Version: V1.01.000

Revised date: 2013-04-24

**NOTES：**

- Carefully read the user manual before using, and keep it well for future reference.
- Carefully check the device parts list before using. For any doubt, contact Launch distributor immediately.
- Due to the product upgrade, tiny difference between the user manual and the device will not be further noticed. Take the device as standard.

This device complies with Part 15 of the FCC Rules. Operation is subject to the following two conditions:

(1) This device may not cause harmful interference, and

(2) This device must accept any interference received, including interference that may cause undesired operation.

## Copyright Information



## Trademark Information

## Table of Contents

# Chapter 1 Product Summary

## 1.1 Product Profile

BST-460 Battery Tester adopts the state-of-the-art conductance testing technology in the world 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.

1. Test all automotive cranking lead acid battery, including ordinary lead acid battery, AGM flat plate battery, AGM spiral battery, and Gel battery, etc.
2. Directly detect bad cell battery.
3. Feature reverse polarity protection: reverse connection may not damage the tester or affect the vehicle and battery.
4. Directly test the battery with loss of electricity, full charge is not required before testing.
5. Testing standards cover the majority of world's battery standards, such as CCA, BCI, CA, MCA, JIS, DIN, IEC, EN, SAE and GB.
6. Support multi-languages, customer can select different language package, which includes: Chinese Simple, Chinese Traditional, English, Japanese, Russian, Spanish, French, Italian, German, etc. Other languages can also be customized according to user's need.

## 1.2 Product Function

BST-760 battery tester features the following functions: battery test, cranking test, charging test and other additional functions.

**Battery test** mainly aims 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 may notify the user to replace battery in advance when the battery gets aged.

**Cranking test** is used to test and analyze the starting motor. Testing the actual required cranking current and cranking voltage of the starting motor is helpful to determine whether the starting motor works properly or not. If the starting motor runs improperly, find the possible reasons: lubricating system malfunction may cause an increased starting loaded torque; or rotor friction of the starting motor generates an increasing friction of the starting motor itself.

**Charging test** is to check and analyze 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 properly and the charging current is normal. In case one of the above mentioned parts is abnormal, it will lead to over charge or incomplete charge of the battery, thus cause quick damage to the battery and greatly shorten the life of other loaded appliance.

**Additional functions** include: Set language, Set voltmeter and screen brightness adjustment.

## 1.3 Technical Parameters

1. Cold Cranking Amps Measurement Range:

| Measurement Standard | Measurement Range |
|---|---|
| CCA | 100-2000 |
| BCI | 100-2000 |
| CA | 100-2000 |
| MCA | 100-2000 |
| JIS | 26A17--245H52 |
| DIN | 100-1400 |
| IEC | 100-1400 |
| EN | 100-2000 |
| SAE | 100-2000 |
| GB | 100-1400 |

2. Voltage Measurement Range: 8-30V DC

## 1.4 Working Environment Requirement

Working Environment Temp.: -20°C-55°C/-4°F-131°F

It is applicable for automotive manufacturers, automotive maintenance and repair workshops, automotive battery factories, automotive battery distributors, and educational organizations, etc.

# Chapter 2 Tester Structure

BST-460 mainly consists of battery tester main unit and testing cables.

BST-460 Battery Tester main unit cover is made of ABS acid-resistant plastic.


Removable testing cables

# Chapter 3 Operation

## 3.1 Pre-Test

### 3.1.1 Connect Tester

- Before test, clean battery poles with metal wire brush and alkaline detergent to avoid the tolerance caused by oil and dust to the test result.
- For Group31 or side-installed battery, install and fix the terminal wiring connector. Otherwise, inaccurate test result will be caused due to wrong installation or dirty or bad wiring connectors.
- While testing, ensure none of the in-vehicle electrical appliance is on, doors are closed and the ignition key is in OFF status.
- Connect the red test clamp with battery anode and the black one with cathode.
- Shake the clamps back and forth to make sure they are well connected.

The tester requires the two clamps are well connected with the battery poles. Otherwise, the tester cannot power on. In this case, clean the poles and re-connect it properly.

Tester has reverse connection protection function. When clamps are reversely connected, tester screen will not light, but it damages neither the tester nor the automotive load.

***NOTE:*** *For parallel connected batteries, break off the cathode connection first, then do single test to each battery. Suppose cathode connection is not cut off, there will be error in test result.*

### 3.1.2 Key Description

-   **Up / Down keys**

Select upwards or downwards via white UP and DOWN keys.


- **Return key**

Return to previous menu via blue RETURN key.

- **OK key**

Confirm the selection via green OK key

- **MENU key**

Enter additional function program via MENU key.

## 3.2 Tester Startup

The tester automatically starts up after the clamps are correctly connected, and displays the Launch startup interface (Default voltmeter is ON) refer to figure 1.


Figure 1, Startup Interface with Voltmeter on

By default, the voltmeter value at the middle bottom of the startup interface can be used as DC voltmeter. The measurement range of DC Voltmeter is 8-30V DC, out of which will damage the tester.

Voltmeter function can be set as "OPEN/CLOSE" in “Set voltmeter” under Additional Functions.

If Voltmeter is OPEN and no activities are made on the tester after startup, the screen will remain as the startup interface all the time. In this case, it can be used as a DC Voltmeter. When OK key is pressed, tester enters the battery test program. Press MENU key, it enters additional function program.

When Voltmeter is OFF, the startup interface will display as figure 2. After 2 seconds, it automatically enters the battery test program. Press MENU key within this 2 seconds, it enters additional function program.


Figure 2, Startup Interface with Voltmeter off

## 3.3 Battery Test

After entering battery test program, the tester will display the tester model and version approx. 2 seconds, see figure 3.

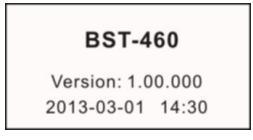


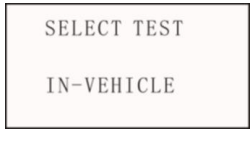

Figure 3, Interface with tester model and version

The tester will display the following contents in a sequence, select the desired items accordingly.

### 3.3.1 IN-VEHICLE or OUT-OF-VEHICLE

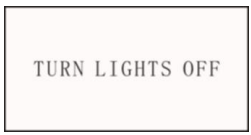
Press UP/DOWN key to select the battery location, in-vehicle or out--of-vehicle, then press OK key to confirm.

**1) IN-VEHICLE** means the battery is connected with vehicle engine or vehicle electrical appliance.



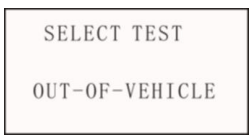

When the tester detects surface charge, a prompt message "SURFACE CHARGE DETECTED, TURN LIGHTS ON" will appear on the screen.


Follow the instructions to turn lights on to eliminate battery surface charge, the tester will then display the following messages in a sequence:


Now the tester detects the surface charge has been eliminated, turn lights off as prompted, then press OK key. The tester will recover automatic test.

**2) OUT-OF-VEHICLE** means battery is not connected with any of the vehicle load, namely, battery connection is cut off.

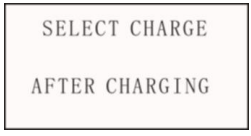


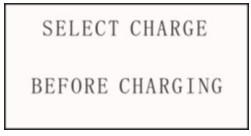

### 3.3.2 Select Battery Charge State

After selecting the battery location, the tester will prompt to select the battery charge status, i.e. **Before Charging** or **After Charging**.
Press UP/DOWN key to select, then press OK key to confirm. In this

way, it ensures a more accurate test result.

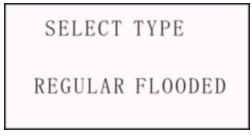
***NOTE:*** *In case of In-Vehicle, select Before Charging for Cold Vehicle and After Charging for Hot Vehicle.*

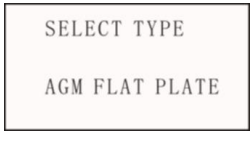


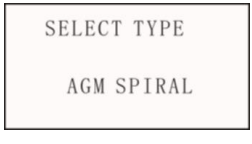



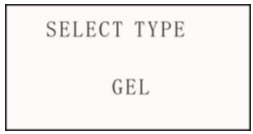

### 3.3.3 Select Battery Type

After the battery charge status is chosen, the tester will enter battery type selection interface: Regular Flooded, AGM Flat Plate, AGM Spiral or Gel battery. Press UP/DOWN key to select, and press OK key to confirm.

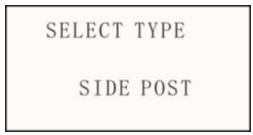


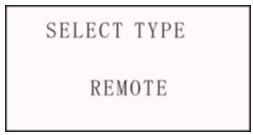






When it's IN-VEHICLE test, battery installation type shall also be selected, e.g. TOP POST, SIDE POST or REMOTE (This selection does not apply to OUT-OF-VEHICLE), then press OK key to confirm. REMOTE is applicable to some in-vehicle battery which is too tightly installed to use the test clamps to connect the battery poles.


***NOTE:*** *For REMOTE test, tolerance may exist. For any doubt, remove the battery and select "OUT-OF-VEHICLE" to re-test.*

### 3.3.4 Battery System Standard and Rating

BST-460 battery tester will test each battery according to the selected system and rating.

Use UP/DOWN key to select according to the actual system standard and rating marked on the battery. See the arrow position as indicated

in the below picture.


**CCA:** Cold Cranking Amps, specified by SAE&BCI, most frequently used value for starting battery at 0°F (-18°C).

**BCI**: Battery Council International standard

**CA:** Cranking Amps standard, effective starting current value at 0°C

**MCA:** Marine Cranking Amps standard, effective starting current value at 0°C.

**JIS:** Japan Industrial Standard, displayed on the battery as combination of the numbers and letters, e.g. 55D23, 80D26.

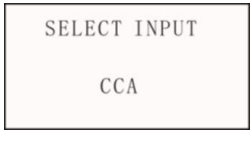
**DIN:** German Auto Industry Committee Standard

**IEC:** Internal Electro technical Commission Standard

**EN:** European Automobile Industry Association Standard

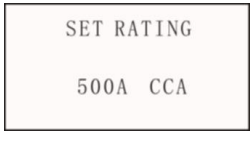
**SAE:** Society of Automotive Engineers Standard

**GB**: China National Standard

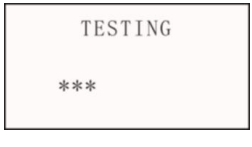


Rating range is as follows:

| Measurement Standard | Measurement Range |
|---|---|
| CCA | 100-2000 |
| BCI | 100-2000 |
| CA | 100-2000 |
| MCA | 100-2000 |
| JIS | 26A17--245H52 |
| DIN | 100-1400 |
| IEC | 100-1400 |
| EN | 100-2000 |
| SAE | 100-2000 |
| GB | 100-1400 |




Input correct test standard and rating, press OK key, the tester starts to test and a screen similar to the following figure will appear:

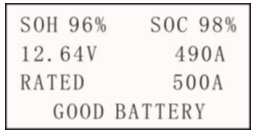



It takes around 3 seconds to display the battery test result.

### 3.3.5 Battery Test Result

Battery test result is mainly classified into 5 types:

**1) Good Battery**



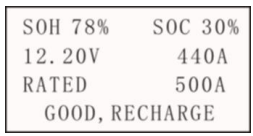

The battery is in good health, please be free to use!

***NOTE:***

***SOH*** *means State of Health*

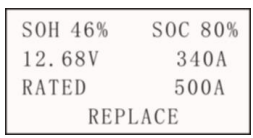
***SOC*** *means State of Charge*

**2) Good, Recharge**



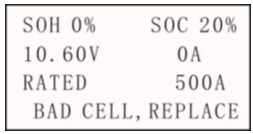

The battery is good but with low power. Please recharge it before using.

**3) Replace**



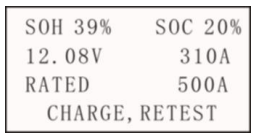

The battery is near to or already reached the end of its service life, replace it immediately, otherwise, potential hazard will be followed.

**4) Bad Cell, Replace**




The battery has internal damage, broken cell or short circuit, please replace it.

**5) Charge, Retest**



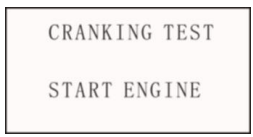

Unstable battery shall be recharged and retested to avoid error. If same test result appears after recharge and retest, the battery is regarded as damaged, please replace it.

***Attention:*** *If "Replace" resulted from IN-VEHICLE mode, it might be the reason that vehicle cable is not well connected with the battery. Ensure to cut off the cable and retest the battery under OUT-OF-VEHICLE before making a decision to replace battery.*

***NOTE:*** *To exit after testing, press RETURN key to directly return to the startup interface.*
*After testing: if it's "IN-VEHICLE" mode, press OK key to enter Cranking Test.*

## 3.4 Cranking Test

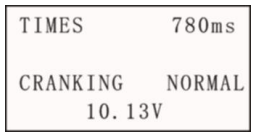
Tester prompts as following:



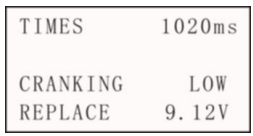
***NOTE:*** *While the system prompts you to start engine, pressing RETURN key can not exit the current interface.*

Follow the on-screen instructions to start the engine, the tester will automatically complete the cranking test and display the result.


Generally, cranking voltage lower than 9.6V is regarded as abnormal and it is OK if it is higher than 9.6V.
Test result of the tester includes actual cranking voltage, cranking amps, and actual cranking time.




When cranking test is abnormal, battery test result will be displayed. See below picture:




It is convenient for maintenance personnel to quickly know the whole state of the starting system according to the data.

After testing finished, do not shut down the engine, press OK key to enter Charging Test.

## 3.5 Charging System and Rectifier Diode Test

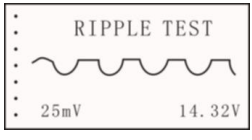
When enter the charging test, the tester will display "Charging Test?"


***NOTE:*** *To return when this prompt message appears on the screen, misfire the engine and press RETURN key.*

Press OK key to start the charging test.

***NOTE:*** *Do not shut down the engine during the test. All electrical appliance and device are in OFF state. Turning on/off any electrical appliance in the vehicle during the test will affect the accuracy of the test result.*

The tester will do the following tests in sequence:



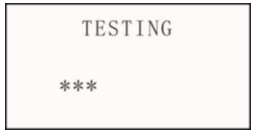

For ripple test, the tester will present the real time waveform and ripple volt and charging volt values are displayed at the bottom line.

It takes approx. 6 seconds for the ripple test.

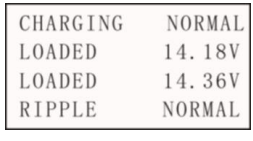
After the ripple test, the tester will automatically start the loaded voltage test. See below picture:


Loaded Volt Test takes approx. 3 seconds, and then the "INCREASE REV" prompt will appear on the screen. See below picture:

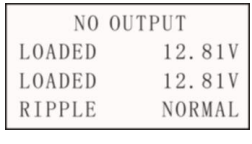

Operate accordingly to increase the engine rotating speed to above 3000 revolutions, and keep it for 5 seconds.
The tester starts the charging volt test after an increased revolution is detected. See below picture:




After the test finished, the tester displays the valid charging volts, ripple test result and charging test result. See below picture:




***NOTE:*** *If no increased rev is detected, it shall be the fault of generator regulator or connection with battery failed. The tester will try 3 times to further detect, if still failed, it will skip the increase rev detect and the test result displays "No Output". See below picture:*




Check the connection between generator and battery, then retest.

**Charging Test Result:**

**1) Charging Volt: Normal**

Charging system shows the generator's output is normal, no

problems are detected.

**2) Charging Volt: Low**

Charging volt of the charging system is low.

Check whether slip or running off occurs on the generator drive belt. Check the connection between generator and battery is normal or not. If both of the drive belt and the connection are in good condition, follow the manufacturer's suggestion to eliminate generator fault.

**3) Charging Volt: High**

Generator output volt is high.

Since most of the vehicle generators are using built-in regulator, the generator assembly has to be replaced. (For some old style cars using external regulator, directly replace the regulator.)

The normal high volt of the voltage regulator is maximum 14.7±0.5V.If charging volt is too high, it will overcharge the battery. Therefore, the battery life will be shortened and troubles will be caused.

**4) No Volt Output:**

No generator volt output is detected. Check whether the generator connecting cable, the drive belt of generator and engine are normal or not.

**5) Diode Test:**

Through the test of charging current ripple, the tester will find out whether the diode works properly or not. When ripple volt is too high, it indicates at least one diode is damaged. Check and replace the diode.

Till now, all tests have been done.

## 3.6 24V System Test

Ordinary 24V battery group combines two 12V batteries in series connection. Therefore, when testing 24V battery, the tester will prompt "24V Battery", divide the batteries and test one by one. It's not necessary to break off the connecting cable (Comparatively, the parallel connected battery group must cut off the cathode connection), test method is same as testing single 12V battery.

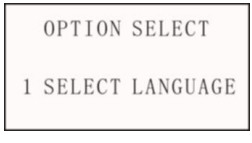

For 24V charging and cranking tests, connect the red clamp to the anode of 24V battery group and the black one to the cathode of 24V battery group (*NOTE: it's not the anode and cathode of the single battery but battery group*), select IN-VEHICLE and the screen displays "24V Battery". Ignore the prompt and after 3 seconds, the tester will skip battery test program and enter the cranking test directly. Follow the method of 12V system test to complete the 24V charging and cranking tests. The test process is same as 12V system.

## 3.7 Additional Functions

### 3.7.1 Select Language

This option lets you to select user interface language.

System contains multi-language package, including Chinese, English, Russian, Japanese, Spanish, German, French, Italian, etc.

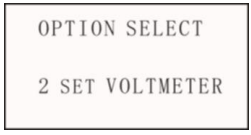



Once finished, it shows "OK" for 2 seconds, then return to the previous interface.

### 3.7.2 Voltmeter

BST-460 Battery Tester can also be used as DC voltmeter.
The working range is 8-30V DC.

**CAUTION: BST-460 Tester may be damaged when connected to voltage above 30V!**




This function enables you to set the voltmeter On/Off at the bottom line of the startup interface.
If successful, it shows "OK" for 2 seconds, then return to the previous interface.

### 3.7.3 Screen Light Adjustment

This item enables you to adjust the screen backlight brightness for power saving and for clear view of the displayed characters under the sunlight.


Brightness range is adjustable from 1-4. Default brightness value is 2.

Press UP/DOWN key to set. Once finished, it shows "OK" for 2 seconds and then returns to the previous interface.

# Chapter 4 Daily Maintenance

## 4.1 Troubleshooting

### 4.1.1 Screen Not Light

- Check whether the battery is well connected or reverse connection between the positive pole and negative pole exists or not.
- Check whether the test cable is broken off or dropped down.

## Warranty

THIS WARRANTY IS EXPRESSLY LIMITED TO PERSONS WHO PURCHASE LAUNCH PRODUCTS FOR PURPOSES OF RESALE OR USE IN THE ORDINARY COURSE OF THE BUYER'S BUSINESS.

LAUNCH electronic product is warranted against defects in materials and workmanship for one year from date of delivery to the user.

This warranty does not cover any part that has been abused, altered, used for a purpose other than for which it was intended, or used in a manner inconsistent with instructions regarding use. The exclusive remedy for any automotive meter found to be defective is repair or replacement, and LAUNCH shall not be liable for any consequential or incidental damages.

Final determination of defects shall be made by LAUNCH in accordance with procedures established by LAUNCH. No agent, employee, or representative of LAUNCH has any authority to bind LAUNCH to any affirmation, representation, or warranty concerning LAUNCH automotive meters, except as stated herein.

## Disclaimer

The above warranty is in lieu of any other warranty, expressed or implied, including any warranty of merchantability or fitness for a particular purpose.

## Purchase Order

Replaceable and optional parts can be ordered directly from your LAUNCH authorized tool supplier. Your order should include the following information:
Order quantity
Part number
Part name

## Customer Service

Any question during the operation, please call +86-755-84528722.
If your unit requires repair service, return it to the manufacturer with a copy of the sales receipt and a note describing the problem. If the unit is determined to be in warranty, it will be repaired or replaced at no charge. If the unit is

determined to be out of warranty, it will be repaired for a nominal service charge plus return freight. Send the unit pre-paid to:

Attn: Customer Service Department
LAUNCH TECH. CO., LTD.
Launch Industrial Park,
North of Wuhe Avenue,
Banxuegang, Bantian,
Longgang, Shenzhen, Guangdong
P.R.China, 518129
Launch website: http://www. cnlaunch.com
http://www.x431.com

**Statement**:

LAUNCH reserves the rights to make any change to product designs and specifications without notice. The actual object may differ a little from the descriptions in the manual in physical appearance, color and configuration. We have tried our best to make the descriptions and illustrations in the manual as accurate as possible, and defects are inevitable, if you have any question, please contact local dealer or after-sale service center of LAUNCH, LAUNCH does not bear any responsibility arising from misunderstandings.