

Instruction Manual

Temp-16 Precision RTD Thermometer



ISO 9001
SUPPLIER CERTIFIED

68X481903 Rev 0 03/09

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QUICK START GUIDE

To ensure best results please read the complete manual.

1. Connect probe.
2. Press the **on/off** key.
Press again to turn on backlight.
3. Select °C or °F display using **°C/°F** key.
4. Insert probe in sample.
Allow adequate time for reading to stabilize.
Response time will vary depending on probe.
5. Take reading.
*Press **hold** key to freeze display.*
*Press **min/max** to display minimum or maximum temperature.*
6. Press and hold the **on/off** key for three seconds to turn meter off.

1. INTRODUCTION



Thank you for choosing the Temp-16 Precision RTD Thermometer. This versatile hand-held instrument provides highly accurate temperature measurements and is designed for easy operation which includes the following features:

- Operator selection of Celsius or Fahrenheit scale
- Resolution of 0.1° (auto ranging)
- Four-digit backlit LCD
- Hold feature to retain a reading temporarily
- Field calibration capability
- Low battery warning
- Auto power off with Enable/Disable function
- Min and max readings display
- 3-pin circular connector input
- Operates with a wide selection of probes

2. SAFETY PRECAUTIONS

DANGER

Voltages present at the RTD may also be present at the battery terminals. Always disconnect the RTD when changing batteries.

WARNING

This instrument is designed to accept low level signals supplied by standard 100 Ω RTDs. Under no circumstances should the input voltage exceed the specified 10 v rms.

CAUTION

1. Do not use or store this instrument in microwave ovens or any abnormally hot or cold areas.
2. Weak batteries should not be left in the instrument. Dead batteries can leak and cause damage to unit.

3. SPECIFICATIONS

Platinum RTD Probes

100 ohm platinum: $\alpha = 0.003850$

-200 °C to 850 °C (-392 °F to 1562 °F)

Out of range display: "Ur", "Or", "OPEN"

Range	Accuracy
-200.0 to -100.0 °C (-392 to -148 °F)	±2.0 °C (±4.0 °F)
-99.9 to 199.9 °C (-148 to 392 °F)	±0.2 °C (±0.4 °F)
200.0 to 850.0 °C (392 to 1562 °F)	±2.0 °C (±4.0 °F)
Resolution	0.1° (-200.0 to 850.0 °C); 0.1° (-392.0 to 999.9 °F); 1° (1000 to 1562 °F)
Display	4-digit LCD (¼ X ½" digits); 2 ⅓ X 1 ½" backlit viewing area
Display Update Rate	0.5 sec per update.
Input	One probe with 3 pin circular connector (Switchcraft TA3F)
Input Protection	10V rms
Battery	Three AA, 1.5V alkaline
Battery Life	700 hours continuous
Auto Shutoff	17 minutes after last keypress.
Stated Accuracy	18 to 28°C (64 to 82°F)
Useful Range	0 to 40°C (32 to 104°F)
Storage	-40 to 65°C (-40 to 149°F)
Humidity	10% to 90% (non-condensing)
Dimensions Without armour With armour	(L x W x H) 175 mm x 97 mm x 42 mm 180 mm x 102 mm x 52 mm

Weight Without armour With armour	267 g 362 g
Ingress Protection (With Probe Attached)	Meets IEC-529 IP-54 for dust and water-resistant enclosures.
CE Compliance	EN61326-1/A1: 1998 (EU EMC Directive)

4. BATTERY INSTALLATION AND REPLACEMENT

DANGER

Voltages present at the RTD may also be present at the battery terminals. Always disconnect the RTD when changing batteries.

CAUTION

Weak batteries should not be left in the instrument. Dead batteries can leak and cause damage to unit.

The typical battery life is about 700 hours. Selected settings are stored in memory and will remain in memory even after power is turned off, or while batteries are being replaced.

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

5. INSERTING AND REMOVING OPTIONAL RUBBER ARMOUR

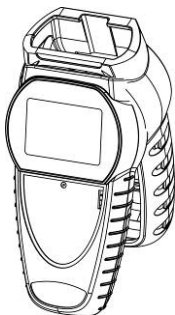


Figure 1: Removing Optional Rubber Armour

1. To insert thermometer into the optional rubber armor, slide in from the top of meter before pushing the bottom edges of meter down to set it into position. Lift up the stand at the back of meter for bench top applications if necessary.
2. To remove thermometer from armor, push out from the bottom edges of meter until it is completely out of boot.

6. ASSEMBLING OPTIONAL HANDSFREE ACCESORIES

You can use the optional magnets and strap in the Hands Free Kit accessories for hands-free operations.

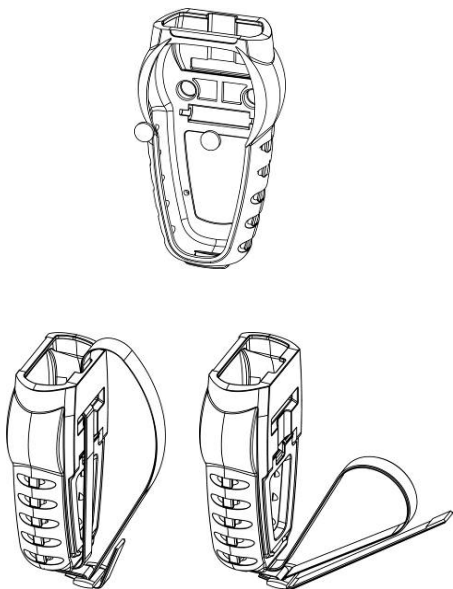


Figure 2: Hands Free Kit

7. CONNECTING AN RTD PROBE

Use the correct 100 Ω RTD ($\alpha = 0.003850$) for your instrument. Using an incorrect probe type will result in erroneous readings. Insert the 3-pin plug into the mating connector on the top of the instrument.

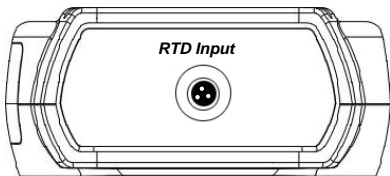


Figure 3: Top view of RTD Thermometer

8. KEY FUNCTIONS

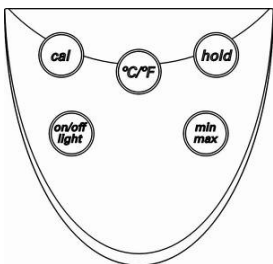







Figure 4: Keypad

	Toggles between Celsius or Fahrenheit in measurement mode and user calibration mode.
	Press and hold this key for 3 seconds to enter Calibration mode if field calibration is unprotected.
	Activates/ Deactivates freezing of the measured reading while in measurement mode.
	Toggles between minimum and maximum readings (MIN and MAX readings are calculated from the last min/max keypress). Press and hold this key for 3 seconds to clear the MIN/MAX reading stored.
	Powers on and shuts off the thermometer by holding it for 3 seconds. Press this key to activate/ deactivate the backlight display. (Backlight will automatically turns off within 30 seconds of activation).

9. DISPLAY OVERVIEW

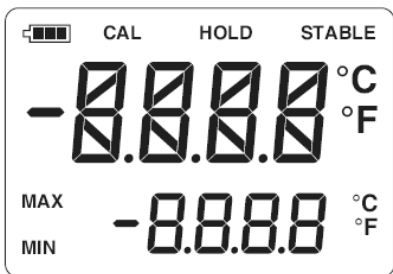



Figure 5: Meter Display

°C/°F	Celsius or Fahrenheit indicator.
MIN	Minimum reading annunciator.
MAX	Maximum reading annunciator.
	3 Bar : 700 – 550 hours 2 Bar : 350 – 550 hours 1 Bar : 150 – 350 hours Blinking: < 150 hours
CAL	Blinks during calibration mode. Remains in display indicating field calibration is active.
HOLD	Remain in display during hold mode.
STABLE	Displayed upon recognizing final value.

10. MEASUREMENT MODE

Press the **on/off** key. The thermometer performs a self-test and all display digits and indicators should remain on for approximately two seconds before the meter enters measurement mode.

If a probe is not connected or if the probe is defective, the display will indicate “OPEN”.



Figure 6: Display when no probe is detected

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.

A **STABLE** indicator appears at the top right corner of the display when reading is continuously stable for 5 seconds.

To freeze reading, press **hold**. Press **hold** key again to release the reading and resume normal operation.

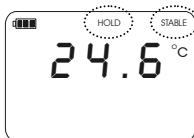


Figure 7: HOLD and STABLE function

The display will show “Ur” (under range) or “Or” (over range) if the temperature reading is out of range of the instrument.

11. SELECTING TEMPERATURE SCALE

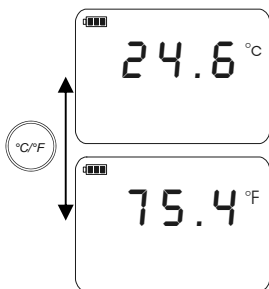


Figure 8: Press °C/°F key to toggle between °C and °F

Select °C or °F by pressing the °C/°F key. Each time the key is pressed, the temperature scale will switch. Switching between °C and °F can be done at any time during operation.

Each time you turn the instrument on, it will power up with the same settings that were set when the unit was last turned off.

12. MIN AND MAX FUNCTION

Press the *min/max* key to toggle between the minimum and maximum readings. The minimum and maximum reading function is ideal for monitoring unattended operations while continually displaying every temperature change that occurs. The minimum and maximum values are sensed and automatically stored. To exit and clear the MIN/MAX reading stored, press and hold the *min/max* key for 3 seconds.

13. AUTO OFF FUNCTION

The thermometer has a default auto off function of 17 minutes.

To deactivate this function, press the *min/max* key while turning the thermometer on with the *on/off* key. "A.OFF no" flashes to show indicate that the auto off function has been disabled for that session.

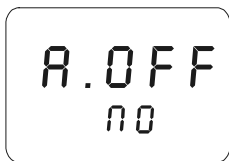


Figure 9: Disabling the auto off function

14. CALIBRATION

The CAL function allows single point calibration of the thermometer at 0°C (32°F) to compensate for probe offset error. Use the field calibration feature to improve thermometer/probe accuracy.

The Temp-16 Precision RTD Thermometer comes with a calibration lock function to prevent accidental changes to calibration settings. A field calibration can only be performed when the function has been unlocked. To unlock field calibration, follow steps 1 through 4 in **FIELD CALIBRATION UNLOCK** section.

To calibrate:

1. Pack sensing end of probe in a container tightly packed with crushed ice and filled with distilled water. Allow temperature to stabilize.
2. Press and release the **cal** key for 3 seconds to enter the calibration mode. The CAL indicator starts blinking. Release the **cal** key.
3. If the measured temperature is from -5°C to 5°C (23 to 41°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 in display, indicating that field calibration is now active.

If “Err” is displayed, the displayed reading is outside the above limits.

<p>NOTE: Press any key (except the cal key) while in calibration mode to abort calibration.</p>

15. CLEAR FIELD CALIBRATION

To clear user calibration:

1. Turn the thermometer off.
2. Hold the **cal** key down while pressing the on/off key.
3. The measurement mode window appears without the CAL indicator to indicate that the user calibration has been successfully cleared.

16. FIELD CALIBRATION UNLOCK

The calibration unlock feature enables field calibration operation. To unlock field calibration:

1. Turn the thermometer off.
2. Hold the **cal** key and **hold** key down simultaneously, then press the **on/off** key.
3. The “CAL” indicator appears momentarily with the version-model window to indicate that the user-calibration function has been unlocked successfully (Figure 10).



Figure 10: Successful field calibration unlock

4. When the **cal** and **hold** keys are released, the unit will go to measurement mode (Figure 11).

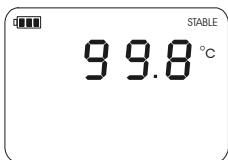


Figure 11: Unit goes to measurement mode

17. FIELD CALIBRATION LOCKOUT

The calibration lockout feature prevents any field calibration changes. The lockout remains in effect until an unlock has been performed. To lock the field calibration operation:

1. Turn the thermometer off.
2. Hold the **cal** key and **°C/°F** key down simultaneously, then press the **on/off** key. Do not release **cal** and **°C/°F** keys until the measurement mode is on display.
3. If field calibration lockout is successful, the version-model window appears without the CAL indicator (Figure 12).



Figure 12: Successful field calibration lockout

4. When the **cal** and **°C/°F** keys are released, the unit will return to measurement mode (Figure 13).

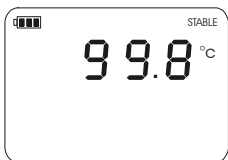


Figure 13: Unit returns to measurement mode

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

19. 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.

20. TROUBLESHOOTING

Problem	Cause	Solution
Power on but no display	Batteries not in place or wrong polarity.	Insert batteries. or re-insert batteries in correct polarity.
“OPEN” display on LCD	Probe not connected	Make sure probe is firmly connected.
“Ur” or “Or” display on LCD	Measurement over (Or) or Under (Ur) range	Ensure temperature taken is within meter’s specification.
Unstable reading	1. Probe not deep enough in sample 2. Broken probe	1. Place probe deeper in sample. 2. Replace probe.
Slow response	Dirty probe	Clean probe

21. SERVICE

There are no internal adjustments or user replaceable parts.

Note: Serial number label is located behind the meter.

22. REPLACEMENT METER & ACCESSORIES

Item	Thermo Scientific
Temp-16 Thermistor	TSTEMP16
Rubber Armour with Stand	ARMORTEMP
Hands Free Kit (Two Magnets and a Strap)	HNSDFRKIT

RTD Probes

ECPT56L	RTD PT100 probe with shaft length: 200 mm, round-tip sensor tip: 3 mm diameter (for liquid measurement); -50 to +400 °C
ECPT56C	RTD PT100 probe with shaft length: 200 mm, round-tip sensor tip: 5 mm diameter (for contact measurement); -50 to +400 °C
ECPT56P	RTD PT100 probe with shaft length: 500 mm, penetration sharp sensor tip: 4 mm diameter; ; -50 to +400 °C (for semi-solid measurement)
ECPT56A	RTD PT100 probe with shaft length: 200 mm, sensor tip: 4 mm

	diameter (for air measurement); -50 to +250 °C
ECPT56L 1/5 DIN	RTD PT100 probe with shaft length: 200 mm, round-tip sensor tip: 3 mm diameter; -50 to +400 °C
ECPT56 TFE	RTD PT100 probe with shaft length: 100 mm, round-tip sensor tip: 4 mm diameter; -50 to +200 °C cable and probe at 300 °C
ECPT56/500	RTD PT100 probe with shaft length: 500 mm, round-tip sensor tip: 6 mm diameter; -50 to +400 °C
ECPT56/1000	RTD PT100 probe with shaft length: 1000 mm, round-tip sensor tip: 6 mm diameter; -50 to +400 °C
ECTEM6TEM01R	3 wire RTD Pt100 Temperature Probe

23. WARRANTY

The Manufacturer warrants this product to be free from significant deviations from published specifications for a period of **three** years. 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.

24. 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.

25. TECHNICAL ASSISTANCE

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

For more information on Thermo Scientific Products, please contact your nearest distributor or visit our web site listed below:

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