

Applications

All Cryogenic Type Thermistor probes are designed for use in the range of 77°F (room temperature) to -320.8°F (the boiling point of Liquid Nitrogen) (25°C to -196°C). These units are very stable, exhibit no hysteresis effects, and rapid temperature cycling from 77°F to -320.8°F (25°C to -196°C) has no measurable effect on electrical, thermal or mechanical properties. These units are well suited for Cryogenic temperature measurement and control applications such as cryogenic fluid flow, liquid level or temperature sensing in the 77°F to -320.8°F (25°C to -196°C) range. They may be used at temperatures below the Nitrogen Point with suitable instrumentation.

Description

Cryogenic thermistor probes consist of bead thermistors hermetically sealed into shock resistant solid glass rods and come in 2 basic styles. The CTFP type features a very

small glass coated bead extending from the tip of the glass rod while the CTP type features a larger bead sealed within the tip of the glass rod. Both styles are rugged, easy to handle and unaffected by severe environmental exposures including high density nuclear radiation. The CTFP units offer ultrafast response times whereas the CTP units are more rugged and at lower cost.

Data

Cryogenic type thermistor probes may be exposed to 572°F (300°C) for short periods. Units can be exposed to 221°F (105°C) for extended periods, however long term storage at or above 140°F (60°C) may result in some resistance change, therefore storage below 140°F (60°C) is recommended for best stability.

NTC Cryogenics

Thermometrics

Thermistors

NTC Cryogenics is a Thermometrics products. Thermometrics has joined other GE high-technology sensing businesses under a new name—GE Industrial, Sensing.



Cryogenics Specifications

Thermal And Electrical Properties

Table A: CTP and CTFP Cryogenics

Thermistor Type	Cryogenic Thermistor Probes Figure 1				Cryogenic Fastip Probes Figure 2		
	CTP 60	CTP 65	CTP 85	CTP 100	CTFP 07	CTFP 10	CTFP 14
D (Maximum Diameter)	0.060	0.065	0.085	0.100	0.085	0.085	0.085
L (Length)	1/4 in (6.35 mm) or 1/2 in (12.7 mm)	1/4 in (6.35 mm) or 1/2 in (12.7 mm)	1/4 in (6.35 mm) or 1/2 in (12.7 mm)	1/4 in (6.35 mm) or 1/2 in (12.7 mm)	1/2 in (12.7 mm)	1/2 in (12.7 mm)	1/2 in (12.7 mm)
Lead Diameter	0.008	.008	.012	.012	0.012	0.012	0.012
Thermal Time Constant in Still Air* (Seconds)	12 Sec.	13 Sec.	16 Sec.	22 Sec.	0.1 Sec.	0.12 Sec.	0.15 Sec.
Dissipation Constant in Still Air (Milliwatts/K)	0.60 mW/K	0.65 mW/K	0.80 mW/K	1.0 mW/K	.05 mW/K	0.09 mW/K	0.10 mW/K
Maximum Power (Watts)	0.060 W	0.065 W	0.075 W	0.100 W	0.006 W	0.010 W	0.014 W

Resistance Tolerances

Standard tolerance is $\pm 50\%$ (tolerance code letter R at end of code number). For other tolerances, substitute letter from Table B for suffix R at end of code number. The CTFP07DE105R is 1 M Ω $\pm 50\%$ when measured in liquid nitrogen. Refer to the table D for resistance ratio vs temperature characteristics.

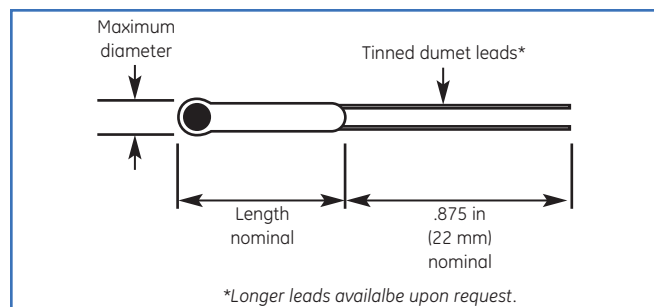


Figure 1: Type CTP60/65/85/100 dimensions

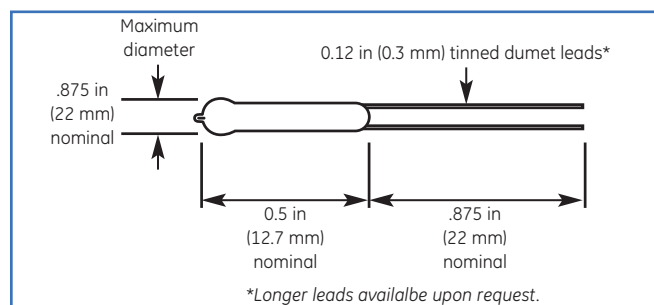


Figure 2: Type CTFP07/10/14 dimensions

Table B: RL Cryogenics

Type Coefficient	Operation In Liquid	Resistance(Ω)	Temp. Coef. %/K	Fig.	Diss. Constant mW/K
RL1004-10K-0-S1	Oxygen	10K $\pm 20\%$	-8.4	1	4
	Nitrogen	31.5K Nominal	-10.4		
RL060628-31.7K-0-S1	Oxygen	31.7K $\pm 20\%$	-8.4	2	3
	Nitrogen	100K Nominal	-10.4		

Dissipation constant is in still air (mW/K)

Cryogenic Probes-Type RL

These cryogenic thermistors are extremely useful for liquid level detection in various cryogenic liquids. In this application, the thermistor is slightly self-heated by passing a small current through the unit. The heat generated in the unit is more easily dissipated when the thermistor is immersed in cryogenic fluid than when the fluid level falls below the thermistor. The resulting change in thermistor temperature is easily detected by the change in resistance.

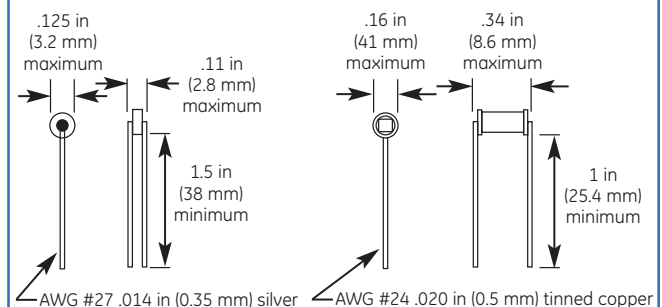
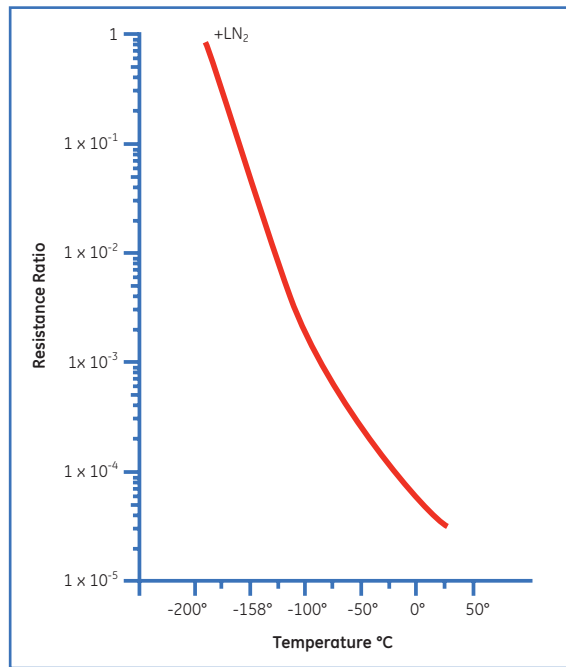


Figure 1

Figure 2

Cryogenics Specifications



Ordering Information

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

Code	Model Number	Code	Probe Length	Code	Material System Code	Code	Resistance in Ohms @ -320°F (-196°C)*	Code	Tolerance
CT P	60	B	1/4 in (6.35 mm)	E	All cryogenic thermistors	104	100 K	K	10
CT P	65	D	1/2 in (12.7 mm)			244	240 K	L	15
CT P	85					514	510 K	M	20
CT P	100					105	1 MΩ	N	25
CT FP	07							P	30
CT FP	10							Q	40
CT FP	14							R	50
								S	Non-standard (specify value)
CT - - - - -								Typical model number	

*Resistance is measured in liquid nitrogen

Resistance Ratio vs Temperature

Table D (For Types CTPs or CTFs)

Characteristic 1 MΩ 105	
-320.47°F (-195.82°C) = 1.0000	-121°F (-85°C) = 0.00073512
	-112°F (-80°C) = 0.00059637
-319°F (-195°C) = 0.97129037	-103°F (-75°C) = 0.00048810
-310°F (-190°C) = 0.75784916	-94°F (-70°C) = 0.00040283
-301°F (-185°C) = 0.54321686	-85°F (-65°C) = 0.00033510
-292°F (-180°C) = 0.37080903	-76°F (-60°C) = 0.00028084
-283°F (-175°C) = 0.24676085	-67°F (-55°C) = 0.00023703
-274°F (-170°C) = 0.16254994	-58°F (-50°C) = 0.00020139
-265°F (-165°C) = 0.10705529	-49°F (-45°C) = 0.00017219
-256°F (-160°C) = 0.07094719	-40°F (-40°C) = 0.00014811
-247°F (-155°C) = 0.04750487	-31°F (-35°C) = 0.00012811
-238°F (-150°C) = 0.03221784	-22°F (-30°C) = 0.00011141
-229°F (-145°C) = 0.02216270	-13°F (-25°C) = 0.00009739
-220°F (-140°C) = 0.01547439	-4°F (-20°C) = 0.00008554
-211°F (-135°C) = 0.01096864	5°F (-15°C) = 0.00007547
-202°F (-130°C) = 0.00789193	14°F (-10°C) = 0.00006688
-193°F (-125°C) = 0.00576173	23°F (-5°C) = 0.00005952
-184°F (-120°C) = 0.00426633	32°F (0°C) = 0.00005317
-175°F (-115°C) = 0.00320214	41°F (+5°C) = 0.00004768
-166°F (-110°C) = 0.00243470	50°F (+10°C) = 0.00004291
-157°F (-105°C) = 0.00187414	59°F (+15°C) = 0.00003875
-148°F (-100°C) = 0.00145960	68°F (+20°C) = 0.00003510
-139°F (-95°C) = 0.00114941	77°F (+25°C) = 0.00003190
-130°F (-90°C) = 0.00091467	



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