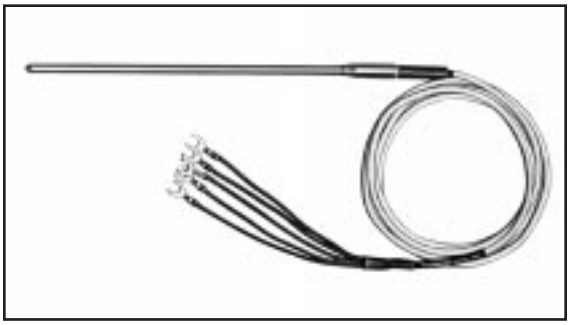
TEMPERATURE STANDARDS: TYPE S / AS / ES

PRECISION, ULTRASTABLE NTC STANDARDS

DESCRIPTION:

Thermometrics temperature standards consist of ultra-stable thermistor probes assembled into thin wall stainless steel housings with shielded extension leads. The thermistors used receive special processing to ensure long term stability. All thermistor temperature standards are ruggedly constructed and are suitable for liquid immersion.



APPLICATIONS:

Thermometrics Thermistor standards are rugged, precision sensors suitable for use as secondary or working temperature standards for all laboratory metrology applications. They generally are not affected by shock and vibration and, consequently, are also suitable for field use. Thermometrics Temperature standards fill the need for low cost temperature standards for general laboratory and hospital use, clinical applications and process temperature measurements. Special versions are available for military and space use. Standards are also available for other temperature ranges in a variety of sizes and enclosures. Our Applications Engineering Staff can assist you with your specific requirements.

DATA:

CONFIGURATION: Temperature standards are enclosed in thin-wall stainless tubes, welded closed at one end. The shielded cable is encapsulated into the tube to provide a solid moisture-proof seal. Full immersion of the metal portion of the standard is permissible. The calibration data is given for an immersion depth of 8" on 9" housings, and 4" on $4^1/_2$" long housings.

TEMPERATURE RANGE: The Type "S" and Type "AS" are designed for operation over the range of 0°C to 60°C. The Type "ES" is rated for 0°C to 100°C.

STABILITY: The stability of each temperature standard is guaranteed for a period of one year. When properly used, the following stability ratings apply:

Type "AS"	0.002° C/year
Type "S"	0.005° C/year
Type "ES"	0.005° C/year

CALIBRATION: Precision calibration, traceable to the National Institute of Standards and Technology, is provided for all temperature standards. A computer generated table in increments of 0.01°C is furnished with each calibration based on the interpolation formula, $RT = \exp(A_0 + A_1/T + A_2/T^2 + A_3/T^3)$. The constants for the formula are obtained from a polynomial regression performed on the calibration data obtained. Over the range of 0°C to 60°C, calibration is performed at the triple point of water (0.01°C) and 15°C, 25°C, 30°C, 37°C, 50°C, and 60°C. For the range of 0°C to 100°C, calibrations are performed at the triple point of water, 25°C, 30°C, 37°C, 60°C, 80°C, and 100°C. Two-wire calibrations are performed using a wheatstone Bridge calibrated to an accuracy of better than 0.005%. Four-wire calibrations are based on a comparison technique using a ratio bridge having an accuracy of 0.0002%. All resistance measurements are referenced to standard resistors calibrated by NIST. All temperature measurements are made using a standard platinum resistance thermometer which has been calibrated by NIST.

RESISTANCE VS. TEMPERATURE CHARACTERISTIC: The nominal resistance values are shown below:

TYPE	RESISTANCE IN OHMS			
	0°C	25°C	60°C	100°C
"AS" & "S"	14250	5000	1458	–
"AS" & "S"	11400	4000	1166	–
"ES"	28500	10000	2915	925

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READ-OUT DEVICES: Thermometrics Temperature Standards are designed for use with Thermometrics Precision Thermometer Model TS8504. Also any suitable resistance measuring instrument may be used with Thermometrics TEMPERATURE STANDARDS. Care must be taken, however, to avoid excessive self-heating of the thermistor. A power dissipation of 4 microwatts will result in 0.001°C self-heat. Self-heat error can be minimized by duplicating the conditions of calibration which are provided with each Thermometrics certificate of calibration.

AVAILABLE MODELS

THREE DIFFERENT TYPES ARE AVAILABLE EACH IN FOUR DIFFERENT SIZES TO ACCOMMODATE ALL STANDARD REQUIREMENTS:

TYPE "S" which includes S10, S15, S20, S25 offer standard 0.005°C/year stability and temperature range 0° to 60° C.

TYPE "AS" which includes AS110, AS115, AS120, AS125 offer 0.002°C/yr stability and temperature range 0° to 60° C.

TYPE "ES" which includes ES210, ES215, ES220, ES225 offer 0.005° C/yr stability and temperature range 0° to 100°C.

NOTE: Add Suffix "8504" when Standard is to be used with Model TS8504 Precision Thermometer.

CODING:

All temperature standards Type "S", "AS", & "ES" may be ordered by part number and are available in two-wire and four-wire terminations. Unless otherwise specified a two-wire termination will be supplied. If a four-wire termination is desired specify by adding the suffix "4wire". Therefore an ES220 unit in 4-wire is ordered as "ES220-4 wire".

When used with Thermometrics Model TS8504 Precision Thermometer add suffix "8504" so that in above example the part number would be ES220-8504.

The Standards so ordered will come with the leads attached to a special connector that incorporates an EEPROM. The EEPROM has the constants in memory based on the precision calibrations explained earlier.

In order to use existing Thermometrics Temperature Standards with Thermometrics Model TS8504 an interfacing cable is available as part number C8504. When ordering an interfacing cable, it is important to specify the Type ("S","AS", or "ES") and Serial Number for which the cable is desired. Each standard requires its own unique interfacing cable.

TYPE	ACCURACY	
	0°C – 60°C	60°C – 100°C
"AS"	0.001°C	–
"S"	0.0015°C	–
"ES"	0.0015°C	0.0025°C

The uncertainties of the computer tables are 0.001°C for the Type "AS" and 0.003°C for the Types "S" and "ES".

DIMENSIONS IN INCHES ("L") DIA X ("D") LONG	STANDARD TYPE "S"	STABILITY °C/YEAR	ABSOLUTE TYPE "AS"	STABILITY °C/YEAR	TEMP. RANGE FOR "S" & "AS" °C	EXTENDED TEMP. RANGE TYPE "ES"	STABILITY °/YEAR °C	TEMP. RANGE "ES" °C
1/4" X 9"	S10	0.005	AS110	0.002	0-60	ES210	0.005	0-100
1/8" X 4-1/2"	S15	0.005	AS115	0.002	0-60	ES215	0.005	0-100
1/4" X 4-1/2"	S20	0.005	AS120	0.002	0-60	ES220	0.005	0-100
1/8" X 9"	S25	0.005	AS125	0.002	0-60	ES225	0.005	0-100

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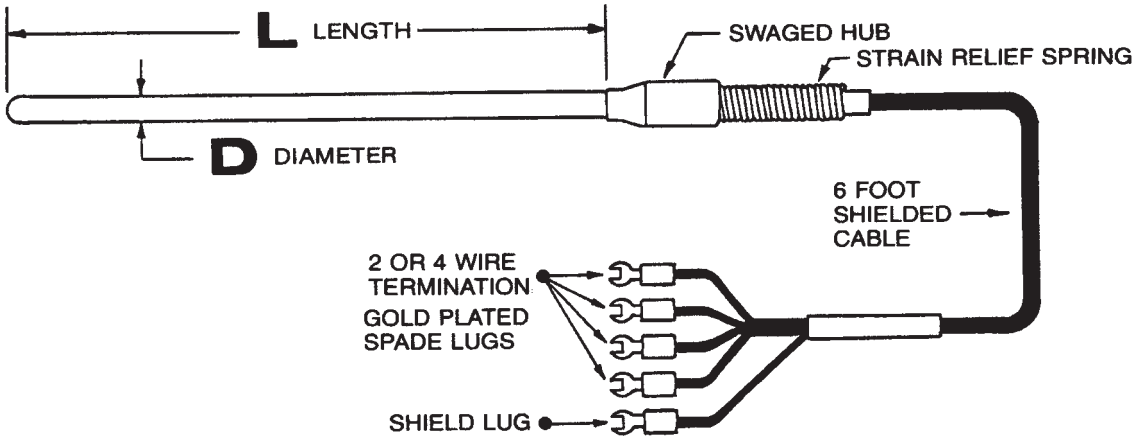
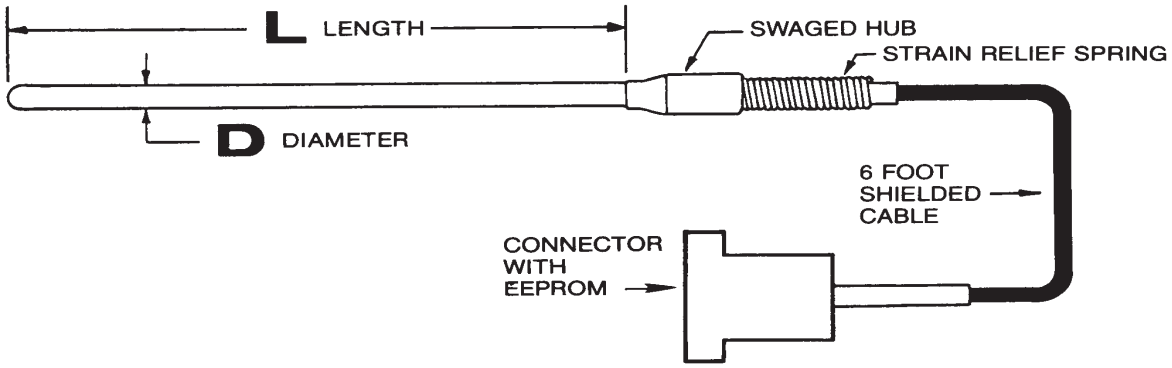
RECALIBRATION SERVICES: We offer a recalibration recertification service for temperature standards Type “S” “AS” & “ES”. For the Type “S”, the units are initially evaluated at the triple point of water and 25°C. The Type”ES” are evaluated at the triple point of water, 37°C, and 100°C. If the calibrations repeat their original values within the published accuracy, then recertification is provided. If not, then complete recalibration is required if the stability has not been impaired. The Type “AS” can only be recertified after complete recalibration.

STANDARD CONFIGURATION



STANDARD CONFIGURATIONS TO BE USED WITH THERMOMETRICS PRECISION THERMOMETER MODEL TS8504



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