REED

Model R2800

Temperature Simulator

Instruction Manual

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Table of Contents

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 8 thermocouple types (R, S, B, E, K, J, T & N) and 7 RTD types (Cu10, Cu50, Pt10, Pt100, Pt200, Pt500 & Pt1000), plus volts and ohms
- 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 - *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
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	

Note 1: Excludes accessory lead resistance

Note 2: Range of excitation current: 0.5mA to 3mA; Max. output voltage: ≤2V

Note 3: 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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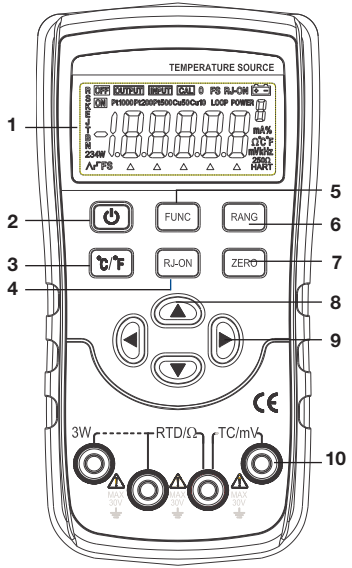
General Specifications

Max. Allowable Voltage:	30V (between any two terminals or between any terminal and ground)
Temperature Coefficient:	0.1 × (dedicated accuracy)%/°C (5 to 18°C, 28 to 40°C)
Operating Temperature:	0°C to 50°C
Operating Humidity:	≤80% RH
Storage Temperature:	≤-10°C to 55°C
Storage Humidity:	≤90% RH
Power Supply:	Two 1.5V alkaline batteries (LR6)
Dimensions:	180 (L) × 90 (W) × 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. °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 terminal



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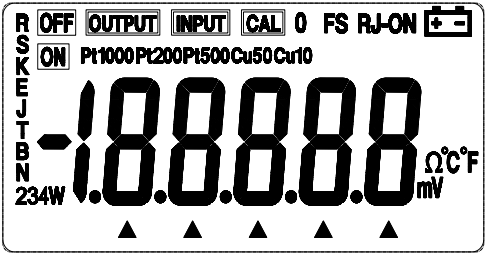
Display Description



OUTPUT	Indicates that the instrument is in an output state
CAL	Indicates that the instrument is in a calibration state
0 FS	Indicates that the instrument is in a calibration state, denoting that the zero point or the full scale point is now in calibration
RJ-ON	Indicates that the instrument is performing its reference-cold junction compensation
	Indicates that the battery power is low and needs to be replaced
▲	Indicates that the output digits need to be set
Ω°C°F mV	Indicates the current output value (unit of measure)
ON	Indicates that the output signal is ON or OFF
R E B S J N K T	Indicates thermocouple type
Pt100 Cu50	Indicates RTD 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-OF 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.

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

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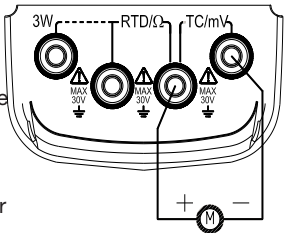
Simulating output from DC voltage



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 (function) button to select DC Voltage output. 'V' will appear on the display.
3. Press the RANG (range) button to select the range of 1.0000V or 100.00mV. 'V' or 'mV' will appear on in the display.
4. Press the ◀▶ button to move the on-screen cursor in order to select the desired digit on the display.
5. Press the ▲▼ button 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 (function) button to select Thermocouple output. 'R' and '°C' will appear on the display.
3. Press the RANG (range) button to select the type of thermocouple.
4. Press the ◀▶ button to move the on-screen cursor in order to select the desired digit on the display.
5. Press the ▲▼ button 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

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Note: During the direct calibration of an instrument with reference-junction temperature compensation, it is common 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.
- 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 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

Note: The instrument produces the 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) = Vx (output voltage) / Ix(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 0.1μf, the simulator will produce improper resistance.

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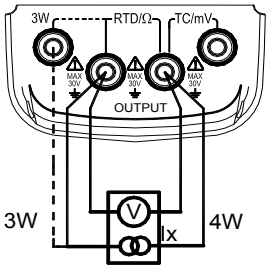
1. Insert one end of the test lead into the output (RTD/Ω) jack of the meter and connect the other end to the input of the instrument under test as shown in the diagram to the right. The dedicated test leads supplied with the simulator can be made into a 3-wire or 4-wire system for testing output according to user's requirement.



2. The display of the symbol 'OUTPUT' denotes the instrument is in an output state.
3. Press the FUNC (function) button to select the function of resistance or RTD. 'Ω' or '°C' and 'Pt100' will appear on the display.
4. While RTD function is selected, press the RANG (range) button to select the type of RTD.
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. Press the Zero button and the output will be directly set to 000.0°C.
8. Press the °C/°F button to select the unit °C or °F.

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.

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's terminals

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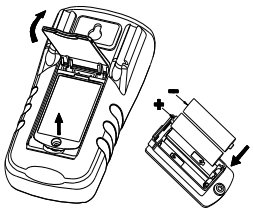
2. Lift the tilt stand on the back of the unit to reveal the battery compartment door which can be removed using a Phillips head screwdriver
3. Replace the batteries in the lid of the battery compartment
4. Reinstall the compartment lid by ensuring that battery terminals touch the unit's contact points 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

For service on this or any other REED product or information on other REED products, contact REED Instruments at info@reedinstruments.com