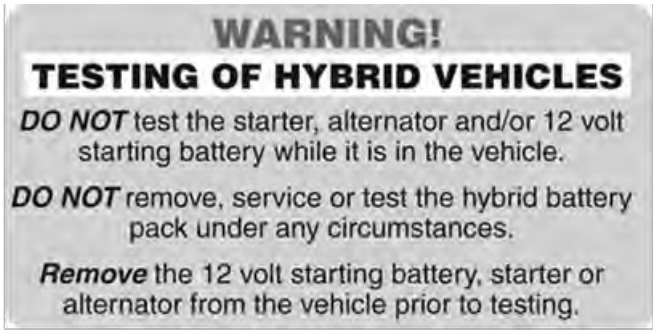
BCT-460DTNA PowerNet Assessment Tool Work Instructions

Note: The BCT-460DTNA performs a complete electrical system test (PowerNet Test) that checks the Battery Pack state of charge, Battery Interconnect cables voltage drop, Individual Batteries, Starter Cables voltage drop, Starter, Alternator Cable voltage drop, and Alternator test. **A completed PowerNet Test must be completed for all warranty claims.**

SAFTEY

- Carefully read all operating instructions before using the BCT-460DTNA
- 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 vehicle 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 BCT-460DTNA to a battery that is connected to any other tester or charging unit. Damage may result.



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 gassing, heat and water loss.

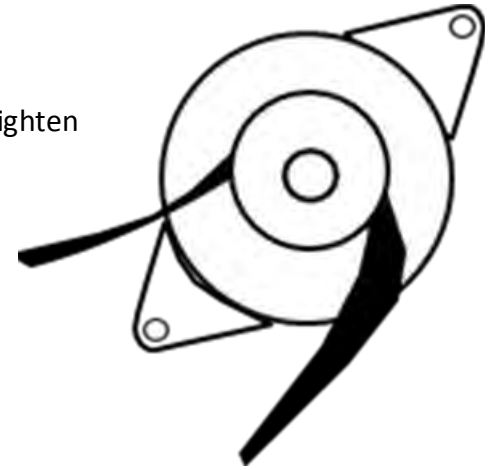
Undercharging: Undercharging caused by a faulty charging system or low voltage regulation can cause lead sulfate to gradually build up and crystallize on the plates greatly reducing the battery's capacity and ability to be recharged.

INSPECTION

Valid heavy duty 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

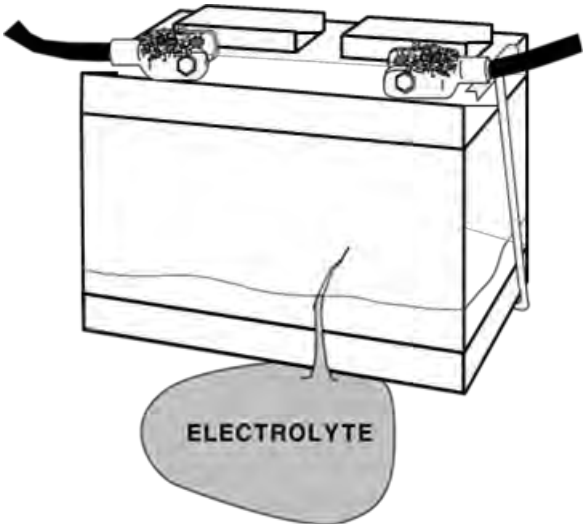
Inspect Belts for cracks, glazed surface and fraying. Tighten loose belts before proceeding.



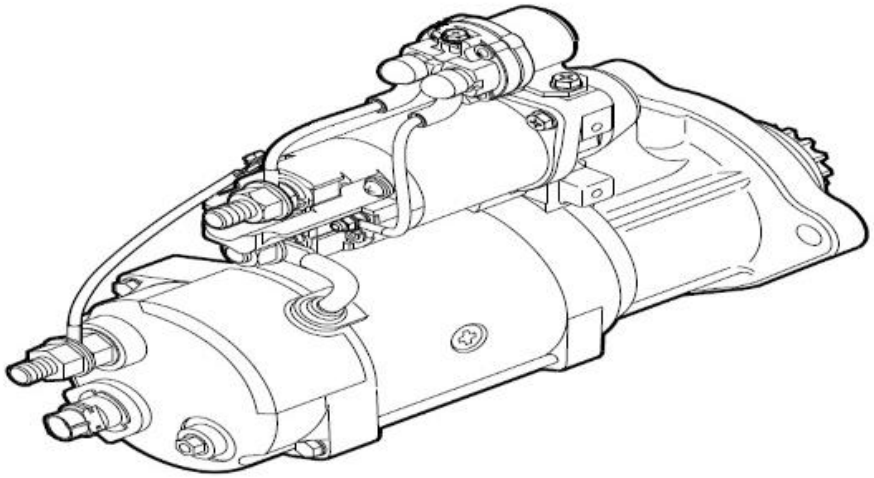
Inspect Battery for terminal corrosion, loose or broken posts, cracks in the case, loose hold-downs, low electrolyte level (if possible), moisture and dirt around the terminals.

If the battery terminals are corroded or dirty, clean terminals before performing any tests

Important Note: A damaged battery must be replaced before proceeding.



Inspect Starting System – Check starter, solenoid for loose connections, loose mounts and frayed or cracked cables



WIRELESS COMMUNICATION

Bluetooth

The BCT-460DTNA uses Bluetooth to communicate between the control module and load module. This allows you to make the connections, remove the control module and the run the tests from inside your vehicle.

The BCT-460DTNA control module and load module come paired from the factory.

Bluetooth will work as long as the distance between the load module and control module is less than 30 feet. Walls, windows and other objects between the control module and load module will affect the range.

If you do experience any communication issues please look at the troubleshooting guide at the back of this manual on how to correct them.

Wi-Fi

The BCT-460DTNA uses Wi-Fi to communicate between the control module and AMPNET server. The AMPNET service will provide firmware updates for the control module and the load module. You will need to pair the control module with your local wireless LAN. See Wi-Fi section for instructions on setting up the wireless connection.

AMPNET

The data from your BCT-460DTNA can be downloaded to the data management software known as AMPNET. This is software that can be used to display and track your battery, starting system, and charging system test results in graphical form.

CONTROLS AND FUNCTIONS

Control Module (CM) and Load Module (LM) mated and latched

Control Module (CM)

Load Module (LM)

Load Module (LM)
Push Button Power

Load Module (LM) Push Button Power

On: Push and Hold button for 1 second
Power Off: Push and hold for more than 5 seconds
Reboot/Reset: Push and hold button for 3-4 seconds

CONTROLS AND FUNCTIONS cont.

The following screens are located in the option menu, by selecting the 3 Dots ⋮ icon in the upper right corner on the main screen.

Options Menu
Click on the 3 dots to access the drop down menu. The drop down menu is for options of the tool.

About Screen
The About screen gives user the information about the applications version and how to contact Auto Meter.

Update Firmware
Update software screen allows the user to update both the Control modules application or the Load module firmware.

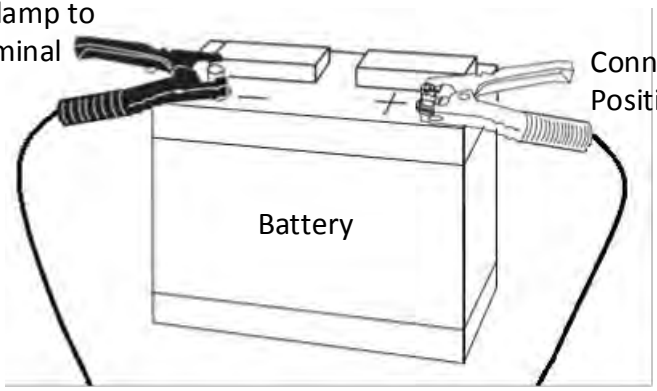
Battery Status
Display the state of charge of the batteries in the Control module (CM) and the Load module (LM). This screen can also be used to verify the CM and LM are connected.

Send PowerNet Test
If the test results are not showing up in AmpNet, use this option to manually send the test to AmpNet.

Bluetooth Settings
Use this screen to connect or verify the CM and LM Bluetooth connection.

Hook Up

Connect Black Clamp to
Negative (-) Terminal



Connect Red Clamp to
Positive (+) Terminal

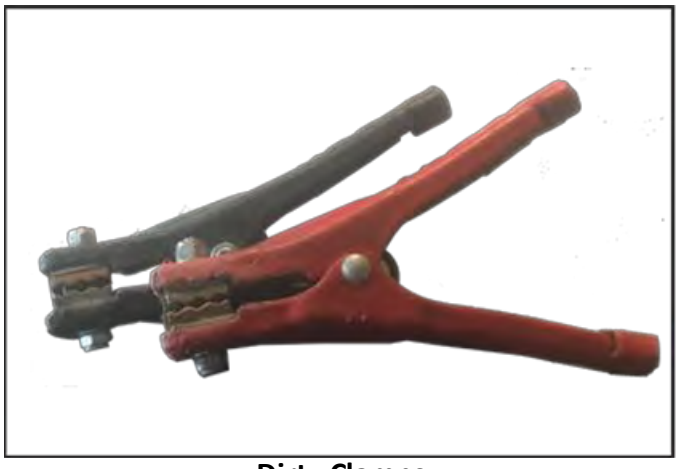
CONNECTING ADAPTORS TO COMPONENT

- Clean matting surface for adaptor with a wire brush to remove any dirt, grime or corrosion protection covering
- Make sure the adaptor is properly torqued to component.

CONNECTION ERRORS

- If the clamps are reversed the Reversed Connection warning will be displayed on the Control Module with an audible beeping.
- If one or both of the clamps are not in complete contact (both of each clamp jaws) A "Check Connections" screen will appear on the control module.
- Clean battery terminals with a wire brush if battery terminals are corroded or dirty. Clean clamp jaws with 1 part ammonia and 10 parts water if clamp jaws are corroded or dirty.

Clean Clamps



Dirty Clamps

PowerNet Test (Info Screen)

Note – the tool has to have been set up and connected to Wi-Fi before these work instructions can be followed. Refer to manual for Wi-Fi connections and set up.

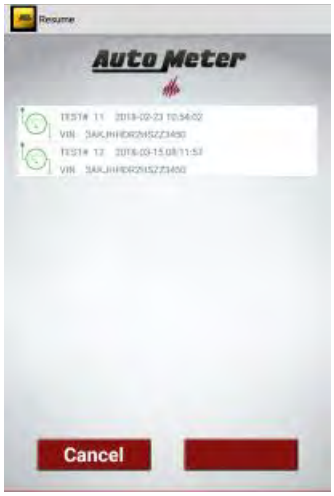
To start the PowerNet test. Press the Blue Icon that says “DTNA PowerNet” on the main screen

If Resume is chosen a list of active tests will appear and the user can choose the test they want to resume. The test are organized by Vin and Date. The latest started test will be at the top.

Safety screen

New

Resume



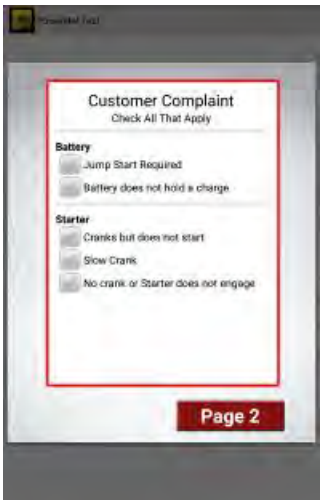
The user will be asked if this is a “New” test or do they want to “Resume” a previous test that was already started.

Go to page 7

The test will start at retesting the battery pack to verify the pack is charged. After the pack test, the test will resume at last step that hasn’t been completed.

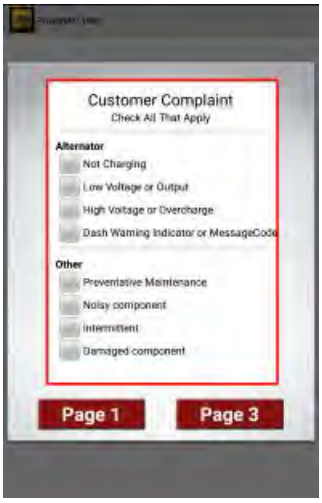
PowerNet Test (Info Screen)

Continued from page 6



Check all that apply

Click on page 2 to continue to the next screen



Check all that apply

Click on page 3 to continue to the next screen

Click on the page number to return to the previous screen.

The complete 18 digit Vehicle VIN must be entered.

Click on the Camera Icon to open screen for scanning vehicle QR code.

VIN QR Code Locations

Freightliner – Driver door jamb by striker

Western Star – Driver door jamb by door hinges

The complete Repair Order ID must be entered.

Vehicle Odometer, Tech ID and repair comments, can also be entered. Press Done on the keypad when finished entering data. Move on to next screen by pressing Done button on the bottom.

Continue to page 8

PowerNet Test (Battery Pack Test)

Continued from page 7

No

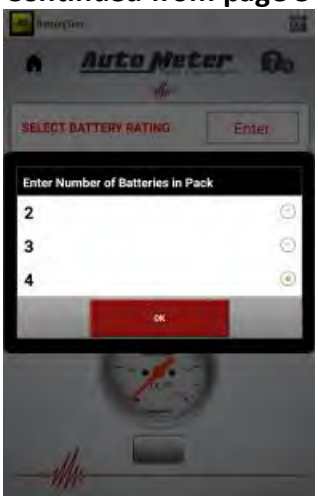
If "No" is selected for "Does the Vehicle Have an Auxiliary Battery Pack" the tester will skip over testing the Auxiliary battery pack.

Yes

Continue to page 9

PowerNet Test (Starting Battery Pack Test)

Continued from page 8



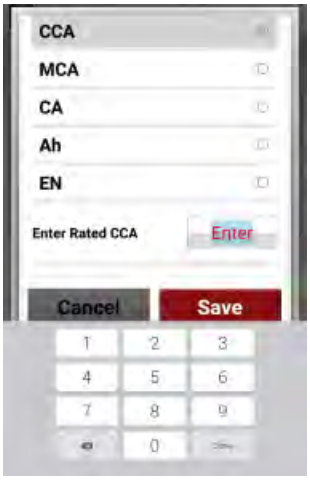
Note:
If an error has been made in any of the battery data fields. Just reselect the battery data field to change the data.

Select Battery Rating to bring up screen for scan or manual entry option.

"Manual Entry"

"Scan Battery QR Code"

When the battery QR code is scanned, the battery rating, type, and serial number are entered into the tool.



Continue to page 10
Section A

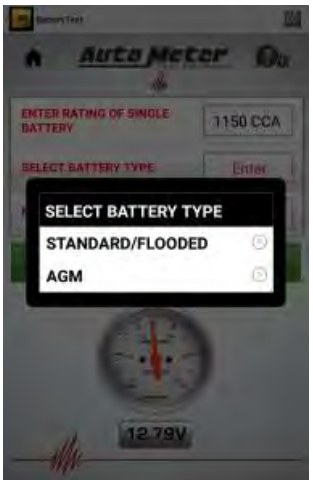
Continue to page 10
Section B

PowerNet Test (Starting Battery Pack Test)

Continued from Page 9 - Section A

Select "Battery Type" to input the type of battery

If an error has been made in any of the battery data fields. Just reselect the battery data field to change the data.

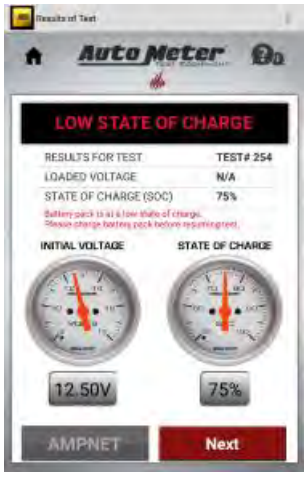


Select the type of batteries that are in the battery pack.
Gray Case - AGM
Black Case - Standard/ Flooded

Select "Measure Battery Temp" to input the battery temperature.

Continued from Page 9 - Section B

If battery pack has a low state of charge. Charge the battery pack before proceeding. The PowerNet test can be resumed after the battery pack has been charged and tested.

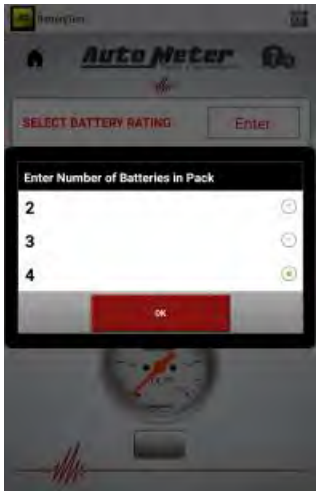


If the truck does NOT have an Auxiliary Battery Pack Continue to page 13

If the truck has an Auxiliary Battery Pack Continue to page 11

PowerNet Test (Auxiliary Battery Pack Test)

Continued from page 10

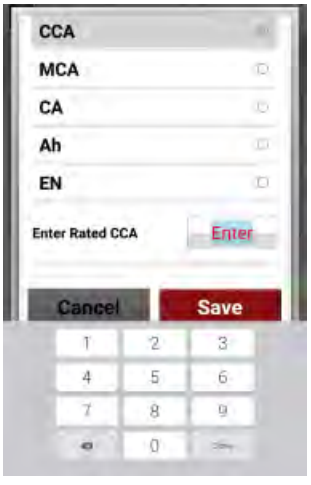


Note:
If an error has been made in any of the battery data fields. Just reselect the battery data field to change the data.

"Manual Entry"

"Scan Battery QR Code"

When the battery QR code is scanned, the battery rating, type, and serial number are entered into the tool.



Continue to page 12
Section A

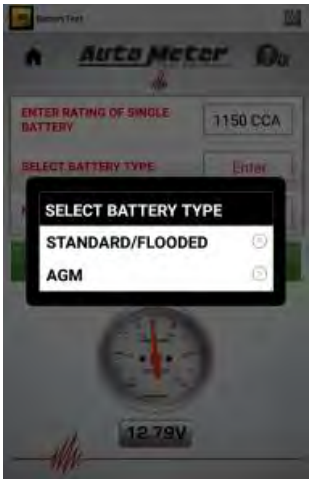
Continue to page 12
Section B

PowerNet Test (Auxiliary Battery Pack Test)

Continued from Page 11 - Section A

Select "Battery Type" to input the type of battery

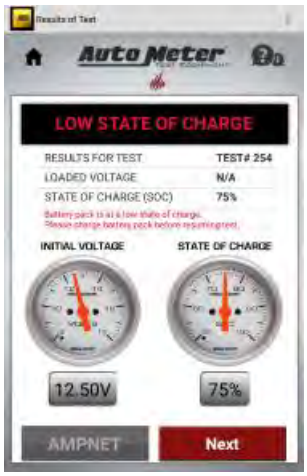
If an error has been made in any of the battery data fields. Just reselect the battery data field to change the data.



Select the type of batteries that are in the battery pack.
Gray Case - AGM
Black Case - Standard/ Flooded

Select "Measure Battery Temp" to input the battery temperature.

Continued from Page 11 - Section B

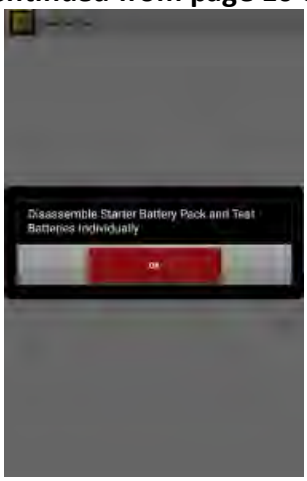


If battery pack has a low state of charge. Charge the battery pack before proceeding. The PowerNet test can be resumed after the battery pack has been charged and tested.

Continue to page 13

PowerNet Test (Individual Battery Test)

Continued from page 10 or 12



Disassemble battery pack to test individual battery.

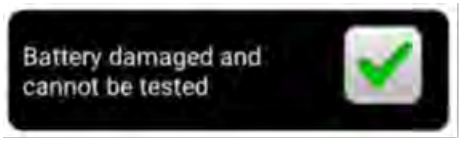
Note:
Disconnect positive and negative battery interconnect cables to test batteries individually.

Select all that apply

Standard battery testing

Continue to page 14

If "Battery Damaged and Cannot be Tested" is selected.



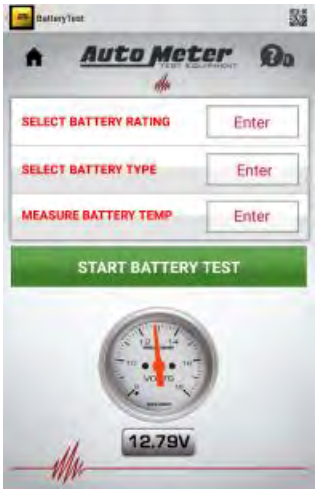
"Battery damaged and cannot be tested" prompt

By selecting this prompt you acknowledge that the battery is physically damaged and unsafe to test. There will be no battery test performed. The test result of "Damaged Battery" will be captured on the test data.

If "Battery Damage" is selected. The test will resume at the next individual battery test. If the last battery is selected as "Battery Damaged" the test will stop and direct to replacing faulty battery.

PowerNet Test (Individual Battery Test)

Continued from page 13

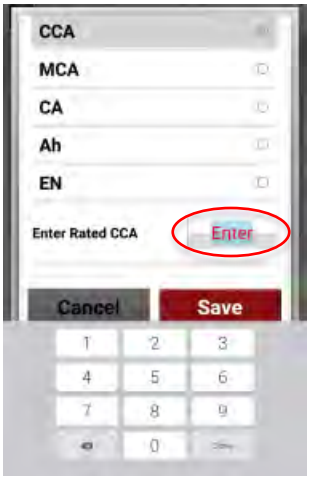


Select Battery Rating to bring up screen for scan or manual entry option.

"Manual Entry"

"Scan Battery QR Code"

When the battery QR code is scanned, the battery rating, type, and serial number are entered into the tool.



Select "Enter Rated CCA" to input the battery CCA rating.

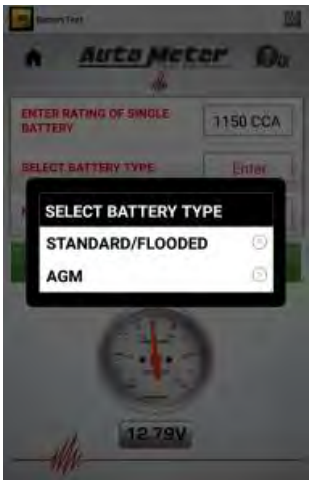
Continue to page 15
Section A

Continue to page 15
Section B

PowerNet Test (Individual Battery Test)

Continued from Page 14 - Section A

Select "Battery Type" to input the type of battery



Select the type of batteries that are in the battery pack.
Gray Case - AGM
Black Case - Standard/Flooded

Select "Measure Battery Temp" to input the battery temperature.

Continued from Page 14 - Section B

Select "Start Battery Test" to continue

Note:
If an error has been made in any of the battery data fields. Just reselect the battery data field to change the data.

If the "Battery Damaged and cannot be tested" prompt was NOT selected. Continue to Section A on page 16

If the "Battery Damaged and cannot be tested" prompt was selected. Continue to Section B on page 16

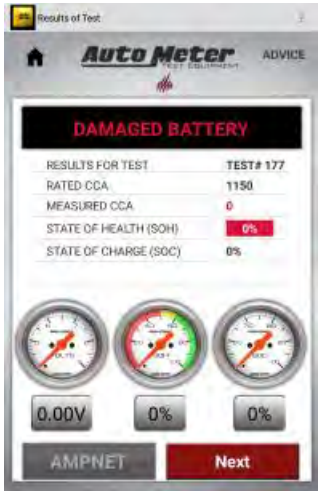
PowerNet Test (Individual Battery Test)

Note:
When Needed, the tester will apply a load to the battery to remove surface charge.

Continued from Page 15 - Section A

Continued from Page 15 - Section B

If the battery QR code **was** scanned, the test will **not** ask to enter the battery serial number. If the battery QR code **wasn't** scanned then the battery serial number **must** be entered.



Steps will be the same on any battery that is labeled as damaged.

Note:
Battery testing will repeat for as many battery as the user inputted into the tester, that are in the battery pack

If Equipped with AUXILLARY battery pack Continue to page 19

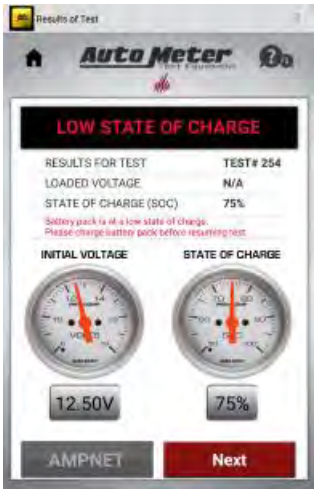
If **Not** Equipped with AUXILLARY battery pack Continue to page 17

Continue to page 17

PowerNet Test (Individual Battery Test)

Note:
Depending on the outcome of the battery test. Any one of these test results could show up.

Continued from page 16



Battery will need to be charged before PowerNet can be continued

If the battery QR code **was** scanned, the test will **not** ask to enter the battery serial number. If the battery QR code **wasn't** scanned then the battery serial number **must** be entered.

Note:
Battery testing will repeat for as many battery as the user inputted into the tester, that are in the battery pack

If Equipped with AUXILLARY battery pack Continue to page 19

If **Not** Equipped with AUXILLARY battery pack Continue to page 18

If all batteries test good, no further battery repairs are required. Continue to page 25

PowerNet Test (Individual Battery Re-Test)

Continued from page 16 or 17

Tip:
There will be a prompt to replace the battery for each battery that has failed. If multiple batteries have failed. Replace all the batteries that have failed at the same time.

Every battery, that has been replaced, will need to be retested. Battery testing prompts are all the same as regular battery testing.

The PowerNet test will not continue until all batteries pass the individual battery test

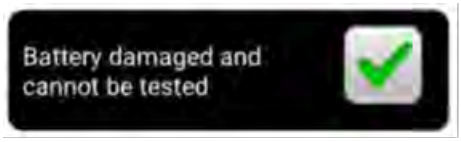
Continue to page 19 or 25

PowerNet Test (Aux Individual Battery Test)

Continued from page 17

Select "Next" to Continue

If the battery QR code is scanned, the battery serial number will be inputted automatically, and no serial number needs to be entered if the battery fails the battery test.



"Battery damaged and cannot be tested" prompt

By selecting this prompt you acknowledge that the battery is physically damaged and unsafe to test. There will be no battery test performed. The test result of "Damaged Battery" will be captured on the test data.

Select all that apply

Standard battery testing

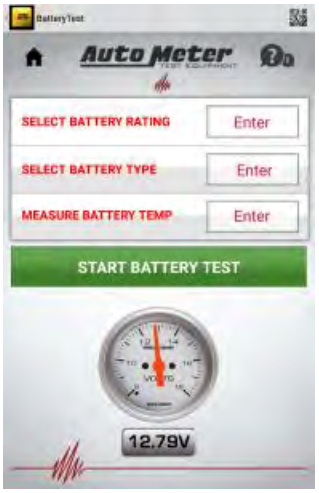
If "Battery Damaged and Cannot be Tested" is selected.

If "Battery Damage" is selected. The test will resume at the next individual battery test. If the last battery is selected as "Battery Damaged" the test will stop and direct to replacing faulty battery.

Continue to page 20

PowerNet Test (Aux Individual Battery Test)

Continued from page 19

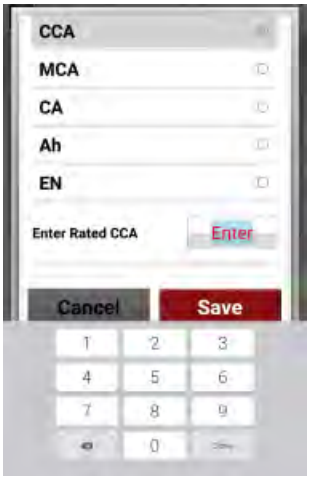


Select Battery Rating to bring up screen for scan or manual entry option.

"Manual Entry"

"Scan Battery QR Code"

When the battery QR code is scanned, the battery rating, type, and serial number are entered into the tool.



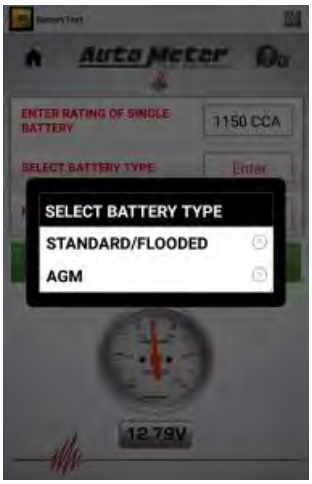
Continue to page 21
Section A

Continue to page 21
Section B

PowerNet Test (Aux Individual Battery Test)

Continued from Page 20 - Section A

Select "Battery Type" to input the type of battery



Select the type of batteries that are in the battery pack.
Gray Case - AGM
Black Case - Standard/Flooded

Select "Measure Battery Temp" to input the battery temperature.

If the "Battery Damaged and cannot be tested" prompt was NOT selected. Continue to Section A on page 22

Continued from Page 20 - Section B

Select "Start Battery Test" to continue

If the "Battery Damaged and cannot be tested" prompt was selected. Continue to Section B on page 22

Note:
If an error has been made in any of the battery data fields. Just reselect the battery data field to change the data.

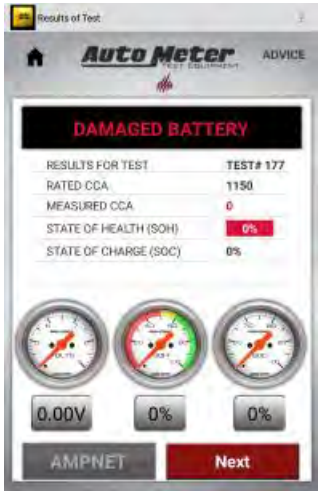
PowerNet Test (Aux Individual Battery Test)

Note:
When Needed, the tester will apply a load to the battery to remove surface charge.

Continued from Page 21 - Section A

Continued from Page 21 - Section B

If the battery QR code **was** scanned, the test will **not** ask to enter the battery serial number. If the battery QR code **wasn't** scanned then the battery serial number **must** be entered.



Steps will be the same on any battery that is labeled as damaged.

Note:
Battery testing will repeat for as many battery as the user inputted into the tester, that are in the battery pack

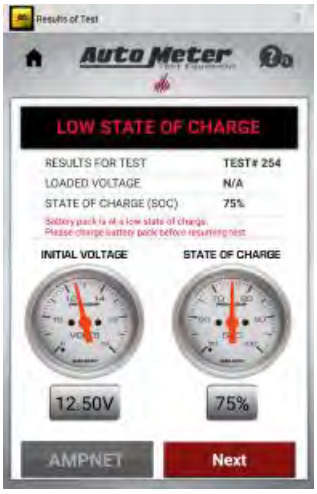
Continue to page 23

Continue to page 24

PowerNet Test (Aux Individual Battery Test)

Note:
Depending on the outcome of the battery test. Any one of these test results could show up.

Continued from page 22



Battery will need to be charged before PowerNet can be continued

If the battery QR code **was** scanned, the test will **not** ask to enter the battery serial number. If the battery QR code **wasn't** scanned then the battery serial number **must** be entered.

Note:
Battery testing will repeat for as many battery as the user inputted into the tester, that are in the battery pack

Continue to page 24

If all batteries test good, no further battery repairs are required.
Continue to page 25

PowerNet Test (Individual Battery Re-Test)

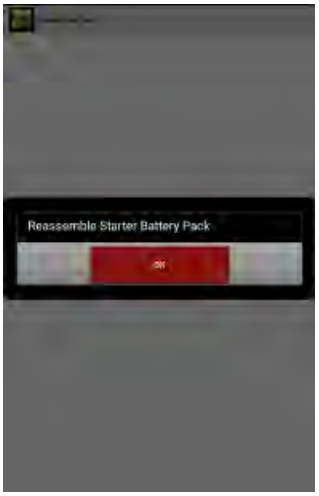
Continued from page 22 or 23

Tip:
There will be a prompt to replace the battery for each battery that has failed. If multiple batteries have failed. Replace all the batteries that have failed at the same time.

After repairs are finished. PowerNet Test must be resumed to complete the PowerNet form.

Every battery, that has been replaced, will need to be retested. Battery testing prompts are all the same as regular battery testing.

The PowerNet test will not continue until all batteries pass the individual battery test



After battery pack passes testing. Continue to page 25

PowerNet Test (Starter Cable Test)

Continued from page 18 or 24

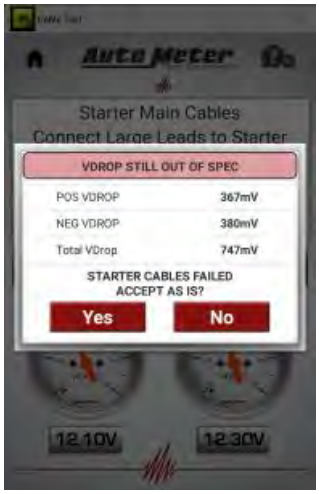
Continue to page 27

Continue to page 26

PowerNet Test (Starter Cable Test)

Continued from page 25

No



Yes

Note:
After the Voltage Drop test has failed 2 times. There is an option to accept the voltage drop "As Is". If yes is selected, the test continues to next test.

After repairs are finished. PowerNet Test must be resumed to complete the PowerNet form.

Continue to page 27

PowerNet Test (Damaged Starter Test)

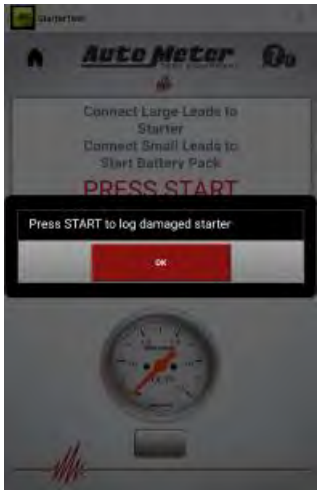
Continued from page 25 or 26

If **"Starter damaged and cannot be tested"** is selected a verification prompt will pop-up.

No

If **"Starter damaged and cannot be tested"** is **NOT** selected.
Continue to page 28

Yes



"Starter damaged and cannot be tested" prompt

By selecting this prompt you acknowledge that the Starter is physically damaged and unable to test. There will be no starter test performed. The test result of "Damaged Starter" will be captured on the test data.

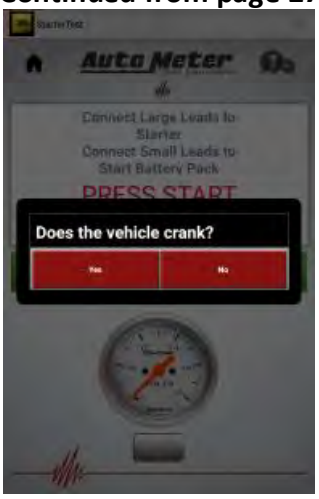
Leave the box unchecked if the starter is NOT damaged.

After repairs are finished. PowerNet Test must be resumed to complete the PowerNet form.

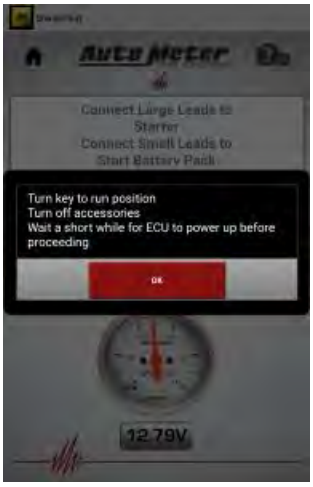
The test will start off retesting the starting battery pack, then will continue to page 28

PowerNet Test (Starter Test)

Continued from page 27

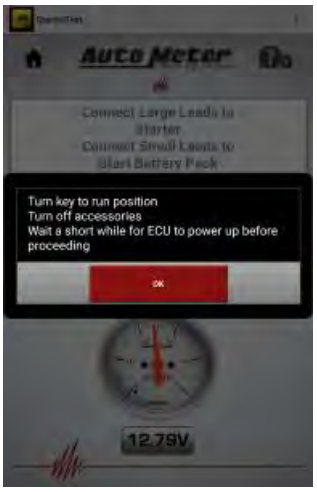


Yes



Continue to page 29

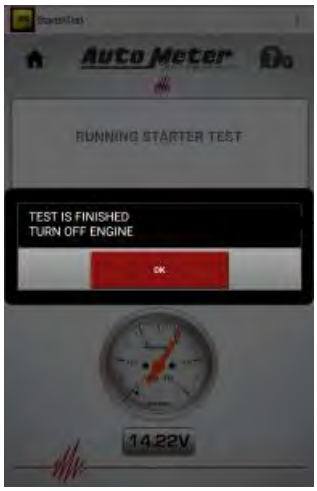
No



Continue to page 30

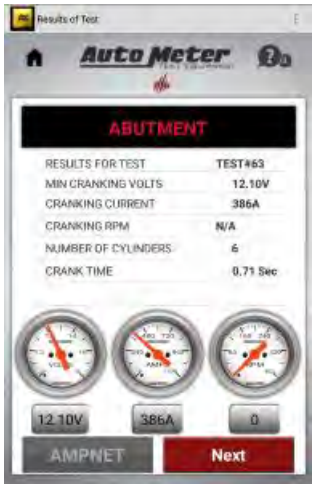
PowerNet Test (Starter Test)

Continued from page 28



Continue to page 31

Note:
Depending on the outcome of the starter test. Any one of these test results could show up.



Abutment is when a start is requested – the starter pinion gets extended to initiate the crank – but the pinion runs into the side of the ring gear and the engine doesn't rotate

Fail Low RPM means that the engine spun over too slow to start the engine. Root cause of why the engine is rotating too slowly needs to be done.

See Engine Diagnostics is when the engine takes too long to start. The starter is not at fault

After repairs are finished. PowerNet Test must be resumed to complete the PowerNet form.

Bad Starter means that the starter is failed and needs to be replaced.

The test will start off retesting the starting battery pack, then will continue to page 28

PowerNet Test (Start Enable Circuit Test)

Continued from page 27

If there is **NOT** low voltage on IMS Circuit

If there is low voltage on IMS Circuit

Note:

PowerNet Test must be completed for all warranty repairs of the PowerNet system

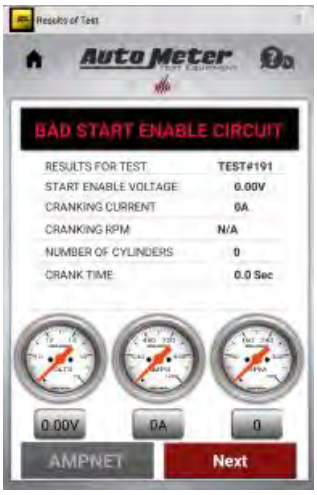
The test will start off retesting the starting battery pack, then will continue to page 28

Continue to page 31

After repairs are finished. PowerNet Test must be resumed to complete the PowerNet form.

PowerNet Test (Start Enable Circuit Test)

Continued from page 30



Note:
Depending on the outcome of the test. Either the starter is faulty or the start enable circuit is faulty.

If there is voltage on the circuit, the starter is faulty.

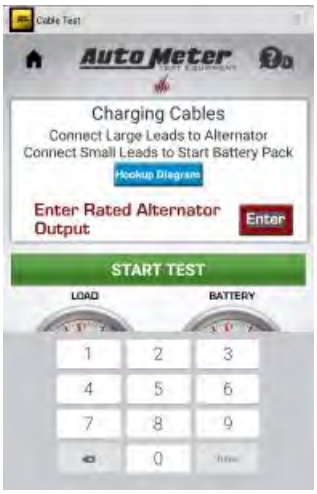
If there is no voltage on the circuit, the circuit will need to have further diagnosis to find root cause.

After repairs are finished. PowerNet Test must be resumed to complete the PowerNet form.

The test will start off retesting the starting battery pack, then will continue to page 28

PowerNet Test (Alternator Cable Test)

Continued from page 29



Select “Start Test”

To enter the alternator rating.
Select
Enter
Select **done** when done entering rating.

Note:
If the incorrect rating has been entered, re-select alternator rating box to change the alternator rating.

Continue to page 34

Continue to page 33

PowerNet Test (Alternator Cable Test)

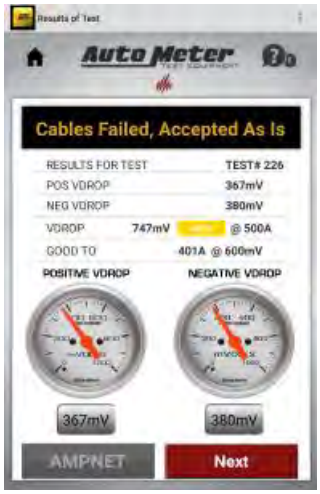
Continued from page 32

No

After repairs are finished. PowerNet Test must be resumed to complete the PowerNet form.

Note:
After the Voltage Drop test has failed 2 times. There is an option to accept the voltage drop "As Is". If yes is selected, the test continues to next test.

Yes



Continue to page 34

PowerNet Test (Damaged Alternator Test)

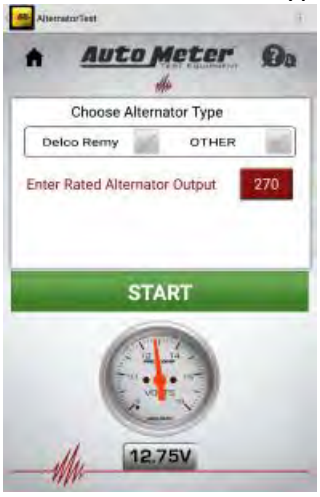
Continued from page 32 or 33

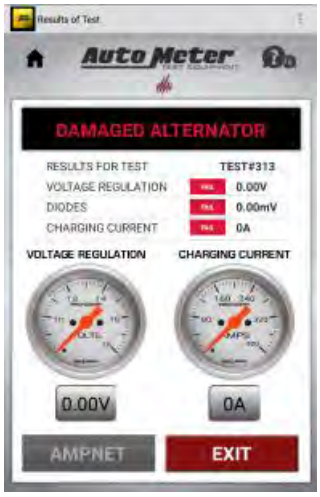
If **"Alternator damaged and cannot be tested"** is selected a verification prompt will pop-up.

No

Yes

Select the alternator type





After repairs are finished. PowerNet Test must be resumed to complete the PowerNet form.

The test will start off retesting the starting battery pack, then will continue at page 35

"Alternator damaged and cannot be tested" prompt

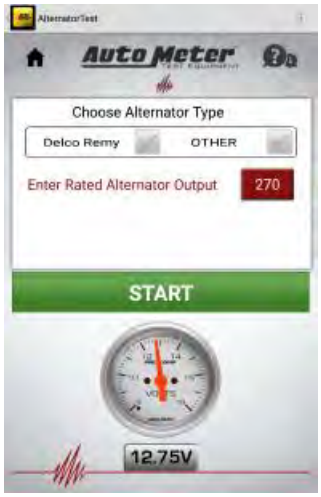
By selecting this prompt you acknowledge that the alternator is physically damaged and unable to test. There will be no alternator test performed. The test result of "Damaged alternator" will be captured on the test data.

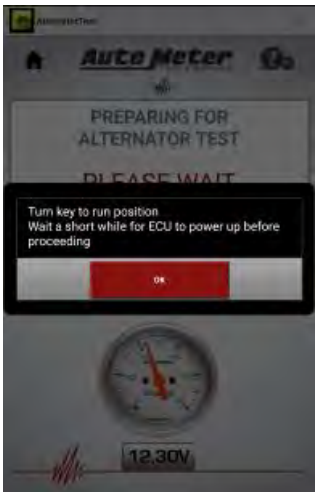
Leave the box unchecked if the alternator is not damaged.

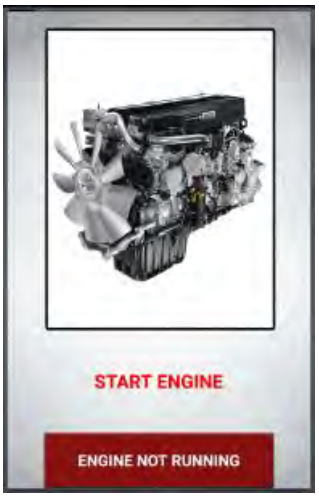
If **"Alternator damaged and cannot be tested"** is **NOT** selected. Continue to page 35

PowerNet Test (Alternator Test)

Continued from page 33 or 34







Continue to page 36

PowerNet Test (Alternator Test)

Continued from page 35

When testing higher current alternators, there might be this prompt

Optional Prompt

If required, there will be a prompt to turn on headlights and accessory.
Turn on Headlights, HVAC blower to high, and any other higher currant accessory.

Yes

If the alternator has a remote sense circuit.
Select Yes

No

Continue to page 38

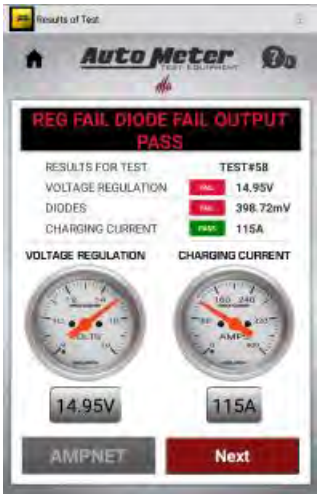
Continue to page 39

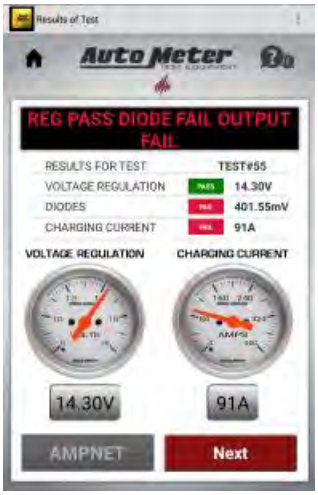
Continue to page 37 for alternator failure modes

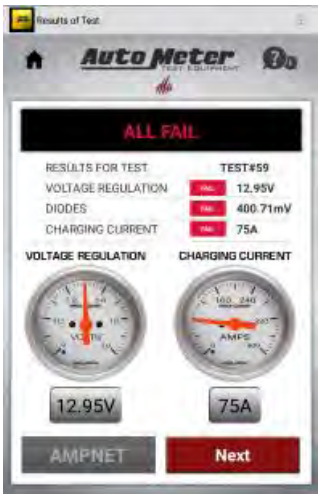
PowerNet Test (Alternator Test)

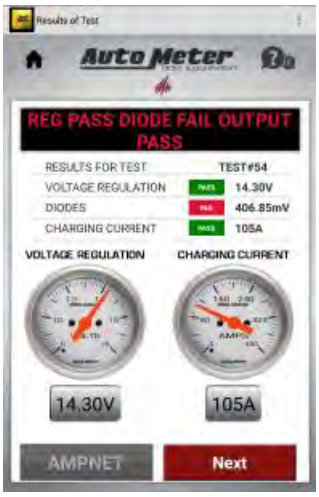
Continued from page 36

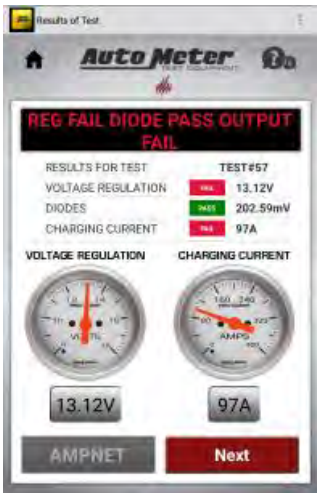
Note:
Depending on the outcome of the alternator test. Any one of these test results could show up.



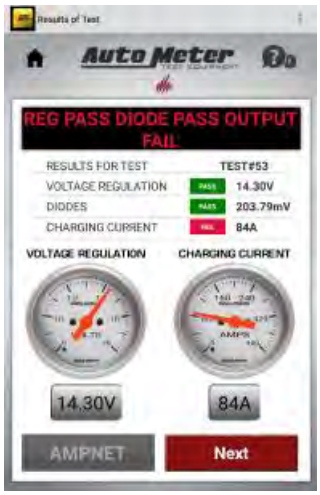








After repairs are finished. PowerNet Test must be resumed to complete the PowerNet form.

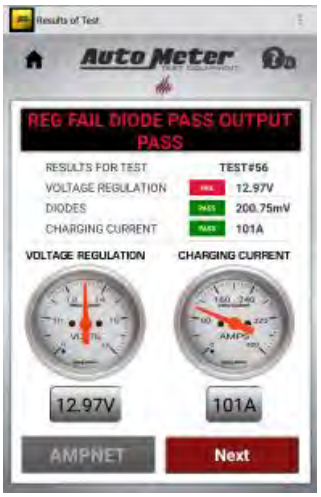


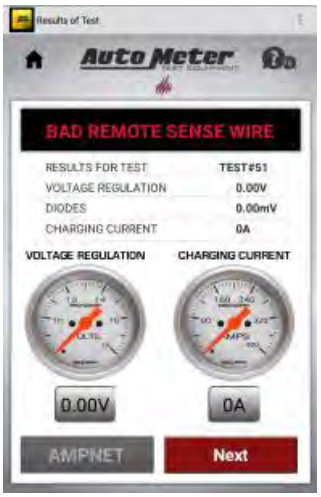
The test will start off retesting the starting battery pack, then will continue to page 35

PowerNet Test (Alternator Remote Sense Test)

Continued from page 64

Diagnose the alternator remote sense circuit for this type of failure.



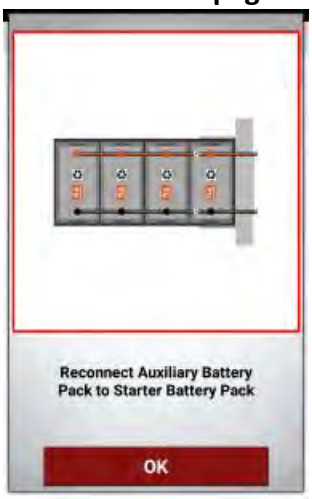


After repairs are finished. PowerNet Test must be resumed to complete the PowerNet form.

The test will start off retesting the starting battery pack, then will continue at page 35

PowerNet Test (Completion of Testing)

Continued from page 36



Continued from page 36

If equipped with auxiliary battery pack, there will be a prompt to reconnect the auxiliary battery pack

If the starter and/or alternator cables failed, but the user selected to accept the cables As Is. The results will be captured in the summary.

Select all that apply. In this section the user can enter any notes, as needed

This prompt confirms that the PowerNet test is completed and all test results are sent to AmpNet. After this step you will be able to access the PowerNet form on the AmpNet website.

Link to AmpNet website.
dtna.autometer.com