NTC THERMISTORS: CRYOGENICS

DESCRIPTION:

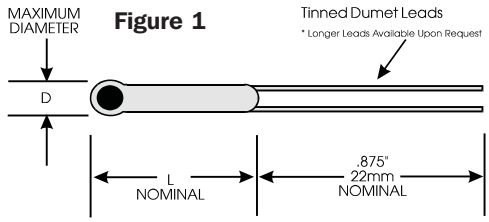
Cryogenic Thermistor probes consist of bead thermistors hermetically sealed into shock resistant solid glass rods and come in 2 basic styles. The CTFP…Type features a very small glass coated bead extending from the tip of the glass rod while the CTP…Type features a larger bead sealed within the tip of 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.

APPLICATIONS:

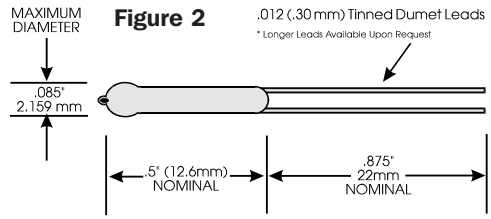
All Cryogenic Type Thermistor probes are designed for use in the range of 25°C (room temperature) to -196°C (the boiling point of Liquid Nitrogen). These units are very stable, exhibit no hysteresis effects, and rapid temperature cycling from 25°C to -196°C has no measurable effect on electrical, thermal 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 25°C to -196°C range. They may be used at temperatures below the Nitrogen Point with suitable instrumentation.

DIMENSIONS:

TYPE CTP60/CTP65/CTP85/CTP100



TYPE CTFP07/CTFP10/CTFP14



DATA:

Cryogenic Type Thermistor probes may be exposed to 300°C for short periods. Units can be exposed to 105°C for extended periods, however long term storage at or above 60°C may result in some resistance change, therefore storage below 60°C is recommended for best stability.

CODING:

CTP60 B E 104 R

- R — Tolerance code letter per Table B
- 104 — Zero-power resistance code from Table
- E — Material System Code Letter (All Cryogenic Thermistors = E)
- B — Probe Length Code Letter B = 1/4", D = 1/2" (for figure 1 only)
- CTP60 — Thermistor type (CTP's or CTFP's)

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TABLE A: THERMAL AND ELECTRICAL PROPERTIES:

DIMENSIONS:	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 (Max. Diameter)	.060	.065	.085	.100	.085	.085	.085
L (Length)	1/4" or 1/2"	1/4" or 1/2"	1/4" or 1/2"	1/4" or 1/2"	1/2"	1/2"	1/2"
Lead Diameter	.008	.008	.012	.012	.012	.012	.012
Thermal Time Constant in Still Air* (Seconds)	12 Sec.	13 Sec.	16 Sec.	22 Sec.	.1 Sec.	.12 Sec.	.15 Sec.
Dissipation Constant in Still Air (Milliwatts/K)	.60 mW/K	.65 mW/K	.80 mW/K	1.0 mW/K	.05 mW/K	.09 mW/K	.10 mW/K
Maximum Power (Watts)	.060 W	.065 W	.075 W	.100 W	.006 W	.010 W	.014 W

TABLE B: STANDARD TOLERANCES:

Tolerance Code Letter	K	L	M	N	P	Q	R	S
± % Tolerance at -196°C	10	15	20	25	30	40	50	Non-standard (specify value)

RESISTANCE TOLERANCE

Standard tolerance is ±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 Megohm ±50% when measured in liquid nitrogen.

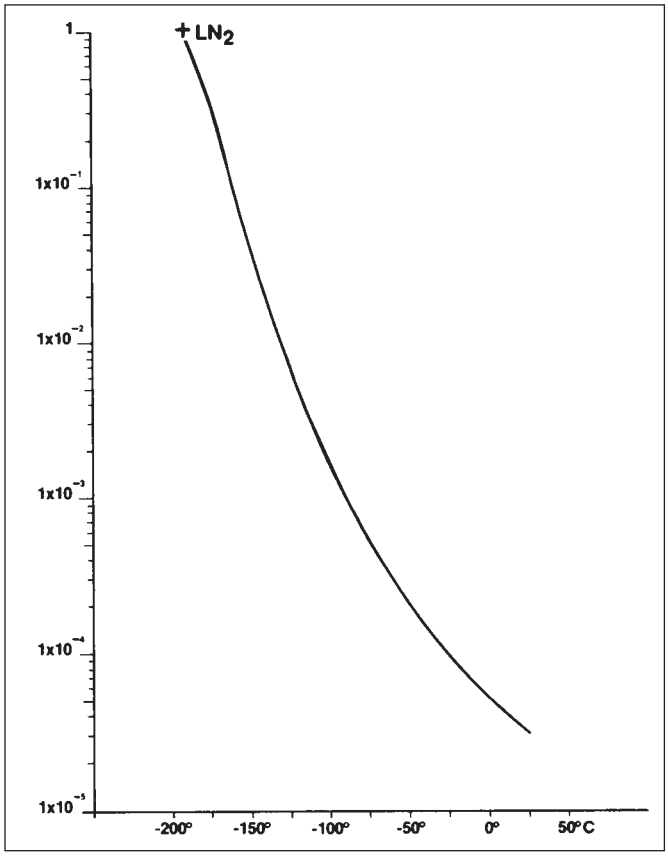
STANDARD RESISTANCE VALUES

Resistance in Ohms at -196°C	Resistance Code
100k	104
240k	244
510k	514
1 Megohm	105

* Resistance is measured in liquid nitrogen.

RESISTANCE RATIO -VS- TEMPERATURE CHARACTERISTIC

-195.82° = 1.0000	-85° = .00073512
	-80° = .00059637
-195° = .97129037	-75° = .00048810
-190° = .75784916	-70° = .00040283
-185° = .54321686	-65° = .00033510
-180° = .37080903	-60° = .00028084
-175° = .24676085	-55° = .00023703
-170° = .16254994	-50° = .00020139
-165° = .10705529	-45° = .00017219
-160° = .07094719	-40° = 00014811
-155° = .04750487	-35° = .00012811
150° = .03221784	-30° = .00011141
-145° = .02216270	-25° = .00009739
-140° = .01547439	-20° = .00008554
-135° = .01096864	-15° = .00007547
-130° = .00789193	-10° = .00006688
-125° = .00576173	-5° = .00005952
-120° = .00426633	-0° = .00005317
-115° = .00320214	+5° = .00004768
-110° = .00243470	+10° = .00004291
-105° = .00187414	+15° = .00003875
-100° = .00145960	+20° = .00003510
-95° = .00114941	+25° = .00003190
-90° = .00091467	



NTC THERMISTORS:
CRYOGENIC THERMISTORS

Type	For Operation In Liquid	Resistance (Ω)	Temperature Coefficient (%/K)	Figure	Dissipation Constant (mW/K)
RL1004-10K-0-S1	Oxygen	10K ± 20%	– 8.4	1	4
	Nitrogen	31.5K Nominal	– 10.4		
RL060628-31.7K-0-S1	Oxygen	31.7K ± 20%	– 8.4	2	3
	Nitrogen	100K Nominal	– 10.4		

NOTE: Dissipation constant is in still air (mW/K)

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.

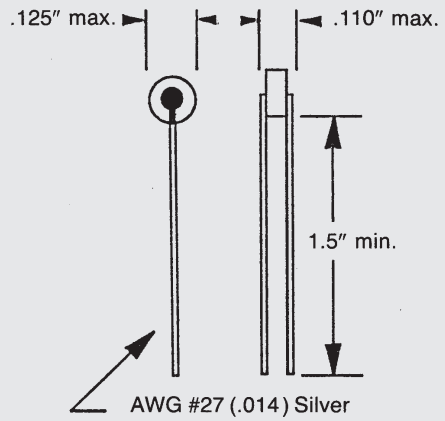


Figure 1

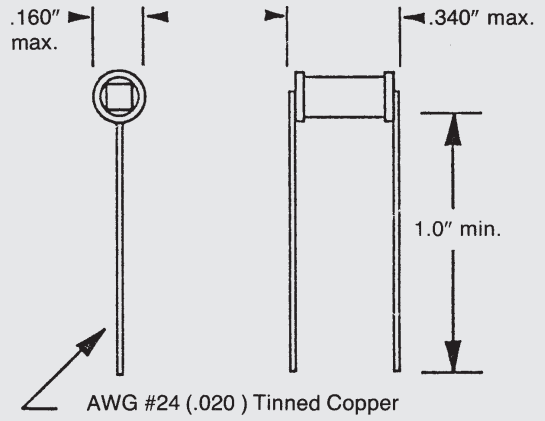


Figure 2

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