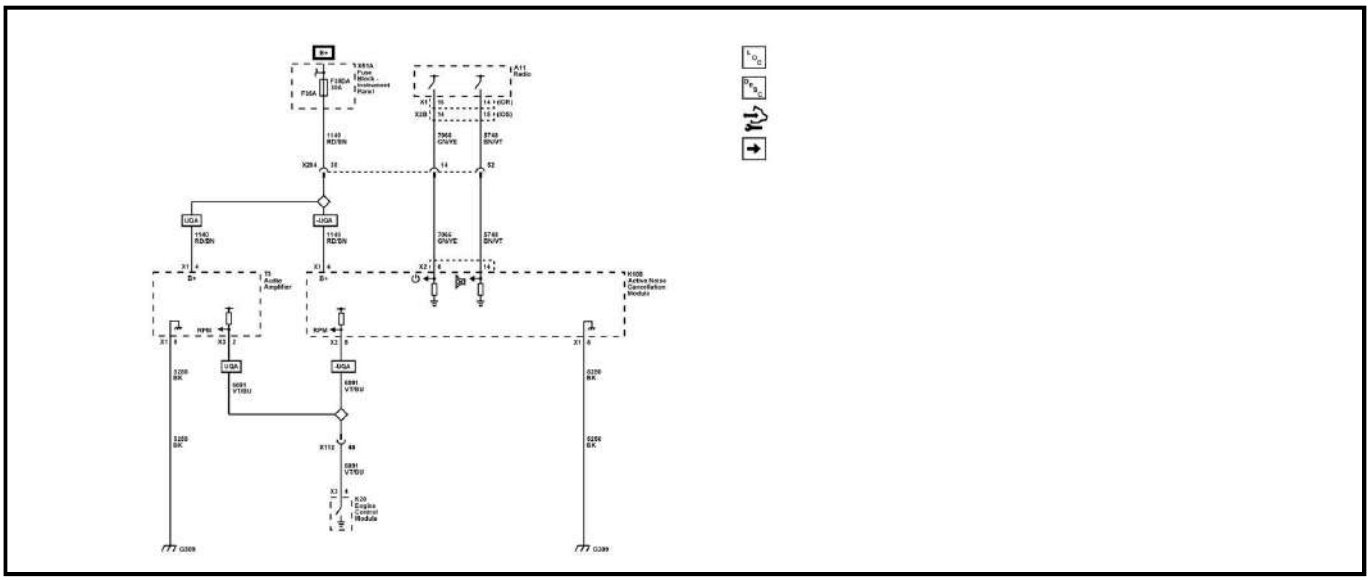
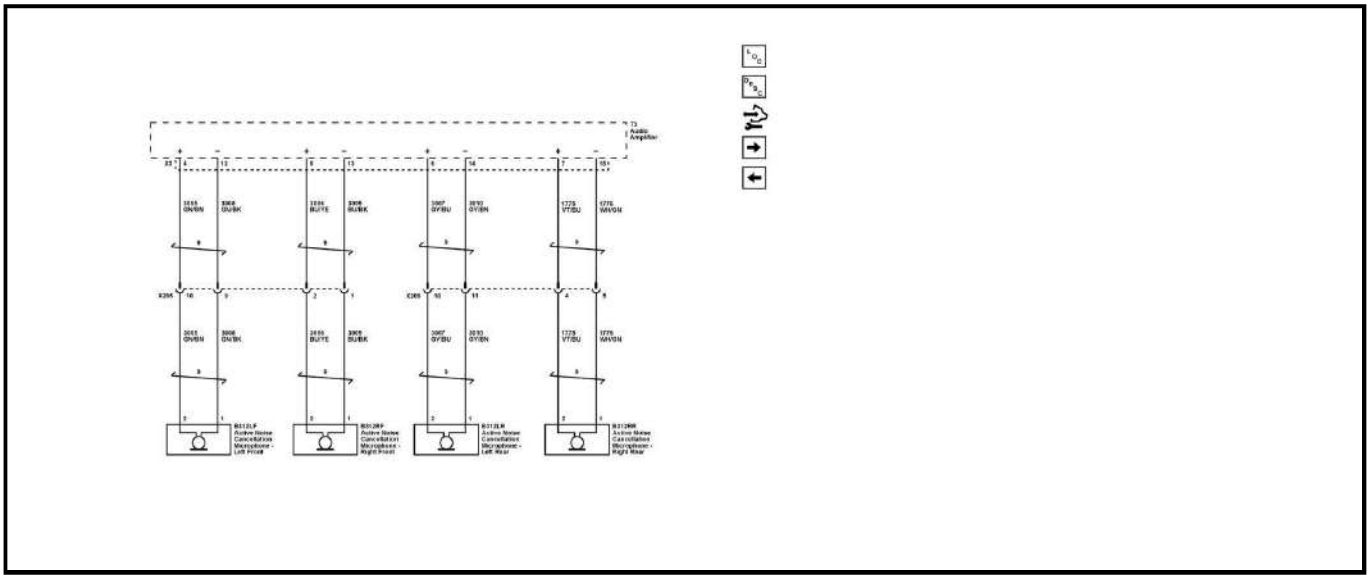
SCHEMATIC WIRING DIAGRAMS

ACTIVE NOISE CANCELLATION WIRING SCHEMATICS

Active Noise Cancellation Module Power and Ground (NKC)



Microphones to Active Noise Cancellation (NKC)



Radio to Active Noise Cancellation Module (NKC)

DIAGNOSTIC INFORMATION AND PROCEDURES

AIR/WIND NOISE

Air/Wind Noise-Diagnosis and Tests

Tools

- Stethoscope
- Duct tape, foam, etc.

WARNING: **Refer to Assistant Driving Warning .**

Overview

To analyze a reported wind noise condition, use the following outline:

- Speak with the customer to obtain as much information as possible.
- Perform a static evaluation of the vehicle to identify potential areas of concern.
- Test drive the vehicle to determine the source of the noise.
- Select the appropriate solution.
- After repair, re-evaluate the vehicle to confirm the customer's complaint is resolved.

When test driving the vehicle, choose a regular route with smooth and straight roads. The area should have little traffic and little noise in order to minimize interference with the test. Drive the vehicle at the speed in which the noise was noticed, or until the noise is heard. Maintain safe and legal speeds.

You can diagnose the following types of wind noise:

- Wind whistle / wind leaks
- Wind rush

When moving at highway speeds, air pressure inside the vehicle becomes greater than the air pressure outside. When a leak occurs, the escaping air causes a hiss or a whistle. Wind whistle / wind leaks are repairable when properly root caused.

Wind rush occurs when air presses over the vehicle's body, and is related to the aerodynamics of the vehicle. Some wind rush is repairable as it relates to part fits and body panel fits. A thorough root cause analysis is required before concluding that the wind noise is not repairable.

Air/Wind Noise - Diagnostic Procedure

Use the following procedure in order to diagnose wind noise:

1. It is important to obtain as many details from the customer as possible in order to assure that you are addressing the issue that the customer hears. Note the following details:
    - The perceived location (B-pillar, mirror, roof, rear of vehicle, front of vehicle, high or low in vehicle)
    - The location where the noise is loudest (specific location along the door header, front edge of sunroof, etc.)
    - The volume of the noise (very loud, can only hear when radio is off and no ambient noises)
    - The ambient conditions (temperature, windy, direction of wind, quiet)
    - The road surface (rough, smooth, smooth concrete, ribbed concrete, asphalt)
    - The vehicle speed (city, highway, all speeds)
    - The interior fan speed (off, lo

4. Refer to Body Control Module-Scan Tool Parameter
    - **If a condition exists**

      Refer to Circuit/System Testing.

    - **Go to next step: If no condition exists**
5. Verify that no DTC listed in the DTC Descriptor Category is set.
    - **If a related DTC is set**

      Refer to Circuit/System Testing.

    - **Go to next step: If a related DTC is not set**
6. All OK.

Circuit/System Testing

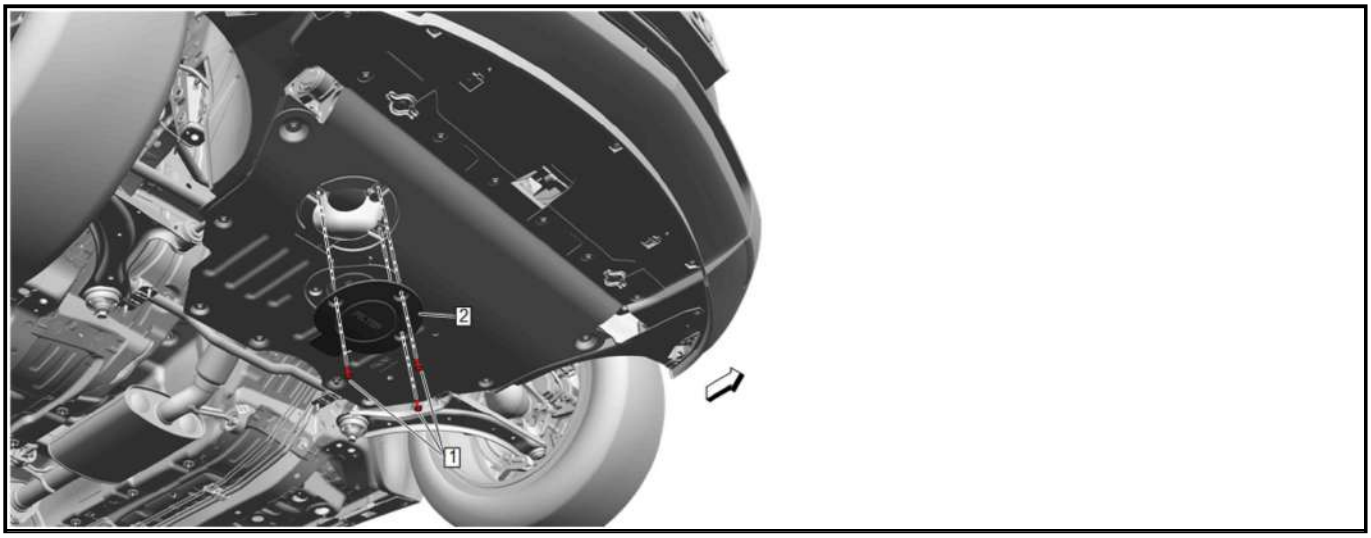
Cruise Control Switch Signal

1. Ignition/Vehicle & All vehicle systems - Off
2. Disconnect the component: K9 Body Control Module
3. Disconnect the component: Cruise Control Switch Assembly
4. Ignition - On/Vehicle - In Service Mode
5. Test for less than 1 V between the test points:
    - 12 V Reference circuit & Ground
    - Cruise Control Switch Signal & Ground
    - If 1 V or greater - Repair the short to voltage on the circuit.
    - Go to next step: If less than 1 V
6. Ignition/Vehicle - Off
7. Test for infinite resistance between the test points:
    - 12 V Reference circuit & Ground
    - Cruise Control Switch Signal & Ground
    - If less than infinite resistance - Repair the short to ground on the circuit.
    - Go to next step: If infinite resistance
8. Test for less than 2 ohms between the test points:
    - 12 V Reference circuit @ Component harness & The other end of the circuit @ Control module harness
    - Cruise Control Switch Signal @ Component harness & The other end of the circuit @ Control module harness
    - If 2 ohms or greater - Repair the open/high resistance in the circuit.
    - Go to next step: If less than 2 ohms
9. Test or replace the component: Cruise Control Switch Assembly
10. Operate the vehicle within the Conditions for Running the DTC. Verify the DTC does not set.
    - **If the DTC sets**

      Replace the component: K9 Body Control Module

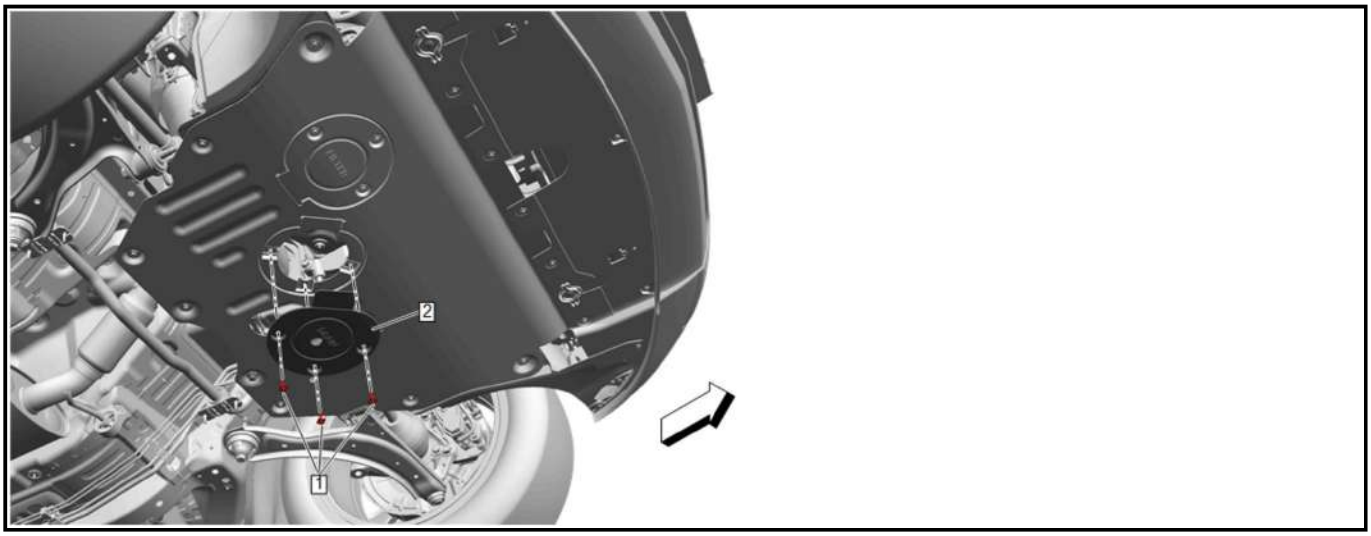
    - **Go to next step: If the DTC is not set**
11. All OK.

Distance Sensing Cruise Control Gap Up/Down Switch Signal



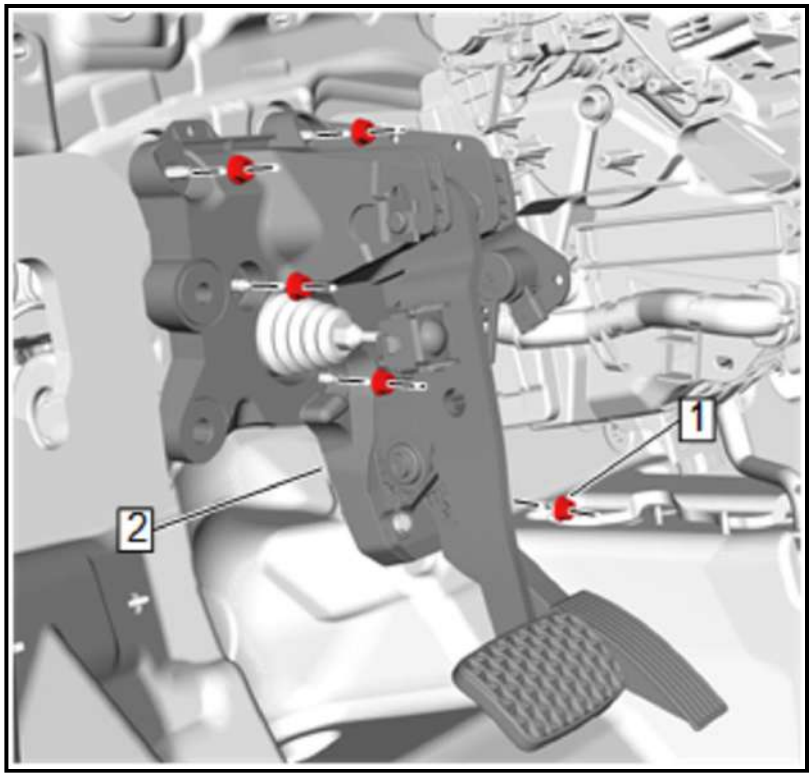
Callout	Component Name
1	Front Compartment Insulator Bolt [3x] **Tighten** 2.5 N.m (22 lb in)
2	Front Compartment Insulator - Service Cover for Engine Oil Filter

FRONT COMPARTMENT INSULATOR REPLACEMENT (SERVICE COVER FOR ENGINE OIL DRAIN)

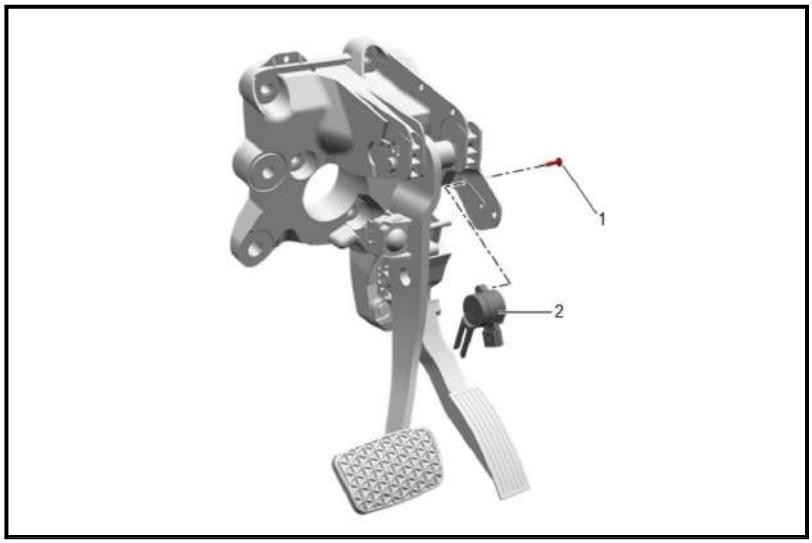


Callout	Component Name
1	Front Compartment Insulator Bolt [3x] **Tighten** 2.5 N.m (22 lb in)
2	Front Compartment Insulator - Service Cover for Engine Oil Drain

REAR CROSSMEMBER REPLACEMENT

1. 

   Brake and Accelerator Pedal Assembly (2) - Remove - **Brake and Accelerator Pedal Assembly Replacement**

2. 

   Brake Pedal Position Sensor Bolt (1) - Remove

3. Brake Pedal Position Sensor (2) - Remove

Installation Procedure

Circuit	Short to Ground	Open	High Resistance	Short to Voltage	Signal Performance
Cinch Latch Motor Open Control	B2495 02	B2495 04, B24A0 05	B2495 04, B24A0 05	B2495 01	-
Cinch Latch Motor Close Control	B2495 02	B2495 04, B24A0 05	B2495 04, B24A0 05	B2495 01	-

Circuit/System Description

The liftgate control module controls the liftgate release motor by supplying 12 V to the release control circuit. The motor control circuits are monitored by the liftgate control module prior to activation for a high or low condition and during motor operation for an insufficient current flow condition.

The ratchet, pawl, and sector switches are part of the liftgate latch assembly and are used by the liftgate control module to determine the state of the latch during the process of latching or unlatching. The ratchet and pawl switches will be inactive when the primary and secondary latches are latched, and the sector switch will be active during the power cinch function. Each of the latch switch signal circuits are supplied battery voltage through a resistor and monitored within the liftgate control module. When the switch contacts close the signal circuit goes low and the liftgate control module determines the switch to be active.

The latch motor is a bi-directional motor and cinch or unlatch operation is the result of the direction of the motor rotation. The liftgate control module controls the latch motor through the control circuits by supplying power and ground in the appropriate polarity. The motor control circuits are monitored by the liftgate control module prior to activation for a high or low condition and during motor operation for an insufficient current flow condition.

Conditions for Running the DTC

The system voltage is 9 - 16 V.

Conditions for Setting the DTC

B2495 01

The liftgate control module detects a short to battery in the liftgate latch motor cinch control circuit.

B2495 02

The liftgate control module detects a short to ground in the liftgate latch motor cinch control circuit.

B2495 04, B24A0 05

The liftgate control module detects an open/high resistance in the liftgate latch motor cinch control circuit when cinching the liftgate to the closed position.

B24A0 01

The liftgate control module detects a short to battery in the liftgate latch motor release control circuit while commanding the liftgate latch to release.

B24A0 02

The liftgate control module detects a short to ground in the liftgate latch motor release control circuit while commanding the liftgate latch to release.

B24A0 08

The liftgate control module detects high resistance in the liftgate latch motor release control circuit while commanding the liftgate latch to release.

Connector End View Reference

Master Electrical Component List , or **Component Connector End Views - Index**

Electrical Information Reference

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

Scan Tool Reference

Control Module References

Circuit/System Verification

1. Ignition - On/Vehicle - In Service Mode
2. Test drive the vehicle.
3. All sensors must show the same speed when driving in a straight line at a speed greater than 40 km/h (25 MPH).

Circuit/System Testing

1. Ignition - On/Vehicle - In Service Mode
2. Verify there are no DTCs set related to the following component/system: B5 Wheel Speed Sensor @ K160 Brake System Control Module
   - **If any of the DTCs are set**

     Refer to **Diagnostic Trouble Code (DTC) List - Vehicle**

   - **Go to next step: If no other DTCs are set**
3. Replace the component: K160 Brake System Control Module

Repair Instructions

Perform the Diagnostic Repair Verification after completing the repair: **Diagnostic Repair Verification**

For control module replacement, programming, and setup refer to **Control Module References**

DTC P18E2

Diagnostic Instructions

- Perform the Diagnostic System Check prior to using this diagnostic procedure: **Diagnostic System Check - Vehicle**
- Review the description of Strategy Based Diagnosis: **Strategy Based Diagnosis**
- An overview of each diagnostic category can be found here: **Diagnostic Procedure Instructions**

DTC Descriptor

DTC P18E2

Automatic Vehicle Hold Status Message Counter Incorrect

Symptom Byte Information: **Symptom Byte List**

Circuit/System Description

Circuit/System Description

For an overview of the component/system, refer to **ABS Description and Operation**

Conditions for Running the DTC

Ignition/Vehicle = On

Conditions for Setting the DTC

K20 Engine Control Module = K160 Brake System Control Module - Message Counter Incorrect

Actions Taken When the DTC Sets

DTCs listed in the DTC Descriptor Category = Type B DTC

Conditions for Clearing the DTC

DTCs listed in the DTC Descriptor Category = Type B DTC

Reference Information

Schematic Reference

Antilock Brake System Wiring Schematics

Connector End View Reference

Master Electrical Component List , or **Component Connector End Views - Index**

Electrical Information Reference

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

DTC Type Reference

Powertrain Diagnostic Trouble Code (DTC) Type Definitions

Scan Tool Reference

Control Module References

Circuit/System Verification

1. Ignition - On/Vehicle - In Service Mode
2. Verify no other DTCs are set.
    - **If other DTCs are set**

      Refer to **Diagnostic Trouble Code (DTC) List - Vehicle**

    - **Go to next step: If no other DTCs are set**
3. Replace the component: K160 Brake System Control Module
4. Verify the DTC does not set.
    - **If the DTC is set**

      Replace the component: K2[illegible]

	3.Replace any seat belt system if you observe the words "REPLACE" or "CAUTION", or if a yellow tag is visible. Do not replace a seat belt if only the child seat caution label is visible 4.Replace any seat belt system if you are doubtful about its condition				
Seat Belt Anchor and/or Retractor Pretensioners	-	Inspect	Replace	Replace B	Replace
Seat Belt Anchor and/or Retractor Pretensioners Mounting Points and Hardware	Visually verify the seat belt retractor units are securely attached and the seat belt anchor bolts are secure.	Inspect	Inspect	Inspect	Inspect
Sensing and Diagnostic Module (SDM)					
	Inflatable Restraint Sensing and Diagnostic Module (SDM) or Restraints Control Module (RCM)	-	Replace	Replace	Replace
Inflatable Restraint Sensing and Diagnostic Module (SDM) or Restraints Control Module (RCM) Mounting Points and Hardware	-	-	Inspect	Inspect	Inspect

Revised MAY 2021

WHEEL ALIGNMENT SPECIFICATIONS, REQUIREMENTS AND RECOMMENDATIONS FOR GM VEHICLES

CAUTION: **Please refer to BODY REPAIR PRECAUTIONS AND WARNINGS before starting.**

Wheel Alignment Specifications, Requirements and Recommendations for GM Vehicles

2020 and Prior GM Passenger Cars and Light Duty Trucks

NOTE: **This bulletin has been revised to update the GM Service Policies & Procedures Manual reference under the Purpose section. Please discard Corporate Bulletin Number 05-03-07-009I.**

Purpose

The purpose of this bulletin is to provide retail, wholesale and fleet personnel with General Motors' recommendations for customer concerns related to wheel alignment. For your convenience, this bulletin updates and centralizes all of GM's Standard Wheel Alignment Service Procedures, and bulletins on wheel alignment warranty service.

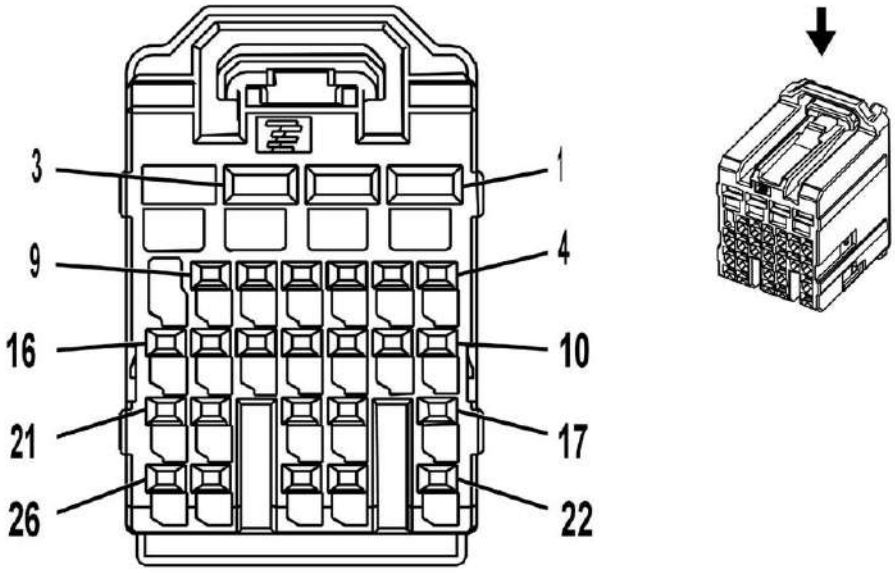
IMPORTANT: PLEASE FAMILIARIZE YOURSELF WITH THESE UPDATES BEFORE PERFORMING YOUR NEXT GM WHEEL ALIGNMENT SERVICE.

The following key steps are a summary of this bulletin and are REQUIRED in completing a successful wheel alignment service.

1. **Verify the vehicle is in an Original Equipment condition** for curb weight, tires, wheels, suspension and steering configurations. Vehicles modified in any of these areas are not covered for wheel alignment warranty.
2. **Review the customer concern relative to "Normal Operation"** definitions.
3. **Document wheel alignment warranty claims** appropriately for labor operations 8070012 and 8070032. A copy of the alignment machine printout showing before and after alignment specifications must be attached to the job card. Refer to additional information in the GM Service Policies & Procedures Manual for complete documentation requirements and labor operation restrictions for transactions involving wheel alignments, toe adjustments and wheel balancing.

Verify Original Equipment Condition Of The Vehicle

- Verify that Original Equipment Tires and Wheels or Official GM Accessory Tires and Wheels are on the vehicle.
- Verify that aftermarket suspension "Lift" or "Lowering" Kits or other suspension alterations have NOT been done to the vehicle.



Connector Part Information

- Harness Type: Body
- OEM Connector: 2098067-6
- Service Connector: 13576036
- Description: 26 - Way F 0.64, 2.8 Series (GY)

Terminal Part Information

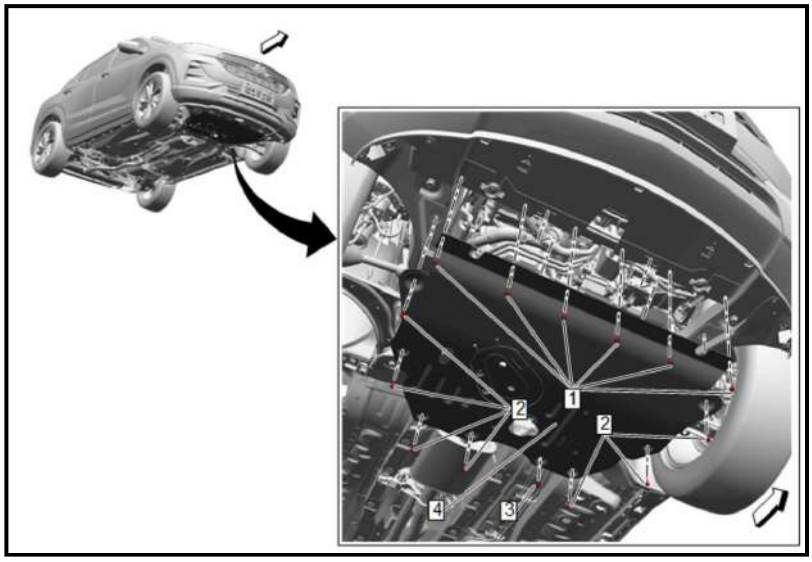
Terminal Type ID	Terminated Lead	Diagnostic Test Probe	Terminal Removal Tool
I	13575577	J-35616-35 (VT)	J-38125-553
II	13582297	J-35616-64B (LT BU)	J-38125-215A
III	13582326	J-35616-35 (VT)	J-38125-553
IV	19354201	J-35616-35 (VT)	J-38125-553

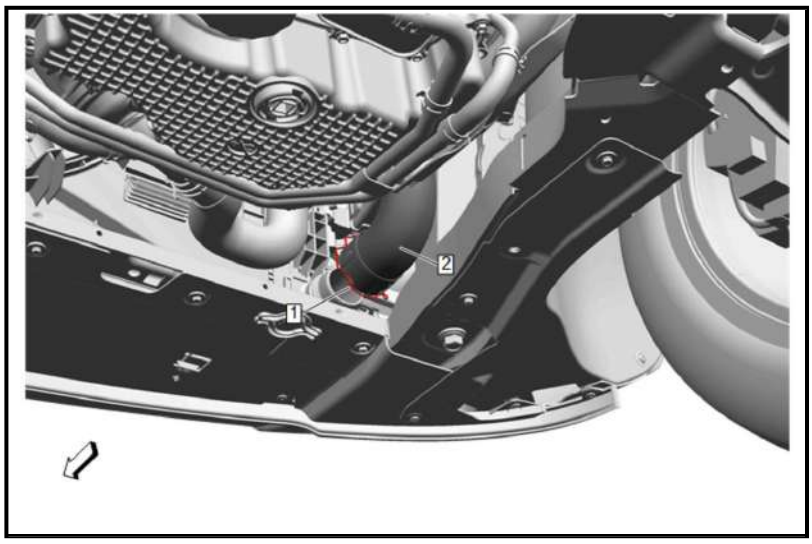
Pin	Size	Color	Circuit	Function	Terminal Type ID	Option
1	0.35	GY	157	Interior Lamp Control	I	-
2	0.75	GN/WH	24	Backup Lamp Control	III	-
3	0.5	WH/BN	6815	Inadvertent Load Control	IV	-
4	0.5	VT/GY	709	Left Park Lamp Control	II	-
5	0.5	GY/BN	309	Right Park Lamp Control	II	-
6	0.35	VT/BK	7553	Park Lock Solenoid Actuator Control	II	-
7	0.5	GY/BN	2309	Front Park Lamp Control	II	-
8	0.5	BU/BN	7539	Right Front DRL Control	II	-
9	0.35	YE	6817	LED Backlight Dimming Control 1	II	-
10 - 11	-	-	-	Not Occupied	-	-
12	0.35	YE/VT	244	Passenger Door Lock Switch Lock Control	II	-

Code	Name	Option	Location	Locator View	Connector End View
J226	Instrument Panel Harness	-	In the passenger compartment, inside rear bumper	Instrument Panel Harness Routing	-
J227	Instrument Panel Harness	-	In the passenger compartment, under instrument panel	Instrument Panel Harness Routing	-
J230	Body Harness	-	In the passenger compartment, under plastic wire guide, approx. 5 cm (2 inches) near X202	Body Harness Routing - Left Front of the Passenger Compartment	-
J231	Body Harness	IOR/UVC	In the passenger compartment, under right side of instrument panel, approx. 10.5 cm (12.5 inches) from X204	Instrument Panel Harness Routing - Right Side	-
J232	Body Harness	-	In the passenger compartment, under right side of instrument panel, approx. 10.5 cm (12.5 inches) from X204	-	-
J279	Steering Wheel Harness	-	In the passenger compartment, in the steering column	-	-
J280	Steering Wheel Harness	-	In the passenger compartment, in the steering column	-	-
J292	HVAC Harness	-	In the passenger compartment, in the HVAC harness	-	-
J301	Body Harness	CE1	In the passenger compartment, under plastic wire guide, approx. 22.8 cm (9 inches) near the power supply transformer	Body Harness Routing - Left Front of the Passenger Compartment	-
J302	Body Harness	-	In the passenger compartment, approx. 64.5 cm (25.5 inches) from X700	-	-
J303	Body Harness	-	In the passenger compartment, approx. 37 cm (14.5 inches) from G300	Body Harness Routing - Left Front of the Passenger Compartment	-
J304	Body Harness	-	In the passenger compartment, approx. 12 cm	Body Harness Routing - Left Front of the Passenger Compartment	-

RADIATOR SURGE TANK OUTLET HOSE REPLACEMENT (L3T)

Removal Procedure

1. Drain the cooling system. **Cooling System Draining and Filling (GE-47716)**, or **Cooling System Draining and Filling (Static)**
2. 

   Front Compartment Insulator - Remove - **Front Compartment Insulator Replacement (Base)** , or **Front Compartment Insulator Replacement (Service Cover for Engine Oil Filter)** , or **Front Compartment Insulator Replacement (Service Cover for Engine Oil Drain)**
3. 

   Charge Air Cooler Outlet Air Hose Retainer Spring (1) - Remove
4. Reposition the charge air cooler outlet air hose from the radiator assembly to get working space.

Conditions for Clearing the DTC

DTCs listed in the DTC Descriptor Category = Type B DTC

Reference Information

Schematic Reference

Engine Mechanical Wiring Schematics

Connector End View Reference

Master Electrical Component List , or **Component Connector End Views - Index**

Electrical Information Reference

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

DTC Type Reference

Powertrain Diagnostic Trouble Code (DTC) Type Definitions

Scan Tool Reference

Control Module References

Circuit/System Verification

NOTE: **The engine oil level and condition is critical to the correct operation of the system.**

1. Ignition - On / Vehicle - In Service Mode
2. Verify there are no DTCs set related to the following component/system:
   - B35B Engine Oil Level Sensor
   - B37 Engine Oil Pressure Switch
   - B37B Engine Oil Pressure Sensor
   - **If other DTCs are set**

     Refer to **Diagnostic Trouble Code (DTC) List - Vehicle**

   - **Go to next step: If no other DTCs are set**
3. Verify the condition does not exist: Engine Oil - Contaminated/Dirty/Fill Level = Low
   - **If a condition exists**

     Repair as necessary

   - **Go to next step: If no condition exists**
4. Perform the scan tool control function: Engine Oil Pressure Control Solenoid Valve - Low Pressure - High Pressure

   Verify the scan tool parameter:

   - Engine Oil Pressure Control Solenoid Valve Control Circuit High Voltage Test Status = OK or Not Run
   - Engine Oil Pressure Control Solenoid Valve Control Circuit Low Voltage Test Status = OK or Not Run
   - Engine Oil Pressure Control Solenoid Valve Control Circuit Open Test Status = OK or Not Run
   - **If not the specified state**

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

DTC Type Reference

Powertrain Diagnostic Trouble Code (DTC) Type Definitions

Scan Tool Reference

Control Module References

Circuit/System Verification

NOTE: **DTC P2B95 = Connect - Scan Tool - Before the engine has started**

Verify the scan tool parameter: Cold Start-Up = Yes

1. Engine Running.
2. Verify that no DTCs are set.
   - **If any DTC listed in the DTC Descriptor Category is set**

     Refer to Circuit/System Testing.

   - **Go to next step: If none of the DTCs listed in the DTC Descriptor Category is set**
3. Operate the vehicle within the Conditions for Running the DTC. You may also operate the vehicle within the conditions that you observed from the Freeze Frame/Failure Records data.
4. Verify the DTC does not set.
   - **If the DTC sets**

     Refer to Circuit/System Testing.

   - **Go to next step: If the DTC does not set**
5. All OK.

Circuit/System Testing

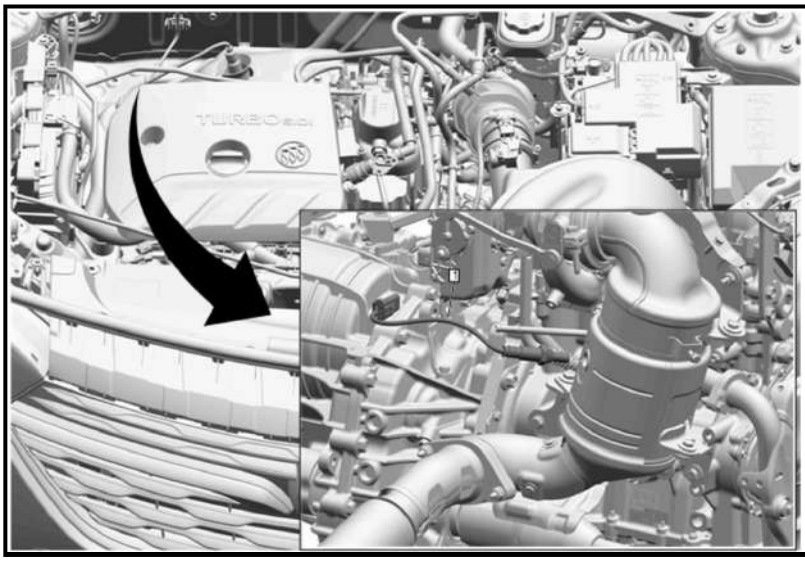
1. If DTC P10A3, P10A4, P10A5, P10A6, P10A7, P10A8 is set and no other DTCs are set
   - Replace the appropriate component: - Q17 Fuel Injector
   - Go to next step: If other DTCs are set - DTCs listed in the DTC Descriptor Category
2. Ignition/Vehicle - Off
3. Disconnect the appropriate component: Q17 Fuel Injector
4. Test for 1.3 to 1.9 ohms between the test points: Control circuit terminal 2 & Ground circuit terminal 1 @ Q17 Fuel Injector @ Temperature 20B°C (68B°F).
   - **If not between 1.3 and 1.9 ohms**

     Replace the component: Q17 Fuel Injector

   - **Go to next step: If between 1.3 and 1.9 ohms**
5. Disconnect the electrical connector: X3 @ K20 Engine Control Module
6. Test for less than 2 ohms between the test points: Control circuit terminal 2 @ Component harness &
   - {Q17A Fuel Injector 1} Terminal 72 @ Control module harness
   - {Q17B Fuel Injector 2} Terr s

Callout	Component Name
	EN-46577 Heated Oxygen Sensor Remover/Installer Equivalent regional tools: Special Tools (Diagnostic Tools)

HEATED OXYGEN SENSOR REPLACEMENT - SENSOR 2 (FWD)



Callout	Component Name
1	Heated Oxygen Sensor **WARNING:** **In order to avoid being burned, do not service the exhaust system while it is still hot. Service the system when it is cool.** **WARNING:** **Avoid contact with HOT components. Wear safety glasses and protective gloves to avoid personal injury.** **CAUTION:** **Refer to Component Fastener**