TS-6300

Temperature sensor and transducers

Product bulletin

The TS-6300 series temperature sensors provide an active and passive signal that corresponds to the air or water temperature in heating, ventilating and air conditioning applications.

They provide either a 0...10 Vdc signal directly proportional to the sensed temperature, or a passive resistive signal NTC K2, NTC K10, Pt100, Pt1000.

The TS-6300 temperature sensor series has been designed to work with Metasys Field Controller, Legacy System91 and FX Field Controllers.

- **Wide range of mounting types and signal outputs**
  Allows more flexibility in sensor selection.
- **Different length of tubes and wells for duct and immersion applications**
  Senses the temperature at the desired location
- **Bayonet mounting system**
  No screws required to close the cover. Easy installation and servicing
- **For immersion applications, well can be mounted before duct sensor is mounted**
  Easy installation and servicing
- **IP54 Ingress Protection (except cable and remote sensor)**
  Protection against condensation and water spray
- **IP67 Ingress Protection for cable and remote sensor**
- **Suitable for plenum use**
  UL 2043

Johnson Controls

Application

The TS-6300 are designed for measuring temperature in gaseous media of heating/cooling and air conditioning systems.

In combination with the thermo-well the sensor are suitable for measuring temperature in liquid fluids.

The TS-6300 series of temperature sensors provide, depending on the selected models:

- 0...10 Vdc voltage output
- NTC K2 resistance signal
- NTC K10 resistance signal
- Pt100 resistance signal (4 wires)
- Pt1000 resistance signal

The various TS-6300 output versions can be connected to the following Johnson Controls controllers:

- Metasys
- System 9100 series
- TC-8900 series
- TUC03 series

Ordering codes

Item codes	Output	Mounting type	Immersion lenght *(mm / in.)*	Temperature operating range
TS-6370D-A11	0...10VDC	Duct / Immersion	138 mm / 5.44 in	-40...+50 °C / -40...+122 °F
TS-6370D-B11			192 mm / 7.56 in	
TS-6370D-C11			290 mm / 11.42 in	
TS-6370D-D11			446 mm / 17.56 in	
TS-6370D-A12			138 mm / 5.44 in	-20...+40 °C / -4...+104 °F
TS-6370D-B12			192 mm / 7.56 in	
TS-6370D-C12			290 mm / 11.42 in	
TS-6370D-D12			446 mm / 17.56 in	
TS-6370D-A13			138 mm / 5.44 in	0...+40 °C / 32...+104 °F
TS-6370D-B13			192 mm / 7.56 in	
TS-6370D-C13			290 mm / 11.42 in	
TS-6370D-D13			446 mm / 17.56 in	
TS-6370D-A14			138 mm / 5.44 in	0...+100 °C / 32...+212 °F
TS-6370D-B14			192 mm / 7.56 in	
TS-6370D-C14			290 mm / 11.42 in	
TS-6370D-D14			446 mm / 17.56 in	
TS-6330D-A10	2K2 NTC	Duct / Immersion	138 mm / 5.44 in	-40...+120 °C / -40...+248 °F
TS-6330D-B10			192 mm / 7.56 in	
TS-6330D-C10			290 mm / 11.42 in	
TS-6330D-D10			446 mm / 17.56 in	
TS-6340D-A10	10K NTC		138 mm / 5.44 in	
TS-6340D-B10			192 mm / 7.56 in	
TS-6340D-C10			290 mm / 11.42 in	
TS-6340D-D10			446 mm / 17.56 in	
TS-6350D-A10	Pt100		138 mm / 5.44 in	
TS-6350D-B10			192 mm / 7.56 in	
TS-6350D-C10			290 mm / 11.42 in	
TS-6350D-D10			446 mm / 17.56 in	
TS-6360D-A10	Pt1000		138 mm / 5.44 in	
TS-6360D-B10			192 mm / 7.56 in	
TS-6360D-C10			290 mm / 11.42 in	
TS-6360D-D10			446 mm / 17.56 in	
TS-6370R-F01	0...10VDC	Remote Sensor	1,5 m / 4,92 feet cable lenght	-40...+50 °C / -40...+122 °F
TS-6370R-F03				0...+40 °C / 32...+104 °F
TS-6370R-F04				0...+100 °C / 32...+212 °F
TS-6330K-F00	2K2 NTC	Cable Sensor	1,5 m / 4,92 feet cable lenght	-40...+100 °C / -40...+212 °F
TS-6340K-F00	10K NTC			
TS-6360K-F00	Pt1000			
TS-6370E-001	0...10VDC	Outdoor	---	-40...+50 °C / -40...+122 °F
TS-6370E-002				-20...+40 °C / -4...+104 °F
TS-6330E-000	2K2 NTC	Outdoor	---	-40...+70 °C / -40...+158 °F
TS-6340E-000	10K NTC			
TS-6350E-000	Pt100			
TS-6360E-000	Pt1000			
TS-6370S-002	0...10VDC	Strap-on	---	-20...+40 °C / -4...+104 °F
TS-6370S-004				0...+100 °C / 32...+212 °F
TS-6330S-000	2K2 NTC	Strap-on	---	-40...+100 °C / -40...+212 °F
TS-6340S-000	10K NTC			
TS-6350S-000	Pt100			
TS-6360S-000	Pt1000			
TS-6370C-E13	0...10VDC	Ceiling	36 mm	0...+40 °C / 32...+104 °F
TS-6330C-E10	2K2 NTC	Ceiling	36 mm	-40... +70 °C / -40...+158 °F
TS-6340C-E10	10K NTC			
TS-6350C-E10	Pt100			
TS-6360C-E10	Pt1000			

Outdoor sensor grey

Item codes	Output	Mounting type	Operating range
TS-6330E-050	2K2 NTC	Outdoor grey enclosure	-40...+70 °C / -40...+158 °F
TS-6340E-050	10K NTC		
TS-6350E-050	Pt100		
TS-6360E-050	Pt1000		
TS-6370E-051	0...10 VDC		-40...+50 °C / -40...+122 °F
TS-6370E-052			-20...+40 °C / -4...+104 °F

Accessories

Item codes	Immersion lenght *(mm / in)*	Material	Mounting thread	PN
TS-6300W-E200	50 mm / 1.97 in	Brass/Copper	R 1/2"	16
TS-6300W-D200	80 mm / 3.15 in			
TS-6300W-F200	120 mm / 4.73 in			
TS-6300W-G200	150 mm / 3.17 in			
TS-6300W-H200	200 mm / 7.88 in			
TS-6300W-I200	260 mm / 10.24 in			
TS-6300W-E300	50 mm / 1.97 in	Stainless steel	R 1/2"	25
TS-6300W-D300	80 mm / 3.15 in			
TS-6300W-F300	120 mm / 4.73 in			
TS-6300W-G300	150 mm / 3.17 in			
TS-6300W-H300	200 mm / 7.88 in			
TS-6300W-I300	260 mm / 10.24 in			
TS-6300W-E400	50 mm / 1.97 in		G 1/2"	
TS-6300W-D400	80 mm / 3.15 in			
TS-6300W-F400	120 mm / 4.73 in			
TS-6300W-G400	150 mm / 3.17 in			
TS-6300W-H400	200 mm / 7.88 in			
TS-6300W-I400	260 mm / 10.24 in			

TS-6300D-000	Duct flange kit
TS-6300W-900	Retrofitting thermowell adapter kit

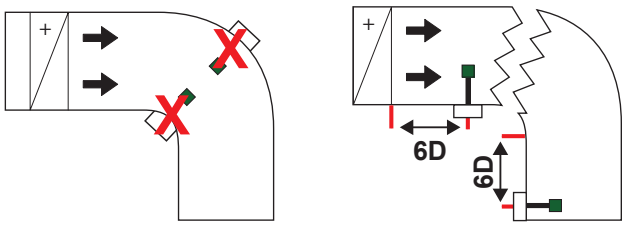
Mounting

The TS-6300 can be mounted in virtually any position, anyway ensure that they are protected against damage and vandalism and will not cause injury. Be aware of the effects of orientation on the functioning of the sensor.

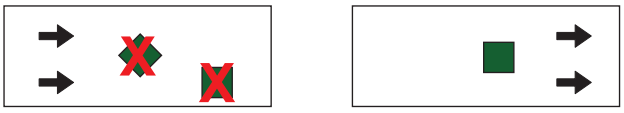
Always determine before mounting the environmental temperature limits and the ambient humidity.

For mounting follow the instructions below:

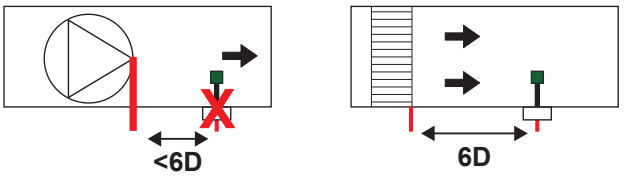
- Locate the sensors, where they will be exposed to stable and typical conditions.
- Avoid locations affected by air draughts, direct sunlight, heat emitted from equipment etc., since it would lead to incorrect measurement.
- Installing sensors in ducts with negative pressure, external air can be drawn into through the installation hole. Seal tightly to prevent false readings.
- Consider access for maintenance when when selecting a location.
- To improve reaction time on Strap-On and Cable Sensor a thermal conductive paste is recommended.



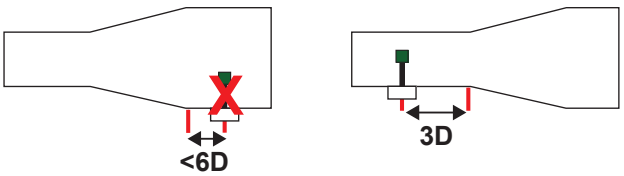
To ensure an accurate reading, place the sensor far enough away from bends, junctions or section changes in the duct. Sensors should be installed at 6 x D from these elements, where D is the larger side of the duct.



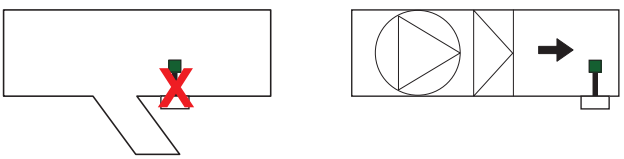
Mount the sensor in the top or side of the supply duct.



Install the sensor far away from fans, heater, humidifier and Coolers.



Place the sensor before duct restriction or diffusers.



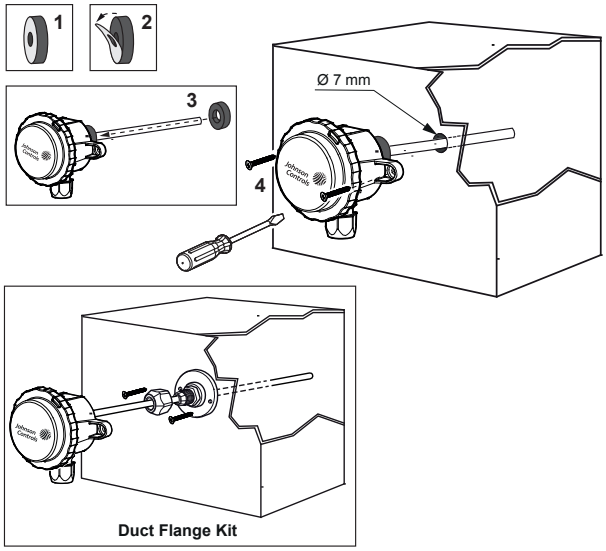
Filters and coils can reduce airflow turbolence.

Mounting method

Duct mounting model (TS-63xx-xx)

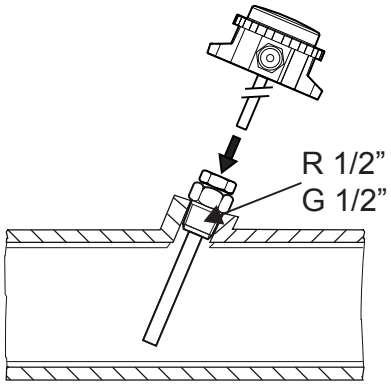
Two M4.5 or M4 (#10 or #8) screws, not included. A seal ring is provided to seal around the probe between the enclosure and mounting surface.

Duct flange kit is available as accessory for positioning TS-6300 inside the duct.



Immersion model (TS-63xx-xx)

For immersion applications use one of the TS-6300 thermowell available in brass/copper or stainless still for high pressure applications.

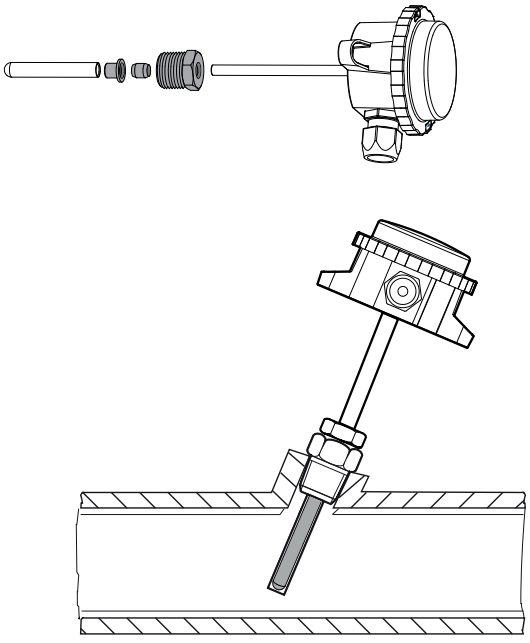


Retrofitting kit (TS-6300W-900):

The TS-6300 retrofitting kit allows the replacement of the former TS-9100 immersion sensor adapting the existing thermowell at the dimension of the new sensor.

Before insert the new sensor in an old thermowell please renew the conductive compound.

Please note, the response time may increase.

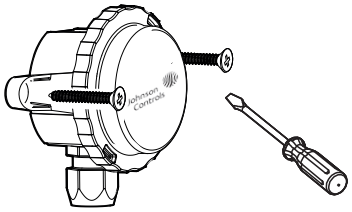


Retrofitting kit adapts TS-6300 to TS-9100 Thermowell

Mounting method

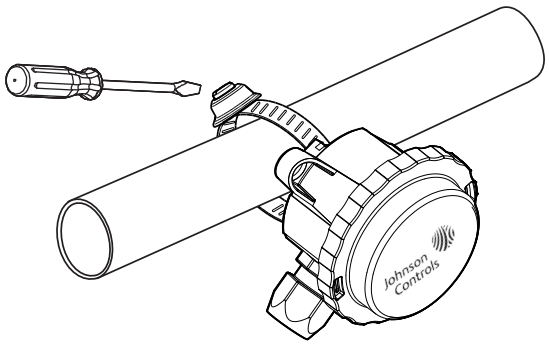
Outdoor model (TS-63x0E):

Two M4.5 or M4 (#10 or #8) screws, not included.



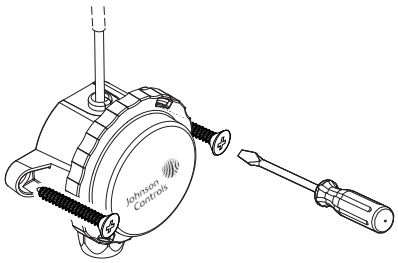
Strap mount model (TS-63x0S):

A Band clamp is included for 20 to 90 mm (0.78 to 3.54 inch) outside diameter pipe.



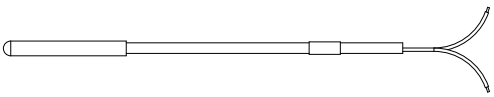
Remote sensor model (TS-6370R):

Two M4.5 or M4 (#10 or #8) screws, not included.
Cable sensor 1,5 m lenght included. Use a cable-tie to clamp sensor on tube. For immersion applications use a TS-6300W-Ex00, 50 mm (2 inch) thermowell.



Cable sensor model (TS-63x0K):

No mounting hardware included.
Cable sensor 1,5 m lenght included. Use a cable-tie to clamp sensor on tube. For immersion applications use a TS-6300W-Ex00, 50 mm (2 inch) thermowell.



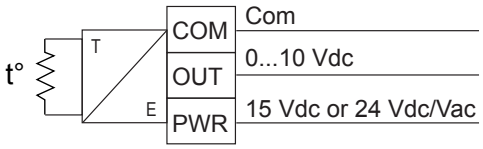
Wiring instructions

For wiring follow the instructions below:

- All wiring must be in accordance with local regulations and national rules.
- Do not attempt field repairs. If the transmitter is not operating properly, even though it is wired correctly, it should be replaced.

3 wires 0...10 Vdc Output

The TS-6300 Active are 3 wires devices utilizing an RTD sensing element that goes through an amplifier circuit to provide a 0...10Vdc output proportional to the sensed temperature.

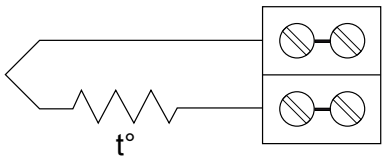


2 wires NTC K2 / NTC K10 / PT1000

The TS-6300 Series Sensors are two-wire devices utilizing an RTD or thermistor temperature sensing element. The sensing elements have a known response to temperature that provides a predictable and repeatable resistance/ temperature (R/T) characteristic.

The RTD sensing elements are thin film platinum SMT chips. They have a positive temperature coefficient and are nearly linear over the operating temperature range.

The thermistor sensing elements are leaded, epoxy coated beads or chips. The thermistor sensing elements have a negative temperature coefficient (NTC) and are non-linear over the operating temperature range.



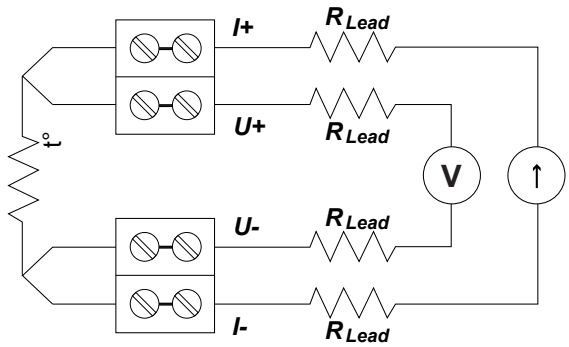
4 wires PT100

The 4-wire, 100 ohm, platinum RTD is used where improved measurement accuracy is desired.

The 4-wire design allows for a Kelvin-connection of the sensor to reduce the error caused by lead wire resistance and contact resistance (see Figure 6). A current source is input to terminals ***I+*** and ***I-***, to provide a known current through the sensing element. The voltage drop across the sensing element is measured at ***U+*** and ***U-***. The measured voltage is a function of the sensor resistance so that the measured temperature may be determined. The voltage measurement circuit should be high impedance to keep the current through ***U+*** and ***U-*** to a minimum so that the voltage drop across the measurement leads is insignificant.

The TS-6350x PT100 4-wire sensor models are not designed for use with Johnson Controls controllers or any specific third-party controller. Application of these products is at the customers discretion.

Note: The RTD sensor is not polarity sensitive. Terminal block labeling is for customer wiring convenience. Terminal markings plus (+) and minus (-) identify paired wires and the pairs are interchangeable. Terminals ***U*** and ***I*** are equivalent and are interchangeable.



Resistance tables

PT100 sensor resistance/temperature values

		R_0 = 100	Resistance (ohms) at temperature								
°C	°F	0	-1	-2	-3	-4	-5	-6	-7	-8	-9
-40	-40	84.27	83.87	83.48	83.08	82.69	82.29	81.89	81.50	81.10	80.70
-30	-22	88.22	87.83	87.42	87.04	86.64	86.25	85.85	85.46	85.06	84.67
-20	-4	92.16	91.77	91.37	90.98	90.59	90.19	89.80	89.40	89.01	88.62
-10	14	96.09	95.69	95.30	94.91	94.52	94.12	93.73	93.34	92.95	92.55
0	32	100.00	99.61	99.22	98.83	98.44	98.04	97.65	97.26	96.87	96.48
°C	°F	0	1	2	3	4	5	6	7	8	9
0	32	100.00	100.39	100.78	101.17	101.56	101.95	102.34	102.73	103.12	103.51
10	50	103.90	104.29	104.68	105.07	105.46	105.85	106.24	106.63	107.02	107.40
20	68	107.79	108.18	108.57	108.96	109.35	109.73	110.12	110.51	110.90	111.29
30	86	111.67	112.06	112.45	112.83	113.22	113.61	114.00	114.38	114.77	115.15
40	104	115.54	115.93	116.31	116.70	117.08	117.47	117.86	118.24	118.63	119.01
50	122	119.40	119.78	120.17	120.55	120.94	121.32	121.71	122.09	122.47	122.86
60	140	123.24	123.63	124.01	124.39	124.78	125.16	125.54	125.93	126.31	126.69
70	158	127.08	127.46	127.84	128.22	128.61	128.99	129.37	129.75	130.13	130.52
80	176	130.90	131.28	131.66	132.04	132.42	132.80	133.18	133.57	133.95	134.33
90	194	134.71	135.09	135.47	135.85	136.23	136.61	136.99	137.37	137.75	138.13
100	212	138.51	138.88	139.26	139.64	140.02	140.40	140.78	141.16	141.54	141.91

PT1000 sensor resistance/temperature values

		R_0 = 1000	Resistance (ohms) at temperature								
°C	°F	0	-1	-2	-3	-4	-5	-6	-7	-8	-9
-40	-40	842.71	838.75	734.75	834.79	826.87	822.90	818.94	814.97	811.00	807.03
-30	-22	882.22	878.27	874.32	870.38	866.43	862.48	858.53	854.57	850.62	846.66
-20	-4	921.60	917.67	913.73	909.80	905.86	901.92	897.98	894.04	890.10	886.16
-10	14	960.86	956.94	953.02	949.09	945.17	941.24	937.32	933.39	929.46	925.53
0	32	1000.00	996.09	992.18	988.27	984.36	980.44	976.53	972.61	968.70	964.78
°C	°F	0	1	2	3	4	5	6	7	8	9
0	32	1000.00	1003.91	1007.81	1011.72	1015.62	1019.53	1023.43	1027.33	1031.23	1035.13
10	50	1039.03	1042.92	1046.82	1050.72	1054.60	1058.49	1062.38	1066.27	1070.16	1074.05
20	68	1077.94	1081.82	1085.70	1089.59	1093.47	1097.35	1101.23	1105.10	1108.98	1112.86
30	86	1116.73	1120.60	1124.47	1128.35	1132.21	1136.08	1139.95	1143.82	1147.68	1151.55
40	104	1155.41	1159.27	1163.13	1166.99	1170.85	1174.70	1178.56	1182.41	1186.27	1190.12
50	122	1193.97	1197.82	1201.67	1205.52	1209.36	1213.21	1217.05	1220.90	1224.70	1228.58
60	140	1232.42	1236.26	1240.09	1243.93	1247.77	1251.60	1255.43	1259.26	1263.09	1266.92
70	158	1270.75	1274.58	1278.40	1282.23	1286.05	1289.87	1293.70	1297.52	1301.33	1305.15
80	176	1308.97	1312.78	1316.60	1320.41	1324.22	1328.03	1331.84	1335.65	1339.46	1343.26
90	194	1347.07	1350.87	1354.68	1358.48	1362.28	1366.08	1369.87	1373.67	1377.47	1381.26
100	212	1385.06	1388.85	1392.64	1396.43	1400.22	1404.00	1407.79	1411.58	1415.36	1419.14

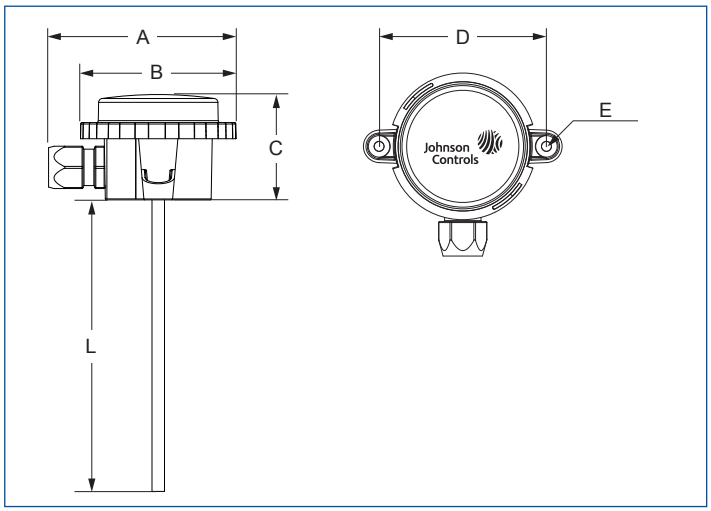
2K2 NTC thermistor sensor resistance/temperature values

Resistance (ohms) at temperature											
°C	°F	0	-1	-2	-3	-4	-5	-6	-7	-8	-9
-40	-40	75487.3	80682.2	86274.5	92297.4	98787.1	105783	113329	121472	130264	139761
-30	-22	39759.4	42309.9	45042.9	47972.7	51115.1	54486.7	58106.1	61993.1	66169.6	70659.0
-20	-4	21831.5	23139.4	24535.0	26024.9	27616.0	29316.0	31132.9	33075.8	35154.0	37378.1
-10	14	12451.6	13149.5	13891.4	14680.4	15519.6	16412.8	17363.7	18376.4	19455.3	20605.3
0	32	7352.80	7739.06	8148.22	8581.79	9041.38	9528.72	10045.7	10594.2	11176.5	11794.8
°C	°F	0	1	2	3	4	5	6	7	8	9
0	32	7352.80	6988.04	6643.48	6317.88	6010.10	5717.07	5443.79	5183.33	4936.81	4703.41
10	50	4482.37	4272.96	4074.51	3886.40	3708.03	3538.84	3378.32	3225.98	3081.35	2944.01
20	68	2813.56	2689.61	2571.80	2459.81	2353.31	2252.00	2155.61	2063.88	1976.55	1893.39
30	86	1814.18	1738.72	1666.80	1598.25	1532.89	1470.55	1411.09	1354.35	1300.19	1248.49
40	104	1199.12	1151.97	1106.92	1063.87	1022.73	983.39	945.78	909.80	875.38	842.44
50	122	810.91	780.73	751.83	724.15	697.63	672.23	647.87	624.53	602.15	580.68
60	140	560.10	540.34	521.39	503.19	485.73	468.96	452.85	437.38	422.51	408.23
70	158	394.50	381.30	368.61	356.41	344.67	333.37	322.50	312.05	301.98	292.28
80	176	282.95	273.96	265.30	256.96	248.92	241.17	233.70	226.49	219.55	212.85
90	194	206.39	200.15	194.14	188.33	182.73	177.32	172.09	167.05	162.18	157.47
100	212	152.92	148.52	144.27	140.17	136.20	132.36	128.65	125.05	121.58	118.22

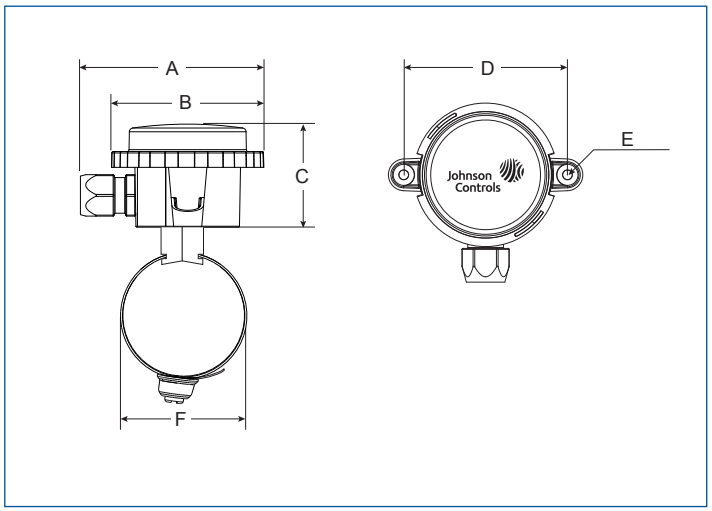
10K NTC thermistor sensor resistance/temperature values

Resistance (ohms) at temperature											
°C	°F	0	-1	-2	-3	-4	-5	-6	-7	-8	-9
-40	-40	336185	359383	384362	411271	440275	471552	505296	541722	581063	623574
-30	-22	176827	188191	200370	212430	229439	242473	258616	275957	294593	314630
-20	-4	97011.1	102830	109040	115670	122751	130318	138407	147057	145313	166219
-10	14	55303.6	58405.5	61703.1	65210.1	68941.2	72912.3	77140.2	81642.5	86441.9	91556.8
0	32	32650.0	34365.6	36183.1	38109.1	40150.8	42315.9	44612.6	47049.9	49637.2	52384.8
°C	°F	0	1	2	3	4	5	6	7	8	9
0	32	32650.0	31029.9	29499.6	28053.5	26686.7	25394.2	24171.8	23015.2	21920.5	20884.1
10	50	19902.6	18972.8	18091.7	17256.4	16464.5	15713.3	15000.6	14324.2	13682.1	13072.4
20	68	12493.2	11942.9	11419.8	10922.6	10449.8	10000.00	9572.06	9964.78	8777.06	8407.85
30	86	8056.19	7721.14	7401.85	7097.49	6807.29	6530.52	6266.49	6014.55	5774.09	5544.53
40	104	5325.32	5115.95	4915.92	4724.77	4542.07	4367.40	4200.36	4040.59	3887.74	3741.47
50	122	3601.47	3467.44	3339.09	3216.17	3098.40	2985.56	2877.41	2773.73	2674.33	2579.00
60	140	2487.55	2399.81	2315.62	2234.81	2157.23	2082.74	2011.19	1942.47	1876.44	1812.99
70	158	1752.00	1693.37	1636.99	1582.78	1530.63	1480.45	1432.17	1385.71	1340.98	1297.92
80	176	1256.45	1216.51	1178.03	1140.96	1105.24	1070.81	1037.62	1005.62	974.77	945.01
90	194	916.30	888.60	861.87	836.08	811.18	787.14	763.93	741.51	719.86	698.94
100	212	678.73	659.20	640.32	622.07	604.43	587.37	570.88	554.92	539.49	524.55

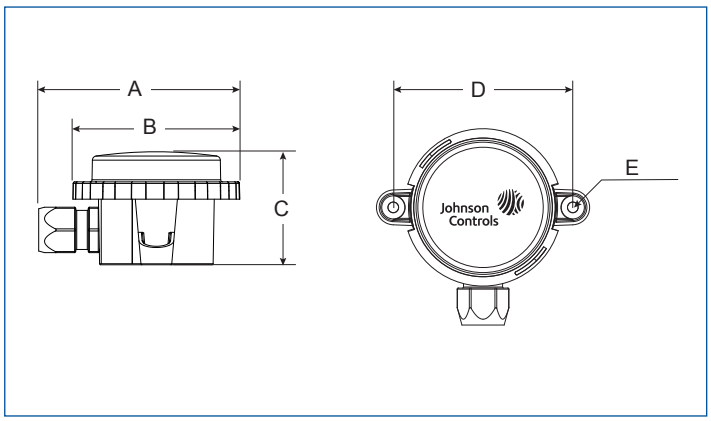
Dimensions *(mm)*



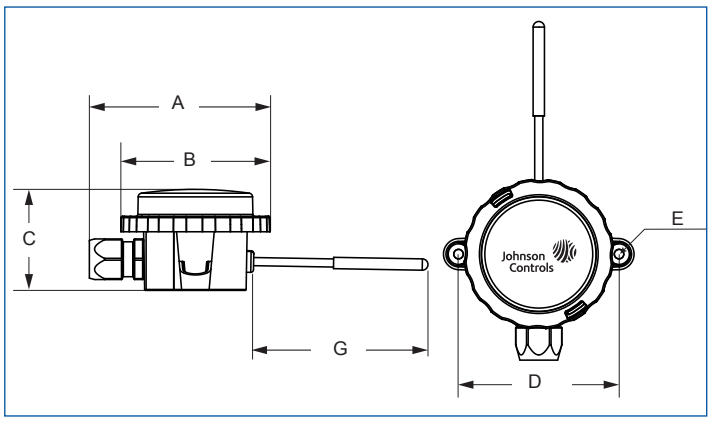
Duct and Ceiling



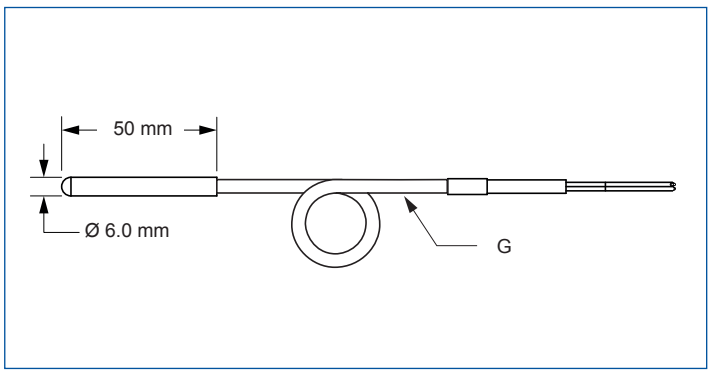
Strap-on



Outdoor



Remote

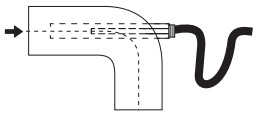
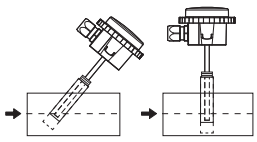
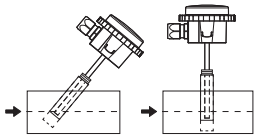
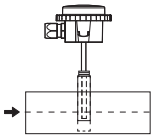
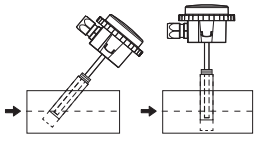
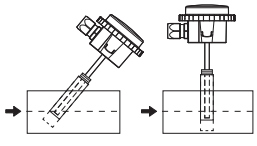


Cable

	mm	inches
A	**95**	**3.74**
B	**79.3**	**3.12**
C	**53.2**	**2.09**
D	**85**	**3.34**
E Ø	**5**	**0.19**
F	**20 - 90**	**0.78 - 3.54**
G	**1500**	**59**
L	**36**	**1.4**
	138	**5.4**
	192	**7.5**
	290	**11.4**
	446	**17.5**

Thermowell selection

A thermowell protects the temperature sensor to ensure long life and accurate measurement. Service is aided by allowing the sensor to be removed without having to drain the pipe or tank. Sensor changes can be done on the fly.

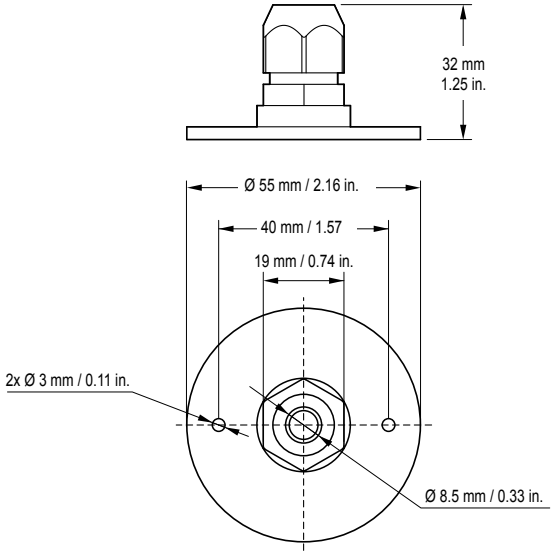
Pipe size *(DN)*	Recommended Thermowell Immersion *(mm)*	Thermowell Item code	Suggested Mounting	Sensing element	Stem outside the thermowell *(mm / inches)*
15	50	TS-6300W-Ex00		TS-63x0K-F00	Cable Sensor
20	50				
25	50				
40	50				
50	50				
65	50				
80	50				
100	80	TS-6300W-Dx00		TS-63x0D-Axx (Probe 138 mm / 5.44 in.)	25 mm / 1 in.
125	80				
150	80				
150	120	TS-6300W-Fx00		TS-63x0D-Bxx (Probe 192 mm / 7.5 in.)	40 mm / 1.58 in.
200	120				
250	120				
300	150	TS-6300W-Gx00		TS-63x0D-Bxx (Probe 192 mm / 7.5 in.)	10 mm / 0.4 in.
350	150				
300	200	TS-6300W-Hx00		TS-63x0D-Cxx (Probe 290 mm / 11.4 in.)	58 mm / 2.28 in.
350	200				
400	200				
450	200				
500	260	TS-6300W-Ix00		TS-63x0D-Dxx (Probe 446 mm / 17.5 in.)	154 mm / 6.1 in.
600	260				

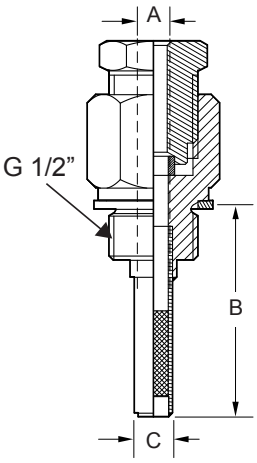
Installation tips

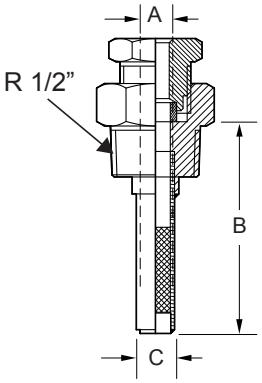
- Use a “Drip Loop” on cable sensor to prevent water from entering the sensor housing.
- Install sensors in the pipe against the direction of flow.
- For each sensing point an additional thermowell is raccomended, adjacent to the sensor for test purposes.
- Take account of stratification when mixing water at different temperatures, keep immersion sensor between 10 and 15 times the tube diameter (internal) from mixing point (valve or T junction).

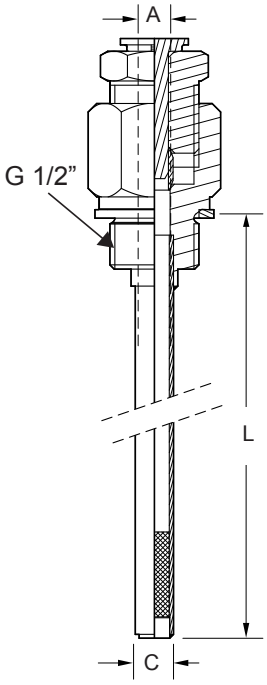
The suggested above combinations are common in HVAC piping applications. A number of fluid characteristics including but not limited to fluid temperature, flow rate and contamination may require shorter immersion depth or larger thermowell probe diameter.

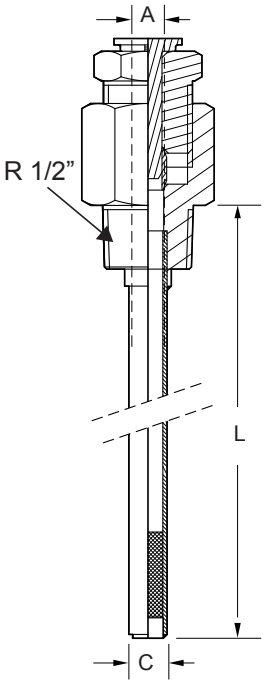
Accessories - Dimensions *(mm)*











	mm	inches
A Ø	7	0.27
B	50	1.96
C Ø	9	0.35
L	80	3.15
	120	4.72
	150	5.9
	200	7.87
	260	10.23

Technical specifications

	0...10 Vdc	K2 NTC thermistor	K10 NTC thermistor	PT100 RTD	PT1000 RTD
Power supply	15 VDC (13,5 VDC… 24,5 VDC) 24 VAC + 20%	---	---	---	---
Output signal	0...10 Vdc	2252 ohm @ 25 °C 2252 ohm @ 77 °F	10 kohm @ 25 °C 10 kohm @ 77 °F JC Type II	100 ohm @ 0 °C 100 ohm @ 32 °F per EN 60751	1000 ohm @ 0 °C 1000 ohm @ 32 °F per EN 60751
Output Accuracy	± 1% FS or 0.5 °C	± 0.2 C° (± 0.36 F°), from 0 to 70 °C	± 0.5 C° (± 0.9 F°), from 0 to 70 °C	EN 60751, Class A, ± (0.15 + 0.002 x | T °C |)	EN 60751, Class A, ± (0.15 + 0.002 x | T °C |)
Measurement current *	5 mA Maximum	0.1 mA Recommended 1 mA Maximum	0.1 mA Recommended 2 mA Maximum	1 mA Recommended 5 mA Maximum	0.3 mA Recommended 2 mA Maximum

Max operating temperature for Enclosure w/PWA	
Operating temperature	-40 to 70 °C (-40 to 158 °F)
Storage temperature	-40 to 70 °C (-40 to 158 °F)
Transit temperature	-40 to 70 °C (-40 to 158 °F)
Humidity	
Operating humidity	5 % to 95 %RH, non-condensing, 30 °C (86 °F) Max Dew Point
Storage Conditions	
Storage humidity	5 % to 95 %RH, non-condensing, 30 °C (86 °F) Max Dew Point
Transit	5 % to 95 %RH, non-condensing, 30 °C (86 °F) Max Dew Point
Protection	
Protection class	IP54 according to IEC 60529
	Exceptions: TS-63x0K Cable or Remote Sensor (without enclosure), probe: IP67
Material	
Housing	Polycarbonate, Lexan EXL9330
Probe	Stainless Steel 304
Cable sensor probe	Stainless Steel 304 or 316
Color	
Housing	Blue, PMS 300
	Grey, PMS 424 (Outdoor Sensors only)
Terminations	
Terminal type	Screw-clamp type terminal block
Max wire size	1 x 1.5 mm^2 (16 AWG)
Compliance	
CE ***Europe***	Johnson Controls declares that this product is in compliance with the essential requirements and other relevant provisions of the EMC Directive.
United States	UL Listed, File E27734, CCN XAPX, Under UL60730 Suitable for Use in Other Environmental Air Space (Plenum) in accordance with Section 300.22, © of the National Electric Code, UL 2043.
Canada	cUL Listed, File E27734, CCN XAPX7, Under E60730.

* Measurement error at Maximum current may excessive from self heating.

The performance specifications are nominal and conform to acceptable industry standards. For application at conditions beyond these specifications, consult the local Johnson Controls office. Johnson Controls, Inc. shall not be liable for damages resulting from misapplication or misuse of its products.