OPERATING INSTRUCTIONS

Techmaster

Model DM-8700
TRUE RMS DIGITAL MULTIMETER

PLEASE READ THESE OPERATING INSTRUCTIONS CAREFULLY
Misuse and or abuse of these instruments cannot be prevented by any
printed word and may cause injury and or equipment damage. Please
follow all these instructions and measurement procedures faithfully
and adhere to all standard industry safety rules and practices.

A.W. SPERRY INSTRUMENTS INC.

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WARRANTY RETURN

This warranty is void if the returned product has been opened, modified, or repaired by anyone other than a Factory Service Technician.

WARRANTY REGISTRATION

FIVE YEAR LIMITED WARRANTY

NOTE: Pre-removed parts are not covered under terms and conditions of warranty.

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**Table:**

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<tr>
<th>Category</th>
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**Diagram:**

- **Diagram Description:**
  - Diagram details not visible in the image.

**Notes:**
- Additional notes or comments not visible in the image.
1. After disconnecting test leads and turning off the multimeter, remove the back cover by removing the three screws from the bottom of the back cover.

2. Replace the battery. 

3. Replace the back cover.

4. Replace the cover carefully and do not damage or bruise.

**WARNING**

When using the instrument, be sure to check the battery level. When the battery displays the battery symbol, replace the battery. If the battery is not connected, the instrument may give incorrect measurements.

5. Never replace the provided battery with any other battery.

6. Never replace the batteries without the back cover.

7. Never replace the batteries with batteries of the wrong type.

8. Never replace the batteries with batteries of the wrong type.

9. Never replace the batteries with batteries of the wrong type.

10. To avoid electric shock, CAUTION when working with voltages.

11. To avoid electric shock, CAUTION when working with voltages.

12. To avoid electric shock, CAUTION when working with voltages.

**Be sure to replace the batteries in the specified order.**

**Do not open the instrument in explosive atmosphere.**

**Do not operate the instrument in explosive atmosphere.**

**Do not use the instrument in explosive atmosphere.**

**To prevent electrical shock hazard, turn off the multimeter and disconnect the test leads and battery before making any measurements.**
CAUTION

Failure to correctly install back cover may damage O-ring.

FUSE TEST AND REPLACEMENT

Failure to correctly install back cover may damage O-ring.

CAUTION

Must use 20A input Terminal which in turn will reduce or expose the water resistant attribute.
FUNCTION SELECT:HOLD

When the HOLD function is selected, the display will freeze the reading. The HOLD button is used to hold the current reading on the display.

POWER Switch

This switch is used to turn the meter on or off. It also acts as a new measurement button that clears the display when pressed. Pressing the button once will reset the value read.
The RMS expression given above:

\[
\begin{align*}
\text{RMS} &= \sqrt{\text{Total Power}} \\
&= \sqrt{\text{AC Component}^2 + \text{DC Component}^2}
\end{align*}
\]

is used instead of the total RMS value. This is because, unlike the average value, the RMS value takes into account the square of the signal and can be used to calculate the root mean square value, which is used in many applications in electrical engineering.

The table below lists the various functions that can be performed by the instrument:

<table>
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<th>Function</th>
<th>Description</th>
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<td>AC RMS</td>
<td>Performs AC RMS measurements</td>
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<tr>
<td>DC RMS</td>
<td>Performs DC RMS measurements</td>
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<tr>
<td>HZ</td>
<td>Performs HZ measurements</td>
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<tr>
<td>%</td>
<td>Performs percentage calculations</td>
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<tr>
<td>V/M</td>
<td>Performs voltage/measurement calculations</td>
</tr>
<tr>
<td>V/Ω</td>
<td>Performs voltage/ohm measurements</td>
</tr>
<tr>
<td>A/Ω</td>
<td>Performs amperage/ohm measurements</td>
</tr>
<tr>
<td>LOGIC</td>
<td>Performs logic analysis</td>
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</table>

Symbols:

- ▲: Appears when the logic pass has been selected
- ▼: Appears when the logic fail has been selected
- ±: Appears when the logic test mode has been selected
- AC: Appears for AC current and voltage modes
- DC: Appears for DC current and voltage modes
AC converters of all types are limited by their frequency response and input dynamic range. Measurements of complex waveforms will not be affected by converter bandwidth limitations, provided that all significant AC components contained within the waveforms are within the bandwidth of the converter.

Crest factor is a measure of the input dynamic range of an AC converter. It expresses the ability of the converter to accept a signal that has large peak values compared to its RMS value without saturating the converter circuitry and degrading the specified accuracy. Crest factor is defined as the ratio of the peak voltage to the total AC RMS voltage.

\[
\text{Crest Factor} = \frac{V(\text{peak})}{V(\text{AC RMS})}
\]

If the crest factor of a waveform is not known, determine the crest factor as follows:

For AC-coupled True RMS meters, AC couple the waveform to an oscilloscope and measure the peak voltage with respect to the ground reference. Divide the peak voltage by the RMS voltage measured by the multimeter. The resultant is the crest factor.

Sec. 9 OPERATION

Before making any measurements always examine the instrument and accessories used with the instrument for damage, contamination (excessive dirt, grease, etc.) and defects. Examine the test leads for cracked or frayed insulation and make sure the lead plugs fit snugly into the instrument jacks. If any abnormal conditions exist do not attempt to make any measurements. Instead refer to sec. 14 Return for Repair.

Sec. 9.1 VOLTAGE MEASUREMENTS

1. Insert the black and red test leads into the respective "COM" and "V-Ω" jacks.
2. Place the range selector switch into the 1000DCV position if a dc voltage is to be measured or into the 750ACV position if an ac voltage is to be measured. Always start in the highest range of the function to be measured.

CAUTION

To avoid possible electric shock, instrument damage and/or equipment damage, do not attempt to take any voltage measurements if the voltage is above 1000Vdc/750Vac or if the voltage is unknown. 1000Vdc and 750Vac is the maximum voltages that this instrument is designed to measure. The "COM" terminal potential should not exceed 500V measured to ground.

3. Apply the test leads to the two points at which the voltage reading is to be taken. Be careful not to touch any energized conductors with any parts of your body.
4. Turn the range selector switch to the next lower range for a more accurate reading only if the reading is within that next lower range.
5. When measurements are completed, disconnect the test leads from the circuit under test. Remove the test leads from the instrument.

Sec. 9.2 CURRENT MEASUREMENTS

1. Insert the black and red test leads into the respective "COM" and "20A" terminals.
2. Place the function switch to the 20A position. Always start with the highest range of the function to be measured.

CAUTION

Do not attempt to measure currents in circuits capable of delivering greater than 600V. Since the fuse is rated at 600V damage or injury could occur.

The 20A input terminal is protected by a 20A/600V hi energy, fast blow fuse. The 200mA input terminal is protected by a 500mA/600V fuse.

3. Completely de-energize the circuit in which the current is to be measured. Place the DMM in series with the conductor carrying the current which is to be measured. Energize the circuit.
4. If the reading is less than 0.20 Amps, you can switch to a lower range for greater accuracy. If not, you have completed your measurement.
CONTINUITY MEASUREMENTS

1. Connect the proper test leads to the circuit to be measured. The probes should be fully inserted into the Bezels. Ensure that the circuit is open.

2. Ensure that the probes are in the correct position. The probes should be fully inserted into the Bezels. Ensure that the circuit is open.

3. Connect the proper test leads to the circuit to be measured. The probes should be fully inserted into the Bezels. Ensure that the circuit is open.

CAUTION
- Do not touch the probes while they are connected to the circuit.
- Ensure that the circuit is open.

RESISTANCE AND DIODE MEASUREMENTS

1. Insert the test leads into the appropriate terminals. Ensure that the circuit is open.

2. Place the range selector switch into the desired position. Ensure that the circuit is open.

3. Connect the proper test leads to the circuit to be measured. The probes should be fully inserted into the Bezels. Ensure that the circuit is open.

4. Continuously measure the resistance of the circuit to be measured. The probes should be fully inserted into the Bezels. Ensure that the circuit is open.

5. Connect the proper test leads to the circuit to be measured. The probes should be fully inserted into the Bezels. Ensure that the circuit is open.

CAUTION
- Do not touch the probes while they are connected to the circuit.
- Ensure that the circuit is open.

Before changing ranges, always de-energize the circuit.
FREQUENCY

0% to 99% of the frequency duty cycle.

ACCURACY

0.12% ± 0.1% of the reading.

INPUT

0-2000 000

The model 575A-870 is a split core current transformer capable of measuring AC currents up to 1200A.

AC CURRENT MEASUREMENT

Operating instructions apply to the measurement capabilities of the 575A-870. Refer to the accompanying data sheet or the manual for more information.

ACCESSORIES

REPLACEMENT - In section 7, RECEPTACLE, no current range do not function. See Fuse Replacement.

FUSE REPLACEMENT - In section 7, RECEPTACLE, no current range do not function. See Fuse Replacement.

BATTERY REPLACEMENT - In section 6, RECEPTACLE, no current range do not function. See Battery Replacement.

CLEANING

Maintenance consists of periodic cleaning. Batteries should be replaced, if necessary, before use.

MAINTENANCE

LOGIC MEASUREMENTS

To avoid electrical shock, instrument damage, and equipment damage, do not exceed 500VDC/600VAC on a TTL logic output.

CAUTION

1. Insert the black and red test leads into the respective COM and measurement terminals.
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2. Insert the black and red test leads into the respective COM and measurement terminals.
RETURN FOR REPAIRS

SEC. 12 CALIBRATION PROCEDURE

1. Calibrate the instrument with the recommended test standards and apply the necessary corrections.
2. Connect the instrument to the power source and follow the manufacturer’s instructions.
3. Set the instrument to the appropriate measurement range.
4. Perform a zero and span adjustment, if necessary.

CAUTION

- Make sure the instrument is turned off before connecting it to the power source.
- Do not apply excessive force to the adjustment knobs.
- Do not use the instrument in hazardous environments.

SEC. 13 TROUBLESHOOTING

- Check the power supply and ensure it is properly connected.
- Check the instrument for any visible damage.
- Calibrate the instrument after making any repairs.