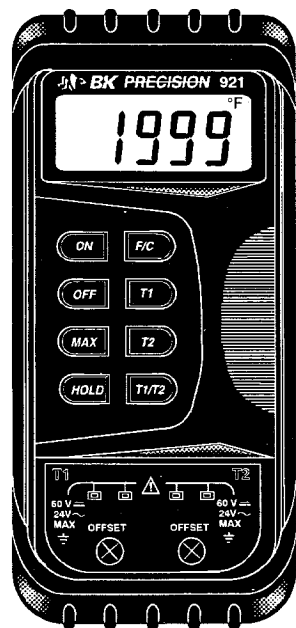


INSTRUCTION MANUAL



DIGITAL TEMPERATURE METERS MODELS 911 & 921



CUSTOMER SUPPORT

1-800-462-9832

BK Precision offers courteous, professional technical support before and after the sale of their test instruments. The following services are typical of those available from our toll-free telephone number:

- Technical advice on the use of your instrument.
- Technical advice on special applications of your instrument.
- Technical advice on selecting the best instrument for a given task.
- Information on optional accessories for your instrument.
- Information on instrument repair and recalibration services.
- Replacement parts ordering.
- Information on other **BK Precision** instruments.
- Requests for a new **BK Precision** catalog.
- The name of your nearest **BK Precision** distributor.

Call toll-free 1-800-462-9832

Monday through Friday, 8:00 A.M. to 5:00 P.M.

Central Standard Time

(Central Daylight Time in summer)



6470 W. Cortland St.

Chicago, Illinois 60707-4098

480-783-9-001

Printed in U.S.A.

SAFETY

WARNING

Avoid all skin contact with hot surfaces, hot liquids and jets of compressed gasses to avoid heat and/or freezer burns. Some compressed gasses can cause permanent nerve damage in addition to freezer burns when they contact your skin.

1. Never attempt to measure temperature at any point, or contact any point with your probe or exposed tip where the voltage exceeds 60 V dc or 24V ac with respect to ground.
2. Use extreme care to avoid heat burns when measuring temperature of heated surfaces and/or liquids. Observe all safety warning signs. Never touch a heated surface even if the heat is off. Remember, heated surfaces can retain enough heat to burn long after the heating power is turned off.
3. Use extreme care when releasing (blowing-off) compressed gasses. Protect your skin from contact with the gas. Some compressed gasses can cause freezer burns and/or permanent nerve damage.
4. Always wear safety glasses, or a preferably a safety shield when taking temperature measurements. This is especially important if you are going to release a compressed gas. It could blow-back into your eyes and/or on your skin causing damage.
5. Know, thoroughly understand and follow the safety instructions provided for the equipment or process you are about to test. Be aware and follow instructions on all safety signs attached to the equipment or process.
6. When taking measurements in high voltage equipment, never touch the equipment, meter, test probe or tip while power is applied. The exposed tip is conductive. If it contacts a voltage source the thermocouple and meter will be "electrically hot".
7. If possible, familiarize yourself with the equipment being tested and the location of its high voltage points. However, remember that high voltage may appear at unexpected points in defective equipment.
8. Use the time proven "one hand in the pocket" technique while handling an instrument probe. Be particularly careful to avoid contacting a nearby metal object that could provide a good ground return path.
9. When using a thermocouple assembly, touch only the insulated portion. Never touch the exposed tip.
10. Before replacing batteries, disconnect the thermocouple assembly from the meter.
11. Never work alone. Someone should be nearby to render aid if necessary. Training in CPR (cardiopulmonary resuscitation) first aid is highly recommended.

SAFETY (Cont.)

LIMITED ONE YEAR WARRANTY

BK Precision warrants to the original purchaser that its product, and the component parts thereof, will be free from defects in workmanship and materials for a period of one year from the date of purchase.

BK Precision will, without charge, repair or replace, at its option, defective product or component parts upon delivery to an authorized **BK Precision** service contractor or to the factory service department, accompanied by proof of the purchase date in the form of a sales receipt.

Exclusions: This warranty does not apply in the event of misuse or abuse of the product or as a result of unauthorized alterations or repairs. It is void if the serial number is altered, defaced or removed.

BK Precision shall not be liable for any consequential damages, including without limitation damages resulting from loss of use. Some states do not allow limitation of incidental or consequential damages, so the above limitation or exclusion may not apply to you. This warranty gives you specific rights and you may have other rights which vary from state-to-state.

For your convenience, we suggest you contact your **BK Precision** distributor, who may be authorized to make repairs or can refer you to the nearest service contractor.

If warranty cannot be obtained locally, please send the unit to **BK Precision** Service Department, 6470 West Cortland Street, Chicago, Illinois 60707, properly packaged to avoid damage in shipment.

BK Precision Test Instruments only warrants products sold in the U.S.A and its overseas territories. In other countries, each distributor warrants the **BK Precision** products which it sells.

**SPECIFICATIONS for
MODEL 911 and 921
DIGITAL TEMPERATURE METERS**

Electrical Characteristics

Measurement Range: -50 ° to +1300 °C
-58 ° to +1999 °F
(-40 ° to +230 °C with probe supplied)

Unit of Measurement: Selectable °C or °F

Resolution: 1 °C or F [921]
Selectable 1 °C or F, 0.1 °C or F (to 199.9 °) [911]

Accuracy**: -50 ° to 0 °C: ±2 °C
0 ° to 1000 °C: ±(0.3% reading + 1 °C)
1000 ° to 1300 °C (0.5% reading + 1 °C)

Sensor: Type K Thermocouple

Input Receptacle: Standard type K thermocouple connector (yellow), blade centers 0.3"

Inputs: Dual [921], Single [911]

Data Hold: Freezes measured value on display

Max Hold: Latches maximum measured value on display

Measurement: Selectable T1, T2 or T1-T2 [921]

Maximum Voltage at Input: 60 V dc or 24 V ac rms

RF Field Derating: Strong RF field can adversely affect accuracy.

General Characteristics

Display: 3-1/2 digit LCD (max reading 1999)

Measurement Rate: 2.5 times per second

Annunciators: °C, °F, Data Hold (DH), Max Hold (MAX), over limit (OL), low battery [921 and 911], T1, T2, T1-T2 [921]

Battery Type: Standard 9 V, NEDA 1604, or equal

Battery Life: 200 hours typical with alkaline

Ambient Temperature: <0.1 times specified accuracy per °C, 0 ° to 18 °C and 28 ° to 50 °C

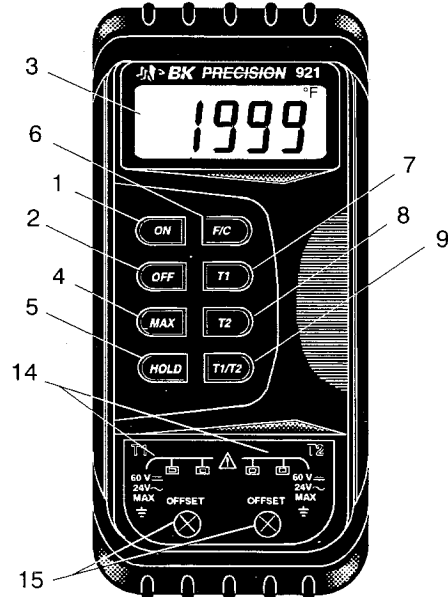
Relative Humidity: <80% (0 ° to 35 °C)
<70% (35 ° to 50 °C)

Dimensions (H x W x D): 6-1/2" x 3" x 1-15/16"
(165 x 76 x 49 mm)

Weight: 8 oz (220 g)

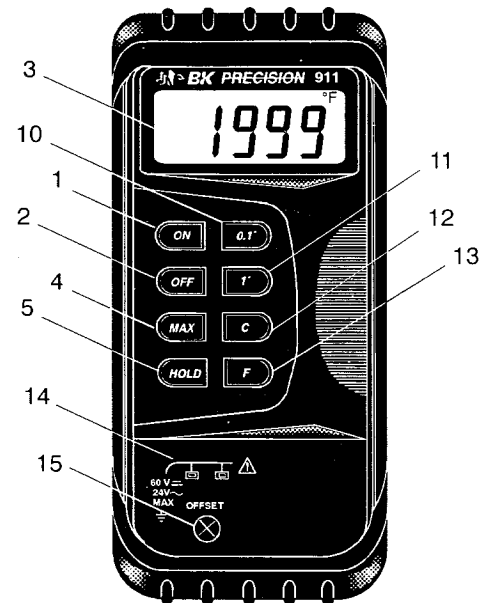
Accessories Supplied: Battery, type K thermocouple probe [two with 921], rubber holster, instruction manual

** Stated accuracy applies only to meter and does not include probe.



Model 921

CONTROLS & INDICATORS



Model 911

1. **ON**
Press to turn on power to meter for temperature measurements.
2. **OFF**
Press to turn off power to meter. Keep meter OFF when not in use to conserve battery power.

3. **Display**
Indicates measured value in degrees of selected temperature, Fahrenheit or Celsius at 3-1/2 LCD digit display. Annunciators show temperature, selection of F or C.
4. **MAX**
Press to latch reading at maximum level sensed. Press again to resume normal sensing operation.
5. **HOLD**
Press to freeze reading at current level. Press again to resume normal sensing operation.
6. **F/C [921]**
Select to read temperature in degrees Fahrenheit or Celsius. Last selection is active when power is turned on.
7. **T1 [921]**
Press to read temperature at input T1.
8. **T2 [921]**
Press to read temperature at input T2.
9. **T1-T2 [921]**
Press to read difference between temperatures at inputs T1 and T2.
10. **0.1° [911]**
Press to read temperature at resolution of 0.1 degree.
11. **1° [911]**
Press to read temperature at resolution of 1 degree.
12. **C [911]**
Press to read temperature in degrees Celsius.
13. **F [911]**
Press to read temperature in degrees Fahrenheit.
14. **INPUT JACK(s)**
Standard input, polarized mini-jacks for K-type thermocouple plugs. Model 921 has two jacks for inputs T1 and T2. Model 911 has one jack for a single input.
15. **OFFSET**
Calibration adjustment, compensates for differences in thermocouples, ambient temperature, etc.

GENERAL INFORMATION

APPLICATION

The Model 911 and 921 Digital Temperature Meters cover a wide range of temperatures and applications. These instruments are typically used to measure temperatures in electronics, heating/ventilating/air conditioning (HVAC), process systems, laboratories, schools and general industrial applications.

Typical uses in the electronics field include measuring surface temperature of components, determining heat dissipation qualities of heat sinks and "thermal troubleshooting". When thermal troubleshooting, shorts can be located by excessive heat and inoperative components by the lack of heat.

In the HVAC field, temperature measurements can be made of inside and outside air, air in return and outgoing plenums, hermetic sealed compressors, incoming and outgoing lines from compressors, environmental chambers and temperature gradients in various areas. Additionally, the difference between two measurements can be taken with the Model 921 Meter.

In the process field, temperatures can be taken of slurries, heating/cooling in processing lines, cooking heats and cooling of batches, steam and dry heat, etc. Needle probes can be obtained to measure temperature in frozen meats and similar products.

Temperature measurements in general industrial uses might include transformers, heat of insulating oil in transformer tanks, bearings, motors, surface friction, etc.

A wide range of probe types and temperature ranges are available for these meters. They include bead style K-type thermocouples, surface sensors, needle probes, immersion probes, etc.

THERMOCOUPLE NOTES

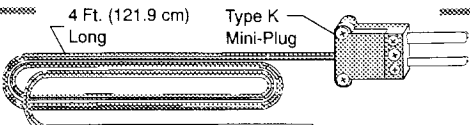
APPLICATION HINTS (cont.)

Always be sure to use the correct thermocouple for the measurements you are about to take. Thermocouples are available to cover specific temperature ranges, response times and applications.

When selecting a thermocouple, try to stay well within its operating range. When you exceed the maximum temperature limits you may get unreliable readings.

Also consider the operating environment when selecting a thermocouple. Corrosive atmospheres can damage an exposed tip and some liquids can cause a galvanic action. This action can disturb the normal voltage generated at the junction. To protect the junction, thermocouples are available with a protective sheath for the tip.

Be sure to consider your application before selecting the type of thermocouple used. General purpose thermocouples may not give the best results in all situations. For your convenience, the following pages illustrate an array of thermocouples available from **EK Precision** for various temperature ranges and operating conditions.



Model: TP-29 (Supplied w/Meter)
Range: -32 to 500 °F (0 to 260 °C)
Type: Exposed Junction-General Purpose
Accuracy: 2.2 °C, or 0.75% of reading, whichever is greater

TAKING A READING

WARNING

To avoid injury, observe all precautions given in SAFETY of this manual.

- Press ON to turn power on. The meter should be in the following modes:
 - [921 & 911] Temperature scale returns to °C or °F, whichever was active meter was turned off.
 - [921] Resolution of reading is 1 degree, not selectable.
 - [911] Resolution of reading is selectable, 0.1 degree or 1 degree.
- Verify that the battery is good, low battery symbol  not shown in display. If this symbol is shown, press OFF and replace battery as indicated in MAINTENANCE of this manual. Low battery symbol appears when battery output drops to about 7.5 volts under load.
- Verify that desired temperature scale is active, Celsius or Fahrenheit are selectable.
- Select measuring probe. Type K thermocouple(s) is (are) supplied with your meter, one with model 911, two with model 921. However, additional temperature probes are available. See TEMPERATURE PROBES of this manual for more information.
- If meter was not used recently, or if battery was replaced, see CALIBRATION of this manual.

OPERATING INTRUCTIONS

TAKING A READING (cont.)

- Plug-in mini, K-type thermocouple probe into polarized jack. When taking a differential measurement with the Model 921 meter, follow the additional instructions given in TAKING A DIFFERENTIAL READING.
- Examine tip of probe, make sure it is clean. If in doubt, clean thoroughly with a soft lint-free cloth lightly saturated in a noncontaminating solvent. Any residue on the sensing element can cause false readings. When measuring batch type slurries and/or foods, residue can contaminate your current batch or sample.
- Place the tip of your probe(s) at the desired measuring point..

CAUTION

When using a surface probe, you may have to hold it firmly on the measuring point for good contact, If you do this, protect your fingers and avoid contact with hot surface to prevent burns.

Never exceed the 60 V dc or 24 V ac voltage to ground rating of your meter.

- Allow reading to stabilize before accepting value at display. The response time of probes varies from a minimum of about 0.5 seconds to a maximum of 5 or more seconds. Verify the response specifications of the probe being used to determine minimum stabilization time.
- After taking reading, remove thermocouples, wipe tip clean, then press OFF to conserve battery power.

TAKING A DIFFERENTIAL READING

Differential readings only apply to the Model 921 Meter.

- Follow steps (1) through (6) of TAKING A READING.
- Plug-in both probes into the T1, T2 jacks,
- Press T1-T2 to activate both jacks.
- Allow both thermocouples to stabilize at ambient temperature, or a temperature close (but not at) the expected operating temperature.
- Slowly adjust one (not both) OFFSET control for a zero reading at meter.
- Place each thermocouple in the desired measurement location.
- Allow several seconds for both sensors to stabilize before taking a reading as determined by your probe specifications.
- Remove thermocouples then wipe probe tips clean.
- Follow steps in CALIBRATION to reset OFFSET, then press OFF to conserve battery power.

CALIBRATION

Use this procedure to calibrate both models.

- Verify that meter is ON and battery is good.
- Make sure thermocouple tip(s) is (are) clean, then place tip(s) into an ice-water bath.
- After thermocouple stabilizes, slowly adjust OFFSET for a 0 °C, or 32 °F reading at meter.
- Remove thermocouples from ice-bath then press OFF to conserve battery power.

THERMOCOUPLE NOTES

GENERAL DESCRIPTION

A Model TP-29 thermocouple probe is supplied with your meter. This thermocouple is suitable for most general purpose applications. TP-1 through -4 series thermocouple probes are available along with eleven TP3000 series thermocouple probes. This array covers the probe tip styles and temperature ranges required for most applications from about -65 °C to 1300 °C. Response times range from 0.3 to 5 seconds.

Thermocouples are low current, voltage generating devices. This voltage is generated at the point where two dissimilar metal wires are joined.

Each thermocouple probe is constructed of a small diameter insulated wire that is flexible and easy to handle. Since the energy needed to heat any sensor's mass slightly alters the temperature to be measured, a low mass tip is used. This arrangement minimizes the heat sinking effect providing good heat transfer and reasonably fast sinking times. The insulated wires protect against shorting and electrical shock while handling the probe.

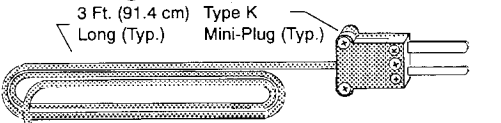
The sensing junction tips of these thermocouple probes come in different styles, such as exposed bead, sheath enclosed, needle and various surface mounts. Examine the various styles in THERMOCOUPLES of this manual.

APPLICATION HINTS

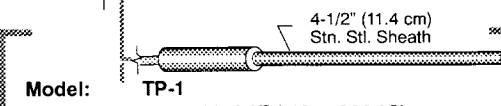
Note that exposed thermocouple tips are conductive. If this tip is applied to a live voltage point, the meter becomes part of the overall circuit. When this happens, all electrical safety precautions must be followed to avoid electrical shock and/or damage to the meter.

THERMOCOUPLE ASSEMBLIES

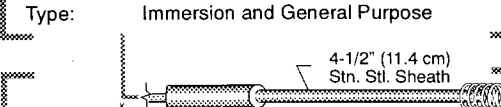
TP-1 through -4 SERIES



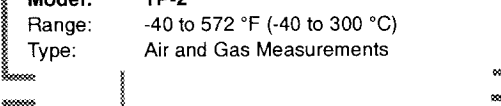
Model: TP-1
Range: -40 to 1652 °F (-40 to 900 °C)
Type: Immersion and General Purpose



Model: TP-2
Range: -40 to 572 °F (-40 to 300 °C)
Type: Air and Gas Measurements

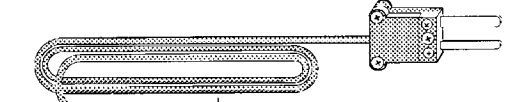


Model: TP-3
Range: -40 to 896 °F (-40 to 480 °C)
Type: Exposed Jctn., Gen. Purpose Hi- Temp

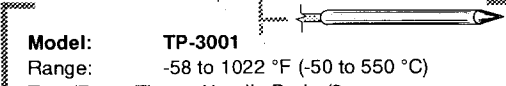


Model: TP-4
Range: -40 to 302 °F (-40 to 150 °C)
Type: Surface Measurements

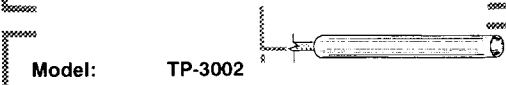
TP- 3000 SERIES



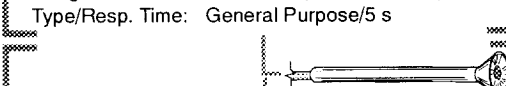
Model: TP-3001
Range: -58 to 1022 °F (-50 to 550 °C)
Type/Resp. Time: Needle Probe/3 s



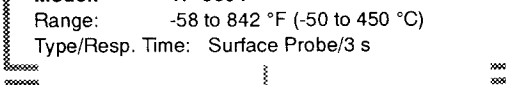
Model: TP-3002
Range: -58 to 1832 °F (-50 to 1000 °C)
Type/Resp. Time: General Purpose/5 s



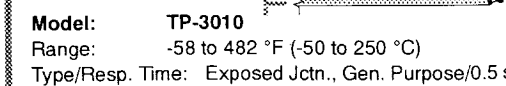
Model: TP-3004
Range: -58 to 842 °F (-50 to 450 °C)
Type/Resp. Time: Surface Probe/3 s



Model: TP-3010
Range: -58 to 482 °F (-50 to 250 °C)
Type/Resp. Time: Exposed Jctn., Gen. Purpose/0.5 s

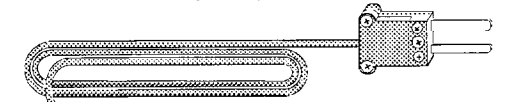


Model: TP-3011
Range: -85 to 752 °F (-65 to 400 °C)
Type/Resp. Time: Needle Probe/3 s

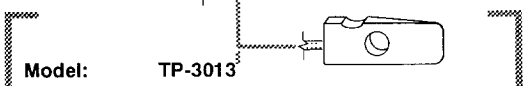


Model: TP-3012
Range: -85 to 1652 °F (-65 to 900 °C)
Type/Resp. Time: General Purpose/5 s

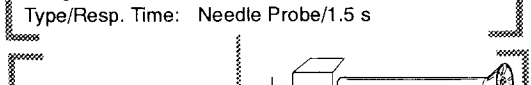
TP3000 SERIES (cont.)



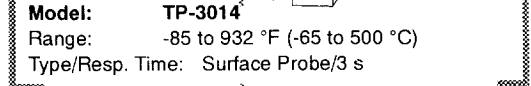
Model: TP-3013
Range: -85 to 1122 °F (-65 to 600 °C)
Type/Resp. Time: Needle Probe/1.5 s



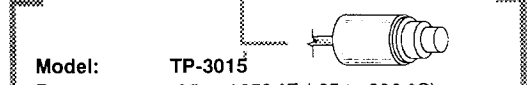
Model: TP-3014
Range: -85 to 932 °F (-65 to 500 °C)
Type/Resp. Time: Surface Probe/3 s



Model: TP-3015
Range: -85 to 1652 °F (-65 to 900 °C)
Type/Resp. Time: Surface Probe/1.5 s



Model: TP-3016
Range: -85 to 482 °F (-65 to 250 °C)
Type/Resp. Time: Cranked Surface Probe/2 s



Model: TP-3020
Range: -58 to 1022 °F (-50 to 500 °C)
Type/Resp. Time: Exposed Jctn., Fast Resp./0.3 s

MAINTENANCE

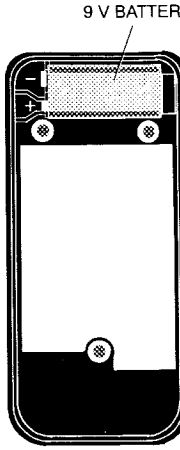
CAUTION

Disconnect thermocouple probe from meter before opening case or performing any maintenance to avoid the possibility of electrical shock.

BATTERY REPLACEMENT

Replace battery when the low battery symbol is displayed. A fresh 9 V, NEDA 1604, battery is needed.

- Verify that meter is OFF then unplug probe(s).
- Pull meter out from flexible holster.
- Remove the three Phillips screws at rear section of case. Gently pry away rear section then remove.
- Remove old battery from rear section and install fresh battery observing polarity.
- Fit rear section of case onto front section and secure with screws removed in step (4). Slip case back into holster to complete battery replacement.



REAR COVER REMOVED FROM CASE