INSTRUCTION MANUAL

ADM3201

Digital Multimeter

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Introduction

The ADM3201 is a handheld battery operated professional automotive multimeter designed to provide trouble shooting solutions in today's sophisticated automotive electronic systems. The ADM3201 measures AC/DC Voltage, AC/DC Current, Resistance, Diode, and Continuity, as well as testing RPM, Dwell, Temperature, and Duty Cycle.

Features include

- Accurate RPM measurement for automotive engines with 1 to 8 cylinders using the inductive pickup
- Duty Cycle and direct DWELL reading
- Autorange function for AC/DC Voltage, AC/DC Current, Resistance testing
- Test AC/DC Voltage, AC/DC Current, Resistance, Diode, Frequency, Duty Cycle, and Continuity
- Temperature measurement up to 1,400˚F or 750˚C
- Overload protection for all ranges
- 3-3/4 digit, 3,260 count display
- Auto-power off
- High impact protective boot

Material Supplied

- ADM3201 Digital Multimeter
- Inductive Pickup
- Test Leads
- Temperature Probe
- Soft carrying case

Safety Notes

Before using this meter, read all safety information carefully. In this manual the word **"WARNING"** is used to indicate conditions or actions that may pose physical hazards to the user. The word **"CAUTION"** is used to indicate conditions or actions that may damage this instrument.

- Allways follow industry standard safety practices including protective clothing, gloves and safety glasses when appropriate.
- Do not attempt to measure any voltage that exceeds the category based rating of this meter.
- Do not attempt to use this meter if either the meter or the test leads have been damaged. Turn it in for repair at a qualified repair facility.
- Ensure meter leads are fully seated by making a quick continuity check of the leads prior to making voltage measurements.
- Keep your fingers away from the test lead's metal probe contacts when making measurements. Always grip the leads behind the finger guards molded into the probes.
- Use a current clamp adapter when measuring current that may exceed 10 amps. See the accessories in UEi's full-line catalog
- Do not open the meter to replace batteries or fuses while the probes are connected.

WARNING!

Exceeding the specified limits of this meter is dangerous and can expose the user to serious or possibly fatal injury.

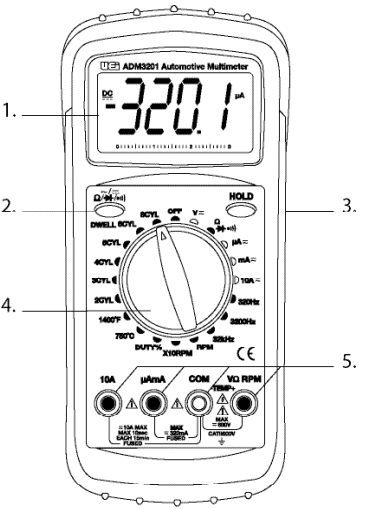
- Voltages above 60 volts DC or 30 volts AC, or 42 volts peak may constitute a serious shock hazard.
- Always turn off power to a circuit (or assembly) under test before cutting, unsoldering, or breaking the current path - Even small amounts of current can be dangerous.
- Always disconnect the live test lead before disconnecting the common test lead from a circuit.
- In the event of electrical shock, ALWAYS bring the victim to the emergency room for evaluation, regardless of the victim's apparent recovery - Electrical shock can cause an unstable heart rhythm that may need medical attention.

- Higher voltages and currents require greater awareness of physical safety hazards - Before connecting the test leads; turn off power to the circuit under test; set the meter to the desired function and range; connect the test leads to the meter first, then to the circuit under test. Reapply power.
- When an input terminal is connected to dangerous live potential it is to be noted that this potential at all other terminals can occur.
- CAT II - Measurement Catagory II is for measurements performed on circuits directly connected to low voltage installation. (Examples are measurements on household appliances, portable tools and similar equipments). Do not use the meter for measurements within Measurement Catagory III and IV.

International Symbols

	Dangerous Voltage		Ground
	AC Alternating Current		Warning or Caution
	DC Direct Current		Double Insulation (Protection Class II)
	Either AC or DC		Fuse
	Not Applicable to Identified Model		Battery

Controls and Indicators



1. **LCD**
2. **Function-Selection Button**
3. **Data Hold Button**
4. **Rotary Switch**
5. **Input Jacks**

Operating Instructions

Testing AC/DC Voltage

1. Insert the black test lead into the "**COM**" jack and the red test lead into the "**VΩ RPM**" jack.
2. Set the rotary switch in "**V** " position, press the "~/⎓" button to select the "**AC/DC**" function according to symbol "**AC**" or "**DC**" on the display
3. Connect the test leads to the circuit to be measured.
4. Read the reading on the display.
5. For DC voltage, the polarity of the red test lead will be displayed as well as the value.

Testing AC/DC Current

1. Connect the black test lead to the "COM" jack, and the red test lead to the "µAmA" jack

NOTE: *When the current to be measured is between 326 mA and 10A, connect the red test lead to "10A" jack instead.*

2. Set the rotary switch in "µA", "mA" or "10A" position, press the "~/⎓" button to select the AC or DC function according to the symbol "AC" or "DC" on display.
3. Connect the test leads in series with the load to be measured.
4. Read the reading on the display. For DC current, the polarity of the red test lead will be displayed too.

Testing Resistance

1. Insert the black test lead into the "**COM**" jack and the red test lead into the "**VΩ RPM**" jack.
2. Set the rotary switch in " " position. The polarity of the red test lead is positive. The display shows "OL", until connected to device under test or when the circuit is open.
3. Connect the test leads across the load to be measured.
4. Read the reading on the display.

Testing Diodes

1. Insert the black test lead into the "**COM**" jack and the red test lead into the "**VR PM**" jack.
2. Set the rotary switch in " " position. Press "Ω/⊣◀/•))" button to make the display show " ⊣◀ ". The polarity of the red test lead is positive.
3. Connect the test leads across the diode (red test lead to the positive pole of the diode, black test lead to the negative pole of the diode.
4. Read the forward voltage on the LCD. If the diode is reversed, the display will show "OL". A good diode will read the voltage drop across the diode when connected properly and "OL" is reversed. A low reading (~0.1V) in both directions indicates a shorted diode. "OL" on both directions indicates an open diode.

Audible Continuity

1. Insert the black test lead into the "**COM**" jack and the red test lead into the "**VΩ RPM**" jack.
2. Set the rotary switch in " " position. Press "Ω/⊣◀/•))" button to make the display show " •)) ". The polarity of the red test lead is positive.
3. Connect the test leads across the circuit to be measured. If its resistance is less than about 50Ω, the buzzer will sound. If the input terminals open, the display will show "OL".

Frequency Measurement

1. Insert the black test lead into the "**COM**" jack and the red test lead into the "**VΩ RPM**" jack.
2. Set the rotary switch in "**320Hz"**, **"3200Hz"** or **"32kHz"** position according to the expected frequency.
3. Connect the test leads to the circuit to be measured.
4. Read the frequency value displayed on the LCD.

Measuring Temperature

NOTE: *To avoid possible damage to the meter or other equipment, remember that while the meter is rated for -4˚ to 1382˚F (-20˚ to ±750˚C), the K-type thermocouple provided with the meter is rated to 900˚F. For temperatures out of that range, use a higher rated thermocouple.*

1. Set the rotary switch to the 1400˚F or 750˚C position. The display will show the temperature of the environment.
2. Connect the negative "**-**" plug of the K-type thermocouple to the "**COM**" jack, and the positive "**+**" plug to the "**VΩ RPM**" jack.
3. Connect the K-type thermocouple to the object to be measured.
4. Read the reading on the display. This it is the true temperature of the measured object.

Measuring DWELL Angle

1. Connect the black test lead to the "**COM**" jack and the red test lead to the "**VΩ RPM**" jack.
2. Set the rotary switch to the "**DWELL**" range according to the cylinders of the engine to be measured.
3. Connect the test lead to the iron bars or the negative pole of the battery, and the red test lead to the distributor terminal of the ignition coil.
4. Start the engine to set it in idle-speed. Read the value of the DWELL angle on the LCD.

Testing Duty Cycle

1. Connect the black test lead to the "**COM**" jack and the red test lead to the "**VΩ RPM**" jack.
2. Set the rotary switch to the "**DUTY**" position.
3. Connect the test leads to the circuit to be measured.
4. Read the reading on the display.

RPM

1. Connect the inductive pickup to the meter.
    - Ground Lead into the "COM" terminal.
    - Signal Lead (red) into the "**VΩ RPM**" terminal.
2. Set the rotary switch to "RPM" (or "10 x RPM") position.
3. Connect the inductive pickup to a spark plug wire noting the side of the inductive pickup toward the spark plug.

NOTE: *• Position the inductive pickup as far as possible from the distributor and exhaust manifold.*

• This meter will measure RPM on 4-stroke engines only. If using on a 2-stroke engine, or engines that have a waste spark (1 spark for every two strokes of the engine) divide the result in half for a correct value.

Maintenance

Periodic Service

WARNING!

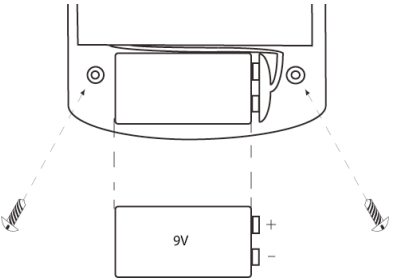
Repair and service of this instrument is to be performed by qualified personnel only. Improper repair or service could result in physical degradation of the meter. This could alter the protection from electrical shock and personal injury this meter provides to the operator. Perform only those maintenance tasks that you are qualified to do.

Cleaning

Periodically clean your meter's case using a damp cloth. **DO NOT** use abrasive, flammable liquids, cleaning solvents, or strong detergents as they may damage the finish, impair safety, or affect the reliability of the structural components.

Battery Replacement

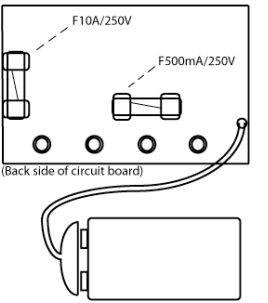
When the symbol " " appears on the display, it shows that the battery should be replaced. To replace the battery, remove the screws on the case, replace the exhausted battery with new batteries of the same type. Reinstall the cover and the screws.



Fuse Replacement

This meter uses fuse: F 10A, L 250V, F 500mA, L 250V.

To replace the fuse, remove the screws on the case, gently pull off circuit board, replace the damaged fuse with a new fuse and reinstall the board and the cover.



Specifications

DC Volts	326mV to 600V Resolution: 0.1mV to 1V Accuracy: 326mV ±(0.5% + 5) 3.26V~326V ±(0.8% + 5) 600V ±(1.0% + 8)
AC Volts	3.26V to 600V Resolution: 1mV to 1V Accuracy: 3.26V ±(0.8% + 5)(400~200Hz) 32.6V ±(1.2% +7)(200~400Hz) 326V ±(1.0% + 5)(40~200Hz) 600V ±(1.5% + 7)(200~400Hz)
DC Current	326_A to 10A Resolution: 0.1_A to 10mA Accuracy: 326_A~3260_A ±(4% + 10) 32.6mA~326mA ±(1.2% + 5) 10A ±(2.0% + 5)
AC Current	326_A to 10A Resolution: 0.1_A to 10mA Accuracy: 326_A~3260_A ±(5% + 10)(40~400Hz) 32.6mA ±(1.5% +5)(40~200Hz) 326mA ±(1.8% + 7)(200~400Hz) 10A ±(3% + 7)
Resistance	326Ω~32.6MΩ Resolution: 0.1Ω~10kΩ Accuracy: 0.1Ω ±(1.0% + 8) 3.26kΩ ~3.26MΩ ±(1.0% + 5) 32.6MΩ ±(3.0% + 7)
Frequency	320Hz to 32kHz Resolution: 0.1Hz to 0.1kHz Accuracy: ±(2.5% + 5)
RPM	(0~3260RPM) to 10 x (0~3260RPM) Resolution: 1RPM to 10 x RPM Accuracy: ±(2.5% + 5)
Dwell	2cyl (0~180˚) to 8cyl (0~45˚) Resolution: 0.1˚ Accuracy: ±(2.5% + 5)

Duty Cycle	1~99% Resolution: 0.1% Accuracy: ±(2.5% + 5)
Temperature	1400˚F or 750˚C Resolution: 1˚ Accuracy: -4˚~32˚F(0˚~20˚C): ±(6.0% + 5) 32˚~752˚F(0˚~400˚C): ±(1.5% + 5) 752˚~1382˚F(401˚~750˚C): ±(1.8% + 5)

ADM3201

Automotive Digital Multimeter

Limited Warranty

The ADM3201 is warranted to be free from defects in materials and workmanship for a period of one year from the date of purchase. If within the warranty period your instrument should become inoperative from such defects, the unit will be repaired or replaced at UEi's option. This warranty covers normal use and does not cover damage which occurs in shipment or failure which results from alteration, tampering, accident, misuse, abuse, neglect or improper maintenance. Batteries and consequential damage resulting from failed batteries are not covered by warranty.

Any implied warranties, including but not limited to implied warranties of merchantability and fitness for a particular purpose, are limited to the express warranty. UEi shall not be liable for loss of use of the instrument or other incidental or consequential damages, expenses, or economic loss, or for any claim or claims for such damage, expenses or economic loss. A purchase receipt or other proof of original purchase date will be required before warranty repairs will be rendered. Instruments out of warranty will be repaired (when repairable) for a service charge. Return the unit postage paid and insured to:

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This warranty gives you specific legal rights. You may also have other rights which vary from state to state.

PLEASE RECYCLE

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