



## **BVA-300** **Operator's Manual**

### ***Hand Held-Accuracy with a 40 Amp Load***

The BVA-300 is the a hand-held tester that is the auto industry's answer to portability in a professionally accurate battery load tester and system analyzer.



**Auto Meter Products Inc.**

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[www.autometer.com/test](http://www.autometer.com/test)

## CONGRATULATIONS!



You have purchased one of Auto Meter's hand-held Battery, Starting and Charging System Analyzers. It is designed to test each component of a vehicle's electrical 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-300

Load Test Capacity.....	40 Amp
Battery Sizes.....	100-1600 CCA
Digital Display .....	1" x 2.5" - 4 line x 16 character
Volt Ranges.....	Digital 0-30
Cooling.....	Heat Sink Ventilation
Leads .....	Load Amp-2 1/2 ft., 16 Gauge
Size .....	3 3/4" x 6 3/4" x 1"
Memory .....	stores the last 100 tests
Internal Battery.....	9 Volt Alkaline
<i>Optional</i> PR-12 .....	Infrared printer
<i>Optional</i> AC-12 .....	PC Interface adapter cord
<i>Optional</i> AC-24J.....	Carrying case only
<i>Optional</i> AC-32 .....	Serial Port to USB adapter
<i>Optional</i> AC-62 .....	AMP Link Data Download PC software
Weight.....	1.34 lbs.

## What to Expect from the BVA-300:

***Immediately determine battery condition and perform a complete starting and charging system analysis.*** The BVA-300 is a portable full-featured menu-driven battery tester and system analyzer that provides quick, professional load results using Auto Meter's Pulsed Load. The BVA-300 is user friendly. It tells you what to do. The stator-diode test automatically indicates open or shorted stator-diodes. It is professionally accurate. Detailed test results are LCD displayed after each test and can be reviewed and/or printed from memory.

## LIMITED WARRANTY



### 12 MONTHS FROM DATE OF PURCHASE- CABLES 90 DAYS

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.

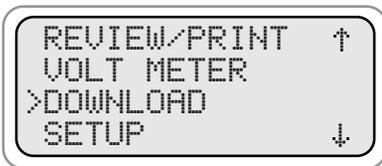
Improper use, accident, water damage, abuse, unauthorized repairs or alterations voids this warranty. The manufacturer disclaims any liability or consequential damages due to breach of any written or implied warranty on its test equipment.

### WARRANTY AND SERVICE INFORMATION

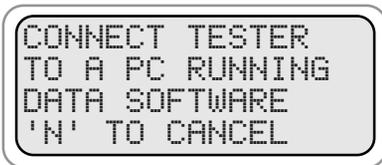
Warranty claims to the manufacturer's service department must be transportation prepaid and accompanied by a dated proof of purchase. This warranty applies only to the original purchaser and is non-transferable. Freight damage incurred during return shipments is not covered under this warranty. It is 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.



From the Main Menu scroll down to **DOWNLOAD**



The following will be displayed



Using Auto Meter's optional adapter cord AC-12 insert the stereo plug into the jack on the BVA-300 and then plug the serial adapter into a free serial port on the rear of your computer or connect to AC-32 serial port to USB adapter. Follow the instructions of the AC-62 AMP Link Data Download software to retrieve data from the BVA-300.

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**Note:** The BVA-300 load tests 6 volt and 12 volt batteries and tests 12 Volt and 24 Volt starting and charging systems. The following examples illustrated are for a 12 Volt system. The BVA-300 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-300
- Wear proper protection when working around batteries.
- Be sure each test is complete before removing load clamps to prevent arcing and potential explosion from battery gases. 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-300 to a battery that is connected to any other tester or charging unit. Damage may result.

**Wear  
Safety  
Glasses**



### 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 Amp rating for original vehicle specifications.
- **Incorrect Installation:** Loose battery hold-downs cause excessive vibration, which can result in damage to the battery 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 old, the failure may be caused by natural causes.
- **Overcharging:** Overcharging caused by a high voltage regulator setting or incorrect battery charging can cause excessive gassing, 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 charged.

## SETUP (cont.)

```
>SET DEFAULT  
RATING: CCA  
USE +/-  
'Y' TO SELECT
```

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

```
>SET DEFAULT CCA  
AS: 600  
USE +/-  
'Y' TO SELECT
```

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

```
DO YOU WANT TO  
DISPLAY MEASURED  
BATTERY CAPACITY  
'N' OR 'Y'
```

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.

```
USE TEST RESULT  
NEAR END OF LIFE  
USE +/-  
'Y' TO SELECT
```

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.

```
PRINTOUT OPTION  
AC-14/PR-12  
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 "POSI-160".

```
DO YOU WANT TO  
ENTER STORE INFO  
'N' OR 'Y'
```

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

### Entry Hints

**Note:** Address one & two and city have a max of 23 characters.

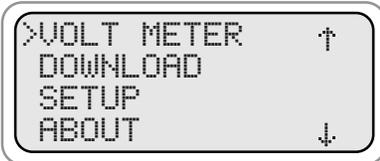
To change the text or number press the (+) or (-) keys. If you press 'N' at the beginning of the screen, no changes will be made. To make changes, use the (+) and (-) keys then press 'Y' to save the change. The cursor will then go to the next character or number. If you are done making changes but there is

more text keep pressing 'Y' until the cursor is on a blank space at the end of the lines of text. Pressing 'N' moves back the cursor position back one character. Pressing Print saves the text up to the cursor position. Any text after is deleted.

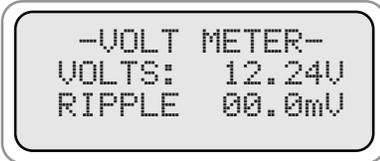


## VOLT METER

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



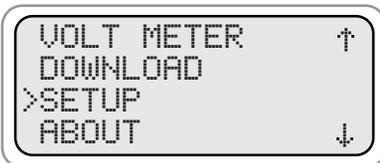
Press (Y Enter)



**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



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



Select the temperature in Fahrenheit or Centigrade.

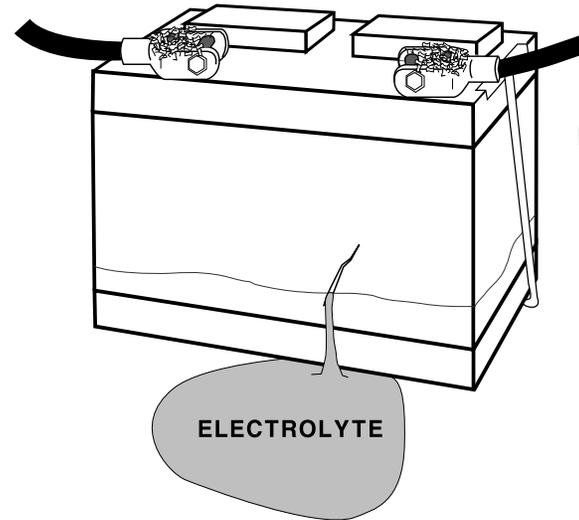
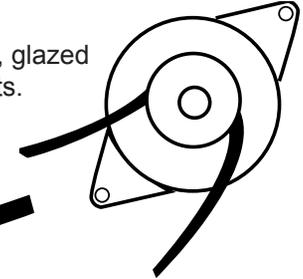


## INSPECTION

- 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 before attempting any electrical diagnosis.

### VISUAL CHECK

- Inspect Belts and Pulleys** 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 known defective 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.

### +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.

### N Esc Key:

This key cancels a test or progression. It also returns to the previous menu.

### Print Key:

Point the BVA-300 infrared print light towards the *Optional PR-12* infrared printer receiver and press the print key. Test results will be printed.



### Infrared Print Light:

When the print button is pressed infrared data will be transmitted to the printer when pointed in the approximate direction of the printer (up to 40 ft.).

### PC Download Jack:

Adapter cord AC-12 can be inserted.

## PRINTING TEST RESULTS

Point the BVA-300 in the direction of the PR-12 printer with the printer's IR receiver pointed in the direction of the BVA-300. Press (Print). You should be within 15 ft of the printer. Wait for the screen to clear before moving the BVA-300. It takes a moment to send all the test data. The BVA-300 also operates the AC-14 printer installed in Auto Meter's XTC-160 tester/charger or BVA-2100 heavy-duty tester/analyzer or Auto Meter's PR-16 Printer when used with a XTC-160 and IR-1 Printer Interface.



### PR-12



- Make sure the Infrared Printer is properly set up.
- After a test is made with the BVA-300 make sure the results are displayed on the LCD.
- Point the BVA-300 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.



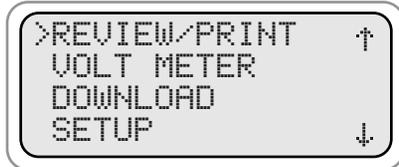
# 5

## OTHER MENU ITEMS



### REVIEW TESTS

Scroll Down to Review/Print



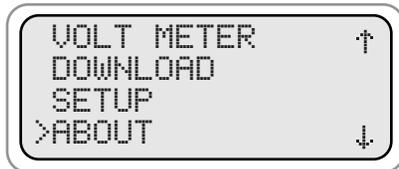
Press (Y Enter) to select Review/Print.

The last test will be displayed.

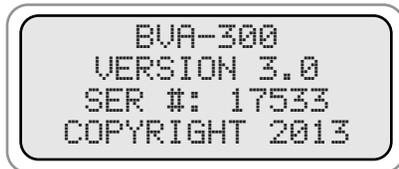


Press (N Esc.) to select previous test. Press (+Up) or (-Down) key to select the desired test.

### 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.

## MAINTENANCE

### CLAMP MAINTENANCE:

CHECK OFTEN FOR LOOSE JAWS OR DAMAGED INTERNAL INSULATOR

- Both jaws of each clamp must firmly engage the battery terminal. The wire soldered to the copper insert jaw must be insulated from the other wire soldered to the opposite handle. This insulation is required so that one can read the Amps and the other can read the Volts. Damaged clamps or loose wires will affect readings. Make sure the copper jaw insert is properly insulated from the clamp and the clamps are clean and in good repair.

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

- CCA values seem extreme.
- If there is continuity between the copper insert and the clamps.
- If there is excessive damage or corrosion to the cables or clamps.

### CLAMP and BATTERY REPLACEMENT

- Remove the screws from the back cover.
- Separate top and bottom cover and open like a book leaving the ribbon in contact with the PC board that will remain with the back cover.
- CLAMPS:** Remove the cables and strain relief. With the new load clamp leads pointing down; insert the new strain relief into the back cover. Make sure the red clamp wires are attached to the left two screws of the green screw terminal (labeled POS) and the black clamp wires are connected to the right two screws (labeled NEG). It does not matter if either of the two red clamp wires is switched. The same applies to the two black clamp wires. Just make sure the red clamp wires are to the left (POS) and the black clamp wires are to the right. (NEG)
- BATTERY:** Remove the battery and replace with a 9 Volt battery. Match the (+) on the new battery with the (+) on the PC board.
- Reverse the procedure to assemble the unit.

# 1

## HOOK UP

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

```

AUTO METER
EVA-300
TESTER/ANALYZER
'Y' FOR MENU

```

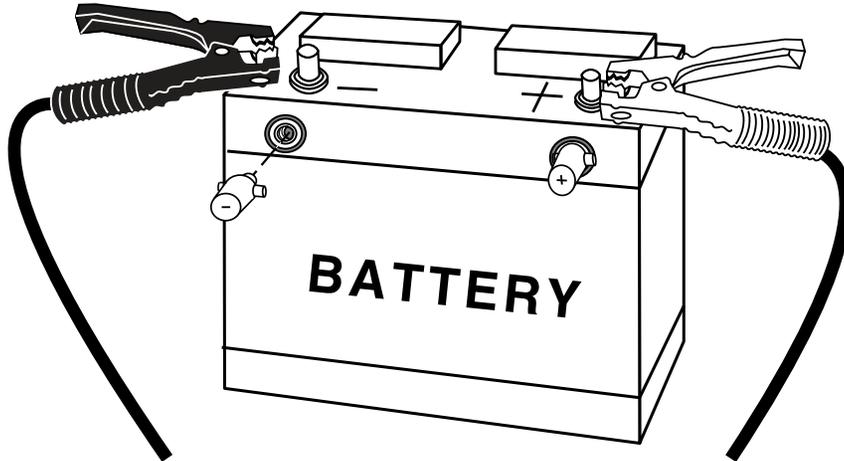
```

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

```

Enter the approximate battery temperature in degrees Fahrenheit or Celsius (seen note) then press (Y Enter).

**Note:** Go to the setup to change temp scale to Celsius. 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 connect load clamps to the post to which the system is attached.

### CONNECTION ERRORS

- If the clamps are reversed the Reversed Connection screen will flash.
- If one or both of the clamps are not in complete contact (including both jaws) CHECK CONNECTIONS! will flash.

## ALTERNATOR TEST RESULTS

Test result will appear. The following are examples.

```

#3 12V ALTER.
VOLT REG PASSED
DIODES PASSED
OUTPUT PASSED

```

Alternator passed all tests.

```

#3 12V ALTER.
VOLT REG PASSED
DIODES PASSED
OUTPUT FAILED ↓

```

Alternator output is too low.

```

#3 12V ALTER.
VOLT REG PASSED
DIODES FAILED
'Y' TO CONTINUE ↓

```

The alternator diodes are bad.

```

#3 12V ALTER.
VOLT REG FAILED
DIODES PASSED
'Y' TO CONTINUE ↓

```

The alternator voltage regulator has failed and the voltage is either too high or too low.

# 4

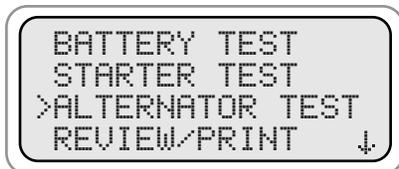
## ALTERNATOR TEST



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.

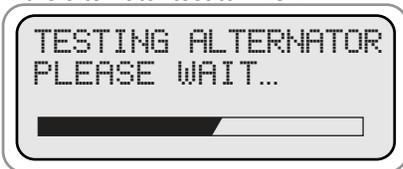


Use the (+Up) and (-Down) arrows to move cursor to the desired test.



The BVA-300 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.

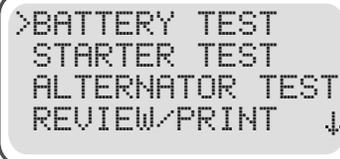
Allow the alternator test to finish.



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

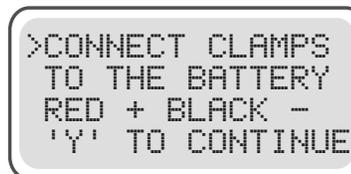
# 2

## BATTERY TEST

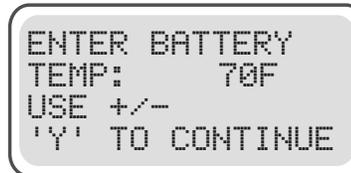


Select Battery Test from the main menu and then press (Y Enter).

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.

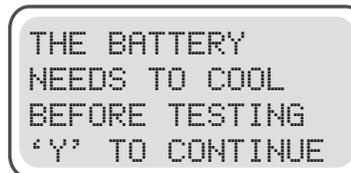
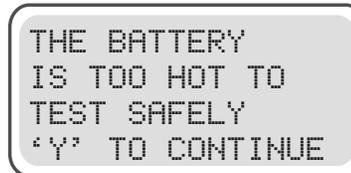


Press 'Y' to continue once the clamps are connected the test will proceed.

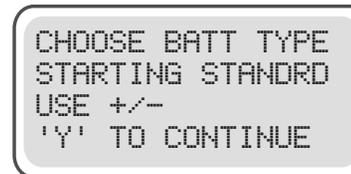


Use the (+Up) and (-Down) Keys to adjust the battery temperature. Press 'Y' to enter.

If the battery temperature is above 180°F the battery is too hot to safely test. the following screens will appear.



Pressing 'Y' or 'N' will return to the main menu. Let the battery cool before testing



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 STD

## BATTERY TEST (cont.)



```
>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.

## SUMMARY SCREEN

```
STARTING STANDRD
TEMP      70°F
RATED CCA = 600
'N' OR 'Y'
```

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:

```
>IS THIS A 6V
BATTERY?
'N' OR 'Y'
```

```
REMOVING SURFACE
CHARGE...
S#22010 T#32
```

Surface charge removed if detected.

```
TESTING BATTERY
PLEASE WAIT...
S#22010 T#32
```

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

Wait for test results.

The BVA-300 serial number and test number are displayed to help reference the test to the print out.

## STARTER TEST (cont.)



```
IF ALL CK GOOD ↑
RECOMMEND BENCH
TESTING STARTER
```

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	5 Cyl Gas Up to 250A	6 Cyl Gas Up to 250A	8 Cyl Gas Up to 250A
4 Cyl Gas Up to 350A	5 Cyl Dsl Up to 400A	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-300 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.

## 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 (+Up) and (-Down) keys 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 (+Up) and (-Down) keys to choose either 4, 5, 6 or 8.

The chart on page 15 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 STARTER
CURRENT: 680A
- FAILED -
'Y' TO CONTINUE ↓
```

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

Advice for what to do next.

## BATTERY TEST (cont.)



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

```
#32 12V BATT.
GOOD BATTERY!
12.84V CHRG 100%
MEAS CCA 610
```

Battery passes testing. Return to service.

```
#33 12V BATT.
BAD BATTERY!
12.45V CHRG 75%
MEAS CCA 400
```

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

```
#34 12V BATT.
GOOD NEEDS CHRG.
12.24V CHRG 50%
MEAS CCA 400
```

Charge battery and place into service.

```
#35 12V BATT.
CHARGE & TEST
12.06V CHRG 25%
'Y' TO CONTINUE
```

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

```
#36 12V BATT.
NEAR END OF LIFE
12.80V CHRG 100%
MEAS CCA 450
```

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

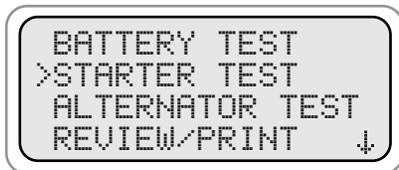
### Symptomatic Check before Proceeding:

- 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

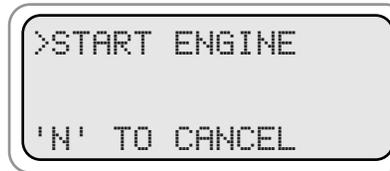


Press (Y) and tester prepares for the starter test. Bar at the bottom of the screen will show the progress.

## STARTER TEST (cont.)

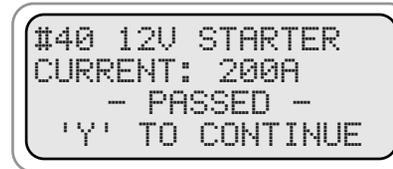


Wait for instructions before cranking engine.

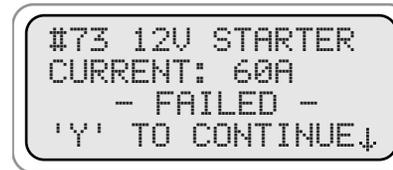


The BVA-300 will test the starting system. A bar at the bottom of the screen will show the tests progress.

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.