

R5820

# REED INSTRUMENTS

## Loop Calibrator



## Instruction Manual

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## Introduction

Thank you for purchasing your REED R5820 Loop 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 prevent the user and the instrument from electric shock and other hazards, it is necessary to follow the following regulations:

- Do not operate the instrument in the presence of flammable gas, explosive gas or vapor.
- Never apply more than 30V between any two terminals, or between terminal and ground.
- For optimal accuracy, allow the instrument to warm up for 5 minutes before operating.

## Features

- mA sourcing and measurement
- 5-digit LCD display
- 0 to 28 VDC measurement to check loop voltage
- Basic measurement/sourcing accuracy of 0.02% and 0.05%, respectively
- Simulate mA and % with 0.001% display span
- Selectable step or ramp outputs
- Internal 24V loop power supply
- Low battery indicator and auto shut off

## Included

- Test Leads
- Alligator Clips
- Protective Holster
- Batteries

## Specifications

### Output Functions

Applicable range from 64.4 to 82.4°F (18 to 28°C), within one year of calibration.

Output	Range	Output Range	Resolution	Accuracy	Note
Current	20mA	0.000 to 22.000mA	0.001mA	±0.05% of set value ±4μA	Max 1KΩ at 20mA, see Note 1
Simu. transmitter (absorp. current)	-20mA	0.000 to -22.000mA	0.001mA		Max 1KΩ at 20mA, see Note 2
Loop power	24V	-	-	±10%	Max output current up to 25mA

*continued...*

## Input Functions

Applicable range from 64.4 to 82.4°F (18 to 28°C), within one year of calibration.

Input	Range	Input Range	Resolution	Accuracy	Note
Voltage	28V	-0.200 to 28.000V	1mV	±0.02% of reading ±2mV	Input resistance 2MΩ
Current	20mA	-1.000 to 22.000mA	0.001mA	±0.02% of reading ±4μA	Max 1KΩ at 20mA, see Note 2
Loop power	20mA	0.000 to 22.000mA			Providing 24V loop power

**Note 1:** When the battery voltage exceeds 6.8V, the max load is 1KΩ at 20mA. When its voltage lies between 5.8V and 6.8V, the max load is 700Ω at 20mA.

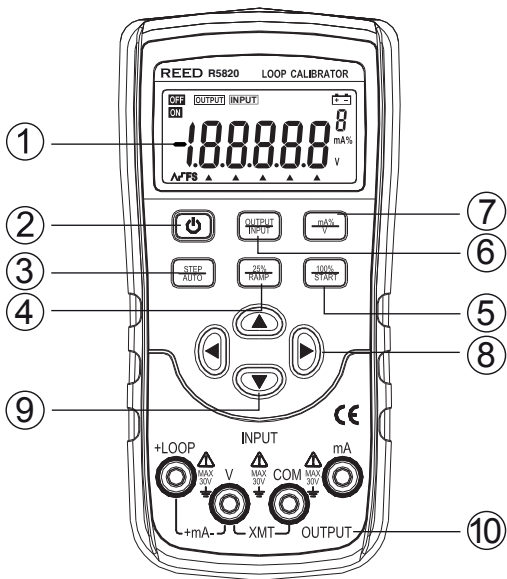
**Note 2:** Power supply range: 5 to 25VDC

**Note 3:** Temperature coefficient: ±0.005% of the range per °C for the temperature ranges 41 to 64.4°F (5°C to 18°C) and 82.4 to 104°F (28°C to 40°C).

## General Specifications

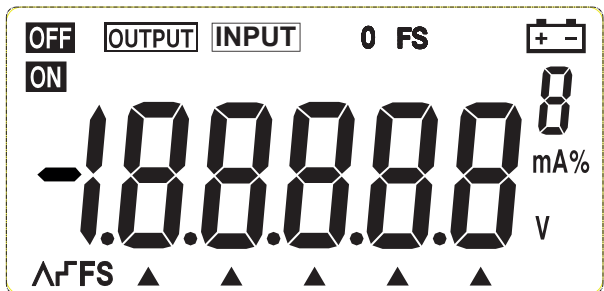
Display:	5-Digit LCD
Kick Stand:	Yes
Battery Life:	Approx. 20 hours
Power Supply:	2 AA Batteries
Auto shut off:	Yes (after 15 minutes/off)
Low Battery Indicator:	Yes
Replaceable Test Leads:	Yes
Product Certifications:	CE
Operating Temperature:	32 to 122°F (0 to 50°C)
Operating Humidity Range:	0 to 85%
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. Single Step/Auto Switch Button
4. 25% Single Step Setting/ Auto Ramp Button
5. 0% & 100% of Setting/ Auto Ramp Start Button
6. Output/Input Button
7. mA%/V Select Button
8. ◀▶ Output Digit Selection Button
9. ▲▼ Output Value Setting Button
10. Input/Output Terminals

## Display Description



<b>OUTPUT</b>	Indicates that the instrument is in output mode.
<b>INPUT</b>	Indicates that the instrument is in input mode.
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.
	Indicates battery power is low and batteries need to be replaced.
▲	Indicates which output digit is being set.
<b>ΛrFS</b>	Indicates the output ramp type.
V. mA. %	Indicates the current output value (unit of measure).
<b>ON OFF</b>	Indicates that the output signal is on or off.

# 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. Follow the steps below to Enable/Disable the Auto-Power Off function.

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 ▼ button to toggle between "AP-ON" & "AP-OFF". 'AP-OFF' indicates that the automatic power-off function is disabled, while 'AP-ON' indicates the automatic power-off function is enabled.
6. Press the **100%/START** 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 simulating resistance.

**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 circuits.

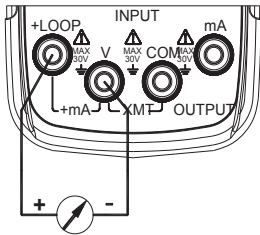
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## Output Operation Procedure

Function Operation	Range Operation	Display	Set Range
DCA 20mA	20mA or %	00.000mA or -025.00mA%	00.000 to 22.000mA or -025.00 to 112.50mA%

### Current Output

1. Insert one end of the test leads into the +mA output jack and connect the other end to the input of the meter, as shown in the diagram on the right.
2. Press the **OUTPUT** button and **OUTPUT** will appear on the display indicating that the calibrator is in an output state.
3. Press the **mA%/V** button to select the output to be either mA or %, in which 0% indicates 4mA and 100% indicates 20mA.
4. Press the **◀▶** buttons to select the output digits.
5. Press the **▲▼** button to change the numerical value of the set digits. Hold the button and the value will keep varying.




### 25% Step Current Output


1. Connect the test leads to the meter as stated in the *Current Output* procedures.
2. Press the **OUTPUT** button and **OUTPUT** will appear on the display indicating that the calibrator is in an output state.
3. Press the **25%/RAMP** button and **1** will appear on the display.
4. Press the **mA%/V** button to select the set output mA or mA%
5. Press the **▲▼** button to change the output in a value of 25%, in which 0% indicates 4mA and 100% indicates 20mA.
6. Press the **25%/RAMP** button again to exit.

*continued...*

## Current Output Set for Zero Point & Full Scale

1. Connect the test leads to the meter as stated in the *Current Output* procedures.
2. Press the  button and **OUTPUT** will appear on the display indicating that the calibrator is in an output state.
3. Press the **100%/START** button.  $\overline{r}$ , 0 and FS will appear on the display.
4. Press the **mA%/V** button to select the set output mA or mA%.
5. Press the  $\blacktriangle$   $\blacktriangledown$  buttons to change the output values at 100%, in which 0% indicates 4mA and 100% indicates 20mA.
6. Press the **mA 100%** button to exit.

## Auto-Ramp

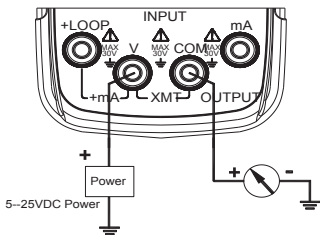
1. Connect the test leads to the meter as stated in the *Current Output* procedures.
2. Press the  button and **OUTPUT** will appear on the display indicating that the calibrator is in an output state.
3. Press the **STEP/AUTO** button and the symbols **OUTPUT**, "OFF", "A", "S" and "4mA" will appear on the display indicating that the calibrator is entering RAMP mode.
4. Press the **25%/RAMP** button to change the type of the output ramp from "S", "F", and "r". "A S" indicates a low speed ramp, which is set to a cycle of 60 seconds. "A F" indicates a high speed ramp, which is set to a cycle of 30 seconds. "r" indicates auto-stair step ramp, which pauses 5 seconds at each step.
5. Press the **100%/START** button to start output on the selected output ramp. "ON" will appear on the LCD indicating that the output is activated. Press the **100%/START** button again and the output will pause on the current value. "OFF" will appear on the display indicating that the output is deactivated. Press the **100%/START** button again to resume output at the set ramp from the pause value.

**Note:** When the "OFF" symbol appears, press any one of the  $\blacktriangleleft$   $\blacktriangleright$   $\blacktriangle$   $\blacktriangledown$  buttons to bring the output back to 0% and 4mA.

*continued...*

## Simulating Transmitter Output (XMT)

1. Insert one end of the test lead to the "XMT" output jack of the calibrator and connect the other end with the input terminal of the user's instrument as shown in the following diagram:
2. The button-operation is the same as that as indicated in the *Current Output* section.



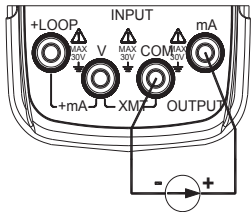
- Power supply range: 5 to 25VDC.
- During an output operation, use a external 24VDC power supply in order to prolong battery life.

## Measuring Function

- Never apply more than 30V between any two terminals, or between any terminal and the ground. Any voltage more than 30V could result in damage to the calibrator, as well as personal injury.
- During operation, do not apply a voltage or current exceeding the measuring range to the input terminal. This could cause damage to the calibrator.
- During the operation, turn off the instrument before connecting the calibrator. Connecting to the Calibrator without it being shut it down may cause damage.

## Measuring DC Current

1. Insert one end of the test lead into the mA input terminal and connect the other end to the output of the user's instrument as shown in the following diagram:
2. Press the  $\frac{\text{OUTPUT}}{\text{INPUT}}$  button till **INPUT** appears on the display. This indicates that the calibrator is in an input state.

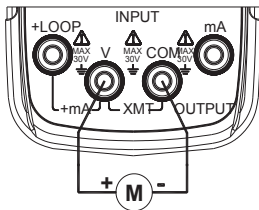


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3. Press the **mA%/V** button to select mA or mA%. The value of 0% indicates 4mA and the value of 100% indicates 20mA.
4. The unit refreshes twice per second. If the measured value exceeds the measuring range, the display will indicate the symbol "-OL-" (overload).

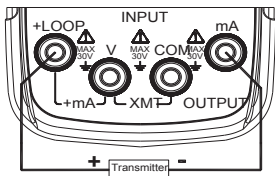
### Measuring DC Voltage

1. Insert one end of the test lead into the V input jack of the calibrator and connect the other end with the output of the user's instrument as show in the following diagram:
2. Press the **OUTPUT** button until **INPUT** appears on the display, indicating that the calibrator is in an input state.
3. Press the **mA%/V** button 3 times to select the V function, indicated by "V" on the display.
4. The unit refreshes twice per second. If the measured value exceeds the measuring range, the display will indicate the symbol "-OL-" (overload).



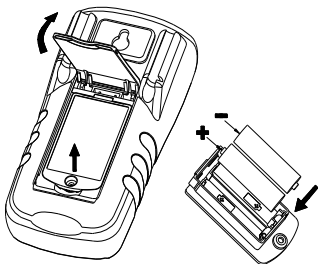
### Providing 24V Power Supply for Measuring Loop Current

1. Insert the test lead into the +LOOP & mA input jacks of the calibrator as shown in the following diagram:
2. The operations are the same as described in the *Measuring DC Current* procedures.



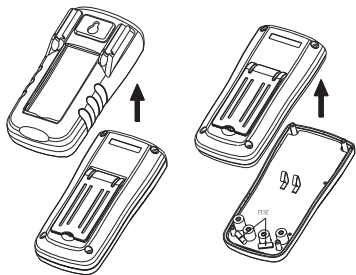
## Battery Replacement

1. Turn the power off the meter and remove any test leads that may be attached to the meter.
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.



## Fuse Replacement

1. Remove the test leads from the meter and turn the meter OFF.
2. Take off the protective boot, remove the four screws by using a standard-blade screwdriver, and then take off the cover.
3. Replace the blown fuse(s).
4. Reinstall the cover.
5. Reinstall the meter's protective boot.



## Applications

- Testing loop powered isolators and two-wire transmitters
- Verifying and calibrating processes involving mA instrumentation

## Accessories and Replacement Parts

**CA-05A** Soft Carrying Case

**R9940** Hard Shell Carrying Case

**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](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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