RESISTANCE TEMPERATURE DETECTORS & ACCESSORIES

RONAN

RONAN
RTD TEMPERATURE PROBES
AND
ACCESSORIES

Designed and manufactured to meet industrial standards for accuracy, ruggedness and high reliability.

Allow temperature measurement and control:

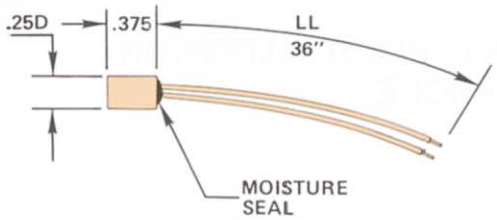
- Without cold junction compensation
- Without special alloy lead wires
- Without calibration drift
- With high output signals—no line noise problems
- With accuracy, sensitivity and stability

Directly used with a wide variety of instrumentation—Indicators, Scanners, Controllers, Recorders.

WARRANTY: Ronan warrants equipment of its own manufacture to be free from defects in material and workmanship, under normal conditions of use and service, and will replace any component found to be defective, on its return, transportation charges prepaid, within one year of its original purchase. This warranty carries no liability, either expressed or implied, beyond our obligations to replace the unit which carries the warranty. Note: Specifications and designs subject to change without notice.

RTD TEMPERATURE PROBES

TYPE A: MINIATURE RTD PROBE



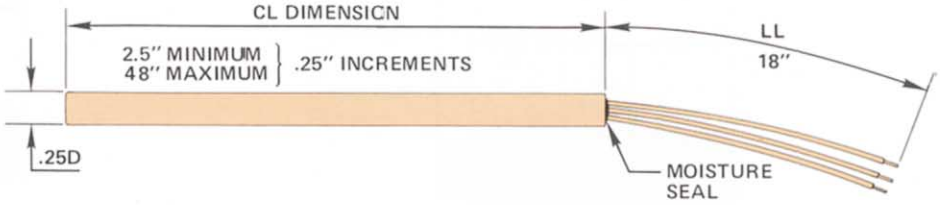
This detector is cesigned to be used in limited space applications where access is restricted. Minimum size and tinned brass case make this detector ideal for embedding directly into a bearing. Babbit metal may be used directly on the case after mounting in a hole in the inner bearing surface. If bearing failure occurs, the journal will not be damaged since the detector case is of brass and will wear away.

Case material: Tinned brass.
Lead length (LL): 36" standard, longer on special reques:.
Lead wire: AWG #22 stranded, silver plated copper, Teflon[1] insulated.
Accuracy: ± ½%.

Minimum pressure in Babbit Bearing 2500 PSIG.
Available with the following elements:

Type	Model	Element	Resistance 0°C (32°F) Ohms ±.5%	Temperature °C Minus Plus	Temperature °F Minus Plus	Number Of Leads	Typical Application
	X40-098	Copper	10	20 to 150	0 to 300	2	
	X40-103	Platinum	100	130 to 650	200 to 1200	2	Bearings and
	X40-100	Nickel	120	130 to 290	200 to 550	2	Metal Surface
	X40-095	Copper	10	20 to 150	0 to 300	3	Temperatures
	X40-097	Platinum	100	130 to 650	200 to 1200	3	
	X40-096	Nickel	120	130 to 290	200 to 550	3	

TYPE B: STRAIGHT RTD PROBE

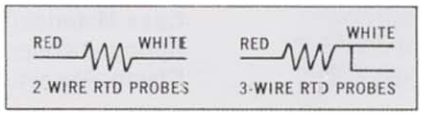


A general purpose detector for measurement of surface, liquid or gas temperatures. Can be used independently or with any of the appropriate RTD accessory fittings, such as fluid seals, thermowells, spring loaded adapter and weather proof thermowell heads.

Case material: Type 304 & 316 SS.
Lead length (LL): 18"standard, longer on special request.
Lead wire: AWG #22 stranded, silver plated copper, Teflon insulated.
Accuracy: ± ½%.
Available with the following elements:

Type	Model	Element	Resistance 0°C (32°F) Ohms ±.5%	Temperature °C Minus Plus	Temperature °F Minus Plus	Number Of Leads	Typical Application
B	X40-113	Copper	10	20 to 150	0 to 300	2	
	X40-103	Platinum	100	130 to 650	200 to 1200	2	Fluid and
	X40-105	Nickel	120	130 to 290	200 to 550	2	Gas Pressures
	X40-114	Copper	10	20 to 150	0 to 300	3	Up to 1500 PSIG
	X40-104	Platinum	100	130 to 650	200 to 1200	3	
	X40-106	Nickel	120	130 to 290	200 to 550	3	

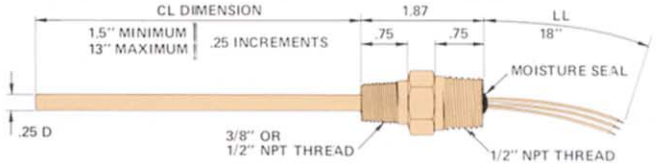
PROBE COLOR CODING



[1]Teflon is a registered trademark of E.I. DuPont de Nemours & Company.

RTD TEMPERATURE PROBES (CONT.)

TYPE C: FIXED IMMERSION RTD PROBE



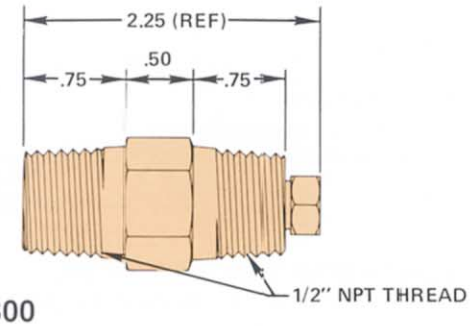
A fixed immersion detector for mounting directly into tanks, pipes, process vessels, etc. The stainless case and integral threaded fitting allow use of this detector in systems under pressure and where isolation of the measure fluid is required.

Case material: Type 304 & 316 SS.
Lead length (LL): 18"standard, longer on special request.
Lead wire: AWG #22 stranded, silver plated copper, Teflon insulated.
Accuracy: ± ½%.
Available with the following elements:

Type	Model	Element	Resistance 0°C (32°F) Ohms ±.5%	Temperature °C Minus Plus	Temperature °F Minus Plus	Number Of Leads	Typical Application
C	X40-111	Copper	10	20 to 150	0 to 300	2	
	X40-107	Platinum	100	130 to 650	200 to 1200	2	Fluid and Gas
	X40-109	Nickel	120	130 to 290	200 to 550	2	Pressures
	X40-112	Copper	10	20 to 150	0 to 300	3	Up to 1000 PSIG
	X40-108	Platinum	100	130 to 650	200 to 1200	3	
	X40-110	Nickel	120	130 to 290	200 to 550	3	

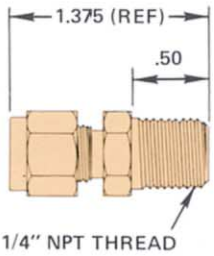
ACCESSORIES

FLUID SEAL FITTING FOR USE WITH TYPE B PROBES



MODEL X40-300

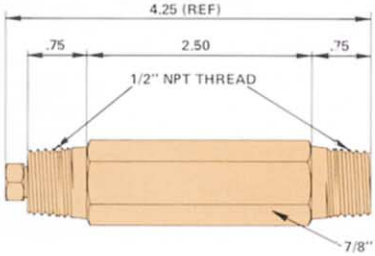
For Type B probes with weatherproof terminal heads, with or without thermowells. Available in Type 304 case material.

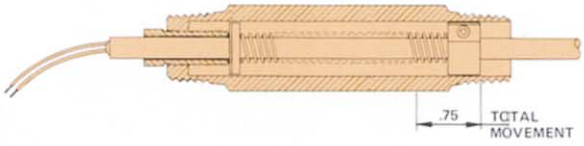


MODEL X40-200

For Type B probes mounted in customer supplied threaded coupling or mounting plate. Available in brass.

RTD SPRING LOADING ADAPTER FOR USE WITH TYPE B PROBES





MODEL X40-700

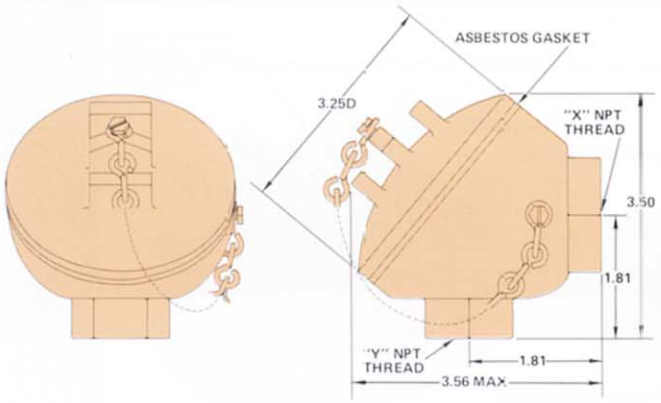
Ideal in applications where positive thermal contact is required to provide faster response to temperature changes. Used with Type B probes in thermowells in high vibration installations to prevent damage to the probe.

See assembly drawings for typical applications.

Case Material: Type 204 SS.
Spring: Inconel.
Clamp: Aluminum.

ACCESSORIES (CONT.)

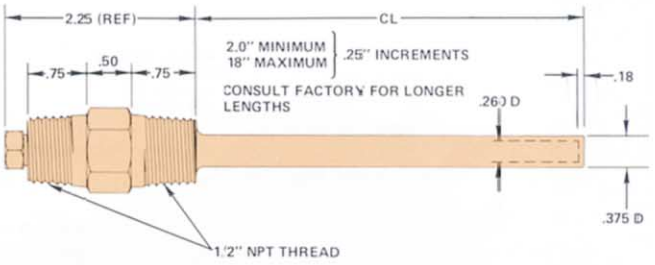
WEATHERPROOF TERMINAL HEAD



Material: Cast iron, cadmium plated.
Terminal block: High temperature ceramic type.
Available with the following conduit hub combinations.

Probe Type B and C Model	"X" Thread	"Y" Thread
X40-400	½"	½"
X40-401	½"	¾"
X40-402	¾"	½"
X40-403	¾"	¾"

RTD THERMOWELLS



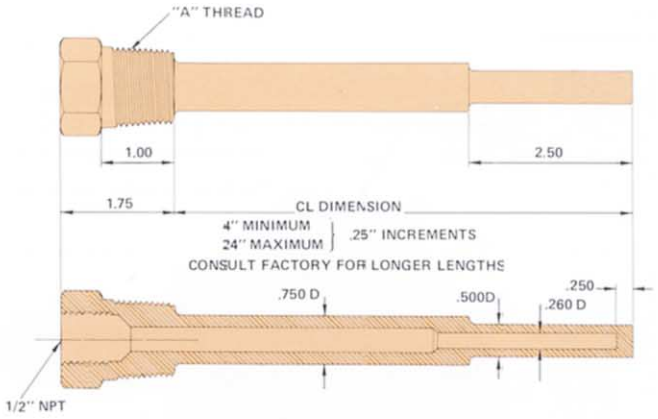
MODEL X40-500

Medium temperature and pressure range thermowell for use with Type B probe.

Recommended for applications where process medium is corrosive and difficult to handle.

Eliminates the shutting down of the equipment when removing or installing the RTD probe.

Maximum temperature: 1200°F (304 SS).
Maximum pressure: 1000 PSIG (304 SS).
Case materials: Type 304 SS or 316 SS.
Fittings: Type 304 SS.

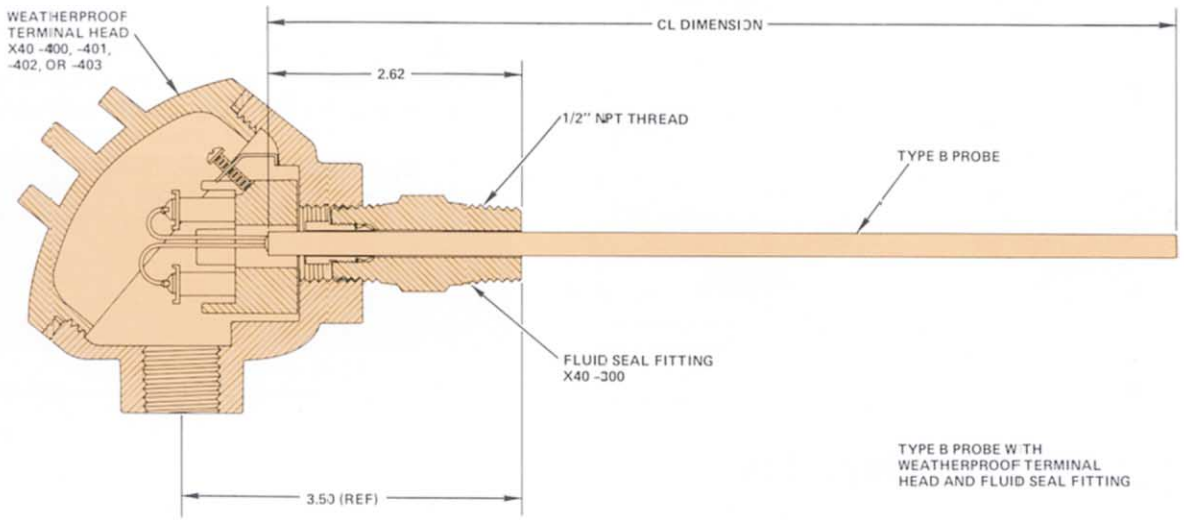
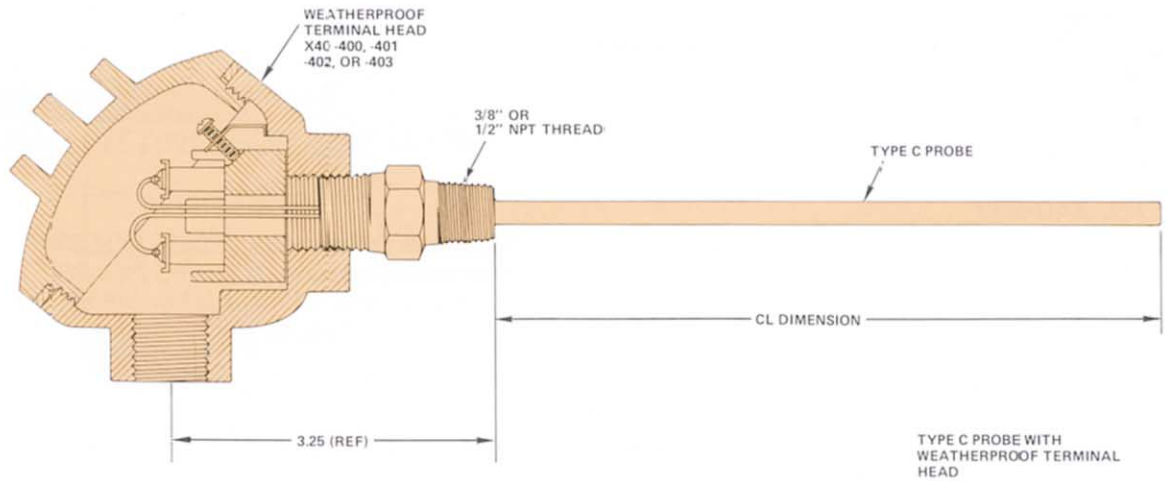
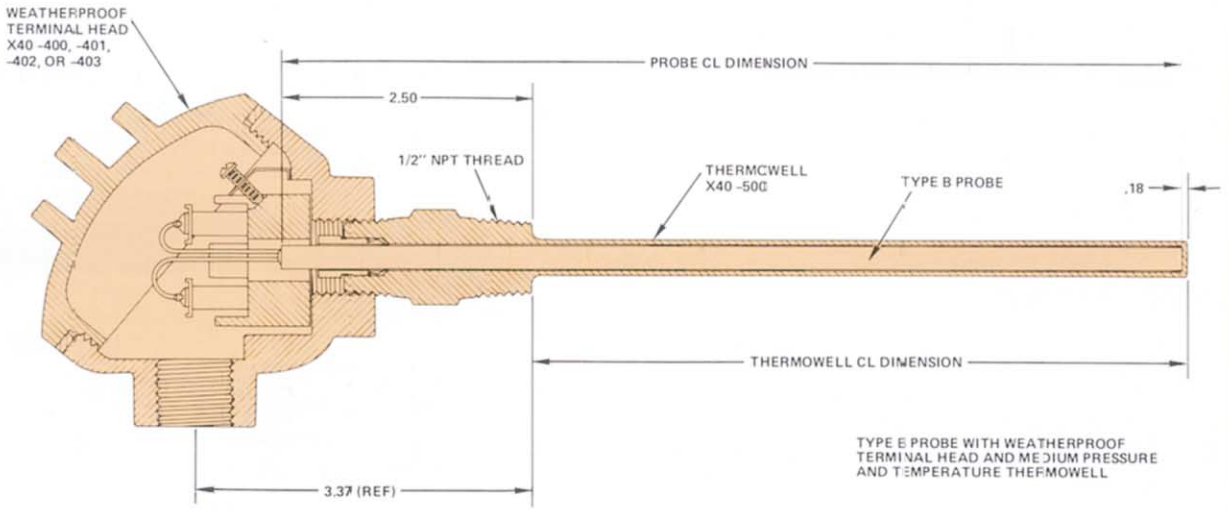


MODEL X40-600

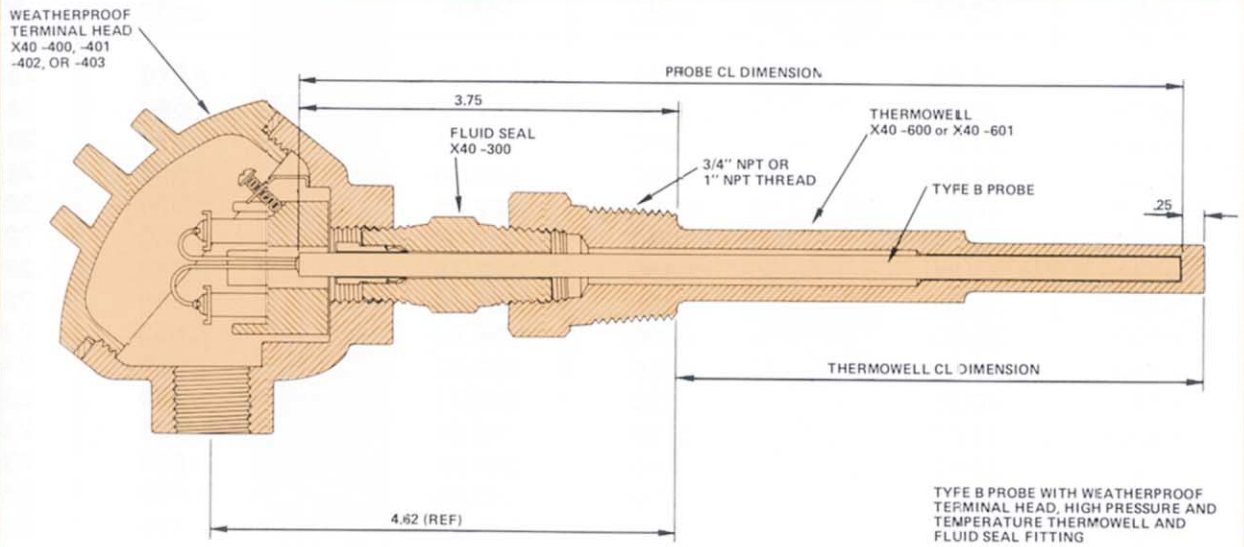
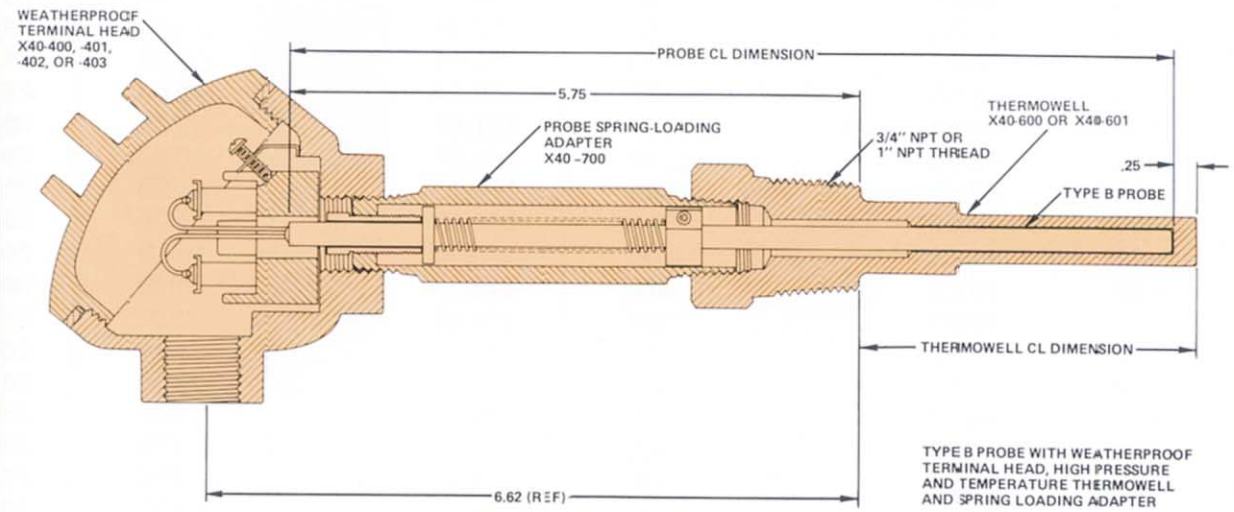
High temperature and pressure range thermowell for use with Type B and C RTD probes.
Maximum temperature: 1200°F (304 SS).
Maximum pressure: 1500 PSIG (304 SS).
Materials: Types 304 SS and 316 SS. Consult factory for other materials.

Model	"A" Thread
X40-600	¾" NPT
X40-601	1" NPT

TYPICAL ASSEMBLIES

Style	Details
A1	 TYPE B PROBE WITH WEATHERPROOF TERMINAL HEAD AND FLUID SEAL FITTING
A2	 TYPE C PROBE WITH WEATHERPROOF TERMINAL HEAD
A3	 TYPE B PROBE WITH WEATHERPROOF TERMINAL HEAD AND MEDIUM PRESSURE AND TEMPERATURE THERMOWELL

TYPICAL ASSEMBLIES (CONT.)

Style	Details
A4	
A5	

ORDERING INFORMATION

1. Select Type of Probe (Type A, B or C) based on application.
2. Select Element Material — Nickel recommended for temperatures below 500°F and Platinum for temperatures above 500°F.
3. Give probe model number specifying CL dimensions and for longer than standard leads, LL dimension.
4. Specify accessories.

Thermowells
Specify: Model Number—CL Dimension—Material

Fluid Seal Fittings
Specify: Model Number—Material

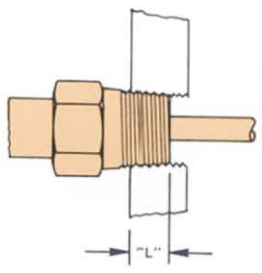
Weatherproof Terminal Head
Specify: Model Number (Note Conduit Sizes)

Spring Loading Adapter
Model X40-700

NOTES:

A. In selecting materials, review maximum pressure and temperature, as well as stability with process fluid or environment.

B. In determining lengths of probes and thermowells (CL Dimensions) care must be given to allow for pipe thread engagement, as given below.



NOMINAL THREAD ENGAGEMENT

Thread Size	L
1/2"	1/2"
3/4"	1/2"
1"	5/8"

TABLE 1 Resistance Temperature Table for Platinum Probes (100 Ohms at 32°F)

Temperature °F	Resistance of Element Ohms	Temperature °F	Resistance of Element Ohms	Temperature °F	Resistance of Element Ohms
−330	16.66	120	119.21	570	213.11
−320	19.12	130	121.38	580	215.11
−310	21.57	140	123.54	590	217.11
−300	24.01	150	125.70	600	219.11
−290	26.43	160	127.85	610	221.10
−280	28.84	170	130.00	620	223.09
−270	31.24	180	132.15	630	225.08
−260	33.63	190	134.30	640	227.06
−250	36.00	200	136.44	650	229.04
−240	38.37	210	138.57	660	231.01
−230	40.72	220	140.71	670	232.98
−220	43.07	230	142.84	680	234.95
−210	45.41	240	144.96	690	236.92
−200	47.74	250	147.09	700	238.88
−190	50.06	260	149.20	710	240.84
−180	52.37	270	151.32	720	242.79
−170	54.68	280	153.43	730	244.74
−160	56.98	290	155.54	740	246.69
−150	59.27	300	157.64	750	248.63
−140	61.55	310	159.74	760	250.57
−130	63.83	320	161.84	770	252.50
−120	66.10	330	163.94	780	254.43
−110	68.36	340	166.03	790	256.36
−100	70.62	350	168.11	800	258.29
−90	72.88	360	170.20	810	260.21
−80	75.12	370	172.27	820	262.13
−70	77.37	380	174.35	830	264.04
−60	79.61	390	176.42	840	265.95
−50	81.84	400	178.49	850	267.86
−40	84.07	410	180.56	860	269.76
−30	86.29	420	182.62	870	271.66
−20	88.52	430	184.68	880	273.56
−10	90.73	440	186.73	890	275.45
0	92.94	450	188.78	900	277.34
10	95.15	460	190.83	910	279.22
20	97.36	470	192.87	920	281.11
30	99.56	480	194.91	930	282.98
40	101.76	490	196.95	940	284.86
50	103.95	500	198.98	950	286.73
60	106.14	510	201.01	960	288.60
70	108.33	520	203.03	970	290.46
80	110.51	530	205.06	980	292.32
90	112.69	540	207.07	990	294.18
100	114.87	550	209.09	1000	296.03
110	117.04	560	211.10		

TABLE 2 Resistance Temperature Table for Platinum Probes (100 Ohms at 0°C)

Temperature °C	Resistance of Element Ohms	Temperature °C	Resistance of Element Ohms	Temperature °C	Resistance of Element Ohms
−200	17.15	55	121.59	310	217.11
−195	19.37	60	123.54	315	218.91
−190	21.57	65	125.48	320	220.70
−185	23.76	70	127.42	325	222.49
−180	25.94	75	129.36	330	224.28
−175	28.12	80	131.29	335	226.07
−170	30.28	85	133.22	340	227.85
−165	32.43	90	135.15	345	229.63
−160	34.58	95	137.08	350	231.41
−155	36.71	100	139.00	355	233.18
−150	38.84	105	140.92	360	234.95
−145	40.96	110	142.84	365	236.72
−140	43.07	115	144.75	370	238.48
−135	45.18	120	146.66	375	240.25
−130	47.28	125	148.57	380	242.01
−125	49.36	130	150.47	385	243.76
−120	51.45	135	152.38	390	245.52
−115	53.53	140	154.27	395	247.27
−110	55.60	145	156.17	400	249.02
−105	57.66	150	158.06	405	250.76
−100	59.72	155	159.85	410	252.50
−95	61.78	160	161.84	415	254.24
−90	63.83	165	163.73	420	255.98
−85	65.87	170	165.61	425	257.71
−80	67.91	175	167.49	430	259.44
−75	69.94	180	169.36	435	261.17
−70	71.97	185	171.23	440	262.89
−65	74.00	190	173.10	445	264.61
−60	76.02	195	174.97	450	266.33
−55	78.04	200	176.84	455	268.05
−50	80.05	205	178.70	460	269.76
−45	82.06	210	180.55	465	271.47
−40	84.07	215	182.41	470	273.18
−35	86.07	220	184.26	475	274.88
−30	88.07	225	186.11	480	276.58
−25	90.07	230	187.96	485	278.28
−20	92.06	235	189.80	490	279.98
−15	94.05	240	191.64	495	281.67
−10	96.04	245	193.48	500	283.36
−5	98.02	250	195.32	505	285.05
0	100.00	255	197.15	510	286.73
5	101.98	260	198.98	515	288.41
10	103.95	265	200.80	520	290.09
15	105.92	270	202.62	525	291.76
20	107.89	275	204.45	530	293.43
25	109.86	280	206.27	535	295.10
30	111.82	285	208.08	540	296.77
35	113.78	290	209.89	545	298.43
40	115.74	295	211.70	550	300.09
45	117.69	300	213.51		
50	119.65	305	215.31		

TABLE 3 Resistance Temperature Table for Nickel Probes (120 Ohms at 32°F)

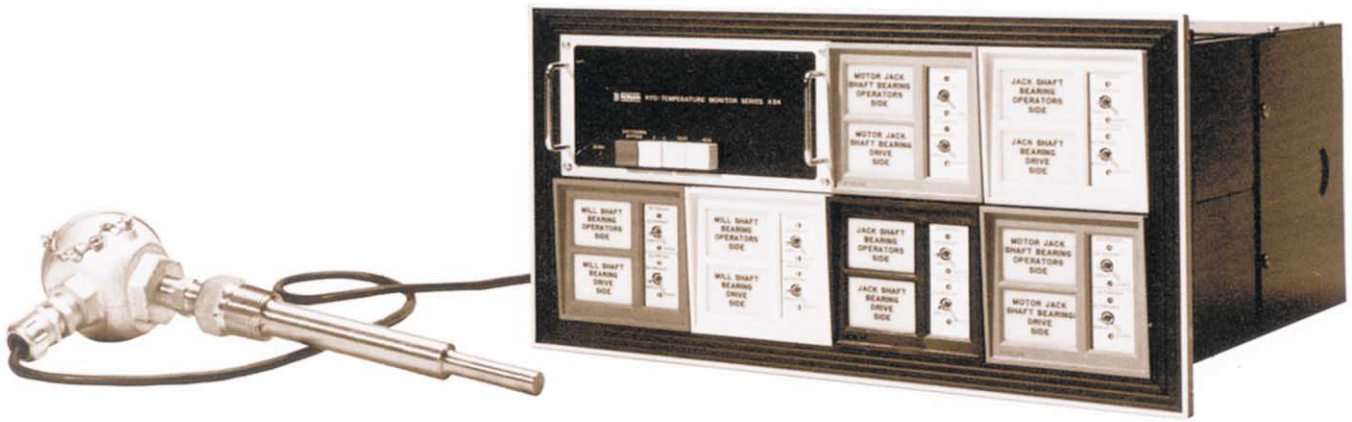
Temperature °F	Resistance of Element Ohms	Temperature °F	Resistance of Element Ohms	Temperature °F	Resistance of Element Ohms
−100	70.80	120	156.58	340	270.92
−90	74.30	130	161.03	350	277.04
−80	77.83	140	165.55	360	283.25
−70	81.40	150	170.13	370	289.56
−60	85.00	160	174.78	380	295.96
−50	88.64	170	179.49	390	302.45
−40	92.32	180	184.26	400	309.04
−30	96.03	190	189.11	410	315.73
−20	99.78	200	194.03	420	322.52
−10	103.59	210	199.01	430	329.41
0	107.42	220	204.07	440	336.40
10	111.24	230	209.20	450	343.50
20	115.11	240	214.38	460	350.70
30	119.02	250	219.70	470	358.00
40	122.98	260	225.84	480	365.42
50	126.99	270	230.50	490	372.94
60	131.06	280	236.02	500	380.57
70	135.17	290	241.62	510	388.31
80	139.34	300	247.31	520	396.17
90	143.56	310	253.08	530	404.14
100	147.84	320	258.94	540	412.22
110	152.18	330	264.88	550	420.43

TABLE 4 Resistance Temperature Table for Copper Probes (10 Ohms at 32°F)

Temperature °F	Resistance of Element Ohms	Temperature °F	Resistance of Element Ohms	Temperature °F	Resistance of Element Ohms
0	9.25	110	11.82	210	14.16
10	9.49	120	12.06	220	14.40
20	9.72	130	12.29	230	14.63
30	9.95	140	12.53	240	14.86
40	10.19	150	12.76	250	15.10
50	10.42	160	12.99	260	15.33
60	10.65	170	13.23	270	15.57
70	10.89	180	13.46	280	15.80
80	11.12	190	13.69	290	16.03
90	11.36	200	13.93	300	16.27
100	11.59				

TABLE 5 Resistance Temperature Table for Nickel Probes (120 Ohms at 0°C)

Temperature °C	Resistance of Element Ohms	Temperature °C	Resistance of Element Ohms	Temperature °C	Resistance of Element Ohms
−75	69.75	50	157.62	175	275.26
−70	72.90	55	161.65	180	280.82
−65	76.06	60	165.71	185	286.45
−60	79.26	65	169.81	190	292.17
−55	82.48	70	173.99	195	297.95
−50	85.73	75	178.21	200	303.81
−45	89.00	80	182.48	205	309.75
−40	92.32	85	186.81	210	315.78
−35	95.66	90	191.20	215	321.88
−30	99.03	95	195.64	220	328.06
−25	102.44	100	200.14	225	334.33
−20	105.88	105	204.70	230	340.68
−15	109.35	110	209.32	235	347.12
−10	112.86	115	214.00	240	353.63
−5	116.41	120	218.74	245	360.23
0	120.00	125	223.54	250	366.93
5	123.57	130	228.42	255	373.71
10	127.18	135	233.35	260	380.58
15	130.83	140	238.35	265	387.54
20	134.52	145	243.41	270	394.60
25	138.26	150	248.54	275	401.74
30	142.04	155	253.75	280	408.97
35	145.86	160	259.02	285	416.30
40	149.74	165	264.36	290	423.73
45	153.65	170	269.78		



FLUSH PANEL MOUNTING TYPE

Refer to RONAN Catalog X84SL for Complete RTD Temperature Monitoring Systems

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RTP-100/Rev. 3

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