



GG
HAND HELD DMM

OPERATOR'S

MANUAL

CE

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1. SAFETY INFORMATION

This multimeter has been designed according to IEC-1010 concerning electronic measuring instruments with an overvoltage category (CAT II) and pollution 2.

Follow all safety and operating instructions to ensure that the meter is used safely and is kept in good operating condition.

1.1 PRELIMINARY


- when using the meter, the user must observe all normal safety rules concerning:
 - Protection against the dangers of electrical current.
 - Protection of the meter against misuse.
- Full compliance with safety standards can be guaranteed only if used with test leads supplied. If necessary, they must be replaced with the same model or same electric ratings. Measuring leads must be in good condition.


1.2 DURING USE


- Never exceed the protection limit values indicated in specifications for each range of measurement.
- When the meter is linked to a measurement circuit, do not touch unused terminals.
- When the value scale to be measured is unknown beforehand, set the range selector at the highest position.
- Before rotating the range selector to change functions, disconnect test leads from the circuit under test.
- When carrying out measurements on TV or switching power circuits, always remember that there may be high amplitude voltages pulses at test points which can damage the meter.
- Never perform resistance measurements on live circuits.
- Never perform capacitance measurements unless the capacitor to be measured has been discharged fully.


- Always be careful when working with voltages above 60V dc or 30V ac rms. Keep fingers behind the probe barriers while measuring.

1.3 SYMBOLS

 Important safety information, refer to the operating manual.

 Dangerous voltage may be present.

 Earth ground.

 Double insulation (Protection class II).

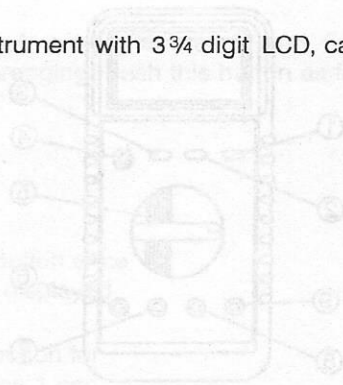
1.4 MAINTENANCE

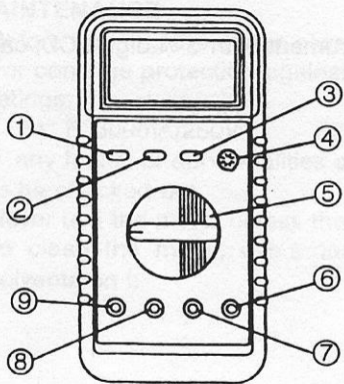
- Before opening the meter, always disconnect test leads from all sources of electric current.
- For continue protection against fire, replace fuse only with the specified voltage and current ratings:
F1: F 300mA/250V F2: F 10A/250V
- If any faults or abnormalities are observed, the meter can not be used any more and it has to be checked out.
- Never use the meter unless the back cover is in place and fastened fully.
- To clean the meter, use a damp cloth and mild detergent only, do not use abrasives or solvents on it.

2. DESCRIPTION

This meter is an autoranging professional measuring instrument with 3¾ digit LCD, capable of performing functions:

- DC voltage measurement
- AC voltage measurement
- DC current measurement
- AC current measurement
- Resistance measurement
- Capacitance measurement
- Frequency measurement
- Diode test
- Transistor test
- Audible continuity test

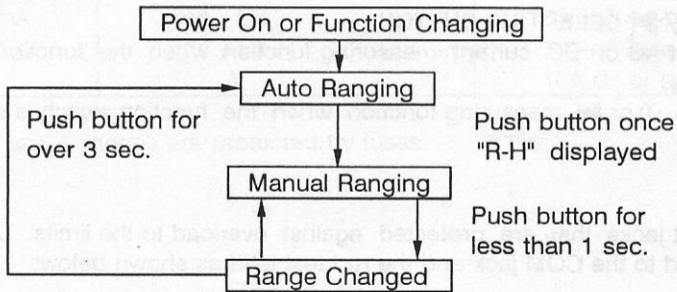




1. Range Control Button
2. Data Hold Button
3. AC/DC Current or .))) / ->+ Selecting Button
4. Socket for Transistor Test
5. Function Switch/Power Switch
6. V/Ω/F Input Jack
7. COM Input Jack
8. mA/Cx Input Jack
9. 10A Input Jack

2.1 RANGE CONTROL BUTTON

Range for AC/DC voltage, AC/DC current (μA and mA only), Resistance and Frequency measuring can be selected manually or handled by autoranging. Push this button as following to choose range control mode and desired ranges.







2.2 DATA HOLD BUTTON

When this button is pushed, the display will show the last reading and " D-H " symbol will appear until pushing it again.

Data holding will be canceled automatically when the function switch is rotated.

2.3 AC/DC CURRENT OR / SELECTING BUTTON

Push this button to select AC or DC current measuring function when the function switch is set at μA , mA, A positions.

Push this button to select  or  measuring function when the function switch is set at  /  position.

2.3 INPUT JACKS

This meter has four input jacks that are protected against overload to the limits. During use, connect the black test lead to the COM jack and the red test lead as shown below:

3. OPERATING INSTRUCTION

3.1 MEASURING VOLTAGE

1. Connect the black test lead to the COM jack and the red test lead to the V/Ω/F jack.
2. Set the function switch at $V \text{ ---}$ or $V \sim$ range to the used and connect test leads across the source or load under measurement.
3. Read LCD display. The polarity of red connection will be indicated when making a DC measurement.

3.2 MEASURING CURRENT

1. Connect the black test lead to the COM jack and the red test lead to the mA/Cx jack for a maximum of 300mA. For a maximum of 10A, move the red lead to the A jack.
2. Set the function switch at μA , mA or A range to be used and push $\text{---} / \sim$ button to select DCA or ACA measuring mode.

3. Connect test leads in series with the load in which the current is to be measured.
4. Read LCD display. The polarity of red lead connection will be indicated when making a DC measurement.

3.3 MEASURING RESISTANCE

1. Connect the black test lead to the COM jack and the red test lead to the V/ Ω /F jack.
(NOTE: The polarity of the red lead connection is positive " + ")
2. Set the function switch at Ω range to be used and connect test leads across the resistance under measurement.

NOTE:

1. For resistance above $3.26\text{M}\Omega$, the meter may take a few seconds to stabilize reading. This is normal for high resistance measuring.
2. When the input is not connected, i.e. at open circuit, the figure "OL" will be displayed for the overrange condition.

3. When checking in-circuit resistance, be sure the circuit under test has all power removed and all capacitors are fully discharged.

3.4 MEASURING CAPACITANCE

1. Connect the black test lead to the COM jack and the red test lead to the mA/Cx jack. (NOTE: The polarity of the red lead connection is positive " + ")
2. Set the function switch at nF or μ F position to be used.
3. Connect test leads across the capacitor under measurement and be sure that the polarity of connection is observed.

NOTE:

1. When checking in-circuit capacitance, be sure that the circuit has all power removed and all capacitor are fully discharged.
2. The range control mode in capacitance measurement is manual ranging and only two ranges (326nF, 32.6 μ F) are provided.

3. If Range Control Button is used in this function measuring, decimal points may be at incorrect positions.
4. At the nF range, when the capacitor to be measured is not connected to test leads, the LCD may not read zero, but a few counts. These counts have to be subtracted from measuring results.





3.5 MEASURING FREQUENCY

1. Connect the black test lead to the COM jack and the red test lead to the V/ Ω /F jack.
2. Set the function switch at the kHz position and connect test leads across the source or load under measurement.

NOTE:

The input voltage should be between 200mV and 10V rms ac. If the voltage is more than 10V rms, reading may be out of the accuracy range.

3.6 CONTINUITY & DIODE TEST

1. Connect the black test lead to the COM jack and the red test lead to the V/ Ω /F jack. (NOTE: The polarity of red lead connection is positive " + ")
2. Set the function switch at  /  position and push the  /  button to select continuity or diode test mode.
3. In continuity testing, if continuity exists (i.e., resistance less than about 50 Ω), built-in buzzer will sound.
4. If diode test mode is selected, connect the red and black leads to the anode and cathode of the diode under test. The forward voltage drop of this diode in V will be displayed.

3.7 TRANSISTOR TEST


1. Set the function switch at hFE position.

2. Identify whether the transistor is NPN or PNP type and locate emitter, base and collector lead. Insert leads of the transistor to be tested into proper holes of the testing socket on the front panel.
3. LCD display will show the approximate hFE value at the test condition of base current $10\mu\text{A}$ and V_{ce} 3.2V.

4. SPECIFICATIONS

Accuracy is specified for a period of one year after calibration and at 18°C to 28°C (64°F to 82°F) with relative humidity to 80%.

4.1 GENERAL

Max. Voltage Between Terminals and Earth Ground	1000V dc or 750V rms ac (sine)
Fuse Protection	μ A, mA: F 300mA/250V A: F 10A/250V.
Power Supply	9V battery, NEDA 1604 or 6F22
Display	LCD, 3260 counts max. updates 2-3/sec
Measurement Method	Dual slope integration A/D sonverter
Ranging Method	Auto / Manual
Overrange Indication	" OL " displayed
Polarity Indication	" - " displayed automatically
Low Battery Indication	"  " displayed
Operating Temperature	0°C to 40°C (32°F to 104°F)
Storage Temperature	-10°C to 50°C (10°F to 122°F)
Dimension	91 x 189 x 31.5 mm
Weight	310g (Including battery)

4.2 DC VOLTAGE

Range	Resolution	Accuracy
326mV	0.1mV	$\pm 0.5\%$ of rdg ± 2 digits
3.26V	1mV	$\pm 0.3\%$ of rdg ± 2 digits
32.6V	10mV	$\pm 0.3\%$ of rdg ± 2 digits
326V	0.1V	$\pm 0.3\%$ of rdg ± 2 digits
1000V	1V	$\pm 0.5\%$ of rdg ± 2 digits

Input Impedance: 10M Ω , more than 100M Ω at 326mV range.

4.3 AC VOLTAGE

Range	Resolution	Accuracy
3.26V	1mV	$\pm 0.8\%$ of rdg ± 3 digits
32.6V	10mV	$\pm 0.8\%$ of rdg ± 3 digits
326V	0.1V	$\pm 0.8\%$ of rdg ± 3 digits
750V	1V	$\pm 0.8\%$ of rdg ± 3 digits

Input Impedance: 10M Ω

Frequency Range: 40 to 400Hz, 40 to 200Hz for 3.26V range.

Response: Average, calibrated in rms of sine wave.

4.4 DC CURRENT

Range	Resolution	Accuracy	Burden Voltage
326 μ A	0.1 μ A	$\pm 1.2\%$ of rdg ± 3 digits	0.5mV / μ A
3260 μ A	1 μ A	$\pm 1.2\%$ of rdg ± 3 digits	0.5mV / μ A
32.6mA	10 μ A	$\pm 1.2\%$ of rdg ± 3 digits	8.0mV / mA
326mA	0.1mA	$\pm 1.2\%$ of rdg ± 3 digits	8.0mV / mA
10A	10mA	$\pm 2.0\%$ of rdg ± 5 digits	0.02V / A

Overload Protection: F 300mA fuse for μ A and mA ranges, F 10A fuse for A range.

4.5 AC CURRENT

Range	Resolution	Accuracy	Burden Voltage
326 μ A	0.1 μ A	$\pm 1.5\%$ of rdg ± 5 digits	0.5mV / μ A
3260 μ A	1 μ A	$\pm 1.5\%$ of rdg ± 5 digits	0.5mV / μ A
32.6mA	10 μ A	$\pm 1.5\%$ of rdg ± 5 digits	8.0mV / mA
326mA	0.1mA	$\pm 1.5\%$ of rdg ± 5 digits	8.0mV / mA
10A	10mA	$\pm 3.0\%$ of rdg ± 7 digits	0.02V / A

Overload Protection: F 300mA fuse for μ A and mA ranges, F 10A fuse for A range.

Frequency Range: 40 to 400Hz,

Response: Average, calibrated in rms of sine wave.

4.6 RESISTANCE

Range	Resolution	Accuracy
326 Ω	0.1 Ω	$\pm 0.8\%$ of rdg ± 3 digits
3.26k Ω	1 Ω	$\pm 0.8\%$ of rdg ± 1 digits
32.6k Ω	10 Ω	$\pm 0.8\%$ of rdg ± 1 digits
326k Ω	100 Ω	$\pm 0.8\%$ of rdg ± 1 digits
3.26M Ω	1k Ω	$\pm 0.8\%$ of rdg ± 1 digits
32.6M Ω	10k Ω	$\pm 1.2\%$ of rdg ± 2 digits

Maximum Open Circuit Voltage: 1.3V

4.7 CAPACITANCE

Range	Resolution	Accuracy
326nF	0.1nF	$\pm 4.0\%$ of rdg ± 5 digits
32.6 μ F	10nF	$\pm 4.0\%$ of rdg ± 5 digits

4.8 FREQUENCY

Range	Resolution	Accuracy
32.6kHz	10Hz	$\pm 1.2\%$ of rdg ± 3 digits
150kHz	100Hz	$\pm 2.5\%$ of rdg ± 3 digits

Sensitivity: 200mV rms up to 50kHz, 1V rms for 50kHz to 150kHz.

5. ACCESSORIES

5.1 SUPPLIED WITH THE MULTIMETER

Test Leads

Electric Ratings 1500V, 10A

MASTECH HYTL - 060

Battery

9V, NEDA 1604 or 6F22

Operating Manual

HYS004236

Holster

HYHT-60

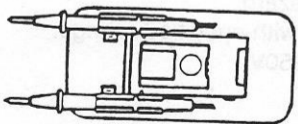
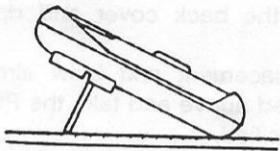
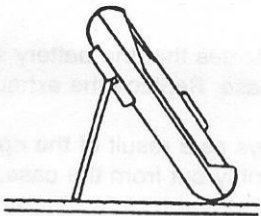
5.1 HOW TO USE THE HOLSTER

The holster is used to protect the meter and to make the measurement more comfortable. It comes with two stands installed together. The following figure shows how to use the holster to:


- a. Support the meter with a standard angle.
- b. Support the meter with a small angle using the little stand.
- c. Hang the meter on the wall using the little stand.

Take the little stand off from the back side of the large stand and insert it into holes located upper on the holster.

- d. Hold test leads



6. BATTERY AND FUSE REPLACEMENT

If the sign "  " appears on the LCD display, it indicates that the battery should be replaced. Remove screws on the back cover and open the case. Replace the exhausted battery with a new one.

Fuse rarely need replacement and blow almost always as a result of the operator's error. Open the case as mentioned above and take the PCB assembly out from the case. Replace the blown fuse with ratings specified.

WARNING

Before attempting to open the case, be sure that test leads have been disconnected from measurement circuit to avoid electric shock hazard.

For protection against fire, replace fuses only with specified ratings:

F1: F 300mA/250V

F2: F 10A/250V