

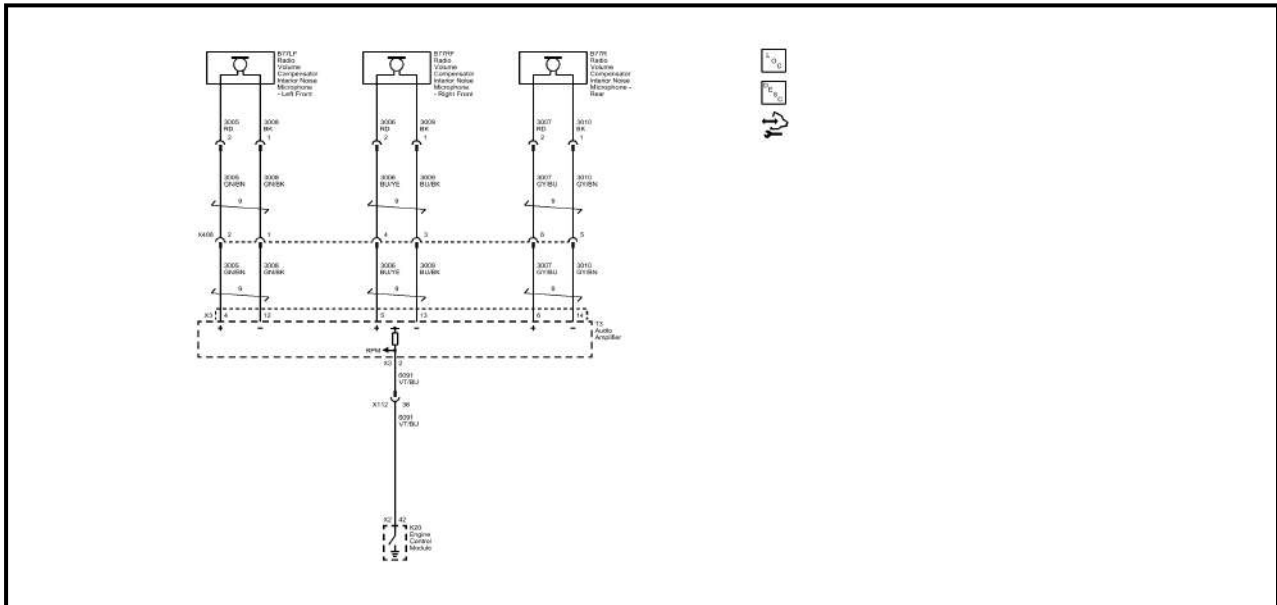
2018 ACCESSORIES & EQUIPMENT

Active Noise Cancellation - Envision

SCHEMATIC WIRING DIAGRAMS

ACTIVE NOISE CANCELLATION WIRING SCHEMATICS

Active Noise Cancellation



DIAGNOSTIC INFORMATION AND PROCEDURES

DTC B0560

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.

DTC Descriptor

DTC B0560 08

Engine RPM Input Circuit Signal Invalid

Circuit/System Description

The Audio Amplifier receives a discrete pulse-width modulated engine speed signal from the Engine Control Module. The Audio Amplifier uses the engine RPM signal for operating active noise cancellation.

Conditions for Running the DTC

- Engine running, Radio ON
- Battery voltage between 9 - 16 volts.

Conditions for Setting the DTC

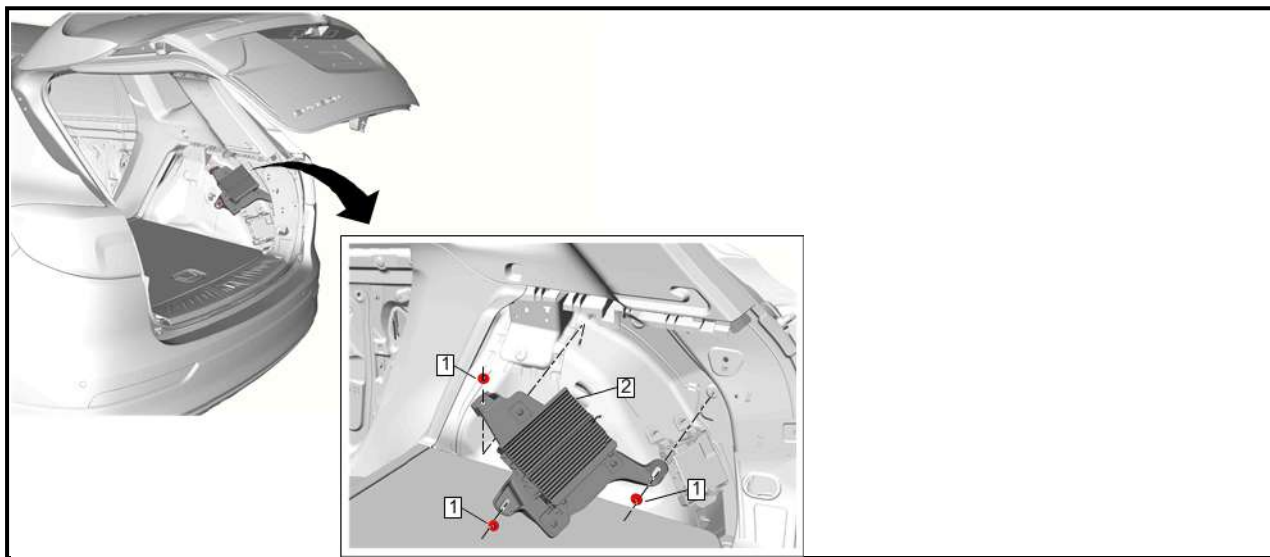
- The Audio Amplifier receives a serial data message that the engine is running.

Perform the [Diagnostic Repair Verification](#) after completing the repair.

- [Active Noise Cancellation Microphone Replacement](#)
- [Control Module References](#) for Audio Amplifier replacement, programming, and setup.

REPAIR INSTRUCTIONS

ACTIVE NOISE CANCELLATION MODULE REPLACEMENT



Callout	Component Name
Preliminary Procedure Quarter Lower Rear Trim Panel Replacement	
1	Active Noise Cancellation Module Fastener [3x] CAUTION: Refer to Fastener Caution . Tighten 9 N.m (80 lb in)
2	Active Noise Cancellation Module Procedure 1. Disconnect the electrical connector. 2. Control Module References for programming and setup information, if required.

DESCRIPTION AND OPERATION

ACTIVE NOISE CANCELLATION DESCRIPTION AND OPERATION

The entertainment system on this vehicle may have several different configurations. To determine the specific configuration of the vehicle, please see the Service Parts ID Label, and refer to [RPO Code List](#)



Powertrain Diagnostic Trouble Code (DTC) Type Definitions

Scan Tool References

Control Module References for scan tool information

Circuit/System Verification

1. Ignition ON/Vehicle in Service Mode.
2. Verify that DTC P0602 or P0610 is not set.
 - **If any of the DTCs are set**
 1. Program the control module that sets the DTC.
 2. Verify that the DTC does not set.
 - If the DTC sets, replace the control module that sets the DTC.
 - Go to next step: If the DTC does not set
 - 3. All OK.
 - **Go to next step: If none of the DTCs are set**
3. Verify that DTC P0601, P0603, P0604, P0605, P0606, P0607, P060A, P060B, P060C, P062F, P16E9, P16EA, P16EB, P16EC, P16ED, P16EE, P16EF, P16F0, P262B, P30D6, P30D7, P30D8, P30D9, P30DA, P30DB, P30DC, P30DD, or P3186 is not set.
 - **If any of the DTCs are set**

Replace the control module that sets the DTC.
 - **Go to next step: If none of the DTCs are set**
4. All OK

Repair Instructions

Perform the Diagnostic Repair Verification after completing the repair.

Control Module References for control module replacement, programming and setup

DTC U0020

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.

DTC Descriptors

DTC U0020

Low Speed CAN Bus

For symptom byte information, refer to Symptom Byte List .

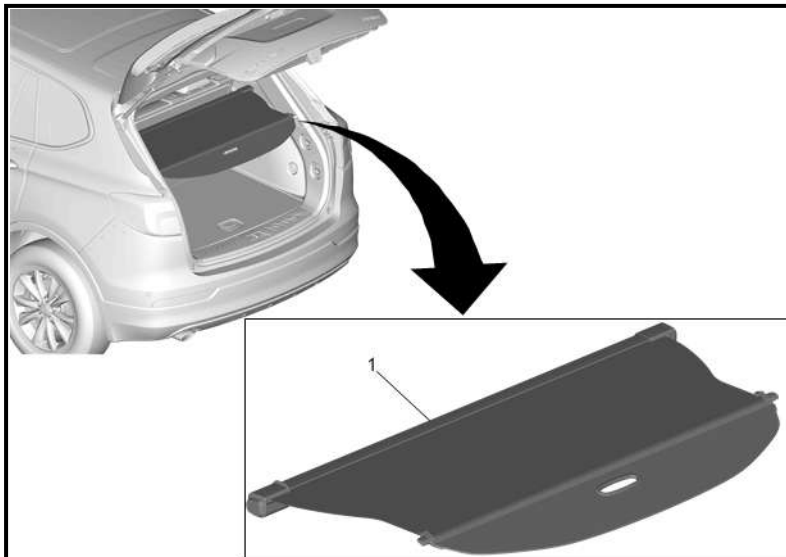
Circuit/System Description

Devices connected to the GMLAN serial data circuits monitor for serial data communications during normal vehicle operation. Operating information and commands are exchanged among the devices. The devices have programmed information about what messages are needed to be exchanged on the serial data circuits. The messages are also supervised and some periodic messages are used by the receiver device as an availability indication of the transmitter device.

Conditions for Running the DTCs

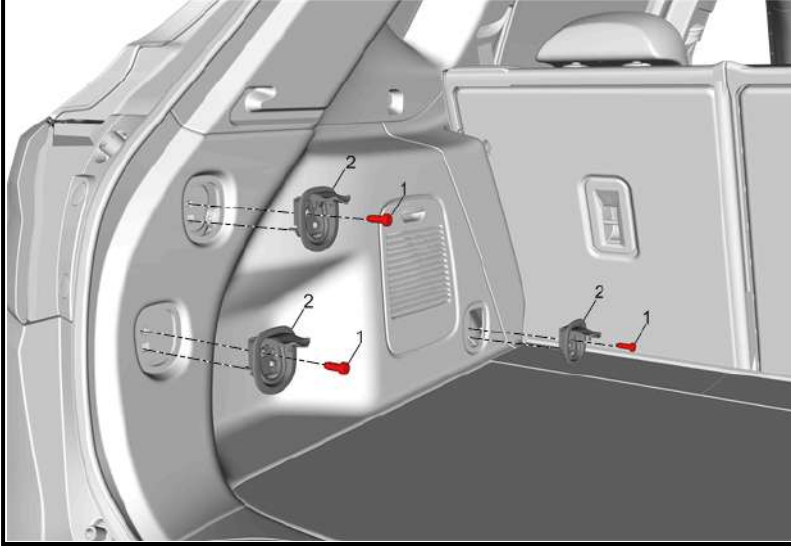
Callout	Component Name
1	Rear Side Door Inside Handle Bolt Cap Procedure Use a flat bladed plastic trim tool.
2	Rear Side Door Inside Handle Fastener CAUTION: Refer to <u>Fastener Caution</u> . Tighten 2.5 N.m (22 lb in)
3	Rear Side Door Armrest Pull Cup Bolt Cap Procedure Use a flat bladed plastic trim tool.
4	Rear Side Door Armrest Pull Cup Fastener [2x] Tighten 2.5 N.m (22 lb in)
5	Rear Side Door Trim Belt Line Clip [5x]
6	Rear Side Door Trim Assembly Procedure 1. Use an appropriate plastic trim tool to loosen the retainers on the door trim panel. 2. Disconnect the electrical connector.

LUGGAGE SHADE REPLACEMENT



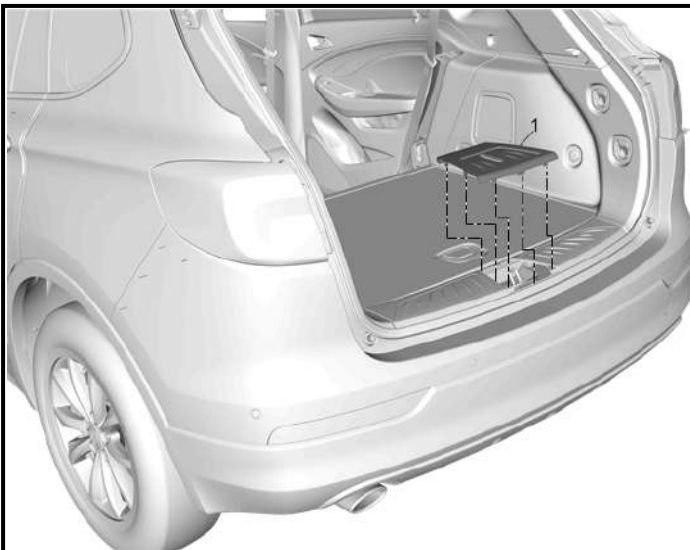
Callout	Component Name
1	Luggage Shade Procedure 1. Lift up on the luggage shade to disengage from the quarter window trim finish panel. 2. Maneuver the luggage shade assembly from the vehicle.

LIFTGATE SILL GARNISH MOLDING REPLACEMENT



Callout	Component Name
1	Cargo Tie Down Loop Fastener [3x] CAUTION: Refer to Fastener Caution . Procedure Use a small flat-bladed tool to open cargo tie down loop bolt cap to gain access to cargo tie down loop fastener. Tighten 20 N.m (15 lb ft)
2	Cargo Tie Down Loop Assembly [3x]

LIFTGATE LOCK STRIKER COVER REPLACEMENT



Callout	Component Name
1	Liftgate Lock Striker Cover Procedure Use a plastic trim tool to aid in removal.

BODY PRESSURE RELIEF VALVE REPLACEMENT



2. Verify that DTC B3106 is not set.

- **If DTC B3106 is set**

Replace the K77 Remote Control Door Lock Receiver.

- **Go to next step: If DTC B3106 is not set**

3. All OK.

Repair Instructions

Perform the [Diagnostic Repair Verification](#) after completing the repair.

[Control Module References](#) for remote control door lock receiver replacement, programming, and setup.

DTC B3109-B3113

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.

DTC Descriptors

DTC B3109

Keyless Entry Transmitter 1 Battery

DTC B3110

Keyless Entry Transmitter 2 Battery

DTC B3111

Keyless Entry Transmitter 3 Battery

DTC B3112

Keyless Entry Transmitter 4 Battery

DTC B3113

Keyless Entry Transmitter 5 Battery

For symptom byte information, refer to [Symptom Byte List](#) .

Circuit/System Description

With each press of a keyless entry transmitter button, a message containing the current battery state of the transmitter is sent to the remote control door lock receiver, along with the commanded keyless entry function. The remote control door lock receiver sends this to the body control module to perform the requested function.

Conditions for Running the DTC

A keyless transmitter button is pressed.

Conditions for Setting the DTC

Three consecutive low battery signals are received from the same transmitter.

Action Taken When the DTC Sets

The keyless entry system is inoperative.

Replace the component: X51A Fuse Block - Instrument Panel

- **Go to next step: If a click can be heard or felt**

6. Replace the component: K9 Body Control Module

Repair Instructions

Perform the Diagnostic Repair Verification after completing the repair: [Diagnostic Repair Verification](#)

- [Battery Distribution Engine Compartment Fuse Block Replacement](#)
- For control module replacement, programming, and setup refer to: [Control Module References](#)

DTC B396A - LIFTGATE MOTOR POWER OPEN/CLOSE MALFUNCTION

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.
- Refer to [Diagnostic Procedure Instructions](#) to provide an overview of each diagnostic category.

DTC Descriptor

DTC B396A

Left Liftgate Motor Control Circuit

For symptom byte information refer to: [Symptom Byte List](#)

Diagnostic Fault Information

Circuit	Short to Ground	Open/High Resistance	Short to Voltage	Signal Performance
Liftgate Control Module B+ Terminal 3 X2	B396A 04	B396A 04	-	-
Liftgate Motor Close Control	B396A 02	B396A 04	B396A 01	-
Liftgate Motor Open Control	B396A 02	B396A 04	B396A 01	-

Circuit/System Description

The liftgate motor is a bi-directional motor and open or close operation is the result of the direction of the motor rotation. The liftgate control module controls the liftgate 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 any irregular current flow conditions.

Conditions for Running the DTC

- The system voltage is 9 - 16 V.
- Power open or close function is initiated.

Conditions for Setting the DTC

B396A 01

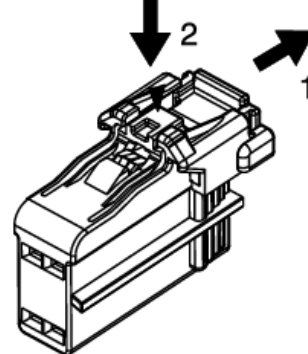
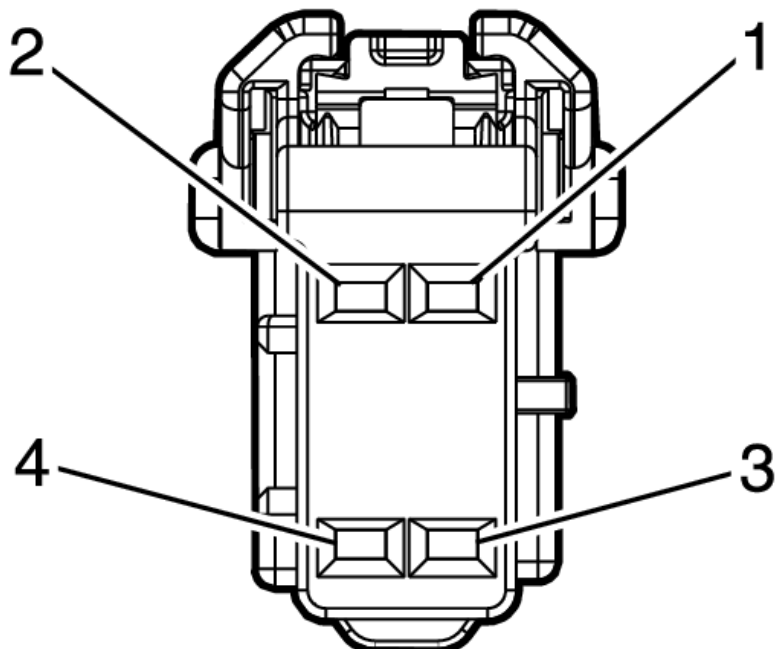
The liftgate control module detects a short to battery in the liftgate motor control circuits.

B396A 02

The liftgate control module detects a short to ground in the liftgate motor control circuits.

B396A 04

DTC	Diagnostic Procedure
P06AD	Automatic Transmission - 6T45 (MHG) or 6T50 (M2D) - <u>DTC P06AC, P06AD, or P06AE</u>
P06AE	Automatic Transmission - 6T45 (MHG) or 6T50 (M2D) - <u>DTC P06AC, P06AD, or P06AE</u>
P06B6	Engine Controls and Fuel - 2.0L (LTG) or 2.5L (LCV) - <u>DTC P0324, P0326, P0331, P06B6, or P06B7</u>
P06B7	Engine Controls and Fuel - 2.0L (LTG) or 2.5L (LCV) - <u>DTC P0324, P0326, P0331, P06B6, or P06B7</u>
P06D2	Engine Controls and Fuel - 2.0L (LTG) or 2.5L (LCV) - <u>DTC P0641, P0651, P0697, P06A3, or P06D2 (ECM)</u>
P06DA	Engine Mechanical - 2.0L (LTG) or 2.5L (LCV) - <u>DTC P06DA-P06DC</u>
P06DB	Engine Mechanical - 2.0L (LTG) or 2.5L (LCV) - <u>DTC P06DA-P06DC</u>
P06DC	Engine Mechanical - 2.0L (LTG) or 2.5L (LCV) - <u>DTC P06DA-P06DC</u>
P06DD	Engine Mechanical - 2.0L (LTG) or 2.5L (LCV) - <u>DTC P06DD or P06DE</u>
P06DE	Engine Mechanical - 2.0L (LTG) or 2.5L (LCV) - <u>DTC P06DD or P06DE</u>
P0700	Engine Controls and Fuel - 2.0L (LTG) or 2.5L (LCV) - <u>DTC P0700</u>
P0703	Cruise Control - <u>DTC P0703</u>
P0711	Automatic Transmission - 6T45 (MHG) or 6T50 (M2D) - <u>DTC P0711-P0713</u>
P0712	Automatic Transmission - 6T45 (MHG) or 6T50 (M2D) - <u>DTC P0711-P0713</u>
P0713	Automatic Transmission - 6T45 (MHG) or 6T50 (M2D) - <u>DTC P0711-P0713</u>
P0716	Automatic Transmission - 6T45 (MHG) or 6T50 (M2D) - <u>DTC P0716, P0717, P07BF, or P07C0</u>
P0717	Automatic Transmission - 6T45 (MHG) or 6T50 (M2D) - <u>DTC P0716, P0717, P07BF, or P07C0</u>
P0722	Automatic Transmission - 6T45 (MHG) or 6T50 (M2D) - <u>DTC P0722, P0723, P077C, or P077D</u>
P0723	Automatic Transmission - 6T45 (MHG) or 6T50 (M2D) - <u>DTC P0722, P0723, P077C, or P077D</u>
P0741	Automatic Transmission - 6T45 (MHG) or 6T50 (M2D) - <u>DTC P0741 or P0742</u>
P0742	Automatic Transmission - 6T45 (MHG) or 6T50 (M2D) - <u>DTC P0741 or P0742</u>
P0751	Automatic Transmission - 6T45 (MHG) or 6T50 (M2D) - <u>DTC P0751 or P0752</u>
P0752	Automatic Transmission - 6T45 (MHG) or 6T50 (M2D) - <u>DTC P0751 or P0752</u>
P0776	Automatic Transmission - 6T45 (MHG) or 6T50 (M2D) - <u>DTC P0776 or P0777</u>
P0777	Automatic Transmission - 6T45 (MHG) or 6T50 (M2D) - <u>DTC P0776 or P0777</u>
P077C	Automatic Transmission - 6T45 (MHG) or 6T50 (M2D) - <u>DTC P0722, P0723, P077C, or P077D</u>
P077D	Automatic Transmission - 6T45 (MHG) or 6T50 (M2D) - <u>DTC P0722, P0723, P077C, or P077D</u>
P0796	Automatic Transmission - 6T45 (MHG) or 6T50 (M2D) - <u>DTC P0796 or P0797</u>
P0797	Automatic Transmission - 6T45 (MHG) or 6T50 (M2D) - <u>DTC P0796 or P0797</u>
P07BF	Automatic Transmission - 6T45 (MHG) or 6T50 (M2D) - <u>DTC P0716, P0717, P07BF, or P07C0</u>
P07C0	Automatic Transmission - 6T45 (MHG) or 6T50 (M2D) - <u>DTC P0716, P0717, P07BF, or P07C0</u>
P0815	Automatic Transmission - 6T45 (MHG) or 6T50 (M2D) - <u>DTC P0815, P0816, or P0826</u>
P0816	Automatic Transmission - 6T45 (MHG) or 6T50 (M2D) - <u>DTC P0815, P0816, or P0826</u>
P0826	Automatic Transmission - 6T45 (MHG) or 6T50 (M2D) - <u>DTC P0815, P0816, or P0826</u>
P0851	Automatic Transmission - 6T45 (MHG) or 6T50 (M2D) - <u>DTC P0851</u>
P0856	Antilock Brake System - <u>DTC P0856</u>
P0961	Automatic Transmission - 6T45 (MHG) or 6T50 (M2D) - <u>DTC P0961-P0963</u>
P0962	Automatic Transmission - 6T45 (MHG) or 6T50 (M2D) - <u>DTC P0961-P0963</u>



Connector Part Information

- Harness Type: Rear Seat
- OEM Connector: 13595574
- Service Connector: Service by Harness - See Part Catalog
- Description: 4-Way F 1.2 Series (BK)

Terminal Part Information

Terminal Type ID	Terminated Lead	Diagnostic Test Probe	Terminal Removal Tool	Service Terminal	Tray Name	Core Crimp	Insulation Crimp
I	Not Required	Not Available	No Tool Required	Not Required	Not Required	Not Required	Not Required

Pin	Size	Color	Circuit	Function	Terminal Type ID	Option
1	0.75	WH/BN	2481	Passenger Heated Back Element Control	I	-
2	0.5	WH/BU	2436	Passenger Heated Back NTC Signal	I	-
3	0.5	BK/GN	2482	Passenger Heated Back NTC Low Reference	I	-
4	0.75	GY/BK	2480	Passenger Heated Seat Element Low Reference	I	-

E14H SEAT HEATING ELEMENT - RIGHT REAR CUSHION (KA6)



retained accessory power is disabled before the K9 Body Control Module sends a command to unlatch the relay.

- **If the test lamp is always OFF**

1. Ignition OFF, remove the test lamp, disconnect the harness connector at the K9 Body Control Module and KR104B Battery Saver Relay 2.
2. Test for infinite resistance between the control circuit and ground.
 - If less than infinite resistance, repair the short to ground on the circuit.
 - Go to next step: If infinite resistance
3. Test for less than 2 Ω in the control circuit end to end.
 - If 2 Ω or greater, repair the open/high resistance in the circuit.
 - If less than 2 Ω , replace the K9 Body Control Module.

- **If the test lamp is always ON**

1. Ignition OFF, remove the test lamp, disconnect the harness connector at the K9 Body Control Module, ignition ON.
2. Test for less than 1 V between the control circuit and ground.
 - If 1 V or greater, repair the short to voltage on the circuit.
 - If less than 1 V, replace the K9 Body Control Module.

- **Go to next step: If the test lamp turns ON and OFF**

11. Connect the in-line harness connector X200.
12. Disconnect the harness connector at the appropriate devices powered by the T19 Power Supply Transformer B+ supply circuit terminal 10 X1.
13. Ignition ON.
14. Verify that a test lamp illuminates between each of the B+ circuits listed below and ground.

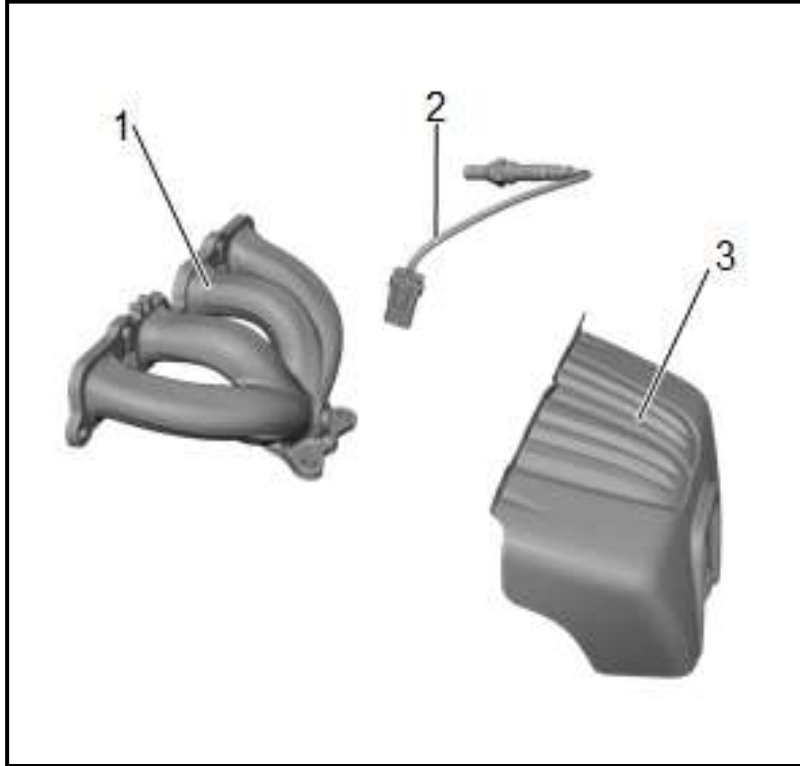
NOTE:

The vehicle may not be equipped with all components as listed below. Use wiring schematics to determine which components are supplied their B+ feed by the KR104A Battery Saver Relay 1. Use the connector end view to identify the B+ circuit terminal for each of those components.

- K9 Body Control Module - B+ circuit terminal 1 X2
- K41 Front and Rear Parking Assist Control Module - B+ circuit terminal 1 X1
- S25 Garage Door Opener - B+ circuit terminal 1
- A26 HVAC Controls - B+ circuit terminal 1
- S136 Infotainment Control Touchpad - B+ circuit terminal 1
- K48 Infotainment Faceplate Control Module - B+ circuit terminal 1 X1
- K74 Human Machine Interface Control Module - B+ circuit terminal 7 X1
- K73 Telematics Communication Interface Control Module - B+ circuit terminal 15 X1
- P16 Instrument Cluster - B+ circuit terminal 7
- X83 Auxiliary Audio Input - B+ circuit terminal 6 X1
- P6 Clock - B+ circuit terminal 1
- C2 Remote CD Changer - B+ circuit terminal 10
- P29 Head-Up Display B+ circuit terminal 6 X1
- A11 Radio - B+ circuit terminal 1 X1
- **If the test lamp does not illuminate and the circuit fuse is good**
 1. Ignition OFF, remove the test lamp.
 2. Test for less than 2 Ω in the B+ circuit end to end.
 - If 2 Ω or greater, repair the open/high resistance in the circuit.
 - If less than 2 Ω , replace the X51A Fuse Block - Instrument Panel.
- **If the test lamp does not illuminate and the circuit fuse is open**

Callout	Component Name
CAV_57	57
312	Right Headlamp Low Beam Control
T4F	HEADLAMPS-HIGH INTENSITY DISCHARGE
711	Left Headlamp High Beam Control
2234_BN/VT	2234 BN/VT
CAV_1	1
CAV_3	3
CAV_5	5
293	Rear Defog Element Control
293_BN/VT	293 BN/VT
CAV_34	34
CONN_X2	X2
2267	Mirror Heating Element Control
2267_BN/YE	2267 BN/YE
CAV_14	14
CONN_X2	X2
CAV_1	1
CONN_X1	X1
CAV_1	1
293_BN/VT	293 BN/VT
CAV_1	1
293_BN/VT	293 BN/VT
2267_BN/YE	2267 BN/YE
2267_BN/YE	2267 BN/YE
CAV_3	3
CAV_3	3
2267_BN/YE	2267 BN/YE
2267_BN/YE	2267 BN/YE
CAV_4	4
CAV_4	4
2267_BK	2267 BK
2267_BK	2267 BK
712	Left Headlamp Low Beam Control
T4F	HEADLAMPS-HIGH INTENSITY DISCHARGE
CAV_8	8
CAV_8	8
X120	X120
CAV_6	6
CAV_2	2
X110	X110
CAV_6	6
CAV_2	2
F37UA	F37UA 10A
F36UA	F36UA 10A
F39UA	F39UA 15A
J105	J105
F57UA	F57UA 15A
F51UA	F51UA 15A
X123	X123
F29UA	F29UA 40A
F30UA	F30UA 7.5A
X903	X903

1.



NOTE:

- Do not reuse the exhaust manifold-to-cylinder head gaskets. Upon installation of the exhaust manifold, install a **NEW** gasket. An improperly installed gasket or leaking exhaust system may effect On-Board Diagnostics (OBD) II system performance.
- Remove the oxygen sensor (2) from the manifold. Do not submerge the oxygen sensor in cleaning solvent.

Remove the oxygen sensor (2) from the manifold.

2. Clean the exhaust manifold (1) in solvent.

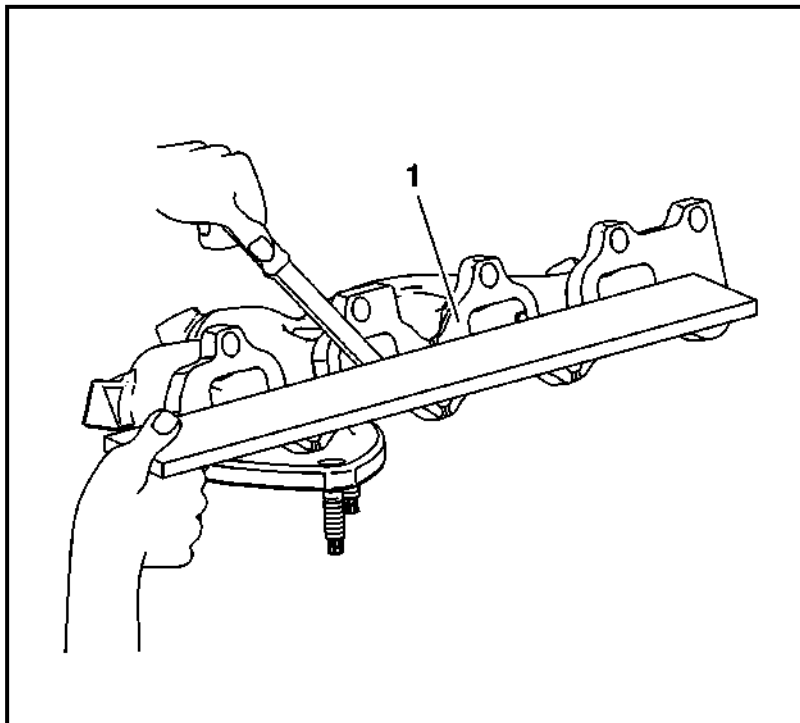
WARNING: Refer to [Safety Glasses Warning](#) .

3. Dry the exhaust manifold with compressed air.

4. Inspect the exhaust manifold (1) for damage.

5. Inspect the heat shield (3) for damage.

6.



Diagnostic Aids

Using the Failure Records data may help locate an intermittent condition. If you cannot duplicate the DTC, the information in the Failure Records can help determine how many miles since the DTC set. The Fail Counter and Pass Counter can help determine how many ignition cycles that the diagnostic test reported a pass and/or a fail.

On vehicles equipped with a high pressure mechanical pump on Direct Fuel Injection engines, the vehicle may continue to run even though the pump in the fuel tank is not operating.

Reference Information

Schematic Reference

Engine Controls Wiring Schematics

Connector End View Reference

COMPONENT CONNECTOR END VIEWS - INDEX

Powertrain Component View

Powertrain Component Views

Description and Operation

Fuel System Description

Electrical Information Reference

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

DTC Type Reference

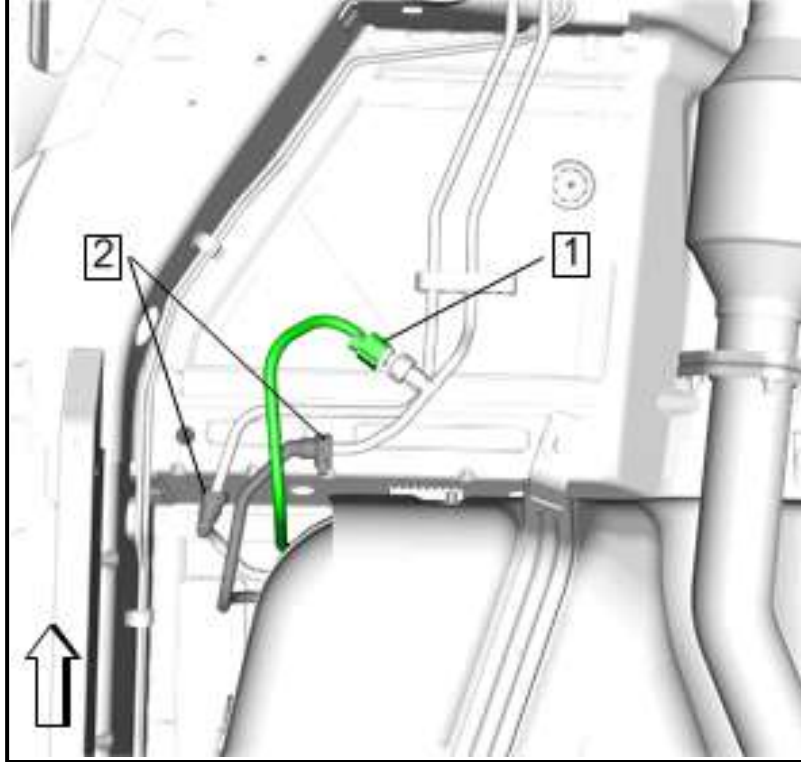
Powertrain Diagnostic Trouble Code (DTC) Type Definitions

Scan Tool Reference

Control Module References for scan tool information

Circuit/System Verification

1. Ignition ON.
2. Verify DTC U0074 or U18A2 is not set or stored in history.
 - **If DTC U0074 or U18A2 is set or stored in history**
Refer to **Diagnostic Trouble Code (DTC) List - Vehicle** .
 - **Go to next step: If DTC U0074 or U18A2 is not set or stored in history**
3. Verify that DTC P018B, P018C, P018D, P0231, P0232, or P023F is not set.
 - **If any of the DTCs are set**
Refer to **Diagnostic Trouble Code (DTC) List - Vehicle** .
 - **Go to next step: If none of the DTCs are set**
4. Verify the scan tool Short Term Fuel Pump Trim and the Long Term Fuel Pump Trim when multiplied together are less than 1.5.
 - **If greater than 1.5**



Connect the evaporative emission and fuel pipes (2). [Plastic Collar Quick Connect Fitting Service](#)

12. Connect the fuel pressure sensor electrical connector (1).
13. [Exhaust Muffler Replacement](#) - Install
14. [Two-Piece Propeller Shaft Replacement](#) - Install
15. Lower the vehicle.
16. Refill the vehicle with fuel.
17. Cycle the ignition on to run the fuel pump and check for fuel leaks.

FUEL TANK REPLACEMENT (FWD)

Removal Procedure

WARNING: Refer to [Diesel/Gasoline Vapors Warning](#) .

WARNING: Refer to [Safety Glasses Warning](#) .

1. [Fuel Pressure Relief](#) - Relieve the fuel pressure:
2. [Fuel Tank Draining](#) - Drain the fuel tank.
3. [Lifting and Jacking the Vehicle](#) - Raise and support the vehicle.
4. [Exhaust Muffler Replacement](#) - Remove

5.



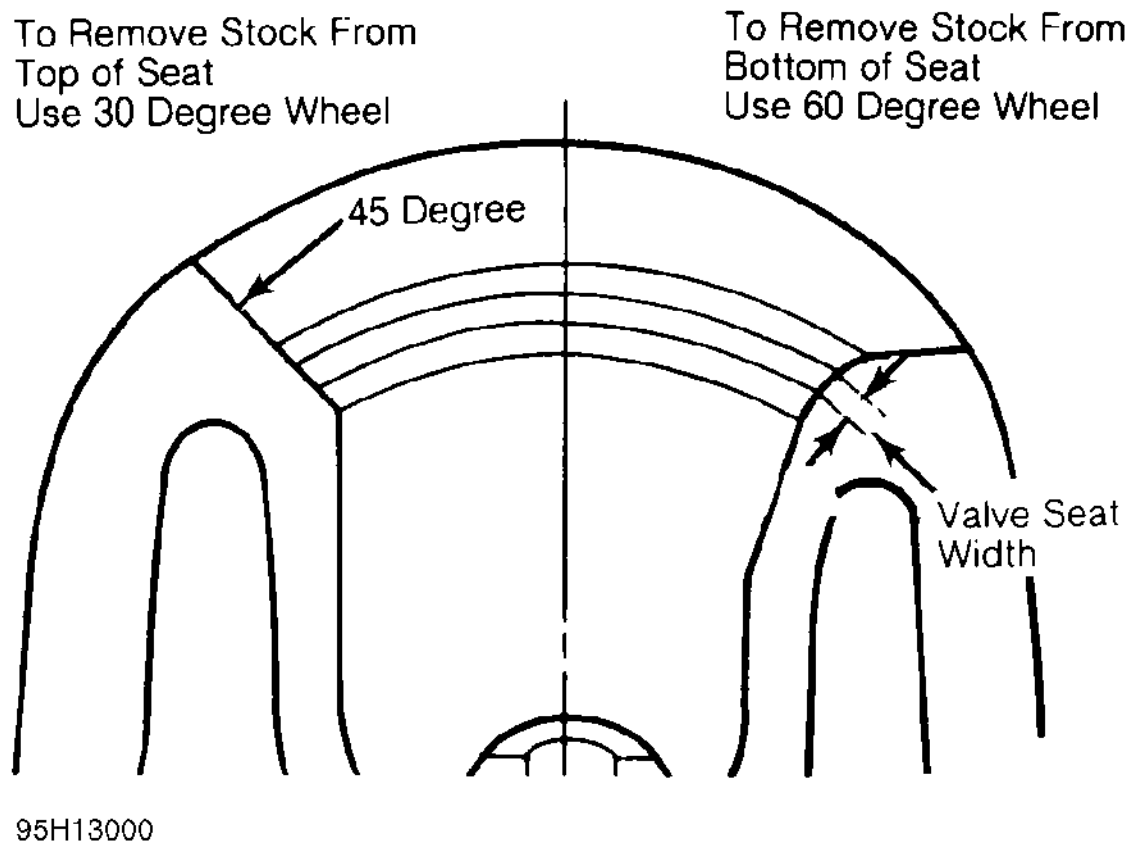


Fig. 10: Adjusting Valve Seat Width

Valve Seat Replacement

Replacement of valve seat inserts is done by cutting out the old insert and machining an oversize insert bore. Replacement oversize insert is usually cooled and the cylinder head is sometimes warmed. Valve seat is pressed into the head. This operation requires specialized machine shop equipment.

Valve Seat Concentricity

Using dial gauge, install gauge pilot in valve guide. Position gauge arm on the valve seat. Adjust dial indicator to zero. Rotate arm 360 degrees and note reading. Runout should not exceed specification.

To check valve-to-valve seat concentricity, coat valve face lightly with Prussian Blue dye. Install valve and rotate it on valve seat. If pattern is even and entire seat is coated at valve contact point, valve is concentric with the valve seat.

CYLINDER HEAD REASSEMBLY

NOTE:

Examples used in this article are general in nature and do not necessarily relate to a specific engine or system. Illustrations and procedures have been chosen to guide mechanic through engine overhaul process. Descriptions of processes of cleaning, inspection, assembly and machine shop practice are included.

Always refer to appropriate engine overhaul article, if available, in the **ENGINES** section for complete overhaul procedures and specifications for the vehicle being repaired.

Valve Stem Installed Height

Valve stem installed height must be checked when new valves are installed or when valves or valve seats have been ground. Install valve in valve guide. Measure distance from tip of valve stem to spring seat. See [Fig. 11](#). Distance must be within specification to allow sufficient clearance for valve operation.