INSTRUCTION MANUAL

MT245

CAR BATTERY TESTER

Contents

Page no

1. PRODUCT SUMMARY

1.1. Product Profile

The MT245 Battery Tester adopts currently the world's most advanced conductance testing technology to easily, quickly and accurately measure the actual cold cranking amps capability of the vehicle starting battery, healthy state of the battery itself, and common fault of the vehicle starting system and charging system, which can help maintenance personnel to find the problem quickly and accurately, thus to achieve quick vehicle repair.

- Test all automotive cranking lead acid battery, including ordinary lead acid battery, AGM flat plate battery, AGM spiral battery, and Gel battery, EFB battery, etc.
- Directly detects bad cell batteries.
- Polarity reverse connection protection, reverse connection will not damage the tester or affect the vehicle and battery.
- Directly test the battery with loss of electricity, no need to fully charge before testing.
- Testing standards include currently the world's majority of battery standards, CCA, BCI, CA, MCA, JIS, DIN, IEC, EN, SAE, GB.

1.2. Product Function

Main functions of the MT245 battery tester include: battery test, starting system test, charging system test and other additional functions.

Battery test is mainly targeted to analyze the battery healthy status to calculate the actual cold cranking capability of the battery and the aging extent, which provide reliable analysis evidence for the test and maintenance of the battery. It notifies the use to replace the battery in advance when the battery is getting older.

Starting system test is mainly to test and analyse the starting motor. Through testing the actual required cranking current and cranking voltage of the starting motor, it can find out whether the starting motor works fine. There are several reasons why the starting motor is abnormal: lubricating system fault causing the starting loaded torque increasing or rotor friction of the starting motor causing the increasing friction of the starting motor itself.

Charging system test is to check and analyse the charging system, including generator, rectifier, rectifier diode, etc., thus to find out whether the output voltage of the generator is normal, the rectifier diode works fine and the charging current is normal. Suppose one of the above mentioned parts is not in a normal situation, it will lead to over charge or incomplete charge of the battery, thus the battery will be quickly damaged and also greatly shorten the using life of other loaded electrical appliance.

1.3. Technical Parameters

- Application: 12V starting battery and 12V/24V car starting / charging system test
- Cold Cranking Amps Measure Range:

Measure Standard	Measure Range
CCA	100-2000
BCI	100-2000
CA	100-2000
MAC	100-2000
JIS	26Al 7--245HS2
DIN	100-1400
IEC	100-1400
EN	100-2000
SAE	100-2000
GB	100-2000

- Test clamp: Double conductor Kelvin clamp
- Measuring battery range: 30Ah-200Ah
- Voltage measurement range: 8V-30V DC
- Support USB printing (connected to the computer)
- Support QR code (the mobile phone can scan QR code to obtain test results)

1.4. Working Environment Requirement

Working Environment Temperature: -20°C to 50°C
It is applicable for automotive manufacturers, automotive maintenance and repair workshops, automotive battery factories, automotive battery distributors and educational organizations, etc.

2. PRODUCT INFORMATION

2.1. Tool Description

- Up / Down Button: Select upwards or downwards via white UP and DOWN keys.
- Exit Button: Exit to previous menu via the EXIT key.
- Enter Button: Confirm the selection via the ENTER key
- Mini-USB Port :Connects to computer for printing via USB cable.

2.2. Product Specifications

1. Display: 2.4" TFT 240x320 pixels color LCD display
2. Operating Temperature: 0°C to 50°C (-32°F to 122°F)
3. Storage Temperature: -20°C to 70°C (-4°F to 158°F)

4. Power-provided via cable from car battery
5. Dimensions: LxWxH: 784mm x 355mm x 210mm
6. Weight: 293g

2.3. Accessories Included

1. User's Manual
2. USB Cable -- Provides link to unit and computer for printing

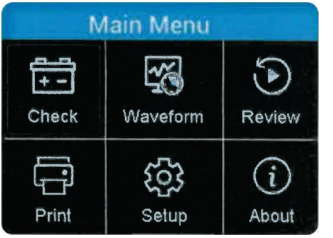
3. OPERATING INSTRUCTIONS

Testing Out-of-Vehicle:
Clean the battery posts or side terminals with a wire brush. For testing side-post batteries, install and tighten the lead terminal stud adapters. **Failure to properly install the stud adapters, or using stud adapters that are dirty or worn, may result in false test results.** Do not use steel bolts.
Testing In-Vehicle:
Turn off the vehicle and all accessory loads. Testing with the ignition switch on or vehicle loads on may cause damage.

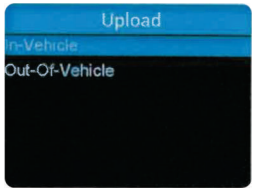
> ⚠ **WARNING:** Battery terminals, terminals and related accessories contain lead and lead compounds, which are known to cause cancer, birth defects or other reproductive hazards. **Wash hands after treatment.**

3.1. Usage and Operation

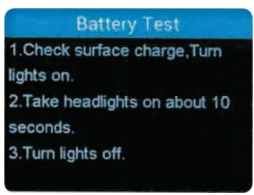
1. Clip the red and black clips of the tester onto the battery to be tested, the red is positive and the black is negative, and the tester display shows the boot interface. If the measured battery voltage is lower than 8.0V, the test cannot be performed normally. Press the 'ENTER' button to continue.
2. According to the prompts of the tester, press the up and down keys to select:
   The main menu contains six function options: battery power, waveform monitoring, playback, printing, settings and about.



3.1.1. In Vehicle Battery Test



- The off vehicle test indicates that the battery is not connected to the vehicle. Clamp the red and black clamps of the tester onto the tested battery, connect the red to the positive and the black to the negative, and the display screen will immediately display the start-up interface. The main interface appears 2 seconds after start-up.
- Press UP/DOWN key to select the battery level, then press the ENTER key to confirm.
- Press UP/DOWN key to select in vehicle measurement, then press the ENTER key to confirm.



- When the tester detects the surface charge, it will prompt "surface charge, turn on the lamp". Turn on the lamp as prompted to remove the battery surface charge, and the tester will display the following messages in sequence: Battery test

1. Select Battery Type

After selecting the battery charging state, the tester will prompt to select the battery type, that is, select ordinary battery, AGM flat battery, AGM winding battery, gel battery and EFB battery. Press the UP/DOWN key to select the battery type, and then press the ENTER key to confirm.

Battery type selection

1. Ordinary battery
2. AGM flat battery
3. AGM wound battery
4. GEL
5. EFB

2. Battery Standard Selection:

The battery tester will test each battery according to the selected system and rating. Press the UP/DOWN key to select according to the actual system standard and the rating marked on the battery. Press the UP/DOWN

key to select according to the actual system standard and the rating marked on the battery. See the position indicated by the arrow in figure 1.

Figure 1.

CCA: Cold starting current specified by SAE and BCI, the most commonly used value when starting the battery at -18°C (0°F).
BCI: International standard of battery Committee
CA: Standard turning current, effective starting current value at 0°C
MCA: Marine turning gear current standard, effective starting current value at 0°C.
JIS: Japanese industrial standard, which is displayed on the battery in combination of numbers and letters, such as 55d23 and 80d26.
DIN: Standards of German automobile industry committee
IEC: Internal electronic technical committee standards
EN: European Automotive Industry Association standards
SAE: Society of Automotive Engineers standards
GB: Chinese national standard

3. Selection Of Rated Capacity

It refers to the factory starting current standard of the battery, which can be seen directly above or in front of the battery, such as CCA 600A
The rated range is as follows:

Measure Standard	Measure Range
CCA	100 - 2000
BCI	100 - 2000
CA	100 - 2000
MAC	100 - 2000
JIS	26Al 7 - 245HS2
DIN	100 - 1400
IEC	100 - 1400
EN	100 - 2000
SAE	100 - 2000
GB	100 - 2000

JIS REFERENCE CHART

JIS	CCA
26B17L	185
28B17L	195
28B19L	190
32C24L	195
34B17L	240
34B19L	240
36B20L	260
38B19L	265
38B20L	265
44B20L	300
46B24L	295
48D26L	250
50B24L	325
50D20L	310
55B24L	370
55D23L	320
55D26L	290
65D23L	370
65D26L	370
65D31L	340
70D23L	420

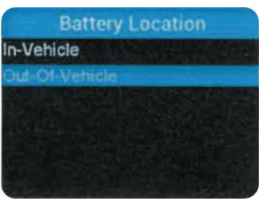
JIS	CCA
75D23L	465
75D26L	450
75D31L	380
80D26L	490
95D31L	565
95E41L	475
105D31L	655
105E41L	540
115E41L	610
115F51	575
130E41L	680
145F51	735
145G51	685
150F51	765
165G51	710
170F51	925
180G51	860
190H52	765
195G51	930
210H52	910
245H52	1170

Press the UP/DOWN key, input the correct test standard and grade, press the ENTER key, and the tester starts the test.
It takes approximately 2 seconds to display the battery test results.

3.1.2. Battery Out-Of-Vehicle

The off vehicle test indicates that the battery is not connected to the vehicle. Clamp the red and black clamps of the tester onto the tested battery, connect the red to the positive and the black to the negative, and the display screen will immediately display the start-up interface. The main interface appears 2 seconds after start-up.

1) Press the UP/DOWN key to select the battery power, and press the 'ENTER' key to confirm.



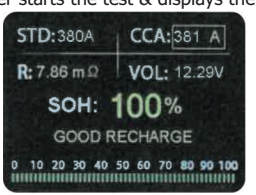
2) Select external battery test and press 'ENTER' to confirm.

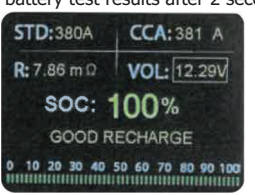
3) Battery type, press UP/DOWN to select the type, and press 'ENTER' to confirm.

4) Enter the standard, press UP/DOWN to scroll through, and press 'ENTER' to confirm.

5) Rated capacity: press the UP/DOWN keys to select the rated capacity of the battery, and press 'ENTER' to confirm.

The meter starts the test & displays the battery test results after 2 seconds.





The battery test results include the following five types:

1. Good Battery
   CCA rating: 500A CCA: 490
   Internal resistance: r=6.lmΩ
   Battery voltage: 12.64V
   Battery life: 100%
   Power percentage: 100%
   The battery is in perfect condition

2. Good Battery but Recharge
   CCA rating: 500A CCA: 490
   Internal resistance: r=7.2mΩ
   Battery voltage: 12.20V
   Battery life: 78%
   Power percentage: 30%
   The battery has good performance but low current. Please recharge.

3. Replace Battery
   CCA rating: 500A CCA: 490
   Internal resistance: r=l8.lmΩ
   Battery voltage: 12.68V
   Battery life: 46%
   Power percentage: 80%
   If the battery is flat or about to go flat, replace the battery.

4. Bad Battery
   CCA rating: 500A CCA: 490
   Internal resistance: r=45.2mΩ
   Battery voltage: 10.64V
   Battery life: 0%
   Power percentage: 20%
   If the battery is internally damaged or short circuited, replace the battery.

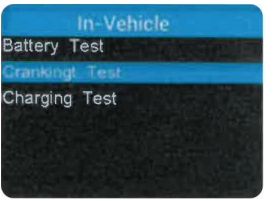
5. Charge, Retest
   CCA rating: 500A CCA: 490
   Internal resistance: r-30.lmΩ
   Battery voltage: 12.08V
   Battery life: 39%
   Power percentage: 20%
   Unstable batteries should be recharged and tested to avoid errors. If the same test result occurs after charging and retesting, the battery is considered damaged and must be replaced.

Note: if the "replacement" is caused by the in car mode, it may be due to the poor connection between the vehicle cable and the battery. Before deciding to replace the battery, make sure to cut off the cable and retest the battery of the vehicle.

Note: after the test, if you need to exit, press the exit key to exit directly to the start-up interface. After test: if it is in the "in vehicle" test status, press enter to enter the climb test.

3.1.3. Starting System Test

- Clamp the red and black clamps of the tester on the tested battery, connect the red to the positive pole and the black to the negative pole, and the display screen will immediately display the start-up interface.
- The main interface appears 2 seconds after start-up. Press the UP/DOWN key to select the battery level, then please select 'In vehicle', and then press ENTER to confirm.
- Press the UP/DOWN keys to select 'starting system test', and then press the "ENTER" key to confirm.

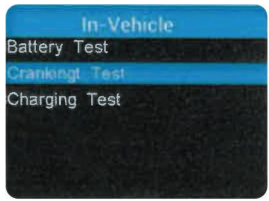


1. The climb test is normal, and the test result example 1 is displayed.
   Climb test
   Time: 6810ms
   Maximum: 11.55V
   Minimum: 10.24V
   The starting voltage is normal
2. When the climb test is abnormal, the test result example 2 is displayed.
   Climb test
   Time: 15020ms
   Maximum: 9.05V
   Minimum: 8.55V
   Low starting voltage

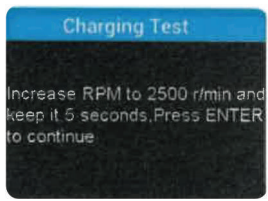
Note: Prepare before the test. If the car is starting, please turn off the engine and turn the key to the "OFF" position. Before starting the system test, it is necessary to test whether the "CCA" of the battery is normal. If the function of the battery itself is abnormal, the test data of the starting system will be abnormal. After the test, do not shut down the engine, press EXIT to enter the next charging system test.

3.1.4. Charging System And Ripple Test

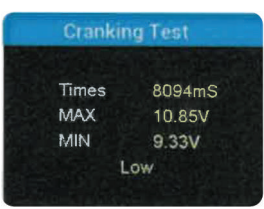
When entering the charging test, please select "charging test" and press enter.

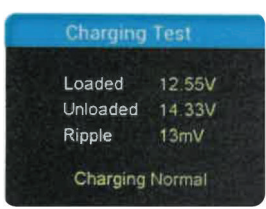


Step on the accelerator, turn the engine speed to more than 2500rpm, and click the "ENTER" key of the instrument to start the charging test.



Test result: if the charging voltage reading is greater than 15.5V, please check the voltage regulator.
If the reading is greater than 13.3V and less than 15.5V, the charging system is normal.
If the reading is less than 13.3V, check the connection point, wires and generator.





Note: Do not shut down the engine during the test. All electrical appliances and equipment are turned off. Switching on/off any electrical appliance in the vehicle during the test will affect the accuracy of the test results.

The tester will perform the following tests in sequence:

For ripple test, the tester will display real-time ripple, and display ripple voltage and charging voltage value at the bottom line. The ripple test takes approximately 6 seconds.

After the ripple test, the tester will automatically start the load voltage test.

Charging test

Load test

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The load voltage test takes about 3 seconds, and then prompts "step on the throttle to increase the engine speed"

Charging test

Increase the speed to 2500rpm

Hold for 5 seconds. Press OK to continue.

Operate accordingly to increase the engine speed to 2500rpm or above for 5 seconds.

When the speed increase is detected, the tester starts the charging voltage test.

Charging test

Test

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After the test, the tester displays the effective charging voltage, ripple test results and charging test results.

Starting test

Load 14.16V

No load 14.39V

Replace 15MV

Normal charging

Note: If no increase in speed is detected, it should be a failure of the generator regulator or a failure of the connection to the battery. The tester will try 3 further tests. If it still fails, it will skip the speed increase test, and the test result shows "no voltage output".

See below:

Check the connection between the generator and the battery and retest.

Charging test results:

1. Charging voltage: normal
   The charging system shows that the generator output is normal and no problem is detected.

2. Charging voltage: low
   The charging voltage of the charging system is low.
   Check whether the generator drive belt slips or deviates. Check whether the connection between the generator and the battery is normal. If the drive belt and connections are in good condition, troubleshoot the generator according to the manufacturer's recommendations.

3. Charging voltage: high
   The generator output voltage is high.
   Since most automotive generators use internal regulators, the generator assembly must be replaced (some older cars use an external regulator and then replace the regulator directly.) The maximum normal high voltage of the voltage regulator is 14.7V ±0.5V. If the charging voltage is too high, the battery will be overcharged. As a result, the battery life will be shortened and failure will occur.

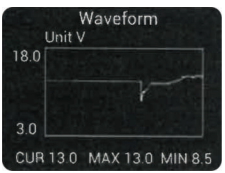
4. No voltage output:
   No generator voltage output detected. Check whether the generator connecting cable and belt are normal.

5. Diode test:
   By testing the charging current ripple, the tester will know whether the diode is normal. When the ripple voltage is too high, at least one diode is damaged. Check and replace the diode.

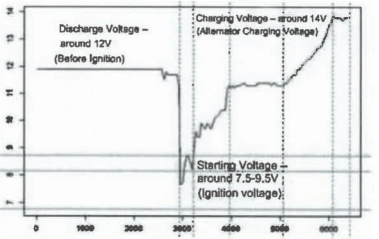
So far, all tests have been completed.

3.2. Waveform Monitoring

From the startup screen press EXIT button to enter Main Menu. Press the UP/DOWN button to select the [Waveform] function and press ENTER, the screen will display the interface as shown below



CUR: Current Voltage
MAX: Maximum Voltage during Ignition
MIN: Minimum Voltage during Ignition
The waveform will stay in static until there's changes in the voltage detected.
Various vehicle voltage analyses.



- Discharge Voltage: When the Ignition OFF engine OFF (Over 20 Minutes) the Discharge
- Voltage should be around 12V. If the discharge voltage is lower than 11V it will be hard to turn the ignition ON. If the discharge voltage continuously stays under 11V it means the battery is aging and replacement is needed.
- Starting Voltage: During ignition, the voltage will drop to a certain point, at this minimum point is Starting Voltage (Around 7.5-9.5V). If the Starting Voltage continuously stay under 7.5V it means battery capacity is low and needs to be replaced.
- Charging Voltage: When the ignition ON engine ON. The alternator will continuously charge the car battery, normally is around 14V.

Battery Status corresponding with Battery Voltage (Before Ignition)

Battery Voltage	Battery Status	Effects and Measures
<10.8V	Too Low	Hard to start vehicles replace battery
10.8V-11.8V	Slightly Low	Hard to start vehicles

Battery Status corresponding with Battery Voltage (After Ignition)

Battery Voltage	Battery Status	Effects and Measures
12.8V-13.2V	Too Low	Battery may not be charged; Check alternator or other electrical load
13.2-14.8V	Normal	Normal
>14.8V	High Voltage	May damage the battery Check alternator stabilizer

3.3. Playback

- Clamp the red and black clips on the positive and negative electrodes of the battery correctly.
- Use the up and down buttons to select on the playback icon and press enter.
- Use the "up" and "down" buttons to select the data saved during the previous test and the waveform diagram for starting the test, and then press "enter" to view.
- Press the exit key to return to the previous menu.

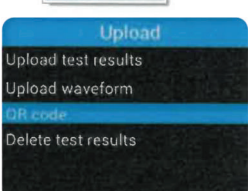
3.4. Printing Data

Before using the print data function, the tool must be connected to the computer via
USB
When the cable is ready, insert the CD into the computer
1. first install the USB driver.

1. then open the printing software
2. select the COM port number.

If there are some data histories in the printing software, clear them.

3. Use the "up" and "down" buttons, select "upload test results" in the options, and press “ENTER” to confirm.



5. After the data is transferred to the computer, the printing software will display this information. For example;
   CCA rating: 500A CCA:490
   Internal resistance: r=6.lm Ω
   Battery voltage: 12.64V
   Battery life: 96%
   Power percentage: 100%
   Good battery
   Or select 'my QR code', and press enter, and the mobile phone can scan the QR code to obtain measurement information.
6. Press exit to return

3.5. Introduction To Setting Options

In the setting options, you can set the language, buzzer sound switch and equipment test and debugging settings:

1. **Language:** select the desired language. Click OK in the language column to enter the next level of language settings, use the "up" and "down" buttons to select the required language, then press the "ENTER" button to save the selection and press the exit button to return to the previous menu.
2. **Buzzer:** buzzer sound switch setting. Click the buzzer option to enter the next level of sound switch settings, use the "up" and "down" buttons to select whether the sound is on or off, then press the "ENTER" button to save the selection and press the exit button to return to the previous menu.
3. **Equipment Test:** check the color screen RGB three colours and confirm whether the four operation keys are normal.
4. **Bluetooth Function:** Activate the Bluetooth function to transfer data from the instrument to the APP.
   1) Download Meterbox Pro APP to connect with the meter to get more functions. Search the APP name Meterbox Pro on the App Store (for iOS) or Google play (for android).
   2) Select the setting option and press the ENTER key to open the menu.
   3) Then press the "Up" and "Down" keys to select the Bluetooth setting option, press ENTER again to open the next menu.
   4) Press the "Up" and "Down" keys to turn the Bluetooth function ON/OFF.
   5) Press the EXIT key to exit the current menu.

3.6. Introduction To Options

About: display instrument software, hardware version and production date.

1. After power on, use the up and down buttons to select about options
2. Then press the "ENTER" button to enter the next menu to view the software, hardware version, production date and other relevant information of the instrument.
3. Press exit to return to the previous menu.

4. Maintenance

When using the test adapter in compliance with the user manual, no special maintenance is required. However, should functional errors occur during normal operation, the after sales service will repair your instrument. Please contact the local service office.

4.1. Cleaning

If the tester needs to be cleaned after daily use, use a damp cloth and mild household detergent.
Before cleaning, disconnect the tester from all measuring circuits.
Do not use acid detergent or solvent liquid for cleaning.
After cleaning, do not use the tester until it is completely dry.

4.2. Transport And Storage

Please keep the original packaging for future transport (e.g.,if calibration is necessary). Any transport damage due to faulty packaging will be excluded fromwarranty claims.
The tester must be stored in dry, closed areas. In case of an adapter being transported in extreme temperatures, a minimum recovery time of 2 hours is required prior to any operation
For customer support, please contact your dealer or dealer directly.

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