1 YEAR WARRANTY

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User's Guide

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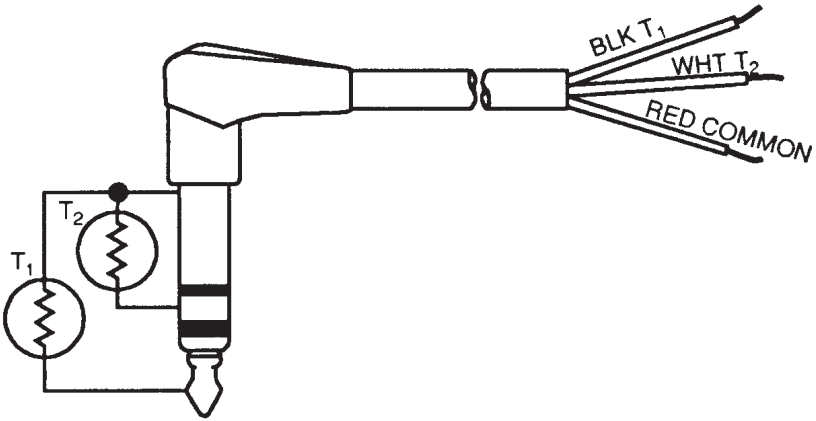


OL-700 SERIES
Linear Thermister Probes

WARNING

Equipment sold by OMEGA is not intended for medicinal use, or on humans. OMEGA ENGINEERING, INC. assumes no responsibility if these products are used for medicinal purposes, or on humans, or are misused in any way.

Maximum operating temperature: 100°C (212°F)

Accuracy and interchangeability: ±0.15°C from –30° to +100°C (–22° to +212°F) when used with appropriate linear circuits and instruments.

CONSTRUCTION

Standard OMEGA® Series 700 Probes consist of a 44018 linear thermistor composite temperature sensing element housed in a probe and attached to a plasticized vinyl jacketed shielded lead wire terminated with a phone plug (see Fig. 1). All probes are constructed with the same sensing elements and lead wires electrically isolated from the outer probe surfaces. However, the probe is subject to damage if abused; therefore, the instrument with which it is used should provide any needed patient safety isolation. (Consult instrument specifications.)

APPLICATION

When connected to suitable signal conditioning networks the probes produce a varying voltage or resistance linear with temperature. They are compatible with OMEGA® DP25-TH Panel Meter and Model 5830 Thermometer. Note that *only* with suitable signal conditioning networks are these probes linear in response.

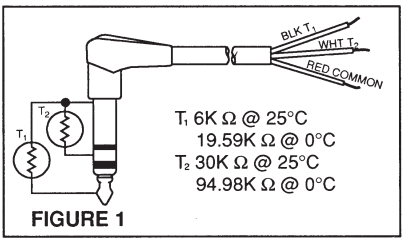


FIGURE 1

See tables within T_1 and T_2 resistance values at various temperatures.

STEM EFFECT

"Stem Effect" refers to the potential inaccuracy of measurement caused by heat transfer through the lead of a probe. The leads of some probes are relatively more massive for the sake of ruggedness; such leads introduce potentially greater stem effects. These effects may be minimized by appropriate insulation or isolation as each application dictates. Stem effect is negligible on probes with very light leads—though at the expense of ruggedness.

CLEANING CAUTIONS

Several precautions must be observed when cleaning and sterilizing probes, as they are easily destroyed with improper handling.

NEVER AUTOCLAVE OR BOIL PROBES. The vinyl lead wire covering may be safely exposed to temperatures up to 100°C, but above 90°C the covering softens and can be permanently deformed by mechanical stress. Handle probes gently while hot.

Avoid contact with strong, aromatic, chlorinated, ketone, ether or ester solvents. Prolonged immersion in alcohols or mild organic solvents, detergent solutions or highly alkaline solutions will cause the vinyl covering to lose flexibility.

In cleaning or sterilization, probes should be handled gently. When wiping clean, hold the probe in one hand at the sensing tip and wipe the probe and lead wire toward the plug end. The action should be gentle. If excessive pressure is used the covering will be stretched which may break the internal wires and destroy the probe.

Continued flexing of probes and lead wires in use and in cleaning will break the internal wires and cause failure. Failure from this cause is not covered by the warranty.

DISINFECTION

Probes may be disinfected and sanitized by washing with 3% hydrogen peroxide or 70% isopropanol. 70% ethanol is nearly as effective, but 100% alcohols are less germicidal. Dakin's solution (sodium hypochlorite in neutral buffer) is also suitable. Brief immersion in detergent solutions is not harmful.

Phenol disinfectants, such as hexachlorophene, should be avoided because the disinfectant may be absorbed by the vinyl.

STERILIZATION

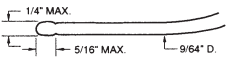
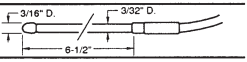
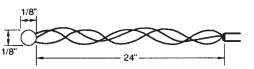
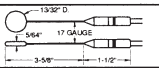
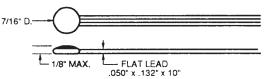
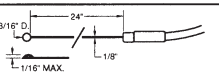
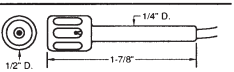
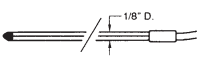
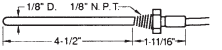
NEVER BOIL OR AUTOCLAVE ANY SERIES 700 LINEAR THERMISTOR PROBES. Autoclaving may cause the insulation to fail and may also cause the probe to give inaccurate temperature readings.

When sterilizing with ethylene oxide, observe the directions given by the manufacturer of the sterilizing apparatus. WARNING: ETHYLENE OXIDE IS HIGHLY IRRITATING AND MUST BE REMOVED ENTIRELY FROM THE PROBE BEFORE USE. Ventilate thoroughly according to the directions given by the manufacturer of the sterilizing apparatus.

STORAGE

When not in use, probes and leads should be formed into loose loops. If lead wire is stretched or wrapped tightly around instrument cases, the sheathing may become permanently indented, creating stresses sufficient to cause mechanical failure. Store probes at temperatures below 50°C, preferably at room temperature.

SERIES 700 PROBE STYLES AVAILABLE

Probe No.	Description	Time Constant	Configuration
701	GENERAL PURPOSE. Vinyl tipped, most rugged probe. Used for water temperatures (short term), and often buried for subsoil readings in dry soil.	9.0 sec.	
702A	SMALL FLEXIBLE. Vinyl sheath and tip. Cuvette temperatures. General purpose measurement.	3.6 sec.	
731	GENERAL PURPOSE. Non-immersible, epoxy tipped probe. Can be potted in place. Probe is suitable for temperature measurements on surfaces.	0.6 sec.	
708	"BANJO" SURFACE TEMPERATURE. Water bath, air, surface temperatures. Stainless steel.	1.0 sec.	
709	ATTACHABLE SURFACE TEMPERATURE. Tape on flat surfaces. Good for heat loss and compression efficiency study of piping systems. 10' vinyl covered parallel lead with right angle phone plug termination. Stainless steel cup, epoxy backed.	1.1 sec.	
729	SMALL SURFACE TEMPERATURE. Cuvette, water bath, leaf and other surfaces 24". Teflon-covered flexible wire. Stainless steel disc with epoxy back.	0.3 sec.	
705	AIR TEMPERATURE. Stainless steel probe suitable for test rooms, incubators, remote air readings, monitoring of gas streams, etc.	0.6 sec.	
703	TUBULAR. Stainless steel probe for rugged duty. Often used for liquid immersion.	3.6 sec.	
704	TUBULAR-GLASS. Chemically inert for liquid immersion use. Thermometric titration. Freezing point determination. Pyrex, 5" long.	5.0 sec.	
710	TUBULAR WITH FITTING. Rugged, stainless steel probe with pipe fitting. Suitable for taking readings in pipes or inside closed vessels.	3.6 sec.	

Time Constant	Time constant, the standard measure of probe response time, is the time required for a probe to read 63% of a newly impressed temperature change. Time constants are obtained by transferring the probe from a well stirred water bath at 68°F to a like bath at 108°F. Approximately five "time constants" are required for a probe to read 99% of the total change. Time constants are representative values and subject to variation due to small differences in location of the thermistor component within the probe.
Probe Leads	Non-detachable 10' vinyl covered shielded wire, may be subjected to 100°C (212°F). Water resistant between probe and lead wire, except for 702 and 731 which have water-resistant junctions that should not be immersed. Longer leads are available.

T_1 RESISTANCE VERSUS TEMPERATURE –30 TO +100°C

TEMP°C	RES	TEMP°C	RES	TEMP°C	RES	TEMP°C	RES
–30	106.2K	+10	11.94K	+50	2162	+90	549.8
29	99.82K	11	11.38K	51	2080	91	533.2
28	93.88K	12	10.85K	52	2004	92	517.2
27	88.32K	13	10.35K	53	1930	93	501.8
26	83.12K	14	9878	54	1859	94	486.8
25	78.26K	15	9428	55	1792	95	472.4
24	73.72K	16	9000	56	1727	96	458.6
23	69.46K	17	8594	57	1664	97	445.2
22	65.48K	18	8210	58	1605	98	432.2
21	61.74K	19	7844	59	1547	99	419.6
–20	58.26K	+20	7496	+60	1493	+100	407.6
19	54.98K	21	7166	61	1440		
18	51.90K	22	6852	62	1389		
17	49.02K	23	6554	63	1341		
16	46.32K	24	6270	64	1294		
15	43.78K	25	6000	65	1249		
14	41.40K	26	5744	66	1207		
13	39.16K	27	5500	67	1165		
12	37.04K	28	5266	68	1126		
11	35.06K	29	5046	69	1087		
–10	33.20K	+30	4834	+70	1051		
9	31.49K	31	4634	71	1016		
8	29.80K	32	4442	72	981.8		
7	28.24K	33	4260	73	949.4		
6	26.78K	34	4084	74	918.0		
5	25.40K	35	3918	75	888.0		
4	24.10K	36	3760	76	859.0		
3	22.88K	37	3610	77	831.2		
2	21.72K	38	3466	78	804.4		
– 1	20.62K	39	3328	79	773.6		
0	19.59K	+40	3196	+80	753.8		
+ 1	18.62K	41	3070	81	729.8		
2	17.70K	42	2950	82	706.8		
3	16.83K	43	2836	83	684.4		
4	16.01K	44	2726	84	663.0		
5	15.24K	45	2620	85	642.4		
6	14.50K	46	2520	86	622.6		
7	13.81K	47	2424	87	603.4		
8	13.15K	48	2334	88	584.8		
9	12.53K	49	2246	89	567.0		

T_2 RESISTANCE VERSUS TEMPERATURE –30 TO +100°C

TEMP°C	RES	TEMP°C	RES	TEMP°C	RES	TEMP°C	RES
–30	481.0K	+10	58.75K	+50	10.97K	+90	2799
29	453.5K	11	56.07K	51	10.57K	91	2714
28	427.7K	12	53.54K	52	10.18K	92	2632
27	403.5K	13	51.13K	53	9807	93	2552
26	380.9K	14	48.84K	54	9450	94	2476
25	359.6K	15	46.67K	55	9109	95	2402
24	339.6K	16	44.60K	56	8781	96	2331
23	320.9K	17	42.64K	57	8467	97	2262
22	303.3K	18	40.77K	58	8166	98	2195
21	286.7K	19	38.99K	59	7876	99	2131
–20	271.2K	+20	37.30K	+60	7599	+100	2069
19	256.5K	21	35.70K	61	7332		
18	242.8K	22	34.17K	62	7076		
17	229.8K	23	32.71K	63	6830		
16	217.6K	24	31.32K	64	6594		
15	206.2K	25	30.00K	65	6367		
14	195.4K	26	28.74K	66	6149		
13	185.2K	27	27.54K	67	5940		
12	175.6K	28	26.40K	68	5738		
11	166.6K	29	25.31K	69	5545		
–10	158.0K	+30	24.27K	+70	5359		
9	150.0K	31	23.28K	71	5180		
8	142.4K	32	22.33K	72	5007		
7	135.2K	33	21.43K	73	4842		
6	128.5K	34	20.57K	74	4682		
5	122.1K	35	19.74K	75	4529		
4	116.0K	36	18.96K	76	4381		
3	110.3K	37	18.21K	77	4239		
2	104.9K	38	17.49K	78	4102		
– 1	99.80K	39	16.80K	79	3970		
0	94.98K	+40	16.15K	+80	3843		
+ 1	90.41K	41	15.52K	81	3720		
2	86.09K	42	14.92K	82	3602		
3	81.99K	43	14.35K	83	3489		
4	78.11K	44	13.80K	84	3379		
5	74.44K	45	13.28K	85	3273		
6	70.96K	46	12.77K	86	3172		
7	67.66K	47	12.29K	87	3073		
8	64.53K	48	11.83K	88	2979		
9	61.56K	49	11.39K	89	2887		

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FAX: (203) 359-7700 e-mail: info@omega.com

Canada:
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France:
Managed by the United Kingdom Office
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FAX: +33 (0) 130 57 54 27 e-mail: sales@omega.fr

Germany/ Austria
Daimlerstrasse 26, D-75392 Deckenpfronn, Germany
Toll-Free: 0 800 6397678 TEL: +49 (0) 7059 9398-0
FAX: +49 (0) 7056 9398-29 e-mail: info@omega.de

United Kingdom: ISO 9001 Certified
OMEGA Engineering Ltd.
One Omega Drive, River Bend Technology Centre, Northbank
Irlam, Manchester M44 5BD England
Toll-Free: 0800-488-488 TEL: +44 (0)161 777-6611
FAX: +44 (0)161 777-6622 e-mail: sales@omega.co.uk

It is the policy of OMEGA Engineering, Inc. to comply with all worldwide safety and EMC/EMI regulations that apply. OMEGA is constantly pursuing certification of its products to the European New Approach Directives. OMEGA will add the CE mark to every appropriate device upon certification.

The information contained in this document is believed to be correct, but OMEGA accepts no liability for any errors it contains, and reserves the right to alter specifications without notice.

WARNING: These products are not designed for use in, and should not be used for, human applications.

MADE IN USA

WARRANTY/DISCLAIMER

OMEGA ENGINEERING, INC. warrants this unit to be free of defects in materials and workmanship for a period of **13 months** from date of purchase. OMEGA's WARRANTY adds an additional one (1) month grace period to the normal **one (1) year product warranty** to cover handling and shipping time. This ensures that OMEGA's customers receive maximum coverage on each product.

If the unit malfunctions, it must be returned to the factory for evaluation. OMEGA's Customer Service Department will issue an Authorized Return (AR) number immediately upon phone or written request. Upon examination by OMEGA, if the unit is found to be defective, it will be repaired or replaced at no charge. OMEGA's WARRANTY does not apply to defects resulting from any action of the purchaser, including but not limited to mishandling, improper interfacing, operation outside of design limits, improper repair, or unauthorized modification. This WARRANTY is VOID if the unit shows evidence of having been tampered with or shows evidence of having been damaged as a result of excessive corrosion; or current, heat, moisture or vibration; improper specification; misapplication; misuse or other operating conditions outside of OMEGA's control. Components in which wear is not warranted, include but are not limited to contact points, fuses, and triacs.

OMEGA is pleased to offer suggestions on the use of its various products. However, OMEGA neither assumes responsibility for any omissions or errors nor assumes liability for any damages that result from the use of its products in accordance with information provided by OMEGA, either verbal or written. OMEGA warrants only that the parts manufactured by the company will be as specified and free of defects. OMEGA MAKES NO OTHER WARRANTIES OR REPRESENTATIONS OF ANY KIND WHATSOEVER, EXPRESSED OR IMPLIED, EXCEPT THAT OF TITLE, AND ALL IMPLIED WARRANTIES INCLUDING ANY WARRANTY OF MERCHANTABILITY AND FITNESS FOR A PARTICULAR PURPOSE ARE HEREBY DISCLAIMED. LIMITATION OF LIABILITY: The remedies of purchaser set forth herein are exclusive, and the total liability of OMEGA with respect to this order, whether based on contract, warranty, negligence, indemnification, strict liability or otherwise, shall not exceed the purchase price of the component upon which liability is based. In no event shall OMEGA be liable for consequential, incidental or special damages.

CONDITIONS: Equipment sold by OMEGA is not intended to be used, nor shall it be used: (1) as a "Basic Component" under 10 CFR 21 (NRC), used in or with any nuclear installation or activity; or (2) in medical applications or used on humans. Should any Product(s) be used in or with any nuclear installation or activity, medical application, used on humans, or misused in any way, OMEGA assumes no responsibility as set forth in our basic WARRANTY/DISCLAIMER language, and, additionally, purchaser will indemnify OMEGA and hold OMEGA harmless from any liability or damage whatsoever arising out of the use of the Product(s) in such a manner.

RETURN REQUESTS / INQUIRIES

Direct all warranty and repair requests/inquiries to the OMEGA Customer Service Department. BEFORE RETURNING ANY PRODUCT(S) TO OMEGA, PURCHASER MUST OBTAIN AN AUTHORIZED RETURN (AR) NUMBER FROM OMEGA'S CUSTOMER SERVICE DEPARTMENT (IN ORDER TO AVOID PROCESSING DELAYS). The assigned AR number should then be marked on the outside of the return package and on any correspondence.

The purchaser is responsible for shipping charges, freight, insurance and proper packaging to prevent breakage in transit.

FOR **WARRANTY** RETURNS, please have the following information available BEFORE contacting OMEGA:

1. Purchase Order number under which the product was PURCHASED,
2. Model and serial number of the product under warranty, and
3. Repair instructions and/or specific problems relative to the product.

FOR **NON-WARRANTY** REPAIRS, consult OMEGA for current repair charges. Have the following information available BEFORE contacting OMEGA:

1. Purchase Order number to cover the COST of the repair,
2. Model and serial number of the product, and
3. Repair instructions and/or specific problems relative to the product.

OMEGA's policy is to make running changes, not model changes, whenever an improvement is possible. This affords our customers the latest in technology and engineering.

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