VC890

SERIES

DIGITAL MULTIMETER

⚠ WARNING

READ AND UNDERSTAND THIS MANUAL BEFORE USING THE INSTRUMENT

Failure to understand and comply with the WARNINGS and operating instructions can result in serious or fatal injuries and/or property damage.

⚠ WARNING AND PRECAUTIONS

To avoid possible electric shock or personal injury, and to avoid possible damage to the meter or to the equipment under test, comply with the follow practices:

- ✧ Do not use the meter if it is damaged. Before you use the meter, inspect the case. Pay particular attention to the insulation surrounding the connectors.
- ✧ Inspect the test leads for damaged insulation or exposed metal. Check the test leads for continuity. Replace damaged test leads before you use the meter.
- ✧ Do not use the meter if it operates abnormally. Protection may be impaired. When in doubt, have the meter serviced.
- ✧ Do not operate the meter around explosive gas, vapor, or dust.
- ✧ Do not apply more than the rated voltage, as marked on the meter, between terminals or between any terminal and earth ground.
- ✧ Before use, verify the meter's operation by measuring a known voltage.
- ✧ When measuring current, turn off circuit power before connecting the meter in the circuit.
- ✧ When servicing the meter, use only specified replacement parts. Do not use the Meter in a manner not specified by this manual or the safety features of the Meter may be impaired.
- ✧ Use with caution when working above 30V ac rms, 42V peak, or 60V dc. Such voltages pose a shock hazard.
- ✧ When using the probes, keep your fingers behind the finger guards on the probes.
- ✧ Connect the common test lead before you connect the live test lead. When you disconnect test leads, disconnect the live test lead first.
- ✧ Remove the test leads from the meter before you open the battery door.
- ✧ Do not operate the meter with the battery door or portions of the cover removed or loosened.
- ✧ To avoid false readings, which could lead to possible electric shock or personal injury, replace the batteries as soon as the low battery indicator ("🔋") appears.

1. GENERAL SPECIFICATION

- ➢ Display: 3-½ digits LCD with a maximum reading of 1999.
- ➢ Measurement rate: updates 2-3/sec.
- ➢ Over range indication: "1" figure only in the display
- ➢ Automatic negative polarity indication.
- ➢ The "🔋" is displayed when the battery voltage drops below the operating voltage.
- ➢ Full range over load protection.
- ➢ Capacitance measurement Auto-Zeroing.
- ➢ 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.
- ➢ Operating temperature: 0°C~40°C, 0~75% R.H.
  Storage temperature: -10°C~50°C, 0~75% R.H.
- ➢ Power: Single standard 9V battery IEC 6F22, NEDA 1604, JIS 006P.
- ➢ Dimensions: 191L*89W*35Hmm.
- ➢ Weight: approx 310g (including battery)
- ➢ Accessories: test leads (pair),
  K-type thermocouple wire (model VC 890C only), operator's manual.
- ➢ Safety Compliance: IEC 61010-1, 2000 CAT I 1000V overvoltage standards.

Overvoltage installation categories per IEC 61010-1, 2000: The Meter is designed to protect against transients in these categories:

CAT I From high-voltage low-energy sources, e.g., electronic circuits or a copy machine.

CAT II From equipment supplied from the fixed installation, e.g., TVs, PCs, portable tools and household appliances.

CAT III From equipment in fixed equipment installations, e.g., installation panels, feeders and short branch circuits, and lighting systems in large buildings.

2. ELECTRICAL SPECIFICATIONS

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

1) DCV

Range	Resolution	Accurate
200mV	0.1mV	± (1%+5)
2V	1mV	± (0.8%+2)
20V	10mV	± (0.8%+2)
200V	100mV	± (0.8%+2)
1000V	1V	± (0.8%+5)

Input impedance: 10MΩ on all range

2) ACV

Range	Resolution	Accurate
200mV (VC890D only)	0.1mV	± (1.2%+5)
2V	1mV	± (1%+5)
20V	10mV	± (1%+5)
200V	100mV	± (1%+5)
750V	1V	± (1.2%+5)

Input impedance: 10MΩ Frequency range: 40 ~ 400Hz

3) DCA

Range	Resolution	Accurate
2mA (VC890D only)	1uA	± (1.5%+5)
20mA	10uA	± (1.5%+5)
200mA	0.1mA	± (1.5%+5)
10A	0.1A	± (2.5%+5)

Measuring voltage drop: 200mV

4) ACA

Range	Resolution	Accurate
2mA (VC890D only)	1uA	± (1.8%+5)
20mA	10uA	± (1.8%+5)
200mA	0.1mA	± (2%+5)
10A	0.1A	± (2.5%+10)

Measuring voltage drop: 200mV Frequency range: 40 ~ 400Hz

5) CAPACITANCE

Range	Resolution	Accurate
20nF	10pF	± (2.5%+5)
200nF	100pF	± (2.5%+5)
2uF	1nF	± (2.5%+8)
20uF	10nF	± (3%+8)
2mF	1uF	± (5%+10)

6) OHM

Range	Resolution	Accurate
200Ω	0.1Ω	± (1.5%+5)
2KΩ	1Ω	± (1.0%+4)
20KΩ	10Ω	± (1.0%+4)
200KΩ	100Ω	± (1.0%+4)
2MΩ (VC890D only)	1KΩ	± (1.0%+4)
20MΩ	10KΩ	± (1.3%+4)
200MΩ	100KΩ	± (4.0%+10)

7) TEMPERATURE (VC 890C only)

Range	Accuracy
	VC 890C
-40℃ ~ 400℃	± (1.0%±4d)
400℃ ~ 1000℃	± (1.5%±15d)

With K-type thermocouple wire

8) FREQUENCY TEST (VC 890C only)

Range	Resolution	Accurate
200kHz	100Hz	± (1.5%+5)

3. METHOD OF MEASUREMENT

⚠⚠ **Warning**

Dangerous voltages may be present at the input terminals and may not be displayed.

3.1 DCV & ACV MASUREMENT

1) Set the Function range switch at the required position.
2) Connect black test lead to "COM" terminal and red test lead to the "VΩ" input terminal.
3) 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:

a) If the voltage to be tested 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 be set to a higher range.
c) Never try to measure the voltage above 1000V! Although the indication is possible to show, there is a danger of damaging the internal circuitry.

3.2 DCA & ACA MEASUREMENT

1) Connect the black test lead to the "COM" terminal and the red test lead to "mA" terminal for a maximum of 0.2A.
2) Set the function range switch at the required position.
3) 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:

a) 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 should be set to a higher range.
c) The 10A range is not protected by a fuse, maximum 10A continuous, maximum 10A measuring time must be less than 15 seconds.

3.3 RESISTANCE MEASUREMENT

⚠ ***Warning***

To avoid electrical shock or damage to the Meter when measuring resistance or continuity in a circuit, make sure the power to the circuit is turned off and all capacitors are discharged.

1) Connect black test lead to "COM" terminal and red test lead to the "VΩ" input terminal.
2) Set the function range switch to the Ω 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 should be set to a higher range.
d) 200MΩ range has a 10 digits (1MΩ) constant, the figure will appear in short circuit status it should be subtracted from measurement result, for instance: when measuring 100MΩ resistor, figure 101.0 will be shown in display and the last 10 digits should be subtracted.

3.4 CAPACITANCE MEASUREMENT

⚠ ***Warning***

To avoid damage to the Meter, disconnect circuit power and discharge all high-voltage capacitors before measuring capacitance.

1) Set the function range switch at the "Cx" position. Before connecting the capacitor, the display could be zeroed automatically slows.
2) Connect the test capacitor to the " ⊣⊢ " and "COM" input terminals and read the display value.

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

3.5 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.

3.6 TEMPERATURE MEASUREMENT

1) Set the function range switch at the "TEMP" position.
2) Plug the thermocouple into the meter's mAT and COM terminals, insuring the thermocouple red plug is inserted into the mAT terminal on the meter.
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 (°C).

Note:

a) The testing temperature is displayed automatically when the thermocouple is put into the testing terminals.
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°C, 300°C is acceptable within short period.

3.7 DIODE & CONTINUITY TEST

1) Set the function range switch at the "⊣◀)" position.
2) Connect the black test lead to "COM" terminal and red test lead to "VΩ" 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±10Ω.
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.

3.8 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 correctly insert in E.B.C connector.
4) Display reading is approx. transistor hFE value.

Note:

Test condition: Base current approx. 10uA. V_{CE} approx.2.8V

3.9 Non-contact voltage test "NCV" (VC890C only)

1) Set the function range switch to the "NCV" position.
3) Pick up the tester and move it around,
   the built-in beeper will beep when the inner sensor detects AC voltage nearby. The stronger the voltage is,
   the quicker the beeper beeps while the LED light will twinkle.

4. MAINTENANCE

Beyond replacing batteries and fuses, do not attempt to repair or service your Meter unless you are qualified to do so and have the relevant calibration, performance test, and service instructions. The recommended calibration cycle is 12 months.

Periodically wipe the case with a damp cloth and mild detergent. Do not use abrasives or solvents. Dirt or moisture in the terminals can affect readings.

To clean the terminals

a) Push the Meter OFF and remove the test leads.
b) Shake out any dirt that may be in the terminals.
c) Soak a new swab with isopropyl alcohol and work around the inside of each input terminal. Use a new swab to apply a light coat of fine machine oil to the inside of each terminal.

5. BATTERY AND FUSE REPLACEMENT

1) Battery and fuse replacement should only be done after the test leads have been

Note: this meter has built-in 0.2A self-recovery fuse, which will not be damaged under normal use