User Manual

The T12 Advanced Battery tester operates on 12V and 24V systems and is able to perform four tests:

Battery Test: Analyses the battery condition using a microprocessor-controlled testing method (12V Batteries).

Ground Test: Analyses the condition of the electrical return circuit (12V System Only).

Starter Test: Checks the cranking effectiveness of the battery to predict when the battery will fail to crank a vehicle (12V/24V System).

Alternator Test: This test checks the alternator's condition by testing it under different loads and performing a diode ripple test (12V/24V System).

Operating Procedure:

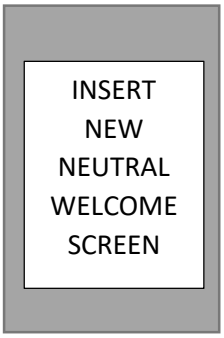
1. Connect the T12's clamps to the battery terminals to power it on. The battery voltage will appear on the screen.
2. Press any key to advance to the home screen. Once on the home screen several modes are available:

a. Detail Entry	b. Test	c. Memory storage	d. Settings

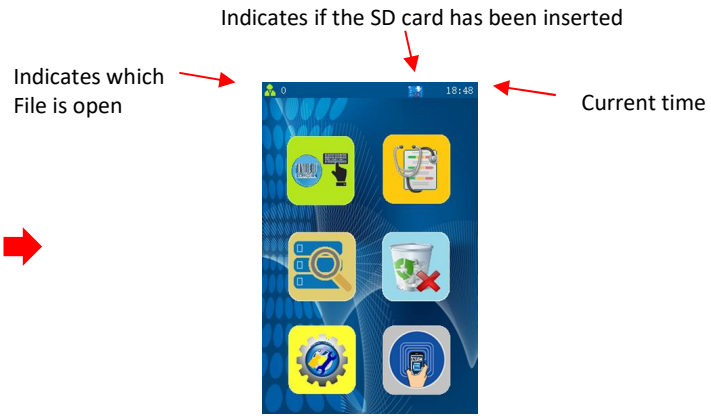
3. To enter workshop information, select the settings mode and chose data input
    a. Once in this mode the workshop name, address and telephone number can be entered using the on-screen keyboard. To save the results, press on the disk symbol on the top right corner of the virtual keyboard. This information will appear on the test results when printed.
4. To enter the license plate, VIN or customer number, select the Detail Entry symbol in the main menu, and the also click on the disk symbol on the virtual keyboard. A barcode scanner (sold separately) can be connected to scan barcodes and print the barcode number on the receipt directly.
5. To change the Date & Time, select the settings mode and chose Date & Time
6. To turn the Sound On/Off, select the settings mode and chose Sound
7. To perform a Test, select the 'stethoscope symbol':
    a. Car, motorcycle or truck modes can then be selected. Note for 24V batteries: they must be separated and be tested individually in 12V only.
    b. For a battery test, select the battery mode and chose the appropriate battery type and enter the specifications of the battery (CCA, EN1 etc.)
    c. For an Alternator test, follow the instructions displayed on the tester
    d. For a Starter test, follow the instructions displayed on the tester
    e. For a Ground test, follow the instructions displayed on the tester
    f. Once the test(s) is(are) complete the results will display and can be printed by pressing the print button on the Tester
8. To view stored results, select the 'Magnifying Glass' symbol on main menu
    a. Navigate through the results to view each test and if necessary, print the results
9. To remove stored test data, just select the 'Dustbin' symbol in the settings menu.
    a. Navigate through the tests and delete each test as necessary
10. The SD card can be inserted or removed on the right side of the tester. Please make sure you insert it upside down as indicated on the tester. Never force the card in the slot. To remove it, use a small pin to press on it.

Powering on the Device

To power on the T12 the clamps must be connected to the battery terminals. Turn the T12 on by connecting the red clamp to the positive (+) terminal and the black clamp to the negative terminal (-). The T12 will display the battery voltage and will then proceed to the home screen once a key is pressed.



Welcome Screen



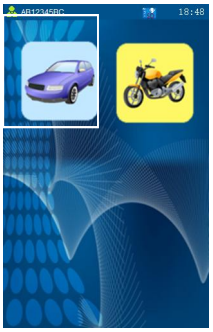
Home Screen

Performing a Battery Test

When a vehicle has been running the battery will carry a surface charge. In order to correctly test the battery, the surface charge must be removed by turning the headlights ON for 30 seconds with the engine off. Leave the battery at rest with the ignition OFF for at least 60 seconds before testing the battery.

Note: The maximum cranking current of a battery tested in motorcycle mode is 600A
The maximum cranking current of a battery tested in car mode is 2000A
In motorcycle mode, only the battery test is available. In car mode, all tests are available.

Use the directional keys to select <Test> and press enter

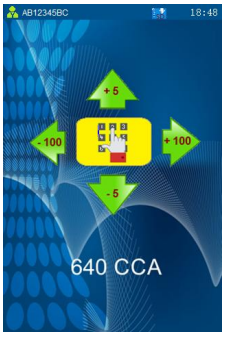


Use the directional keys to select the vehicle

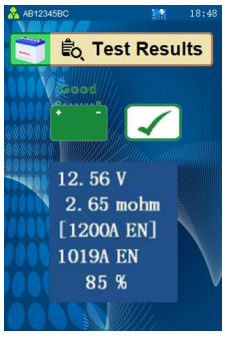
Use the directional keys to select the required test

Select the appropriate battery type

Select the test measure according to your battery



Use the arrows to change the value by +/- 5 and by +/- 100



Press the print button on the Tester to print the results.

Interpretation of the battery test results:

Flashing

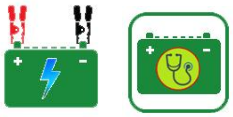
The battery is in good condition

Flashing

The battery is OK but needs to be recharged (State

Flashing

The battery is no longer healthy and must be replaced



Flashing

The battery needs to be recharged and tested again to confirm the final results.

Test Results: *(example values)*

Volts:	**12.68V**	Indicates the State of Charge [SOC] of the tested battery)
Battery Rating:	**320 CCA**	Indicates the battery capacity rated output
Power available:	**286 CCA**	Indicates the actual power output.
Internal Resistance:	**9.45 mOhm**	Indicates the internal resistance of the tested battery.
LIFE:	**89 %**	Indicates battery life expectancy [Health] in percentage. If it falls below 50 %, the tester will indicate that the battery must be replaced.

Note for the internal resistance: On average normal range is between 2-4 mOhm to 10-15 mOhm to be considered good. Above these values a battery is considered aged or sulphated. Motorcycle batteries may have a higher internal resistance and still be considered good due to their lower CCA values. Please always refer to the values given by the battery manufacturer.

Note: Surface charge detected

If the Tester detects a surface charge, the following procedure must be followed. Once complete proceed with the test.

Turn ignition key to ON position

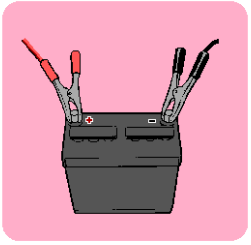
Headlights – [Low & High] turned: ON

Turn ignition key OFF position

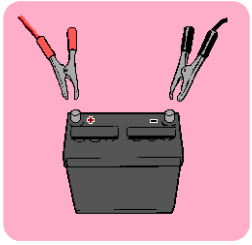
Headlights [Low & High]: OFF

Note: Weak terminal connections detected

When the connection to the battery is insufficiently secure to accurately perform a test. The tester will display the following icon on the screen. Disconnect the tester from the battery, remove potential dirt from the terminals and reconnect it firmly. Repeat the test procedure.



Flashing alternately



Note: Low state of charge (>75%), temperature selection

If the Tester detects that the battery is discharged it will prompt the temperature selection option

(-) 0°C and below →

← (+) 0°C and above

Note: Low state of charge (>75%), charge status selection

If the Tester detects that the battery is discharged it will prompt the charge status selection option

Before charge selection →

← After charge selection

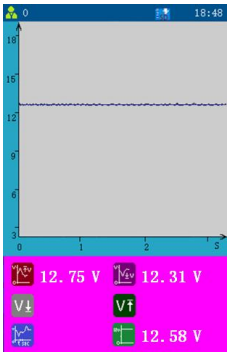
Performing a Quick Test: Starter

Once the clamps are connected follow the on-screen instructions to perform a starter test.

1

Select the starter test

2



Battery voltage before cranking →

← Battery Voltage (SOC) before cranking

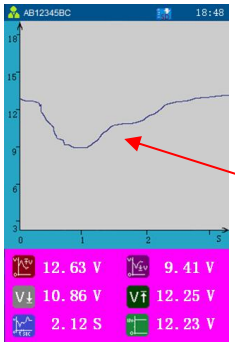
← Lowest Voltage

← Average Voltage

3

Start the engine →

4



1. Battery Voltage before cranking

2. Maximum Voltage drop during cranking

3. Cranking Voltage

4. Maximum Recovered Voltage

5.Cranking Period before engine ignition starts.

6. Average recovered Voltage

Interpretation of the Starter Test results:

1. Battery Voltage before cranking: 12.63 V
   Indicates the state of charge (SOC) of the battery before cranking the engine.
2. Maximum voltage drop during cranking: 9.41 V
   Indicates the captured voltage drop when the Starter crank the engine due to the load during starting.
3. Cranking Voltage: 10.86 V
   Indicates the actual cranking voltage. If the voltage drops below 9.6V for 12V system or below 19.2V for 24V system that means that the battery is weak and is coming to the end of its operating life.
4. Maximum Recovered Voltage: 12.23 V
   Indicates the highest climb voltage before going into the charging while the engine is running.
5. Cranking period before engine ignition starts: 2.12 S
   Indicates the period (in seconds) during cranking before the engine starts and determines the condition of the battery. The shorter the cranking time the better the condition of the battery. Weak batteries will take longer to start the engine.
6. Average recovered voltage: 12.22 V
   This voltage captured during recovery stage after ignition before going to charging volts. It tells how good the battery is on its voltage recovery compared to the state of charge (SOC) voltage.

Performing an Alternator Test:

This test should only be performed with the vehicle's engine turned OFF, its transmission in NEUTRAL or PARK and with the parking brake applied.

1

Select the alternator test

2

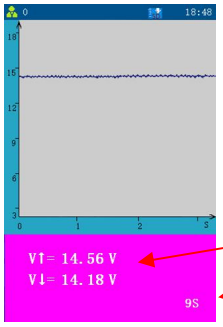
Select either smart or normal alternator

3

Start the engine and leave it running at idle.

Follow the on-screen instructions, and press Enter

4



Charging voltage at 2,500 ~ 3,000 RPM with all electrical loads switch OFF

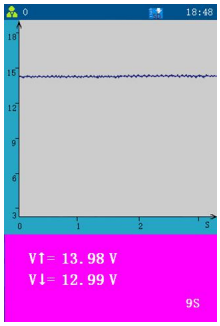
Captured voltages

Timer starts to countdown from 10s to 0s

5

Follow the on-screen instructions

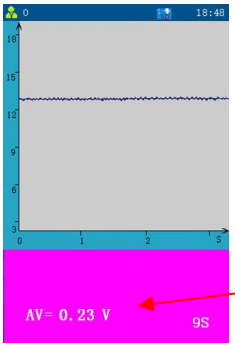
6



Charging voltage at 1,500 ~ 2,000 RPM with all electrical loads switch ON

7

8



Checking the AC ripple at 700 ~ 1,000 RPM with all electrical loads switch ON

AC Ripple Voltage

❶ ❷ ❸

OR

Symbols

V↑: Maximum Voltage (V max)
V↓: Minimum Voltage (V min)
AV: Average Voltage

The recorded results can be compared with the tables below to indicate the state of the alternator, and are categorized into three sections

1. Without Electrical Load Test (2,500 ~ 3,000 RPM)

2.5K ~ 3.0K RPM Without Load	12V Alternator Volt Limits		24V Alternator Volt Limits	
	Normal	Smart	Normal	Smart
V↑	< 15.0V	< 16.2V	< 30.0 V	< 32.4V
V↓	> 13.3V	> 12.4V	> 26.6 V	> 24.8 V

2. With Electrical Load Test (1,500 ~ 2,000 RPM)

1.5K ~ 2.0K RPM With Load	12V Alternator Volt Limits		24V Alternator Volt Limits	
	Normal	Smart	Normal	Smart
V↑	> 13.8V	> 12.4V	> 27.6 V	> 24.8V
V↓	> 12.6V	> 12.0V	> 25.2 V	> 24.0 V

3. Diode AC Ripple Test with Load (Idling speed: 700 ~ 1,000 RPM)

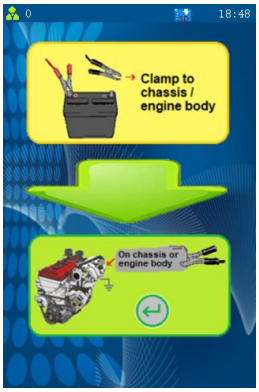
The AC ripple of the alternator is checked to see if it is within an average of the 0.5V limit. If one of the diodes is faulty, the AC ripple will produce higher than the accepted 0.5V. Indicating that the alternator is not functioning correctly.

To print the results, press the printer symbol on the tester. Pressing the return key will exit the tests.

Performing a Ground Test:

With the engine OFF, connect the clamps to the battery terminals.

Use the directional keys to select the ground test

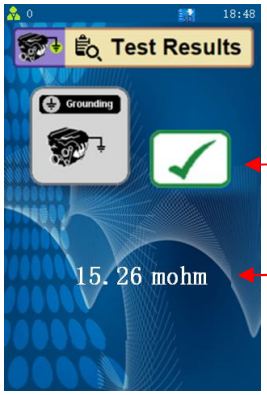


This screen indicates that the negative clamp must be attached to the chassis or engine.

Testing in progress

This screen indicates that the negative clamp must be attached back onto the battery's negative terminal

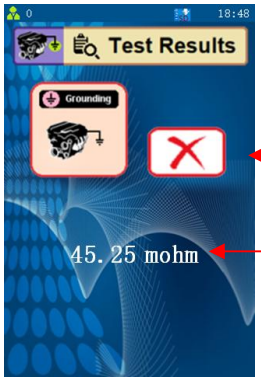
Testing in progress



Flashing

Resistance reading

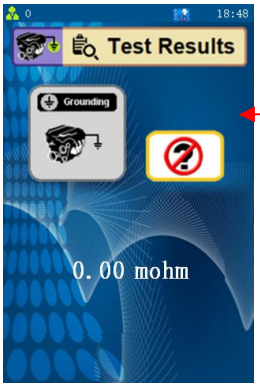
Test result indicating the ground connection is good.



Flashing

Resistance reading

Test result indicating the ground connection is not good.



Flashing

No resistance reading
Resistance not detected

Test result inconclusive, repeat the test.

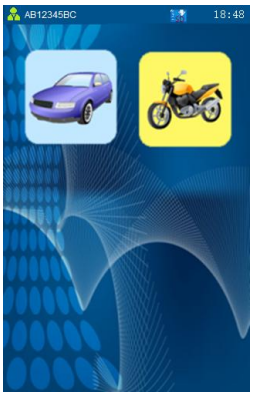
Detail Entry:

To enter particular client information before performing a Test, access the detail entry mode on the main menu.

Use the directional keys to select Detail entry and press enter

Using the optional barcode scanner, scan the batteries code and the details will appear in the barcode field.

Use the directional keys to input the customers information such as name, license plate or VIN. This information will then title the test results in the device's memory as well as appearing on the test results once printed.



Proceed with the required tests as explained in the above sections, Battery Test, Starter Test, Alternator Test, Ground Test.

Workshop information entry:

To enter the name, address and contact information of the workshop access the settings menu and select the data input mode.

Use the directional keys to select <Setup> and press enter

Use the directional keys to select <Date & Time> and press enter

Use the directional keys to input the required data.

When moving between lines, select the 'return' key on the on-screen keyboard. Once the 'return' icon appears, use the up/down keys to move between lines.
Once input is complete select the 'Save' icon on the on-screen keyboard and press enter.