



DIGITAL BATTERY TESTER MANUAL



OWNER'S MANUAL

Read Entire Manual Before Using This Product
Battery/Charging/Starting System Analyser / Printer

BT400



DIGITAL BATTERY TESTER

TEST PROCEDURES / OPERATING INSTRUCTIONS

IMPORTANT

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

WARNING: This product can expose you to chemicals including arsenic, which is known to the State of California to cause cancer.

For more information, go to www.P65Warnings.ca.gov.

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 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.

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OPERATION & USE

Note: Each time you connect the tester to a battery, the tester will run a quick cable verification to ensure a proper connection through the output cables to sensors in the clamp jaws. If the connection checks out OK, the tester will proceed to the Home Screen. If the connection is poor, the display will show "CHECK CABLE". In this case, check cable connections for visible signs of damage, as you may need to re-connect the clamps to the battery or replace the cable end.

BEFORE TESTING

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 the battery terminals are clean. Wire brush them if necessary. Clamp the black load lead to the vehicle negative battery terminal. Clamp the red load lead to the vehicle positive battery terminal. Please clamp on the lead part of the terminal only. Clamping on the iron part of the terminal will lead to wrong test results.

MAIN MENU

SYSTEM ANALYSER

You will view the following screens by pressing ◀/▶ to switch between all functions and settings.

BATTERY TEST XX.XX V

Press «ENTER» to do battery test.

SYSTEM TEST XX.XX V

Press «ENTER» to do system test.

IN-VEHICLE TEST XX.XX V

Press «ENTER» to do In-vehicle test.

LANGUAGE SELECT

Press «ENTER» to change language.

BRIGHTNESS

Press «ENTER» to start adjusting brightness of the screen.

BATTERY TEST

1. Select BATTERY TEST. Press «ENTER».

BATTERY TEST
XX.XX V

2. Press the ◀/▶ to select REGULAR/STD or START/STOP battery.

REGULAR/STD

START/STOP

REGULAR/STD BATTERY:
FLOODED, AGM FLAT PLATE,
AGM SPIRAL, VRLA/GEL

START/STOP BATTERY:
AGM FLAT PLATE, EFB

3. Press the ◀/▶ key to select the battery type:

BATTERY TYPE:
AGM FLAT PLATE

4. Press «ENTER» to confirm choice.

ENTER

5. Press the ◀/▶ key to select the battery rating: CCA/SAE, EN, JIS, DIN, IEC, & CA/MCA.

SELECT RATING:
CCA/SAE

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BATTERY TEST

6. Press «ENTER» to confirm choice.

ENTER

7. Press the ◀/▶ key to input the battery capacity.

CCA/SAE: 40~2000

EN: 40~1885

DIN: 25~1120

IEC: 30~1320

JIS: By Battery Type No.

CA/MCA: 50~2400

SELECT CAPACITY:
560CCA/SAE

8. Press the ◀/▶ key to confirm temperature.

ABOVE 32°F/0°C?
YES/NO

9. Press <<Enter>> to begin the test.

*Return Feature: Before the test is started, the user can always return to the previous setting page by pressing <<ENTER>> for 2 seconds.

SURFACE CHARGE NOTICE:

The battery will hold a surface charge if the engine has been running or after the battery has been charged. The tester may prompt you to remove the surface charge.

BATTERY TEST

- A. Follow the instructions indicating when to turn the headlights on and off or apply a load into the battery.

In Vehicle:

SURFACE CHARGE IN VEHICLE?
YES

TURN HEADLIGHTS ON FOR 15 SECS

Out Of Vehicle:

SURFACE CHARGE IN VEHICLE?
NO

TESTING

- B. The tester will resume testing after it detects that the surface charge is removed.

TESTING

10. Test the battery for few seconds.

11. Press the ◀/▶ key to select battery fully charged or not if tester asks.
Press «ENTER» to confirm choice.

IS BATTERY CHARGED?
YES/NO

12. When the test is completed, the display shows the actual volts and the actual CCA and internal resistance. {Press the ◀/▶ key to read: SOH (STATE OF HEALTH) and SOC (STATE OF CHARGE)}.

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BATTERY TEST

13. One of the six test results will be displayed:

GOOD & PASS

VOL: xx.xx V
 CCA: xxxx CCA/SAE
 IR: xx.xx mΩ

GOOD & PASS

*The battery is good and capable of holding a charge.

GOOD & RECHARGE

VOL: xx.xx V
 CCA: xxxx CCA/SAE
 IR: xx.xx mΩ

GOOD & RECHARGE

*The battery is good but needs to be recharged.

CAUTION

VOL: xx.xx V
 CCA: xxxx CCA/SAE
 IR: xx.xx mΩ

CAUTION

*The battery may be serviced but decrease the capability of starting the engine gradually. The battery may fail under extreme climate conditions. There may be a poor connection between the vehicle and the battery affecting the charging function. Please pay attention to the battery for replacement consideration and charging system checking.

RECHARGE & RETEST

VOL: xx.xx V
 CCA: xxxx CCA/SAE
 IR: xx.xx mΩ

RECHARGE & RETEST

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

BAD & REPLACE

VOL: xx.xx V
 CCA: xxxx CCA/SAE
 IR: xx.xx mΩ

BAD & REPLACE

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

BAD CELL & REPLACE

VOL: xx.xx V
 CCA: xxxx CCA/SAE
 IR: xx.xx mΩ

BAD CELL & REPLACE

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

BATTERY TEST

LOAD ERROR

LOAD ERROR

*The tested battery is bigger than 2000CCA/SAE 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. SOC & SOH Display: Press directional keys to see SOC & SOH:

GOOD & PASS

SOC: xx.xx V

■■■■■■■■■■□ 90%

GOOD & PASS

SOH: xxxx CCA/SAE

■■■■■■■■■■□ 90%

15. Press «ENTER» return to MAIN MENU or remove the test clamps from the battery posts after completion of testing batteries to end test.

ENTER

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SYSTEM TEST

1. Select "SYSTEM TEST" from the main menu.

SYSTEM TEST
xx.xx V

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

TURN OFF LOADS
START 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
xx.xx V **NORMAL**

CRANKING VOLTS LOW

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

CRANKING VOLTS
xx.xx V **LOW**

CRANKING VOLTS NOT DETECTED

The cranking voltage is not detected.

CRANKING VOLTS
NOT DETECTED

4. Press «ENTER» to begin charging system test.

PRESS ENTER FOR CHARGING TEST

MAKE SURE ALL LOADS ARE OFF

SYSTEM TEST

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

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.



CHARGING SYSTEM NORMAL WHEN TEST AT IDLE

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



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.



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SYSTEM TEST

6. 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
PRESS ENTER**

7. When testing older model diesel engines, the users need to run up the engine to 2500 rpm for 15 secs.

**RUN ENGINE UP TO 2500RPM
15 SEC**

8. Press «ENTER» to read the ripple from the charging system to the battery. One of the three testing results will be displayed along with the actual testing measured.

RIPPLE DETECTED NORMAL

Diodes function well in the alternator / starter.

RIPPLE DETECTED
xx.xx V **NORMAL**

NO RIPPLE DETECT

Ripple is not detected.

**NO RIPPLE DETECT
PRESS ENTER**

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
xx.xx V **HIGH**

SYSTEM TEST

- 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

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

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

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

xx.xx V

ALT. LOAD VOLTS

HIGH

xx.xx V

ALT. LOAD VOLTS

LOW

xx.xx V

ALT. LOAD VOLTS

NORMAL

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SYSTEM TEST

10. Press «ENTER» when charging system test is completed. Turn all accessory loads and engine off. Press «ENTER» to read the system test results.

**TEST OVER. TURN OFF LOADS
& ENGINE**

ALT. LOAD VOLTS

xx.xx V NORMAL RIPPLE VOLTAGE

xx.xx V NORMAL

CRANKING VOLTAGE

xx.xx V NORMAL ALT. IDLE VOLTS

xx.xx V NORMAL

IN-VEHICLE TEST

This is a combination test of both battery test & system test. Please refer to above testing procedures or follow the instructions on the display of the tester.

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 not recommended.
- Connections must be retorqued and the batteries should be cleaned periodically.

GLOSSARY

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 in separators consisting of a sponge-like mass of matted glass fibres.
- 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 not recommended.
- Connections must be retorqued 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 with a “Bunce” Valve or Valves in the top of them that opens when a preset pressure is realised inside the battery and let’s the excess gas pressure out. Then the valve resets itself.

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 on all normal vehicles. Batteries given this description will have been specifically designed for service on 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 how many percent of the battery is actually charged.

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GLOSSARY

WHAT IS CCA (COLD CRANKING AMPS)?

The current in amperes which a new fully charged battery can deliver for 30 seconds continuously without the terminal voltage falling below 1.2volts per cell, after it has been cooled to 0°F and held at that temperature. 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

Products developed and sold by Tridon Australia Pty Ltd come with a guarantee for the reasonable life of the product, for the purpose it is commonly used. This is in addition to the rights of the consumer under the Australian Consumer Law. To be considered for warranty please take the product with proof of purchase to the store where you purchased the product or contact Tridon Australia.

The warranty is given by:

Tridon Australia, 21-25 Derby St, Silverwater, NSW 2128

Tel: 1300 362 263

Email: mail@tridon.com.au

Our goods come with guarantees that cannot be excluded under the Australian Consumer Law. You are entitled to a replacement or refund for a major failure and for compensation for any other reasonably foreseeable loss or damage incurred if the product fails when used for the purpose for which it was intended. You are also entitled to have the goods repaired or replaced if the goods fail to be of acceptable quality and the failure does not amount to a major failure.

Tridon Australia will bear costs associated with claiming legitimate warranties. Proof of expenses incurred must be submitted to Tridon Australia Pty Ltd.