

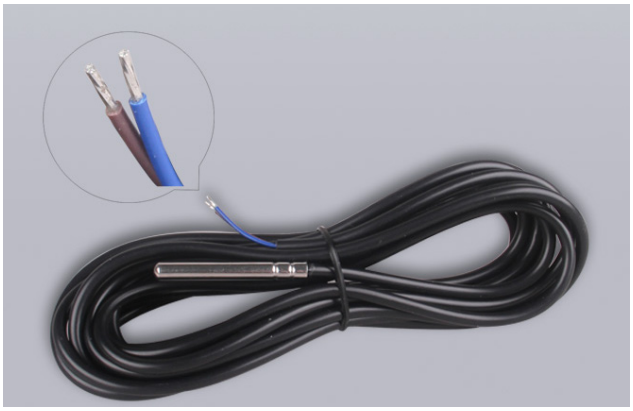
Code	Description
PRB	Temperature Probe

Code	Probe Size
0.6	0.6" stainless steel probe
*	Other lengths availabel, consult factory

Code	Temperature Curve
6	3K
7	10K Type2
9	100K
12	1K PT
24	10K Type3

*Thermistors, pt elements and probe sizes for all popular control systems are available, send us an email if you don’t see what you need online.

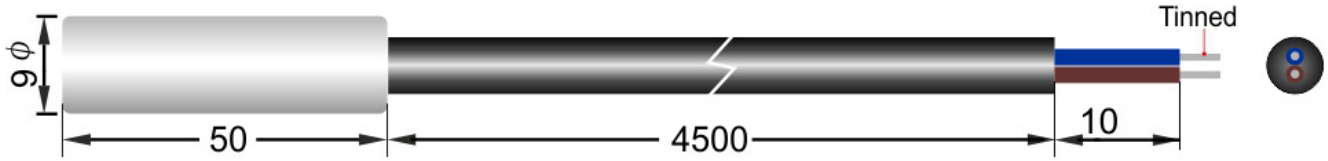
PRB-50-45-7 Temperature Sensor: ID6 X 50mmprobe temp sensor, 10K thermistor, Type 2



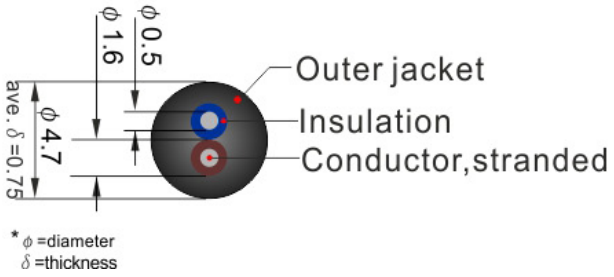
Dimensions:

unit:mm

1: Ø6x50 Stainless Steel
2: UL2464 20/2CAWG 105°C Black Wire



cross-section



Part Number Scheme:

PRB - 50 -45- 7

Code	Description
PRB	Temperature Probe

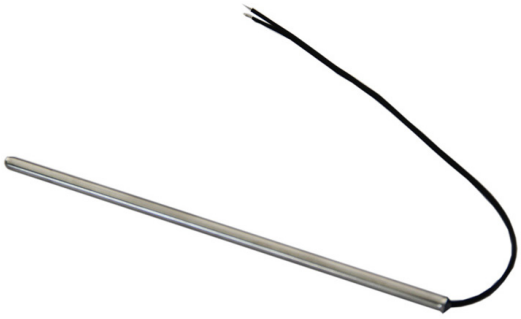
Code	Description
50	50mm stainless steel probe
*	Other lengths available, consult factory

Code	Temperature Curve
7	10K Type 2
24	10K Type 3
12	1K PT
*	Other curve available, consult factory

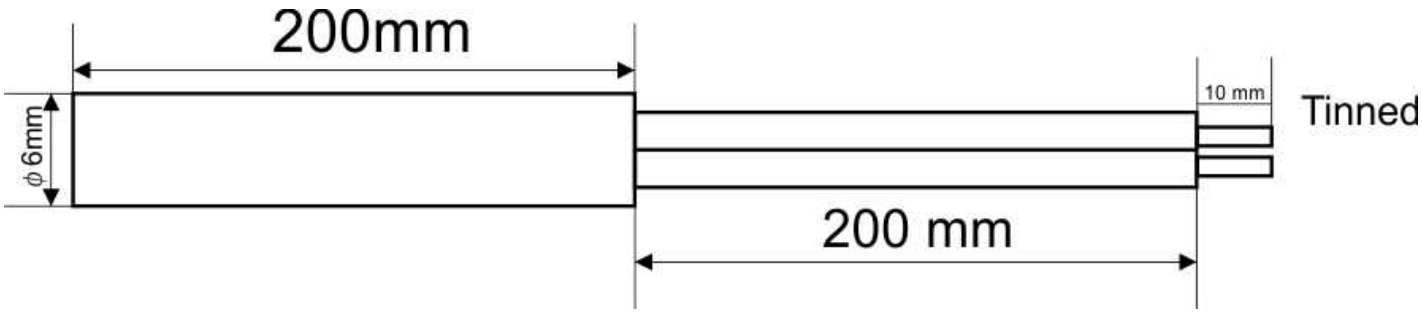
Code	Cable length
45	4.5m
*	Other lengths available, consult factory

*Thermistors, pt elements and probe sizes for all popular control systems are available, send us an email if you don't see what you need online.

PRB-8-8-12 Temperature Sensor: ID6mm X 200mm probe temp sensor, 1K Platinum thermistor



Dimensions (mm):



Part Number Scheme:

PRB - 8 -8- 12

Code	Description
PRB	Temperature Probe

Code	Probe Length
8	8in

Code	Temperature Curve
2	100PT
6	3K
7	10K Type2
9	100K
12	1K PT
24	10K Type3

Code	Cable length
8	8in

*Thermistors, pt elements and probe sizes for all popular control systems are available, send us an email if you don't see what you need online.

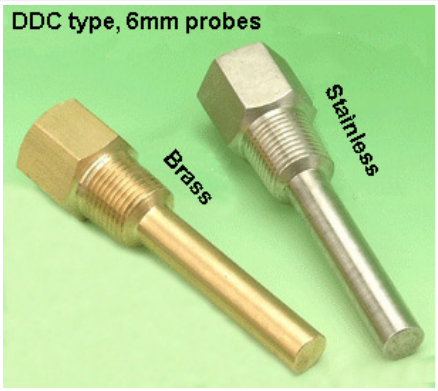
Accuracy Table:

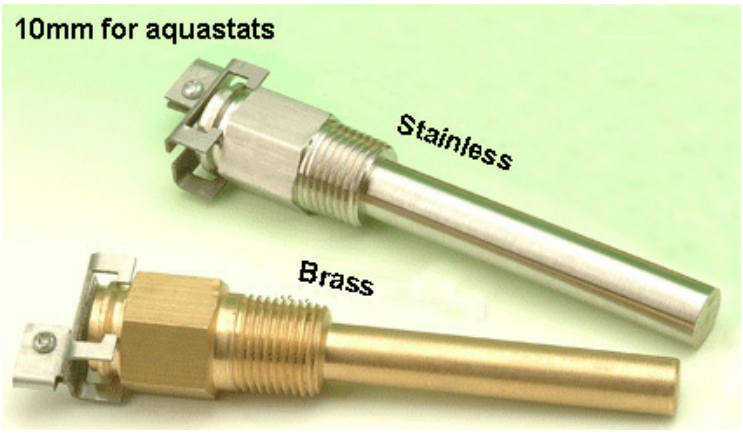
ACTUAL	RTD ACCURACY +/- °C PT100 Ω ALPHA 0.003850 to DIN 43760 IEC751 DIN EN 60 751			
	B GRADE	A GRADE	BAND 3 (1/3 DIN)	BAND 5 (1/10 DIN)
-200 °C	1.30 °C	0.55 °C	0.39 °C	0.38 °C
-150 °C	1.05 °C	0.45 °C	0.23 °C	0.21 °C
-100 °C	0.80 °C	0.35 °C	0.15 °C	0.12 °C
-90 °C	0.75 °C	0.33 °C	0.14 °C	0.10 °C
-80 °C	0.70 °C	0.31 °C	0.13 °C	0.09 °C
-70 °C	0.65 °C	0.29 °C	0.12 °C	0.08 °C
-60 °C	0.60 °C	0.27 °C	0.11 °C	0.07 °C
-50 °C	0.55 °C	0.25 °C	0.10 °C	0.06 °C
-40 °C	0.50 °C	0.23 °C	0.10 °C	0.06 °C
-30 °C	0.45 °C	0.21 °C	0.09 °C	0.05 °C
-20 °C	0.40 °C	0.19 °C	0.09 °C	0.04 °C
-10 °C	0.37 °C	0.17 °C	0.08 °C	0.03 °C
0 °C	0.30 °C	0.15 °C	0.08 °C	0.03 °C
10 °C	0.35 °C	0.17 °C	0.09 °C	0.04 °C
20 °C	0.40 °C	0.19 °C	0.10 °C	0.04 °C
30 °C	0.45 °C	0.21 °C	0.11 °C	0.05 °C
40 °C	0.50 °C	0.23 °C	0.12 °C	0.06 °C
50 °C	0.55 °C	0.25 °C	0.13 °C	0.07 °C
60 °C	0.60 °C	0.27 °C	0.14 °C	0.08 °C
70 °C	0.65 °C	0.29 °C	0.16 °C	0.09 °C
80 °C	0.70 °C	0.31 °C	0.17 °C	0.10 °C
90 °C	0.75 °C	0.33 °C	0.18 °C	0.11 °C
100 °C	0.80 °C	0.35 °C	0.19 °C	0.12 °C
110 °C	0.85 °C	0.37 °C	0.20 °C	0.13 °C
120 °C	0.90 °C	0.39 °C	0.21 °C	0.14 °C
130 °C	0.95 °C	0.41 °C	0.22 °C	0.15 °C
140 °C	1.00 °C	0.43 °C	0.24 °C	0.15 °C
150 °C	1.05 °C	0.45 °C	0.25 °C	0.16 °C
160 °C	1.10 °C	0.47 °C	0.26 °C	0.17 °C
170 °C	1.15 °C	0.49 °C	0.27 °C	0.18 °C
180 °C	1.20 °C	0.51 °C	0.29 °C	0.19 °C
190 °C	1.25 °C	0.53 °C	0.30 °C	0.21 °C
200 °C	1.30 °C	0.55 °C	0.31 °C	0.22 °C

Wells (Brass and Stainless Steel):

Description:

The stainless steel and brass thermowells which is machined from a single piece of bar stock, no welds, are designed for mounting temperature sensors in pipes and tanks. The thermowells are designed to reduce the stress encountered in a flowing fluid installation which produces a constantly oscillating force that can eventually crack a probe unless mounted within one of these wells. The wells are designed to handle the stress, while providing good thermal contact with fluid. They also provide isolation, if the sensor needs to be serviced the system can remain in operation without having to drain the lines.





Features & Options:

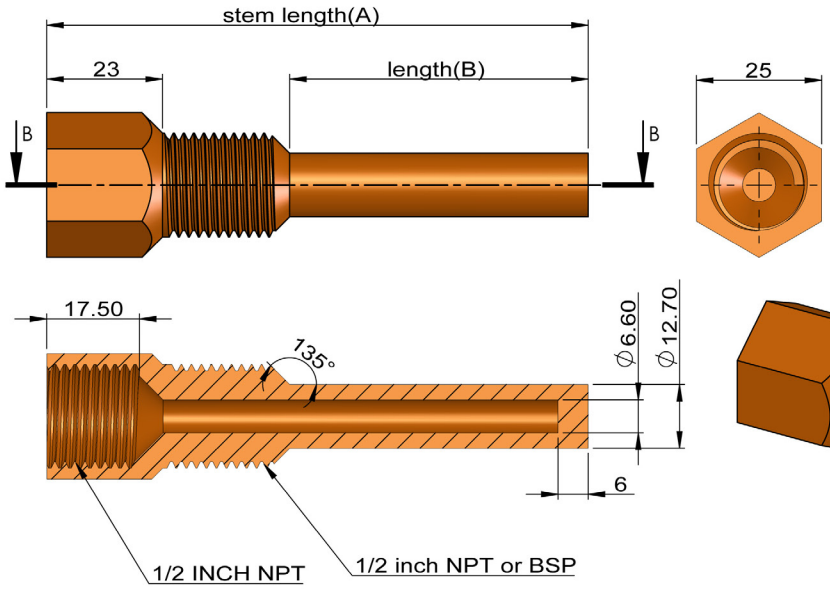
- Five Lengths: 2”, 3”,4” , 6”,and 8”
- Stainless Steel (304) or Brass
- Construction: machined from a single piece of bar stock, no welds.
- Other Lengths or Materials Available Upon Request
- Limited Lifetime Warranty
- NPT or BSP thread need to be specified when order

Specifications:

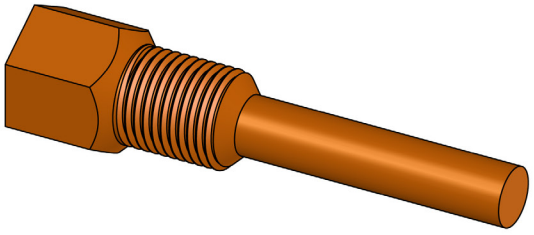
Maximum Fluid Velocity (Stainless steel 304)				
Thermowell lengths	2.5”	4”	6”	10”
Steam, air, gas& fluids with similar density	300 ft/sec	109 ft/sec	39.5 ft/sec	20.1 ft/sec
Water flow (safe values)	148 ft/sec	82.2 ft/sec	39.5 ft/sec	20.1 ft/sec

Maximum Fluid Velocity (Stainless steel 304)				
Temperature	70F	200F	400F	600F
Pressure	1600 psi	1600 psi	1600 psi	1600 psi

Dimensions



standard		
inch	stem length(A)	length(B)
2"	60mm	11.5mm
3"	70mm	26.5mm
4"	108mm	59.5mm
6"	155mm	106.5mm
8"	200mm	151.5mm



note

internal thread is standard for NPT

Part Number Scheme:

WL-H-B-4-N

Code	Description
WL	Thermo well

Code	Inner Diameter
H	10mm for aquastats
-	DDC type, 6mm probes

Code	Material
B	Brass
S	Stainless steel 304

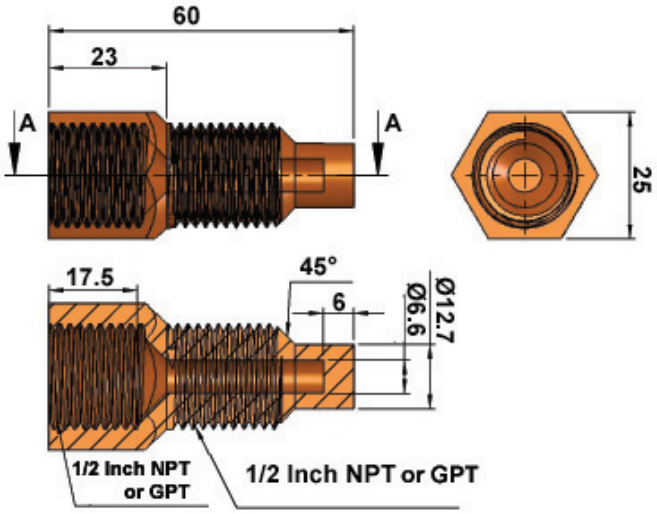
Code	Thread
N	NPT tapered thread
B	BSP British standard

Code	Probe Length
2	2 inch probe
3	3 inch probe
4	4 inch probe
6	6 inch probe
8	8 inch probe

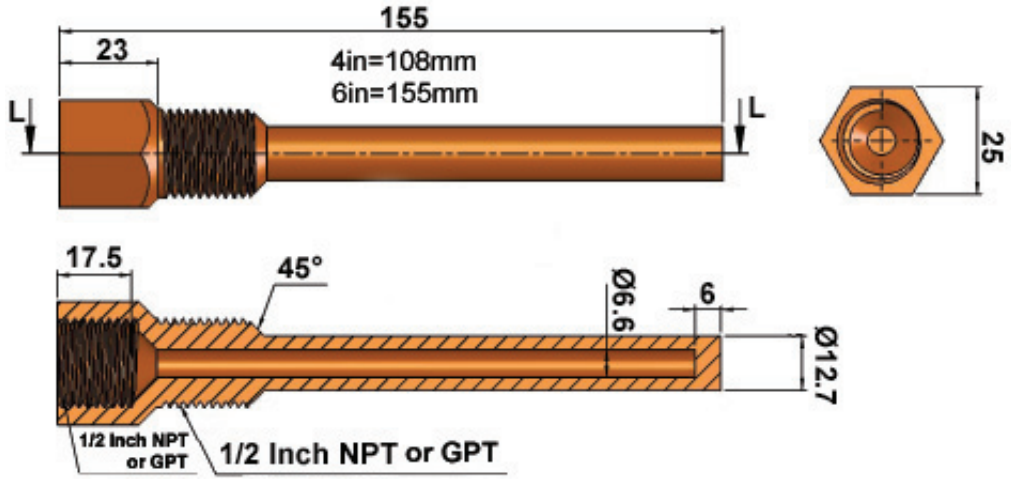
*Thermistors, pt elements and probe sizes for all popular control systems are available, send us an email if you don't see what you need online.

DDC Type:

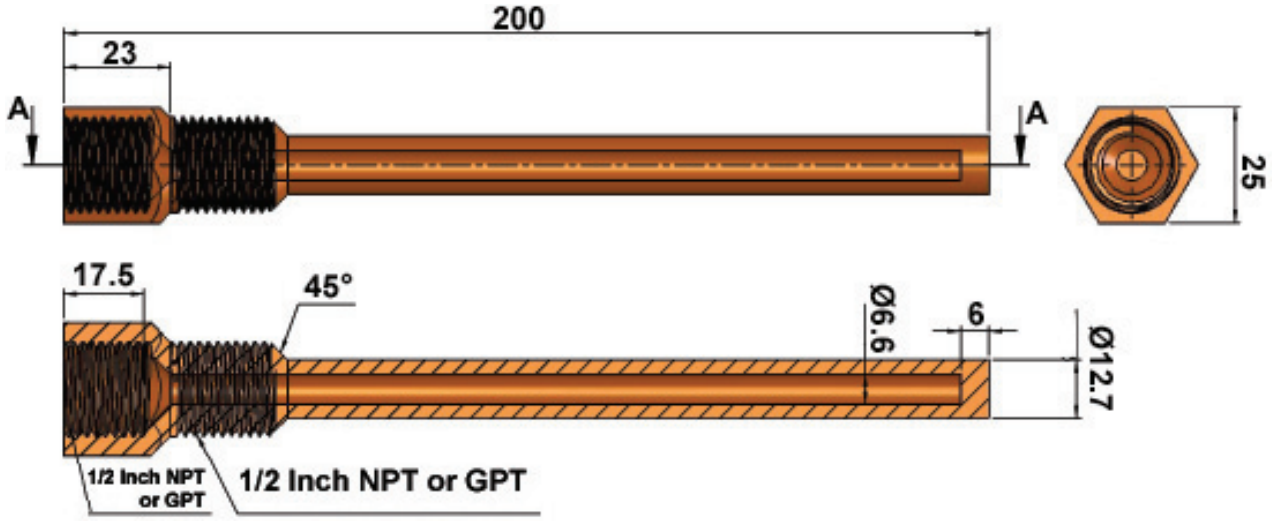
2 inch Dimensions (mm):



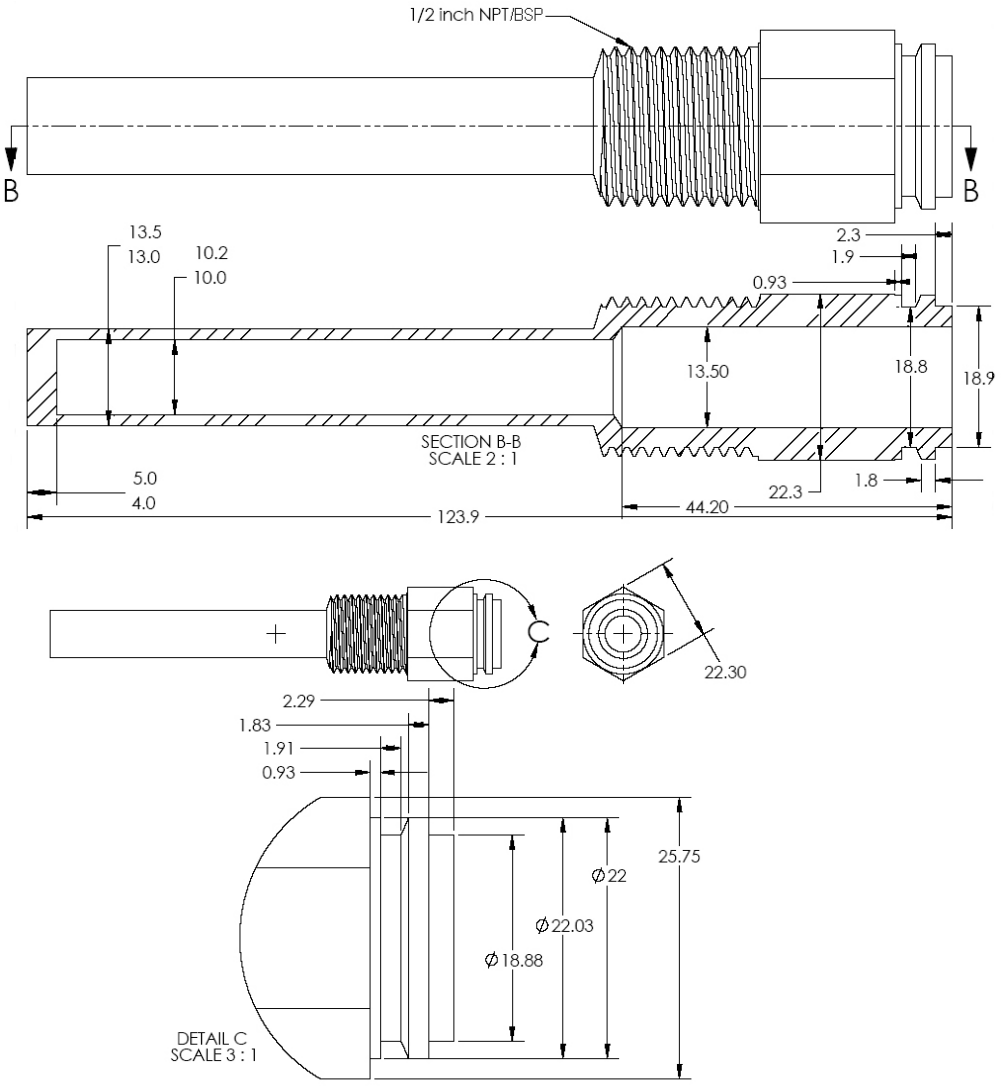
4 inch & 6 inch Dimensions (mm):



8 inch Dimensions (mm):

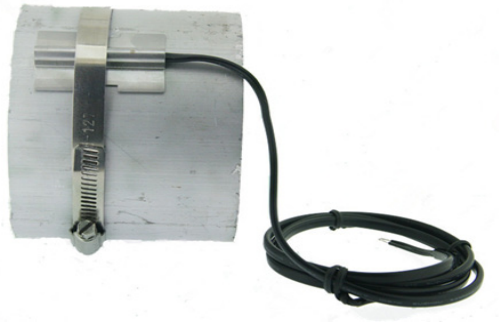


10mm for aquastats:



Strap On Temperature Sensor

Features

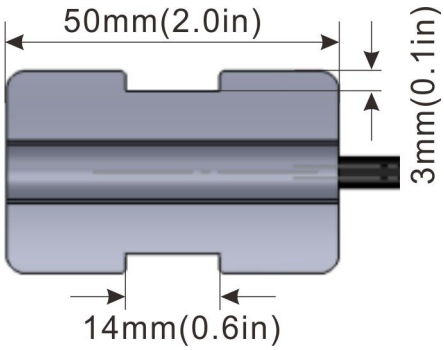


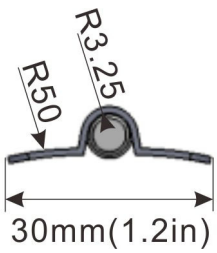
• Sensing elements
Thermistors and RTDs in all industry standard ranges.
• Included 300 mm adjustable strap-on band,for pipe diameter 13 to 92 mm (1/4“ to 3“)
• IP 54 protection
• Simple two wire connection
• Economical way to measure temperature
• Metal Wing: Stainless steel 304
• Main Tube: Stainless steel 304

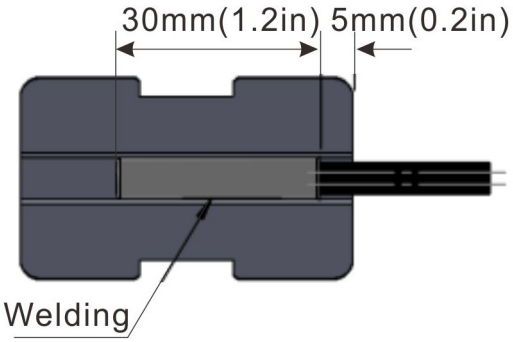
Application/Description

The strap-on temperature sensor is used for sensing the temperature of pipework in heating, ventilation and air conditioning systems.
The strap on sensor is available with RTD and PT type passive sensor elements.
Passive sensing elements is a low cost alternative to measure temperature with simple two wire connection.
The sensing element is housed in a 50 mm long metal wing.
The probe will be fixed to the pipe with an adjustable 300 mm, strap-on band, other strap-on lengths on request.

Dimension:







Part Number Scheme:

WTS6 - 40 -M-S1- 7

Code	Description
WTS6	Water temperature Sensor6

Code	Description
40''	(1m)Length cable
120''	(3m)Length cable

Code	Temperature Curve
M	Metal box
P	Plastic box
-	No box

Code	Description
S1	Pipe diameter 91to114mm(3.5''to4.9'')
S2	Pipe diameter105to127mm(4.1''to5'')

Code	Temperature Curve
7	10K Type 2
12	1K PT
24	10K Type3

*Thermistors, pt elements and probe sizes for all popular control systems are available, send us an email if you don’t see what you need online.

Strap On Insert Temperature Sensor:

Strap-on Insert Sensor

The strap-on Insert sensor consists of a stainless steel sheath temperature sensor, thermal conducting compound, and an adjustable pipe bracket accessory. The stainless steel sheath temperature sensor is suitable for direct application to pipe surfaces for chilled or hot water measurement. It is also used for freezer cases, where moisture protection is important.

Strap-on Applications

Where it is not practical to install immersion wells, the stainless sheath sensor may be strapped to the pipe. A pipe strap accessory provides a bracket to hold a thermally conductive compound and clamps the sensor securely in place.

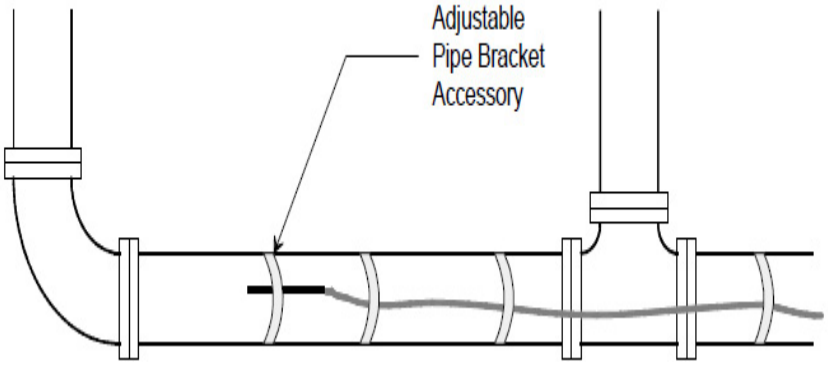
Make electrical connections to the sensor in accordance with the installation wiring diagram for the job and in accordance with national and local electrical codes. Use the one big-foot lead furnished with the sensor. ***Do not use wire nuts***.

Though the sensor itself does not require shielded cable, some controllers and microprocessors do; check with the controller supplier.

Accuracy ±36°F from 32°F to 158°F) ±2°C from 0°C to 70°C)
Stability 24°F (-4.4°C) over 5 years
Basic Model Basic model comes with one foot lead and a 0.24-inch stainless steel tube.

Typical Mounting

When used as a strap-on Insert sensor, best results are obtained when conductive compound is applied between the sensor and the pipe. In addition, the sensor should be inserted under insulation with at least 4mm of the sensor lead covered. A pipe clamp accessory is available for use with this sensor.

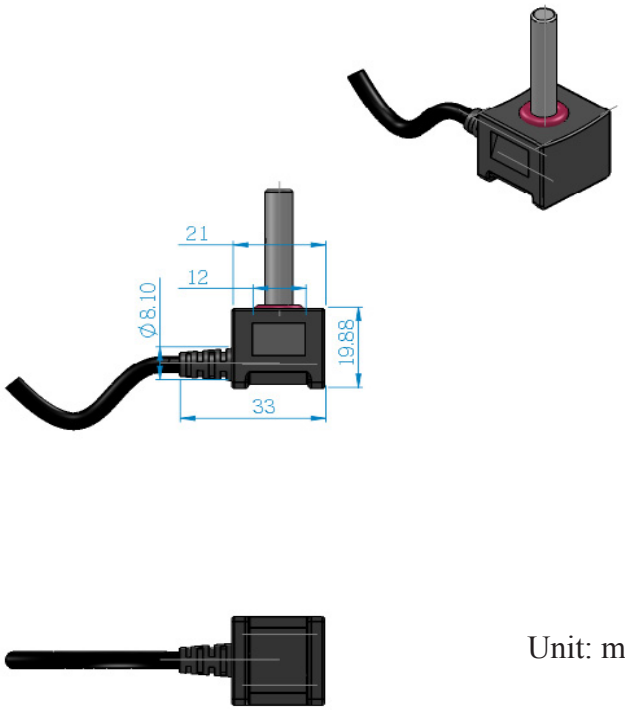


Strap On Insert Temperature Sensor:

Adjustable Pipe Bracket Accessory
The pipe bracket is designed for use with the stainless sheath sensor. The bracket can be used on pipe sizes from 2" (50.8mm) to 8" (203mm) outside diameter. Thermal conducting compound should be used with the bracket to improve heat transfer between the pipe and the temperature sensor.

130~152mm adjustable 304 stainless steel strap as a standard accessory with larger size available on request.

Dimensions



Unit: mm

Part Number Scheme:

WTS6 - I - P - 7

Code	Description
WTS6	Water Temperature Sensor6

Code	Description
I	Insert Strap on
*	Other lengths available, consult factory

Code	Temperature Curve
6	3K
7	10K Type2
9	100K
12	1K PT
24	10K Type3

Code	Enclosure
P	Plastic Enclosure

*Thermistors, pt elements and probe sizes for all popular control systems are available, send us an email if you don't see what you need online.

Installation

1. Drill a hole which diameter is 8mm in the pipe

2. Put sensor into the hole

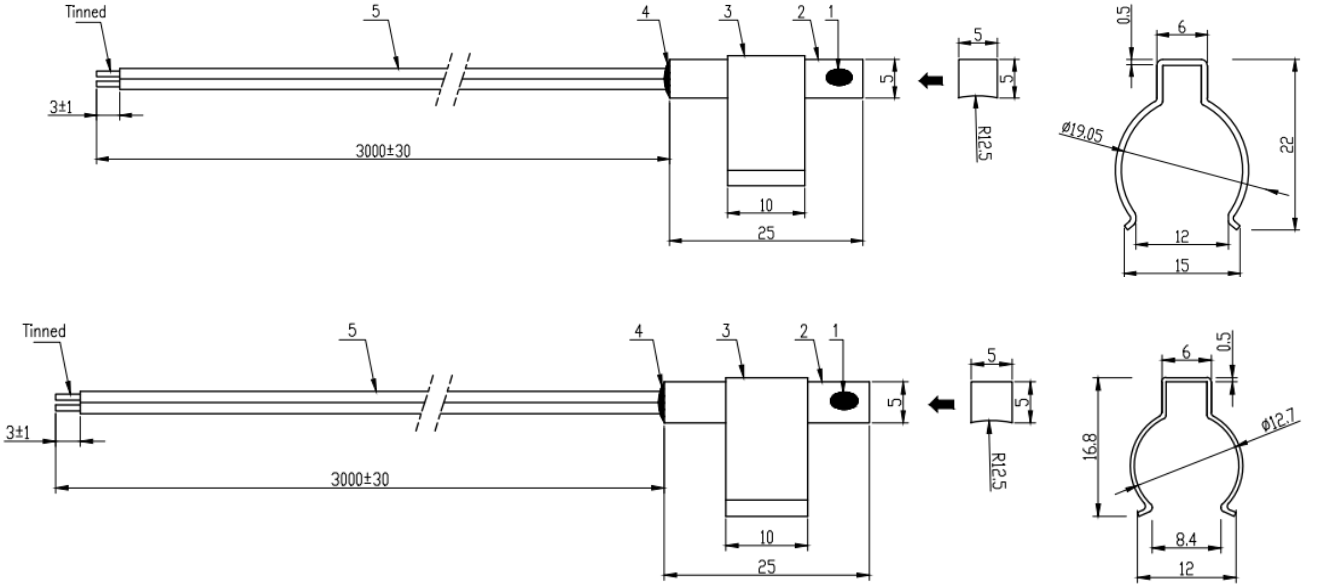
3. Attach with a stainless steel strap

Copper Probe Temperature Sensor

Typical Applications:
Gas boilers
Water heater
water pipe with different diameter
Heating and air conditionding systems
Instant water heaters
Compressors

Features:
• 10k thermistor with type 2 temperature curve, compatible with major control systems.
• Fast thermal response design, 90% response of step change in under 5 seconds
• Accurancy of ±0.2C over the range of 0-70℃
• Interchangeable, calibration not required for most applications
• Excellent long-term stability
• Operating range up to +150℃
• UL2651 cable with UL file number XXXXX

Dimensions



No.	PN.	Name	Qty	Unit	Material	Remark
5		Wire	1	PCS	UL2651 24AWG	Black
4		Epoxy	1	PCS	Epoxy resin potting	Black
3		Pipe strap	1	PCS	ø12.7	SUS304
2		Housing	1	PCS	Cu/Ni 5*5*25	
1		Component	1	PCS	NTC Thermistor	

Item	Symbol	Test Condition	Performance	Unit
Rated resistance	R25	+25℃±0.05	10	kohm
Temperature Accuracy		+0℃~+70℃	±0.20℃	℃
B Value	$B_{25/85}$	25℃±0.05℃ +85℃±0.05℃	3977	K
Time Constant	τ	in the water	Approx.6.0	Sec
Dissipation Factor	δ	in still air	Approx.2.5	mW/ ℃
Voltage Withstanding	U	AC1000V(Peak value)	NO destroy or spark	V
Insulation Resistance	Ri	DC500V	≥100	Mohm
Max.power	P_{Max}	Ambient Temp.+25℃	50	mW
Operation Temp.Range	Topr	-	-30~+105	℃

Reliability Test

1.Intensity
Fix the probe,pull the lead by striped wire end with 5N force for 10±1sec.No visib damage
2.High Temp.Store(In air)105±3℃, 1000h Δ R25/R25≤±3%
3.Low Temp.Store(In air)±3℃, 1000h Δ R25/R25≤±3%
4.Heat and Humidity Stability 40±3℃ 92%RH~98%RH,240h Δ R25/R25≤±3%

Operation Notice
1.Application Temperature measure and control
2.Avoid measure error caused by self heat when over current pass through.

Part Number Scheme

CPTS - 120-S1- 7

Code	Description
CPTS	Copper Probe Temperature Sensor

Code	Description
120''	(3m)Length cable

Code	Temperature Curve
7	10K Type 2
12	1K PT
24	10K Type3

Code	Description
S1	Pipe strap diameter 1/2''(12.7mm)
S2	Pipe strap diameter 3/4''(19.05mm)

	RT Table				FILE NO.	RT6.0207E3977BFA0-401	
					RESISTANCE	R37= 6.0207kOhm ± 0.3%	
CUSTOMER		VERSION			B VALUE	B25/85= 3977K ± 0.3%	
Temp.	Resistance(kΩ)			resistance tol. (%)		Temp.tol. (℃)	
℃	Rmin	R(t)Normal	Rmax	MIN	MAX	MIN	MAX
-40	332.2176	337.2659	342.3878	-1.5%	1.5%	-0.22	0.22
-39	310.7846	315.4439	320.1702	-1.5%	1.5%	-0.21	0.22
-38	290.8789	295.1810	299.5440	-1.5%	1.5%	-0.21	0.22
-37	272.3819	276.3558	280.3851	-1.4%	1.5%	-0.21	0.21
-36	255.1850	258.8572	262.5799	-1.4%	1.4%	-0.21	0.21
-35	239.1884	242.5831	246.0238	-1.4%	1.4%	-0.21	0.21
-34	224.3008	227.4402	230.6215	-1.4%	1.4%	-0.21	0.21
-33	210.4383	213.3428	216.2854	-1.4%	1.4%	-0.21	0.21
-32	197.5239	200.2120	202.9348	-1.3%	1.4%	-0.21	0.21
-31	185.4869	187.9756	190.4960	-1.3%	1.3%	-0.20	0.21
-30	174.2621	176.5670	178.9008	-1.3%	1.3%	-0.20	0.21
-29	163.7897	165.9252	168.0870	-1.3%	1.3%	-0.20	0.20
-28	154.0148	155.9939	157.9970	-1.3%	1.3%	-0.20	0.20
-27	144.8864	146.7212	148.5779	-1.3%	1.3%	-0.20	0.20
-26	136.3578	138.0594	139.7810	-1.2%	1.2%	-0.20	0.20
-25	128.3860	129.9646	131.5614	-1.2%	1.2%	-0.20	0.20
-24	120.9313	122.3962	123.8777	-1.2%	1.2%	-0.19	0.20
-23	113.9570	115.3168	116.6918	-1.2%	1.2%	-0.19	0.20
-22	107.4292	108.6918	109.9683	-1.2%	1.2%	-0.19	0.19
-21	101.3166	102.4893	103.6746	-1.1%	1.2%	-0.19	0.19
-20	95.5904	96.6799	97.7809	-1.1%	1.1%	-0.19	0.19
-19	90.2238	91.2363	92.2593	-1.1%	1.1%	-0.19	0.19
-18	85.1921	86.1332	87.0839	-1.1%	1.1%	-0.19	0.19
-17	80.4724	81.3474	82.2312	-1.1%	1.1%	-0.18	0.19
-16	76.0435	76.8573	77.6791	-1.1%	1.1%	-0.18	0.18
-15	71.8858	72.6428	73.4071	-1.0%	1.1%	-0.18	0.18
-14	67.9811	68.6854	69.3964	-1.0%	1.0%	-0.18	0.18
-13	64.3125	64.9680	65.6296	-1.0%	1.0%	-0.18	0.18
-12	60.8644	61.4745	62.0902	-1.0%	1.0%	-0.18	0.18
-11	57.6222	58.1903	58.7634	-1.0%	1.0%	-0.17	0.18
-10	54.5725	55.1015	55.6351	-1.0%	1.0%	-0.17	0.17
-9	51.7026	52.1953	52.6922	-0.9%	1.0%	-0.17	0.17
-8	49.0012	49.4601	49.9229	-0.9%	0.9%	-0.17	0.17
-7	46.4570	46.8846	47.3157	-0.9%	0.9%	-0.17	0.17
-6	44.0604	44.4588	44.8604	-0.9%	0.9%	-0.17	0.17

-5	41.8017	42.1730	42.5473	-0.9%	0.9%	-0.16	0.17
-4	39.6722	40.0183	40.3671	-0.9%	0.9%	-0.16	0.16
-3	37.6638	37.9865	38.3116	-0.8%	0.9%	-0.16	0.16
-2	35.7692	36.0700	36.3730	-0.8%	0.8%	-0.16	0.16
-1	33.9809	34.2614	34.5439	-0.8%	0.8%	-0.16	0.16
0	32.2926	32.5542	32.8176	-0.8%	0.8%	-0.16	0.16
1	30.6982	30.9421	31.1877	-0.8%	0.8%	-0.15	0.15
2	29.1917	29.4192	29.6482	-0.8%	0.8%	-0.15	0.15
3	27.7680	27.9802	28.1938	-0.8%	0.8%	-0.15	0.15
4	26.4220	26.6199	26.8191	-0.7%	0.7%	-0.15	0.15
5	25.1491	25.3337	25.5195	-0.7%	0.7%	-0.15	0.15
6	23.9448	24.1170	24.2903	-0.7%	0.7%	-0.14	0.14
7	22.8051	22.9658	23.1274	-0.7%	0.7%	-0.14	0.14
8	21.7262	21.8761	22.0268	-0.7%	0.7%	-0.14	0.14
9	20.7046	20.8444	20.9850	-0.7%	0.7%	-0.14	0.14
10	19.7368	19.8672	19.9983	-0.7%	0.7%	-0.14	0.14
11	18.8198	18.9414	19.0637	-0.6%	0.6%	-0.13	0.13
12	17.9505	18.0640	18.1780	-0.6%	0.6%	-0.13	0.13
13	17.1264	17.2322	17.3385	-0.6%	0.6%	-0.13	0.13
14	16.3447	16.4434	16.5425	-0.6%	0.6%	-0.13	0.13
15	15.6031	15.6951	15.7875	-0.6%	0.6%	-0.13	0.13
16	14.8993	14.9851	15.0712	-0.6%	0.6%	-0.12	0.12
17	14.2312	14.3111	14.3914	-0.6%	0.6%	-0.12	0.12
18	13.5968	13.6713	13.7461	-0.5%	0.5%	-0.12	0.12
19	12.9942	13.0636	13.1333	-0.5%	0.5%	-0.12	0.12
20	12.4215	12.4862	12.5511	-0.5%	0.5%	-0.11	0.11
21	11.8774	11.9376	11.9980	-0.5%	0.5%	-0.11	0.11
22	11.3600	11.4161	11.4723	-0.5%	0.5%	-0.11	0.11
23	10.8681	10.9203	10.9726	-0.5%	0.5%	-0.11	0.11
24	10.4001	10.4487	10.4974	-0.5%	0.5%	-0.11	0.11
25	9.9600	10.0000	10.0400	-0.4%	0.4%	-0.10	0.10
26	9.5311	9.5731	9.6152	-0.4%	0.4%	-0.10	0.10
27	9.1277	9.1667	9.2058	-0.4%	0.4%	-0.10	0.10
28	8.7435	8.7797	8.8160	-0.4%	0.4%	-0.10	0.10
29	8.3776	8.4112	8.4449	-0.4%	0.4%	-0.09	0.09
30	8.0289	8.0601	8.0914	-0.4%	0.4%	-0.09	0.09
31	7.6967	7.7256	7.7546	-0.4%	0.4%	-0.09	0.09
32	7.3799	7.4067	7.4335	-0.4%	0.4%	-0.09	0.09
33	7.0779	7.1027	7.1275	-0.3%	0.3%	-0.08	0.08
34	6.7899	6.8129	6.8359	-0.3%	0.3%	-0.08	0.08

35	6.5151	6.5363	6.5575	-0.3%	0.3%	-0.08	0.08
36	6.2529	6.2725	6.2921	-0.3%	0.3%	-0.08	0.08
37	6.0026	6.0207	6.0387	-0.3%	0.3%	-0.08	0.08
38	5.7624	5.7804	5.7984	-0.3%	0.3%	-0.08	0.08
39	5.5329	5.5509	5.5689	-0.3%	0.3%	-0.08	0.08
40	5.3138	5.3317	5.3496	-0.3%	0.3%	-0.08	0.08
41	5.1045	5.1223	5.1402	-0.3%	0.3%	-0.09	0.09
42	4.9046	4.9223	4.9401	-0.4%	0.4%	-0.09	0.09
43	4.7135	4.7311	4.7487	-0.4%	0.4%	-0.09	0.09
44	4.5308	4.5483	4.5658	-0.4%	0.4%	-0.10	0.10
45	4.3562	4.3735	4.3908	-0.4%	0.4%	-0.10	0.10
46	4.1893	4.2064	4.2236	-0.4%	0.4%	-0.11	0.11
47	4.0296	4.0465	4.0635	-0.4%	0.4%	-0.11	0.11
48	3.8767	3.8935	3.9103	-0.4%	0.4%	-0.11	0.11
49	3.7304	3.7470	3.7636	-0.4%	0.4%	-0.12	0.12
50	3.5906	3.6069	3.6233	-0.5%	0.5%	-0.12	0.12
51	3.4565	3.4726	3.4888	-0.5%	0.5%	-0.12	0.12
52	3.3282	3.3441	3.3601	-0.5%	0.5%	-0.13	0.13
53	3.2053	3.2210	3.2367	-0.5%	0.5%	-0.13	0.13
54	3.0875	3.1030	3.1185	-0.5%	0.5%	-0.13	0.14
55	2.9748	2.9900	3.0053	-0.5%	0.5%	-0.14	0.14
56	2.8666	2.8816	2.8966	-0.5%	0.5%	-0.14	0.14
57	2.7629	2.7777	2.7925	-0.5%	0.5%	-0.15	0.15
58	2.6636	2.6781	2.6927	-0.5%	0.5%	-0.15	0.15
59	2.5683	2.5826	2.5969	-0.6%	0.6%	-0.15	0.15
60	2.4769	2.4909	2.5050	-0.6%	0.6%	-0.16	0.16
61	2.3892	2.4030	2.4169	-0.6%	0.6%	-0.16	0.16
62	2.3049	2.3185	2.3321	-0.6%	0.6%	-0.17	0.17
63	2.2242	2.2375	2.2509	-0.6%	0.6%	-0.17	0.17
64	2.1466	2.1597	2.1729	-0.6%	0.6%	-0.17	0.17
65	2.0721	2.0850	2.0979	-0.6%	0.6%	-0.18	0.18
66	2.0007	2.0133	2.0260	-0.6%	0.6%	-0.18	0.18
67	1.9320	1.9444	1.9569	-0.6%	0.6%	-0.19	0.19
68	1.8660	1.8782	1.8904	-0.6%	0.7%	-0.19	0.19
69	1.8026	1.8145	1.8265	-0.7%	0.7%	-0.19	0.19
70	1.7416	1.7533	1.7651	-0.7%	0.7%	-0.20	0.20
71	1.6830	1.6945	1.7061	-0.7%	0.7%	-0.20	0.20
72	1.6267	1.6380	1.6493	-0.7%	0.7%	-0.21	0.21
73	1.5725	1.5836	1.5947	-0.7%	0.7%	-0.21	0.21
74	1.5204	1.5313	1.5422	-0.7%	0.7%	-0.21	0.22

75	1.4703	1.4809	1.4916	-0.7%	0.7%	-0.22	0.22
76	1.4221	1.4325	1.4430	-0.7%	0.7%	-0.22	0.22
77	1.3757	1.3859	1.3962	-0.7%	0.7%	-0.23	0.23
78	1.3310	1.3410	1.3511	-0.7%	0.8%	-0.23	0.23
79	1.2880	1.2978	1.3077	-0.8%	0.8%	-0.24	0.24
80	1.2466	1.2562	1.2659	-0.8%	0.8%	-0.24	0.24
81	1.2066	1.2161	1.2256	-0.8%	0.8%	-0.24	0.25
82	1.1682	1.1775	1.1868	-0.8%	0.8%	-0.25	0.25
83	1.1312	1.1403	1.1494	-0.8%	0.8%	-0.25	0.25
84	1.0956	1.1045	1.1135	-0.8%	0.8%	-0.26	0.26
85	1.0612	1.0699	1.0787	-0.8%	0.8%	-0.26	0.26
86	1.0281	1.0367	1.0453	-0.8%	0.8%	-0.27	0.27
87	0.9961	1.0045	1.0129	-0.8%	0.8%	-0.27	0.27
88	0.9654	0.9736	0.9819	-0.8%	0.8%	-0.27	0.28
89	0.9357	0.9437	0.9518	-0.9%	0.9%	-0.28	0.28
90	0.9070	0.9149	0.9228	-0.9%	0.9%	-0.28	0.29
91	0.8794	0.8871	0.8949	-0.9%	0.9%	-0.29	0.29
92	0.8527	0.8603	0.8679	-0.9%	0.9%	-0.29	0.30
93	0.8271	0.8345	0.8420	-0.9%	0.9%	-0.30	0.30
94	0.8022	0.8095	0.8168	-0.9%	0.9%	-0.30	0.30
95	0.7783	0.7854	0.7926	-0.9%	0.9%	-0.31	0.31
96	0.7551	0.7621	0.7691	-0.9%	0.9%	-0.31	0.31
97	0.7328	0.7396	0.7465	-0.9%	0.9%	-0.32	0.32
98	0.7112	0.7179	0.7247	-0.9%	0.9%	-0.32	0.32
99	0.6903	0.6969	0.7035	-0.9%	1.0%	-0.33	0.33
100	0.6703	0.6767	0.6832	-1.0%	1.0%	-0.33	0.33
101	0.6508	0.6571	0.6635	-1.0%	1.0%	-0.33	0.34
102	0.6320	0.6382	0.6444	-1.0%	1.0%	-0.34	0.34
103	0.6138	0.6199	0.6260	-1.0%	1.0%	-0.34	0.35
104	0.5963	0.6022	0.6082	-1.0%	1.0%	-0.35	0.35
105	0.5793	0.5851	0.5910	-1.0%	1.0%	-0.35	0.36
106	0.5629	0.5686	0.5744	-1.0%	1.0%	-0.36	0.36
107	0.5470	0.5526	0.5582	-1.0%	1.0%	-0.36	0.37
108	0.5316	0.5371	0.5426	-1.0%	1.0%	-0.37	0.37
109	0.5168	0.5222	0.5276	-1.0%	1.0%	-0.37	0.38
110	0.5024	0.5077	0.5130	-1.0%	1.0%	-0.38	0.38
111	0.4885	0.4937	0.4989	-1.0%	1.1%	-0.38	0.39
112	0.4750	0.4801	0.4852	-1.1%	1.1%	-0.39	0.39
113	0.4620	0.4670	0.4720	-1.1%	1.1%	-0.39	0.40
114	0.4494	0.4543	0.4592	-1.1%	1.1%	-0.40	0.40

115	0.4372	0.4420	0.4468	-1.1%	1.1%	-0.40	0.41
116	0.4254	0.4301	0.4348	-1.1%	1.1%	-0.41	0.41
117	0.4140	0.4186	0.4232	-1.1%	1.1%	-0.41	0.42
118	0.4029	0.4074	0.4119	-1.1%	1.1%	-0.42	0.42
119	0.3922	0.3966	0.4010	-1.1%	1.1%	-0.42	0.43
120	0.3818	0.3861	0.3905	-1.1%	1.1%	-0.43	0.43
121	0.3717	0.3759	0.3802	-1.1%	1.1%	-0.43	0.44
122	0.3619	0.3661	0.3703	-1.1%	1.1%	-0.44	0.44
123	0.3524	0.3565	0.3606	-1.1%	1.2%	-0.44	0.45
124	0.3433	0.3473	0.3513	-1.1%	1.2%	-0.45	0.45
125	0.3344	0.3383	0.3423	-1.2%	1.2%	-0.45	0.46
126	0.3258	0.3296	0.3335	-1.2%	1.2%	-0.46	0.46
127	0.3173	0.3211	0.3249	-1.2%	1.2%	-0.46	0.47
128	0.3093	0.3130	0.3167	-1.2%	1.2%	-0.47	0.48
129	0.3014	0.3050	0.3087	-1.2%	1.2%	-0.48	0.48
130	0.2937	0.2973	0.3009	-1.2%	1.2%	-0.48	0.49
131	0.2864	0.2899	0.2934	-1.2%	1.2%	-0.49	0.49
132	0.2792	0.2826	0.2861	-1.2%	1.2%	-0.49	0.50
133	0.2722	0.2756	0.2790	-1.2%	1.2%	-0.50	0.50
134	0.2654	0.2687	0.2720	-1.2%	1.2%	-0.50	0.51
135	0.2589	0.2621	0.2654	-1.2%	1.2%	-0.51	0.51
136	0.2525	0.2557	0.2589	-1.2%	1.3%	-0.51	0.52
137	0.2463	0.2494	0.2525	-1.2%	1.3%	-0.52	0.52
138	0.2402	0.2433	0.2464	-1.3%	1.3%	-0.52	0.53
139	0.2345	0.2375	0.2405	-1.3%	1.3%	-0.53	0.54
140	0.2288	0.2317	0.2347	-1.3%	1.3%	-0.53	0.54
141	0.2233	0.2262	0.2291	-1.3%	1.3%	-0.54	0.55
142	0.2180	0.2208	0.2237	-1.3%	1.3%	-0.55	0.55
143	0.2127	0.2155	0.2183	-1.3%	1.3%	-0.55	0.56
144	0.2077	0.2104	0.2132	-1.3%	1.3%	-0.56	0.56
145	0.2027	0.2054	0.2081	-1.3%	1.3%	-0.56	0.57
146	0.1980	0.2006	0.2033	-1.3%	1.3%	-0.57	0.58
147	0.1933	0.1959	0.1985	-1.3%	1.3%	-0.57	0.58
148	0.1889	0.1914	0.1940	-1.3%	1.3%	-0.58	0.59
149	0.1845	0.1870	0.1895	-1.3%	1.4%	-0.59	0.59
150	0.1802	0.1826	0.1851	-1.3%	1.4%	-0.59	0.60

Cable Specification

TYPE 型号	UL2651 24AWG TS/2F	STANDARD 参考标准	UL1581 UL758 CAN/CSA C22.2No.210.2
APPLICATIONS 应 用	Internal wiring of electronic equipment. 电气设备内部用线		

CONSTRUCTION ITEM/ 结构项目		结构项目	
CONDUCTOR 导体	Material / 材质	-----	Soft-annealed tinned copper wire 退火镀锡铜
	Size / 线规	AWG	24
	Construction/构造规格	mm	11/0.160±0.008
	Diameter / 外径	mm	0.61
INSULATION 绝缘	Material / 材质	-----	PVC
	Average thickness/平均厚度	mm	0.40
	Nominal Thickness/标称厚度	mm	0.23
	Min. Thickness/最小厚度	mm	0.18
	Diameter/外径	mm	(1.45±0. 10)×(3.05±0.15)
	Color / 颜色	-----	黑色

Electric characters/电气特性			
1	Temperature rating (额定温度)	℃	105
2	Voltage rating (额定电压)	V	300
3	Conductor resistance (导体电阻)	Ω/Km 20℃	≤94.2
4	Dielectric Voltage withstand test (耐压测试)	(V/min)	2000
5	Spark test (火花测试)	V	3000
6	Heat shock test (热冲击测试)	(136±1.0℃ /1h)	Not any cracks 不开裂
7	deformation test (变形测试)	(121± 1.0℃,250g)	<50%
8	Cold-bend test (冷弯测试)	(-10±2.0℃ /4h)	Not any cracks 不开裂
9	Flame test (耐燃测试)	/	VW-1

Physical Characters/物理特性				
Conditioning 老化条件: 136℃±1. 0/168h			Insulation 绝缘	Jacket 护套
Before Aging 老化前	Ultimate Elongation (伸长率)		≥100%	
	Tensile Strength (抗张强度)		≥1.05kgf/ mm²	
After aging 老化后	Remnant Ultimate Elongation (伸长残率)		≥65%	
	Remnant Tensile Strength (抗张残率)		≥70%	

MARKING 印字:

兄 AWM 2651 E354173 VW-1 105℃ 300V 24AWG DIANHANG C 兄 AWM I A FT1 105℃ 300V 24AWG LM

Cross drawing:
截面示意图