

V1

ANCEL®

BATTERY SYSTEM TESTER

BST600
OPERATING MANUAL

resistance. But it can be predicted the life of the battery will be over soon from the sudden increase of it's internal resistance and decrease of it's conductance.

6-4 Is the CCA value tested by this tester correct?

CCA is considered as a control standard with the produce of the battery. According to the accumulated records, the tested value of new battery is 10-15% higher than the standard value, and along with consuming of the battery, the value is getting close to standard, even lower afterward.

6-5 What is the difference between the method of this tester and the load test method?

The load test method: According to the physical formula R=V/1, test equipment forcibly make the high permanent DC current (presently 40-80A large current is available) go through the battery shortly (about 2-3 seconds). And then the tested voltage of the battery can be used to figure out the internal resistance by the formula.

Disadvantages of load test method:

(1) Just available for large capacitance battery or storage battery. The small capacitance battery can not load 40-80A large current in 2-3 seconds.

(2) When the large current going through the battery, there comes out polarization phenomenon from internal electrode, which can cause polarization internal resistance. As a result it has to be tested in a short time. Otherwise there is a large error of the internal resistance value.

(3) The internal electrode will be damage generally when large current go through the battery.

The method of this tester: Battery is actually equivalent to an active resistance. So we add a fixed frequency and small current to it, and then sample the voltage value. Eventually the internal resistance can be figured out after some operation such as rectification and smoothing.

Advantages of this method:

(1) It can be used for checking almost all the batteries including low capacity battery and internal resistance of the notebook battery exclusively.

(2) It will not harm the battery to use this method.

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1. Brief Introduction

BST600 is used for lead-acid starting battery, testing the following conditions of the battery, cranking system and charging system.

This tester supplies readings by a large color screen display with great design of easy-to-use buttons operation, intelligent test methods and reverse polarity protection. It makes operation safe, clear and convenient.

So this is the best tool in the fields of battery sales, vehicle repair and battery inspection in equipment system associated with lead-acid starting battery.

2. Safety Rules and Precautions

This manual includes instruction, operation warning and maintenance. Damage to the meter may occur if it is not operated following the rules in this manual. This tester is designed and produced strictly according to IEC/EN61010-1 safety standard. Also it reaches double insulation over voltage standard CATⅢ 600V and pollution degree 2 .

(1) Available for 12V and 24V Lead - Acid Starting Battery. The working voltage is DC 9V to 35V.
(2) The voltage value will be higher than that in the normal situation after the checked battery being fully charged . Please turn on the headlights for 2 to 3 minutes, then check the battery when it's voltage drops to the normal value.
(3) Check the insulating layer of the clamps before testing. It should be operated without any damage, bareness or disconnection. Also it is not allowed to use it when the housing is not covered completely or correctly, which will cause electric shock.
(4) Do not use or store the tester in the condition of high temperature, high humidity, combustibility, explosion and strong electromagnetic field.
(5) Do not modify the internal circuit in order to avoid damage to the tester and injury to user.
(6) Wear proper eye mask when testing or repairing in order to avoid some objects hitting eyes from the engine.
(7) Keep the site ventilated when testing or repairing in order to avoid inhaling some toxic gas.
(8) When the engine is running, do not place the tester or accessories beside the engine or exhaust pipe in order to avoid damage by high temperature.
(9) Pay attention to the precautions and maintenance procedure of the manufacturer during repairing.

5-5-2
Review every last test result of BATTERY CAPACITY , CRANKING TEST, CHARGE SYSTEM by pressing < ○ > .

6. FAQ

6-1 What is the measurement principle of this tester?
The battery will gradually aging with increase of time. The main reason is that it can no longer generate some effectively chemical reaction because of aging of the surface of the battery plate. That is why most of the batteries can longer be used mainly. International Electric and Electronic Engineer Association(IEEE)formally looks the Conductivity Test as one of the standard of checking lead acid storage battery. It points out from IEEE standard 1118-1996 that : Conductivity Test is used to test AC current generated by putting the known frequency and amplitude AC signal to both sides of the battery. AC conductivity value is the ratio of AC current signal which keeps same phase with AC voltage and the AC voltage. This tester is designed from this principle actually.

6-2 Is the result affected by the installation of negative current for the vehicle?
All the negative currency will affect the result. Therefore please remove the negative currency prior to checking, in order to achieve the accurate data.

6-3 Can this tester predict when the battery goes down?
The internal resistance of the sealed lead-acid battery is complicated. It is generated by ohm internal resistance, concentration polarization internal resistance, chemical reactions internal resistance and interference effect caused by double capacitance's charging. The ingredient of internal resistance and its relative content will change with different test method and different test moment, which can lead to different tested value of the internal resistance. And there is no strict relationship between internal resistance (or conductance) and capacitance of the sealed lead - acid battery. So it is impossible to predict the life of battery according to a single battery's internal

5-4. TEST REPORT PRINTING

5-4-1.

Test report printing is available for every finished test. Press < ○ > to Test Report Printing Interface as below to confirm printing or not.



5-4-2.

VIN code of tested vehicle is required before printing report.

5-4-3.

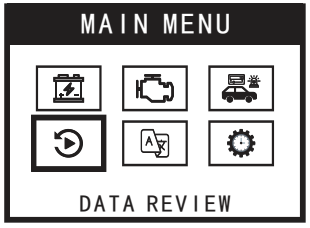
Press < ◀ > < ▶ > to set VIN code. < ○ > is used for confirming every digit until last one.



5-5. DATA REVIEW

5-5-1

Press < ◀ > < ▶ > to select " DATA REVIEWING" at MAIN MENU interface.



(10)Standard of optional storage battery:

CCA: 100~2000	IEC: 100~1400
BCI: 100~2000	EN: 100~2000
CA : 100~2000	DIN: 100~1400
MCA: 100~2000	SAE: 100~2000
JIS: 26A17 - 245H52 (100~2000 CCA)	GB: 100~1400

3. International Electric Symbol

⎓	DC
~	AC
≂	DC/AC
⚠	WARNING
⚠	HIGH VOLTAGE (ELECTRIC SHOCK)
⏚	EARTH
⧈	DOUBLE INSULATION
▭	FUSE
▭+	BATTERY

4. Structure of Meter

< ◀ >: increase the value / page up

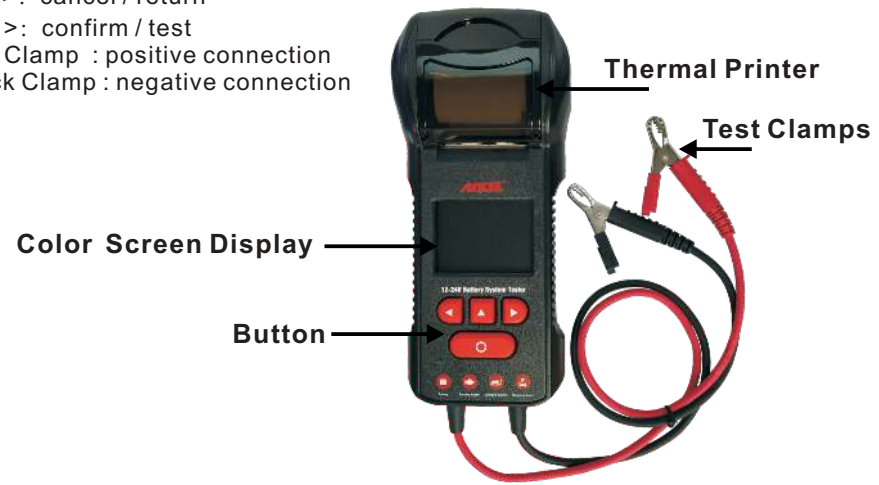
< ▶ >: decrease the value / page down

< ▲ >: cancel / return

< ○ >: confirm / test

Red Clamp : positive connection

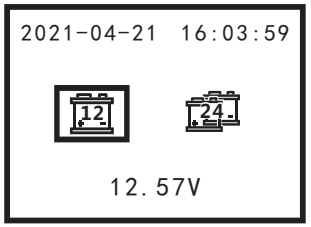
Black Clamp : negative connection



5. Operation Instruction

The tester is powered by the vehicle battery. Please connect the RED clamp to the positive terminal, and connect the Black clamp to the negative terminal. Connect the RED clamp prior to Black one is suggested.

The tester is ready to use along with the screen displays as below.

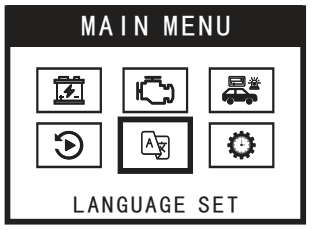


Please check and reconnect two clamps fully and firmly connected to the terminals in case the screen displays as below.





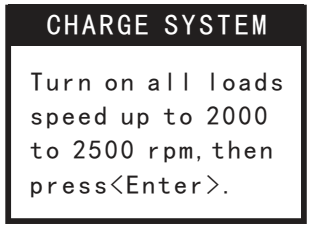
Select language and set date and time as below.





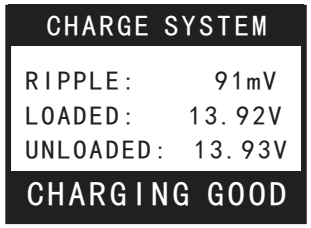
5-3-3.

Press < ○ > to Charging Test interface. Start engine as guide displayed in the screen.



5-3-4.

Test result will be displayed as below and auto saved for reviewing.



5-3-5

Press < ○ > to print the report. Please refer to 5-4 TEST REPORT PRINTING.

Press < ▲ > to return to main menu.

Charge System Result Reference Table

Reference Table (For 12V System)		
Status	**Battery Voltage**	**Engine Performance**
All Electric System Off（Depress Accelerator）	> 13.5	Normal
	13.2~13.5	General
	13.0~13.2	Keep Caution
	< 13	Inspection Immediately
All Electric System On （Depress Accelerator）	13.4~14. 6	Normal
	13.2~13.4	Keep Caution
	< 13.2	Inspection Immediately
For reference only. Bad batteries will affect the test results.		

Press < ▲ > to return to main menu.



Reading over 9.6V (for 24V system, reading over 16V) means cranking is good.

Reading below 9.6V (for 24V system, reading below 16V) means cranking is abnormal. Please check associated parts , such as connections, wires, starter and battery's terminal corrupted or not.

Cranking Test Result Reference Table

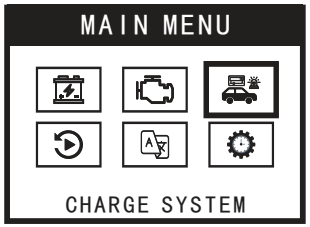
Reference Table (For 12V System)		
Cranking Voltage	**Cranking Ability**	**Action to Battery**
> 10.7 V	Good	No Action
10.2 ~ 10.7 V	Normal	Keep Caution
9.6 ~ 10.2 V	Bad	Replace It Soon
< 9.6 V	Very Bad	Replace It Immediately

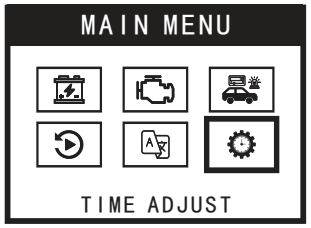
5-3. CHARGE SYSTEM

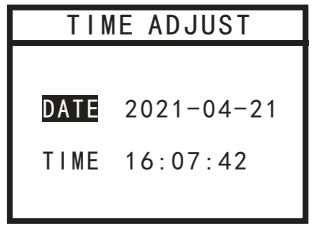
This test determines charging system by testing its condition under loaded and unloaded status.

5-3-1.
First make sure the engine and all devices are off.

5-3-2.
Press < ◀ > < ▶ > to select " CHARGE SYSTEM".





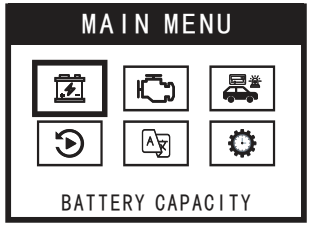


5-1. BATTERY CAPACITY TEST

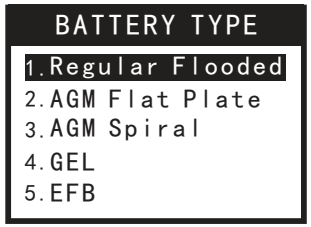
This tester determines condition of battery according to rated value labeled on the battery.

5-1-1.
First make sure the engine and all devices are off. The voltage value will be higher than that in the normal situation due to the checked battery is fully charged after the vehicle runs for a while. Please turn on the headlights for 2 to 3 minutes, until its voltage drops to the normal value, then turn off all devices and start testing.

5-1-2.
Press < ◀ > < ▶ > to select "BATTERY CAPACITY" and press < ○ > to continue.

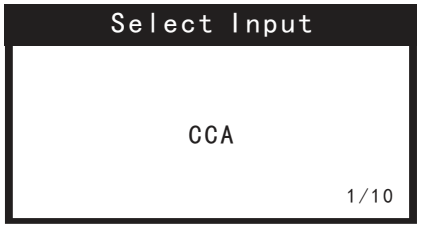


5-1-3.
Press < ◀ > < ▶ >to select "BATTERY TYPE" and press < ○ > to continue.



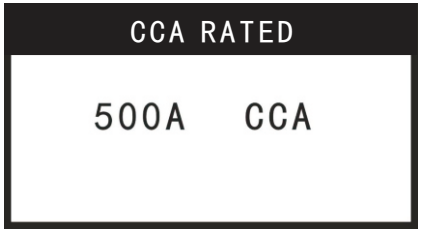
5-1-4.

Press < ◀ > < ▶ > to select CCA TYPE which is displayed on the battery rating label, and press < ○ > to continue.



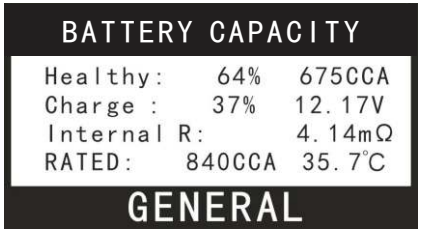
5-1-5.

Press < ◀ > < ▶ > to select CCA RATED which is displayed on the battery rating label.



5-1-6.

Press < ○ > to start Battery Test. The test result will be displayed as below and auto saved for reviewing.



5-1-7.

Press < ○ > to print the report. Please refer to 5-4 TEST REPORT PRINTING.
Press < ▲ > to return to main menu.

Battery State of Health（SOH）and Test Result Reference Table

LIFE	RESULT	NOTE
>80%	GREAT	Good to Use
>60%	NORMAL	Not Bad
>45%	CAUTION	Keep Caution
<45%	SUGGEST REPLACE!	Replace Needed

Please note that Internal Resistance refers to the sum total resistance of two series connection 12V batteries when testing 24V system.

5-2. CRANKING TEST

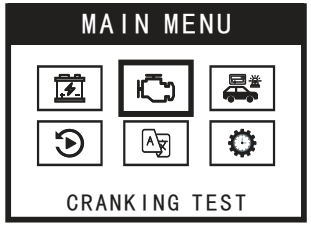
This test determines cranking state by testing cranking voltage and time.

5-2-1.

First make sure the engine and all devices are off.

5-2-2.

Press < ◀ > < ▶ > to select " CRANKING TEST" .



5-2-3.

Press < ○ > to Cranking Test interface. Start engine as guide displayed in the screen.

5-2-4.

Test result will be displayed as below and auto saved for reviewing.

5-2-5

Press < ○ > to print the report. Please refer to 5-4 TEST REPORT PRINTING.