BENNING 44690

BENNING MM 7-2 True RMS Digital Multimeter User Manual

Model: 44690

1. Introduction

The BENNING MM 7-2 is a True RMS digital multimeter designed for precise measurements in industrial, service, electrical trade, and HVAC technology applications. It features a 4 5/6 digit LCD display with backlight, offering high resolution and accuracy for various electrical parameters. This manual provides essential information for the safe and effective use of your BENNING MM 7-2 multimeter.

2. Safety Information

Always adhere to the following safety precautions to prevent personal injury and damage to the multimeter or equipment under test.

- **Read the Manual:** Thoroughly read and understand all instructions before using the multimeter.
- **Rated Voltage:** Do not exceed the maximum input limits for any function. The multimeter is rated for CAT IV 600V and CAT III 1000V.
- **Inspect Before Use:** Before each use, inspect the multimeter, test leads, and accessories for any damage. Do not use if damaged.
- **Proper Terminals:** Ensure test leads are connected to the correct input terminals for the desired measurement function.
- **Live Circuits:** Exercise extreme caution when working on live circuits. Always assume circuits are live until proven otherwise.
- **Personal Protective Equipment (PPE):** Wear appropriate PPE, such as safety glasses and insulated gloves, when necessary.
- **Environmental Conditions:** Do not use the multimeter in wet environments or in the presence of explosive gases or dust.
- **Fuse Protection:** The current input terminals are fuse-protected. Replace fuses only with specified types

and ratings.

- **Battery Replacement:** Replace batteries promptly when the low battery indicator appears to ensure accurate readings.

3. Setup and Initial Operation

3.1 Unpacking and Contents

Carefully unpack the BENNING MM 7-2 multimeter and verify that all components are present:

- BENNING MM 7-2 Digital Multimeter
- Silicone test leads with gold-plated 2mm and 4mm measuring tips (screw-on)
- Protective carrying bag
- Wire temperature sensor
- 3 x 1.5V Micro/AAA/LR03 batteries
- Fuses (11A and 0.4A)

Figure 1: BENNING MM 7-2 Multimeter and its complete set of accessories, including test leads, a temperature probe, and a protective carrying case.

3.2 Battery Installation

The BENNING MM 7-2 requires 3 AAA batteries for operation. To install or replace batteries:

1. Ensure the multimeter is turned OFF and disconnect all test leads.
2. Locate the battery compartment cover on the rear of the multimeter.
3. Use a screwdriver to open the battery compartment.
4. Insert three 1.5V AAA batteries, observing the correct polarity (+/-) as indicated inside the compartment.
5. Replace the battery compartment cover and secure it with the screw.

3.3 Connecting Test Leads

Always connect the black test lead to the 'COM' (common) jack. Connect the red test lead to the appropriate input jack for the desired measurement:

- **VΩHz:** For voltage, resistance, frequency, capacitance, and diode/continuity tests.
- **µA mA:** For microampere and milliampere current measurements.
- **A:** For ampere current measurements.

4. Operating Instructions

4.1 Power On/Off and Display

Turn the rotary switch to any function to power on the multimeter. Turn it to 'OFF' to power off. The 4 5/6 digit LCD display shows measurement values, units, and various indicators. The backlight can be activated for improved visibility in low-light conditions.

4.2 Voltage Measurement (DC/AC)

The BENNING MM 7-2 can measure both DC and AC voltages up to 1000V. It features an AutoV function for automatic AC/DC switching and range selection.

1. Turn the rotary switch to 'V'. The multimeter will automatically detect AC or DC voltage.
2. Connect the black test lead to 'COM' and the red test lead to 'VΩHz'.
3. Connect the test probes in parallel across the circuit or component to be measured.
4. Read the voltage value on the display.

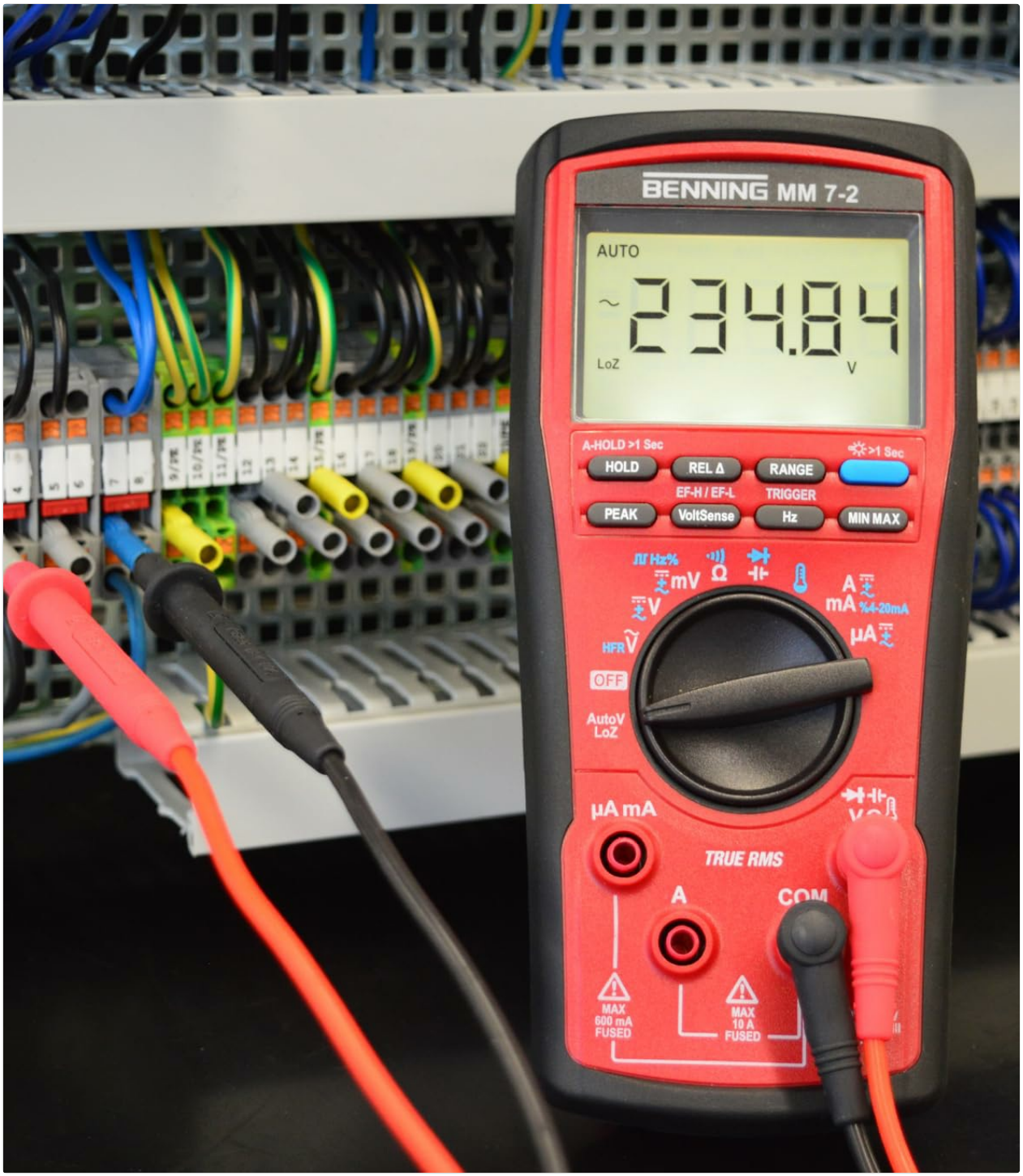

Figure 2: The BENNING MM 7-2 Multimeter actively measuring voltage within an electrical control panel, demonstrating its application in industrial settings.

4.3 Current Measurement (DC/AC)

The multimeter supports current measurements from microamperes to 10A. Ensure proper fuse protection and correct terminal selection.

1. Turn the rotary switch to 'µA mA' or 'A' depending on the expected current range.
2. Connect the black test lead to 'COM'. Connect the red test lead to 'µA mA' or 'A' accordingly.
3. **Important:** Connect the multimeter in series with the circuit to be measured. Open the circuit and insert the multimeter.
4. Read the current value on the display.

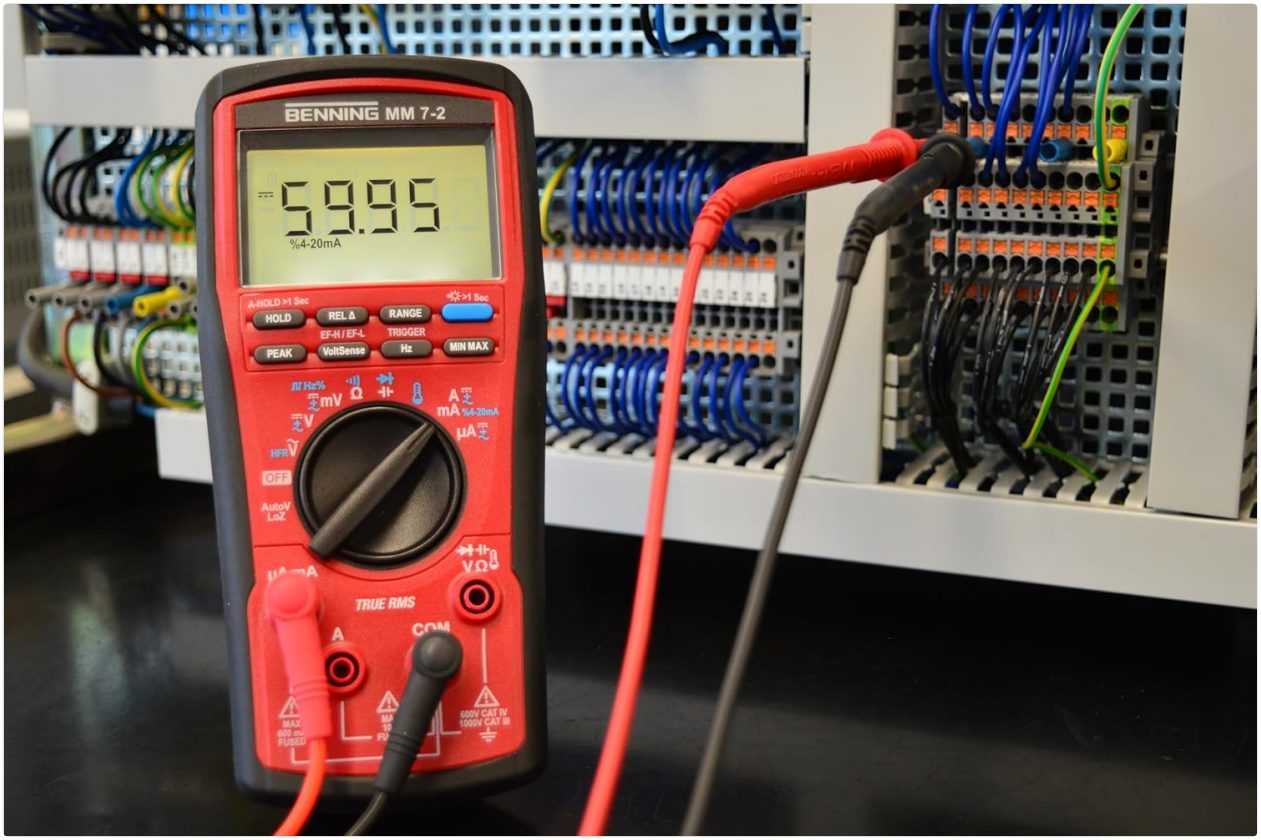

Figure 3: The BENNING MM 7-2 Multimeter performing a 4-20mA current loop measurement within an industrial control system, highlighting its capability for process control applications.

4.4 Resistance Measurement

Measure resistance up to 60 MOhm.

1. Turn the rotary switch to 'Ω'.
2. Connect the black test lead to 'COM' and the red test lead to 'VΩHz'.
3. Ensure the circuit or component is de-energized before measuring resistance.
4. Connect the test probes across the component.
5. Read the resistance value on the display.

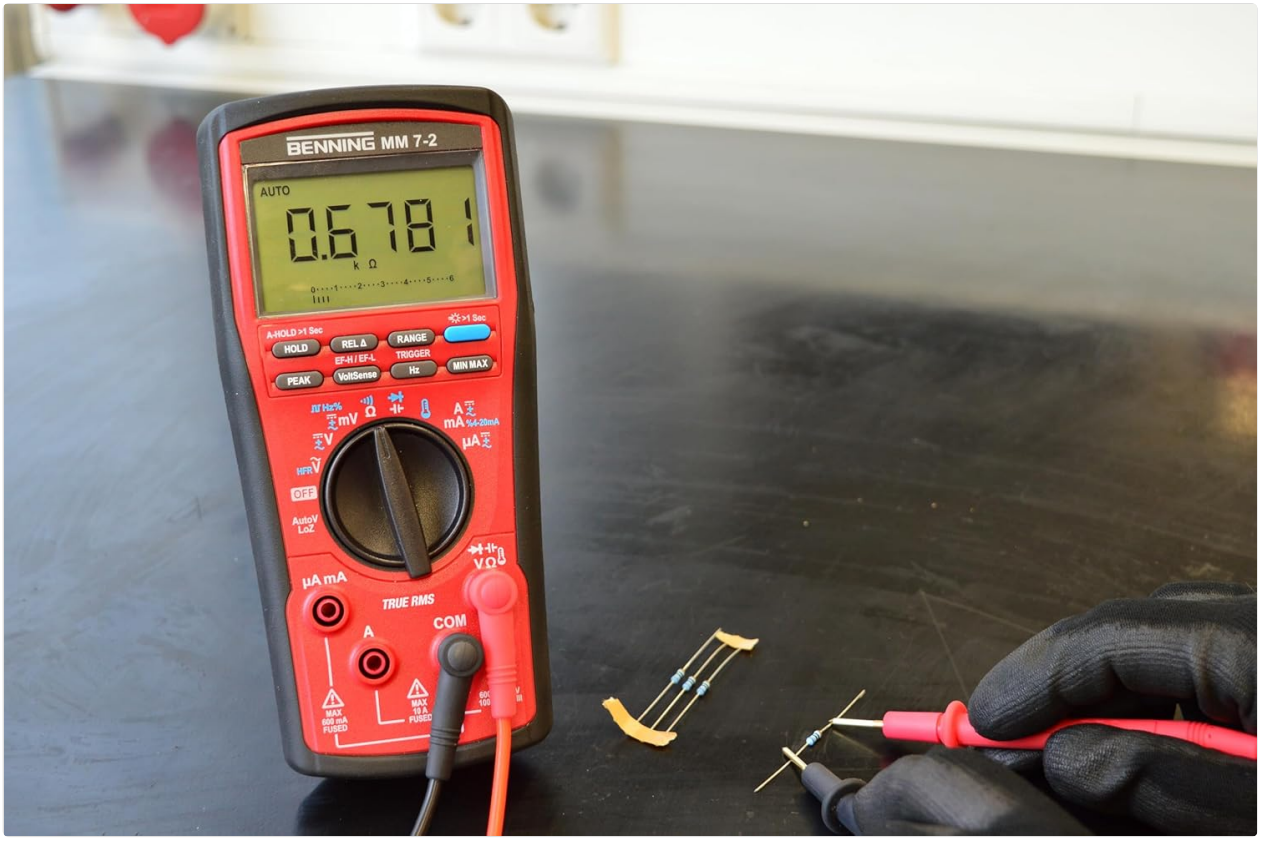

Figure 4: The BENNING MM 7-2 Multimeter accurately measuring the resistance of small electronic resistors, demonstrating its precision for component testing.

4.5 Capacitance Measurement

Measure capacitance up to 10000 µF.

1. Turn the rotary switch to 'CAP'.
2. Connect the black test lead to 'COM' and the red test lead to 'VΩHz'.
3. Ensure the capacitor is fully discharged before measurement to prevent damage to the multimeter.
4. Connect the test probes across the capacitor terminals.
5. Read the capacitance value on the display.

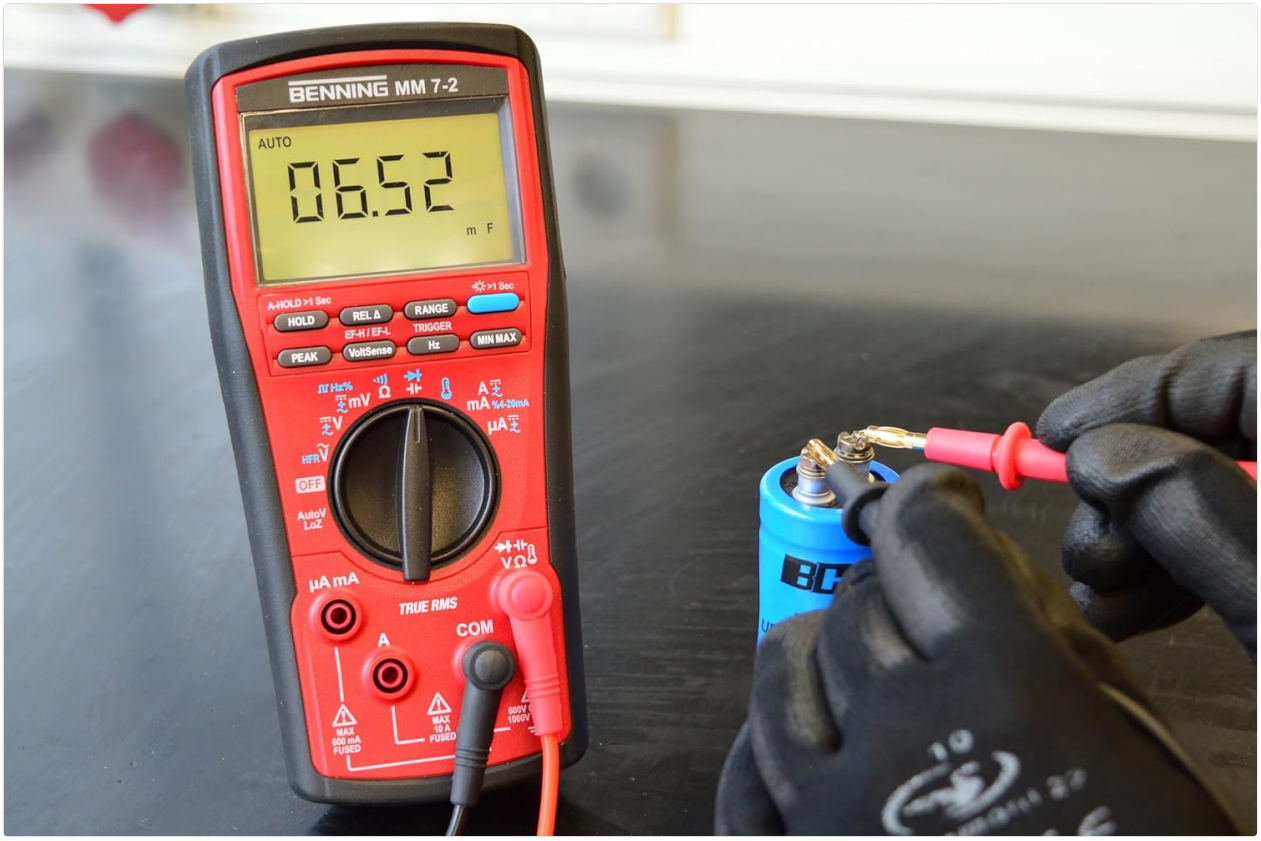

Figure 5: The BENNING MM 7-2 Multimeter accurately measuring the capacitance of a large blue electrolytic capacitor, illustrating its capability for component analysis.

4.6 Frequency Measurement

Measure frequency up to 1 MHz (logic level) or 50 kHz (mains level).

1. Turn the rotary switch to 'Hz'.
2. Connect the black test lead to 'COM' and the red test lead to 'VΩHz'.
3. Connect the test probes across the signal source.
4. Read the frequency value on the display.

4.7 Temperature Measurement

Measure temperature from -200 °C to +1090 °C using the included wire temperature sensor.

1. Turn the rotary switch to '°C/°F'.
2. Connect the temperature sensor to the 'VΩHz' and 'COM' jacks, observing polarity if indicated on the sensor.
3. Place the sensor tip on or near the object whose temperature is to be measured.
4. Read the temperature value on the display.

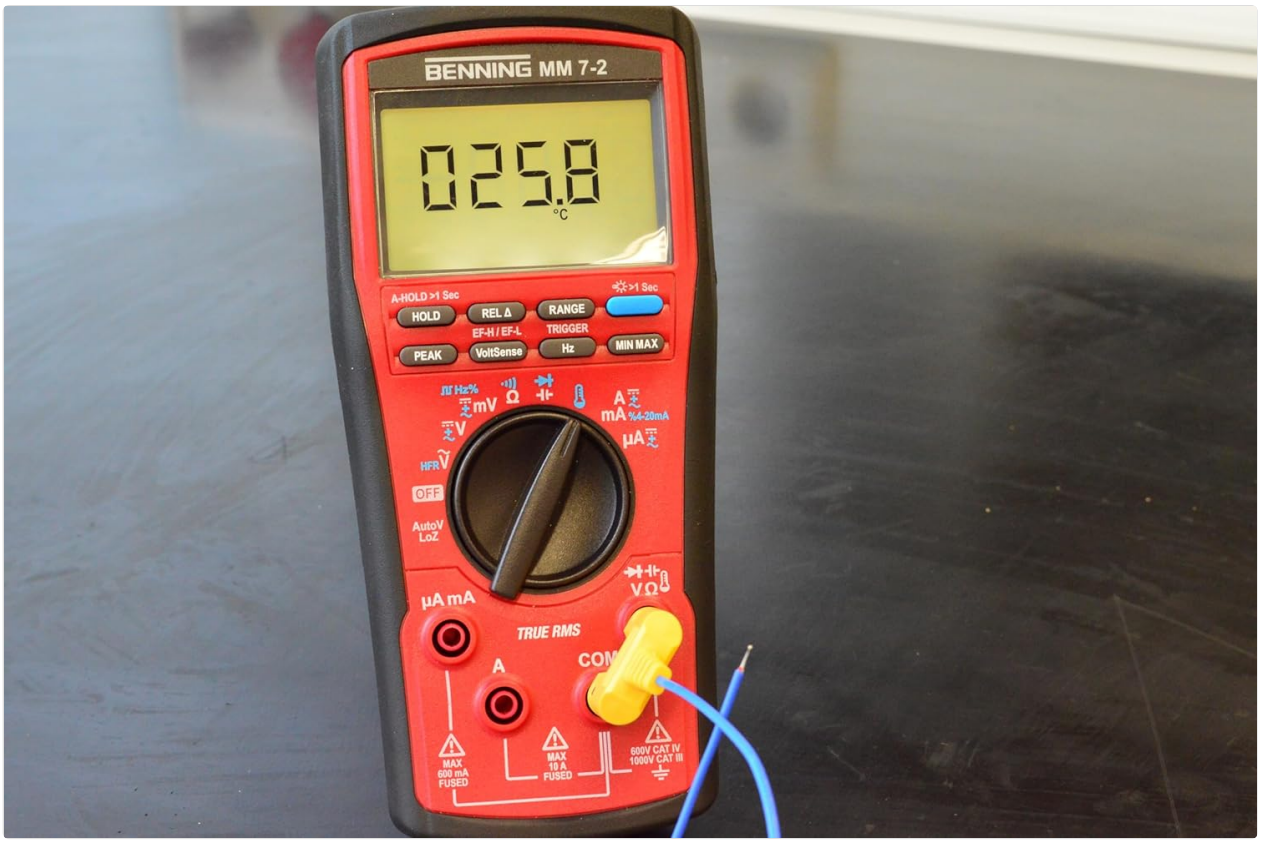

Figure 6: The BENNING MM 7-2 Multimeter displaying a temperature reading, with a yellow wire temperature sensor connected and ready for use.

4.8 Continuity Test and Diode Test

The multimeter provides fast optical and acoustic indications for continuity and diode testing.

- **Continuity:** Turn the rotary switch to 'Ω'. Press the 'RANGE' button until the continuity symbol (speaker icon) appears. A continuous beep indicates continuity (<100 Ω - 420 Ω).
- **Diode:** Turn the rotary switch to 'Ω'. Press the 'RANGE' button until the diode symbol appears. Connect the red lead to the anode and black lead to the cathode. A forward voltage drop (e.g., 0.5V to 0.8V) will be displayed for a good diode.

4.9 Special Functions

- **AutoV Function:** Automatically switches between AC and DC voltage measurement and selects the appropriate range.
- **LoZ Function:** Low input impedance (> 2 kΩ) to suppress capacitive/inductive interspersed voltages, providing more stable readings in certain environments.
- **Low Pass Filter (HFR):** High frequency suppression (1000 Hz) for accurate measurements on clocked motor drives.
- **VoltSensor:** Non-contact and single-pole phase and cable break testing with two sensitivities, indicated by LCD and buzzer.
- **Optical and Acoustic Socket Control:** Provides a warning when the measuring range is incorrectly selected for µA/mA and A ranges.
- **Data Hold (HOLD):** Freezes the current display reading.
- **Min/Max/Avg (MIN MAX AVG):** Records minimum, maximum, and average values over a measurement period.
- **Relative Value Measurement (REL):** Displays the difference between the current reading and a stored reference value.

- **Peak Memory (PEAK):** Captures fast transient peaks.
- **Duty Cycle Measurements:** Measures the duty cycle (%) of a signal.
- **4 mA - 20 mA DC Current Loop (%):** Measures the percentage of a 4-20mA current loop, useful in industrial control systems.

5. Maintenance

5.1 Cleaning

Wipe the multimeter casing with a damp cloth and mild detergent. Do not use abrasive cleaners or solvents. Ensure the device is dry before use.

5.2 Battery Replacement

Refer to section 3.2 for battery installation instructions. Replace batteries when the low battery indicator appears on the display to maintain measurement accuracy.

5.3 Fuse Replacement

If the current measurement functions cease to work, the fuses may need replacement. The BENNING MM 7-2 uses specific fuses:

- For µA/mA range: 0.4A fuse
- For A range: 11A fuse

To replace a fuse:

1. Ensure the multimeter is turned OFF and disconnect all test leads.
2. Open the battery compartment cover (refer to section 3.2).
3. The fuse compartment is typically located near the battery compartment. Carefully remove the old fuse.
4. Install a new fuse of the exact specified type and rating.
5. Close and secure the compartment cover.

6. Troubleshooting

If you encounter issues with your BENNING MM 7-2, refer to the following common problems and solutions:

- **No Display/Power:**
  - Check if the rotary switch is set to an ON position.
  - Verify battery installation and charge level. Replace batteries if low.
- **Incorrect Readings:**
  - Ensure test leads are connected to the correct input jacks for the selected function.
  - Check if the measurement range is appropriate (though AutoV and auto-ranging help).
  - Verify the integrity of test leads; replace if damaged.
  - Ensure the circuit under test is de-energized for resistance/capacitance measurements.
- **Current Measurement Not Working:**
  - Check and replace the appropriate fuse (0.4A for µA/mA, 11A for A).

- Ensure the multimeter is connected in series with the circuit.

- **"OL" or Overload Indication:**
  - The measured value exceeds the selected range. Switch to a higher range if available, or ensure the input is within the multimeter's maximum specifications.

If problems persist, contact BENNING customer support.

7. Specifications

Parameter	Specification
Display	4 5/6 digit LCD (60,000 counts) with backlight, analogue bar display
True RMS	AC, AC + DC
DC Voltage Range	0.01 mV to 1000 V
AC Voltage Range	0.01 mV to 1000 V
DC Current Range	0.01 µA to 10 A
AC Current Range	0.01 µA to 10 A
Resistance Range	0.01 Ω to 60 MΩ
Capacitance Range	0.01 nF to 10000 µF
Frequency Range	0.001 Hz to 1 MHz (logic level), up to 50 kHz (mains level)
Temperature Range	-200 °C to +1090 °C
Continuity Test	<100 Ω - 420 Ω (optical/acoustic)
Diode Test	3.0 V (optical/acoustic)
Measuring Circuit Category	CAT IV 600V, CAT III 1000V
Power Source	3 x 1.5V AAA batteries
Product Dimensions	5.1 x 8.9 x 19.3 cm
Item Weight	420 Grams
Safety Standard	UL
Special Features	AutoV, LoZ, Low Pass Filter (HFR), VoltSensor, Data Hold, Min/Max/Avg, REL, Peak, Duty Cycle, 4-20mA loop (%)

8. Warranty and Support

For warranty information and technical support, please refer to the documentation provided with your purchase or visit the official BENNING website. Keep your proof of purchase for warranty claims.