R2810

REED INSTRUMENTS

# Thermocouple Calibrator


WARRANTY 1 YEAR WARRANTY

# Instruction Manual

# Table of Contents

## Introduction

Thank you for purchasing your REED R2810 Thermocouple 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 for the purpose of replacing 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

- Source and measure 8 thermocouple types, including R, S, B, E, K, J, T, N; and volts
- Basic accuracy of 0.05%
- Internal cold junction compensation
- Easy to read 6-digit LCD display
- Zero adjustment button
- User selectable unit of measure (°F/°C)
- Low battery indicator and auto shut off

## Included

- Test Leads
- Alligator Clips
- Thermocouple Adapter
- Protective Holster
- Batteries

## Specifications

### *Output Functions*

Accuracy specified at 23°C ±5°C & 75% RH for a period of one year after calibration.

| Output | Range | Output Range | Resolution | Accuracy |
|---|---|---|---|---|
| DCV | 100mV | -10.00mV to 110.00mV | 0.01mV | 0.05% rdg. +30µV |
| | 1V | -0.1000V to 1.1000 V | 0.1mV | 0.05% rdg. +0.3mV |
| TC | R | -40 to 1760°C | 1°C | ±0.05% rdg. +3°C (≤100°C) ±0.05% rdg. +2°C (>100°C) |
| | S | -20 to 1760°C | 1°C | |
| | B | 400 to 1800°C | 1°C | ±0.05% rdg. +3°C (≤600°C); ±0.05% rdg. +2°C (>600°C) |
| | E | -200.0 to 1000.0°C | 0.1°C | ±0.05% rdg. +2°C (≤-100°C) ±0.05% rdg. +1°C (>-100°C) |
| | K | -200.0 to 1370.0°C | 0.1°C | |
| | J | -200.0 to 1200.0°C | 0.1°C | |
| | T | -200.0 to 400.0°C | 0.1°C | |
| | N | -200.0 to 1300.0°C | 0.1°C | |

*continued…*

## Measure Functions

| Output | Range | Output Range | Resolution | Accuracy |
|---|---|---|---|---|
| DCV | 100mV | -10.00mV to 110.00mV | 0.01mV | 0.05% rdg. +30µV |
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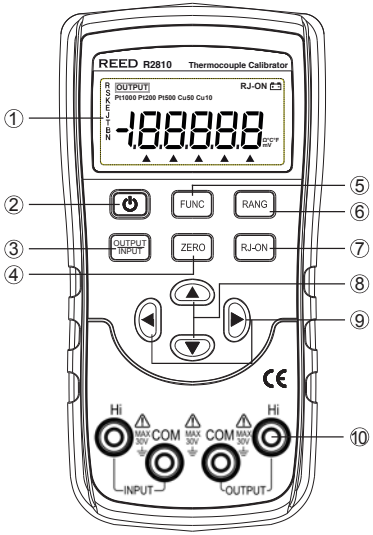
| | J | -200.0 to 1200.0°C | 0.1°C | |
| | T | -200.0 to 400.0°C | 0.1°C | |
| | N | -200.0 to 1300.0°C | 0.1°C | |

## General Specifications

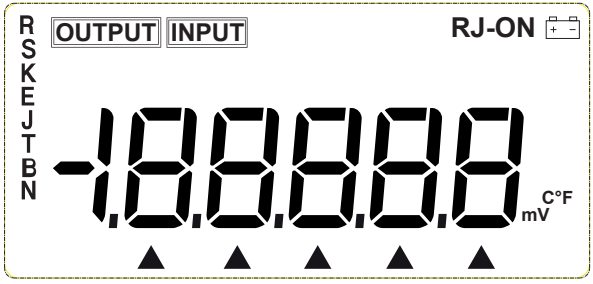
| | |
|---|---|
| Display: | 6-Digit LCD |
| Zero Adjustment Button: | Yes |
| Kick Stand: | Yes |
| Power Supply: | 2 AA Batteries |
| Cold Junction Compensation: | Yes |
| Auto shut off: | Yes (after 15 minutes/off) |
| Low Battery Indicator: | Yes |
| Replaceable Test Leads: | Yes |
| Product Certifications: | 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: | 7.1 x 3.5 x 1.9" (180 x 90 x 47mm) |
| Weight: | 8.2oz (500g) |

## Instrument Description




1. LCD Display
2. POWER Button
3. Input/Output Button
4. Zero Reset Button
5. Function Selection Output Button
6. Range Selection Button
7. RJ-ON Button (T/C Cold Junction Compensation Button)
8. ▲▼ Output Value Setting Button
9. ◀▶ Output Digit Selection Button
10. Input/Output terminals

## Display Description




| | |
|---|---|
| OUTPUT | Indicates that the instrument is in output mode. |
| INPUT | Indicates that the instrument is in input mode. |
| RJ-ON | Indicates that the instrument is performing its reference cold junction compensation. |
| | Indicates battery power is low and batteries need to be replaced. |
| ▲ | Indicates which output digit is being set. |
| Ω°C°F mV | Indicates unit of measure of current output value. |
| R E B S J N K T | Indicates thermocouple type. |

# 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 15 minutes of inactivity. To turn off this feature:

1. Turn the meter off.
2. Press the POWER button (to display the full screen).
3. Quickly press the **RANG** button when the instrument is in the maintenance state as indicated by "1.8.8.888".
4. "AP-XX" will now appear on the display.
5. Press the ▼ button to toggle between "AP-ON" & "AP-OF". "AP-OF" indicates that the no automatic power-off function is disabled, while "AP-ON" indicates the automatic power-off function is enabled.
6. Press the **RJ-ON** button to save the required setting.
7. Press and hold the POWER button to exit the maintenance state and turn the instrument off.

## *Selecting the Temperature Unit of Measure (°C/°F)*

1. Turn the meter off.
2. Press the POWER button (to display the full screen).
3. Quickly press and hold the **RANG** button when the instrument is in the maintenance state as indicated by "1.8.8.888".
4. "AP-XX" will now appear on the display.
5. Press the **FUNC** button once and you will see "tC-0C" confirming that the instrument is measuring in Celsius.
6. Press the ▼ and ▲ buttons to toggle between "tC-0F" for Fahrenheit and "tC-0C" for Celsius.
7. Press the **RJ-ON** button to save the required setting.
8. Press and hold the POWER button to exit the maintenance state and turn the instrument off.

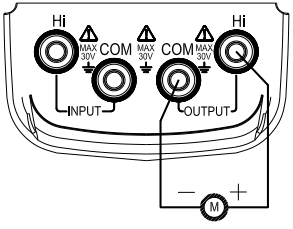
*continued…*

## *Output Function*

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

**Do not apply any voltage to the output terminal during the operation. If any improper voltage is applied to the output terminal, it will cause damage to the internal circuit.**

## *Simulating Output from DC Voltage*




1. Insert one end of the test lead into the output (OUTPUT) terminal of the meter and connect the other end to the input terminal of the instrument under test. See diagram on right.
2. Press the **FUNC** button to select the VDC function and 'V' will appear on the display.
3. Press the **RANG** button to select the output range of 0.0000V or 00.00mV.
4. Press the ◀▶ button to select the set digits for output.
5. Press the ▲▼ button to change the numerical value of the set digits. (Numerical value cannot be changed beyond the maximum range of the meter).
6. Press the **ZERO** button and the output will be set to 00.00mV or 0.0000V.

## *Simulating Output from Thermocouple (TC)*

1. Insert one end of the test lead into the OUTPUT terminal of the calibrator and connect the other end to the input terminal of the instrument under test. See diagram above.
2. Press the **INPUT/OUTPUT** button to select the Output function.
3. Press the **FUNC** button to select Thermocouple output. 'R' and '°C' will appear on the display.
4. Press the **RANG** button to select the type of thermocouple.
5. Press the ◀▶ button to move the on-screen cursor in order to select the desired digit on the display.

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6. Press the ▲▼ button to change the numerical value of each digit. (Numerical value cannot be changed beyond range maximum.)
7. Automatic compensation for cold junction temperature.

**Note:** While calibrating an instrument with cold junction temperature compensation, press the **RJ-ON** button so that the meter can start the function of automatic cold junction compensation. The meter will output the necessary temperature thermoelectric force, and display 'RJ-ON':

Output thermoelectric force = corresponding thermoelectric force of set temperature – thermoelectric force of room temperature

- It takes two seconds for the instrument to start its internal reference-junction temperature. After this, each automatic compensation occurs at 10 second intervals.
- If there is a change in the operating ambient temperature, do not start the operation until the built-in compensating sensor has become stable (approx. 10 minutes).
- If there is no need for the calibrator to perform automatic reference-junction compensation, press the **RJ-ON** button and the symbol RJ-ON will no longer appear in the display.

8. Press the **ZERO** button and the output will be directly set to 0000°C (R or S type), 400°C (B type) or 0000.0°C (other types).

## *Measure Function*

### *Warning*

The maximum voltage allowed between the terminals and between the terminals and the ground is 30V, all voltages exceeding the specified voltage may cause damage to the meter and injury to the user.

### *Caution*

- Do not apply any voltage exceeding the maximum allowed to the input terminals, as this may cause damage to the meter.
- Please power off instrument under test when connecting to the input terminal. Connection to the instrument under test with power may cause damage to the meter.

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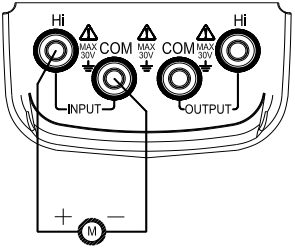
- Pay particular attention not to connect the current signal to the input terminal. Incorrect connection may cause damage to the meter and the instrument under test.

## *Measuring DC Voltage*

1. Insert one end of the test lead into the INPUT terminal of the meter and connect the other end to the output terminal of the instrument under test, as shown in the diagram to the right.
2. Press **INPUT/OUTPUT** button to select the Input function. 'INPUT', 'mV' will be displayed.
3. Starts the measurement process by displaying '000.00' which indicates waiting and then displays measurement result. (Refresh rate is twice a second, and if the measured value exceeds the measurement range, the LCD displays 'OL'.)

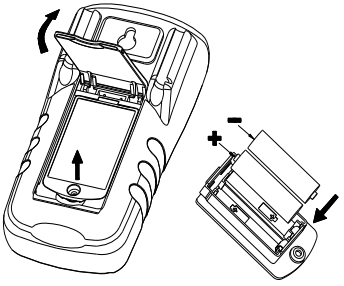



## *Measuring Thermocouples*

1. Insert one end of the test lead into the INPUT terminal of the meter and connect the other end to the output terminal of the instrument under test, as shown in the diagram above.
2. Press **INPUT/OUTPUT** button to select the Input function.
3. Press the **FUNC** button to select thermocouple function. 'R' and '°C' will appear on the display.
4. Press the **RANG** button to select the type of thermocouple.
5. Starts the measurement process by displaying '000.00' which indicates waiting and then displays measurement result. (Refresh rate is twice a second, and if the measured value exceeds the measurement range, the LCD displays 'OL'.)

## Battery Replacement

When the battery symbol appears on the display that the battery needs to be replaced.



1. Ensure that the meter is turned OFF and remove any test leads from the meter terminals.
2. Lift the tilt stand on the back of the unit to access the battery compartment door which can be removed using a Phillips head screwdriver.
3. Replace the 2x AA batteries in the lid of the battery compartment.
4. Reinstall the compartment lid by ensuring that the battery terminals touch the unit's contact points and snap into place.
5. Tighten the screw to secure the battery compartment door.

**Note:** Ensure battery door is closed and secured in place before using the meter. To ensure proper operation, please wait 5 seconds before turning meter on after changing batteries.

## Applications

- Verification and calibration of temperature instruments including thermocouple and RTD thermometers

## 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
**CA-05A** Soft Carrying Case
**R9940** Hard Shell Carrying Case
**R2990** Thermocouple Adapter
**R1000** Safety Test Lead Set
**R1020** Fused Test Lead Set

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.

## 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 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.

Please visit **www.REEDINSTRUMENTS.com** for the most up-to-date manuals, datasheets, product guides and software.

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