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Digi-Sense®
Temperature Products













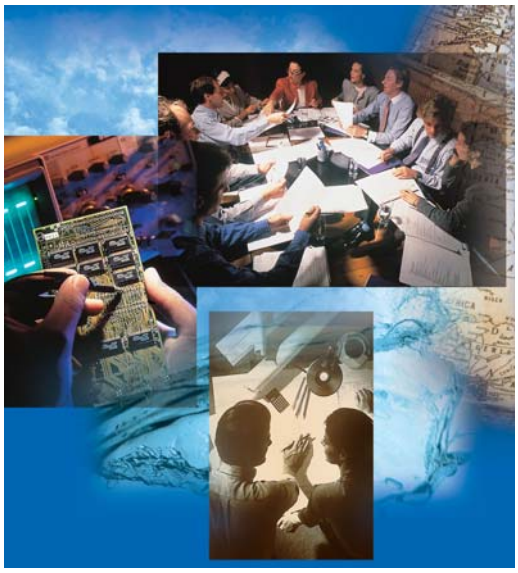
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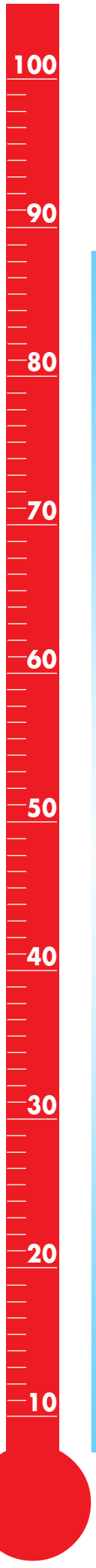
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EUTECH INSTRUMENTS
Technology Made Easy ...

Corporate Profile

A leader in the field of sensor instrumentation, Eutech Instruments is a dynamic company rapidly positioning itself globally as a leading manufacturer of electrochemical instrumentation for water analysis. A pioneer in developing ASIC-based (Application Specific Integrated Circuit) instruments, Eutech Instruments has gained international awards and recognition for its achievements in sensor technology, software programming and product design. Underlying its strong commitment to Research & Development, is the constant drive by Eutech engineers to apply new, emerging technologies to the design and manufacture of advanced sensor instruments. Eutech offers a comprehensive range of laboratory and field instrumentation for water analysis and continuous online process instruments for the monitor and control of pH, Conductivity, Total Dissolved Solids (TDS), Turbidity, Temperature, Ion Concentration, Redox Potential (ORP) and Dissolved Oxygen (DO). The **Digi-Sense** range of temperature products, now manufactured by Eutech, complements Eutech's product line-up in electrochemistry. Eutech's products are certified to comply with global standards for electromagnetic emission and interference. Eutech Instruments is dedicated to producing convenience products for Water analysis and Thermometry.





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1 Introduction

Digi-Sense® thermometers deliver quick, reliable and accurate temperature readings. Eutech Instruments manufactures a wide range of portable hand-held meters with distinctive features for a wide range of applications. These intrinsically safe UL-listed thermometers meet the needs of chemical, laboratory, petrochemical and HVAC specialty applications.

For almost every temperature/humidity monitoring application there is a **Digi-Sense®** digital instrument. Choose any of the following :

- Type J, K, or T Thermocouple meters that are economical and easy -to-use.
- Dual input type J-T-E-K Thermocouple meter with 2-point calibration and differential temperature feature.
- DuaLogR Thermocouple and Logger Thermometer that logs up to 1000 readings in real-time and transfers data via infrared or RS232 interface adapter (to be used with most popular RS232 programs including Windows® Terminal, 95, 98 or Hyperterminal).
- RTD Thermometers from basic simple-to-use model to a more sophisticated model that logs up to 1000 readings in real time with data transfer.
- Thermistor Thermometers that accept a wide variety of YSI® series 400 or series 700 thermistor probes. Select a simple-to-use model or a more sophisticated model that logs up to 1000 readings with data transfer.
- Temperature and Humidity Datalogger meter that retains up to 1000 sets of readings with date and time, and transfers data via infrared or RS232 (via adapter)
- 12-channel Scanning and Datalogging Thermometers (wall-mounted and bench models) that feature software, alarms, a full menu of display options, and NIST-traceable calibration.
- Temperature Controllers with On/Off or PID control, and several modes in between. A deluxe version model is available with programmable ramp and soak functions to achieve precise heating and cooling results in speciality applications. A software (included with advanced models) allows real-time datalogging.

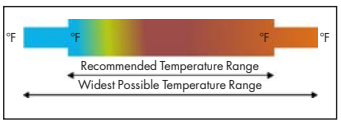
Handy and ergonomic in design, these meters are manufactured for long term reliability and rugged field use. Go further, measure better, and manage measurements better with the **Digi-Sense®** thermometers.

Temperature Introduction

Temperature Instrument Ranges

The stated accuracy of any temperature measurement device is for the "Recommended Temperature Range" only. The narrow section of the temperature bar represents the widest range the instrument can be used in. Accuracy in this range is not guaranteed. Probe damage may occur at the extreme ends of the temperature range. Temperatures listed below are approximate.

Key to Colour Bar



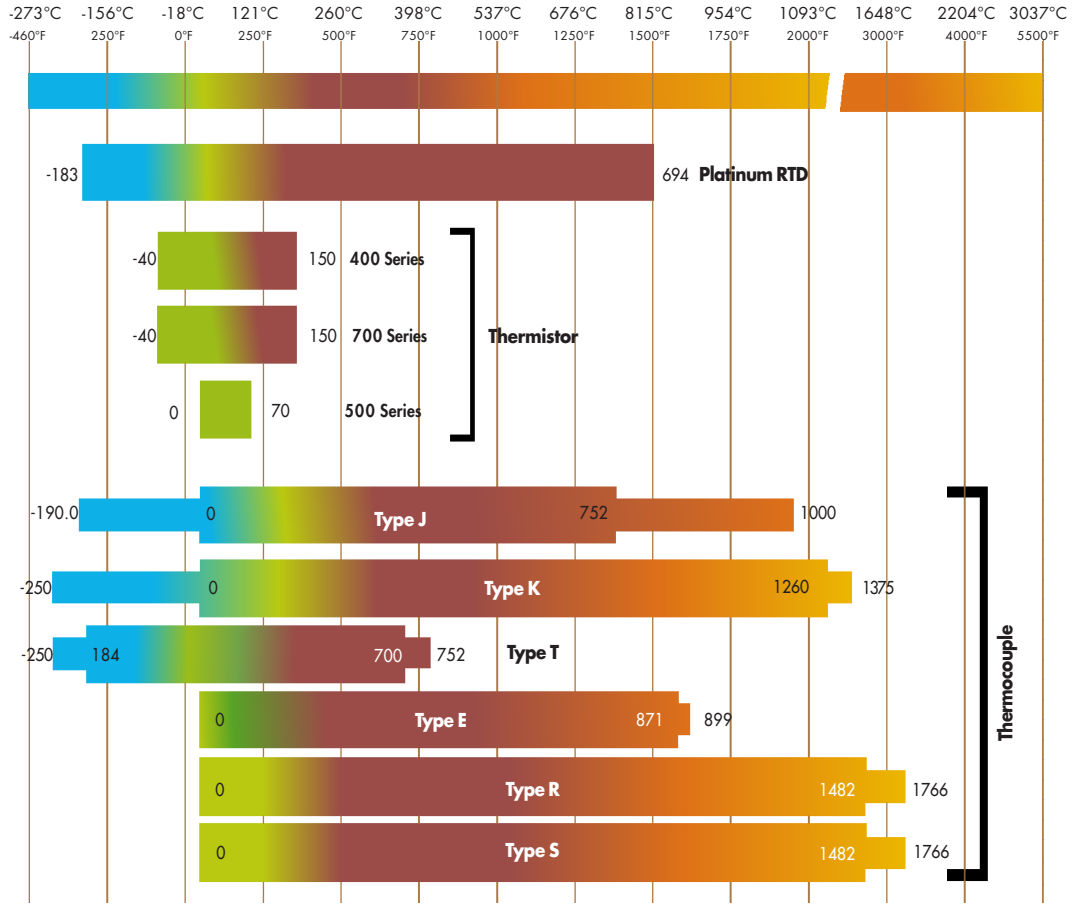
Typical Accuracies

Platinum RTD
Probes : ±0.2 to 0.35% of reading
Meter : ±0.1% of reading and ±1 °C (±1 °F)

Thermistor
400 series probes : ±0.2 °C (±0.36 °F) from 0 to 75 °C (32 to 167 °F)
500 series probes : ±0.1 °C (±0.2 °F)
700 series probes : ±0.15 °C (±0.27 °F)
Meters : ±0.1 °C to 0.2 °C (±0.2 to 0.4 °F)

Thermocouple
Type J, K and E probes : ±1.8 to 7.9 °F or ±0.4% of reading above 32 °F, whichever is greater
Type T probes : ±0.9 to 3.6 °F or 0.4% of reading above 32 °F, whichever is greater
Type R and S probes : ±2.5 °F or 0.25% of reading, whichever is greater
Meters : ±0.1 to 1% of reading and ±1 °C (±1.8 °F)

Temperature
°F = (1.8 x °C) +32
°C = (°F–32) x 0.555
Kelvin = °C + 273.2
°Rankin = °F + 459.67



Digi-Sense® Thermocouple Thermometers

Type J, K, or T Thermocouple Thermometers

Easy to use automatic field calibration for improved meter accuracy

Up to 0.1° resolution for improved readability

Intrinsically safe UL listed & certified for Class 1, Division 1 Groups: A, B, C, and D harzardous (classified) locations





These easy-to-use portable meters are ideal for routine temperature monitoring applications. Display is °C or °F selectable. HOLD function freezes display for easy viewing and recording. Meter resolution (0.1° or 1°) auto-switches for easy readability.

Meter allows automatic offset calibration - simply place the probe in a container packed with ice, filled with water and it automatically recognizes the freezing point. Calibration lockout feature prevents tampering and protects factory setting.

Factory calibrated to a NIST-traceable calibrator, these thermometers have ±0.03°C (±0.05°F) conformity to NIST calibration tables.

Thermocouple probes produce fast response and are extremely popular. K thermocouples have the widest temperature range, J has ruggedness and reliability while T has narrow range which is ideal for cryogenics, food and research applications below 90 °C. A wide range of thermocouple probes (with mini-connectors) are available to meet discerning application needs.

Meter Specifications

Range	**J**	: -200 to 1000 °C (-328 to 1832 °F)
	K	: -250 to 1372 °C (-418 to 2501 °F)
	T	: -250 to 400 °C (-418 to 752 °F)
Resolution		: 0.1° between -99.9° and 299.9 °C; 1° below -99.9° and above 299.9 °C
Accuracy		: Below -99.9 °C/°F; ±0.25% of reading plus 1 °C (2 °F) Above -99.9 °C/°F; ±0.2% of reading plus 0.5 °C (0.9 °F)
Display		: $3^3/_4$- digit custom LCD
Power		: 2 x AA alkaline batteries (included), >700 hours continuous
Dimensions		: 84mm W x 158mm H x 30mm D
Weight		: 0.5 kg

Ordering Information

60010-00	Type J Thermocouple Thermometer
60010-10	Type K Thermocouple Thermometer
60010-20	Type T Thermocouple Thermometer

Probe to be ordered separately. Refer to page 11 and 12 for selection.

Digi-Sense® Thermocouple Thermometers

Dual Input J-T-E-K Thermocouple Thermometer

Multi-line display shows minimum, maximum, and differential temperatures simultaneously

Accepts up to 2 thermocouple inputs - either J, K, T or E type

Non-volatile memory stores up to 25 data sets

Intrinsically safe, UL listed & certified for Class 1, Division 1 Groups: A, B, C, and D harzardous (classified) locations

Take differential temperature measurements

The **Digi-Sense®** dual J-T-E-K thermocouple thermometer allows single or simultaneous dual-channel temperature measurements. This handy meter accepts most types of J, T, E and K thermocouple probes, and displays maximum, minimum, differential temperature measurements at a touch of buttons. It also offers selectable resolution, °C/°F measurement mode, single/dual probe capability, HOLD function and auto-power off.

Differential temperature measurements using the T1/T2 function can be performed for easy viewing. The meter resolution (0.1° or 1°) auto-switches or manually selectable via keypad for improved readability.

Manual field calibration is possible either on a single- or dual-point calibration for each probe to any known temperature standard. Two-point calibration adjusts for the offset and slope. Meter automatically stores and self-corrects inherent probe error for best Meter + Probe system accuracy. Calibration lockout protects NIST traceable factory settings and prevents tampering.

Every **Digi-Sense®** thermometer is individually factory calibrated on an NIST-traceable calibrator. Most thermocouple thermometers have ±0.02°C (±0.04°F) conformity to NIST calibration tables.

Meter Specifications

Range	**J**	:	-200 to 1000°C (-328 to 1832°F)
	K	:	-250 to 1372°C (-418 to 2501°F)
	T	:	-250 to 400°C (-418 to 752°F)
	E	:	-250 to 1000°C (-418 to 1832°F)
Resolution		:	0.1° between -150° and 999.9°C; 1° below -150° and above 999.9°C
Accuracy		:	Above -150°C(-238°F): ±0.1% of reading plus 0.4°C (0.7°F) Below -150°C (-238°F): ±0.25% of reading plus 1°C (2°F)
Display		:	Multi-line 4-digit custom LCD
Power		:	2 x AA alkaline batteries (included), >700 hours continuous
Dimensions		:	84mm W x 158mm H x 30mm D
Weight		:	0.5 kg



Ordering Information

60010-40	Dual Input J–T–E–K Thermocouple Thermometer

Probe to be ordered separately. Refer to page 11 and 12 for selection.

Handheld Meters Feature:

- Sealed silicone rubber keypad
- APB/Polycarbonate impact resistance case
- Rated IP 54 for splash & dust resistance
- Built-in foldable meter stand for bench top operation
- Meets CE requirements for electromagnetic compatibility
- Bright, easy to read LCD
- 3-year meter warranty, 6-months for probes

Digi-Sense® Thermocouple Thermometers

DuaLogR® Thermocouple Thermometer and Datalogger

Log up to 1000 sets of readings in real time

Transfer data to an infrared printer wirelessly or to a computer via optional RS-232 adapter for permanent documentation

Takes differential temperature measurements

Meter accepts J, K, T, E, R, S, N or B thermocouple probes

The DuaLogR® thermometer has real time datalogging with infra-red and RS232 output capabilities. Meter accepts up to 2 thermocouple inputs with type J, K, T, E, R, S, N or B thermocouples and displays temperatures in °F, °C, °R or K scales. Meter resolution (0.1° or 1°) auto-switches, or selectable resolution manually, improves readability under rapidly changing temperature conditions.

Measures minimum, maximum, and differential temperature readings using one or two probes. Manually stores or automatically logs up to 1000 sets of readings real time with selectable logging interval from 1 second to 60 minutes.

Seamless data transfer can be performed using wireless infrared output to a portable infrared printer or RS232 interface to a printer or computer with an optional RS232 adapter.

This thermometer is factory calibrated on an NIST-traceable calibrator. Thermocouple linearization has ±0.02°C (±0.04°F) conformance to NIST thermocouple tables. Improve meter accuracy by calibrating each probe for offset and slope. Calibration values can be manually entered and stored for each thermocouple probe at any temperature. Meter automatically stores and adjusts for inherent probe error for best Meter + Probe system accuracy.

Ideal for laboratory, industrial, and field use. Order an optional power adapter to conserve battery life during extended logging and printing operations.

Meter Specifications

Range	**J**	: -200 to 1000°C (-328 to 1832°F)
	K	: -250 to 1372°C (-418 to 2501°F)
	T	: -250 to 400°C (-418 to 752°F)
	E	: -250 to 1000°C (-418 to 1832°F)
	R	: 0 to 1768°C (32 to 3214°F)
	S	: 0 to 1768°C (32 to 3214°F)
	N	: -250 to 1300°C (-418 to 2372°F)
	B	: 200 to 1800°C (392 to 3272°F)
Resolution		: 0.1° between -150° and 999.9°C; 1° below -150° and above 999.9°C
Accuracy		: Type J, K, T, E, and N Below -150°C (-238°F): ±0.25% of reading plus 1°C (2°F) Above -150°C (-238°F): ±0.1% of reading plus 0.4°C (0.7°F) Type R, S, and B ±0.1% of reading plus 1°C (2°F)
Display		: Multi-line 4-digit custom LCD
Output		: Infra-red or RS232 (via interface adapter)
Power		: 2 x AA alkaline batteries (included), >600 hours continuous or mains power adapter
Dimensions		: 84mm W x 158mm H x 30mm D
Weight		: 0.5 kg



Ordering Information

60010-50	DuaLogR Thermocouple Thermometer and Logger
91100-52	115VAC Power Adapter, 2-flat pin US type
91100-55	220VAC Power Adapter, 2-round pin European type
91100-85	RS232 Interface Adapter

Probe to be ordered separately. Refer to page 11 and 12 for selection.

Digi-Sense® RTD Thermometers

RTD Thermometer

Automatic user calibration for improved meter accuracy

Meter features selectable °C/°F readout, auto-power off, and HOLD function that freezes measured display for easy reading. It accepts 100 ohm 3-wire platinum RTD sensors, and conforms to ITS-90 temperature scale.

Rugged splashproof housing makes meter ideal for indoor and outdoor uses.



Meter Specifications

Range	: -200 to 850 °C (-328 to 1562 °F)
Resolution	: 1°C/°F : From -200 to -100 °C (-328 to -148 °F) 0.1°C/°F : From -99.9 to 199.9 °C (-148 to 392 °F) 1°C/°F : From 200 to 850 °C (392 to 1562 °F)
Accuracy	: ±2 °C (±4 °F) : From -200 to -100 °C (-328 to -148 °F) ±0.2 °C (±0.4 °F) : From -99.9 to 199.9 °C (-148 to 392 °F) ±2 °C (±4 °F) : From 200 to 850 °C (392 to 1562 °F)
Alpha Coefficient	: 0.003850 Ω/Ω/°C
Display	: $3^3/_4$- digit custom LCD
Power	: 2 x AA alkaline batteries (included), > 300 hours continuous
Dimensions	: 84mm W x 158mm H x 30mm D
Weight	: 0.5 kg

Ordering Information

60010-80	RTD Thermometer
EC-TEM6TEM01P	3-wire 100Ω RTD Temperature probe

Probe to be ordered separately. Refer to page 11 and 12 for selection.

ThermoLogR RTD Thermometer and Datalogger

Log up to 1000 sets of readings in real time

Up to 0.01° resolution for improved readability

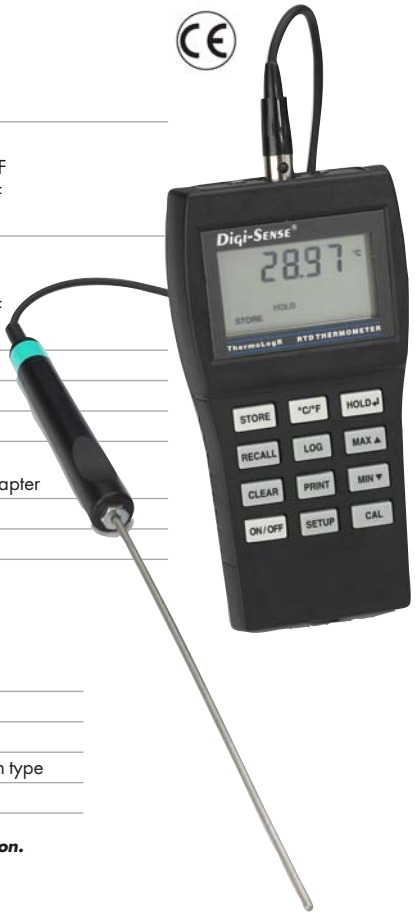
Transfer data via infra-red or RS232 to a printer or computer

Simultaneous monitoring of current, minimum, and maximum readings can be viewed easily with the multi-line display. Selectable log interval from 1 second to 60 minutes is possible with data-logging function. Meter accepts 100 ohm 3-wire platinum RTD sensors and conforms to ITS-90.

Meter features auto-power off, selectable °C/°F mode, HOLD function, low battery indicator, and automatic field calibration for added convenience.

Meter Specifications

Range	: -201 to 1210°C (-330 to 2210°F)
Resolution	: 0.1°C/°F : From -330.0 to -100°C/°F 0.01°C/°F : From -99.99 to 99.99°C/°F 0.1°C/°F : From 100.0 to 999.9°C/°F 1 °C/°F : Above 1000°C/°F
Accuracy	: ±0.1°C/°F : From -330.0 to -100°C/°F ±0.03°C/°F : From -99.9 to 99.9°C/°F 0.1°C/°F : From 100.0 to 999.9°C/°F 1°C/°F : Above 1000°C/°F
Alpha Coefficient	: 0.003850 Ω/Ω/°C or 0.003916 Ω/Ω/°C
Display	: Multi-line 4- digit custom LCD
Output	: Infra-red or RS232 (via interface adapter)
Power	: 2 x AA alkaline batteries (included), > 200 hours continuous or mains power adapter
Dimensions	: 76mm W x 152mm H x 25mm D
Weight	: 0.5 kg



Ordering Information

60010-85	ThermoLogR RTD Thermometer and Logger
EC-TEM6TEM01P	3-wire 100Ω RTD Temperature probe
91100-52	115VAC Power Adapter, 2-flat pin US type
91100-55	220VAC Power Adapter, 2-round pin European type
91100-85	RS232 Interface Adapter

Probe to be ordered separately. Refer to page 11 and 12 for selection.

Digi-Sense® Thermistor Thermometers

Thermistor Thermometer

Automatic calibration recognises freezing point for improved meter accuracy, minimises probe errors

This easy-to-use thermistor thermometer features auto-power-off, selectable °C/°F mode, low-battery indicator and HOLD function; ideal for both laboratory and field applications.

Accepts a large variety of YSI® series 400 or series 500 thermistor probes with 6.35 mm phono plug.



Meter Specifications

Range	: -40.0 to 125.0°C (-40.0 to 257.0°F)
Resolution	: 0.1°C/°F
Accuracy	: ±0.2°C (±0.4°F)
Probes	: one YSI® 400 or 500 series probe with 0.635 mm phone plug connector (not included)
Display	: $3^3/_4$-digit custom LCD
Power	: 2 x AA alkaline batteries (included), > 200 hours of battery life
Dimensions	: 84mm W x 158mm H x 30mm D
Weight	: 0.5 kg

Ordering Information

60010-70	Thermistor Thermometer

Probe to be ordered separately

ThermoLogR Thermistor Thermometer and Datalogger

Log up to 1000 readings in real time

Up to 0.01° resolution for improved readability

Transfer data to an infra-red printer wirelessly or to a computer via optional RS-232 adapter for permanent documentation

Automatic field calibration recognises freezing point for improved meter accuracy, minimises probe errors

With the large memory capability, datalogging of measured readings can be performed in real time effortlessly. Download data via infra-red or RS232 (via interface adapter) to a printer or computer for report analysis. Meter allows simultaneous monitoring of current, minimum and maximum readings.

Other features include auto-power off, selectable °C/°F mode, low-battery indicator, and HOLD function. This meter accepts a large variety of YSI® series 400 or series 500 thermistor probes with 6.35 mm phono plug.



Meter Specifications

Range	: -40.0 to 150.0°C (-40.0 to 302.0°F)
Resolution	: 0.01 or 0.1 °C/°F; auto-ranging to 0.1° above +99.99°
Accuracy	: ±0.03°C (±0.06°F) : From –40 to 99.99°C (-40 to 99.99°F) ±0.1°C (±0.1°F) : From 100 to 125°C (100 to 257°F) ±0.2°C(±0.4°F) : From 125 to 150°C (257 to 302°F)
Display	: Multi-line 4-digit custom LCD
Output	: Infra-red or RS232 (via interface adapter)
Power	: 2 x AA alkaline batteries (included), >300 hours continuous or mains power adapter
Dimensions	: 84mm W x 158mm H x 30mm D
Weight	: 0.5 kg

Ordering Information

60010-75	ThermoLogR Thermistor Thermometer and Datalogger
91100-52	115VAC Power Adapter, 2-flat pin US type
91100-55	220VAC Power Adapter, 2-round pin European type
91100-85	RS232 Interface Adapter

Probe to be ordered separately. Refer to page 11 and 12 for selection.

Digi-Sense® Handheld Humidity Datalogger

Temperature/Humidity Datalogger

Retain up to 1000 data sets complete with date and time

Measure and display relative humidity, temperature and dewpoint simultaneously

Transfer data to an infrared printer wirelessly or to a computer via optional RS-232 adapter for permanent documentation

0 to 100% RH range - Use in a variety of environments

External probe allows accessibity to hard-to-reach areas

This rugged portable datalogger is suitable for applications where relative humidity measurement is critical, such as laboratories, storage areas, and research facilities. It measures and displays all 3 parameters - relative humidity (RH), temperature, and dew point simultaneously on its easy-to-read LCD.

Datalogger features minimum/maximum readings, easy data transfer via infra-red or RS232, HOLD function, and low battery indicator. Calibration salts are available for field calibration (order separately).



Meter Specifications

Humidity Range	:	0 to 100% RH
Resolution	:	0.1% RH
Accuracy	:	±2% from 10 to 90% RH; ±4% outside this range
Temperature Range	:	-40 to 60°C (-40 to 140°F)
Resolution	:	0.1°C (0.1°F)
Accuracy	:	±0.5°C (±0.9°F) or ±0.2% of reading
Dew Point Range	:	-50 to 60°C (-58 to 140°F)
Response Time	:	15 seconds
Display	:	Multi-line 4-digit custom LCD
Output	:	Infrared or RS232 (via interface adapter)
Power	:	2 x AA alkaline batteries (included), >200 hours continuous or mains power adapter
Dimensions	:	76mm W x 152mm H x 25mm D
Weight	:	0.5 kg

Ordering Information

60020-52	Temperature/Humidity Datalogger with probe
60020-62	Replacement probe
37950-60	Calibration salt, 33% RH
37950-61	Calibration salt, 75% RH
91100-52	115VAC Power Adapter, 2-flat pin US type
91100-55	220VAC Power Adapter, 2-round pin European type
91100-85	RS232 Interface Adapter

Probe to be ordered separately. Refer to page 11 and 12 for selection.

Handheld Meters Feature:

- Sealed silicone rubber keypad
- APB/Polycarbonate impact resistance case
- Rated IP 54 for splash & dust resistance
- Built-in foldable meter stand for bench top operation
- Meets CE requirements for electromagnetic compatibility
- Bright, easy to read LCD
- 3-year meter warranty, 6-months for probes

Digi-Sense® 12-Channel Scanning Thermometers

Store and recall up to 4680 temperature data sets with date and time.



Display or record temperature readings manually or automatically

Achieve accuracy of ± 0.1% of reading

Bidirectional RS-232 for setup or PC datalogging - includes a real-time clock, non-volatile memory, and parallel printer output (benchtop only)

Immune to RF Interference

Wall-Mount Thermometer features:

Use high alarm and low alarm relays for On/Off control - relays are rated at 250 VAC 2A or 2A at 30 VDC resistive

Easy-to-view drop proof housing

With all wire connections at the bottom

Power unit with 100 – 240 VAC, 50/60 Hz supply

Benchtop Thermometer features:

Parallel printer connection

Allows you to connect the thermometer to a printer — make a hard copy of your data as a permanent record

Power adapter unit included

115 VAC or 230 VAC or any 10 to 25 VDC or 7 to 20 VAC 500 mA power supply. (user supplied)

Accepts thermocouple probes with miniconnectors

For quick and easy probe changes

When simultaneous monitoring of temperatures during different process steps or phases is critical, these multi-channel scanning thermometers are ideal. Wall-mount unit is ideal for permanent installation and continuous monitoring of your processes. Benchtop unit accepts most any power source giving you great flexibility as to where and when it may be used. Both models function as a datalogger – store data in the non-volatile memory and later download to your printer or PC. Link both models in series to expand the number of channels you can scan. Each thermocouple input is individually programmable to scan from every four seconds to 99 minutes, 59 seconds.

Instrument Features for Wall-Mount and Benchtop

- Scan and log up to 12 thermocouple inputs from any combination of J, K, T, E, N, B, R, and S thermocouple probes.
- Thermocouple type is individually selectable per channel.
- Datalogging feature automatically stores up to 4680 sets of readings.
- Download readings or stored data to your computer.



- Link up to 8 units together to expand channel capacity to 96 channels (with supplied software).
- Sequentially captures temperature data, allowing you to monitor and record process variations – ideal for statistical process control.
- Easy-to-use front panel MENU key lets you program Datalogging and print intervals, scan rate, date and time, temperature scale (°F, °C, K, or °R), resolution (0.1 or 1 °C), channels displayed, thermocouple type, and data output parameters.
- Each channel features HOLD, STORE, MAX AND MIN (measures maximum and minimum values), RECALL and AVERAGE buttons.
- Calibrate each channel separately at either one or two points to minimize probe offset. Parameter setup and calibration offsets are stored in non-volatile memory.

Physical Features for both models

- Large 19 mm high, 14-segment, 12-character alphanumeric LCD indicates channel number or name, temperature reading, and temperature units.
- Indicator warns you of open probes or out-of-range readings.
- Benchtop models accept thermocouple probes with ANSI mini connectors for quick hookup and changes.
- Wall-mount models accept thermocouple probes with stripped ends.

Multiple Safety Features for both models

- MENU key lets you select high or low alarm set points for each channel. Easily enable or disable built-in audible alarm and sets alarm hysteresis; program for manual or automatic alarm reset.
- Thermocouple inputs are electrically isolated from each other and from data outputs provides safe and accurate measurements even when probes are exposed to various electrical conditions.

Computer/Printer Capabilities for both models

- Use printing function to send current readings directly to your computer and printer at chose intervals.
- Vary datalogging and printing intervals from 4 seconds to 99 minutes, 59 seconds.
- Features RS-232 (for both units), and parallel printer output of date and time (benchtop only), channel number and name, and temperature readings in a tabular format.
- Includes RS-232 cable. Parallel printer cable is not included (sold separately).



Meter Specifications

Range	**J**	: - 200 to 1000 °C (-392 to 1832 °F)
	K	: - 250 to 1372 °C (-418 to 2501 °F)
	T	: - 250 to 400 °C (-418 to 752 °F)
	E	: - 250 to 1000 °C (-418 to 1832 °F)
	N	: - 250 to 1300 °C (-418 to 2372 °F)
	R	: 0 to 1768 °C (32 to 3214 °F)
	S	: 0 to 1768 °C (32 to 3214 °F)
	B	: 200 to 1800 °C (392 to 3272 °F)
Resolution		: 0.1° / 1°selectable up to 999.9°; 1° above 1000°; auto-range to 1° below -150°C
Accuracy		: **Type J, K, T, E, N** : Above -150 °C : ±0.5°C (±0.9°F), and ±0.1% of reading; Below -150 °C : ±1°C (1°F), and ±0.25% of reading; **Type R, S, B** : ±2°C (±4 °F) ±0.1 % of reading
Display		: 12 - character alphanumeric LCD
Display Update Rate		: 3 seconds/channel
Scan Rate		: from 4 seconds / 12 channels, 10 seconds / 24 channels to 99 minutes, 59 seconds / 24 channels
Alarm Output (Wall-mount model only)		: SPDT high/low relays are rated at 250 VAC 2A or 2A at 30 VCD resistive
Digital Output		: Both models : RS-232, ASCII format, baud rate 19.2 K, RJ11 connector; Benchtop unit only : Centronics parallel printer output; DB25F connector
Dimensions		: Benchtop : 191 mm L x 267 mm W x 89 mm H; Wall-mount : 140 mm L x 286 mm W x 216 mm H
Shipping Weight		: Benchtop : 1.4 kg; Wall-mount : 1.8 kg
Power		: Benchtop : 10 to 25 VDC, or 7 to 20 VAC 500 mA; Wall-mount : 100 to 240 VAC, 50/60 Hz

Ordering Information

Cat no.	Description	Includes Power Supply
69200-00	12-Channel	115 VAC 50/60 Hz
69202-30	Benchtop	230 VAC 50/60 Hz
69210-00	12-Channel	115 VAC 50/60 Hz
69212-30	Wall-mount	230 VAC 50/60 Hz

Probe to be ordered separately. Refer to page 11 and 12 for selection.



Digi-Sense® Temperature Controllers

Feature direct plug-in of heating devices
Advanced models include FREE software for remote computer control of all system operations

Plain English menus
With two-line display simultaneously show measured value and set point

Temperature scale
Selectable to read in °C, °F, K (Kelvin), and °R (Rankine)

Multiple control modes
From simple on/off control to sophisticated auto-tuning PID control

Non-volatile EEPROM memory
Stores set-up and operating parameters – saves parameters even during power loss

Sensor-calibrate function
Corrects for probe error

Accepts up to 8 thermocouple types
Advanced models also accepts RTDs and YSI® thermistor probes in addition

Convenient output receptacle
For direct plug-in of heaters and other devices (IEC on 230 VAC models)

Loop-break alarm
Shuts off output if a broken sensor or heater is detected

User selectable over-temperature and time cutoffs

Audible/visible out-of-range alarms
Front-panel LEDs indicate output and alarm conditions



Separate fuses
For instrument and output receptacle

Easy to connect
115 VAC models include 2m power cord and U.S. standard plug; 230 VAC models feature an IEC socket power connector for interchangeable cord sets (specify country of destination when ordering).

Place on benchtop or mount with optional panel-mount kit

Advanced models include
Windows® software, bidirectional RS-232, ramp/soak, alarm relay with adjusted hysteresis, and isolated 4 to 20 mA recorder output.

Free Software (included with advanced models)
Control all parameters of your controller through a computer. Program set-up files for later use – software allows you to load, save, and print multiple set-up files. Other software features include logging of measured temperature, set-point temperature, and alarm status in real time; help menu; and the ability to interface with other Windows®-based programs.

Meter Specifications

Input type	Range		Resolution	Accuracy
J:	-190 to 1000°C	(-310 to 1832°F)	0.1°; 1° above 999.9°; 1° below -99.9°	**Types J, K, T, E and N:** Above -100°C (-248°F) : ±0.1% of reading, and ±0.4°C (±0.7°F) Below -100°C (-248°F) : ±0.1% of reading, and ±1°C (±1.8°F) **Types B, R, and S:** ±0.1% of reading, and ±1°C (±1.8°F) **Thermistors and RTDs*:** ±0.1% of reading, and ±0.4°C (±0.7°F)
K:	-200 to 1372°C	(-328 to 2502°F)		
T:	-200 to 400°C	(-328 to 752°F)		
E:	-200 to 1000 °C	(-328 to 1832°F)		
R:	0 to 1768°C	(32 to 3214°F)		
S:	0 to 1768°C	(32 to 3214°F)		
N:	-200 to 1300°C	(-328 to 2372°F)		
B:	200 to 800°C	(392 to 3272°F)		
400 series thermistor*	0 to 100°C (32 to 212°F)			
700 series thermistor*	0 to 100°C (32 to 212°F)			
100 Ω Pt RTD *	-200 to 850°C (-328 to 1562°F)			

** Advanced models only*

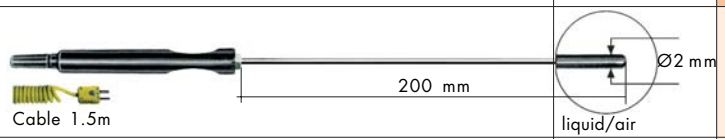
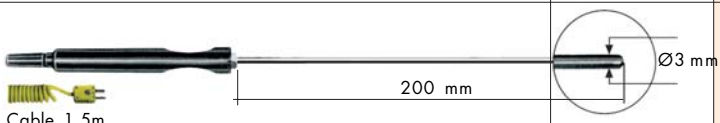
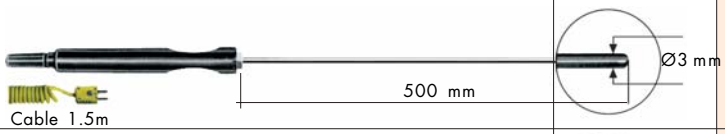
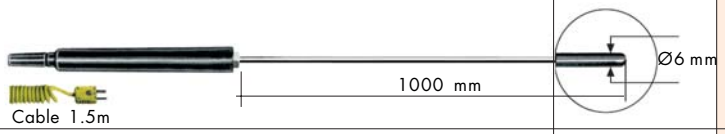
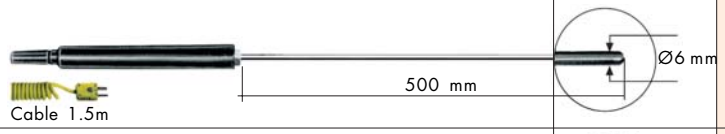
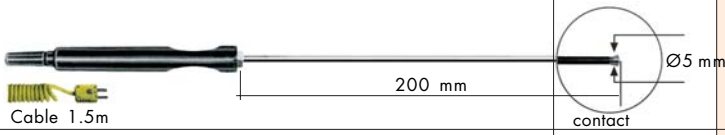
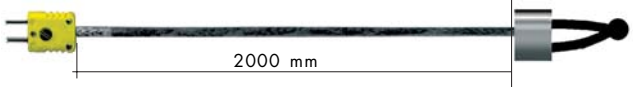
Ordering Information

Code No.	Controller Type	Control output	Control Type (50/60 Hz)	Ramp/Soak	Recorder Output	Power	Shipping Weight
68900-01 68900-03	Standard	1150 Watts 2300 Watts	On/Off, Programmable PID, Auto-tune PID	No	None	115 VAC, 10 A max 230 VAC, 10 A max	3.2 kg
68900-11 68900-13	Deluxe	1752 Watts 3450 Watts		Yes; 9 programs 16 segments	4-20/20-4 mA, selectable	115 VAC, 15 A max 230 VAC, 15 A max	4.1 kg

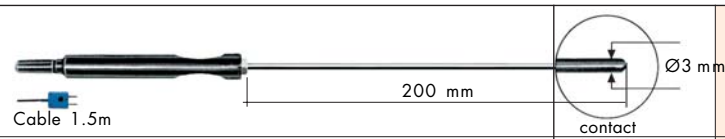
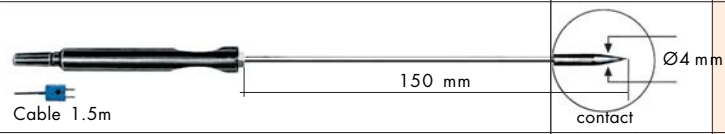
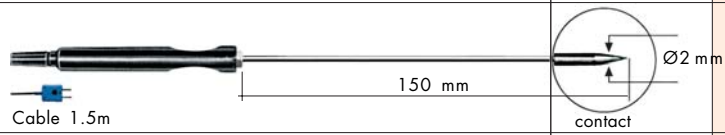
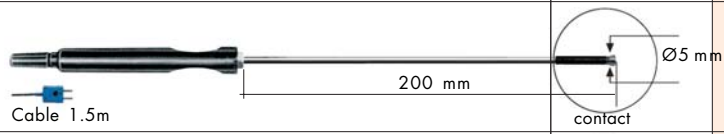
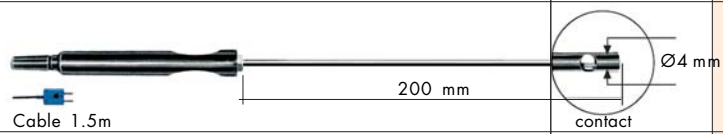
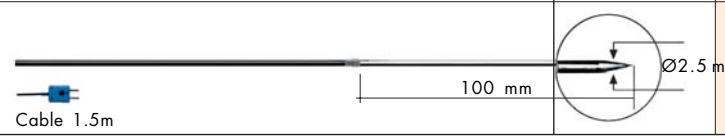
Probe to be ordered separately. Refer to page 11 and 12 for selection.

Temperature Probes

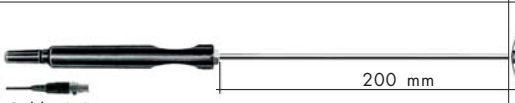
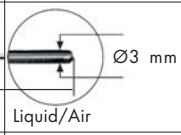
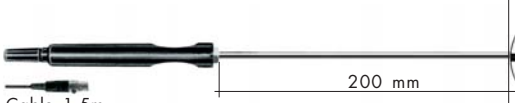
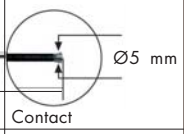
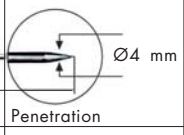
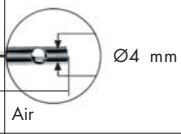
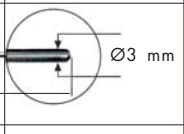
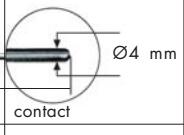
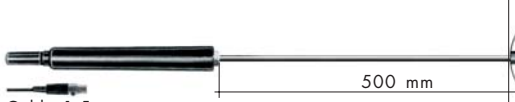
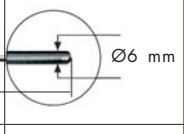
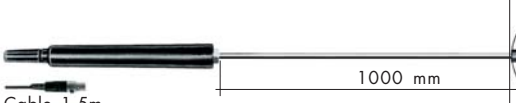
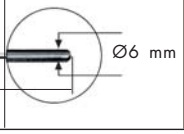
Thermocouple Type K Probes

Ordering Code	Dimension	Sensor Tip	Temperature °C	Time Constant	Class of Precision
EC — 3K220			-60 to +600	2	1
EC — 3K320			-60 to +800	3	1
EC — 3K350			-60 to +800	3	1
EC — 3K6100			-60 to +1100	6	1
EC — 3K650			-60 to +1100	6	1
EC — 3K520C			-60 to +600	15	1
EC — 3K1200			-60 to +400	2	1

Thermocouple Type T Probes

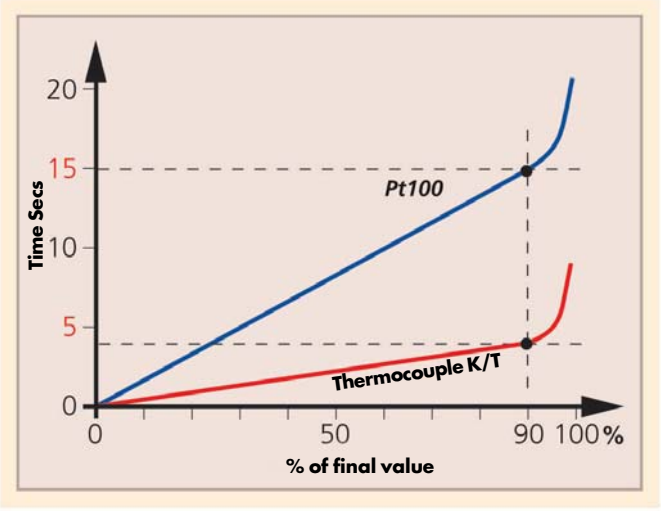
EC — 3T320			-50 to +350	2	1
EC — 3K415			-50 to +350	3	1
EC — 3T215			-50 to +350	2	1
EC — 3T520C			-50 to +350	5	1
EC — 3T420A			-50 to +250	3	1
EC — 3T210			-50 to +300	3	1

RTD Pt 100 Probes

Model	Dimension	Sensor Tip	Temperature °C	Time constant	Class of Precision
EC — PT56L			-50 to +400	30	A
EC — PT56C			-50 to +400	120	A
EC — PT56P			-50 to +400	60	A
EC — PT56A			-50 to +250	60	A
EC — PT56L 1/5DIN			-50 to +400	30	1/5 DIN
EC — PT56 TFE			-100 to +350	30	A
EC — PT56/500			-50 to +400	60	A
EC — PT56/1000			-50 to +400	60	A

Specification

Sensor	Temperature Range	Class	Tolerance
Themocouple Type K	-60...+1200°C	1	±1.5°C or 0.4% full scale
Type T	-40...+350°C	1	±0.5°C or 0.4% full scale
Type J	-40...+750°C	1	±1.5°C or 0.4% full scale
Pt 100	-100°C +0°C +100°C +200°C	Class A	±0.35°C ±0.15°C ±0.35°C ± 0.55°C
Pt 100	-100°C +0°C +100°C +200°C	Class $^1/_5$	±0.16°C ±0.06°C ±0.16°C ± 0.26°C



Temperature response per second, when immersed in liquid

Temperature Measurement

Temperature is the most commonly measured parameter. To obtain an accuracy better than 0.2°C (0.4°F), extreme care is needed. Quite often errors can occur due to presence of temperature gradients or drafts, sensor non-linearities, poor thermal contact, calibration drifts, radiant energy and sensor self-heating.

There are many types of sensors used to measure temperature. Choice of sensor depends on accuracy, temperature range desired, access to the point of interest, speed of response, environment (chemical, physical, electrical) and cost effectiveness. The following table provides an estimated comparison between common temperature sensor types.

Sensor Type	Output	Range °C	Accuracy ±°C	Robustness	Cost
Thermocouple	40 µV/°C	-270 to 2300	1.5	High	Low
Platinum RTD	0.4%/°C	-200 to 600	0.2	Medium	Medium
Nickel RTD	0.4%/°C	-200 to 600	0.3	Medium	Low
Thermistor	5%/°C	-50 to 200	0.2	High	Medium
Semiconductor	10 mV/°C or 1 µA/°C	-40 to 125	1.5	Medium	Low
Non-contact	Millivolts	0 to 6000+	2	Low	High
Fiber Optic	Various	-100 to 200	1	Medium	Very High
Cryogenic	Various	-273.15 to -200	Various, to ±0.001	Various	Various
Bimetallic	Hi/Low	-100 to 200	2	High	Low

The above table provides a general summary and should not be taken as definitive statement on temperature sensors, especially on the accuracy. Generally the accuracy of all sensor types can be greatly improved by calibration.

Temperature Sensors

Thermocouple sensors consist of a measuring junction formed by two dissimiliar wires that complete an electrical circuit to the meter. A millivolt signal is generated proportional to the temperature gradient between the measuring and reference junctions. Thermocouples can be used in a wide variety of applications and offer a broad measuring range.

RTD sensors (resistance-temperature detector) use an element with charateristic resistance (commonly 100 Ω) that varies proportionally with temperature. Three-wire probe reduces effect of lead-length resistance on measurements giving a more precise indication of temperature and providing the highest intrinsic accuracy.

Thermistor sensors are thermally sensitive semi-conductors that are usually encapsulated in epoxy, glass or ceramic to prevent contact with water. Thermistors operature on a principle similar to that of RTDs, but thermistors exhibit a greater sensitivity in 0 to 100 °C working range.

			Features	Applications	Max. Range
RTD	100 Ω	Platinum thin-film	Excellent accuracy, stability, wide measuring range, maximum practical distance is approximately 200 ft	High accuracy; industrial and laboratory use	±0.1% of reading
Thermistor	400	Two-wire, single ceramic element	Excellent accuracy, fast response, and resistance to mechanical shock; NIST traceable	Ambient temperature and biological applications	-200 to 849°C -330 to 1560°F
	500	Miniature two-wire, single ceramic element	Excellent accuracy, fast response, and resistant to mechanical shock; compact	Ambient temperature and biological applications	-40 to 150°C -40 to 302°F
	700	Three-wire, dual ceramic element	Excellent accuracy, fast response, resistant to mechanical shock; NIST traceable	Ambient temperature and biological applications	-40 to 150°C -40 to 302°F
Thermocouple (T/C)	J	+ / white / Iron – / red / Constantan	Wide temperature range	Vacuum, reducing, or inert atmospheres; industrial and laboratory use	0 to 1000°C -328 to 1832°F
	K	+ / yellow / Chromel – / red / Alumel	Widest temperature range	Oxidizing or neutral atmospheres and higher temperatures; industrial and laboratory use	-250 to 1375°C -418 to 2507°F
	T	+ / blue / Copper – /red / Constantan	Good for sub-zero and biological ranges; moisture resistant	Vacuum, reading, oxidizing, or atmospheres and lower; Industrial and laboratory use	-250 to 400°C -418 to 752°F
	E	+ / purple / Chromel – / red /Constantan	High emf output	Oxidizing inert or corrosive atmospheres; industrial and laboratory use	-250 to 1000°C -118 to 1832°F
	N	+ / orange / 87% Platinum, 13% Rhodium – / black / Platinum	High emf output	Resists oxidation and corrosion, but contaminated by hydrogen, carbon, and metal vapors	-250 to 1300°C -400 to 2372°F
	R	+ / red / 87% Platinum, 13% Rhodium – / red / Platinum	High emf output	Resists oxidation and corrosion, but contaminated by hydrogen, carbon, and metal vapors	0 to 1450°C 32 to 1450°F
	S	+ / red / 90% Platinum, 10% Rhodium – / black / Platinum	High emf output	Resists oxidation and corrosion, but contaminated by hydrogen, carbon, and metal vapors	0 to 1450°C 32 to 2642°F

Selecting a Temperature Sensor

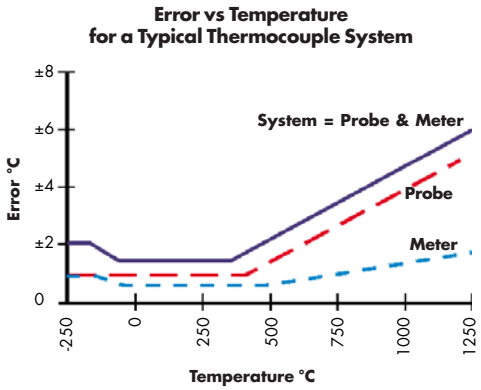
Selecting an appropriate sensor is not always easy. The following table serves only as a guide. You may have to adapt or change according to the situation and your specific application:

Field	Traditional Sensor
Agriculture Research	Thermistor, Type T thermocouple, semiconductor
Automotive	Thermistor, Pt100
Chemical & Materials Processing	Pt100
Cryogenics	Metal Oxide resistor
Environmental Research	Thermistor, Type T thermocouple, Pt100, semiconductor
General Industry	Pt100
Hobby, Education	Semiconductor, Thermistor, Type T thermocouple
HVAC	Thermistor, Pt100
In Manufactured Goods	Semiconductor, Thermistor, Pt100
Metallurgy	Type K or Type N thermocouple

It is a good practice to first define the accuracy and resolution required, sensor interchangeability needs, the temperature range, measuring equipment capability, cost, possibility of performing calibration, media compatibility and other environment issues that may impact sensor reliability and life.

How to determine Your System Accuracy

To determine your system accuracy when you have a separate meter and probe, add the tolerance of the meter to the tolerance of the probe. The diagram (on the right) shows the accuracy versus temperature for a typical thermocouple meter and probe. For example, using the diagram, the meter error at 250°C is ±0.5°C and the probe error at 250°C is ±1.0°C, thus the system accuracy would be ±1.5°C or better. The result is often conservative — the actual system accuracy is usually better. Glass thermometers, labels, paints, bimetal thermometers, handheld infra-red thermometers, and digital indicators include a general system accuracy statement.



Warranty

Eutech Instruments warrants its handheld meters free from manufacturing defects for 3 years, scanning thermometers and temperature controllers for 1 year and probes for 6 months.

Note: We reserve the right to make changes, improvements and modifications to products shown.

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