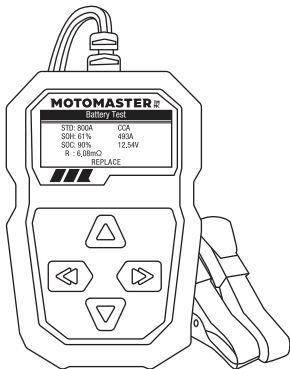




MOTOMASTER

12 V DIGITAL BATTERY TESTER AND CHARGING SYSTEM ANALYZER



model no. 011- 3020-8

IMPORTANT:

This manual contains important safety and operating instructions.
Read all instructions and follow them with use of this product.

**INSTRUCTION
MANUAL**

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INTRODUCTION

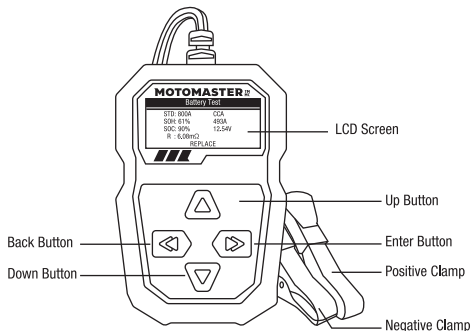
The MotoMaster® Digital Battery Tester adopts advanced conductance testing technology to easily, quickly and accurately measure the actual cold cranking amps capability of the battery, health state of the battery, and common faults in the vehicle's starting system and charging system, which can help to solve problems quickly and proactively.

- This device can conduct three types of tests: battery test, cranking test and charging system test.
- Test all automotive lead-acid batteries, including regular, AGM flat plate battery, AGM spiral battery, Gel and EFB.
- Equipped with reverse polarity protection. Connecting in reverse will not damage the tester or affect the vehicle and battery.
- Testing standards include the world's majority of battery standards: CCA, BCI, CA, MCA, JIS, DIN, IEC, EN, SAE.
- Selectable multi-language support, including English, French, Spanish, German, Italian, Portuguese, Russian and Dutch.

TIPS AND BEST PRACTICES

- Ensure you have a clean and solid connection to the battery.
- When possible, it is best to use the battery post directly (not remote posts) to ensure direct connection.
- To ensure accurate battery test results, it is recommended to perform tests in 0°C (32°F) or above temperatures. Testing below this temperature could yield inaccurate results.
- Inspect the battery for a cracked or broken case or cover. If the battery is damaged, do not use the tester.
- Do not perform battery test on a battery that is being charged. Doing so will yield inaccurate results.

GET TO KNOW YOUR TESTER



Product Setup

The MotoMaster® Digital Battery Tester allows you to make the following adjustments and settings:

1. Language (select from English, French, Spanish, German, Italian, Portuguese, Russian or Dutch).
2. Beep (key sound on or off).
3. Contrast of the LCD display.

To enter the Setup menu:

1. Press button to select Setup.
2. Press to enter Setup menu.

Main Menu	
1. Check	3/4
2. Review	
3. Setup	
4. About	
14.51V	

Device test

You can test the tester's screen and keys, to check whether the screen or keys are functioning properly.

To enter Device test:

1. From Setup menu, use button to select Device test.
2. Use and button to select between Screen test or Key test.

Device test	
1/2	
1. Screen test	
2. Key test	

BATTERY TEST

Battery test provides reliable analysis of the battery state of charge, state of health, and actual cold cranking amps. It notifies the user to replace battery in advance when the battery is getting old.

1. Press to select Check


Main Menu	
1/4	
1. Check	
2. Review	
3. Setup	
4. About	
12.33V	

2. Press / button to select the battery location—In-Vehicle or Out-of-Vehicle—press button.

Battery Location	
1/2	
1. In-Vehicle	
2. Out-of-Vehicle	

3. Press  button to select Battery Test (for In-Vehicle battery location only).



In-Vehicle	
	1/3
1. Battery Test	
2. Cranking Test	
3. Charging Test	

4. When surface charge is detected by the tester, it prompts a message to turn lights on for 10 seconds. Follow on-screen instructions to eliminate battery surface charge, and then press  button.

5. Press  /  button to select the battery type, then press  button to confirm.

Select Type	
	1/5
1. Regular Flooded	
2. AGM Flat Plate	
3. AGM Spiral	
4. GEL	
5. EFB	

1. Regular Flooded	Regular Flooded (also referred to as standard or wet cell) battery
2. AGM Flat Plate	Absorbed Glass Matte (AGM) Flat Plate battery
3. AGM Spiral	Absorbed Glass Matte (AGM) Spiral battery
4. GEL	Gel cell battery
5. EFB	Enhanced Flooded Battery (EFB)

6. Press  /  button to select the battery rating standard. The test will be performed according to the selected rating standard.

Select Standard	Select Standard
1/9	7/9
1. CCA	7. MCA
2. IEC	8. SAE
3. EN	9. JIS
4. DIN	
5. CA	
6. BCI	


The tester supports the following battery standards and ratings:

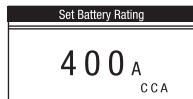
Measurement Standard	Definition	Measurement Range
1. CCA	Cold Cranking Amps Specified by SAE & BCI, most frequently used rating in Canada. Value measured by starting battery at -18°C (0°F).	100 – 2000
2. IEC	Internal Electro Technical Commission	100 – 1400
3. EN	European Automobile Industry Association	100 – 2000
4. DIN	German Auto Industry Committee	100 – 1400
5. CA	Cranking Amps Value measured by starting battery at 0°C (32°F).	100 – 2000
6. BCI	Battery Council International	100 – 2000
7. MCA	Marine Cranking Amps Value measured by starting battery at 0°C (32°F).	100 – 2000
8. SAE	Society of Automotive Engineers	100 – 2000
9. JIS	Japan Industrial Standard Displayed on the battery as combination of the numbers and letters.	26A17 – 245H2

7. Confirm the CCA (or other) rating of battery to be tested.

NOTE: If CCA rating is not shown on the battery, you can use the following estimates:

GAS			DIESEL		
L4	V6	V8	L4	V6	V8
400 CCA	600 CCA	700 CCA	500 CCA	700 CCA	1000 CCA

Input battery rating, then press  button.



8. The device will perform the test for about 3 seconds and indicate the result:

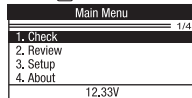
Battery Test			
Original CCA rating	STD: 500A	CCA	
State of Health	SOH: 100%	654A	Actual, measured CCA rating
State of Charge	SOC: 38%	12.53V	Battery voltage
Resistance	R : 4.59mΩ		
Test assessment	GOOD BATTERY		

Test Result	Details
GOOD BATTERY	The battery is healthy and charged, no problem detected.
GOOD-RECHARGE	Good battery but low current detected. Recharge battery.
REPLACE	The battery state of health % low, indicating that it is nearing or reached the end of its lifecycle. Replace battery. NOTE: If "Replace" resulted from In-Vehicle mode, the assessment might be because the vehicle cable is not well connected with the battery terminal. It is recommended to remove the cable and retest the battery directly in Out-of-Vehicle mode before deciding to replace battery.
BAD CELL-REPLACE	Battery internals are damaged through a bad cell or a short circuit. Replace battery.
CHARGE-RETEST	Unstable battery detected. Recharge and retest to avoid testing error. If same test result appears after recharge and retest, the battery is damaged. Replace battery.

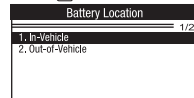
CRANKING SYSTEM TEST


Cranking system test analyzes the starter motor draw. Through testing the actual required cranking current and cranking voltage of the starting motor, it establishes the state of the starting motor. There are several reasons that can lead to a fault of the starting motor: a) lubricating system fault causing the starting loaded torque to increase, b) increased rotor friction of the starting motor causing reduced performance.

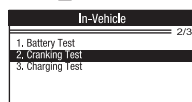
1. Press  to select Check



2. Press  button to select In-Vehicle.




3. Press  button to select Cranking Test.



4. Follow on-screen instructions. The tester will automatically perform the test, and indicate the result:

Cranking Test			
Actual cranking time	TIME	41.75ms	
Maximum cranking voltage	MAX	10.58V	
Minimum cranking voltage	MIN	7.83V	
Test assessment	CRANKING NORMAL		

Test Result	Details
CRANKING NORMAL	Starter motor draw and cranking system is normal; no problem detected.
CRANKING LOW	Abnormal starter motor draw detected. Consult a licensed mechanic to further investigate the issue.
	Battery test result will also be displayed at the same time.

NOTE: After finishing the Cranking Test, you may automatically proceed to Charging Test by pressing  button and leaving the engine turned on.

CHARGING SYSTEM TEST


Charging system test checks and analyzes the alternator, rectifier, rectifier diode and other charging system components by measuring the output voltage of the alternator. Fault in one of the charging system components will lead to: a) overcharge or incomplete charge of the battery, thus damaging the battery and shortening its lifespan; b) possible damage to the vehicle electrical system.

1. Press  to select Check

Main Menu	
1. Check	1/4
2. Review	
3. Setup	
4. About	
12.33V	

2. Press  button to select In-Vehicle.

Battery Location	
1. In-Vehicle	1/2
2. Out-of-Vehicle	

3. Press  button to select Charging Test.


In-Vehicle	
1. Battery Test	2/3
2. Cranking Test	
3. Charging Test	

NOTE: Do not shut down the engine during the test. Ensure all electrical draws are turned off. Turning 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

4. Tester will perform the following tests in a sequence:

• Ripple Test

Ripple Test	
	
95mV	14.32V

Real-time ripple voltage and charging voltage will be displayed. The device will perform the test for about 6 seconds.

• Loaded Voltage Test

Charging Test	
LOADED TESTING	

The device will perform the test for about 3 seconds.

5. Follow on-screen instructions. The tester will automatically perform the test, and indicate the result:

Charging Test	
Loaded charge voltage	Loaded 14.41V
Unloaded charge voltage	Unloaded 14.55V
Ripple test result (mV)	Ripple 53mV
Test assessment	CHARGING NORMAL


Test Result	Details
CHARGING NORMAL	Charging system shows the alternator output is normal; no problem detected.
CHARGING LOW	Low voltage of the charging system detected. Possible causes: • Accessory belt slipping or running off the alternator • Bad connection between alternator and battery Consult a licensed mechanic to further investigate the issue.
CHARGING HIGH	High voltage of the charging system detected. Possible causes: • Faulty alternator High charging system voltage can be overcharging the battery, causing damage to the battery and shortening its lifespan.
NO-OUTPUT	No output voltage of the charging system detected. Possible causes: • Alternator connection • Accessory belt slipping or running off the alternator

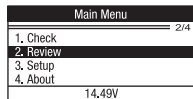
Diode assessment

Through the test of charging current ripple, the tester will determine the state of the diode. When ripple volt is too high, it indicates at least one diode is damaged. Consult the car manufacturer for the normal operating voltage range of the diode and compare with test result. If outside range, replace the diode.

REVIEW AND DELETE DATA

The tester stores the data of the last battery test result. To view the last result data:

1. Press  button to select Review menu.
2. Press  to enter Review menu.



3. Press Review to view the last result.
4. Press Delete to delete the last result.

SPECIFICATIONS

Display	LCD
Operating Temperature	0 to 50°C (-32 to 122°F)
Storage Temperature	-20 to 70°C (-4 to 158°F)
Power Supply	Provided automatically via cable from battery
Voltage Measurement Range	8 – 16 V DC
Dimensions	4 15/16 x 3 1/4 x 13/16" (125 x 82 x 20 mm)
Weight	6.8 oz (194 g)

WARRANTY AND RETURNS

IF ANY PARTS ARE MISSING OR DAMAGED, OR IF YOU HAVE ANY QUESTIONS, PLEASE CALL OUR TOLL-FREE HELPLINE AT 1-888-942-6686

Read and understand this instruction manual thoroughly before using the product. It contains important information for your safety as well as operating and maintenance advice.

Keep this instruction manual for future use. Should this product be passed on to a third party, this instruction manual must be included.

The English version of this manual is available online at: www.canadiantire.ca/manuals



Do not dispose of this product in household garbage at the end of its life cycle; hand it over at a collection point for the recycling of electrical and electronic appliances. The symbols on the product, the instructions for use, or the packaging will inform about methods for disposal.

This MotoMaster® product carries a one (1) year warranty against defects in workmanship and materials. At its discretion, MotoMaster Canada agrees to have any defective part(s) repaired or replaced free of charge, within the stated warranty period, when returned by the original purchaser with proof of purchase. This product is not guaranteed against wear or breakage due to misuse and/or abuse.

MADE IN CHINA

IMPORTED BY MOTOMASTER CANADA, TORONTO, CANADA M4S 2B8