

Test condition: Base current approx. 10uA. Vce approx.2.8V

5.9 LOGIC TEST (DT9208A only)

- 1) Set the function range switch at "LOGIC" position.
- 2) Connect black test lead to "COM" terminal and red test lead to the "V/OHM/Hz" input terminal.
- 3) Check the logic circuit voltage, only 5V logic level circuit can be tested.
- 4) Connect the black test probe to the logic circuit negative power supply point. Connect the red test lead probe to the logic circuit test point.
- 5) Testing Level $> 2.4V$, logic high 1 level the figure "▲" will be displayed. Test level $< 0.7V$, logic low 0 level the figure "▼" will be displayed and buzzer sounds.

When the testing level is not connected the figure "▲" will be displayed.

Note: When the function range switch at "LOGIC" position, the figure "1" is displayed, without over range inclusion and describe the internal circuitry is connected.

6. LCD DISPLAY PANEL ANGLE SELECTION

LCD display panel is locked in lie down position in normal operating condition and storage, when the usage needs to change the display panel angle, push down the button which is above the top case, the display panel locking will be released. The display panel can be rotated to the best angle.

7. BATTERY AND FUSE REPLACEMENT

- 1) Battery and fuse replacement should only done after the test leads have been disconnected and power is off.
- 2) Loosen screws with suitable screwdriver and remove case bottom.
- 3) The meter is power by a single 9V battery (IEC 6F22, NEDA 1604, JIS 006P). Snap the battery connector leads to the terminals of a new battery and reinsert the battery into the case top. Dress the battery leads so that they will not be pinched between the case bottom and case top.
- 4) The meter is protected fast fuse 0.5A/250V (mode I DT9201A is protected fuse 2A/250V only), dimensions is $\Phi 5 \times 20mm$.
- 5) Replace the case bottom and reinstall the three screws. Never operate the meter unless the case bottom is fully closed.

MODEL:

- DT9201A DT9202A DT9203A DT9204A
- DT9205A DT9206A DT9207A DT9208A
- DT9205A* DT9208A* DT9205M DT9208M
- DT9205L DT9208L

DIGITAL MULTIMETER

OPERATOR'S
MANUAL

Large rotational folded LCD display

1. INTRODUCTION

This DT92 Advanced Series Digital Multimeter is a compact precision, battery operated, LCD display 3-1/2 or 4-1/2 digits Digital Instrument.

Superiority:

- ✓ High accuracy
- ✓ Large rotational folded LCD display, button release lock
- ✓ Digital height 25mm
- ✓ Single 32 position rotary switch for FUNCTION and RANGE selection, allows fast and convenient operation.
- ✓ Curvilinear mode soft case.
- ✓ Colored indication jack with fully protection test leads.
- ✓ Lower overage power Auto-Power Off
- ✓ Data hold for easy reading

2. GENERAL SPECIFICATION

- 1) Display: 3-1/2 digits LCD with a maximum reading of 1999. (Model DT9203A/DT9204A is 4-1/2 digit maximum reading of 19999.)
- 2) Measurement rate: updates 2-3/sec.
- 3) Over range indication: "1" figure only in the display
- 4) Automatic negative polarity indication.
- 5) The "BAT" is displayed when the battery voltage drops below the operating voltage.
- 6) Full range over load protection.
- 7) Capacitance measurement Auto-Zeroing.
- 8) Auto Power Off: It will be automatically cut off in about 15 minutes after the power is turned on. It needs to be turned off and turned on again to continue the power.
- 9) Operating temperature: 0°C~40°C, 0~75% R.H.
Storage temperature: -10°C~50°C, 0~75% R.H.
- 10) Power: Single standard 9V battery IEC 6F22, NEDA 1604, JIS 006P.
- 11) Dimensions: 191L*89W*35Hmm.
- 12) Weight: approx 310g (including battery)
- 13) Accessories: test leads (pair), spare fuse 0.5A piece in case (model DT9201A fuse 2A), K-type thermocouple wire (model DT9207A/DT9208A only), operator's manual.

3. ELECTRICAL SPECIFICATIONS

Accuracy is given as \pm (% of reading \pm number of least significant digits) for one year, at 23°C \pm 5°C RH<75%

- 1) DCV

Range	Accuracy						
	DT9201A	DT9202A	DT9203A	DT9204A	DT9205A	DT9206A	DT9207A/DT9208A
200mV	0.5% \pm 1		0.1% \pm 2			0.5% \pm 1	
2V							
20V	0.5% \pm 2		0.1% \pm 5			0.5% \pm 2	
200V							
1000V	0.8% \pm 2		0.2% \pm 5			0.8% \pm 2	

Input impedance: 10M Ω on all range

2) ACV

Range	Accuracy						
	DT9201A	DT9202A	DT9203A	DT9204A	DT9205A	DT9206A	DT9207A/DT9208A
200mV	1.2% \pm 5	1.2% \pm 5	—	—	1.2% \pm 5	—	1.2% \pm 5
2V							
20V				1.0% \pm 5			1.0% \pm 5
200V							
750V					1.2% \pm 5		

Input impedance: 10M Ω

Frequency range: 40 ~ 400Hz

3) DCA

Range	Accuracy						
	DT9201A	DT9202A	DT9203A	DT9204A	DT9205A	DT9206A	DT9207A/DT9208A
20uA	2% \pm 5		—	—	—	—	2% \pm 5
200uA							
2mA	1.0% \pm 3		1.0% \pm 3	1.0% \pm 3	1.0% \pm 3	1.0% \pm 3	1.0% \pm 3
20mA							
200mA	1.5% \pm 5	1.5% \pm 5	1.0% \pm 5	1.0% \pm 5	1.5% \pm 5	1.5% \pm 5	1.5% \pm 5
2A							
10A					2.0% \pm 10		

Measuring voltage drop: 200mV

4) ACA

Range	Accuracy						
	DT9201A	DT9202A	DT9203A	DT9204A	DT9205A	DT9206A	DT9207A/DT9208A
20uA	3% \pm 7						
200uA	1.8% \pm 3						
2mA							
20mA	1.2% \pm 5	1.2% \pm 5	1.2% \pm 10	1.2% \pm 10	1.2% \pm 5	1.2% \pm 5	1.2% \pm 5
200mA					1.0% \pm 5	2.0% \pm 5	2.0% \pm 5
2A							
10A					2.0% \pm 10		

Measuring voltage drop: 200mV

Frequency range: 40 ~ 400Hz

5) CAPACITANCE

Range	Accuracy						
	DT9201A	DT9202A	DT9203A	DT9204A	DT9205A	DT9206A	DT9207A/DT9208A
2nF							
20nF							
200nF	—	4.0% \pm 3	4.0% \pm 3	4.0% \pm 3	4.0% \pm 3	4.0% \pm 3	4.0% \pm 3
2uF							
200uF		4.0% \pm 5	4.0% \pm 5	4.0% \pm 5	4.0% \pm 5	4.0% \pm 5	4.0% \pm 5

6) OHM

Range	Accuracy							
	DT9201A	DT9202A	DT9203	DT9204A	DT9205A	DT9206A	DT9207A	DT9208A
200Ω	1.0%±10							
2KΩ	1.0%±3							
20KΩ								
200KΩ								
2MΩ	1.0%±5							
20MΩ								
200MΩ	—	5%±20	—	—	5%±20	—	5%±20	5%±20

7) TEMPERATURE (DT9207A & DT9208A only)

Range	Accuracy	
	DT9207A	DT9208A
-40°C ~ 400°C	0.75%±3	0.75%±3
400°C ~ 1000°C	1.5%±15	1.5%±15

With K-type thermocouple wire

8) FREQUENCY TEST

Range	Accuracy							
	DT9201A	DT9202A	DT9203A	DT9204A	DT9205A	DT9206A	DT9207A	DT9208A
2KHz	—	—	—	—	—	1.5%±10	—	1.5%±10
20KHz	—	—	1.5%±10	1.5%±10	—	—	—	—

Sensitivity: 100mV rms

4. PRECAUTIONS AND PREPARATIONS FOR MEASUREMENT

- Be sure that battery is correctly placed in the battery case and connected to the battery snap.
- Don't exceed the input limit shown below:

Function Range	Input terminals	Maximum input
DCV 200mV	V/OHM COM	250VDC
ACV 200mV		250VAC
DCV 2~1000V		1000VDC
ACV 2~750V		750VAC
OHM	V/OHM COM	250V DC/AC
Freq	V/OHM/Hz COM	
Logic	V/OHM COM	
Diode	V/OHM COM	
DCA 200mA	A COM	200mA DC/AC
ACA 200mA		
DCA 2A		2A DC/AC
ACA 2A		
DCA 20A	20A COM	20A DC/AC

- Inspect the test leads for damaged insulation or exposed metal. Check Test lead continuity. Damaged leads should be replaced.
- Select the proper function and range for your measurement.
- Check the input terminal position for red test lead depends on measurement ranges.

- Either one of the test leads should be taken off from the circuit under test when changing the test ranges.
- To avoid electrical shock or damage to the meter; Do not apply more than 500V between any terminal and earth ground.
- To avoid electronic shock, use caution when working above 60VDC or 25VAC rms, such voltage pose a shock hazard.
- When finished the measurement, switch off the power. Be sure to remove the battery when it is not used for a long time to avoid leakage problem.
- Do not tamper with the circuitry to avoid damage.
- Do not use or store the instrument in a place of direct sunlight, high temperature and high humidity.

5. METHOD OF MEASUREMENT

5.1 DCV & ACV MEASUREMENT

- Set the Function range switch at the required position.
- Connect black test lead to "COM" terminal and red test lead to the "V/OHM" input terminal.
- Connect test leads to measuring point and read the display value the polarity of the red lead connection will be indicated at the same time as the voltage.

Note:

- If the voltage to be tested is unknown beforehand, set the Function range switch to the highest range and work down.
- When only the figure "1" is displayed over range is being indicated and the function range switch has be set to a higher range.
- Never try to measure the voltage above 1000V! Although the indication is possible to show, there is danger of damaging the internal circuitry.

5.2 DCA & ACA MEASUREMENT

- Connect the black test lead to the "COM" terminal and the red test lead to "A" terminal for a maximum of 0.5A (model DT9201A maximum 2A)
- Set the function range switch at the required position.
- Connect test leads to measuring points and read the display value. The polarity at the red test lead connection will be indicated at the same time as the current.

Note:

- If the current range is unknown beforehand, set the function range switch to the highest range and work down.

- b) When only the figure "1" is displayed, over range is being indicated and the function range switch has to be set to a higher range.
- c) Excessive current will blow the fuse that must be replaced when the input is from "A" terminal. Fuse type is 0.5A (model DT9201A use 2A).
- d) The 20A range is not protected by a fuse, maximum 10A continuous, maximum 20A measuring time must be less than 15 seconds.

5.3 RESISTANCE MEASUREMENT

- 1) Connect black test lead to "COM" terminal and red test lead to the "V/OHM" input terminal.
- 2) Set the function range switch to the OHM range.
- 3) Connect the test leads across the resistance under measurement and read the display value.

Note:

- a) The polarity of the red test lead is "+".
- b) When the input is not connected, i.e. at open circuit the figure "1" will be displayed for the over range condition.
- c) If the resistance value being measured exceeds the maximum value of the range selected an over range indication "1" will be displayed and function range switch must be set to a higher range.
- d) 200M Ω range has a 10 digits (1M Ω) constant, the figure will appear in short circuit status it should be subtracted from measurement result, for instance: when measuring 100M Ω resistor, figure 101.0 will shown in display and the last 10 digits should be subtracted.

5.4 CAPACITANCE MEASUREMENT

- 1) Set the function range switch at the "Cx" position. Before connecting the capacitor, the display that could be zeroed automatically slows.
- 2) Connect the test capacitor to the "Cx" input socket (not test leads) and read the display value.

Note: The tested capacitor should be discharged before the testing procedure. Never apply voltage to the "Cx" input socket, or serious damage may result.

5.5 FREQUENCY MEASUREMENT

- 1) Set the function range switch at the required "Hz" position.

- 2) Connect test leads to measuring points and read the display value.

Note: Do not apply more than 250V rms to the input. Indication is possible a voltage higher than 100V rms, but reading maybe out of specification.

5.6 TEMPERATURE MEASUREMENT

- 1) Set the function range switch at the "TEMP" position.
- 2) Be sure the polarity of the thermocouple, put the cold end (free end) of the thermocouple sensor into the temperature testing holes.
- 3) The working end (testing end) on or inside the object being tested.
- 4) The value of the temperature is shown on the display in degrees centigrade ($^{\circ}$ C).

Note:

- a) The testing temperature is displayed automatically when the thermocouple is put into the testing holes.
- b) The surrounding temperature is shown when the circuit of the sensor is cut off.
- c) The limit temperature measured by the thermocouple given together with the instrument is 250 $^{\circ}$ C, 300 $^{\circ}$ C is acceptable within short period.

5.7 DIODE & CONTINUITY TEST

- 1) Set the function range switch at the "D \rightarrow " position.
- 2) Connect the black test lead to "COM" terminal and red test lead to "V/OHM" input terminal; (Note: the polarity of the red test lead is "+").
- 3) This range with "AUDIBLE CONTINUITY TEST" function. Built-in buzzer sounds if the resistance between two probes is less than 30 \pm 10 Ω .
- 4) Connect the test leads across the diode and read the display value.

Note:

- a) When the input is not connected, i.e. at open circuit, the figure "1" will be displayed.
- b) Test condition: Forward DC current approx. 1mA. Reversed DC voltage approx. 2.8V.
- c) The meter displays the forward voltage drop and displays figure "1" for overload when the diode is reversed.

5.8 TRANSISTOR hFE TEST

- 1) Set the function range switch to the "hFE" position.
- 2) Make sure the transistor is "NPN" or "PNP" type.
- 3) Transistor correct insert to E.B.C connector.
- 4) Display reading is approx. transistor hFE value.

Note: