

# REED

## Model R2810

### Thermocouple Calibrator

## Instruction Manual



[www.reedinstruments.com](http://www.reedinstruments.com)

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# Safety Information

To avoid injury to the user or damage to the instrument, please read the safety information below before initial use:

## *Warning*

- 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.

## *Caution*

- The meter case is not to be opened, unless by a qualified technician.
- Use a damp cloth with neutral detergent for cleaning the meter periodically. Do not use abrasives or solvents.

## *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 a qualified REED technician.

# Features

- Source and measure 8 thermocouple types including R, S, B, E, K, J, T, N, plus volts
- Basic accuracy of 0.05%
- Internal cold junction compensation
- Quick reset with zero button
- 6-digit LCD readout, selectable °C or °F
- Includes protective holster with tilt stand



## Specifications - Source Function

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. + 30mV
	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	
	K	-200.0 to 1370.0°C	0.1°C	±0.05% rdg. +2°C (≤-100°C) ±0.05% rdg. +1°C (>-100°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	

## Measure Function

Output	Range	Output Range	Resolution	Accuracy
DCV	100mV	-10.00mV to 110.00mV	0.01mV	0.05% rdg. + 30mV
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	
	K	-200.0 to 1370.0°C	0.1°C	±0.05% rdg. +2°C (≤-100°C) ±0.05% rdg. +1°C (>-100°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*



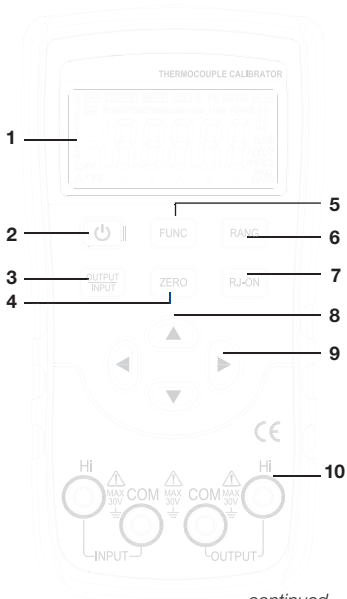
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## *General Specifications*

Max. Allowable Voltage:	30V (between any two terminals or between any terminal and ground)
Temperature Coefficient:	$0.1 \times$ (dedicated accuracy)%/°C (5 to 18°C, 28 to 40°C)
Operating Temperature:	0°C to 50°C
Operating Humidity:	$\leq 80\%$ RH
Storage Temperature:	$\leq -10^\circ\text{C}$ to $55^\circ\text{C}$
Storage Humidity:	$\leq 90\%$ RH
Power Supply:	Two 1.5V alkaline batteries (LR6)
Dimensions:	180 (L) $\times$ 90 (W) $\times$ 47 (D) mm (with holster)
Weight:	500g (with holster)
Includes:	Set of industrial test leads, alligator clips, thermocouple adapter, protective holster, batteries and user manual
Safety:	Certified compliant to IEC1010 provisions

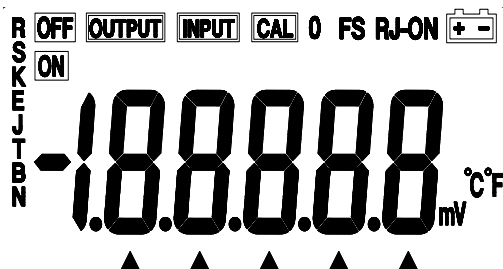
# Instrument Description

1. LCD screen
2. ON/OFF 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 terminal



*continued ...*

## Display Description



<b>OUTPUT</b>	Indicates that the instrument is in an output state
<b>CAL</b>	Indicates that the instrument is in an input state
<b>0 FS</b>	Indicates that the instrument is in a calibration state
<b>RJ-ON</b>	Indicates that the instrument is in a calibration state, denoting that the zero point or the full scale point is now in calibration
	Indicates that the instrument is performing its reference-cold junction compensation
<b>Ω°C°F mV</b>	Indicates that the battery power is low and needs to be replaced
	Indicates current output value
<b>Ω°C°F mV</b>	Indicates unit of measure of current output value
<b>ON</b>	Indicates that the output signal is ON or OFF
<b>R E B S J N K T</b>	Indicates thermocouple type

# Operating Instructions

## *Power ON/OFF*

Press the ON/OFF button to turn the instrument on. Press and hold the power button to turn the instrument off. When the instrument is on, it will begin an internal self-diagnosis at which time the full screen will be displayed. Once complete, the instrument is ready to take measurements.

## *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 instrument off.
2. Press the ON/OFF button (to display the full screen).
3. Press the RANG button when the instrument is in the maintenance state. AP-XX will appear on the display.
4. Press the ▼ button when AP-ON is displayed. AP-OFF will now appear, indicating that the automatic power-off is turned off.
5. Press the ON/OFF button to exit the maintenance state and turn the instrument off.

## *Output Function*

**Caution:** 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.

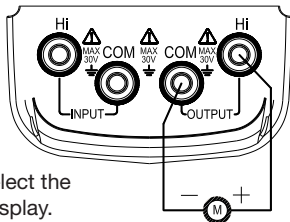
**Note:** The output terminal of the instrument can produce DC voltages or can simulate thermocouple temperature set by the user.

*continued ...*



## Simulating DC voltage output

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 (function) button to select the VDC function. 'mV/V' appears in the display.
3. Press the RANG (range) button to select the range of 1.0000V or 100.00mV.
4. Press the ◀▶ button to select the set digits for output.
5. Press the ▲▼ button to change the numerical value of the set digits. Hold the button for one second and the value will keep varying.
6. Press the ZERO button and the output will be set to 00.00mV or 0.0000V.



## Simulating thermocouple (TC) output

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 (function) button to select Thermocouple output. 'R' and '°C' will appear on the display.
4. Press the RANG (range) 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.
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.
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).
9. Press the °C/°F button to select °C or °F unit of measure.

*continued ...*

*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 (about 10 minutes).
- If there is no need for the calibrator to perform the function of automatic reference-junction compensation, press the RJ-ON button and the symbol RJ-ON will no longer appear in the display.

## *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.

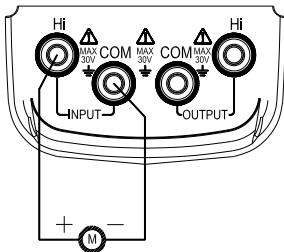
*Caution:* Please power off instrument under test when connecting to the input terminal. Connection to the instrument under test with power may cause damage to this meter.

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

*continued ...*

## Measuring DC voltage

1. Insert one end of the test lead into the input (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', 'ON', '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 (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 (function) button to select Thermocouple function. 'R' and '°C' will appear on the display..
4. Press the RANG (range) 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'.)
6. Press the °C/°F button to select °C or °F unit of measure.

## Battery Replacement

*Note:* The meter is powered by two AA alkaline batteries (LR6).

*Note:* Ensure that the battery's positive and negative terminals mirror the illustration in the battery compartment when replacing them.

*Note:* New and old batteries cannot be mixed.

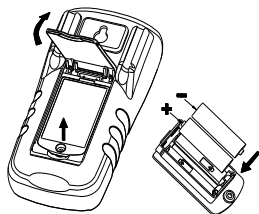
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*Note:* Dispose of old batteries in accordance with local regulations.

*Note:* Remove batteries if the meter will not be used for a long time.

When the battery  symbol appears in the display it indicates that the battery power is low and 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 reveal the battery compartment door which can be removed using a Phillips head screwdriver
3. Replace the batteries in the lid of the battery compartment
4. Reinstall the compartment lid by ensuring that battery terminals touch the unit's contact points and snap into place.



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

## Notes

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For service on this or any other REED product or information on other REED products, contact REED Instruments at [info@reedinstruments.com](mailto:info@reedinstruments.com)



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