

BVA-230

Operator's Manual

Hand Held-Accuracy with a Pulsed 120 Amp Load

The BVA-230 is the ultimate hand-held tester. It is the auto industry's answer to portability in a professionally accurate load tester and system analyzer.

Auto Meter Products Inc.

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Toll Free (866)-883-TEST (8378)

www.autometer.com/test

2650-1509-00 11/29/11

CONGRATULATIONS!



You have purchased one of Auto Meter's hand-held Electrical System Analyzers. It is designed to test each component of a vehicle's electrical charging and starting system with speed and accuracy. If you should have any questions about your tester, testing procedures, or service see the last page of this booklet for contact information.

BVA-230

Load Test Capacity	120 Amp
Battery sizes	100-1600 CCA
Digital Back-Lit Display	1" x 2.5" - 4 line x 16 character
Volt Ranges	Digital 0-30
Cooling	Vented
Leads	Load Amp-2 1/2 ft., 6 Gauge
Size	5 7/8" x 9 1/2" x 1 7/8"
Memory	Stores the last 150 tests
Internal Battery	9 Volt Alkaline
Weight	4 lbs.

What to Expect from the BVA-230:

Immediately recognize a bad battery and perform a complete starting and charging system analysis. The BVA-230 is a portable full-featured menu-driven battery tester, starting, and charging system analyzer that provides quick, professional load results using Auto Meter's Digital Pulse Load. The BVA-230 is user friendly. It tells you what to do. Detailed test results provide next steps advice and are displayed after each test or can be reviewed and/or printed.

Caution: The BVA-230 grill may get hot after repeated use. Be sure to hold the unit from the side grips only. Keep hands away from the grill.

LIMITED WARRANTY



12 MONTHS FROM DATE OF PURCHASE

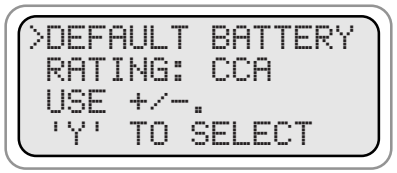
The manufacturer warrants to the consumer that this product will be free from defects in material or workmanship for a period of twelve (12) months from the date of original purchase. Products that fail within this 12 month warranty period will be repaired or replaced at the manufacturer's option to the consumer, when determined by the manufacturer that the product failed due to defects in material or workmanship. This warranty is limited to the repair or replacement of parts and the necessary labor by the manufacturer to effect the repair or replacement of the product. In no event shall the manufacturer be responsible for special, incidental or consequential damages or costs incurred due to the failure of this product.

Improper use, accident, water damage, abuse, unauthorized repairs or alterations voids this warranty. The manufacturer disclaims any liability or consequential damages due to breach of any written or implied warranty on its test equipment.

WARRANTY AND SERVICE INFORMATION

Warranty claims to the manufacturer's service department must be transportation prepaid and accompanied with dated proof of purchase. This warranty applies only to the original purchaser and is non-transferable. Shipper damage incurred during return shipments is not covered under this warranty. It is the responsibility of the shipper (the customer returning the Test Equipment) to package the tester properly to prevent any damage during return shipment. Repair costs for such damages will be charged back to shipper (customer returning the Test Equipment). Protect the product By shipping in original carton or add plenty of over-pack cushioning such as crumpled up newspaper.





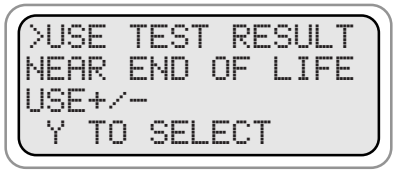
Select the rating from CCA, MCA, CA, AH.



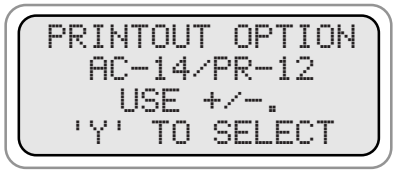
You can also select the default rating to be the last entered CCA value or a particular amount such as 600 CCA.



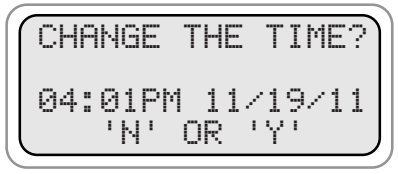
If 'Y' is chosen, the measured battery capacity will be displayed on the battery test result screen and print out. If 'N' is chosen no measured battery capacity will be displayed or printed.



To toggle battery test results between "GOOD" or "BAD" only and "NEAR END OF LIFE", use + or - to change setting then use 'Y' to select.



To print to an Auto Meter stand alone IR printer choose "AC-14/PR-12". To print to the Auto Meter high speed PR-16 printer using the Auto Meter XTC-160 charger/tester and IR-1 printer interface choose "XTC-160/PR-16. To print to a network printer using the POSI-160 choose "Print Center".



Press 'Y' to change the time, or 'N' to continue.



Press 'Y' to enter or change the store address for use on print outs or 'N' to continue.

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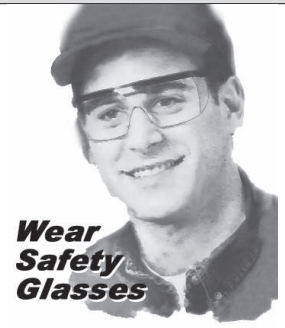
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Note: The BVA-230 checks and load tests 6 volt and 12 volt Batteries and tests the starting and charging systems on 12 volt and 24 volt systems. The following examples illustrated are for a 12 volt system. The BVA-230 automatically identifies the appropriate voltage and displays the menu selection and instructions needed for that system.

SAFETY



- Carefully read all operating instructions before using the BVA-230
- Wear eye protection when working around batteries.
- Be sure each test is completed before removing load clamps to prevent arcing and potential explosion from battery gases. Never remove load clamps while testing. Keep sparks flames, or cigarettes away from batteries.
- Keep hair, hands, and clothing as well as tester leads and cords away from moving blades and belts.
- Provide adequate ventilation to remove car exhaust.
- In extremely cold temperatures, check for frozen electrolytic fluid before applying load. Do not attempt to Load Test or charge a battery under 20 degrees. Allow the battery to warm to room temperature before testing or charging.
- ***Warning!*** Never attach the BVA-230 to a battery that is connected to any other tester or charging unit. Damage may result.

WARNING!

TESTING OF HYBRID VEHICLES

DO NOT test the starter, alternator and/or 12 volt starting battery while it is in the vehicle.

DO NOT remove, service or test the hybrid battery pack under any circumstances.

Remove the 12 volt starting battery, starter or alternator from the vehicle prior to testing.

CAUSE OF BATTERY FAILURE

- **Incorrect Application:** Wrong size battery may have inadequate cold cranking rating for original vehicle specifications.
- **Incorrect Installation:** Loose battery hold-downs cause excessive vibration, which can result in damage to the plates.
- **Improper Maintenance:** Low electrolytic fluid and corrosion on battery connections can greatly reduce battery life and affect battery performance.
- **Age of Battery:** If the date code on the battery indicates it is fairly old, the failure may be due to natural causes.
- **Overcharging:** Overcharging caused by a high voltage regulator setting or incorrect battery charging can cause excessive gasing, heat and water loss.
- **Undercharging:** Undercharging caused by a faulty charging system or low voltage regulation can cause lead sulfate to gradually build up and crystallize on the plates greatly reducing the battery's capacity and ability to be recharged.

VOLT METER



Scroll Down to Volt Meter then select **Volt Meter** by pressing Y

```
 REVIEW/PRINT  ↑
>VOLT METER
 SETUP
 ABOUT         ↓
```

Press (Y Enter)

```
--VOLT METER--
VOLTS:  12.24V
RIPPLE  00.0mV
```

Note: If the car is running and the clamps are attached to the battery a high ripple (over 50mV) indicates bad diodes in the alternator.

SETUP

Scroll Down to Setup, Select setup by pressing Y

```
 REVIEW/PRINT  ↑
 VOLT METER
>SETUP
 ABOUT         ↓
```

```
>SET LANGUAGE:
 ENGLISH
 USE+/-
 'Y' TO SELECT
```

Choose between English or Spanish using the + and - keys to change the language. Press 'Y' to select.

```
>SET TEMPERATURE
 SCALE: F.
 USE +/-.
 'Y' TO SELECT
```

Select the temperature in Fahrenheit or Centigrade.

PRINTING TEST RESULTS



Point the BVA-230 in the direction of the printer with the printer's IR receiver pointed in the direction of the BVA-230. Press (Print). You should be within 15 ft. of the printer. Wait for the screen to clear before moving the BVA-230. It takes a moment to send all the test data. The BVA-230 also operates the AC-14 printer installed in Auto Meter's XTC-160 tester/charger or BVA-2100 heavy duty tester/analyzer.

- Make sure the Infrared Printer is properly set up.
- After a test is made with the BVA-230 make sure the results are displayed on the LCD.
- Point the BVA-230 in the direction of the Infrared Printer (within 15 ft.)
- Press the <Print> key and the test results will be printed.
- Depending upon the test made the printer will sometimes yield more information than the LCD.
- Wait until the printer stops printing before you press the BVA-230 print key again.







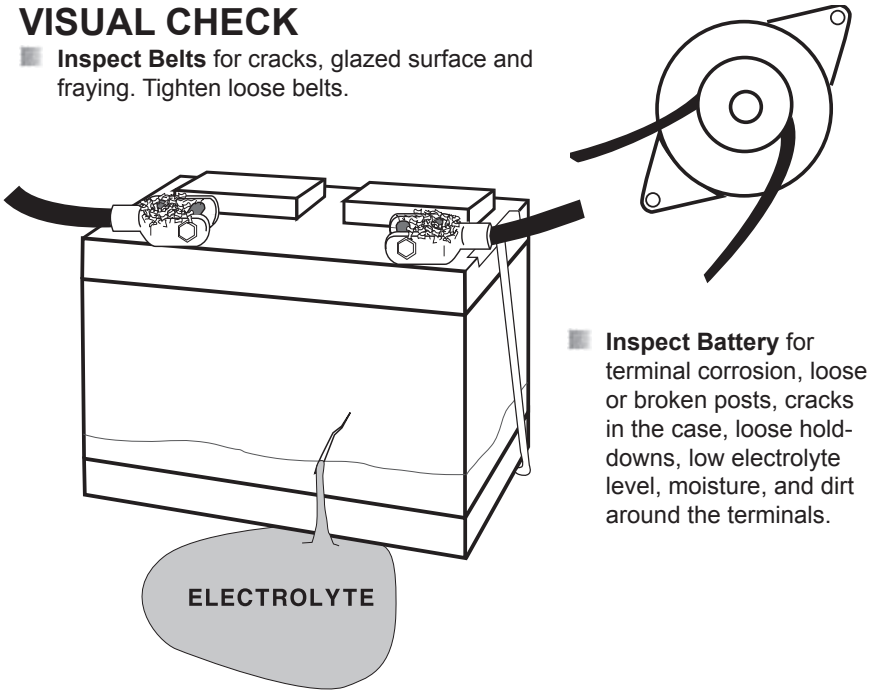
INSPECTION



- Valid automotive electrical system testing depends on all the components being in good operating condition. In addition, the battery MUST have sufficient charge for testing. Carefully perform the following steps before attempting any electrical diagnosis.

VISUAL CHECK

- **Inspect Belts** for cracks, glazed surface and fraying. Tighten loose belts.



- **Inspect Battery** for terminal corrosion, loose or broken posts, cracks in the case, loose hold-downs, low electrolyte level, moisture, and dirt around the terminals.
- **Inspect Starting System.** Check starter, solenoid, and regulator for loose connections, loose mounts and frayed or cracked wires.
- **Important Note:** A damaged battery must be replaced before proceeding.

CONTROLS AND FUNCTIONS



LCD:
Displays menus and test results.

KEYS:
When each key is pressed, a beep sounds to assure contact has been made.

On/Off Key:
This is the manual on/off key.

Y Enter Key:
This key selects the next menu, the cursor line item and answers '*yes'* to a test progression.

N Esc Key: This key cancels a test or progression. It also returns to the previous menu.

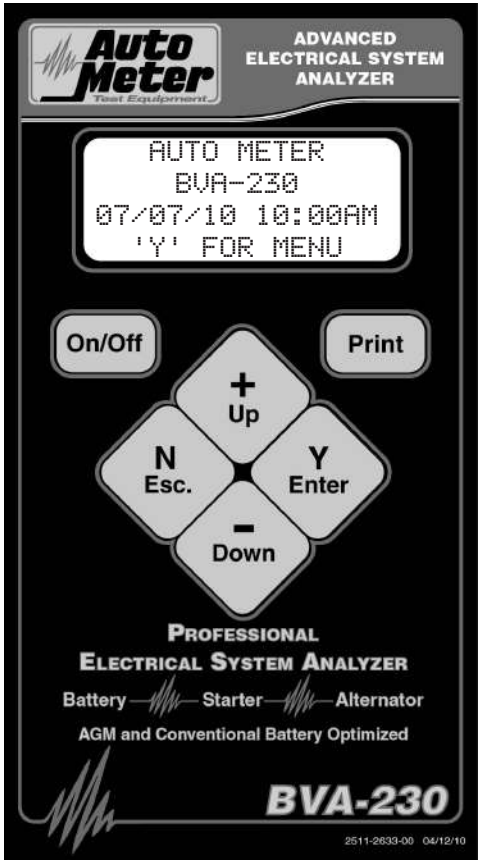
+Up Key**:**
This key moves the cursor up in order to select a menu line item and increments certain displayed values.

-Down Arrow Key:
This key moves the cursor down in order to select a menu line and decrements certain displayed values.

Print Key**:**
Point the BVA-230 infrared print light towards the IR Print Receiver and press the print key. Continue to point the print light towards the IR Print Receiver until printing is completed. Test results will be printed.

USB Type Mini B - Future expansion factory use.

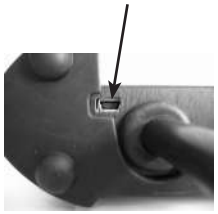
Infrared Print Light:
When the print button is pressed infrared data will be transmitted to the printer IR receiver if pointed in the appropriate direction (up to 15 ft.).



Infrared Print Light



Mini B USB

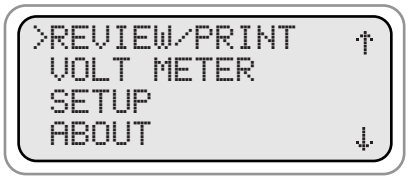


5 OTHER MENU ITEMS



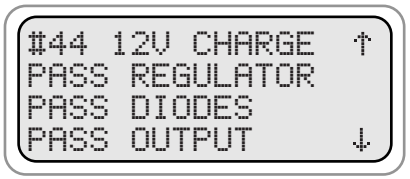
REVIEW TESTS

Scroll Down to Review/Print



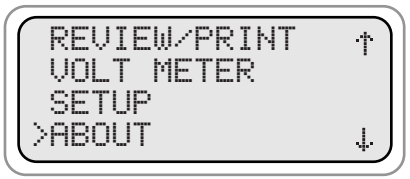
Press (Y Enter) to select Review/Print.

The last test will be displayed.

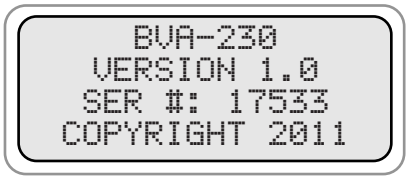


Press (N Esc.) to select previous test. Press (+Up) or (-Down) key to select the desired test.

ABOUT SCREEN



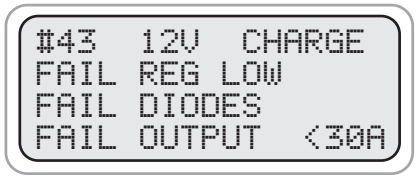
Scroll down to about. Press Y to select.



The about screen shows the model number. Firmware revision and the tester serial number.
Press any key to go back to the menu.

ALTERNATOR TEST cont.





If Measured Output is displayed the output may be low for some systems.

NOTE 1: If the LCD reads "FAIL OUTPUT" it is recommended you run the test again with the engine at fast idle (2,000 RPM or more.)

MAINTENANCE



IMPORTANT:

- Both jaws of each clamp must firmly engage the battery terminal. The copper jaw contains the smaller gauge wire that reads the voltage and the silver jaw contains the larger conducting wire that draws the load in each test. Jaw insulation is necessary for accurate readings. Damaged clamps or loose wires will affect the readings. Keep clamps clean and in good repair.

CHECK OFTEN FOR LOOSE JAWS OR DAMAGED INTERNAL PLASTIC SHOULDER INSULATORS



Store clamps on posts as shown.

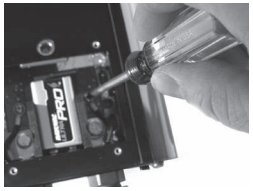
BATTERY CLAMP/LEAD REPLACEMENT

Over time the battery clamps will need to be replaced if any of the following are indicated:

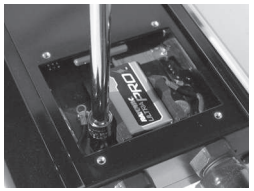
- CCA values seem to be way off.
- If there is continuity between the copper jaws.
- If there is excessive damage or corrosion to the cables or clamps.



1. Remove protective rubber boot from tester.
2. Remove battery cover on the back of the tester by removing the 4 Philips head screws using a #1 Phillips screw driver.



3. Remove both volt lead Phillips head screws, lock washers, and flat washers using a #1 Phillips screw driver.



4. Remove the 8 mm hex head bolt, lock washer, and flat washer from the positive side current lead using an 8 mm socket.



5. Remove the 10 mm hex head bolt, lock washer, and flat washer from the negative side current lead using an 10 mm drive socket.



6. Unthread both cable strain reliefs from the tester, and pull both cables out of the tester.



7. Remove rubber insert from both threaded fittings on tester.



8. Cut off small plastic fingers from both threaded fittings using a wire cutter.



9. Insert cables through threaded fittings. Fittings have a slot on the inside to clear the terminal. Align the terminal with the slot when inserting the cable through threaded fitting.



10. Continue installing replacement cable and clamp assemblies in reverse order of removal. Note hardware assembly order. (Fastener, lock washer, then flat washer)



11. Tighten hardware. Recommended torque:
    a. 8 mm and 10 mm hex head screws: 22 IN. LBS.
    b. Phillips head Volt lead screws: 6 IN. LBS

BATTERY REPLACEMENT

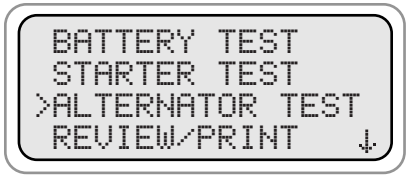
When the LCD indicates a low internal battery, the BVA-230 will shut down and not operate until the 9 volt battery is replaced. Remove rubber insulator boot, then remove the back cover and replace the battery.

ALTERNATOR TEST

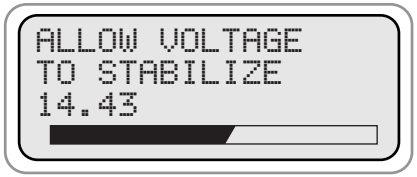


This test measures the output of the charging systems under load conditions. This information provides the basis for further charging system tests. It also detects the presence of an open or shorted diode that causes an output loss of several amps and can cause the failure of other diodes.
Symptomatic Check before Proceeding:

- Battery should be in good condition and charged before testing the Charging System.
- Check warning light indications.
- Check belt condition and tension.
- Check all cables and connections.
- Check the battery for corrosion and dirty terminals.
- Does the battery have a low state of charge? (See section 2 and 3)
- Make sure all electrical items are off.
- Check for Alternator noise.



Use the (+Up) and (-Down) arrows to move cursor to the desired test.



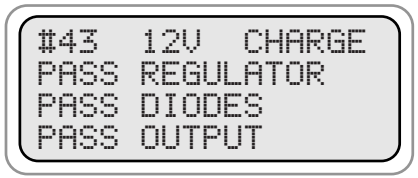
The BVA-230 will allow the voltage to stabilize before starting the test bar at the bottom of the screen that shows the test progress. Be patient, it can take up to 30 seconds for the voltage to stabilize.

Allow the alternator test to finish.

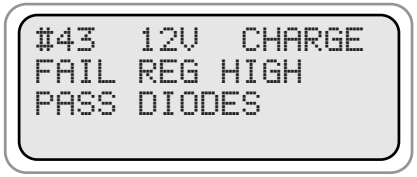


Bar at the bottom of the screen will show the tests progress.

Test result will appear. The following are examples.



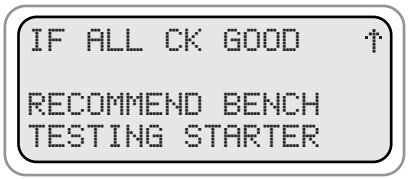
Alternator has GOOD regulation and GOOD output.



High Regulation will damage the system. High Regulation is likely due to a faulty alternator and/or voltage regulator.

STARTER TEST cont





Use the (+ Up) and (- Down) keys to scroll through the screens. Press Y or N to go to the main menu.

If manufacturer's specifications are not available the chart below can be used as a general guideline. The amounts are in Amps.

4 Cyl Gas 120-250A	6 Cyl Gas Up to 250A	8 Cyl Gas Up to 250A
4 Cyl Dsl Up to 350A	6 Cyl Dsl Up to 450A	8 Cyl Dsl Up to 650A

If the results are out of specification do the following:

- **Inspect the connectors for excessive voltage drop.**
- **Repair or replace any defective cables or connectors.**
- **Retest the system.**

If still out of specifications: **High** Amp reading may indicate engine is out of time or a faulty starter. Some possible causes are shorted windings, bent armature, broken housing or bad bearings.

STARTING CURRENT DRAW AND DIESEL ENGINES

There are a few points to consider in testing a starting system on a diesel engine. The BVA-230 is designed to recognize any significant amount of draw; this includes glow plugs in small diesel engines. In heavy-duty applications consider computer and accessory draw.

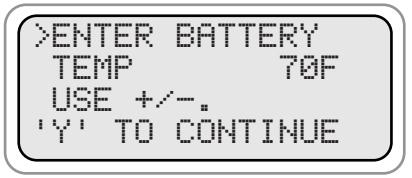
- **Make sure you start the engine quickly. The engine should be warm.**
- **Turn the ignition on and allow the glow plugs to heat up and click off before you run the Starting Test.**
- **Repeat the test in different ways and compare results.**

1 HOOK UP



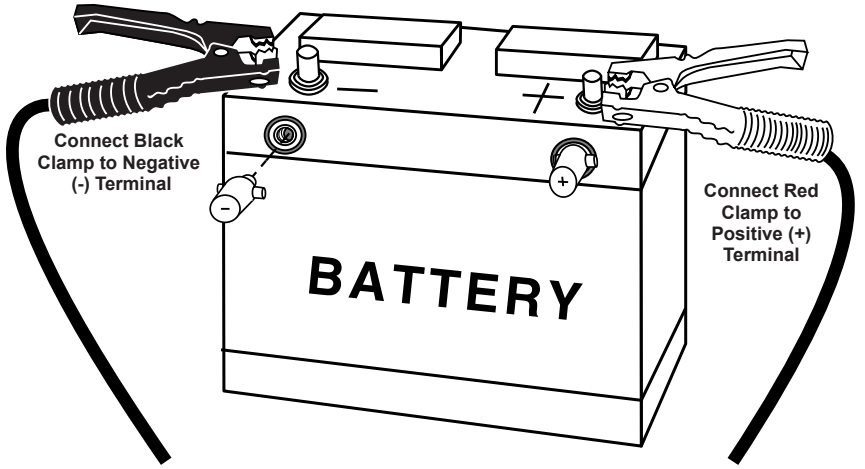
Press the On/Off button: Connect the clamps as instructed on the LCD.





Enter the approximate battery temperature in degrees Fahrenheit then press (Y Enter).

Note: Go to the setup to change temp scale to centigrade. The temperature request only appears once for each battery tested. If the clamps are disconnected you will be prompted again to begin a new battery test.



Note! Take special care when connecting to battery side terminals. If necessary use a side post adapter to prevent thread damage. When testing dual post batteries always check the post to which the system is attached.

CONNECTION ERRORS

- If the clamps are reversed the Reversed Connection warning will be displayed on the LCD with an audible beeping.
- If one or both of the clamps are not in complete contact (both the copper and silver jaw) CHECK CONNECTIONS! will flash on the LCD.

2 BATTERY TEST




```
>BATTERY TEST
 STARTER TEST
 ALTERNATOR TEST
 REVIEW/PRINT   ↓
```

Select Battery Test from the main menu and then press (Y Enter).

If any of the tests (battery test or starter test, or alternator test) are selected and the clamps are not connected to the battery the following screen will appear.

```
>CONNECT CLAMPS
 TO BATTERY.
 RED+, BLACK-
 'Y' TO CONTINUE
```

Press 'Y' to continue once the clamps are connected the test will proceed.

```
>ENTER BATTERY
 TEMP       70F
 USE +/-
 'Y' TO CONTINUE
```

Note: Enter the approximate battery temperature.

```
>ENTER RATED CCA
 600    USE +/-.
 12.50V
 'Y' TO CONTINUE
```

Press the (+Up) or (-Down) key to increment or decrement to the rated CCA of the battery.

STARTER TEST cont




```
 CK SOLENOID     ↑
 CK CABLES
 CK CONNECTIONS
 CK FOR CORROSION ↓
```

Press the (-Down) key to display the next screen. Press the (+Up) key to move to the previous screen

```
 IF ALL CK GOOD ↑

 RECOMMEND BENCH
 TESTING STARTER
```

If the current is over 250A, the system will need more information to determine if the starter is good. The next screen will ask what type of engine you are testing.

```
 WHAT TYPE ENGINE
 ARE YOU TESTING
 USE +/- DIESEL
 'Y' .TO CONTINUE
```

Use the +/- key to choose between gas and diesel.

```
HOW MANY CYLINDERS
DOES ENGINE HAVE
USE +/- 4
'Y' TO CONTINUE
```

If the engine is diesel the system will need to know the number of cylinders the engine has. Use the +/- key to choose either 4, 6 or 8.

The chart on page 16 shows the current limits for the different engine types. If the starter is likely to have a problem the following screens will appear.

```
#74 12V STARTING
CURRENT 680A
   - FAILED -
 'Y' TO CONTINUE↓
```

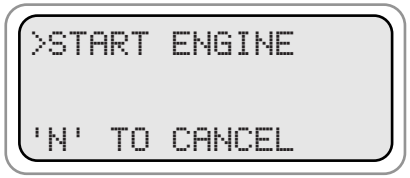
```
CK CABLES        ↑
CK CONNECTIONS
CK SHORT/GROUND
CK SOLENOID      ↓
```

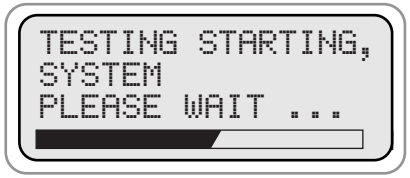
Advice for what to do next.

STARTER TEST cont



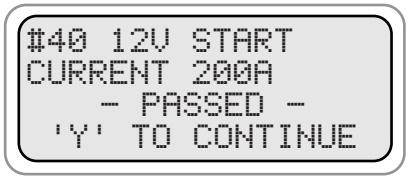
Wait for instructions before cranking engine.





The BVA-230 will test the starting system. A bar at the bottom of the screen will show the tests progress.

If the current draw is between 75A & 250A (for gas powered engines) the starting system is likely good and the following screen will appear



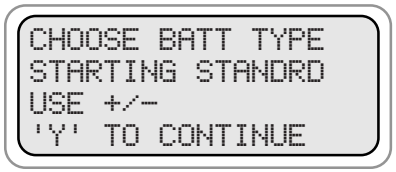
If the current is under 75A a solenoid connection or corrosion problem is likely and the following screens appear.



Press the (-Down) key to display the next screen. Press Y or N to go to the main menu.

BATTERY TEST (cont.)

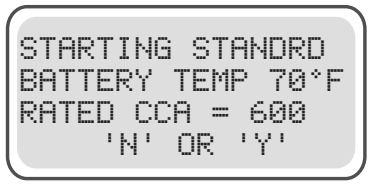




Press the (+Up) or (-Down) key to cycle through the battery types. Press 'Y' when it matches the type of battery you are testing.

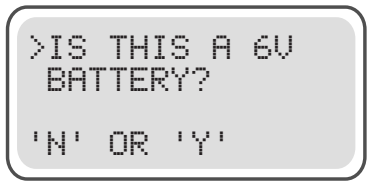
BATTERY TYPE OPTIONS:
STARTING STANDRD
STARTING AGM
DEEP CYCLE AGM
DEEP CYCLE STANDRD

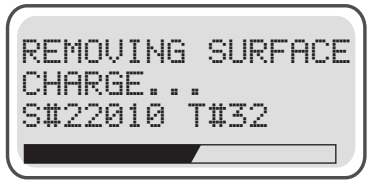
SUMMARY SCREEN



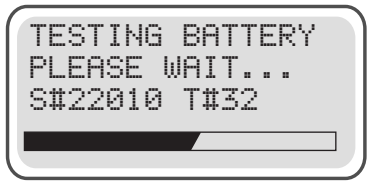
Confirm that the inputs are correct. Press "Y" if they are correct. The test will start. Press "N" to re-enter battery type, temp, and rating.

If the reading is below 7.2 Volts you will get the following:





Surface charge removed if detected.



Bar at the bottom of the screen will show the tests progress.

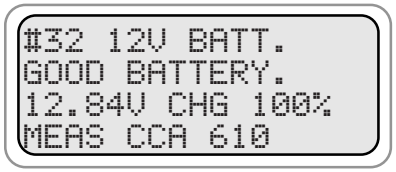
Wait for test results.

The BVA-230 serial number and test number are displayed to help reference the test to the print out.

BATTERY TEST (cont.)



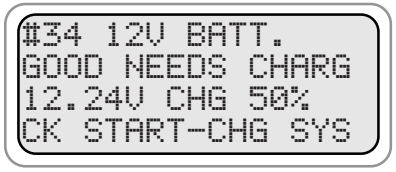
After the Digital Pulse Load Test is completed results similar to one of the following sample screens will appear.



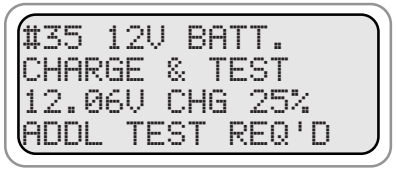
Battery passes testing. Return to service.



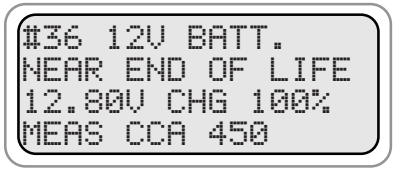
Battery did not have sufficient remaining capacity to pass tests. Battery should be replaced immediately.



Charge battery and place into service.



Battery did not have a sufficient charge for a Digital Pulse Load Test. Charge and retest battery.



Battery passes testing and is near end of life. Battery is ok for mild climate. May not start vehicle in hot or cold conditions.

3 STARTER TEST



The starter test measures the amount of current needed to crank the engine and provides the initial information to diagnose and/or further test the starting system if necessary

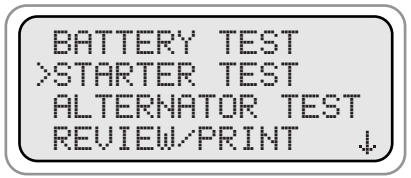
Symptomatic Check before Proceeding:

- Check all cables and connections.
- Check the battery for corrosion and dirty terminals.
- Check starter/solenoid for visual defects.
- Check the ignition switch and any magnetic switches for loose or bad wiring, loose mounting, or connections and sticking contacts.
- Check for starter/solenoid noise. The type of noise or the lack thereof can help in diagnosing the problem.
- Does the solenoid click, but the starter does not turn? Does the starter turn, but not engage the flywheel? Is the starter sluggish?

Note: A remote starter switch can be used to bypass the ignition switch and crank the engine from under the hood. This way the sounds of the starter can be heard.

STARTER TEST

Press (N Esc.) to return to main menu. Select **Starter Test** then press (Y Enter).



Use the (+Up) and (-Down) to move cursor to the desired test



Press (Y) and tester prepares for the starter test. Bar at the bottom of the screen will show the progress.