

Component Procedures: Battery

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Component Procedures: Battery

Parts and Labor (itype_189)

Labor

Operation	Qualifier Path	Skill	Std Hrs	Wty Hrs
Charge/Test	Battery > Battery, Charge/Test	B	0.4	0.0
Remove & Replace	Alternator > Battery Current Sensor, R&R	B	0.5	0.0
Remove & Replace	Battery > Battery Current Sensor, R&R	B	0.7	0.0
Remove & Replace	Battery > Battery, R&R	C	0.4	0.0
Remove & Replace	Battery > Negative Cable, R&R	B	1.0	0.0
Remove & Replace	Battery > Positive Cable, R&R	B	1.8	1.2
Clean	Battery > Battery Terminals, Clean	C	0.3	0.0

Battery (Article 11914)

- Always shield your eyes and avoid leaning over the battery whenever possible.
- Do not expose the battery to open flames or sparks.
- Do not allow the battery electrolyte to contact the eyes or the skin. Flush immediately and thoroughly any contacted areas with water and get medical help.
- Follow each step of the jump starting procedure in order.
- Treat both the booster and the discharged batteries carefully when using the jumper cables.

Batteries that are no longer wanted must be disposed of by an approved battery recycler and must never be thrown in the trash or sent to a landfill.

Batteries that are not part of the vehicle itself, not the battery under the hood, must only be transported on public streets for business purposes via approved hazardous material transportation procedures.

Battery storage, charging and testing facilities in repair shops must meet various requirements for ventilation, safety equipment, material segregation, etc.

The maintenance free battery is standard. There are no vent plugs in the cover. The battery is completely sealed except for 2 small vent holes in the side. These vent holes allow the small amount of gas that is produced in the battery to escape.

The battery has 3 functions as a major source of energy:

- Engine cranking
- Voltage stabilizer
- Alternate source of energy with generator overload

Battery Low Start Vehicle Message

The body control module (BCM) monitors battery positive voltage to determine battery state of charge. If one or more of the BCM battery positive voltage terminals measure less than approximately 11.6V compared to the BCM ground circuits, this message will display and four chimes may sound. Start the vehicle immediately. If the vehicle is not started and the battery continues to discharge, the climate controls, heated seats, and audio systems will shut off and the vehicle may require a jump start. These systems will function again after the vehicle is started.

Battery Ratings

A battery has 2 ratings:

- Cold cranking amperage
- Amperage hours

When a battery is replaced use a battery with similar ratings. See battery specification label on the original battery.

Amperage Hours

The amperage hour rating tells you how much amperage is available when discharged evenly over a 20 hour period. The amperage hour rating is cumulative, so in order to know how much constant amperage the battery will output for 20 h, you have to divide the amperage hour rating by 20. Example: If a battery has an amperage hour rating of 74, dividing by 20 = 3.75. Such a battery can carry a 3.75 A load for 20 hours before dropping to 10.5 V. (10.5 V is the fully discharged level, at which point the battery needs to be recharged). A battery with an amperage hour rating of 55 will carry a 2.75 A load for 20 hours before dropping to 10.5 V.

Cold Cranking Amperage

The cold cranking amperage is an indication of the ability of the battery to crank the engine at cold temperatures. The cold cranking amperage rating is the minimum amperage the battery must maintain for 30 seconds at -18°C (0°F) while maintaining at least 7.2 V. See battery label for the cold cranking amperage rating of this battery.

Battery Charging (Article 11918)

Special Tools

EL 50313 - Battery Tester

For equivalent regional tools, refer to Special Tools .

Diagnostic Aids

- The charging area should be well ventilated.
- Do not charge a battery that appears to be frozen. Allow the battery to warm to room temperature and test it using the EL 50313 - Battery Tester before charging.
- An AGM battery may be damaged if charged to more than 14.5 V.
- A Flooded Cell battery may be damaged if charged to more than 16.5 V.
- Vehicles with dual batteries must be charged individually which will result in two printouts.

Battery State of Charge

The maintenance-free batteries state of charge is estimated by reading the voltage of the battery across the battery terminals. Because the voltage is affected by current flow into or out of the battery, the engine must be stopped and all electrical loads turned OFF, including parasitic loads, when checking the voltage. The voltage can also be affected if the battery has just been charged or discharged, so it is important to consider what has happened to the battery in the time just before testing. Use the following procedure to determine the batteries state of charge:

- Be sure all electrical loads are turned OFF.
- Determine whether the battery has been used in a vehicle or charged within the past 12 hours.
- If the answer is no, the terminal voltage will be stabilized and no action is necessary before reading the voltage. Skip to step 3.
- If the answer is yes, terminal voltage will not be stabilized and you should wait 12 hours since the last time the battery was used.
- Estimate the battery temperature by determining the average temperature to which the battery has been exposed for the past 12 hours.
- Measure the battery voltage at the battery terminals. Refer to the following table to determine the state of charge according to the estimated battery temperature:

Battery Voltage % Charge at 0°C (32°F) % Charge at 25°C (75°F)

12.75 V	100%	100%
12.7 V	100%	90%
12.6 V	90%	75%
12.45 V	75%	65%
12.2 V	65%	45%
12.0 V	40%	20%

Use the state of charge information as follows:

- A battery with a state of charge that is below 65 percent must always be recharged before returning it to service or continuing storage.
- A battery with a state of charge that is 65 percent or greater is generally considered to be charged enough in order to be returned to normal service or in order to continue storage. However, if the battery is being used in slow traffic or with short drive times, or if the temperature is very hot or very cold, the battery should be fully charged, to at least 90 percent, before returning it to service or continuing storage.

Charging Time Required

The time required to charge a battery will vary depending upon the following factors:

- The battery charger capacity—The higher the charger amperage, the less time it will take to charge the battery.
- The state of charge of the battery—A completely discharged battery requires more than twice as much charging time as a half charged battery. In a discharged battery with a voltage below 11 V, the battery has a very high internal resistance and may only accept a very low current at first. Later, as the charging current causes the acid content to increase in the electrolyte, the charging current will increase. Extremely discharged batteries may not activate the reversed voltage protection in some chargers. Refer to the manufacturer's instructions for operating this circuitry.
- The temperature of the battery—The colder the battery is, the more time it takes to recharge the battery. The charging current accepted by a cold battery is very low at first. As the battery warms, the charging current will increase.

Charging Procedure

When charging side-terminal batteries with the battery cables connected, connect the charger to the positive cable bolt and to a ground located away from the battery. When charging side-terminal batteries with the battery cables disconnected, install the battery side terminal adapters and connect the charger to the

adapters.

- Ensure that all of the battery terminal connections are clean and tight.
- Connect the charger positive lead to the battery positive terminal on the battery or the remote jumper stud underhood.
- Connect the negative charger lead to a solid engine ground or to a ground stud in the engine compartment that is connected directly to the battery negative terminal, but away from the battery. If the negative battery cable is disconnected and a terminal adapter is being used, connect directly to the adapter.
- Select "Charging," "PDI" and "In Vehicle" when setting up the charger.
- Select the proper battery type, Flooded, AGM, Spiral AGM or Stop/Start AGM.
- Enter the CCA as shown on the battery label.

Battery Replacement (Article 11949)

Callout Component Name

Preliminary Procedure Disconnect the negative battery cable . Refer to Battery Negative Cable Disconnection and Connection . Disconnect the positive battery cable from the battery . Refer to Battery Positive Cable Replacement

Preliminary Procedure

- Disconnect the negative battery cable . Refer to Battery Negative Cable Disconnection and Connection .
- Disconnect the positive battery cable from the battery . Refer to Battery Positive Cable Replacement

1 Battery Cover

2 Battery Support Bolt (Qty: 2) Caution: Refer to Fastener Caution . Tighten 22 Nm(16 lb ft)

22 Nm(16 lb ft)

3 Battery Retainer Bolt

4 Battery Vent Tube

5 Battery

Battery Disconnect Warning (Article 13031)

Document ID: 2061934

Warning:

Unless directed otherwise, the ignition must be OFF with the key

removed, and all electrical loads must be OFF before servicing any electrical component. Disconnect the negative battery cable

to prevent an electrical spark should a tool or equipment come in contact with an exposed electrical terminal.

Failure to follow these precautions may result in personal injury and/or damage to the vehicle or its components.

For Vehicles equipped with OnStar® (UE1) with Back Up Battery

:

The Back Up Battery is a redundant power supply to allow limited OnStar® functionality in the event of a main vehicle battery power disruption to the VCIM (OnStar®module). Do not disconnect the main vehicle battery or remove the OnStar® fuse with the ignition key in any position other than OFF. Retained accessory power should be allowed to time out or be disabled (simply opening the driver door should disable retained accessory power) before disconnecting power. Disconnecting power to the OnStar® module in any way while the ignition is On or with retained accessory power activated may cause activation of the OnStar® Back-Up Battery system and will discharge and permanently damage the back-up battery. Once the Back-Up Battery is activated it will stay on until it has completely discharged. The back-up battery is not rechargeable and once activated the back-up battery must be replaced.

All New Technical Service Bulletins (itype_432)

Tsbs

- Warranty Administration – 12V Battery Testing and Warranty Replacement Requirements (U.S and Canada ONLY) (20-NA-132, 2026/05/20)
- AGM Battery Frequently Asked Questions (FAQs) (23-NA-044, 2024/08/16)
- Cold Weather and Long Stand Time Battery Maintenance and Testing Tips (15-06-03-001F, 2025/03/12)

All Technical Service Bulletins (itype_100)

Tsbs

- Dead Battery After Exiting The Vehicle While On A Bluetooth Cal (PIC6198A, 2016/08/02)

- Warranty Administration – 12V Battery Testing and Warranty Replacement Requirements (U.S and Canada ONLY) (20-NA-132, 2026/05/20)
- Warranty Administration – Battery Testing and Warranty Replacement Requirements (North America ONLY) (03-06-03-004Z, 2020/04/09)
- AGM Battery Frequently Asked Questions (FAQs) (23-NA-044, 2024/08/16)
- #17-NA-032: Information On Negative Battery Cable Alignment Pin Change - (Feb 2, 2017) (17-NA-032, 2017/02/02)
- Cold Weather and Long Stand Time Battery Maintenance and Testing Tips (15-06-03-001F, 2025/03/12)
- Electrical - Non GM Approved Battery Chargers and Booster Packs (15-NA-030, 2015/10/14)

Repair Tips (itype_110)

Tsbs

- Dead Battery After Exiting The Vehicle While On A Bluetooth Cal (PIC6198A, 2016/08/02)
- Electrical - Non GM Approved Battery Chargers and Booster Packs (15-NA-030, 2015/10/14)

Battery Inspection/Test (Article 11920)

Diagnostic Instructions

- Perform the Diagnostic System Check - Vehicle prior to using this diagnostic procedure.
- Review Strategy Based Diagnosis for an overview of the diagnostic approach.
- Diagnostic Procedure Instructions provides an overview of each diagnostic category.

Diagnostic Aids

- For 2019 and Newer North American Vehicle only we have an OEM (as built with) reference table available in SI under General Information > General Information > 12 V Battery Usage.
- For accurate test results the battery must be disconnected from the vehicle and the equipment connected directly to the battery posts.
- Failure to obtain the correct connections during the test may result in a failed test on a good battery.
- For Dual Batteries both of the batteries must be disconnected with test equipment connected directly to the posts. Each battery needs to be tested separately.
- For battery replacement warranty claims, the complete 15-character (17 with hyphens) test code from the EL-50313 Midtronics GR8 Battery Tester/Charger or 20-character (no hyphens) test code from the EL-52800 E-XTEQ Diagnostic Charge Battery Station (DCBS) must be included in the Labor Code Dependency field in GWM,
- Setup:
 - When using the GR8, Select "Charging," "Diagnostic" when setting up the test. and then select the correct battery type (Flooded, AGM, or Stop/Start AGM) and rated CCA (both from the battery label) must be entered. Use the Out of Vehicle test (battery disconnected with test equipment connected directly to the posts) for each battery when testing a vehicle with dual batteries.
 - When using the DCBS, Select "Diagnostic" and "Trolley", then scan the VIN and verify the battery selection is correct, or manually select the correct battery type (Flooded or AGM) and rated CCA (both from the battery label).

Cold Battery Testing — Battery Temperature Less Than 0° C (32° F)

- Cold batteries are resistant to charging even when in use on the vehicle. They will not recover quickly in subfreezing temperatures. Releasing a new vehicle with a battery in a low state of charge puts the customer at risk to a no crank event.
- If you suspect that a battery may be frozen, inspect the case for cracks prior to charging. Do not charge a frozen battery.
- When an automotive 12 Volt battery is cold (below freezing), its capacity starts to reduce. This can be observed in the voltage level of the battery, as well as measured cold cranking amps. A cold battery is also resistant to charging. The colder the battery, the more these characteristics are affected.
- Depending how cold a battery is, it can fail testing using any type of battery test equipment.

Reference Information

Schematic Reference

Starting and Charging Schematics

Connector End View Reference

Master Electrical Component List

Description and Operation

Battery Description and Operation

Electrical Information Reference

- Circuit Testing
- Connector Repairs

- Testing for Intermittent Conditions and Poor Connections

- Wiring Repairs

Scan Tool Reference

Control Module References for scan tool information

Special Tools

- GR8 EL-50313 - Midtronics Battery Tester/Charger

- DCBS EL-52800 - E-XTEQ Diagnostic Charge Battery Station

For equivalent regional tools, refer to Special Tools

Circuit/System Testing

- Always shield your eyes.

- Avoid leaning over the battery whenever possible.

- Do not expose the battery to open flames or sparks.

- Do not allow battery acid to contact the eyes or the skin.

- Flush any contacted areas with water immediately and thoroughly.

- Get medical help.

Battery Testing with EL-50313 GR8 Midtronics

- Verify there is no Battery acid leakage and/or sulfur/acid odor.

- If there is Battery acid leakage and/or sulfur/acid odor Ventilate the area prior to servicing, testing or charging the Battery.

- If there is no Battery acid leakage and/or sulfur/acid odor

- Verify the C1 Battery or C1B Battery – Auxiliary (if equipped) case is not cracked, broken, or damaged, which may be indicated by battery acid leakage and/or Sulfur/Acid Smell.

- If there is any apparent damage Replace the appropriate C1 Battery or C1B Battery – Auxiliary.

- If there is no damage

- Verify that the battery cables are clean and tight. The battery terminal bolts should be torqued as specified in Fastener Specifications .

- If the battery cables need to be cleaned or tightened Clean as required and tighten as specified.

- If the battery cables are clean and tight

- Disconnect battery from the vehicle. There is no need to remove the battery from the vehicle, Refer to:

Battery Replacement

- Connect the EL-50313 directly to the battery terminal posts.

- Select “Charging,” “Diagnostic” and “Out of Vehicle” when setting up the test.

- The correct Battery Type MUST be selected when setting up the test. Selecting the incorrect Battery Type may lead to a false “Battery is bad” result for a good battery.

- Battery Type selection START/STOP AGM is ONLY for testing the small Auxiliary battery on some vehicles equipped with Auto Stop/Start (KL9). NOT all vehicles with Auto Stop/Start.

- Do NOT Select Start/Stop AGM for Vehicles equipped with Diesel Engines or Dual Battery Option (K4B) or (TP2).

- Select the proper battery type: Flooded, AGM or START/STOP AGM.

- Always enter the CCA as shown on the battery label.

- Verify the test result is not REPLACE BATTERY or BAD CELL-REPLACE

- If the test result is REPLACE BATTERY or BAD CELL-REPLACE Note: You must provide the Print out of the Warranty Code when a battery is replaced. The printout must be attached to the job card and stored in the dealership’s vehicle history folder. Write the code on the warranty copy since the code must be entered by the warranty administrator in the “Battery Tester Code” Field of the transaction. Replace the appropriate C1 Battery or C1B Battery – Auxiliary.

- If the test result is not BAD BATTERY or BAD CELL, but the battery requires Charging Conduct Battery Charging and Battery Electrical Drain/Parasitic Load Test .

- If Battery is OK and the battery doesn’t require Charging

- The condition is not currently present and may be an intermittent fault. Conduct a Battery Electrical Drain/Parasitic Load Test .

Battery Testing with EL-52800 DCBS E-XTEQ

- Verify the C1 Battery or C1B Battery – Auxiliary (if equipped) case is not cracked, broken, or damaged, which may be indicated by battery acid leakage.

- Verify that the battery cables are clean and tight. The battery terminal bolts should be torqued as specified in Fastener Specifications .

- Connect the EL-52800 directly to the battery terminal posts.

- Select “Diagnostic” and “Trolley” when setting up the test.

- Use the VIN Scan feature or select the proper battery type: Flooded, or AGM.

- Verify the CCA as shown on the battery label.

- Verify the test result is not "Battery is Bad".
 - If the test result is "Battery is Bad" Note: You must provide the Print out of the Warranty Code when a battery is replaced. The printout must be attached to the job card and stored in the dealership's vehicle history folder. Write the code on the warranty copy since the code must be entered by the warranty administrator in the "Battery Tester Code" Field of the transaction. Replace the appropriate C1 Battery or C1B Battery – Auxiliary.
 - If the test result is not "Battery is Bad", but the battery requires Charging Conduct Battery Charging and Battery Electrical Drain/Parasitic Load Test .
 - If "Battery is Good" and the battery doesn't require Charging The condition is not currently present and may be an intermittent fault. Conduct a Battery Electrical Drain/Parasitic Load Test .
- Repair Instructions
- Perform the Diagnostic Repair Verification after completing the repair.
- Battery Replacement

Battery Electrical Drain/Parasitic Load Test (Article 11919)

12 V Battery

The following procedure is for the 12 V battery only.

Diagnostic Instructions

- Perform the Diagnostic System Check - Vehicle prior to using this diagnostic procedure.
- Review Strategy Based Diagnosis for an overview of the diagnostic approach.
- Diagnostic Procedure Instructions provides an overview of each diagnostic category.

Circuit/System Description

Components most likely to cause a parasitic draw on the vehicles battery are switches, relays, and control modules. After the ignition is turned OFF the control modules will begin to go to sleep (shut OFF). All control modules do not go to sleep at the same time, some may take up to 30 minutes or longer after turning the ignition off before going to sleep e.g. RAP or IRAP. Other components such as EVAP, HVAC afterblow, EV Battery Heater/Coolers, OnStar and keyless entry control modules (approach detection in keyless access vehicles) etc. may periodically wake up then go back to sleep. These are all normal conditions, use of a DMM set to Min/Max may help identify the normal types of spikes in the parasitic draws

Diagnostic Aids

Active Draws

- If the battery voltage is interrupted by removing fuses, relays, module or component connectors, or disconnecting the battery may cause the condition to clear or reset. To prevent a loss of power when disconnecting the battery install the EQPMSK6211 Battery Booster Pack or equivalent to the positive and negative battery cable s prior disconnecting it to prevent a loss of voltage.
- Verify no aftermarket accessories are installed or connected to the Auxiliary Power Ports, Audio Ports, or DLC. e.g. insurance snapshot or tracking devices.
- On Some Vehicles the Auxiliary Power Ports can have B+ at all times (not controlled by RAP) by relocating the fuse in the fuseblock.
- Aftermarket accessories installed into the courtesy lamp circuit may cause the inadvertent power timer in the K9 Body Control Module (BCM) to keep resetting. This may cause the BCM to remain awake and cause a current drain on the battery.
- Verify that the battery and charging system are operating correctly. Refer to Battery Charging and Charging System Test .
- An engine off natural vacuum evaporative test can occur if the Engine Control Module (ECM) determines the drive cycle has met the appropriate criteria immediately after key off. The ECM will stay awake and the vent solenoid will stay energized for up to 45 min. The typical current draw for this is approximately 1 A.
- The K9 Body Control Module has discrete input and output terminals to control the vehicle's body functions. The K9 Body Control Module is wired to the High Speed GMLAN bus, Low Speed GMLAN bus and multiple Local Interconnect Network (LIN) buses and acts as a gateway between them. The various K9 Body Control Module input and output circuits are illustrated in the corresponding functional areas on the K9 Body Control Module electrical schematics.
- The K9 Body Control Module functions as the power mode master. The ignition switch is a low current switch with multiple discrete ignition sw itch signals to the power mode master for determining the power mode that will be sent over the serial data circuits to the other devices that need this information; the power mode master will activate relays and other direct outputs of the power mode master as needed. Refer to Power Mode Description and Operation for a complete description of power mode functions.
- The K9 Body Control Module functions as a gateway or translator. The purpose of the gateway is to translate serial data messages between the High Speed GMLAN bus and the Low Speed GMLAN bus for communication between

the various devices. The gateway will interact with each network according to that network's transmission protocol. All communication between the K9 Body Control Module and a scan tool is done through the primary High Speed GMLAN bus.

- Generation 5 and prior OnStar module does can "wake up" every 10 minutes for the first 48 hours, for Generation 6 and later the current draw is very low, less than 40 mA, the OnStar system is left in that state for up to the first 48 h. a parasitic draw of up to 40 mA with an occasional spike as high as 80 mA for the first 48 hours is normal. If Equipped Refer to OnStar Description and Operation OnStar Sleep Cycle.
- Some automatic climate control systems can remain in a semi awake state for up to three hours, actual draw amounts vary by vehicle platform but are typically not greater than 50 mA.
- An extremely low mA current level is consumed by the body control module for monitoring purposes, actual system wake up occurs when the fobs for the vehicle are activated or approach is detected on keyless access vehicles. Other devices that operate on the same remote keyless entry frequency, such as the tire pressure monitoring sensors and other vehicle Fobs in the vicinity, may cause the body control module to have a 100 mA spike. These spikes are normal and occur too briefly to have a significant effect on battery drain.
- If an excessive current draw is not present during initial testing, continue periodic testing over a 1–2 hour period to see if the current draw increases and stays above an unacceptable level.
- The battery run down time will vary depending on the batteries reserve capacity. If the reserve capacity is higher, then the battery run down time may be longer. If the reserve capacity is lower, then the battery run down time may be shorter. The graph below indicates roughly how many days a 690 cold cranking amperage battery with a 110 min. reserve capacity starting at 80 percent state of charge will last with a constant current draw until it reaches 50 percent state of charge. Differences in battery reserve capacity and temperature will affect the results.

Current Drain Days

25 mA	33
50 mA	16.5
75 mA	11
100 mA	8.25
250 mA	3.3
500 mA	1.65
750 mA	1
1 A	0.8
2 A	0.4

Intermittent Draws

- The Battery Draw Customer Verification Worksheet may be helpful isolating or duplicating the customers concern
- When diagnosing an intermittent battery draw, if the battery voltage is interrupted by removing fuses, relays, module or component connectors, or disconnecting the battery may cause the condition to clear or reset. To prevent a loss of power when disconnecting the battery install the EQPMSK6211 Battery Booster Pack or equivalent to the positive and negative battery cable s prior disconnecting it to prevent a loss of voltage.
- Rule out customer driving habits such as regular short trips that do not allow enough time to properly charge the battery. Refer to Battery Description and Operation .
- A battery discharging for no apparent reason while the vehicle is parked can be caused by an intermittent draw, such as a module waking up, or a continuous draw, such as a dome light or stuck relay.
- The K9 Body Control Module functions as the power mode master. The ignition switch is a low current switch with multiple discrete ignition switch signals to the power mode master for determining the power mode that will be sent over the serial data circuits to the other devices that need this information; the power mode master will activate relays and other direct outputs of the power mode master as needed. Refer to Power Mode Description and Operation for a complete description of power mode functions.
- Generation 5 and prior OnStar module does can "wake up" every 10 minutes for the first 48 hours, for Generation 6 and later the current draw is very low, less than 40 mA, the OnStar system is left in that state for up to the first 48 h. a parasitic draw of up to 40 mA with an occasional spike as high as 80 mA for the first 48 hours is normal. Refer to OnStar Description and Operation OnStar Sleep Cycle.

Reference Information

Schematic Reference

Control Module References

Connector End View Reference

Master Electrical Component List

Electrical Information Reference

- Circuit Testing

- Testing for Intermittent Conditions and Poor Connections
- Connector Repairs
- Wiring Repairs

Scan Tool Reference

Control Module References for scan tool information

Special Tools

EL 38758 - Parasitic Draw Test Switch

For equivalent regional tools, refer to Special Tools .

Circuit/System Verification

- Most vehicle systems will go into the initial sleep cycle after 10 min, with periodic normal wake up cycles that will occur for approximately 1 s, it can take up to 2 hours before all systems powers down completely depending on make model or year. Typically a vehicle will not have more than 50 mA parasitic draw during the initial power sleep cycle.
 - Closing the doors, hood, trunk/liftgate, glove compartments, and console switches/ajar switches are closed while leaving the them open is recommended, this allows the vehicle systems to perform in a “doors/hood/trunk/liftgate closed” mode while allowing access to the vehicle components that need to be accessed for testing without waking the vehicle back up.
 - Locking doors will arm the vehicle content theft deterrent system if equipped. Failure to arm the system may cause a theft system fault to not be present during testing. If the vehicle is equipped with intrusion detection, the vehicle will activate full content theft alarm (vehicle wake up with siren and/or horn activation and exterior lighting cycling) when entering the vehicle.
 - There are many things that can prevent the vehicle from completely going to sleep and passing the parasitic draw test. Make sure all the conditions listed below are met before performing the parasitic current draw test.
 - Ignition OFF
 - Key out of the ignition switch – when not equipped with keyless access and start. Transmitter (Key FOB) away from vehicle for keyless access equipped vehicles.
 - Retained Accessory Power OFF – open and close the driver door after ignition OFF
 - Scan tool not communicating with a vehicle control module – in some cases it may need to be disconnected from the DLC
 - All doors, hood, trunk/liftgate, glove compartments, and console switches, latches and ajar switches are closed.
 - Head lamps OFF – auto head lamps disabled.
 - Any delay lighting OFF.
 - If equipped with an underhood lamp disable it. On vehicles will disable the underhood lamp when the hood latch is closed
 - If equipped with HVAC Afterblow, after shutting the vehicle off afterblow may cycle on after 30 min for approximately 10 minutes. Starting with some 2021 Model Vehicles afterblow is enabled at the factory and cannot be disabled.
 - Any accessory that can work with ignition OFF inactive or OFF. On some vehicles the Auxiliary Power Ports can be enabled to be on at all times by relocating the fuse in the fuseblock.
 - Wait 15 min or longer, after all other listed conditions are met
- Using an Inductive Amp Clamp (Preferred Method)
- Verify meter operating correctly, refer to the tools owner manual for tool being used,
 - Road test the vehicle in the same manner as the customer does, based on information obtained from the customer verification sheet.
 - Activate all the accessories the vehicle is equipped with, such as the radio, rear seat entertainment, rear defogger, windows, sunroof, front and rear HVAC etc. (operate components through a full cycle) confirm everything is operating correctly and note any components that are not operating correctly.
 - Connect a 50 Amp inductive amp clamp to the negative battery cable that can read down to 1 mA.
 - Ignition OFF.
 - Ignition off, exit the vehicle following the same manner that the customer does, based on information obtained from the customer verification sheet.
 - Allow all modules and components to go to sleep.
 - Disconnect negative terminal at the C1B Battery - Auxiliary, if equipped.
 - Verify there is less than 40 mA of parasitic current drain.
 - If greater than the specified range, refer to Circuit/System Testing.
 - If less than the specified range
 - The condition may be an intermittent fault and is currently not present. Perform additional road test or repeat customer scenario to attempt to duplicate the draw

Alternate Method for Vehicles with Battery Sensor Module

- When diagnosing an intermittent battery draw, if the battery voltage is interrupted by disconnecting the battery, fuses, relays, component or module connectors may cause the condition to clear.
- The switch knob on the EL 38758 - switch is marked ON and OFF. When the switch knob is in the ON position, the circuit is closed and electrical current will pass through the switch. When the switch knob is in the OFF position, the circuit is open and electrical current will not pass through the switch.
- Connect the EQPMSK6211 Battery Booster Pack or equivalent to the Battery positive and negative jump start posts prior to disconnecting the negative battery cable to prevent a loss of voltage which could reset or clear an intermittent draw.
- Connect a 10 A fused jumper wire between the Battery Negative post clamp and the other end of the Negative Battery Cable. [Click for full-size image](#)
- Remove the Current sensor stud nut and remove the negative cable from the Battery Sensor Module. [Click for full-size image](#)
- Check the fuse in the jumper wire. The fuse should be OK.
- If the jumper wire fuse is blown, the vehicle has an Active excessive parasitic draw. Refer to [Circuit/System Testing](#)
- If the jumper wire fuse is not blown,
- Disconnect the the EQPMSK6211 Battery Booster Pack or equivalent
- Verify there is less than 40 mA of parasitic current drain. [Click for full-size image](#)
- Reconnect negative terminal at the C1B Battery - Auxiliary, if equipped.
- Reconnect the Battery Negative Battery Cable to the Battery Sensor Module.
- The condition may be an intermittent fault and is currently not present. Perform additional road test, repeat customer scenario per the Battery Draw customer verification sheet to attempt to duplicate the draw.

Alternate Method for Vehicles without a Battery Sensor Module Using the EL 38758 Parasitic Draw Test Switch

- Ignition OFF, disconnect the battery negative cable from the battery. Refer to [Battery Negative Cable Disconnection and Connection](#) .
- Turn the EL 38758 - switch knob to the OFF position.
- Install the male end of the EL 38758 - switch to the battery ground terminal.
- Install the battery negative cable to the female end of the EL 38758 - switch .
- Turn the EL 38758 - switch knob to the ON position.
- Disconnect the EQPMSK6211 Battery Booster Pack or equivalent.
- Connect a 10 A fused jumper wire to the test switch tool terminals.
- Turn the EL 38758 - switch knob to the OFF position. The current now flows through the jumper wire.
- Turn the EL 38758 - switch knob to the ON position. Remove the fused jumper wire.
- Connect a DMM set to the 10 A DC scale between the test switch tool terminals.
- Turn the EL 38758 - switch knob to the OFF position. The current now flows through the DMM.
- If the jumper wire fuse is blown, refer to [Circuit/System Testing](#).

Circuit/System Testing

Battery Junction Block Voltage Drop Example

- If the equipped with a battery Junction block and if it is accessible, utilize an inductive amp clamp or perform a voltage drop test between the battery positive post and each leg of the battery junction block to help determine which fuse block is containing the draw.
- If a Parasitic Draw has not been isolated in Step 1.
- [Standard Fuse Voltage Drop Test Example](#) [Click for full-size image](#)
- [Micro 3 Fuse Voltage Drop Test Example](#) [Click for full-size image](#) [Click for full-size image](#)
- Use a DMM set to mV scale and perform a voltage drop across each fuse excluding J-Case type fuses (ignore negative readings) one at a time to determine the fuse that is causing the parasitic draw using the tables below.
- If a Parasitic Draw has been Isolated in Step 1
- Go to the fuse block that the draw has been isolated to.
- Use the DMM set to the mV scale perform a voltage drop across each fuse excluding J-Case type fuses (ignore negative readings) one at a time to determine the fuse that is causing the parasitic draw using the tables below.
- If a voltage drop is found Note: Do NOT remove any fuses as it may cause the draw to go away and may not return. If the draw is isolated to a fuse that supplies voltage to more than one component, disconnect the components one at a time until the draw is gone. Refer to [Power Distribution Schematics](#) to diagnose exactly which circuit of the suspect system is causing the high parasitic drain.
- If a voltage drop is not found
- Verify an excessive current draw is not present by removing each remaining J-Case fuse(s), circuit breaker(s), relay(s), components and modules one at a time while monitoring the draw to verify it drops to

below 40 mA.

- If an excessive parasitic draw is found Note: Do NOT remove any fuses as it may cause the draw to go away and may not return. If the draw is isolated to a fuse that supplies voltage to more than one component, disconnect the components one at a time until the draw is gone. Refer to Power Distribution Schematics to diagnose exactly which circuit of the suspect system is causing the high parasitic drain.

- If an excessive parasitic draw is not found

- The condition may be an intermittent fault and is currently not present.

- Stuck switch

- Stuck relay

- Control module

- Perform additional road test, repeat customer scenario per the Battery Draw customer verification sheet to attempt to duplicate the draw,

- Circuit Current Across Fuse mA (milliAmps)

- The mA values listed in the tables below are estimated based on the voltage drop across the different fuse designs.

- Some fuses that may have an initial voltage drop then drop off, is normal.

- Some fuses that always have a nominal draw going to components that supply memory retention is normal.

- Use the parasitic draw reference tables along with the schematics to determine the excessive draw.

mV Grey 2 Amp (mA) Violet 3 Amp (mA) Pink 4 Amp (mA) Tan 5 Amp (mA) Brown 7.5 Amp (mA) Red 10 Amp (mA) Blue 15 Amp (mA) Yellow 20 Amp (mA) Clear 25 Amp (mA) Green 30 Amp (mA)

0.1 2 3 4 6 9 13 22 31 42 54

0.2 4 6 9 11 18 27 44 62 85 108

0.3 5 9 13 17 28 40 66 93 127 162

0.4 7 12 17 23 37 54 87 125 169 216

0.5 9 15 21 28 46 67 109 156 212 270

0.6 11 18 26 34 55 81 131 187 254 324

0.7 13 21 30 39 65 94 153 218 297 378

0.8 14 24 34 45 74 108 175 249 339 432

0.9 16 27 38 51 83 121 197 280 381 486

1 18 30 43 56 92 135 218 312 424 541

1.1 20 33 47 62 101 148 240 343 466 595

1.2 22 36 51 68 111 162 262 374 508 649

1.3 23 39 55 73 120 175 284 405 551 703

1.4 25 41 60 79 129 189 306 436 593 757

1.5 27 44 64 85 138 202 328 467 636 811

1.6 29 47 68 90 147 216 349 498 678 865

1.7 31 50 72 96 157 229 371 530 720 919

1.8 32 53 77 101 166 243 393 561 763 973

1.9 34 56 81 107 175 256 415 592 805 1027

2 36 59 85 113 184 270 437 623 847 1081

2.1 38 62 89 118 194 283 459 654 890 1135

2.2 40 65 94 124 203 296 480 685 932 1189

2.3 41 68 98 130 212 310 502 717 975 1243

2.4 43 71 102 135 221 323 524 748 1017 1297

2.5 45 74 106 141 230 337 546 779 1059 1351

2.6 47 77 111 146 240 350 568 810 1102 1405

2.7 49 80 115 152 249 364 590 841 1144 1459

2.8 50 83 119 158 258 377 611 872 1186 1514

2.9 52 86 124 163 267 391 633 903 1229 1568

3 54 89 128 169 276 404 655 935 1271 1622

3.1 56 92 132 175 286 418 677 966 1314 1676

3.2 58 95 136 180 295 431 699 997 1356 1730

3.3 59 98 141 186 304 445 721 1028 1398 1784

3.4 61 101 145 192 313 458 742 1059 1441 1838

3.5 63 104 149 197 323 472 764 1090 1483 1892

3.6 65 107 153 203 332 485 786 1121 1525 1946

3.7 67 110 158 208 341 499 808 1153 1568 2000

3.8 68 113 162 214 350 512 830 1184 1610 2054

3.9 70 116 166 220 359 526 852 1215 1653 2108

4 72 119 170 225 369 539 873 1246 1695 2162

4.1 74 121 175 231 378 553 895 1277 1737 2216
4.2 76 124 179 237 387 566 917 1308 1780 2270
4.3 77 127 183 242 396 580 939 1340 1822 2324
4.4 79 130 187 248 406 593 961 1371 1864 2378
4.5 81 133 192 254 415 606 983 1402 1907 2432
4.6 83 136 196 259 424 620 1004 1433 1949 2486
4.7 85 139 200 265 433 633 1026 1464 1992 2541
4.8 86 142 204 270 442 647 1048 1495 2034 2595
4.9 88 145 209 276 452 660 1070 1526 2076 2649
5 90 148 213 282 461 674 1092 1558 2119 2703
5.1 92 151 217 287 470 687 1114 1589 2161 2757
5.2 94 154 221 293 479 701 1135 1620 2203 2811
5.3 95 157 226 299 488 714 1157 1651 2246 2865
5.4 97 160 230 304 498 728 1179 1682 2288 2919
5.5 99 163 234 310 507 741 1201 1713 2331 2973
5.6 101 166 239 315 516 755 1223 1745 2373 3027
5.7 103 169 243 321 525 768 1245 1776 2415 3081
5.8 104 172 247 327 535 782 1266 1807 2458 3135
5.9 106 175 251 332 544 795 1288 1838 2500 3189
6 108 178 256 338 553 809 1310 1869 2542 3243
6.1 110 181 260 344 562 822 1332 1900 2585 3297
6.2 112 184 264 349 571 836 1354 1931 2627 3351
6.3 113 187 268 355 581 849 1376 1963 2669 3405
6.4 115 190 273 361 590 863 1397 1994 2712 3459
6.5 117 193 277 366 599 876 1419 2025 2754 3514
6.6 119 196 281 372 608 889 1441 2056 2797 3568
6.7 121 199 285 377 618 903 1463 2087 2839 3622
6.8 122 201 290 383 627 916 1485 2118 2881 3676
6.9 124 204 294 389 636 930 1507 2150 2924 3730
7 126 207 298 394 645 943 1528 2181 2966 3784
7.1 128 210 302 400 654 957 1550 2212 3008 3838
7.2 129 213 307 406 664 970 1572 2243 3051 3892
7.3 131 216 311 411 673 984 1594 2274 3093 3946
7.4 133 219 315 417 682 997 1616 2305 3136 4000
7.5 135 222 319 423 691 1011 1638 2336 3178 4054
7.6 137 225 324 428 700 1024 1659 2368 3220 4108
7.7 138 228 328 434 710 1038 1681 2399 3263 4162
7.8 140 231 332 439 719 1051 1703 2430 3305 4216
7.9 142 234 336 445 728 1065 1725 2461 3347 4270
8 144 237 341 451 737 1078 1747 2492 3390 4324
8.1 146 240 345 456 747 1092 1769 2523 3432 4378
8.2 147 243 349 462 756 1105 1790 2555 3475 4432
8.3 149 246 353 468 765 1119 1812 2586 3517 4486
8.4 151 249 358 473 774 1132 1834 2617 3559 4541
8.5 153 252 362 479 783 1146 1856 2648 3602 4595
8.6 155 255 366 485 793 1159 1878 2679 3644 4649
8.7 156 258 371 490 802 1173 1900 2710 3686 4703
8.8 158 261 375 496 811 1186 1921 2741 3729 4757
8.9 160 264 379 501 820 1199 1943 2773 3771 4811
9 162 267 383 507 829 1213 1965 2804 3814 4865
9.1 164 270 388 513 839 1226 1987 2835 3856 4919
9.2 165 273 392 518 848 1240 2009 2866 3898 4973
9.3 167 276 396 524 857 1253 2031 2897 3941 5027
9.4 169 279 400 530 866 1267 2052 2928 3983 5081
9.5 171 281 405 535 876 1280 2074 2960 4025 5135
9.6 173 284 409 541 885 1294 2096 2991 4068 5189
9.7 174 287 413 546 894 1307 2118 3022 4110 5243
9.8 176 290 417 552 903 1321 2140 3053 4153 5297
9.9 178 293 422 558 912 1334 2162 3084 4195 5351
10 180 296 426 563 922 1348 2183 3115 4237 5405

mV Black 1 Amp (mA) Grey 2 Amp (mA) Violet 3 Amp (mA) Pink 4 Amp (mA) Tan 5 Amp (mA) Brown 7.5 Amp (mA) Red 10 Amp (mA) Blue 15 Amp (mA) Yellow 20 Amp (mA) Clear 25 Amp (mA) Green 30 Amp (mA) Blu-Green 35 Amp (mA) Orange 40 Amp (mA)

0.1 1 2 3 4 6 9 13 21 30 40 51 62 69
0.2 2 4 6 9 11 18 26 42 59 79 102 124 139
0.3 2 6 10 13 17 27 39 63 89 119 152 186 208
0.4 3 7 13 18 22 37 52 83 118 159 203 248 278
0.5 4 9 16 22 28 46 65 104 148 198 254 311 347
0.6 5 11 19 26 34 55 78 125 178 238 305 373 417
0.7 6 13 23 31 39 64 91 146 207 278 355 435 486
0.8 7 15 26 35 45 73 104 167 237 317 406 497 556
0.9 7 17 29 39 50 82 117 188 266 357 457 559 625
1 8 19 32 44 56 92 130 208 296 397 508 621 694
1.1 9 21 35 48 62 101 143 229 325 437 558 683 764
1.2 10 22 39 53 67 110 156 250 355 476 609 745 833
1.3 11 24 42 57 73 119 169 271 385 516 660 807 903
1.4 11 26 45 61 78 128 182 292 414 556 711 870 972
1.5 12 28 48 66 84 137 195 313 444 595 761 932 1042
1.6 13 30 51 70 90 147 208 333 473 635 812 994 1111
1.7 14 32 55 75 95 156 221 354 503 675 863 1056 1181
1.8 15 34 58 79 101 165 234 375 533 714 914 1118 1250
1.9 15 36 61 83 106 174 247 396 562 754 964 1180 1319
2 16 37 64 88 112 183 260 417 592 794 1015 1242 1389
2.1 17 39 68 92 118 192 273 438 621 833 1066 1304 1458
2.2 18 41 71 96 123 202 286 458 651 873 1117 1366 1528
2.3 19 43 74 101 129 211 299 479 680 913 1168 1429 1597
2.4 20 45 77 105 134 220 312 500 710 952 1218 1491 1667
2.5 20 47 80 110 140 229 325 521 740 992 1269 1553 1736
2.6 21 49 84 114 146 238 338 542 769 1032 1320 1615 1806
2.7 22 50 87 118 151 247 351 563 799 1071 1371 1677 1875
2.8 23 52 90 123 157 257 364 583 828 1111 1421 1739 1944
2.9 24 54 93 127 162 266 377 604 858 1151 1472 1801 2014
3 24 56 96 132 168 275 390 625 888 1190 1523 1863 2083
3.1 25 58 100 136 174 284 403 646 917 1230 1574 1925 2153
3.2 26 60 103 140 179 293 416 667 947 1270 1624 1988 2222
3.3 27 62 106 145 185 302 429 688 976 1310 1675 2050 2292
3.4 28 64 109 149 190 312 442 708 1006 1349 1726 2112 2361
3.5 28 65 113 154 196 321 455 729 1036 1389 1777 2174 2431
3.6 29 67 116 158 202 330 468 750 1065 1429 1827 2236 2500
3.7 30 69 119 162 207 339 481 771 1095 1468 1878 2298 2569
3.8 31 71 122 167 213 348 494 792 1124 1508 1929 2360 2639
3.9 32 73 125 171 218 357 506 813 1154 1548 1980 2422 2708
4 33 75 129 175 224 367 519 833 1183 1587 2030 2484 2778
4.1 33 77 132 180 230 376 532 854 1213 1627 2081 2547 2847
4.2 34 79 135 184 235 385 545 875 1243 1667 2132 2609 2917
4.3 35 80 138 189 241 394 558 896 1272 1706 2183 2671 2986
4.4 36 82 141 193 246 403 571 917 1302 1746 2234 2733 3056
4.5 37 84 145 197 252 412 584 938 1331 1786 2284 2795 3125
4.6 37 86 148 202 258 422 597 958 1361 1825 2335 2857 3194
4.7 38 88 151 206 263 431 610 979 1391 1865 2386 2919 3264
4.8 39 90 154 211 269 440 623 1000 1420 1905 2437 2981 3333
4.9 40 92 158 215 275 449 636 1021 1450 1944 2487 3043 3403
5 41 93 161 219 280 458 649 1042 1479 1984 2538 3106 3472
5.1 41 95 164 224 286 467 662 1063 1509 2024 2589 3168 3542
5.2 42 97 167 228 291 477 675 1083 1538 2063 2640 3230 3611
5.3 43 99 170 232 297 486 688 1104 1568 2103 2690 3292 3681
5.4 44 101 174 237 303 495 701 1125 1598 2143 2741 3354 3750
5.5 45 103 177 241 308 504 714 1146 1627 2183 2792 3416 3819
5.6 46 105 180 246 314 513 727 1167 1657 2222 2843 3478 3889
5.7 46 107 183 250 319 522 740 1188 1686 2262 2893 3540 3958

5.8 47 108 186 254 325 532 753 1208 1716 2302 2944 3602 4028
5.9 48 110 190 259 331 541 766 1229 1746 2341 2995 3665 4097
6 49 112 193 263 336 550 779 1250 1775 2381 3046 3727 4167
6.1 50 114 196 268 342 559 792 1271 1805 2421 3096 3789 4236
6.2 50 116 199 272 347 568 805 1292 1834 2460 3147 3851 4306
6.3 51 118 203 276 353 577 818 1313 1864 2500 3198 3913 4375
6.4 52 120 206 281 359 587 831 1333 1893 2540 3249 3975 4444
6.5 53 121 209 285 364 596 844 1354 1923 2579 3299 4037 4514
6.6 54 123 212 289 370 605 857 1375 1953 2619 3350 4099 4583
6.7 54 125 215 294 375 614 870 1396 1982 2659 3401 4161 4653
6.8 55 127 219 298 381 623 883 1417 2012 2698 3452 4224 4722
6.9 56 129 222 303 387 632 896 1438 2041 2738 3503 4286 4792
7 57 131 225 307 392 642 909 1458 2071 2778 3553 4348 4861
7.1 58 133 228 311 398 651 922 1479 2101 2817 3604 4410 4931
7.2 59 135 232 316 403 660 935 1500 2130 2857 3655 4472 5000
7.3 59 136 235 320 409 669 948 1521 2160 2897 3706 4534 5069
7.4 60 138 238 325 415 678 961 1542 2189 2937 3756 4596 5139
7.5 61 140 241 329 420 687 974 1563 2219 2976 3807 4658 5208
7.6 62 142 244 333 426 697 987 1583 2249 3016 3858 4720 5278
7.7 63 144 248 338 431 706 1000 1604 2278 3056 3909 4783 5347
7.8 63 146 251 342 437 715 1013 1625 2308 3095 3959 4845 5417
7.9 64 148 254 346 443 724 1026 1646 2337 3135 4010 4907 5486
8 65 150 257 351 448 733 1039 1667 2367 3175 4061 4969 5556
8.1 66 151 260 355 454 742 1052 1688 2396 3214 4112 5031 5625
8.2 67 153 264 360 459 752 1065 1708 2426 3254 4162 5093 5694
8.3 67 155 267 364 465 761 1078 1729 2456 3294 4213 5155 5764
8.4 68 157 270 368 471 770 1091 1750 2485 3333 4264 5217 5833
8.5 69 159 273 373 476 779 1104 1771 2515 3373 4315 5280 5903
8.6 70 161 277 377 482 788 1117 1792 2544 3413 4365 5342 5972
8.7 71 163 280 382 487 797 1130 1813 2574 3452 4416 5404 6042
8.8 72 164 283 386 493 807 1143 1833 2604 3492 4467 5466 6111
8.9 72 166 286 390 499 816 1156 1854 2633 3532 4518 5528 6181
9 73 168 289 395 504 825 1169 1875 2663 3571 4569 5590 6250
9.1 74 170 293 399 510 834 1182 1896 2692 3611 4619 5652 6319
9.2 75 172 296 404 515 843 1195 1917 2722 3651 4670 5714 6389
9.3 76 174 299 408 521 852 1208 1938 2751 3690 4721 5776 6458
9.4 76 176 302 412 527 862 1221 1958 2781 3730 4772 5839 6528
9.5 77 178 305 417 532 871 1234 1979 2811 3770 4822 5901 6597
9.6 78 179 309 421 538 880 1247 2000 2840 3810 4873 5963 6667
9.7 79 181 312 425 543 889 1260 2021 2870 3849 4924 6025 6736
9.8 80 183 315 430 549 898 1273 2042 2899 3889 4975 6087 6806
9.9 80 185 318 434 555 907 1286 2063 2929 3929 5025 6149 6875
10 81 187 322 439 560 917 1299 2083 2959 3968 5076 6211 6944

mV Yellow 20 Amp (mA) Clear 25 Amp (mA) Green 30 Amp (mA) Blu-Green 35 Amp (mA) Orange 40 Amp (mA) Red 50 Amp (mA) Blue 60 Amp (mA) Tan 70 Amp (mA) Clear 80 Amp (mA)

0.1 32 42 51 58 70 91 112 156 185
0.2 65 84 103 117 141 182 225 313 370
0.3 97 126 154 175 211 273 337 469 556
0.4 129 167 205 234 282 364 449 625 741
0.5 161 209 256 292 352 455 562 781 926
0.6 194 251 308 351 423 545 674 938 1111
0.7 226 293 359 409 493 636 787 1094 1296
0.8 258 335 410 468 563 727 899 1250 1481
0.9 290 377 462 526 634 818 1011 1406 1667
1.0 323 418 513 585 704 909 1124 1563 1852
1.1 355 460 564 643 775 1000 1236 1719 2037
1.2 387 502 615 702 845 1091 1348 1875 2222
1.3 419 544 667 760 915 1182 1461 2031 2407
1.4 452 586 718 819 986 1273 1573 2188 2593
1.5 484 628 769 877 1056 1364 1685 2344 2778

1.6 516 669 821 936 1127 1455 1798 2500 2963
1.7 548 711 872 994 1197 1545 1910 2656 3148
1.8 581 753 923 1053 1268 1636 2022 2813 3333
1.9 613 795 974 1111 1338 1727 2135 2969 3519
2.0 645 837 1026 1170 1408 1818 2247 3125 3704
2.1 677 879 1077 1228 1479 1909 2360 3281 3889
2.2 710 921 1128 1287 1549 2000 2472 3438 4074
2.3 742 962 1179 1345 1620 2091 2584 3594 4259
2.4 774 1004 1231 1404 1690 2182 2697 3750 4444
2.5 806 1046 1282 1462 1761 2273 2809 3906 4630
2.6 839 1088 1333 1520 1831 2364 2921 4063 4815
2.7 871 1130 1385 1579 1901 2455 3034 4219 5000
2.8 903 1172 1436 1637 1972 2545 3146 4375 5185
2.9 935 1213 1487 1696 2042 2636 3258 4531 5370
3.0 968 1255 1538 1754 2113 2727 3371 4688 5556
3.1 1000 1297 1590 1813 2183 2818 3483 4844 5741
3.2 1032 1339 1641 1871 2254 2909 3596 5000 5926
3.3 1065 1381 1692 1930 2324 3000 3708 5156 6111
3.4 1097 1423 1744 1988 2394 3091 3820 5313 6296
3.5 1129 1464 1795 2047 2465 3182 3933 5469 6481
3.6 1161 1506 1846 2105 2535 3273 4045 5625 6667
3.7 1194 1548 1897 2164 2606 3364 4157 5781 6852
3.8 1226 1590 1949 2222 2676 3455 4270 5938 7037
3.9 1258 1632 2000 2281 2746 3545 4382 6094 7222
4.0 1290 1674 2051 2339 2817 3636 4494 6250 7407
4.1 1323 1715 2103 2398 2887 3727 4607 6406 7593
4.2 1355 1757 2154 2456 2958 3818 4719 6563 7778
4.3 1387 1799 2205 2515 3028 3909 4831 6719 7963
4.4 1419 1841 2256 2573 3099 4000 4944 6875 8148
4.5 1452 1883 2308 2632 3169 4091 5056 7031 8333
4.6 1484 1925 2359 2690 3239 4182 5169 7188 8519
4.7 1516 1967 2410 2749 3310 4273 5281 7344 8704
4.8 1548 2008 2462 2807 3380 4364 5393 7500 8889
4.9 1581 2050 2513 2865 3451 4455 5506 7656 9074
5.0 1613 2092 2564 2924 3521 4545 5618 7813 9259
5.1 1645 2134 2615 2982 3592 4636 5730 7969 9444
5.2 1677 2176 2667 3041 3662 4727 5843 8125 9630
5.3 1710 2218 2718 3099 3732 4818 5955 8281 9815
5.4 1742 2259 2769 3158 3803 4909 6067 8438 10000
5.5 1774 2301 2821 3216 3873 5000 6180 8594 10185
5.6 1806 2343 2872 3275 3944 5091 6292 8750 10370
5.7 1839 2385 2923 3333 4014 5182 6404 8906 10556
5.8 1871 2427 2974 3392 4085 5273 6517 9063 10741
5.9 1903 2469 3026 3450 4155 5364 6629 9219 10926
6 1935 2510 3077 3509 4225 5455 6742 9375 11111
6.1 1968 2552 3128 3567 4296 5545 6854 9531 11296
6.2 2000 2594 3179 3626 4366 5636 6966 9688 11481
6.3 2032 2636 3231 3684 4437 5727 7079 9844 11667
6.4 2065 2678 3282 3743 4507 5818 7191 10000 11852
6.5 2097 2720 3333 3801 4577 5909 7303 10156 12037
6.6 2129 2762 3385 3860 4648 6000 7416 10313 12222
6.7 2161 2803 3436 3918 4718 6091 7528 10469 12407
6.8 2194 2845 3487 3977 4789 6182 7640 10625 12593
6.9 2226 2887 3538 4035 4859 6273 7753 10781 12778
7 2258 2929 3590 4094 4930 6364 7865 10938 12963
7.1 2290 2971 3641 4152 5000 6455 7978 11094 13148
7.2 2323 3013 3692 4211 5070 6545 8090 11250 13333
7.3 2355 3054 3744 4269 5141 6636 8202 11406 13519
7.4 2387 3096 3795 4327 5211 6727 8315 11563 13704
7.5 2419 3138 3846 4386 5282 6818 8427 11719 13889

7.6 2452 3180 3897 4444 5352 6909 8539 11875 14074
7.7 2484 3222 3949 4503 5423 7000 8652 12031 14259
7.8 2516 3264 4000 4561 5493 7091 8764 12188 14444
7.9 2548 3305 4051 4620 5563 7182 8876 12344 14630
8 2581 3347 4103 4678 5634 7273 8989 12500 14815
8.1 2613 3389 4154 4737 5704 7364 9101 12656 15000
8.2 2645 3431 4205 4795 5775 7455 9213 12813 15185
8.3 2677 3473 4256 4854 5845 7545 9326 12969 15370
8.4 2710 3515 4308 4912 5915 7636 9438 13125 15556
8.5 2742 3556 4359 4971 5986 7727 9551 13281 15741
8.6 2774 3598 4410 5029 6056 7818 9663 13438 15926
8.7 2806 3640 4462 5088 6127 7909 9775 13594 16111
8.8 2839 3682 4513 5146 6197 8000 9888 13750 16296
8.9 2871 3724 4564 5205 6268 8091 10000 13906 16481
9 2903 3766 4615 5263 6338 8182 10112 14063 16667
9.1 2935 3808 4667 5322 6408 8273 10225 14219 16852
9.2 2968 3849 4718 5380 6479 8364 10337 14375 17037
9.3 3000 3891 4769 5439 6549 8455 10449 14531 17222
9.4 3032 3933 4821 5497 6620 8545 10562 14688 17407
9.5 3065 3975 4872 5556 6690 8636 10674 14844 17593
9.6 3097 4017 4923 5614 6761 8727 10787 15000 17778
9.7 3129 4059 4974 5673 6831 8818 10899 15156 17963
9.8 3161 4100 5026 5731 6901 8909 11011 15313 18148
9.9 3194 4142 5077 5789 6972 9000 11124 15469 18333
10 3226 4184 5128 5848 7042 9091 11236 15625 18519

Repair Instructions

Perform the Diagnostic Repair Verification after completing the repair.

Control Module References for control module replacement, programming and setup

Improper Alignment (itype_145)

Tsbs

- #17-NA-032: Information On Negative Battery Cable Alignment Pin Change - (Feb 2, 2017) (17-NA-032, 2017/02/02)

Inoperative (itype_148)

Tsbs

- Electrical - Non GM Approved Battery Chargers and Booster Packs (15-NA-030, 2015/10/14)

Low, Dead battery (itype_153)

Tsbs

- Dead Battery After Exiting The Vehicle While On A Bluetooth Cal (PIC6198A, 2016/08/02)

OEM Policies and Procedures (itype_120)

Tsbs

- AGM Battery Frequently Asked Questions (FAQs) (23-NA-044, 2024/08/16)

- Cold Weather and Long Stand Time Battery Maintenance and Testing Tips (15-06-03-001F, 2025/03/12)

Warranty Information (itype_119)

Tsbs

- Warranty Administration – 12V Battery Testing and Warranty Replacement Requirements (U.S and Canada ONLY) (20-NA-132, 2026/05/20)

- Warranty Administration – Battery Testing and Warranty Replacement Requirements (North America ONLY) (03-06-03-004Z, 2020/04/09)