

# DHC<sup>®</sup>

Model BT2100

**BATTERY & ELECTRICAL SYSTEM ANALYZER**



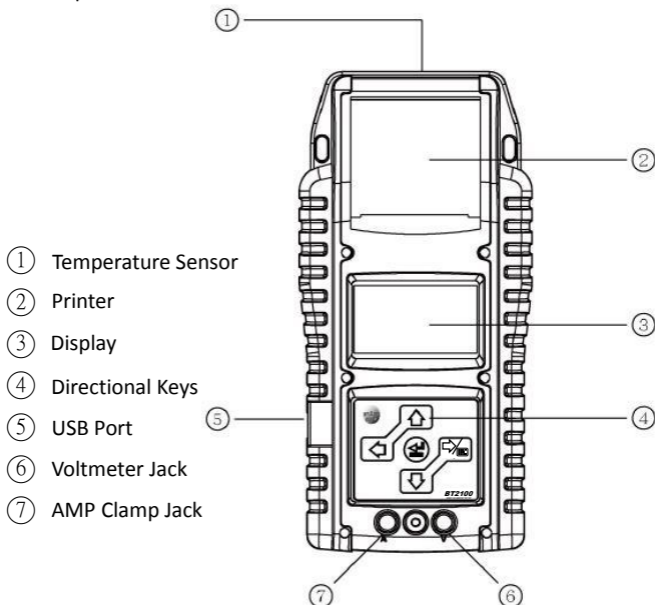
## OWNER'S MANUAL

**READ ENTIRE MANUAL BEFORE USING THIS PRODUCT**

## TEST PROCEDURES/ OPERATING INSTRUCTIONS

### IMPORTANT:

1. For testing 6 and 12 volt batteries, and 12 and 24 volt charging systems. (ONLY 12 volt for START & STOP battery test)
2. Suggested operation range 32°F(0°C) to 122°F(50°C) in ambient temperature.



## WARNING:

Pursuant to California Proposition 65, this product contains chemicals known to the State of California to cause cancer and birth defects or other reproductive harm. Wash hands after handling.

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, please 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.

## BEFORE 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 6pcs 1.5V batteries into the battery chamber. Oxyride batteries are not recommended because of the initial 1.7 Volt output. If the 1.5V battery runs out of power, screen will show "REPLACE INTERNAL BATTERY" or "POWER LOW". Replace those 4pcs 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 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.

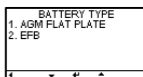
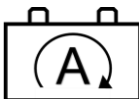
4. Paper load:

- a. Open the clear cover.
- b. Place a new paper roll in the compartment.
- c. Put a short length of paper from the compartment and press down the clear cover to close.



## START-STOP BATTERY TEST

1. Press the ◀ ▶ key to select START-STOP Test.
2. Press the ◀ ▶ key to select battery type:
  - a. AGM FLAT PLATE
  - b. EFB (ENHANCED FLOODED)Press «ENTER» button to confirm choice.
3. Press the ◀ ▶ key to select battery rating :  
CCA/SAE, EN, IEC, or DIN. Press «ENTER» button to confirm choice.



4. Press the ◀ ▶ key to input the battery capacity:

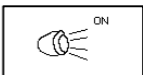
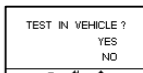
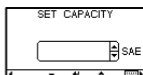
SAE (CCA): 25~3,000

EN: 25~2,830

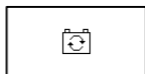
DIN: 25~1,685

IEC: 25~1,985

Press «ENTER» to begin test.



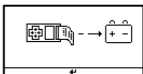
5. Press the ◀ ▶ key to confirm the location of the battery if a surface charge is detected, follow the tester 's introductions to remove the surface charge.



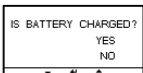
6. Testing battery.

7. Aim the "Temperature Measurement sensor"

2.5cm (1 inch) from the top or sides of the battery case and press <<ENETR>>. Measured temperature may vary by distance from the battery, under hood conditions, and cabinet temperature.



8. Press the ◀ ▶ key to confirm if the battery has been charged recently.

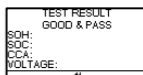


9. When the test is completed, the display shows the results as follows. {Press the ◀ ▶ key to select: Temperature, SOH (STATE OF HEALTH), and SOC (STATE OF CHARGE)}.

**GOOD & PASS**

(GREEN backlight)

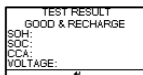
The battery is good and capable of holding a charge.



**GOOD & RECHARGE**

(GREEN backlight)

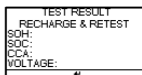
The battery is good but needs to be recharged.



## RECHARGE & RETEST

(YELLOW backlight)

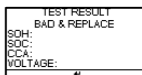
Battery is discharged, the battery condition cannot be determined until it is fully charged. Recharge & retest the battery.



## BAD & REPLACE

(RED backlight)

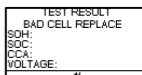
The battery will not hold a charge. It should be replaced immediately.



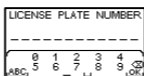
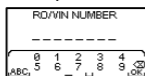
## BAD CELL & REPLACE

(RED backlight)

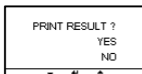
The battery has at least one cell short circuit. It should be replaced immediately.



10. Add RO# and VIN#? YES or NO. Select YES to enter RO number and vehicle plate number.



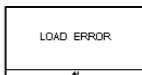
11. Press ENTER to print the result.



**NOTE:** Under certain conditions the follow messages may be displayed.

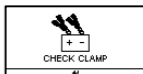
## LOAD ERROR

The tested battery is bigger than 3000 SAE (CCA) or the connection is not established. Check the capacity of the battery & make sure the clamps are properly connected.



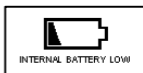
## CHECK CLAMP

The connection between battery and cable set is loosed, please check cable clamp.



## INTERNAL BATTERY LOW

Please change new AA batteries.



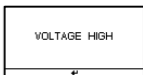
## NO PAPER

Please insert new paper row.



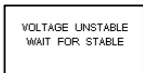
## VOLTAGE HIGH

The voltage of tested battery is too high and cannot be measured.



## VOLTAGE UNSTABLE

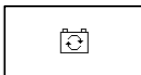
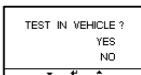
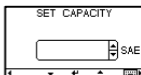
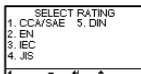
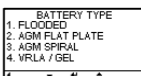
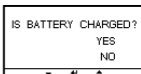
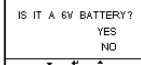
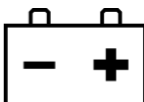
The voltage of tested battery is unstable Please switch off the engine, wait for 90 second and retest.



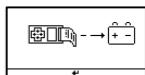


## BATTERY TEST

- Press the ◀ ▶ key to select Battery Test.
- Press the ◀ ▶ key to confirm the battery voltage.
- Press the ◀ ▶ key to confirm if the battery has been charged recently.
- Press the ◀ ▶ key to select the battery type:
  - FLOODED
  - AGM FLAT PLATE
  - AGM SPIRAL
  - VRLA/GEL
 Press «ENTER» to confirm choice.
- Press the ◀ ▶ key to select battery rating :  
CCA/SAE, EN, IEC or DIN. Press «ENTER» to confirm choice.
- Press the ◀ ▶ key to input the battery capacity :
  - SAE (CCA) : 25~3,000
  - EN : 25~2,830
  - DIN : 25~1,685
  - IEC : 25~1,985
  - JIS : Battery Type No.
 Press «ENTER» to begin the test.
- Press the ◀ ▶ key to confirm the location of the battery if a surface charge is detected, follow the tester 's instruction to remove the surface charge.
- Testing battery.



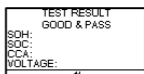
9. Aim the "Temperature Measurement sensor" 2.5cm (1 inch) from the top or sides of the battery case and press <<ENETR>>. Measured temperature may vary by distance from the battery, under hood conditions, and cabinet temperature.



10. When the test is completed, the display shows the results as following. {Press the ◀ ▶ key to select: Temperature, SOH (STATE OF HEALTH), and SOC (STATE OF CHARGE)}.

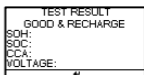
## GOOD & PASS

The battery is good and capable of holding a charge.



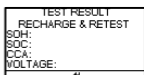
## GOOD & RECHARGE

The battery is good but needs to be recharged.



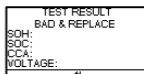
## RECHARGE & RETEST

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



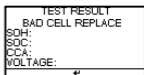
## BAD & REPLACE

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

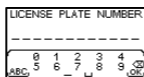
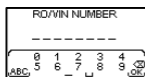


## BAD CELL & REPLACE

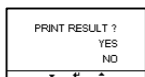
The battery has at least one cell short circuit. It should be replaced immediately.



11. Press ENTER button to enter RO number and vehicle plate number.



12. Press ENTER to print the result.



**NOTE:** Under certain conditions the follow messages may be displayed.

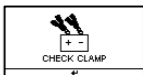
## LOAD ERROR

The tested battery is bigger than 3000 SAE (CCA) or the connection is not established. Check the capacity of the battery & make sure the clamps are properly connected.



## CHECK CLAMP

The connection between battery and cable set is loosed, please check cable clamp.



## INTERNAL BATTERY LOW

Please change new AA batteries.



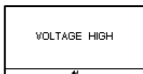
## NO PAPER

Please insert new paper row.



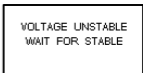
## VOLTAGE HIGH

The voltage of tested battery is too high and cannot be measured.



## VOLTAGE UNSTABLE

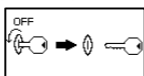
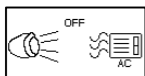
The voltage of tested battery is unstable Please switch off the engine, wait for 90 second and retest.



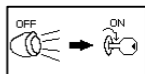
## SYSTEM TEST



1. Press the ◀ ▶ key to select Battery Test.
2. Turn off all vehicle accessory loads such as light, air conditioning, radio, etc. before starting the engine.

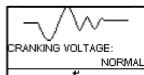


3. When the engine is started, one of the three results will be displayed along with the actual measured result.



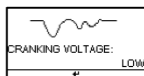
## CRANKING VOLTS NORMAL

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



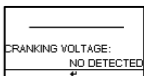
## CRANKING VOLTS LOW

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



## CRANKING VOLTS NO DETECTED

The cranking voltage is not detected.



- If the cranking voltage is normal, press «ENTER» to begin charging system test.
- Press the «ENTER» key, you will view the following screen.
- Press the «ENTER» key, one of the three results will be displayed along with the actual reading measured.

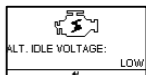


**NOTE:** Under certain conditions the follow messages may be displayed.

## LOW CHARGING VOLTS WHEN TEST AT IDLE

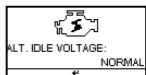
The alternator is not providing sufficient current to the battery. Check the belts to ensure the alternator is rotating with engine running. If the belts are slipping or broken, replace the belts and retest.

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.



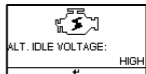
## CHARGING SYSTEM NORMAL WHEN TEST AT IDLE

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



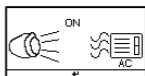
## HIGH CHARGING VOLTS WHEN TEST AT IDLE

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 heater blower to high, high beam headlights, and rear defogger (If equipped). Do not use cyclical loads such as air conditioning or windshield wipers.



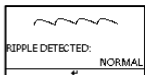
8. When testing older model diesel engines, the user need to run up the engine to 2500 rpm for 15 seconds. You will see the run engine up instruction screen.



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

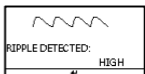
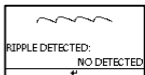
Diodes function well in the alternator / stator.



OR

## EXCESS RIPPLE

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

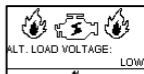


10. Press the «ENTER» key to continue the charging system with accessory loads. One of the three results will be displayed along with the actual testing measured.

## CHARGING SYSTEM **LOW** WHEN TEST WITH ACC. LOADS

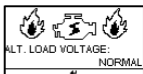
The alternator is not providing sufficient current for the system's electrical loads and the charging current for the battery. Check the belts to ensure the alternator is rotating with the engine running.

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.



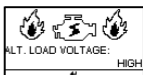
## CHARGING SYSTEM **NORMAL** WHEN TEST WITH ACC. LOADS

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

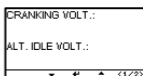


## CHARGING SYSTEM **HIGH** WHEN TEST WITH ACC. LOADS

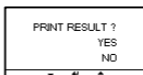
The voltage output from the alternator to the battery exceeds the normal limits of a functioning regulator. Check to ensure there are no loose connections and that the ground connection is connected properly. If there are no connection issues, replace the regulator. Since most alternators have the regulator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



11. When the test is completed, the display shows the results as following.

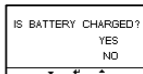
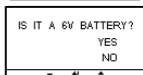
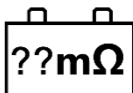


12. Press ENTER to print the result.

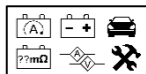


## IR TEST

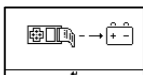
1. Press the ◀ ▶ key to select IR TEST.
2. Press the ◀ ▶ key to confirm the battery voltage.
3. Press the ◀ ▶ key to confirm if the battery has been charged recently.



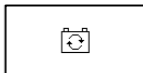
4. If the battery has NOT been charged, please select "NO" to recharge and retest the battery. If the battery has been charged, please select "YES" and proceed the test.



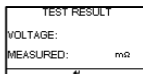
5. Aim the "Temperature Measurement sensor" 2.5cm (1 inch) from the top or sides of the battery case and press <<ENETR>>. Measured temperature may vary by distance from the battery, under hood conditions, and cabinet temperature.



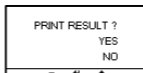
6. Testing battery.



7. When the test is completed, the display shows the results as following.



8. Press ENTER to print the result.

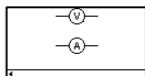
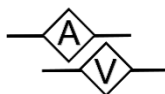




## VM/AM TEST

### AM TEST

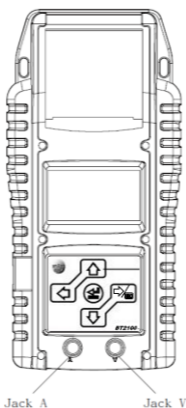
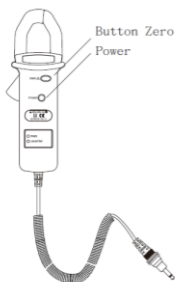
1. Install the 9V battery.
2. Connect Clamp Meter to the jack A on BT2100. Press POWER.
3. Press the button ZERO. Make sure the display reads zero.
4. Press the trigger to open the transformer jaws and clamp one electrical wire.
5. Make sure the clamp jaw is perfectly closed.
6. Read the displayed value.



### VM TEST

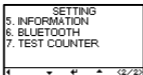
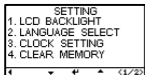
1. Connect Red Test Lead to the jack V on BT2100.
2. Use the test lead to touch a point within the network of the battery.
3. Read the displayed value.

NOTE: Do not test the volt more than 60V. It may damage the tester.



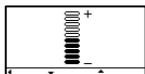
## SETTING AND INFORMATION RETRIEVAL

Press the ◀ ▶ key to select Setting.



### LCD BACKLIGHT

1. Press the directional keys to get to the LCD BACKLIGHT.
2. Press the directional keys to adjust the brightness of the display.
3. Press ENTER and the display returns to the menu.



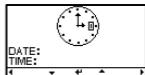
### LANGUAGE SELECT

1. Press the directional keys to get to the LANGUAGE SELECT display.
2. Press ENTER and the display will show the language options. Press the directional keys to select the language you want the tester to display.
3. Press ENTER and the display returns to the menu.



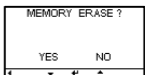
### CLOCK SETTING

1. Press the directional keys to get to the CURRENT DATE/TIME display.
2. Press ENTER and use virtual keyboard to adjust YEAR/MONTH/DAY/HOUR/MINUTE/SECOND and change the setting.
3. Press ENTER and the display returns to the menu.



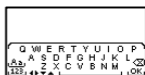
### CLEAR MEMORY

1. Press the directional keys to get to the CLEAR MEMORY.
2. Select "NO" to delete the memory.
3. Press «ENTER» button and the display returns to the menu.



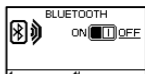
## INFORMATION

1. Press the directional keys to enter INFORMATION.
2. Use the direction key to input customized data.
3. Press «ENTER» button and the display returns to the menu.



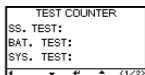
## BLUETOOTH


1. Press the directional keys to enter BLUETOOTH.
2. Press ENTER and the display will show the connection status.
3. Log in APP and use it to connect tester.

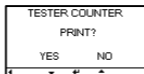
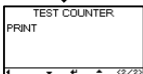


## TEST COUNTER

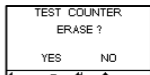
1. Press the directional keys to enter TEST COUNTER.



2. Press  to find PRINT and print the test counter record.



3. Press ENTER to erase specific test counter records.



## PC NAVIGATION GUIDE

Each BT2100 comes with a CD, including the driver of the software installation DHC SYNC and its user guide.

