

R2815

# REED INSTRUMENTS

## Temperature Calibrator



## Instruction Manual



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## Introduction

Thank you for purchasing your REED R2815 Temperature Calibrator. Please read the following instructions carefully before using your instrument. By following the steps outlined in this manual your meter will provide years of reliable service.

## Product Quality

This product has been manufactured to meet the stated product specifications. If a certificate of calibration is required please contact the nearest authorized REED distributor or authorized Service Center. Please note an additional fee for this service will apply.

## Safety

Never attempt to repair or modify your instrument. Dismantling your product, other than to replace batteries, may cause damage that will not be covered under the manufacturer's warranty. Servicing should only be provided by an authorized service center. To avoid injury to the user or damage to the instrument, please read the safety information below before initial use:

- Do not operate the instrument around flammable or explosive gas, vapor or dust.
- Never apply more than 30V between any two terminals, or between any terminal and ground terminal.

**Note:** For optimal accuracy, allow the instrument to warm up 5 minutes before operating. If the automatic reference-junction temperature compensation of the instrument deviates from its designed accuracy, contact an Authorized REED Service Center.

## Features

- Accurately sources and measures 11 thermocouple types, including A, B, C, D, E, J, K, N, R, S, T
- Supports 5 RTD (3-wire) types, including Pt100, Pt200, Pt500, Pt1000 and Cu50
- Source and measure Volts and Ohms
- Internal cold junction compensation for improved accuracy
- Easy to read 6-digit LCD display
- Zero adjustment button
- Built-in LED flashlight
- User selectable unit of measure ( $^{\circ}\text{F}/^{\circ}\text{C}$ )
- Low battery indicator and auto shut off

## Included

- Temperature Calibrator
- Test Leads
- Alligator Clips
- Thermocouple Adapter
- Batteries

## Specifications

### *Measure Function*

| Measurement | Range        | Measurement Range | Resolution       | Accuracy                 |
|-------------|--------------|-------------------|------------------|--------------------------|
| DCV         | 100mV        | -110 to 110.00mV  | 0.01mV           | 0.05% rdg. +30mV         |
|             | 1V           | -1.1 to 1.1V      | 0.0001V          | 0.05% rdg. +0.3mV        |
|             | 30V          | -30 to 30V        | 0.001V           | 0.02% rdg. +2mV          |
| OHM         | 500 $\Omega$ | 0 to 500 $\Omega$ | 0.01 $\Omega$    | 0.05% rdg. +0.2 $\Omega$ |
|             | 5K $\Omega$  | 0 to 5K $\Omega$  | 0.0001K $\Omega$ | 0.05% rdg. +2 $\Omega$   |

*continued...*

| Measurement Range |   | Measurement Range                  | Resolution    | Accuracy       |
|-------------------|---|------------------------------------|---------------|----------------|
| TC                | A | 0 to 2912°F<br>(0 to 1600°C)       | 1°F (1°C)     | ±3.6°F (2.0°C) |
|                   |   | 2912 to 3632°F<br>(1600 to 2000°C) |               | ±4.0°F (2.2°C) |
|                   |   | 3632 to 4532°F<br>(2000 to 2500°C) |               | ±4.3°F (2.4°C) |
|                   | B | 1112 to 1472°F<br>(600 to 800°C)   | 1°F (1°C)     | ±4.0°F (2.2°C) |
|                   |   | 1472 to 1832°F<br>(800 to 1000°C)  |               | ±3.2°F (1.8°C) |
|                   |   | 1832 to 3308°F<br>(1000 to 1820°C) |               | ±2.5°F (1.4°C) |
|                   | C | 0 to 2912°F<br>(0 to 1600°C)       | 1°F (1°C)     | ±3.6°F (2.0°C) |
|                   |   | 2912 to 3632°F<br>(1600 to 2000°C) |               | ±4.0°F (2.2°C) |
|                   |   | 3632 to 4190°F<br>(2000 to 2310°C) |               | ±4.3°F (2.4°C) |
|                   | D | 0 to 212°F<br>(0 to 100°C)         | 1°F (1°C)     | ±4.7°F (2.6°C) |
|                   |   | 212 to 518°F<br>(100 to 270°C)     |               | ±4.3°F (2.4°C) |
|                   |   | 518 to 2192°F<br>(270 to 1200°C)   |               | ±4.0°F (2.2°C) |
|                   |   | 2192 to 4190°F<br>(1200 to 2310°C) |               | ±4.3°F (2.4°C) |
|                   | E | -58 to 32°F<br>(-50 to 0°C)        | 0.1°F (0.1°C) | ±1.6°F (0.9°C) |
|                   |   | 32 to 1832°F<br>(0 to 1000°C)      |               | ±2.7°F (1.5°C) |
|                   | J | -76 to 32°F<br>(-60 to 0°C)        | 0.1°F (0.1°C) | ±1.8°F (1.0°C) |
|                   |   | 32 to 2192°F<br>(0 to 1200°C)      |               | ±1.3°F (0.7°C) |
|                   | K | -148 to 32°F<br>(-100 to 0°C)      | 0.1°F (0.1°C) | ±2.1°F (1.2°C) |
|                   |   | 32 to 2501.6°F<br>(0 to 1372°C)    |               | ±1.4°F (0.8°C) |

continued...

| Measurement Range |               | Measurement Range                | Resolution    | Accuracy       |
|-------------------|---------------|----------------------------------|---------------|----------------|
| TC                | N             | -328 to 32°F<br>(-200 to 0°C)    | 0.1°F (0.1°C) | ±2.7°F (1.5°C) |
|                   |               | 32 to 2372°F<br>(0 to 1300°C)    |               | ±1.6°F (0.9°C) |
|                   | R             | 0 to 3212.6°F<br>(0 to 1767°C)   | 1°F (1°C)     | ±4.5°F (2.5°C) |
|                   | S             | 0 to 3212.6°F<br>(0 to 1767°C)   | 1°F (1°C)     | ±3.6°F (2.0°C) |
|                   | T             | -148 to 32°F<br>(-100 to 0°C)    | 0.1°F (0.1°C) | ±1.8°F (1.0°C) |
|                   |               | 32 to 752°F<br>(0 to 400°C)      |               | ±1.3°F (0.7°C) |
| RTD<br>(3-Wire)   | Pt100<br>385  | -328 to 32°F<br>(-200 to 0°C)    | 0.1°F (0.1°C) | ±0.9°F (0.5°C) |
|                   |               | 32 to 752°F<br>(0 to 400°C)      |               | ±1.3°F (0.7°C) |
|                   |               | 752 to 1472°F<br>(400 to 800°C)  |               | ±1.4°F (0.8°C) |
|                   | Pt200<br>385  | -328 to 212°F<br>(-200 to 100°C) | 0.1°F (0.1°C) | ±1.4°F (0.8°C) |
|                   |               | 212 to 572°F<br>(100 to 300°C)   |               | ±1.6°F (0.9°C) |
|                   |               | 572 to 1166°F<br>(300 to 630°C)  |               | ±1.8°F (1.0°C) |
|                   | Pt500<br>385  | -328 to 212°F<br>(-200 to 100°C) | 0.1°F (0.1°C) | ±0.7°F (0.4°C) |
|                   |               | 212 to 572°F<br>(100 to 300°C)   |               | ±0.9°F (0.5°C) |
|                   |               | 572 to 1166°F<br>(300 to 630°C)  |               | ±1.3°F (0.7°C) |
|                   | Pt1000<br>385 | -328 to 212°F<br>(-200 to 100°C) | 0.1°F (0.1°C) | ±0.5°F (0.3°C) |
|                   |               | 212 to 572°F<br>(100 to 300°C)   |               | ±0.9°F (0.5°C) |
|                   |               | 572 to 1166°F<br>(300 to 630°C)  |               | ±1.3°F (0.7°C) |
|                   | Cu50          | -58 to 302°F<br>(-50 to 150°C)   | 0.1°F (0.1°C) | ±1.3°F (0.7°C) |

*continued...*

## Source Function

| Output | Range | Output Range                       | Resolution | Accuracy           |
|--------|-------|------------------------------------|------------|--------------------|
| DCV    | 100mV | -10 to 110mV                       | 0.01mV     | 0.05% rdg. +0.03mV |
|        | 1V    | -0.1 to 1.1V                       | 0.0001V    | 0.05% rdg. +0.3mV  |
| OHM    | 400Ω  | 0 to 400Ω                          | 0.1Ω       | 0.05% rdg. +0.2Ω   |
|        | 4KΩ   | 0 to 4KΩ                           | 1Ω         | 0.05% rdg. +2Ω     |
| TC     | A     | 0 to 2912°F<br>(0 to 1600°C)       | 1°F (1°C)  | ±3.6°F (2.0°C)     |
|        |       | 2912 to 3632°F<br>(1600 to 2000°C) |            | ±4.0°F (2.2°C)     |
|        |       | 3632 to 4532°F<br>(2000 to 2500°C) |            | ±4.3°F (2.4°C)     |
|        | B     | 1112 to 1472°F<br>(600 to 800°C)   | 1°F (1°C)  | ±2.7°F (1.5°C)     |
|        |       | 1472 to 3308°F<br>(800 to 1820°C)  |            | ±2.0°F (1.1°C)     |
|        | C     | 0 to 2912°F<br>(0 to 1600°C)       | 1°F (1°C)  | ±3.6°F (2.0°C)     |
|        |       | 2912 to 3632°F<br>(1600 to 2000°C) |            | ±4.0°F (2.2°C)     |
|        |       | 3632 to 4190°F<br>(2000 to 2310°C) |            | ±4.3°F (2.4°C)     |
|        | D     | 0 to 212°F<br>(0 to 100°C)         | 1°F (1°C)  | ±4.7°F (2.6°C)     |
|        |       | 212 to 518°F<br>(100 to 270°C)     |            | ±4.3°F (2.4°C)     |
|        |       | 518 to 2192°F<br>(270 to 1200°C)   |            | ±4.0°F (2.2°C)     |
|        |       | 2192 to 4190°F<br>(1200 to 2310°C) |            | ±4.3°F (2.4°C)     |

continued...

| Output | Range | Output Range                         | Resolution    | Accuracy       |
|--------|-------|--------------------------------------|---------------|----------------|
| TC     | E     | -328 to -148°F<br>(-200 to -100°C)   | 0.1°F (0.1°C) | ±0.5°F (0.6°C) |
|        |       | -148 to 1112°F<br>(-100 to 600°C)    |               | ±0.9°F (0.5°C) |
|        |       | 1112 to 1832°F<br>(600 to 1000°C)    |               | ±0.7°F (0.4°C) |
|        | J     | -328 to -148°F<br>(-200 to -100°C)   | 0.1°F (0.1°C) | ±0.5°F (0.6°C) |
|        |       | -148 to 1472°F<br>(-100 to 800°C)    |               | ±0.9°F (0.5°C) |
|        |       | 1472 to 2192°F<br>(800 to 1200°C)    |               | ±1.3°F (0.7°C) |
|        | K     | -328 to -148°F<br>(-200 to -100°C)   | 0.1°F (0.1°C) | ±0.5°F (0.6°C) |
|        |       | -148 to 752°F<br>(-100 to 400°C)     |               | ±0.9°F (0.5°C) |
|        |       | -752 to 2192°F<br>(-400 to 1200°C)   |               | ±1.3°F (0.7°C) |
|        |       | -2192 to 2501°F<br>(-1200 to 1372°C) |               | ±1.6°F (0.9°C) |
|        | N     | -328 to -148°F<br>(-200 to -100°C)   | 0.1°F (0.1°C) | ±1.8°F (1.0°C) |
|        |       | -148 to 1652°F<br>(-100 to 900°C)    |               | ±1.3°F (0.7°C) |
|        |       | 1652 to 2372°F<br>(900 to 1300°C)    |               | ±1.4°F (0.8°C) |
|        | R     | 0 to 212°F<br>(0 to 100°C)           | 1°F (1°C)     | ±2.7°F (1.5°C) |
|        |       | 212 to 3212°F<br>(100 to 1767°C)     |               | ±2.1°F (1.2°C) |
|        | S     | 0 to 212°F<br>(0 to 100°C)           | 1°F (1°C)     | ±2.7°F (1.5°C) |
|        |       | 212 to 3212°F<br>(100 to 1767°C)     |               | ±2.1°F (1.2°C) |
|        | T     | -418 to 752°F<br>(-250 to 400°C)     | 0.1°F (0.1°C) | ±0.5°F (0.6°C) |

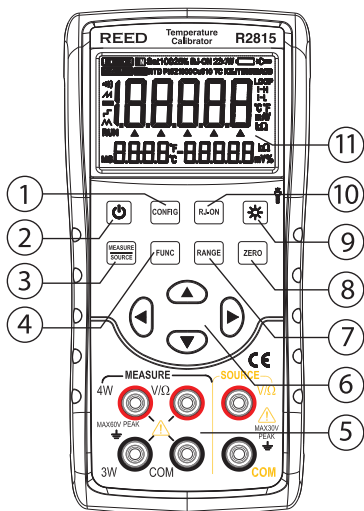
*continued...*

| Output          | Range         | Output Range                     | Resolution    | Accuracy       |
|-----------------|---------------|----------------------------------|---------------|----------------|
| RTD<br>(3-Wire) | Pt100<br>385  | -328 to 32°F<br>(-200 to 0°C)    | 0.1°F (0.1°C) | ±0.5°F (0.3°C) |
|                 |               | 32 to 752°F<br>(0 to 400°C)      |               | ±0.9°F (0.5°C) |
|                 |               | 752 to 1472°F<br>(400 to 800°C)  |               | ±1.4°F (0.8°C) |
|                 | Pt200<br>385  | -328 to 212°F<br>(-200 to 100°C) | 0.1°F (0.1°C) | ±1.4°F (0.8°C) |
|                 |               | 212 to 572°F<br>(100 to 300°C)   |               | ±1.6°F (0.9°C) |
|                 |               | 572 to 1166°F<br>(300 to 630°C)  |               | ±1.8°F (1.0°C) |
|                 | Pt500<br>385  | -328 to 212°F<br>(-200 to 100°C) | 0.1°F (0.1°C) | ±0.7°F (0.4°C) |
|                 |               | 212 to 572°F<br>(100 to 300°C)   |               | ±0.9°F (0.5°C) |
|                 |               | 572 to 1166°F<br>(300 to 630°C)  |               | ±1.3°F (0.7°C) |
|                 | Pt1000<br>385 | -328 to 212°F<br>(-200 to 100°C) | 0.1°F (0.1°C) | ±0.5°F (0.2°C) |
|                 |               | 212 to 572°F<br>(100 to 300°C)   |               | ±0.9°F (0.5°C) |
|                 |               | 572 to 1166°F<br>(300 to 630°C)  |               | ±1.3°F (0.7°C) |
|                 | Cu50          | -58 to 302°F<br>(-50 to 150°C)   | 0.1°F (0.1°C) | ±0.5°F (0.6°C) |

## ***General Specifications***

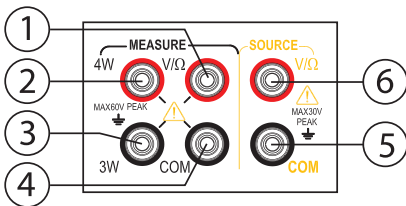
|                             |                                    |
|-----------------------------|------------------------------------|
| Display:                    | 6-Digit LCD                        |
| Backlit Display:            | Yes                                |
| Kick Stand:                 | Yes                                |
| Magnetic Hanger Compatible: | Yes (R5900 sold separately)        |
| Built-In Flashlight:        | Yes                                |
| Zero Adjustment Button:     | Yes                                |
| Power Supply:               | 3 AA Batteries                     |
| Battery Life:               | Approx. 20 hours                   |
| Cold Junction Compensation: | Yes                                |
| Auto shut off:              | Yes (up to 60 minutes/off)         |
| Low Battery Indicator:      | Yes                                |
| Replaceable Test Leads:     | Yes                                |
| Product Certifications:     | CE                                 |
| Operating Temperature:      | 32 to 122°F (0 to 50°C)            |
| Operating Humidity Range:   | 0 to 85%                           |
| Storage Temperature:        | 14 to 122°F (-10 to 50°C)          |
| Dimensions:                 | 7.5 x 3.5 x 2.1" (191 x 90 x 53mm) |
| Weight:                     | 17.6oz (500g)                      |

# Instrument Description



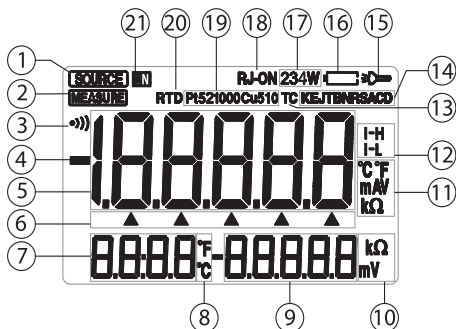
1. CONFIG button
2. Power Button
3. MEASURE/SOURCE Button
4. Function Button
5. Input/Output Terminals
6. Output Selection/Setting Buttons
7. RANGE Button
8. ZERO Button
9. Backlight/Flashlight Button
10. RJ-ON Button
11. LCD Display

## Input and Output Terminals



| Terminal | Function Description                                                                                        |
|----------|-------------------------------------------------------------------------------------------------------------|
| 1        | V $\Omega$ terminal: Input terminal for all measurement (+)                                                 |
| 2        | 4W terminal: 4-wire resistance measurement high-end SENSE                                                   |
| 3        | 3W terminal:<br>4-wire resistance measurement low-end SENSE<br>3-wire resistance measurement SENSE terminal |
| 4        | COM terminal: Common (-) (return) terminal for all inputs                                                   |
| 5        | COM terminal: Common (-) (return) terminal for all inputs                                                   |
| 6        | V $\Omega$ terminal: Output terminal for all outputs (+)                                                    |

# Display Description



- |                                                      |                                                               |
|------------------------------------------------------|---------------------------------------------------------------|
| 1. Source Mode Indicator                             | 13. Thermocouple Function Indicator                           |
| 2. Measure Mode Indicator                            | 14. Thermocouple Range Indicator                              |
| 3. Function Status Indicator                         | 15. Flashlight Indicator                                      |
| 4. Input/Output Value Polarity Indicator             | 16. Battery Status Indicator                                  |
| 5. Input/Output Value                                | 17. Input Resistance/Thermal Resistance Wire System Indicator |
| 6. Selected Digit Indicator                          | 18. Cold Junctions Compensation Indicator                     |
| 7. Cold-End Compensation Temperature Value           | 19. Thermal Resistance Range Indicator                        |
| 8. Cold-End Compensation Temperature Unit of Measure | 20. Thermal Resistance Function Indicator                     |
| 9. Voltage/Resistance Measurement Value              | 21. Signal Connection Indicator                               |
| 10. Voltage/Resistance Unit of Measure of Measure    |                                                               |
| 11. Input/Output Unit of Measure                     |                                                               |
| 12. Output Resistance Excitation Indicator           |                                                               |

# Operating Instructions

## *Power ON/OFF*

Press the Power button to turn the instrument on. To turn the instrument off, press and hold the Power button.

## *Auto Power-Off*

As a default, the instrument will automatically turn off after 5 minutes of inactivity. To turn off this feature, refer to the "Enabling/Disabling Auto Power OFF" section of this manual for additional details.

## *Backlight*

Press the Backlight button to turn the LCD Backlight on or off.

**Note:** The backlight automatically turns off after approximately 60 seconds by default. To turn it back on, press the Backlight button. The backlight illumination duration can be adjusted in the factory settings. For more information, refer to the "Setting Backlight Time" section of this manual for additional details.

# Output Function

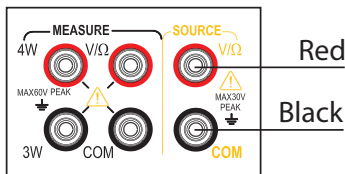
The output terminal of the instrument can produce DC voltages or can simulate thermocouple temperature set by the user.

To avoid electric shock, ensure that the voltage applied between the calibrator terminals or between any terminal and ground does not exceed the rated voltage specified for the calibrator. Do not use the calibrator in situations where the terminal-to-ground voltage exceeds 30V peak.

## Connecting Leads to Output Terminals

Connection method for all outputs:

1. Connect the black lead to the **COM** terminal and the red lead to the **V/ $\Omega$**  terminal of the output.
2. Attach the opposite ends of the leads to the input terminals of the controlled device, ensuring that the terminal polarities are correct.



## Outputting DC Voltage

1. Press the **MEASURE/SOURCE** button to switch to the output mode. The **SOURCE** indicator will illuminate on the display. By default, the calibrator will be in DC voltage mode with an initial measurement range of 100mV. The "mV" symbol on the right side of the main display will light up.
2. Press the **RANGE** button to select the desired measurement range (options: 100mV, 1V).
3. Set the output value using the output setting buttons:
  - Change the digit to be adjusted using the ◀▶ buttons.
  - Adjust the value using the ▲▼ buttons.

*continued...*

**Note:** Press the **ZERO** button to reset the output setting to the default value (0).

## **Analog Output Resistance**

1. Press the **FUNC** button to switch to the analog resistance function. The " $\Omega$ " symbol on the right side of the main display will light up, indicating resistance mode.
2. Press the **RANGE** button to select the desired measurement range (400 $\Omega$  / 4K $\Omega$ ).

**Note:** For the 400 $\Omega$  range, two excitation currents are available: 1mA and 0.1mA. You can manually switch between them to improve accuracy based on your needs.

To set the excitation current:

- Press the **CONFIG** button to enter the excitation current setting menu. "OHM.IS" will appear in the secondary display area at the lower right corner.
  - The main display area will show "I-H" for 1mA or "I-L" for 0.1mA.
  - Use the **▲▼** buttons to select the excitation current.
  - Press the **ZERO** button to save the setting.
  - Press **CONFIG** button to exit the setting menu.
3. Set the output value using the output setting buttons:
    - Change the digit to be adjusted using the **◀▶** buttons.
    - Adjust the value using the **▲▼** buttons.

**Note:** If the excitation current does not match the selected range (400 $\Omega$ ), the excitation current indicator on the right side of the display will flash. In this case, return to the setting interface to adjust the excitation current appropriately.

## **Analog Output Thermocouple**

1. Press the **FUNC** button to switch to the thermocouple (TC) function. The "TC" indicator in the upper right corner of the display will light up.
2. Press the **RANGE** button to select the desired thermocouple type (R, S, K, E, J, T, N, B, A, C, D).
3. If cold junction compensation is required, press **RJ-ON** to activate the cold junction compensation function. If not, skip this step.

*continued...*

There are two types of cold junction compensation:

**Automatic:** The instrument uses its internal temperature sensor to detect the ambient temperature automatically.

**Manual:** The user sets the cold junction compensation temperature manually.

To set cold junction compensation:

- Press the **CONFIG** button to enter the cold junction compensation settings menu. "RJST" will appear in the secondary display area at the lower right corner.
- The main display will show "MANU" for manual compensation or "AUTO" for automatic compensation.
- Use the ▲▼ buttons to switch between manual and automatic compensation.
- Press the **ZERO** button to save the setting.
- If manual compensation is selected, you will be prompted to set the manual temperature. The secondary display will show "RJVA," and the main display will show the temperature to be set. Use the ▲▼ ◀▶ buttons to adjust the temperature within the range of -10°C to 50°C.
- Press the **ZERO** button to save the setting.
- Press **CONFIG** button to exit the setting menu.

**Note:** In automatic cold junction compensation, the current ambient temperature will be displayed in the lower-left corner of the screen.

In manual cold junction compensation, the user-set compensation temperature will be displayed, and the "M" symbol will light up.

4. Set the output value using the output setting buttons:
  - Change the digit to be adjusted using the ▲▼ buttons.
  - Adjust the value using the ◀▶ buttons.

*continued...*

## Analog Output Thermal Resistance

1. Press the **FUNC** button to switch to the analog thermal resistance output function. The "RTD" indicator in the upper left corner of the display will light up.
2. Press the **RANGE** button to select the desired thermal resistance type (PT100, PT200, PT500, PT1000, Cu50).

For PT100 and Cu50 divisions, two excitation currents are available (1mA and 0.1mA). The user can switch between them for more accurate thermal resistance simulation.

To set the excitation current:

- Press the **CONFIG** button to enter the excitation current setting interface. "OHMI.S" will appear in the secondary display area at the lower right corner.
  - The main display will show "I-H" for 1mA or "I-L" for 0.1mA.
  - Use the ▲▼ buttons to select the desired excitation current.
  - Press the **ZERO** button to save the setting.
  - Press **CONFIG** button to exit the setting menu.
3. Set the output value using the output setting buttons:
    - Change the digit to be adjusted using the ▲▼ buttons.
    - Adjust the value using the ◀▶ buttons.

**Note:** For PT100 and Cu50 divisions, if the selected excitation current does not match the required value, the excitation current indicator on the right side of the display will flash. You will need to re-enter the setting interface to adjust the excitation current accordingly.

## Reset Function

- Press the **ZERO** button to perform a reset operation in any measurement range of the DC voltage, resistance, thermocouple, or thermal resistance output functions.
- This action will reset the output setting value to the default initial value, providing a convenient way for users to quickly return to the starting point.

## Measurement Mode

**Warning:** When using the calibrator in measurement mode, ensure that all connections are made with the proper leads. The maximum allowable voltage between any input terminal and ground is 60V peak.

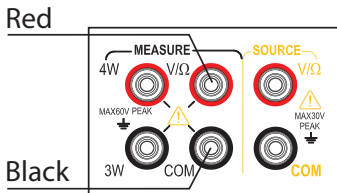
Exceeding this limit may result in electric shock. Never apply a voltage higher than this maximum to the terminal or ground.

If the measured value exceeds the allowable measurement range, the "OL" (Overload) symbol will appear in the main display area, indicating that the input is out of range.

### Connecting Leads to Input Terminals

#### Connection Method for DC Voltage, Thermocouple, Thermal Resistance, and Resistance (2W) Measurement:

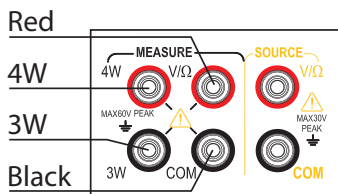
1. Connect the black lead to the **COM** terminal of the input.
2. Connect the red lead to the **VΩ** terminal of the input.
3. Attach the other ends of the two leads to the measurement terminals of the device under test.
4. Ensure that the terminal polarity is correct to ensure accurate measurements.



*continued...*

### Connection Method for Resistance (3W) and Thermal Resistance (3W) Measurement:

1. Connect the black lead to the **COM** terminal of the input.
2. Connect the red lead to the **V $\Omega$**  terminal of the input.
3. Connect the third lead to the **3W** terminal.
4. Attach the other ends of the three leads to the measurement terminals of the device under test, ensuring that each lead is connected correctly.
5. Verify that the terminal polarity is correct to ensure accurate measurements.



### Connection Method for Resistance (4W) and Thermal Resistance Measurement (4W):

1. Connect the black lead to the **COM** terminal of the input.
2. Connect the red lead to the **V $\Omega$**  terminal of the input.
3. Connect the third lead to the **3W** terminal.
4. Connect the fourth lead to the **4W** terminal.
5. Attach the other ends of the four leads to the measurement terminals of the device under test.
6. Ensure that each lead is connected to the correct terminal and verify that the terminal polarity is correct to ensure accurate measurements.

*continued...*

**Warning:** Disconnect Power Supply: Before connecting the calibrator to the device under test, ensure that the device's power supply is disconnected.

**Avoid Damage and Injury:** Incorrect operation or measurement can potentially damage the instrument or cause injury. Exercise extreme caution and follow proper procedures during all measurement operations.

## Measuring DC Voltage

1. Ensure that the measurement lead is disconnected from the device under test.
2. Press the **MEASURE/SOURCE** button to switch to measurement mode. The **MEASURE** indicator will light up on the display screen. By default, the calibrator will be set to DC voltage function with a measurement range of 100mV. The "mV" symbol will appear on the right side of the main display area.
3. Press the **RANGE** button to select the desired measurement range (100mV, 1V, 30V).
4. Connect the measurement lead to the device under test. The measured voltage value will be displayed in the main display area.

## Measuring Resistance

1. Ensure that the measurement lead is disconnected from the device under test.
2. Press the **FUNC** button to switch to the resistance function. The " $\Omega$ " symbol will light up on the display screen.
3. Press the **RANGE** button to select the desired measurement range (500 $\Omega$  or 5K $\Omega$ ).
4. Set the resistance wire system:
  - Press the **CONFIG** button to enter the wire system setting interface. The secondary display area at the lower right corner will show "Wire System"
  - The main display area will show the available wire systems (2W, 3W, 4W).
  - Use the **▲▼** buttons to select the desired excitation current.

*continued...*

- Press the **ZERO** button to save the setting.
  - Press **CONFIG** button to exit the setting menu.
5. Connect the measurement lead to the measurement terminals of the device under test. The measured resistance value will be displayed in the main display area.

## *Measuring Thermocouples*

1. Ensure that the measurement lead is disconnected from the device under test.
2. Press the **FUNC** button to switch to the thermocouple function. The "TC" symbol will light up on the display screen.
3. Press the **RANGE** button to select the required thermocouple type (R, S, K, E, J, T, N, B, A, C, D).
4. If cold junction compensation is required, press the **RJ-ON** button to enable this function. If cold junction compensation is not required, skip this step.

### Setting Cold Junction Compensation:

- Automatic Temperature Compensation: The instrument uses its internal temperature sensor to detect the ambient temperature automatically.
- Manual Temperature Compensation: The user sets the compensation temperature manually.

### To set the excitation current:

- Press the **CONFIG** button to enter the cold junction compensation setting interface. "RJST" will appear in the secondary display area at the lower right corner, indicating the compensation method settings.
- The main display will show "MANU" for manual temperature compensation or "AUTO" for automatic temperature compensation.
- Use the ▲▼ buttons to select the desired excitation current.
- Press the **ZERO** button to save the setting.
- Press **CONFIG** button to exit the setting menu.

*continued...*

**Note:**

- For automatic cold junction compensation, the actual ambient temperature will be displayed in the lower-left corner of the screen.
  - For manual compensation, the user-set compensation temperature will be displayed with the "M" symbol lit.
5. Connect the measurement lead to the measurement terminals of the device under test. The measured value will be displayed in the main display area.

### ***Measuring Thermal Resistance***

1. Ensure that the measurement lead is disconnected from the device under test.
2. Press the **FUNC** button to switch to the thermal resistance function. The "RTD" symbol will light up on the display screen.
3. Press the **RANGE** button to select the desired thermal resistance type (PT100, PT200, PT500, PT1000, Cu50).
4. Set the thermal resistance wire system:
  - Press the **CONFIG** button to enter the wire system setting interface. "WRIE" will be displayed in the lower right corner of the screen.
  - The main display will show the available wire systems (2W, 3W, 4W).
  - Use the ▲▼ buttons to select the appropriate wire system.
  - Press the **ZERO** button to save the setting.
  - Press **CONFIG** button to exit the setting menu.
5. Connect the measurement lead to the measurement terminals of the device under test. The measured value will be displayed in the main display area.

# Factory Settings Adjustment

Follow the steps below to access and change the default calibrator settings.

## *Accessing the Settings*

1. Press and hold the Backlight button.
2. While holding the Backlight button, press the Power button to turn on the instrument.
3. Once the settings interface appears, release the Backlight button.

## *Enabling/Disabling Auto Power OFF*

1. Upon entering the settings interface, "APOF" will appear on the display, indicating the automatic shutdown setting.
2. Use the ▲▼◀▶ buttons to adjust the automatic shutdown time between 0 and 60 minutes. A setting of 0 disables the automatic shutdown; other values represent the time in minutes after which the instrument will shut down.
3. Press the **ZERO** button to confirm selection. The display will show "SAVE," confirming that the new setting has been saved.

**Note:** You can turn the meter OFF and then back ON at any time to resume normal operation.

## *Setting Backlight Time*

1. Press the **CONFIG** button until "BLOF" appears on the display, indicating the backlight time setting.
2. Use the ▲▼◀▶ buttons to adjust the backlight time setting between 0 and 3600 seconds. A setting of 0 disables the automatic backlight shutdown; other values represent the time in seconds after which the backlight will turn off.
3. Press the **ZERO** button to confirm selection. The display will show "SAVE," confirming that the new setting has been saved.

**Note:** You can turn the meter OFF and then back ON at any time to resume normal operation.

## *Setting Flashlight Time*

1. Press the **CONFIG** button until "LTOF" appears on the display, indicating the flashlight time setting.
2. Use the ▲▼◀▶ buttons to set the desired flashlight time settings between 0-30 minutes. A setting of 0 disables the automatic flashlight shutdown; other values represent the time in minutes after which the flashlight will turn off.
3. Press the **ZERO** button to confirm selection. The display will show "SAVE," confirming that the new setting has been saved.

**Note:** You can turn the meter OFF and then back ON at any time to resume normal operation.

## *Enabling/Disabling the Beeper Sound*

1. Press the **CONFIG** button until "BEEP" appears on the display, indicating the buzzer setting.
2. Use the ▲▼◀▶ buttons to toggle between ON (Enabled) or OFF (Disabled).
3. Press the **ZERO** button to confirm selection. The display will show "SAVE," confirming that the new setting has been saved.

**Note:** You can turn the meter OFF and then back ON at any time to resume normal operation.

## *Selecting the Temperature Unit of Measure*

1. Press the **CONFIG** button until "TEPU" appears on the display, indicating the temperature unit setting.
2. Use the ▲▼◀▶ buttons to select between °C and °F.
3. Press the **ZERO** button to confirm selection. The display will show "SAVE," confirming that the new setting has been saved.

**Note:** You can turn the meter OFF and then back ON at any time to resume normal operation.

## Factory Reset

1. Press the **CONFIG** button until the display shows "FACT" to enter the factory default settings.

Factory Default Settings:

APOF (Auto Power Off): 5 minutes

BLOF (Backlight Off): 60 seconds

LTOF (Light Timeout): 5 minutes

BEEP: ON

TEPU (Temperature Unit): °C

2. Use the ▲▼ buttons to select between YES and NO.

### **Note:**

**NO:** The settings will remain as they are and will not be restored to factory defaults.

**YES:** All settings will be restored to factory default settings.

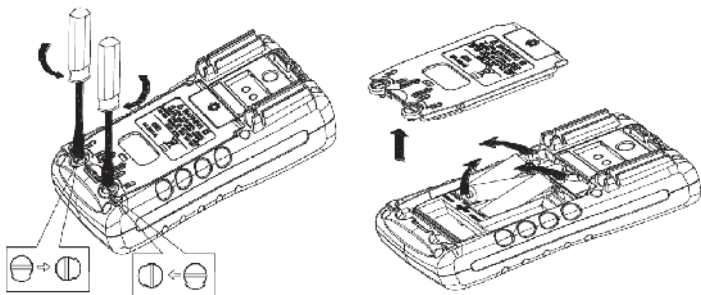
3. Press the **ZERO** button to confirm selection.

**Note:** You can turn the meter OFF and then back ON at any time to resume normal operation.

# Battery Replacement

**Warning:** To prevent electric shock, always remove the test leads from the calibrator before opening the battery compartment. Ensure the battery door is securely closed before using the calibrator.

1. Turn off the calibrator and remove the test leads.
2. Use a flathead screwdriver to turn the battery door screws a quarter turn counterclockwise and remove the door.
3. Replace the 3 x AA batteries in the battery compartment.
4. Close the battery door and securely tighten the screws.



## Applications

- Ideal for calibrating devices that use thermocouples as input signals (e.g., meters, controllers, transmitters, data loggers, and recorders)
- Essential for applications requiring precise thermocouple temperature measurements, including:
  - Chemical production
  - Petroleum refineries
  - Manufacturing
  - Power production
  - Steel and iron industries

## Accessories and Replacement Parts

**R2920** Surface Thermocouple Probe

**R2930** Right Angle Thermocouple Probe

**R2940** Air/Gas Thermocouple Probe

**R2950** Immersion Thermocouple Probe

**R2960** Needle Tip Thermocouple Probe

**R2970** Type K Pipe Clamp Thermocouple Probe

**R2980** Type K Air Oven/Freezer Thermocouple Probe

**TP-01** Type K Beaded Wire Probe

**CA-05A** Soft Carrying Case

**R9940** Hard Shell Carrying Case

**R1000** Safety Test Lead SetW

**R1020** Fused Test Lead Set

**R5900** Magnetic Meter Strap

Don't see your part listed here? For a complete list of all accessories and replacement parts visit your product page on [www.REEDInstruments.com](http://www.REEDInstruments.com).

## Product Care

To keep your instrument in good working order we recommend the following:

- Store your product in a clean, dry place.
- Change the battery as needed.
- If your instrument isn't being used for a period of one month or longer please remove the battery.
- Clean your product and accessories with biodegradable cleaner. Do not spray the cleaner directly on the instrument. Use on external parts only.

## Product Warranty

REED Instruments guarantees this instrument to be free of defects in material or workmanship for a period of one (1) year from date of shipment. During the warranty period, REED Instruments will repair or replace, at no charge, products or parts of a product that proves to be defective because of improper material or workmanship, under normal use and maintenance. REED Instruments total liability is limited to repair or replacement of the product. REED Instruments shall not be liable for damages to goods, property, or persons due to improper use or through attempts to utilize the instrument under conditions which exceed the designed capabilities. In order to begin the warranty service process, please contact us by phone at 1-877-849-2127 or by email at [info@reedinstruments.com](mailto:info@reedinstruments.com) to discuss the claim and determine the appropriate steps to process the warranty.

## Product Disposal and Recycling



Please follow local laws and regulations when disposing or recycling your instrument. Your product contains electronic components and must be disposed of separately from standard waste products.

## Product Support

If you have any questions on your product, please contact your authorized REED distributor or REED Instruments Customer Service by phone at 1-877-849-2127 or by email at [info@reedinstruments.com](mailto:info@reedinstruments.com).

Please visit [www.REEDInstruments.com](http://www.REEDInstruments.com) for the most up-to-date manuals, datasheets, product guides and software.

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