

ATTENTION:

- GENERAL MANAGER
- PARTS MANAGER
- CLAIMS PERSONNEL
- SERVICE MANAGER

IMPORTANT - All Service Personnel Should Read and Initial in the boxes provided, right.

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QUALITY DRIVEN® SERVICE

SERVICE INFORMATION BULLETIN

APPLICABILITY: All MYs / All Models

NUMBER: 07-178-21

SUBJECT: Battery Testing and Charging

DATE: 11/15/21

INTRODUCTION:

This Service Information bulletin is being released as guidance for proper testing and charging of vehicle batteries. This bulletin will focus on those required procedures necessary to ensure the best possible outcome.

This bulletin contains the following sections / topics:

- Required tools and related training for effective use and application
- Proper identification of battery types used by Subaru and specifics about handling each
- Warnings and Cautions when testing and charging batteries using the required tools
- Required battery testing and evaluation criteria and instructions.

TOOL INFORMATION:

Knowledge base sites –helpful hints, user manuals:

- DSS-5000: <https://subaru.dss5000.com/>

Use for quick analysis of the battery condition:

- a. Cranking Condition – Battery’s ability to start the vehicle
- b. Reserve Capacity – Battery’s ability to power accessory loads for extended periods of time.

- DCA-8000: <https://subaru.dca8000.com/>

Use when Recharge decisions are reached from the DSS-5000 or, in the event of a customer complaint regarding battery performance:

- a. Cranking Condition – Battery’s ability to start the vehicle
- b. Reserve Capacity – Battery’s ability to power accessory loads for extended periods of time
- c. DCA-8000 Decision – Dynamic Charge Acceptance – Battery’s ability to accept charge after time spent in a discharged condition
- d. Defect detection – additional fault detection for Cranking, Reserve Capacity, and other factors reducing battery performance.

NOTE: If any issues are experienced with the DSS-5000 or DCA-8000, the Midtronics Technical Customer Support line is available at: 866-592-8052.

CAUTION: VEHICLE SERVICING PERFORMED BY UNTRAINED PERSONS COULD RESULT IN SERIOUS INJURY TO THOSE PERSONS OR TO OTHERS.

Subaru Service Bulletins are intended for use by professional technicians ONLY. They are written to inform those technicians of conditions that may occur in some vehicles, or to provide information that could assist in the proper servicing of the vehicle. Properly trained technicians have the equipment, tools, safety instructions, and know-how to do the job correctly and safely. If a condition is described, DO NOT assume that this Service Bulletin applies to your vehicle, or that your vehicle will have that condition.

Subaru of America, Inc. is ISO 14001 Compliant

ISO 14001 is the international standard for excellence in Environmental Management Systems. Please recycle or dispose of automotive products in a manner that is friendly to our environment and in accordance with all local, state and federal laws and regulations.

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IDENTIFYING BATTERIES:

The two battery types Subaru uses are (see example images below):

- Standard flooded batteries (Flooded)
- Enhanced Flooded Batteries (EFB)

VEHICLE APPLICATIONS:

- EFB –Utilized on Models equipped with Stop / Start ONLY:
 - 2020-22MY Legacy and Outback
 - 2019-22MY Forester
 - 2019-22MY Ascent
 - 2017-22MY Impreza
 - 2020-22MY Crosstrek with CVT
 - 2014-16MY Crosstrek Hybrid (Engine Restart Battery only) Hybrid Power Control Module (HPCM)

NOTE: 2019-22MY Ascent and 2017-22MY Impreza could have either an EFB or Flooded battery.

- Flooded –All other Subaru models and Model Years

There are additional selections of battery types supported by the Midtronics tools which are not applicable to Subaru: (AGM, AGM Spiral, Gel). **IMPORTANT:** With the latest Midtronics software update (Q2, 2021, version “G” for DCA-8000 and “M” for DSS-5000),critical battery information (battery type and CCA) which previously populated automatically after VIN entry is now **REQUIRED** to be entered *accurately* by the Technician.

ENHANCED FLOODED BATTERIES (EFB) KEY POINTS:

EFB batteries require different charging and testing logic:

- Charging with incorrect battery type entered can damage the battery.
- Testing with incorrect battery type entered can produce incorrect results.

EFB battery types currently being used:

- **Q85** –2019-22MY Forester, 2020-22MY Crosstrek with CVT, 2019-22MY Ascent* and 2017-22MY Impreza*
- **LN2** –2020-22MY Legacy and Outback
- **55N** –2014-16MY Crosstrek Hybrid

REMINDER: 2019-22MY Ascent and 2017-22MY Impreza could have either an EFB or Flooded battery.

Standard Flooded Type
CCA will vary by application



LN2 type EFB
2020-22MY Legacy and Outback



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Q85 Type EFB

2019-22MY Forester and 2020-22MY Crosstrek with CVT, 2019-22MY Ascent and 2017-22MY Impreza



WARNINGS:

- Because batteries produce flammable gases, never bring any open flame close to the batteries.
- Ventilate sufficiently when using or charging batteries in an enclosed space.
- Electrolyte is a highly corrosive acid and has toxicity; use gloves and ALWAYS wear eye protection whenever handling the fluid or cleaning any deposits / residue from the battery.
- For safety, in case an explosion does occur, always wear eye protection when working near any battery. In addition, never lean over the battery.
- Always prevent electrolyte from coming into contact with skin, eyes or clothing. Especially if coming in contact with eyes, flush with water for 15 minutes and get prompt medical attention.
- Always prevent electrolyte from coming contact with any coated or painted surfaces.
- Before starting work, remove rings, metal watchbands or other metal jewelry.
- Never let any metal tools contact the positive battery terminal and possibly ground / short out against anything close to it.
- When operations using a metal tool on the positive terminal or anything connected to it are required, **CAREFULLY** disconnect the ground terminal while supporting the battery sensor with the other hand before proceeding. **IMPORTANT:** Always consult the applicable Service Manual for proper Battery Sensor servicing procedures.
- Always follow the manufacturer's instructions when handling the battery charger.

Battery Inspection:

- Check the battery case, top cover and terminals for dirt or cracks, and perform the following work as necessary:
 - Clean the battery with water and wipe with a dry cloth.
 - Apply a **thin** coat of readily available battery terminal protectant on the terminals to prevent corrosion.
- If terminal posts are corroded, the terminals must be removed and cleaned.
 - It may be necessary to test the battery with both terminals removed to ensure a good test connection with the clamps.
 - Clean with a brush and common baking soda solution.

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Connecting Testers/Chargers to the Battery:

- Before disconnecting the battery, ensure the vehicle has been switched off with all the doors closed for a minimum of 60 seconds.
- If the battery voltage is less than 8 volts, it is required to use the Subaru Midtronics DCA-8000 Dynamic Diagnostic Charging System.
- Connecting the clamps:
 - Always confirm the clamp teeth are clean and free of corrosion.
 - Disconnect the ground terminal or CAREFULLY remove the ground cable from the battery sensor to prevent damage to alternator diodes or other electrical components.
IMPORTANT: Always consult the applicable Service Manual for proper Battery Sensor servicing procedures.
 - Connect the clamps directly to the battery post/terminal. Avoid connecting to the terminal bolt/nut. NEVER connect the tester/charger ground clamp to a body or engine ground point. Use ONLY the battery posts or terminal clamps for testing and / or charging.
 - Rock/rotate clamps to ensure a clean connection onto the battery post/terminal.
IMPORTANT: Never connect the negative clamp to a point that will position the battery sensor between the clamp and negative battery post.

DCA-8000 Main Menu Options:

- In-Vehicle Charge and Test:
 - Warranty test for use when the battery is in the vehicle or when a system test is needed.
 - **NOTE: This is the only test to be used in warranty situations.**
- Out of Vehicle Charge:
 - Non-warranty test for use when the battery is on the bench (an in-vehicle test can also be used on the bench as long as the VIN is entered). Performs charge and test functions.
- Manual Charge:
 - Use when needing to charge a battery without running a full diagnostic test procedure.
IMPORTANT: NEVER exceed the default time of (1 hr.) or use this mode without closely monitoring the battery.
 - Should not be used in normal situations but may be used when battery voltage is too low to begin an “In Vehicle Charge and Test”.
- Power Supply mode:
 - Use when performing any vehicle reprogramming functions.
- Jump Start:
 - Use to jump-start a vehicle with a dead or deeply discharged battery.
- After New Battery Install:
 - Used for testing newly-installed batteries. Also includes vehicle electronics reset information after battery installation.

DSS-5000 Main Menu Options:

- In Vehicle Test:
 - Automates battery testing for quickly testing vehicles using the fewest steps. A VIN is required and a Warranty Code is generated for all “Replace Battery” decisions.
 - **NOTE: This and the Express Test (with a VIN scan / entry) listed below are the only test to be used in warranty situations.**

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- Out of Vehicle Test:
 - To be used for testing out-of-vehicle batteries for possible return / replacement.
- After New Battery Install:
 - To be used for testing newly-installed batteries. Also includes vehicle electronics reset information after battery installation.
- Express Test:
 - To be used for quickly testing batteries of vehicles in for servicing. Although VIN entry is optional, the required Warranty Code is generated for all “Replace Battery” decisions (only when the VIN is scanned or entered).

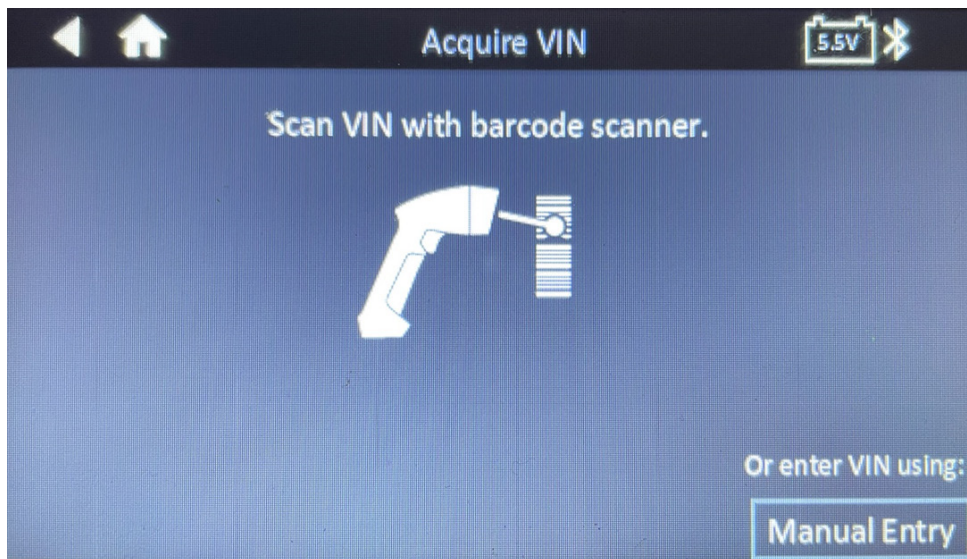
Vehicle Identification:

- In most cases, the vehicle will be recognized when a VIN scan is performed.
 - Pre-populated fields include: VIN, Year, Make, Model, Technology (Hybrid, Gasoline, EV, Start-Stop, etc.), Test Location (Top Post, Side Post, Remote). **IMPORTANT REMINDER:** With the latest Midtronics software update (Q2, 2021, version “G” for DCA-8000 and “M” for DSS-5000), critical battery information (battery type and CCA) which previously populated automatically after VIN entry is now **REQUIRED** to be entered *accurately* by the Technician.

NOTE: The VIN schematic data follows vehicle launch. There will be a delay between the on sale dates for new models / model years and the corresponding Midtronics software update release timing. For this reason, the VIN of a newly-launched vehicle may not be recognized right away.

Vehicle Identification: VIN Scan:

Scan the VIN. If the VIN bar code is not available, use manual entry to type in the VIN.



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Vehicle Identification: VIN recognized:

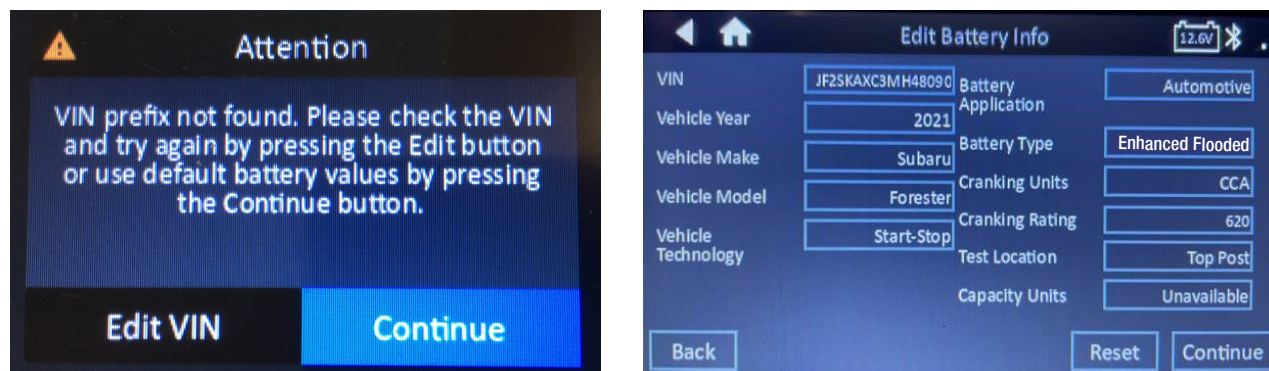
Scan the VIN. If the VIN is recognized, the tool will decode the VIN or pre-populate the vehicle information. The Technician must now **accurately** select the Battery Type from the drop-down menu and enter the Battery / Cranking Rating (CCA) value (use of CCA for the Battery Units is required).



Vehicle Identification: VIN not recognized:

Scan the VIN –if the VIN is not recognized, the tool will not decode the VIN or pre-populate the vehicle information. The Technician will need to **accurately** select the Battery Type from the drop-down menu and enter the Battery / Cranking Rating (CCA) to receive a Warranty Test Code.

NOTE: The VIN will be captured and recorded in the BMIS for future reference and traceability.



Discharged Battery Testing in General:

IMPORTANT: Effective testing and diagnosis of customer concerns regarding battery discharge or a dead battery starts with a thorough customer interview.

It is critical to understand how and when the condition was first recognized by the customer, events occurring prior to that time, and how the condition was addressed when identified.

As examples, the following questions may provide needed insights to help avoid subsequent failures or may and or explain the battery's current condition:

- When was the condition identified? Was it during the first start in the morning or after driving?
- How long had the vehicle been parked prior to this occurrence?

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- How was the vehicle used just prior to or after being parked?
- When the condition was found, how was it addressed? Was the car jump-started? If yes, how?
- What are the customer's normal driving habits? Is the car driven daily? What are the typical distances being driven?

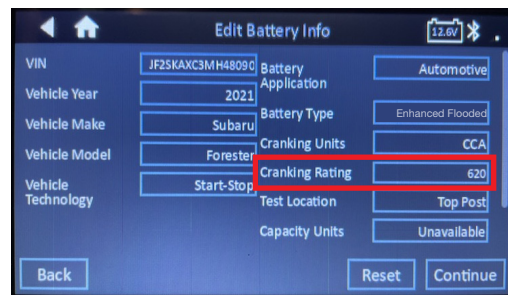
Additionally, as part of any diagnosis of a discharged battery, if a root cause for the condition is not identified (i.e. map lamp left on or similar), it is critical to ensure no condition exists on the vehicle side that could result in a future discharged battery. This testing includes the completion of a correctly performed parasitic / dark current draw test based on the information supplied by the customer. See TSBs *07-85-14*, *07-62-07* and *07-199-21* for more information on dark current testing procedures.

Testing / Charging EFB Batteries:



Always confirm the Battery Type is EFB and the proper Cranking Rating (CCA) is entered as shown on the battery label..

- DCA-8000 and DSS-5000 screens are shown.



Interpreting DSS-5000 and DCA-8000 Test Results:

Battery Diagnostics Overview:

The ongoing advancement of vehicle electrical systems requires batteries to do much more than just start the engine. While diagnosing the cranking ability of the battery is important, evaluating Reserve Capacity and Dynamic Charge Acceptance (when applicable) provides a holistic view of battery health:

- **Reserve Capacity** is the battery's ability to support loads when the engine is off or when the alternator is in a low output phase.
- **Dynamic Charge Acceptance** is the battery's ability to discharge and recharge quickly to support the Stop/Start system.

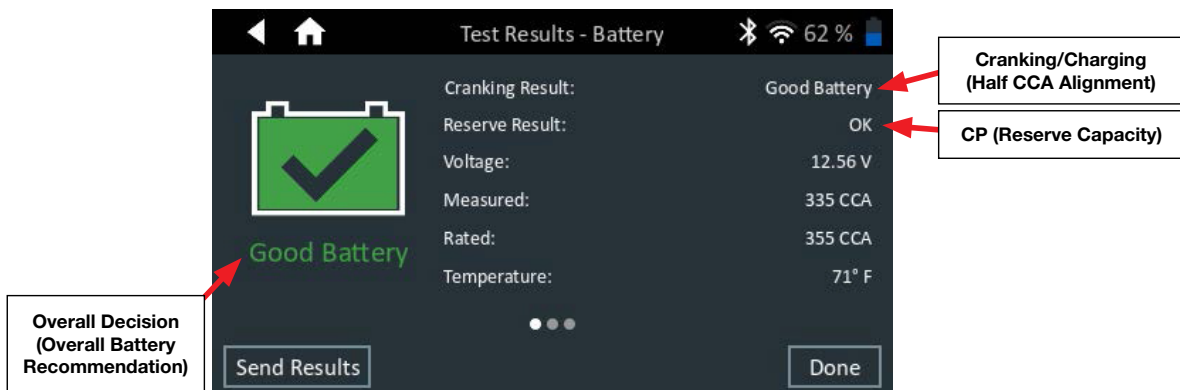
The DSS-5000 is limited to diagnosing the Cranking ability and Reserve Capacity since it cannot charge the battery. However, the additional capabilities of the DCA-8000 provide diagnostics on all these failure modes *plus*, it monitors the battery during a Diagnostic Charge to ensure the battery can be recovered in an adequate amount of time.

NOTE: These results should align with the DCA-8000 "Cranking/Charging Result" and "Reserve Result".

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Some exceptions may occur:

- Back to back testing or pre-charging before a 2nd test is performed can cause measurements to respond differently masking bad batteries from being identified or, cause good batteries to incorrectly be diagnosed as failed.
- If Diagnostic Charging is selected, results may vary from a tester due to changes in battery condition.
- The DSS-5000 cannot perform **Charge Acceptance or Defect** detection tests and may cause variations in Overall Decisions during the Battery Test (see “Interpreting DCA-8000 Results” for defect explanation).



DSS-5000 Decision Breakdown:

Overall/Cranking:

1. **Good Battery** – Battery is Good and can be returned to service.
2. **Good Recharge** – Battery is Good, but discharged. Use the DCA-8000 in “Vehicle Charge and Test” mode to charge the battery and return it to service.
3. **Charge & Retest** – Battery condition is discharged and should be charged for a decisive evaluation. Charge the battery using the DCA-8000 Diagnostic Charger in “Vehicle Charge and Test” mode for a final decision.
4. **Replace Battery** – Battery is faulty and should be replaced before returning the vehicle to the customer. **NO FURTHER TESTING SHOULD BE ATTEMPTED. ALWAYS** record the displayed battery test code.
5. **Bad-Cell Replace** – Battery is faulty and should be replaced before returning the vehicle to the customer. **NO FURTHER TESTING SHOULD BE ATTEMPTED. ALWAYS** record the displayed battery test code.

Reserve Capacity Result (CP):

1. **OK** – Reserve Capacity is good and the battery should be handled according to the Overall Decision.
2. **Warning** – Battery has poor reserve capacity and should be replaced before returning the vehicle to the customer.
3. **Low Battery** – Battery being tested is too discharged to perform the CP test.

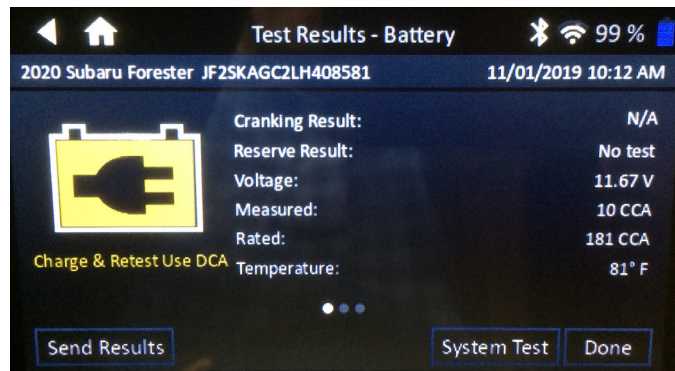
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4. **Internal Battery Low** – The AA batteries inside DSS-5000 base unit need to be replaced to allow proper testing.
5. **Conditions Not Met** – Vehicle conditions have prevented the DSS-5000 from performing the Reserve Capacity test. Before attempting any retest and to ensure the battery is properly prepared, confirm the ground cable has been removed from the battery sensor (if equipped) or the negative battery post on older models.

Test Result: Charge and Retest Use DCA -8000:

If the DSS-5000 returns the result of “Charge and Retest Use DCA”.

- ***DO NOT*** keep repeating the test with the DSS-5000.
- Use the DCA-8000.



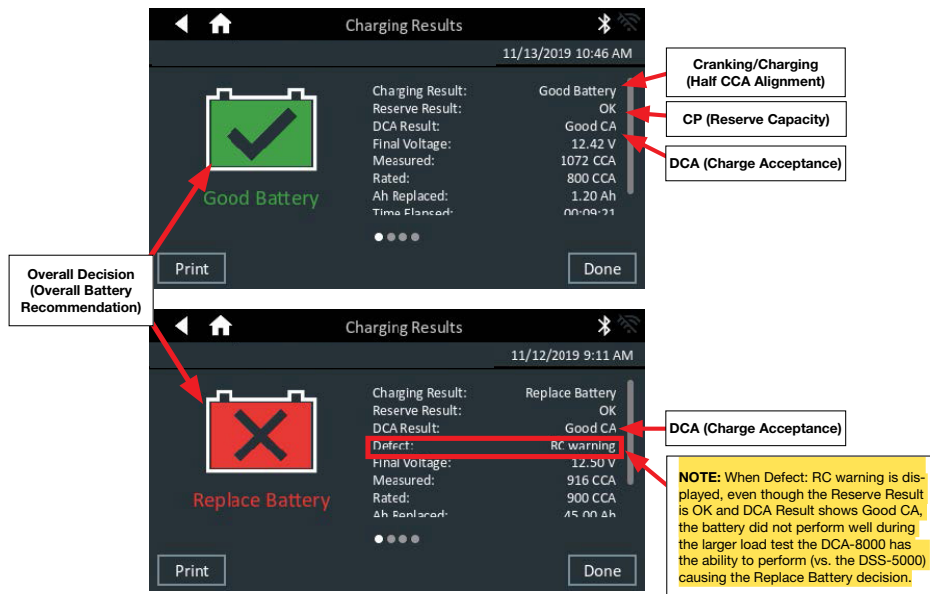
IMPORTANT: With the battery properly prepared and the tester properly configured, no more than **ONE** test using the DSS-5000 should be performed. If the DSS-5000 recommends recharging, retesting or both, the DCA-8000 must be used (and properly configured prior to use) to perform those functions.

Interpreting DCA-8000 Results:

DCA-8000 Decision Breakdown:

- **Cranking/Charging Result:** Decision aligns with the battery’s ability to pass a Half CCA load test.
- **DCA-8000 Result (Charge Acceptance):** Decision aligns with the battery’s ability to quickly accept a charge and recover after use during Key Off power consumption or Start/ Stop vehicle systems (EFB type battery only).
- **Defect Result:** Decision **ONLY** appears when a battery fails for testing / detection methods only capable of being performed specifically by the DCA-8000 Diagnostic Charger.
- **Overall Decision:** The decision requires all of the above results to be good. If any of the above results are suspect (Replace), battery replacement is recommended.

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DCA-8000 Decision Explanation:

Overall/Cranking:

Determines battery's overall condition and ability to start the vehicle.

1. **Good Battery** – Battery is good and can be returned to service.
2. **Good Recharge** – Battery is good, but discharged. Use DCA -8000 to charge the battery and return it to service. (If this decision was reached during a Diagnostic Charge, the process was aborted before the battery was fully charged.)
3. **Charge & Retest** – Battery condition is discharged and should be charged for a decisive evaluation. Charge the battery using the DCA-8000 Diagnostic Charger for a final decision.
 - a. If a Battery is determined Charge & Retest, use the Diagnostic Charge mode in the DCA-8000 to get a Replace or Good Battery decision.
4. **Replace Battery** – Battery is faulty and should be replaced before returning the vehicle to the customer.
5. **Bad-Cell Replace** – Battery is faulty and should be replaced before returning the vehicle to the customer. Charging is not recommended for safety purposes.

Reserve Result (CP):

Determines battery's ability to support Key Off accessory loads.

1. **OK** – Reserve Capacity is good and battery should be handled according to the Overall Decision.
2. **Warning** – Battery has poor reserve capacity and should be replaced before returning it to the customer.
3. **Low Battery** – Battery being tested is too deeply discharged to perform the CP test.

DCA-8000 Charge Acceptance Result:

Determines the battery's ability to accept charge and recover after Key Off accessory draw.

1. **Good CA** – Battery recovers at an acceptable rate and can continue service.
2. **Poor CA** – Battery cannot recover charge and should be replaced.

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Defect Results:

Additional detection methods utilized by the DCA-8000 diagnostic capabilities:

1. **Replace** – Cranking fault has been identified that did not utilize conductance.
2. **Broken Weld** – Load performance indicates a broken weld and battery replacement is recommended.
3. **Hard Short** – A hard short has been detected and battery replacement is recommended.
4. **RC Warning** – Reserve capacity problems have been identified using a method other than the RC test performed by the DSS-5000.

Best Practice: VIN tagging the battery

If the battery is removed from the car for testing or replacement, place a bar code sticker of the VIN on the battery if available. If a bar code sticker is not available, a piece of masking tape or equivalent with the last 8 digits of the VIN CLEARLY written on it will suffice. This provides traceability for the battery and any tests or charging performed.

If the battery is to be covered under Warranty, the VIN, test result and test code MUST be secured to the battery using a Warranty tag, masking tape, etc.

VERY IMPORTANT: There must be CLEARLY written indications on the Warranty Tag of the following:

- **Coverage Type:** Warranty (WC), Parts Warranty (PW) or Policy Adjustment (PA) .
- **Pick-Up Date:** Batteries replaced under any of the Coverage Types listed above **MUST be retained for at least 40 days** after the CLAIM APPROVAL DATE (NOT R.O. Date) before they are eligible to be picked up by the Interstate Batteries (IB) representative. Therefore, there must be clear indication to the IB representative that the battery in question is not available to be picked up until AFTER the listed “Pick Up After” date.

Leaking Batteries:

Refer to TSB **07-186-20** for detailed information regarding identification of leaking batteries.

Replacing a battery:

- Always remember to record the customer’s radio station presets and navigation favorites before disconnecting the battery and to reset them when replacement is complete.
- NEVER replace an EFB battery with a flooded battery. Use ONLY the battery specified for the vehicle.
- When testing a new replacement battery, use the After New Battery Install function of either the DSS-5000 or the DCA-8000 to perform the test.