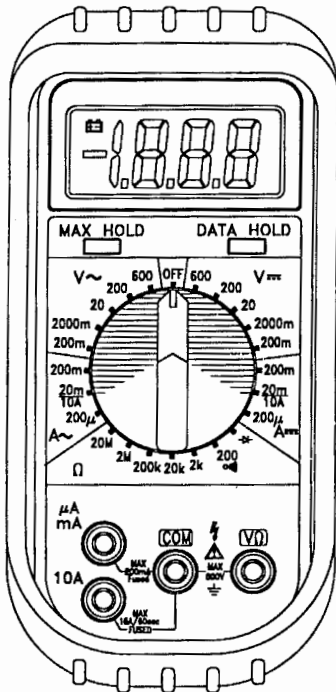




#61-360

## IDEAL Test Pro<sup>®</sup> 360 Series Multimeter



### WARNING!

- 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.
- 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.
- 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.
- Visually inspect leads for damage before using. Replace if insulation is damaged or leads appear suspect.
- 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.
- Before beginning all unknown measurements, set meter to the highest range possible.

### WARNING! (cont.)

- 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.
- Disconnect the meter from the circuit before turning off any indicator, including motors, transformers, and solenoids.

### Overload Protection

$V_{AC} + V_{DC}$	200mV range	500VDC/350VAC for 15 sec
	>200mV range	600VDC/600VAC
$A_{AC} + A_{DC}$	mA input	0.5A/250V
	10A input	10A/600V
Ohms ( $\Omega$ )		500VDC/500VAC
Diode		500VDC/500VAC
Continuity		500VDC/500VAC

### Unit of Measure Multipliers

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

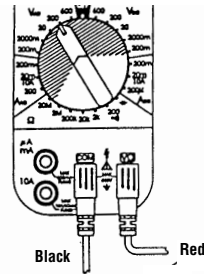
Symbol	Verbal	Multiplier
M	mega	X1,000,000
K	kilo	X1,000
m	milli	$\div$ 1,000
$\mu$	micro	$\div$ 1,000,000

### To Measure AC Voltage:

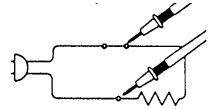
- Plug the test leads into the meter inputs as indicated in the diagram below.
- Select the proper range to be used within the VAC area.
- Connect the meter in parallel with the load or circuit.
- Measure AC voltage.

### AC VOLTAGE

#### Meter Setup:



#### Circuit Connection:



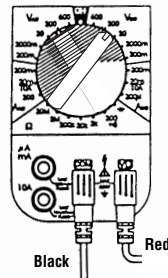
Function	Range	Resolution	Accuracy
AC Voltage	200.0 mV	.1 mV	50 to 500Hz $\leq$ 20 V range $\pm(1\% + 4)$ $\leq$ V range $\pm(1.5\% + 4)$
	2000 mV	1mV	
	20.00 V	.01 V	
	200.0 V	.1 V	
	600 V	1 V	

### To Measure DC Voltage

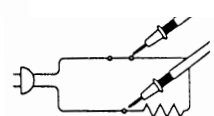
- Plug the test leads into meter inputs as indicated in the diagram on the next page.
- Select the proper range to be used within the VDC area.
- Connect the meter in parallel with the load or circuit.
- Measure DC voltage.

### DC VOLTS

#### Meter Setup:



#### Circuit Connection:



Function	Range	Resolution	Accuracy
DC Voltage	200.0 mV	.1 mV	$\pm (0.5\% + 1)$
	2000 mV	1 mV	$\pm (0.5\% + 1)$
	20.00 V	.01 V	$\pm (0.5\% + 1)$
	200.0 V	.1 V	$\pm (0.5\% + 1)$
	600 V	1 V	$\pm (0.5\% + 1)$

### To Measure Resistance:

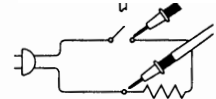
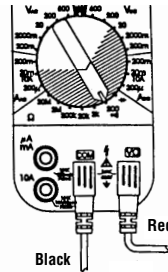
Resistance is measured in Ohms.

- Turn the power off to the circuit or device that is to be measured and discharge all capacitors before measurement is to be taken.
- Plug test leads into the meter inputs as indicated in the following diagram.
- Select the proper range within the  $\Omega$  function of the tester.
- Measure resistance. If necessary, perform the required multiplication to acquire the actual resistance.
  - Range Guide for Ohms ( $\Omega$ ):
    - 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.
- 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.

### Resistance (Ohms)

Meter Setup:

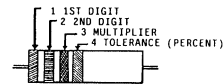
Circuit Connection:



Function	Range	Resolution	Accuracy
Resistance	200.0 $\Omega$	.1 $\Omega$	$\pm (1.0\% + 4)$
	2.000K $\Omega$	.001K $\Omega$	$\pm (1.0\% + 4)$
	20.00K $\Omega$	.01 K $\Omega$	$\pm (1.0\% + 4)$
	200.0K $\Omega$	.1K $\Omega$	$\pm (1.0\% + 4)$
	2.000M $\Omega$	.001M $\Omega$	$\pm (1.0\% + 4)$
	20.00M $\Omega$	.01 M $\Omega$	$\pm (2.0\% + 4)$

### Determining Resistor Values:

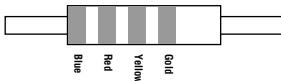
To determine the value of a resistor, use the color bands on the resistor and the following table.



## 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  $\pm 5\%$

Your Resistor value is 620,000 Ohms (620K $\Omega$ ) with a tolerance of  $\pm 5\%$ .

### 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 below.
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 200 $\Omega$  setting.

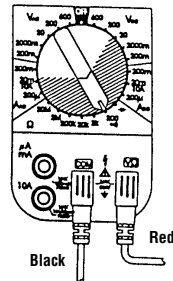
### To Verify Continuity:

4. Test for continuity by connecting the meter to the circuit.
5. If the beeper sounds the circuit is complete.

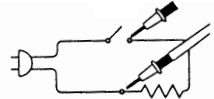
### Continuity Beeper

(beeps at resistance <30 $\Omega$ )

#### Meter Setup:



#### Circuit Connection:



### Diode Testing:

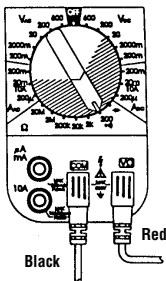
To ensure a proper functioning diode, the meter will develop a voltage across the component from a test current. The diode test function allows measurements of forward voltage drops across diodes and transistor junctions.

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 following diagram.
3. Select the diode **(•••)** function on the meter.
4. Connect the red test probe to the anode (+) and the black test probe to the cathode (-) of the diode. If the diode is shunted by a resistor of 1K Ohm or less, it must be removed from the circuit before taking the measurement.

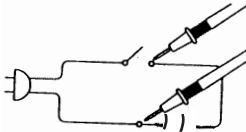
5. Read the forward voltage drop on the digital display:
  - 5.1 A good silicon diode will result in a reading around 0.7 V.
  - 5.2 A good germanium diode will result in a reading around 0.3 V.
  - 5.3 A short is indicated by a continuous beep and a reading of .000 V.
  - 5.4 An open is indicated by a 1. V reading.
6. Reverse the test probe connections to the diode and perform a reverse-leakage test of the diode.
  - 6.1 A reading of 1. V indicates reverse blocking and a good diode.
  - 6.2 A reading of .000 V and a continuous beep indicates high reverse leakage current or a short.

### DIODE TESTING

**Meter Setup:**



**Circuit Connection:**



Function	Range	Resolution	Accuracy
Diode Test	3 VDC	1 mV	$\pm (1.5\% + 1)$

### To Measure AC Current:

Current is measured in amps.

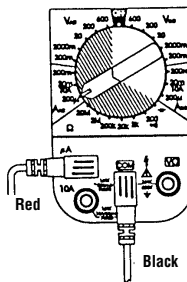
Do not attempt to measure current in circuits capable of delivering greater than 600V. If the current is unknown, begin at the highest range, selecting the next lowest until a reading is displayed.

### To Measure AC Current (cont.):

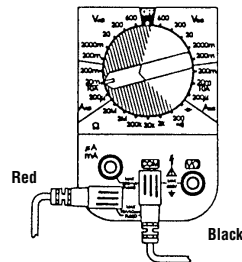
1. Connect the test leads into the meter inputs as indicated in the following diagram.
2. Select the proper range to be used within the AAC area.
3. Turn the power off.
4. Connect the meter in series with the load or circuit.
5. Turn power on.
6. Measure AC Current.

### Meter Setup:

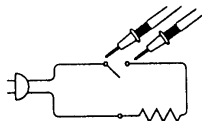
**Current <200mA AC**



**Current AMPS>200mA AC  
10 Amps Max.**



### Circuit Connection:



Function	Range	Resolution	Accuracy
AC Current	200.0µA	.1µA	$\pm(1.5\% + 4)$
	20.00 mA	.01 mA	$\pm(1.5\% + 4)$
	200.0mA	.1mA	$\pm(1.5\% + 4)$
	20.00A	.01A	$\pm(2.5\%)$

## To Measure DC Current:

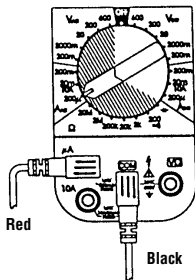
Current is measured in amps.

Do not attempt to measure current in circuits capable of delivering greater than 600V. If the current is unknown, begin at the highest range, selecting the next lowest until a reading is displayed.

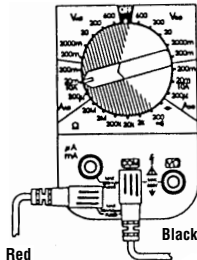
1. Plug the test leads into the meter inputs as indicated in the following diagram.
2. Select the proper range to be used within the ADC area.
3. Turn power off.
4. Connect the meter in series with the load or circuit.
5. Turn power on.
6. Measure DC Current.

### Meter Setup:

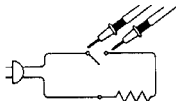
#### Current <200mA DC



#### Current >200mA DC 10 Amps Max.



### Circuit Connection:



## To Use Accessories:

### For AC Current Clamp:

1. Plug test leads into the meter inputs as indicated in diagram 1.
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. Select the mVAC range on the meter.
5. Snap the jaw of the current clamp around one of the current carrying conductors.
6. Take reading.

### For all other Accessories:

1. Plug test leads into the meter inputs as indicated in diagram 2.
2. Remove the probe tips from the end of the leads.
3. Attach the leads to the accessory.
4. Select the mVDC range on the meter.
5. Turn the accessory on.
6. Take reading.

Diagram 1

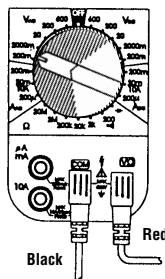
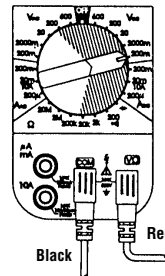


Diagram 2



Function	Range	Resolution	Accuracy
DC Current	200.0µA	.1µA	± (1.0% +1)
	20.00 mA	.01 mA	± (1.0% +1)
	200.0mA	.1mA	± (1.0% +1)
	20.00A	.01A	± (2.0% +3)

## General Specifications:

**Data Hold:** "HOLD" button "locks" reading. Any range or function.

**Max hold:** "Max" button locks the largest reading. Any range, any function.

**Low battery indicator:** Located in the LCD.

**Indicators:** Continuity Beeper: ( $<30\Omega$   $<500\text{msec}$ , 3V type), low battery, polarity. Overrange: "OL" is displayed.

**Environmental:** Operating temperature 32°F to 122°F, storage 0°F to 140°F with batteries removed, RH $<$ 70%.

**Temperature Coefficient:** 0.05 x (accuracy) per °F (32°F to 65°F, 80°F to 122°F)

**Measurement rate:** 2.5 times/sec.nominal.

**Battery life:**  $>$ 300 hours typical with carbon-zinc battery.

**Battery type:** 9V NEDA 1604 type.

**Safety:** Designed to IEC1010-1 Cat. III 600V, UL1244.

**Overload Protection:** 600V for VAC, VDC. 500V for resistance. Current protected by 0.5A/250V (5x20mm) fuse model LA-3895 and 10A/600V (6.35x25.4mm) fuse model LA-3897.

## 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.


## 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.

## 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. Review 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.