R5010

REED INSTRUMENTS

True RMS Digital Multimeter



WARRANTY 1 YEAR WARRANTY

Instruction Manual

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Introduction

Thank you for purchasing your REED R5010 True RMS Digital Multimeter. 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 in an ISO9001 facility and has been calibrated during the manufacturing process 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.

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	This symbol adjacent to another symbol, terminal or operating device indicates that the operator must refer to an explanation in the Instruction Manual to avoid personal injury or damage to the meter.
WARNING	Indicates a potentially hazardous situation, which if not avoided, could result in death or serious injury.
CAUTION	Indicates a potentially hazardous situation, which if not avoided, may result damage to the product.
	The terminal(s) so marked must not be connected to a circuit point for which the voltage with respect to ground exceeds (in this case) 1000 VAC or VDC.
	This symbol adjacent to one or more terminals identifies them as being associated with ranges that may, in normal use, be subject to particularly hazardous voltages. For maximum safety, the meter and its test leads should not be handled when these terminals are energized.
	Indicates that an instrument is protected throughout by double insulation or reinforced insulation.

IEC1010 Overvoltage Installation Category

Overvoltage Category I: Equipment for connection to circuits for which measures are taken. Examples include protected electronic circuits.

Overvoltage Category II: Energy-consuming equipment to be supplied from the fixed installation. Examples include household, office, and laboratory appliances.

Overvoltage Category III: Equipment in fixed installations.
Examples include switches in the fixed installation and some equipment for industrial use with permanent connection to the fixed installation.

Overvoltage Category IV: For use at the origin of the installation.
Examples include electricity meters and primary over-current protection equipment.

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Warnings

This meter has been designed for safe use, but must be operated with caution. The warnings listed below must be carefully followed for safe operation.

1. **NEVER** apply voltage or current to the meter that exceeds the specified maximum Input Protection Limits:

Function	**Maximum Input**
V DC or V AC	1000V DC/AC RMS
mA AC/DC	500mA 1000V fast acting fuse
A AC/DC	10A 1000V fast acting fuse (20A for 30 seconds max every 15 minutes)
Frequency, Resistance, Capacitance, Duty Cycle, Diode Test, Continuity	1000VDC/AC RMS
Temperature	1000VDC/AC RMS
Surge Protection: 8kV peak per IEC 61010	

2. **USE EXTREME CAUTION** when working with high voltages.
3. **DO NOT** measure voltage if the voltage on the "COM" input jack exceeds 1000V ground.
4. **NEVER** connect the meter leads across a voltage source while the function switch is in the current, resistance, or diode mode. Doing so can damage the meter.
5. **ALWAYS** discharge filter capacitors in power supplies and disconnect the power when making resistance or diode tests.
6. **ALWAYS** turn off the power and disconnect the test leads before opening the covers to replace the fuse or batteries.
7. **NEVER** operate the meter unless the back cover and the battery and fuse covers are in place and fastened securely.
8. If the equipment is used in a manner not specified by the manufacturer, the protection provided by the equipment may be impaired.

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Features

- True RMS measures frequency, resistance, capacitance and temperature
- Diode check and continuity functions
- Backlit LCD readout with analog bar graph
- 4-20 mA process loop measurements with % readout
- Data hold, Max/Min and Peak capture mode
- IP67 dust and waterproof
- Cat. IV 600V, Cat. III 1000V safety rating

Specifications

AC/DC Voltage

Range:	AC: 400mV, 4, 40, 400, 1000V DC: 400mV, 4, 40, 400, 1000V
Accuracy:	AC: 400mV ±(1.0% rdg. + 5 dgt.) 4, 40, 400, 1000V ±(1.0% rdg. + 3 dgt.) DC: 400mV/4,40,400V ±(0.06% rdg. + 2 dgt.) 1000V ±(0.1% rdg. + 5 dgt.)
Resolution:	AC: 0.1mV, 0.001, 0.01, 1V DC: 0.01mV, 0.0001, 0.01, 0.1V

AC/DC Current

Range:	400, 4000µA, 40, 400mA, 10A
Accuracy:	AC: ±(1.5% rdg. + 3 dgt.) DC: ±(1.0% rdg. + 3 dgt.)
Resolution:	AC: 0.1, 1µA, 0.01,0.1mA, 0.01A DC: 0.01, 0.1µA, 0.001,0.01mA, 0.001A

Resistance

Range:	400Ω, 4, 40, 400kΩ, 4, 40MΩ
Accuracy:	400Ω: ±(0.3% rdg. + 9 dgt.) 4, 40, 400kΩ, 4MΩ: ±(0.3% rdg. + 4 dgt.) 40MΩ: ±(2.0% rdg. + 10 dgt.)
Resolution:	0.01Ω, 0.0001, 0.001, 0.01kΩ, 0.001MΩ

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Capacitance

Range:	40, 400nF, 4, 40, 400, 4000µF, 40mF
Accuracy:	40, 400nF: ±(3.5% rdg. + 40 dgt.) 4, 40, 400µF: ±(3.5% rdg. + 10 dgt.) 4000µF, 40mF: ±(5% rdg. + 10 dgt.)
Resolution:	0.001, 0.01nF, 0.0001, 0.001, 0.01, 0.1µF, 0.001mF

Frequency

Range:	40, 400Hz, 4, 40, 400kHz, 4, 40, 100MHz
Accuracy:	±(0.1% rdg. + 1 dgt.)
Resolution:	0.00, 0.01Hz, 0.0001, 0.001, 0.01kHz, 0.0001, 0.001, 0.01MHz

Temperature

Range:	-58 to 1832°F (-50 to 1000°C)
Accuracy:	±(1.0% rdg. + 4.5°F) ±(1.0% rdg. + 2.5°C)
Resolution:	1°F, 1°C

4 - 20mA%

Range:	-25 to 125%
Accuracy:	±(50 dgt.)
Resolution:	0.01%

General Specifications

Range Selection:	Autoranging/Manual
True RMS:	Yes
Display:	40,000 count LCD display
Display Hold:	Yes
Max/Min:	Yes
Peak Hold:	Yes
Relative Mode:	Yes
Diode Test:	Yes
Backlit Display:	Yes
Digital Analog Bargraph:	Yes
Continuity Check:	Audible signal if resistance ≤35Ω

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Duty Cycle:	Yes (0.1 to 99.9%)
Kick Stand:	Yes
Auto Power Off:	Yes (after 15 minutes)
Power Supply:	9V Battery
Low Battery Indicator:	Yes
Fuse Protection:	Yes
Replaceable Test Leads:	Yes
Overvoltage Category:	CAT. IV 600V, CAT. III 1000V
Product Certifications:	CE, IP67, Drop Tested (2M)
Operating Temperature:	41 to 104°F (5 to 40°C)
Storage Temperature:	-4 to 140°F (-20 to 60°C)
Dimensions:	7.4 x 3.2 x 2.0" (187 x 81 x 50mm)
Weight:	12oz (342g)

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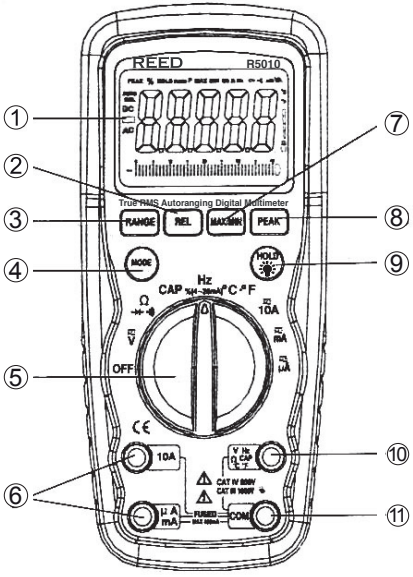
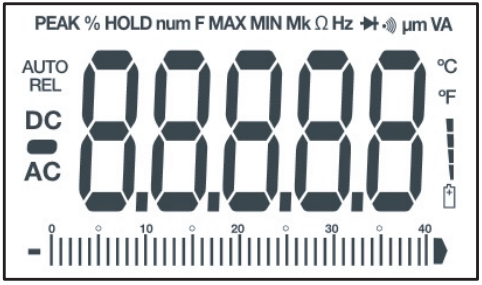
Instrument Description



1. 40,000 count LCD display
2. REL Button
3. RANGE Button
4. MODE Button
5. Rotary Function switch
6. mA, µA and 10A Input Jacks
7. MAX/MIN Button
8. PEAK Button
9. HOLD and ☀ (Backlight) Button
10. Positive Input Jack
11. COM Input Jack

Note: Tilt stand and battery compartment are located on the back of the unit.

Display Description



•))	Continuity	⊣◀	Diode test
▭	Battery status	**n**	nano (10-9) (capacitance)
µ	micro (10-6) (amps, cap)	**m**	milli (10-3) (volts, amps)
A	Amps	**k**	kilo (103) (ohms)
F	Farads (capacitance)	**M**	mega (106) (ohms)
Ω	Ohms	**PEAK**	Peak Hold
Hz	Hertz (frequency)	**V**	Volts
%	Percent (duty ratio)	**REL**	Relative
AC	Alternating current	**AUTO**	Autoranging
DC	Direct current	**HOLD**	Display hold
°F	Degrees Fahrenheit	**°C**	Degrees Centigrade
MAX	Maximum	**MIN**	Minimum

Operating Instructions

WARNING: Risk of electrocution. High-voltage circuits, both AC and DC, are very dangerous and should be measured with great care.

1. ALWAYS turn the function switch to the **OFF** position when the meter is not in use.
2. If "OL" appears in the display during a measurement, the value exceeds the range you have selected. Change to a higher range.

AC/DC Voltage Measurement

Note: Do not measure AC or DC voltages if a motor on the circuit is being switched ON or OFF. Large voltage surges may occur that can damage the meter.

WARNING: Risk of Electrocution. The probe tips may not be long enough to contact the live parts inside some 240V outlets for appliances because the contacts are recessed deep in the outlets. As a result, the reading may show 0 volts when the outlet actually has voltage on it. Make sure the probe tips are touching the metal contacts inside the outlet before assuming that no voltage is present.

1. Set the rotary function switch to the **V** ⎓ position and select either AC or DC by pressing the **MODE** button.

Note: When the meter is first turned on, it automatically goes into AutoRanging. This automatically selects the best range for the measurements being made and is generally the best mode for most measurements. For measurement situations requiring that a range be manually selected, see *Autoranging/Manual Range Selection* for details.

2. Insert the black test lead banana plug into the negative COM jack. Insert the red test lead banana plug into the positive V jack.
3. For DC voltage, touch the black test probe tip to the negative side of the circuit and the red test probe tip to the positive side of the circuit.
4. For AC voltage, touch the black test probe tip to the neutral side of the circuit and the red test probe tip to the "hot" side of the circuit.
5. The LCD will display the reading.

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AC/DC Current Measurement

Note: Do not measure AC or DC voltages if a motor on the circuit is being switched ON or OFF. Large voltage surges may occur that can damage the meter.

1. Insert the black test lead banana plug into the negative COM jack.
2. For AC or DC current measurements up to 4000µA, set the rotary function switch to the µA ⎓ position and insert the red test lead banana plug into the µA/mA jack.
3. For AC or DC current measurements up to 400mA, set the rotary function switch to the mA ⎓ position and insert the red test lead banana plug into the µA/mA jack.
4. For AC or DC current measurements up to 20A, set the rotary function switch to the 10A ⎓ position and insert the red test lead banana plug into the 10A jack.
5. Select either AC or DC by pressing the **MODE** button.
6. Remove power from the circuit under test, then open up the circuit at the point where you wish to measure current.
7. For DC current, touch the black test probe tip to the negative side of the circuit and the red test probe tip to the positive side of the circuit.
8. For AC current, touch the black test probe tip to the neutral side of the circuit and the red test probe tip to the "hot" side of the circuit.
9. Apply power to the circuit.
10. The LCD will display the reading.

Resistance Measurement

WARNING: To avoid electric shock, disconnect power to the unit under test and discharge all capacitors before taking any resistance measurements. Remove the batteries and unplug the line cords.

1. Set the rotary function switch to the Ω ⏭ •)) position.
2. Insert the black test lead banana plug into the negative COM jack and the red test lead banana plug into the positive Ω jack.
3. Press the **MODE** button to select "Ω" on the display.

Note: When the meter is first turned on, it automatically goes into

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AutoRanging. This automatically selects the best range for the measurements being made and is generally the best mode for most measurements. For measurement situations requiring that a range be manually selected, see *Autoranging/Manual Range Selection* for details.

4. Touch the test probe tips across the circuit or part under test. It is best to disconnect one side of the part under test so the rest of the circuit will not interfere with the resistance reading.
5. The LCD will display the reading.

Continuity Check

WARNING: To avoid electric shock, never measure continuity on circuits or wires that have voltage on them.

1. Set the rotary function switch to the Ω position.
2. Insert the black test lead banana plug into the negative COM jack and the red test lead banana plug into the positive Ω jack.
3. Press the **MODE** button to select and "Ω" on the display.
4. Touch the test probe tips to the circuit or wire you wish to check.
5. If the resistance is less than approximately 35Ω, the audible signal will sound. If the circuit is open, the display will indicate "OL".

Diode Test

1. Set the rotary function switch to the Ω position.
2. Insert the black test lead banana plug into the negative COM jack and the red test lead banana plug into the positive V jack.
3. Press the **MODE** button to select and "V" on the display.
4. Touch the test probes to the diode under test. Forward voltage will typically indicate 0.400 to 0.700V. Reverse voltage will indicate "OL". Shorted devices will indicate near 0V and an open device will indicate OL in both polarities.

Type K Temperature Measurements

1. Set the rotary function switch to the Temp position.
2. Plug the optional Type K Thermocouple Probe into the thermocouple input jack.

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Note: The temperature probe is fitted with a type K mini connector. A mini connector to banana connector adaptor is supplied for connection to the input banana jacks.

3. Touch the Temperature Probe head to the area to be measured.
4. When the reading is stable (allow up to 30 seconds), note the measured value.

Capacitance Measurement

WARNING: To avoid electric shock, disconnect power to the unit under test and discharge all capacitors before taking any capacitance measurements. Remove the batteries and unplug the line cords.

1. Set the rotary function switch to the **CAP** position.

Note: When the meter is first turned on, it automatically goes into AutoRanging. This automatically selects the best range for the measurements being made and is generally the best mode for most measurements. For measurement situations requiring that a range be manually selected, see *Autoranging/Manual Range Selection* for details.

2. Insert the black test lead banana plug into the negative COM jack and the red test lead banana plug into the positive V jack.
3. Touch the test leads to the capacitor under test.
4. The LCD will display the reading.

Frequency (Duty Cycle) Measurement (Electronic)

1. Set the rotary function switch to the **Hz/%** position.

Note: When the meter is first turned on, it automatically goes into AutoRanging. This automatically selects the best range for the measurements being made and is generally the best mode for most measurements. For measurement situations requiring that a range be manually selected, see *Autoranging/Manual Range Selection* for details.

2. Insert the black test lead banana plug into the negative COM jack and the red test lead banana plug into the positive Hz jack.
3. Touch the test probe tips to the circuit under test.
4. Note the frequency value on the LCD display

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5. Press the MODE button to indicate "%".
6. Note the "%" duty cycle frequency value on the LCD display.

%4 – 20mA Measurement

1. Set the rotary function switch to the 4-20mA% position.
2. Insert the black test lead banana plug into the negative COM jack and the red test lead banana plug into the µA/mA jack.
3. The meter will display loop current as a % with 0mA=-25%, 4mA=0%, 20mA=100%, and 24mA=125%.

Autoranging/Manual Range Selection

When the meter is first turned on, it automatically goes into AutoRanging. This automatically selects the best range for the measurements being made and is generally the best mode for most measurements. For measurement situations requiring that a range be manually selected, perform the following:

1. Press the **RANGE** button once and the "AUTO" display indicator will turn off.
2. Continuously press the **RANGE** button to scroll through the available ranges until the required range has been selected.
3. To exit the Manual Ranging mode and return to Autoranging, press and hold the **RANGE** button for approx. 2 seconds.
4. Release the **RANGE** button once the meter emits a beep confirming it is now in autoranging mode.

Note: Manual ranging does not apply for the Temperature function.

MAX/MIN Function

1. Press the **MAX/MIN** button to activate the MAX/MIN recording mode. The "MAX" indicator will appear on the LCD display. The meter will now display and hold the maximum reading and will automatically update when a new maximum data value is measured.
2. Press the **MAX/MIN** button again and the "MIN" indicator will appear on the LCD display. The meter will now display and hold the minimum reading and will automatically update when a new minimum data value is measured.

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3. To exit MAX/MIN recording mode press and hold the **MAX/MIN** button for approx. 2 seconds.
4. Release the **MAX/MIN** button once the meter emits a beep confirming it has now resumed normal operation.

Relative Mode

The relative measurement feature allows you to make measurements relative to a stored reference value. A reference voltage, current, etc. can be stored and measurements made in comparison to that value. The displayed value is the difference between the reference value and the measured value.

Note: Relative mode does not operate in the 4-20mA function.

1. Perform the measurement applicable to your test as described in the operating instructions.
2. Press the **REL** button to enter relative mode storing the current reading on the display
3. While in this mode, the "REL" indicator will appear on the LCD display.
4. The display will now indicate the difference between the stored relative value and the measured value.
5. Press the **REL** button to exit the relative mode and resume normal operation.

Display Backlight

1. Press the **HOLD** button for approx. 2 seconds to turn the backlight on.
2. Release the **HOLD** button once the meter emits a beep confirming it will turn the backlight on.
3. The backlight will automatically turn off after approx. 30 seconds.

Data Hold

Press the **HOLD** button to freeze the current reading on the display. Press the button again to resume normal operation.

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Peak Hold

The Peak Hold function captures AC voltage or current peak measurements. The meter can capture negative or positive peaks as fast as 1 millisecond in duration.

1. Press the **PEAK** button to activate the peak hold recording mode as indicated by "PEAK MAX" on the LCD display. The meter will now display and hold the maximum peak reading and will automatically update when a new maximum positive peak value is measured.
2. Press the **PEAK** button again and the meter will now display and hold the maximum peak reading and will automatically update when a new minimum negative peak value is measured.
3. To exit peak hold recording mode press and hold the **PEAK** button for approx. 2 seconds.
4. Release the **PEAK** button once the meter emits a beep confirming it has now resumed normal operation.

Note: The Auto Power Off feature will be disabled while in this mode.

Auto Power Off

To preserve battery life, the meter is programmed to turn off after approx. 15 minutes of inactivity.

1. To disable this feature, press and hold the **MODE** button while turning the rotary function switch to turn the meter on.
2. Release the **MODE** button when "APO d" appears on the LCD display and the meter will emit a beep confirming that the "Auto Power Off" feature is now disabled.
3. If the meter is turned off then back on, the "Auto Power Off" feature will be enabled again.

Battery Replacement

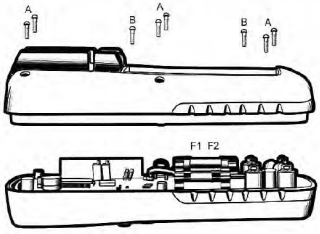
If  appears on the LCD, the batteries must be replaced.

WARNING: To avoid electric shock, disconnect the test leads from any source of voltage before removing the battery cover.

1. Turn the meter off and disconnect the test leads.
2. Open the rear battery cover by removing the two screws labeled (B) in the figure below using a Phillips head screwdriver.

3. Replace the 9v battery.
4. Secure the battery cover with the two Phillips screws.

WARNING: To avoid electric shock, do not operate the meter until the battery cover is in place and fastened securely.



Note: If the meter is not working properly, check the fuses and batteries to make sure that they are still good condition and that they are properly installed.

Accessories and Replacement Parts

CA-05A Soft Carrying Case

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.

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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 email at 1-877-849-2127 or 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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