

TRIPLETT

Model 9005-A Digital Multimeter Instruction Manual



 **TRIPLETT**

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1: INTRODUCTION

The **Triplett Model 9005-A** is a 3 1/2 digit, high reliability, handheld Digital Multimeter with a large 1.15" high Liquid Crystal Display. At its core is an LSI (Large Scale Integration) integrated circuit which uses dual slope A/D conversion for stability and accuracy. The meter can measure AC and DC Voltage and Current, Resistance, Transistor gain, Diode voltage drop, and Continuity. Auto Power Off and Hold features enhance convenience, and Overload protection makes the meter resistant to damage from accidental overloads.

2: SAFETY RULES & WARNINGS




WARNING!!!

This meter is NOT to be used to measure High Energy circuits (power circuitry fused at greater than 4KW, such as distribution circuits, power entrance circuits, etc.) or circuits classified by CE as CATEGORY III (CAT III).

2.1 Read all instructions in this manual before using this meter. Failure to do so may result in damage to the meter or injury to the user.

2.2 Prior to using the meter in any situation which could result in injury to the user, in order to verify that the meter is functional and producing a valid reading, test the meter on a circuit(s) known to have potentials equivalent to the potential that is to be measured. For example, before using the meter to determine if an AC power line is energized with 120VAC, test the meter on a line known to be energized with 120VAC. Failure to do so may result in damage to the meter or injury to the user.

- 2.3** *Do not use this meter with its case open, or with parts removed. Doing so may damage the meter and/or injure the user.*
- 2.4** *When using this meter in schools and workshops, responsible teachers or skilled personnel must control the usage of this meter. Failure to observe this precaution may result in damage to the meter or injury to the user.*
- 2.5** *Follow the recommendations of any Trade Organizations or Regulatory Agencies whose scope encompasses the use of this meter. Failure to do so may result in damage to the meter or injury to the user.*
- 2.6** *Do not open this meter for maintenance without first disconnecting the test leads from all external circuitry. Failure to observe this precaution may result in damage to the meter or injury to the user.*
- 2.7** *Repairs and maintenance must only be carried out by qualified service personnel or qualified electricians / technicians who know the dangers of, and the safety rules applicable to this type of equipment. Failure to observe this precaution may result in damage to the meter or injury to the user.*
- 2.8** *Always set the meter to the appropriate range or mode before connecting it to the circuitry to be tested. Failure to observe this precaution may result in damage to the meter or injury to the user.*
- 2.9** *Check the condition of the test leads before making a measurement. Do not use the test leads if there is damaged insulation or exposed metal. Failure to observe this precaution may result in damage to the meter or injury to the user.*
- 2.10** *Make sure test leads are properly inserted and seated in the meter's input jacks. A loose test lead may cause the user to believe that no hazard exists, when in fact, dangerous voltages or currents may be present. Failure to observe this precaution may result in damage to the meter or injury to the user.*
- 2.11** *Do not touch the tips of the test leads when making a measurement. Do not touch live circuitry when making a measurement. Failure to observe this precaution may result in damage to the meter or injury to the user.*
- 2.12** *Before using the meter, examine both the meter and the test leads for damage. Do not use the meter if damage (damaged insulation, exposed metal, cracked case, burnt smell, etc.) is evident. Failure to observe this precaution may result in damage to the meter or injury to the user.*

- 2.13** Insert the test leads in the jacks specified in the instructions for performing particular tests. Inserting the test leads in incorrect jacks can damage the meter and/or injure the user.
- 2.14** Do not exceed the maximum voltage or current limitations of the meter (see product specifications). Doing so may damage the meter and/or injure the user.
- 2.15** Do not apply voltage or current to the input of the meter when it is set to any of the Ohms Ω ranges. Doing so may damage the meter and/or injure the user.
- 2.16** Do not apply voltage or current to the input of the meter when it is set to the Diode Test  or Continuity Beeper  modes. Doing so may damage the meter and/or injure the user.
- 2.17** Do not attempt to measure a voltage source with the test leads plugged into the meter's mA or 20A jacks. Doing so may damage the meter and/or injure the user.
- 2.18** Do not rotate the Function switch with the test leads connected to the circuitry to be tested. Doing so may damage the meter or the circuitry, and/or injure the user.
- 2.19** Replace fuses only with exact or equivalent fuses. Do not “bridge” fuses out of circuit. Failure to observe this precaution may result in damage to the meter or injury to the user.
- 2.20** Do not apply voltages to the input of the meter which are elevated above the earth ground potential by more than 600V AC/DC. Doing so may damage the meter and/or injure the user.
- 2.21** Do not continue to use meter when the “low battery” symbol  is displayed. The displayed reading may be in error and lead the user to believe that no hazard exists, when in fact, dangerous voltages or currents may be present. Failure to observe this precaution may result in damage to the meter or injury to the user.
- 2.22** Use caution when working with voltages above 25 volts AC or 35 volts DC. Such voltages may cause a life threatening electrical shock.
- 2.23** This meter is not for use by children. Failure to observe this precaution may result in damage to the meter or injury to the user.













- 2.24** *Do not use this meter to make measurements in adverse environments such as rain, snow, fog, or locations with steam, explosive gases or dusts. Doing so may damage the meter and/or injure the user.*
- 2.25** *Do not use meter in condensing atmospheres. That is, do not use meter in conditions where ambient temperature and humidity could cause condensation of water inside of meter. Doing so may cause injury to the user.*
- 2.26** *Do not use the meter if either the meter or the test leads are wet, either from exposure to the weather, or after cleaning the case of the meter. Doing so may cause injury to the user.*
- 2.27** *Do not attempt immediate use of the meter when bringing it from a cold environment to a warm environment. Condensation of water, inside and outside of the meter, may produce dangerous measuring conditions. Allow the meter to warm to room temperature before using. Failure to observe this precaution may result in damage to the meter or injury to the user.*
- 2.28** *Do not modify the meter. Changing the design may make the meter unsafe and may result in injury to the user.*
- 2.29** *Use caution when attempting to evaluate if a dangerous voltage is present. The meter will not read AC voltage if it is set to DC, nor will it read DC if it is set to AC. For example, if the meter is set to 200VDC, it will not measure a dangerous AC voltage, even if the probes are inserted into a household AC wall outlet.*
- 2.30** *Do not touch the metallic portion of one test lead if the other test lead is connected to a live circuit. The current from the live circuit may pass through the meter and appear on the unconnected test lead. Failure to observe this warning may result in user injury.*
- 2.31** *Do not attempt to use meter when no display is present on LCD. Doing so may damage the meter and/or injure the user.*
- 2.32** *Use caution when measuring circuits containing capacitors. Capacitors can store dangerous or lethal levels of electricity, even when the circuitry which they are in has been disconnected from its power source. Some capacitors could source enough energy to damage the meter and/or injure the user.*
- 2.33** *Do not use this meter to measure voltages or currents in industrial applications where High Energy circuitry is used. High Energy circuitry is usually regarded as any circuitry capable of supplying over 4000 watts to a load before a safety device (like a fuse) interrupts the circuit. See product specifications for Category II statement.*

- 2.34** Do not use this meter to measure current in circuits whose open circuit voltage exceeds 250V AC/DC. The meter's fuses are rated at 250V max. Failure to observe this precaution may result in damage to the meter or injury to the user.
- 2.35** When you use the meter to check a high-voltage circuit, do not try to connect both test leads at once. Instead, clip one probe to the neutral or ground lead of the circuit (usually a bare, green, or white wire in AC wiring circuits) using the insulated slip-on Alligator Clips. Then probe for voltages with the other test lead. This helps prevent you from accidentally touching a hot wire, since you need to concentrate on only one test lead. Failure to observe this precaution may result in damage to the meter or injury to the user.
- 2.36** If there is any doubt about the condition of the meter (i.e. safe vs unsafe), remove the meter from service and secure it in a location that will prevent its unintentional use. Failure to observe this precaution may result in damage to the meter or injury to the user.
- 2.37** Do not use the meter if it does not appear to work correctly on all ranges and in all modes. Failure to observe this precaution may result in damage to the meter or injury to the user.
- 2.38** Do not use the meter if it has undergone long-term storage under unfavorable conditions. Failure to observe this precaution may result in damage to the meter or injury to the user.
- 2.39** Do not use the meter if it may have been damaged in transport. Failure to observe this precaution may result in damage to the meter or injury to the user.
- 2.40** Always connect one of the meter's alligator clips to the low side of a power circuit first. Never clamp onto a hot wire first, (usually red, black, or blue in AC wiring circuits.) If you clamp onto a hot wire first, and touch the other probe, you could receive a shock. Failure to observe this precaution may result in damage to the meter or injury to the user.
- 2.41** To avoid damage to the meter and possible user injury, disconnect test leads from test points before changing the function/range. Failure to observe this precaution may result in damage to the meter or injury to the user.

- 2.42** *Avoid usage near strong magnetic fields (magnets, loudspeakers, transformers, motors, coils, relays, contactors, electromagnets, etc.). The meter may display readings that are in error, causing the user to misinterpret the hazards present. For example, the meter may indicate a low voltage when high voltages are actually present. Failure to observe this precaution may result in damage to the meter or injury to the user.*
- 2.43** *Avoid usage near strong electrostatic fields (high voltage power lines, televisions, computer monitors, etc.). The meter may display readings that are in error, causing the user to misinterpret the hazards present. For example, the meter may indicate a low voltage when high voltages are actually present. Failure to observe this precaution may result in damage to the meter or injury to the user.*
- 2.44** *Avoid usage near strong RF fields (radio or television transmitters, walkie talkies, cellular phones, etc.). The meter may display readings that are in error, causing the user to misinterpret the hazards present. For example, the meter may indicate a low voltage when high voltages are actually present. Failure to observe this precaution may result in damage to the meter or injury to the user.*
- 2.45** *Remove the battery when the meter may be left unused for longer than 1 month. Chemical leakage from the battery could damage the meter, leading to user injury.*
- 2.46** *Do not use the meter if there is evidence of chemical leakage from the battery. Leakage could damage meter and lead to injury of user.*
- 2.47** *Observe whether HOLD function is activated. The meter may not show the presence of dangerous potentials when HOLD is activated. For example, if HOLD is applied when the meter is reading zero, and 120VAC is subsequently applied, the meter will continue to read zero. Failure to observe this precaution may result in damage to the meter or injury to the user.*
- 2.48** *Do not attempt to measure the hFE of a transistor with the meter's test leads connected. Failure to observe this precaution may result in injury to the user.*

3: INTERNATIONAL SYMBOLS


The following International Symbols may be used in this manual and on the case of the meter to identify, caution, or warn the user of important product limitations or important operational procedures that must be followed to ensure safe usage of the product.

	Low Battery		Ground
	See Instruction Manual		AC
	DC		Fuse
	Double Insulated		Beeper
	Diode		AC or DC
	Dangerous Voltages		Ohms

4: PRODUCT FEATURES

- 4.1 32 Measurement Ranges
- 4.2 Large 1.15" (29mm) high LCD display
- 4.3 3 1/2 digit resolution (2000 counts) with onscreen mode annunciators
- 4.4 Protective shock absorbing "holster" with built in stand and test lead holders
- 4.5 Diode Test indicates true voltage across diode
- 4.6 Continuity Beeper
- 4.7 Transistor Gain Test
- 4.8 HOLD button
- 4.9 Auto Power Off
- 4.10 Fused μA and mA ranges
- 4.11 Overload protection
- 4.12 Double Insulated
- 4.13 CE Mark (EMC / LVD)
- 4.14 CAT I, II, and III compliance (see Specifications for details)

5: SPECIFICATIONS

Display:	1.15" (29mm) high LCD
Display Resolution:	2000 counts, 0000 to 1999
Overrange Indication:	First digit displays "1", remaining digits are blank
Measurement Rate:	2 to 3 measurements per second
Low Battery Annunciator:	
Operating Conditions:	
Temperature:	0 to 40 degrees C (32 to 104 degrees F)
Relative Humidity:	less than 75%
Storage Conditions:	
Temperature:	-10 to 50 degrees C (14 to 122 degrees F)
Relative Humidity:	less than 80%
Case Dimensions:	19.7 x 8.6 x 3.8 cm, (L x W x H) 7.75 x 3.4 x 1.5 inches (L x W x H) (without holster)
Weight:	272 grams, 0.60 lbs. (w/ battery, w/o holster or leads)
Battery:	1 standard 9 volt alkaline battery (Triplett PN 37-48)
Battery Life:	approx. 200 hours
Fuse:	2A/250 volt FAST, 5 x 20mm fuse, for μ A & mA ranges (PN 3207-121) Littelfuse # 217002, 216002, 235002 Bussman # GDA-2, GDB-2 or GMA-2
Insulation:	Double Insulated (Protection Class II)
Approvals:	IEC 1010-1 (EN61010-1) Overvoltage Category (Installation Category) Category I to 1000 volts DC Category I to 750 volts AC Category II to 600 volts AC/DC Category III to 300 volts AC/DC CE: EMC, LVD

Note:

- a) The following accuracy specifications are valid at 23 degrees C, +/- 5 degrees C, Relative Humidity less than 75%
- b) The specifications are in the form “ +/- (x % of reading + LSD)” where LSD is “Least Significant Digit”.

DC Voltage		
Range	Resolution	Accuracy
200mV	0.1mV	±(0.8% rdg + 5 digits)
2V	1mV	
20V	10mV	
200V	100mV	
1000V	1V	



Input Impedance: All ranges are 10MΩ
Overload Protection: 200mV Range: 250V AC/DC rms. (15 sec. Max)
 2V / 20V / 200V Ranges: 600V AC/DC rms
 1000V Range: 1000VDC, 1000VAC pk-pk max.

AC Voltage		
Range	Resolution	Accuracy
200mV	0.1mV	±(1.2% rdg + 3 digits)
2V	1mV	±(0.8% rdg + 3 digits)*
20V	10mV	±(0.8% rdg + 3 digits)
200V	100mV	
750V	1V	±(1.2% rdg + 3 digits)



Input Impedance: All ranges are 10MΩ
Frequency: 40Hz to 400Hz
Overload Protection: 200mV Range: 250V AC/DC rms.
 2V / 20V / 200V Ranges: 600V AC/DC rms
 750V Range: 750V AC/DC rms, 1000VAC pk-pk max.
Display: Average Value (RMS of Sine Wave)

* From 10% to 100% of FS. Residual reading of up to 0.015V is normal on this range

DC Current		
Range	Resolution	Accuracy
20μA	0.01μA	±(0.8% rdg + 3 digits)
200μA	0.1μA	
2mA	1μA	
20mA	10μA	
200mA	100μA	±(1.0% rdg + 3 digits)
2A	1mA	
10A	10mA	±(2.0% rdg + 5 digits)



Overload Protection: 2A / 250V fuse (below 2A range)
 10A Range is unfused
Max. Current Input: 10A
Measuring Voltage Drop: Full range is 200mV.

AC Current		
Range	Resolution	Accuracy
200 μ A	0.1 μ A	$\pm(1.2\% \text{ rdg} + 3 \text{ digits})$
2mA	1 μ A	
20mA	10 μ A	
200mA	100 μ A	$\pm(1.5\% \text{ rdg} + 3 \text{ digits})$
2A	1mA	
10A	10mA	$\pm(3.0\% \text{ rdg} + 5 \text{ digits})$



Overload Protection: 2A / 250V fuse (below 2A range)
10A Range is unfused

Max. Current Input: 10A

Measuring Voltage Drop: Full range is 200mV.

Display: Average Value (RMS of Sine Wave)

Resistance		
Range	Resolution	Accuracy
200 Ω	0.1 Ω	$\pm(0.8\% \text{ rdg} + 2 \text{ digits})$ after subtracting any residual resistance noted when test leads are shorted. Typically less than 0.5 Ω on 200 Ω range
2K Ω	1 Ω	
20K Ω	10 Ω	
200K Ω	100 Ω	
2M Ω	1K Ω	
20M Ω	10K Ω	$\pm(1.0\% \text{ rdg} + 2 \text{ digits})$
200M Ω	100K Ω	$\pm [5\% (\text{rdg}-10) + 10 \text{ digits}]$



Open Circuit Voltage: Less than 700mV on all ranges
(except 200M Ohm range, which is approx. 3V).

Overload Protection: All ranges 250V DC or AC RMS. (15 sec. Max)

Note: On 200M Ohm range, it is normal for the meter to display 10 LSD with the test leads shorted together. To obtain an accurate reading, subtract 10 LSD from the displayed value.

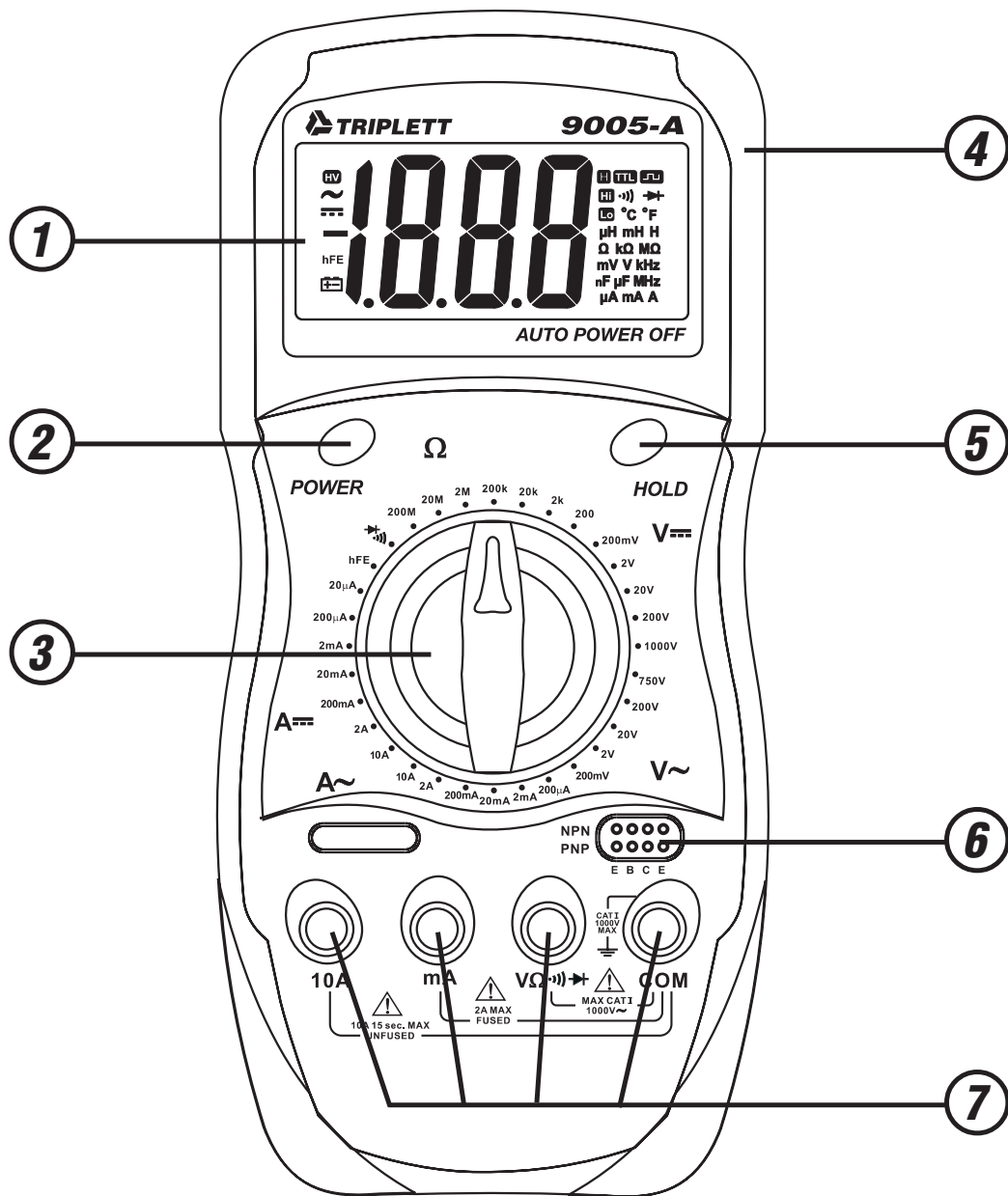
Diode Test and Continuity		
Range	Resolution	Accuracy
	Displays actual diode voltage in mV	Forward DC current about 1mA Open circuit voltage about 2.8V
	Beeper sounds if Continuity Resistance is less than 20 to 100 Ohms	Open circuit voltage about 2.8V



Overload Protection: 250V DC or AC RMS. (15 sec. Max)

Transistor hFE Test		
Range	Resolution	Accuracy
hFE	Can measure NPN or PNP transistor hFE. Range: 0-1000 β	Base current about 10 μ A Vce about 2.8V

6: 9005-A FRONT PANEL



- 1) **Liquid Crystal Display**
- 2) **POWER Button**
- 3) **Rotary Function / Range Switch**
- 4) **Holster**
- 5) **HOLD Button**
- 6) **Transistor Socket**
- 7) **Input Jacks**

7: MEASUREMENT PROCEDURES

WARNING!!!

Do not use the meter when the low battery annunciator  is displayed. This may cause the meter to produce inaccurate readings, and lead the user to believe that no hazard exists, when, in fact, dangerous voltages or currents are present.

7.1 Using the HOLD feature:

The 9005-A incorporates a convenient HOLD feature. This feature “freezes” the reading in the LCD when the HOLD button is pressed. To release the HOLD, press the HOLD button again.

Note: “H” annunciator appears in the LCD when HOLD is activated.

WARNING!!!

The meter may not show the presence of dangerous potentials when HOLD is activated. For example, if HOLD is applied when the meter is reading zero, and 120VAC is subsequently applied, the meter will continue to read zero. Failure to observe this precaution may result in damage to the meter or injury to the user.

7.2 Auto Power Off:

The 9005-A has Auto Power Off. This power saving feature automatically turns the meter off 15 to 20 minutes after turning it on..... thereby extending battery life.

7.3 DC Voltage Measurement:

WARNING!!!

If the magnitude of the voltage to be measured is unknown, always start by setting the meter to the highest range, and then to lower ranges, until a satisfactory reading is obtained.

Do not rotate the RANGE switch with the input applied to the meter. If the input voltage is higher than 1000VDC (CAT I), 600V DC (CAT II), or 300V DC (CAT III), do not attempt to measure!



Use Caution when measuring voltages above 50V DC.

7.3.1 Connect the black test lead to the **COM** jack and the red test lead to the **VOLT / OHM / BEEPER / DIODE “V Ω •)) ➔+”** jack.

- 7.3.2** Set the RANGE switch to a V_{DC} position. If the magnitude of the voltage is unknown, set the RANGE switch to the highest V_{DC} position. If the input voltage is higher than the previously stated limits, do not attempt to measure!
- 7.3.3** Connect the test probes to circuit being measured. The LCD will display the DC voltage.
- 7.3.4** If the display indicates overrange, i.e. “1- - -”, disconnect the test probes from the circuit and rotate the RANGE switch to the next higher position. Reconnect the test probes to the circuit and observe the reading on the LCD display. If the RANGE switch is already at the highest position (i.e. 1000 VDC), the input voltage exceeds the measurement capability of the meter and should not be measured.
- 7.3.5** If the displayed value is less than “200” (decimal point not shown), a more accurate reading may be obtained by setting the RANGE switch to a lower range. Disconnect the probes from the circuit and rotate the RANGE switch to the next lower position. Reconnect the test probes to the circuit and observe the reading on the LCD display. If the RANGE switch is already on the lowest position (i.e. 200mV DC), no greater measurement resolution can be obtained.

7.4 AC Voltage Measurement:

WARNING!!!

If the magnitude of the voltage to be measured is unknown, always start by setting the meter to the highest range, and then to lower ranges, until a satisfactory reading is obtained.

Do not rotate the RANGE switch with the input applied to the meter. If the input voltage is higher than 750VAC (CAT I), 600VAC (CAT II), or 300VAC (CAT III), do not attempt to measure!



Use Caution when measuring voltages above 30V AC.

- 7.4.1** Connect the black test lead to the **COM** jack and the red test lead to the **VOLT / OHM / BEEPER / DIODE “V Ω ∙)) ➔”** jack.
- 7.4.2** Set the RANGE switch to a V_{\sim} position. If the magnitude of the voltage is unknown, set the RANGE switch to the highest V_{\sim} position. If the input voltage is higher than the previously stated limits, do not attempt to measure!

- 7.4.3** Connect the test probes to circuit being measured. The LCD will display the AC voltage.
- 7.4.4** If the display indicates overrange, i.e. “1- - -”, disconnect the test probes from the circuit and rotate the RANGE switch to the next higher position. Reconnect the test probes to the circuit and observe the reading on the LCD display. If the RANGE switch is already at the highest position (i.e. 750 VAC), the input voltage exceeds the measurement capability of the meter and should not be measured.
- 7.4.5** If the displayed value is less than “200” (decimal point not shown), a more accurate reading may be obtained by setting the RANGE switch to a lower range. Disconnect the probes from the circuit and rotate the RANGE switch to the next lower position. Reconnect the test probes to the circuit and observe the reading on the LCD display. If the RANGE switch is already on the lowest position (i.e. 200mV AC), no greater measurement resolution can be obtained.

7.5 DC Current Measurement:

WARNING!!!

If the magnitude of the current to be measured is unknown, always start by setting the meter to the highest range, and then to lower ranges, until a satisfactory reading is obtained.

Do not rotate the RANGE switch with the input applied to the meter. If the input current is higher than 10A, do not attempt to measure!



Use caution when measuring current in a circuit with voltages above 50 VDC. Do not use meter to measure current in circuits whose voltage exceeds 250V AC/DC.

- 7.5.1** Connect the black test lead to the **COM** jack. Connect the red test lead to the **10A** jack unless it is known that the input current is less than 2A. If the current is less than 2A, connect the red test lead to the **mA** jack.
- 7.5.2** If the red test lead is inserted into the **10A** jack, set the RANGE switch to the **10A** **==** position. Read the value of the current on the LCD display.
- 7.5.3** If the red test lead is inserted into the **mA** jack, set the RANGE switch to the **2A** **==** position. Read the value of the current on the LCD.

7.5.4 If the display indicates overrange, i.e. “1- - -”, disconnect the test probes from the circuit and reconnect the red test lead to the **10A** jack. Set the RANGE switch to the **10A** position, and reconnect the test leads to the circuit. Read the value from the LCD. If the input current exceeds the measurement capability of the meter, as evidenced by a display of over 10 amps, or an overrange display, it should not be measured.

7.5.5 If the displayed value is less than “200” (decimal point not shown), a more accurate reading may be obtained by setting the RANGE switch to a lower range. Disconnect the probes from the circuit and rotate the RANGE switch to the next lower position. Reconnect the test probes to the circuit and observe the reading on the LCD display. If the RANGE switch is already on the lowest position (i.e. 20 μ A), no greater measurement resolution can be obtained.

7.6 AC Current Measurement:

WARNING!!!

If the magnitude of the current to be measured is unknown, always start by setting the meter to the highest range, and then to lower ranges, until a satisfactory reading is obtained.

Do not rotate the RANGE switch with the input applied to the meter. If the input current is higher than 10A, do not attempt to measure!



Use caution when measuring current in a circuit with voltages above 30 VAC. Do not use meter to measure current in circuits whose voltage exceeds 250V AC/DC.

7.6.1 Connect the black test lead to the **COM** jack. Connect the red test lead to the **10A** jack unless it is known that the input current is less than 2A. If the current is less than 2A, connect the red test lead to the **mA** jack.

7.6.2 If the red test lead is inserted into the **10A** jack, set the RANGE switch to the **10A** position. Read the value of the current on the LCD display.

7.6.3 If the red test lead is inserted into the **mA** jack, set the RANGE switch to the **2A** position. Read the value of the current on the LCD.

7.6.4 If the display indicates overrange, i.e. “1- - -”, disconnect the test probes from the circuit and reconnect the red test lead to the **10A** jack. Set the RANGE switch to the **10 A~** position, and reconnect the test leads to the circuit. Read the value from the LCD. If the input current exceeds the measurement capability of the meter, as evidenced by a reading of greater than 10 amps, or an overrange display, it should not be measured.

7.6.5 If the displayed value is less than “200” (decimal point not shown), a more accurate reading may be obtained by setting the RANGE switch to a lower range. Disconnect the probes from the circuit and rotate the RANGE switch to the next lower position. Reconnect the test probes to the circuit and observe the reading on the LCD display. If the RANGE switch is already on the lowest position (i.e. 200 μ A), no greater measurement resolution can be obtained.

7.7 Resistance Measurement:



WARNING!!!

Do not apply voltage or current to the meter when it is set to any of the “ Ω ” ranges.

7.7.1 Connect the black test lead to the **COM** jack, and the red test lead to the **VOLT / OHM / BEEPER / DIODE “V Ω \cdot)) \rightarrow +** jack.

7.7.2 Set the RANGE switch to the **Ohms “ Ω ”** position that is appropriate for the device or circuit to be measured. The LCD display will indicate overrange (i.e. “1- - -”).

7.7.3 Connect the test leads to the device or circuit being measured. Observe correct polarity if appropriate.

7.7.4 If the display indicates overrange, i.e. “1- - -”, rotate the RANGE switch to the next higher position and observe the reading on the LCD display. If the RANGE switch is already at the highest position (i.e. 200M Ohms), the resistance exceeds the value measurable by the meter.


7.7.5 If the displayed value is less than “200” (decimal point not shown), a more accurate reading may be obtained by setting the RANGE switch to a lower range. Rotate the RANGE switch to the next lower position and observe the reading on the LCD display. If the RANGE switch is already on the lowest position (i.e. 200 Ohms), no greater measurement resolution can be obtained.

Notes:

- a) The 2M, 20M, and 200M ranges require several seconds to stabilize.
- b) The 200M range reads 10 LSD high. To obtain an accurate reading, subtract 10 LSD from the indicated value on the LCD.
- c) To obtain the most accurate reading on the 200Ω range, short the test leads together and note the “residual resistance” reading. It is typically less than 0.5Ω . Subtract this value from subsequent readings on the 200Ω range.

7.8 Continuity Beeper:

 **WARNING!!!**
Do not apply voltage or current to the meter when it is set to the Diode Test / Continuity Beeper “ ·)))” range.

7.8.1 Connect the black test lead to the **COM** jack and the red test lead to the **VOLT / OHM / BEEPER / DIODE “V Ω ·)))  ”** jack.

7.8.2 Set the RANGE switch to the **Diode Test / Continuity Beeper “ ·)))”** range.


7.8.3 Connect the test probes to the device or circuit to be tested.

7.8.4 If the resistance of the device or circuit is less than 20 to 100 Ohms, the continuity beeper will sound.


Note: The reading displayed on the LCD is not an accurate indication of the resistance of the device or circuit being measured.

7.9 Diode Test:

 **WARNING!!!**
Do not apply voltage or current to the meter when it is set to the Diode Test / Continuity Beeper “ ·)))” range.

7.9.1 Connect the black test lead to the **COM** jack and the red test lead to the **VOLT / OHM / BEEPER / DIODE “V Ω ·)))  ”** jack.

7.9.2 Set the RANGE switch to the **Diode Test / Continuity Beeper**

“ ·)))” range.

7.9.3 Connect the test probes to the device or circuit to be tested. To test a simple diode, connect the red test probe to the Anode of the diode and the black test lead to the Cathode (“banded” end) of the diode. The LCD will indicate the voltage drop of the diode. Reverse the connections of the test probes to the diode. The LCD should indicate overrange (“1 - - -”). If the Continuity Beeper sounds when the leads are connected in either direction to a standard silicon diode, the diode is probably shorted.

Note: The reading displayed on the LCD is an accurate indication of the voltage drop of the device or circuit being measured.

7.10 Measuring Transistor hFE:



WARNING!!!

Do not apply voltage or current to the meter when it is set to the “hFE” range.

7.10.1 Set RANGE switch of meter to the **hFE** position. Do not insert test leads into any of the input jacks. Failure to observe this precaution may result in injury to the user.

7.10.2 Identify transistor type (i.e. NPN or PNP) and pinout of the transistor to be tested. Insert the leads of the transistor into the meter’s transistor jack at the appropriate locations.

7.10.3 Read the hFE of the transistor on the LCD display.

Notes:

a) The hFE test is not intended to determine if a transistor is “good” or “bad”. An assumption is made that the transistor is good, and the meter measures the hFE (small signal current gain) of the transistor.

b) For safety purposes, the contacts of the transistor socket are recessed. The leads of transistors removed from circuit boards may not be long enough to make contact in the socket.

c) It may be necessary to hold the transistor, and apply a slight pressure, in order to obtain an hFE reading.

8: USING THE HOLSTER

A protective holster is provided with the Model 9005-A. This vinyl holster provides a measure of protection from the everyday rigors that products of this type are often subjected to.

Molded into the holster are two holders for the test probes. When not in use, the test leads can be coiled around the meter and the probes snapped into these holders. Take care not to be stabbed with the points of the probes!

A built in stand can be flipped out to tilt the meter up to a convenient angle for use on a table top.

A flexible loop in the holster allows it to be hung from a hook or nail.

Two different ways to use the holster:

- 1. Set holster parallel on the table, do not open the tilt stand (see Diagram 1).*
- 2. Flip the stand out to tilt the meter up on a table top (see Diagram 2).*



Diagram 1

Diagram 2

9: MAINTENANCE

Your Triplet Model 9005-A DMM is a precision measuring instrument and, when used as described in this manual, should not require maintenance.

However, periodic calibration of the meter will insure that it is accurate and performing in accordance with its design specifications. A one year calibration interval is suggested.

To clean the outside of the meter, use a cloth dampened with a mild detergent solution. Do not use any abrasive cleansers, or chemical solvents that may damage the case of the meter.

TRIPLETT PRODUCT RETURN INSTRUCTIONS

In the unlikely event that you must return your Triplet equipment for repair, the following steps must be taken.

- 1) Call 1-800-TRIPLETT to obtain a Return Material Authorization (RMA) number from Customer Service.***
- 2) Enclose a copy of the original sales receipt showing date of purchase.***
- 3) Clearly print the RMA number on the outside of the shipping container.***
- 4) Return to:***
Triplet Corporation
One Triplet Drive
Bluffton, OH 45817
ATTN: Repair Dept.

Be sure to include a full description of the problem, and a telephone number, street address, or email address, where you can be contacted, and a return address where the meter can be shipped to upon repair.

9.1 Replacing Battery:

9.1.1 *Remove the test leads and the holster from the meter.*

9.1.2 *Remove the 3 screws from the back of the meter case.*

9.1.3 *Open the meter case by separating the front and back case shells at the bottom of the meter. Gently pull the case apart, and set the back of the case to one side.*

9.1.4 *Remove the 9 volt battery and replace with a fresh battery (PN 37-48).*

9.1.5 *Carefully install the fresh battery back into the meter, making sure that the battery wires will not be pinched when the case of the meter is reassembled.*

9.1.6 *Reassemble case of meter. Reinstall screws.*

9.1.7 *Verify that the meter operates properly before using it to make measurements.*

9.2 Replacing Fuse:

9.2.1 *Remove the test leads and the holster from the meter.*

9.2.2 *Remove the 3 screws from the back of the meter case.*

9.2.3 *Open the meter case by separating the front and back case shells at the bottom of the meter. Gently pull the case apart, and set the back of the case to one side.*

9.2.4 *Locate the defective fuse and replace with the exact or equivalent type. See meter specifications.*

9.2.5 *Reassemble case of meter. Reinstall screws.*

9.2.6 *Verify that the meter operates properly before using it to make measurements.*

10: ACCESSORIES

10.1 The Triplet Model 9005-A package contains the following items:

*The Model 9005-A DMM
Test leads w/ Screw-On Alligator Clips (Triplet PN 79-760)
Holster (Triplet PN 10-4281)
Instruction Manual (Triplet PN 84-852)*

10.2 Replacement Fuse

2A/250V FAST, 5 x 20mm (Triplet PN 3207-121)

10.3 Optional Carrying Case

An optional carrying case is available for the 9005-A. It's constructed of Cordura, with a Velcro secured flap, a belt loop on the back, and a padded interior. (Triplet PN 10-4275)

10.4 Optional Clamp-On

A "clamp-on" is available for measuring AC Current. The 9005-A is set to the 200mV AC range to use the clamp-on.

10.4.1 *Model 10-N AC Current Clamp-On for measuring AC current up to 400A. (Triplet PN 60-573)*

10.4.2 *Model 101-G Line Separator for use with the Model 10-N. Allows easy measurement of current in standard AC line cords. (Triplet PN 3264)*

11: Triplet Three Year Limited Warranty

The Triplet Corporation warrants instruments and test equipment manufactured by it to be free from defective material or workmanship and agrees to repair or replace such products which, under normal use and service, disclose the defect to be the fault of our manufacturing, with no charge within three years (one year on calibration) of the date of original purchase for parts and labor. If we are unable to repair or replace the product, we will make a refund of the purchase price. Consult the Instruction Manual for instructions regarding the proper use and servicing of instruments and test equipment. Our obligation under this warranty is limited to repairing, replacing, or making refund on any instrument or test equipment which proves to be defective within three years from the date of original purchase.

This warranty does not apply to any of our products which have been repaired or altered by unauthorized persons in any way so as, in our sole judgment, to injure their stability or reliability, or which have been subject to misuse, abuse, misapplication, negligence, accident or which have had the serial numbers altered, defaced, or removed. Accessories, including batteries and fuses, not of our manufacture used with this product are not covered by this warranty.

To register a claim under the provisions of this warranty, contact Triplet Corporation's Customer Service Department for a Return Authorization Number (RMA) and return instructions. **No returned product will be accepted without an RMA number.** Upon our inspection of the product, we will advise you as to the disposition of your claim.

ALL WARRANTIES IMPLIED BY LAW ARE HEREBY LIMITED TO A PERIOD OF THREE YEARS (ONE YEAR ON CALIBRATION) FROM DATE OF PURCHASE, AND THE PROVISIONS OF THE WARRANTY ARE EXPRESSLY IN LIEU OF ANY OTHER WARRANTIES EXPRESSED OR IMPLIED.

The purchaser agrees to assume all liability for any damages and bodily injury which may result from the use or misuse of the product by the purchaser, his employees, or others, and the remedies provided for in this warranty are expressly in lieu of any other liability Triplet Corporation may have, including incidental or consequential damages.

Some states (USA ONLY) do not allow the exclusion or limitation of incidental or consequential damages, so the above limitation or exclusion may not apply to you. No representative of Triplet Corporation or any other person is authorized to extend the liability of Triplet Corporation in connection with the sale of its products beyond the terms hereof.

Triplet Corporation reserves the right to discontinue models at any time, or change specifications, price or design, without notice and without incurring any obligation.

This warranty gives you specific legal rights, and you may have other rights which vary from state to state.

**TRIPLETT CORPORATION
ONE TRIPLETT DRIVE
BLUFFTON, OHIO
1-800-874-7538**

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