TECPEL®

DMM-136B DIGTAL MULTIMETER Operation Manual

CONTENTS

GENERAL DESCRIPTION .....
SAFETY PRECAUTIONS.....
FEATURES .....
OPERATION INSTRUCTION.....
MAINTENANCE .....
TROUBLE SHOOTING .....

1. General Description

This is a 3 1/2 digital multimeter with high stablility and performance. It uses a LCD with 20mm high figure, which makes the reading clearer and the operation more convenient. It can test DCV, ACV, DCA, ACA, resistance, capacitance, frequency, NCV, duty cycle, temperature, diode, and continuity. This meter also designed with functions including unit symbol display, data hold, lighting, auto range, auto power off and warning functions. To assure high accuracy and resolution, it adopts integrated circuit 8-bit microprocessor and a dual integral A/D conversion as LCD driver, giving high resolution and high accuracy. It is an ideal tool for labs, factories and radio-technology.

2. Safety Instructions

The instrument is designed in compliance with IEC1010 standard (safety standard issued by International Electro technical Committee). Please read the following safety instructions before operation.

2.1 Check the connection and insulation of test leads to avoid electric shock.

2.2 To avoid electric shock and damage to the meter, do not input voltage exceeding rated value.

2.3 When measuring voltage higher than DC 60V or AC 40V, please be careful and avoid electric shock.

2.4 Select correct function and range to avoid wrong operation.

2.5 Move the test leads away from test points when switching to other function.

2.6 Don't input voltage in current terminal.

2.7 Don't make any modification to the circuit. It may damage the meter or jeopardize safety.

2.8 Safety symbols:

"⚠" High voltage, "⏚" GND, "⧈" Dual insulation, "⚠" Refer to manual, "🪫" Low battery indication.

3. Features

3.1 General Characteristics

3.1.1 Display: LCD;

3.1.2 Max display: 6000 (3 5/6 digits, automatic polarity, and unit symbol display);

3.1.3 Measurement method: Analog to digital converter (in micro processor ADC+MCU);

3.1.4 Sampling rate: approx.3 times/sec.

3.1.5 Over-range display: "OL" displayed.

3.1.6 Low battery indicator: "🪫"

3.1.7 Working environment: (0～40)℃, relative humidity: <80%;

3.1.8 Store condition: (-10～50)℃, relative humidity: <80%

3.1.9 Battery: 2 pieces 1.5V battery ("AAA" 7# battery);

3.1.10 Dimension: 140×72×37mm (length x width x height);

3.1.11 Weight: approx. 195g (including battery);

3.1.12 Accessories: test leads, TP01 thermocouple, user manual, holster, gift box, and 2*1.5V batteries.

3.2 Technical Features

3.2.1 Accuracy: ± (a% × reading + digits). To assure accuracy, the ambient temperature should be (23±5) ℃, relative humidity <75%. One year accuracy is guaranteed since production date.

3.2.2 DC Voltage（DCV）

Range	Accuracy	Resolution
600mV	±(0.5%+4)	0.1mV
6V		1mV
60V		10mV

600V	±(1.0%+4)	100mV

Input impedance: at 200mv range >40MΩ, at other ranges is 10MΩ.

Overload protection: 600V DC/AC rms.

3.2.3. AC Voltage（ACV）

Range	Accuracy	Resolution
6V	±(0.8%+6)	1mV
60V		10mV
600V	±(1.0%+6)	100mV

Input impedance: at ranges is 10MΩ.

Overload protection: 600V DC/ AC rms.

Frequency response: at 600V range: (40~1000)Hz, at other ranges: (40~2000)Hz

Displaying: True RMS response (calibration based on sine wave RMS)

3.2.4 DC Current（DCA）

Range	Accuracy	Resolution
600uA	±(1.0%+5)	0.1μA
6000uA		1μA
60mA		10μA
600mA		100μA
6A		1mA
60A	±(2.0%+5)	10mA

Maximum voltage drop: 200 mV for full range.

Maximum input current: 10A (within 10 seconds).

Overload protection: 0.5A/250V fuse and 10A/250V fuse.

3.2.5 AC Current (ACA)

Range	Accuracy	Resolution
600uA	±(1.5%+5)	0.1μA
6000uA		1μA
60mA		10μA
600mA		100μA
6A		1mA
60A	±(2.0%+10)	10mA

Maximum voltage drop: 200 mV for full range.

Maximum input current: 10A (within 10 seconds).

Overload protection: 0.5A/250V fuse and 10A/250V fuse.

Frequency response: 10A range: 40~100Hz, other ranges: 40～400Hz.

3.2.6 Resistance（Ω）

Range	Accuracy	Resolution
600Ω	±(0.8%+5)	0.1Ω
6kΩ	±(0.8%+1)	1Ω
60kΩ		10Ω
600kΩ		100Ω
6MΩ		1kΩ
60MΩ	±(1.2%+5)	10kΩ

Open circuit voltage: 500mV

Overload protection: 250V DC/AC peak value.

3.2.7 Capacitance (C)

Range	Accuracy	Resolution
60nF	±(2.5%+6)	10pF
600nF	±(2.5%+5)	100pF
6uF		1nF
60uF		10nF
600uF	±(5.0%+8)	100nF
6mF		1uF
60mF		10uF

Overload protection: 250V DC/AC peak value.

3.2.8 Frequency

Range	Accuracy	Resolution
10Hz	±(0.5%+4)	0.01Hz
100Hz		0.1Hz
1000Hz		1Hz
10kHz		10Hz
100kHz		100Hz
1MHz		1kHz
60MHz		10kHz

Input sensitivity: 0.7V rms.

Overload protection: 250V DC/AC peak value.

3.2.9 Diode and Continuity Test

Measurement	Range	Test conditions
→◦))	Diode forward voltage drop.	Forward DC current is approx 0.8mA, reverse voltage is approx 2.2V.
	When the resistance under test is less than 50Ω, buzzer sounds continuously.	Open circuit voltage: 2.2V

Overload protection: 250V DC/AC peak value.

WARNING: Do not input voltage at this range!

3.2.10 Temperature (℃/℉)

Range	Accuracy	Resolution
-40℃~1000℃	＜400℃ ±(1.0%+5) ≥400℃ ±(1.5%+15)	1℃
0F~1832℉	＜750℉ ±(1.0%+5) ≥750℉ ±(1.5%+15)	℉

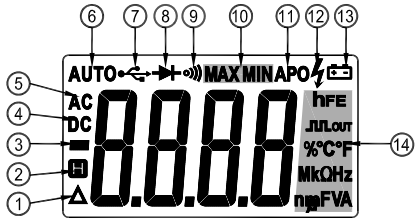
Thermocouple: K type.

WARNING: do not input voltage at this range!

Operation

4.1 Panel Description

①. LCD: Display the data and unit symbol



Number	Feature	Description
1	△	Relative (REL) mode is active
2	H	Data Hold is active.
3	-	Indicates negative readings.
4	DC	DC voltage or current measurement.
5	AC	AC voltage or current measurement.
6	AUTO	Auto range mode.
7	◦	Null
8	→◦	Diode test mode.
9	·))	The continuity beeper is on.
10	MAX MIN	Null
11	APO	Auto power off symbol.
12	ϟ	The symbol of high voltage risk indication.

13		Low battery indication. Warning: To avoid error readings, which could lead to possible electric shock or personal injury, please replace the battery in time.
14	hFE OUT %, ℃, ℉ MΩ, kΩ, Ω Hz, kHz, MHz mV, V uA, mA, A	Null; Null; Duty cycle, Degrees Celsius, Degrees Fahrenheit; Megohm, Kilohm, Ohm; Hertz, Kilohertz, Megahertz; Millivolts, Volts; Microamp, Milliamp, Amperes (A).

②. Rotary switch: it is used to change the range and choose functions.

Switch position	Description
V~	AC voltage measurement. Press SELECT key to switch between frequency/ duty cycle measurements.
V⎓	DC voltage measurement.
Ω	Resistance measurement.
→+	Diode/continuity measurement. Press SELECT key to choose diode or continuity range.
⊣⊢	Capacitance measurement.
Hz	Frequency measurement, Press SELECT key to switch between frequency/ duty cycle measurements.
℃/℉	Temperature measurement, press SELECT key to choose ℃ or ℉.
NCV	Non-contact voltage detector.
uA≂	DC current measurement (from 0uA to 6000uA). Press SELECT key to switch to AC current measurement (from 0uA to 6000uA).
mA≂	DC current measurement (from 0mA to 600mA). Press SELECT key to switch to AC current measurement (from 0mA to 600mA).
A≂	DC current measurement (from 0A to 10A). Press SELECT key to switch to AC current measurement (from 0A to 10A).

③Input Terminal

Terminal	Description
A	Input terminal for AC and DC current from 0 to 10.00A (Overload for max 10 seconds).
VΩmA	Input terminal for voltage, resistance, diode, and continuity, and temperature positive (+) terminal. AC and DC current from 0uA to 600mA (Max 18 hours for less than 600mA).
COM	Common terminal for all measurements, and temperature negative (-) terminal.

④ Function Key

SELECT/ Key:

1) Select function: Press SELECT key to choose DC or AC measurement under ≂ ranges. Under →+ (Diode/Continuity) range, press SELECT key can choose →+ (diode test) or ·)) (continuity test). Under temperature ranges, press SELECT key to choose Degrees Celsius or Degrees Fahrenheit. Under ACV ranges, press SELECT key to switch between Frequency or Duty Cycle measurement.
2) When there is no measurement in 15 minutes, the meter will automatically power off and enter sleep mode. One minute before sleep mode, the buzzer will beep for 5 times to remind user. Press any button or turn the rotary switch will exit the sleep mode.
3) Press SELECT key to active the meter from the sleep mode or hold the SELECT key down when turn on the meter to cancel auto power off function.
4) TORCH FUNCTION Key: Press TORCH FUNCTION key for more than 2 seconds to turn on the torch. Ppress it for more than 2 seconds once again to turn off the torch.

RANGE/REL Key

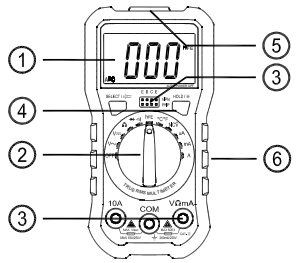
1) Auto range is the default when you turn on the meter, and the meter displays “AUTO” symbol. Press RANGE to enter manual range mode. Press RANGE to switch between the ranges available for the selected function. Hold the RANGE button down for more than 2 seconds to return to auto ranging,
2) Under capacitance measurement, press REL key to enter relative value test mode. The display is zeroed, and △ symbol appears. Press REL key again to exit relative value test mode.

HOLD/☀ Light Key

1) HOLD Key : Press HOLD key to enter HOLD mode. The current value will be hold, and symbol “ H “ will be displayed. Press HOLD again to exit the HOLD mode.
2) ☀ Light Key: Press HOLD key for more than 2 seconds to turn on the backlight. The backlight can last for 15 seconds. During 15 seconds, press “☀” light key for 2 seconds again to turn off the backlight.

⑤ Non-contact voltage detector area.

⑥ Holster, Battery door.



See picture.

4.2 DCV measurement

4.2.1 Insert the black test lead into “COM” terminal, and the red one into “VΩmA” terminal.

4.2.2 Turn the rotary to switch to “V⎓” ranges. Under Auto Range status, it will display “AUTO” symbol. Press “RANGE/REL” key can change to Manual range, the available ranges are 600mV, 6V, 60V, 600V.

4.2.3 Connect test leads to the test point; LCD will display polarity and voltage of the test point connected by the red test lead.

NOTE:

1) If LCD display “OL” under manual range, it means it is over range, now you need to select a higher range.
1) Do not input voltage over 600V. Or it may cause damage to the circuit of the meter, and the built-in buzzer will alarm.
2) Be careful while measuring a high voltage circuit. DO NOT touch the high voltage circuit.

4.3 ACV measurement

4.3.1 Insert the black test lead into “COM” terminal, and the red one into “VΩmA” terminal.

4.3.2 Turn the rotary to switch to “V~” ranges. Under Auto Range status, it will display “AUTO” symbol. Press “RANGE/REL” key can change to Manual range, the available ranges are 600mV, 6V, 60V, 600V; Press “SELECT” key to switch between Frequency/Duty cycle measurement.

4.3.3 Connect test leads to the test point; LCD will display voltage of the test point connected by the test leads.

NOTE:

2) If LCD display “OL” under manual range, it means it is over range, now you need to select a higher range.
1) Do not input a voltage over 600V. Or it may cause damage to the circuit of the meter, and the built-in buzzer will alarm.
2) Be careful while measuring a high voltage circuit. DO NOT touch the high voltage circuit.

4.4 DCA measurement

4.4.1 Insert the black test lead into “COM” terminal and the red one into “VΩmA” terminal (Max.600mA) or into “10A” terminal (Max.10A);

4.4.2 Turn the rotary switch to Current ranges, auto range is the default when you turn on the meter, “AUTO” symbol displayed. Press “RANGE/REL” key can change to Manual range, the available ranges are 600uA, 6000uA, 60mA, 600mA, 6A, 10A.

4.4.3 Connect test leads to the tested circuit; LCD will display polarity and current of the test point connected by the red test lead.

NOTE:

1) If you are not sure about the range of current under test, please select the highest range, and then select the proper range based on displaying value.
2) If the LCD displays “OL”, it means the current is over range. Now you need to select a higher range.
3) Maximum input current is 600mA or 10A (subject to which terminal the red test lead is inserted into). Current exceeding rated value will damage the fuse, and may cause damage to the circuit of meter.

4.5 ACA measurement

4.5.1 Insert the black test lead into “COM” terminal and the red one into “VΩmA” terminal (Max.200mA) or into “10A” terminal (Max.10A);

4.5.2 Turn the rotary switch to a proper cuttent range. Press “SELECT/⩥” key to select the AC mode, auto range is the default when you turn on the meter, “AUTO” symbol displayed. Press “RANGE/REL” key can change to Manual range, the available ranges are 600uA, 6000uA, 60mA, 600mA, 6A, 10A.

4.5.3 Connect test leads to the tested circuit; LCD will display the current of the test point.

NOTE:

1) If you are not sure about the range of current under test, please select the highest range, and then select the proper range based on displaying value.
2) If the LCD displays “OL”, it means the current is over range. Now you need to select a higher range.
3) Maximum input current is 600mA or 10A (which terminal the red test lead is inserted into). Current exceeding rated value will damage the fuse, and may cause damage to the circuit of meter.

4.6 RESISTANCE measurement

4.6.1 Insert the black test lead into “COM” terminal and the red one into “VΩmA” terminal;

4.6.2 Turn the rotary switch to “Ω” ranges, press “SELECT/” key to select “Ω” mode. Connect two test leads across the resistor under test;

4.6.3 Auto range is the default when you turn on the meter, “AUTO” symbol displayed. Press “RANGE/REL” key can change to Manual range, the available ranges are 600Ω, 6kΩ, 60kΩ, 600kΩ, 6MΩ, 60MΩ.

NOTE:

1) If you are not sure about the range of current under test, please select the highest range;
2) If LCD displays “OL”, it means it is over range. Now you need to select a higher range. When measuring value is over 1MΩ, the reading will take a few seconds to be stable. It’s normal for high resistance measurement;
3) When input terminal is in open circuit, LCD will display “OL”;
4) Before measuring in line resistor, make sure that the power is off and all capacitors are discharged completely;
5) When there is big error, it may be affected by other online component or there is voltage on the resistor;
6) Do not input any voltage at resistance range.

4.7 CAPACITANCE MEASUREMENT

4.7.1 Insert the black lest lead in “COM” terminal and the red one in “VΩmA” terminal;

4.7.2 Turn the rotary to switch to “⊣⊢” range;

4.7.3 If the LCD doesn’t display “0”, press “RANGE/REL” to clear the reading;

4.7.4 Connect the capacitor to “COM” and “VΩmA” terminal. (Note: the red test leads is for positive pole +). LCD displays capacitance value.

NOTE:

1) Don’t input voltage or current under capacitance ranges;
2) Press “RANGE/REL” to clear the reading before testing to assure the accuracy;
3) There is only the auto range mode under the capacitance range;
4) The capacitor must be completely discharged before testing to avoid damage the meter,;
5) The reading of a higher than 600uF range will take more several seconds to be stabled.

4.8 FREQUENCY MEASUREMENT

4.8.1 Insert the lest leads or shielded cable into “COM” terminal and “VΩmA” terminal;

4.8.2 Turn the rotary to switch to “Hz” range, connect the test leads or shielded cable to the signal source or the load which is tested (It should over 3Hz).

4.8.3 Press “SELECT/” key to choose frequency/duty cycle measurement, LCD will display the frequency or duty cycle of the tested signal source.

NOTE:

1) There is only the auto range mode under the frequency range;
2) When the input is higher than 10V AC rms, please switch to V~ range and then select frequency or duty cycle to measure;
3) In noisy environment, it's better to use shield cable to measure a low signal;
4) Do not touch the high voltage circuit when measuring high voltage circuit;
5) Don’t input voltage higher than 250V DC/AC peak value under Hz ranges, or it may damage the meter.

4.9 NON-CONTACT VOLTAGE (NCV) DETECT

WARNING:

This function could be affected by different external interference sources, and then the alarm is activated by wrong signal. The measurement result is for reference only.

Turn the rotary function switch to “NCV” position. When the testing circuit is placed above the meter, the meter displays the strength of signal, and the buzzer alarms with “beep beep”.

NOTE:

1) Even if there is no voltage indication, there may be voltage on the circuit. Do not rely on NCV detector as the only way to detect voltage.
2) Voltage detecting may be affected by power socket design, type of insulation and its thickness and other factors.
3) Interference sources in the external environment, such as flashing light, motor, would cause wrong signal to activate alarm function.

4.10 DIODE AND CONTINUITY TEST

4.10.1 Insert the black test lead into “COM” terminal and the red one into “VΩmA” terminal (the polarity of red lead is “+”);

4.10.2 Turn the rotary switch to “Ω” range, and press “SELECT/” key to choose “” mode;

4.10.3 Forward measurement: connect red test lead to the positive polarity and the black test lead to the negative polarity of the diode. LCD will display the approx. value of forward voltage drop;

4. 10.4 Backward measurement: connect red test lead to the negative polarity and the black test lead to positive polarity of the diode. LCD will display “OL”;

4.10.5 The complete diode test includes forward and backward measurement, if the result doesn’t meet the descriptions above; it means the diode is broken;

4.10.6 Press “SELECT/” key to select the continyity measurement mode;

4.10.7 Connect test leads to two points of tested circuit, if the resistance is less than 50 Ω, the built-in buzzer sounds.

NOTE:

1) DO NOT input voltage at “Ω” range.
2) When test circuits, make sure the power is off and all capacitors are discharged. Any negative potential or AC signal will activate the buzzer.

4.11 TEMPERATURE MEASUREMENT

4.11.1 Turn the rotary switch to “°C/°F” range. Press “SELECT/” key to select °C or °F mode.

4.11.2 Insert the cold end (free end) of thermocouple in “VΩmA(+)” and “COM(-)” terminal, and put the working end (temperature measuring end) of thermocouple on the surface or inside the tested object. Then LCD will display the temperature of tested object, and the reading is in °C/°F(when the polarity is contrary. The reading will decrease when the temperature of the tested object increase).

NOTE:

1) When the input terminal is open circuit, it will display the environment temperature.
2) To ensure measure accuracy, do not replace the temperature probe unless it is necessary.
3) Do not input voltage at temperature range.

5. MAINTENANCE

This meter is a precise instrument. Any modification to the circuit is not allowed.

NOTE:

1) Don’t input the voltage value higher than 600V DC or ACrms.
2) Don’t input voltage at current, resistance, diode or continuity range.
3) Don’t make any measurements when the battery is not properly installed or the back cover isn’t fixed.
4) Before replacing battery or fuse, please remove the test leads from the measuring point and turn off the power.
5) Keep the meter away from water, dust and shock.
6) Don't expose the meter under high temperature, high humidity, combustible, explosive and strong magnetic place.
7) Wipe the case with a damp cloth and detergent. Do not use abrasives and alcohol to

clean the meter.

8) If the meter will not be used for a long time, please take out the battery to avoid leakage damage.
9) When "🔋" symbol is displayed, please replace the battery according to the following steps:
   ① Remove the holster at first.
   ② Screw off the fixing screws of the battery door and remove the cover;
   ③ Take off the old battery and replace with a new one. To extend the using life, it's better to use alkaline battery.
   ④ Fix the battery door.
   ⑤ Put on the holster.
10) Fuse replacement: When replacing fuse, please use fuse with same type and specification.
   ① Remove the holster first, then screw off the fixing screws of the battery door and back cover to remove the cover;
   ② Take off the old fuse and replace with a new one.
   ③ Install the back cover, then fix the screws of the battery door and back cover. Put on the holster.

6. Trouble Shooting

If the meter does not work properly, please check the meter as following steps:
(If the problems still cannot be solved, please refer to repairing center or contact the local dealers.)

Fatult	Solution
No reading on LCD	■Turn on the power; ■Release the HOLD key; ■Replace battery.
🔋signal appears	■Replace battery.
No input	■Replace fuse.
Big error Value	■Replace battery.

- The specifications are subject to changes without prior notice;
- The content of this manual is regarded as correct. If users find out any mistakes or omissions, please kindly contact the manufacturer;
- The manufacturer will not be responsible for accidents and damage caused by improper operations;
- The functions described in this User Manual shall not be considered as the reason for any special usages;