

OPERATOR'S INSTRUCTION MANUAL DIGITAL MULTIMETER

MODEL:

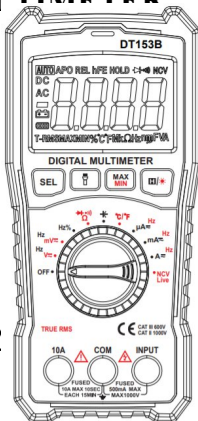
☒ DT153B

CAT III 600V



WARNING

READ AND UNDERSTAND
BEFORE USING THE INSTRUMENT



1. Overview

The new generation DT153B product redefines the performance standard for general-purpose digital multimeter. The innovative industrial design ensures the products have good impact resistance. The new LCD display layout provides a clear display for better user experience. The DT153B ensure safe operation in CAT III 600V environment.

2. Safe operation rule

1) Safety certification

The product complies with IEC 61010 safety standard. as well as CAT III: 600V, RoHS, pollution grade 2, and double insulation standards.

2) Safety instructions and precautions

- Do not use the device if the device or test leads appear damaged or if you suspect that the device is not operating properly. Pay particular attention to the insulation layers.
- If the test leads are damaged, it must be replaced with one of the same type or the same electrical specification.
- When measuring, do not touch exposed wires, connectors, unused inputs, or the circuit being measured.
- When measuring the voltage higher than 60 VDC or 36 VAC rms, keep your fingers behind the finger guard on the test lead in order to prevent electric shock.
- If the range of the voltage to be measured is unknown, the maximum range should be selected

and then gradually decreased.

- Never input voltage and current exceeding the value listed on the device.
- Before switching ranges, make sure to disconnect the test leads with the circuit to be tested. It is strictly prohibited to switch the ranges during the measurement.
- Do not use or store the device in high temperature, high humidity, flammable, explosive or strong magnetic field environments.
- Do not change the internal circuit of the device in order to avoid the damage to the device and users.
- To avoid false reading, replace the battery when the battery indicator “+” appears.
- Use dry cloth to clean the case, do not use detergent containing solvents

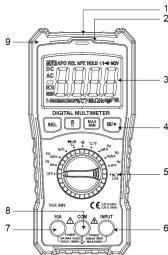
3. Electrical symbols and component descriptions

3.1 Electrical symbols

	Dangerous voltage maybe present		Important safety information
	Double insulated		Conforms to European Union directive
	Earth ground		High voltage hazard symbol
	DC (Direct Current)		AC (Alternating Current)
	DC or AC		Battery low voltage symbol
	auto range		auto power off
	Non-contact voltage test		Celsius and Fahrenheit unit
	Electromagnetic field symbol		Electric torch

3.2 Component descriptions

- 1.NCV sensing area
- 2.Electric torch
- 3.LCD display
- 4.Function buttons
- 5.Rotary switch (dial)
- 6.INPUT jack (10A excepted)
- 7.10A jack
- 8.COM jack
- 9.Holster



4. Technical specifications

Accuracies are guaranteed for 1 year, $23\pm5^{\circ}\text{C}$, $\leq 80\%\text{RH}$.

4.1 DC voltage

Range	Resolution	Accuracy
600mV	0.1mV	$\pm(0.8\%\text{ of rdg}+5\text{D})$
6V	1mV	
60V	10mV	
600V	100mV	
1000V	1V	$\pm(1.2\% \text{ of rdg}+5\text{D})$

- Input impedance: about $10\text{M}\Omega$.
- Results might be unstable at mV range when no load is connected. The value becomes stable once the load is connected. Least significant digit $\leq \pm 3$.
- Overload protection: $1000\text{V}_{\text{rms}}(\text{AC/DC})$

4.2 AC voltage

Range	Resolution	Accuracy
600mV	0.1mV	$\pm(1.2\% \text{ of rdg}+8D)$
6V	1mV	
60V	10mV	
600V	100mV	
1000V	1V	

- Input impedance: about 10M Ω .
- Frequency response: 40Hz ~ 400Hz, True-RMS
- Overload protection: 750Vrms (AC/DC)

4.3 DC current

Range	Resolution	Accuracy
60 μ A	0.01 μ A	$\pm(1.0\% \text{ of rdg}+5D)$
60mA	10 μ A	
600mA	100 μ A	
6A	1mA	
10A	10mA	$\pm(2.0\% \text{ of rdg}+5D)$

- Overload protection
mA: F0.5A/600V fuse
10A: F10A/600V fuse

4.4 AC current

Range	Resolution	Accuracy
60 μ A	0.01 μ A	$\pm(1.5\% \text{ of rdg}+8D)$
60mA	10 μ A	
600mA	100 μ A	
6A	1mA	
10A	10mA	$\pm(3\% \text{ of rdg}+5D)$

- Frequency response: 40 - 400Hz.
- Accuracy guarantee range: 5 -100% of the range,

shorted circuit allows least significant digit ≤ 2 .

- Overload protection
mA: F0.5A/600V fuse
10A: F10A/600V fuse

4.5 Resistance

Range	Resolution	Accuracy
600 Ω	0.1 Ω	$\pm(1.2\% \text{ of rdg} + 5D)$
6K Ω	1 Ω	
60K Ω	10 Ω	
600K Ω	100 Ω	
6M Ω	1K Ω	$\pm(1.5\% \text{ of rdg} + 5D)$
60M Ω	10K Ω	

- Measurement result = reading of resistor - reading of shorted test leads.
- Overload protection: 250Vrms (AC/DC)

4.6 Capacitance

Range	Resolution	Accuracy
10n~100mF	10p~100 μ F	$\pm(5\% \text{ of rdg} + 5D)$

- Overload protection: 250Vrms (AC/DC)

4.7 Temperature

Range	Resolution	Accuracy
-40~1000 $^{\circ}$ C	1 $^{\circ}$ C	-40~150 $^{\circ}$ C: $\pm(1\% + 4^{\circ}\text{C})$
		150~1000 $^{\circ}$ C: $\pm(2\% + 4^{\circ}\text{C})$
-40~1832 $^{\circ}$ F	1 $^{\circ}$ F	-40~302 $^{\circ}$ F: $\pm(2\% + 4^{\circ}\text{F})$
		302~1832 $^{\circ}$ F: $\pm(2.5\% + 4^{\circ}\text{F})$

- Overload protection: 250Vrms (AC/DC)

4.8 Frequency

Range	Resolution	Accuracy
10Hz~ 10MHz	0.01Hz~ 10kHz	$\pm(1.5\% \text{ of rdg}+5D)$

- Overload protection: 250Vrms (AC/DC)
- Input sensitivity >3vpp

4.9 Duty cycle

Range	Resolution	Accuracy
10 ~ 95%	0.1%	$\pm 2.0\%$

- Overload protection: 250Vrms (AC/DC)

5. Specification

1) The maximum voltage between the input terminal and the ground: 600Vrms.

2) 10A terminal: Fuse 10A/600V Fast fuse $\Phi 6 \times 30 \text{mm}$.

3) mA/ μ A terminal: Fuse 0.5A/600V Fast fuse $\Phi 6 \times 30 \text{mm}$.

4) Max display 5999, over range display "OL", update rate: 2~3 times/second.

5) Backlight: Manual on, auto shut off after 15 seconds.

6) Polarity: "-" symbol displaying on screen represents negative polarity signal.

7) Data hold function: " symbol displays on screen when data hold function is activated.

8) Low battery power: " symbol displays on screen when battery power is low.

9) Battery: AAA 1.5V x 2

10. Operating temperature: 0~40°C (32°F-104°F)

Storage temperature: -10~50°C (14°F-122°F)

Relative humidity: 0~30°C: $\leq 75\% \text{RH}$

Operating altitude: 0 - 2000m

11. Dimension: (186x87x50) mm

12. Weight: about 310g (battery included and holster)

6. Button functions

◆ **SEL button:** Press the button to switch between NCV and LIVE modes for  positions, to switch between diode and continuity modes for  positions, to switch between Fahrenheit and Celsius modes for  positions, to switch between frequency and duty radio modes for  positions.

When measuring AC voltage and AC current, press the button, and the screen displays the frequency of the AC signal.

◆  **button:** Press the button to turn on the electric torch on the front of the meter, press the button again to turn it off.

◆  **button:** Press the key to enter the maximum and minimum measurement mode. Press the key one by one to display the maximum and minimum values in a cycle. Hold down the key for more than 2 seconds to exit the maximum and minimum measurement mode.

◆  **button:** Press the key to enter or exit data hold mode. press the key for a long time to turn on/off backlight. If no operation is performed, the backlight will automatically turn off after 15 seconds.

7. Operations

To avoid false reading, replace the battery if the battery low power symbol  appears. Also pay special attention to the warning sign  beside the test lead

jack, indicating that the tested voltage or current must not exceed the values listed on the device.

7.1 AC/DC voltage measurement

- 1) Set the dial to $V^{\sim}$ or $V^{\sim}$ range.
- 2) Insert the black test lead into the COM jack, the red test lead into the INPUT jack. Connect test leads with the load in parallel.

Notes:

- Do not measure voltage over 1000Vrms, or it may expose users to electric shock and damage the device. If the range of the voltage to be measured is unknown, select the maximum range and reduce accordingly.
- Please pay extra attention when measuring high voltage in order to avoid electric shock.
- Before using the device, it is suggested to measure a known voltage for verification.

7.2 Resistance measurement

- 1) Set the dial to Ω range.
- 2) Insert the black test lead into the COM jack, the red test lead into the "INPUT" jack. Connect test leads with the resistor in parallel.

Notes:

- Before measuring resistance, switch off the power supply of the circuit, and fully discharge all capacitors.
- If the resistance when probes are shorted is more than 0.5Ω , please check if test leads are loosened or damaged.
- If the resistor is open or over the range, the "OL"

symbol will be displayed on the screen.

- When measuring low resistance, the test leads will produce $0.10\sim0.20\Omega$ measurement error. To obtain accurate measurement, the measured value should subtract the value displayed when two test leads are shorted.
- When measuring high resistance above $1\text{M}\Omega$, it is normal to take a few seconds to steady the readings. In order to quickly obtain steady data, use short test wires to measure high resistance.

7.3 Continuity test

1) Set the dial to $\Omega \rightarrow$ range, press the SEL button. the screen displays the  symbol, and the meter enters continuity test mode.

2) Insert the black test lead into the COM jack, the red test lead into the INPUT jack. Connect test leads with the points to be tested in parallel

3) If measured points' resistance $>51\Omega$, circuit is in open status. If measured points' resistance $\leq 10\Omega$, circuit is in good conduction status, buzzer will go off.



Notes:

Before test continuity, switch off all power supplies and fully discharge all capacitors.

7.4 Diode test

1) Set the dial to $\Omega \rightarrow$ range, press the SEL button, the meter enters diode measurement mode.

2) Insert the black test lead into the COM jack, the red test lead into the INPUT jack. Connect test leads with the diode in parallel

3) "OL" symbol appears when the diode is open or polarity is reversed. For silicon PN junction, normal value: 500 ~ 800mV (0.5 ~ 0.8V).

1) The mode of diode measurement, measuring voltage greater than 2.5V, current greater than 1mA.

Notes:

- Before measuring PN junction, switch off the power supply to the circuit, and fully discharge all capacitors.

7.5 Capacitance measurement

1) Set the dial to $\overline{fC}$ range, the meter is in the measurement mode of automatic capacitance range.

2) Insert the black test lead into the COM jack, the red test lead into the INPUT jack. Connect test leads with the capacitor in parallel

3) When there is no input, the device displays a fixed value (intrinsic capacitance).

Notes:

- If the tested capacitor is shorted or its capacity is over the specified range "OL" symbol will be displayed on the screen.
- When measuring large capacitors, it may take a few seconds to obtain steady readings.
- Before measuring capacitors (especially for high voltage capacitors), please fully discharge them.
- For small capacitance measurement, to ensure measurement accuracy, the measured value must be subtracted from intrinsic capacitance.

7.6 DCA & ACA measurement

- 1) Set the dial to **A $\overline{\text{---}}$** or **A $\sim$** range.
- 2) Insert the black test lead into the COM jack, the red test lead into the INPUT jack, Connect test leads with the tested circuit in series. If you want to test the current above 600mA, the red lead should be inserted into the position of 10A jack.

Notes:

- Before measuring, switch off the power supply of the circuit and carefully check the input terminal and range position.
- If the range of the measured current is unknown, select the maximum range and then reduce accordingly.
- Please replace the fuse with the same type.
- When measuring, please do not connect the test leads with any circuit in parallel. Otherwise there is a risk of damage to the device and human body.
- If the tested current is over 10A, each measurement time should be less than 10 seconds and the next test should be after 15 minutes.

7.7 Temperature measurement

- 1) Set dial to “°C/°F” range.
- 2) Press the “Select” button to select °C or °F mode, and the symbol °C or °F will appear as an indicator.
- 3) Insert the black plug of the K-type thermo-couple to the “COM” jack, and the red plug to the “INPUT” jack.
- 4) Carefully touch the end of the thermo-couple to the object to be measured.
- 5) Wait a while, read the reading on the display.

NOTE:

- a. The TP01 K-type thermo-couple max. operating temperature is 250°C/482°F (or 300°C/572°F short time). The sensor supplied with the instrument is an ultra fast response naked bead thermo-couple suitable for many general purpose applications.
- b. The measuring range of the meter temperature is the widest value, the accurate measurement must be based on the suitable temperature sensor.

7.8 Frequency & duty cycle measurement

- 1) Switch dial to the required “**Hz%**” range, press SEL button can select frequency or duty ratio measurement mode.
- 2) The meter default frequency measurement mode connect the black test lead to the “COM” jack and the red to the “INPUT” jack, Read the reading on the display.
- 3) Press the “SEL” button again to select duty cycle measurement mode, and the symbol “%” will appear as an indicator.
- 4) The measurement of duty cycle is only suitable to signals not exceeding 10KHz.
- 5) When measuring AC voltage or AC current signal, press SEL button. The LCD displays the frequency of the signal.

7.9 NCV test

Set dial to “**Live**” range, the LCD displays EF, and the meter is used to test the strength of the electromagnetic field. When the front end of the meter is placed within 5mm of the electromagnetic field, the meter will emit a beeping sound and a symbol ----, indicating the intensity

of the electromagnetic field appear. The stronger the electromagnetic field, the more rapid the beeping sound and the longer the electromagnetic field intensity banner.

Note: This meter is only used to determine the presence of an alternating electric field. Because there may be environmental electric field interference or electric field interference caused by irregular wiring layout in the test environment, this measurement method can only be used to determine the existence of dangerous voltage.

7.10 Live wire judgment:

Set dial to "Live" range, press "SEL" button, the "L I U" symbol is displayed on the LCD, and the meter will enter the measure mode of live line judgment. Connect the red lead to the INPUT jack and connect the probe reliably to the metal portion of the line, At the same time, the black lead must be plugged into the COM jack. If the buzzer emits a continuous beeping sound and the electromagnetic field intensity ---- symbol appears, the lead is connected to the live wire.

NOTE: This function is for live line test, need professional use. Non-professionals are strictly prohibited from using .

8. Auto power off

8.1 If you don't operate the meter for about 15 minutes, After auto power off, before the meter auto power off, there is a sound and light indication that the meter is about to be powered off.(1min before auto shutdown, 5 continuous beeps,Before shutdown, 1 long beep)

8.2 In the auto power off state, press“SEL”the key, rotary range switch to turn on the meter, you can cancel the auto power off function, “APO” symbol disappear from the LCD.

9. Battery and fuse replacement

9.1 Fuse rarely need replacement and blow almost always as a result of operator error.

9.2 If “” appears in display, it indicates that the battery should be replaced.

9.3 To replace battery: remove the 1 screws in the bottom of the battery case, simply remove the old, and replace with a new one. Be careful to observe polarity.

9.4 Remove the holster and remove the bottom cover of the meter to replace the fuse (500mA/600V or 10A/600V). Please replace the appropriate fuse according to operation manual.

10. Accessories

- Operator's instruction manual
- Set of test leads
- Set of temperature probe
- Gift box
- 1.5V x 2, AAA size.



WARRANT



This Instrument is warranted to be free from defects in material and workmanship for a period of one year. Any instrument found defective within one year from the delivery date and returned to the factory with transportation charges prepaid, will be repaired, adjusted, or replaced at no charge to the original purchaser. This warranty does not cover expandable items such as batteries & fuses. If the defect has been caused by a misuse or abnormal operating conditions, the repair will be billed at a nominal cost.