TEST PROCEDURES / OPERATING INSTRUCTIONS

IMPORTANT

1. For testing 6 and 12 volt batteries, and for testing 12 and 24 volt charging systems.
2. Suggested operation range 0℃(32℉) to 50℃ (122℉) in ambient temperature.

WARNING：

1. Working in the vicinity of a lead acid battery is dangerous. Batteries generate explosive gases during normal battery operation. For this reason, it is of utmost importance, if you have any doubt, that each time before using your tester, you read these instructions very carefully.
2. To reduce risk of battery explosion, follow these instructions and those published by the battery manufacturer and manufacturer of any equipment you intend to use in the vicinity of the battery. Observe cautionary markings on these items.
3. Do not expose the tester to rain or snow.

PERSONAL SAFETY PRECAUTIONS：

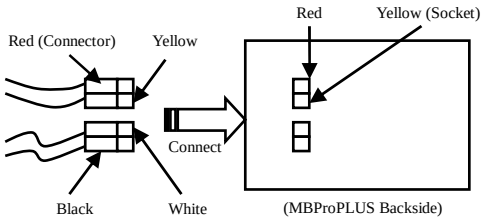
1. Someone should be within range of your voice or close enough to come to your aid when you work near a lead acid battery.
2. Have plenty of fresh water and soap nearby in case battery acid contacts skin, clothing or eyes.
3. Wear safety glasses and protective clothing.
4. If battery acid contacts skin or clothing, wash immediately with soap and water. If acid enters eye, immediately flood eye with running cold water for at least ten minutes and get medical attention immediately.
5. NEVER smoke or allow a spark or flame in vicinity of battery or engine.
6. Be extra cautious to reduce risk of dropping a metal tool onto the battery. It could spark or short-circuit the battery or other electrical parts and could cause personal injury or an explosion.
7. Remove personal metal items such as rings, bracelets, necklaces and watches when working with a lead acid battery. It can produce a short circuit current high enough to weld a ring or the like to metal causing a severe burn.

PREPARING TO TEST：

1. Be sure area around battery is well ventilated while battery is being tested.
2. Clean battery terminals. Be careful to keep corrosion from coming in contact with eyes.
3. Inspect the battery for cracked or broken case or cover. If battery is damaged, do not use tester.
4. If the battery is not sealed maintenance free, add distilled water in each cell until battery acid reaches level specified by the manufacturer. This helps purge excessive gas from cells. Do not overfill.
5. If necessary to remove battery from vehicle to test, always remove ground terminal from battery first. Make sure all accessories in the vehicle are off to ensure you do not cause any arcing.

INSERTION OR REPLACEMENT OF TEST LEADS:

1. Remove the cover in the backside bottom of the battery tester.
2. Insert the connectors which contain black-yellow pair and yellow-red pair in one end of the lead wire into the sockets which can be found when you remove the cover as above. Be sure to make colors matched between the connectors and sockets as shown below.



TESTER OPERATION & USE ：

BATTERY TEST

1. Before you test a battery in a vehicle, turn off the ignition, all accessories and loads. Close all the vehicle doors and the trunk lid.

2. Make sure you have put all 6 AA 1.5V batteries into the battery chamber. Rechargeable batteries are not recommended because of the initial 1.7 Volt output. If the 1.5V battery runs out of power, screen will show “POWER LOW”. Replace all 6 AA 1.5V batteries before starting the test.

   Note that nothing will be seen on the display until the tester is connected to a vehicle battery.

3. Make sure the battery terminals are clean. Wire brush them if necessary. Clamp the black load lead to the vehicle negative battery terminal. Clamp the red lead to the vehicle positive battery terminal. Please clamp on the lead or brass part of the terminal only.

4. Paper load:

   First connect tester to a battery to get power source. Open the paper roll cover. Insert paper to the paper feed slot for auto feed to occur. Allow the printer to pull the paper slow and straight from the paper roll in the chamber.

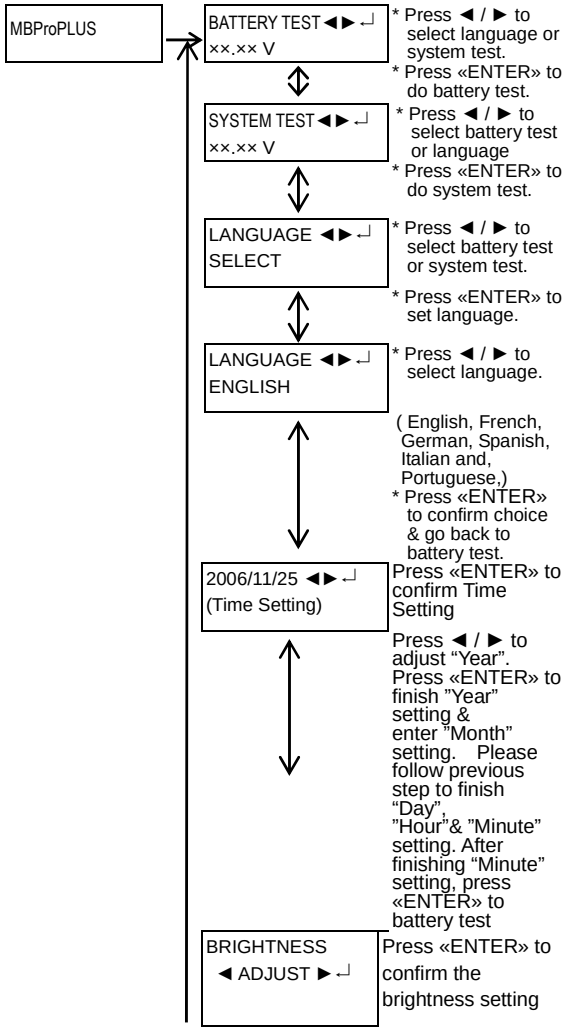
   Paper replacement: Repeat step #4

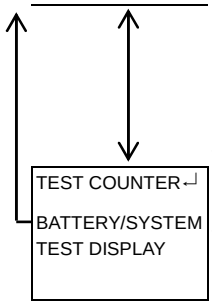
   a. Open the clear cover

   b. Insert replaced paper roll into the paper feed for auto feed to occur.

   c. Allow the printer to pull the paper slow and straight from the paper roll in the chamber.

5. You will then see the following screens：


MBProPLUS
BATTERY TEST◄►↵
××.×× V
* Press ◄ / ► to select language or system test.
* Press «ENTER» to do battery test.
SYSTEM TEST◄►↵
××.×× V
* Press ◄ / ► to select battery test or language
* Press «ENTER» to do system test.
LANGUAGE ◄►↵
SELECT
* Press ◄ / ► to select battery test or system test.
* Press «ENTER» to set language.
LANGUAGE ◄►↵
ENGLISH
* Press ◄ / ► to select language.
(English, French, German, Spanish, Italian and, Portuguese,)
* Press «ENTER» to confirm choice & go back to battery test.
2006/11/25 ◄►↵
(Time Setting)
Press «ENTER» to confirm Time Setting
Press ◄ / ► to adjust “Year”. Press «ENTER» to finish ”Year” setting & enter ”Month” setting. Please follow previous step to finish “Day”, ”Hour”& ”Minute” setting. After finishing “Minute” setting, press «ENTER» to battery test
BRIGHTNESS
◄ ADJUST ►↵
Press «ENTER» to confirm the brightness setting

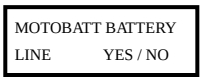


Press ◄ / ► to adjust the brightness of the display. Press “Enter” to confirm the brightness & go back to battery test.

Press «ENTER» to see how many times the tester has been used to perform a battery / system test.

6. Press the ◄ ► key to select battery test. Press «ENTER» button. **Example** :

7. MOTOBATT BATTERY LINE



   a. Press the ◄ ► key to select YES or NO to test by MotoBatt part number. Press “ENTER” to confirm choice YES or NO

   b. Press the ◄ ► key to select MOTOBATT Part number. Press “ENTER” to confirm choice and test

8. If “NO” is selected from MOTOBATT BATTERY LINE selection screen. Press the ◄ ► key to select the battery type：

   a. REGULAR LIQUID
   b. AGM FLAT PLATE
   c. AGM SPIRAL
   d. VRLA/GEL

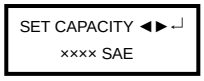
   Press «ENTER» to confirm choice.

9. Press the ◄ ► key to select the battery rating： CCA (SAE), EN, IEC, DIN or JIS

   Press «ENTER» to confirm choice.

10. Press the ◄ ► key to input the battery capacity of SAE：

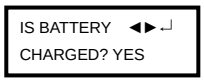
- CCA (SAE)：40~2000
- EN：40~2100
- IEC：30~1500
- DIN：25~1300
- JIS：By Battery Type No.



Press «ENTER» to begin the test.

11. Test the battery for few seconds.

12. Press the ◄ ► key to select if battery has been recently charged or not if tester asks. Press «ENTER» to confirm choice.



13. When the test is completed, the display shows the actual volts and the actual CCA or %. {Press the◄ ► key to select: SOH (STATE OF HEALTH) or SOC (STATE OF CHARGE)}.

One of six results will be displayed**:**

GOOD & PASS :

The battery is good & capable of holding a charge and can be put into service.

GOOD & RECHARGE :

The battery is good but needs to be recharged.

RECHARGE & RETEST :

Battery is discharged, the battery condition cannot be determined until it is fully charged. Recharge & retest the battery.

BAD & REPLACE :

The battery will not hold a charge. It should be replaced immediately.

BAD CELL & REPLACE :

The battery has at least one cell short circuit. It should be replaced immediately.

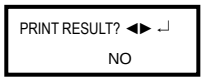
LOAD ERROR :

The tested battery is bigger than 2,000 CCA's or 200AH. Or the clamps are not connected properly. Please fully charge the battery and retest after excluding both previous reasons. If reading is the same, the battery should be replaced immediately.

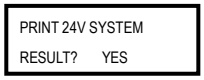
14. Press «ENTER» to get TEST CODE for record.

※ There will be BARCODE appearance after printing. Please pay attention to BARCODE Scanner which only supports CODE39 format.

15. Press the ◄ ► key to select result printing: YES or NO. Press «ENTER» to confirm your choice.



※ 24V System Test Printing:



The printer will not function for 24 Volt batteries system test printing. The 24V system test result will be recorded till you hook up to a 12V battery and the right screen shows up. Please select "YES" and press enter key to print the result

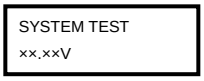
and then disconnect the clamps. The screen will appear again after you reconnect the clamps. Please select "NO" and press the enter key to go back to the main menu.

16. Press «ENTER» return to step 5 or remove the test clamps from the battery posts after completion of testing batteries to end test.

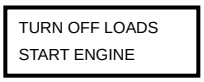
SYSTEM TEST

Example :

1. Press «ENTER» button, you will view the following screen:



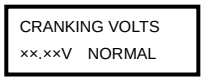
2. Turn off all vehicle accessory loads such as light, air conditioning, radio, etc. Before start the engine.



3. When the engine is started, one of the three results will be displayed along with the actual reading measured.

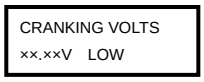
CRANKING VOLTS NORMAL

The system is showing normal draw. Press «ENTER» to perform the charging system test.



CRANKING VOLTS LOW

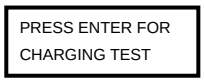
The cranking voltage is below normal limit, troubleshoot the starter with manufacturers recommended procedure.



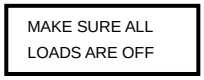
CRANKING VOLTS NO DETECTED

The cranking voltage is not detected.

4. If the cranking voltage is normal, press «ENTER» to begin charging system test.



5. Press the «ENTER» key, you will view the following screen.



6. Press the «ENTER» key, one of the three results will be displayed along with the actual reading measured.

LOW CHARGING VOLTS WHEN TEST AT IDLE

The alternator is not providing sufficient current to the battery. Check the belts to ensure the alternator is rotating with engine running. If the belts are slipping or broken, replace the belts and retest. Check the connections from the alternator to the battery. If the connection is loose or heavily corroded, clean or replace the cable and retest. If the belts and connections are in good condition, replace the alternator.

CHARGING SYSTEM NORMAL WHEN TEST AT IDLE

The system is showing normal output from the alternator. No problem is detected.

HIGH CHARGING VOLTS WHEN TEST AT IDLE

The voltage output from the alternator to the battery exceeds the normal limits of a functioning regulator. Check to ensure there is no loose connection and the ground connection is normal. If there is no connection issue, replace the regulator. Since most alternators have the regulator built-in, this will require you to replace the alternator. The normal high limit of a typical automotive regulator is 14.7 volts +/- 0.05. Check manufacturer specifications for the

correct limit, as it will vary by vehicle type and manufacturer.

7. Following the charging system at idle, press «ENTER» for the charging system with accessory loads. Turn on the blower to high (heat), high beam headlights, and rear defogger. Do not use cyclical loads such as air conditioning or windshield wipers.

```
TURN ON LOADS
AND PRESS ENTER
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8. When testing older model and/or diesel engines, the users need to run up the engine to 2500 rpm for 15 seconds. You will view the screen as follows:

```
RUN ENGINE UP TO
2500 RPM 15 SEC.
```

9. Press «ENTER» to look for the amount of ripple from the charging system to the battery. One of two testing results will be displayed along with the actual testing measured.

RIPPLE DETECTED NORMAL

Diodes are working properly in the Alternator/Stator.

```
RIPPLE DETECTED
××.××V  NORMAL
```

Or

```
NO RIPPLE DETECT
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EXCESS RIPPLE DETECTED

One or more diodes in the alternator are not functioning or there is stator damage. Check to ensure the alternator mounting is sturdy and that the belts are in good shape and functioning properly. If the mounting and belts are good, replace the alternator.

```
RIPPLE DETECTED
××.××V  HIGH
```

10. Press the «ENTER» key to continue the charging system with accessory loads. One of the three results

will be displayed along with the actual testing measured.

CHARGING SYSTEM HIGH WHEN TEST WITH ACCESSORY LOADS

ALT. LOAD VOLTS
××.××V HIGH

The voltage output from the alternator to the battery exceeds the normal limits of a functioning regulator. Check to ensure there are no loose connections and that the ground connection is normal. If there are no connection issues, replace the regulator. Since most alternators have the regulator built-in, this will require you to replace the alternator.

CHARGING SYSTEM LOW WHEN TEST WITH ACCESSORY LOADS

ALT. LOAD VOLTS
××.××V LOW

The alternator is not providing sufficient current for the system's electrical loads and the charging current for the battery. Check the belts to ensure the alternator is rotating with the engine running. If the belts are slipping or broken, replace the belts and retest. Check the connections from the alternator to the battery. If the connection is loose or heavily corroded, clean or replace the cable and retest. If the belts and connections are in good working condition, replace the alternator.

CHARGING SYSTEM NORMAL WHEN TEST WITH ACCESSORY LOADS

ALT. LOAD VOLTS
××.××V NORMAL

The system is showing normal output from the alternator. No problem detected.

11. Press «ENTER» when charging system test is completed finish. Turn all accessory loads and engine off. Press «ENTER» to return to step 1 or remove the test clamps from the battery posts after completion of testing to end test.

TEST OVER. TURN
OFF LOADS & ENGINE

GLOSSARY

What is a GEL battery?

A gel battery is a lead-acid electric storage battery that:

- is sealed using special pressure valves and should never be opened.
- is completely maintenance-free.*
- uses thixotropic gelled electrolyte.
- uses a recombination reaction to prevent the escape of hydrogen and oxygen gases normally lost in a flooded lead-acid battery (particularly in deep cycle applications).
- is non-spillable, and therefore can be operated in virtually any position. However, upside-down installation is usually not recommended.

✧ Connections must be checked for proper torque for fastener tightness and the batteries should be cleaned periodically.

What is an AGM battery?

An AGM battery is a lead-acid electric storage battery that:

- is sealed using special pressure valves and should never be opened.
- is completely maintenance-free.*
- has all of its electrolyte absorbed into separators consisting of a sponge-like mass of matted glass fibers.
- uses a recombination reaction to prevent the escape of hydrogen and oxygen gases normally lost in a flooded lead-acid battery (particularly in deep cycle applications).
- Has no free flowing liquid electrolyte and is non-spillable, and therefore can be operated in virtually any position. However, upside-down installation is not recommended.

✧ Connections must be checked for proper torque for fastener tightness and the batteries should be cleaned periodically.

What is a VRLA battery?

Valve Regulated Lead Acid Battery – This type of battery is sealed Maintenance Free, recombination design battery that

utilize a “Bunce” Valve or Valves that opens when a preset pressure is realized inside the battery and lets the excess gas pressure out as needed. Then the valve resets itself. AGM and Gel batteries are battery types within this family of batteries

What is a SLI battery?

These initials stand for Starting, Lighting and Ignition, which are the three basic functions which a battery has to perform in all “normal” vehicles. Batteries given this description will have been specifically designed for service in cars and trucks within a voltage controlled electrical system. Those SLI batteries which are intended for heavy haulage vehicles fitted with large diesel motors may often be called COMMERCIAL batteries. They have to be much more powerful and more robust than batteries intended for cars.

What is STATE OF HEALTH?

It means how much battery capacity is left (%) comparing with the marked original battery capacity.

What is STATE OF CHARGE?

It means the level in percent of total capacity that the battery is actually charged.

What is CCA (COLD CRANKING AMPS)?

A battery performance measurement where a battery is first cooled and held at a core temperature 0^{O}F then loaded by a current in amperes which a new fully charged battery can deliver for 30 seconds continuously without the terminal voltage falling below 1.2 volts per cell. This rating reflects the ability of the battery to deliver engine starting currents under winter conditions.

What is AMPERE-HOUR?

The unit of measurement of electrical capacity. A current of one ampere for one hour implies the delivery or receipt of one ampere-hour of electricity. Current multiplied by time in hours equals ampere-hours.

TERMS AND CONDITIONS OF WARRANTY

Any battery tester defective in material or workmanship will be repaired or replaced according to published defective return test repair procedures. The existence of a defect shall be determined by the seller in accordance with published procedures. The published test procedures are available upon request.

This warranty does not cover any unit that has been damaged due to accident, abuse, alternation, use for a purpose other than that for which it was intended, or failure to follow operating instructions. This warranty is expressly limited to original retail buyers. This warranty is not assignable or transferable. Proof of purchase is required for all alleged claims. Warranty cannot be authorized without proof of purchase. Warranty claims must be sent pre-paid with dated proof of purchase. Damage incurred during shipment is the responsibility of the shipper (customer returning unit) If the returned unit qualifies for warranty, the shipper will only incur shipping cost. The seller reserves the right to substitute or offer alternative warranty options at its discretion.

The sole and exclusive remedy for any unit found to be defective is repair or replacement, at the option of the seller. In no event shall the seller be liable for any direct, indirect, special, incidental, or consequential damages (including lost profit) whether based on warranty, contract, tort, or any other legal theory.

RETURN GOODS:

Pack with sufficient over-pack to prevent damage during shipment. Damage incurred during return shipment is not covered under this warranty. Repair costs for such damages will be charged back to shipper.

REMARK:

WHEN RETURNING GOODS, PLEASE SHOW “RETURN GOODS” ON ALL INVOICES & RELATED SHIPPING DOCUMENTS TO PREVENT ANY EXTRA CHARGE.”