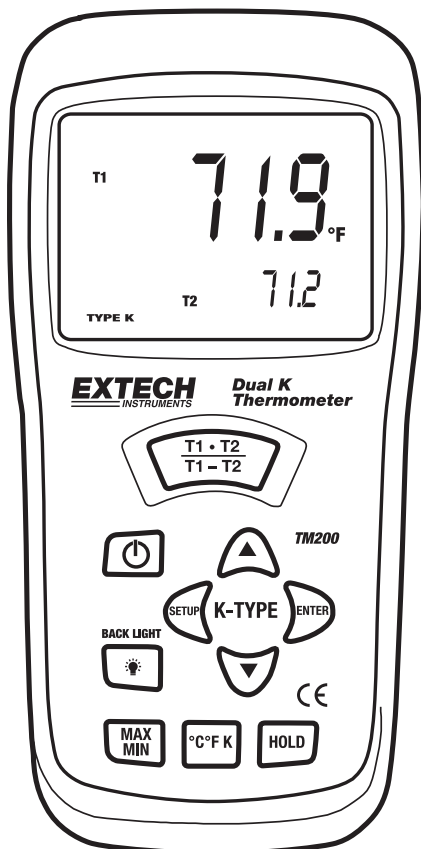User Guide

EXTECH
INSTRUMENTS

Type K Dual Input Thermometer

Model TM200

Introduction

Congratulations on your purchase of the Extech TM200 Type K Dual Input Thermometer. This instrument offers a dual thermocouple input and a multifunction LCD display. Additional features include differential temperature measurement (T1-T2), Data Hold, push-button Offset adjustment, and MIN/MAX/AVG displays. This meter is shipped fully tested and calibrated and, with proper use, will provide years of reliable service.

Meter Description

1. LCD display

2. T1, T2, T1-T2 display select button

3. Power button

4. SETUP button

5. Backlight button

6. Min/Max button

7. °C °F Kelvin (°K) select button

8. Data Hold button

9. Down arrow button

10. ENTER button

11. Up arrow button

12. T2 Thermocouple input socket

13. T1 Thermocouple input socket
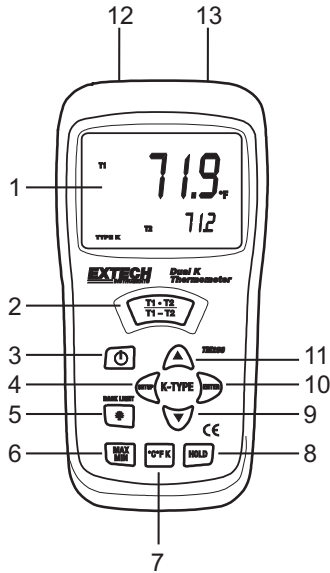
Note: The battery compartment is located on the back of the instrument under the protective jacket. Remove the rubber protective jacket that encases the meter to access the compartment. The tripod mount access is also on the back of the instrument above the tilt stand.

Safety

Please read the safety information and operation instructions before operating this instrument.

- To avoid electrical shock, do not use this instrument when voltages at the measurement surface exceed 24V ac or 60V dc.
- To avoid electrical shock or personal injury, do not apply more than 20V ac rms, between the thermocouples, or between any thermocouple and earth ground.
- If voltage on the measurement surface results in potentials of more than 1V, measurement errors may occur.
- If a potential exists between the thermocouples, use electrically insulated thermocouples
- To avoid meter damage and burn hazards, do not use this instrument to measure temperature in a microwave oven.
- Avoid repeated sharp flexing of the thermocouple wire as this can cause thermocouple lead breakage. To prolong lead life, avoid sharp bends in the leads, especially near the connector.
- The meter can display temperature as high as 2501°F (1372°C), however, the supplied thermocouple is rated for 500°F (260°C). To measure higher temperatures, a high-temperature thermocouple (not supplied) must be used.

⚠ This symbol on the instrument indicates that the operator must refer to an explanation in this manual.

Operation

Connecting thermocouples

1. This meter accepts one or two thermocouples. Only type K thermocouples with spade plugs (sub-miniature type with one spade wider than the other) may be used.
2. Plug one thermocouple into the meter's T1 input jack and optionally plug another thermocouple into the meter's T2 input jack.

Turn Power ON

1. Press the ⏻ button to turn the meter on.
2. If a probe is not inserted to the meter, dashes "-----" will appear on the display.

Selecting ^{o}C / ^{o}F / Kelvin (^{o}K) unit of measure

Use the ^{o}**C** / ^{o}**F / K** button to select the desired unit of measure.

Taking Measurements

Hold the thermocouple in air or touch the tip of the thermocouple to a device under test and read the temperature on the meter's LCD. If the measured temperature exceeds the meters high or low limits, 'OL' will appear in place of a temperature reading.

Important Note: The supplied thermocouples are rated for 500°F (260°C). To measure higher temperatures, a high-temperature Type K thermocouple (not supplied) must be used.

Display resolution

The meter has a 0.1^o resolution on displays ranging from 0.1^o to 999.9 ^{o}. The resolution is 1° for temperatures 1000° and higher.

Selecting T1, T2, and T1-T2 Displays

Use the **T1, T2, T1-T2** button to select the desired display configuration

- When the meter is turned on, the T1 thermocouple reading is displayed on the primary display and the T2 reading is displayed on the secondary (smaller display).
- First press of the button: The T1 and T2 displays switch places (the T2 reading is now on the primary display and the T1 reading is on the secondary display)
- Second press: The differential (T1-T2) is shown on the primary display and the T1 temperature reading is shown on the secondary display.
- Third press: The differential value (T1-T2) is shown on the primary display and the T2 temperature reading is shown on the secondary display.
- Fourth press: The display configuration loops back to the start up condition (the T1 reading is displayed on the primary and the T2 reading is displayed on the secondary)

Backlight

Press the ☼ backlight button to switch on the LCD display backlight. Press the button again to turn the backlight off. Judicious use of the backlight feature will conserve battery power.

Data Hold

Press the **HOLD** button to freeze the readings in the display. The 'HOLD' icon will appear above the temperature reading on the display. Press the **HOLD** button again to return to normal operation (the 'HOLD' hold icon will disappear).

Tripod Mount

The tripod mounting connector is located on the back of the meter. Tripods are available through Extech Instruments distributors.

MIN / MAX /AVG Display Function

In the MIN MAX mode the meter tracks the lowest (MIN), highest (MAX), and average (AVG) readings while displaying elapsed time.

1. Press the **MIN MAX** button to start the Elapsed Timer (bottom left side of LCD)
2. Begin taking measurements
3. The secondary display (lower right) will display only the primary display's highest reading (the MAX icon will be visible on the bottom of the LCD).
4. Press the **MIN MAX** button to see the MIN (minimum) reading.
5. The secondary display (lower right) will display only the primary display's lowest reading (the MIN icon will be visible on the bottom of the LCD).
6. Press the **MIN MAX** button to see the AVG (reading)
7. The secondary display (lower right) will display only the primary display's average reading (the AVG icon will be visible on the bottom of the LCD).
8. Press <u>and hold</u> the **MIN MAX** button for three (3) seconds to exit this mode and return to normal operation (the MIN, MAX, and AVG display icons should switch off when this mode is successfully exited).
9. Note that in MIN MAX mode, the **T1 T2 / T1-T2** button is active allowing the user to view the MIN/MAX/AVG of the T1, T2, or T1-T2 displays.

Auto Power OFF (Sleep Mode)

The meter will automatically turn off if no keys are pressed during any twenty (20) minute period. To configure the Sleep Mode ON or OFF:

1. With the meter ON, press the **SETUP** button to enter the SETUP mode (the SETUP display icon will appear on the LCD)
2. Repeatedly press the **UP arrow** button until the SLP (sleep) icon appears on the LCD
3. Press the **ENTER** button (on or off will appear on the LCD under the SLP icon)
4. Use the **UP/DOWN arrow** buttons to select ON (sleep mode on) or OFF (sleep mode defeated)
5. Press **ENTER** again to save the selection
6. Press **SETUP** again to exit the setup mode and to return to normal operation.

Display OFFSET adjustment

Use the display OFFSET feature to compensate for thermocouple irregularities and to better match two thermocouples. The allowable offset range is ± 9$^\mathbf{o}$F (±5$^\mathbf{o}$C).

1. With the meter ON, press the **SETUP** button to enter the SETUP mode (the SETUP display icon will appear on the LCD)
2. Use the **UP arrow button** to select input T1 or input T2 (icons are shown on left side of LCD)
3. Press the **ENTER** button; the temperature reading will appear in the primary display area. The offset will be shown in the smaller secondary display area
4. Use the **UP/DOWN arrow** buttons to program an offset. The available range is ± 9$^\mathbf{o}$F (±5$^\mathbf{o}$C)
5. Press **ENTER** again to save the selection
6. Press **SETUP** again to exit the setup mode and to return to normal operation.

Turning Power OFF

Press the ⏻ button to turn power off.

Maintenance

Battery Replacement

When the low battery symbol ▯ appears on the display, replace the 9V battery:

1. Remove the rubber protective jacket that encases the meter. If this jacket is not removed, the battery compartment cannot be accessed.

2. Remove the rear Phillips screw that secures the battery compartment.

3. Open the compartment and replace the 9V battery.

4. Secure the meter's battery compartment and rubber jacket before using the meter.

WARNING! To avoid electrical shock, disconnect the thermocouples before removing the battery cover.

Cleaning

Use a damp cloth with a mild detergent to periodically wipe the meter housing and display area. Do not use abrasives or solvents to clean the meter.

Specifications

Measurement Range	-328 to 2501°F (-200 to 1372°C)*	
Max. Resolution	0.1°C/$^\circ$F<999.9°, 1°C/$^\circ$F>1000°	
Accuracy (T1&T2)	-148 to 2501°F (-100 to 1372°C)	± [0.5% of reading + 1.8^{o}F(1°C)]
	-328 to -148°F (-200 to -100°C)	± [0.5% of reading + 3.6^{o}F(2°C)]
Temperature Coefficient	0.1 times the applicable accuracy specifications per $^\circ$C from 0°C to 18°C and 28°C to 50°C (32°F to 64°F and 82°F to 122°F)	
Note: Temperature accuracy does not include the accuracy of the type K probe		
Note: Temperature accuracy specifies @ 23 ± 5°C		
Note: The temperature scale is based on the international temperature scale of 1990 (ITS90)		
Note: Supplied thermocouples rated for 500°F (260°C) max.		

General Specifications

Display	Multi-function LCD with Backlight
Input Protection	60VDC; 24VAC rms
Display Update Rate	2.5 times per second
Over range indication	"OL" appears on the LCD
Open input indication	Dashes "-------" appears on the LCD
Low battery indication	" ▯ " appears on the LCD
Power supply	9V alkaline battery
Auto Power OFF	After 20 minutes of inactivity (programmable)
Ambient Operating conditions	4 to 122°F (0 to 50°C) / < 80% Relative Humidity
Ambient Storage conditions	14 to 122°F (-10 to 50°C) / 10 to 80% Relative Humidity
Dimensions	6.5 x 3.0 x 1.7" (165 x 76 x 43mm) without holster
Weight	7.4oz (210g) with battery

Warranty

Calibration and Repair Services

Extech offers complete repair and calibration services for all of the products we sell. For periodic calibration, NIST certification or repair of this Extech product, call customer service for details on services available. Extech recommends that calibration be performed on an annual basis to ensure calibration integrity.

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Support line (781) 890-7440
Technical support: Extension 200; E-mail: support@extech.com
Repair & Returns: Extension 210; E-mail: repair@extech.com
Product specifications subject to change without notice
For the latest version of this User Guide, Software updates, and other up-to-the-minute product information, visit our website: www.extech.com
Extech Instruments Corporation, 285 Bear Hill Road, Waltham, MA 02451