

NTC Thermistor Assemblies



FEATURES

- Standard and custom assemblies are available in a variety of configurations
- Assemblies can conveniently attach to or be an integral part of any system to monitor or control temperature
- No added labor required prior to assembly in the intended application

Standard and custom assemblies are available in a variety of configurations. The choice of assembly style is dependent on the application. The primary factors which determine the optimum configuration of a thermistor assembly are the operating environment, mounting, time response and minimum dissipation constant.

The two factors which do vary considerably with assembly design are time constant and dissipation constant. The time constant will typically be of greater duration in encapsulated thermistors. This is, of course, due to additional mass surrounding the thermistor element; therefore, extending the thermal transfer time. Dissipation constant will also be greater in assemblies. The additional housing mass serves well as a heat sink. Greater power is therefore required to induce self-heating.

Both time constant and dissipation constant will vary with the selected thermistor and housing. Heat transfer properties of the housing, thermistor location, mass and wire type determine these constants. It is recommended to evaluate or consult the factory in applications where TC and DC are critical.

ASSEMBLY STYLES

IMMERSION PROBES

1. Thread Mounted
2. Penetration Probe
3. Tubular Stainless Steel
4. Tubular Pyrex®
5. Flexible Immersion

GENERAL PURPOSE SENSORS

6. Delrin® Housing
7. Stainless Steel Rod
8. Gold Anodized Flanged Sensor
9. ABS Housing

10. Polyester Housing

11. Epoxy Tip Probe

12. Pipe Sensor

SURFACE SENSORS

13. Ring Tongue Lugs

14. Heat Sink Sensors

15. Rectangular Block Sensors

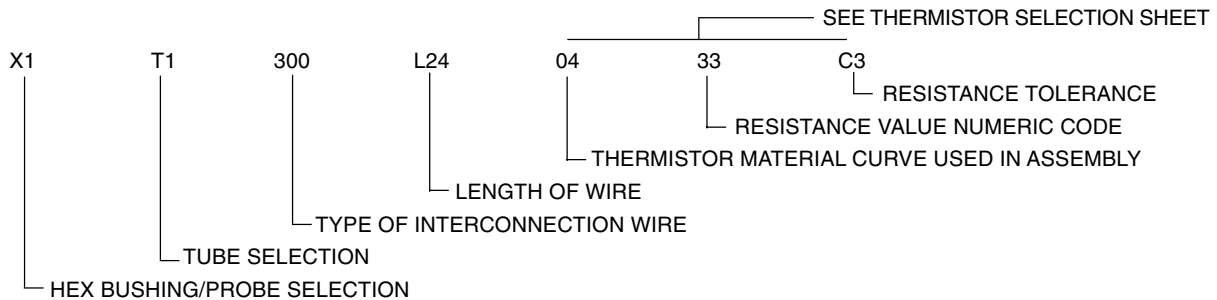
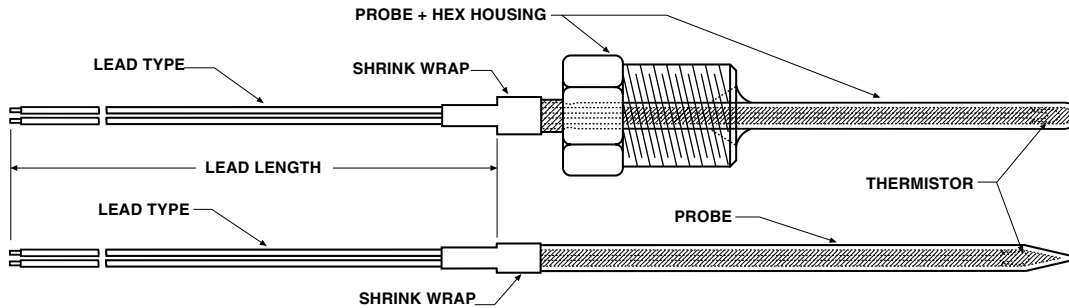
Refer to "How to Select an NTC Thermistor" for general design aids in choice of thermistor value, tolerance and R-T curve.

ORDERING INFORMATION

1. Choose Style: R07
2. Select Wire Type: PVC Insulated - example 300
3. Select Wire Length: L06
4. Select Thermistor - See thermistor selector sheet
 - 1) Curve 01
 - 2) Resistance value numeric code - 31
 - 3) Resistance tolerance 10
5. Contact factory for part numbers.

IMMERSION TYPE ASSEMBLY HOUSING

<p>MATERIAL: #303 STAINLESS STEEL</p>	<p>MATERIAL: #303 & #304 STAINLESS STEEL</p>	<p>T1 = 1" T2 = 1.5" T3 = 3" T4 = 6"</p> <p>MATERIAL #304 STAINLESS STEEL 01.05 [2.67]</p>
<p>MATERIAL: #304 STAINLESS STEEL</p>	<p>MATERIAL: BRASS</p>	<p>T5 = 1.5" T6 = 2.5" T7 = 3" T8 = 4" T9 = 6" T10 = 8"</p> <p>MATERIAL #304 STAINLESS STEEL 0.168 [4.27]</p>
<p>MATERIAL: #303 STAINLESS STEEL</p>	<p>TUBES T1, T2, T3, T4, T13, T14 FIT TO HEX BUSHING "X1"</p> <p>TUBES T5, T6, T7, T8, T9, T10 FIT TO HEX BUSHING "X2"</p> <p>TUBES T1, T2, T3, T4, T13, T14 FIT TO COUPLING "X5"</p> <p>ALL TUBES MAY BE USED INDEPENDENT OF ANY BUSHING OR COUPLING</p>	<p>T11 = 2.5" T12 = 6"</p> <p>MATERIAL #304 STAINLESS STEEL 0.230 [5.84]</p> <p>T13 = 1.25" T14 = 6.25"</p> <p>MATERIAL #304 STAINLESS STEEL 0.105 [2.67]</p>



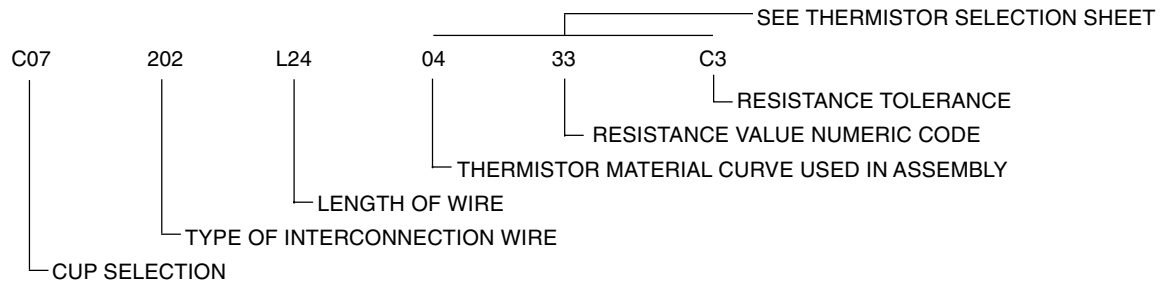
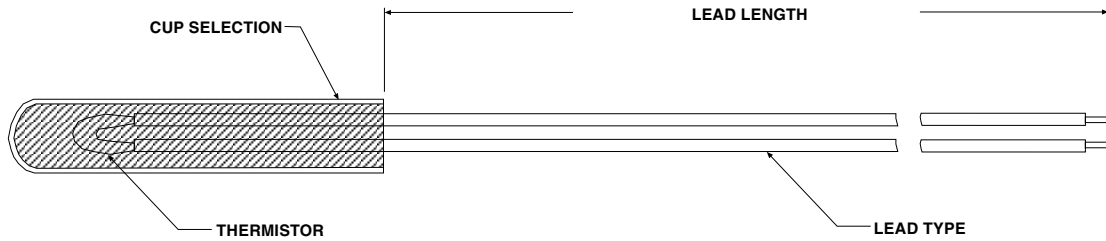
HOOK-UP WIRE TYPE	STANDARD WIRE FOR HEX/TUBE HOUSINGS							
	X1/X5	X2	X3	X4	T1 - T4	T5 - T10	T11 - T12	T13 - T14
Cable	508	503	503	503	508	503	503	508
Teflon Insulated Wire	208	202	202	202	208	202	202	208
PVC Insulated Wire	300	300	300	300	300	300	300	300
Twisted Pair Wire	702	702	702	702	702	702	702	702
Zip (Flat) Wire	601	601	601	601	601	601	601	601
Ni Wire, Teflon Insulated	400	400	400	400	400	400	400	400

STANDARD WIRE LENGTHS: 3, 6, 9, 12, 24, 36 Inches



CUP TYPE ASSEMBLY HOUSING

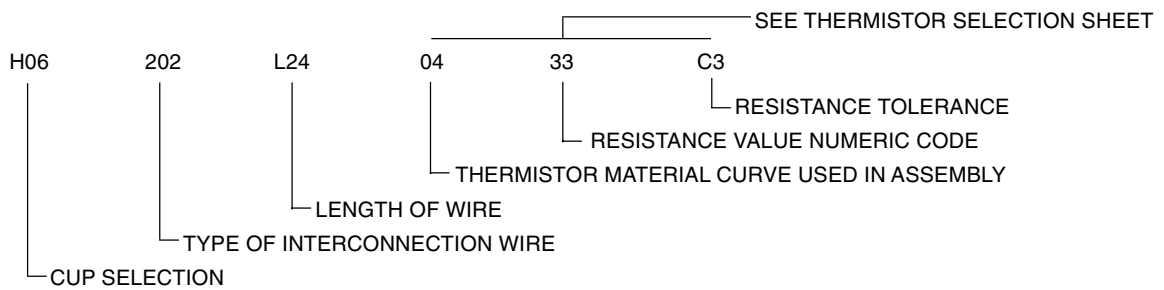
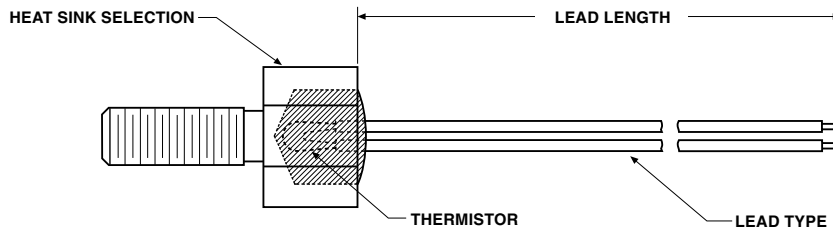
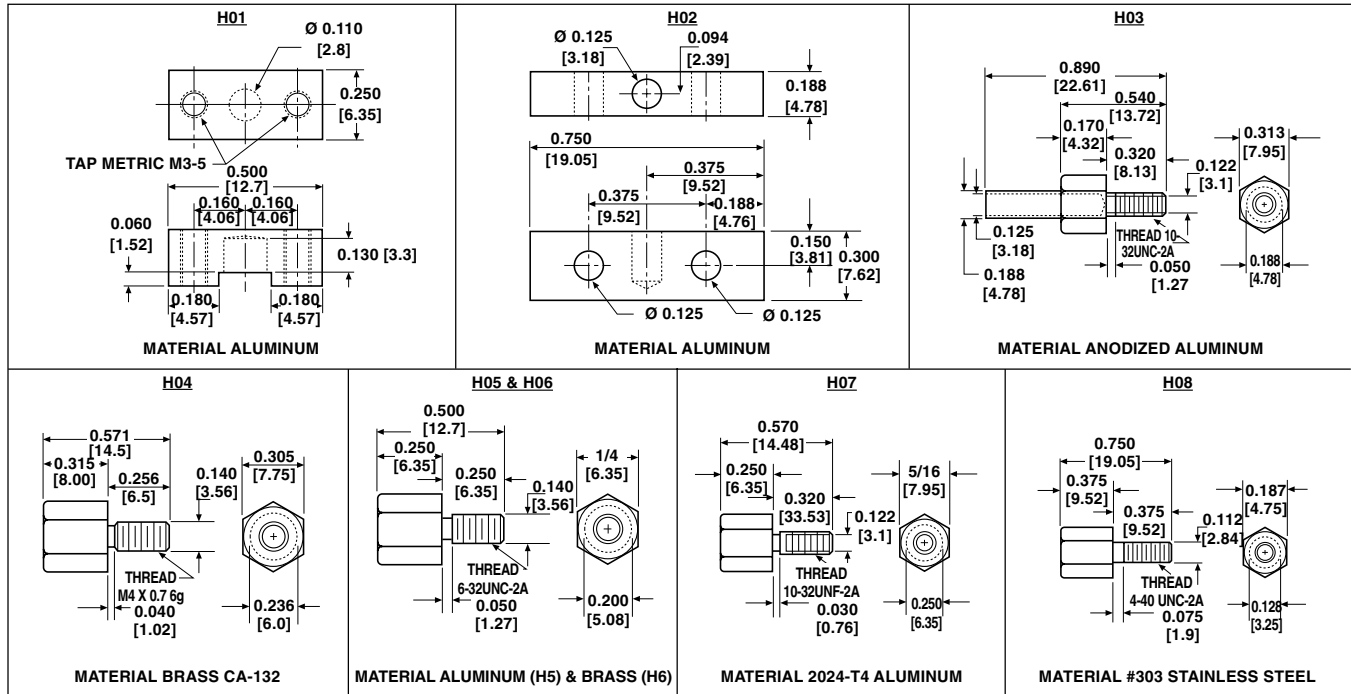
<p>C01</p> <p>MATERIAL: ALUMINUM</p>	<p>C02</p> <p>MATERIAL: #303 STAINLESS STEEL</p>	<p>C03</p> <p>MATERIAL: #2011 ALUMINUM</p>
<p>C04</p> <p>MATERIAL: NICKEL PLATED BRASS</p>	<p>C05</p> <p>MATERIAL: #2024-T4 ALUMINUM</p>	<p>C06</p> <p>MATERIAL: GOLD ANODIZED ALUMINUM</p>
<p>C07</p> <p>MATERIAL: CELANEX 2012-2 (BLACK POLYESTER)</p>	<p>C08</p> <p>MATERIAL: DELRIN II#500 WHITE & BLACK</p>	<p>C09</p> <p>MATERIAL: MOLDED ABS</p>



HOOK-UP WIRE TYPE	STANDARD WIRE FOR CUP HOUSINGS							
	C01	C02	C03	C04	C05	C06	C07	C08
Cable	503	N/A	508	508	508	503	503	508
Teflon Insulated Wire	202	202	202	202	202	202	202	202
PVC Insulated Wire	300	300	300	300	300	300	300	300
Zip (Flat) Wire	601	601	601	601	601	601	601	601
Twisted Pair Wire	703	703	703	703	703	703	703	703
Ni Wire, Teflon Insulated	400	400	400	400	400	400	400	400

STANDARD WIRE LENGTHS: 3, 6, 9, 12, 24, 36 Inches

TEX BUSHING/PROBE TYPE ASSEMBLY HOUSING



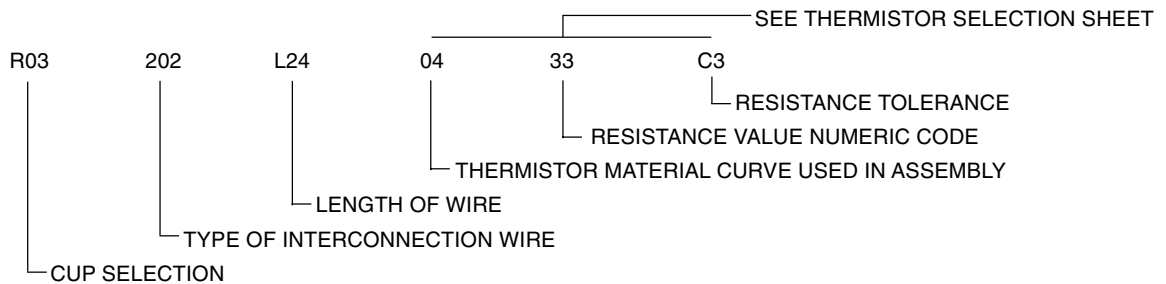
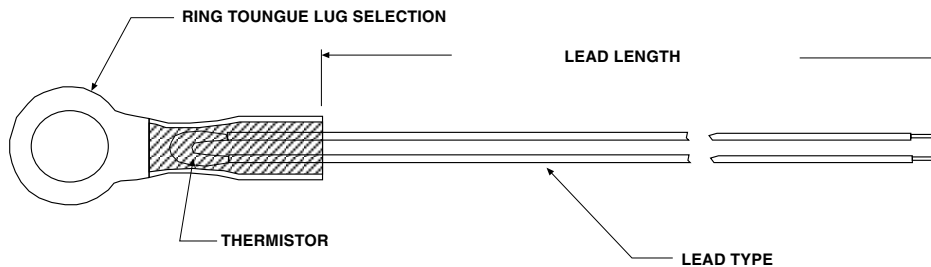
HOOK-UP WIRE TYPE	STANDARD WIRE FOR HEAT SINK HOUSINGS							
	H01	H02	H03	H04	H05	H06	H07	H08
Cable	508	508	508	503	503	503	503	508
Teflon Insulated Wire	202	202	202	202	202	202	202	202
PVC Insulated Wire	306	306	306	306	306	306	306	306
Twisted Pair Wire	703	703	703	703	703	703	703	703
Zip (Flat) Wire	601	601	601	601	601	601	601	601
Ni Wire, Teflon Insulated	400	400	400	400	400	400	400	400

STANDARD WIRE LENGTHS: 3, 6, 9, 12, 24, 36 Inches



RING TONGUE TYPE ASSEMBLY HOUSING

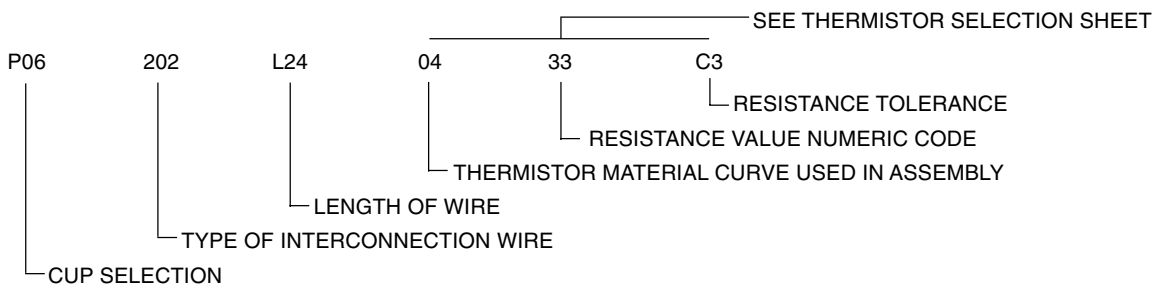
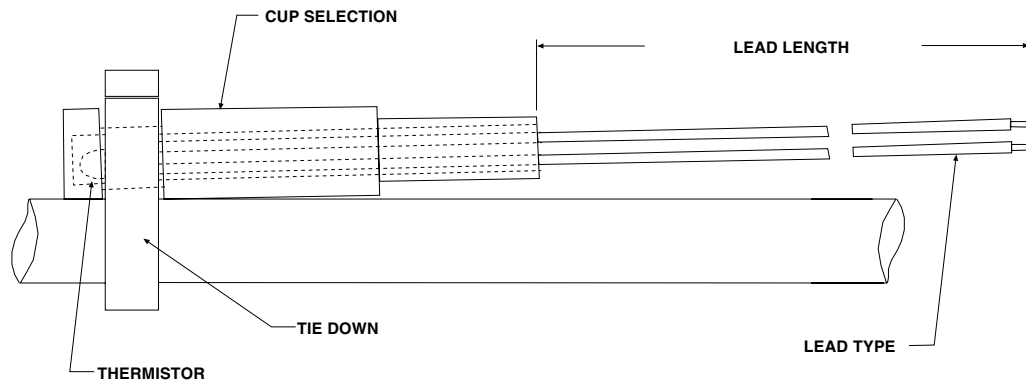
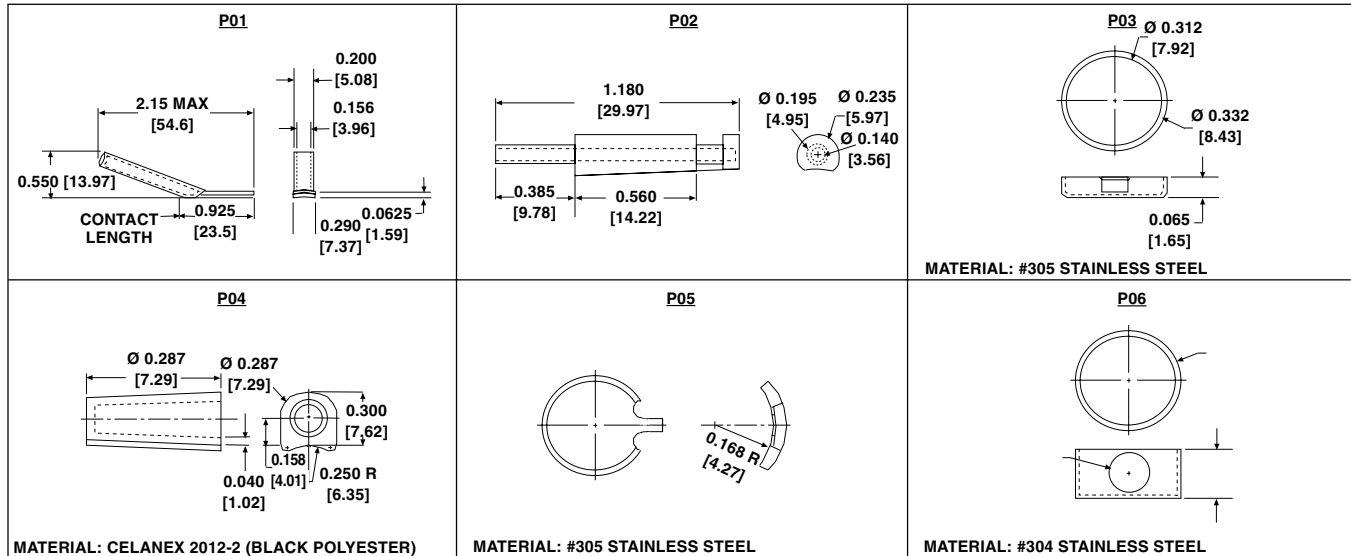
R01 	R02 	R03 	R04
R05 	R06 	R07 	R08



HOOK-UP WIRE TYPE	STANDARD WIRE FOR HEAT SINK STYLES							
	R01	R02	R03	R04	R05	R06	R07	R08
Cable	503	503	503	503	N/A	508	508	503
Teflon Insulated Wire	202	202	202	202	208	207	207	201
PVC Insulated Wire	301	301	304	306	301	301	304	306
Twisted Pair Wire	703	703	703	703	N/A	703	703	702
Zip (Flat) Wire	601	601	601	601	601	601	601	601
Ni Wire, Teflon Insulated	400	400	400	400	400	400	400	400

STANDARD WIRE LENGTHS: 3, 6, 9, 12, 24, 36 Inches

PIPE STYLE ASSEMBLY HOUSING

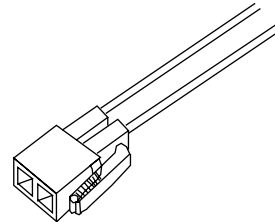
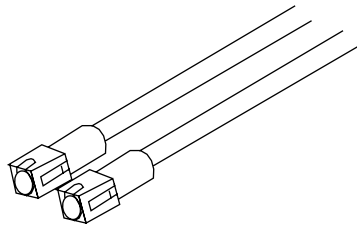


HOOK-UP WIRE TYPE	STANDARD WIRE FOR PIPE HOUSINGS					
	P01	P02	P03	P04	P05	P06
Cable	508	508	N/A	503	N/A	N/A
Teflon Insulated Wire	202	202	202	202	202	202
PVC Insulated Wire	304	304	301	304	301	301
Zip (Flat) Wire	601	601	601	601	601	601
Twisted Pair Wire	703	703	703	703	703	703
Ni Wire, Teflon Insulated	400	400	400	400	400	400

STANDARD WIRE LENGTHS: 3, 6, 9, 12, 24, 36 Inches

ASSEMBLY CONNECTORS

<p>I1 18 - 22 WIRE </p> <p>I2 20 - 24 WIRE </p> <p>I3 24 - 26 WIRE </p> <p>RECEPTABLE FOR 3/16 X 0.020 TAB</p>	<p>I4 22 AWG. 2-CIRCUIT HOUSING AND DUST COVER COVER (AMP P/N: 640551-2) HOUSING (AMP P/N: 641219-2) TIN COPPER ALLOY CONTACTS, GOLD PLATED </p>
<p>I5 2 CAP HOUSINGS 2 SOCKETS SOCKET (18 - 24 AWG) (AMP P/N: 350889-1) CAP HOUSING (AMP P/N: 350888-1) </p>	<p>I6 1 RECEPTACLE 2 TERMINALS FEMALE TERMINAL (24 - 30 AWG) (MOLEX P/N: 02-08-1132) BRASS W/TIN PLATE FREE HANGING RECEPTACLE (MOLEX P/N: 03-06-1023) </p>
<p>I7 1 PLUG HOUSINGS 2 TERMINALS MALE TERMINAL (18 - 24 AWG) (AMP P/N: 350690-2) BRASS W/GOLD PLATE 2-CIRCUIT PLUG HOUSING (AMP P/N: 350777-1) </p>	<p>I8 1 MINI-FIT HOUSING 2 TERMINALS FEMALE TERMINAL (18 - 24 AWG) (MOLEX P/N: 39-00-0039) BRASS W/TIN PLATE 2-GKT MINI-FIT HOUSING (MOLEX P/N: 39-01-2020) </p>



ASSEMBLY STRAIN RELIEF AND MARKING

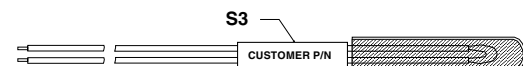
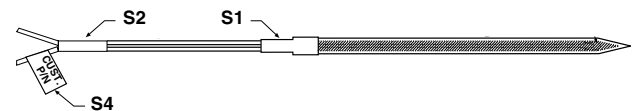
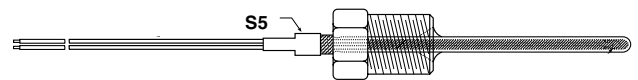
S1: SHRINK WRAP STRAIN RELIEF, HOUSING/LEAD

S2: SHRINK WRAP STRAIN RELIEF, LEADS

S3: SHRINK WRAP WITH MARKING

S4: AVERY LABEL MARKING

S5: SPRING - STRAIN RELIEF



NTC Thermistor Assemblies



Vishay Dale

NTC Thermistor Assemblies

HOOK UP WIRES AVAILABLE

WIRE P/N	# COND'S	AWG	CONDUCTOR MATERIAL	INSULATOR	NOM. DIA	COMMENTS	
Bare, Copper Wire, Tin Plated							
100	1	20	Cu/Tin Plate		0.032	"G" Series Thermistor Std.	250201-05
101	1	22	Cu/Tin Plate		0.025		250201-04
102	1	26	Cu/Tin Plate		0.016	"B" Series Thermistor Std.	220049-04
103	1	28	Cu/Tin Plate		0.013	"C" Series Thermistor Std.	220049-01
104	1	30	Cu/Tin Plate		0.010	"M" Series Thermistor Std.	220049-02
105	1	32	Cu/Tin Plate		0.008	"F" Series Thermistor Std.	220049-03
Copper Conductor, Silver Plated with Teflon Insulation							
200	1	18 - 19/30	Cu/Silver Plate	Teflon	0.079	Black	220019-06
201	1	22 - 19/34	Cu/Silver Plate	Teflon	0.053	Black	220019-04
202	1	24 - 7/32	Cu/Silver Plate	Teflon	0.047	Black, White	220019-02, -03
203	1	24 - 19/36	Cu/Silver Plate	Teflon	0.047	White	220019-05
204	1	24 - 7/32	Cu/Silver Plate	Teflon	0.036	Black	220166-03
205	1	26 - 19/38	Cu/Silver Plate	Teflon	0.042	Red	
206	1	28 - 7/36	Cu/Silver Plate	Teflon	0.038	Orange, Red, Black	220086-02, -03, -09
207	1	28 - 7/36	Cu/Silver Plate	Teflon	0.027	Black, White, Green	220166-01, -02, -04
208	1	30 - 7/38	Cu/Silver Plate	Teflon	0.035	Black	220019-05
209	1	24	Cu/Silver Plate	Teflon	0.040	Black, White	220019-01, -07
210	1	26	Cu/Silver Plate	Teflon	0.035	Black	
211	1	28	Cu/Silver Plate	Teflon	0.032	Black	220086-06
212	1	30	Cu/Silver Plate	Teflon	0.029	Black	220086-08
Copper Conductor, Tin Plated with PVC Insulation							
300	1	26 - 19/38	Cu/Tin Plate	PVC	0.038	Black, White, MIL-W-16878/1, Type B	220079-01
301	1	28 - 7/36	Cu/Tin Plate	PVC	0.034	Black, White, Green, MIL-W-16878/1, Type B	220079-02, -05, -11
302	1	24 - 7/32	Cu/Tin Plate	PVC	0.044	Black, White, MIL-W-16878/1, Type B	220079-04, -06
303	1	22 - 19/34	Cu/Tin Plate	PVC	0.050	Black, MIL-W-16878/1, Type B	220079-07
304	1	30 - 7/38	Cu/Tin Plate	PVC	0.032	Black, MIL-W-16878/1, Type B	220079-08
305	1	22 - 7/30	Cu/Tin Plate	PVC	0.095	Black, UL 1015	220234-01
306	1	24 - 7/32	Cu/Tin Plate	PVC	0.089	Yellow, UL 1015	220234-03
307	1	22 - 7/30	Cu/Tin Plate	PVC	0.062	White, UL 1569	220234-02
308	1	26 - 7/34	Cu/Tin Plate	PVC	0.038	Light Blue, UL 1061	220262-01
309	1	22 - 7/30	Cu/Tin Plate	PVC	0.058	Black, UL 1569	220313-01
310	1	26 - 7/34	Cu/Tin Plate	PVC	0.051	Black, UL 1569	220323-01
311	1	24 - 7/32	Cu/Tin Plate	PVC	0.056	Black, UL 1569	220323-02
312	1	24	Cu/Tin Plate	PVC	0.040	Black, UL 1061	220332-01
313	1	30	Cu/Tin Plate	PVC	0.027	Black	220181-01
Miscellaneous Insulated Wires							
400	1	30	Nickel	Teflon	0.020	Yellow, Black, "T" Series Thermistor	220215-02, -03
401	1	30	Cu/Silver Plate	Kynar	0.020	Black, UL 1423	220316-01
402	1	28 - 7/36	Cu/Silver Plate	Kapton	0.025	Black	220317-01



HOOK UP WIRES AVAILABLE (continued)

WIRE P/N	# COND'S	AWG	CONDUCTOR MATERIAL	INSULATOR	NOM. O.D.	COMMENTS
Cables - Wires w/ Jackets Exterior						
500	2	18 - 19/30	Cu/Tin Plate	PVC	0.22/0.075	Gray Jacket w/ Black/White/Braid Shield 220298-01
501	2	20 - 7/28	Cu/Tin Plate	PVC	0.175/0.059	Gray Jacket w/ Red/Black Wires 220014-02
502	2	22 - 19/34	Cu/Silver Plate	Teflon	0.142/0.050	White Jacket w/ Black/White/Braid Shield 220131-01
503	2	22 - 7/30	Cu/Tin Plate	PVC	0.160/0.048	Gray Jacket w/ Red/Black Wires 220014-01
504	3	22 - 7/30	Cu/Tin Plate	PVC	0.160/0.048	Gray Jacket w/ Red/Black/White Wires 220014-03
505	3	22 - 7/30	Cu/Tin Plate	PVC	0.130/0.048	Gray Jacket w/ Red/Black/Drain Wires 220112-01
506	2	22 - 7/30	Cu/Tin Plate	PVC	0.170/0.057	Gray Jacket w/ Red/Black Wires 220177-01
507	3	22 - 7/30	Cu/Tin Plate	PVC	0.160/0.048	Gold Jacket w/ Black/White Wires 220121-01
508	2	28 - 7/36	Cu/Tin Plate	PVC	0.100/0.033	Gray Jacket w/ Black/White/Paper Wrap 220202-01
509	3	20	Cu/Tin Plate	Teflon	0.150	Red, White, Black in Stainless Steel Braid 220021-01
Flat Wire & Zip Cords						
600	2	24 - 7/32	Cu/Tin & Cu	PVC	0.065 X 0.130	Clear w/ 1 Tin Plated Cu and 1 Bare Cu 220016-01
601	2	28 - 7/36	Cu/Tin & Cu	PVC	0.034 X 0.067	Black w/ 1 Tin Plated Cu and 1 Bare Cu 220016-03
602	2	18 - 41/34	Cu/Tin & Cu	PVC	0.105 X 0.205	Black w/ 1 Tin Plated Cu and 1 Bare Cu 220180-01
603	2	28 - 7/36	Cu/Tin Plate	PVC	0.200 X 0.041	Gray, UL 2651 220223-01
Twisted Pair Wires						
700	2	24 - 7/32	Cu/Silver Plate	Teflon	0.044	White, UL 1213 - 2 Twists/Inch 220334-01
701	2	22 - 19/34	Cu/Tin Plate	Tefzel	0.043	Blue 220113-01
702	2	22 - 7/30	Cu/Tin Plate	PVC	0.063	Black/White, UL 1007 220176-01
703	2	24 - 7/32	Cu/Tin Plate	PVC	0.057	Black/White, UL 1007 220176-02
704	2	24 - 7/32	Cu/Tin Plate	PVC	0.057	White/White, UL 1007 220176-03

NTC Thermistor Assemblies

Vishay Dale

NTC Thermistor Assemblies



THERMISTOR SELECTIONS FOR SPECIAL ASSEMBLIES											
R ₂₅ Code	R ₂₅ (Ohms)	CURVE NUMBER									
		01	02	03	04	07	08	09	12	14	17
01	50										•
02	56										•
03	68										•
04	82										•
05	100										•
06	120										•
07	150			•							•
08	180			•							•
09	220			•							•
10	270			•							
11	330			•							
12	390			•							
13	470			•							
14	500			•							
15	560			•							
16	680		•								
17	820		•								
18	1K		•								
19	1.2K		•								
20	1.5K		•								
21	1.8K		•								
22	2.2K		•								
23	2.7K		•								
24	3.3K		•								
25	3.9K	•									
26	4.7K	•									
27	5K	•									
28	5.6K	•									
29	6.8K	•									
30	8.2K	•									
31	10K	•									
32	12K	•									
33	15K	•							•		•
34	18K	•							•		•
35	22K								•		•
36	27K								•		•
37	33K				•				•		•
38	39K				•				•		•
39	47K				•			•	•		•
40	50K				•			•	•		•
41	56K				•	•		•	•		
42	68K				•	•		•	•		
43	82K				•	•		•	•		
44	100K				•	•		•	•		
45	120K					•		•	•		
46	150K					•		•	•		
47	180K					•		•	•		
48	220K					•		•	•		
49	270K					•		•	•		
49	500K									•	
50	560K									•	
51	680K									•	
52	820K									•	
53	1 Meg									•	

THERMISTOR TOLERANCES

POINT MATCHED AT 25 °C

- 01 ± 1 %
- 02 ± 2 %
- 03 ± 3 %
- 05 ± 5 %
- 10 ± 10 %

CURVE TRACKING

- B3 ± 0.5 % 0 °C to + 70 °C
- A3 ± 1 % 0 °C to + 70 °C
- B4 ± 0.5 % 0 °C to + 100 °C
- A4 ± 1 % 0 °C to + 100 °C
- B5 ± 0.5 % + 25 °C to + 90 °C
- A5 ± 1 % + 25 °C to + 90 °C
- B8 ± 0.5 % 0 °C to + 50 °C
- C8 ± 1 % 0 °C to + 50 °C

Curve 1, 10K Thermistor, ± 5 % at 25 °C

01
CURVE NUMBER

31
VALUE CODE

05
TOLERANCE at + 25 °C