

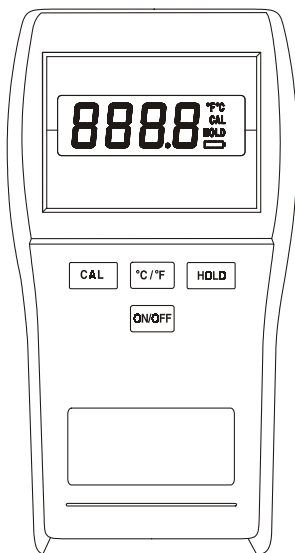
Digi-SENSE[®]

Thermocouple Thermometer Models

91100-00 (Type J)

91100-10 (Type K)

91100-20 (Type T)



Cole-Parmer Instrument Co.

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A1299-0628

Edition 06



ACCESSORY THERMOCOUPLE PROBES

Cole-Parmer offers a wide variety of thermocouple probes, wire, connectors, extension cables, switch boxes, accessories, and calibration services.

The popular probes listed below have a nylon handle, a 5-ft coiled cord and a 316 SS sheath.

General-purpose probes, 5 in long x 0.156 in dia with 0.093 in dia tip. 3 second time constant.

Type J **08517-55**

Type K **08516-55**

Type T **08500-55**

Penetration probes, 4 in long x 0.156 in dia sharp tip. 5 second time constant.

Type J **08517-65**

Type K **08516-65**

Type T **08500-65**

Surface probes, 10 in long with 5/8 in dia aluminum and ceramic tip. 6 second time constant.

Type J **08517-60**

Type K **08516-60**

Type T **08500-60**

Air/gas probes, 8 in long sheath with 1/4 in dia radiant heat shield. 45 second time constant.

Type J **08517-75**

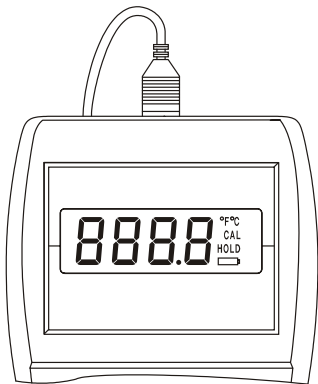
Type K **08516-75**

Type T **08500-75**

39800-98 Carrying case. Hard plastic case with foam insert holds one meter and up to five probes. Measures 21 in W x 12 in H x 3 in D.

08520-05 Soft carrying case. Water-resistant cloth. Extra room for batteries or small probe. Measures 3.5 in W x 10 in H x 2 in D.

INTRODUCTION



This versatile hand-held instrument provides highly accurate temperature measurements. The instrument is designed for easy operation and includes the following features:

- Operator selection of Celsius or Fahrenheit scale
- Resolution of 0.1° from –99.9 to 299.9°
- Four-digit LCD
- Hold feature for temporarily retaining a reading
- Field calibration capability
- Low battery warning
- Built-in tilt stand for easy hands-free operation
- Two blade female ANSI mini-connector input
- Operates with a wide selection of probes

SAFETY PRECAUTIONS

 **WARNING** *THIS INSTRUMENT IS DESIGNED TO ACCEPT LOW LEVEL SIGNALS SUPPLIED BY STANDARD THERMOCOUPLES. UNDER NO CIRCUMSTANCES SHOULD THE INPUT VOLTAGE EXCEED THE SPECIFIED 50V RMS.*

 **CAUTION** *DO NOT USE OR STORE THIS INSTRUMENT IN MICROWAVE OVENS OR ANY ABNORMALLY HOT OR COLD AREAS.*

 **CAUTION** *WEAK BATTERIES SHOULD NOT BE LEFT IN THE INSTRUMENT. DEAD BATTERIES CAN LEAK AND CAUSE DAMAGE TO UNIT.*

 **DANGER** *VOLTAGES PRESENT AT THE THERMOCOUPLE MAY ALSO BE PRESENT AT THE BATTERY TERMINALS. ALWAYS DISCONNECT THE THERMOCOUPLE WHEN CHANGING BATTERIES.*

 **WARNING** *TO PREVENT IGNITION OF A HAZARDOUS ATMOSPHERE, BATTERIES MUST ONLY BE CHANGED IN AN AREA KNOWN TO BE NON-HAZARDOUS.*

 **AVERTISSEMENT** *AFIN DE PREVENIR L'INFLAMMATION D'ATMOSPHERES DANGEREUSES, NE CHANGER LES BATTERIES QUE DANS DES EMPLACEMENTS DESIGNES NON DANGEREUX.*

 **WARNING** *TO PREVENT IGNITION OF A HAZARDOUS ATMOSPHERE BY ELECTROSTATIC DISCHARGE, CLEAN WITH DAMP CLOTH.*

SPECIFICATIONS

THERMOCOUPLE PROBES

Type	Temperature Range
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Type J:	−200°C to 1000°C (−328°F to 1832°F)
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Type K:	−250°C to 1372°C (−418°F to 2501°F)
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Type T:	−250°C to 400°C (−418°F to 752°F)
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Out of range display: - - - -

Resolution: 0.1°/1° autoranging, 0.1° from −99.9° to 299.9°, 1° outside this range.

Accuracy

> −99.9°: $\pm(0.2\% \text{ of reading } \pm 0.5^{\circ}\text{C})$
 $\pm(0.2\% \text{ of reading } \pm 0.9^{\circ}\text{F})$

< −99.9°: $\pm(0.25\% \text{ of reading, } \pm 1^{\circ}\text{C})$
 $\pm(0.25\% \text{ of reading } \pm 2^{\circ}\text{F})$

Display: 4-digit LCD with 0.5 in high numerals.

Display update rate: 0.6 sec per update.

Input: One thermocouple with ANSI connector.

Input Protection: 50V rms

Battery: Two AA, 1.5V alkaline ANSI-L40, IEC-LR6.

Battery Life: 750 hours continuous, typical.

Low battery indication

Battery Symbol on when 8 to 10 hours of battery life remains.

Battery symbol blinking: replace battery

Operating Conditions

Stated accuracy: 18°C to 28°C (64°F to 82°F)

Useful range: 0°C to 40°C (32°F to 104°F)

Storage: −40°C to 65°C (−40°F to 149°F)

Humidity (non-condensing): 10% to 90%

Dimensions

3 cm D x 8.4 cm W x 15.8 cm H
(1.2 in x 3.3 in x 6.2 in)

Weight with batteries: 227 grams (8 ounces)

Ingress protection: Meets IEC-529 IP-54 for dust and water-resistant enclosures.

Intrinsic safety

This product is energy limited for intrinsically safe operation in hydrogen atmospheres per Class I, Division 1, Groups A, B, C and D hazardous (classified) locations for UL per UL913 and CSA per C22.2 No. 0-M1982 and No. 157-M1987. Maximum surface temperature: 135°C (T4); UL file No. E182612 (1997).

Compliance: (For CE Mark)

EN61326-1/A1: 1998 (EU EMC Directive)

BATTERY INSTALLATION AND REPLACEMENT

 **CAUTION** WEAK BATTERIES SHOULD NOT BE LEFT IN THE INSTRUMENT. DEAD BATTERIES CAN LEAK AND CAUSE DAMAGE TO UNIT.

 **DANGER** VOLTAGES PRESENT AT THE THERMOCOUPLE MAY ALSO BE PRESENT AT THE BATTERY TERMINALS. ALWAYS DISCONNECT THE THERMOCOUPLE WHEN CHANGING BATTERIES.

 **WARNING** TO PREVENT IGNITION OF A HAZARDOUS ATMOSPHERE, BATTERIES MUST ONLY BE CHANGED IN AN AREA KNOWN TO BE NON-HAZARDOUS.

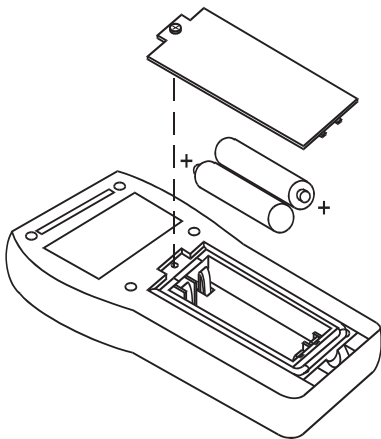
 **AVERTISSEMENT** AFIN DE PREVENIR L'INFLAMMATION D'ATMOSPHERES DANGEREUSES, NE CHANGER LES BATTERIES QUE DANS DES EMPLACEMENTS DESIGNES NON DANGEREUX.

If battery indicator turns on, battery life is approximately 8 to 10 hours. The battery indicator will start blinking with less than 1 hour of life remaining.

AT THIS POINT, BATTERY MUST BE CHANGED. IF BATTERY VOLTAGE GOES TOO LOW, DISPLAY WILL GO BLANK.

See SPECIFICATIONS for battery type.

1. Before changing battery, turn instrument off and disconnect thermocouple.
2. Loosen screw and lift battery cover off back of case.
3. Remove the two AA batteries.
4. Insert two new batteries observing polarity.
5. Install cover and tighten screw.

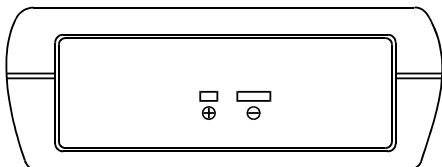


CONNECTING A THERMOCOUPLE

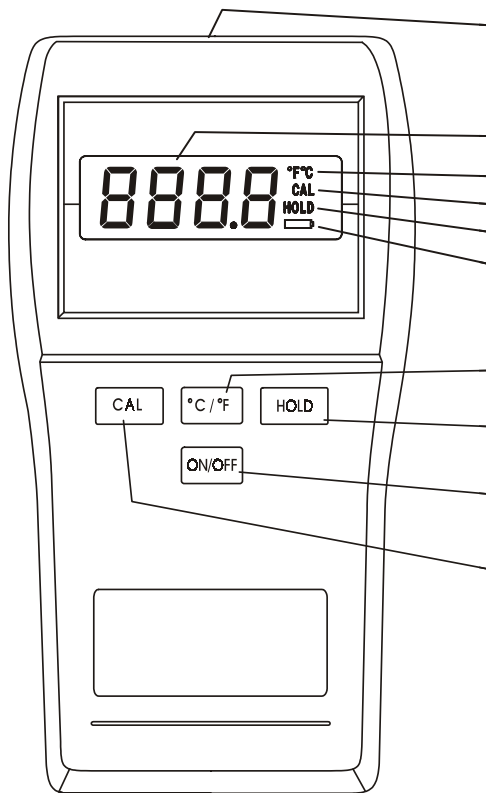
Use the correct thermocouple type for your instrument. Using an incorrect thermocouple type will result in erroneous readings. Thermocouples are color coded by type using the North American ANSI Color Code as follows:

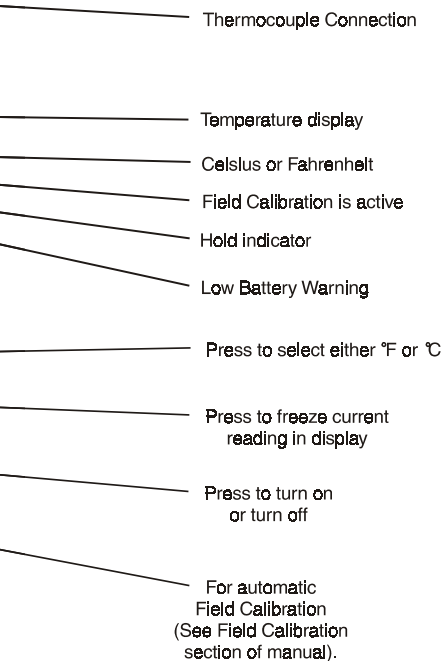
TYPE	COLOR
J	Black
K	Yellow
T	Blue

Thermocouple connectors have one wide blade and one narrow blade. *Do not force connector in backwards.* Connect thermocouple to receptacle at top of instrument as shown in the following illustration.



Thermocouple wiring polarity must be correct. If readings decrease as the temperature increases, the thermocouple wires may be reversed. The red wire is negative for thermocouple wires manufactured in North America.





OPERATION

Note: Be sure the thermocouple you are using matches the instrument setting indicated on the unit.

1. Press the **ON/OFF** key. The thermometer performs a self-test and all display digits and indicators, as shown below, should remain on for approximately two seconds.



2. If a thermocouple is not connected or if the thermocouple is defective, the display will indicate **OPEN**.
3. Select °C or °F by pressing the **°C/°F** key. Temperature scale can be switched at any time. The thermometer remembers the last selected scale the next time you turn the power on.
4. For optimum instrument accuracy, allow one minute for ambient temperature stabilization. If the unit has been stored at an extreme ambient condition, more time will be needed.

Thermocouples are sensitive at the tip or measuring junction. When taking temperature measurements, allow time for the reading to stabilize. Multiplying the time constant of the probe by 5 will give you the approximate time required.

Note that the readings will automatically change to 1° resolution below -99.9° or above 299.9°.

If desired, press the **HOLD** key to retain the reading on the display. Press **HOLD** key again for normal operation.

If the display shows "- - - -" the temperature reading is out of range of the instrument.

FIELD CALIBRATION

The thermometer is factory calibrated and does not require calibration before use. The CAL function allows single point calibration of the thermometer, at 0°C (32°F) to compensate for thermocouple offset error. It is not necessary to perform a field calibration to obtain specified meter accuracy. Use the field calibration feature to improve thermometer/probe accuracy or to compensate for thermocouple drift.

1. Follow steps 1 through 4 in **OPERATION** section.
2. Pack sensing end of probe in a container tightly packed with crushed ice and filled with distilled water. Allow temperature to stabilize.
3. Press and hold the **CAL** key for 5 seconds to enter the calibration mode, the CAL annunciator on the display starts blinking. Release the **CAL** key.
4. If the measured temperature is from -10°C to 10°C (14 to 50°F), when the temperature reading is stable, press the **CAL** key.

The **CAL** indicator will stop blinking and the reading will be set to 0°C (32°F). The CAL indicator will remain turned on, indicating a field calibration is active.

If "Err" is displayed, either the displayed reading is outside the above limits or the batteries are weak.

CANCELING A FIELD CALIBRATION

1. Turn the thermometer off.
2. Hold the **CAL** key down while pressing the **ON/OFF** key.

The field calibration is canceled and the thermometer reverts to the default factory calibration. The CAL annunciator is now turned off.

FIELD CALIBRATION LOCKOUT AND RE-ENABLE

The calibration lockout feature, prevents any field calibration changes. The lockout remains in effect until a lockout re-enable has been performed. Use the following procedures to lockout or re-enable the field calibration operation.

Lockout Procedure

1. Turn the thermometer off.
2. Simultaneously press and hold the **CAL** and the **°C/°F** keys down and momentarily press the **ON/OFF** key. Continue to hold the **CAL** and **°C/°F** keys for at least 5 seconds.

Re-Enable Procedure

1. Turn the thermometer off.
2. Simultaneously press and hold the **HOLD** and the **CAL** keys down and momentarily press the **ON/OFF** key. Continue to hold the **HOLD** and **CAL** keys until the display blanks.

MAINTENANCE

Properly used, the thermometer should maintain calibration indefinitely and not require service other than occasional cleaning of the housing and changing of the batteries.

CLEANING

 **WARNING** *TO PREVENT IGNITION OF A HAZARDOUS ATMOSPHERE BY ELECTROSTATIC DISCHARGE, CLEAN WITH DAMP CLOTH.*

Do not clean with abrasives or solvents. Use mild detergents, never immerse nor use excessive fluid.

BATTERIES

If there is no display when the thermometer is turned on, check condition of the two AA batteries. Also check that the battery terminals are clean and batteries are properly installed. If replacement is necessary, refer to the BATTERY INSTALLATION AND REPLACEMENT section for replacement procedure.

SERVICE

⚠ WARNING *SUBSTITUTION OF COMPONENTS MAY IMPAIR INTRINSIC SAFETY.*

⚠ AVERTISSEMENT *LA SUBSTITUTION DE COMPOSANTS PEUT COMPROMETTRE LA SECURITE INTRINSEQUE.*

There are no internal adjustments or user replaceable parts.

If “Err” followed by the numbers 1 through 9 is displayed (see example below) return unit for service. Note that “Err” alone may be displayed during improper field calibration.



Note: Serial number label is located inside battery compartment.

EU DECLARATION OF CONFORMITY

Name of Apparatus: *DIGI-SENSE®*
Thermocouple
Thermometer

Model Numbers: 91100-00, -10 and -20

Description of Apparatus: Electronic Thermometer
using a Thermocouple
Probe
91100-00 (Type J),
-10 (Type K)
and -20 (Type T)

Barnant Company declares that the above models
are in conformity to the following harmonized
standard and directives:

Applicable Directives	Applicable Specifications	Manufacturer's Report Number
89/336/EEC 92/31/EEC 93/68/EEC	EN61326-1/A1: 1998	TR9648

Manufacturer: Barnant Company Division
Cole-Parmer Instrument Company
28W092 Commercial Avenue
Barrington, IL 60010
USA
Tel.: 847-381-7050

Manufacturer's Signature:



James W. Doll
Vice President, Engineering

5 October, 2000

Date

WARRANTY

The Manufacturer warrants this product to be free from significant deviations from published specifications. If repair or adjustment is necessary within the warranty period, the problem will be corrected at no charge if it is not due to misuse or abuse on your part as determined by the Manufacturer. Repair costs outside the warranty period, or those resulting from product misuse or abuse, may be invoiced to you.

The warranty period for this product is noted on the Warranty Card.

PRODUCT RETURN

To limit charges and delays, contact the seller or Manufacturer for authorization and shipping instructions before returning the product, either within or outside of the warranty period. When returning the product, please state the reason for the return. For your protection, pack the product carefully and insure it against possible damage or loss. Any damages resulting from improper packaging are your responsibility.

TECHNICAL ASSISTANCE

If you have any questions about the use of this product, contact the Manufacturer or authorized seller.

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