#61-361

IDEAL Test Pro®
360 Series True RMS Multimeter

WARNING!

1. DO NOT UNDER ANY CIRCUMSTANCES EXCEED THESE RATINGS:
   - Voltage is not to exceed 600V AC or DC.
   - Resistance, Capacitance, Logic, and Continuity functions are not to be performed on circuits capable of delivering greater than 500V AC or DC.
   - Current measurements are not to be performed on circuits capable of delivering greater than 600V AC on insulated conductors, 250V AC on uninsulated conductors.
2. To avoid electrical shock hazards and/or damage to the meter:
   - Do not exceed the voltage ratings for the meter. Use caution when measuring voltage.
   - Do not use during electrical storms. AC power sources with inductive loads or electrical storms may result in high voltage. High energy transients can damage meter and present a dangerous shock hazard.
   - Turn off the power to the circuit or device being measured before taking resistance and capacitance measurements. Fully discharge all capacitors before measuring.
3. Ensure meter is in proper working order before using. Visually inspect meter for damage. Performing a continuity check can verify proper operation. If the meter reading goes from overload to zero, this typically means the meter is in proper working order.
4. Visually inspect leads for damage before using. Replace if insulation is damaged or leads appear suspect.
5. Never ground yourself when taking electrical measurements. Do not touch exposed metal pipes, outlets, fixtures, etc. Keep your body isolated from ground by using dry clothing, rubber shoes, rubber mats, or any other approved insulating material. Keep your fingers behind the finger guards on the probes. Work with others.
6. Before beginning all unknown measurements, set meter to the highest range possible.

WARNING! (cont.)

7. Before breaking a circuit for testing, turn off the power to the circuit. When disconnecting from a circuit, disconnect the hot lead first, then the common lead.
8. Disconnect the meter from the circuit before turning off any indicator, including motors, transformers,and solenoids.

Overload Protection

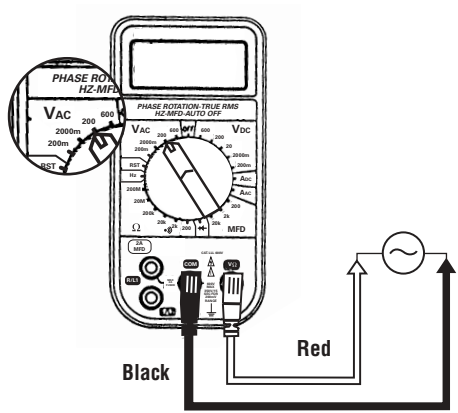
$V_{AC} + V_{DC}$	200m Vrange	500VDC/350VAC for 15 sec
	>200m Vrange	600V AC/DC
$A_{AC} + A_{DC}$	mA input	0.5A/250V
	10A input	10A/600V
Ohms (Ω)		500V AC/DC
Diode		500V AC/DC
Continuity		500V AC/DC
Capacitance (MFD)		500V AC/DC
Frequency (Hz)		500V AC/DC
Phase Rotation (RST)		500V AC/DC

Unit of Measure Multipliers

For your reference, the following symbols are often used to make measurement easier:

Symbol	Verbal	Multiplier
M	mega	x1,000,000
k	kilo	x1,000
m	milli	÷1,000
µ	micro	÷1,000,000

AC Voltage (VAC)

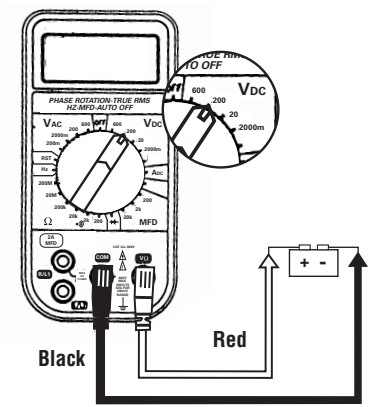


Function	Range	Resolution	Accuracy
AC Voltage	200.0 mV 2000 mV 200.0 V 600 V	.1 mV 1 mV .1V 1 V	±(2.0% + 4) 50 to 500Hz all ranges

To Measure AC Voltage:

1. Plug the test leads into the meter inputs as indicated in the above diagram.
2. Select the proper range to be used within the VAC Function.
3. Connect the meter in parallel with the load or circuit.
4. Measure AC voltage.

DC Voltage (VDC)



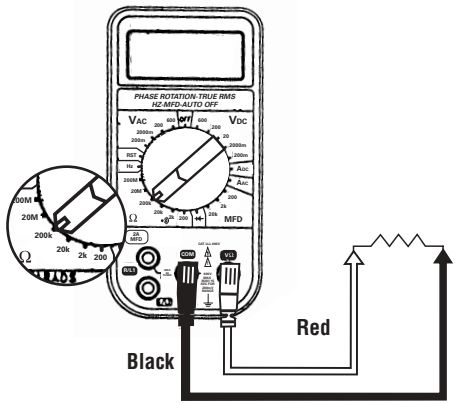
Function	Range	Resolution	Accuracy
DC Voltage	200.0 mV	.1 mV	± (1.2% +1) all ranges
	2000 mV	1 mV	
	20.00 V	.01 V	
	200.0 V	.1 V	
	600 V	1 V	

To Measure DC Voltage:

Do not attempt to measure voltage in circuits capable of delivering more than 600V.

1. Plug the leads into meter inputs as indicated in the diagram above.
2. Select the proper range to be used within the VDC Function.
3. Connect the meter in parallel with the load or circuit.
4. Measure DC voltage.

Resistance (Ohms)



Function	Range	Resolution	Accuracy
Resistance	200.0Ω	.1Ω	± (1.5% + 4)
	2.000kΩ	.001kΩ	± (1.5% + 4)
	20.00kΩ	.01kΩ	± (1.5% + 4)
	200.0kΩ	.1kΩ	± (1.5% + 4)
	20.00MΩ	.01MΩ	± (2.5% + 4)
	200.0MΩ	.1 MΩ	± (5.0% +20)

To Measure Resistance:

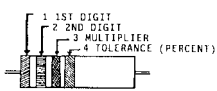
Resistance is measured in Ohms.

1. Turn the power off to the circuit or device that is to be measured and discharge all capacitors before attempting a measurement.
2. Plug the red test lead into the "V-Ω" meter input.
3. Plug the black test lead into the "Com" meter input.
4. Select the proper range within the Ω function of the tester.

5. Measure resistance. If necessary, perform the required multiplication to acquire the actual resistance.
   5.1 Range Guide for Ohms (Ω):
   - 200 = Meter indicates actual resistance
   - 2k = Multiply meter display reading by 1,000 to acquire actual resistance.
   - 20k = Multiply meter display reading by 1,000 to acquire actual resistance.
   - 200k = Multiply meter display reading by 1,000 to acquire actual resistance.
   - 2M = Multiply meter display reading by 1,000,000 to acquire actual resistance
   - 200M = Multiply meter display reading by 1,000,000 to acquire actual resistance.

6. The meter displays total resistance through all possible paths between the probe-tips. These multiple paths may result in measurements that do not correspond to the ohm value indicated by the resistor color code.

Determining Resistor Values:

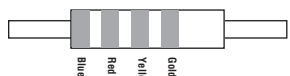


To determine the value of a resistor, use the color bands on the resistor and the table on the following page.

Resistor Color Code Table

Color	1st Digit	2nd Digit	Multiplier	Tolerance (Percentage)
Black	0	0	1	
Brown	1	1	10	
Red	2	2	100	
Orange	3	3	1,000	
Yellow	4	4	10,000	
Green	5	5	100,000	
Blue	6	6	1,000,000	
Violet	7	7	10,000,000	
Gray	8	8	100,000,000	
White	9	9	1,000,000,000	
Gold				+/- 5%
Silver				+/- 10%
No Color				+/- 20%

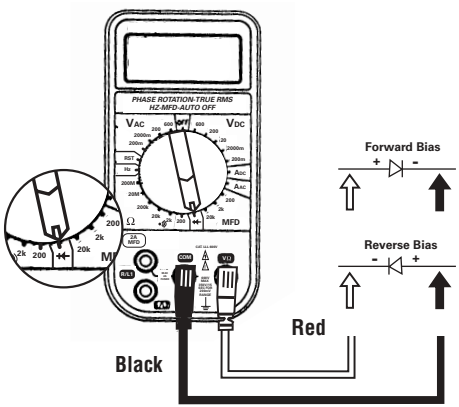
Example:



1st color band is blue so the first digit is a 6
2nd color band is red so the second digit is a 2
3rd color band is yellow so multiply 62 x 10,000
4th color band is gold so the tolerance is ±5%

Your Resistor value is 620,000 Ohms (620kΩ) with a tolerance of ±5%.

Diode Verification



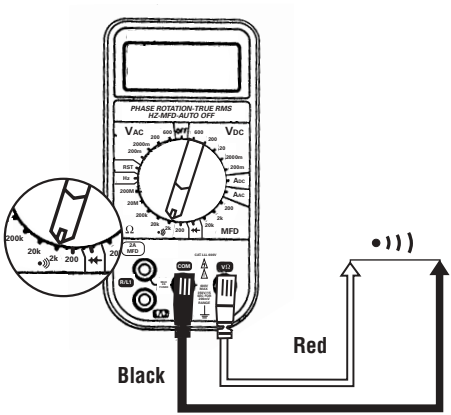
Function	Range	Resolution	Accuracy
Diode Test	2 VDC	1 mV	± (3.0% + 1)

Diode Testing:

To ensure a proper functioning diode, the meter will develop a voltage across the component from a test current. The diode test function allows measurements of forward and reverse bias across diodes and transistor junctions.

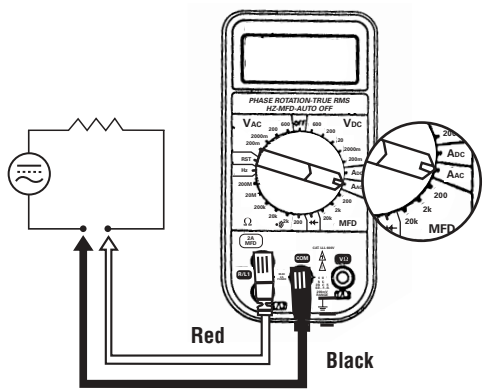
1. Turn off power to the device or circuit that is being tested and discharge all capacitors.
2. Plug the leads into the meter inputs as indicated in the above diagram.
3. Select the diode ⊣◁— function on the meter.
4. Check the forward bias of the diode by connecting the red test probe to the anode (+) and the black test probe to the cathode (-) of the diode. Read the forward voltage drop on the meter display.
   - 4.1 A good silicone diode will result in a reading around 0.7 V.
   - 4.2 A good germanium diode will result in a reading around 0.3 V.
   - 4.3 A short is indicated by a continuous beep and a reading of .000 V.
   - 4.4 An open is indicated by an "OL" reading.
5. Check the reverse bias of the diode by reversing the test lead connections to the diode (red probe to cathode and black probe to anode).
   - 5.1 A reading of "OL" indicates reverse blocking and a good diode.
   - 5.2 A reading of .000 V and a continuous beep indicates high reverse leakage current or a short.

Continuity Beeper
(beeps at resistance <150Ω)



To Verify Continuity:
A continuity test ensures that all circuit connections are intact.
1. Plug the test leads into the meter inputs as indicated in the diagram above.
2. Turn the power off to the circuit or device that is to be verified.
3. Select the continuity function •))) on the meter. See switch position below. The continuity function is located at the 2kΩ setting.
4. Test for continuity by connecting the meter to the circuit.
5. If the beeper sounds, the circuit is complete.

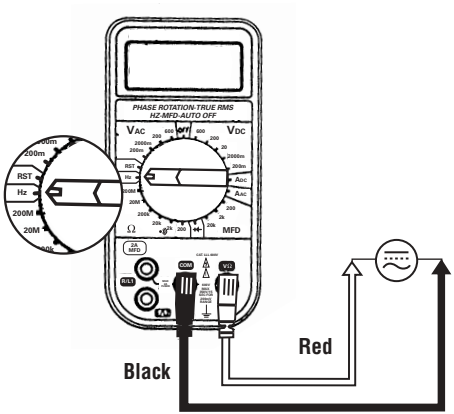
Current (AAC and ADC)



Function	Range	Resolution	Accuracy
AC Current	2.000 A	.001 A	± (3.0% + 4)
DC Current	2.000 A	.001 A	50 to 500Hz

To Measure Current:
Current is measured in amps.
Do not attempt to measure current in circuits capable of delivering greater than 600V.
1. Connect the test leads into the meter inputs as indicated in the diagram above.
2. Select the AAC or ADC function.
3. Turn the power off.
4. Connect the meter in series with the load or circuit.
5. Turn power on.
6. Measure the Current.

Frequency (Hz)



Function	Range	Resolution	Accuracy
Frequency	10 Hz to 100 kHz for AC 10 Hz to 100 Hz for DC* Sensitivity : 3.5 V rms	.001 kHz	±(2% + 3 digits)

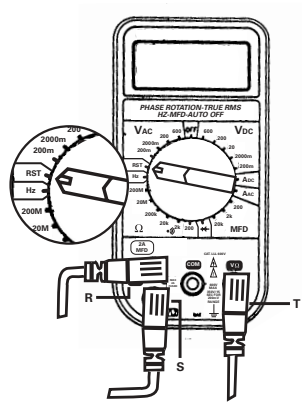
*DC Voltage higher than 3.5 V rms

Frequency is measured in Hertz:

Do not attempt to measure frequency in circuits capable of delivering greater than 600V.

1. Plug test leads into the meter inputs as indicated in the diagram above.
2. Select the Hz function on the meter.
3. Connect the meter in series with the load or circuit.
4. Measure the frequency.

Phase Rotation (RST)



Function	Frequency Range	Voltage Range	
Phase Rotation Indicator	50 Hz to 500 Hz	80V to 500V	LCD indicates sequence of three-phases.

To Determine Phase Rotation (RST):

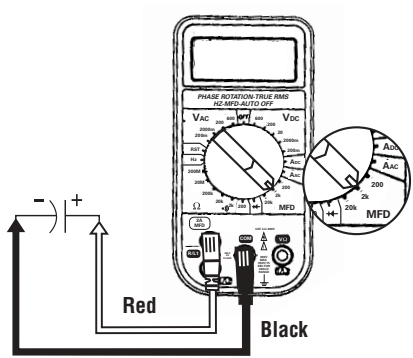
This test function correctly identifies each of the 3-Phases in a power panel as R, S, T. Note: The displayed numerical value has no meaning when performing this procedure. Maximum 3 phase voltage allowed in this mode is 500 VAC.

1. Turn power off to the circuit that is to be tested.
2. Place the function switch on the meter to "RST."
3. Plug the test leads into the meter inputs labeled as R, S, T in the diagram above. Note that test lead colors are insignificant.
4. Attach the three test leads to each of the 3-Phase cables in any order.
5. Turn the power on.
6. If all three supply lines have power, the meter will indicate a R, S, T (in the upper left corner).

Phase Rotation (continued)

7. If the meter indicates “OK” in the display (upper left-hand side),
   a. Turn power off to the circuit.
   b. Label each phase cable as R, S, or T following the test lead connections to the labeled meter inputs.
8. If the meter indicates an C message in the display (lower left-hand side), the phase rotation is counter-clockwise.
   a. Turn power off to the circuit.
   b. Switch any two test lead connections to the phase cables.
   c. Turn power on.
   d. The meter will now indicate “OK” in the display.
   e. Turn the power off.
   f. Label each phase cable as R, S, or T following the test lead connections to the labeled meter inputs.

Capacitance (MFD)



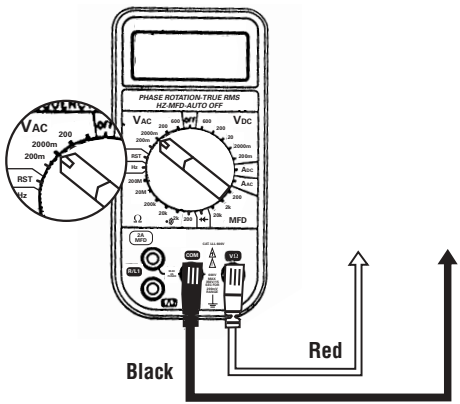
Function	Range	Resolution	Accuracy
Capacitance	200.0 µF 2.000 mF 20.00 mF	.1 µF .001 mF .01 mF	± (4.0% + 10) all ranges

To Measure Capacitance:

Capacitance is measured in micro-farads (MFD). Turn off power and discharge the capacitor before attempting a measurement. The meter measures capacitance by charging the capacitor with a predetermined current, measuring the resultant voltage, and then calculating the capacitance.

1. Plug the test leads into the meter inputs as indicated in the diagram above.
2. Select the proper range to be used within the MFD area on the meter.
3. Connect the red test lead to the anode (+) of the capacitor, and the black test lead to the cathode (-) of the capacitor.
4. Measure capacitance.

Accessories



Optional Clamp Adaptor
To Use Accessories:

Clamp adapters allow multimeters the versatility to measure large amounts of current safely through a clamphead. IDEAL clamp adapters convert amps measured into mV signals that the multimeter can display. Since the clamp adapters convert the amps measurement into mVAC, the clamp adapter leads must be inserted into the volts and com inputs and the meter must be set to the mVAC range. The conversion ratio is one-to-one (1Amp=1mV). So, when the meter displays 50.0 mV, the clamp adapter is measuring 50.0 Amps.

For 300 AAC Current Clamp (61-450) with model 61-363:

1. Plug test leads into the meter inputs as indicated in the diagram above.
2. Remove the probe tips from the end of the leads.
3. Attach the leads to the current clamp (polarity will not affect reading).
4. a. Select 200 mVAC range for measuring less than 200 Amps.
   b. Select 2000 mVAC range for measuring more than 200 Amps.
5. Snap the jaw of the current clamp around one of the current carrying conductors.
6. Take the reading.

For all other Clamp Adaptors (61-451, 61-334, 61-436):

1. Plug test leads into the meter inputs as indicated in the diagram above.
2. a. Select 200 mVAC range for measuring less than 200 Amps.
   b. Select 2000 mVAC range for measuring more than 200 Amps.
3. Snap the jaw of the current clamp around one of the current carrying conductors.
4. Take the reading.

General Specifications:

Indicators: Continuity: (<150Ω) indicated by a continuous "beep" within 100 msec. Low Battery indicator displayed in the LCD when battery is below operating range. Overrange: "OL" displayed.
Environmental: Operating temperature 32°F to 122°F, storage 0°F to 140°F with batteries removed, RH<70%.
LCD: 3.5 digits.
Size: 4.0"W x 7.5"H x 2.5"D
Weight: 18 oz. including battery.
Battery life: >200 hours typical (9V NEDA 1604 type, JIS006P, IEC6F22 battery).
Accessories: Comes with a pair of test leads ground lead with clip, operator's manual, and battery.
Overload Protection: 600V for DCV, ACV, and phase indication. 500VAC/500VDC for capacitance, ohms, frequency and diode test. Current protected by 2A/600V (6.35mm x 25.4mm) fuse model LA-3893 and 0.1A/250V (5mm x 20mm) fuse model LA-3898.

User Maintenance

Regular operator maintenance of the multimeter consists of cleaning case and window, and battery replacement. All other repairs must be performed by a factory service center or other qualified instrument service personnel.

Cleaning Case and window

Periodically wipe the case with a damp cloth and detergent, allow to dry completely before using; do not use abrasives or solvents.

Battery Replacement

When the multimeter displays the 

the battery must be replaced to maintain proper operation.

WARNING

To prevent electrical shock hazard, turn off the multimeter and disconnect test leads before removing the back cover.

1. Disconnect the test leads and turn the meter off. Remove the test leads from the front terminals.
2. Position the meter face down. Remove the screws from the case bottom.
3. Lift the end of the case back until it gently unsnaps.
4. Lift the battery from the case back.
5. Replace battery.
6. Replace the case top. Reinstall screws.

Fuse Replacement

1. Disconnect the test leads and turn the meter off. Remove the test leads from the front terminals.
2. Position the meter face down. Remove the screws from the case back.
3. Lift the end of the case back until it gently unsnaps.
4. Remove the fuse by gently prying one end of the fuse loose and sliding the fuse out of the bracket.
5. Verify continuity across the fuse.
6. If the fuse is good, return to tester.
7. If the fuse is blown, install a new fuse of the same size and rating.
8. Replace the case top. Reinstall screws.

Troubleshooting

The meter has been designed to be accurate, reliable and easy-to-use. However, it is possible that you may experience difficulties during operation. If there appears to be any kind of problem during use of the multimeter, please perform the following steps to help determine the source:

1. Review and comply with the operating instructions section of this instruction manual.
2. Test the battery, replace as necessary.
3. Test the fuses, replace as necessary.
4. Check to see that the Function/Range Switch is in the correct position for the type of parameter and range of values being measured, and that the measurement value is within the capability of the multimeter.
5. Inspect the test leads for breaks or cracks, and ensure that the test leads are inserted fully into the input connectors.
6. If problem persists, meter should be inspected by a qualified service person.

LIFETIME LIMITED WARRANTY

This meter is warranted to the original purchaser against defects in material or workmanship. During the warranty period, IDEAL INDUSTRIES, INC. will, at its option, replace or repair the defective unit, subject to verification of the defect or malfunction.

This warranty does not apply to defects resulting from abuse, neglect, accident, unauthorized repair, alteration, or unreasonable use of the instrument.

Any implied warranties arising out of the sale of an IDEAL product, including but not limited to implied warranties of merchantability and fitness for a particular purpose, are limited to the above. The manufacturer shall not be liable for loss of use of the instrument or other incidental or consequential damages, expenses, or economic loss, or for any claim or claims for such damage, expenses, or economic loss.

State laws vary, so the above limitations or exclusions may not apply to you. This warranty gives you specific legal rights, and you may also have other rights which vary from state to state.