



NOTES:

- ◆ Please read the user manual carefully before using.
- ◆ There will be no further notice for the product upgrade or changes. Please take the device as standard.
- ◆ Declaration : Any product names mentioned in this manual are used for explaining the using methods. The trademarks still belong to the original company.
- ◆ Only available for 12V lead-acid batteries.

Mashin will have no responsibility for the followings:

- ◆ This manual is designed for Mashin' s Battery Analyzer only. Any consequence caused by using this manual to other products.
- ◆ Any damages or problems that caused by using other accessories or consumables instead of Mashin' s original products.
- ◆ Any fees or expenses from the damages or losses of the analyzer caused by private accidents or misused and unused without following Mashin' s standard.

Chapter 2 Operation

■ Pre-Test

- Please clean battery poles before using.
- Please make sure clamps and battery are well-connected.
- Before testing, please make sure the engine stopped and the door closed.

■ Connect Analyzer

- Please connect the clamps with the battery pole, positive to positive and negative to negative.

Please make sure clamps are well-connected. If they are not connected well, the test will be unavailable. If screen shows "CHECK CONNECTION", before getting into the testing program, please clean the poles and re-connect.



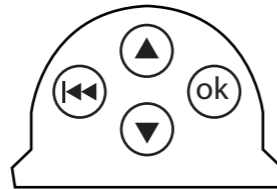
- This Analyzer has reverse polarity protection. If the clamps are connecting reversely, the screen will not light on. But it will not cause any damages either on analyzer or car load.

※ For parallel batteries, must break off the cathode connection first, then do the individual test to each battery. If you do not break off the cathode connection, there might come out with an error testing result.

※ For series batteries, if it is 24V, please test by each battery.

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■ Button Indicator



■ Analyzer Startup

The Battery Analyzer will startup automatically when clamps are well connected.



Chapter 1 Product Summary

■ Product Profile

VAT-180/200 Lead-acid Battery Analyzer adopts the world's most advanced conductance testing technology which can easily, quickly and accurately measure the actual cold cranking amps capability of the vehicle starting battery, state of battery health, and common faults of the vehicle starting and charging system. This Battery Analyzer helps maintenance personnel to find out the problem quickly and accurately to increase the efficiency for repairing the vehicle.

- 1、 Available for all automotive lead-acid batteries, such as Ordinary Battery, AGM Flat Plate, AGM Spiral, Gel and EFB...etc.
- 2、 Detect the battery condition.
- 3、 Reverse polarity protection which will not cause the damage when connecting reversely either for analyzer or battery.
- 4、 Test low battery without full charging.
- 5、 Testing standard includes CCA, DIN, JIS, EN, IEC, GB, SAE, MCA, BCI and CA.
- 6、 Multi-language support which includes Traditional Chinese, English, Japanese ...etc, other language is available according to customer' s requirement.

■ Function

VAT-180/200 Lead-acid Battery Analyzer includes Battery Test, Cranking Test, Charging System Test and other additional functions.

Battery Test : Analyze the battery status to calculate the actual cold cranking capability and aging.

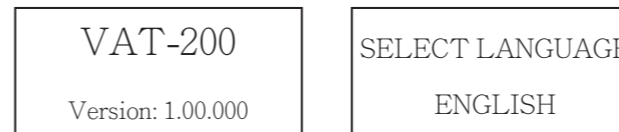
Cranking Test : Test and analyze the condition of starting motor.

Charging Test : Check and analyze the condition of charging system.

The battery voltage will show at the bottom of screen which can be used as DC Voltmeter. The measuring range is 6 - 16V DC, out of this range will cause the damage of the analyzer.

■ Battery Test

Press (ok) to get into the testing program and wait for approx. 2 seconds to SELECT your LANGUAGE then press (ok).



■ Battery Location Selection

Press (▲) (▼) to select your BATTERY LOCATION then press (ok).
 (IN-VEHICLE: Battery is installed on the car)
 (OUT-OF-VEHICLE: Battery is not installed on the car or any devices)



■ Technical Parameters

◎ Cold Cranking Amps Measure Range:

| | VAT-180 | VAT-200 |
|------------------|---------------|----------------|
| Measure Standard | Measure Rate | Measure Rate |
| CCA | 20 ~ 300 | 100 ~ 800 |
| DIN | 20 ~ 240 | 100 ~ 700 |
| JIS | 26A17 ~ 46B24 | 26A17 ~ 155G51 |
| EN | 20 ~ 300 | 100 ~ 800 |
| IEC | 20 ~ 240 | 100 ~ 700 |
| GB | 2 ~ 30 | 30 ~ 220 |
| SAE | 20 ~ 300 | 100 ~ 800 |
| MCA | 20 ~ 300 | 100 ~ 800 |
| BCI | 20 ~ 300 | 100 ~ 800 |
| CA | 20 ~ 300 | 100 ~ 800 |

◎ Voltage Measure Range: 6 - 16V DC

■ Environmental Requirement

◎ Temperature : -20° C ~ 60° C (Non-waterproof)

◎ Storge : -30° C ~ 70° C

■ Charging State Selection

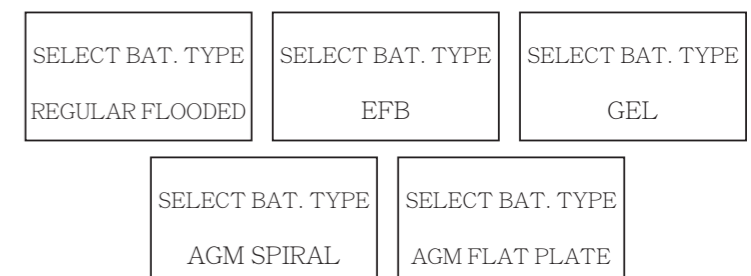
After selecting battery location, press (▲) (▼) to select your CHARGE STATE, then press (ok).

When the battery is settled on your car, please select BEFORE CHARGE for cold vehicle and AFTER CHARGE for hot vehicle.



■ Battery Type Selection

Finish charge state selection, please select your BATTERY TYPE by pressing (▲) (▼) for following: " REGULAR FLOODED, EFB, GEL, AGM SPIRAL, AGM FLAT PLATE" and press (ok).



For battery which is IN-VEHICLE, the battery pole still need to be selected, such as TOP POST, SIDE POST or REMOTE, then press **OK**.
If it is difficult to connect clamps with battery poles, please select REMOTE.



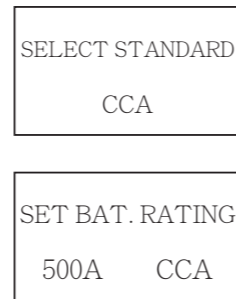
※ The testing data might have a difference when selecting REMOTE. If there is any concern, please take off the battery and select OUT-OF-VEHICLE to re-test.

■ Battery System Standard and Rating

Please press **▲** **▼** to select the SYSTEM STANDARD and RATING according to the information showed on the battery, as the arrow indicated below:



CCA : Cold Cranking Amps, specified by SAE & BCI
DIN : German Institute for Standardisation
JIS : Japanese Industrial Standard, displayed on the battery as combination of the numbers and letters, e.g. 55D23, 80D26
EN : European Standard
IEC : International Electrotechnical Commission
GB : Chinese National Standard
SAE : Society of Automotive Engineers (USA)
MCA : Marine Cranking Amps standard, effective starting current value at 0° C.
BCI : Battery Council International (Publishes Automotive Battery Standards)
CA : Cranking Amps standard, effective starting current value at 0° C.



After selecting system standard and rating, press **OK** then the test begins.

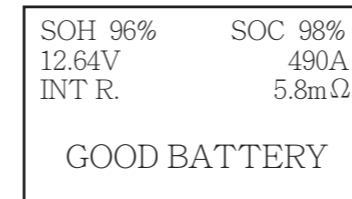


It takes around 3-5 seconds and the result will come out.

■ Battery Test Result

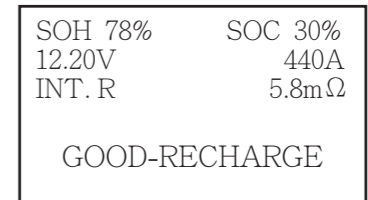
There will be 5 different situations as follows:

① Good Battery

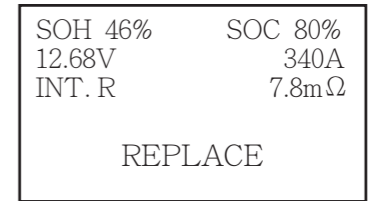


NOTE : SOH : State Of Healthy
SOC : State Of Charge

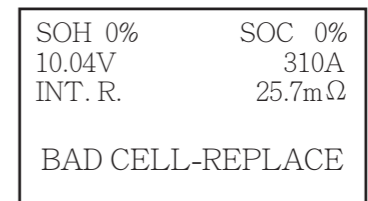
② Good, Recharge



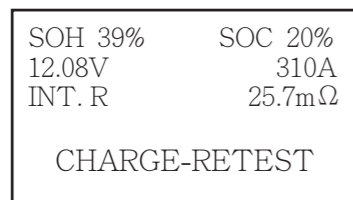
③ Replace



④ Bad Cell, Replace

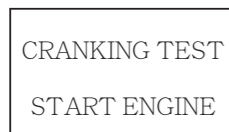


⑤ Charge, Re-test



■ Cranking Test

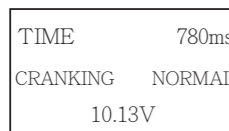
For doing the CRANKING TEST, please follow the instruction and start your engine:



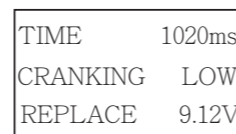
Once detecting the RPM, the testing will begin automatically.



The normal Cranking Voltage should higher than 9.6V, if it is lower, then the battery is faulty.



If the cranking system is faulty, it will show as follows:



The maintenance personnel can easily know the condition of starting system according to the data. After finishing cranking test, do not stop the engine and press **OK** to get into the next step.

※ Please make sure starter motor operates normally.

■ Charging System Test

After pressing **OK**, it will ask for starting the charging test.

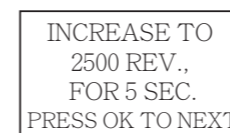


Press **OK** once again to get into charging system test.

※ Please do not stop the engine during testing process, and make sure all the electronic devices are turned off. If there is any electronic device not in OFF position during the test which could affect the accuracy of the result.



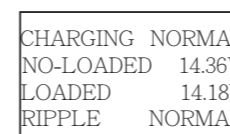
It will take around 3 seconds for LOADED TESTING then will show as follows:



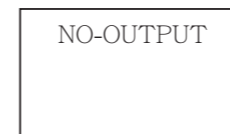
Please increase rotating speed to 2500rpms or above for 5 seconds, then press **OK** for analyzing.



After then, the result will show as follows:



※ If there is no engine rev detected, the connection for alternator regulator and battery might be faulty. If it still fails detecting at least three times, it will come out a result for "NO-OUTPUT" .



Please check if the alternator and battery are well-connected and re-test.

■ Charging System Test Result

- ① Charging Voltage : Normal
No problems detected.
- ② Charging Voltage : Low
Please check if alternator system is well-connected. Otherwise, the alternator might be faulty.
- ③ Charging Voltage : High
Normally the highest voltage for stabilizer will not over 14.7±0.5V, otherwise, please check if the alternator is faulty.
- ④ No Charge :
Please check if alternator system is well connected.
- ⑤ Ripple :
Through detecting the charging current wave to check if the ripple is in a normal condition. If the voltage is too high means the rectifier is damaged, please check and replace.

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