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› allsun EM133A Automotive Digital Multimeter Instruction Manual

allsun EM133A

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Model: EM133A

1. INTRODUCTION

This manual provides comprehensive instructions for the safe and effective operation of your allsun EM133A Automotive Digital Multimeter. Please read this manual thoroughly before use and retain it for future reference. The allsun EM133A is a versatile automotive digital multimeter designed for precise measurements in various automotive and electrical applications, featuring a large LCD display, a function range switch, and multiple input terminals.

2. SAFETY INFORMATION

Always adhere to safety precautions when using electrical testing equipment. Ensure the meter is in good condition and test leads are not damaged. Do not exceed the maximum input values for any range. Disconnect power to the circuit before measuring resistance, continuity, or capacitance. Use caution when working with high voltages.

- Always inspect the meter and test leads for damage before use.
- Do not apply voltage or current that exceeds the specified maximum limits.
- Ensure the function switch is in the correct position for the desired measurement.
- Never measure resistance, continuity, or capacitance on a live circuit.
- Use appropriate personal protective equipment (PPE) such as safety glasses.

3. PRODUCT OVERVIEW

The allsun EM133A is an advanced automotive tester and digital multimeter. It combines the functions of a standard multimeter with specialized automotive measurement capabilities.



Figure 3.1: The allsun EM133A Automotive Digital Multimeter, showing its blue and black casing, LCD display, rotary switch, and input terminals. Insets highlight the display, USB port, and input terminal warnings.

3.1. Components and Display

Familiarize yourself with the meter's layout and display indicators.



Figure 3.2: Diagram illustrating the key components of the allsun EM133A multimeter, including the display, holster, Range button, Hz% button, REL button, HOLD button, S button, Function Range Switch, 20A terminal, COM terminal, and VΩmAHZ terminal.

- **Display:** Shows measurement readings, units, and various indicators (e.g., AUTO, HOLD, low battery).
- **Function Range Switch:** Rotary switch to select the desired measurement function.
- **RANGE Button:** Switches between auto-ranging and manual ranging modes.
- **Hz% Button:** Used for frequency and duty cycle measurements, and to switch between them.
- **REL Button:** Activates relative measurement mode and is used for PC communication mode.
- **HOLD Button:** Freezes the current display reading; also controls backlight.
- **S Button:** Used to select specific settings within certain functions (e.g., 2-stroke/4-stroke for RPM, cylinder count for Dwell).
- **Input Terminals (VΩmAHZ, COM, 20A):** Connect test leads according to the measurement type.

4. SETUP



Figure 5.0: The allsun EM133A multimeter being used in an automotive engine bay, demonstrating its practical application.

5.1. General Functions

- **Auto Ranging:** The meter defaults to autorange in measurement functions. The "AUTO" indicator is displayed when in autorange mode. Manual range mode can be selected using the RANGE button.
- **Backlight:** The meter features an auto backlight. To manually control the backlight, press and hold the 'HOLD' button.
- **Data Hold:** Press the 'HOLD' button briefly to freeze the current reading on the display. Press again to release the hold function.
- **Auto Power Off:** If no button is pressed and the rotary switch is not rotated for approximately 15 minutes, the meter will enter sleep mode. Rotate the rotary switch or press any button to wake it. To disable auto power off, press and hold any button while rotating the rotary switch from the "OFF" position to another measurement position.

5.2. Specific Measurements

5.2.1. Measuring DC or AC Voltage

Rotate the function switch to the V~ (AC Voltage) or V= (DC Voltage) position. Connect the red test lead to the VΩmAHz terminal and the black test lead to the COM terminal. Connect the probes in parallel across the circuit to be measured.



Figure 5.1: Connection diagram for measuring DC or AC voltage.

5.2.2. Measuring DC or AC Current

Rotate the function switch to the A~ (AC Current) or A= (DC Current) position. For currents up to 600mA, connect the red test lead to the VΩmAHz terminal. For currents up to 20A, connect the red test lead to the 20A terminal. Connect the black test lead to the COM terminal. Connect the meter in series with the circuit to measure current flow.

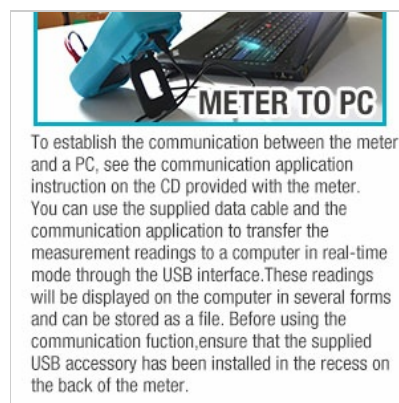


Figure 5.2: Connection diagram for measuring DC or AC current.

5.2.3. Measuring Resistance

Rotate the function switch to the Ω position. Connect the red test lead to the VΩmAHz terminal and the black test lead to the COM terminal. Connect the probes across the component to be measured. Ensure the circuit is de-energized before measurement.

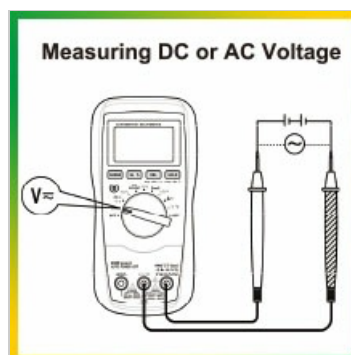


Figure 5.3: Connection diagram for measuring resistance.

5.2.4. Continuity Test

Rotate the function switch to the $\varnothing$ position. Connect the red test lead to the VΩmAHz terminal and the black test lead to the COM terminal. Connect the probes across the circuit or component. A built-in buzzer will sound if the resistance is

less than 20Ω , indicating continuity.

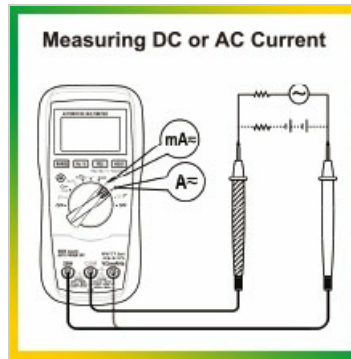


Figure 5.4: Connection diagram for performing a continuity test.

5.2.5. Measuring Frequency and Duty Cycle

Rotate the function switch to the Hz% position. Connect the red test lead to the V Ω mAHZ terminal and the black test lead to the COM terminal. Connect the probes across the signal source. Use the 'Hz%' button to switch between frequency and duty cycle measurements.

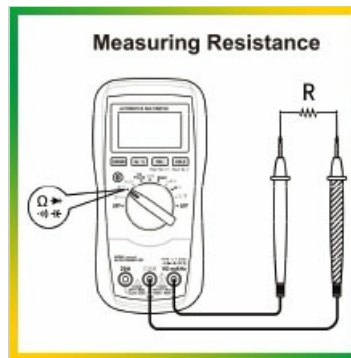


Figure 5.5: Connection diagram for measuring frequency.

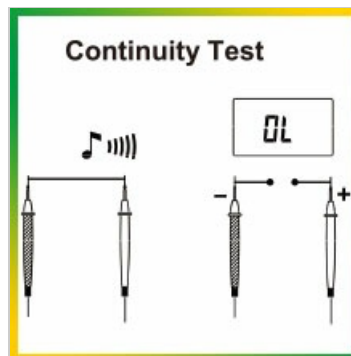


Figure 5.6: Connection diagram for measuring duty cycle.

5.2.6. Measuring Capacitance

Rotate the function switch to the $\square$ position. Connect the red test lead to the V Ω mAHZ terminal and the black test lead to the COM terminal. Connect the probes across the capacitor. Ensure the capacitor is fully discharged before measurement to prevent damage to the meter.

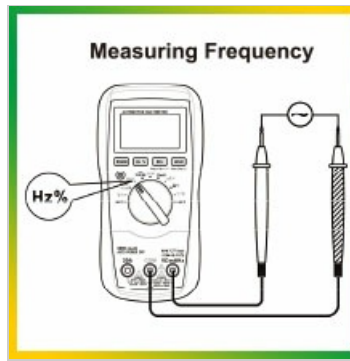


Figure 5.7: Connection diagram for measuring capacitance.

5.2.7. Diode Test

Rotate the function switch to the ∇ position. Connect the red test lead to the VΩmAHZ terminal and the black test lead to the COM terminal. Connect the probes across the diode. The approximate forward voltage drop of the diode will be displayed.

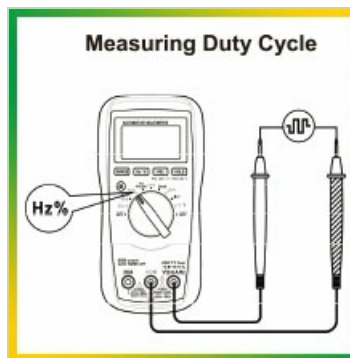


Figure 5.8: Connection diagram for performing a diode test.

5.2.8. Measuring Temperature

Rotate the function switch to the Temp position. Connect the K-type thermocouple (included) to the VΩmAHZ and COM terminals, observing polarity. Place the thermocouple tip on the object to be measured. The temperature will be displayed in Celsius or Fahrenheit.

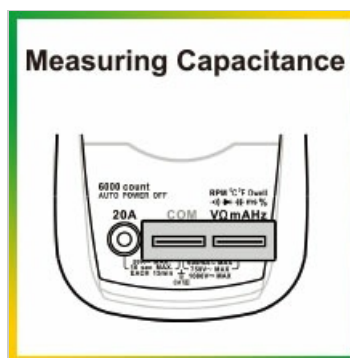


Figure 5.9: Connection diagram for measuring temperature using a K-type thermocouple.

5.2.9. Measuring RPM (Tachometer)

Rotate the function switch to the RPM position. Connect the inductive pickup to the VΩmAHZ and COM terminals. Clamp the inductive pickup to a spark plug wire. Select 2-stroke or 4-stroke engine mode using the 'S' button if applicable. Read the RPM value on the display.

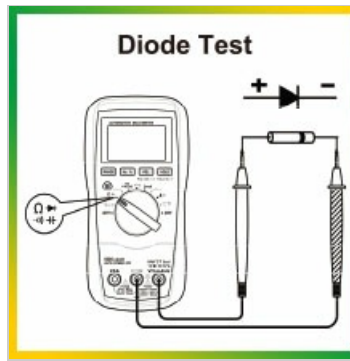


Figure 5.10: Connection diagram for measuring RPM using the inductive pickup clamped to a spark plug wire.

5.2.10. Measuring Dwell Angle

Rotate the function switch to the Dwell position. Connect the red test lead to the positive terminal of the ignition coil and the black test lead to a reliable ground point on the vehicle chassis. Select the correct cylinder setting (3, 4, 5, 6, or 8 cylinders) using the 'S' button. Read the dwell angle on the display.

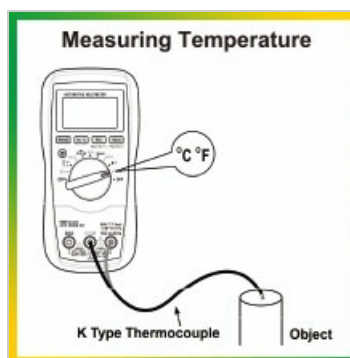


Figure 5.11: Connection diagram for measuring dwell angle on an ignition coil.

5.2.11. Measuring Pulse Width

Rotate the function switch to the Pulse position. Connect the red test lead to the signal source (e.g., fuel injector signal) and the black test lead to the vehicle battery negative terminal. Read the pulse width on the display.

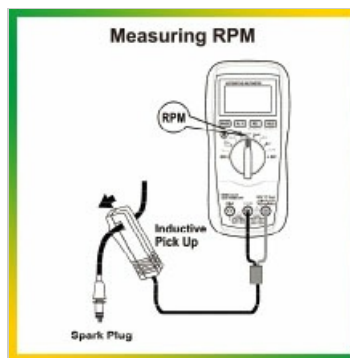


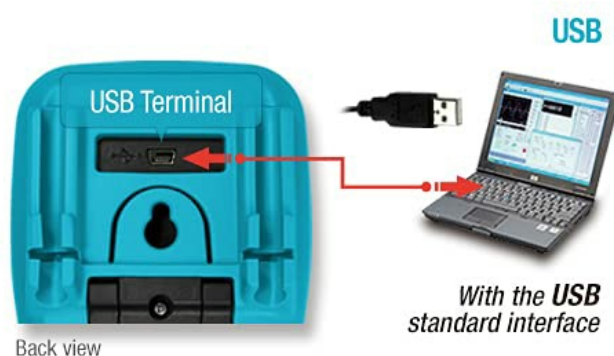
Figure 5.12: Connection diagram for measuring pulse width, typically from an ECM signal.

5.3. PC Communication

The EM133A can connect to a PC for real-time data transfer and storage. Connect the supplied USB data cable to the meter's USB terminal and your computer. Install the communication application from the provided CD. Press and hold the 'REL' button for approximately 2 seconds to enter USB communication mode. The readings will be displayed on the computer in various forms and can be stored as a file.

METER-TO-PC

Meter-to-PC communication: You can use the supplied data cable and the communication application to transfer the measurement readings to a computer in real-time mode through the USB interface. These readings will be displayed on the computer in several forms and can be stored as a file.



CAT III 1000V

Press and hold down this "REL" button for about 2 secs to enter the USB communication mode.



Figure 5.13: Diagram showing the allsun EM133A multimeter connected to a laptop via a USB cable for data transfer.



Figure 5.14: Close-up image detailing the USB connection port on the back of the allsun EM133A multimeter and its connection to a PC.

6. MAINTENANCE

- **Cleaning:** Keep the meter clean and dry. Wipe the case with a damp cloth. Do not use abrasive cleaners or solvents.
- **Battery Replacement:** Replace the 9V battery when the low battery indicator appears on the display to ensure accurate readings.
- **Fuse Replacement:** If the current measurement function fails, the fuse may need replacement. Refer to the specifications for the correct fuse type and rating. Always disconnect test leads and power off the meter before attempting fuse replacement.
- **Storage:** If the meter is not used for an extended period, remove the battery to prevent leakage. Store the meter in a cool, dry place.

7. TROUBLESHOOTING

Problem	Possible Cause	Solution
No display or dim display	Low or dead battery; incorrect battery installation.	Check battery installation. Replace the 9V battery.
Inaccurate readings	Incorrect function/range selection; damaged test leads; measuring on a live circuit (for resistance/continuity/capacitance).	Ensure correct function and range. Inspect test leads for damage. Disconnect power to the circuit before specific measurements.
No PC communication	USB cable not connected properly; software not installed; PC mode not activated.	Verify USB cable connection. Install communication software from CD. Press and hold 'REL' button for 2 seconds to activate PC mode.
Current measurement fails	Blown fuse.	Replace the fuse with the correct type and rating (refer to specifications).

8. SPECIFICATIONS

The following table outlines the technical specifications of the allsun EM133A Automotive Digital Multimeter.

EM133A SPECIFICATION

Pulse Width	0.5~20ms
Dwell Angle	4-5-6-8CYL (180°/120°/90°/72°/60°/45°)
Tach(2-stroke)	60~20000RPM, Highest Resolution: 1RMP
Tach(4-stroke)	120~20000RPM, Highest Resolution: 1RMP
Voltage DC	600m/6/60/600/1000V
Voltage AC	6/60/600/750V
Current DC	60m/600m/6/20A
Current AC	60m/600m/6/20A
Resistance	600/6k/60k/600k/6M/60MΩ
Capacitance	40n/400n/4μ/40μ/400μ/4000μF
Frequency	9.999~9.999MHz
Duty Cycle	0.5%~99.9%
Temperature	-20~1000°C /-4~1832°F
Continuity	Less than 20Ω, more than 150Ω
Diode Check	approx. 3.0V



Figure 8.1: Overview of EM133A technical specifications.

Measuring Dwell Angle

Range: 4 cylinders/5 cylinders/6 cylinders/8 cylinders

Measuring RPM

Range: 2-stroke engine: 60~20000RPM 4-stroke engine: 120~20000RPM

Measuring Pulse Width

Range: 0.1~20ms

Measuring DC or AC Voltage

Range: DC Voltage: 600mV/6V/60V/600V/1000V AC Voltage: 6V/60V/600V/750V

Measuring DC or AC Current

Range: DC Current: 60mA/600mA/6A/20A AC Current: 60mA/600mA/6A/20A

Measuring Frequency

Range: 9.999Hz/99.99Hz/999.9Hz/9.999kHz/99.99kHz/999.9kHz/9.999MHz

Measuring Duty Cycle

Range: 0.5%~99.9%

Measuring Resistance

Range: 600Ω/6KΩ/60KΩ/600KΩ/6MΩ/60MΩ

Continuity Test

The built-in buzzer will sound if the resistance is less than about 20Ω.

Measuring Capacitance

Range: 40nF/400nF/4μF/40μF/400μF/4000μF

Diode Test

The approx. forward voltage drop of the diode will be displayed.

Measuring Temperature

Range: -20°C~0°C/0°C~400°C/400°C~1000°C -4°F~32°F/32°F~752°F/752°F~1832°F

"20A" TERMINAL

Plug-in connector for the red test lead for current (600mA - 20A) measurements



Figure 8.2: Detailed measurement ranges and resolutions for the EM133A.

Measurement	Range	Details
Pulse Width	0.5ms ~ 20.0ms	
Dwell Angle	3/4/5/6/8 Cylinder Switchable	(180°/120°/90°/72°/60°/45°)
Tachometer (2-stroke)	60 ~ 20000 RPM	Highest Resolution: 1 RPM
Tachometer (4-stroke)	120 ~ 20000 RPM	Highest Resolution: 1 RPM
Voltage DC	600mV / 6V / 60V / 600V / 1000V	
Voltage AC	6V / 60V / 600V / 750V	
Current DC	60mA / 600mA / 6A / 20A	
Current AC	60mA / 600mA / 6A / 20A	

Measurement	Range	Details
Resistance	600Ω / 6kΩ / 60kΩ / 600kΩ / 6MΩ / 60MΩ	
Capacitance	40nF / 400nF / 4μF / 40μF / 400μF / 4000μF	
Frequency	9.999MHz	
Duty Cycle	0.5% ~ 99.9%	
Temperature	-20 ~ 1000°C / -4 ~ 1832°F	
Continuity	Less than 20Ω (buzzer sounds)	
Diode Test	Approx. 3.0V	Forward voltage drop
Power Source	1 x 9V Battery	
Dimensions	9.33 x 7.95 x 3.9 inches (Package)	
Item Weight	447 Grams / 15.8 ounces	
Safety Compliance	CE, RoHS, UL	

9. WARRANTY AND SUPPORT

For warranty information and technical support, please refer to the documentation included with your product or contact allsun customer service. Keep your purchase receipt as proof of purchase.

Manufacturer: Zhangzhou Haimao Dianzi Keji Co., LTD

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