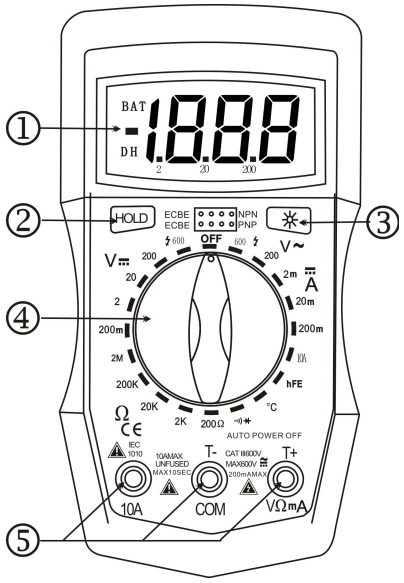
ET2301A INSTRUCTION MANUAL

1. Overview

This multimeter is characterized as slim size, portable, with stable performance and anti-drop capacity. Using 3½ digits LCD monitor with character 16MM high, it offers clear readings. With overall circuitry design centering on large-scale IC A/D converters in conjunction with over-load protection circuit, the meter give excellent performance.

The meters can be used to measure DC & AC voltage, DC current, resistance, temperature, positive diode voltage fall, hFE parameters for transistor and continuity.

2. Panel Layout



① LCD Display: 3½ digits, character 16MM high

② Data-hold Switch (HOLD).

③ Back Light Button Switch: Press this button to switch on back light If the environment makes reading difficult when measuring; the light will automatically turn off in 1 minute. If the battery is in weak power, the light will be dimmed. And Press the key to power on when auto power off for 30 minutes.

④ Rotary Switch: use this switch to select functions and ranges

⑤ T+V Ω mA Input Jack、10A Input Jack、T- COM Input Jack

3. Safety Information

3-1 The meters are designed according to IEC-1010 concerning electronic measuring instruments with an over-voltage category (CAT III) and pollution

3-2 Follow all safety and operating instructions to ensure that the meter is used safely and is kept in good operating condition.

3-3 safety symbols:

⚠ important safety information, refer to the operating manual.

⚠ Dangerous voltage may be present.

⧈ Double insulation (protection Class II)

4. Special Cautions for Operation

4-1 The meters can be safely operated according to standard procedures only when used in conjunctions with the supplied test leads. Replace damaged test leads with only the same model or same electric specifications.

4-2 To avoid risk of electric shock, do not use the meter before the cover is in place.

4-3 The range switch should be in the correct position for testing.

4-4 To avoid electric shock and damaging the instruments, the input signals must not exceed the specified limits.

4-5 When measuring TV set or switched power, attention should be paid to the possible pulses that may damage the circuit.

4-6 The range switch position must not be changed at random during measurement.

4-7 Take caution against shock in the course of measuring voltage higher than DC 60V & AC 30V.

4-8 Protection fuse should be replaced only with same type and same specification.

5. GENERAL SPECIFICATIONS

5-1 Max Voltage between input terminal and Earth Ground: CAT III 600V

5-2 Over-range Indication: display "1" for the significant digit.

5-3 Automatic display of negative polarity "_" .

5-4 Low Battery Indication: '🪫' displayed

5-5 Max LCD display: 1999 (31/2 digits)

5-6 Fuse protection: F-200mA/250V (Ø5x20MM)

5-7 Power Supply: 9V battery, 6F22 or NEDA 1604

5-8 Operating Temp.: 0℃ to 40℃ (relative humidity <85%)

5-9 Storage Temp.:-10℃ to 50℃ ((relative humidity <85%)

5-10 Guaranteed precision Temp.: 23±5℃ (relative humidity <85%)

5-11 Dimension: 69x138x31MM

5-12 Weight: approx. 170g (including battery)

6. Testing Specifications

Accuracy is specified for a period of one year after calibration and at 18℃ to 28 ℃ (64℉ to 82℉) with relative humidity to 75%.

6-1 DC Voltage

Range	Resolution	Accuracy
200mV	0.1mV	±(0.8% of rdg + 4digits)
2V	1mV	±(0.8% of rdg + 4digits)
20V	10mV	±(0.8% of rdg + 4digits)
200V	100mV	±(0.8% of rdg + 5digits)
600V	1V	±(1.2% of rdg + 5digits)

-- Input Impendence: 1M Ω

-- Overload protection: 250V for 200mV range, effective DC or AC 600V for other ranges

6-2 AC Voltage

Range	Resolution	Accuracy
200V	100mV	±(1.5% of rdg + 5 digits)
600V	1V	±(1.5% of rdg + 8digits)

-- Frequency Range: 40 to 400Hz

-- Response: average, calibrated in rms of sine wave

-- Input Impendence: 1M Ω

-- Overload protection: DC or AC 600V

6-3 DC Current

Range	Resolution	Accuracy
2mA	1μA	±(1.2% of rdg + 5digits)
20mA	10μA	±(1.2% of rdg + 5 digits)
200mA	100μA	±(2.0% of rdg + 5 digits)
10A	10mA	±(3.0% of rdg + 5 digits)

-- Overload protection: F 200mA/500V fuse

Note: [1] 10A range: not fused. 10A up to 10 seconds

6- 4 Resistance

Range	Resolution	Accuracy
200 Ω	0.1 Ω	±(1.5% of rdg +5 digits)
2k Ω	1 Ω	±(1.2% of rdg + 5digits)
20k Ω	10 Ω	±(1.2% of rdg + 5 digits)
200k Ω	100	±(1.2% of rdg + 5 digits)
2M Ω	1k Ω	±(1.5% of rdg + 5digits)

-- over-load protection: 250V effective value

6-5 Temperature

Range	Resolution	Accuracy
-20~150℃	1℃	±(3% of rdg +2 digits)
150~300℃	1℃	±(3% of rdg + 2 digits)
300~1000℃	1℃	±(3.5% of rdg +10 digits)

-- over-load Protection: 250V DC or rms AC

6-6 Transistor hFE Test

Range	Test Range	Test Current / Voltage
NPN & PNP	0-1000	Ib=10uA / Vce=3V

6-7 Diode Test

Range	Resolution	Function
⏩	1mV	Display: read approximate forward voltage of diode

-- over-load Protection: 250V effective value

-- forward DC current: approximate 1mA

■ Reversed DC voltage: approximately 3.0V

6-8 Continuity

Range	Function
·))	Built-in buzzer will sound if resistance is less than 50 Ω

-- over-load protection: 500V effective value

-- open circuit voltage: approximate 3.0V

7. OPERATING INSTRUCTIONS

7-1 Attention Before Operation

7-1-1 Check 9V battery. If the battery voltage is less than 7V, display will show "⊟"; the battery should be replaced at this time to ensure measuring precision.

7-1-2 Pay attention to the " ⚠ " besides the input jack which shows that the input voltage or current should be within the specified value.

7-1-3 The range switch should be positioned to desired range for measurement before operation.

7-2 Measuring DC Voltage

7-2-1 Connect the black test lead to COM jack and the red to V Ω mA jack.

7-2-2 Set the rotary switch at the desired V⎓ range position.

7-2-3 Connect test leads across the source or load under measurement.

7-2-4 You can get reading from LCD. The polarity of the red lead connection will be indicated along with the voltage value.

NOTE:

1. When the value scale to be measured is unknown beforehand, set the range selector at the highest position.
2. When only the figure'1' or '-1' is displayed, it indicates over-range situation and a higher range has to be selected.
3. " ⚠ means you can't input the voltage more than 600V, it's possible to show higher voltage, but it may destroy the inner circuit or pose a shock.
4. Be very cautious against shock when measuring high Voltage.

7-3 Measuring AC Voltage

7-3-1 Connect the black test lead to COM jack and the red to V Ω mA jack.

7-3-2 Set the rotary switch at the desired V~ range position.

7-3-3 Connect test leads across the source or load under measurement.

7-3-4 View the reading on the LCD.

NOTE:

1. When the value scale to be measured is unknown beforehand, set the range selector at the highest position.
2. When only the figure'1' or '-1' is displayed, it indicates over-range situation and a higher range has to be selected.
3. " ⚠ means you can't input the voltage more than 600V, it's possible to show higher voltage, but it may destroy the inner circuit or pose a shock.
4. Be very cautious against shock when measuring high Voltage.

7-4 Measuring DC Current

7-4-1 Connect the black test lead to COM jack and the red to the V Ω mA jack for a maximum 200mA current , for a maximum 10A current, move the red lead to the 10A jack.

7-4-2 Set the rotary switch at the desired A⎓ range position.

7-4-3 Connect test leads in series with the load under measurement.

7-4-4 View the reading on the LCD. The polarity of the red lead connection will be indicated along with the current value.

NOTE:

1. When the value scale to be measured is unknown beforehand, set the range selector at the highest position.
2. When only the figure'1' or '-1' is displayed, it indicates over-range situation and a higher range has to be selected.
3. " ⚠ " means the socket mA's maximum current is 200mA and 10A's maximum current is 10A, over current will destroy the fuse. Since 10A is not fused, the measuring time should be less than 1 second to prevent precision being affected by circuit heating.

7-5 Measuring Resistance

7-5-1 Connect the black test lead to COM jack and the red to V Ω mA jack.

7-5-2 Set the rotary switch at the desired Ω range position.

7-5-3 Connect test leads across the resistance under measurement.

7-5-4 View the reading on the LCD.

NOTE:

1. When only the figure'1' or '-1' is displayed, it indicates over-range situation and a higher range has to be selected.
2. For measuring resistance above 1M Ω , the meter may take a few seconds to get a stable reading.
3. When the input is not connected, i.e. at open circuit, the figure '1' will be displayed for the over-range condition.
4. When checking in-circuit resistance, be sure the circuit under test has all power removed and that all capacitors have been fully discharged.
5. If the value scale to be measured is unknown beforehand, set the range selector at the highest position.

7-6 Measuring Temperature

7-6-1 Set the rotary switch at the ℃ range position.

7-6-2 The LCD will show the current temperature of the environment.

7-6-3 When measuring temperature with a thermocouple, the temperature probe supplied with this meter can be used. Insert 'K' type thermocouple probe (red one into VΩmA jack and black one into COM jack)

7-6-4 View the reading on the LCD.

7-6-5 In order to guarantee the accuracy of the measurement , close the light switch while measuring temperature.

7-6-6 Please use a special probe to test high temperature.

7-7 Transistor Testing

7-7-1 Set the rotary switch at 'hFE' position.

7-7-2 Determine whether the transistor under testing is NPN or PNP and locate the emitter, base and collector leads. Insert the leads into the proper holes of the hFE socket on the front panel.

7-7-3 Read the approximate hFE value at the testing condition of base current Ib10uA and Vce 3V.

7-8 Diode Testing

7-8-1 Connect the black test lead to COM jack and the red to V Ω mA jack. (the polarity of red lead is '+')

7-8-2 Set the rotary switch at the ⏩ F range position.

7-8-3 Connect the red lead to the anode and the black lead to the cathode of the diode under testing.

7-8-4 View the reading on the LCD.

NOTE:

1. The meter will show approximate forward voltage drop of the diode.
2. If the lead connections is reversed, only '1' will be displayed.

7-9 Continuity Testing

7-9-1 Connect the black test lead to COM jack and the red to V Ω mA jack.

7-9-2 Set the rotary switch at the ·)) range position.

7-9-3 Connect test leads across two points of the circuit under testing.

7-9-4 If continuity exists (i.e. resistance less than about 50 Ω), built-in buzzer will sound.

NOTE:

If the input open circuit, the figure '1' will be displayed.

8. Maintenance

8-1 Before attempting to remove the battery door or open the case, be sure that test leads have been disconnected from measurement circuit to avoid electric shock hazard.

8-2 To avoid electrical shock, remove test leads from measurement circuits before replacing the fuse. For protection against fire, replace fuses only with specified ratings: F-200mA / 250V fuse.

8-3 Your must replace the test leads if the lead is exposed, and should adopt the leads with the same specifications as origin.

8-4 Use only moist fabric or small amount of detergent but not chemical solution for cleaning.

8-5 Do not use the meter before the back cover is properly closed and the screw secured. Upon any abnormality, stop operation immediately and send the meter for maintenance.

8-6 Please take out the battery when not using the multimeter for a long time.

9. Accessories

[1] Test Leads: electric rating 1000V
10A

[2] Fuse: F-200mA/250V

[3] 'K' type Thermocouple

[4] Instruction Manual

Above picture and content just for your reference.Please be subject to the actual products if anything different or updated.Please pardon for not informing in advance.