ATD-5570
DELUXE AUTOMOTIVE METER

INSTRUCTION MANUAL

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his chapter covers brief, introductory information. You will find:

- Safety precautions

**Safety**

**DANGER**

- Engines produce carbon monoxide which is odorless, causes slower reaction time, and can lead to serious injury. When the engine is operating, keep service areas WELL VENTILATED or attach the vehicle exhaust system to the shop exhaust removal system.

- Set the parking brake and block the wheels before testing or repairing the vehicle. It is especially important to block the wheels on front-wheel drive vehicles; the parking brake does not hold the drive wheels.

- Wear an eye shield when testing or repairing vehicles.

Exceeding the limits of this meter is dangerous. It will expose you to serious or possibly fatal injury. Carefully read and understand the cautions and the specification limits of this meter.

- Voltage between any terminal and ground must not exceed 1000V DC or 750V AC.

- Use caution when measuring voltage above 25V DC or 25V AC.

- Circuit tested must be protected by a 10A fuse or circuit breaker.

- Do not use the meter if it has been damaged.

- Do not use the test leads if the insulation is damaged or if metal is exposed.
Safety Cont’d…

**Danger**
- Avoid electrical shock: do not touch the test leads, tips or the circuit being tested.
- Do not try a voltage measurement with the test leads in the 10A or the mA terminal.
- When testing for the presence of voltage or current, make sure the meter is functioning correctly. Take a reading of a known voltage or current before accepting a zero reading.
- Choose the proper range and function for the measurement. Do not try voltage or current measurements that may exceed the ratings marked on the Function/Range switch or terminal.
- When measuring current, connect the meter in series with the load.
- Never connect more than one set of test leads to the meter.
- Disconnect the live test lead before disconnecting the common test lead.
- The mA and the 10A terminals are protected by fuses. To avoid possible injury or damage, use only in circuits limited to 320mA or 10A for 60 seconds.

See also…
- Fuse Replacement

Safety Cont’d…

**IMPORTANT**
- To maintain accuracy of the meter, replace the discharged battery immediately when the battery symbol appears on the meter display.
- Avoid measuring error from outside interference: keep the meter away from spark plug or coil wires.
- Avoid damaging the meter when testing voltage: disconnect the test leads from the test points before changing functions.
- Do not exceed the limits shown in the table below:

<table>
<thead>
<tr>
<th>Function</th>
<th>Terminal</th>
<th>Input limit</th>
</tr>
</thead>
<tbody>
<tr>
<td>AC Volts</td>
<td>V-Ω-RPM</td>
<td>750 Volts AC rms</td>
</tr>
<tr>
<td>DC Volts</td>
<td>V-Ω-RPM</td>
<td>1000 Volts DC</td>
</tr>
<tr>
<td>Frequency</td>
<td>V-Ω-RPM</td>
<td>500 Volts AC/DC</td>
</tr>
<tr>
<td>Ohm (resistance)</td>
<td>V-Ω-RPM</td>
<td>250 Volts AC DC</td>
</tr>
<tr>
<td>Diode</td>
<td></td>
<td></td>
</tr>
<tr>
<td>AC/DC μmA</td>
<td>μA/mA</td>
<td>320mA AC/DC</td>
</tr>
<tr>
<td>AC/DC 10A</td>
<td>10A</td>
<td>*10AAC/DC</td>
</tr>
<tr>
<td>RPM</td>
<td>V-Ω-RPM</td>
<td>500 Volts AC/DC</td>
</tr>
<tr>
<td>Duty Cycle(%)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Dwell angle</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

* 10 Amp measurement for 60 seconds maximum.
① Ohms can not be measured if voltage is present, ohms can be measured only in a non-powered circuit. However, the meter is protected to 250 volts.
This chapter will help you get started. It describes the basic functions of the Meter.
Meter Basics

1. Digital and Analog display
Display features:
   a. Four character digital display
   b. Symbols to identify function
   c. Analog bar graph

The digital display is best for stable input. The bar graph is best for rapidly changing input.

2. Function buttons
Press the button to select a function. A symbol will display to verify your choice.

3. Rotary Selector Switch
Turn this switch to select a function or turn the meter OFF.

4. Temperature Terminal
Insert the temperature probe in this terminal.

5. Test Lead Terminals
The Black test lead is used in the Common (COM) terminal for all tests. The Red test lead is used to measure Amps or Volts.

Units of measure:
- Kilo (k=1,000)
- Hertz (Hz)
- Milli (m=1/1000)
- Volts (V)
- mega (m=1,000,000)
- ohms (Ω)
- dwell degrees
- duty percent (%)
Meter Basics Cont’d …

**Function and Range Select**

Turn the rotary switch in either direction to select a function.

Most functions also have ranges. Always select a range higher than you expect the current or voltage to be. Then select a lower range if better accuracy is needed.

- If the range is too high, the readings are less accurate.
- If the range is too low, the meter shows **OL** (over limit).

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**Push – button Functions**

**Alternate Function Button**

Press the Alternate Function button to toggle between DC and AC in the current measurements.

**Range Select**

The range is automatically selected by the meter. You can also manually select a range within a function by pressing the **RANGE** button.

**Range Exit**

To exit the **RANGE** mode and return to autoranging, press and hold the **RANGE** button for 2 seconds.

**Note:**
- If the range is too high, the readings are less accurate.
- If the range is too low, the meter shows **OL** (over limit).

**Data Hold**

The Data Hold Feature stores the last reading in memory.

- Press the **Data Hold** button once to hold the present reading.
- Press the **Data Hold** button again to exit and resume readings.
**Meter Functions - Voltage (V)**

The meter will automatically select the best voltage (V) range.

Insert:
- Black lead in **COM** terminal.
- Red lead in **V-Ω-RPM** terminal

Touch the Black probe to ground or to the negative (-) circuit.

Touch the Red probe to the circuit coming from the power source

**IMPORTANT:** voltage must be measured in parallel (Red probe measuring circuit from power source).

**Accuracy**
Selection of a lower range will move the decimal point one place and increase the accuracy. An **OL** display means the range is too low, select the next higher range.

**Analog Bar Graph**
The Bar Graph is easiest to read when the data causes the digital display to rapidly change. It is also useful for trend setting or directional data.

**WARNING**
When measuring voltage, be sure the Red test lead is in the terminal marked “V”. If the test lead is in an Amp (A) or Milliampere (mA) terminal, you may be injured or the meter damaged.

**Meter Functions – Resistance (Ω )**

**IMPORTANT:** If you are testing an application that has capacitors in the circuit, be sure to turn the power OFF on the test circuit and discharge all capacitors. Accurate measurement is not possible if external or residual voltage is present.

Select the **resistance (Ω )** range with the rotary switch.

Select the **resistance(Ω )** range with the button labeled "RANGE", if more accurate measurement is desired.

Insert:
- Black lead in **COM** terminal.
- Red lead in **V-Ω-RPM** terminal.

Touch the test lead probes across the resistor to be tested.
Meter Functions – Diode Check

IMPORTANT: Turn the power OFF to the test circuit

Select the Diode Check setting with the rotary switch.

Insert:
Black lead in COM terminal.
Red lead in V- Ω -RPM terminal.

Touch the Black test probe to the negative (-) side of the diode.

Touch the Red test probe to the positive (+) side of the diode.
Reverse the probes: Black to the positive (+) side and Red to the negative (-) side.

Note:
A “good” diode will read low in one direction and high in the other direction when the probes are reversed (or vice versa).
A defective diode will have the same reading in both directions or read between 1.0 to 3.0 V. in both directions.

<table>
<thead>
<tr>
<th>Diode</th>
<th>Reverse Probes</th>
<th>Black - to +</th>
<th>Red + to -</th>
</tr>
</thead>
<tbody>
<tr>
<td>Good</td>
<td>.4 to .9V</td>
<td>OL</td>
<td>OL</td>
</tr>
<tr>
<td></td>
<td>.4 to .9V</td>
<td>.4 to .9V</td>
<td>.4 to .9V</td>
</tr>
<tr>
<td>Bad</td>
<td>OL</td>
<td>1.0 to 3.0V</td>
<td>1.0 to 3.0V</td>
</tr>
<tr>
<td></td>
<td>.4 to .9V</td>
<td>.4 to .9V</td>
<td>.4 to .9V</td>
</tr>
<tr>
<td></td>
<td>OL</td>
<td>OL</td>
<td>OL</td>
</tr>
<tr>
<td></td>
<td>.000V</td>
<td>.000V</td>
<td>.000V</td>
</tr>
</tbody>
</table>

Meter Functions – Audible Continuity

IMPORTANT: Turn the power OFF on the test circuit

⇔ Select the Audible Continuity range with the rotary switch.

Insert:
• Black lead in COM terminal.
• Red lead in V- Ω -RPM terminal.

Connect one test probe to each end of the circuit to be tested.
• Circuit complete, the meter will beep continuously.
• Circuit open, there is no beep and the display shows to OL (over limit).
Meter Functions –AC or DC Current (A)

IMPORTANT: All current measured flows through the meter.  
It is important that you do not:
• Measure current greater than 600 Volts AC or DC, with respect to ground.
• Exceed 60 seconds when measuring continuous current between 1A-10A. Allow five minutes for cooldown before continuing.

⇒ Select the 10A, mA or μA range with the rotary switch.

⇒ Press the Alternate Function button to select AC or DC.

Insert:
• Black lead in COM terminal.
• Red lead in the 10A or mA terminal (select 10A if you are unsure of the current draw).

IMPORTANT: Turn OFF all power to the circuit or disconnect the circuit from the power source.

Connect:
• The Red probe to the side of the circuit closest to the power source.
• The Black probe to the side of the circuit to ground.
• Turn the power ON and test.

Note: Current must always be measured with the meter test probes connected in series, as described.

Meter Functions –Temperature (°C/°F)

IMPORTANT: To avoid heat damage to the meter, keep it away from sources of very high temperature. The life of the Temperature Probe is also reduced when subjected to very high temperatures. Probe operating range is –4° to 1,400 °F.

⇒ Select the Temperature (°C/°F) unit of measure with the rotary switch.

⇒ Insert the temperature probe connector into the K-type thermocouple socket.

Touch the end of the temperature sensor to the area or surface of the object to be measured.
**Meter Functions – Frequency (Hz)**

- Select the **Frequency** (Freq) setting with the rotary switch.

- Set the rotary switch to the Frequency range that gives the most accurate measurement reading.

  Insert:
  - Black lead in **COM** terminal.
  - Red lead in **V-Ω-RPM** terminal.

  Connect the Black test probe to ground.

  Connect the Red test probe to the “signal out” wire of the sensor to be tested.

**Meter Functions – Dwell**

- Select the proper **Dwell** range with the rotary switch.

  Insert:
  - Black lead in **COM** terminal.
  - Red lead in **V-Ω-RPM** terminal.

  Connect the Black test probe to ground.

  Connect the Red test probe to the wire that connects to the breaker points (see illustration).
Meter Functions-Duty Cycle (%)

⇒ Select the % Duty Cycle range with the rotary switch.

Insert:
• Black lead in COM terminal.
• Red lead in V-Ω-RPM terminal.

Connect the Black test probe to ground.
Connect the Red test probe to the signal wire circuit.

The illustration for a mixture control solenoid is shown with the metering rod in the closed position. The meter will display the percentage of time the plunger is in the closed position. (low duty cycle) during one duty cycle.

Meter Functions-RPM/×10RPM

⇒ Select the RPM range with the rotary switch.

⇒ Select the ×10RPM range with the rotary switch (1,000 to 12,000 RPM). Multiply the displayed reading times by ten to get actual RPM.

⇒ Press STROKE /DIS button toward select through RPM for 4-stroke, RPM for 2-stroke and DIS.

Insert the inductive pickup connecting terminal into the meter.

• Ground lead in COM terminal.
• Output lead in V-Ω-RPM terminal.

Connect the inductive pickup to a spark plug wire. If no reading is received, unhook the clamp, turn it over and connect again.
Note:

- Position the inductive pick-up as far away from the distributor and the exhaust manifold as possible.

- Position the inductive pick-up to within six inches of the spark plug or move it to another plug wire if no reading or an erratic reading is received.

**RPM 4**: For RPM of 4-stroke engines which have 1 ignition on every 4 engine strokes

**RPM 2**: For RPM of DIS & 2-stroke engines which have 1 ignition on every 2 engine strokes

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**Maintenance**

**Fuse and Battery Replacement**

⚠️ **WARNING:**

- Avoid electrical shock: remove test leads before opening case.
- Do not operate the meter or rotate the meter switch when the case is open.

1. To replace a battery or fuse, loosen the three screws in the case back and remove the case by lifting up and forward. Replace the battery with an 9 Volt alkaline battery.

**Important:**

- To prevent contamination of the circuits, your hands must be clean and the printed circuit board must be held by the edges.
- Replace the fuses with the same type of fuse.
  - 10A is a F 10A, 250V high energy, fast acting fuse.
  - mA is a F500mA, 250V fast acting fuse.
- Make sure the replacement fuse is centered in the fuse holder.

3. Re-assemble the case. Fasten the three screws.
Trouble Shooting

1. Meter will not turn ON.
   - Check the battery contacts for a tight fit.
   - Check for a minimum battery voltage of 8.0 volts.

2. Ampere reading is erratic or there is no reading at all.
   - Disassemble the meter back cover and test the fuses for continuity.

3. Meter reading is erratic.
   - Printed circuit board contaminated from handling with hands.
   - Low battery.
   - Open circuit in a test lead (frayed or broken wire).
   - Wrong range selected.
   - “Blown” fuse.

4. Meter readings do not change.
   - “Hold” feature is still toggled ON.

General Specifications

GENERAL SPECIFICATIONS

- **Display:** 3 1/2 digit (3200 counts) liquid crystal display (LCD), with function and units sign annunciators.
- **Analog Bar Graph:** 34 segments with measurements 12 times per second.
- **Polarity:** Automatic, (-) negative polarity indication.
- **Overrange Indication:** “OL” mark indication.
- **Low Battery Indication:** The [ ] is displayed when the battery voltage drops below the operating level.
- **Measurement Rate:** 2 times per second, nominal.
- **Operating Environment:** 0°C to 50°C (32°F to 122°F) at<70% R.H.
- **Storage Environment:** -20°C to 60°C (-4°F to 140°F) at<80% R.H.
- **Temperature Coefficient:** 0.2×(specified accuracy)/ °C ( < 18°C or > 28°C).
- **Power:** Single standard 9 Volt battery (NEDA 1604 or IEC 6F22).
- **Battery Life:** 200 hours typical with alkaline battery.
- **Fuse:** 10A/250V, 6.3 × 25mm fast acting ceramic type. 0.5A/250V, 5×20mm fast acting ceramic type.
- **Dimensions:** 189mm(H)×91mm(W)×31.5mm(D).
- **Weight:** Approx.280g(Meter Only), 450g(With Holster).
**Electrical Specifications**

**ELECTRICAL SPECIFICATIONS**

*Accuracy is given as ±[(% of reading) + (number of least significant digits)] at 18°C to 28°C (65°F to 83°F), with relative humidity up to 70%.

**RPM (Tach)**
- Ranges (RPM 4): 600-3200, 6000-12000 (×10RPM)
- Ranges (RPM 2/DIS): 300-3200, 3000-6000 (×10RPM)
- Resolution: 1 RPM
- Effect Reading: > 600 RPM
- Accuracy: ±(2.0%rdg + 4dgts)
- Overload protection: 500 VDC or RMS AC

**%DUTY CYCLE**
- Ranges: 1.0%-90.0%
- Resolution: 0.1%
- Pulse width: > 100μs < 100ms
- Accuracy: ±(2.0%rdg + 5dgts)
- Overload protection: 500 VDC or RMS AC

**DWELL LANGLE**
- NO. of cylinders: 2, 3, 4, 5, 6, 8
- Ranges: 0-180.0° (2CYL), 0-120.0° (3CYL), 0-90.0° (4CYL), 0-72.0° (5CYL), 0-60.0° (6CYL), 0-45.0° (8CYL)
- Resolution: 0.1°
- Accuracy: ±(2.0%rdg + 5dgts)
- Overload protection: 500VDC or RMS AC

**TEMPERATURE**
- Ranges: -20.0 to 320°C, -4.0 to 1400°F, -20 to 750°C, -4 to 1400°F
- Resolution: 0.1°C/0.1°F, 1°C/1°F
- Accuracy: ±(3.0%rdg + 2°C), ±(3.0%rdg + 4°F)
- Sensor: Type K Thermocouple
- Input protection: 60VDC or 24 VAC rms

**Electrical Specifications Cont’d…**

**DC VOLTAGE (Autoranging)**
- Ranges: 32mV, 3.2V, 32V, 320V, 1000V
- Resolution: 100μV
- Accuracy: ±(1.2%rdg + 1dgts)
- Input impedance: 10MΩ
- Overload protection: 1000VDC or 750VAC rms

**AC VOLTAGE (Autoranging)**
- Ranges: 3.2V, 32V, 320V, 750V
- Resolution: 1mV
- Accuracy: ±(2.0%rdg + 4dgts) at 50 Hz to 60 Hz
- Input impedance: 10MΩ
- Overload protection: 1000VDC or 750VAC rms

**CURRENT**
- Ranges: 320μA, 3200μA, 32mA, 320 mA, 10A
- Resolution: 0.1μA
- DC Accuracy: ±(2.0%rdg + 1dgts) on μA and mA ranges
  ±(3.0%rdg + 3dgts) on 10A range
- AC Accuracy: ±(2.5%rdg + 4dgts) on μA and mA ranges
  ±(3.5%rdg + 4dgts) on 10A range
- Frequency response: 50Hz to 60Hz
- Voltage burden: 0.2V on 320μA, 32mA ranges
  2V on 3200μA, 320mA ranges
- Input protection: 0.5A/250V fast acting ceramic fuse on μA/mA input
  10A/250V fast acting ceramic fuse on 10A input

**RESISTANCE (Autoranging)**
- Ranges: 32Ω, 3.2Ω, 32KΩ, 3.2MΩ, 32MΩ
- Resolution: 100mΩ
- Accuracy: ±(1.5%rdg + 3dgts) on 320Ω to 320 KΩ ranges
  ±(2.5%rdg + 3dgts) on 3.2MΩ range
  ±(5.0%rdg + 5dgts) on 32MΩ range
- Overload protection: 250VDC or RMS AC
**Electrical Specifications Cont'd**

**FREQUENCY**  
Ranges: 320Hz, 3200Hz, 32KHz  
Resolution: 0.1Hz  
Accuracy: \(\pm 1.0\% \text{ rdg } + 4\text{dghts }\) on all ranges  
Sensitivity: 3.5V RMS min.at > 20% and < 80% duty cycle  
Effect Reading: More than 100 digits at pulse width > 2\(\mu\) Sec  
Overload protection: 500VDC or RMS AC

**DIODE TEST**  
Test current: 0.6mA typical (Vf=0.6V)  
Resolution: 1mA  
Accuracy: \(\pm 10\% \text{ rdg } +3\text{dghts}\)  
Open circuit voltage: 3.0Vdc typical  
Overload protection: 250VDC or RMS AC

**AUDIBLE CONTINUITY**  
Audible threshold: Less than 20\(\Omega\)  
Resolution: 100m\(\Omega\)  
Test current: \(< 0.7\text{mA}\)  
Overload protection: 250VDC or RMS AC

**WARRANTY INFORMATION:**  
This product is warranted to be free of defects for one year. If this product fails during the first 12 months due to faulty material or workmanship, it will be replaced or repaired free of charge, at the discretion of the manufacturer.

**NOTE:** this one year warranty does not cover dead batteries and blown fuses.

For warranty service and coverage, please return this product to your supplier for processing and evaluation. OR, return it directly to:

Electronic Specialties, Inc.  
139 Elizabeth Ln.  
Genoa City, WI  53128  
262-279-1400  
Defective units being returned to your supplier or to the factory should include proof of purchase date.

Any testers that do not function due to misuse or abuse will be subject to “out of warranty service charges”.