

**Identifying Batteries:**

- The two battery types that Subaru uses are:
  - Standard flooded batteries (Flooded)
  - Enhanced Flooded Batteries (EFB)
- Vehicle applications
  - EFB – Stop/Start models only
    - 2020 Legacy and Outback
    - 2019+ Forester
    - 2020 Crosstrek with CVT
    - 2014-2016 Crosstrek Hybrid (engine restart battery only)
  - Flooded – All others
- There are additional selections of battery types in the tools that Subaru does not use (AGM, AGM Spiral, Gel)

**Enhanced Flooded Batteries (EFB):**

- EFB batteries require different charging and testing logic
  - Charging with incorrect battery type can damage the battery
  - Testing with incorrect battery type can produce incorrect results
- EFB battery types currently used
  - Q85 – 2019+ Forester, 2020 Crosstrek with CVT
  - LN2 – 2020 Legacy and Outback
  - 55N – 2014-2016 Crosstrek Hybrid

**Recovering Enhanced Flooded Batteries (EFB):**

- If an EFB battery has an insufficient charge to start the vehicle.
  - Before testing, use a Manual Charge to bring some life back into the battery.
    - Be sure to select EFB type battery.
  - A thirty-minute charge will generally be sufficient.
  - Make sure to give the battery a rest period between manual charge and testing.
  - Once the battery has a sufficient amount of charge, continue with either an In-Vehicle Test and Charge or an Out of Vehicle Charge
- Replacing an EFB battery
  - Do not 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 in either the DSS-5000 or the DCA-8000 to perform the test.

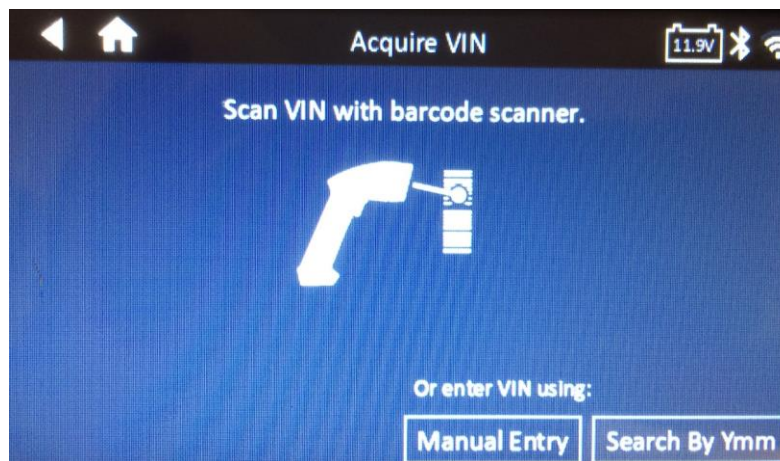
### Vehicle Identification:

- In most cases the vehicle will be recognized when a VIN scan is performed
  - Prepopulated Fields include: VIN, Year, Make, Model, Technology, Test Location, Battery type
- Note: the VIN schematic data follows vehicle launch so there is a period of time between start of sales and the related software update release timing so newly launched vehicle might not be recognized

Field	Value
VIN	JF2GTAMC4JH220519
Vehicle Year	2018
Vehicle Make	Subaru
Vehicle Model	Crosstrek
Vehicle Technology	Gasoline
Battery Application	Automotive
Rated Ah	Optional
Test Location	Top Post
Battery Type	Flooded
Battery Units	CCA
Battery Rating	Enter rating...

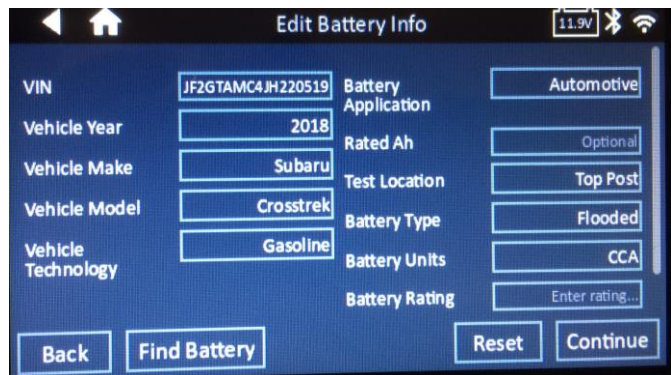
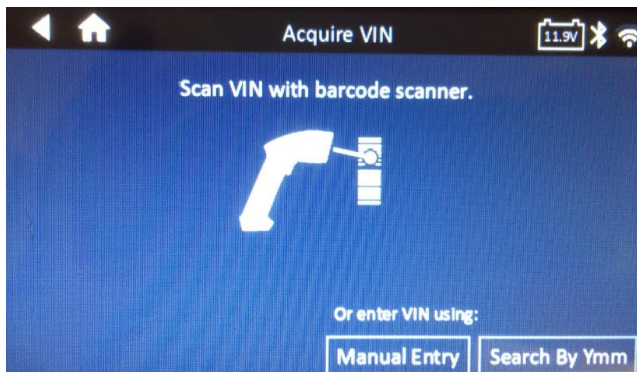
### VIN Scan:

- Scan the VIN – if the VIN bar code is not available use manual entry to type in the VIN



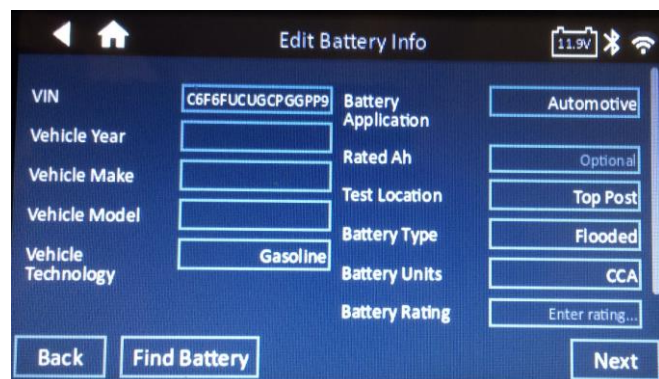
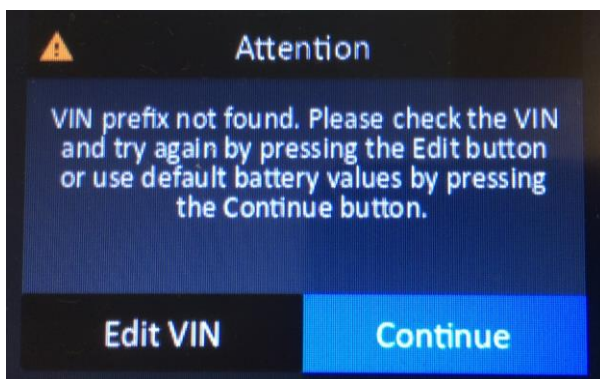
## Vehicle Identification (VIN Recognized):

- Scan the VIN – if the VIN is recognized it will decode the VIN and pre-populate the vehicle information and battery type. The user need only to input the battery rating (Use of CCA for the Battery Units is recommended).



## Vehicle Identification (VIN Not Recognized):

- Scan the VIN – if the VIN is not recognized it will not decode the VIN and pre-populate the vehicle information and battery type. The user may need to change the battery type (defaults to flooded) and input battery rating (Use of CCA for the Battery Units is recommended) to complete the test
- Note: the VIN will be captured and recorded in BMIS for future reference and traceability





Title:

## Test Procedures and Interpreting Results

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### Midtronics Recommended Testing Procedure:

#### Tool Definition:

1. **DSS-5000** – Use for quick analysis of the battery condition
  - a. Cranking Condition – Battery’s ability to start your vehicle
  - b. Reserve Capacity – Battery’s ability to power accessory loads for extended periods of time
2. **DCA-8000** – Use when Recharge decisions are reached from the DSS or in the event of a customer complaint regarding battery performance
  - a. Cranking Condition – Battery’s ability to start your vehicle
  - b. Reserve Capacity – Battery’s ability to power accessory loads for extended periods of time
  - c. DCA Decision – Dynamic Charge Acceptance – Battery’s ability to accept charge after time in discharge
  - d. Defect detection – additional fault detection for Cranking, Capacity, and defects reducing battery performance

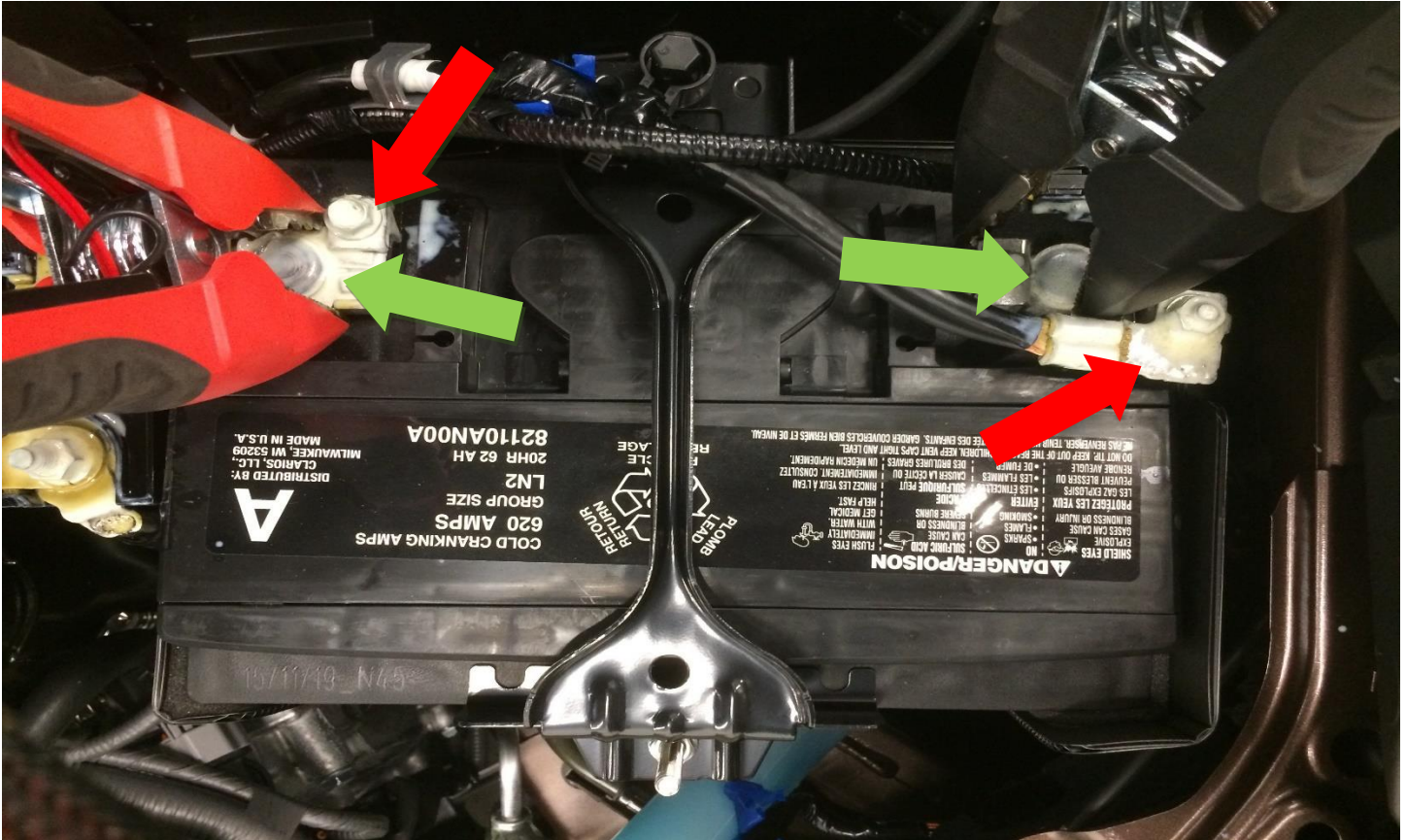
Note: If the Battery Voltage is less than 8 Volts, while the DSS-5000 has the ability to test and provide a decision, it is recommended to place the battery on the DCA-8000. The DCA-8000 has the same basic testing ability as the DSS-5000 and can begin to charge the battery if needed.

- After you receive a Definitive result(Good/Replace/Bad-Cell), handle the battery accordingly and return the vehicle to service.
- If the battery has physical damage, this may not result in a Replace decision due to battery performance.
  - Warranty – Refer to the Claims Policy and Procedure manual for claim processing instructions
  - If the battery is removed from the car for testing or replacement, place a bar code sticker of the VIN on the battery if it is available. If the sticker is not available, a piece of masking tape with the last 8 digits of the VIN written on it will suffice
    - This provides traceability for the battery and any tests or charging performed
  - Non-Warranty – Notify the vehicle owner of the damage and recommend replacement



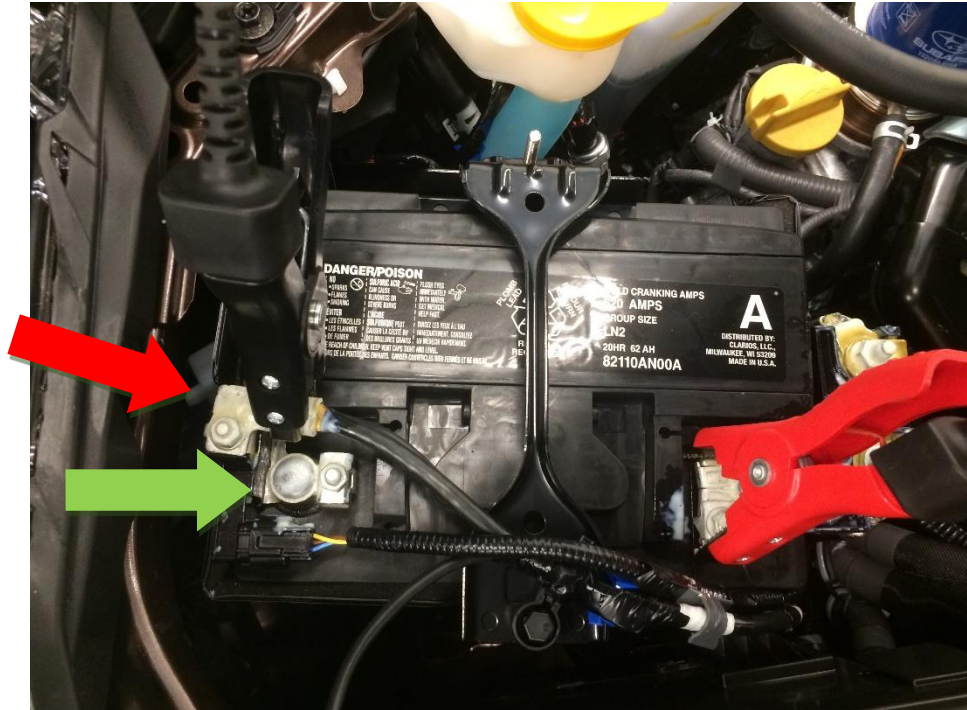
## Connecting Testers/Chargers to the Battery:

- For Best testing accuracy, ensure the vehicle has been off with the doors closed for a minimum of 60 seconds

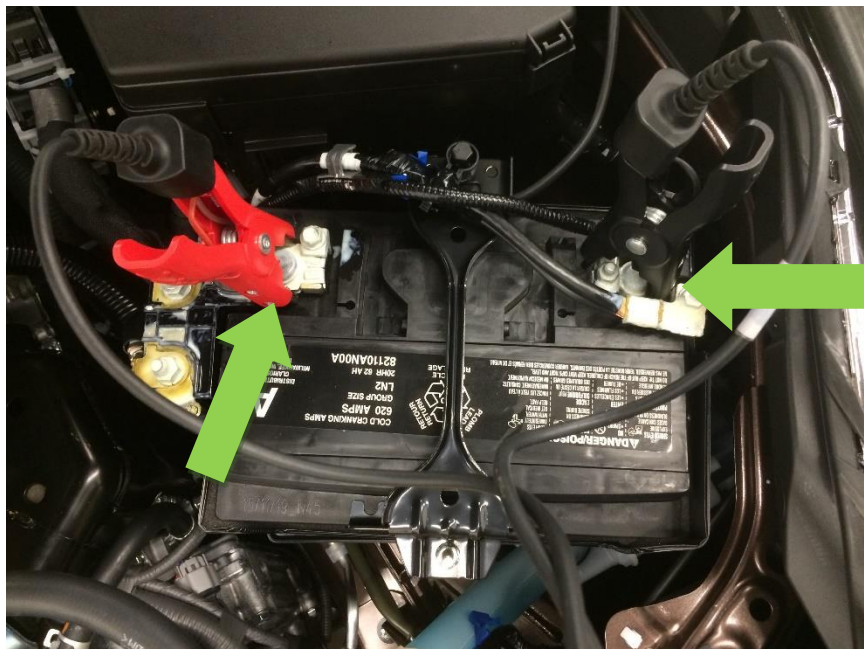


- Connect the clamps directly to the battery post/band (Green arrow), avoid connecting to tightening hardware (Red arrow)
  - If a BMS (Battery Monitor Sensor) is installed, connect onto or as close to the battery post as possible
  - Rock/rotate clamps to achieve a clean connection onto the battery post
    - If the terminal posts are corroded, the terminals must be removed and cleaned. It may be necessary to test the battery with the terminals removed to ensure a good test connection with the clamps

- Do not connect clamps over BMS sensor



- Connect as close to the battery posts as possible



## Interpreting DSS/CPX/JDT Results:

- **Tester** Decision Breakdown
  - **Cranking/Charging Result:** Decision aligns with the battery's ability to maintain a loaded voltage above 9.6V when applying half the rated CCA for 15 seconds
  - **Reserve Result:** Decision aligns with the battery's ability to discharge at 25 amps for the minute rating listed on the battery label
- **NOTE:** These results should align with the DCA "Cranking/Charging Result" and "Reserve Result"
  - Some exceptions may occur:
    - Back to back testing or pre-charging before a 2<sup>nd</sup> test is performed can cause measurements to respond differently masking bad battery's from being identified or cause good battery's to incorrectly fail
    - If Diagnostic Charging is selected, results may vary from a tester due to changes in battery condition
    - DSS cannot perform **Charge Acceptance or Defect** detection tests and may cause variation in Overall Decisions during the Battery Test (see "Interpreting DCA Results" for defect explanation)

Parameter	Result
Cranking Result:	Good Battery
Reserve Result:	OK
Voltage:	12.56 V
Measured:	335 CCA
Rated:	335 CCA
Temperature:	71° F

**Good Battery**

Send Results Done

**Cranking/Charging (Half CCA Alignment) CP (Reserve Capacity)**

**Overall Decision (Overall Battery Recommendation)**

**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 DCA to Charge the battery and return 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 for a final decision
4. **Replace Battery** – Battery is Bad and should be replaced before returning the vehicle to the customer
5. **Bad-Cell Replace** – Battery is Bad and should be replaced before returning the vehicle to the customer

**Reserve Result (CP):**

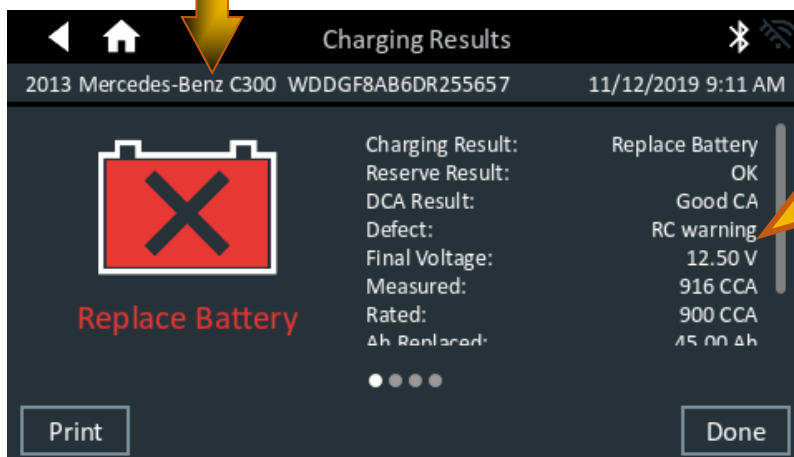
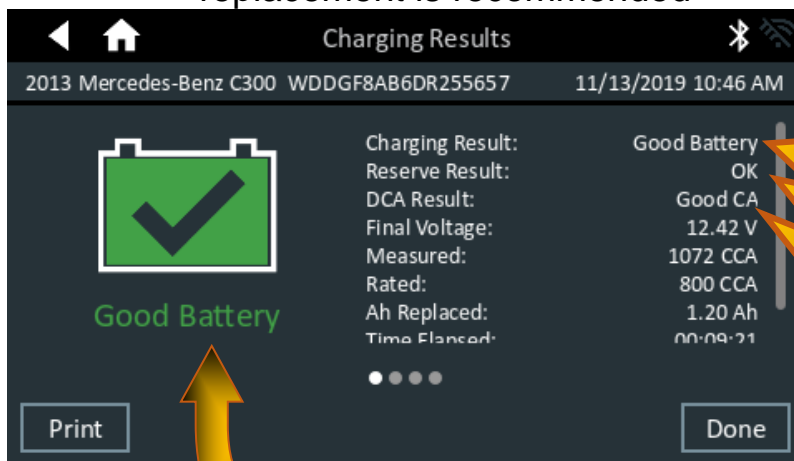
1. **OK** – Reserve Capacity is Good and the battery should be handled according to the Overall Decision
2. **Warning** – Battery has poor reserve capacity and should be replaced before returning the vehicle to the customer
3. **Low Battery** – Battery under test is too discharged to perform the CP test
4. **Internal Battery Low** – DSS-5000 AA batteries 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, ensure all vehicle loads are off, the key is not in the ignition, and the doors are closed.



## Interpreting DCA Results:

- **DCA-8000 Decision Breakdown**

- **Cranking/Charging Result:** Decision aligns with the battery's ability to Pass a Half CCA load test
- **Reserve Result (CP):** Decision aligns with the battery's ability to discharge at 25 Amps for Minute Rating listed on the battery label
- **DCA Result (Charge Acceptance):** Decision aligns with the battery's ability to charge back and recover after use during Key Off power consumption or Start/Stop vehicle systems
- **Defect Result:** Decision **ONLY** appears when a battery fails for detection methods only capable by the DCA Diagnostic Charger
- **Overall Decision:** The decision requires all of the above results to be Good. If any of the above results are suspect (Replace), then battery replacement is recommended



Cranking/Charging (Half CCA Alignment)
CP (Reserve Capacity)
DCA (Charge Acceptance)
Overall Decision (Overall Battery Recommendation)
Defect (Additional Fault Detection)

**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 to Charge the battery and return 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 Bad and should be replaced before returning the vehicle to the customer
5. **Bad-Cell Replace** – Battery is Bad 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 to the customer
3. **Low Battery** – Battery under test is too discharged to perform the CP test

**DCA Result:** - Determines 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

**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 replacement is recommended
3. **Hard Short** – A hard short has been detected and replacement is recommended
4. **RC Warning** – Reserve capacity problems have been identified using a method other than the RC test from the DSS-5000

**Additional information for the DSS-5000 and DCA-8000 are available on the internet:**

- Knowledge base sites – tips and tricks, user manuals
  - DSS-5000: <https://subaru.dss5000.com/>
  - DCA-8000: <https://subaru.dca8000.com/>