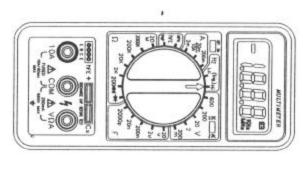
OPERATING INSTRUCTIONS ELENCO M-1700

DIGITAL MULTIMETER



SAFETY INFUKMATION The following safety information must be observed to

insure maximum personal safety during the operation at this

- . Do not use the meter if the meter or test leads damaged, or if you suspect that the meter is not operating
- This meter is not recommended for high voltage industrial energy circuit to 250 VAC or DC. Accidental misuse by connection across a high voltage, high energy power use with low energy circuits to 600V AC/DC or high use; for example, not for measurements of 440 VAC or source when the meter is set up for mA measurement may 600 VAC industrial power mains. The unit is intended for
- Turn off power to the circuit under test before cutting current can be dangerous. unsoldering, or breaking the circuit. Small amounts of
- Use caution when working above 60V dc or 30V ac rms Such voltages pose a shock hazard
- When Using the probes, keep your fingers behind the finger guards on the probes.
- a shock hazard. Always recognize the meter voltage Measuring voltage which exceeds the limits of the multimeter may damage the meter and expose the operator to
- If the equipment is used in a manner not specified by the may be impaired. manufacturer, the protection provided the equipment

limits as stated on the front of the meter.

SPECIFICATIONS

Display: 31/2 digit liquid crystal display (LCD) with maximum reading of 1999.

Polarity: Automatic, positive implied, negative polarity

Overrange: (OL) or (-OL) is displayed Zero: Automatic

Low battery indication: the " E3 " is displayed when battery voltage drops below the operating level

Measurement rate: 2.5 times per second, nominal Operating Environment: 0°C to 40°C at < 70% relative humidity

Storage Temperature: -20°C to 60°C, 0 to 80% R.H. with battery removed from meter

Accuracy: Stated accuracy at 23°C ± 5°C, <75% relative humidity

Safety: According to EN61010-1 protection class II overvoltage category (CAT III 600V) pollution degree 2.

Battery life: 150 hours typical with carbon-zinc Power: single standard 9-volt battery, NEDA 1604, JIS 006P, IEC 6F22.

Dimensions: 151mm (H) x 70mm (W) x 38mm (D). Weight: Approx. 7 oz. (200g) including battery

(installed) and Operating Instructions

Accessories: One pair test leads, One spare fuse, 9V battery the Sensitivity Trig Lo: 1Vms Trig Ht 2Vms (1gb1 + gb1/21.0); (5HM21-5H01) (ympo-ceube) SKHS-12WHS SOUNDC or ACM **РЕСОПЕИСУ** ACE-COA 0-1000 AE ZHS Z Huos-Agooos CAPACITANCE CONTINUITY SA Amã 0±Ami DIODE SOUVEDC or Acrima ZOMOZ (1601+60% 8 0) 3KD-2000KD MHO 3 OADC 20002 (lgb!+gb1%0.E)a VZ.I AOI osny NOSZAYS O VT.0 (1gb1+gb1#0.F)± Am CURRENT A 500VDC or ACms on 250mV range on all other ranges on all other ranges (algb#-gb1%8.f)± agns: V008 no (algb#-gb1%f0.f)± asgns: terbo ils no OMO (ZH009-ZH09 OLTAGE DC Accuracy

Remove power from the circuit under test and open the normal circuit path where the measurement is to be taken. Connect the meter in series with the circuit.

Use caution when measuring 10 amps on 10A range for of 10 amps for safety reason. 60s, please waiting for 10 minutes for next measurement

Resistance and Continuity Measurements

1. Set the Function/Range switch to the desired resistance range or continuity position.

Voltage Measurements

Connect the red test lead to the "VΩA" jack and the black

test lead to the "COM" jack.

Set the Function/Range switch to the desired voltage

range and slide the "AC/DC" selector switch to the desired voltage type. If magnitude of voltage is not

known, set switch to the highest range and reduce until a

any abnormal conditions exist do not attempt to make any

Examine the test leads for cracked or frayed insulation. If contamination (excessive dirt, grease, etc.) and defects

Before taking any measurements, read the Safety Informa-tion Section. Always examine the instrument for damage,

damage,

OPERATION

- Connect the red test lead to the "VQA" jack and the black Remove power from the equipment under test
- 4. Touch the probes to the test points. In ohms, the value if the resistance is less than $40\Omega \pm 20\Omega$. indicated in the display is the measured value of resis-tance. In continuity test, the beeper sounds continuously, test lead to the "COM" jack.

WARNING

when exposed to a radiated electromagnetic field environment, eg, radio, telephone or similar The accuracy of the functions might be slightly affected

4. For dc, a (-) sign is displayed for negative polarity;

positive polarity is implied

Connect the test leads to the device or circuit being

satisfactory reading is obtained

Current Measurements

Set the Function/Range switch to the desired current range

and slide the "AC/DC" selector switch to the desired

- Connect the red test lead to the "VQA" jack and the black test lead to the "COM" jack
- Set the Function/Range switch to the " ≠ " position.

2. For current measurements less than 200mA, connect the

red test lead to the "VΩA" jack and the black test lead to

the COM jack

For current measurements over 200mA or greater, con-

nect the red test lead to the 10A jack and the black test lead

to the COM jack

- 4. Touch probes to the diode. A forward-voltage drop is Turn off power to the circuit under test. about 0.6V (typical for a silicon diode). 'n
- Reverse probes. If the diode is good, "OL" is displayed. If the diode is shorted, ".000" or another number is dis-

 If the diode is open, "OL" is displayed in both directions.
 If the junction is measured in a circuit and a low reading be shunted by a resistance of less than IkQ. In this case the is obtained with both lead connections, the junction may diode must be disconnected from the circuit for accurate

Transistor Gain Measurements

- 1. Set the Function/Range switch to the desired hrE range (PNP or NPN type transistor)
- Never apply an external voltage to the hFE sockets Damage to the meter may result
- 4. Read the transistor hFE (dc gain) directly from the display 3. Plug the transistor directly into the hFE socket. The sockets are labeled E, B, and C for emitter, base, and collector
- Frequency Measurements
- Set the Function/Range switch to the Hz position
- Connect the red test lead to the "VΩA" jack and the black test lead to the "COM" jack.
- Connect the test leads to the point of measurement and read the frequency from the display.

Capacitance Measurements

- 1. Set the Function/Range switch to the desired F (capaci
- Damage to the meter may result Never apply an external voltage to the Cx sockets
- 3. Insert the capacitor leads directly into the Cx socket
- 4. Read the capacitance directly from the display

MAINTENANCE

WARNING

Remove test leads before changing battery or performing any servicing

Battery Replacement

1604, IEC 6F22). The "☐" appears on the LCD display when replacement is needed. To replace the battery, remove front case. Remove the battery from battery contacts the two screws from the back of the meter and lift off the Power is supplied by a 9 volt "transistor" battery. (NEDA

Fuse Replacement

the front case. Replace F1 only with the original type 0.5A/ "VΩA" jack and F2 for the 10A jack. For access to fuses, overload protection fuse. There are two fuses; F1 for the remove the two screws from the back of the meter and lift off If no current measurements are possible, check for a blown type 10A/600V, fast acting ceramic fuse 250V, fast acting fuse. Replace F2 only with the original

Cleaning

do not use abrasives or solvents Periodically wipe the case with a damp cloth and detergent,