



# 120

## Digital Multimeter Instruction Manual



## **EC DECLARATION OF CONFORMITY**

This is to certify that model 120 conforms to the protection requirements of the council directive 89/336/EEC, in the approximation of laws of the member states relating to Electromagnetic compatibility and 73/23/EEC, The Low Voltage Directive by application of the following standards:


<b>EN 50081-1</b>	<b>1992 Emissions Standard</b>
<b>EN 50082-1</b>	<b>1992 Immunity Standard</b>
<b>EN61010-1</b>	<b>1993 Safety Standard</b>
<b>EN61010-2-031</b>	<b>1995 Safety Standard</b>

To ensure conformity with these standards, this instrument must be operated in accordance with the instructions and specifications given in this manual.

### **CAUTION:**

Even though this instrument complies with the immunity standards, the accuracy can be affected by strong radio emissions not covered in the above standards. Sources such as hand held radio transceivers, radio and TV transmitters, vehicle radios and cellular phones generate electromagnetic radiation that could be induced into the test leads of this instrument. Care should be taken to avoid such situations or alternatively, check to make sure that the instrument is not being influenced by these emissions.

## **SAFETY CONSIDERATIONS**

 **WARNING:** Please follow manufacturers test procedures whenever possible. Do not attempt to measure unknown voltages or components until a complete understanding of the circuit is obtained.

### **GENERAL GUIDELINES**

#### **ALWAYS**

- Test the 120 before using it to make sure it is operating properly.
- Inspect test leads before using to make sure there are no breaks or shorts.
- Double check all connections before testing.
- Have someone check on you periodically if working alone.
- Have a complete understanding of circuit being measured.
- Disconnect power to circuit, then connect test leads to the 120, then to circuit being measured.

#### **NEVER**

- Attempt to measure unknown high voltages.
- Attempt to measure current with the meter in parallel to the circuit.
- Connect the test leads to a live circuit before setting up the instrument.
- Touch any exposed metal part of the test lead assembly.

## INTERNATIONAL SYMBOLS

 **CAUTION: RISK OF ELECTRIC SHOCK**

 **AC (ALTERNATING CURRENT)**

 **DC (DIRECT CURRENT)**

 **REFER TO INSTRUCTION MANUAL**

 **GROUND**

 **DOUBLE INSULATION**

 **ON/OFF, PUSH BUTTON SWITCH**

## Features and Benefits

- Safety** Meets CE and IEC 1010 requirements. UL Listed.
- Large LCD** Easy to read at all angles and the majority of lighting levels.
- Data Hold** Freeze readings on the display.
- Rubber Boot** Added protection when the instrument is dropped. (120NB does not include boot.)
- Versatile** Use accessories like a carbon monoxide attachment to expand the capabilities of the 120.

## SPECIFICATIONS

### a. General Specifications

Power Supply	9 Volt Battery
Battery Life	560 hrs. Alkaline
Size (H x L x W)	33mm x 86mm x 187mm (1.3" x 3.4" x 7.4")
Weight	340g (12 oz)



**IEC 1010 Over Voltage:**  
CAT II - 1000V, CAT III - 600V  
Pollution Degree 2



### b. DCV

Range	Resolution	Accuracy	Impedance
2V	0.001V	±0.5% of reading,	10MΩ
20V	0.01V	±2 digits	
200V	0.1V		
600V	0.1V		

### c. ACV (45Hz to 450Hz)

Range	Resolution	Accuracy	Impedance
200V	0.1V	±1.2% of reading,	10MΩ
600V	1V	±3 digits	

### d. OHM (Resistance, Ω)

Range	Resolution	Accuracy	Overload Protection
2kΩ	0.001kΩ	±0.5% of rdg,	600V DC or AC Peak ±1 digit

### e. Continuity Buzzer

Test Voltage	Threshold	Overload Protection
2.5V	<100Ω	600 V DC or Peak AC

\*Warning: Test Leads: Use only correct type and overvoltage category rating.

## MEASUREMENT TECHNIQUES

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### 1. Controls and Functions:

#### Push Buttons

- ⓘ Turns the 120 on and off.  
D/H Activates the Data Hold function.

#### Rotary Switch

- V** Used for measurement of DC Volts. Select best range for the voltage to be measured.  
**V** Used for measurement of AC Volts. Select best range for the voltage to be measured.  
**Ω** Used for measurement of Resistance and Continuity.

#### Input Jacks

- COM** Black test lead connection for all functions.  
**V/Ω** Red test lead connection for OHM, Continuity Buzzer, DCV and ACV functions.

## STEP BY STEP PROCEDURES

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### a. Measuring DC Volts

- ⚠ WARNING!**  
*Do not attempt to make a voltage measurement of more than 600V or of a voltage level that is unknown.*

#### Instrument set-up:

FUNC	BLACK TEST LEAD	RED TEST LEAD	MIN READING	MAX READING
DCV	COM	VΩ	0.001V	600V

#### Measurement Procedure:

1. Disconnect power to circuit to be measured.
2. Plug the black test lead into the **COM** input jack.
3. Plug red test lead into **V/Ω** input jack.
4. Set rotary switch on 120 to desired range in **DCV** function depending on the voltage to be measured.
5. Connect the test leads to the circuit to be measured.
6. Reconnect power to the circuit to be measured.
7. Read the voltage on the 120.

## STEP BY STEP PROCEDURES

### b. Measuring AC Volts

**⚠ WARNING!**  
Do not attempt to make a voltage measurement of more than 600V or of a voltage level that is unknown.

#### Instrument set-up:

FUNC	BLACK TEST LEAD	RED TEST LEAD	MIN READING	MAX READING
ACV	COM	V $\Omega$	0.001V	600V

#### Measurement Procedure:

1. Disconnect power to circuit to be measured.
2. Plug the black test lead into the **COM** input jack.
3. Plug red test lead into **V/ $\Omega$**  input jack.
4. Set rotary switch on 120 to desired range in **ACV** function depending on the voltage to be measured.
5. Connect the test leads to the circuit to be measured.
6. Reconnect power to the circuit to be measured.
7. Read the voltage on the 120.

## STEP BY STEP PROCEDURES

### c. Measuring Resistance

**⚠ WARNING!**  
Do not attempt to make resistance measurements with circuit energized. For best results, remove resistor completely from circuit before attempting to measure.

#### NOTE:

To make accurate low ohm measurements, short ends of test leads together and record resistance reading. Deduct this value from actual readings.

#### Instrument set-up:

FUNC	BLACK TEST LEAD	RED TEST LEAD	MIN READING	MAX READING
OHM	COM	V $\Omega$	1 $\Omega$	2.000k $\Omega$

#### Measurement Procedure:

1. Disconnect power to the circuit to be measured.
2. Plug the black test lead into the **COM** input jack.
3. Plug the red test lead into the **V/ $\Omega$**  input jack.
4. Set rotary switch on the 120 to **2k $\Omega$**  function depending on the voltage to be measured.
5. Connect the test leads to the circuit to be measured.
6. Read the resistance value on the 120.

## STEP BY STEP PROCEDURES: 10


### d. Continuity Buzzer




#### **WARNING!**

*Do not attempt to make continuity measurements with circuit energized.*

#### Instrument set-up:

FUNCTION LEAD	BLACK TEST LEAD	RED TEST
OHM(  )	COM	V $\Omega$

#### Measurement Procedure:

1. Disconnect power to the circuit to be measured.
2. Plug the black test lead into the **COM** input jack.
3. Plug the red test lead into the V/ $\Omega$  input jack.
4. Set the rotary switch on the 120 to the  position.
5. Connect the test leads to the circuit to be measured.
6. Listen for the buzzer to confirm continuity.

### e. Data Hold

Press the **DATA-H** button at any time on any function or range to freeze the reading on the LCD display. This function is very useful when measuring in locations where the display is difficult to read.

Standard Accessories	Part No.
9V Battery	A009
Test Lead Set	A040
Rubber Boot (120 only)	A121

Optional Accessories	Part No.
Deluxe Test Lead Set	SDK1C
Microamp Adapter	A112
Temperature Adapter	A301
Carbon Monoxide Accessories	A701/A702/A711
Boot Hook	A120
Soft Carrying Case	A255
Carrying Case for multiple instruments	A901

\*These accessories have not been evaluated by UL and are not considered as part of the UL Listing of this product.

## MAINTENANCE

1. **Battery Replacement:** The 120 will display BAT when the internal 9 Volt battery needs replacement. The battery is replaced as follows:
  - a. Disconnect and remove all test leads from live circuits and from 120.
  - b. Remove the 120 from its protective boot.
  - c. Remove the four screws from back of 120 housing.
  - d. Carefully pull apart front and rear instrument housing.
  - e. Remove old battery and replace it with new battery.
  - f. Reassemble instrument in reverse order from above.
2. **Cleaning your 120**  
Use a mild detergent and slightly damp cloth to clean the surfaces of 120.



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