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Chapter 1 Product Summary

1.1 Product Profile

BT-360 Battery Tester adopts currently the world's most advanced conductance testing technology 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. Polarity reverse connection protection, reverse connection will not damage the tester or affect the vehicle and battery.
4. Directly test the battery with loss of electricity, no need to full charge before testing.
5. Testing standards include currently the world's majority of battery standards, CCA, JIS, DIN, IEC, EN, SAE, GB.
6. Support multi-languages, customer can select different language package, which includes: English, Russian, Spanish, French, German, etc. Other languages can also be customized according to user's need.if you need such as Chinese ,Japanese etc , Pls contact with us,we can OEM for you.

1.2 Product Function

Main functions of BT-360 battery tester include: battery test, cranking test, charging test and other additional functions.

Battery test is mainly targeted 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 notifies the user to replace battery in advance when the battery getting aged.

Cranking test is mainly to test and analyze the starting motor. Through testing

the actual required cranking current and cranking voltage of the starting motor, it can find out whether the starting motor works fine. There are several reasons why the starting motor is abnormal: lubricating system fault causing the starting loaded torque increasing or rotor friction of the starting motor causing the 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 fine and the charging current is normal. Suppose one of the above mentioned parts is not in normal situation, it will lead to over charge or incomplete charge of the battery, thus the battery will be quickly damaged and also greatly shorten the using life of other loaded electrical appliance.

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

1.3 Technical Parameters

1. Cold Cranking Amps Measure Range:

Measure Standard	Measure Range	
CCA	100-2400	
JIS	26A17--245H52	
DIN	100-2200	
IEC	100-2200	
EN	100-2400	
SAE	100-2400	
GB	30-220Ah	
BCI	100-2400	
MCA	100-2400	
CA	100-2400	

2. Voltage Measure Range: 6.5-30VDC.

1.4 Working Environment Requirement

Working Environment Temp.: -20°C-50°C

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

BT-360 mainly consists of battery tester main unit and testing cables.

BT-360 Battery Tester main unit cover is made of ABS acid-resistant plastic.



Chapter 3 Operation

3.1 Pre-Test

3.1.1 Connect Tester

Shake the clamps back and forth to make sure they are well connected. Tester requires the two clamps are well connected with the battery poles, otherwise, the test cannot go on. When enter the battery test program, screen prompts "**Check Connection**", do clean the poles and re-connect in the right way.



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



3.2 Tester Startup

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

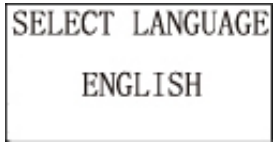


Figure 1, Startup Interface with Voltmeter on

At the middle bottom of the startup interface, it displays the voltmeter value, which can be used as DC voltmeter. DC Voltmeter test range is 8-30DCV, out of which will damage the tester.

3.3 Select Language

Press UP/DOWN key to select the Language,Include English, Franch, germany,spanlish,etc.



3.4 Battery Test

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



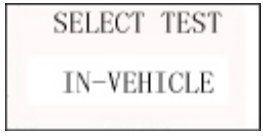
Figure 3, Interface with tester model and version

Tester will display the following contents in a sequence, select accordingly.

3.4.1 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.

IN-VEHICLE means battery is connected with vehicle generator or vehicle electrical appliance.



When surface charge detected by the tester, it prompts "SURFACE CHARGE, TURN LIGHTS ON"



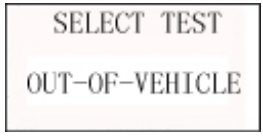
Turn lights on as prompted to eliminate battery surface charge, tester will then display the following messages in a sequence:





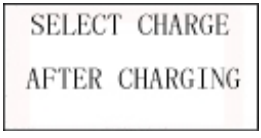
Now the tester detects the surface charge has been eliminated, turn lights off as prompted, then press OK key. The tester will recover automatic test

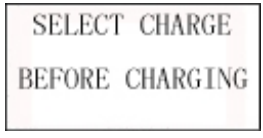
OUT-OF-VEHICLE means battery is not connected with any of the vehicle loaded, i.e. battery connection is cut off.



3.4.2 Select Battery Charge State

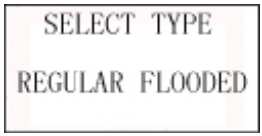
After selecting the battery location, tester will prompt to select the battery charge state, i.e. Before Charge or After Charge.
Press UP/DOWN key to select battery charge state, then press OK key to confirm. In this way, it ensures a more accurate test result.
In Vehicle, select Before Charge for Cold Vehicle and After Charge for Hot Vehicle.

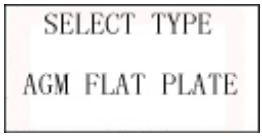


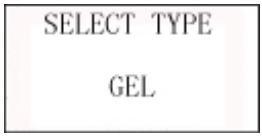


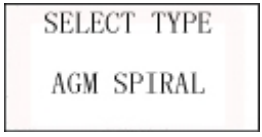
3.4.3 Select Battery Type

After the battery charge status selected, tester will prompt to select battery type, i.e. Regular Flooded, AGM Flat Plate or AGM Spiral, and Gel battery. Press UP/DOWN key to select battery type, then press OK key to confirm.

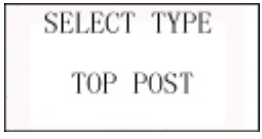


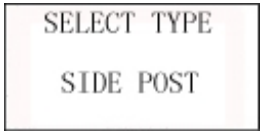


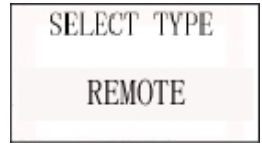




When it's IN-VEHICLE test, battery installation way shall also be selected, e.g. TOP, SIDE or REMOTE (This selection is no need for OUT-OF-VEHICLE), then press OK key to confirm. REMOTE is adopted for some in vehicle battery which is too tightly installed to use the test clamps to connect the battery poles.







NOTE: *For REMOTE test, there will be a little tolerance. For any doubt, take off the battery and select "OUT-OF-VEHICLE" to re-test.*

3.4.4 Battery System Standard and Rating

BT-360 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. Use UP/DOWN key to select according to the actual system standard and rating marked on the battery. See in the below picture, the arrow indicated location.



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

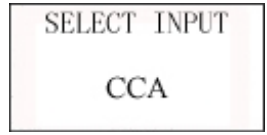
IEC： Internal Electro technical Commission Standard

EN： European Automobile Industry Association Standard

SAE: Society of Automotive Engineers Standard

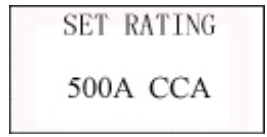
GB： China National Standard

There are other features: BCI、MCA、CA

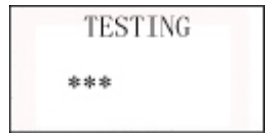


Rating range as following:

Measure Standard	Measure Range
CCA	100-2400
JIS	26A17--245H52
DIN	100-2200
IEC	100-2200
EN	100-2400
SAE	100-2400
GB	30-220Ah
BCI	100-2400
MCA	100-2400
CA	100-2400



Input correct test standard and rating, press OK key, tester starts to test, and dynamic interface "TESTING" prompted. See below:



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

3.4.5 Battery Test Result

Battery test result includes 5 types as following:

1) Good Battery

SOH:96%	SOC:98%
12.64V	490A
Rating	500A
GOOD BATTERY	

The battery is without any problem, please be relaxed to use!

NOTE: SOH means State of Health

SOC means State of Charge

2) Good, Recharge

SOH:78%	SOC:30%
12.20V	440A
Rating	500A
GOOD, RECHARGE	

Good battery but low current, recharge before using.

3) Replace

SOH:46%	SOC:80%
12.68V	340A
Rating	500A
REPLACE	

The battery is near to or already reached the end of the using life, replace battery, otherwise, bigger danger will be followed.

4) Bad Cell, Replace

SOH:0%	SOC:20%
10.60V	0A
Rating	500A
BAD CELL，REPLACE	

Battery interior damaged, broken cell or short circuit, replace battery.

5) Charge, Retest

SOH:39%	SOC:20%
12.08V	310A
Rating	500A
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, replace the battery.

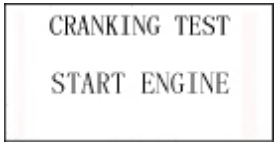
Attention: If "Replace" resulted from IN-VEHICLE mode, it might be the reason that vehicle cable is not well connected with the battery.

Ensure to cut off the cable and retest the battery under OUT-OF-VEHICLE before making a decision to replace battery.

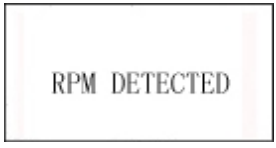
NOTE: *After testing, if need to return, press RETURN key to directly return to the startup interface.*
After testing: if it's "IN-VEHICLE" test state, press OK key will bring to Cranking Test.

3.5 Cranking Test

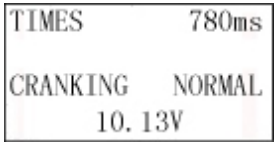
Tester prompts as following:



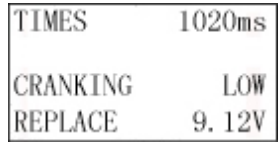
Starting the engine as prompted, tester will automatically complete the cranking test and display the result.



Normally, cranking voltage value 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 and actual cranking time.



When cranking test is abnormal, battery test result will also be displayed at the same time.



This is for the convenience of the 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.

3.6 Charging System and Rectifier Diode Test

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

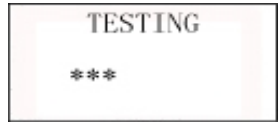


Press OK key again to start the charging test.

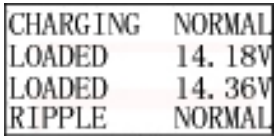
NOTE: *Do not shut down the engine during the test. All electrical appliance and device are in OFF state. Turn on/off any electrical appliance in the vehicle during the test will affect the accuracy of the test result.*

Tester will do the following tests in a sequence:

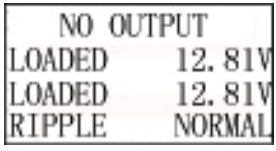
Operate accordingly to increase the engine rotating speed to 3000turns or above, and keep for 5 seconds.
Tester starts the charging volt test after increase rev detected.



After the test finished, tester displays the effective charging volts, ripple test result and charging test result.



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



Check the connection between generator and battery, then retest.

Charging Test Result:

1) Charging Volt: Normal

Charging system shows the generator output normal, no problem detected.

2) Charging Volt: Low

Charging volt of the charging system is low.

Check drive belt of the generator whether slip or running off. 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 internal regulator, the generator assembly has to be replaced.(Some old style cars are using external regulator, then 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 the generator connection cable and the belt whether they are normal.

5) Diode Test:
Through the test of charging current ripple, tester will find out whether the diode is normal or not. When ripple volt is too high, it proves at least one diode is damaged. Check and replace the diode. Till now, all tests have been done.

Chapter 4 Daily Maintenance

4.1 Eliminate Common Fault

4.1.1 Screen Not Light

- Check connection with the battery whether it's well or reverse connected.
- Check the test cable whether break off or drop down.

Warranty Clause

The warranty clause is only applicable to users and distributors who purchased AUTOOL products via the regular process.
Within 1 years since the delivery, AUTOOL guarantee the products damaged due to the material or craft defects. Any damage to the device or part due to abuse, unauthorized change, usage other than designed to, operation not following the user manual, etc. is out of the warranty. Compensation for the auto instrument damage due to the device defect is limited to repair or replacement, AUTOOL is not responsible for any indirect or accidental loss. AUTOOL will clarify the device damage according to the specified test method. Any distributor, employee and business representative of AUTOOL are not entitled to do any confirmation, presentation or promise related to AUTOOL products.

Statement of Disclaimer

The above warranty clause can substitute for any other form of warranty clauses.

Purchase Order

Replaceable parts and optional parts are available from AUTOOL authorized suppliers. Purchase order should include:
Order quantity
Part Number
Part Name

Customer Service Center

Any question during the operation, please call to 86-755-27807580 or email to aftersale@autooltech.com

For maintenance and repair, please send back to AUTOOL with Warranty Card, Product Qualified Card, Purchase Invoice and problem description. AUTOOL will maintain and repair the device for free when it is within the warranty. Otherwise, AUTOOL will charge the maintenance and repair and the shipping.

AUTOOL Website: http://www.autooltech.com