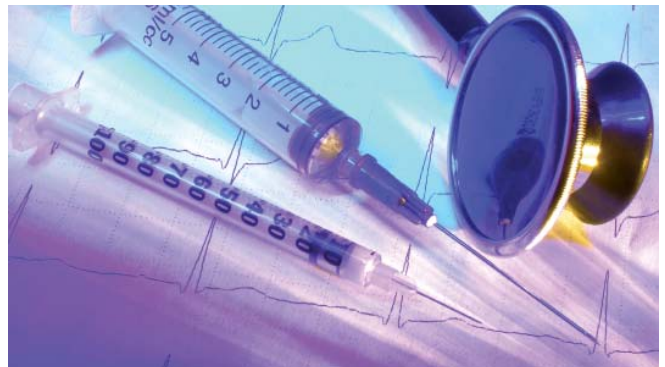


Temperature Sensors for Hypodermic Needles

Precise Temperature Measurement for Surgical Applications

When integrated into small gage hypodermic needles, NTC thermistors can measure temperature in a variety of human and animal tissues and organs. They can be used to penetrate skin, brain tissue, blood vessels and other tissues to aid in cancer treatment, microbiology, and other medical applications.

GE Sensing & Inspection Technologies' fine wire thermocouples or AB6 thermistor subassemblies maintain heat control in customer devices. NTC Type AB6 thermistor assemblies consist of small GC (chip-in-glass) or Thermobeads that are welded to insulated extension leads. The platinum leads are cut short and welded to insulated extension leads, and the joints are covered in one of several insulation types, depending upon the application or environment. The assembly is then ready for insertion into hypodermic needles, catheters or other small housings that require extended leads. Miniature 400 series chip thermistors or bead matched pair assemblies provide a range of available R-T curves, in sharp, blunt or rounded tip versions.



Features and Benefits

- Reliable performance
- Extremely small size, fast response
- Interchangeable for single use (optional)
- Available in a range of standard needle lengths
- Temperature accuracies to $\pm 0.01^{\circ}\text{C}$
- Designed for sterilization
- 400 series compatible

Typical Applications

- Skin or tissue temperature
- Cancer screening and treatment
- Brain temperature profiling
- Animal studies
- Microbiology
- Other medical applications



Resistance vs. Temperature Characteristics

Temperature (°C)	Resistance Code (Data in ohms)					
	UN 103	UT 103	UN 223	UT 223	UN 443	UT 443
0	14129.9	56519.5	31452.1	125808	64394.4	257577.5
5	11335.1	45340.5	25168.0	100672	51167.4	204669.5
10	9152.8	36611.2	20273.6	81094.6	40931.5	163726.2
15	7437.4	29749.5	16435.7	65742.7	32956.3	131825.2
20	6080.3	24321.1	13406.3	53625.1	26701.3	106805.3
25	5000.0	20000.0	11000.0	44000.0	21764.2	87056.8
30	4134.9	16539.7	9077.0	36307.9	17843.2	71372.8
35	3438.1	13752.5	7531.1	30124.5	14710.6	58842.5
40	2873.8	11495.1	6281.4	25125.7	12193.5	48774.1
45	2414.2	9656.7	5265.6	21062.5	10159.7	40638.8
50	2038.0	8151.9	4435.6	17742.3	8507.6	34030.3
55	1728.4	6913.8	3753.9	15015.5	7154.4	28617.7
60	1472.6	5890.2	3193.3	12765.2	6043.0	24171.9
65	1260.0	5040.0	2724.8	10899.2	5126.1	20504.4
70	1082.7	4330.6	2336.2	9344.9	4366.4	17465.8
75	934.02	3736.1	2011.1	8044.5	3734.4	14937.8
80	808.93	3235.7	1738.0	6952.0	3206.5	12825.9
85	703.23	2812.9	1507.6	6030.3	2763.7	11054.7
90	613.55	2454.2	1312.4	5249.6	2390.8	9563.4
95	537.18	2148.7	1146.5	4586.0	2075.7	8303.0
100	471.90	1887.6	1004.9	4019.6	1808.5	7233.9
105	415.90	1663.6	883.67	3534.7	1580.9	6323.7

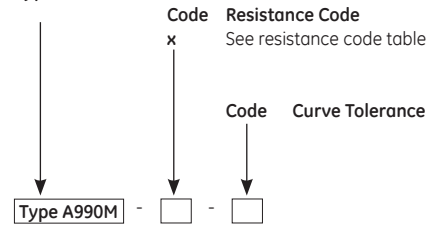
Curve Tolerances

Temperature Tolerance in °C				
Tolerance Code	0°C to 25°C	25°C to 50°C	50°C to 70°C	70°C to 105°C
Sx1	±0.1	±0.05	±0.1	±0.2
Sx2	±0.1	±0.1	±0.1	±0.2
Sx3	±0.2	±0.1	±0.2	±0.3
Sx4	±0.2	±0.2	±0.2	±0.3

Ordering Information

The code number to be ordered may be specified as follows:

Type A990M

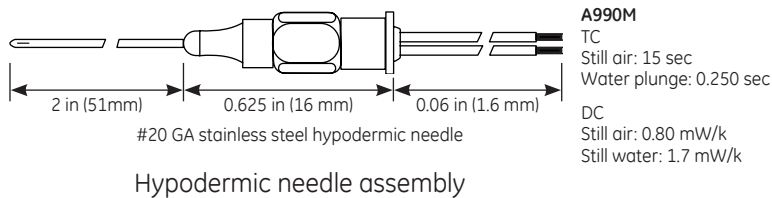


Note: GE Sensing & Inspection Technologies is a sensor supplier to OEM manufacturers. We do not offer direct sales to clinics, hospitals, or end users.

Technical Specifications

Miniature NTC thermistor sensors assembled into standard stainless steel hypodermic needles.

Needle lengths	8 mm minimum
Needle gage sizes	20, 22 ga. (others available)
Temperature range	0°C to 70°C
R-T Curves	Options available, including 400 series
Accuracy and interchangeability	Down to ±0.05°C
Response times	down to 0.200 seconds in water.
Can be ETO, autoclave, e-beam sterilized.	



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920-464A