

R2800

REED INSTRUMENTS

Temperature Simulator



Instruction Manual

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Introduction

Thank you for purchasing your REED R2800 Temperature Simulator. 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 8 thermocouple types, including R, S, B, E, K, J, T, N; and 5 RTD types, including Pt 100 (385), Pt200 (385), Pt500 (385), Pt1000 (385), Cu50; plus volts and ohms
- 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	-10.00 to 110.00mV	0.01mV	0.05% rdg. + 30mV
	1000mV	-100.00 to 1100.00mV	0.1mV	0.05% rdg. + 0.3mV
OHM	400Ω	0.0 to 400.0Ω	0.1Ω	±0.05% rdg. + 0.2Ω
	400Ω	0 to 4000Ω	1Ω	±0.05% rdg. + 2Ω

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Output	Range	Output Range	Resolution	Accuracy
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 (400 to 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	
RTD	Cu10	-10.0 to 250.0°C	0.1°C	±0.05% rdg. +0.6°C
	Cu50	-50.0 to 150°C	0.1°C	
	Pt10 385	-200.0 to 850°C	0.1°C	±0.05% rdg. +0.6°C
	Pt100 385	-200.0 to 850°C	0.1°C	
	Pt200 385	-200.0 to 630°C	0.1°C	±0.05% rdg. +0.6°C
	Pt500 385	-200.0 to 630°C	0.1°C	
	Pt1000 385	-200.0 to 630°C	0.1°C	

Notes

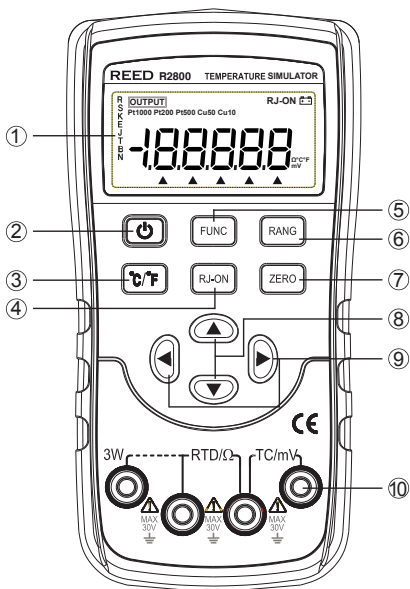
- Excludes accessory lead resistance
- Range of excitation current: 0.5mA to 3mA; Max. output voltage: ≤2V
- The accuracies indicated do not include the error of internal temperature compensation caused by a sensor. The range of the internal temperature compensation sensor is from -10 to 50°C with its compensating error up to 0.5°C.

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General Specifications

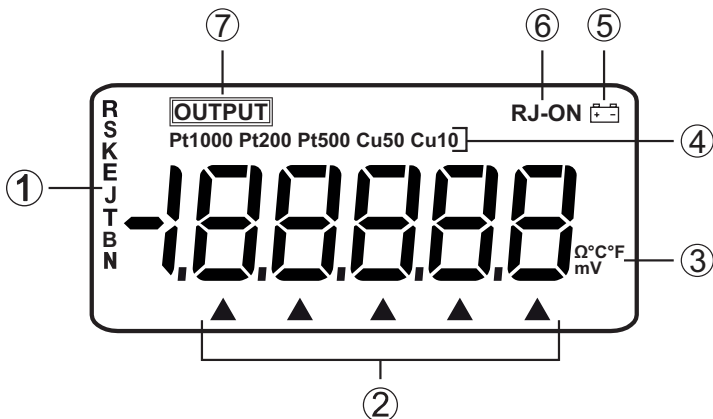
Display:	6-Digit LCD
Zero Adjustment Button:	Yes
Kick Stand:	Yes
Power Supply:	2 x AA Batteries
Cold Junction Compensation:	Yes
Auto Shut Off:	Yes (after 15 minutes/off)
Low Battery Indicator:	Yes
Replaceable Test Leads:	Yes
Product Certifications:	CE
Operating Temperature:	32 to 122°F (0 to 50°C)
Operating 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. ON/OFF Button
3. °C/°F Selection Button
4. RJ-ON Button (T/C Reference Junction Compensation Button)
5. Function Selection Output Button
6. Range Selection Button
7. Zero Reset Button
8. ▲▼ Output Value Setting Button
9. ◀▶ Output Digit Selection Button
10. Output Terminals

Display Description



1. Thermocouple Type Indicator
2. Indicates which output value is being set
3. Current output value (unit of measure)
4. RTD Type Indicator
5. Low Battery Indicator
6. Instrument is performing its reference-cold junction compensation
7. Output State Indicator

Operating Instructions

Power ON/OFF

Press the POWER 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. When complete, the instrument is ready to take measurements.

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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-OFF". "AP-OFF" indicates that the no automatic power-off function is disabled, while "AP-ON" indicates the automatic power-off function is enabled.
6. Press the **ZERO** button to save the required setting.
7. Press and hold the **POWER** button to exit the maintenance state and turn the instrument off.

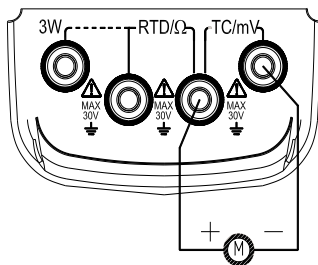
Output Function

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

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 (TC/mV) jack of the meter and connect the other end to the input of the instrument under test, as shown in the diagram to the right.
2. Press the **FUNC** button to select "DC Voltage Output". "V" will appear on the display.



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3. Press the **RANG** button to select the range of 1.0000V or 100.00mV. "V" or "mV" will appear on the display.
4. Press the ◀ and ▶ buttons to move the on-screen cursor in order to select the desired digit on the display.
5. Press the ▲ and ▼ buttons to change the numerical value of each digit. (Numerical value cannot be changed beyond range maximum.)
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 (TC/mV) jack of the meter and connect the other end to the input of the instrument under test, as shown in the above diagram.
2. Press the **FUNC** button to select "Thermocouple Output". "R" and "°C" will appear on the display.
3. Press the **RANG** button to select the type of thermocouple.
4. Press the ◀ and ▶ buttons to move the on-screen cursor in order to select the desired digit on the display.
5. Press the ▲ and ▼ buttons to change the numerical value of each digit. (Numerical value cannot be changed beyond range maximum.)
6. Automatic compensation for reference-junction temperature.
7. 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 type).
8. Press the °C/°F button to select the unit °C or °F.

Note: During the direct calibration of an instrument with reference-junction temperature compensation, it is recommended to press the **RJ-ON** button so that the instrument can start the function of automatic reference-junction compensation. Thus providing the required thermo-electromotive force for output followed by displaying the symbol "RJ-ON" where:

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

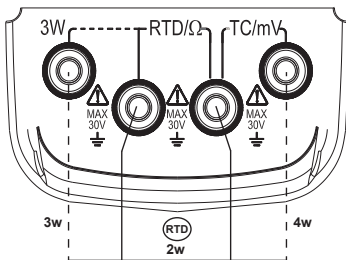
- It takes two seconds for the instrument to start its internal reference junction temperature. After this, each automatic compensation occurs at 10 second intervals.

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- 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 simulator 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.

Simulating output from thermal resistance or RTD

1. Insert one end of the test lead into the output (RTD/ Ω) jack of the meter and connect the other end to the input of the instrument under test as shown in the diagram to the right. The dedicated test leads supplied with the simulator are intended for a 2-wire system for testing output according to user's requirement.



Note: An additional set of test leads are required for 3-wire or 4-wire systems.


2. The display of the symbol "OUTPUT" denotes the instrument is in an output state.
3. Press the **FUNC** button to select thermal resistance output or RTD output as indicated by " Ω " or " $^{\circ}\text{C}$ " and "Cu10" (Copper 10 ohm RTD) on the LCD display.
4. While RTD function is selected, press the **RANG** button to select the type of RTD.
5. Press the **◀** and **▶** buttons to move the on-screen cursor in order to select the desired digit on the display.
6. Press the **▲** and **▼** buttons to change the numerical value of each digit. (Numerical value cannot be changed beyond range maximum.)
7. Press the **ZERO** button and the output will be directly set to 000.0 $^{\circ}\text{C}$.
8. Press the **$^{\circ}\text{C}/^{\circ}\text{F}$** button to select the unit $^{\circ}\text{C}$ or $^{\circ}\text{F}$.

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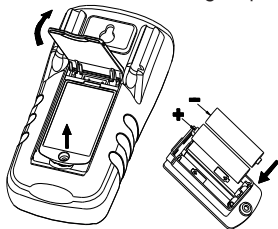
Note: The instrument produces a simulation resistance up to 400Ω at its output terminal (RTD / Ω). The method of simulating resistance output is to send out an appropriate voltage 'Vx' according to the excitation current 'Ix' produced by the calibrated instrument. Because R (set resistance) = V_x (output voltage) / I_x (excitation current), the calibrated device must provide an excitation current to the simulator. The excitation current should range from 0.5mA to 2mA.

Note: When testing the resistance output of a 4-wire system while employing a 2-wire connection, you should take into consideration the error (approx. 0.1Ω) arising from the lead resistance of the test leads. If the capacitance between the resistance output terminal of the simulator and the tested instrument is more than $0.1\mu\text{f}$, the simulator will produce improper resistance.

Battery Replacement

When the battery symbol, , appears on the display, the battery needs to be replaced. In order to replace the battery, proceed with the following steps.

1. Ensure that the meter is turned OFF and remove any test leads from the meter's 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 2 x AA 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.
5. Tighten the screw to secure the battery compartment cover.



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

AD-1 Thermocouple Adapter

R1000 Safety Test Lead

FC-300 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.reed instruments.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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