

**WAVETEK<sup>®</sup>**  
**Meterman<sup>™</sup>**

Operator's Manual

**TC-253A**  
**Temperature Converter**

Temperature Converter

## WARRANTY

The TC-253A Temperature Converter is warranted against any defects of material or workmanship within a period of one (1) year following the date of purchase of the instrument by the original purchaser or user.

Any accessory claimed to be defective during the warranty period should be returned with proof of purchase to an authorized Wavetek Meterman . Service Center or to the local Wavetek Meterman dealer or distributor where your multimeter was purchased. See maintenance section for details.

Any implied warranties arising out of the sale of a Wavetek Meterman product, including but not limited to implied warranties of merchantability and fitness for a particular purpose, are limited in duration to the above stated one (1) year period. Wavetek Meterman shall not be liable for loss of use of the multimeter or other incidental or consequential damages, expenses, or economical loss or for any claim or claims for such damage, expenses or economical loss.

Some states do not allow limitations on how long implied warranties last or the exclusion or limitation of incidental or consequential damages, so the above limitations or exclusions may not apply to you. This warranty gives you specific legal rights, and you may also have other rights which vary from state to state.

## EXPLANATION OF SYMBOLS



Attention! Refer to Operating instructions.



Ground connection.



Battery.

## WARNING AND PRECAUTIONS

■ This instrument is designed to use external K-type thermocouple as temperature sensor. ■ Temperature indication follows National Bureau of Standards and IEC 584 temperature / Voltage tables for K-type Thermocouple supplied with the thermometer.

■ Inspect DMM, TC-253A, and thermocouple cable before every use. Do not use any damaged part. ■ Never ground yourself when taking measurements. ■ Do not touch exposed circuit elements or probe tips. ■ Do not operate instrument in an explosive atmosphere. ■ Voltages applied to the COM connector may be present on all other input connectors. ■ Do not use this piece or any piece of equipment without proper training.

## WARNING!

- TO AVOID ELECTRICAL SHOCK, DO NOT USE THIS INSTRUMENT WHEN VOLTAGES AT THE MEASUREMENT SURFACE EXCEED 24V r.m.s. AC OR 60V DC.
- TO AVOID DAMAGE OR BURNS – DO NOT MAKE TEMPERATURE MEASUREMENTS IN MICROWAVE OVENS.

## UNPACKING AND INSPECTION

Upon removing your new Temperature Converter from its packing, you should have the following items:

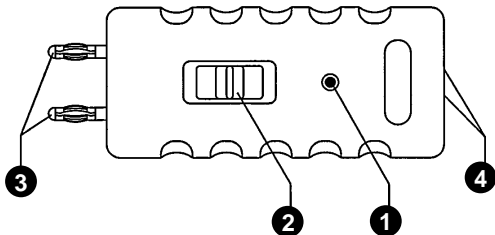
1. Temperature Converter
2. K-type Bead Thermocouple
3. Operator's Manual

## FRONT PANEL

Refer to Figure 1 and the following numbered steps to familiarize yourself with the meter's front panel controls and connectors.

1. Red LED: Flashing while turned ON.
2. Function Switch: Slide switch used to select measuring function.
3. Output plugs: Voltage output.
4. Thermocouple Input Connector.

**Figure 1**



## PREPARATION AND CAUTION BEFORE MEASUREMENT

1. Before measurement, warm up for at least 30 seconds, after connecting the thermocouple to the connector of the Temperature Converter.
2. If the instrument is used near noise generating equipment, be aware that the Voltage output may become unstable or indicate large errors.
3. Check TC-253A battery. The multimeter should read  $> 7.1$  volts in the OFF position.

## TEMPERATURE MEASUREMENTS

1. **Warning!** do not measure the temperature of any surface that the potential exceeds 60 Vdc or 24 Vrms.
2. Connect the plug of the thermocouple to the connector of the thermometer.
3. Select the  $^{\circ}\text{C}/^{\circ}\text{F}$  function desired.
4. Insert the "Output Plugs (V and COM)" to the input terminals of Multimeter. Set the Multimeter to "DC mV or V" range.
5. Place the sensing point of thermocouple on the surface or environment to be measured.
6. Wait until the reading stabilizes.

## GENERAL SPECIFICATIONS

This Temperature Converter conforms to the temperature/voltage tables of the National Bureau of Standards and to the IEC 584 Standards for K-type.

1. Temperature Scale: Celsius or Fahrenheit user selectable.
2. Input: Single K-type thermocouple.
3. Output to Meter: 1mVdc per  $^{\circ}\text{C}$  or  $^{\circ}\text{F}$ .
4. Measurement Range:  $-50^{\circ}\text{C}$  to  $1000^{\circ}\text{C}$  – ( $-58^{\circ}\text{F}$  to  $1832^{\circ}\text{F}$ ).
5. Low Battery Indication: if the reading is less than 7.1V.
6. Temperature Coefficient:  $0.15 \times$  (specified accuracy) /  $^{\circ}\text{C}$ , ( $<18^{\circ}\text{C}$  or  $>28^{\circ}\text{C}$ ).
7. Power Requirements: Standard 9V battery, NADA 1604, JIS 006P, or IEC6F22 Size.
8. Battery Life: Alkaline 300 hours.
9. Dimensions: 122mm(L) x 46mm(W) x 30mm(D).
10. Weight (including battery): 114 grams.
11. Accessories: K-type bead thermocouple, battery (installed), operators manual.

**CE** EMC: This product complies with requirements of the following European Community Directives: 89/336/EEC (Electromagnetic Compatibility) as amended by 93/68/EEC (CE Marking). Directive 73/23/EEC (Low Voltage) does not apply to this product. However, electrical noise or intense electromagnetic fields in the vicinity of the equipment may disturb the measurement circuit. Measuring instruments will also respond to unwanted signals that may be present within the measurement circuit. Users should exercise care and take appropriate precautions to avoid misleading results when making measurements in the presence of electronic interference.

## ENVIRONMENTAL CONDITIONS:

1. Indoor Use.
2. Operating Ambient: 0% to 80% R.H. (0 to 35 °C); 0% to 70% (35 to 50°C) R.H.
3. Storage Temperature: -20 to 60°C, 0 to 80% R.H. with battery removed from Temperature Converter.

## ELECTRICAL SPECIFICATIONS:

MEASUREMENT RANGE		ACCURACY	INPUT PROTECTION
-50°C	-20°C	=(2.0% rdg + 2°C)	60Vdc & 24Vrms
-19°C	350°C	=(0.5% rdg + 2°C)	
351°C	500°C	=(2.0% rdg + 2°C)	
501°C	1000°C	=(2.9% rdg + 2°C)	
-58°F	-4°F	=(2.0% rdg + 4°F)	
-3°F	662°F	=(0.5% rdg + 4°F)	
663°F	932°F	=(2.0% rdg + 4°F)	
933°F	1832°F	=(2.9% rdg + 4°F)	

## ACCESSORIES:

- TP-255 Replacement Bead Probe  
 TP-254 Immersion Probe with Handle  
 MH101K Master Handle Probe  
 TP110K Immersion Probe \*  
 TP120K Surface Probe \*  
 TP130K Air Probe \*

\*(TP110K, TP120K, & TP130K require MH101K Handle)

## TP-255 Bead Thermocouple:

Temperature Range:  $-40^{\circ}\text{C}$  to  $204^{\circ}\text{C}$  ( $-40^{\circ}\text{F}$  to  $400^{\circ}\text{F}$ ).

Tolerances: = ( $2.2^{\circ}\text{C}$  or  $0.75\%$ ) from  $0^{\circ}\text{C}$  to  $204^{\circ}\text{C}$

= ( $2.2^{\circ}\text{C}$  or  $2.0\%$ ) from  $0^{\circ}\text{C}$  to  $-40^{\circ}\text{C}$

Wire Length: 1 meter, with miniature plug. Teflon tape insulated.

## MAINTENANCE:

### WARNING!

**TO AVOID ELECTRICAL SHOCK REMOVE TEST THERMOCOUPLE BEFORE OPENING THE COVER.**

## GENERAL MAINTENANCE:

1. The case can be cleaned with a mild solution of detergent and water. Apply sparingly with a soft cloth and allow the TC-253A to dry completely before using. Do not use hydro carbon or chlorinated solvents or abrasives for cleaning.
2. All calibration and repair should be performed by an authorized service center or by other qualified instrument service personnel. To maintain a thermocouple in good condition, observe the following items.
  - Avoid excess bending.
  - Don't overheat the thermocouple.
  - Avoid chemical reactions that can damage the thermocouple.

## BATTERY CHECKING AND REPLACEMENT:

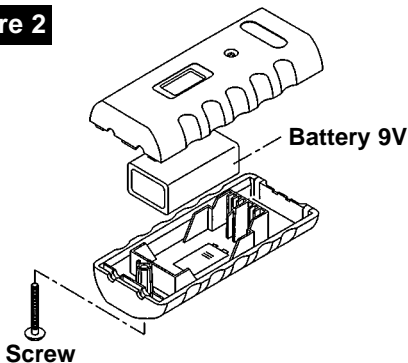
To check the battery:

1. Turn the TC-253A OFF.
2. Insert the "output plugs (V and COM)" to the input terminals of multimeter to "DCV" for autoranging type meter or 20 VDC or greater for manual ranging type meter.
3. Read the display on the multimeter. Replace the battery, if the reading is less than 7.1V.

To replace the battery, refer to Figure 2 and use the following procedure.

1. Turn the TC-253A OFF and disconnect the multimeter and thermocouple.
2. Position the TC-253A face down. Remove the screw from the bottom case.
3. Remove the bottom case.
4. Carefully disconnect the battery from bottom case

**Figure 2**



## REPAIR

Read the warranty located at the front of this manual before requesting warranty or non-warranty repairs. For warranty repairs, any multimeter claimed to be defective can be returned to any authorized Wavetek Meterman Distributor or to a Wavetek Meterman Service Center for an over-the-counter exchange for the same or like product. Non-warranty repairs should be sent to a Wavetek Meterman Service Center. Please call Wavetek Meterman or inquire at your point of purchase for the nearest location and current repair rates. All Instruments returned for warranty or non-warranty repair or for calibration should be accompanied by the following information or items: company name, customer's name, address, telephone number, proof of purchase (warranty repairs), a brief description of the problem or the service requested, and the appropriate service charge (for non-warranty repairs). Please include the test leads with the meter.

Service charges should be remitted in the form of a check, a money order, credit card with expiration date, or a purchase order made payable to Wavetek Meterman or to the specific service center. For minimum turn-around time on out-of-warranty repairs please phone in advance for service charge rates. The Temperature converter should be shipped with transportation charges prepaid to one of the addresses/service centers shown on the rear cover.



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