

1. Brief Introduction

The ANCEL BST100 battery tester is used for testing the conditions of the 12V lead-acid starting battery: cranking system and charging system.

It comes with a large backlight LCD screen and it supports classic touch-tone to help you read and operate more efficiently. It utilizes the 4-wire Kelvin method to complete the collection of a series of complicated data for calculating every testing data with a build-in precise circuit and improved digital processor. Moreover, some circuit improvements including polar reversal protection, over-voltage input protection, and loose lead detection, ensure safety and convenience during testing.

This is a must-have in the fields of battery sales, vehicle repair and battery inspection equipment system.

2. Safety Rules and Precautions

This manual includes operation instruction and warning.

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) The working voltage is DC 9V to 18V.
- (2) The voltage value will be higher than 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 value drops to the normal value.
- (3) Check the insulating layer of the clamps before testing. It can only be operated without any damage, bareness or disconnection. Do not 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 danger to the user.
- (6) Wear proper eye mask when testing or repairing in order to avoid objects hitting eyes from the engine.
- (7) Keep the site ventilated when testing or repairing in order to avoid inhaling toxic gas.
- (8) When the engine is running, do not place the tester or accessories besides the engine or the exhaust pipe in order to avoid damage by high temperature.
- (9) Pay attention to the precautions and maintenance procedure from the manufacturer during repairing.
- (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

GB: 100~1400

(100~2000 CCA)

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

<ESC> : cancel / return

<ENTER> : confirm / test

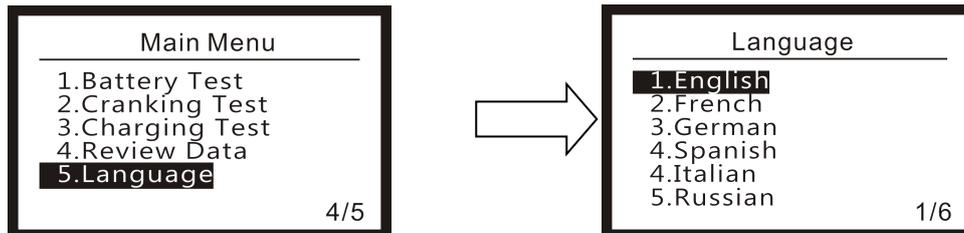
Red clamp : positive connection

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. Ensure two clamps are fully and firmly connected to the terminals of battery.

Select language as below.



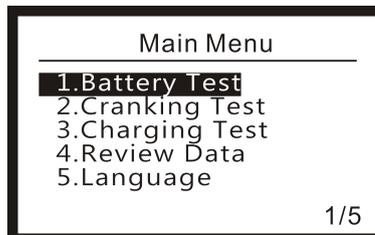
5-1. Battery Test

5-1-1.

If the engine is running, please turn off the engine first and switch the key to off position. The voltage value will be higher than 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, then check the battery when it's voltage value drops to the normal value.

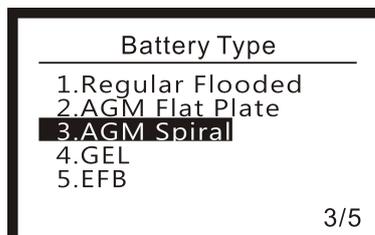
5-1-2.

Press <▲> <▼> to select "1. Battery Test" and press <ENTER> to continue.



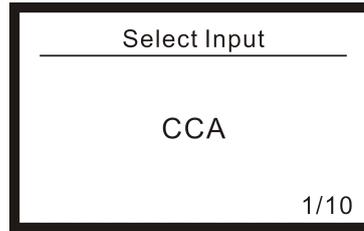
5-1-3.

Press <▲> <▼> to select "Battery Type" and press <ENTER> to continue.



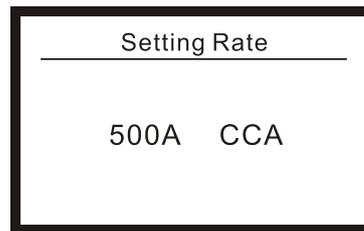
5-1-4.

Press <▲> <▼> to select testing standard which is displayed on the battery rating label, and press <ENTER> to continue.



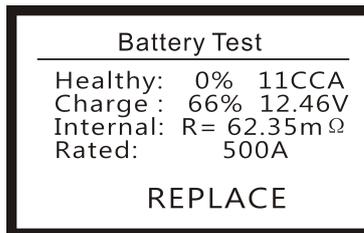
5-1-5.

Press <▲> <▼> to select battery rating value which is displayed on the battery rating label.



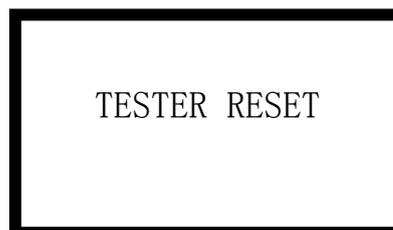
5-1-6.

Press <ENTER> to start Battery Test. The test result will be displayed as below.



5-1-7.

Press <ESC> to return to main menu as below.



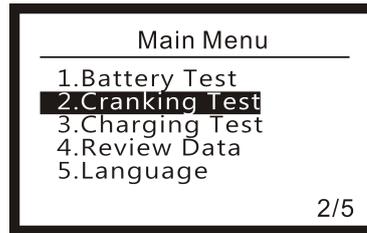
5-2. Cranking Test

5-2-1.

The engine and all other accessory loads must be off during test to obtain accurate result.

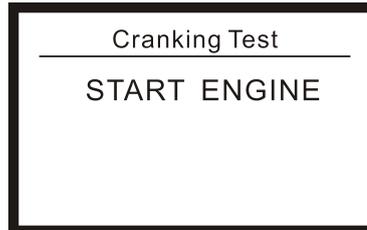
5-2-2.

Press <▲> <▼> to select "2. Cranking Test" .



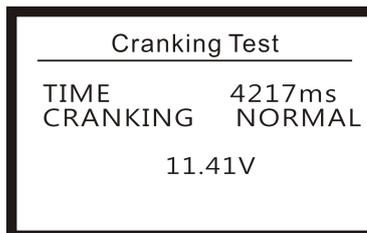
5-2-3.

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



5-2-4.

Test result will be displayed as below. Press <ESC> to return to the main menu.



Cranking Test Result Instruction

Reference Table (For 12V System)		
Cranking Voltage	Discharge Ability	Action to Battery
> 10.5 V	Good	No Action
10.0 ~ 10.5 V	Normal	Recharging It
9.6 ~ 10.0 V	Bad	Replace It Soon
< 9.6 V	Very Bad	Replace It Immediately

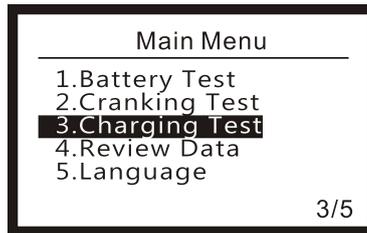
5-3. Charging Test

5-3-1.

Turn on the engine and set all electric systems, such as headlights, A/C system and multi-media system, to maximum load status.

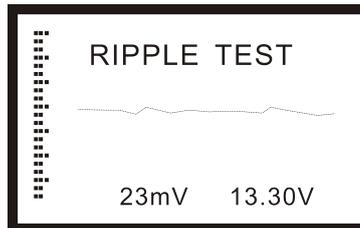
5-3-2.

Press <▲> <▼> to select "3. Charging Test".



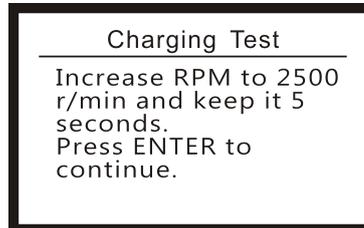
5-3-3.

Press <ENTER> to conduct RIPPLE TEST.



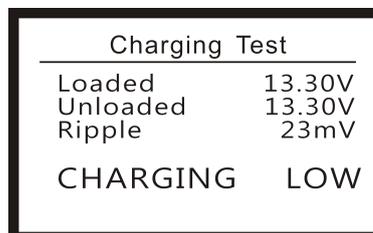
5-3-4.

Press "ENTER" again, or wait for a few seconds for "Charging Test". Right now turn off all electric systems and press vehicle accelerator to increase RPM to 2500r/min and maintain 2500 r/min for 5 seconds, which will be display in the screen.



5-3-5.

Press "ENTER" to display the test result as below. Press <ESC> to return to main menu.



Charging Test Result Instruction

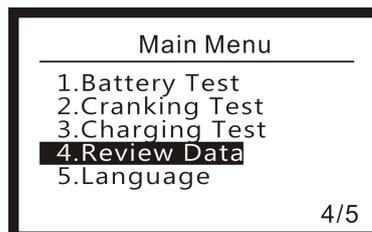
Reference Table (For 12V System)

Status	Battery Voltage	Engine Performance

All Electric System Off (Depress Accelerator)	> 13.5	Normal
	13.2~13.5	General
	13.0~13.2	Attention
	< 13	Inspection Immediately
All Electric System On (Depress Accelerator)	13.4~14.6	Normal
	13.2~13.4	Attention
	< 13.2	Inspection Immediately
Ripple	<= 1200mV	Normal
	> 1200mV	Inspection Immediately
For reference only: Bad batteries will affect the test results.		

5-4 Review Data

Each last test result of Battery Test / Cranking Test / Charging Test will be stored. Select "4. Review Data" on main menu and press <ENTER> to display "Review Data" screen.



6.FAQ

6-1 What is the measurement principle of this tester?

The battery will gradually be aged with an increase in time. The main reason is that it can no longer generate some effectively chemical reaction because of the aging of the surface of the battery plate. International Electric and Electronic Engineer Association(IEEE) formally looks the Conductivity Test as one of the standards of checking lead-acid storage batteries. 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 the 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

before checking, 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 methods and different test moments, which can lead to different tested values 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 resistance. But it can be predicted the life of the battery will be over soon from the sudden increase of its internal resistance and decrease of its 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 a new battery is 10-15% higher than the standard value, and along with consuming the battery, the value is getting close to standard, even lower afterward.

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

The load test method: According to the physical formula $R=V/I$, test equipment forcibly makes the high permanent DC (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 the load test method:

- (1) Only 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 a polarization phenomenon from the internal electrode, which can cause polarization internal resistance. As a result, it has to be tested in a short time. Otherwise, there will be a large error in the internal resistance value.
- (3) The internal electrode will be damage generally when the large current goes through the battery.

The method of this tester: Battery is equivalent to 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 by using this method.