TENMA®

Model 72-6620

3-3/4 DIGIT AUTO RANGE PEN TYPE MULTIMETER
OPERATION MANUAL

1. SAFETY RULES

- This meter is designed and tested in accordance with IEC publication 1010, pollution degree II and installation category (overvoltage category) II.
- This meter has been tested according to the following EC Directives
  - 89/336/EEC (EMC of Nov., 1992, Electromagnetic Compatibility)
  - 73/23/EEC (Product safety law of June 11, 1979, Low Voltage Directive of February 19, 1973)
- This meter is designed to be indoor use at temperature 5°C to 40°C and altitude up to 2,000m.
- To ensure that the meter is used safely, follow all safety and operating instructions in this operation manual. If the meter is not used as described in this operation manual, the safety features of this meter might be impaired.
- Do not use the meter if the meter or test leads look damaged, or if you suspect that the meter is not operating properly.
- When using the probes, keep your fingers behind the finger guards on the probes.
- Disconnect the live test lead before disconnecting the common test lead.
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- Do not apply more than 600Vdc or 600Vac rms between a terminal and earth ground.
- To avoid electrical shock, use CAUTION when working above 60Vdc or 25Vac rms. Such voltages pose a shock hazard.
- Never make measurements with the battery cover or bottom case off.
- To avoid electrical shock or damage to the meter, do not exceed the input limits.

2. INTERNATION SYMBOLS

⚠	Important information see manual	•))	Continuity
~	AC	⏚	Ground
⎓	DC	⧈	Double insulation

3. FEATURES

- Compact size and easy operation
- Ergonomic design for better hand gripping
- Fully automatic and extreme low power consumption
- Auto polarity with engineering units annunciator
- Auto voltage ranges selection: DCV: 1mV - 600V, ACV: 1mV - 600V
- Auto ampere ranges selection: DCA: 40mA - 400mA, ACA: 40mA - 400mA
- Auto resistance ranges selection: 0.1Ω - 40MΩ
- Continuity test
- Auto power off
- Data hold

3.1 General Specifications

Display	:	3 3/4 digit LCD, 3999 counts with decimal point and engineering units annunciator display
Polarity	:	Automatic, (-) negative polarity indication.
Zero adjustment	:	Automatic.
Measuring Method	:	Dual slop integration A to D converter system.
Over range indication	:	Only the "OL" is displayed.
Power	:	Single, standard 9 volt battery NEDA 1604, JIS 006P, IEC6F22.
Dimension	:	232 (L) x 45 (W) x 31 (D) mm.
Weight	:	Approx. 160gm. (including battery)
Packing	:	Complete with battery and crocodile clip.

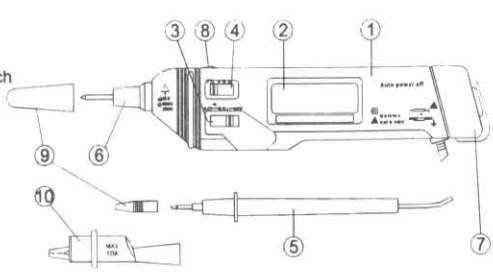
3.2 Electrical Specifications

Accuracies are ± (% of reading + number of least significant digits) at 23°C ± 5°C, <75% RH.

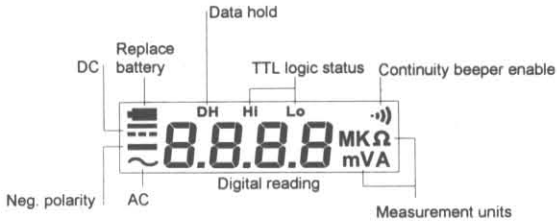
DC Voltage	Range	Resolution	Accuracy	Input Impedance	
	4V	1mV	±(0.8%+1)	10MΩ	Response time: 2 sec. max.
	40V	10mV			
	600V	1V			
AC Voltage	Range	Resolution	Accuracy	Frequency (Hz)	Input Impedance: 10MΩ
	4V	1mV	±(1.2%+3)	40-400	Response time: 2 sec. max.
	40V	10mV			
	600V	1V			
DC Current	Range	Resolution	Accuracy	Input resistor	Max. input current: 400mA
	40 – 400mA	100μA	±(1.2%+3)	1Ω	Protected by 400mA fuse
AC Current	Range	Resolution	Accuracy	Input resistor	Max. input current: 400mA
	40 – 400mA	100μA	±(1.2%+5)	1Ω	Protected by 400mA fuse
Resistance	Range	Resolution	Accuracy	Measurement Voltage/ Current	Response time: 5sec. max. on 40MΩ range. 2 sec. on all other ranges Temperature Range for 40MΩ From 18°C to 30°C
	400Ω	100mΩ	±(1.0%+2)	VDDA 1.2mA or less	
	4KΩ	1Ω		0.7V(TYP) 0.7mA or less	
	40KΩ	10Ω		0.47V(TYP) 0.47mA or less	
	400KΩ	100Ω			
	4MΩ	1KΩ			
	40MΩ	10KΩ	±(1.5%+2)		

4. PANEL DESCRIPTIONS

1) Case
2) 3 3/4 digit LCD display
3) On / Off and function switch
4) Function switch
5) Fixed test lead with probe
6) Fixed probe tip and fuse cap
7) Battery cover
8) Data hold switch
9) Pin covers
10) Crocodile clip



5. DISPLAY



6. OPERATION

- The mark ⚠ next to the probe tip is for warning that the input voltage should not exceed the indicated values. This is to prevent damage to the internal circuitry.
- The function switches should be set to the function which you want to test before operation.

6.1 DC Voltage measurement
Set the FUNCTION switches to V and DC positions and connect the test leads across the source or load under measurement. The polarity will be indicated when the tip probe is connected.

6.2 AC Voltage measurement
Set the FUNCTION switches to V and AC positions and connect the test leads across the source or load under measurement.

6.3 DC Current measurement
Set the FUNCTION switches to A and DC positions and connect the test leads IN SERIES with the load in which current to be measured.

6.4 AC Current measurement
Set the FUNCTION switches to A and AC positions and connect the test leads IN SERIES with the load in which current to be measured.

6.5 Resistance measurement
Set the FUNCTION switches to R and Ω positions, if the resistance being measured is connected to a circuit, turn off power and discharge all capacitors before applying probes.

⚠ CAUTION
MAXIMUM INPUT PROTECTION 250Vrms <10sec.

6.6 Continuity test
Set the FUNCTION switches to R and •)) positions and connect the test leads across circuit to be tested. If the resistance less than approx. 100Ω, buzzer will be activated.

⚠ CAUTION
MAXIMUM INPUT PROTECTION 250Vrms <10sec.

6.7 TTL logic check
Set the FUNCTION switches to TTL and DC positions, connect test leads across device under test. Check conditions of the logic status as the following table:

Voltage read from device	Determined status	Display shown
Above 2.0 V	High	Hi
Below 0.8 V	Low	Lo
0.8 V ~ 2.0 V	Uncertain	No display
Negative volt (-V)	Uncertain	• Hi or Lo or Hi/Lo
Pulse	Uncertain	• Hi or Lo or Hi/Lo

• The (–V) reading will be displayed simultaneously
• The unstable display of Hi/Lo is affected by the amplitude and frequency of the input pulse signal.

⚠ CAUTION
MAXIMUM INPUT PROTECTION 250Vrms <10sec.

6.8 Data Hold
A push switch is used to hold data during measurement. Pressing the key, reading is held and "DH" appears on the display. Pressing the switch again to release the held data.

6.9 Auto power off
The meter will turn off automatically to extend the battery life after approx. 30 minutes without operation.

7. MAINTENANCE

⚠ CAUTION
BEFORE ATTEMPTING BATTERY AND FUSE REMOVAL OR REPLACEMENT, DISCONNECT TEST LEAD FROM ANY ENERGIZED CIRCUITS TO AVOID SHOCK HAZARD.

7.1 Fuse replacement
With proper use of the meter the fuse should never need replacement. To replace fuse, turn the fuse cap counter clockwise and the fuse cap will come off. Take out the used fuse and replace with 400mA / 250V fast acting new fuse.

MCM stock replacment fuse: Part number 28-235.400

7.2 Battery replacement
When the battery needs replacement, a battery symbol ▬ will be displayed in the upper left hand side of the LCD display. To replace the battery, remove the screw at the battery cover. Replace with a 9V NEDA 1604 or IEC6F22 new battery.

7.3 Cleaning
Periodically wipe the case with a soft damp cloth and mild household cleanser. Do not use abrasives or solvents. Ensure that no water gets inside the equipment to prevent possible shorts and damage.