SPECIFICATIONS

FASTENER TIGHTENING SPECIFICATIONS

Fastener Tightening Specifications

Application	Specification	
	Metric	English
Air Outlet Deflector Screw - Right	2 N.m	18 lb in
Air Outlet Duct Screw	2.5 N.m	22 lb in
Center Console Cup Holder Screw	2.5 N.m	22 lb in
Center Console Screw	2.5 N.m	22 lb in
Cluster Trim Panel Screw	2.5 N.m	22 lb in
Console Cup Holder Track Screw	2.5 N.m	22 lb in
Console Trim Panel Screw - Left	2.5 N.m	22 lb in
Console Trim Panel Screw - Right	2.5 N.m	22 lb in
Front Console Trim Panel Screw	2.5 N.m	22 lb in
Front Supplemental Inflatable Restraint Bolt - Passenger Side	10 N.m	89 lb in
Instrument Panel Cluster Screw	2 N.m	18 lb in
Instrument Panel Compartment Door Screw	2 N.m	18 lb in
Instrument Panel Retainer Nut	10 N.m	89 lb in
Radio Ground Strap Screw	10 N.m	89 lb in
Radio Screw	2.5 N.m	22 lb in
Steering Column Filler Panel Screw	2.5 N.m	22 lb in
Steering Column Shroud Screw	2.5 N.m	22 lb in
Storage Compartment Screw	2.5 N.m	22 lb in
Upper Trim Panel Bolt	10 N.m	89 lb in
Upper Trim Panel Screw	2.5 N.m	22 lb in

FUEL LEVEL SPECIFICATIONS

The information in this table is intended for use with the J 33431-C Signal Generator and Instrument Panel Tester. The fuel level sensor values represent the test values to be used on the Signal Generator to drive the fuel gage display to the indicated positions. Vehicles that require more than one fuel level sensor calculate gage position from many possible resistance combinations of fuel levels between the 2 tanks. Therefore, the values in the table may not correlate directly to readings taken from the vehicle primary or secondary sending units.

The values in the table are approximate values based on information obtained from properly operating vehicles. Actual results may vary slightly.

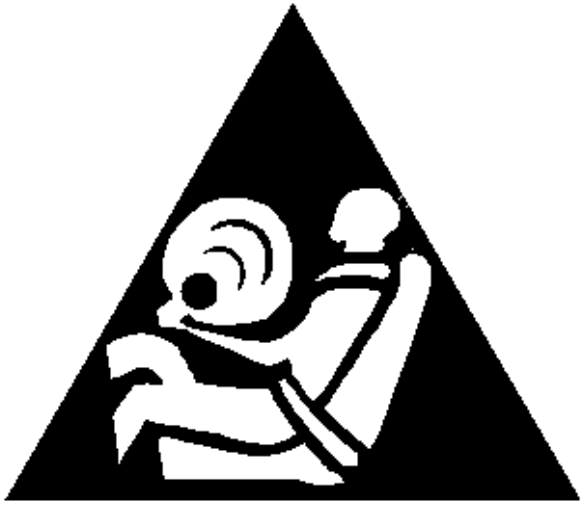
Fuel Level Specifications

Fuel Gage Display	Resistance (ohm)	Fuel Level (%)	Fuel Remaining	Fuel Level parameter (Gallons)
E	225-250	0-2	0.4-3.7 L (0.1-1.0 gal)	1
1/4	188	25	14.2 L (3.8 gal)	4
1/2	124	50	31.0 L (8.2 gal)	8
3/4	63	75	42.6 L (11.3 gal)	11
F	20-45	95-100	54.89-58.67 L (14.5-15.5 gal)	14-15
Low Fuel Telltale On	210	10	5.6 L (1.5 gal)	2

SCHEMATIC AND ROUTING DIAGRAMS

INSTRUMENT PANEL, GAGES, AND CONSOLE SCHEMATIC ICONS

Instrument Panel, Gages, and Console Schematic Icons

Icon	Icon Definition
	**CAUTION:** **When performing service on or near the SIR components or the SIR wiring, the SIR system must be disabled. Refer to SIR Disabling and Enabling Zones. Failure to observe the correct procedure could cause deployment of the SIR components, personal injury, or unnecessary SIR system repairs.**

INSTRUMENT CLUSTER SCHEMATICS

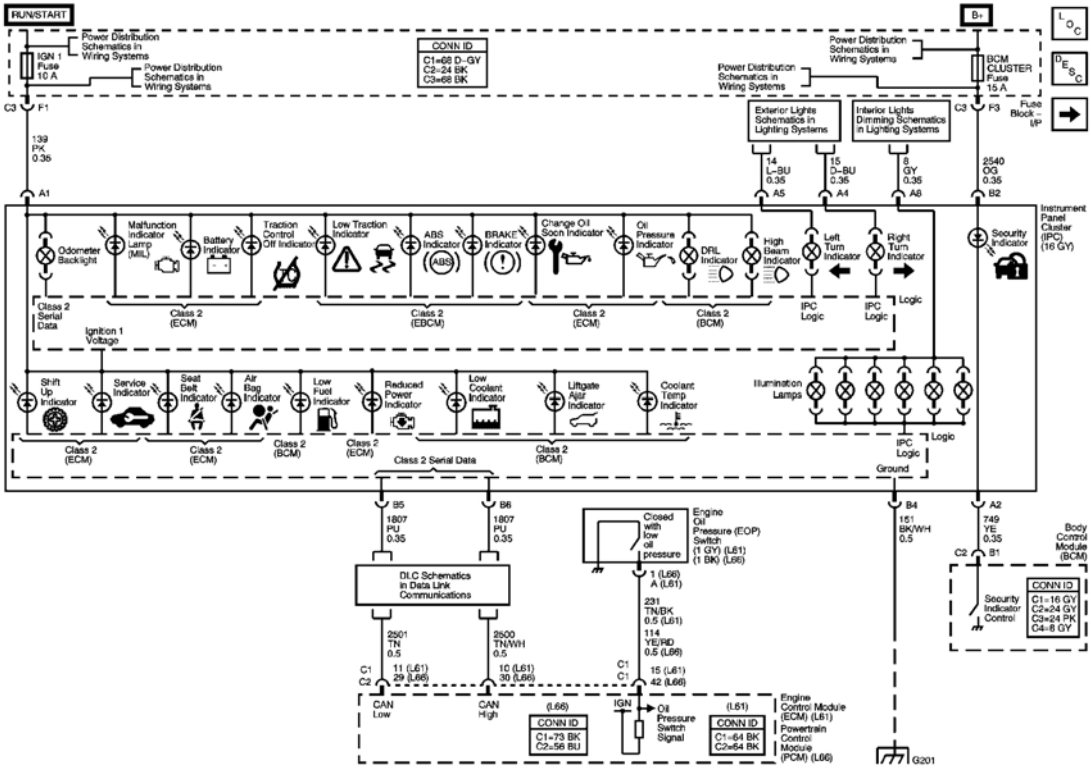


Fig. 1: View Of Instrument Cluster Schematics
Courtesy of GENERAL MOTORS CORP.

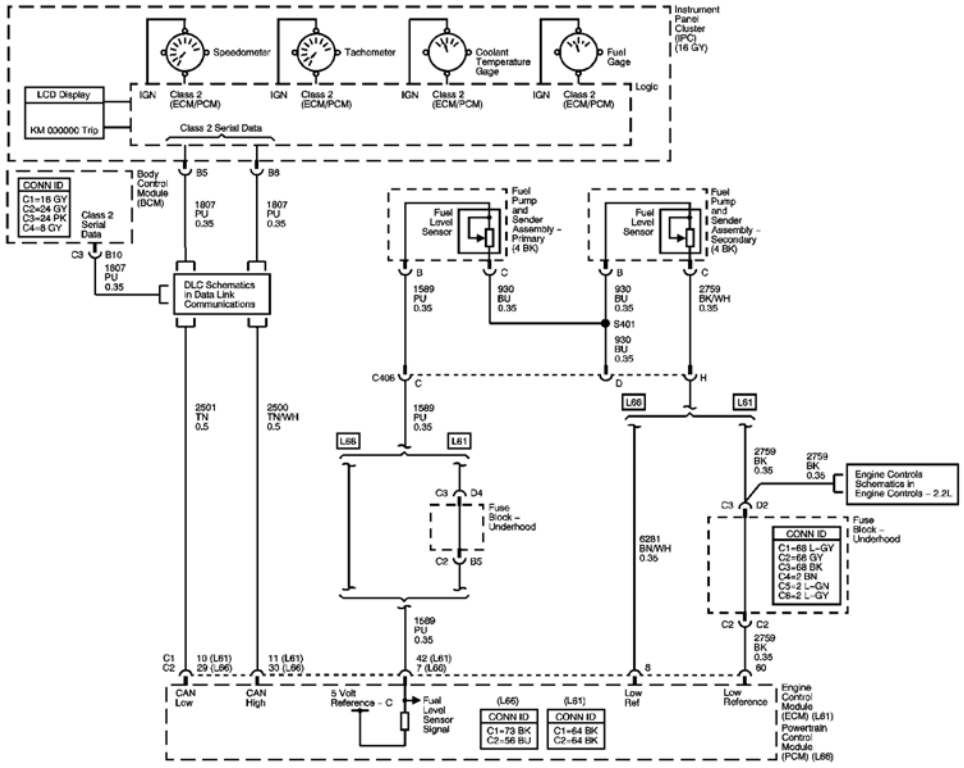


Fig. 2: Gages
Courtesy of GENERAL MOTORS CORP.

AUDIBLE WARNINGS SCHEMATICS

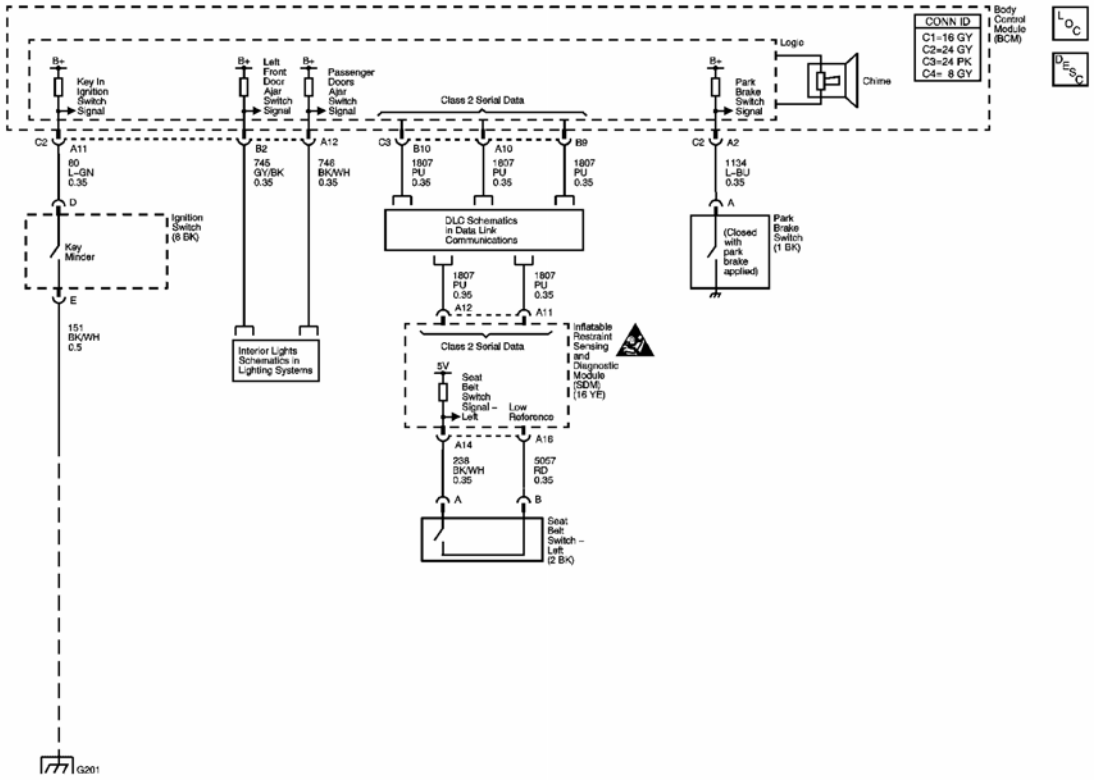
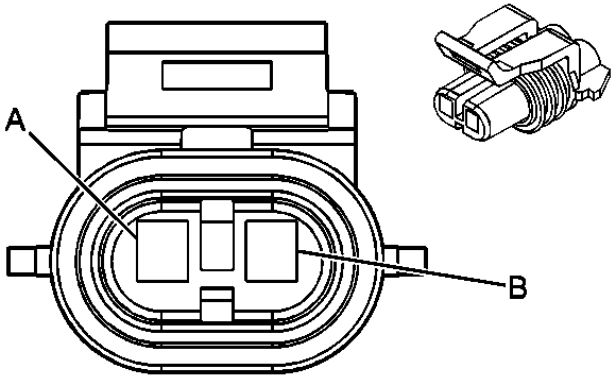


Fig. 3: View Of Audible Warnings Schematics
Courtesy of GENERAL MOTORS CORP.

COMPONENT LOCATOR

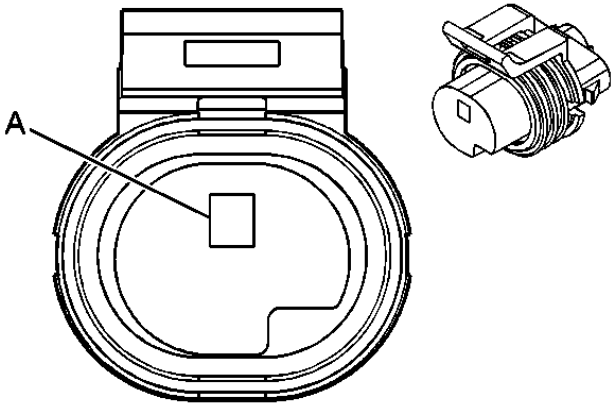
INSTRUMENT PANEL, GAGES, AND CONSOLE CONNECTOR END VIEWS

Ambient Air Temperature Sensor (HAA, DH3) Connector End View



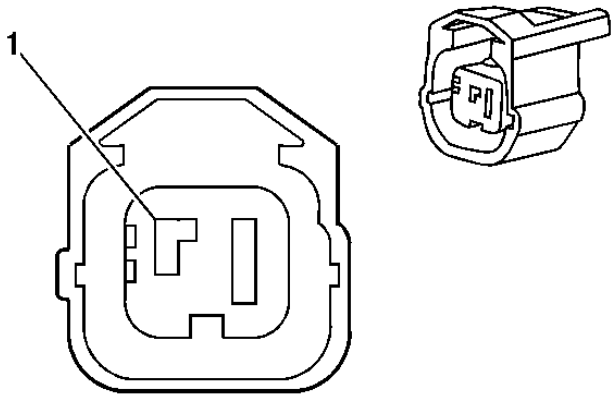
Connector Part Information		• 12052642 • 2-Way F Metri-Pack 150 Series Sealed (L-GN)	
Pin	**Wire Color**	**Circuit No.**	**Function**
A	L-GN/BK	735	Ambient Air Temperature Sensor Signal
B	GY	720	Low Reference

Engine Oil Pressure (EOP) Switch (L61) Connector End View



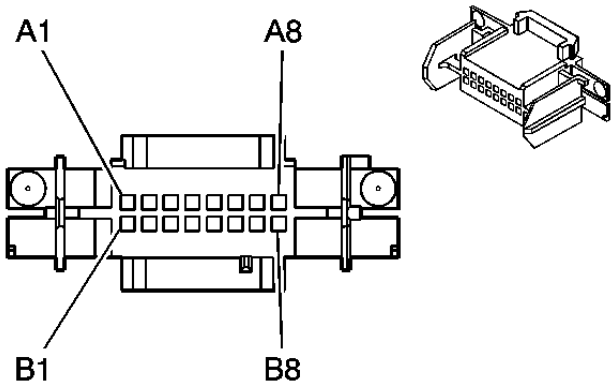
Connector Part Information		• 12065299 • 1-Way F Metri-Pack 150 Series Sealed (GY)	
Pin	**Wire Color**	**Circuit No.**	**Function**
A	TN/BK	231	Oil Pressure Switch Signal

Engine Oil Pressure (EOP) Switch (L66) Connector End View



Connector Part Information		• 6189-1113 • 1-Way F HX Series (BK)	
Pin	**Wire Color**	**Circuit No.**	**Function**
1	YE/RD	114	Oil Pressure Switch Signal

Instrument Panel Cluster (IPC) Connector End View



Connector Part Information		• 15305356 • 16-Way F (GY)	
Pin	**Wire Color**	**Circuit No.**	**Function**
A1	PK	139	Ignition 1 Voltage
A2	YE	749	Security Indicator Control
A3	-	-	Not Used
A4	D-BU	15	Right Turn Signal

A5	L-BU	14	Left Turn Signal
A6-A7	-	-	Not Used
A8	GY	8	I/P Lamps Supply Voltage
B1	-	-	Not Used
B2	OG	2540	Battery Positive Voltage
B3	-	-	Not Used
B4	BK/WH	151	Ground
B5-B6	PU	1807	Class 2 Serial Data
B7-B8	-	-	Not Used

DIAGNOSTIC INFORMATION AND PROCEDURES

DIAGNOSTIC STARTING POINT - INSTRUMENT PANEL, GAGES AND CONSOLE

Begin the I/P system diagnosis with **Diagnostic System Check - Instrument Cluster** or begin the audible warning system diagnosis with **Diagnostic System Check - Audible Warnings** . The Diagnostic System Check will provide the following information:

- The identification of the control modules which command the system.
- The ability of the control modules to communicate through the serial data circuit.
- The identification of any stored diagnostic trouble codes (DTCs) and their status.

The use of the Diagnostic System Check will identify the correct procedure for diagnosing the system and where the procedure is located.

DIAGNOSTIC SYSTEM CHECK - INSTRUMENT CLUSTER

Test Description

The numbers below refer to the step numbers on the diagnostic table.

2: Lack of communication may be due to a malfunction of the CAN serial data circuit. The specified procedure will determine the particular condition.

3: Lack of communication may be due to a partial malfunction of the class 2 serial data circuit or due to a total malfunction of the class 2 serial data circuit. The specified procedure will determine the particular condition.

4: The symptoms list in Symptoms will determine the correct diagnostic procedure to use.

5: The presence of DTCs which begin with "U" indicate some other module is not communicating. The specified procedure will compile all the available information before tests are performed.

Diagnostic System Check - Instrument Cluster

Step	Action	Yes	No
Schematic Reference:Instrument Cluster Schematics			

1	Install a scan tool. Does the scan tool power up?	Go to **Step 2**	Go to **Scan Tool Does Not Power Up** in Data Link Communications
2	1. Turn the ignition ON, with the engine OFF. 2. Attempt to establish communication with the following modules • Electronic Brake Control Module (EBCM) • Electric Power Steering (EPS) • Engine Control Module (ECM) Does the scan tool communicate with all of the control modules?	Go to **Step 3**	Go to **Data Link References** in Data Link Communications
3	1. Turn the ignition ON, with the engine OFF. 2. Attempt to establish communication with the following modules • Body Control Module (BCM) • Instrument Panel Cluster (IPC) • Inflatable Restraint Sensing and Diagnostic Module (SDM) Does the scan tool communicate with all of the control modules?	Go to **Step 4**	Go to **Data Link References** in Data Link Communications
4	Select the display DTCs function on the scan tool for each of the following modules: • Body Control Module (BCM) • Electronic Brake Control Module (EBCM) • Engine Control Module (ECM) • Instrument Panel Cluster (IPC) • Inflatable Restraint Sensing and Diagnostic Module (SDM)		

	Does the scan tool display any DTCs?	Go to **Step 5**	Go to **Symptoms - Instrument Panel, Gages and Console**
5	Does the scan tool display any DTCs which begin with a "U"?	Go to **Diagnostic Trouble Code (DTC) List** in Data Link Communications	Go to **Step 6**
6	Does the scan tool display DTC B1000, B1001, B1372, or B1382?	Go to **Diagnostic Trouble Code (DTC) List** in Body Control System	Go to **Diagnostic Trouble Code (DTC) List**

DIAGNOSTIC SYSTEM CHECK - AUDIBLE WARNINGS

Test Description

The numbers below refer to the step numbers on the diagnostic table.

2: Lack of communication may be due to a partial malfunction of the class 2 serial data circuit or due to a total malfunction of the class 2 serial data circuit. The specified procedure will determine the particular condition.

3: The symptoms list in Symptoms will determine the correct diagnostic procedure to use.

4: The presence of DTCs which begin with "U" indicate some other module is not communicating. The specified procedure will compile all the available information before tests are performed.

Diagnostic System Check - Audible Warnings

Step	Action	Yes	No
Schematic Reference:Audible Warnings Schematics			
1	Install a scan tool. Does the scan tool power up?	Go to **Step 2**	Go to **Scan Tool Does Not Power Up** in Data Link Communications
2	1. Turn the ignition ON, with the engine OFF. 2. Attempt to establish communication with the following modules: • Body Control Module (BCM) • Instrument Panel Cluster (IPC) Does the scan tool communicate with all of the control modules?	Go to **Step 3**	Go to **Data Link References** in Data Link Communications
	Select the display DTCs function on the scan tool for each of the		

3	following modules: • Body Control Module (BCM) • Instrument Panel Cluster (IPC) Does the scan tool display any DTCs?	Go to **Step 4**	Go to **Symptoms - Instrument Panel, Gages and Console**
4	Does the scan tool display any DTCs which begin with a "U"?	Go to **Diagnostic Trouble Code (DTC) List** in Data Link Communications	Go to **Step 5**
5	Does the scan tool display DTC B1000, B1001, B1372, or B1382?	Go to **Diagnostic Trouble Code (DTC) List** in Body Control System	Go to **Diagnostic Trouble Code (DTC) List**

SCAN TOOL OUTPUT CONTROLS

Body Control Module (BCM) Scan Tool Output Controls

Scan Tool Output Control	Additional Menu Selection(s)	Description
I/P Illumination Lamps	Output Control/Lamp Test	The body control module (BCM) turns the instrument panel (I/P) illumination lamps ON when you select ON. The illumination lamps should stay ON until commanded OFF.
Key Minder	Output Control/Chime Test	The BCM turns the key in ignition reminder chime ON when you select ON. The key in ignition reminder chime should stay ON until commanded OFF.
Lights On Minder	Output Control/Chime Test	The BCM turns the lights on reminder chime ON when you select ON. The lights on reminder chime should stay ON until commanded OFF.
Occupant Restraint	Output Control/Chime Test	The BCM turns the fasten safety belt chime ON when you select ON. The fasten safety belt chime should stay ON until commanded OFF.

Instrument Panel Cluster (IPC) Scan Tool Output Controls

Scan Tool Output Control	Additional Menu Selection(s)	Description
		The instrument panel cluster (IPC) illuminates the following indicators when you select ON: • ABS • Air Bag • BRAKE • Charge

Lamp and Gauge Check	-	• Change Engine Oil • DRL • Engine Coolant Temperature • Fasten Safety Belt • High Beam • Liftgate Ajar • Low Fuel • Low Oil Pressure • Low Coolant Level • Low Traction • Malfunction Indicator Lamp • Reduced Power (L61) • Security • Service Engine Soon • Traction off • Upshift Indicator (manual transmission) The IPC drives the following gages to maximum position when you select ON: • Engine coolant temperature gage • Fuel gage • Speedometer • Tachometer The indicators should stay illuminated and all gages remain at maximum until commanded OFF. When commanded OFF, the indicators should turn OFF and all gages should remain at the minimum position until the test is exited or commanded ON.

SCAN TOOL DATA LIST

The scan tool data lists contain all the instrument panel, gages, and console related parameters that are available on the scan tool. The parameters in the list are arranged in alphabetical order. The data list column indicates the location of the parameter within the scan tool menu selections.

Use the scan tool data lists as directed by a diagnostic table or in order to supplement the diagnostic procedures. Begin all of the diagnostic procedures with **Diagnostic System Check - Instrument Cluster** or **Diagnostic System Check - Audible Warnings** .

Use the scan tool data lists only after the following is determined:

- There is no published DTC procedure nor published symptom procedure for the customer concern.
- The DTC or symptom procedure indicated by the diagnostic system check does not resolve the customer concern.

The typical data values are obtained from a properly operating vehicle under the conditions specified in the first row of the scan tool data list table. Comparison of the parameter values from the suspect vehicle with the typical data values may reveal the source of the customer concern.

Body Control Module (BCM) Scan Tool Data List

Scan Tool Parameter	Data List	Units Displayed	Typical Data Value
Operating Conditions: Ignition ON/Engine OFF/High Beams Off/Doors Closed/Trunk Closed/Park Brake Unapplied			
Battery 1	Accessory Switch Inputs	Volts	Varies
Coolant Gauge Position	Accessory	%	Varies
Driver Door Switch	Switch Inputs	High/Low	High
Fuel Gauge Position	Accessory	%	Varies
Key in Ignition	Switch Inputs	Yes/No	Yes
Liftgate Ajar Switch	Switch Inputs	High/Low	High
Low Brake Fluid	Switch Inputs	Yes/No	No
Low Coolant	Switch Inputs	Yes/No	No
Oil Life Reset Switch	Switch Inputs	High/Low	High
Park Brake Switch	Switch Inputs	On/Off	Off
Parklamp Switch	Switch Inputs	On/Off	Off
Pass Door Switches	Switch Inputs	High/Low	High

Engine Control Module (ECM) Scan Tool Data List

Scan Tool Parameter	Data List	Units Displayed	Typical Data Value
Operating Conditions: Engine Idling/Normal Operating Temperature			
ECT	Fuel and Emissions General Info - Inputs General Info - Outputs Ignition	Celsius (Fahrenheit)	85-105°C (185-220°F)
Engine Oil Life Left (3.5L)	General Info - Inputs	%	0-100% varies
Engine Oil Life Remaining (2.2L)	General Info - Inputs	%	0-100% varies
Engine Speed	Fuel and Emissions General Info - Inputs	RPM	+/-100 RPM from Desired Idle

	General Info - Outputs Ignition		Speed
Fuel Level	General Info - Inputs Fuel and Emissions Ignition	Liters (Gallons)	Varies
Fuel Level Sensor (3.5L)	Fuel and Emissions General Info - Inputs	Volts	Varies
Low Oil Pressure (2.2L)	General Info	Yes/No	No
Low Oil Pressure Switch (3.5L)	General Info	Open/Closed	Closed
Vehicle Speed	Fuel and Emissions General Info - Inputs General Info - Outputs Ignition	km/h (mph)	0 km/h (0 mph)

Instrument Panel Cluster (IPC) Scan Tool Data List

Scan Tool Parameter	Data List	Units Displayed	Typical Data Value
Operating Conditions: Ignition ON/Engine OFF/Seat Belt Buckled/High Beams Off/Park Brake Unapplied			
Software Date - Day	ID Information	Numeric	Varies
Software Date - Month	ID Information	Numeric	Varies
Software Date - Year	ID Information	Numeric	Varies
Software ID	ID Information	Numeric	Varies

SCAN TOOL DATA DEFINITIONS

Battery 1

The scan tool displays 0-19 volts. The battery voltage as monitored by the ECM.

Coolant Gauge Position

The scan tool displays 0-100%. The BCM receives a serial data message from the PCM/ECM regarding the engine coolant temperature and converts the data to percentage.

Driver Door Switch

The scan tool displays High or Low. The state of the driver door switch as commanded by the BCM.

ECT

The scan tool displays -40 to +151°C (-40 to +304°F). The ECM monitors the voltage at the signal circuit of the engine coolant temperature sensor. The voltage is inversely proportional to the engine coolant temperature.

Engine Oil Life Left (3.0L)

The scan tool displays 0-100%. The ECM calculates the remaining engine oil life.

Engine Oil Life Remaining (2.2L)

The scan tool displays 0-100%. The PCM calculates the remaining engine oil life.

Engine Speed

The scan tool displays 0-9999 RPM. Engine speed is computed by the ECM. It should remain close to desired idle under various engine loads with the engine idling.

Fuel Gauge Position

The scan tool displays 0-100%. The BCM calculates the amount of fuel remaining in the tank based on the serial data messages from the ECM/PCM regarding fuel level.

Fuel Level

The scan tool displays the amount of fuel left in Gallons or Liters. The ECM/PCM calculates the amount of fuel remaining in the tank based on the input from the fuel level sensor.

Fuel Level Sensor (3.0L)

The scan tool displays the state of the fuel level in Volts. The ECM monitors the signal circuit of the fuel level sensor and displays the current voltage.

Key in Ignition

The scan tool displays Yes or No. The state of the key in ignition switch as commanded by the BCM.

Liftgate Ajar Switch

The scan tool displays High or Low. The state of the liftgate switch as monitored by the BCM.

Low Brake Fluid

The scan tool displays Yes or No. The state of the brake fluid level switch as commanded by the BCM.

Low Coolant

The scan tool displays Yes or No. The state of the coolant level switch as commanded by the BCM.

Low Oil Pressure

The scan tool displays Yes or No. The state of the engine oil pressure sensor as commanded by the ECM.

Low Oil Pressure Switch

The scan tool displays Open or Closed. The state of the engine oil pressure switch as commanded by the ECM.

Oil Life Reset Switch

The scan tool displays High or Low. The BCM calculates the remaining engine oil life.

Pass Door Switches

The scan tool displays High or Low. The state of the passenger door switches as monitored by the BCM.

Software Date-Day

The scan tool displays the day the software was created for the BCM installed in the vehicle.

Software Date-Month

The scan tool displays the month the software was created for the BCM installed in the vehicle.

Software Date-Year

The scan tool displays the year the software was created for the BCM installed in the vehicle.

Software ID

The scan tool displays a numeric value. The identification of the BCM software installed in the vehicle.

Vehicle Speed

The scan tool displays 0-255 km/h (0-155 mph). The ECM/PCM monitors the signal circuit of the vehicle speed sensor.

DIAGNOSTIC TROUBLE CODE (DTC) LIST

Diagnostic Trouble Code (DTC) List

DTC	Diagnostic Procedure	Module(s)
B2532	**DTC B2532** in Lighting Systems	BCM
B2533	**DTC B2533** in Lighting Systems	BCM

B2600	**DTC B2600** in Lighting Systems	BCM
B2602	**DTC B2602** in Lighting Systems	BCM
B2603	**DTC B2603** in Lighting Systems	BCM
B2622	**DTC B2622** in Lighting Systems	BCM
B2623	**DTC B2623** in Lighting Systems	BCM
B2627	**DTC B2627** in Lighting Systems	BCM
B2628	**DTC B2628** in Lighting Systems	BCM
B2662	**DTC B2662** in Lighting Systems	BCM
B2743	**DTC B2743** in Lighting Systems	BCM
B2965	**DTC B2965**	BCM
BXXXX	**Diagnostic Trouble Code (DTC) List** in SIR	SDM
CXXXX	Refer to **Diagnostic Trouble Code (DTC) List** in Antilock Brake System	EBCM
P0461	**DTC P0461**	PCM
P0462	**DTC P0462**	PCM
P0463	**DTC P0463**	PCM
PXXXX	Refer to **Diagnostic Trouble Code (DTC) List** in Engine Controls.	PCM

DTC B2965

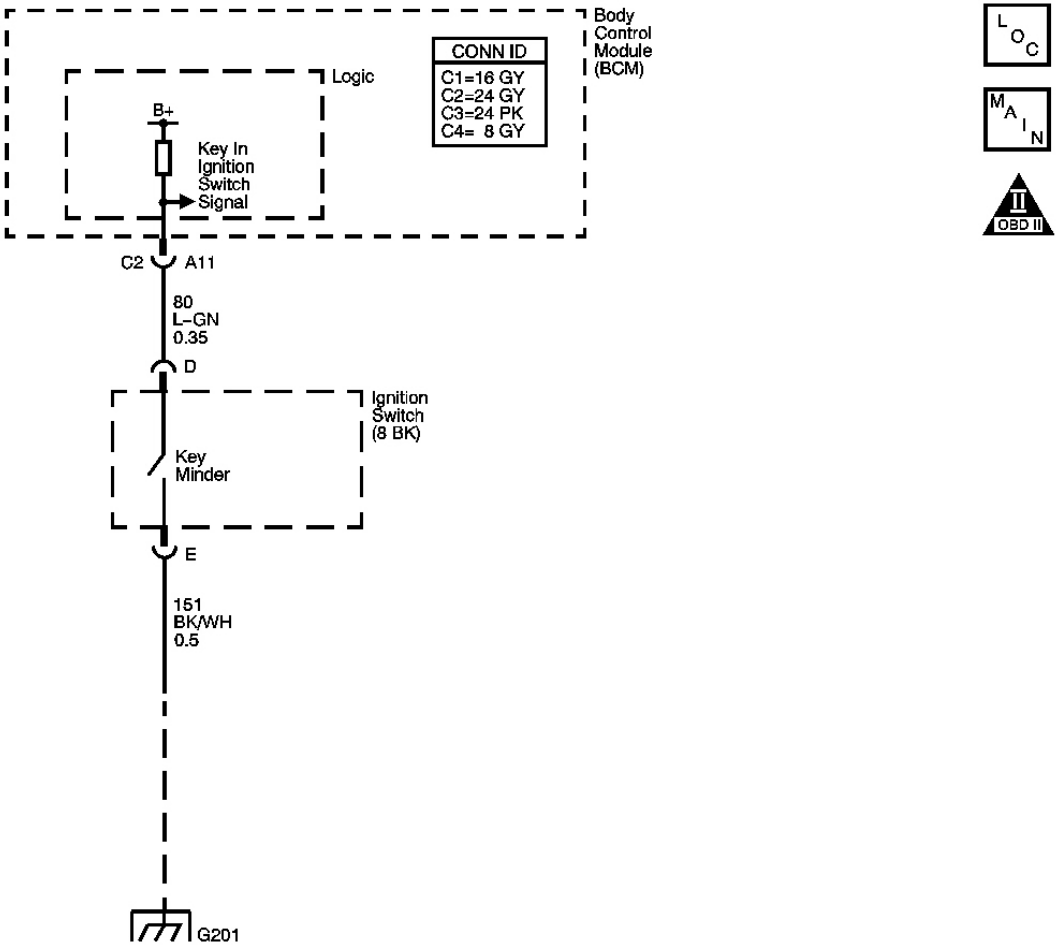


Fig. 4: DTC B2965 Circuit
Courtesy of GENERAL MOTORS CORP.

Circuit Description

The ignition switch closes, signal circuit is low, when the key is in the ignition and opens, signal circuit is high, when the key is not in the ignition. The body control module (BCM) monitors the key in ignition signal circuit in order to activate an audible warning.

Conditions for Running the DTC

The ignition is ON.

Conditions for Setting the DTC

- The ignition 1 voltage circuit is active, high signal, and the key in ignition signal circuit is high.

- The conditions above must be present for more than 0.3 seconds.

Action Taken When the DTC Sets

The BCM stores DTC B2965 in memory.

Conditions for Clearing the DTC

- The DTC becomes history when the fault is no longer present.
- A history DTC will clear after 100 consecutive ignition cycles if the condition for the malfunction is no longer present.
- The BCM receives a clear code command from the scan tool.

DTC B2965 Circuit

Step	Action	Yes	No
Schematic Reference:Audible Warnings Schematics			
1	Did you perform the Audible Warnings Diagnostic System Check?	Go to **Step 2**	Go to **Diagnostic System Check - Audible Warnings**
2	1. Install a scan tool. 2. Turn ON the ignition, with the engine OFF. 3. With the scan tool, observe the Key in Ignition parameter in the BCM Switch Inputs data list. Does the Key in Ignition parameter display Low?	Go to **Step 3**	Go to **Step 4**
3	1. Turn the ignition OFF and remove key. 2. Disconnect the IPC connector. 3. Connect a test lamp between the ignition 1 voltage circuit and a good ground. Does the test lamp illuminate?	Go to **Step 6**	Go to **Step 8**
4	Test the key in ignition switch signal circuit for an open, high resistance, or a short to voltage. Refer to **Circuit Testing** and **Wiring Repairs** in Wiring Systems. Did you find and correct the condition?	Go to **Step 11**	Go to **Step 5**
5	Test the ground circuit of the ignition key alarm switch for an open or a high resistance. Refer to **Circuit Testing** and **Wiring Repairs** in Wiring Systems. Did you find and correct the condition?	Go to **Step 11**	Go to **Step 7**
6	Test the ignition 1 voltage circuit for a short to voltage. Refer to **Circuit Testing** and **Wiring Repairs** in Wiring Systems. Did you find and correct the condition?	Go to **Step 11**	Go to **Step 7**
	Inspect for poor connections at the harness connector of the		

7	ignition switch. Refer to **Testing for Intermittent Conditions and Poor Connections** and **Connector Repairs** in Wiring Systems. Did you find and correct the condition?	Go to **Step 11**	Go to **Step 9**
8	Inspect for poor connections at the harness connector of the BCM. Refer to **Testing for Intermittent Conditions and Poor Connections** and **Connector Repairs** in Wiring Systems. Did you find and correct the condition?	Go to **Step 11**	Go to **Step 10**
9	Replace the ignition switch. Refer to **Ignition Switch Replacement** in Steering Wheel and Column. Did you complete the replacement?	Go to **Step 11**	-
10	**IMPORTANT:** **Perform the setup procedure for the replacement BCM.** Replace the BCM. Refer to **Body Control Module Replacement** in Body Control System.Did you complete the replacement?	Go to **Step 11**	-
11	1. Use the scan tool in order to clear the DTCs. 2. Operate the vehicle within the Conditions for Running the DTC as specified in the supporting text. Does the DTC reset?	Go to **Step 2**	System OK

DTC P0461

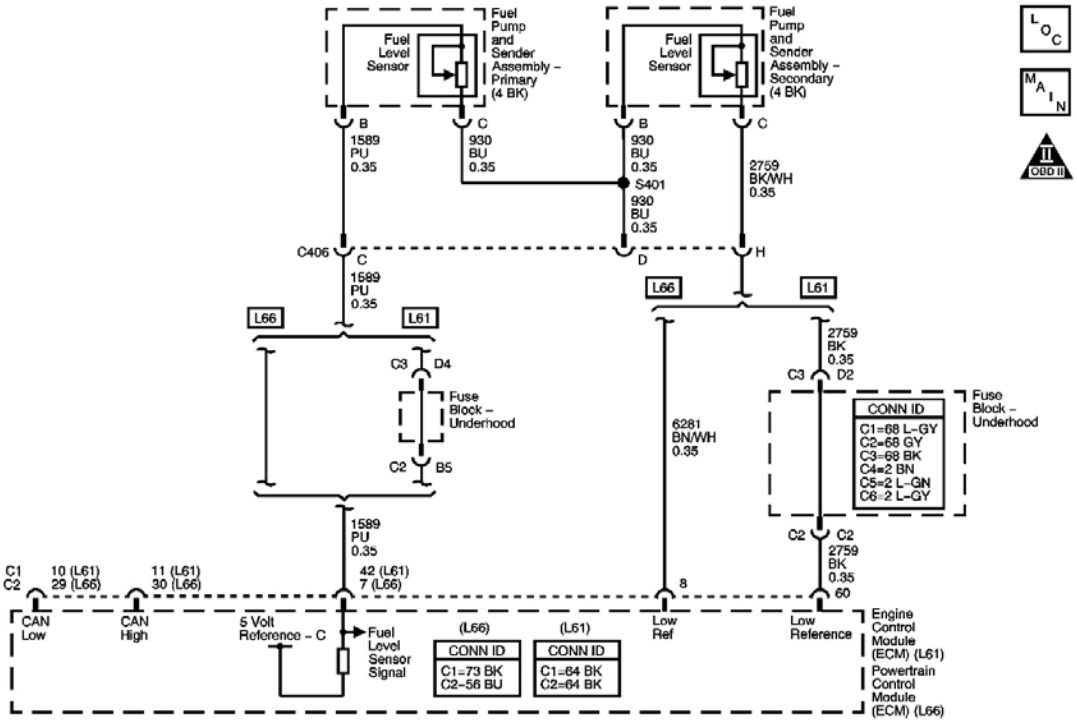


Fig. 5: DTC P0461 Circuit
Courtesy of GENERAL MOTORS CORP.

Circuit Description

The fuel level sender changes resistance based on the fuel level. The engine control module (ECM) (L61) or powertrain control module (PCM) (L66) monitors the signal circuit of the fuel level sender in order to determine fuel level. When the fuel tank is full, the sender resistance is high and the ECM/PCM senses a high signal voltage. When the fuel tank is empty, the sender resistance is low and the ECM/PCM senses a low signal voltage. The ECM/PCM uses the signal circuit of the fuel level sender in order to calculate the total remaining fuel percent in the tank. The ECM/PCM sends the fuel level message via the CAN serial data circuit to the BCM. The BCM sends the fuel level percent to the IPC via the class 2 data circuit to display on the fuel gage. The fuel level information is also used for misfire and EVAP diagnostics.

This diagnostic tests for a stuck fuel level sender signal.

Conditions for Running the DTC

The ignition is ON.

Conditions for Setting the DTC

The ECM/PCM does not detect a change in fuel level of at least 1.6 percent over a distance of 193 km (120 mi).

Action Taken When the DTC Sets

- The fuel gage defaults to empty.
- The ECM/PCM records the operating conditions at the time the diagnostic fails. The ECM/PCM displays the failure information in the Failure Records on the scan tool.

Conditions for Clearing the DTC

- The DTC becomes history when the conditions for setting the DTC are no longer present.
- The history DTC clears after 40 malfunction free warm-up cycles.
- The ECM/PCM receives the clear code command from the scan tool.

Diagnostic Aids

Use the Freeze Frame and/or Failure Records data in order to locate an intermittent condition. If you cannot duplicate the DTC, the information included in the Freeze Frame and/or Failure Records data may aid in determining the number of miles since the DTC set. The Fail Counter and Pass Counter can also aid in determining the number of ignition cycles that the diagnostic reported a pass and/or fail. Operate the vehicle within the same freeze frame conditions, i.e. RPM, engine load, vehicle speed, temperature, etc. This will isolate when the DTC failed.

Refer to **Testing for Intermittent Conditions and Poor Connections** in Wiring Systems.

DTC P0461 Circuit

Step	Action	Value (s)	Yes	No
Schematic Reference:Instrument Cluster Schematics				
1	Did you perform the Instrument Cluster Diagnostic System Check?	-	Go to **Step 2**	Go to **Diagnostic System Check - Instrument Cluster**
2	1. Remove the fuel level senders. 2. Inspect for the following items: • A stuck fuel level sender, i.e. the fuel strainer interfering with the sender float arm • Foreign material in the fuel tank, i.e. ice Did you find and correct the condition?	-	Go to **Step 3**	Go to Diagnostic Aids
3	Replace the malfunctioning fuel level sender. Refer to **Fuel Level Sensor Replacement (Primary)** or **Fuel Level Sensor Replacement (Secondary)** in Engine Controls. Did you complete the replacement?	-	Go to **Step 4**	-
4	1. Use the scan tool in order to clear the DTCs. 2. Operate the vehicle within the Conditions for Running the DTC as specified in the supporting text.	-		

	Does the DTC reset?		Go to **Step 2**	System OK

DTC P0462

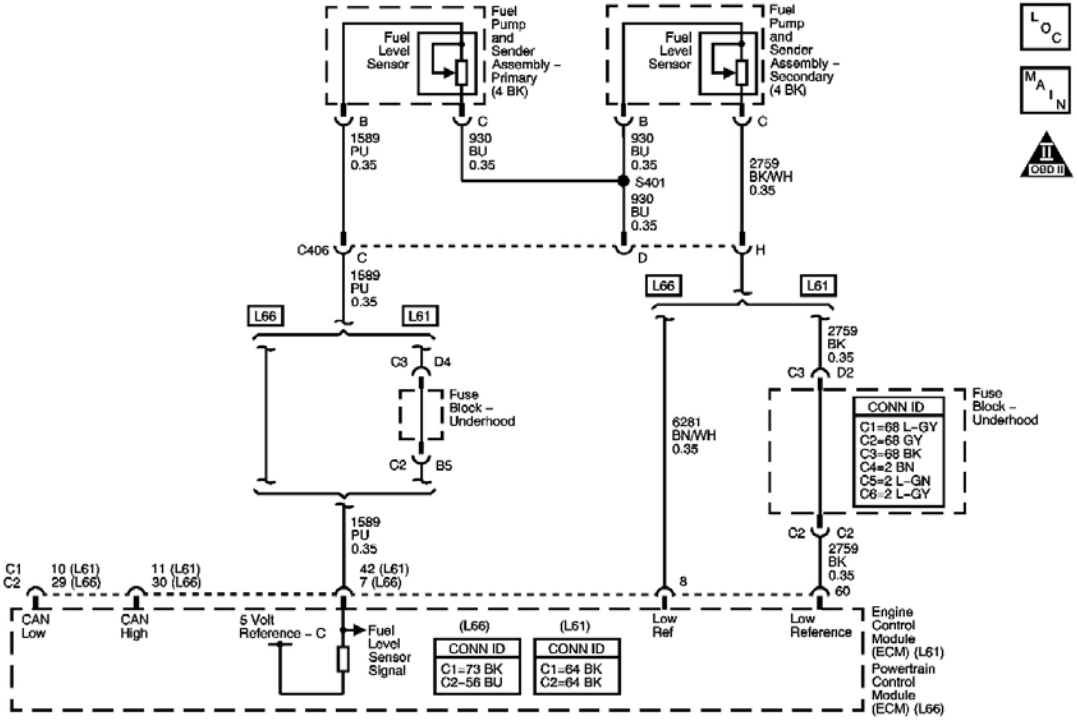


Fig. 6: DTC P0462 Circuit
Courtesy of GENERAL MOTORS CORP.

Circuit Description

The fuel level sender changes resistance based on the fuel level. The engine control module (ECM) (L61) or powertrain control module (PCM) (L66) monitors the signal circuit of the fuel level sender in order to determine fuel level. When the fuel tank is full, the sender resistance is high and the ECM/PCM senses a high signal voltage. When the fuel tank is empty, the sender resistance is low and the ECM/PCM senses a low signal voltage. The ECM/PCM uses the signal circuit of the fuel level sender in order to calculate the total remaining fuel percent in the tank. The ECM/PCM sends the fuel level message via the CAN serial data circuit to the BCM. The BCM sends the fuel level percent to the IPC via the class 2 data circuit to display on the fuel gage. The fuel level information is also used for misfire and EVAP diagnostics.

This diagnostic tests for a lower than normal fuel level sender signal.

Conditions for Running the DTC

The ignition is ON, with the engine ON.

Conditions for Setting the DTC

- The fuel level signal is less than 3.5 percent.
- The above condition is present for greater than 20 seconds.

Action Taken When the DTC Sets

- The fuel gage defaults to empty.
- The ECM/PCM records the operating conditions at the time the diagnostic fails. The ECM/PCM displays the failure information in the Failure Records on the scan tool.

Conditions for Clearing the DTC

- The DTC becomes history when the conditions for setting the DTC are no longer present.
- The history DTC clears after 40 malfunction free warm-up cycles.
- The ECM/PCM receives the clear code command from the scan tool.

Diagnostic Aids

Use the Freeze Frame and/or Failure Records data in order to locate an intermittent condition. If you cannot duplicate the DTC, the information included in the Freeze Frame and/or Failure Records data may aid in determining the number of miles since the DTC set. The Fail Counter and Pass Counter can also aid in determining the number of ignition cycles that the diagnostic reported a pass and/or fail. Operate the vehicle within the same freeze frame conditions, i.e. RPM, engine load, vehicle speed, temperature, etc. This will isolate when the DTC failed.

Refer to **Testing for Intermittent Conditions and Poor Connections** in Wiring Systems.

Test Description

The number below refers to the step number on the diagnostic table.

3: Tests for the proper operation of the circuit in the high voltage range.

DTC P0462 Circuit

Step	Action	Value (s)	Yes	No
Schematic Reference:Instrument Cluster Schematics				
1	Did you perform the Instrument Cluster Diagnostic System Check?	-	Go to **Step 2**	Go to **Diagnostic System Check - Instrument Cluster**
	1. Install a scan tool. 2. Turn ON the ignition, with the engine OFF.			

2	3. With a scan tool, observe the Fuel Level parameter in the Powertrain Fuel and Emissions list. Does the scan tool indicate that the Fuel Level parameter is less than the specified value?	2 Gallons	Go to **Step 3**	Go to Diagnostic Aids
3	1. Turn OFF the ignition. 2. Disconnect C406. 3. Turn ON the ignition, with the engine OFF. 4. With a scan tool, observe the Fuel Level parameter. Does the scan tool indicate that the Fuel Level parameter is greater than the specified value?	12 Gallons	Go to **Step 5**	Go to **Step 4**
4	Test the signal circuit of the fuel level sender for a short to ground between C406 and the ECM/PCM. Refer to **Circuit Testing** and to **Wiring Repairs** in Wiring Systems. Did you find and correct the condition?	-	Go to **Step 10**	Go to **Step 7**
5	Test the signal circuit of the fuel level sender for a short to ground between C406 and the fuel level sender. Refer to **Circuit Testing** and to **Wiring Repairs** in Wiring Systems. Did you find and correct the condition?	-	Go to **Step 10**	Go to **Step 6**
6	Inspect for poor connections at the harness connector of the fuel level senders. Refer to **Testing for Intermittent Conditions and Poor Connections** and to **Connector Repairs** in Wiring Systems. Did you find and correct the condition?	-	Go to **Step 10**	Go to **Step 8**
7	Inspect for poor connections at the harness connector of the ECM/PCM. Refer to **Testing for Intermittent Conditions and Poor Connections** and to **Connector Repairs** in Wiring Systems. Did you find and correct the condition?	-	Go to **Step 10**	Go to **Step 9**
8	Replace the malfunctioning fuel level sender that is internally shorted to ground. Refer to **Fuel Level Sensor Replacement (Primary)** or **Fuel Level Sensor Replacement (Secondary)** in Engine Controls. Did you complete the replacement?	-	Go to **Step 10**	-
9	**IMPORTANT:** **Program the replacement ECM/PCM.** Replace the ECM/PCM. Refer to **Powertrain Control Module (PCM) Replacement** in Engine Controls - 3.5L or to **Engine Control Module (ECM) Replacement** in Engine Controls - 2.2L.Did you complete the replacement?	-	Go to **Step 10**	-
	1. Use the scan tool in order to clear the DTCs.			

10	2. Operate the vehicle within the Conditions for Running the DTC as specified in the supporting text. Does the DTC reset?	-	Go to **Step 2**	System OK

DTC P0463

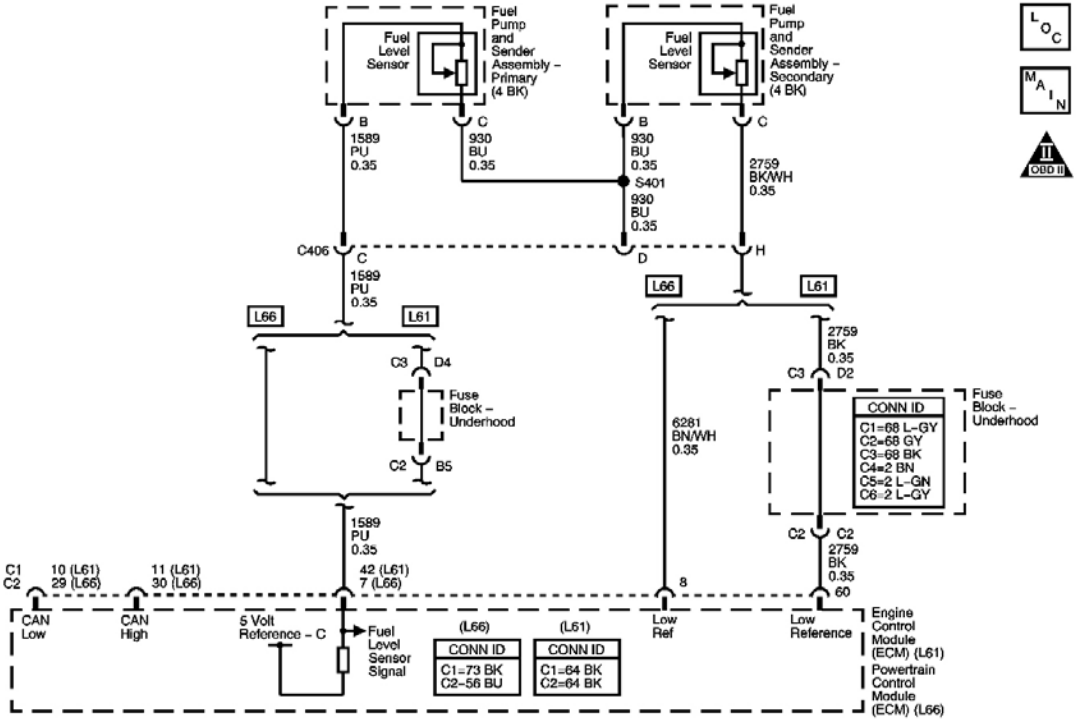


Fig. 7: DTC P0463 Circuit
Courtesy of GENERAL MOTORS CORP.

Circuit Description

The fuel level sender changes resistance based on the fuel level. The engine control module (ECM) (L61) or powertrain control module (PCM) (L66) monitors the signal circuit of the fuel level sender in order to determine fuel level. When the fuel tank is full, the sender resistance is high and the ECM/PCM senses a high signal voltage. When the fuel tank is empty, the sender resistance is low and the ECM/PCM senses a low signal voltage. The ECM/PCM uses the signal circuit of the fuel level sender in order to calculate the total remaining fuel percent in the tank. The ECM/PCM sends the fuel level message via the CAN serial data circuit to the BCM. The BCM sends the fuel level percent to the IPC via the class 2 data circuit to display on the fuel gage. The fuel level information is also used for misfire and EVAP diagnostics.

This diagnostic tests for a higher than normal fuel level sender signal.

Conditions for Running the DTC

The ignition is ON, with the engine ON.

Conditions for Setting the DTC

- The fuel level signal is greater than 98 percent.
- The above condition is present for greater than 20 seconds.

Action Taken When the DTC Sets

- The fuel gage defaults to empty.
- The ECM/PCM records the operating conditions at the time the diagnostic fails. The ECM/PCM displays the failure information in the Failure Records on the scan tool.

Conditions for Clearing the DTC

- The DTC becomes history when the conditions for setting the DTC are no longer present.
- The history DTC clears after 40 malfunction free warm-up cycles.
- The ECM/PCM receives the clear code command from the scan tool.

Diagnostic Aids

Use the Freeze Frame and/or Failure Records data in order to locate an intermittent condition. If you cannot duplicate the DTC, the information included in the Freeze Frame and/or Failure Records data may aid in determining the number of miles since the DTC set. The Fail Counter and Pass Counter can also aid in determining the number of ignition cycles that the diagnostic reported a pass and/or fail. Operate the vehicle within the same freeze frame conditions, i.e. RPM, engine load, vehicle speed, temperature, etc. This will isolate when the DTC failed.

Refer to **Testing for Intermittent Conditions and Poor Connections** in Wiring Systems.

Test Description

The number below refers to the step number on the diagnostic table.

3: Tests for the proper operation of the circuit in the low voltage range. If the fuse in the jumper opens when you perform this test, the signal circuit is shorted to voltage.

DTC P0463 Circuit

Step	Action	Value (s)	Yes	No
Schematic Reference: Instrument Cluster Schematics				
1	Did you perform the Instrument Cluster Diagnostic System Check?	-	Go to **Step**	Go to **Diagnostic System Check - Instrument**

			2	**Cluster**
2	1. Install a scan tool. 2. Turn ON the ignition, with the engine OFF. 3. With a scan tool, observe the Fuel Level parameter in the Powertrain Fuel and Emissions list. Does the scan tool indicate that the Fuel Level parameter is greater than the specified value?	12 Gallons	Go to **Step 3**	Go to Diagnostic Aids
3	1. Turn OFF the ignition. 2. Disconnect C406. 3. Connect a 3-amp fused jumper wire between the signal circuit of the fuel level sender and the low reference circuit of the fuel level sender on the female terminal side. 4. Turn ON the ignition, with the engine OFF. 5. With a scan tool, observe the Fuel Level parameter. Does the scan tool indicate that the Fuel Level parameter is less than the specified value?	2 Gallons	Go to **Step 5**	Go to **Step 4**
4	Test the signal circuit of the fuel level sender and the low reference circuit of the fuel level sender between C406 and the ECM/PCM for an open, for a high resistance, or for a short to voltage. Refer to **Circuit Testing** and to **Wiring Repairs** in Wiring Systems. Did you find and correct the condition?	-	Go to **Step 10**	Go to **Step 7**
5	Test the signal circuit of the fuel level senders and the low reference circuit of the fuel level senders between C406 and the fuel level senders for an open, for a high resistance, or for a short to voltage. Refer to **Circuit Testing** and to **Wiring Repairs** in Wiring Systems. Did you find and correct the condition?	-	Go to **Step 10**	Go to **Step 6**
6	Inspect for poor connections at the harness connector of the fuel level senders. Refer to **Testing for Intermittent Conditions and Poor Connections** and to **Connector Repairs** in Wiring Systems. Did you find and correct the condition?	-	Go to **Step 10**	Go to **Step 8**
7	Inspect for poor connections at the harness connector of the ECM/PCM. Refer to **Testing for Intermittent Conditions and Poor Connections** and to **Connector Repairs** in Wiring Systems. Did you find and correct the condition?	-	Go to **Step 10**	Go to **Step 9**
8	Replace the fuel level sender that internally has an open, an abnormally high resistance, or a short to voltage. Refer to **Fuel Level Sensor Replacement (Primary)** or **Fuel Level**	-	Go to	

	Sensor Replacement (Secondary) in Engine Controls. Did you complete the replacement?		**Step 10**	-
9	**IMPORTANT:** **Program the replacement ECM/PCM.** Replace the ECM/PCM. Refer to **Powertrain Control Module (PCM) Replacement** in Engine Controls - 3.5L or to **Engine Control Module (ECM) Replacement** in Engine Controls - 2.2L.Did you complete the replacement?	-	Go to **Step 10**	-
10	1. Use the scan tool in order to clear the DTCs. 2. Operate the vehicle within the Conditions for Running the DTC as specified in the supporting text. Does the DTC reset?	-	Go to **Step 2**	System OK

DTC P0520

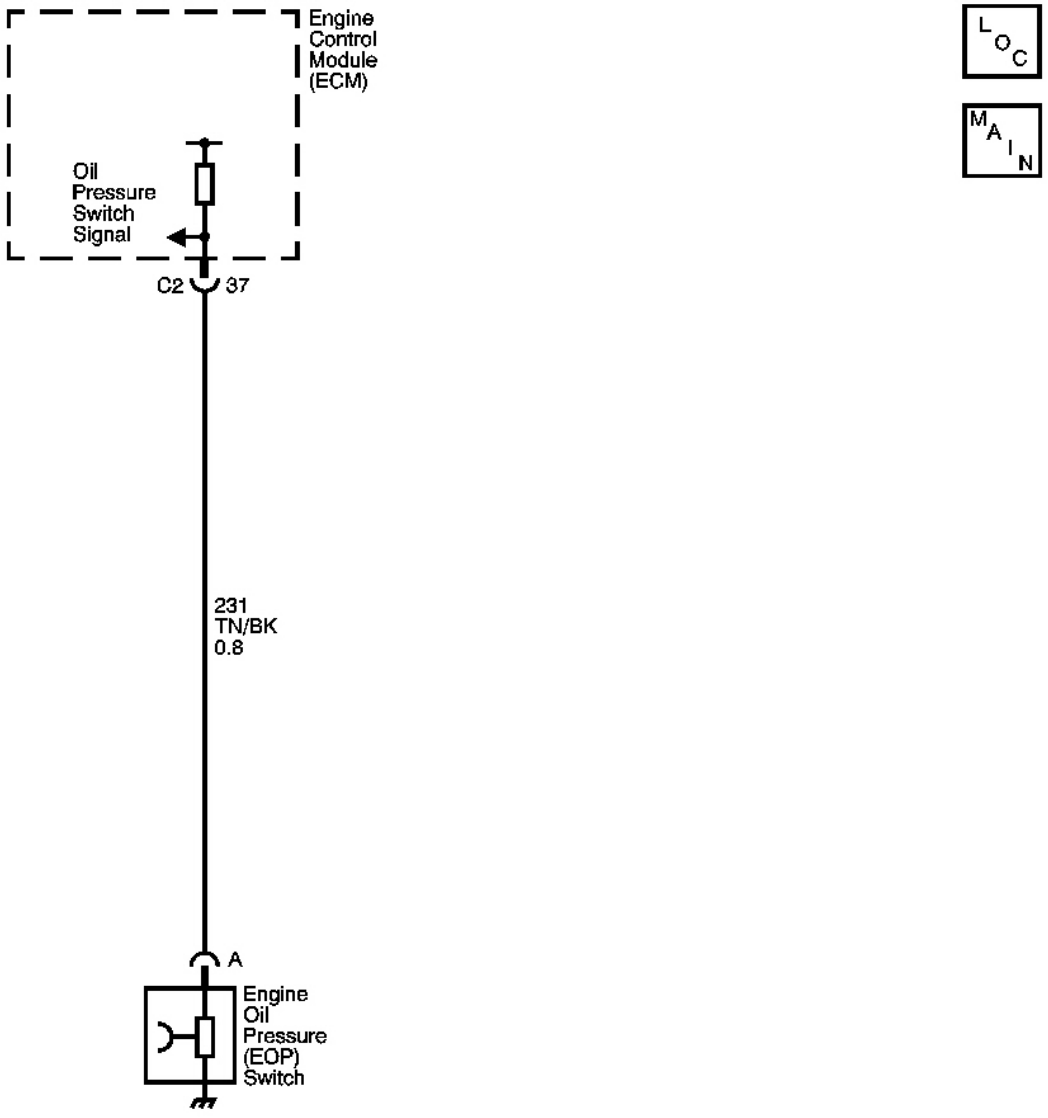


Fig. 8: DTC P0520 Circuit
Courtesy of GENERAL MOTORS CORP.

Circuit Description

The engine control module (ECM) monitors the signal circuit of the engine oil pressure (EOP) sensor. When the oil pressure is high, the sensor is open, and the ECM senses a high signal voltage. When the oil pressure is low, the sensor is closed, and the ECM senses a low signal voltage.

Conditions for Running the DTC

The ignition is ON, with the engine ON.

Conditions for Setting the DTC

- The PCM detects that the EOP sensor signal circuit is pulled low.
- The above condition is present for greater than 5 seconds.

Action Taken When the DTC Sets

- The PCM records the operating conditions at the time the diagnostic test fails. The PCM displays this information in the Failure Records on the scan tool.
- The instrument panel cluster (IPC) illuminates the engine oil pressure indicator.
- The Service Vehicle Soon (SVS) light may be illuminated.

Conditions for Clearing the DTC

- The DTC becomes history when the conditions for setting the DTC are no longer present.
- The history DTC clears after 40 malfunction free warm-up cycles.
- The PCM receives a clear code command from the scan tool.

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.

Refer to **Testing for Intermittent Conditions and Poor Connections** in Wiring Systems.

DTC P0520 Circuit

Step	Action	Yes	No
Schematic Reference: Instrument Cluster Schematics			
1	Did you perform the Instrument Cluster Diagnostic System Check?	Go to **Step 2**	Go to **Diagnostic System Check - Instrument Cluster**
2	1. Disconnect the engine oil pressure switch. 2. Connect a test lamp from battery positive voltage to the engine oil pressure (EOP) switch terminal. 3. Start the engine. 4. Observe the test light. Does the test light illuminate?	Go to **Step 4**	Go to **Step 3**
3	Test the signal circuit of the oil pressure switch for a short to ground. Refer to **Circuit Testing** and to **Wiring Repairs** in Wiring Systems.	Go to	

	Did you find and correct the condition?	**Step 9**	Go to **Step 5**
4	Inspect for poor connections at the harness connector of the engine oil pressure switch. Refer to **Testing for Intermittent Conditions and Poor Connections** and to **Connector Repairs** in Wiring Systems. Did you find and correct the condition?	Go to **Step 9**	Go to **Step 6**
5	Inspect for poor connections at the harness connector of the engine control module (ECM). Refer to **Testing for Intermittent Conditions and Poor Connections** and to **Connector Repairs** in Wiring Systems. Did you find and correct the condition?	Go to **Step 9**	Go to **Step 7**
6	Replace the engine oil pressure switch. Refer to Engine Oil Pressure Switch Replacement in Engine Mechanical - 3.5L. Did you complete the replacement?	Go to **Step 9**	-
7	**IMPORTANT:** **Program the replacement PCM.** Replace the PCM. Refer to **Powertrain Control Module (PCM) Replacement** in Engine Controls - 3.5L.Did you complete the replacement?	Go to **Step 9**	-
8	Replace the instrument panel cluster (IPC). Refer to **Instrument Panel Cluster (IPC) Replacement** . Did you complete the replacement?	Go to **Step 9**	-
9	Operate the system in order to verify the repair. Did you correct the condition?	System OK	Go to **Step 2**

SYMPTOMS - INSTRUMENT PANEL, GAGES AND CONSOLE

IMPORTANT: The following steps must be completed before using the symptom tables.

1. Perform **Diagnostic System Check - Instrument Cluster** or **Diagnostic System Check - Audible Warnings** before using the Symptom Tables in order to verify that all of the following are true:
   - There are no DTCs set.
   - The control modules can communicate via the serial data link.
2. Review the system operation in order to familiarize yourself with the system functions. Refer to the following:
   - **Instrument Panel Cluster (IPC) Description and Operation**
   - **Indicator/Warning Message Description and Operation**
   - **Audible Warnings Description and Operation**

Visual/Physical Inspection

- Inspect for aftermarket devices which could affect the operation of the instrument panel cluster or audible warnings system. Refer to **Checking Aftermarket Accessories** in Wiring Systems.

- Inspect the easily accessible or visible system components for obvious damage or conditions which could cause the symptom.
- Inspect for the proper fluid levels.

Intermittent

Faulty electrical connections or wiring may be the cause of intermittent conditions. Refer to **Testing for Intermittent Conditions and Poor Connections** in Wiring Systems.

Symptom List

Refer to a symptom diagnostic procedure from the following list in order to diagnose the symptom:

Gages and Odometer

- **Engine Coolant Temperature Gage Inaccurate or Inoperative**
- **Fuel Gage Inaccurate or Inoperative**
- **Odometer Trip/Reset Switch Inoperative**
- **Speedometer and/or Odometer Inaccurate or Inoperative**
- **Tachometer Inaccurate or Inoperative**

Indicators

- **ABS Active Indicator Always On** in Anti-Lock Brake System
- **ABS Active Indicator Inoperative** in Anti-Lock Brake System
- **Air Bag Indicator Circuit Malfunction** in SIR
- **Brake Warning Indicator Always On** in Hydraulic Brakes
- **Brake Warning Indicator Inoperative** in Hydraulic Brakes
- **Charge Indicator Always On** in Engine Electrical
- **Charge Indicator Inoperative** in Engine Electrical
- **High Beam Indicator Inoperative** in Lighting Systems
- **Low Engine Coolant Indicator Always On** in Engine Cooling
- **Malfunction Indicator Lamp (MIL) Always On** in Engine Controls
- **Malfunction Indicator Lamp (MIL) Inoperative** in Engine Controls
- **Seat Belt Indicator Circuit Malfunction** in Seat Belts
- **Traction Control Indicator Always On (L61 Engine W/NW7 Only)** in Antilock Brake System
- **Traction Control Indicator Inoperative (L61 Engine W/NW7 Only)** in Antilock Brake System
- **Turn Signal Lamps and/or Indicators Inoperative** in Lighting Systems

Audible Warnings

- **Chime Always On**

- **Chime Inoperative**

ENGINE COOLANT TEMPERATURE GAGE INACCURATE OR INOPERATIVE

Engine Coolant Temperature Gage Inaccurate or Inoperative

Step	Action	Yes	No
Schematic Reference:Instrument Cluster Schematics			
1	Did you perform the Instrument Cluster Diagnostic System Check?	Go to **Step 2**	Go to **Diagnostic System Check - Instrument Cluster**
2	1. Install a scan tool. 2. Turn the ignition ON, with the engine OFF. 3. With the scan tool, perform the Lamp and Gauge Check in the IPC Special Functions list. Does the engine coolant temperature gage move up and down when commanded?	Go to **Testing for Intermittent Conditions and Poor Connections** in Wiring Systems	Go to **Step 3**
3	Replace the IPC. Refer to **Instrument Panel Cluster (IPC) Replacement** . Did you complete the replacement?	Go to **Step 4**	-
4	Operate the system in order to verify the repair. Did you correct the condition?	System OK	Go to **Step 2**

FUEL GAGE INACCURATE OR INOPERATIVE

Diagnostic Aids

- Ensure that the fuel level is in the same range as the customer concern.
- For intermittent diagnosis, refer to **Testing for Intermittent Conditions and Poor Connections** in Wiring Systems.
- Refer to **Fuel Level Specifications** in order to verify the correct fuel level sensor readings. The Fuel Level parameter is available on the scan tool in the Powertrain Fuel and Emissions data list. The Fuel Gage Position parameter is available in the Body Control Module Accessory data list.

Test Description

The numbers below refer to the step number on the diagnostic table.

3: This step tests for a high resistance in the signal circuit and the low reference circuit of the fuel level sensor.

15: DTCs will be set in the ECM/PCM when you perform this diagnostic table.

Fuel Gage Inaccurate or Inoperative

Step	Action	Value (s)	Yes	No
Schematic Reference:Instrument Cluster Schematics				
1	Did you perform the Instrument Cluster Diagnostic System Check?	-	Go to **Step 2**	Go to **Diagnostic System Check - Instrument Cluster**
2	1. Disconnect C406. 2. Connect the J 33431-C Signal Generator and Instrument Panel Tester between the signal circuit of the fuel level sensor and the low reference circuit of the fuel level sensor on the male terminal side. 3. Turn ON the ignition, with the engine OFF. **IMPORTANT:** **Verify the J 33431-C resistance settings with a DMM.** 4. Vary the resistance on the J 33431-C from 40-250 ohm. 5. Refer to **Fuel Level Specifications** in order to convert from resistance to fuel gage display. Does the fuel gage display the correct fuel level?	-	Go to **Step 4**	Go to **Step 3**
3	1. Install a scan tool. 2. Turn ON the ignition, with the engine OFF. **IMPORTANT:** **Verify the J 33431-C resistance settings with a DMM.** 3. Vary the resistance on the J 33431-C from 40-250 ohm. 4. Refer to **Fuel Level Specifications** in order to convert from resistance to fuel level percent. **IMPORTANT:** **Turn OFF the ignition momentarily between the resistance settings in order to quickly update the scan tool display.**	-		

	5. With the scan tool, observe the Fuel Level parameter in the Powertrain Fuel and Emissions data list. Does the Fuel Level parameter display the correct fuel level amount?		Go to **Step 9**	Go to **Step 5**
4	Inspect for the following items: • A poor connection at the harness connector of the fuel level sensors Refer to **Testing for Intermittent Conditions and Poor Connections** and to **Connector Repairs** in Wiring Systems. • A high resistance in the signal circuit or the low reference circuit between the fuel level sensor and C406 • A misaligned fuel level sender • A deformed fuel tank Did you find and correct the condition?	-	Go to **Step 15**	Go to **Step 7**
5	Test the signal circuit of the fuel level sensor for a high resistance. Refer to **Circuit Testing** and to **Wiring Repairs** in Wiring Systems. Did you find and correct the condition?	-	Go to **Step 15**	Go to **Step 6**
6	Test the low reference circuit of the fuel level sensor for a high resistance. Refer to **Circuit Testing** and to **Wiring Repairs** in Wiring Systems. Did you find and correct the condition?	-	Go to **Step 15**	Go to **Step 10**
7	1. Remove the fuel level senders. 2. Inspect for the following items: • A stuck fuel level sensor, i.e. the fuel strainer interfering with the sender float arm. • Foreign material in the fuel tank, i.e. ice. Did you find and correct the condition?	-	Go to **Step 15**	Go to **Step 8**
8	1. With the **J 39200** DMM, measure the resistance of both fuel level sensors while moving the float arm. 2. Observe both the analog and digital displays on the DMM. Does the resistance change smoothly across the specified	20-125 ohm	Go to Diagnostic	

	range on both fuel level sensors?		Aids	Go to **Step 11**
9	1. Turn the ignition ON, with the engine OFF. **IMPORTANT:** **Verify the J 33431-C resistance settings with a DMM.** 2. Vary the resistance on the J 33431-C from 40-250 ohm. 3. Refer to **Fuel Level Specifications** in order to convert from resistance to fuel level percent. **IMPORTANT:** **Turn the ignition OFF momentarily between the resistance settings in order to quickly update the scan tool display.** 4. With the scan tool, observe the Fuel Gage Position parameter in the Body Control Module Accessory data list and the Fuel Level parameter in the Powertrain Fuel and Emissions data list. Does the Fuel Gage Position parameter match the Fuel Level parameter?	-	Go to **Step 12**	Go to **Step 14**
10	Inspect for poor connections at the harness connector of the ECM/PCM. Refer to **Testing for Intermittent Conditions and Poor Connections** and to **Connector Repairs** in Wiring Systems. Did you find and correct the condition?	-	Go to **Step 15**	Go to **Step 13**
11	Replace the fuel level sensor with the abnormally high resistance. Refer to **Fuel Level Sensor Replacement (Primary)** or **Fuel Level Sensor Replacement (Secondary)** in Engine Controls - 2.2L or to **Fuel Level Sensor Replacement - Primary** or to **Fuel Level Sensor Replacement - Secondary** in Engine Controls - 3.5L. Did you complete the replacement?	-	Go to **Step 15**	-
12	Replace the IPC. Refer to **Instrument Panel Cluster (IPC) Replacement** . Did you complete the replacement?	-	Go to **Step 15**	-
13	Replace the ECM/PCM. Refer to **Engine Control Module (ECM) Replacement** in Engine Controls - 2.2L or to **Powertrain Control Module (PCM) Replacement** in Engine Controls - 3.5L. Did you complete the replacement?	-	Go to **Step 15**	-
	IMPORTANT:			

14	**Program the replacement BCM.** Replace the BCM. Refer to **Body Control Module Replacement** in Body Control System.Did you complete the replacement?	-	Go to **Step 15**	-
15	1. Use the scan tool in order to clear the ECM DTCs. 2. Operate the system in order to verify the repair. Did you correct the condition?	-	System OK	Go to **Step 2**

ODOMETER TRIP/RESET SWITCH INOPERATIVE

Odometer Trip/Reset Switch Inoperative

Step	Action	Yes	No
Schematic Reference:Instrument Cluster Schematics			
1	Did you perform the IPC Diagnostic System Check?	Go to **Step 2**	Go to **Diagnostic System Check - Instrument Cluster**
2	1. Turn the ignition ON, with the engine OFF. 2. Press the trip reset switch. Does the odometer toggle between trip and season?	Go to **Testing for Intermittent Conditions and Poor Connections**	Go to **Step 3**
3	Replace the instrument panel cluster (IPC). Refer to **Instrument Panel Cluster (IPC) Replacement** . Did you complete the replacement?	Go to **Step 4**	-
4	Operate the system in order to verify the repair. Did you correct the condition?	System OK	Go to **Step 2**

SPEEDOMETER AND/OR ODOMETER INACCURATE OR INOPERATIVE

Speedometer and/or Odometer Inaccurate or Inoperative

Step	Action	Yes	No
Schematic Reference:Instrument Cluster Schematics			
1	Did you perform the Instrument Cluster Diagnostic System Check?	Go to **Step 2**	Go to **Diagnostic System Check - Instrument Cluster**
	1. Install a scan tool. 2. Raise the vehicle's drive wheels. Refer to **Lifting and Jacking the**		

2	**Vehicle** in General Information. 3. Start the engine. 4. Place the transmission into drive for an automatic transmission or third gear for a manual transmission. 5. With the scan tool, observe the Vehicle Speed parameter in the Powertrain Ignition data list. Does the Vehicle Speed parameter match the speedometer display?	Go to **Step 3**	Go to **Step 4**
3	Does the odometer operate properly?	Go to **Testing for Intermittent Conditions and Poor Connections** in Wiring Systems	Go to **Step 4**
4	Replace the IPC. Refer to **Instrument Panel Cluster (IPC) Replacement** . Did you complete the replacement?	Go to **Step 5**	-
5	Operate the system in order to verify the repair. Did you correct the condition?	System OK	Go to **Step 2**

TACHOMETER INACCURATE OR INOPERATIVE

Tachometer Inaccurate or Inoperative

Step	Action	Yes	No
Schematic Reference:Instrument Cluster Schematics			
1	Did you perform the Instrument Cluster Diagnostic System Check?	Go to **Step 2**	Go to **Diagnostic System Check - Instrument Cluster**
2	1. Install a scan tool. 2. Start the engine. 3. With the scan tool, observe the Engine Speed parameter in the Powertrain Ignition data list. Does the Engine Speed parameter match the tachometer display?	Go to **Testing for Intermittent Conditions and Poor Connections** in Wiring Systems	Go to **Step 3**
3	Replace the IPC. Refer to **Instrument Panel Cluster (IPC) Replacement** . Did you complete the replacement?	Go to **Step 4**	-
4	Operate the system in order to verify the repair. Did you correct the condition?	System OK	Go to **Step 2**

ENGINE OIL PRESSURE INDICATOR ALWAYS ON

Engine Oil Pressure Indicator Always On

Step	Action	Yes	No
Schematic Reference:Instrument Cluster Schematics			
1	Did you perform the Instrument Cluster Diagnostic System Check?	Go to **Step 2**	Go to **Diagnostic System Check - Instrument Cluster**
2	Start the engine. Does the engine oil pressure indicator illuminate after the displays test?	Go to **Step 3**	Go to **Testing for Intermittent Conditions and Poor Connections** in Wiring Systems
3	1. Install a scan tool. 2. With a scan tool, observe the Low Oil Pressure parameter in the Powertrain General Info - Inputs list. Does the Low Oil Pressure parameter display No?	Go to **Step 10**	Go to **Step 4**
4	1. Turn OFF the ignition. 2. Disconnect the engine oil pressure switch. 3. Start the engine. 4. With the scan tool, observe the Low Oil Pressure parameter. Does the Low Oil Pressure parameter display Yes?	Go to **Step 6**	Go to **Step 5**
5	Test the signal circuit of the oil pressure switch signal for a short to ground. Refer to **Circuit Testing** and to **Wiring Repairs** in Wiring Systems. Did you find and correct the condition?	Go to **Step 11**	Go to **Step 7**
6	Inspect for poor connections at the harness connector of the engine oil pressure switch. Refer to **Testing for Intermittent Conditions and Poor Connections** and to **Connector Repairs** in Wiring Systems. Did you find and correct the condition?	Go to **Step 11**	Go to **Step 8**
7	Inspect for poor connections at the harness connector of the ECM/PCM. Refer to **Testing for Intermittent Conditions and Poor Connections** and to **Connector Repairs** in Wiring Systems. Did you find and correct the condition?	Go to **Step 11**	Go to **Step 9**
8	Replace the engine oil pressure switch. Refer to **Engine Oil Pressure Sensor and/or Switch Replacement** in Engine Mechanical - 2.2 L or to **Engine Oil Pressure Sensor and/or Switch Replacement** in Engine Mechanical - 3.5 L. Did you complete the replacement?	Go to **Step 11**	-
	Replace the ECM/PCM. Refer to **Engine Control Module**		

9	**(ECM) Replacement** in Engine Controls - 2.2L or to **Powertrain Control Module (PCM) Replacement** in Engine Controls - 3.5L. Did you complete the replacement?	Go to **Step 11**	-
10	Replace the IPC. Refer to **Instrument Panel Cluster (IPC) Replacement** . Did you complete the replacement?	Go to **Step 11**	-
11	Operate the system in order to verify the repair. Did you correct the condition?	System OK	Go to **Step 2**

CHIME ALWAYS ON

Chime Always On

Step	Action	Yes	No
Schematic Reference:Audible Warnings Schematics			
1	Did you perform the Audible Warnings Diagnostic System Check?	Go to **Step 2**	Go to **Diagnostic System Check - Audible Warnings**
2	Are any indicators illuminated?	Go to **Symptoms - Instrument Panel, Gages and Console**	Go to **Step 3**
3	1. Turn the ignition OFF. 2. Turn the headlamp switch to OFF. 3. Remove the key from the ignition. 4. Open the driver door. Does the chime sound?	Go to **Step 4**	Go to **Testing for Intermittent Conditions and Poor Connections** in Wiring Systems
4	1. Turn the ignition OFF. 2. Disconnect the ignition switch. 3. Install a scan tool. 4. Turn the ignition ON, with the engine OFF. 5. With a scan tool, observe the Key in Ignition parameter in the Body Control Module Switch Inputs data list. Does the Key in Ignition parameter display No?	Go to **Step 6**	Go to **Step 5**
5	Test the key in ignition signal circuit for a short to ground. Refer to **Circuit Testing** and to **Wiring Repairs** in Wiring Systems. Did you find and correct the condition?	Go to **Step 8**	Go to **Step 7**
	Replace the ignition switch. Refer to		

6	**Ignition Switch Replacement** in Steering Wheel and Column. Did you complete the replacement?	Go to **Step 8**	-
7	**IMPORTANT:** **Program the replacement BCM.** Replace the BCM. Refer to **Body Control Module Replacement** in Body Control System.Did you complete the replacement?	Go to **Step 8**	-
8	Operate the system in order to verify the repair. Did you correct the condition?	System OK	Go to **Step 2**

CHIME INOPERATIVE

Chime Inoperative

Step	Action	Yes	No
Schematic Reference:Audible Warnings Schematics			
1	Did you perform the Audible Warnings Diagnostic System Check?	Go to **Step 2**	Go to **Diagnostic System Check - Audible Warnings**
2	1. Place the key in the ignition. 2. Open the driver door. Does the chime sound?	Go to **Step 3**	Go to **Step 4**
3	Do the courtesy lamps illuminate when the driver's door is opened?	Go to **Testing for Intermittent Conditions and Poor Connections** in Wiring Systems	Go to **Courtesy Lamps Inoperative** in Lighting Systems
4	1. Connect a scan tool. 2. Turn the ignition ON, with the engine OFF. 3. With the scan tool, command the chime ON. Does the chime sound?	Go to **Testing for Intermittent Conditions and Poor Connections** in Wiring Systems	Go to **Step 5**
5	**IMPORTANT:** **Program the replacement BCM.** Replace the BCM. Refer to **Body Control Module Replacement** in Body Control Systems.Did you complete the replacement?	Go to **Step 6**	-

6	Operate the system in order to verify the repair. Did you correct the condition?	System OK	Go to **Step 2**

REPAIR INSTRUCTIONS

CLOSEOUT/INSULATOR PANEL REPLACEMENT - RIGHT

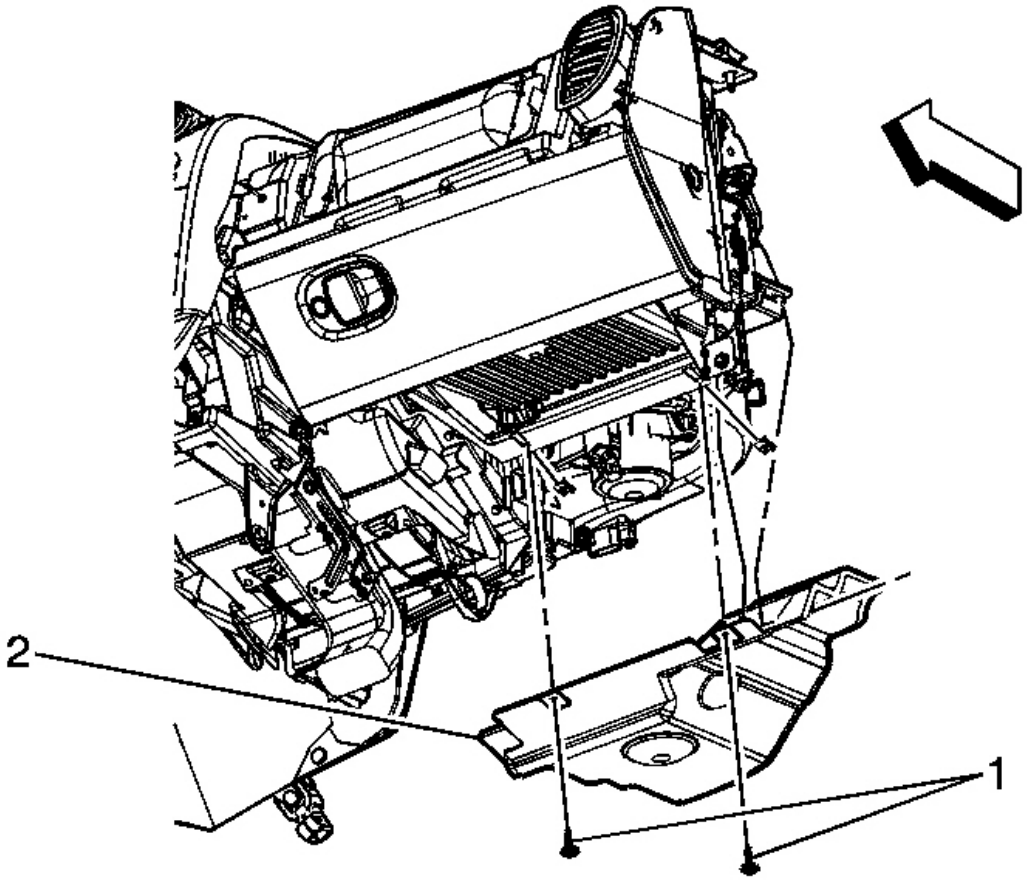


Fig. 9: View Of Right Closeout/Insulator Panel
Courtesy of GENERAL MOTORS CORP.

Closeout/Insulator Panel Replacement - Right

Callout	Component Name
NOTE: **Refer to Fastener Notice**	

Fastener Tightening Specifications: Refer to **Fastener Tightening Specifications** .	
1	Bolt, instrument panel insulator panel
3	Panel assembly, instrument panel insulator (Qty 2) **Tighten:** 2 N.m (18 lb in)

CLOSEOUT/INSULATOR PANEL REPLACEMENT - LEFT

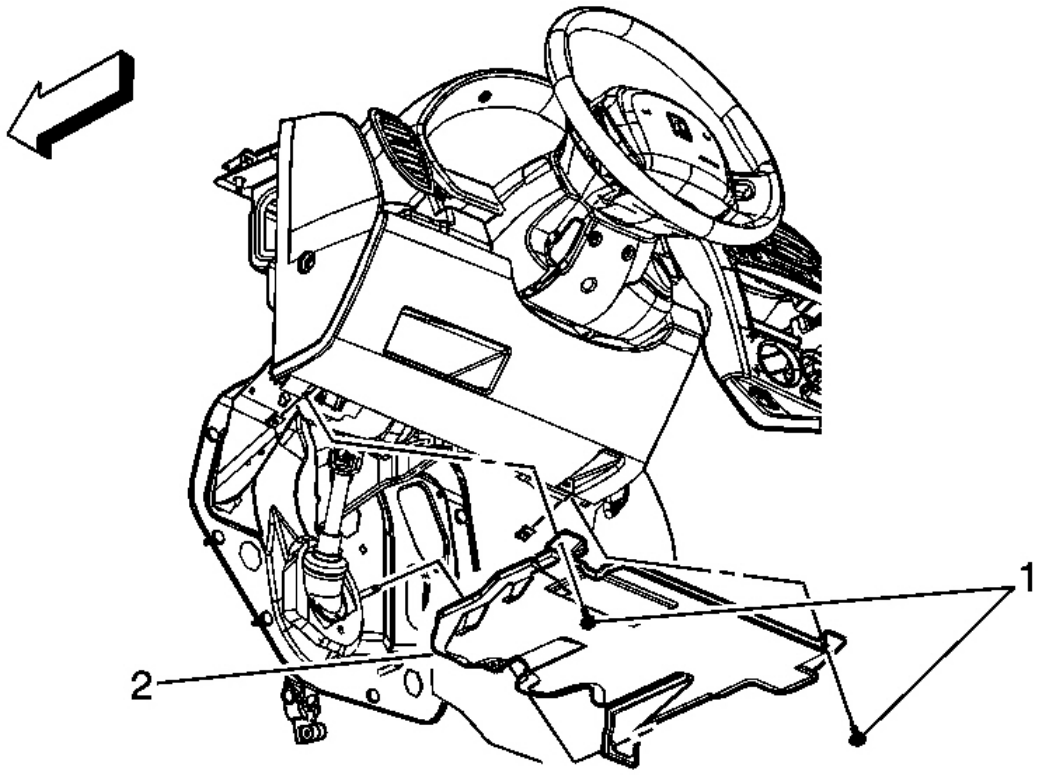


Fig. 10: View of Left Closeout/Insulator Panel
Courtesy of GENERAL MOTORS CORP.

Closeout/Insulator Panel Replacement - Left

Callout	Component Name
NOTE: **Refer to Fastener Notice** **Fastener Tightening Specifications:** Refer to **Fastener Tightening Specifications** .	

1	Bolt, instrument panel insulator panel
3	Panel assembly, instrument panel insulator (Qty 2) **Tighten:** 2 N.m (18 lb in)

TRIM PANEL REPLACEMENT - INSTRUMENT PANEL (I/P) UPPER

Removal Procedure

CAUTION: Refer to SIR Inflator Module Handling and Storage Caution in Cautions and Notices.

CAUTION: A deployed dual stage inflator module will look the same whether one or both stages were used, always assume a deployed dual stage inflator module has an active stage 2. Improper handling or servicing can activate the inflator module and cause personal injury.

CAUTION: Refer to SIR Caution in Cautions and Notices.

1. Disable the frontal SIR system. Refer to **SIR Disabling and Enabling Zone 3** and to **SIR Disabling and Enabling Zone 5** in SIR.
2. Remove the windshield garnish moldings. Refer to **Windshield Upper Garnish Molding Replacement** .

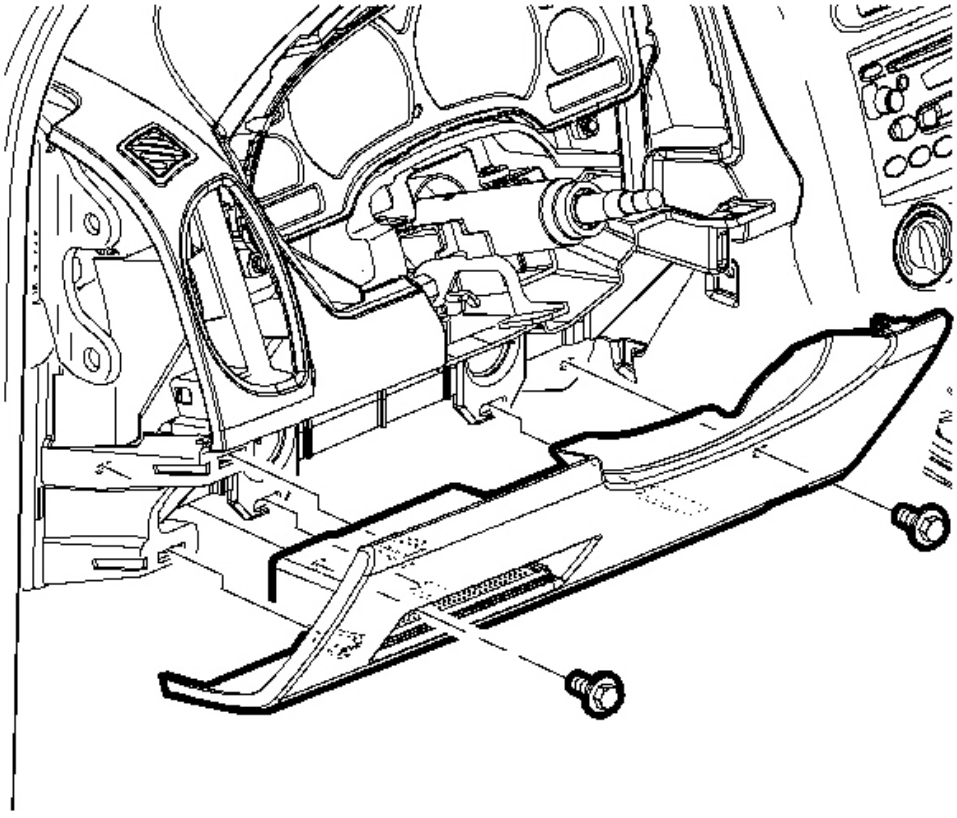


Fig. 11: Removing/Installing Screws From The Steering Column Filler Panel
Courtesy of GENERAL MOTORS CORP.

3. Remove the screws from the steering column filler panel.
4. Pull to remove the filler panel.

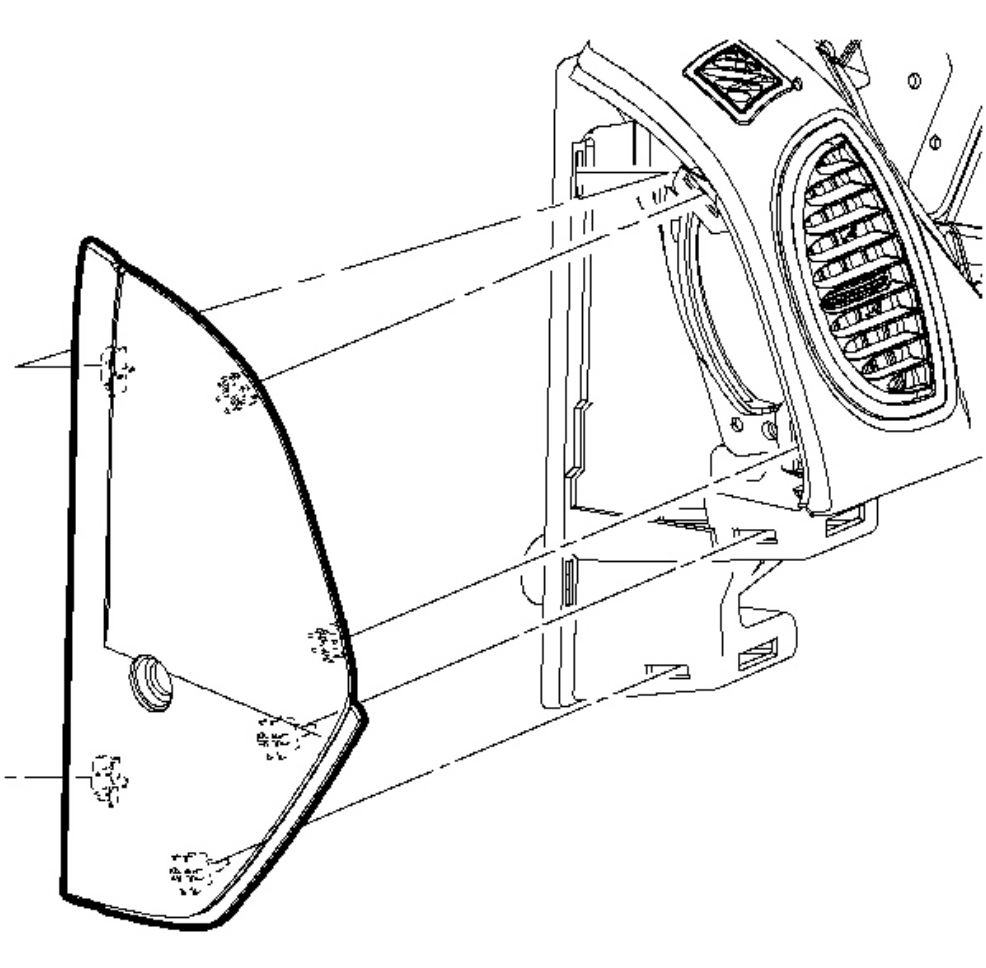


Fig. 12: Removing Left I/P Outer Trim Cover
Courtesy of GENERAL MOTORS CORP.

5. Pull to remove the left I/P outer trim cover.

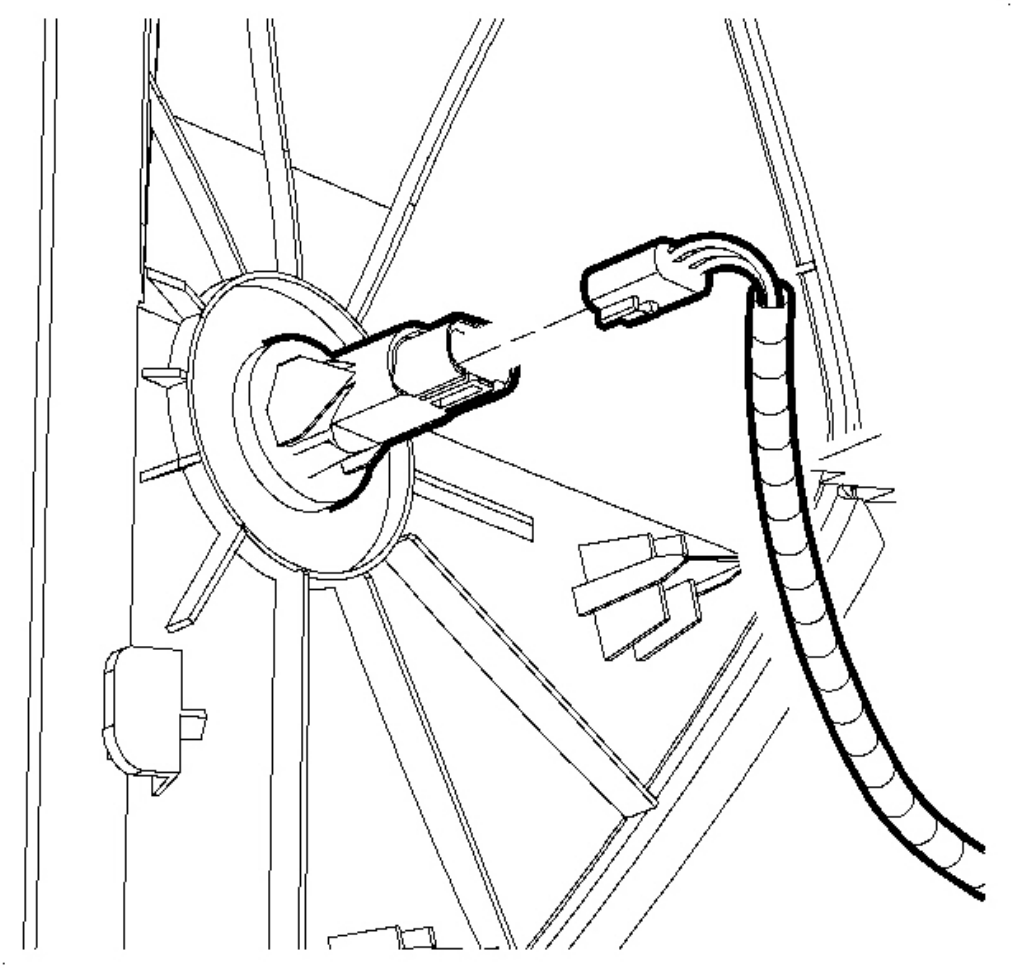


Fig. 13: Disconnecting/Connecting Electrical Connector
Courtesy of GENERAL MOTORS CORP.

6. Disconnect the doorjamb switch electrical connector.
7. Remove the right I/P outer trim cover. Refer to **Instrument Panel (I/P) Outer Trim Cover Replacement - Right** .

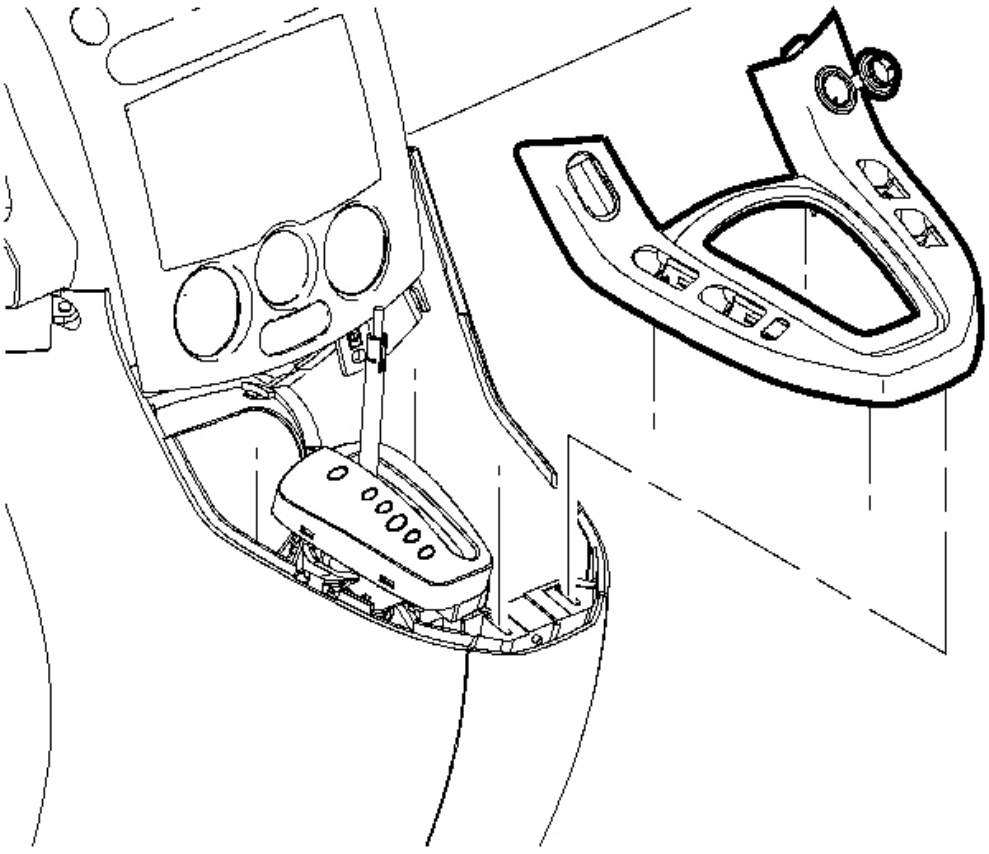


Fig. 14: Removing Shift Level Bezel From The Console
Courtesy of GENERAL MOTORS CORP.

8. Beginning at the rearward edge, pull to remove the shift lever bezel from the console.

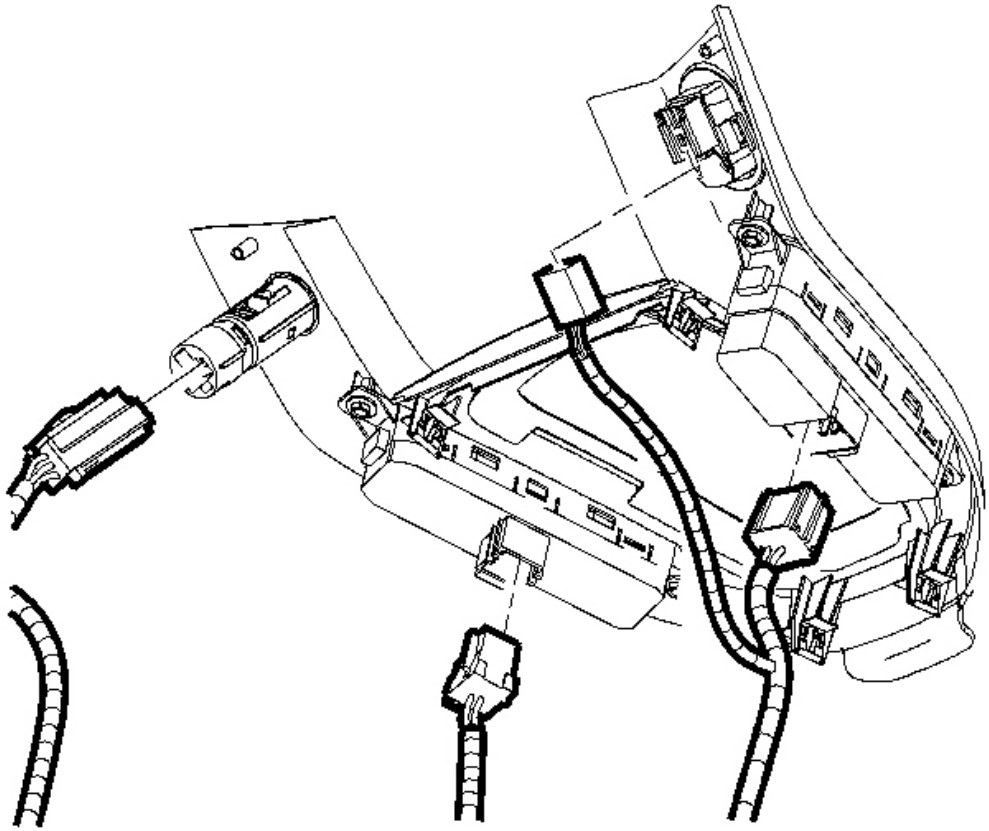


Fig. 15: Disconnecting/Connecting Electrical Connectors
Courtesy of GENERAL MOTORS CORP.

9. Disconnect the bezel electrical connectors.

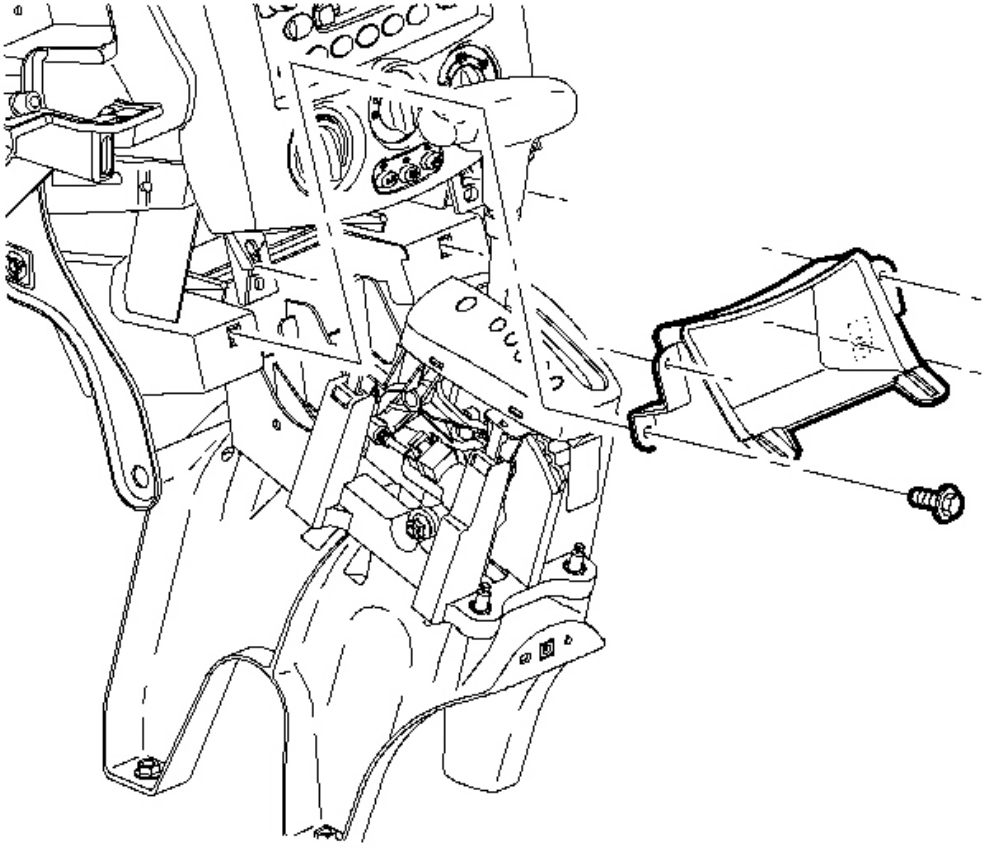


Fig. 16: Removing/Installing Center Storage Compartment Screws
Courtesy of GENERAL MOTORS CORP.

10. Remove the center storage compartment screws.
11. Remove the storage compartment.
12. Remove the center trim bezel. Refer to **Trim Bezel Replacement - Center** .

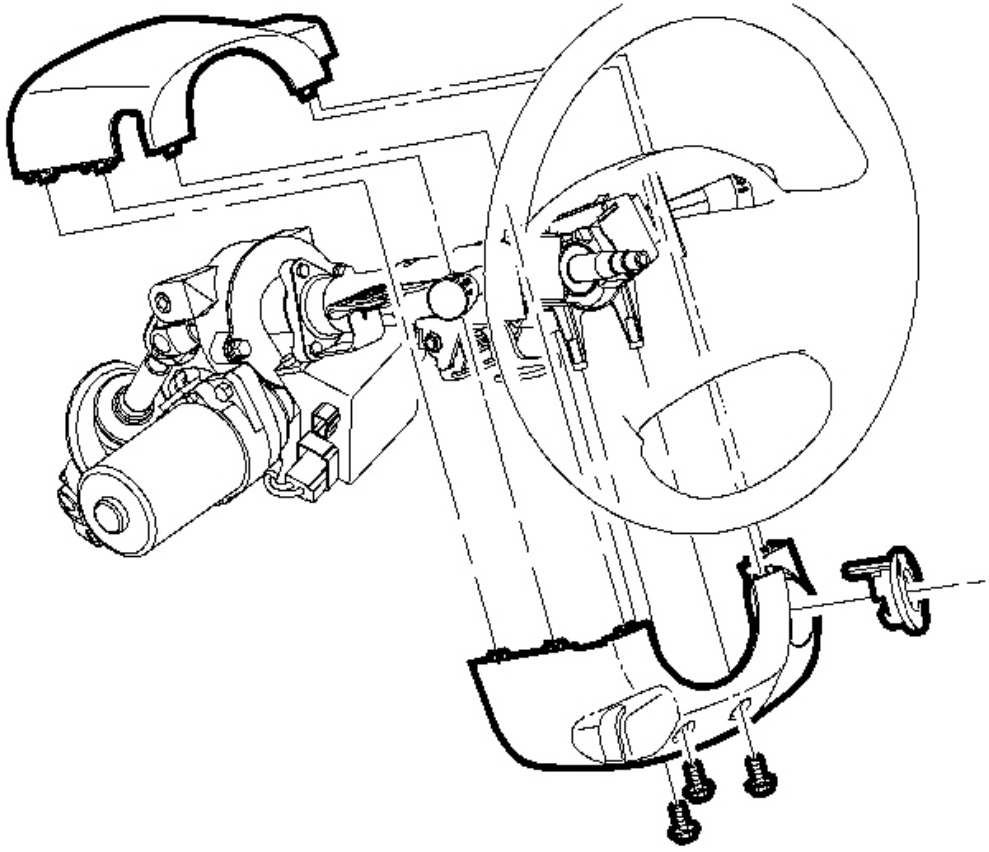


Fig. 17: Removing/Installing Screws From The Steering Column Shroud
Courtesy of GENERAL MOTORS CORP.

13. Using a small, flat-bladed tool, pry off the ignition bezel.
14. Remove the screws from the steering column shroud.
15. Remove the upper shroud.
16. Remove the lower shroud.

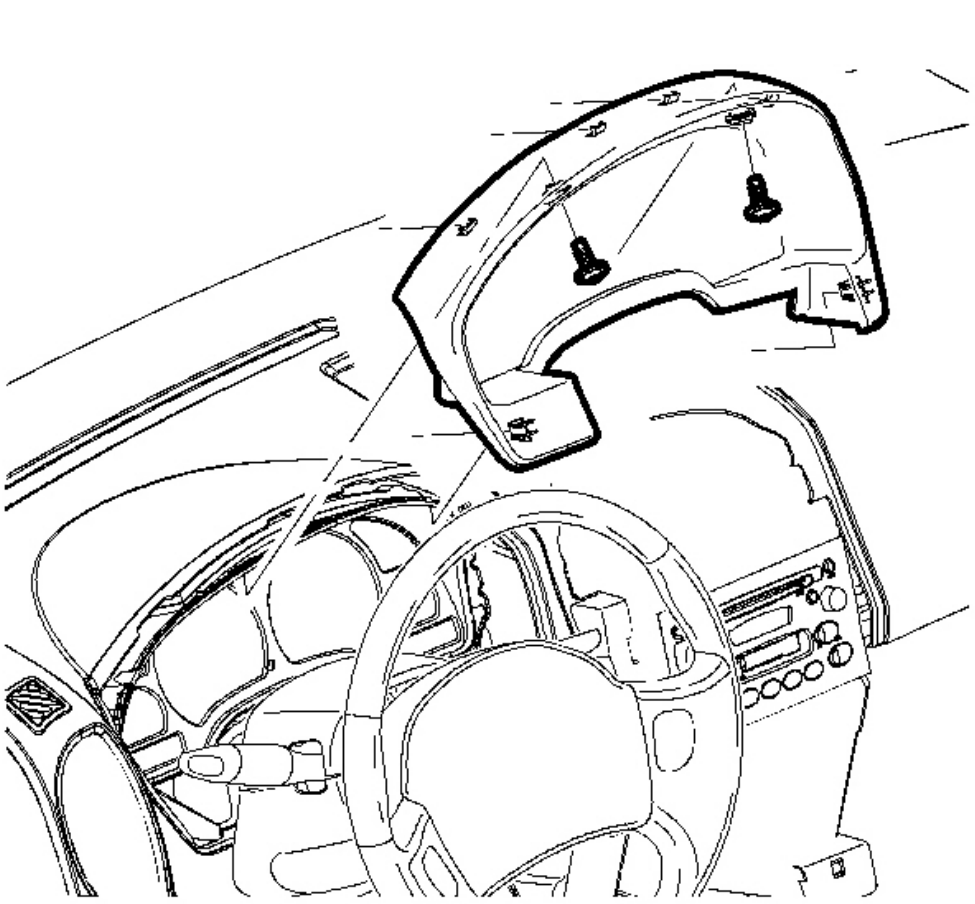


Fig. 18: Removing/Installing Cluster Trim Panel Screws
Courtesy of GENERAL MOTORS CORP.

17. Remove the I/P cluster trim panel screw.
18. Pull to remove the cluster trim.

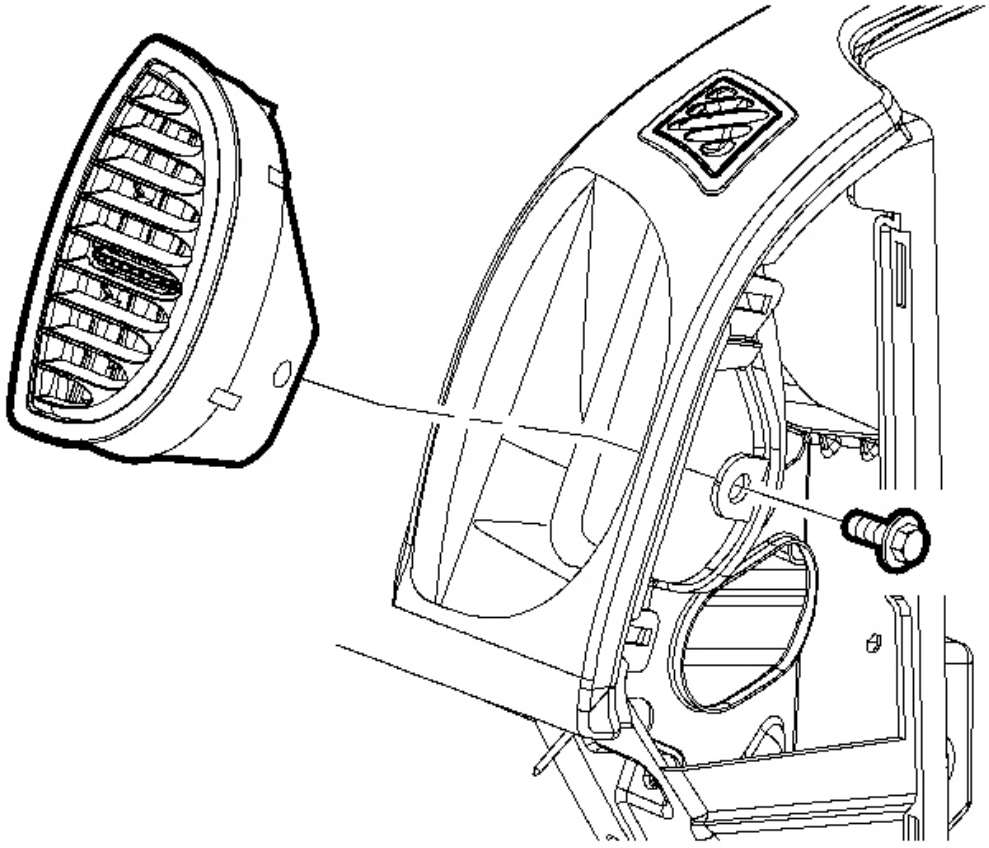


Fig. 19: Removing/Installing Right Air Outlet Screw
Courtesy of GENERAL MOTORS CORP.

19. Remove the screw from the right air outlet.
20. If equipped, remove the ambient light sensor. Refer to **Ambient Light Sensor Replacement** .

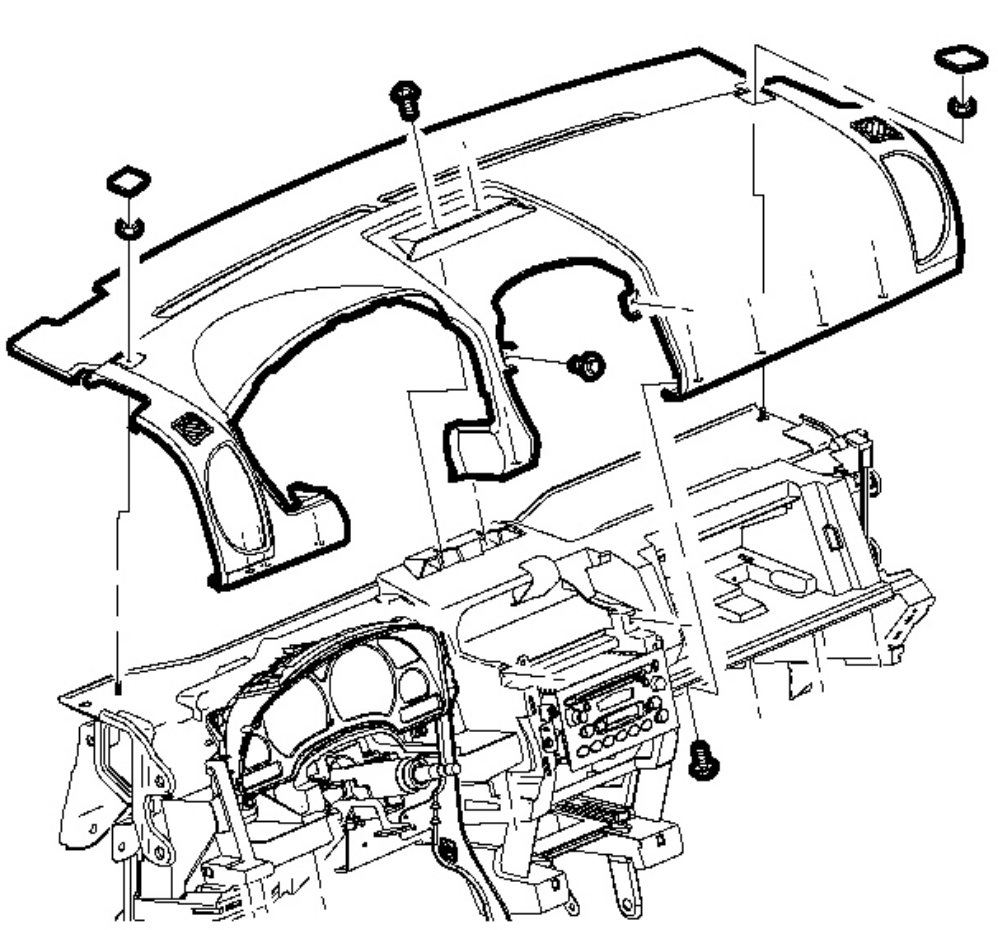


Fig. 20: Removing/Installing I/P Upper Trim Panel
Courtesy of GENERAL MOTORS CORP.

21. Using a small, flat-bladed tool, pry off the trim panel bolt covers.
22. Remove the bolts from the I/P upper trim panel.
23. Remove the screws from the I/P upper trim panel.
24. Remove the I/P upper trim panel from the vehicle.

Installation Procedure

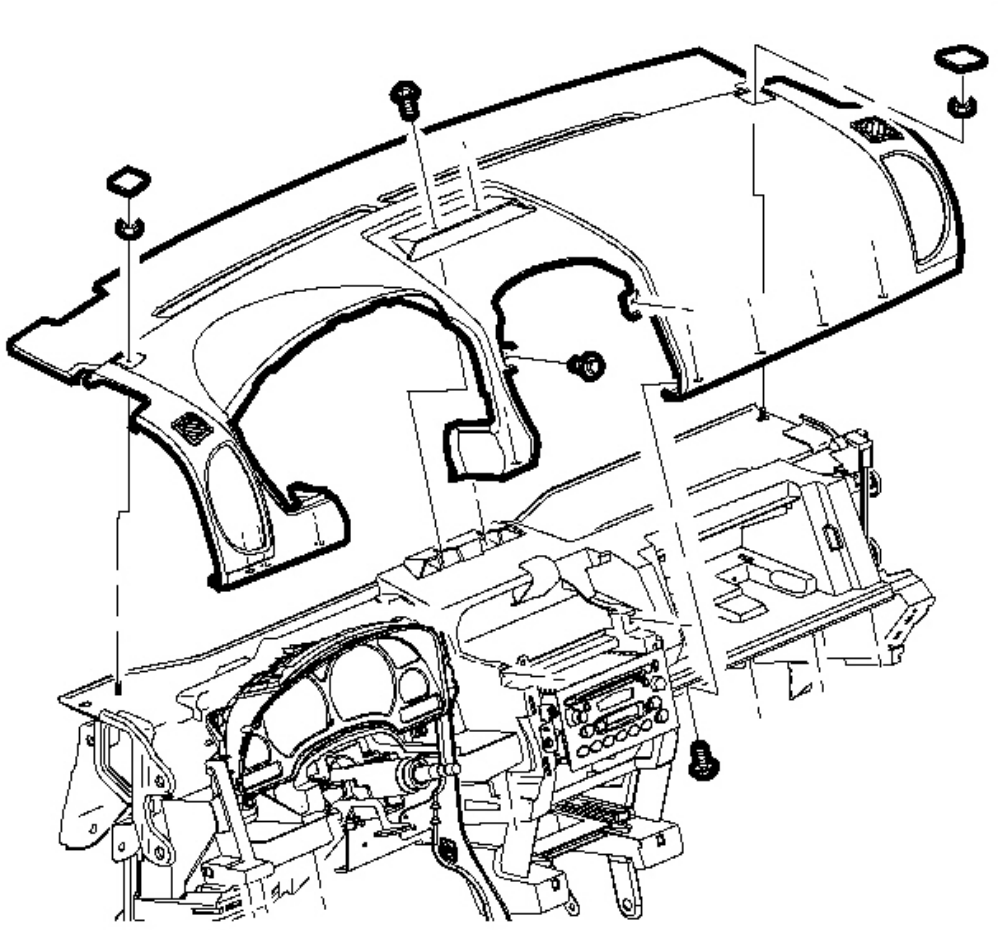


Fig. 21: Removing/Installing I/P Upper Trim Panel
Courtesy of GENERAL MOTORS CORP.

1. Position the I/P upper trim panel in the vehicle.

   NOTE: Refer to Fastener Notice in Cautions and Notices.

2. Install the bolts to the I/P upper trim panel.

   Tighten: Tighten the bolts to 10 N.m (89 lb in).

3. Install the trim panel bolt covers.

4. Install the screws to the I/P upper trim panel.

   Tighten: Tighten the bolts to 2.5 N.m (22 lb in).

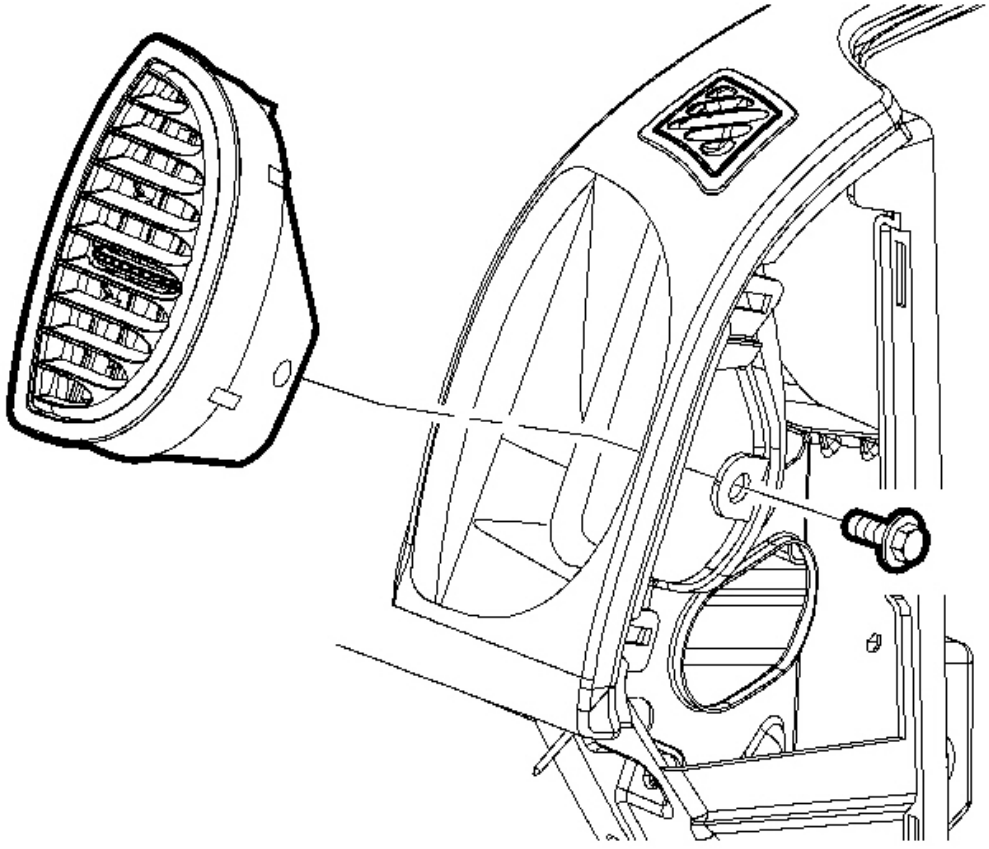


Fig. 22: Removing/Installing Right Air Outlet Screw
Courtesy of GENERAL MOTORS CORP.

5. Install the right air outlet screw.

   Tighten: Tighten the bolts to 2 N.m (18 lb in).

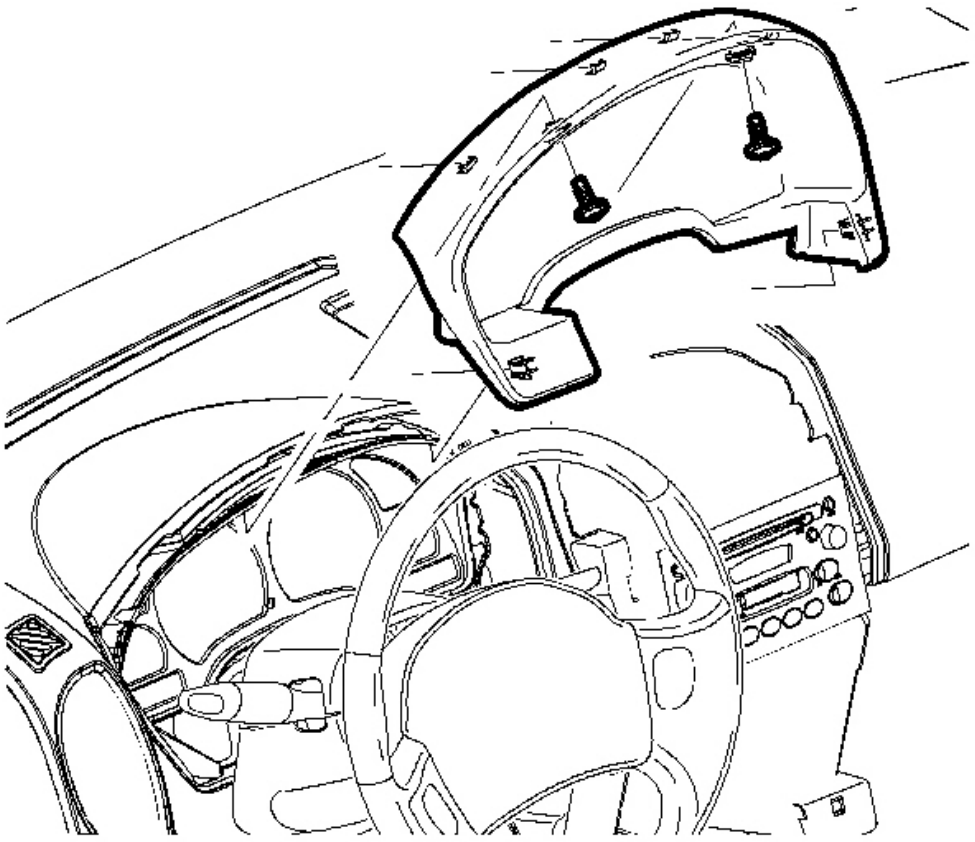


Fig. 23: Removing/Installing Cluster Trim Panel Screws
Courtesy of GENERAL MOTORS CORP.

6. Position the I/P cluster trim panel.
7. Push to install the trim panel in the vehicle.
8. Install the screws to the I/P cluster trim panel.

Tighten: Tighten the bolts to 2.5 N.m (22 lb in).

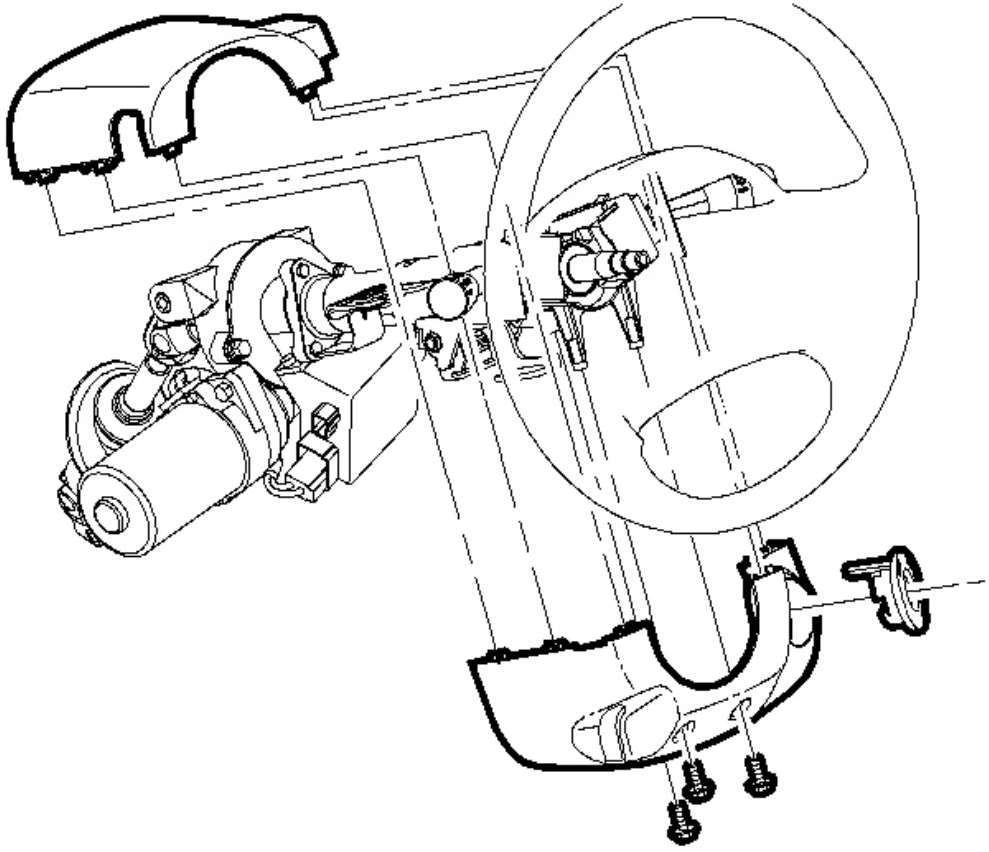


Fig. 24: Removing/Installing Screws From The Steering Column Shroud
Courtesy of GENERAL MOTORS CORP.

9. Position the upper steering column shroud.
10. Position the lower steering column shroud.
11. Install the shrouds by pressing the shrouds together.
12. Position the ignition bezel and install by pushing the bezel into place.
13. Install the screws to the steering column shroud.

Tighten: Tighten the bolts to 2.5 N.m (22 lb in).

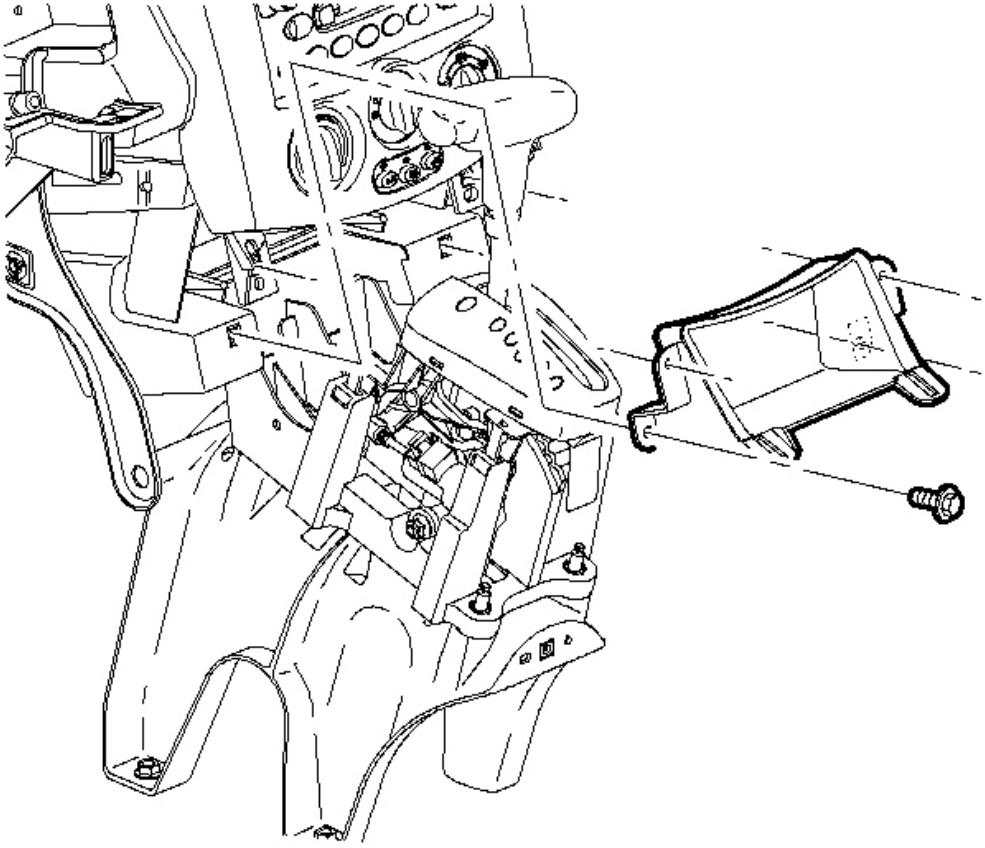


Fig. 25: Removing/Installing Center Storage Compartment Screws
Courtesy of GENERAL MOTORS CORP.

14. Install the center trim bezel. Refer to **Trim Bezel Replacement - Center** .
15. Position the center storage compartment.
16. Install the screws to the center storage compartment.

Tighten: Tighten the bolts to 2.5 N.m (22 lb in).

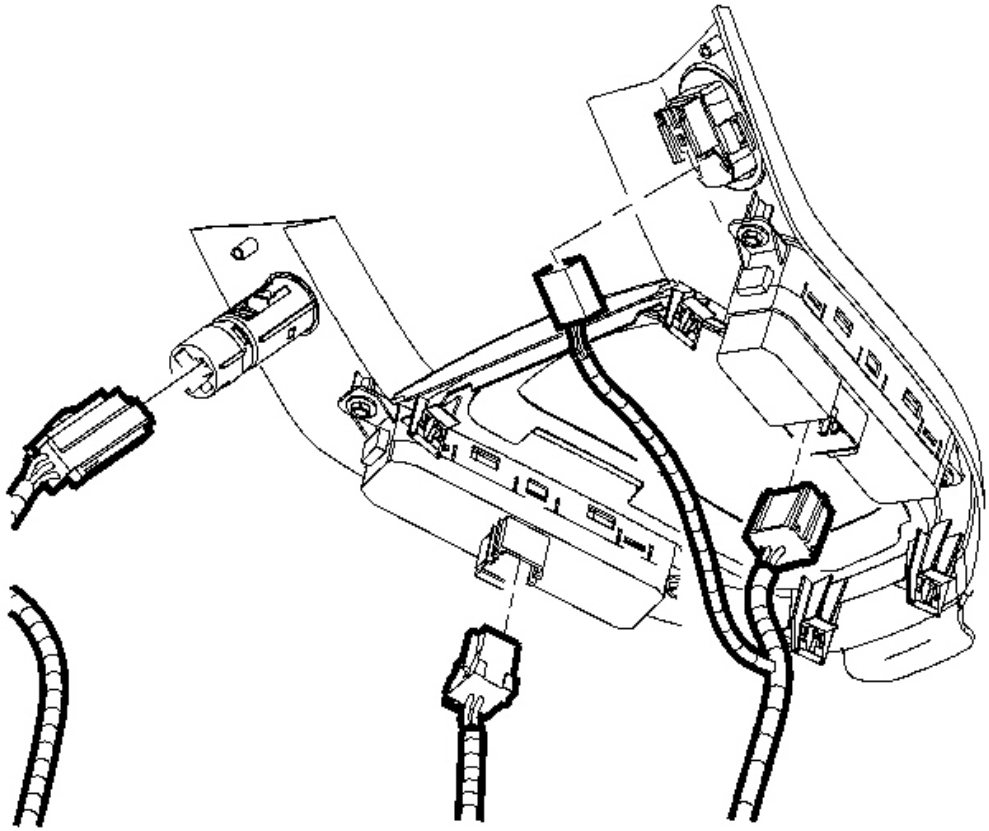


Fig. 26: Disconnecting/Connecting Electrical Connector
Courtesy of GENERAL MOTORS CORP.

17. Connect the electrical connectors to the shift lever bezel on the console.

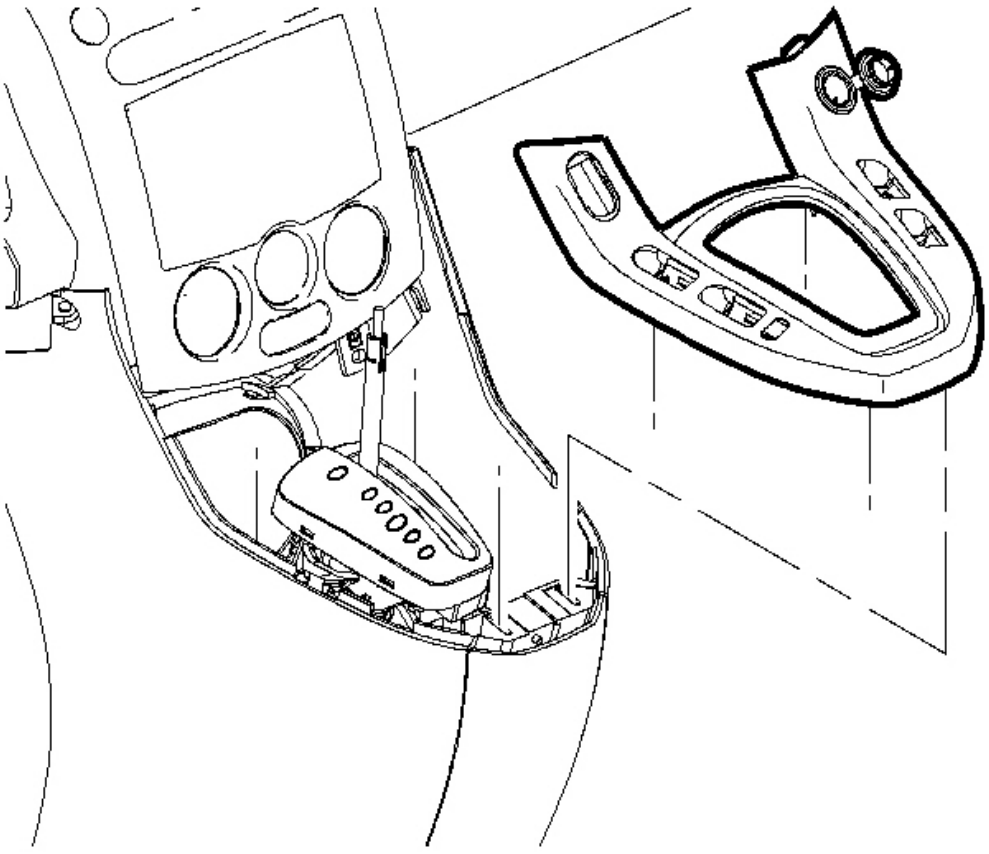


Fig. 27: Removing Shift Level Bezel From The Console
Courtesy of GENERAL MOTORS CORP.

18. Position the lever bezel and press to install the bezel.
19. Install the right I/P outer trim cover. Refer to **Instrument Panel (I/P) Outer Trim Cover Replacement - Right** .

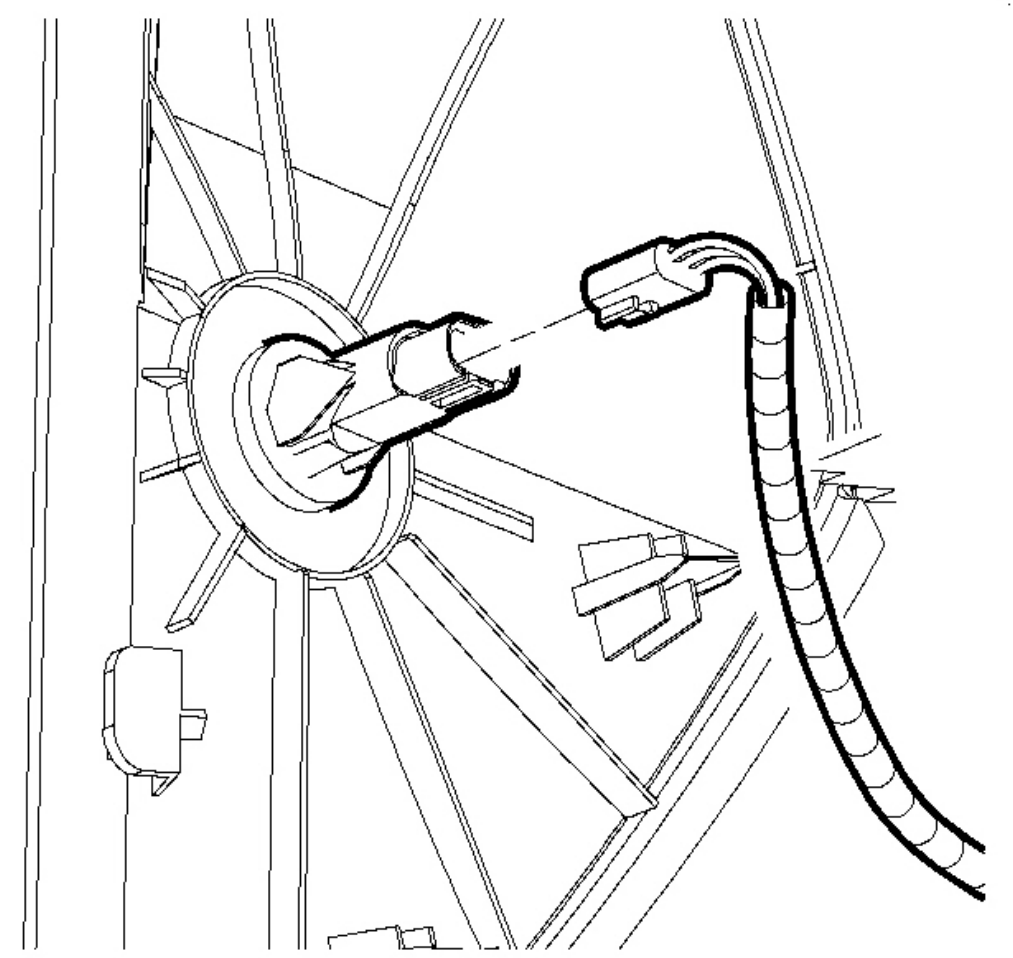


Fig. 28: Disconnecting/Connecting Electrical Connector
Courtesy of GENERAL MOTORS CORP.

20. Connect the electrical connector to the left doorjamb switch.

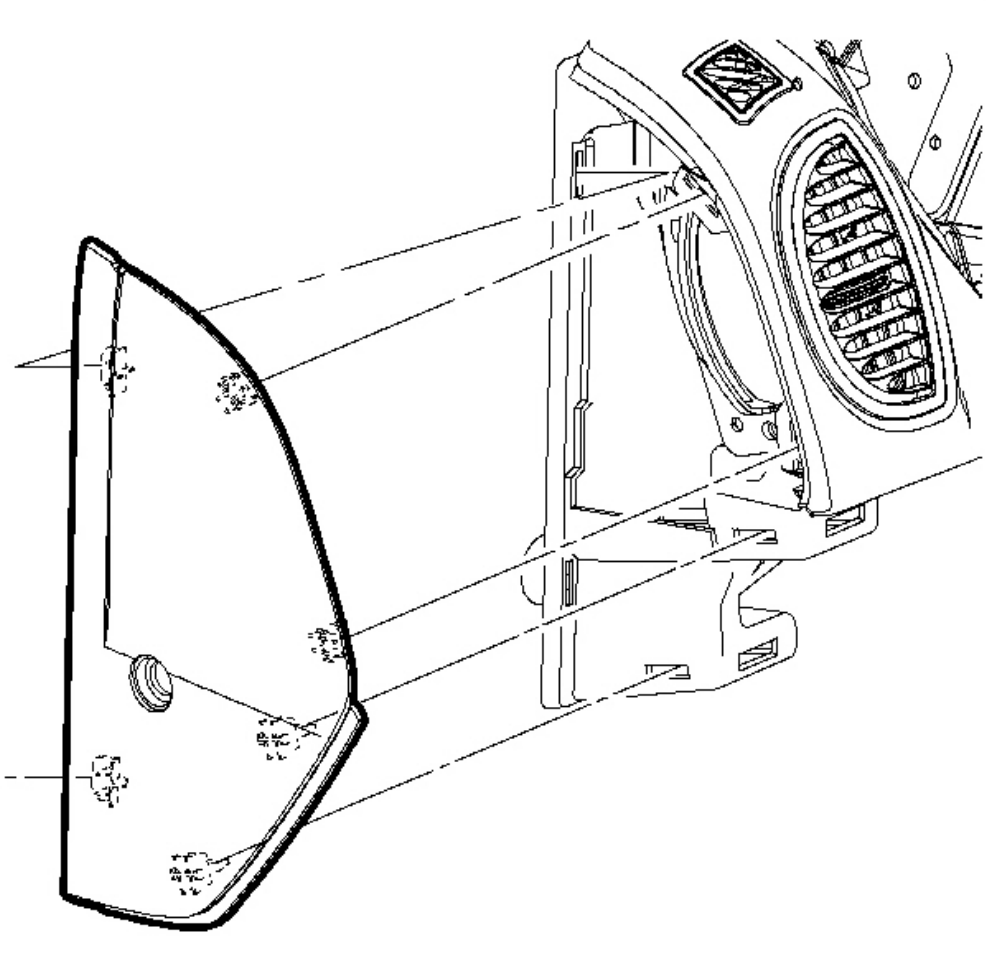


Fig. 29: Removing Left I/P Outer Trim Cover
Courtesy of GENERAL MOTORS CORP.

21. Position the left I/P outer trim cover and press to install the cover.

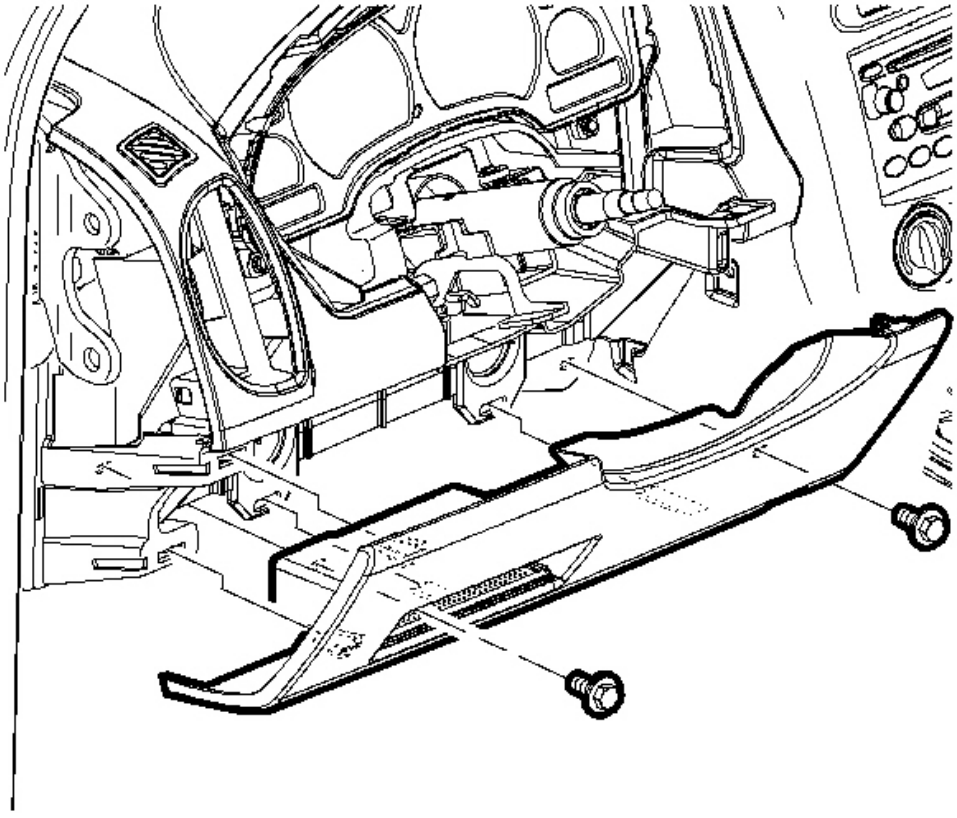


Fig. 30: Removing/Installing Screws From The Steering Column Filler Panel
Courtesy of GENERAL MOTORS CORP.

22. Position the steering column filler panel and press to install the panel.
23. Install the filler panel screws.

    Tighten: Tighten the bolts to 2.5 N.m (22 lb in).

24. Install the windshield garnish moldings. Refer to **Windshield Upper Garnish Molding Replacement** .
25. Enable the frontal SIR system. Refer to **SIR Disabling and Enabling Zone 3** and to **SIR Disabling and Enabling Zone 5** in SIR.

TRIM PANEL REPLACEMENT - INSTRUMENT PANEL (I/P) CLUSTER

Removal Procedure

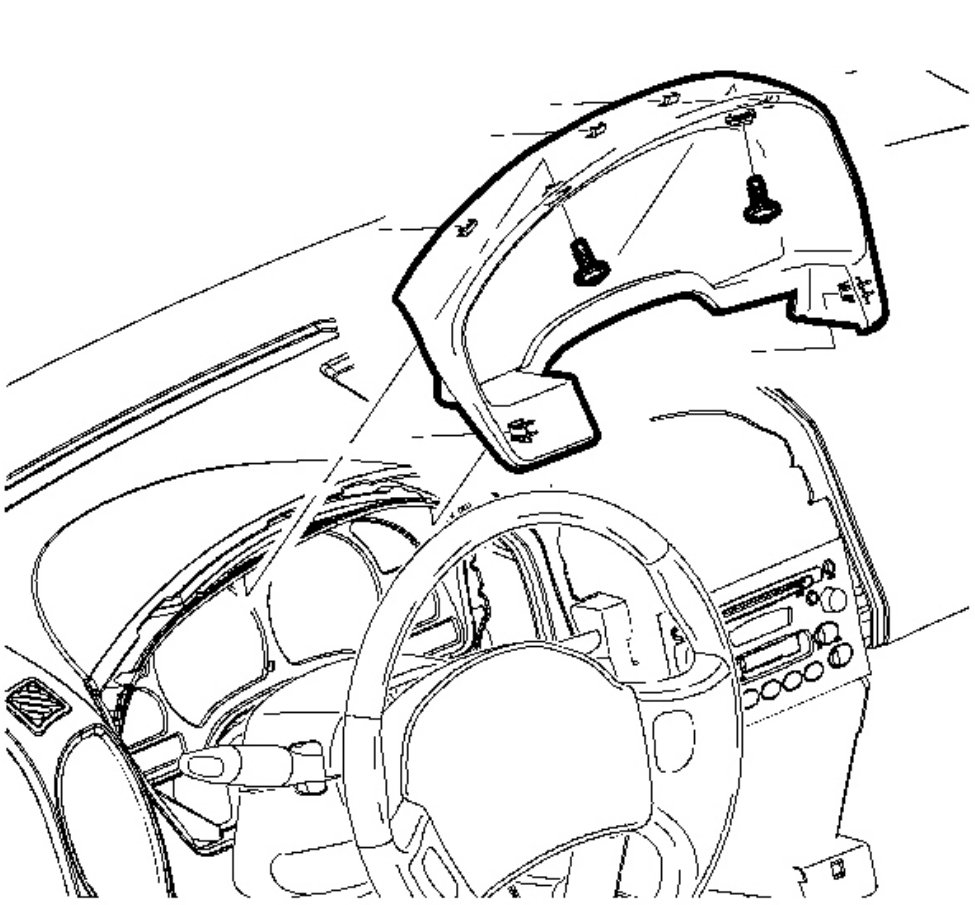


Fig. 31: View of Instrument (I/P) Cluster Trim Panel
Courtesy of GENERAL MOTORS CORP.

1. Remove the cluster trim panel screws.
2. Pull out to remove the cluster trim panel.

Installation Procedure

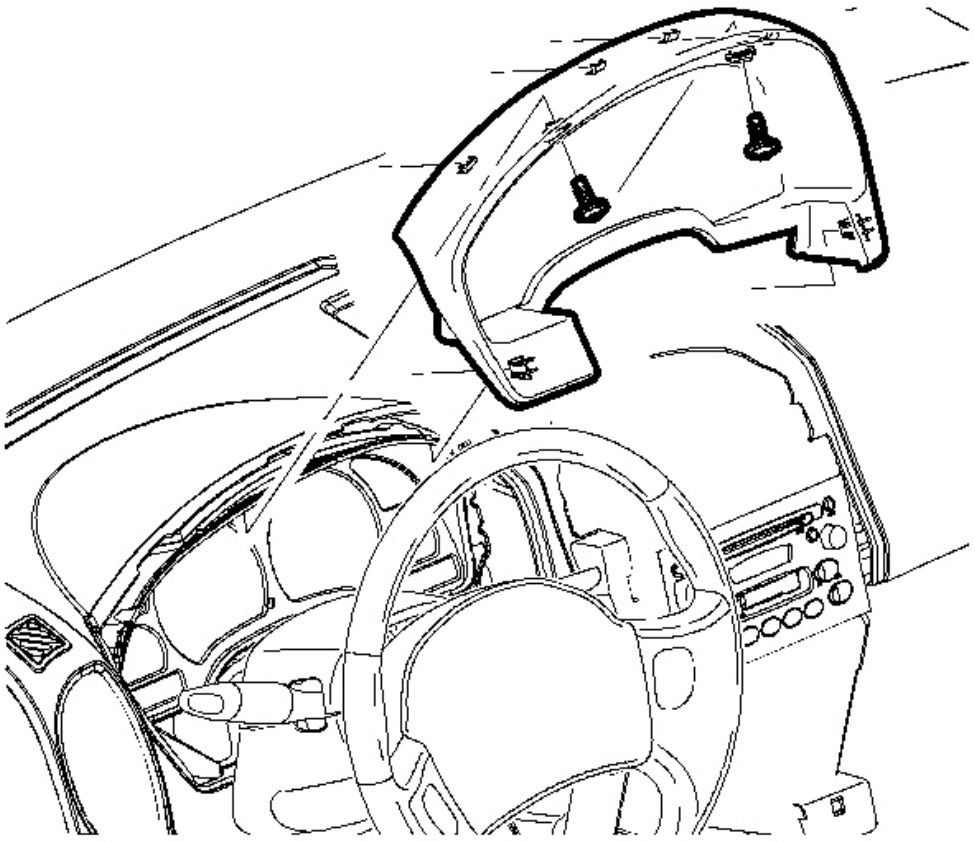


Fig. 32: Removing/Installing Cluster Trim Panel Screws
Courtesy of GENERAL MOTORS CORP.

1. Position the cluster trim panel. Push forward to install the panel.

NOTE: Refer to Fastener Notice in Cautions and Notices.

2. Install the cluster trim panel screws.

Tighten: Tighten the screws to 2.5 N.m (22 lb in).

TRIM BEZEL REPLACEMENT - CENTER

Removal Procedure

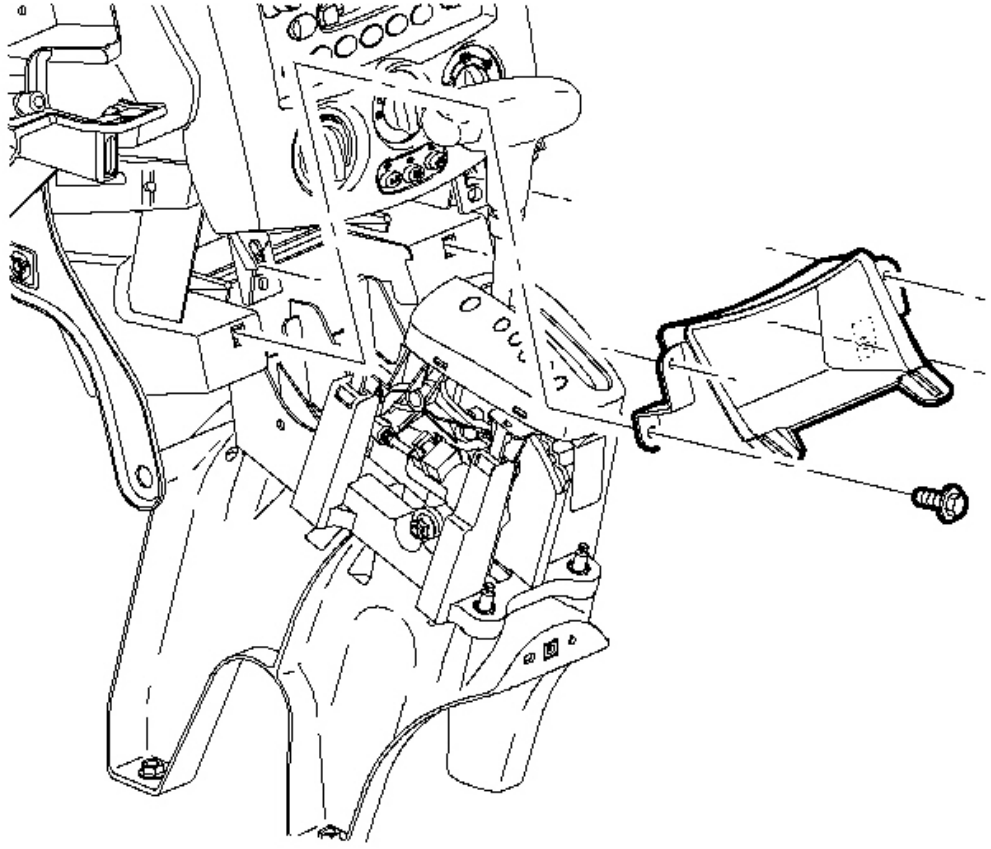


Fig. 33: View Of Center Trim Bezel
Courtesy of GENERAL MOTORS CORP.

1. Remove the console shift lever bezel. Refer to **Console Shift Lever Bezel Replacement** .
2. Remove the I/P storage compartment screws.
3. Remove the storage compartment from the I/P.

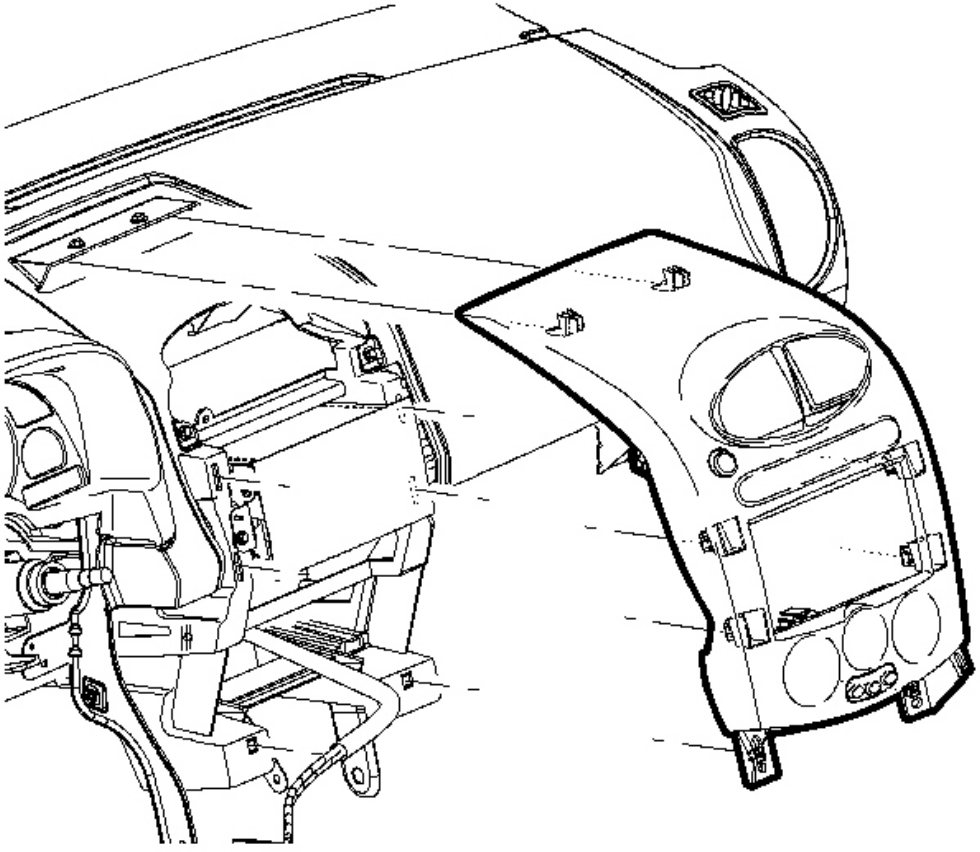


Fig. 34: Pull To Disengage The Trim Bezel Clips
Courtesy of GENERAL MOTORS CORP.

4. Starting at the bottom, pull to disengage the trim bezel clips.

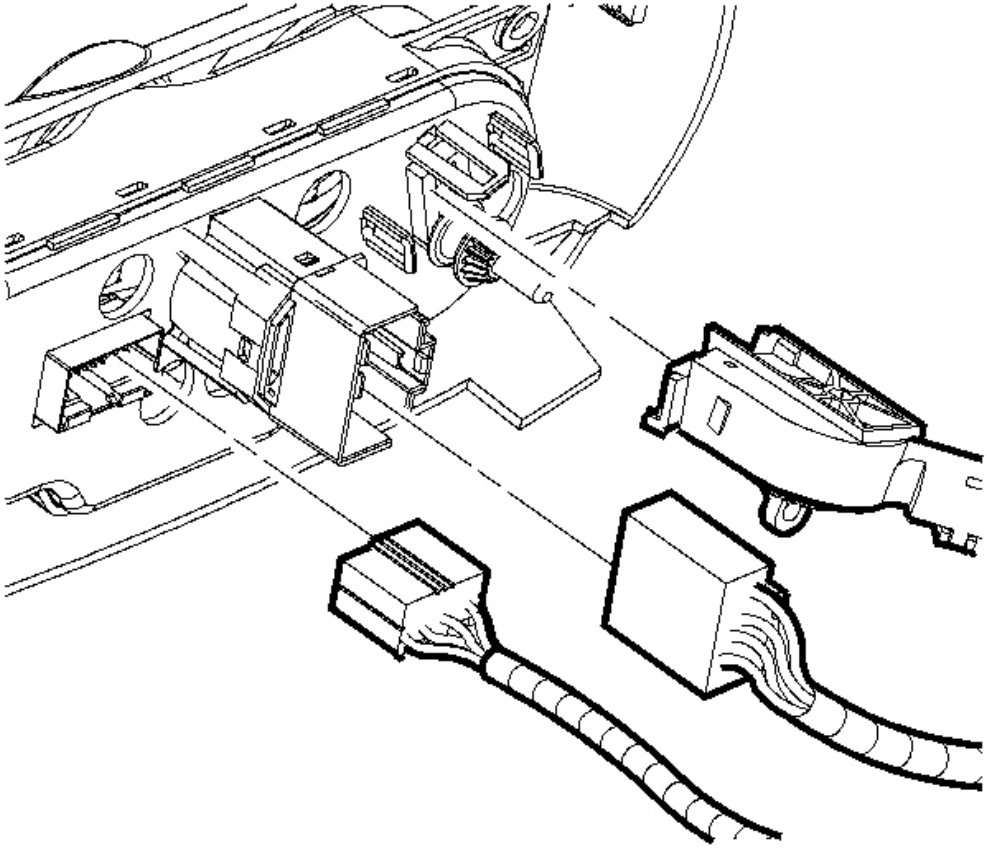


Fig. 35: Removing/Installing HVAC Control Head Connections
Courtesy of GENERAL MOTORS CORP.

5. Disconnect the HVAC control head connections.

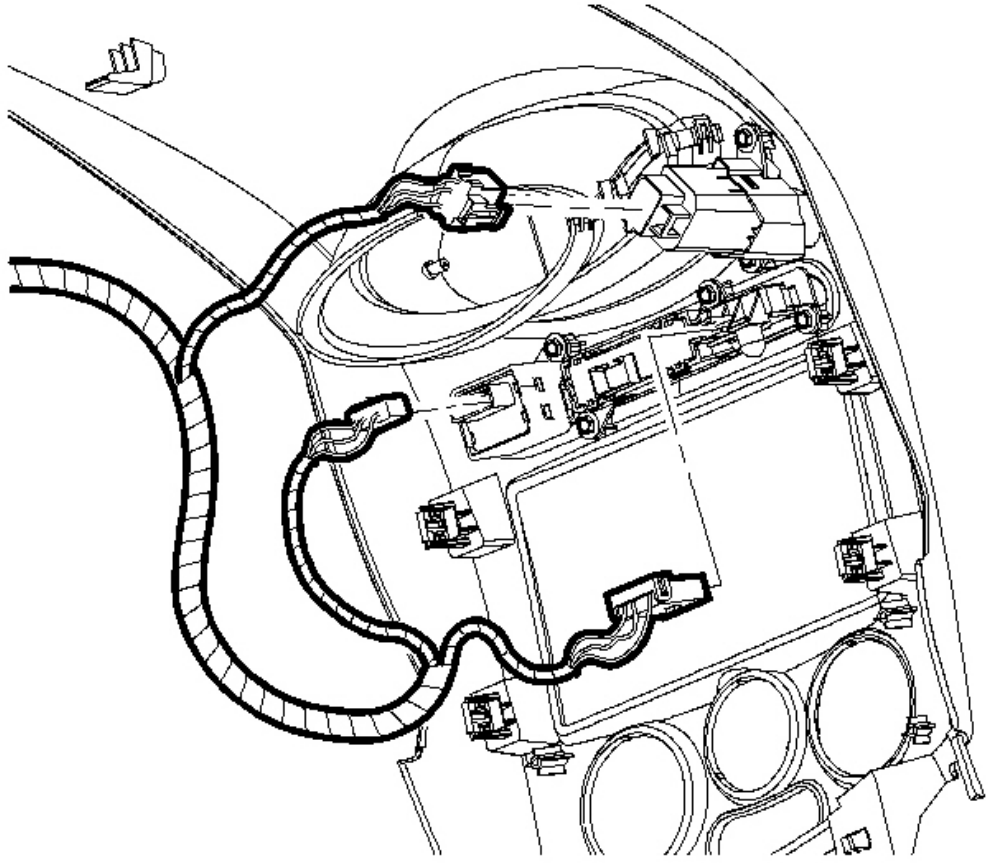


Fig. 36: Removing/Installing Electrical Connectors
Courtesy of GENERAL MOTORS CORP.

6. Disconnect the electrical connectors from the bezel mounted switches.
7. Remove the center trim bezel from the vehicle.

Installation Procedure

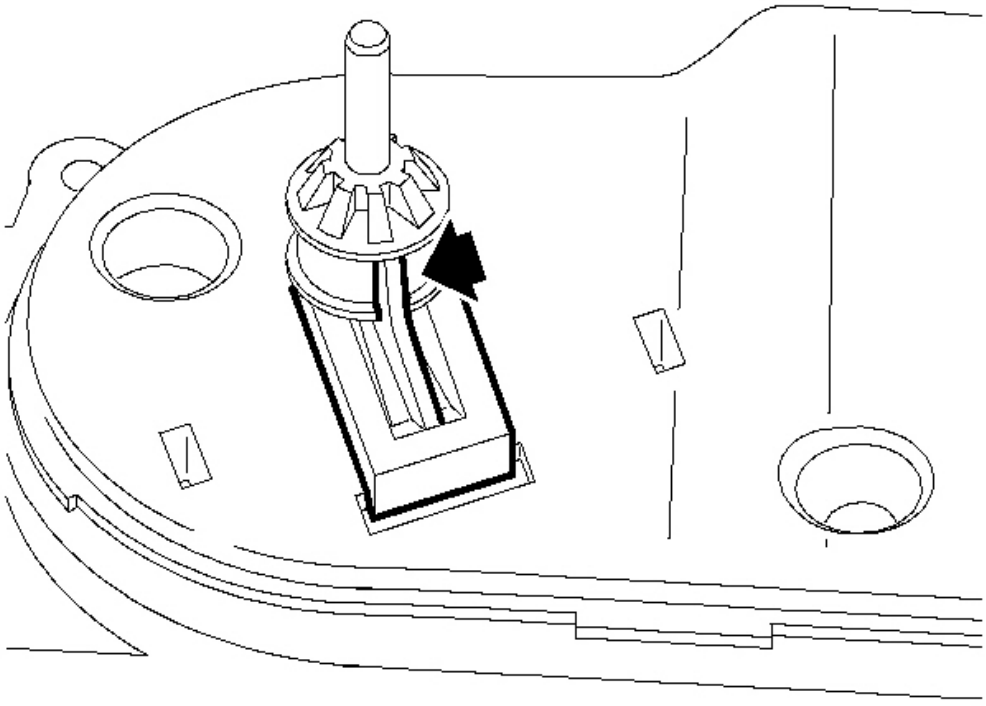


Fig. 37: View Of Center Trim Bezel
Courtesy of GENERAL MOTORS CORP.

1. Position the center trim bezel in the vehicle.
2. Center the temperature cable knob by inserting the alignment tab into the centering slot of the temperature knob shaft.

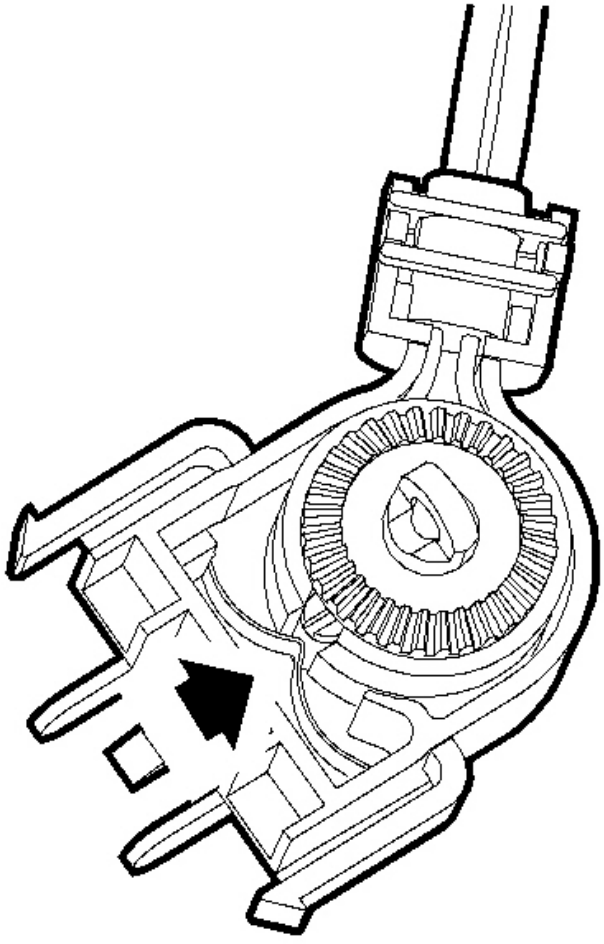


Fig. 38: Aligning Cable Lug With Center Point Detent Spring
Courtesy of GENERAL MOTORS CORP.

3. Center the HVAC module temperature door by aligning the cable lug of the temperature control cable with the center point detent spring.

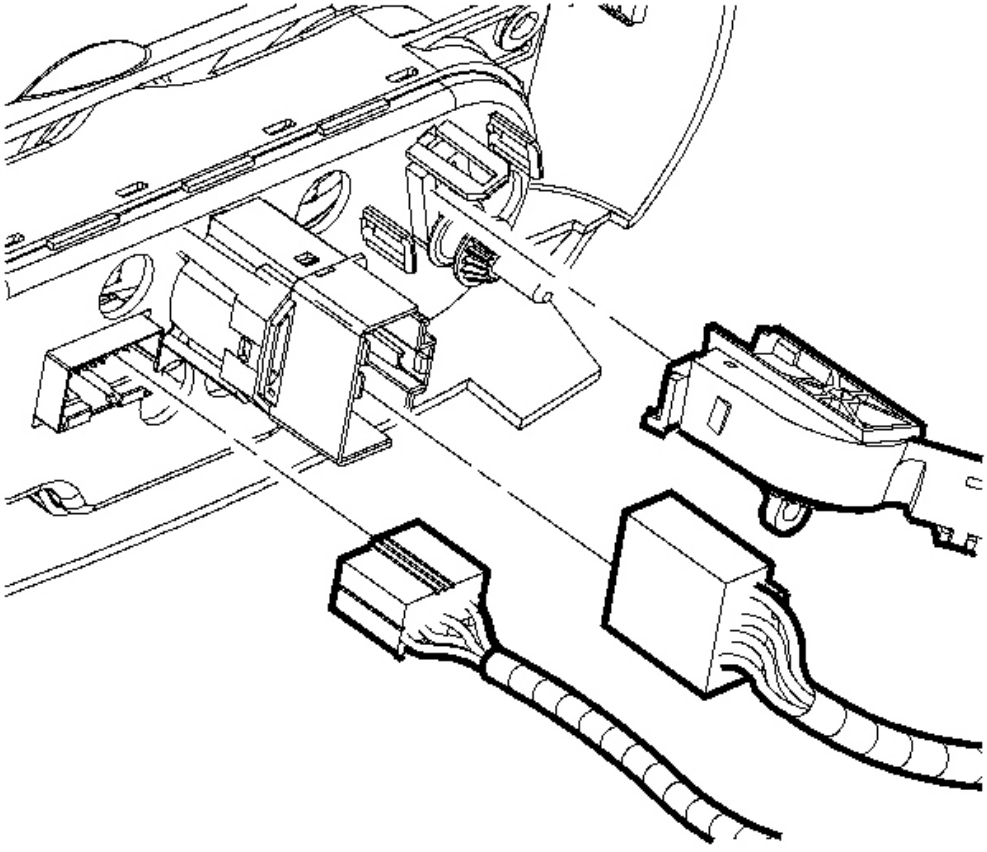


Fig. 39: Removing/Installing HVAC Control Head Connections
Courtesy of GENERAL MOTORS CORP.

4. Install the temperature cable to the HVAC control head by aligning the snap tabs to the knob shaft and by snapping into place.
5. Connect the other control head connectors.

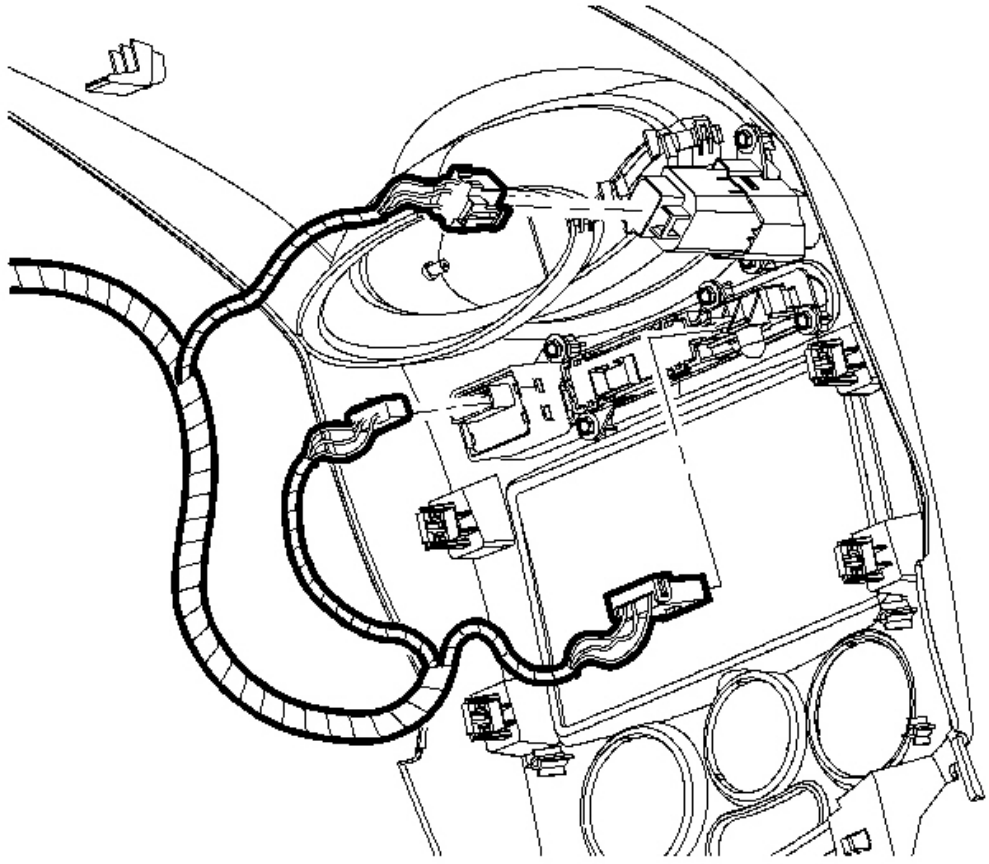


Fig. 40: Removing/Installing Electrical Connectors
Courtesy of GENERAL MOTORS CORP.

6. Connect the electrical connectors to the bezel mounted switches.

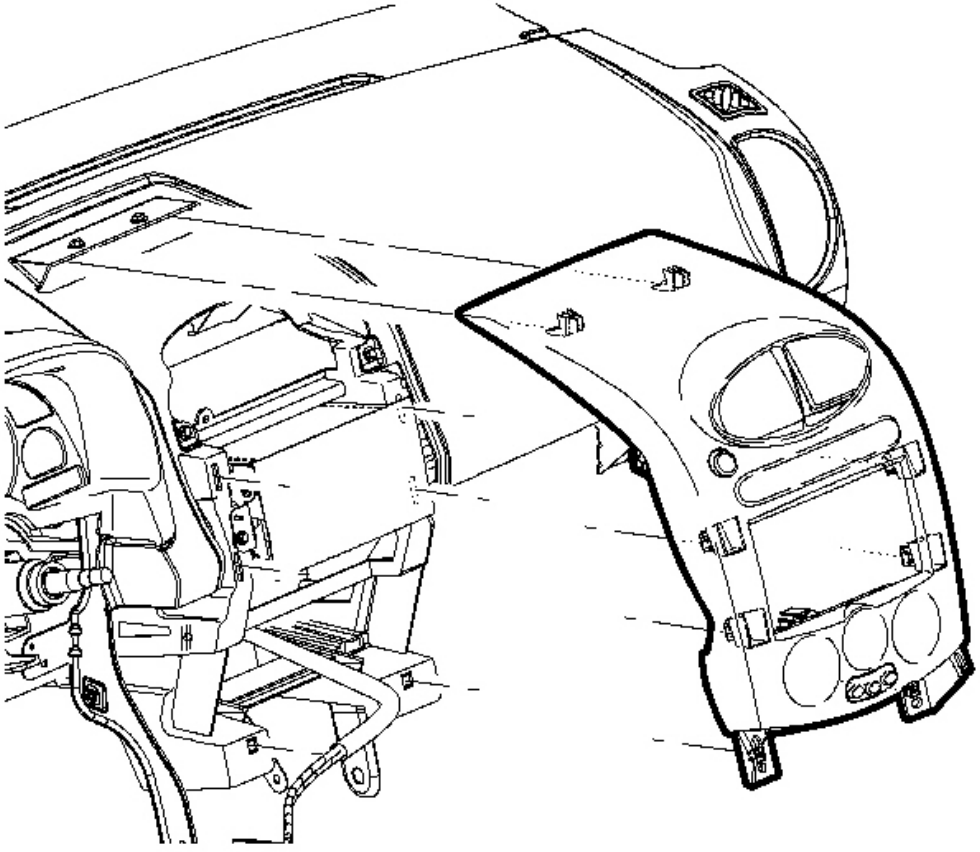


Fig. 41: Pull To Disengage The Trim Bezel Clips
Courtesy of GENERAL MOTORS CORP.

7. Starting at the top of the bezel, push to engage the trim clips.

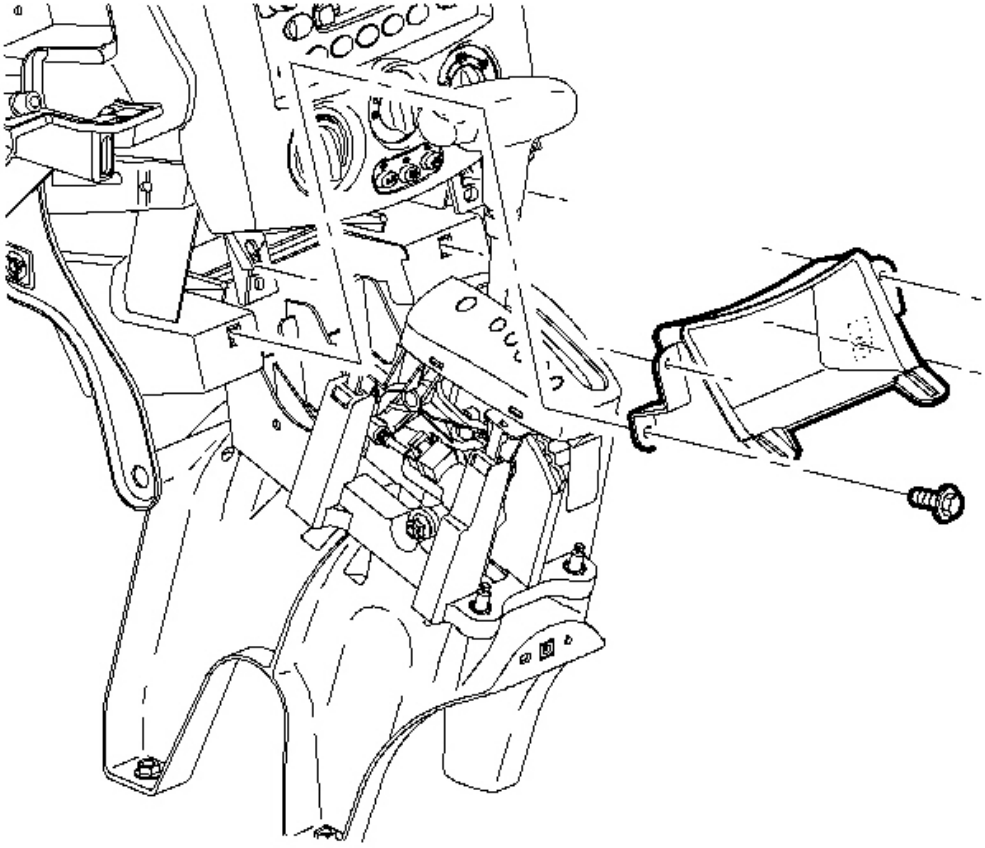


Fig. 42: Removing/Installing Center Storage Compartment Screws
Courtesy of GENERAL MOTORS CORP.

8. Position the I/P storage compartment.

NOTE: **Refer to Fastener Notice in Cautions and Notices.**

9. Install the storage compartment screws.

Tighten: Tighten the screws to 2.5 N.m (22 lb in).

10. Install the console shift lever bezel. Refer to **Console Shift Lever Bezel Replacement** .

INSTRUMENT PANEL (I/P) OUTER TRIM COVER REPLACEMENT - RIGHT

Removal Procedure

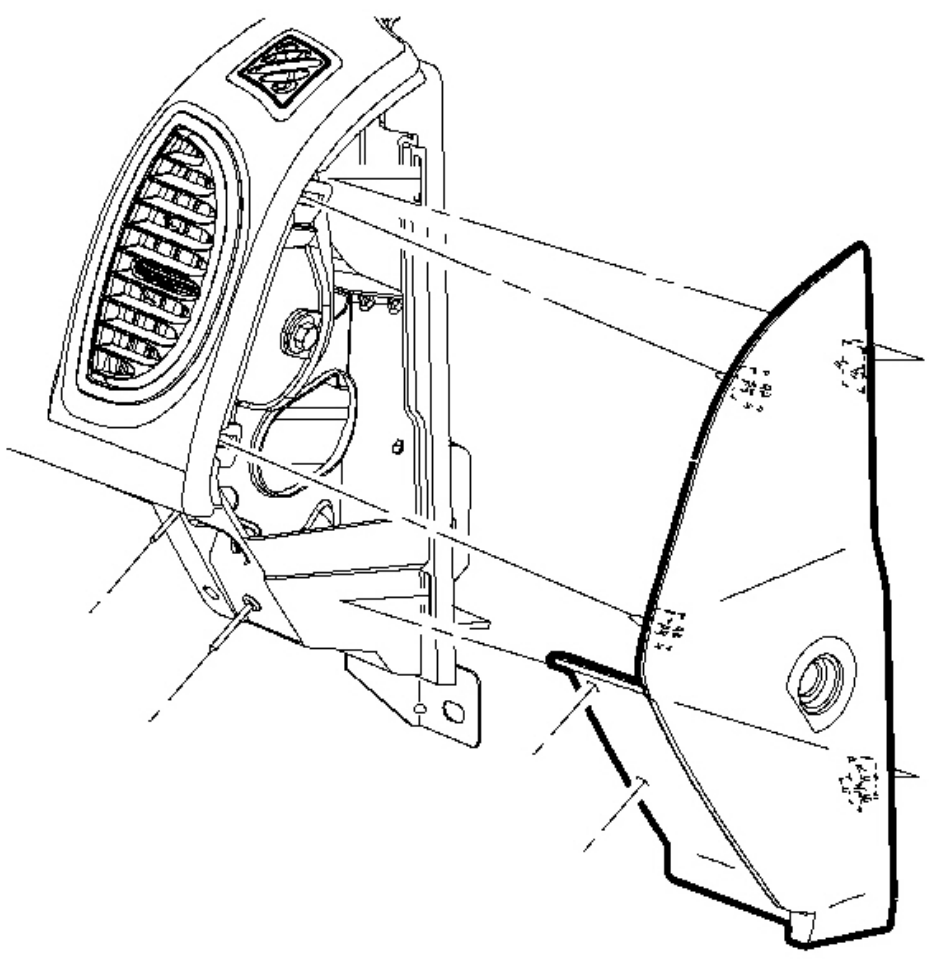


Fig. 43: Removing/Installing Push-Pins From The Outer Trim Panel
Courtesy of GENERAL MOTORS CORP.

1. Open the I/P compartment door.
2. Remove the push-pins from the outer trim panel cover by pushing the center pin with an awl.
3. Pull the trim panel to disengage the trim clips.

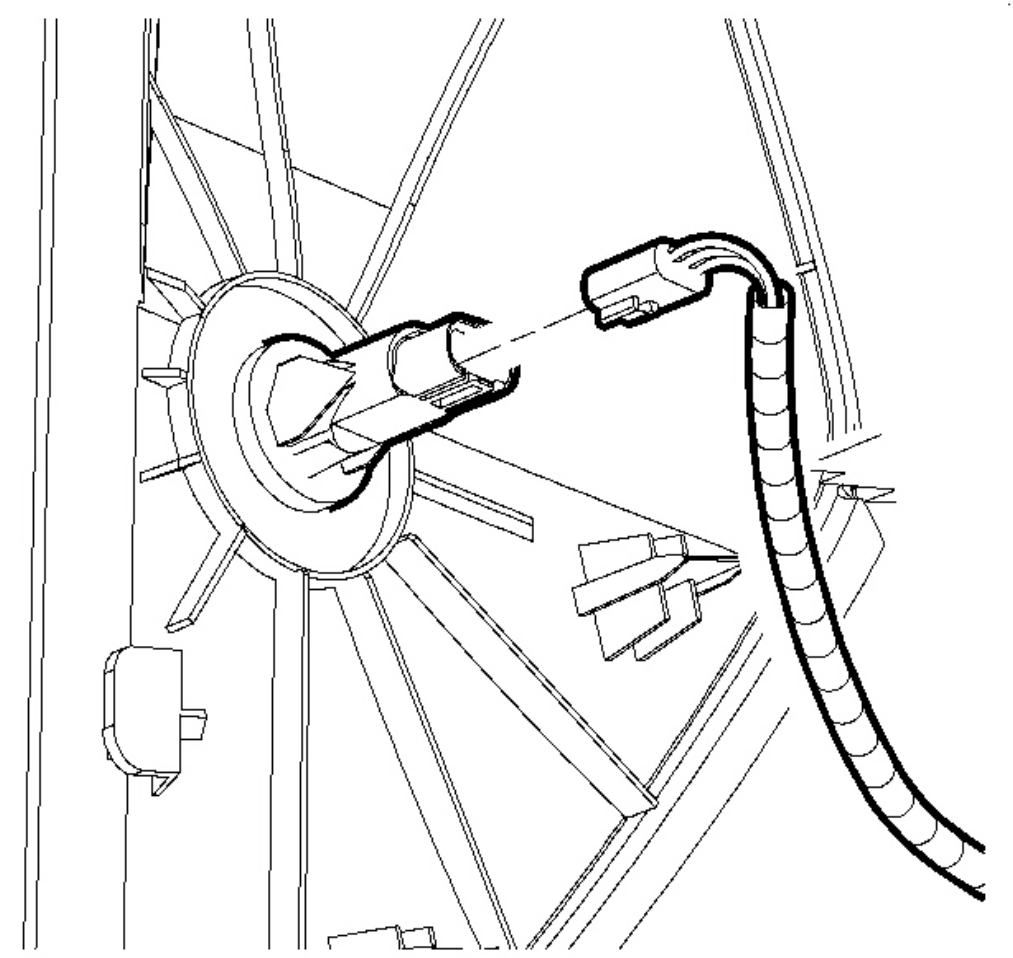


Fig. 44: Disconnecting/Connecting Electrical Connector
Courtesy of GENERAL MOTORS CORP.

4. Disconnect the electrical connector from the outer panel door jamb switch.
5. Remove the right outer trim panel.

Installation Procedure

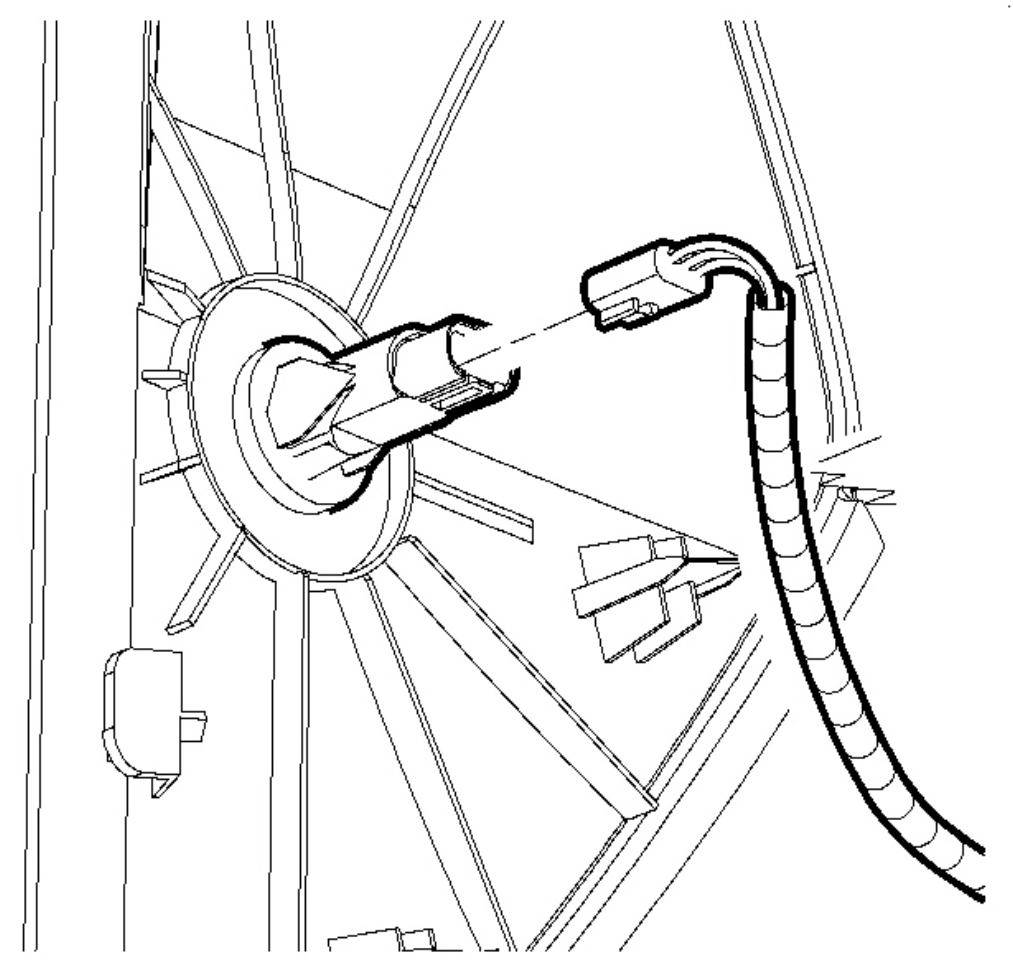


Fig. 45: Disconnecting/Connecting Electrical Connector
Courtesy of GENERAL MOTORS CORP.

1. Connect the door jamb electrical connector
2. Position the outer trim panel.

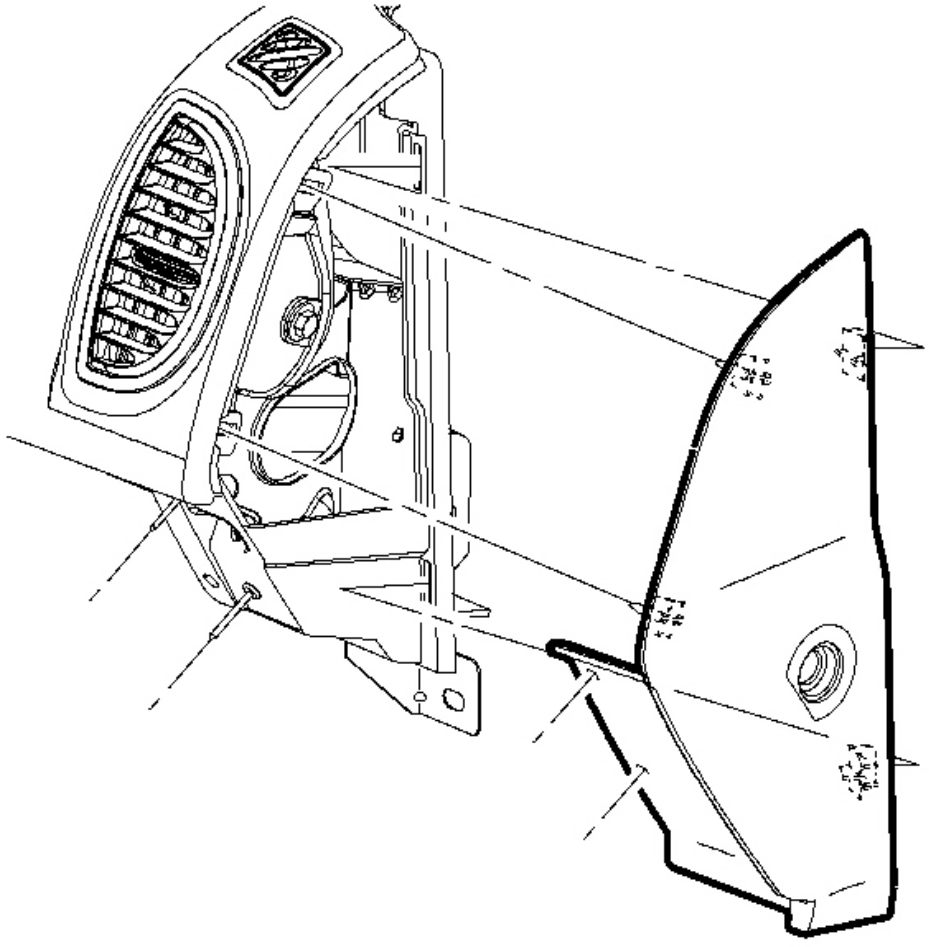


Fig. 46: Removing/Installing Push-Pins From The Outer Trim Panel
Courtesy of GENERAL MOTORS CORP.

3. Push to install the outer trim panel.
4. Install the push-pins to the outer trim panel.
5. Close the I/P compartment door.

INSTRUMENT PANEL (I/P) OUTER TRIM COVER REPLACEMENT - LEFT

Removal Procedure

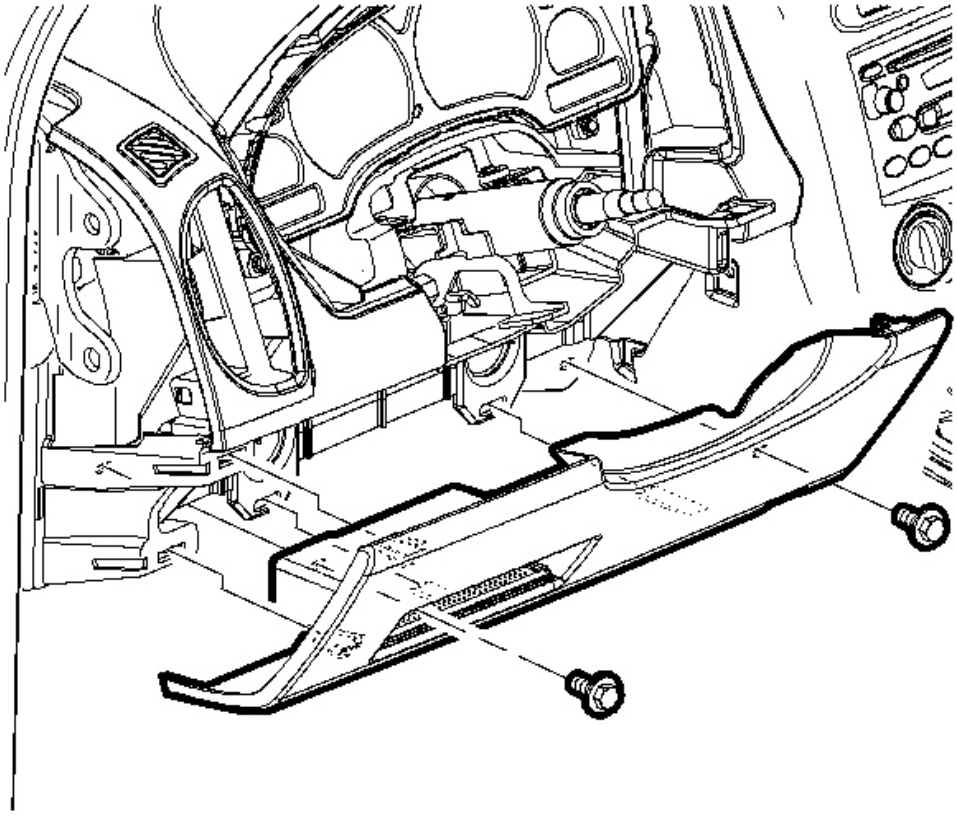


Fig. 47: Removing/Installing Screws From The Steering Column Filler Panel
Courtesy of GENERAL MOTORS CORP.

1. Remove the screws from the steering column filler panel.
2. Remove the filler panel by pulling until the trim clips disengage.

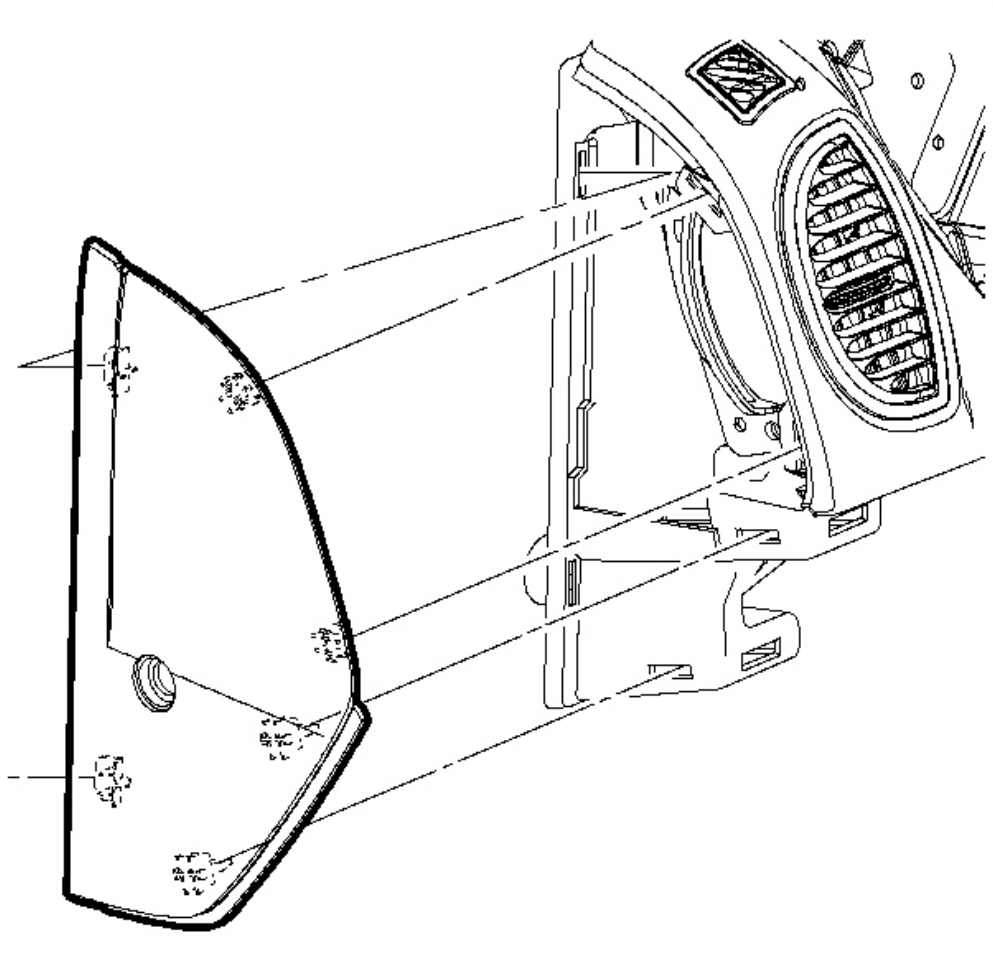


Fig. 48: Removing Left I/P Outer Trim Cover
Courtesy of GENERAL MOTORS CORP.

3. Remove the outer trim panel by pulling on the panel.

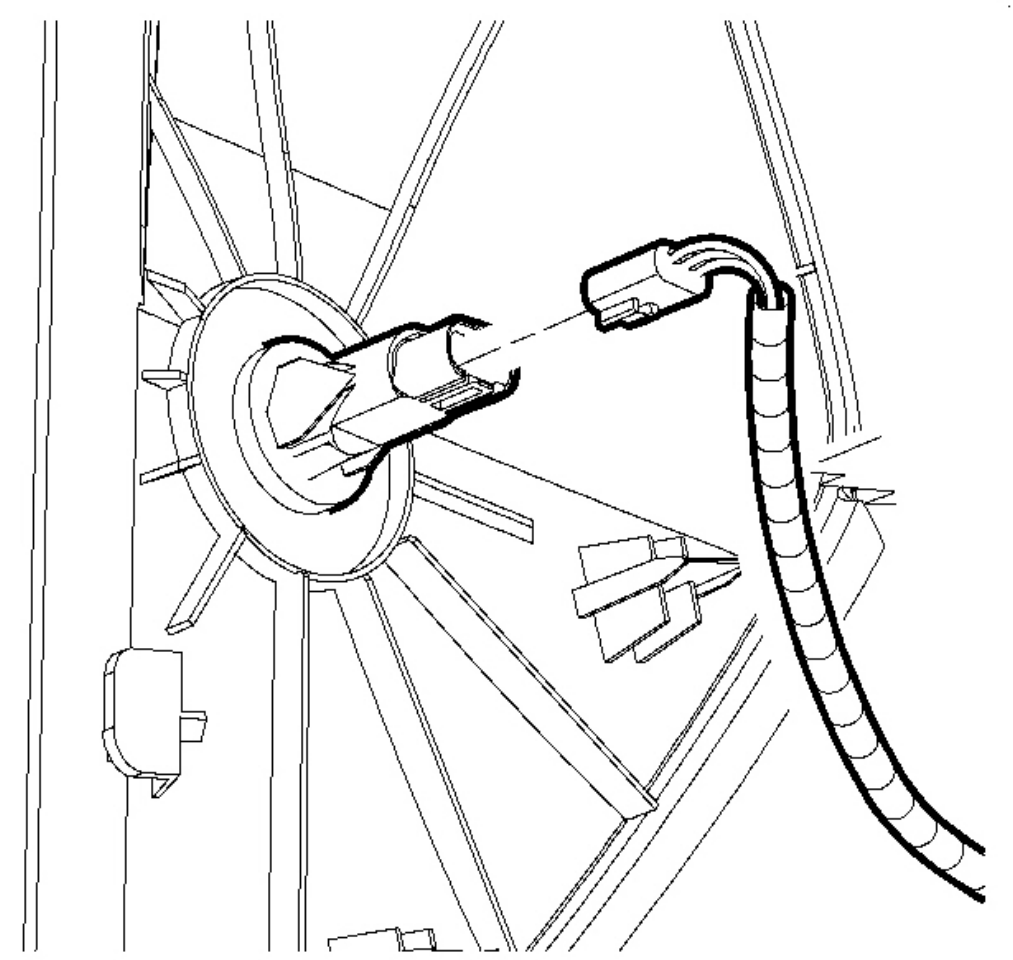


Fig. 49: Disconnecting/Connecting Electrical Connector
Courtesy of GENERAL MOTORS CORP.

4. Disconnect the electrical connector from the door jamb switch.
5. Remove the right outer trim panel.

Installation Procedure

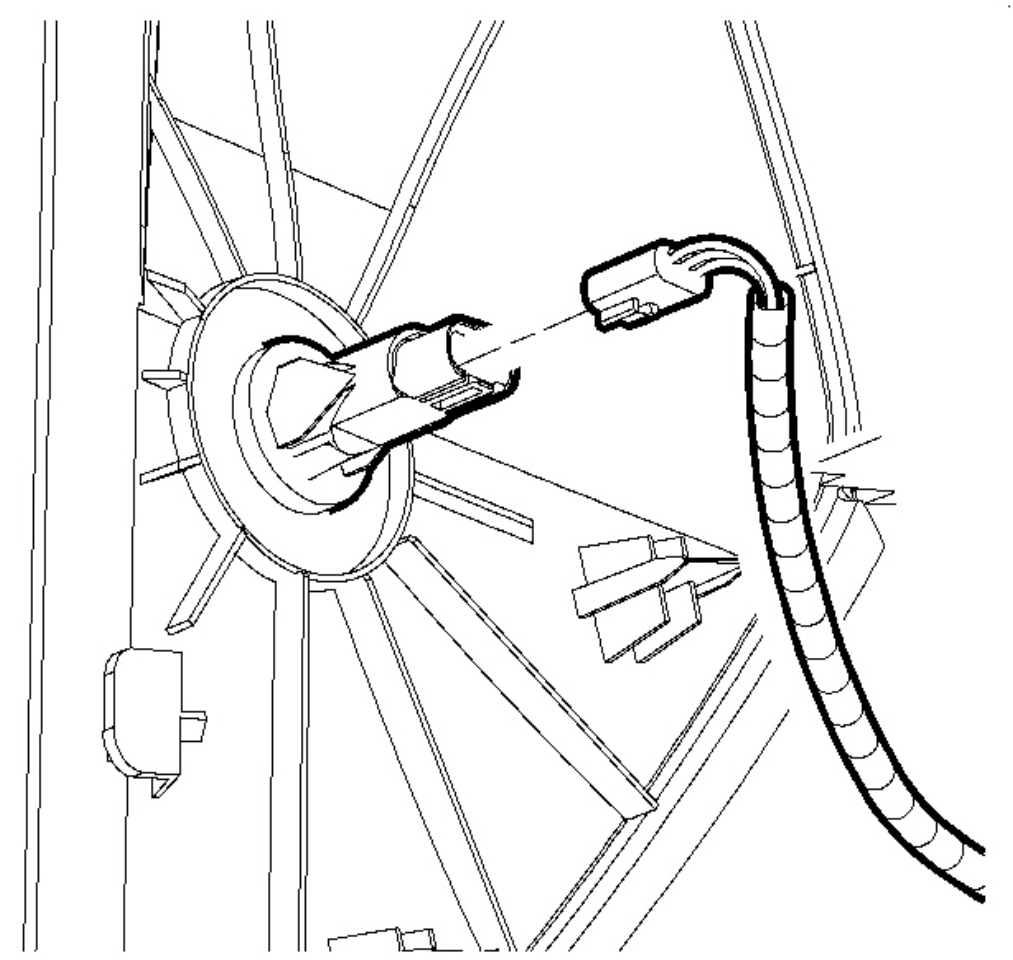


Fig. 50: Disconnecting/Connecting Electrical Connector
Courtesy of GENERAL MOTORS CORP.

1. Connect the electrical connector to the door jamb switch.
2. Position the outer trim panel.

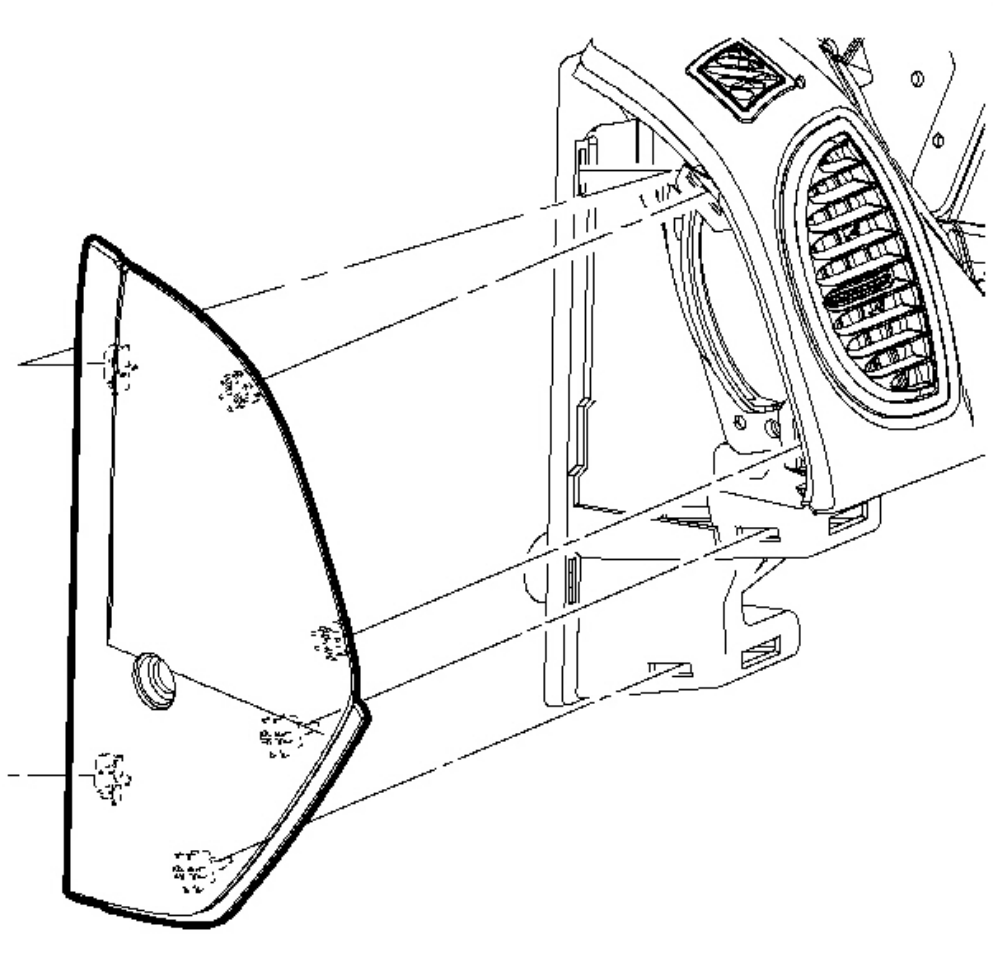


Fig. 51: Removing Left I/P Outer Trim Cover
Courtesy of GENERAL MOTORS CORP.

3. Push to install the panel.

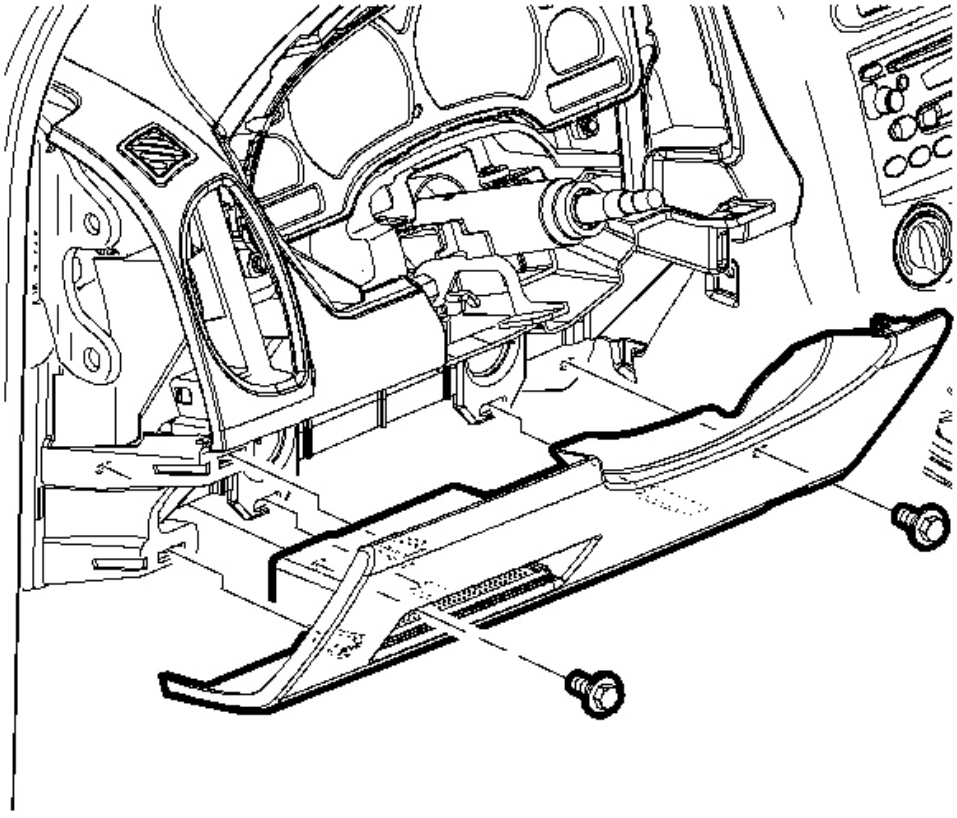


Fig. 52: Removing/Installing Screws From The Steering Column Filler Panel
Courtesy of GENERAL MOTORS CORP.

4. Position the steering column filler panel.
5. Push to install the filler panel.

NOTE: Refer to Fastener Notice in Cautions and Notices.

6. Install the screws to the steering panel filler panel.

Tighten: Tighten the screws to 2.5 N.m (22 lb in).

STORAGE COMPARTMENT REPLACEMENT - INSTRUMENT PANEL (I/P)

Removal Procedure

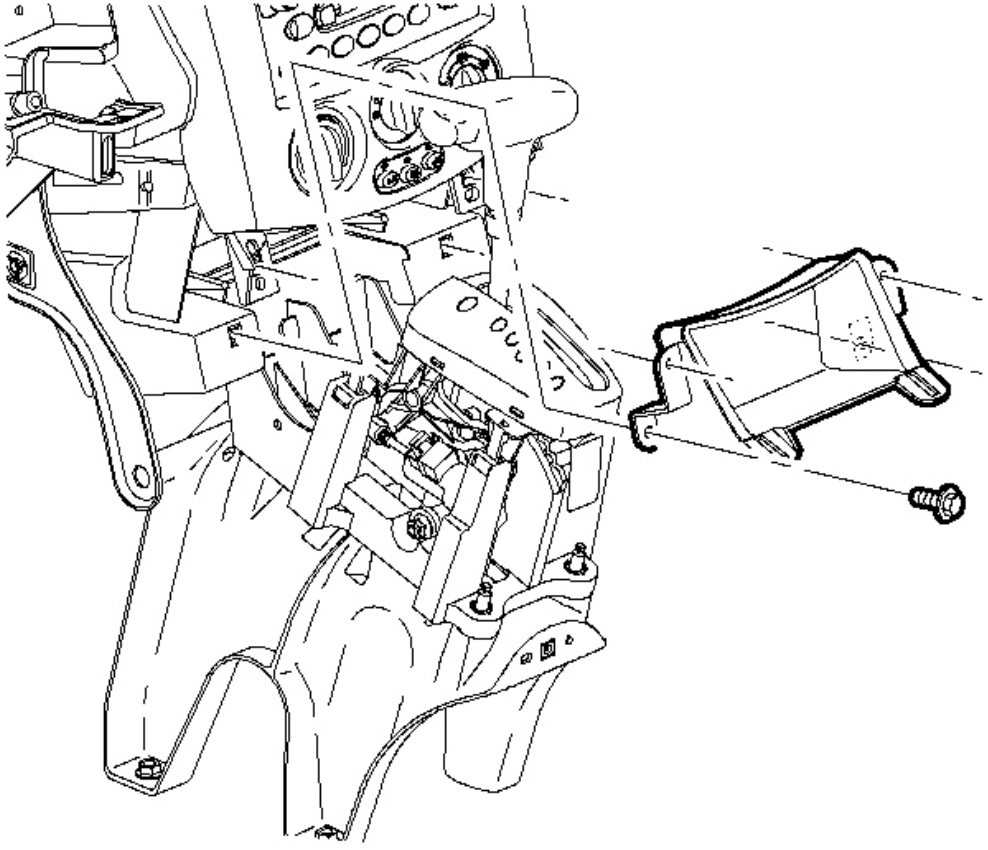


Fig. 53: Removing/Installing Center Storage Compartment Screws
Courtesy of GENERAL MOTORS CORP.

1. Remove the console shift lever bezel. Refer to **Console Shift Lever Bezel Replacement** .
2. Remove the screws from the I/P storage compartment.
3. Remove the storage compartment from the I/P.

Installation Procedure

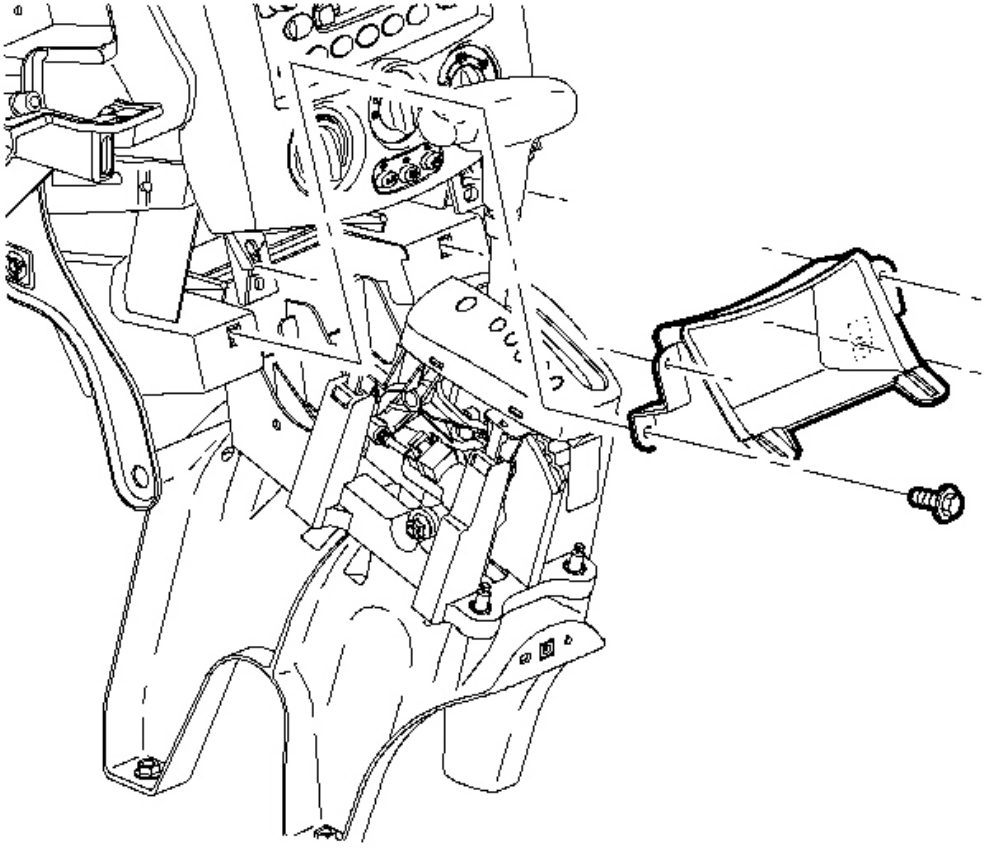


Fig. 54: Removing/Installing Center Storage Compartment Screws
Courtesy of GENERAL MOTORS CORP.

1. Position the I/P storage compartment.

   NOTE: Refer to Fastener Notice in Cautions and Notices.

2. Install the storage compartment screws.

   Tighten: Tighten the screws to 2.5 N.m (22 lb in).

3. Install the console shift lever bezel. Refer to **Console Shift Lever Bezel Replacement** .

COMPARTMENT REPLACEMENT - INSTRUMENT PANEL (I/P)

Removal Procedure

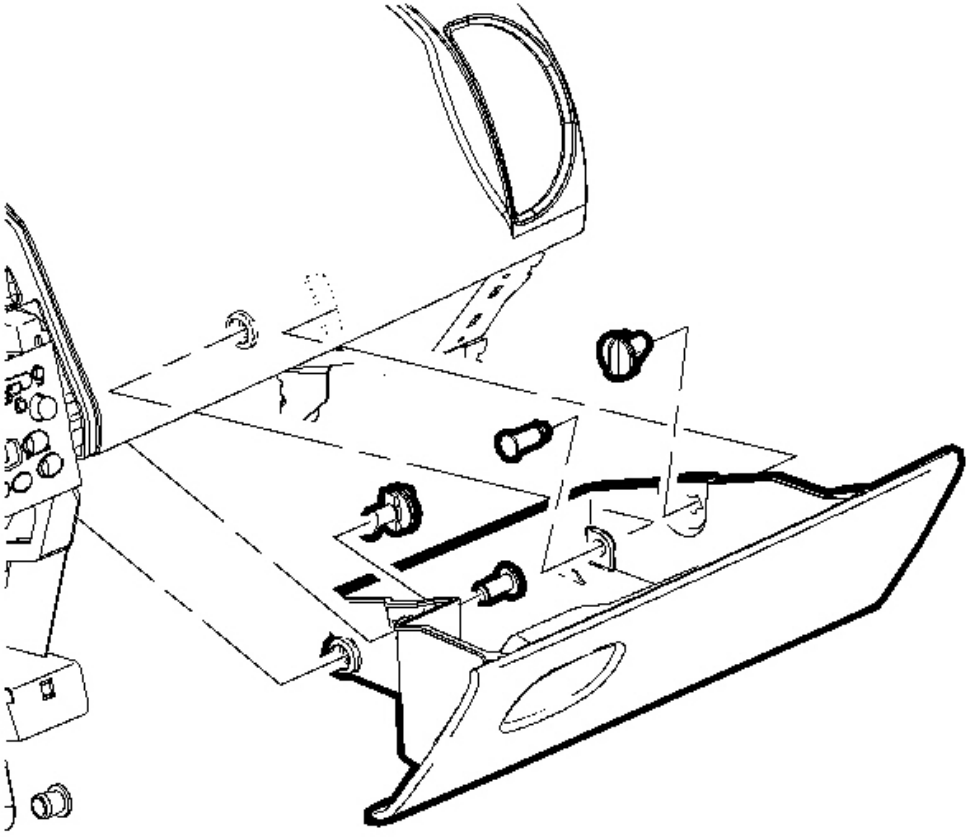


Fig. 55: View of Instrument Panel (IP) Compartment
Courtesy of GENERAL MOTORS CORP.

1. Open the compartment door.
2. Remove the compartment door pivot pins.
3. Rotate the compartment door stops and remove the stops.
4. Remove the I/P compartment.

Installation Procedure

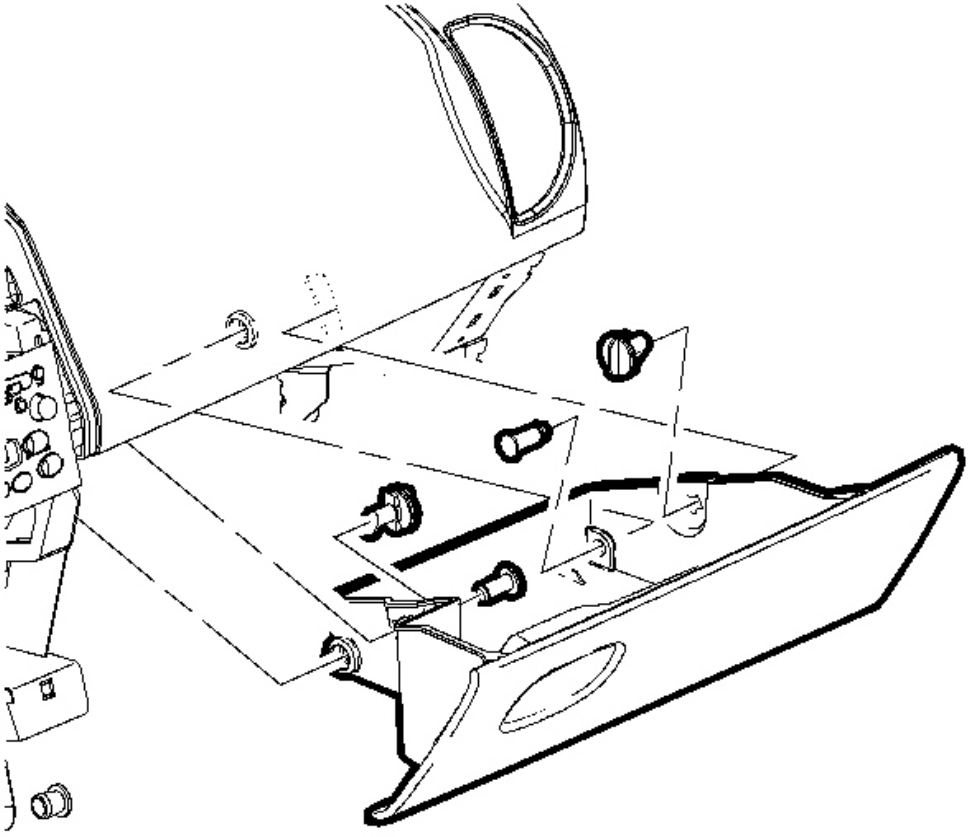


Fig. 56: View of Instrument Panel (IP) Compartment
Courtesy of GENERAL MOTORS CORP.

1. Position the I/P compartment.
2. Install the pivot pins.
3. Install the door stops.

DOOR REPLACEMENT - INSTRUMENT PANEL (I/P) COMPARTMENT

Removal Procedure

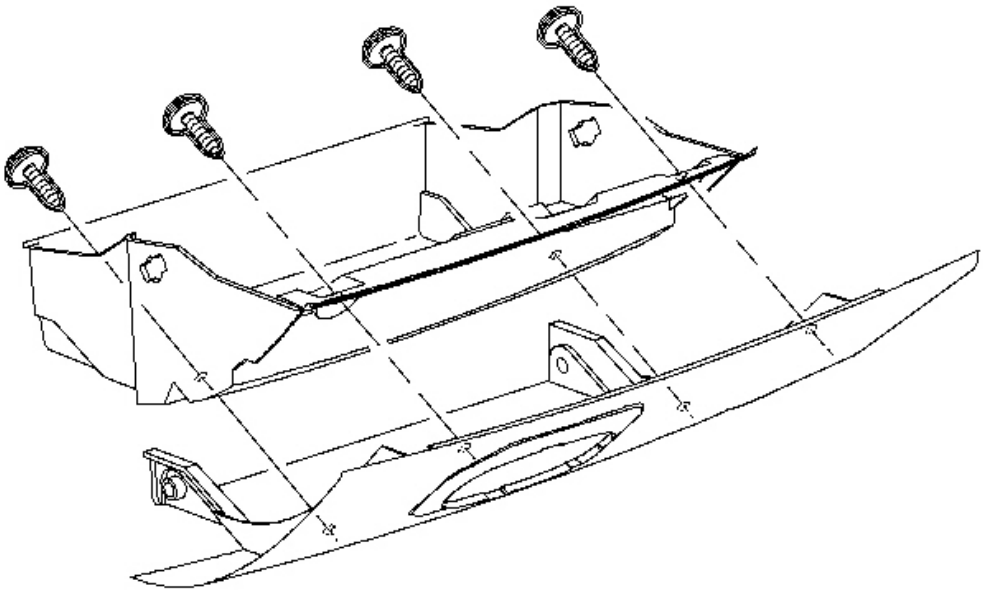


Fig. 57: View Of Instrumental Panel (I/P) Compartment Door
Courtesy of GENERAL MOTORS CORP.

1. Remove the I/P compartment. Refer to **Compartment Replacement - Instrument Panel (I/P)** .
2. Remove the compartment door screws.
3. Remove the compartment door.

Installation Procedure

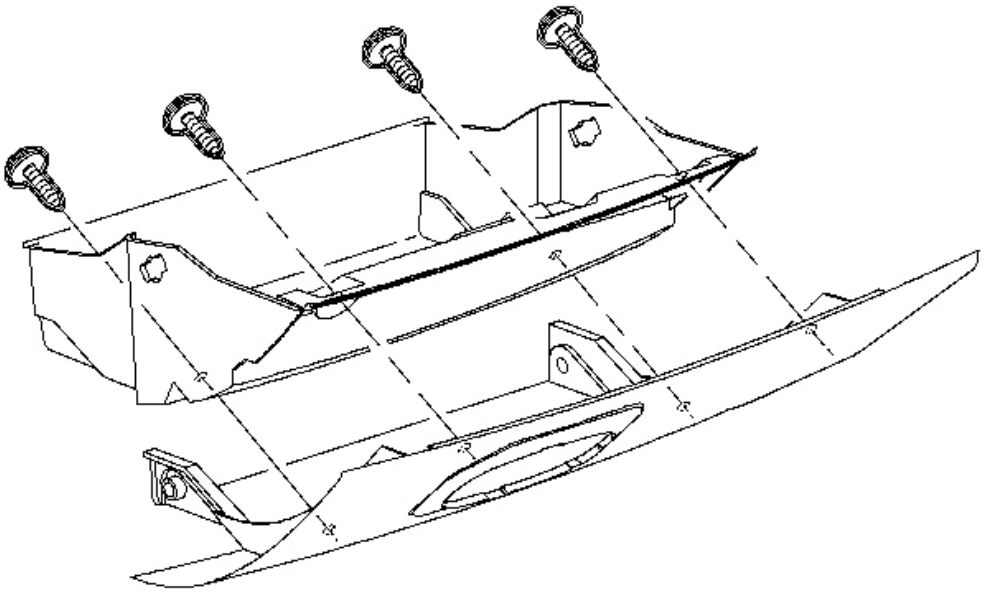


Fig. 58: View Of Instrumental Panel (I/P) Compartment Door
Courtesy of GENERAL MOTORS CORP.

1. Position the I/P compartment door.

   NOTE: Refer to Fastener Notice in Cautions and Notices.

2. Install the compartment door screws.

   Tighten: Tighten the screws to 2 N.m (18 lb in).

3. Install the I/P compartment. Refer to **Compartment Replacement - Instrument Panel (I/P)** .

HANDLE REPLACEMENT - INSTRUMENT PANEL (I/P) COMPARTMENT

Removal Procedure

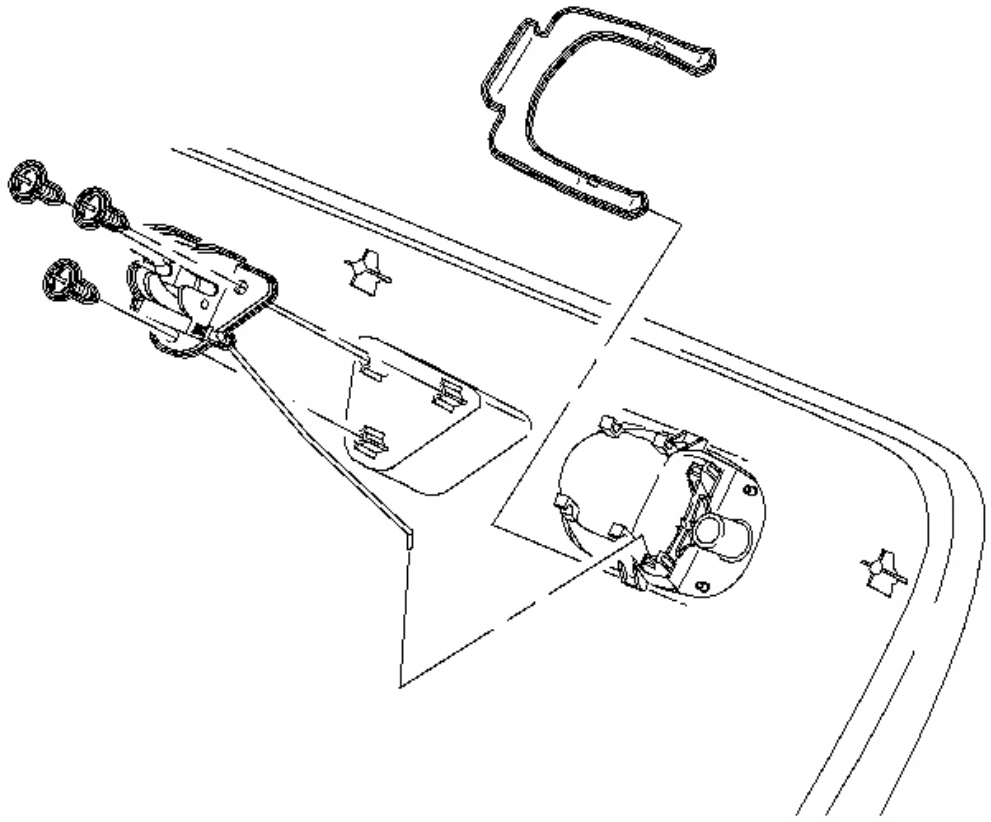


Fig. 59: View Of Instrument Panel (I/P) Compartment Door Handle
Courtesy of GENERAL MOTORS CORP.

1. Remove the I/P compartment door. Refer to **Door Replacement - Instrument Panel (I/P) Compartment** .
2. Remove the compartment latch screws.
3. Remove the latch and rod assembly from the compartment door handle assembly.
4. Remove the U-clip from the handle assembly.

5. Remove the handle assembly from the compartment.

Installation Procedure

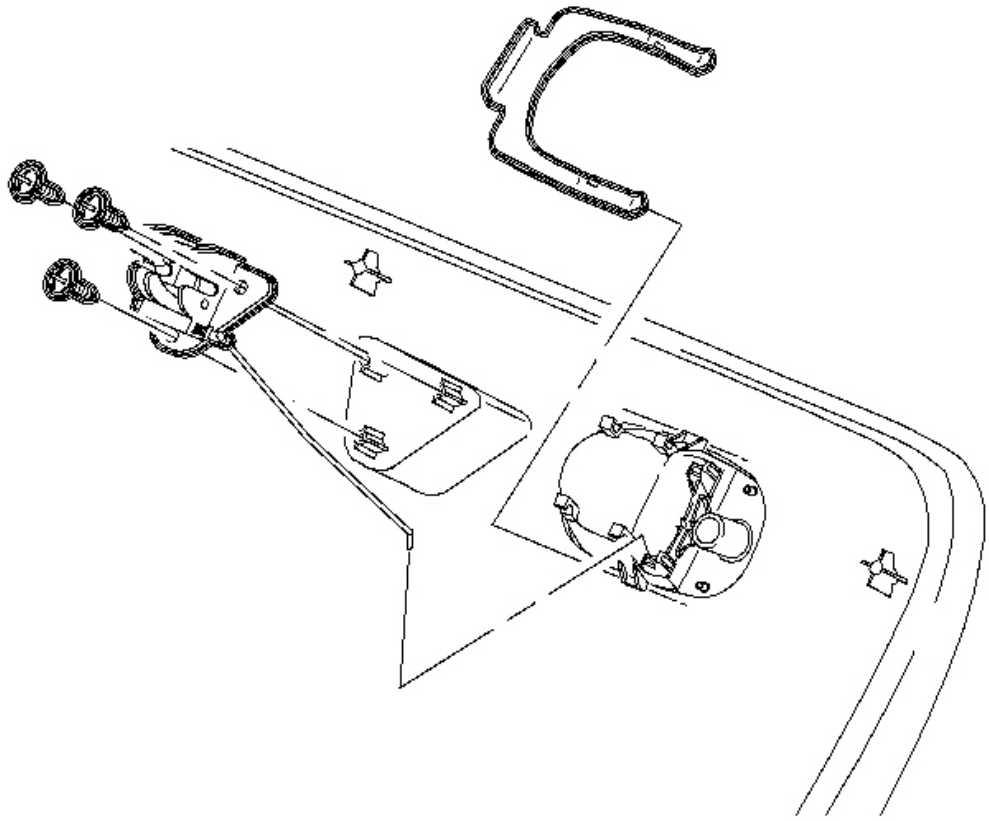


Fig. 60: View Of Instrumental Panel (I/P) Compartment Door Handle
Courtesy of GENERAL MOTORS CORP.

1. Position the handle assembly to the I/P compartment door.
2. Install the U-clip.
3. Position the latch and rod assembly to the compartment door.

NOTE: Refer to Fastener Notice in Cautions and Notices.

4. Install the latch screws.

   Tighten: Tighten the screws 2 N.m (18 lb in).

5. Install the I/P compartment door. Refer to **Door Replacement - Instrument Panel (I/P) Compartment** .

LATCH REPLACEMENT - INSTRUMENT PANEL (I/P) COMPARTMENT

Removal Procedure

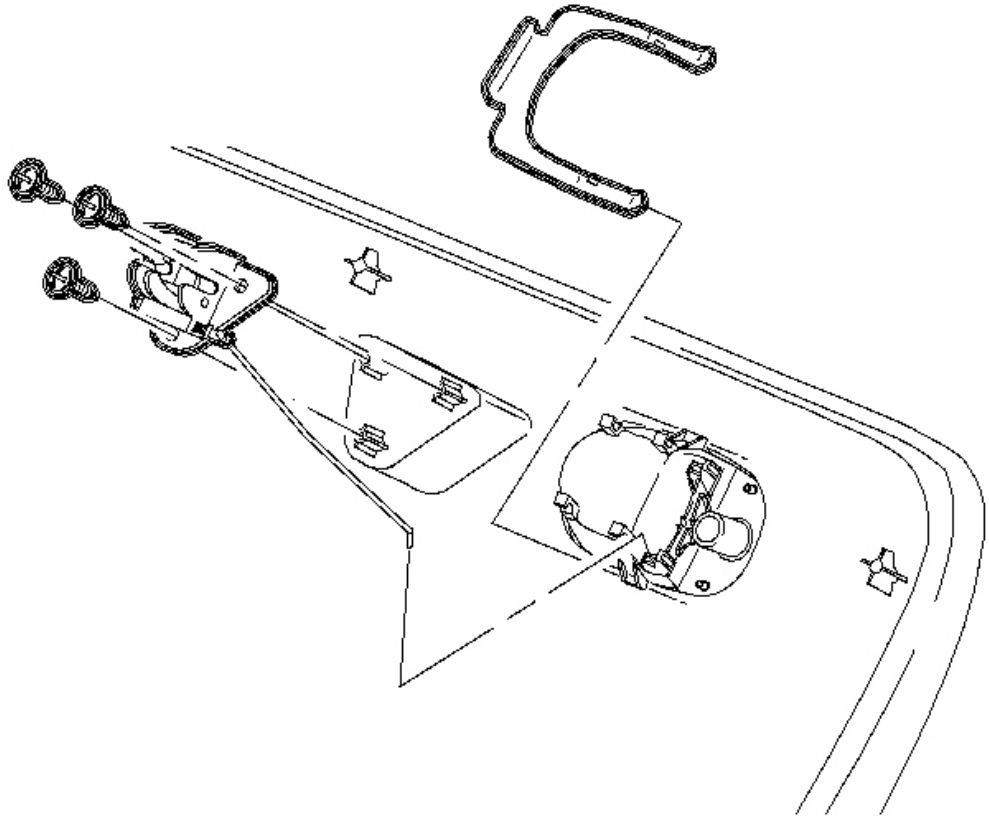


Fig. 61: View Of Instrumental Panel (I/P) Compartment Latch
Courtesy of GENERAL MOTORS CORP.

1. Remove the I/P compartment door. Refer to **Door Replacement - Instrument Panel (I/P) Compartment** .
2. Remove the compartment latch screws.
3. Remove the latch and rod assembly from the compartment door.

Installation Procedure

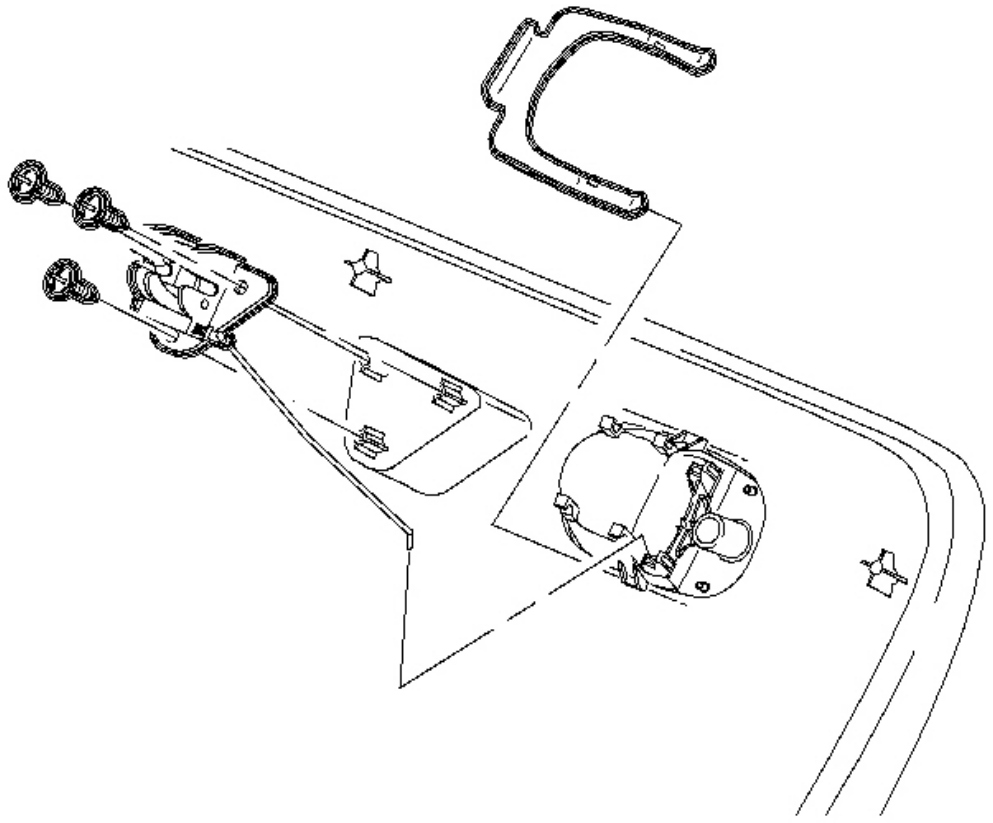


Fig. 62: View Of Instrumental Panel (I/P) Compartment Door Handle
Courtesy of GENERAL MOTORS CORP.

1. Position the latch and rod assembly to the handle.

NOTE: **Refer to Fastener Notice in Cautions and Notices.**

2. Install the latch screws.

   Tighten: Tighten the screws to 2 N.m (18 lb in).

3. Install the I/P compartment door. Refer to **Door Replacement - Instrument Panel (I/P) Compartment** .

LOCK CYLINDER REPLACEMENT - INSTRUMENT PANEL (I/P) COMPARTMENT

Removal Procedure

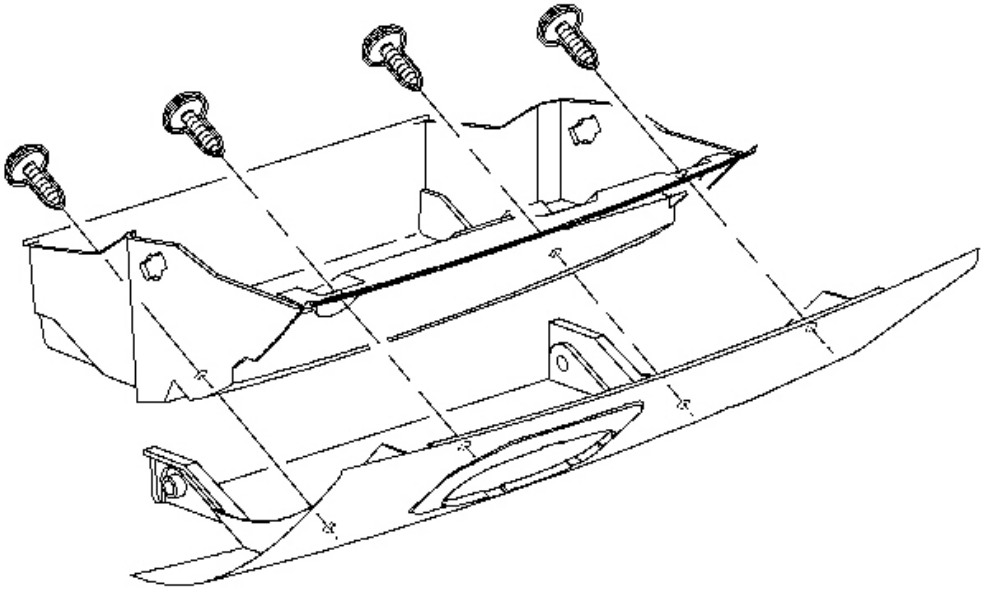


Fig. 63: View Of Instrumental Panel (I/P) Compartment Door Lock Cylinder

Courtesy of GENERAL MOTORS CORP.

1. Remove the I/P compartment door cover.
2. Insert the key into the I/P compartment lock cylinder and rotate the cylinder clockwise 90 degrees. The cylinder will stop and the retainer tumbler will be visible.

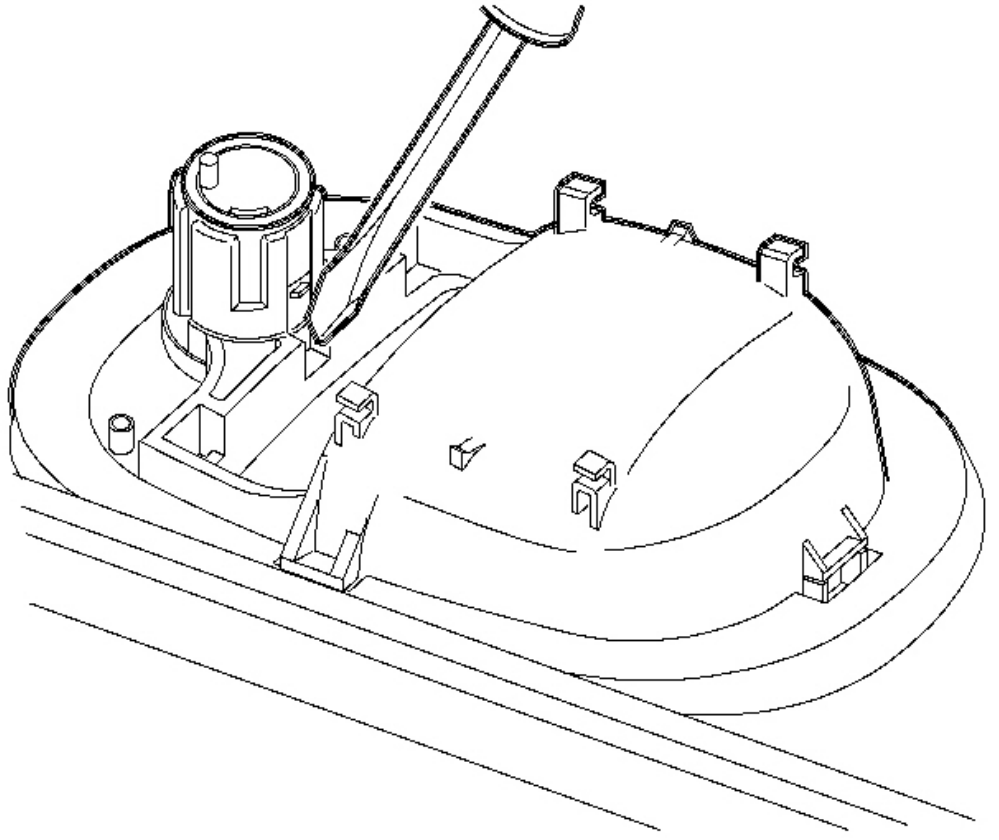


Fig. 64: View Of Retainer Tumbler With A Thin Flat-Bladed Tool
Courtesy of GENERAL MOTORS CORP.

3. Depress the retainer tumbler with a thin flat-bladed tool.

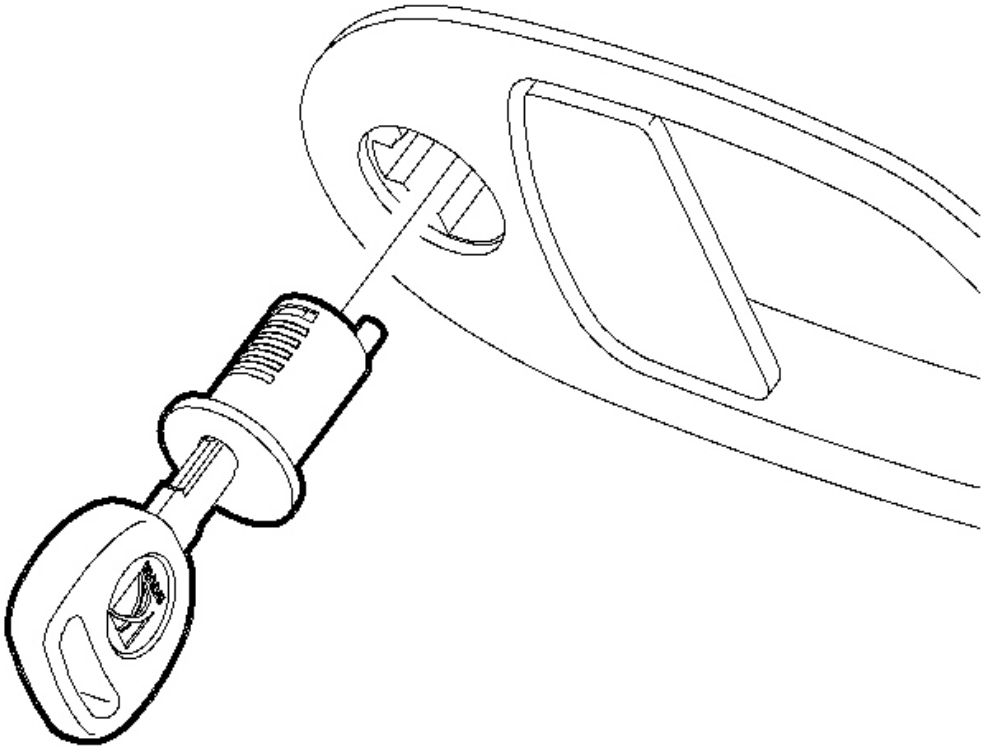


Fig. 65: Rotating & Removing Lock Cylinder
Courtesy of GENERAL MOTORS CORP.

4. Rotate the lock cylinder an additional 90 degrees and remove the lock cylinder.

Installation Procedure

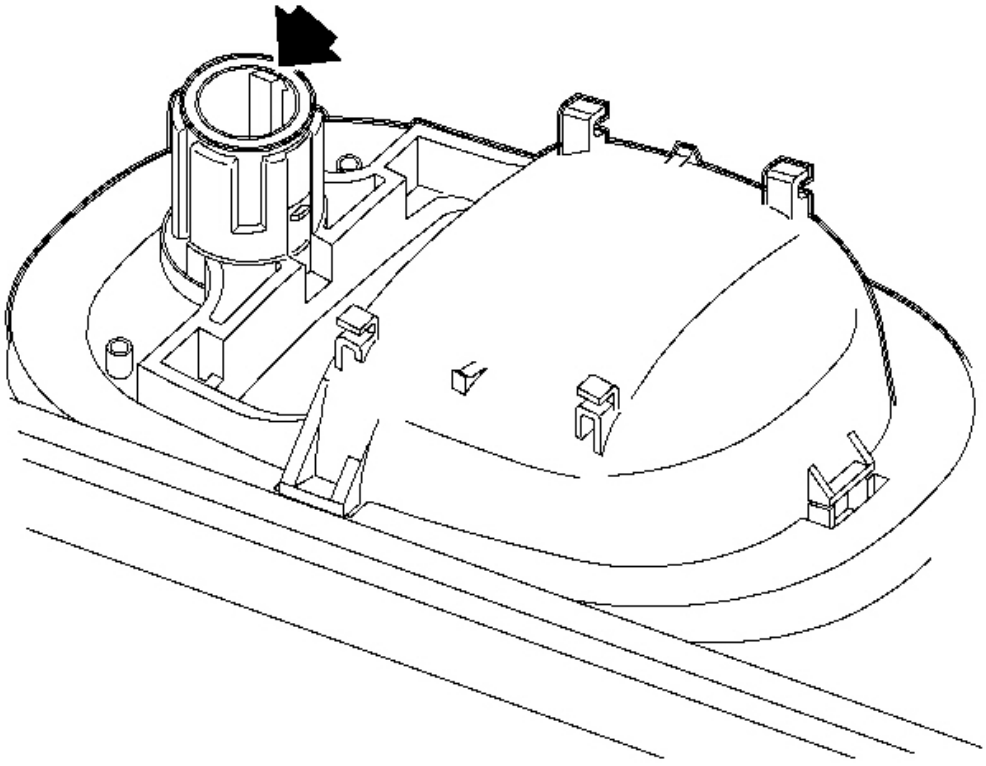


Fig. 66: Identifying Cylinder Plug Locking Tab
Courtesy of GENERAL MOTORS CORP.

IMPORTANT: If this is the initial installation of the I/P compartment door lock, you must first remove the factory installed cylinder plug by depressing the locking tab and pushing the plug out of the door.

IMPORTANT: When you insert the key into a properly coded lock cylinder, all of the tumblers except the retainer cylinder will be flush with the lock cylinder.

1. Insert the key into the lock cylinder.

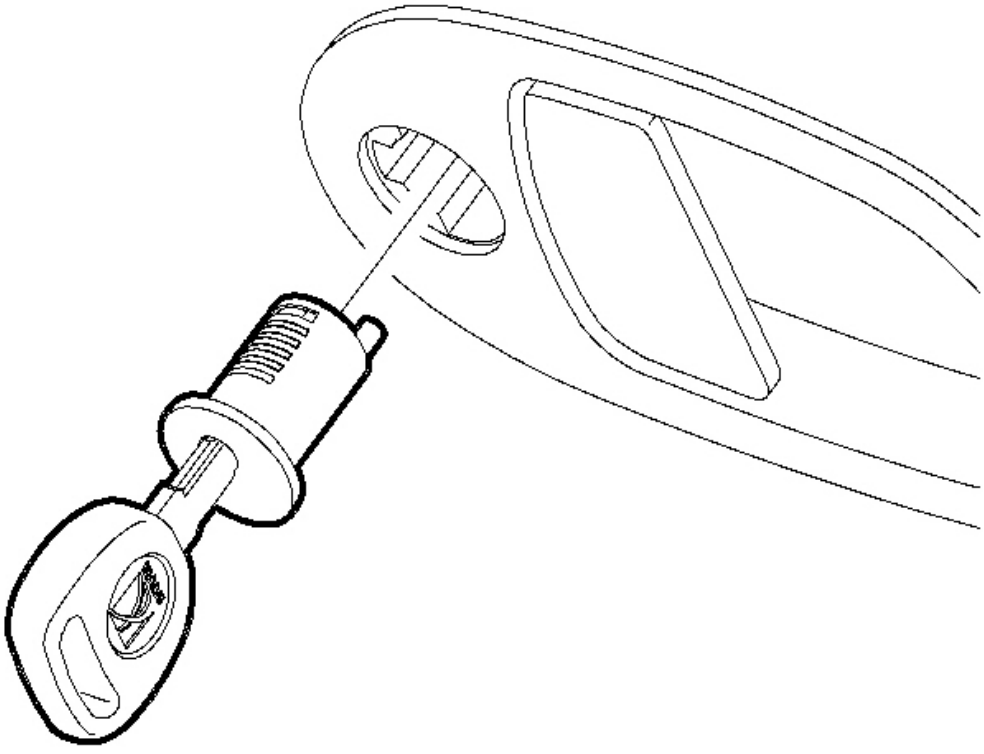


Fig. 67: Rotating & Removing Lock Cylinder
Courtesy of GENERAL MOTORS CORP.

2. Place the key and the lock cylinder into the I/P compartment door handle.
3. Rotate the lock cylinder counterclockwise 180 degrees to engage the retainer tumblers.

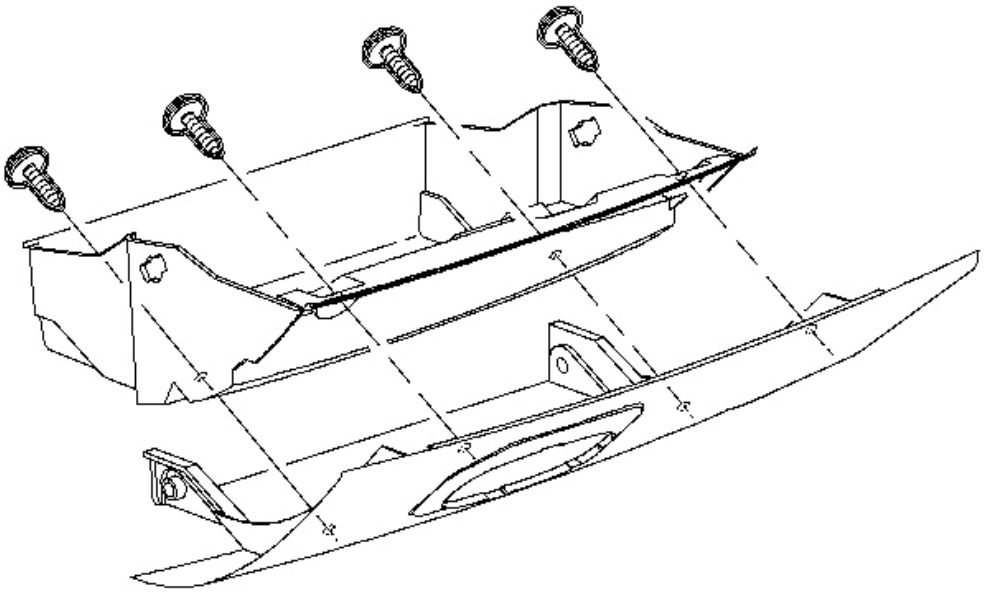


Fig. 68: View Of Instrumental Panel (I/P) Compartment Door
Courtesy of GENERAL MOTORS CORP.

4. Install the cover on the I/P compartment door.

DEFROSTER GRILLE REPLACEMENT

Removal Procedure

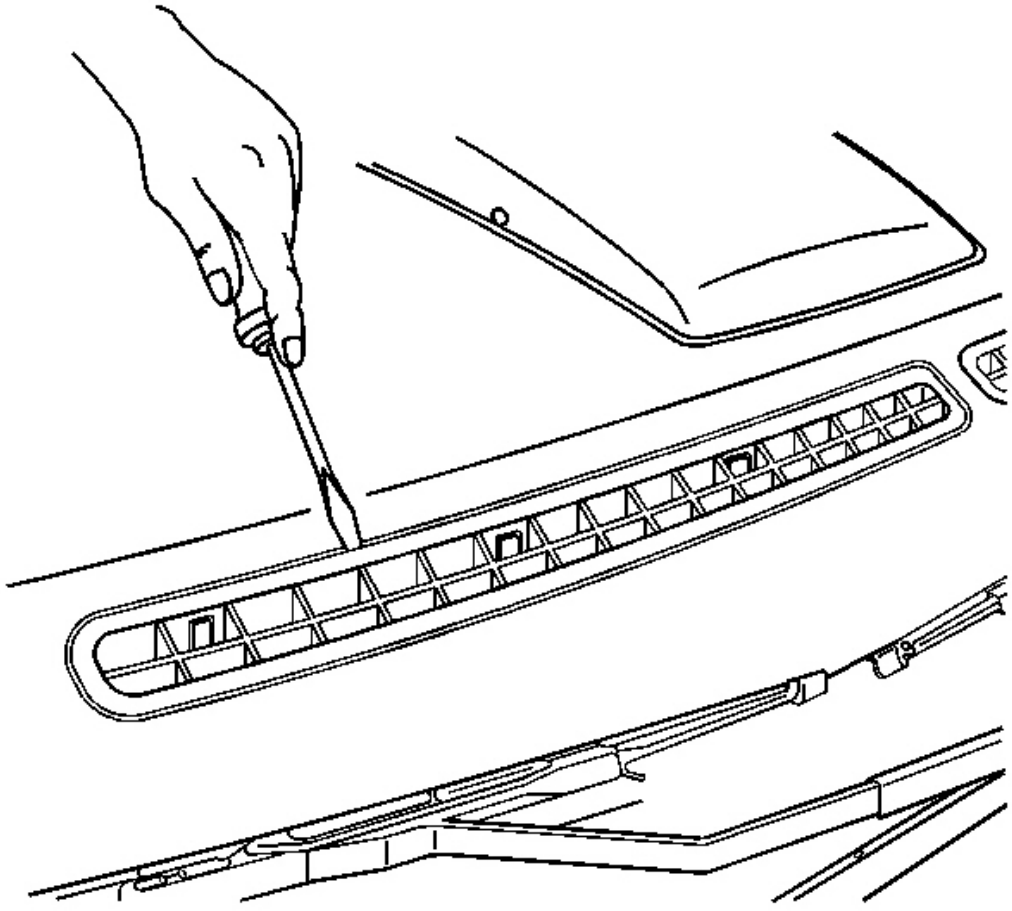


Fig. 69: View Of Defroster Grille
Courtesy of GENERAL MOTORS CORP.

1. Remove the I/P upper trim panel. Refer to **Trim Panel Replacement - Instrument Panel (I/P) Upper** .
2. Depress the tabs on the rear side of the defroster grille and remove the grille from the I/P trim pad.

Installation Procedure

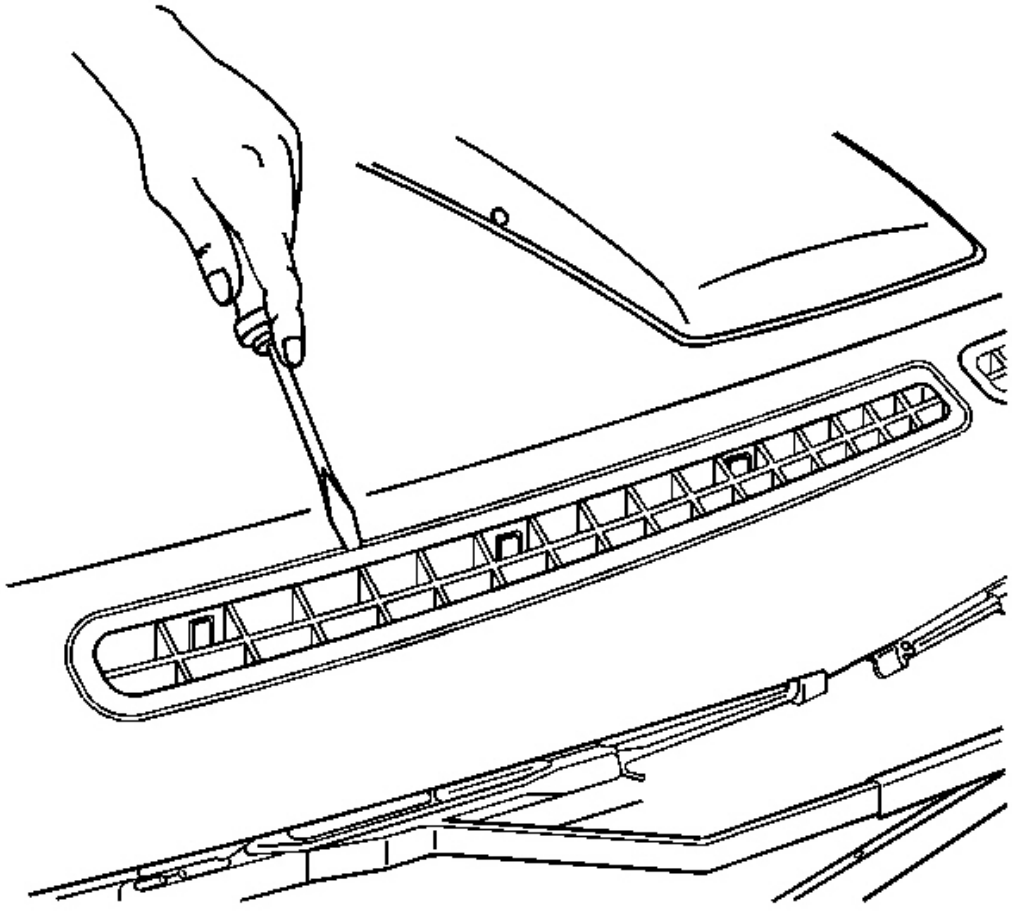


Fig. 70: View Of Defroster Grille
Courtesy of GENERAL MOTORS CORP.

1. Position the defroster grille in the I/P trim pad and push to install the grille within the tabs.
2. Install the I/P upper trim panel. Refer to **Trim Panel Replacement - Instrument Panel (I/P) Upper** .

STEERING COLUMN FILLER REPLACEMENT

Removal Procedure

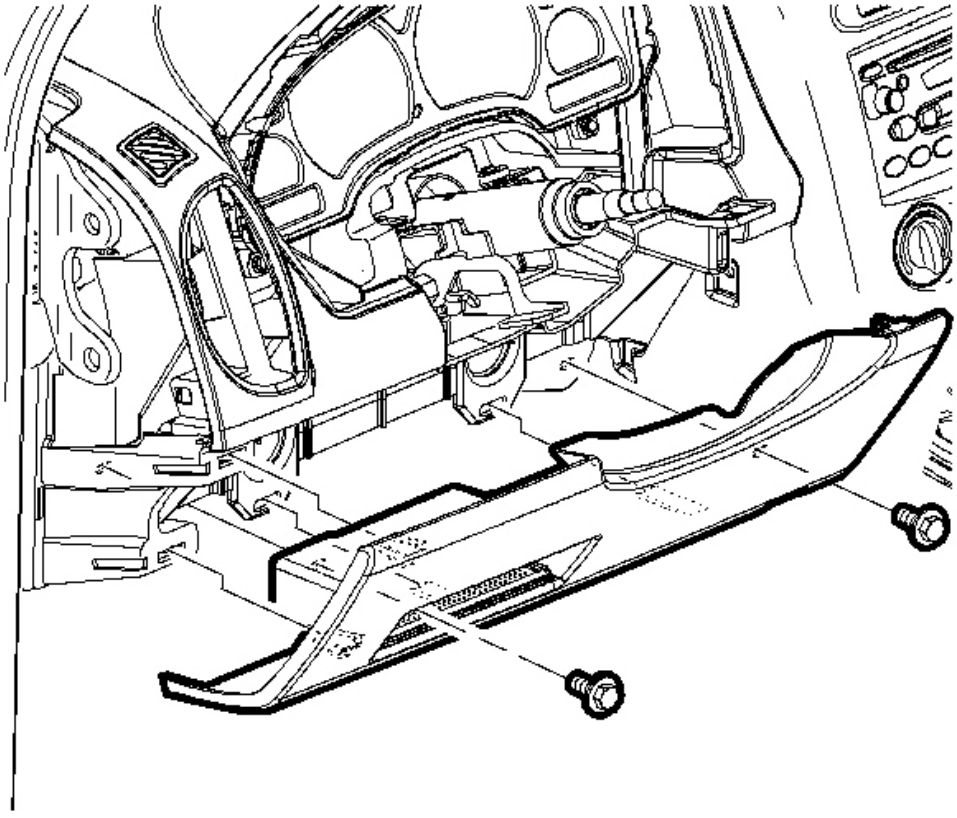


Fig. 71: Removing/Installing Screws From The Steering Column Filler Panel
Courtesy of GENERAL MOTORS CORP.

1. Remove the screws from the steering column filler panel.
2. Pull on the trim panel to disengage the trim clips.
3. Remove the filler panel from the vehicle.

Installation Procedure

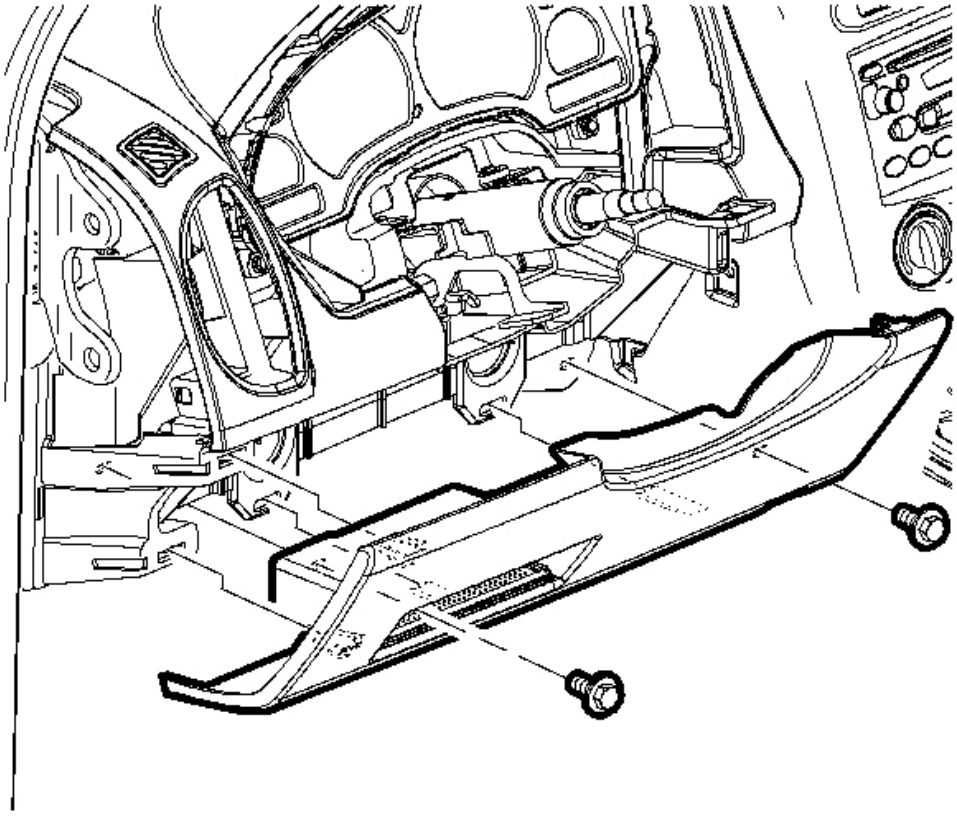


Fig. 72: Removing/Installing Screws From The Steering Column Filler Panel
Courtesy of GENERAL MOTORS CORP.

1. Position the filler panel in the vehicle.
2. Push on the panel to engage the trim clips.

NOTE: Refer to Fastener Notice in Cautions and Notices.

3. Install the screws to the steering column filler panel.

Tighten: Tighten the screws to 2.5 N.m (22 lb in).

INSTRUMENT PANEL (I/P) RETAINER REPLACEMENT

Removal Procedure

CAUTION: A deployed dual stage inflator module will look the same whether one or both stages were used, always assume a deployed dual stage inflator module has an active stage 2. Improper handling or servicing can activate the inflator module and cause personal injury.

CAUTION: Refer to SIR Inflator Module Handling and Storage Caution .

CAUTION: Refer to SIR Caution .

1. Disable the frontal SIR system. Refer to **SIR Disabling and Enabling Zone 3** and **SIR Disabling and Enabling Zone 5** in SIR.
2. Remove the I/P upper trim panel. Refer to **Trim Panel Replacement - Instrument Panel (I/P) Upper** .
3. Remove the I/P compartment. Refer to **Compartment Replacement - Instrument Panel (I/P)** .

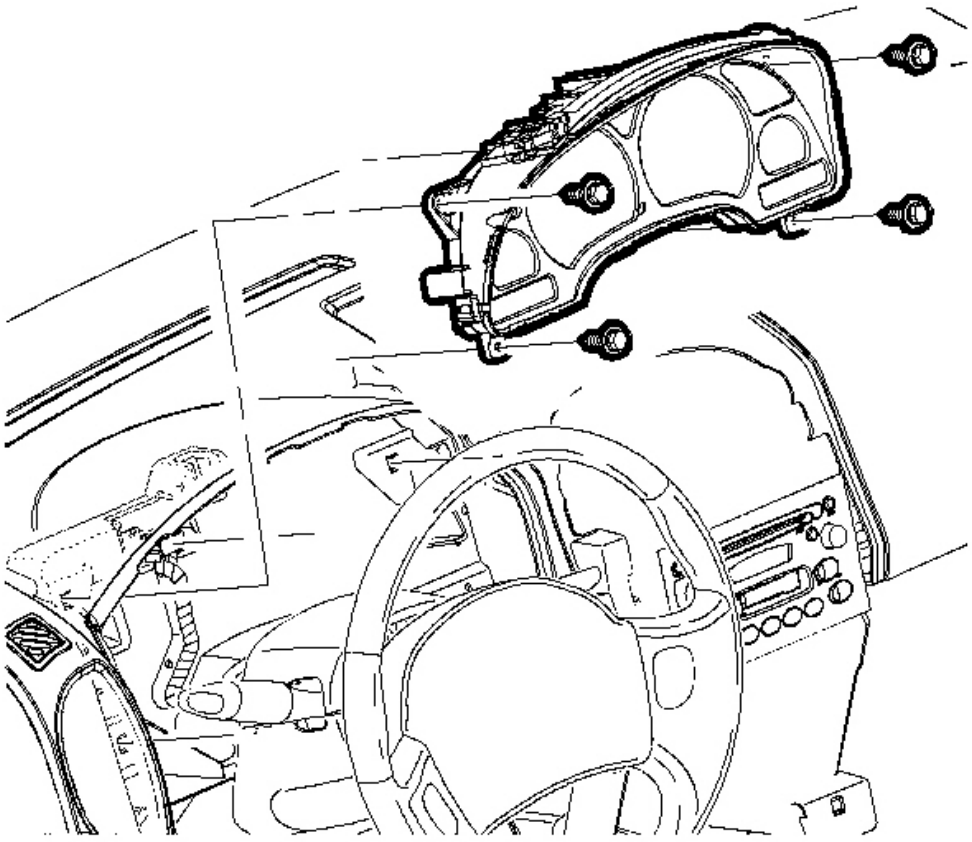


Fig. 73: View Of Instrument Panel (I/P) Retainer
Courtesy of GENERAL MOTORS CORP.

4. Remove the I/P cluster screws
5. Pull rearward to remove the I/P cluster.

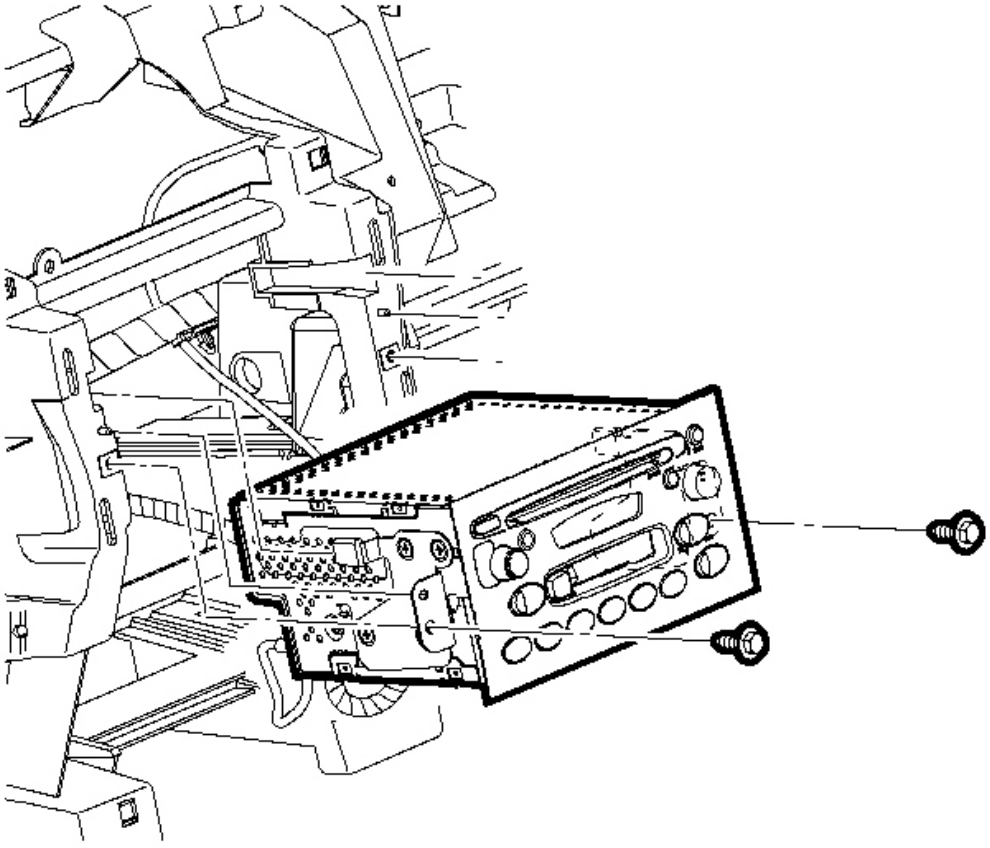


Fig. 74: Removing/Installing Radio Screws
Courtesy of GENERAL MOTORS CORP.

6. Remove the radio screws.
7. Remove the radio.

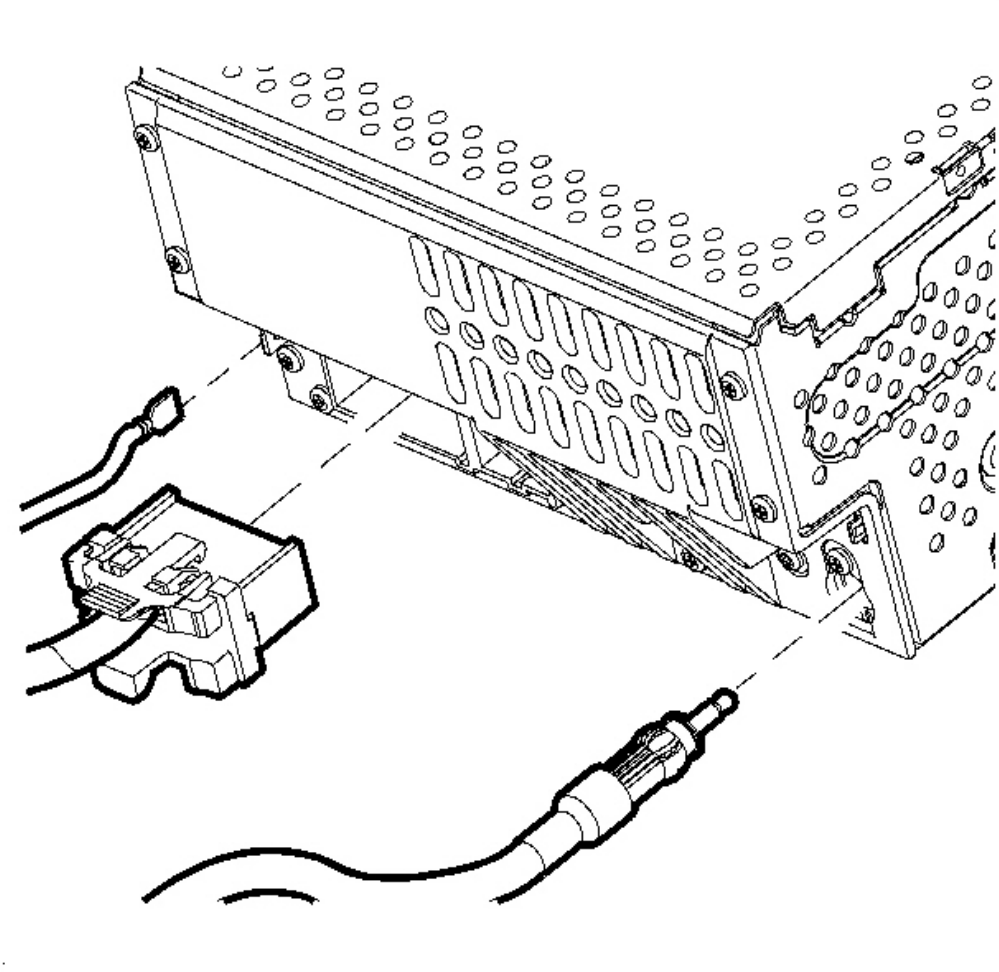


Fig. 75: Disconnecting/Connecting Radio Antenna, Ground Strap, and Electrical Connectors
Courtesy of GENERAL MOTORS CORP.

8. Disconnect the radio antenna, the ground strap, and the electrical connectors.

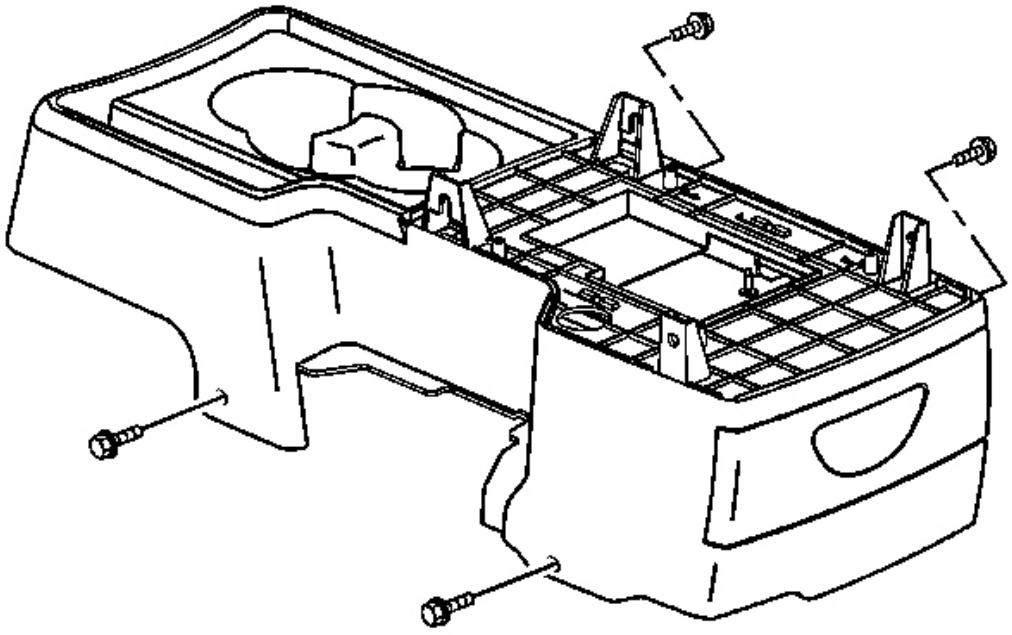


Fig. 76: Removing/Installing Console Screws
Courtesy of GENERAL MOTORS CORP.

9. Position the front seats rearward.
10. Reach under the front seats to access the lower console screws.
11. Remove the console screws.

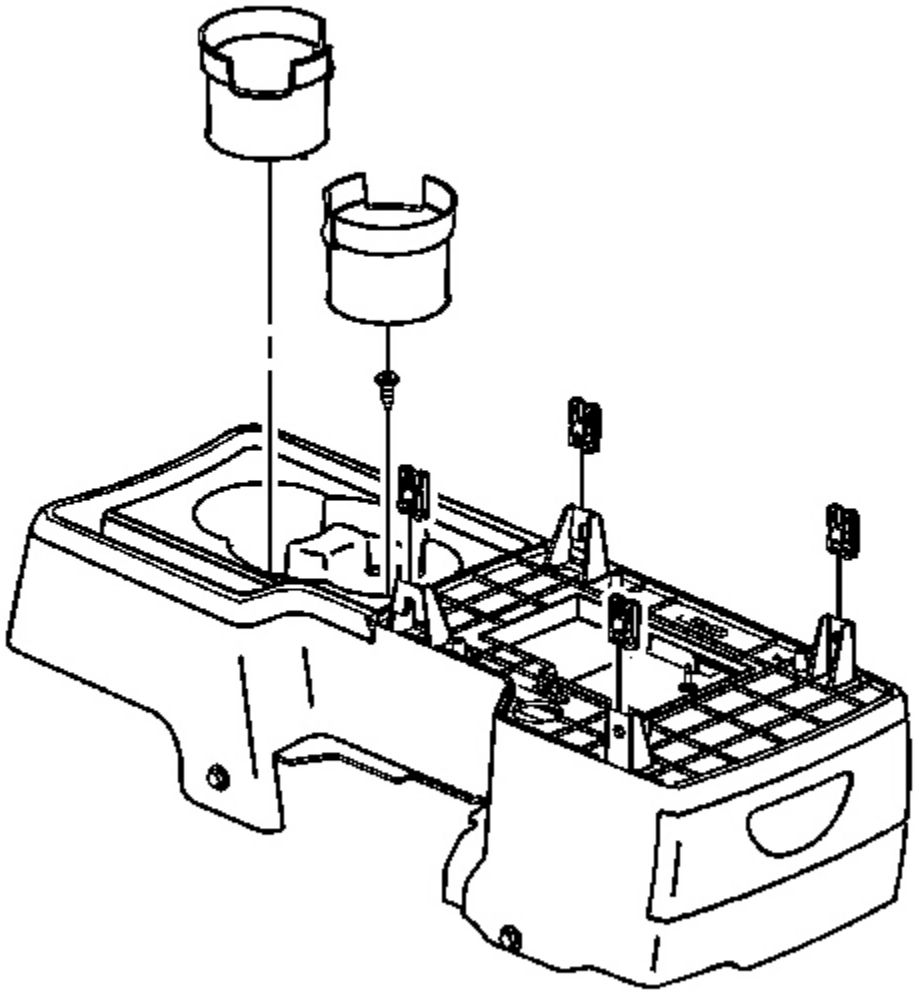


Fig. 77: Removing/Installing Cup Holder Liner
Courtesy of GENERAL MOTORS CORP.

12. Remove the cup holder.

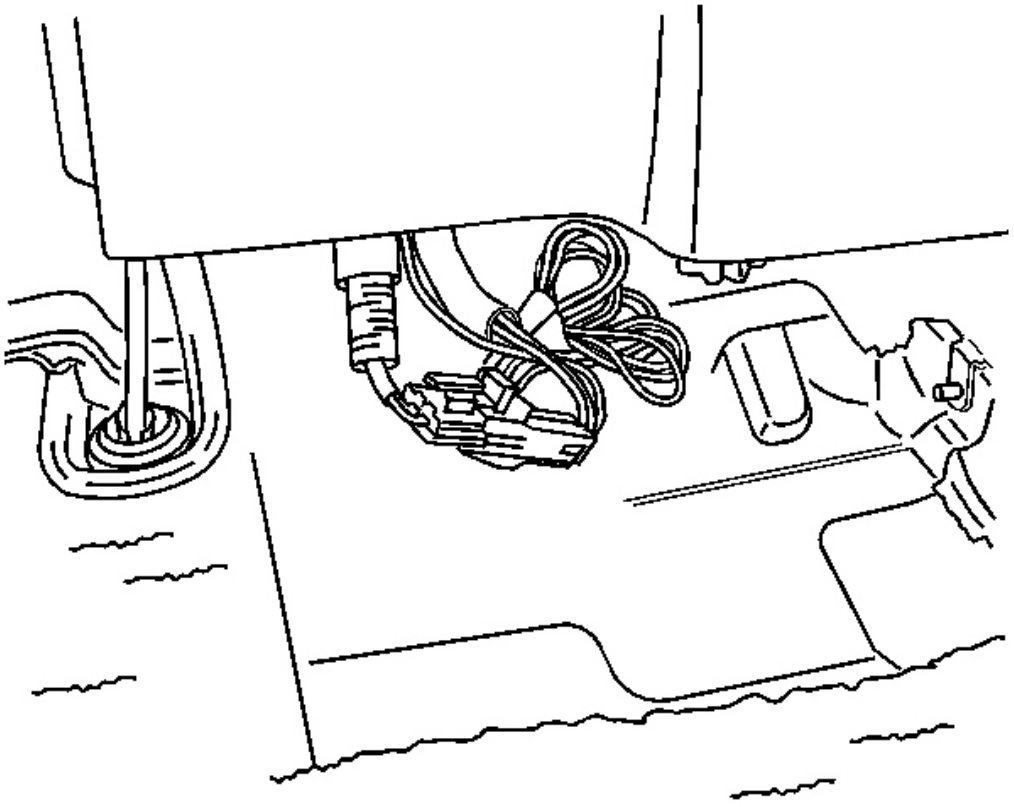


Fig. 78: Disconnecting/Connecting Electrical Connector To The Auxiliary Power Outlet
Courtesy of GENERAL MOTORS CORP.

13. Lift the rear of the center floor console.
14. Disconnect the electrical connector to the auxiliary power outlet.
15. Slide the console rearward.

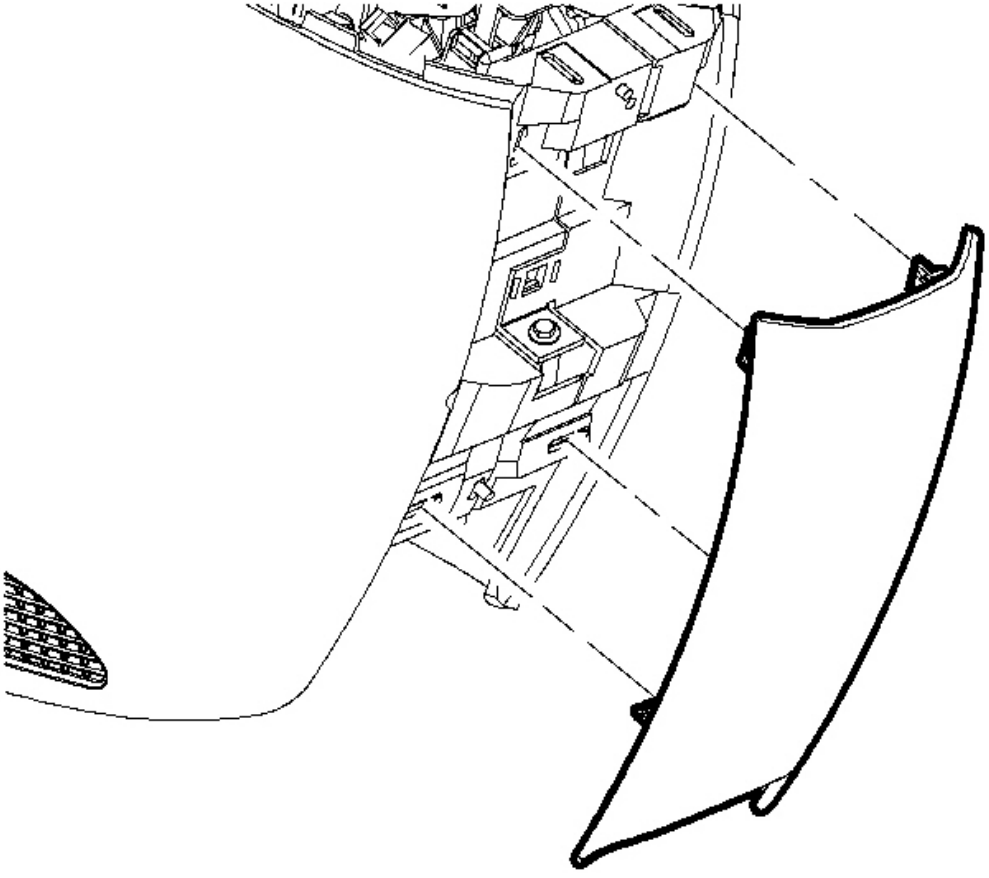


Fig. 79: Removing/Installing Center Trim Plate
Courtesy of GENERAL MOTORS CORP.

16. Remove the center trim plate from the front console.

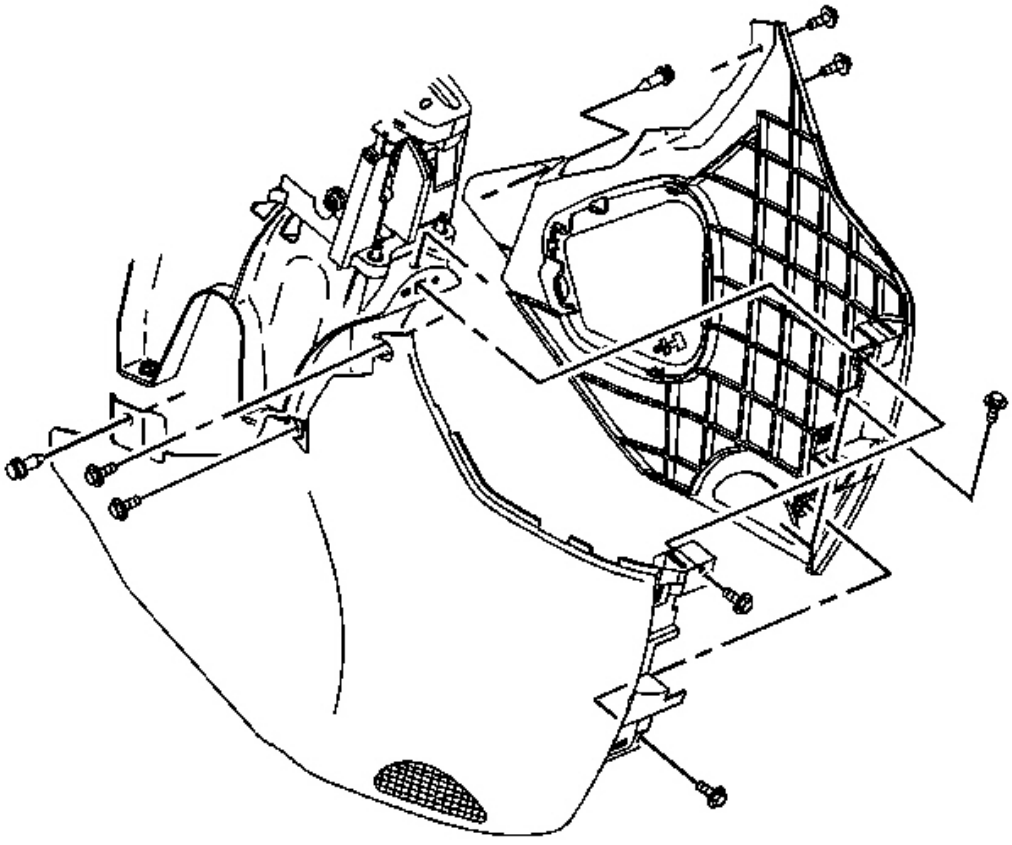


Fig. 80: Removing/Installing Front Console Trim Panels
Courtesy of GENERAL MOTORS CORP.

17. Remove the front console screws from the right and the left trim panels.
18. Remove the front console trim panels.

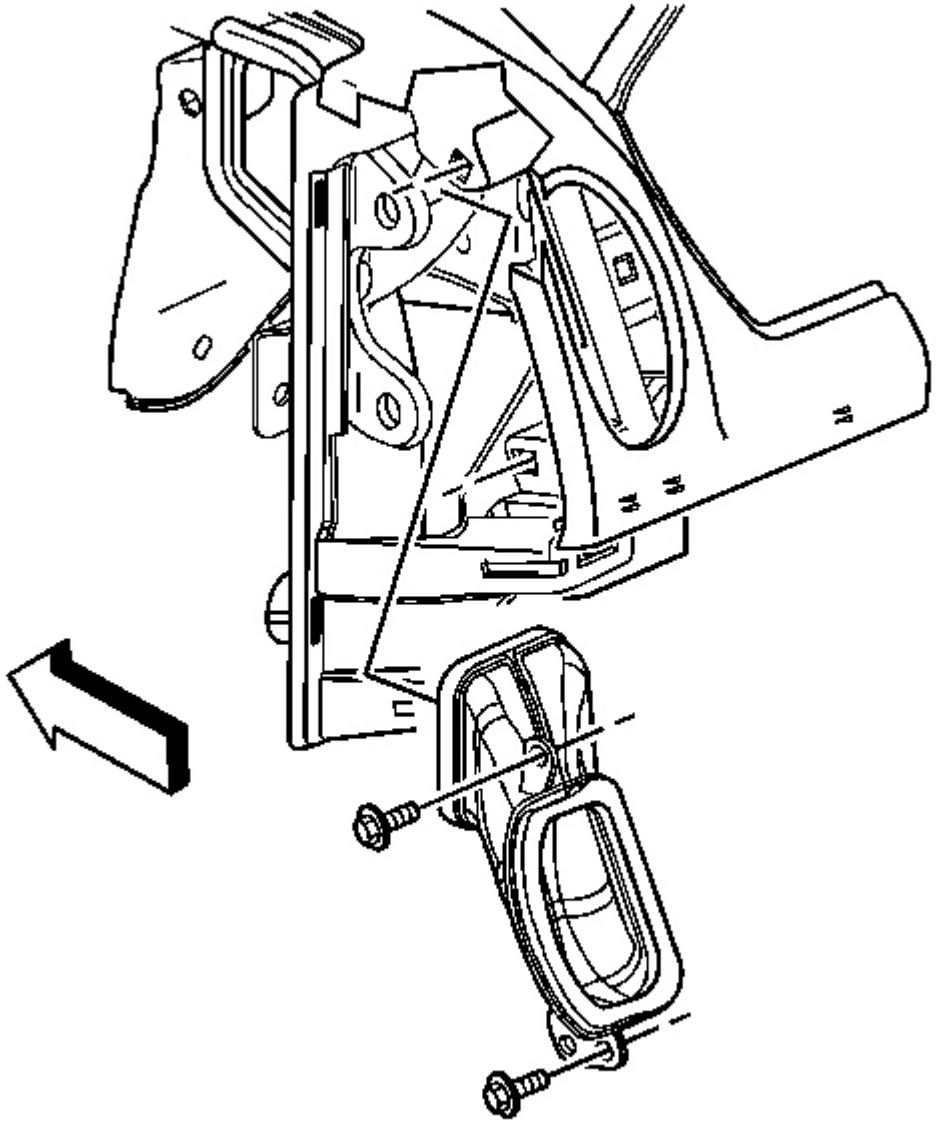


Fig. 81: Removing/Installing Screws To The Outlet Ducts
Courtesy of GENERAL MOTORS CORP.

19. Remove the screws from the right and the left air outlet ducts.

    Remove the outlet ducts.

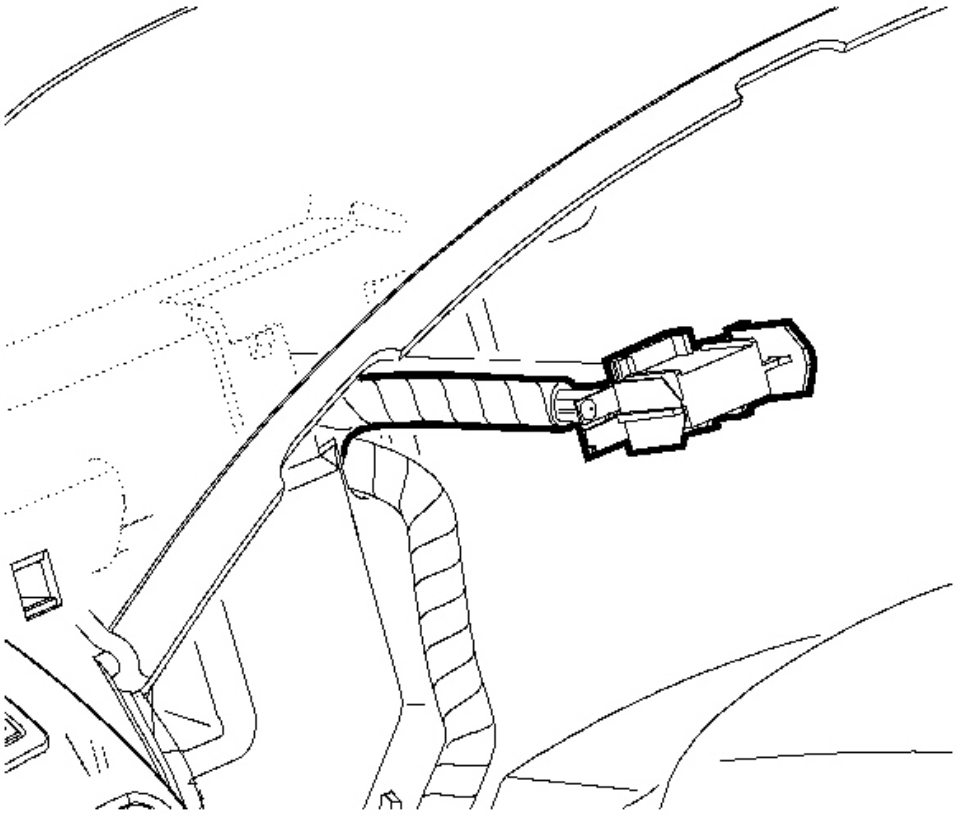


Fig. 82: Removing/Installing I/P Cluster Electrical Connector
Courtesy of GENERAL MOTORS CORP.

20. Remove the I/P cluster electrical connector from the slot in the retainer.

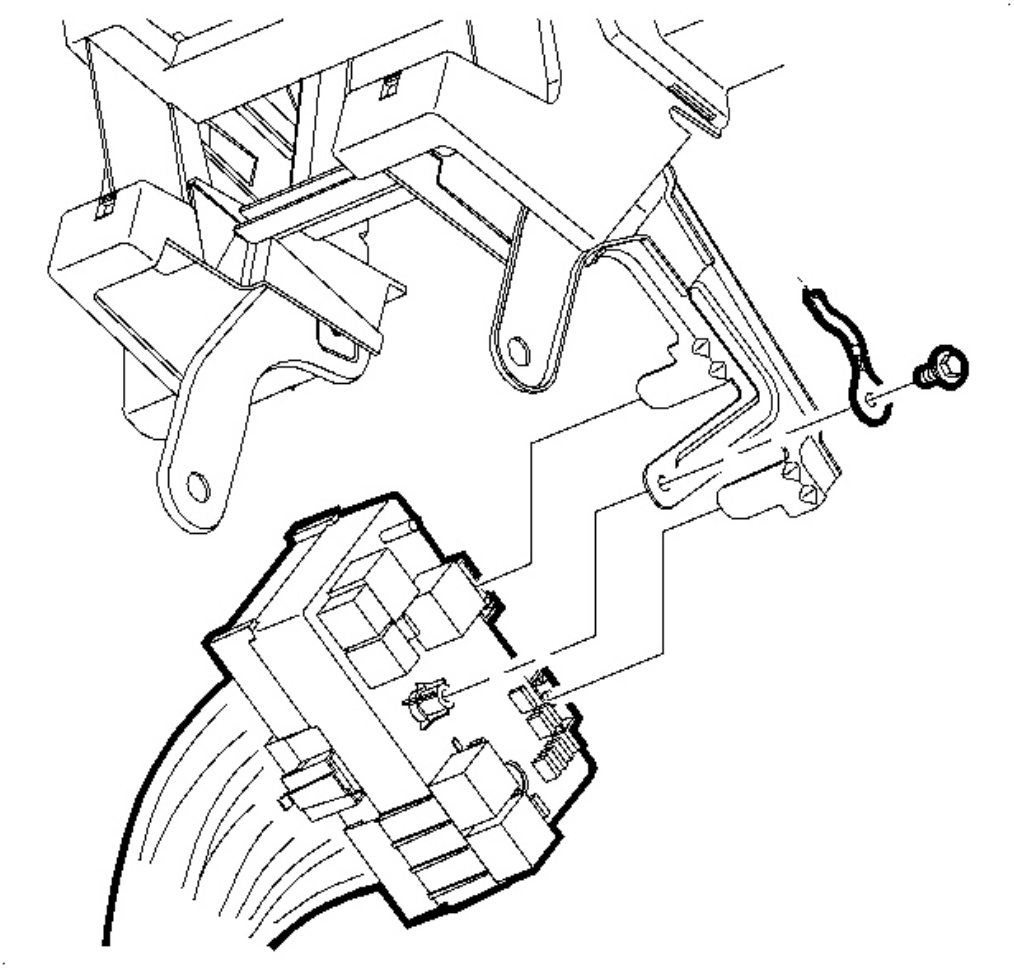


Fig. 83: Removing/Installing Screw From The Radio Ground Strap
Courtesy of GENERAL MOTORS CORP.

21. Remove the screw from the radio ground strap.
22. Remove the radio ground strap.
23. Slide the I/P electrical center off of the tabs on the I/P bracket.

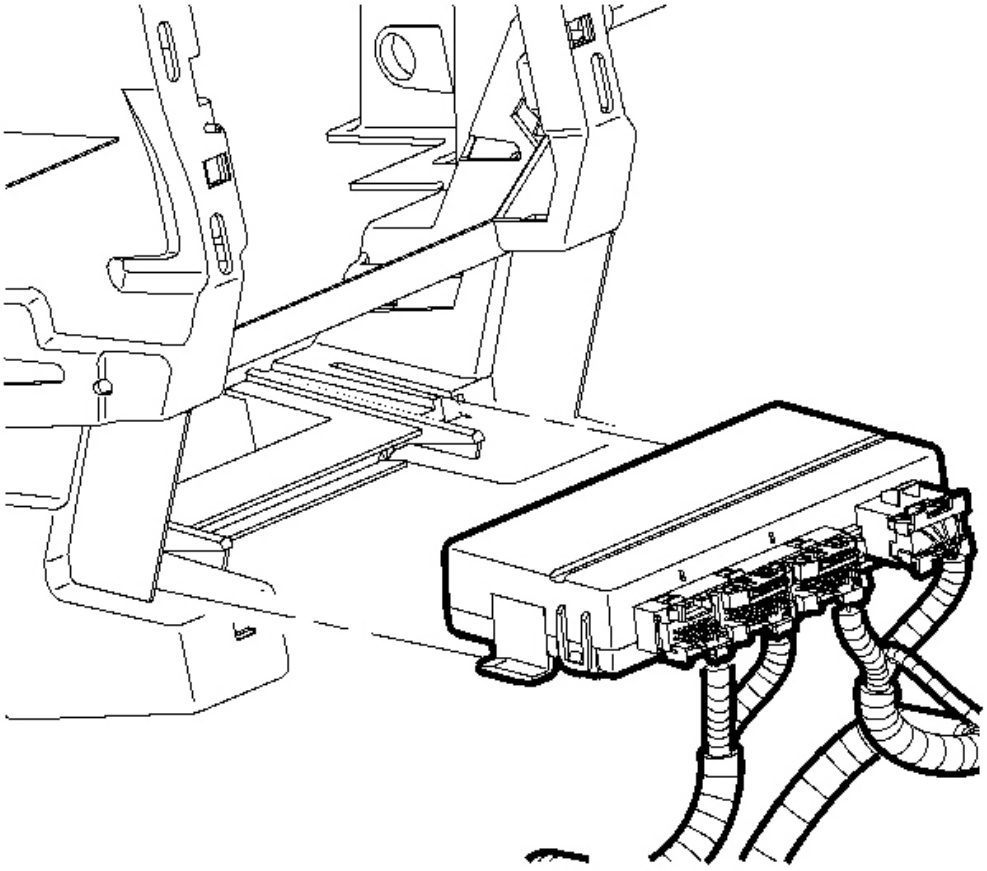


Fig. 84: Disconnecting/Connecting Body Control Module (BCM) Electrical Connector
Courtesy of GENERAL MOTORS CORP.

24. Disconnect the body control module (BCM) electrical connector.
25. Remove the DLC by pressing the tabs and pushing the DLC through the I/P retainer.
26. Remove the front carpet retainers. Refer to **Carpet Retainer Replacement - Front** in Interior Trim.

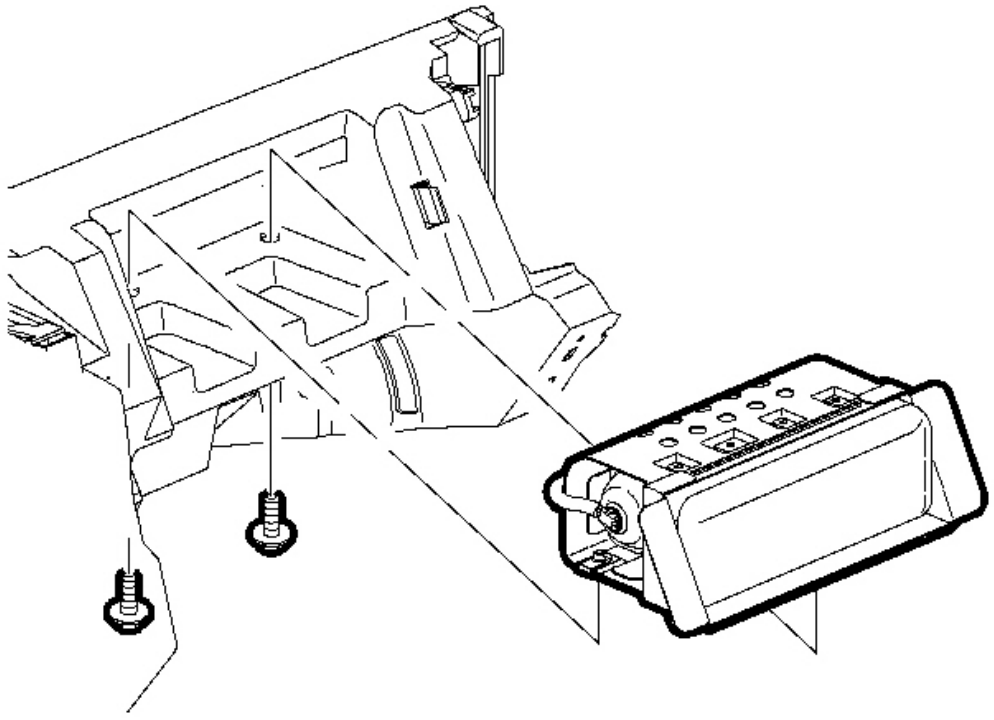


Fig. 85: Removing/Installing Bolts From The Passenger SIR System
Courtesy of GENERAL MOTORS CORP.

27. Remove the bolts from the passenger SIR system. Access these bolts by reaching through the I/P retainer in the radio area or through the air outlet area.

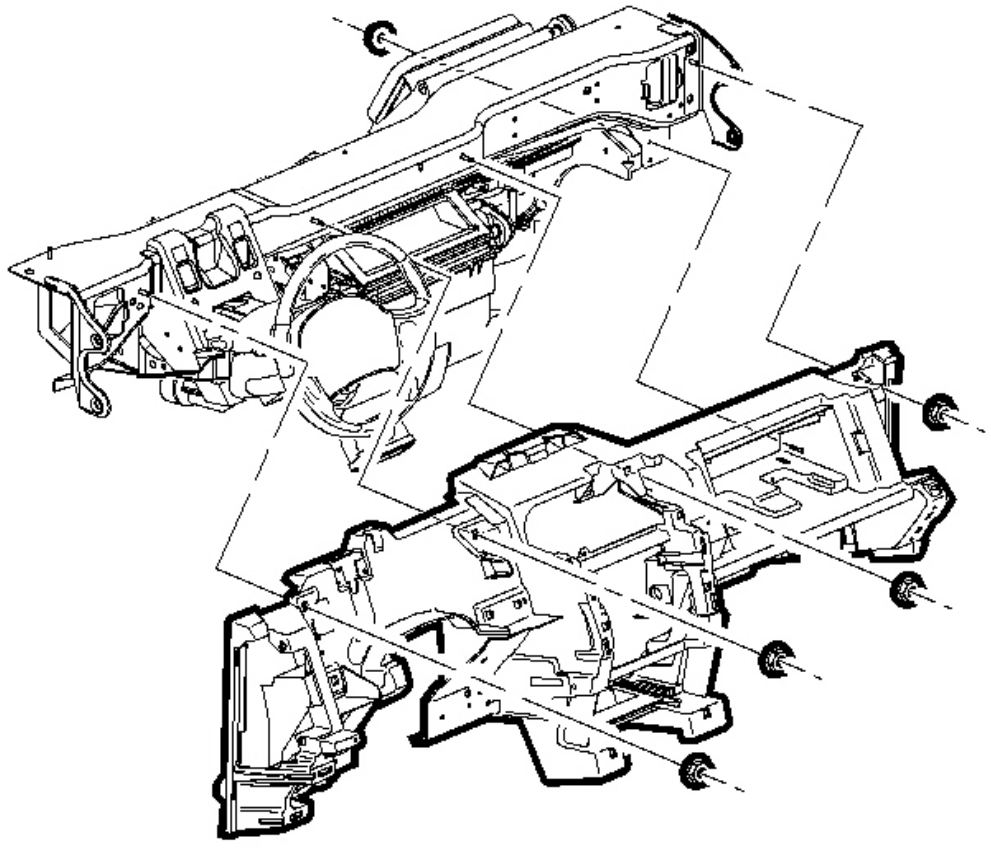


Fig. 86: Removing/Installing I/P Retainer Nuts & Bolts
Courtesy of GENERAL MOTORS CORP.

28. Disconnect the I/P ground connections from the I/P.
29. Remove the retainer nuts and bolts.
30. Remove the I/P retainer from the vehicle.

Installation Procedure

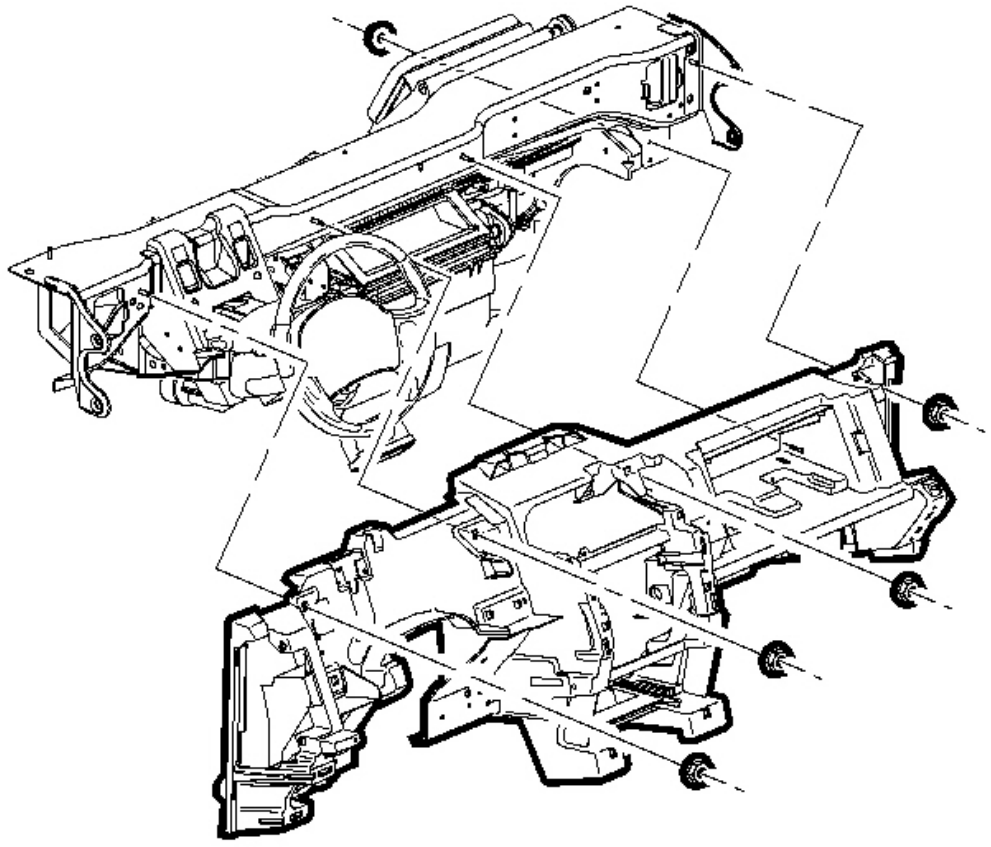


Fig. 87: Removing/Installing I/P Retainer Nuts & Bolts
Courtesy of GENERAL MOTORS CORP.

IMPORTANT: Insulators are required between the I/P retainer and the cross car beam.

1. Verify that an insulator is present at each interface of the I/P retainer to the cross car beam. Install insulators where necessary.
2. Install the I/P retainer by aligning the center 4-way locator first and then the outboard up/down locators with the corresponding holes in the cross car beam.

NOTE: Refer to Fastener Notice in Cautions and Notices.

3. Beginning in the center of the I/P, install the I/P retainer nuts and bolts.

   Tighten: Tighten the bolts to 10 N.m (89 lb in).

4. Connect the I/P grounds to the I/P.

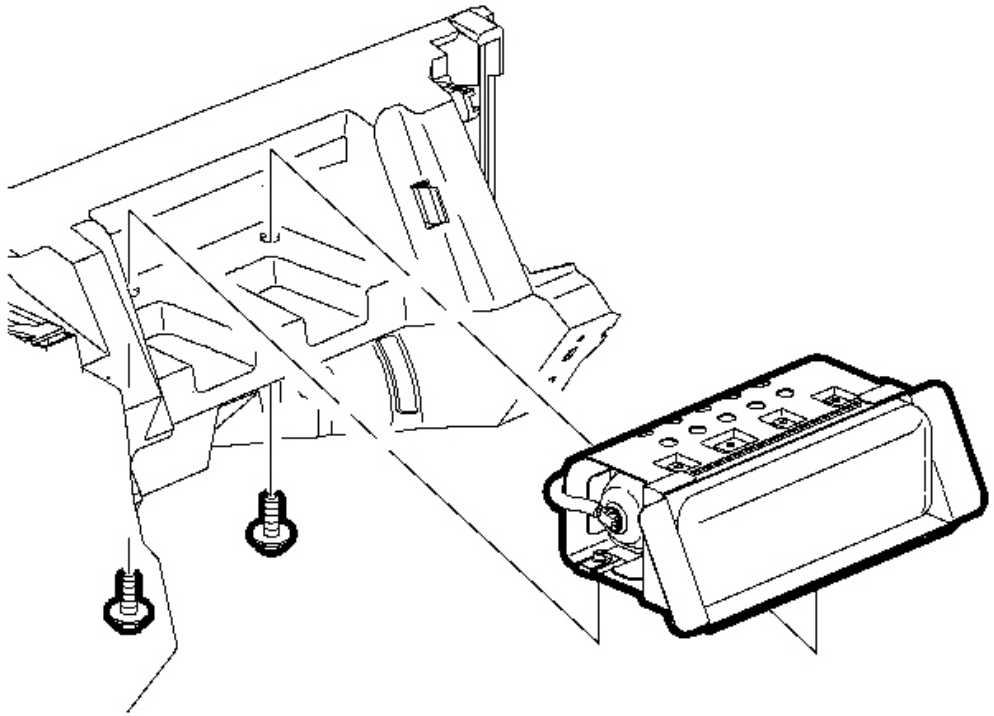


Fig. 88: Removing/Installing Bolts From The Passenger SIR System
Courtesy of GENERAL MOTORS CORP.

5. Position the passenger side frontal SIR component.
6. Install the bolts to the SIR component.

Tighten: Tighten the bolts to 10 N.m (89 lb in).

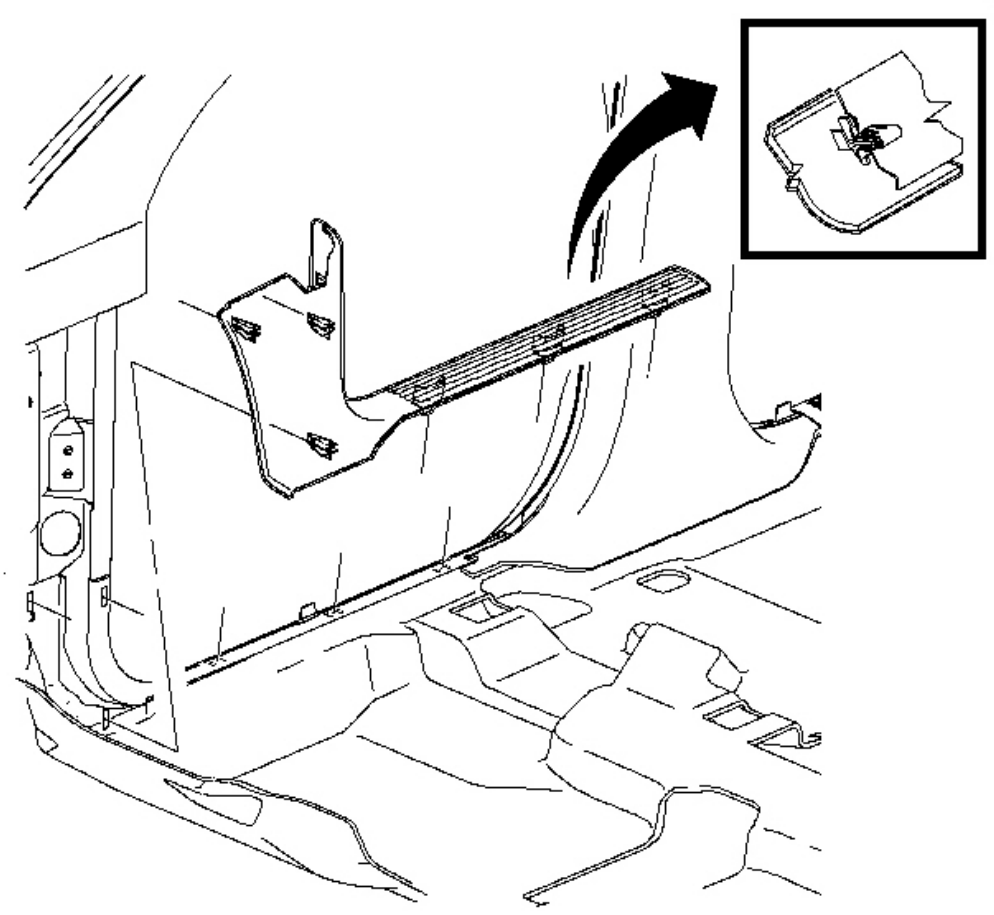


Fig. 89: Installing Front Carpet Retainers
Courtesy of GENERAL MOTORS CORP.

7. Install the front carpet retainers. Refer to **Carpet Retainer Replacement - Front** in Interior Trim.
8. Install the DLC in the I/P retainer.

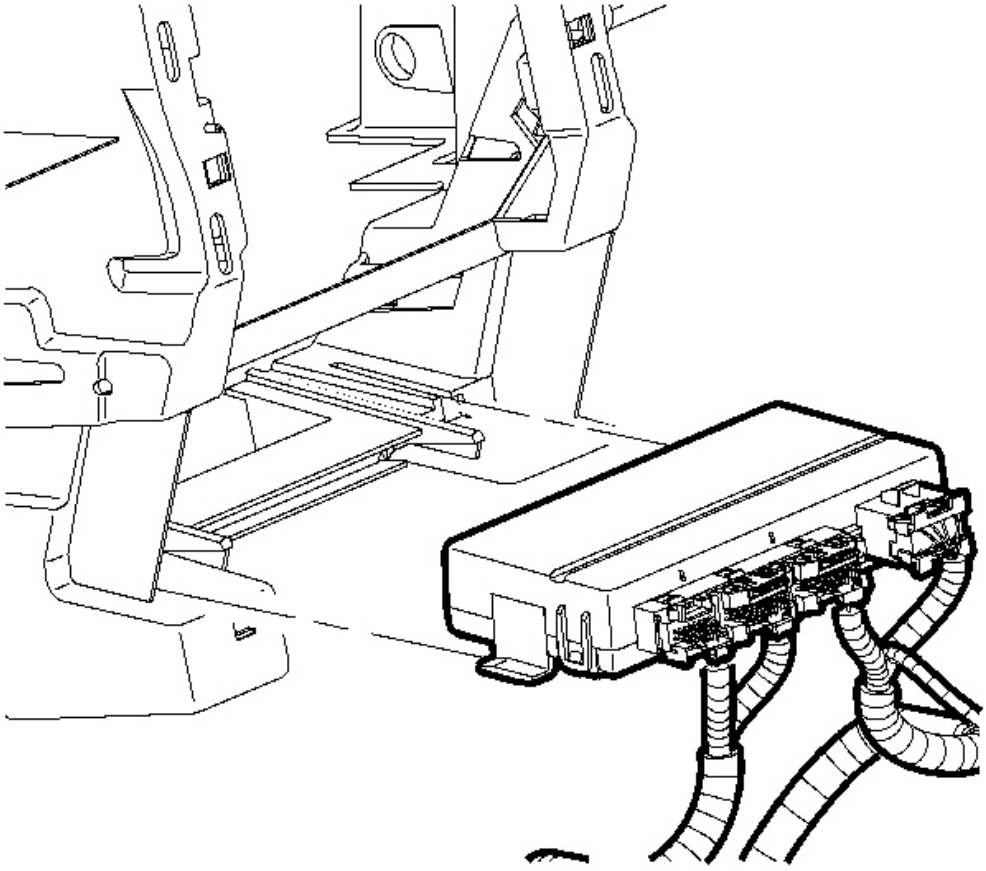


Fig. 90: Disconnecting/Connecting Body Control Module (BCM) Electrical Connector
Courtesy of GENERAL MOTORS CORP.

9. Connect the BCM wiring to the BCM.

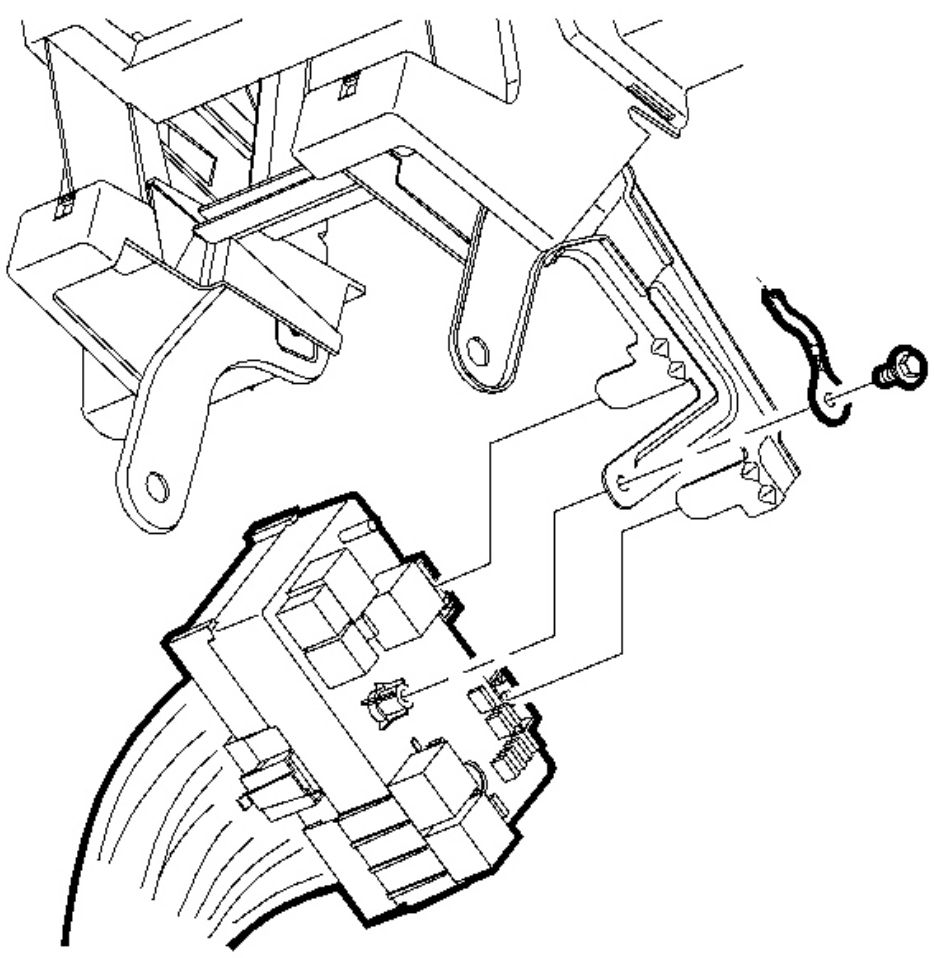


Fig. 91: Removing/Installing Screw From The Radio Ground Strap
Courtesy of GENERAL MOTORS CORP.

10. Position the I/P electrical center on the H-brace bracket tabs.
11. Position the radio ground strap.
12. Install the screw to the radio ground strap.

Tighten: Tighten the bolts to 10 N.m (89 lb in).

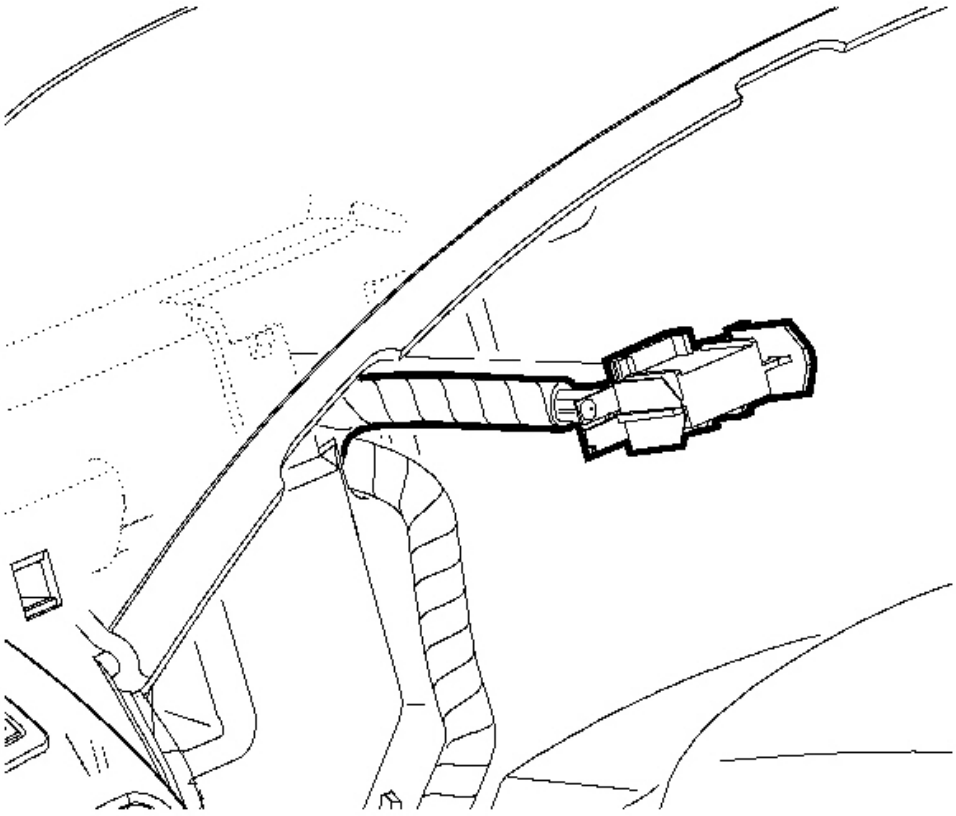


Fig. 92: Removing/Installing I/P Cluster Electrical Connector
Courtesy of GENERAL MOTORS CORP.

13. Install the I/P cluster electrical connector into the slot in the I/P retainer.

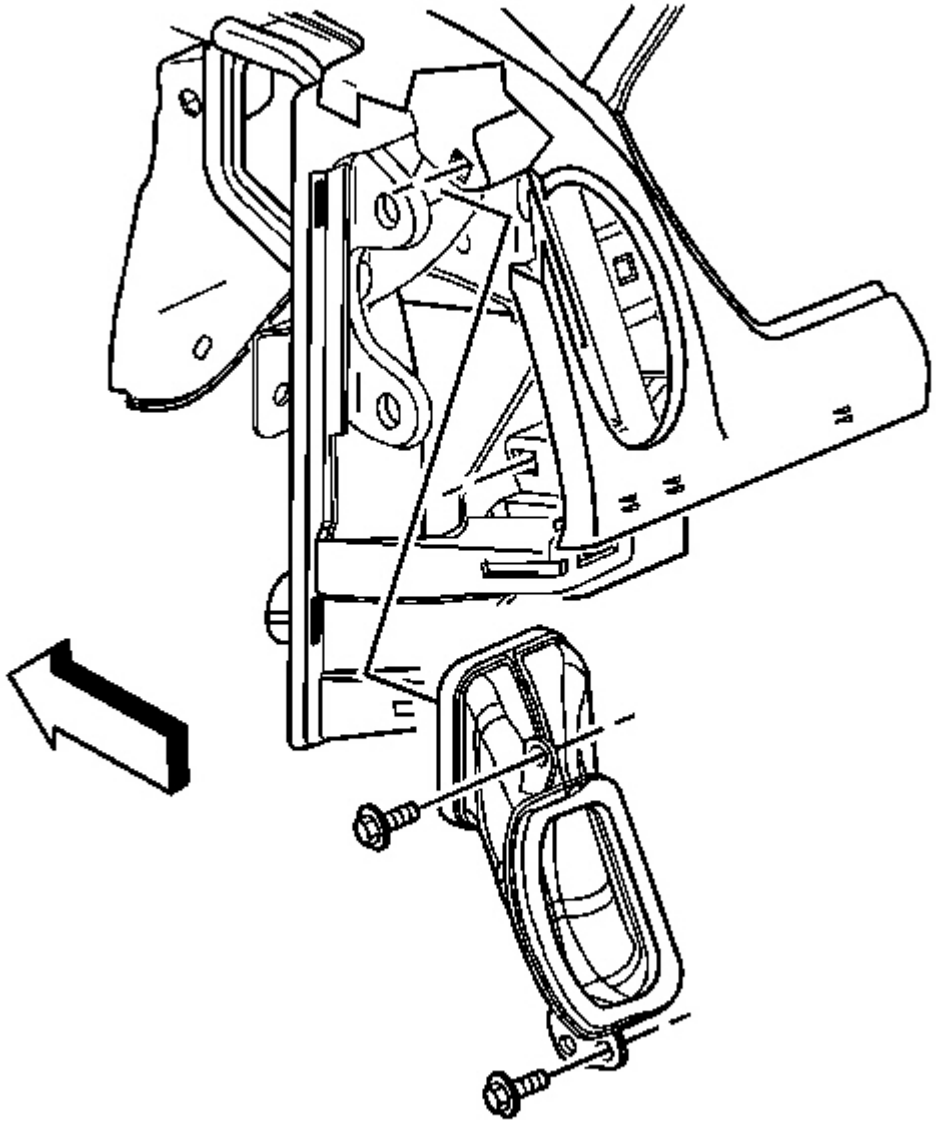


Fig. 93: Removing/Installing Screws To The Outlet Ducts
Courtesy of GENERAL MOTORS CORP.

14. Position the right and the left air outlet ducts.
15. Install the screws to the outlet ducts.

Tighten: Tighten the screws to 2.5 N.m (22 lb in).

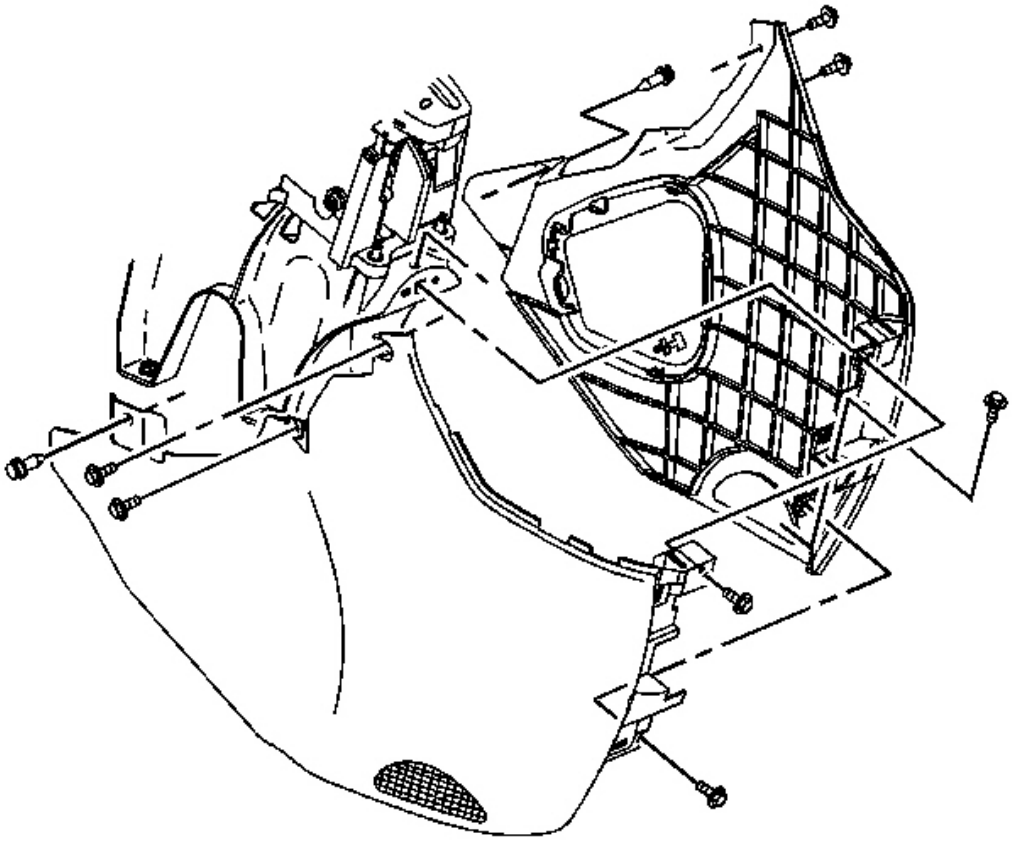


Fig. 94: Removing/Installing Front Console Trim Panels
Courtesy of GENERAL MOTORS CORP.

16. Position the right and the left trim panels on the front console.
17. Install the screws to the front console trim panels.

Tighten: Tighten the screws to 2.5 N.m (22 lb in).

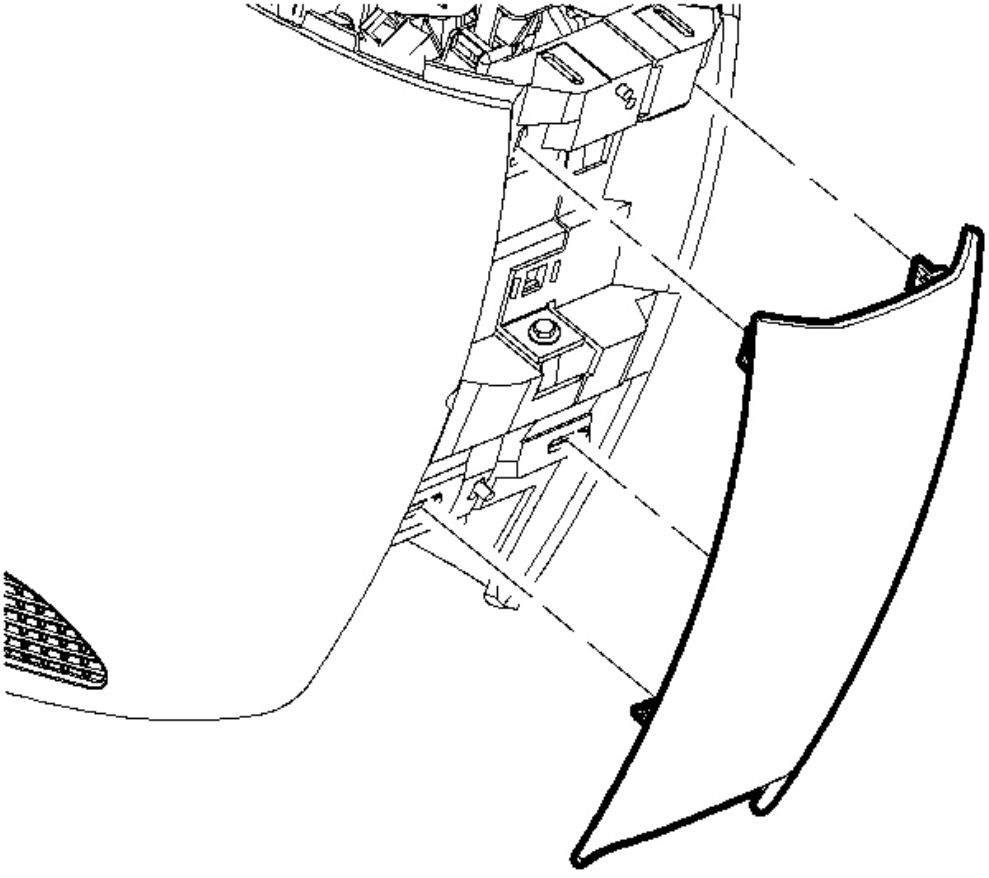


Fig. 95: Removing/Installing Center Trim Plate
Courtesy of GENERAL MOTORS CORP.

18. Position the center trim plate to the front console. Push on the plate until the trim clips engage.

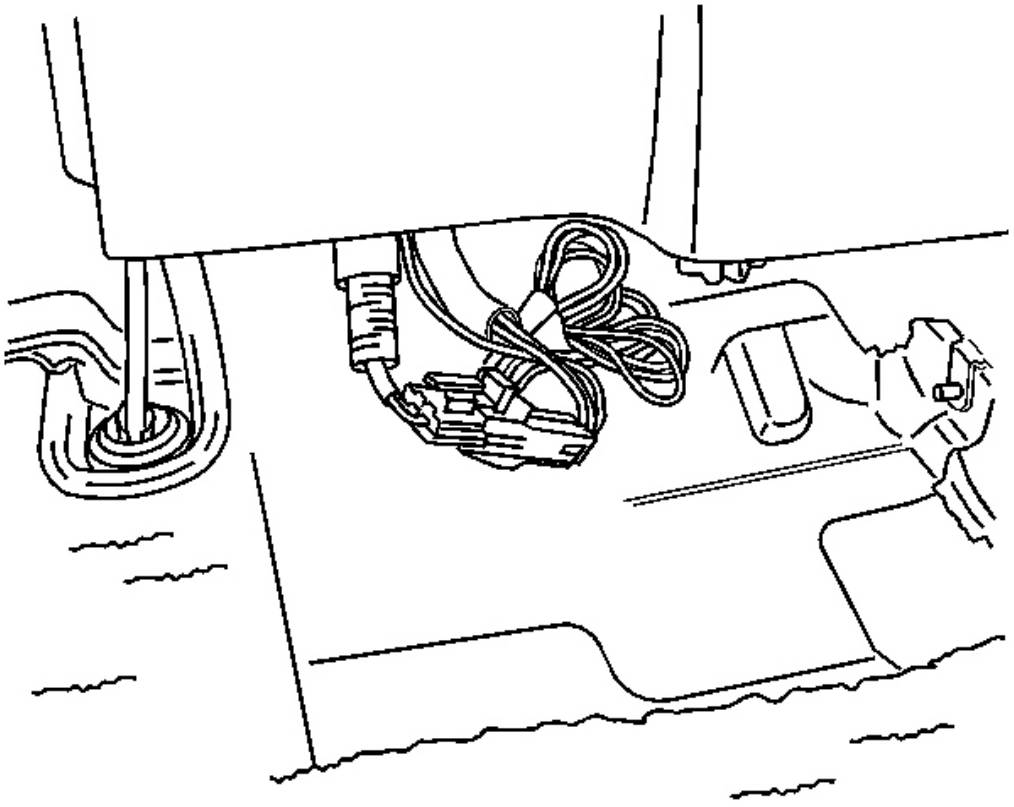


Fig. 96: Disconnecting/Connecting Electrical Connector To The Auxiliary Power Outlet
Courtesy of GENERAL MOTORS CORP.

19. Lift the rear of the center floor console.
20. Connect the electrical connector to the auxiliary power outlet.
21. Reposition the center console.

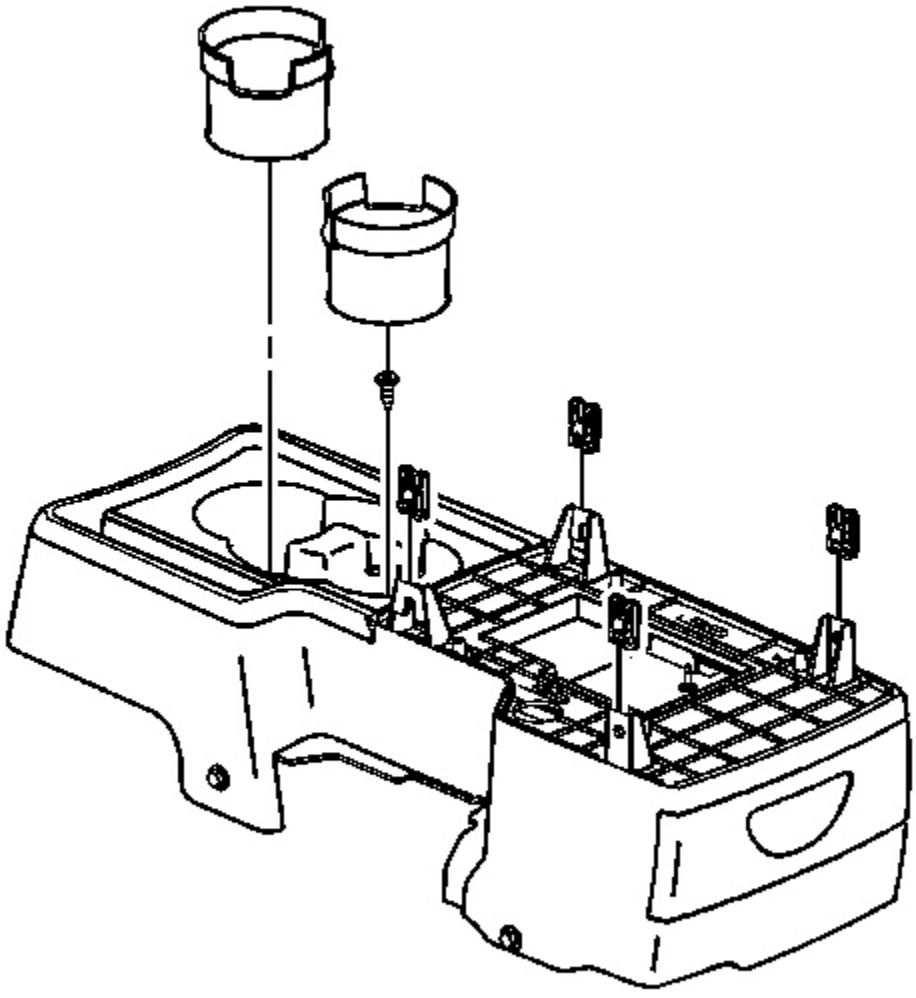


Fig. 97: Removing/Installing Cup Holder Liner
Courtesy of GENERAL MOTORS CORP.

22. Install the cup holder to the center console.

    Tighten: Tighten the screw to 2.5 N.m (22 lb in).

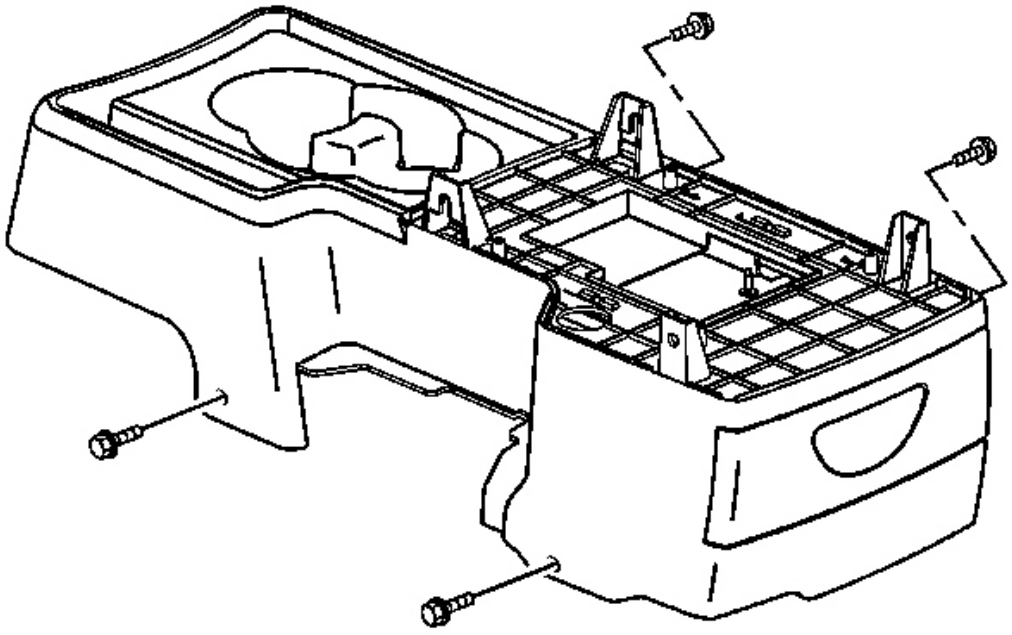


Fig. 98: Removing/Installing Console Screws
Courtesy of GENERAL MOTORS CORP.

23. Position the front seats rearward.
24. Reach under the front seats to access the lower console screws.
25. Install the center console screws.

Tighten: Tighten the screw to 2.5 N.m (22 lb in).

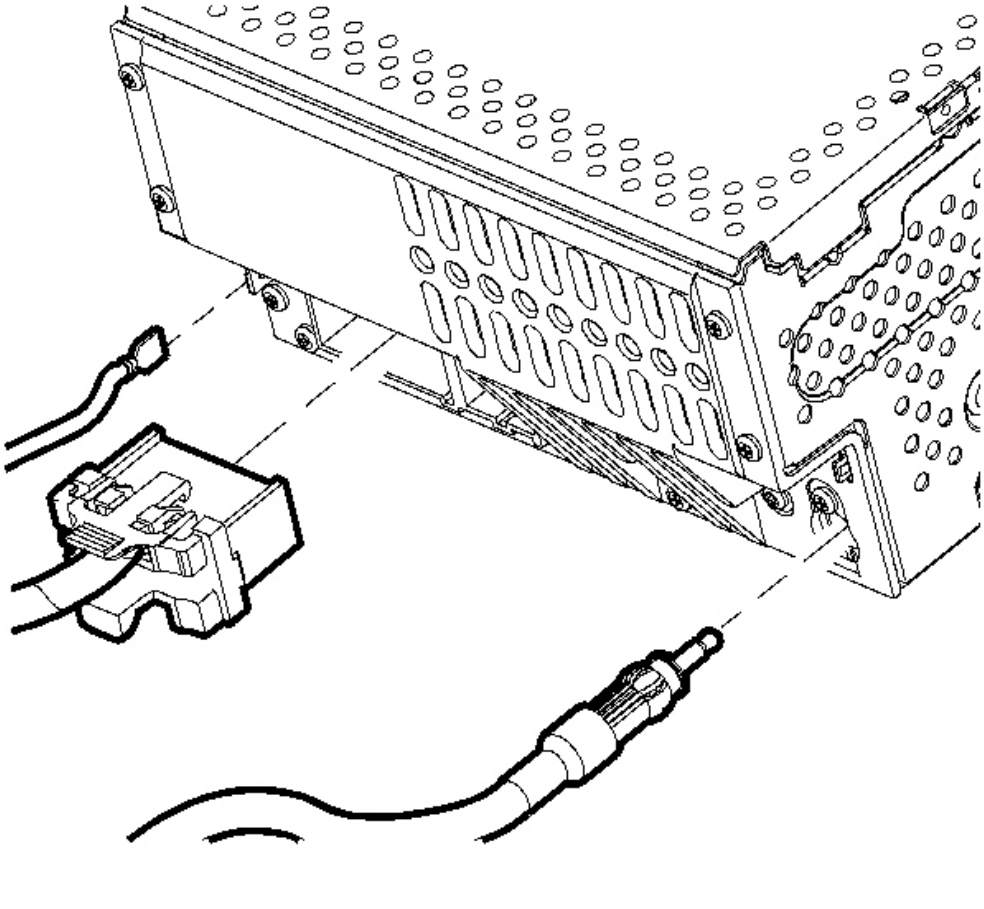


Fig. 99: Disconnecting/Connecting Radio Antenna, Ground Strap, and Electrical Connectors
Courtesy of GENERAL MOTORS CORP.

26. Connect the radio antenna, the ground strap, and the electrical connector.

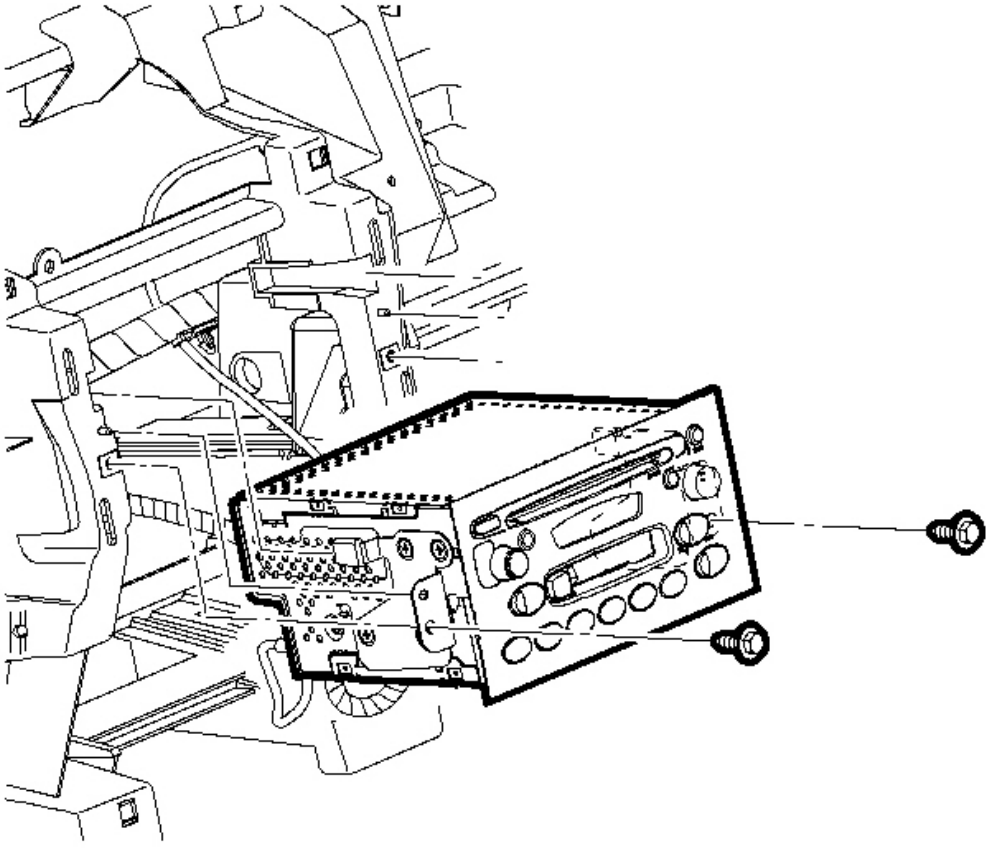


Fig. 100: Removing/Installing Radio Screws
Courtesy of GENERAL MOTORS CORP.

27. Position the radio in the I/P retainer.
28. Install the radio screws.

Tighten: Tighten the screws to 2.5 N.m (22 lb in).

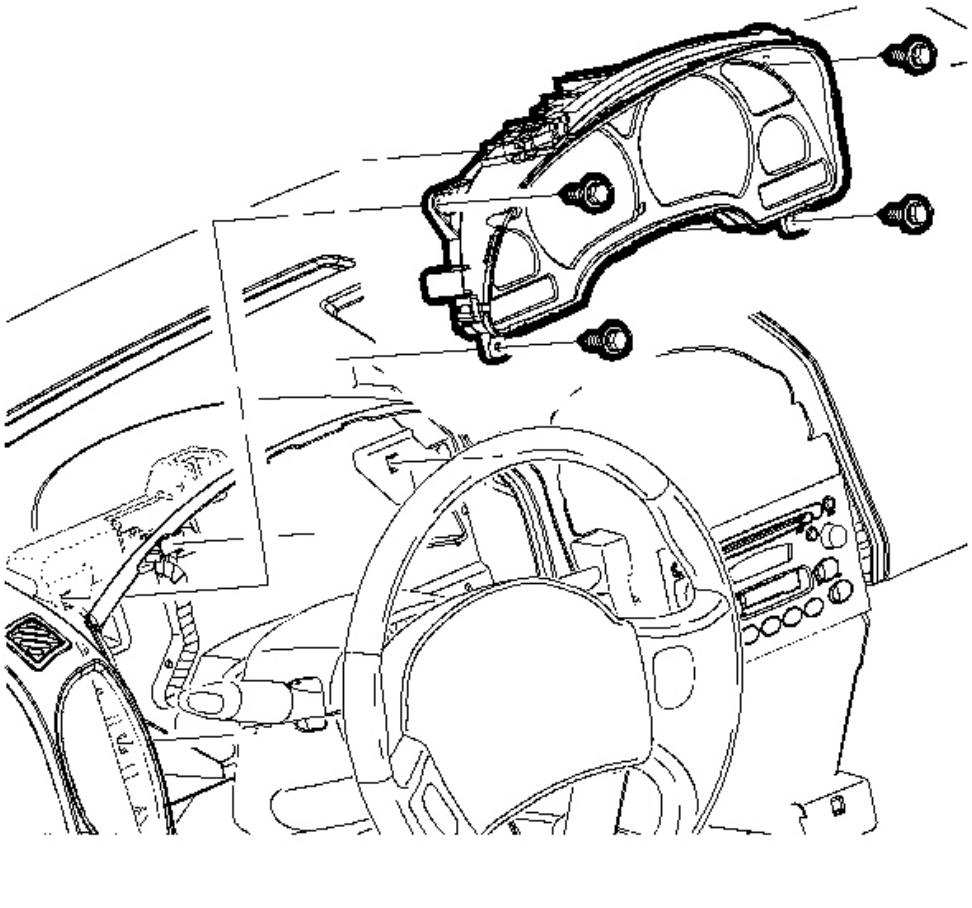


Fig. 101: View Of Instrument Panel (I/P) Retainer
Courtesy of GENERAL MOTORS CORP.

29. Position the I/P cluster and install by pushing the cluster forward.
30. Install the cluster screws.

    Tighten: Tighten the screws to 2 N.m (18 lb in).

31. Install the I/P compartment. Refer to **Compartment Replacement - Instrument Panel (I/P)** .
32. Install the I/P upper trim panel. Refer to **Trim Panel Replacement - Instrument Panel (I/P) Upper** .
33. Enable the frontal SIR system. Refer to **SIR Disabling and Enabling Zone 3** and **SIR Disabling and Enabling Zone 5** in SIR.

INSTRUMENT PANEL CLUSTER (IPC) REPLACEMENT

Removal Procedure

1. Disable the SIR system. Refer to **SIR Disabling and Enabling Zone 3** in SIR.
2. Place the steering column in the lowest position.
3. Remove the I/P cluster trim plate. Refer to **Trim Panel Replacement - Instrument Panel (I/P) Cluster** .

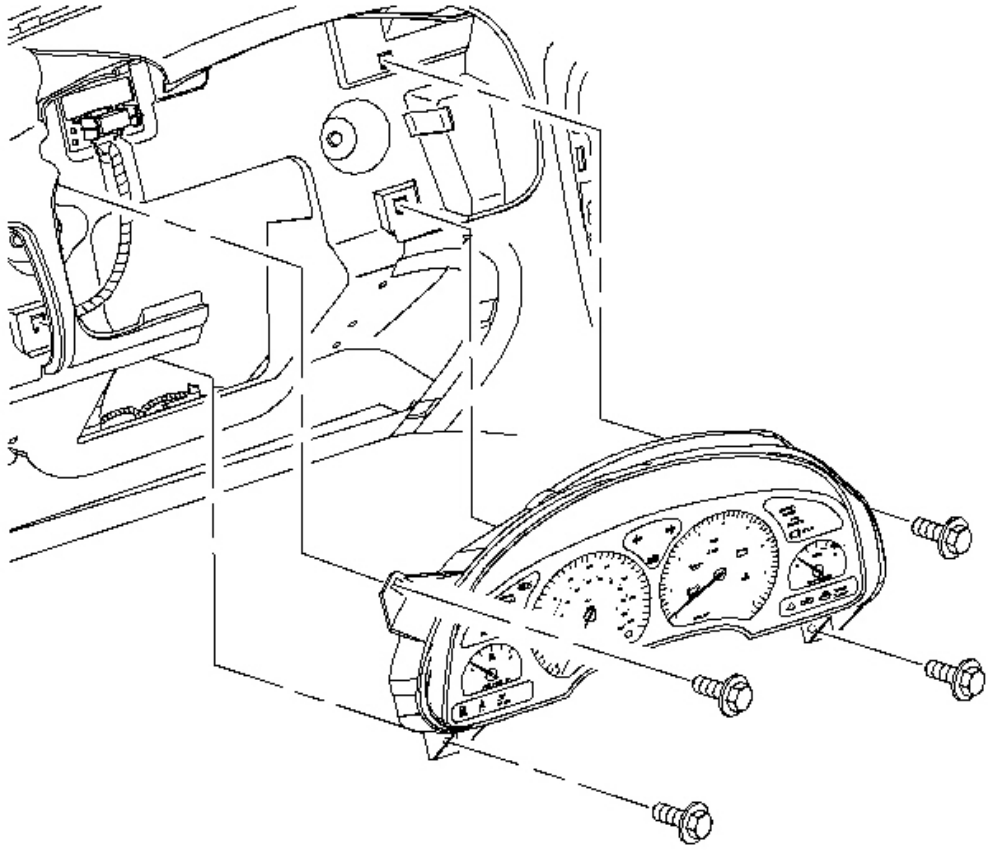


Fig. 102: View Of Instrument Panel Cluster (IPC)
Courtesy of GENERAL MOTORS CORP.

4. Remove the fasteners from the upper and the lower cluster. Pull rearward to remove the I/P cluster.

5. Disconnect the I/P cluster harness.

Installation Procedure

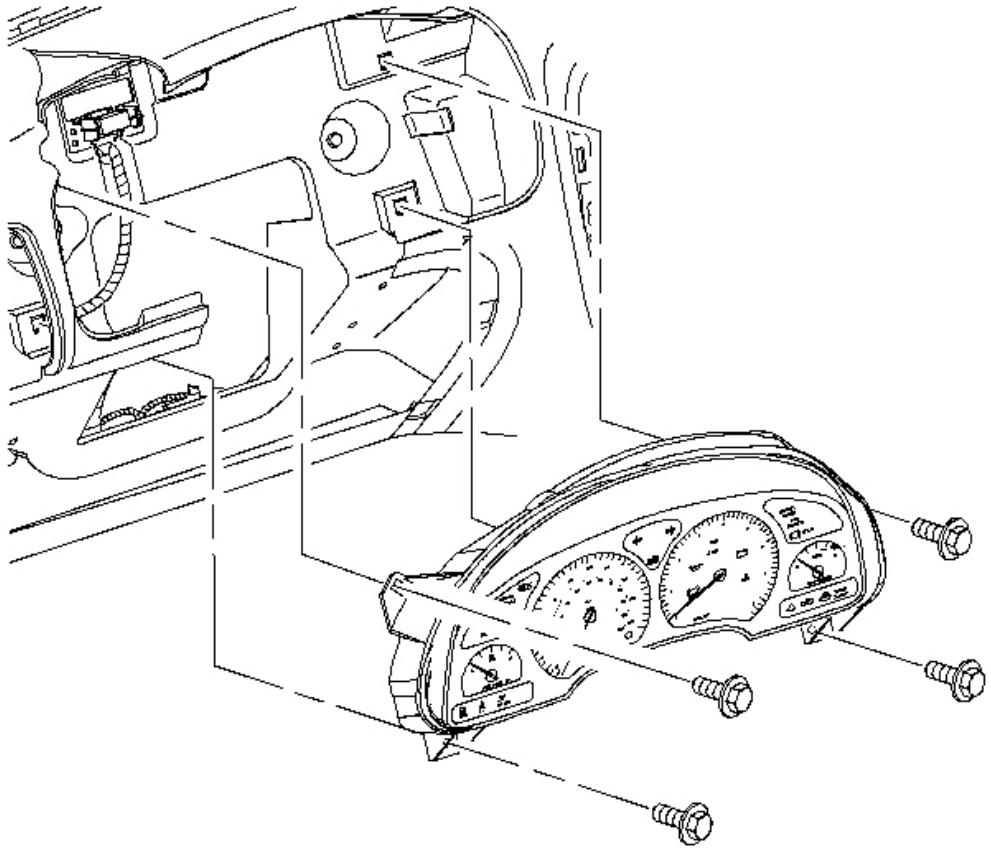


Fig. 103: View Of Instrument Panel Cluster (IPC)
Courtesy of GENERAL MOTORS CORP.

1. Connect the I/P cluster harness.

NOTE: Refer to Fastener Notice in Cautions and Notices.

2. Install the I/P cluster in the I/P housing. Install and tighten the fasteners.

Tighten: Tighten the fasteners to 2 N.m (18 lb in).

3. Install the I/P cluster trim plate. Refer to **Trim Panel Replacement - Instrument Panel (I/P) Cluster** .
4. Enable the SIR system. Refer to **SIR Disabling and Enabling Zone 3** .

INSTRUMENT PANEL CLUSTER (IPC) LENS REPLACEMENT

Removal Procedure

NOTE: **Failure to use the anti-static mat SA9502Z properly may result in damage to the cluster electronics.**

NOTE: **Do not touch or bump the pointers of the gages. If a pointer is moved from its position, the calibration of the gage will be affected and the gage will no longer be accurate. If a pointer is moved, the cluster assembly will need to be replaced.**

IMPORTANT: **If the lens/mask gets dirty, clean the lens by following the procedure in the Owner's Handbook. If a dial face gets dirty, clean the face with glass cleaner and a lint-free rag.**

1. Remove the I/P cluster. Refer to **Instrument Panel Cluster (IPC) Replacement** .

IMPORTANT: **Rubber gloves should be worn during these procedures to prevent grease, smudges, scratches, and fingerprints. If rubber gloves are not available, clean your hands thoroughly with soap and water.**

2. Place an anti-static mat on the work area. In order to ground the mat, connect the alligator clip to a large metal object. Verify that the attaching point is a bare metal surface and not painted or coated. Secure the wrist strap around one of your wrists.
3. Place a clean, dry, soft material such as a cloth baby diaper on top of the anti-static mat.
4. Place the I/P cluster assembly face down on the cloth and the anti-static mat.

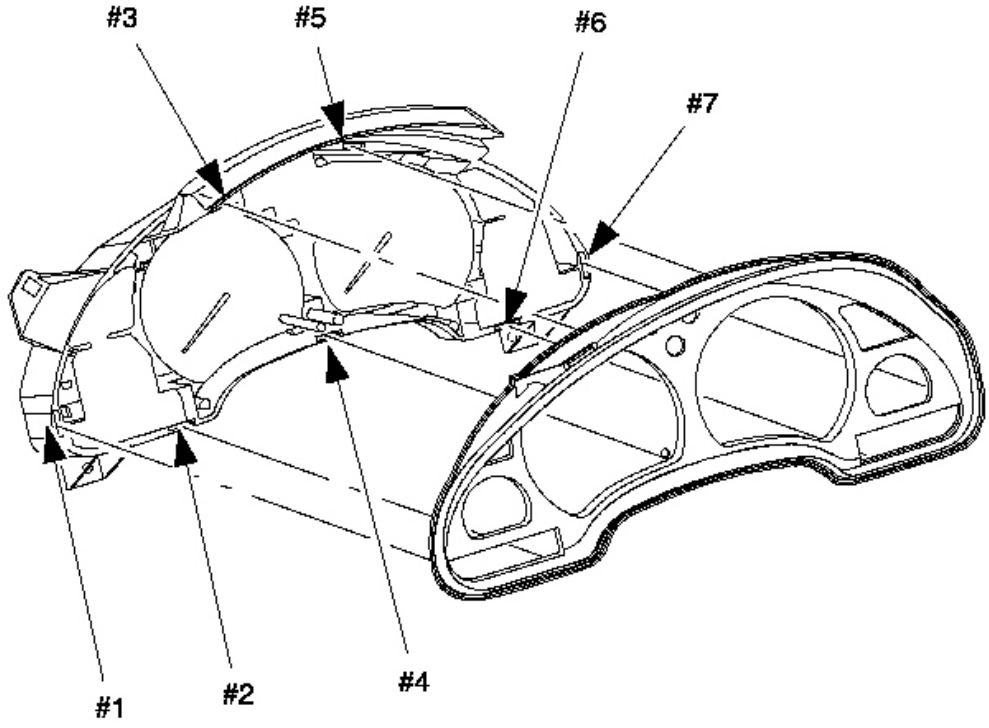


Fig. 104: View Of Instrument Panel Cluster (IPC) Lens
Courtesy of GENERAL MOTORS CORP.

5. Disengage clip #1 with one hand while separating the assembly from the housing with the other hand.
6. Repeat this procedure for clips #2 through #7.

IMPORTANT: Do not touch the inside of the lens.

7. Place the lens/mask assembly in a clean area.

Installation Procedure

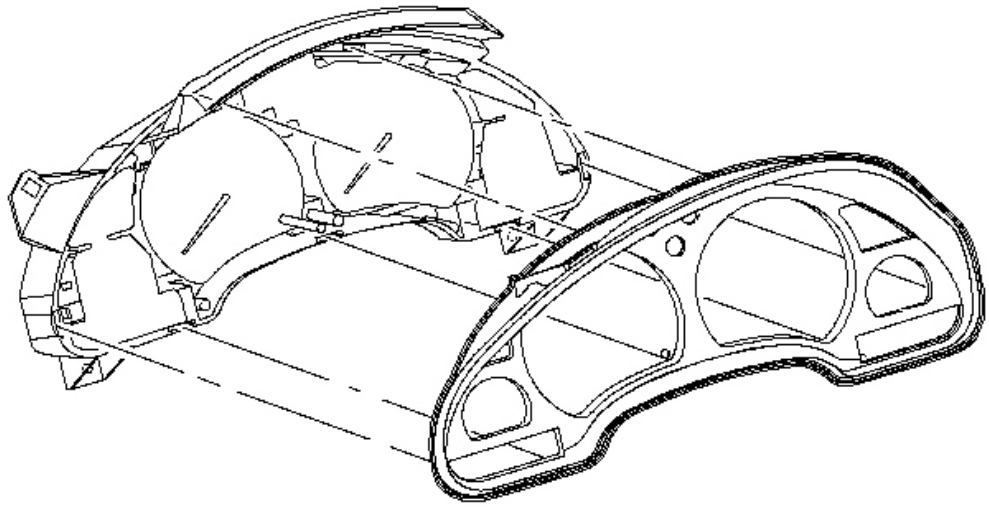


Fig. 105: Installing I/P Cluster Assembly
Courtesy of GENERAL MOTORS CORP.

1. Hold the lens/mask assembly face up by the ends and align the reset knob with the hole in the lens.
2. Align the tabs and the slots between the assembly and the housing.
3. Press down on top of the assembly around the edges to fully seat all clips.
4. Inspect that all gages and clips are seated correctly and that no debris or markings are on the lens or the dial faces.
5. Install the I/P cluster assembly. Refer to **Instrument Panel Cluster (IPC) Replacement** .

INSTRUMENT CLUSTER LAMP REPLACEMENT

Removal Procedure

NOTE: Failure to use the anti-static mat SA9502Z properly may result in damage to the cluster electronics.

IMPORTANT: If the lens/mask gets dirty, clean the lens by following the procedure in the Owner's Handbook.

1. Remove the I/P cluster. Refer to **Instrument Panel Cluster (IPC) Replacement** .

IMPORTANT: Rubber gloves should be worn during these procedures to prevent grease, smudges, scratches, and fingerprints. If rubber gloves are not available, clean your hands thoroughly with soap and water.

2. Place an anti-static mat on the work area. In order to ground the mat, connect the alligator clip to a large metal object. Verify that the attaching point is a bare metal surface and not painted or coated. Secure the wrist strap around one of your wrists.
3. Place a clean, dry, soft material such as a cloth baby diaper on top of the anti-static mat.
4. Place the I/P cluster assembly face down on the cloth and the anti-static mat.

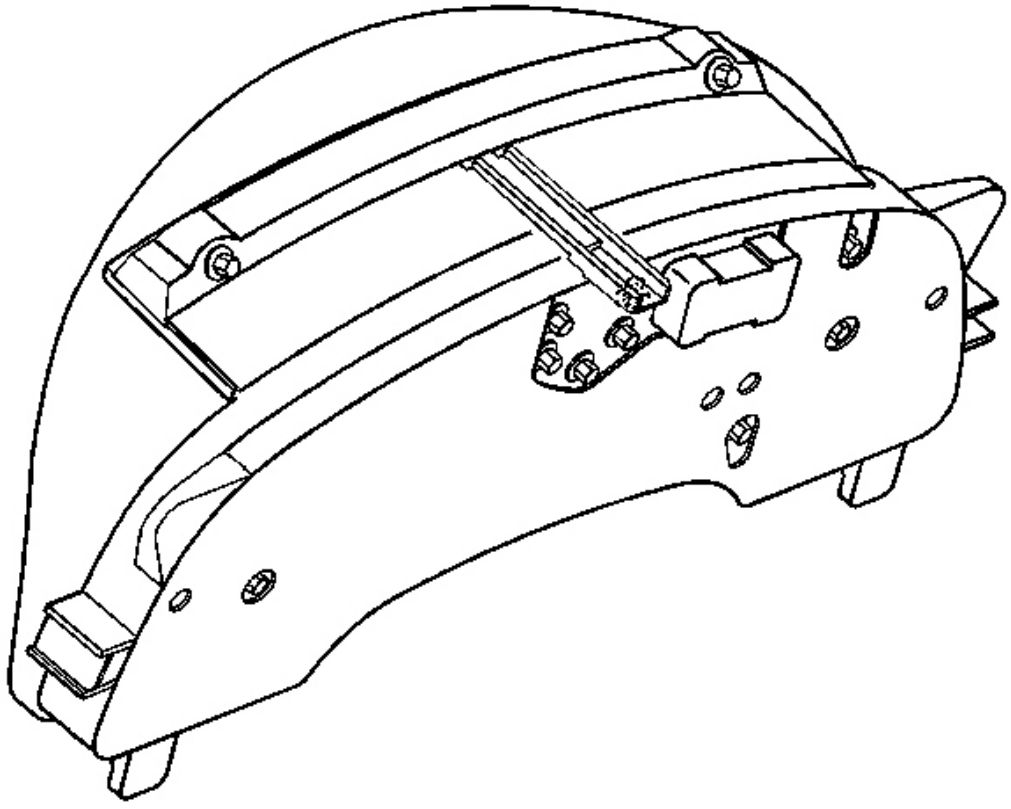


Fig. 106: View Of Instrument Cluster Lamp
Courtesy of GENERAL MOTORS CORP.

5. Using a 1/4-inch socket or a small flat-bladed tool, rotate the bulb base 1/4 turn counter-clockwise. Remove the bulb.

Installation Procedure

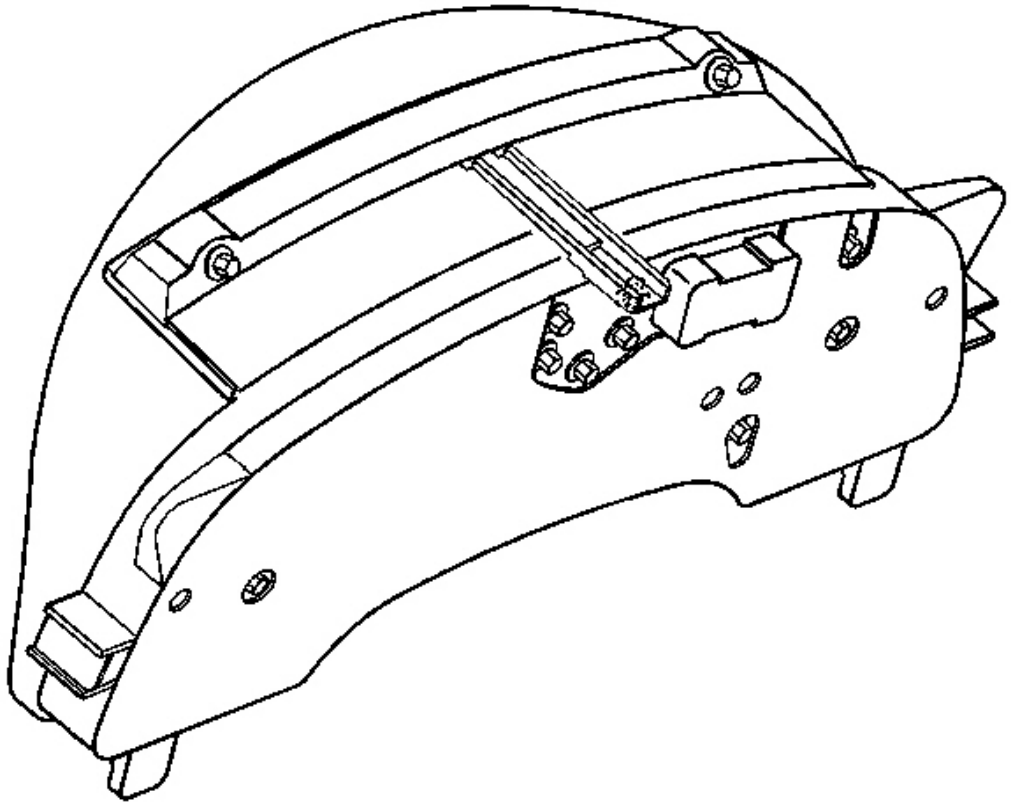


Fig. 107: View Of Instrument Cluster Lamp
Courtesy of GENERAL MOTORS CORP.

1. Insert a new bulb. Using a 1/4-inch socket or a small flat-bladed tool, rotate the bulb base 1/4 turn clockwise.
2. Install the I/P cluster assembly. Refer to **Instrument Panel Cluster (IPC) Replacement** .

TRIM PLATE REPLACEMENT - CONSOLE

Removal Procedure

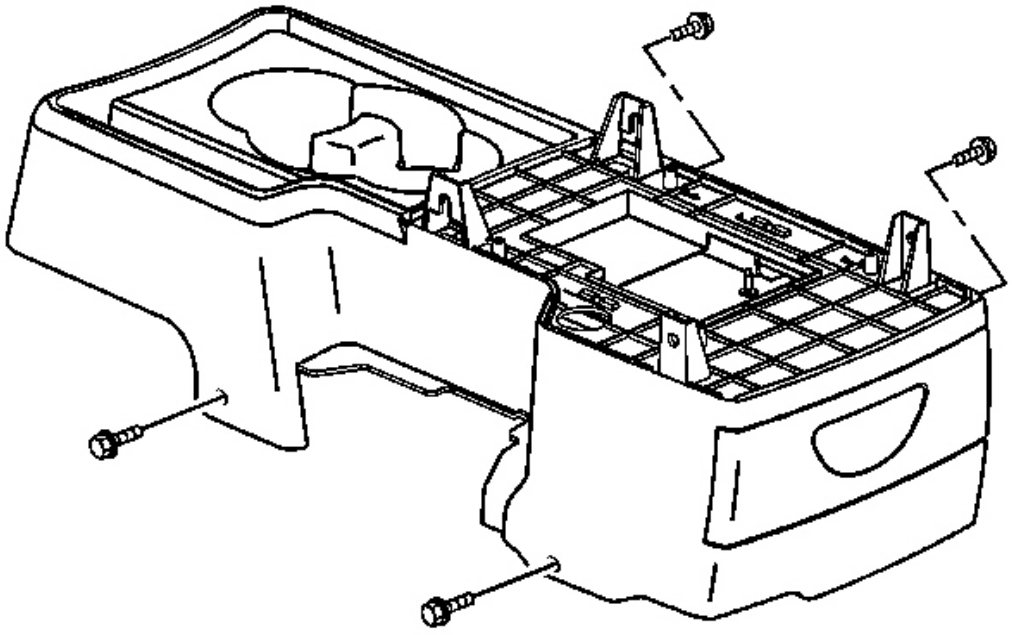


Fig. 108: Removing/Installing Console Screws
Courtesy of GENERAL MOTORS CORP.

1. Position the front seats rearward.
2. Reach under the front seats to access the lower console screws.
3. Remove the console screws.

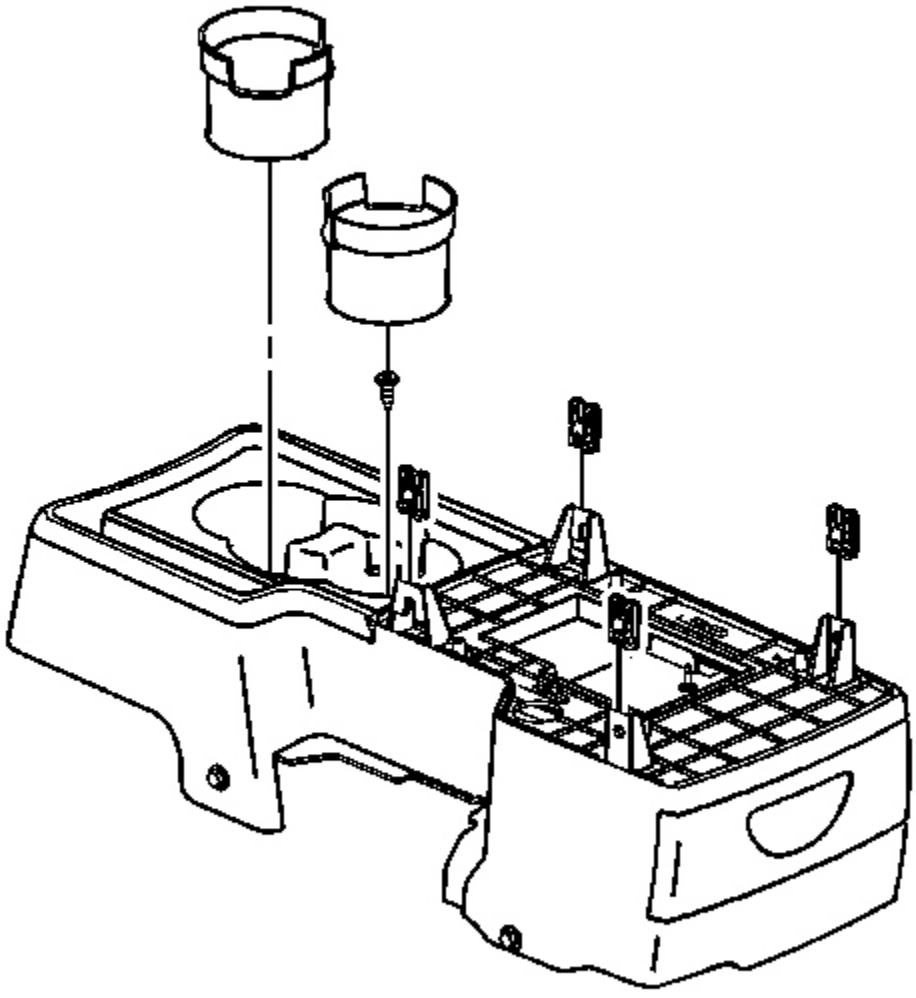


Fig. 109: Removing/Installing Cup Holder Liner
Courtesy of GENERAL MOTORS CORP.

4. Remove the cup holder liner.
5. Remove the cup holder screw.

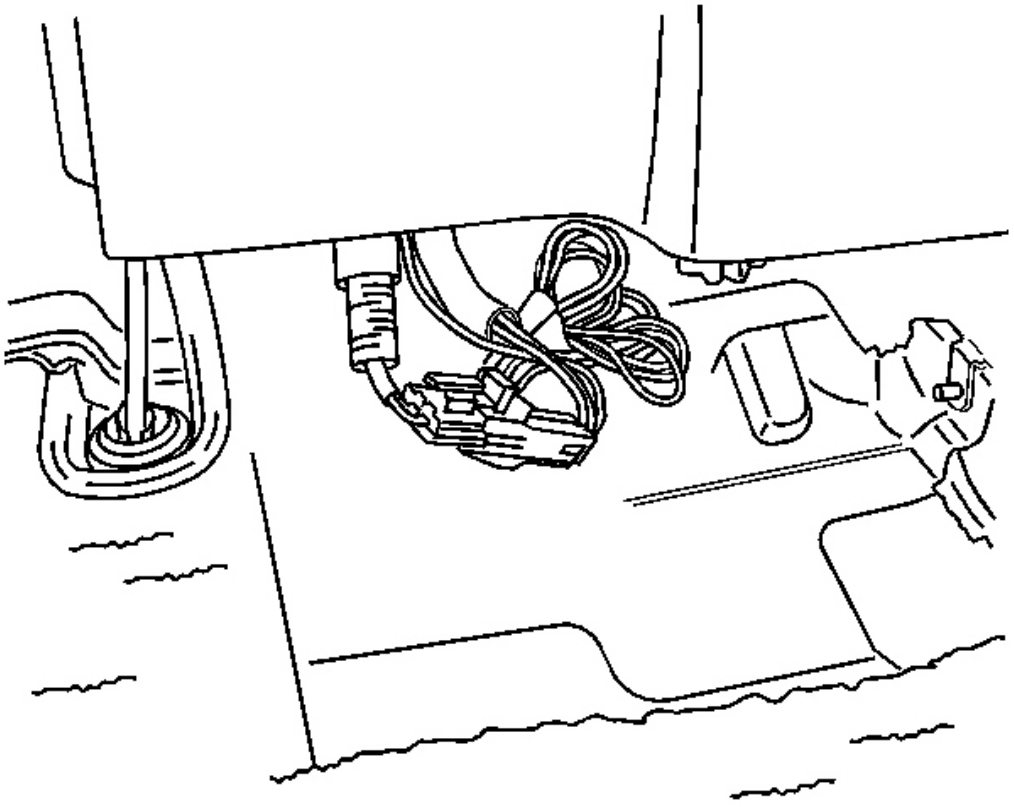


Fig. 110: Disconnecting/Connecting Electrical Connector To The Auxiliary Power Outlet
Courtesy of GENERAL MOTORS CORP.

6. Lift the rear of the center floor console.
7. Disconnect the electrical connector to the auxiliary power outlet.
8. Slide the center floor console rearward.

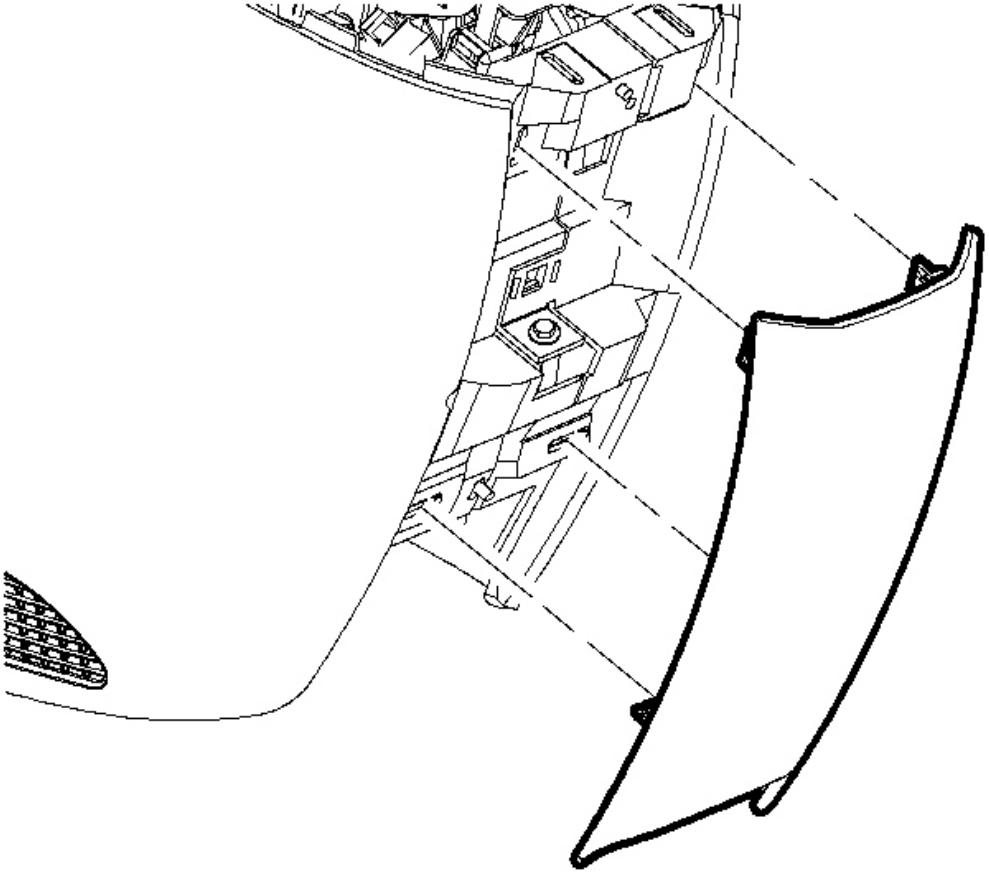


Fig. 111: Removing/Installing Center Trim Plate
Courtesy of GENERAL MOTORS CORP.

9. Remove the center trim panel by pulling outward.

Installation Procedure

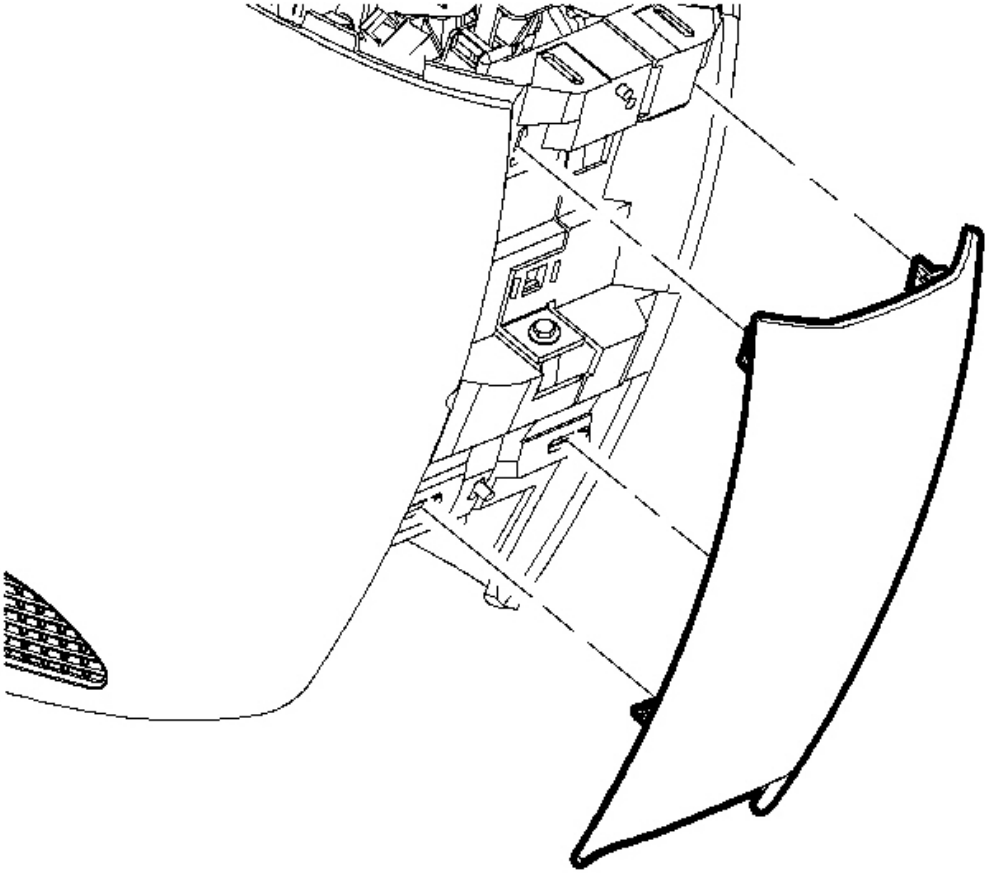


Fig. 112: Removing/Installing Center Trim Plate
Courtesy of GENERAL MOTORS CORP.

1. Position the center trim plate to the front console.
2. Push until the trim clips engage.

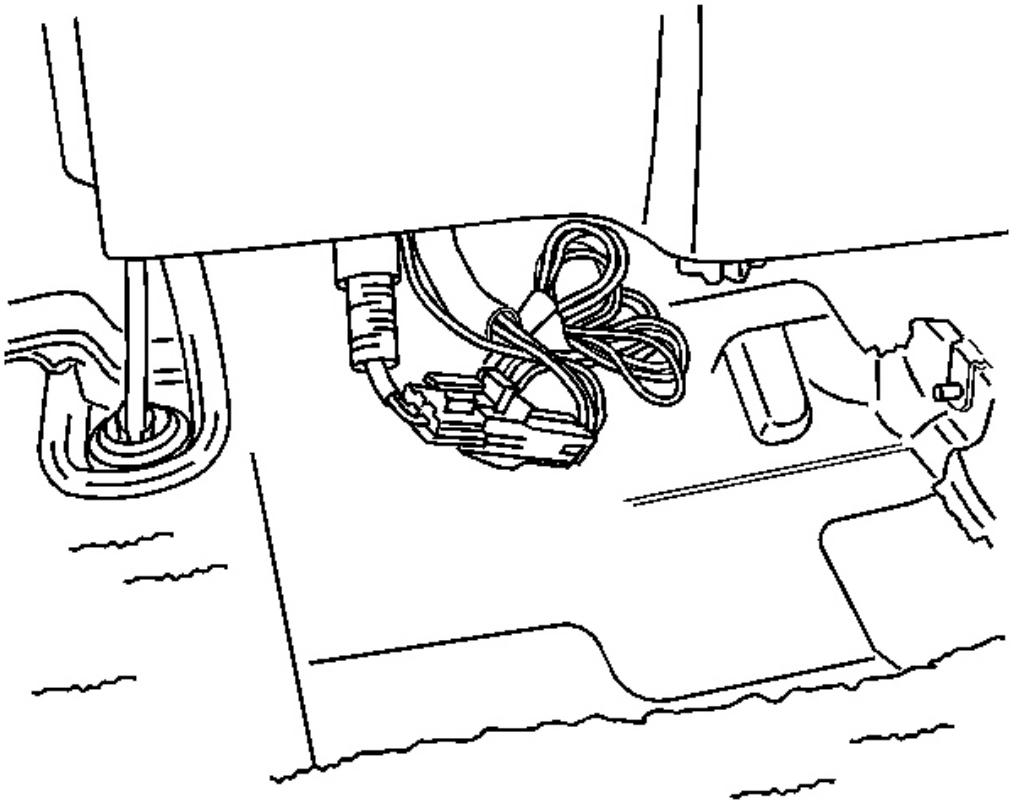


Fig. 113: Disconnecting/Connecting Electrical Connector To The Auxiliary Power Outlet
Courtesy of GENERAL MOTORS CORP.

3. Lift the rear of the center floor console.
4. Connect the electrical connector to the auxiliary power outlet.
5. Reposition the center console.

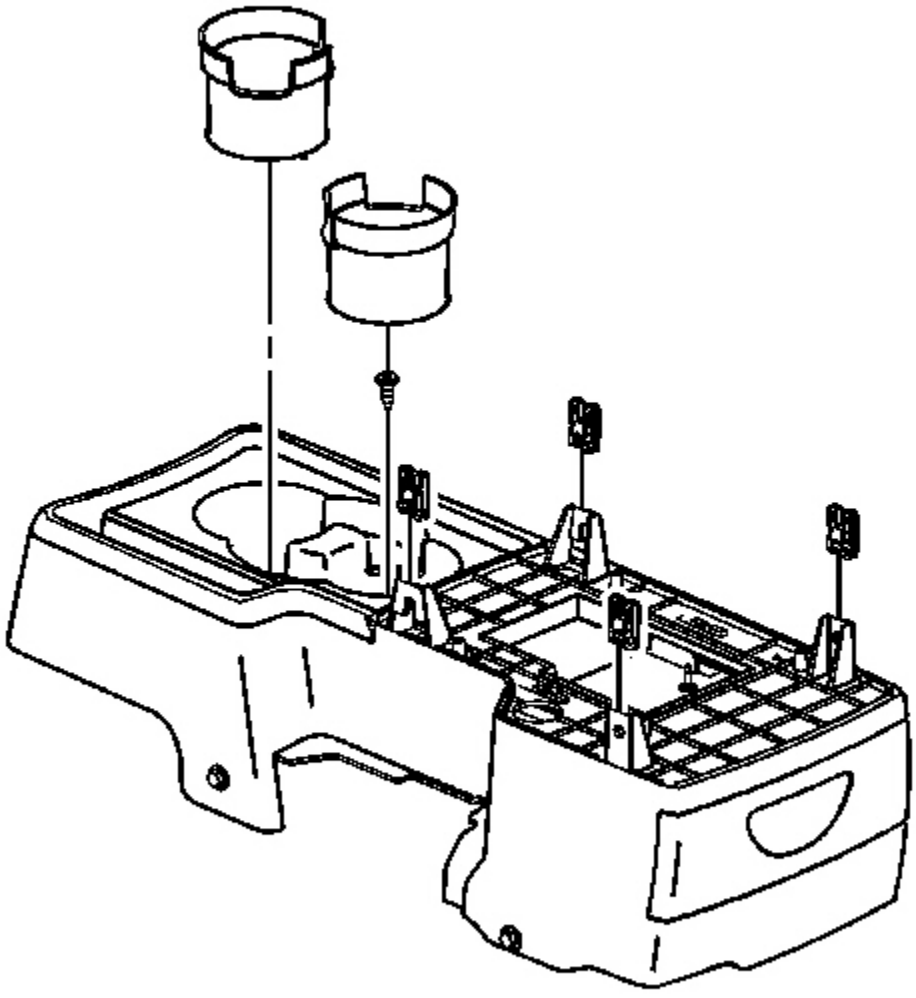


Fig. 114: Removing/Installing Cup Holder Liner
Courtesy of GENERAL MOTORS CORP.

NOTE: Refer to Fastener Notice in Cautions and Notices.

6. Install the cup holder screw.

   Tighten: Tighten the screws to 2.5 N.m (22 lb in).

7. Install the cup holder liner.

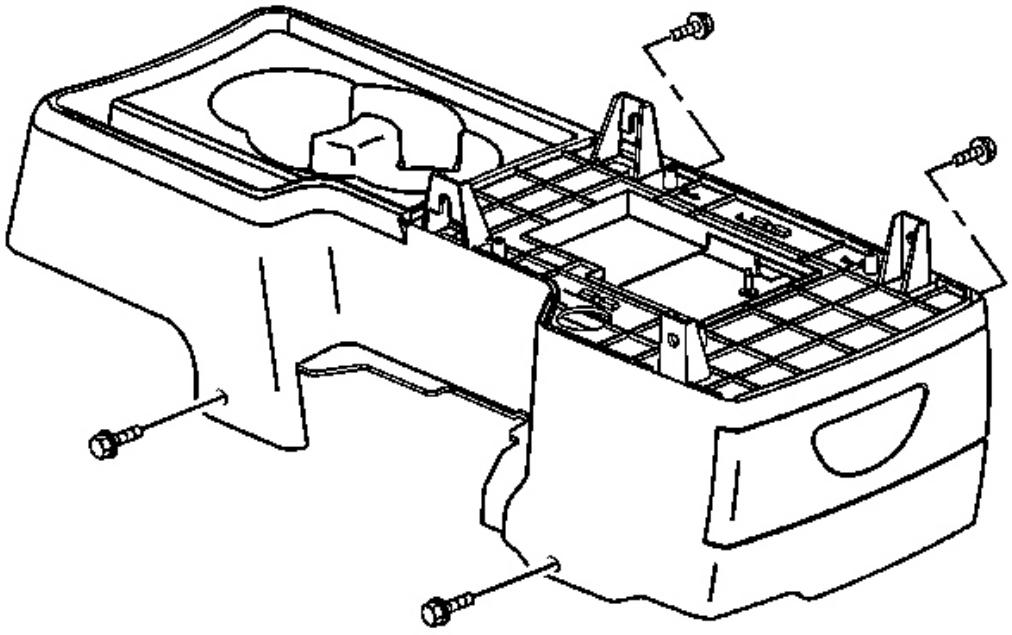


Fig. 115: Removing/Installing Console Screws
Courtesy of GENERAL MOTORS CORP.

8. Reach under the front seats to access the lower console screws.
9. Install the center console screws.

   Tighten: Tighten the screws to 2.5 N.m (22 lb in).

10. Position the front seat forward to the original position.

CONSOLE TRIM PANEL REPLACEMENT - RIGHT

Removal Procedure

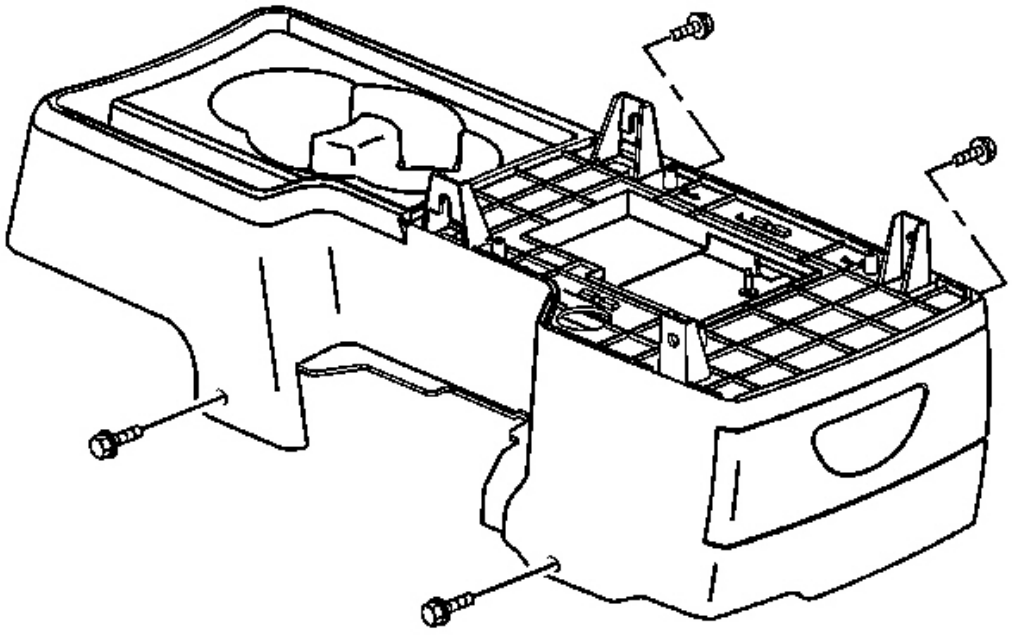


Fig. 116: Removing/Installing Console Screws
Courtesy of GENERAL MOTORS CORP.

1. Position the front seats rearward.
2. Reach under the front seats to access the lower console screws.
3. Remove the console screws.

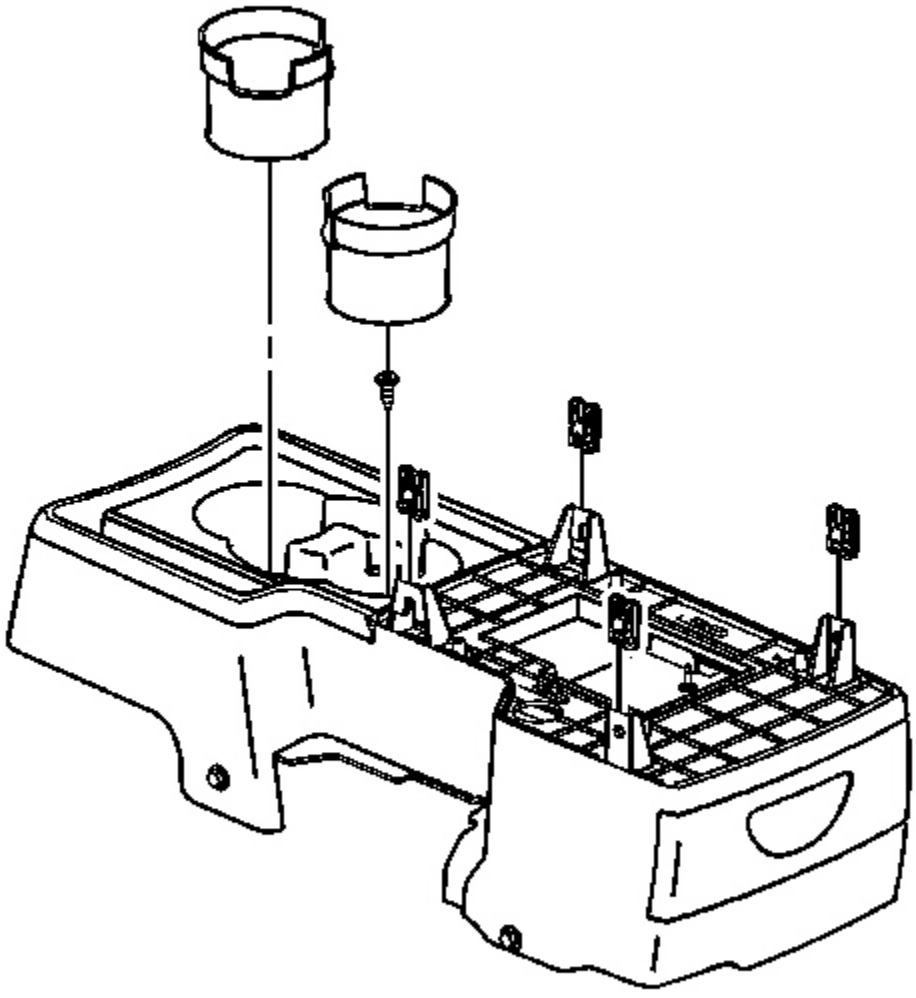


Fig. 117: Removing/Installing Cup Holder Liner
Courtesy of GENERAL MOTORS CORP.

4. Remove the cup holder liner.
5. Remove the cup holder screw.

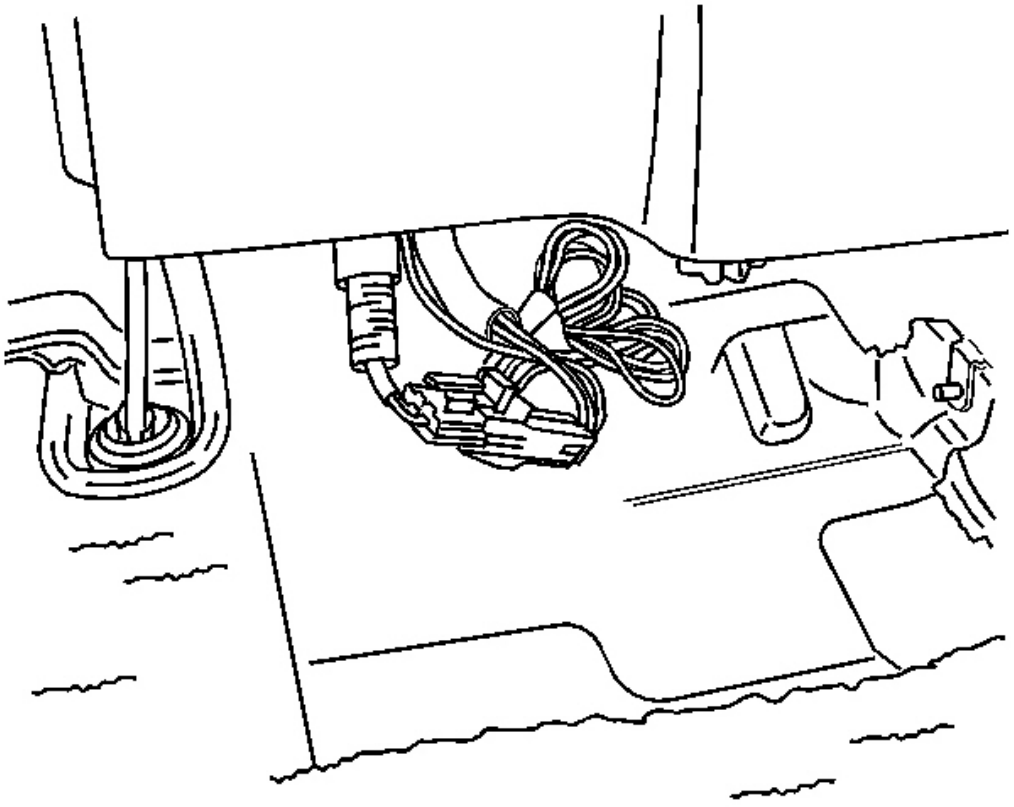


Fig. 118: Disconnecting/Connecting Electrical Connector To The Auxiliary Power Outlet
Courtesy of GENERAL MOTORS CORP.

6. Lift the rear of the center floor console.
7. Disconnect the electrical connector to the auxiliary power outlet.
8. Slide the center floor console rearward.

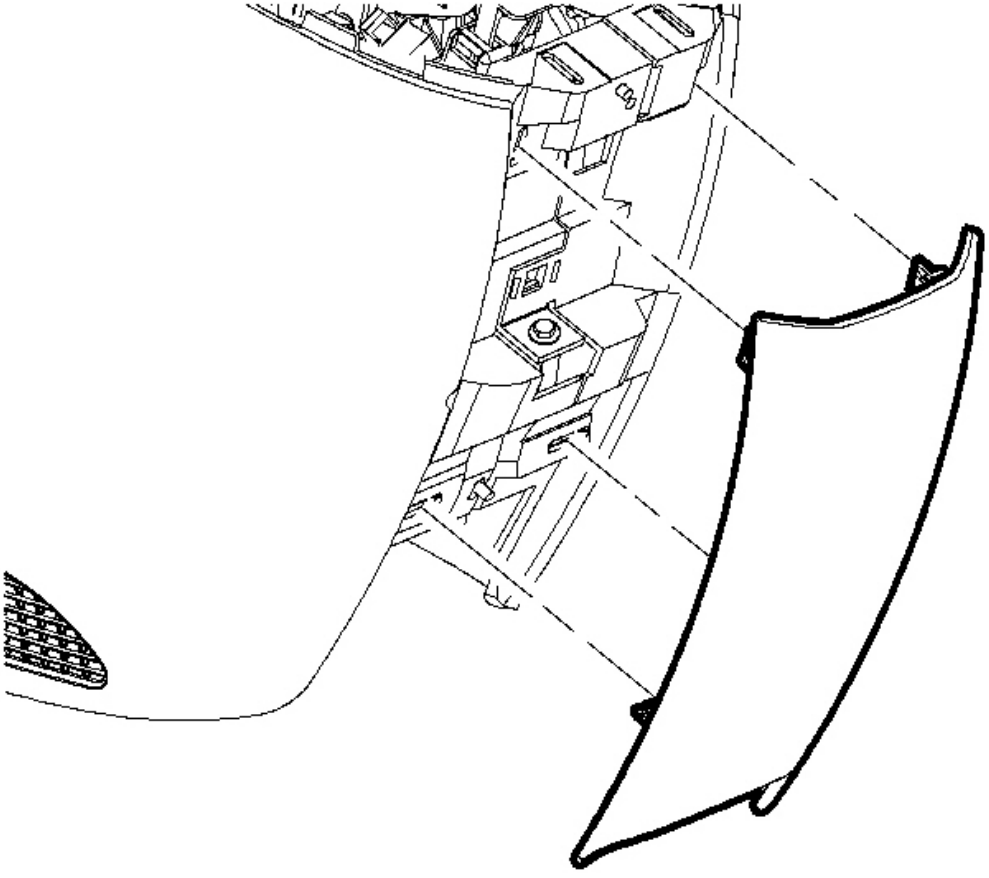


Fig. 119: Removing/Installing Center Trim Plate
Courtesy of GENERAL MOTORS CORP.

9. Remove the center trim panel by pulling outward.
10. Remove the console shift lever bezel. Refer to **Console Shift Lever Bezel Replacement** .
11. Remove the I/P compartment. Refer to **Compartment Replacement - Instrument Panel (I/P)** .

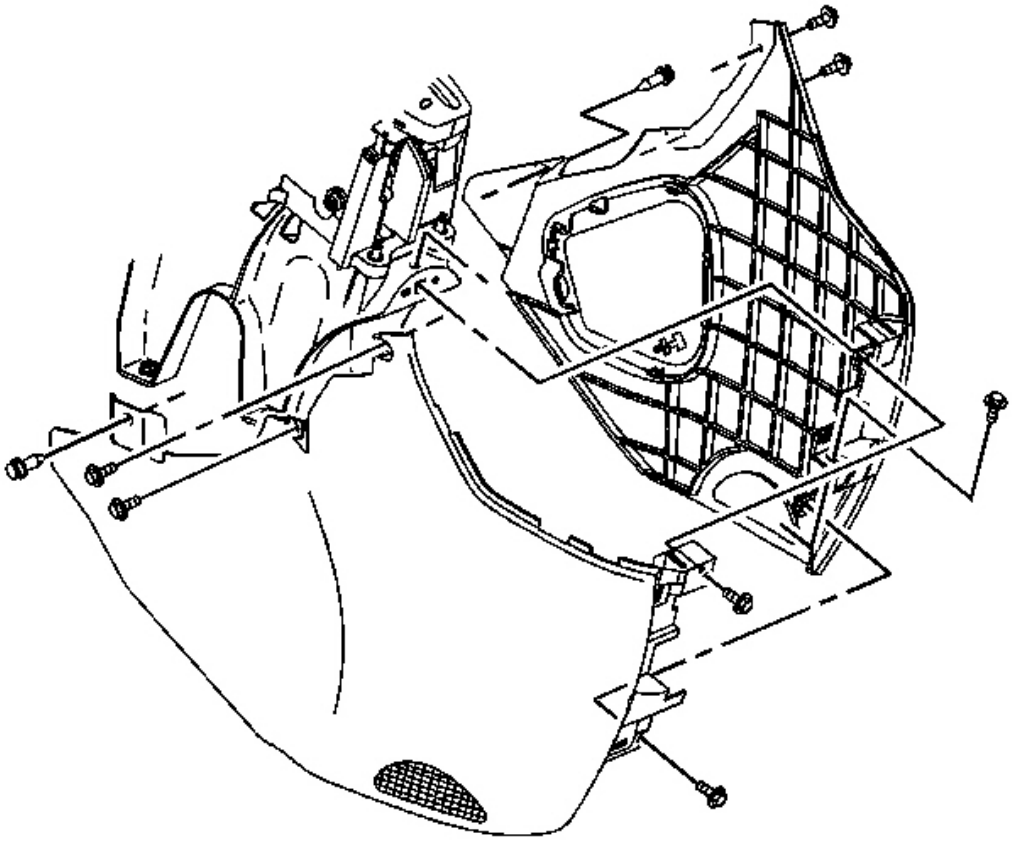


Fig. 120: Removing/Installing Front Console Trim Panels
Courtesy of GENERAL MOTORS CORP.

12. Remove the screws from the right console trim panel.
13. Remove the push-in fastener from the trim panel.
14. Remove the trim panel from the vehicle.

Installation Procedure

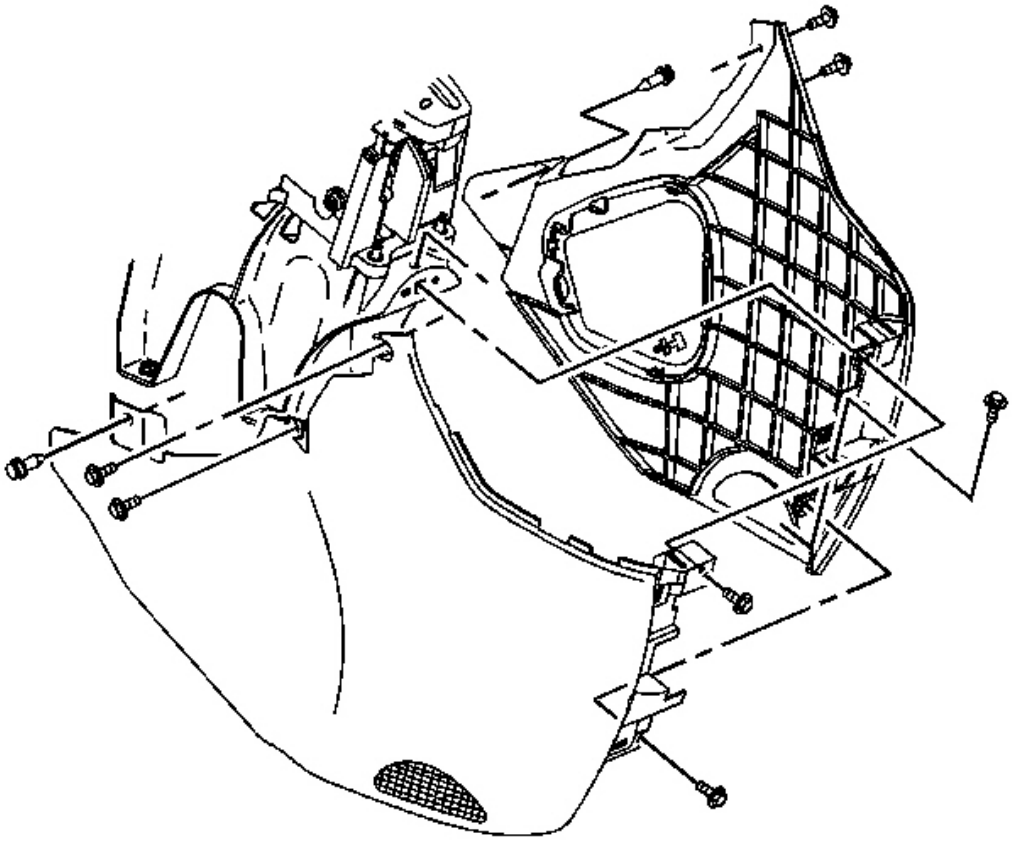


Fig. 121: Removing/Installing Front Console Trim Panels
Courtesy of GENERAL MOTORS CORP.

1. Position the right console trim panel.
2. Install the push-in fastener.

NOTE: Refer to Fastener Notice in Cautions and Notices.

3. Install the screws to the right console trim panel.

   Tighten: Tighten the screws to 2.5 N.m (22 lb in).

4. Install the I/P compartment. Refer to **Compartment Replacement - Instrument Panel (I/P)** .

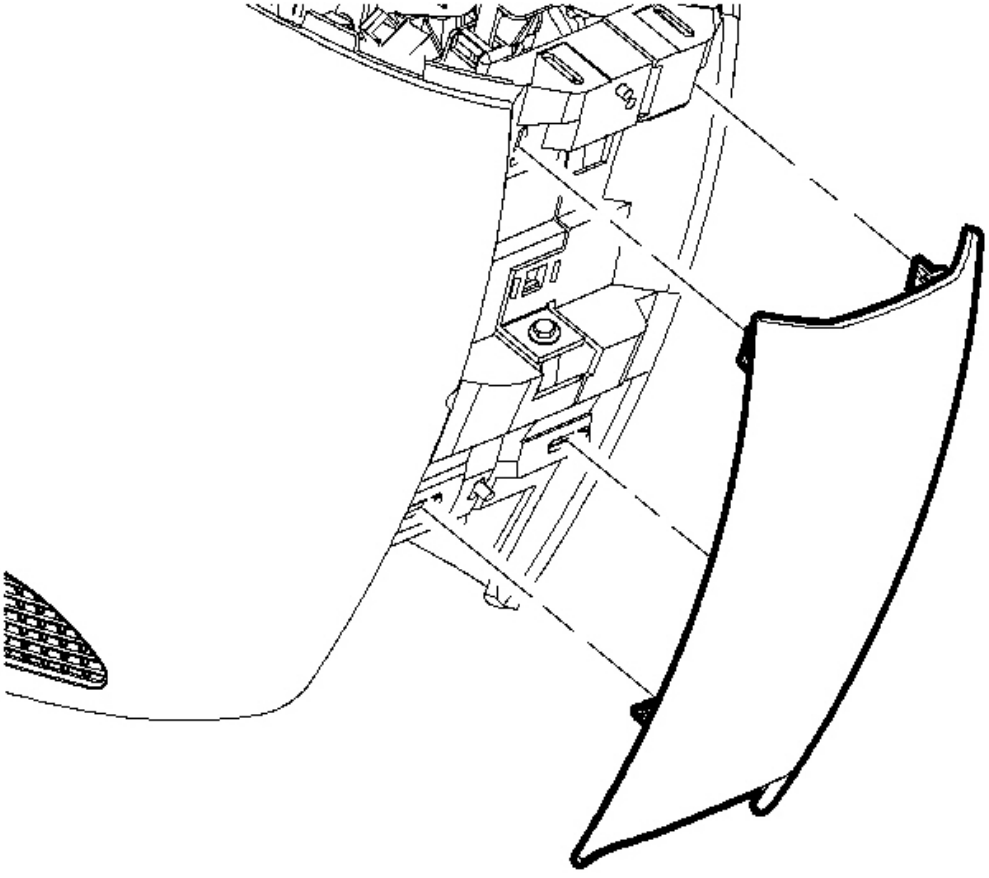


Fig. 122: Removing/Installing Center Trim Plate
Courtesy of GENERAL MOTORS CORP.

5. Position the center trim plate to the front console.
6. Push until the trim clips engage.
7. Install the console shift lever bezel. Refer to **Console Shift Lever Bezel Replacement** .

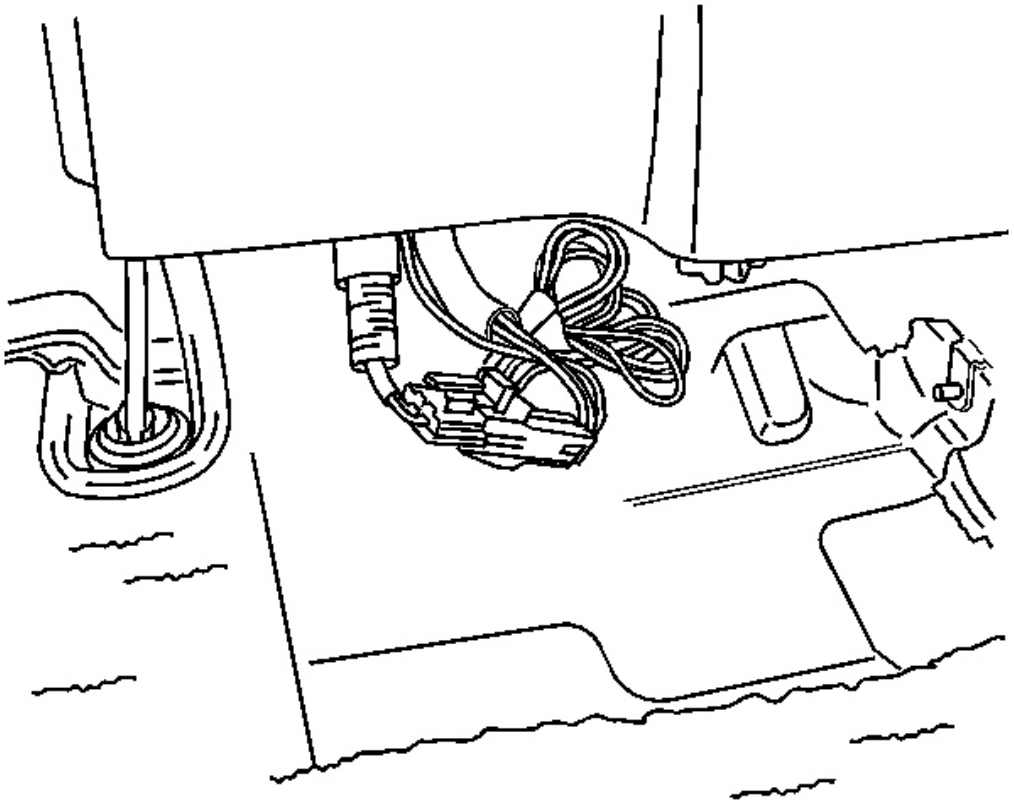


Fig. 123: Disconnecting/Connecting Electrical Connector To The Auxiliary Power Outlet
Courtesy of GENERAL MOTORS CORP.

8. Lift the rear of the center floor console.
9. Connect the electrical connector to the auxiliary power outlet.
10. Reposition the center console.

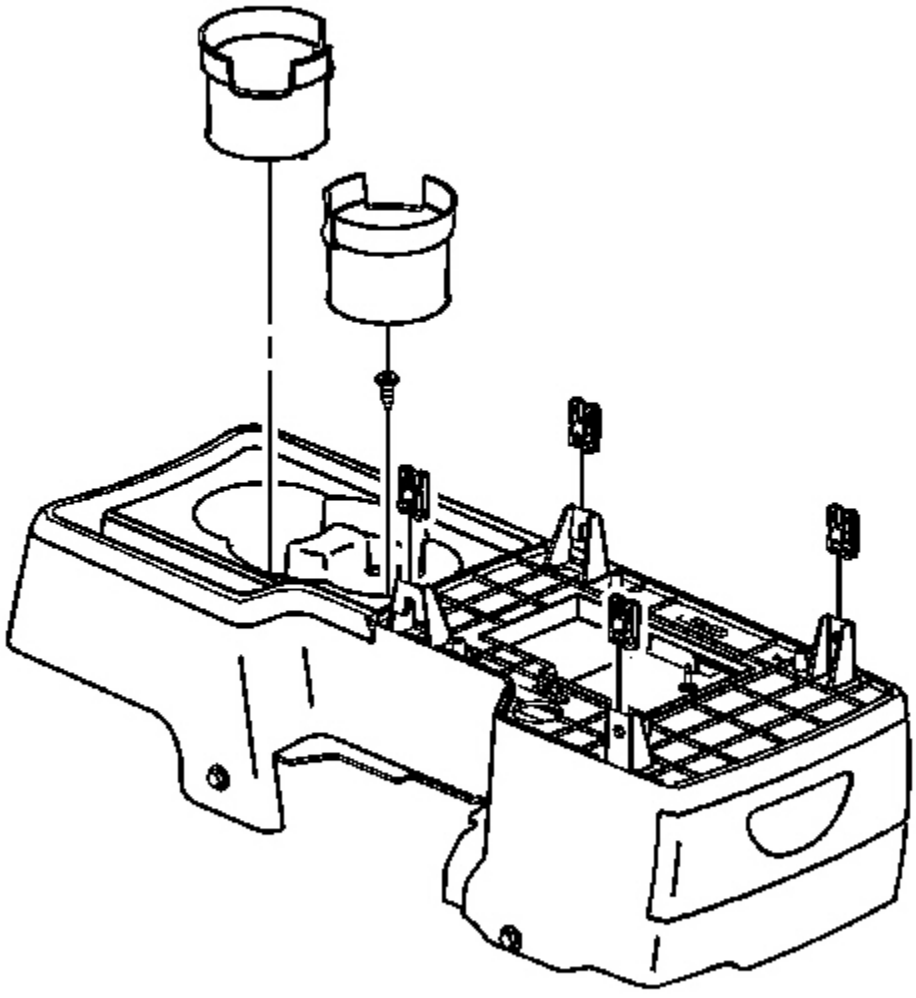


Fig. 124: Removing/Installing Cup Holder Liner
Courtesy of GENERAL MOTORS CORP.

11. Install the cup holder screw.

    Tighten: Tighten the screws to 2.5 N.m (22 lb in).

12. Install the cup holder liner.

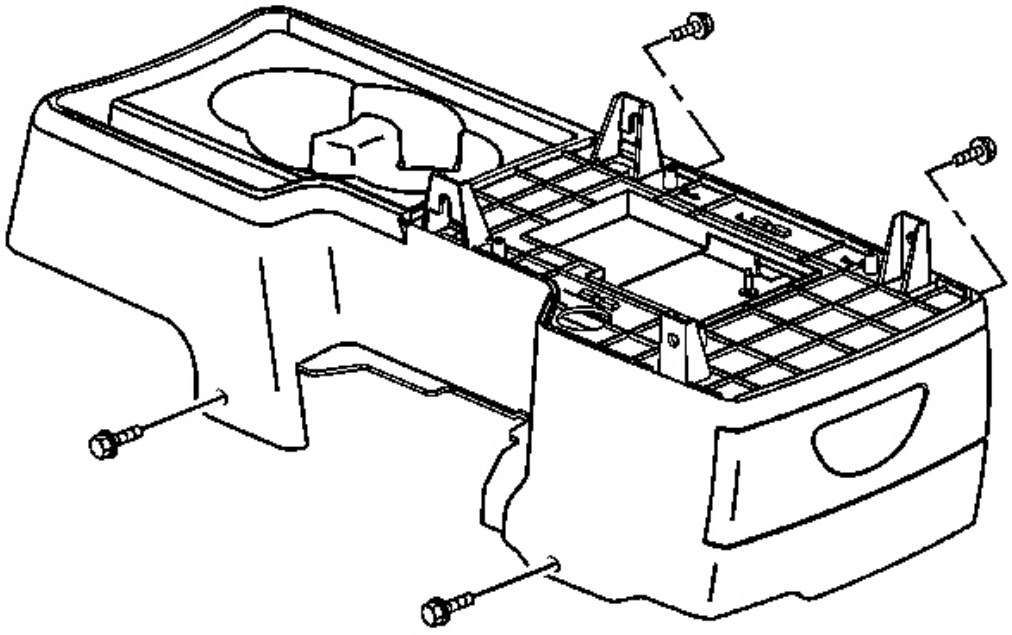


Fig. 125: Removing/Installing Console Screws
Courtesy of GENERAL MOTORS CORP.

13. Reach under the front seats to access the lower console screws.
14. Install the center console screws.

    Tighten: Tighten the screws to 2.5 N.m (22 lb in).

15. Position the front seat forward to the original position.

CONSOLE TRIM PANEL REPLACEMENT - LEFT

Removal Procedure

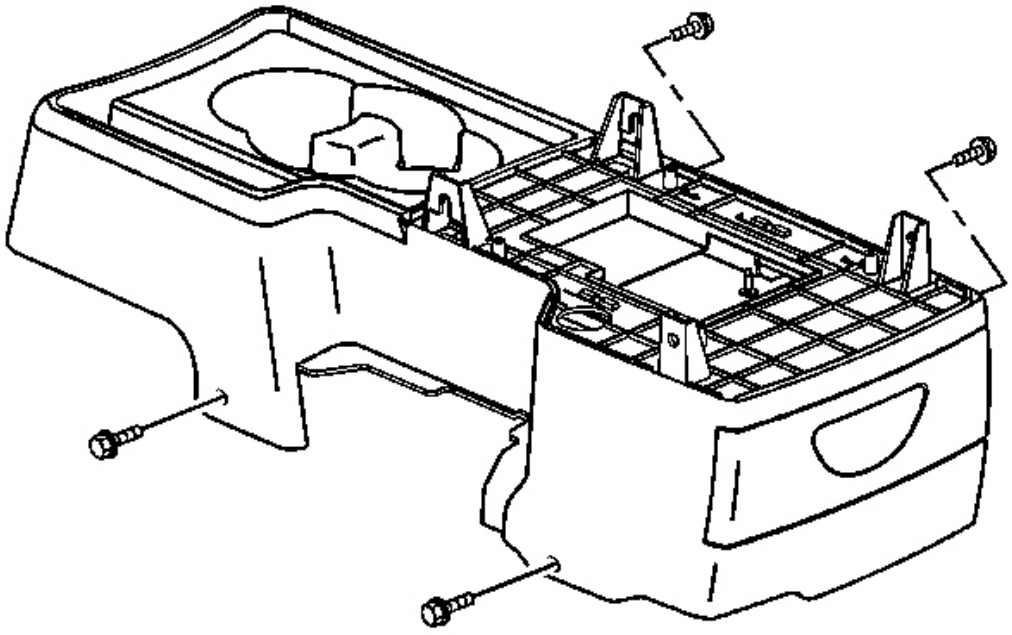


Fig. 126: View Of Left Console Trim Panel
Courtesy of GENERAL MOTORS CORP.

1. Position the front seats rearward.
2. Reach under the front seats to access the lower console screws.
3. Remove the console screws.

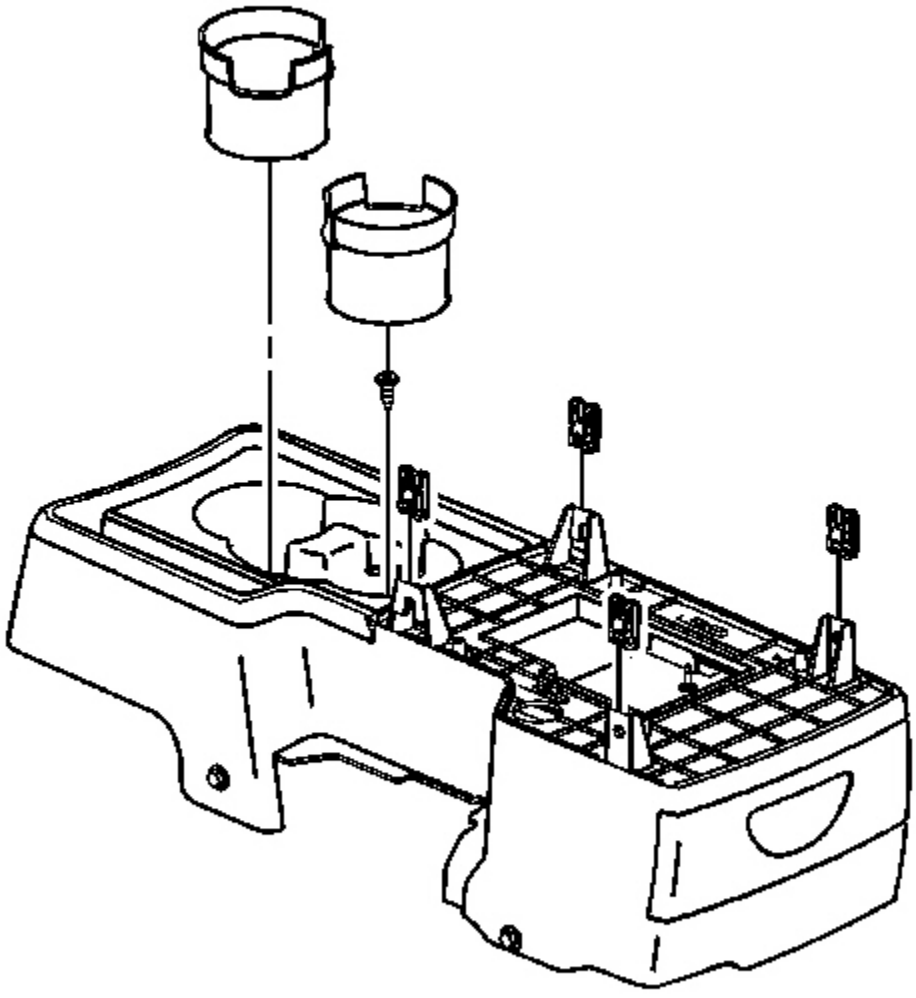


Fig. 127: Removing/Installing Cup Holder Liner
Courtesy of GENERAL MOTORS CORP.

4. Remove the cup holder liner.
5. Remove the cup holder screw.

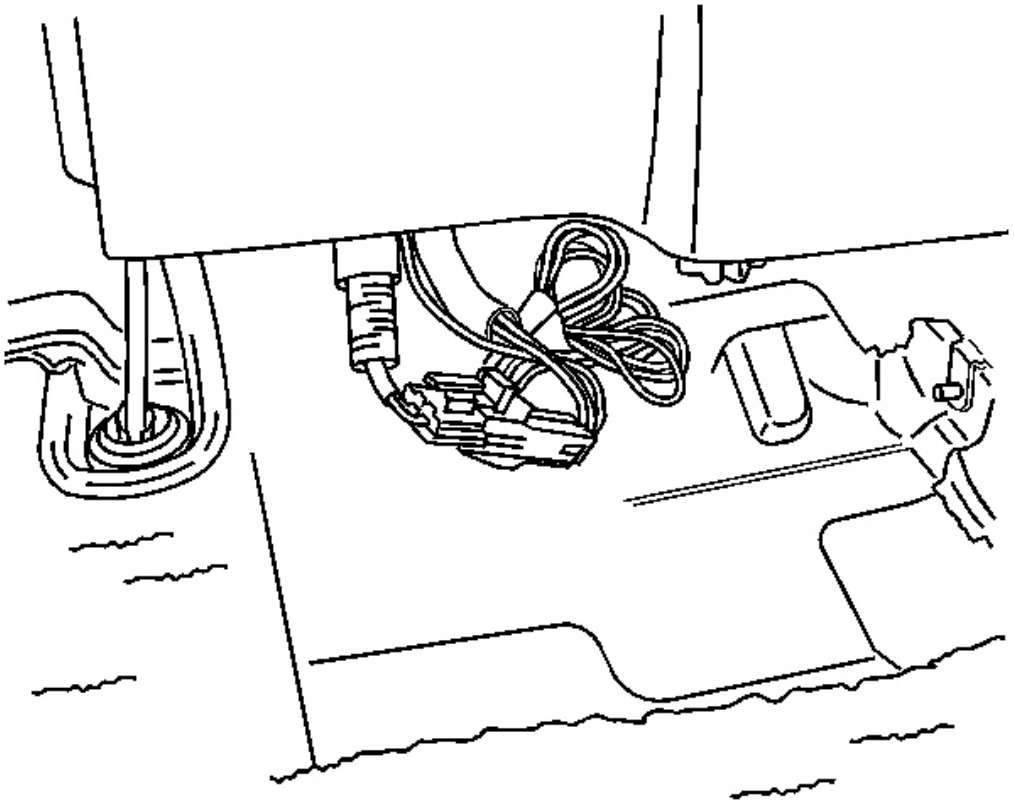


Fig. 128: Disconnecting/Connecting Electrical Connector To The Auxiliary Power Outlet
Courtesy of GENERAL MOTORS CORP.

6. Lift the rear of the center floor console.
7. Disconnect the electrical connector to the auxiliary power outlet.
8. Slide the center floor console rearward.

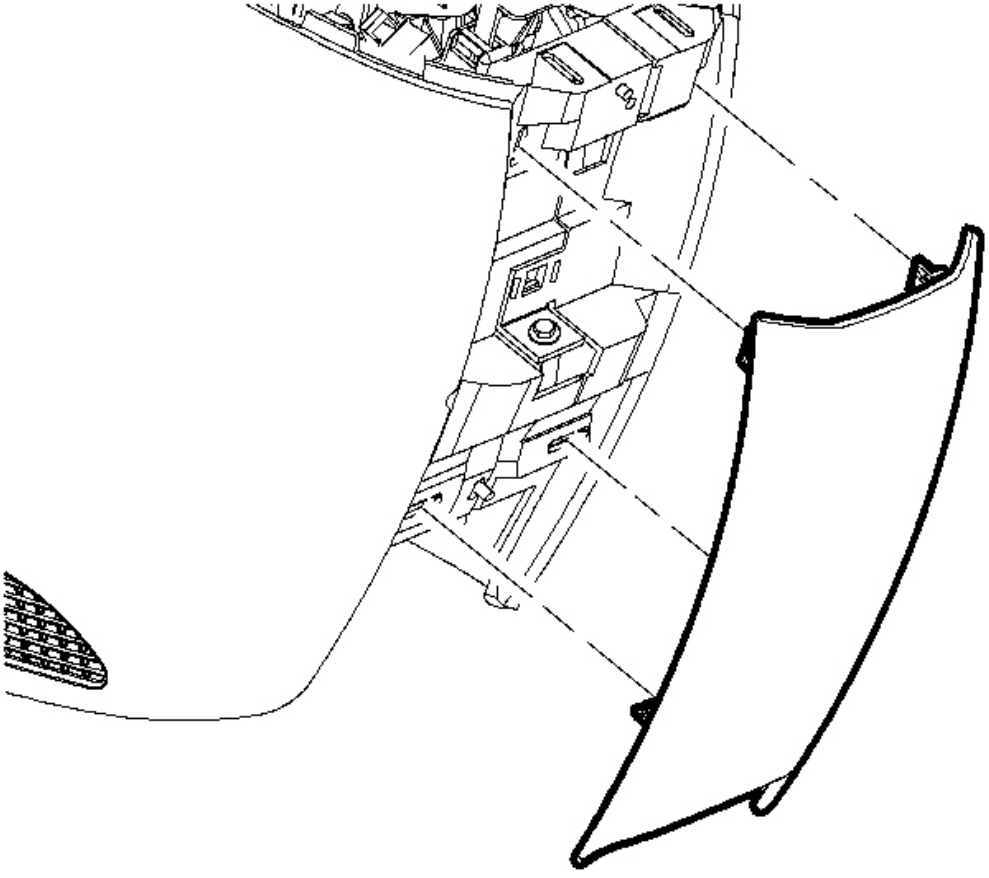


Fig. 129: Removing/Installing Center Trim Plate
Courtesy of GENERAL MOTORS CORP.

9. Remove the center trim panel by pulling outward.
10. Remove the console shift lever bezel. Refer to **Console Shift Lever Bezel Replacement** .

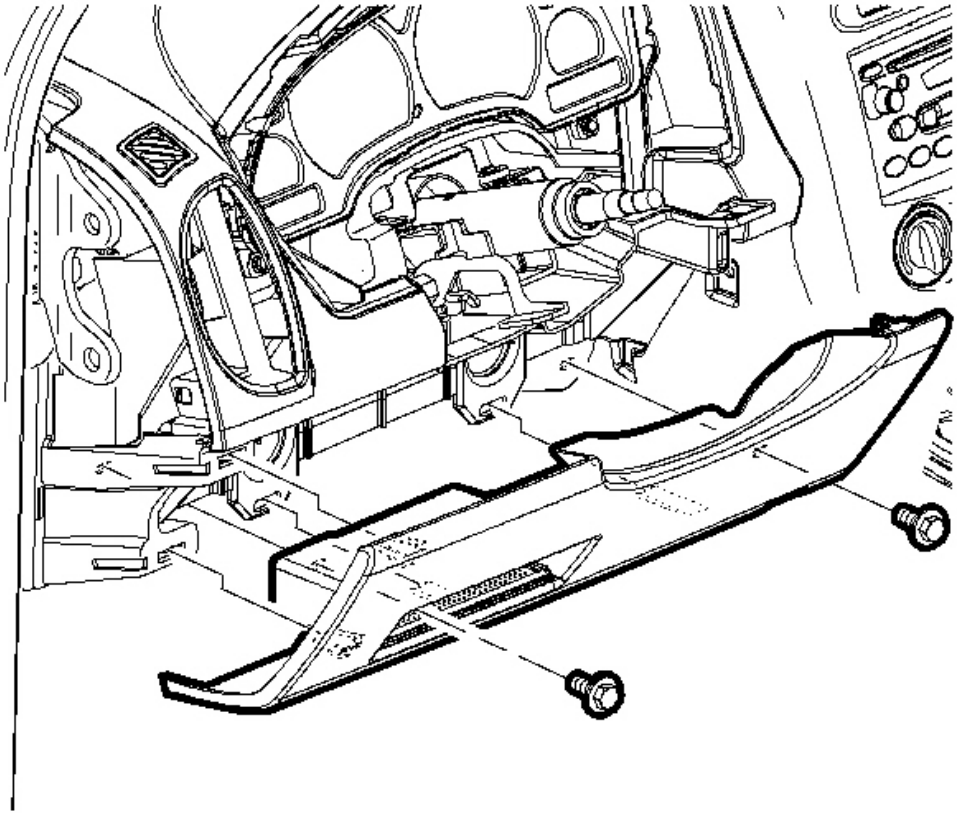


Fig. 130: Removing/Installing Screws From The Steering Column Filler Panel
Courtesy of GENERAL MOTORS CORP.

11. Remove the screws from the steering column filler panel.
12. Remove the filler panel by pulling outward.

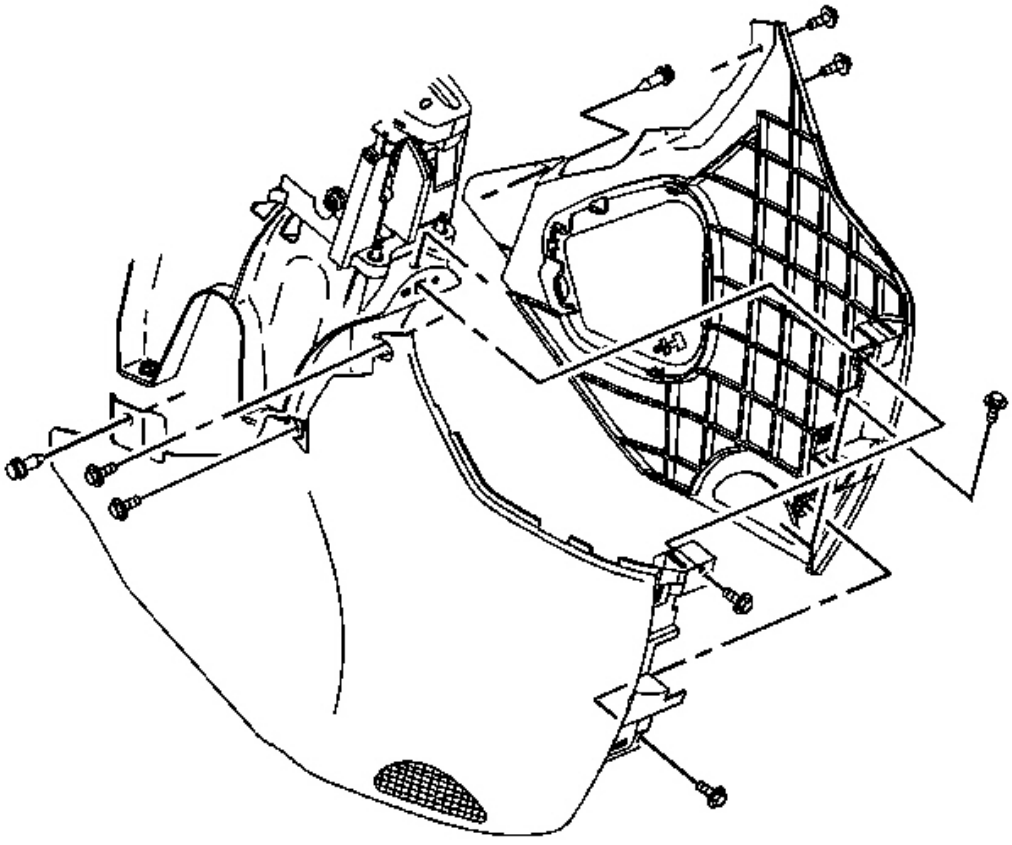


Fig. 131: Removing/Installing Front Console Trim Panels
Courtesy of GENERAL MOTORS CORP.

13. Remove the screws from the left console trim panel.
14. Remove the push-in fastener from the trim panel.
15. Remove the trim panel from the vehicle.

Installation Procedure

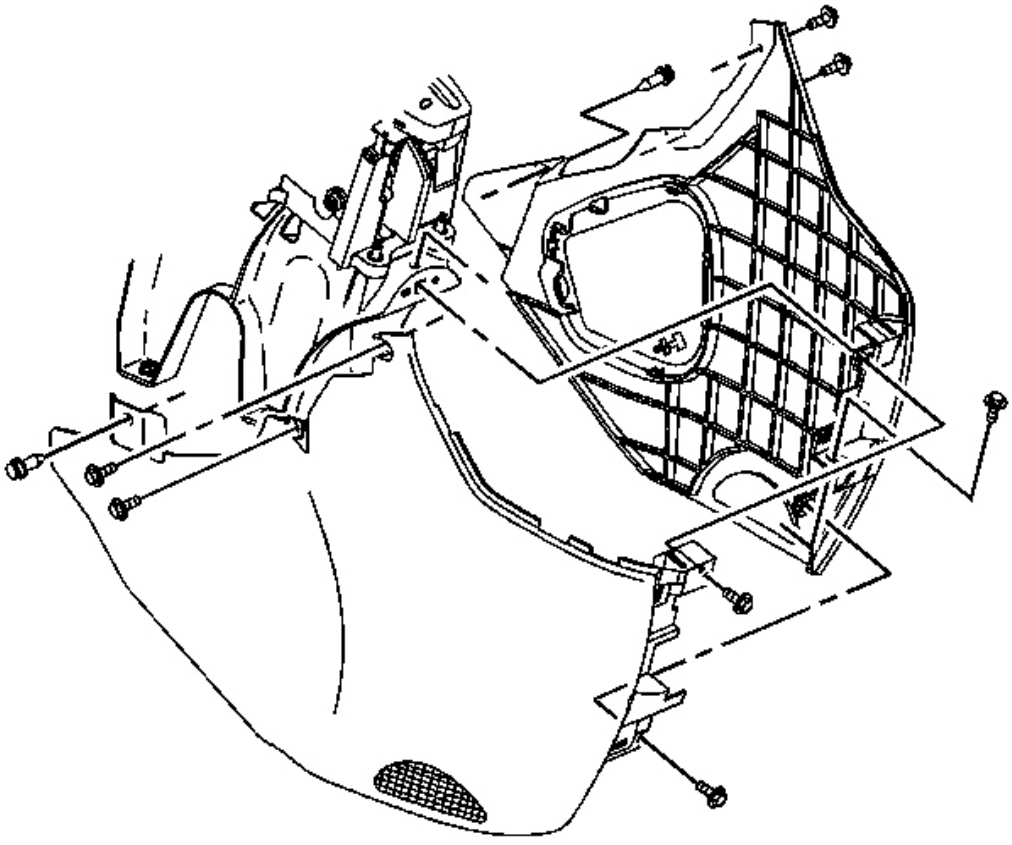


Fig. 132: Removing/Installing Front Console Trim Panels
Courtesy of GENERAL MOTORS CORP.

1. Position the left console trim panel.
2. Install the push-in fastener.

NOTE: Refer to Fastener Notice in Cautions and Notices.

3. Install the screws to the left console trim panel.

Tighten: Tighten the screws to 2.5 N.m (22 lb in).

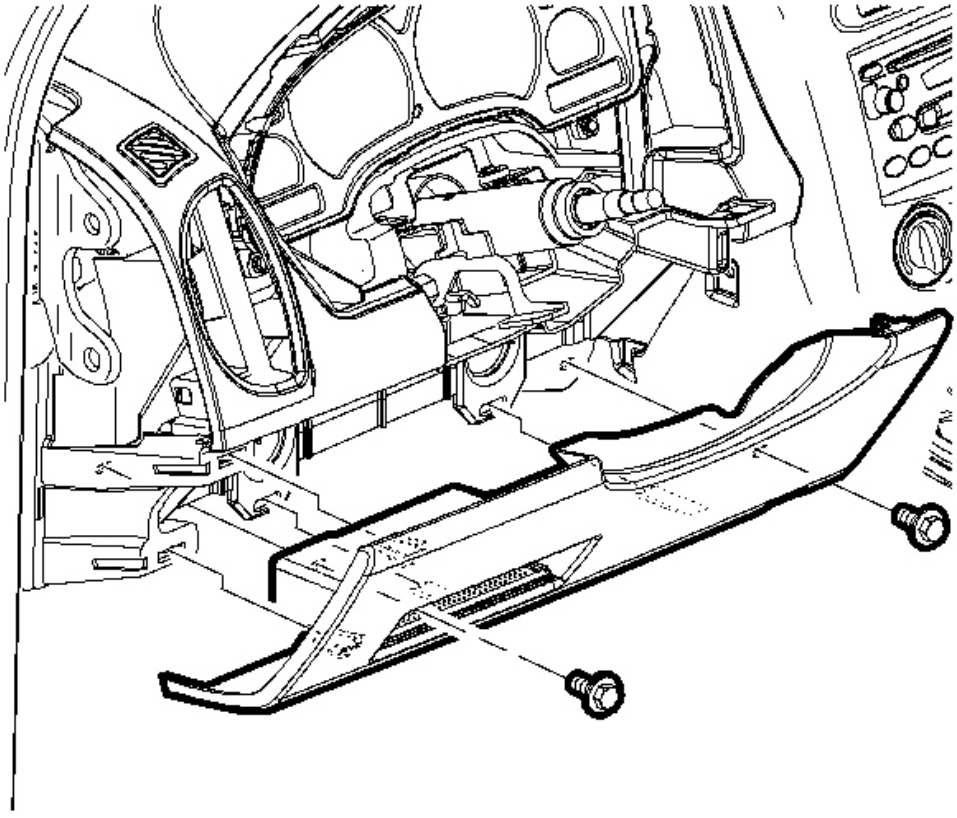


Fig. 133: Removing/Installing Screws From The Steering Column Filler Panel
Courtesy of GENERAL MOTORS CORP.

4. Position the steering column filler panel.
5. Install the screws to the filler panel.

Tighten: Tighten the screws to 2.5 N.m (22 lb in).

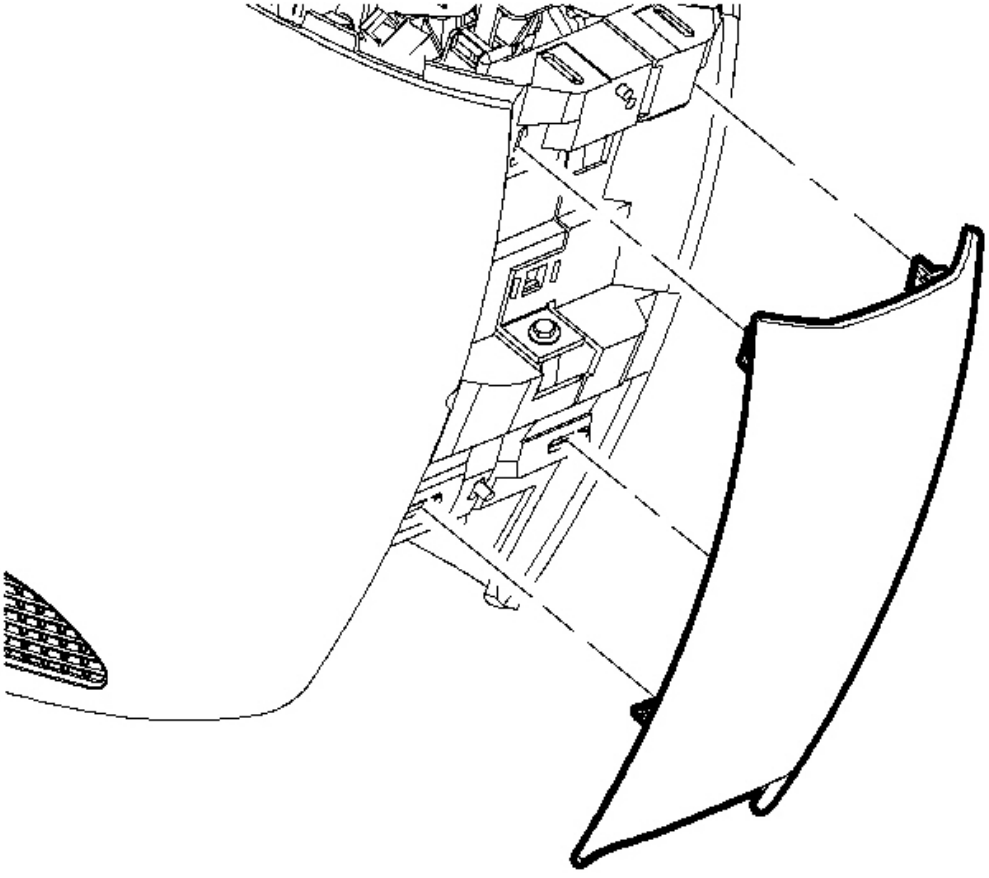


Fig. 134: Removing/Installing Center Trim Plate
Courtesy of GENERAL MOTORS CORP.

6. Position the center trim plate to the front console.
7. Push until the trim clips engage.
8. Install the console shift lever bezel. Refer to **Console Shift Lever Bezel Replacement** .

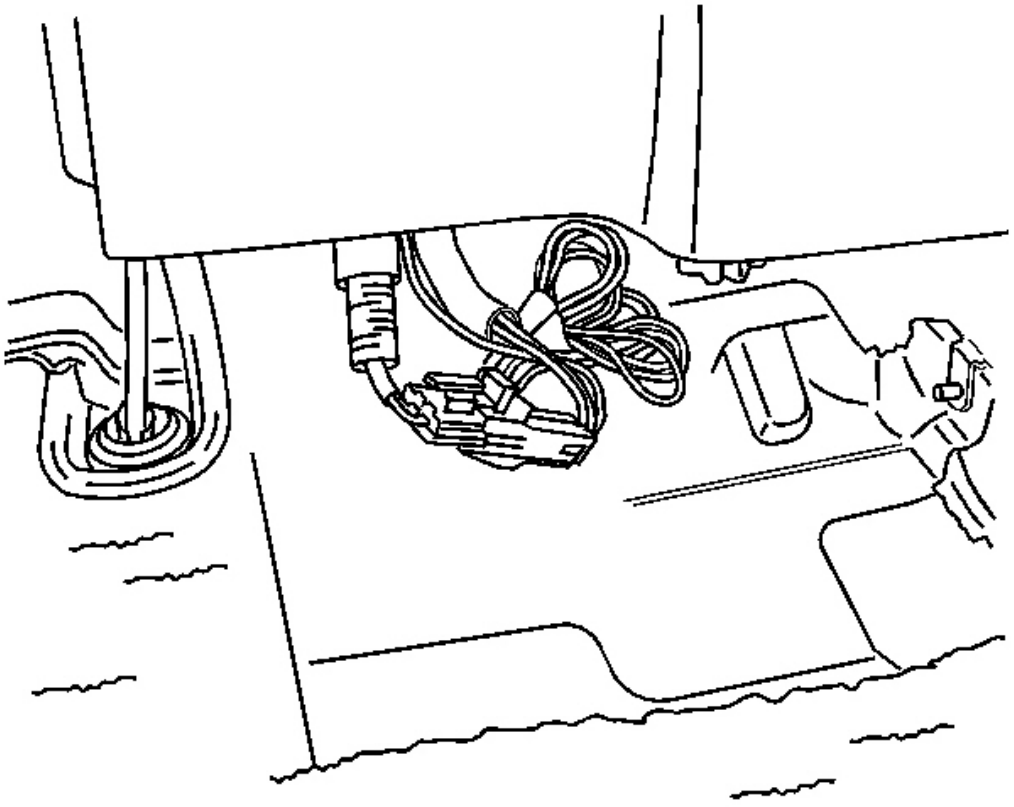


Fig. 135: Disconnecting/Connecting Electrical Connector To The Auxiliary Power Outlet
Courtesy of GENERAL MOTORS CORP.

9. Lift the rear of the center floor console.
10. Connect the electrical connector to the auxiliary power outlet.
11. Reposition the center console.

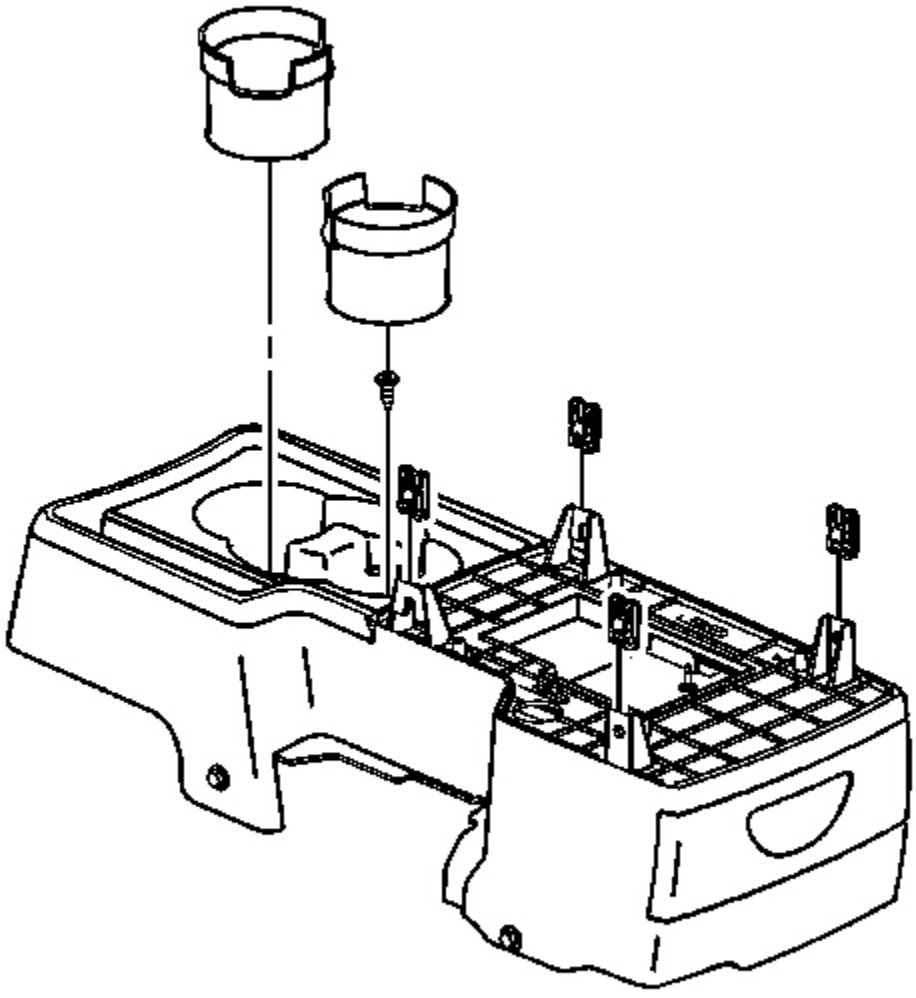


Fig. 136: Removing/Installing Cup Holder Liner
Courtesy of GENERAL MOTORS CORP.

12. Install the cup holder screw.

    Tighten: Tighten the screws to 2.5 N.m (22 lb in).

13. Install the cup holder liner.

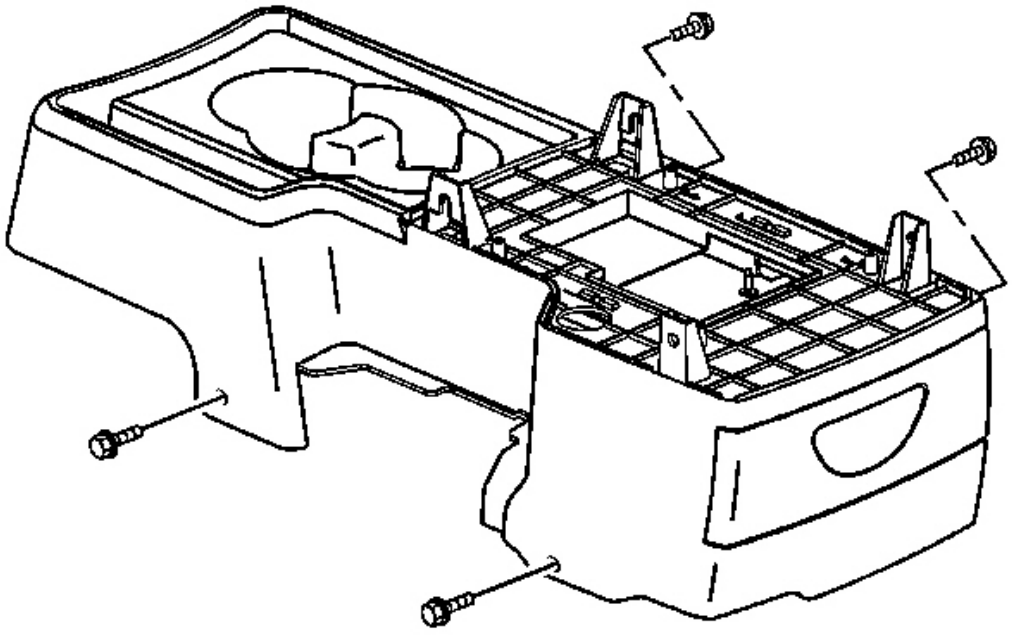


Fig. 137: Removing/Installing Console Screws
Courtesy of GENERAL MOTORS CORP.

14. Reach under the front seats to access the lower console screws.
15. Install the center console screws.

    Tighten: Tighten the screws to 2.5 N.m (22 lb in).

16. Position the front seat forward to the original position.

CONSOLE SHIFT LEVER BEZEL REPLACEMENT

Removal Procedure

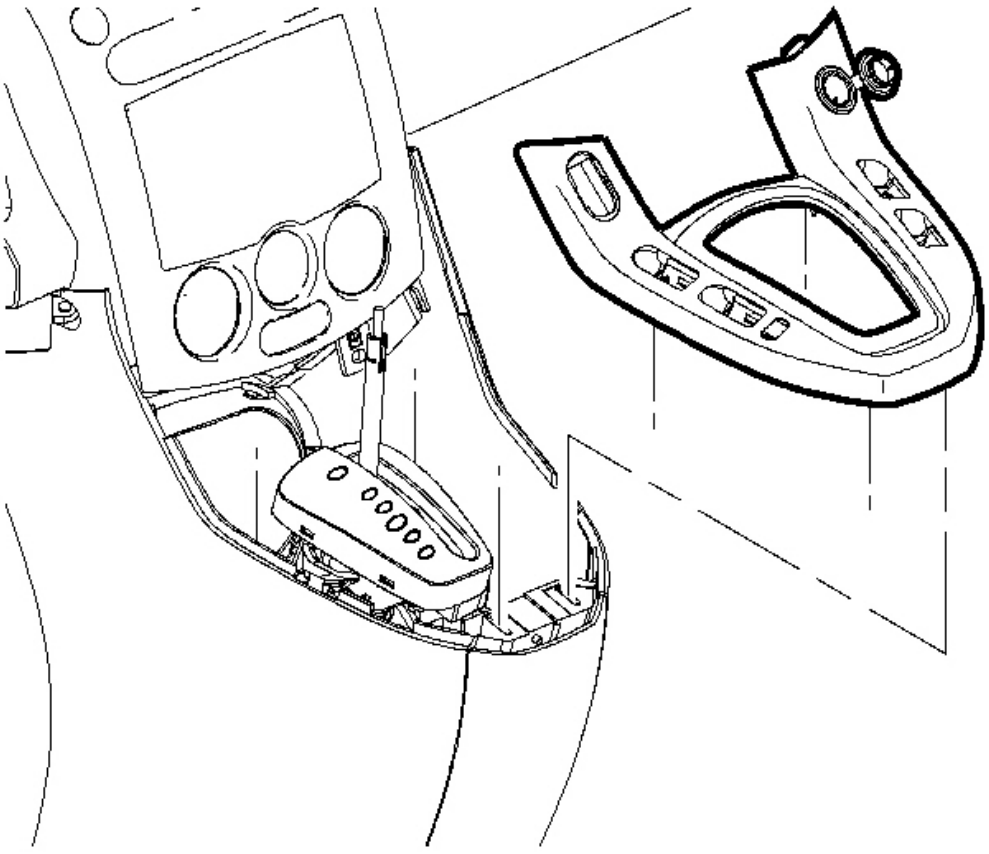


Fig. 138: Removing Shift Level Bezel From The Console
Courtesy of GENERAL MOTORS CORP.

1. Set the park brake.
2. Move the shifter to the neutral position.
3. Starting at the most forward end, pull up to remove the bezel.

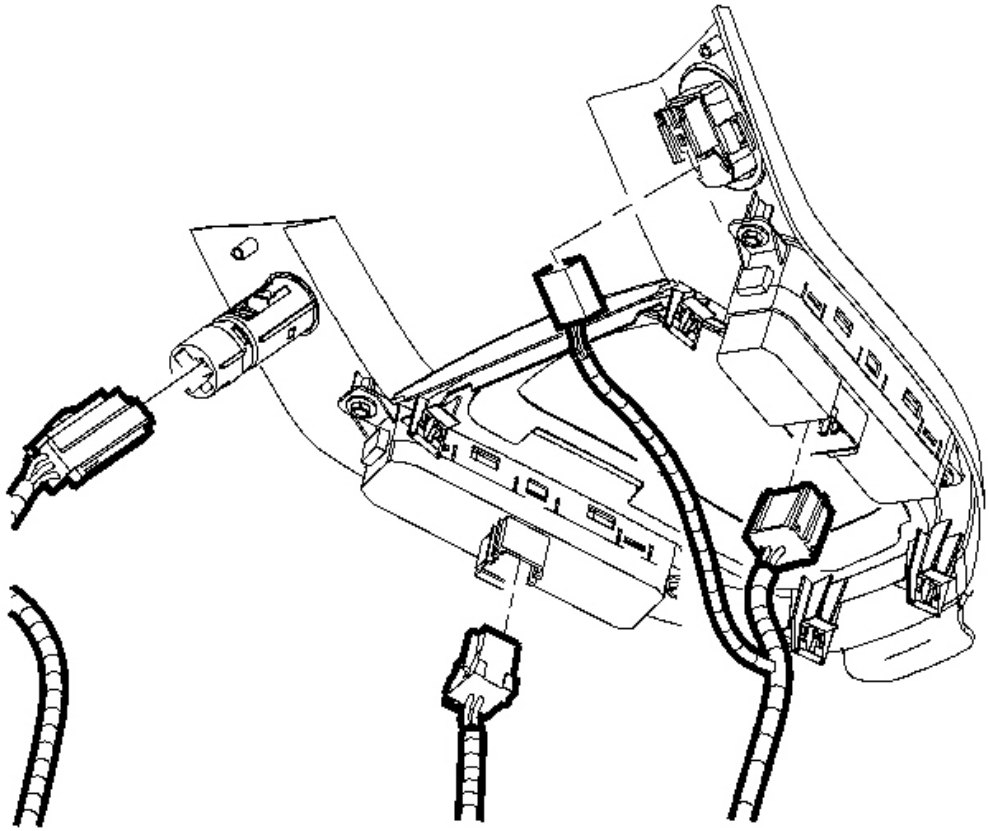


Fig. 139: Disconnecting/Connecting Electrical Connectors
Courtesy of GENERAL MOTORS CORP.

4. Disconnect the electrical connectors.
5. Remove the shift lever bezel.

Installation Procedure

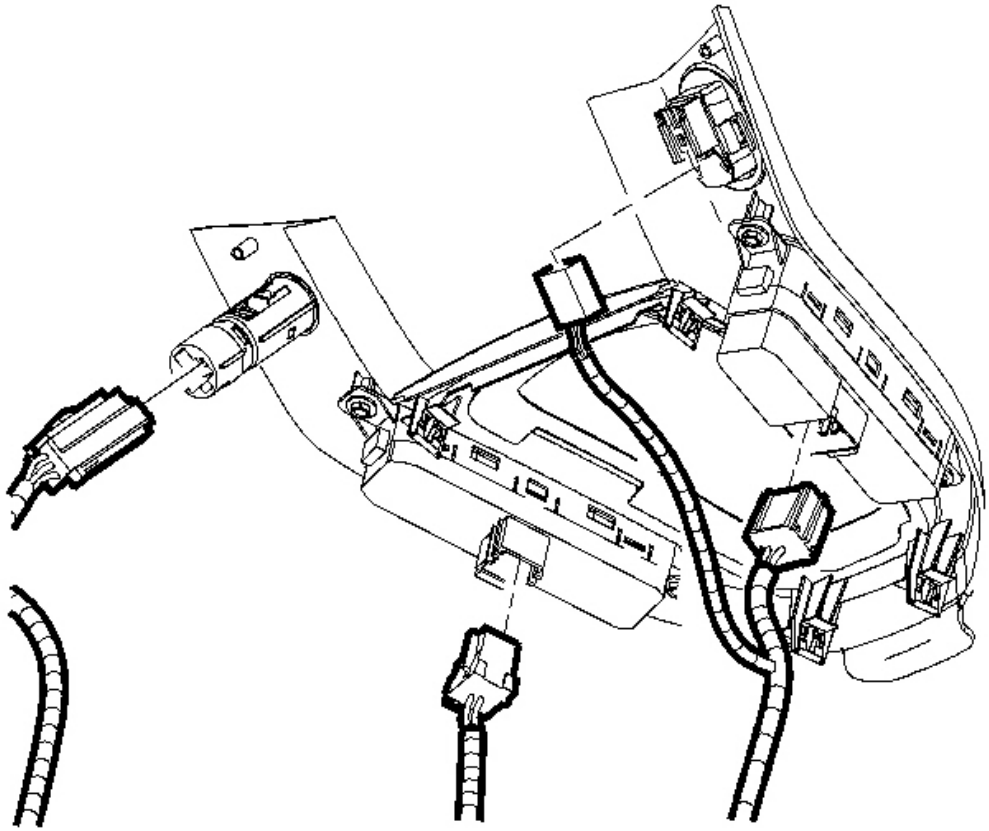


Fig. 140: Disconnecting/Connecting Electrical Connectors
Courtesy of GENERAL MOTORS CORP.

1. Position the shift lever bezel.
2. Connect the electrical connectors.

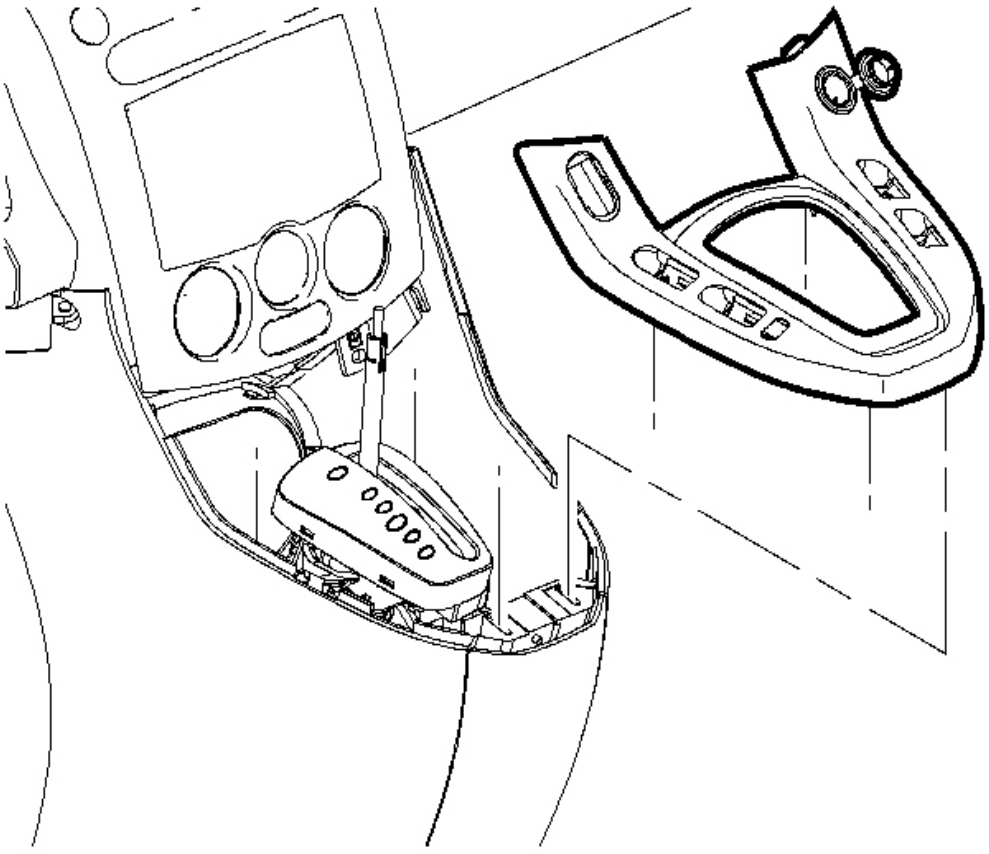


Fig. 141: Removing Shift Level Bezel From The Console
Courtesy of GENERAL MOTORS CORP.

3. Press on the bezel to engage the bezel trim clips.
4. Put the shifter in the park position.
5. Release the park brake.

CUP HOLDER REPLACEMENT - FRONT FLOOR CONSOLE - REAR

Removal Procedure

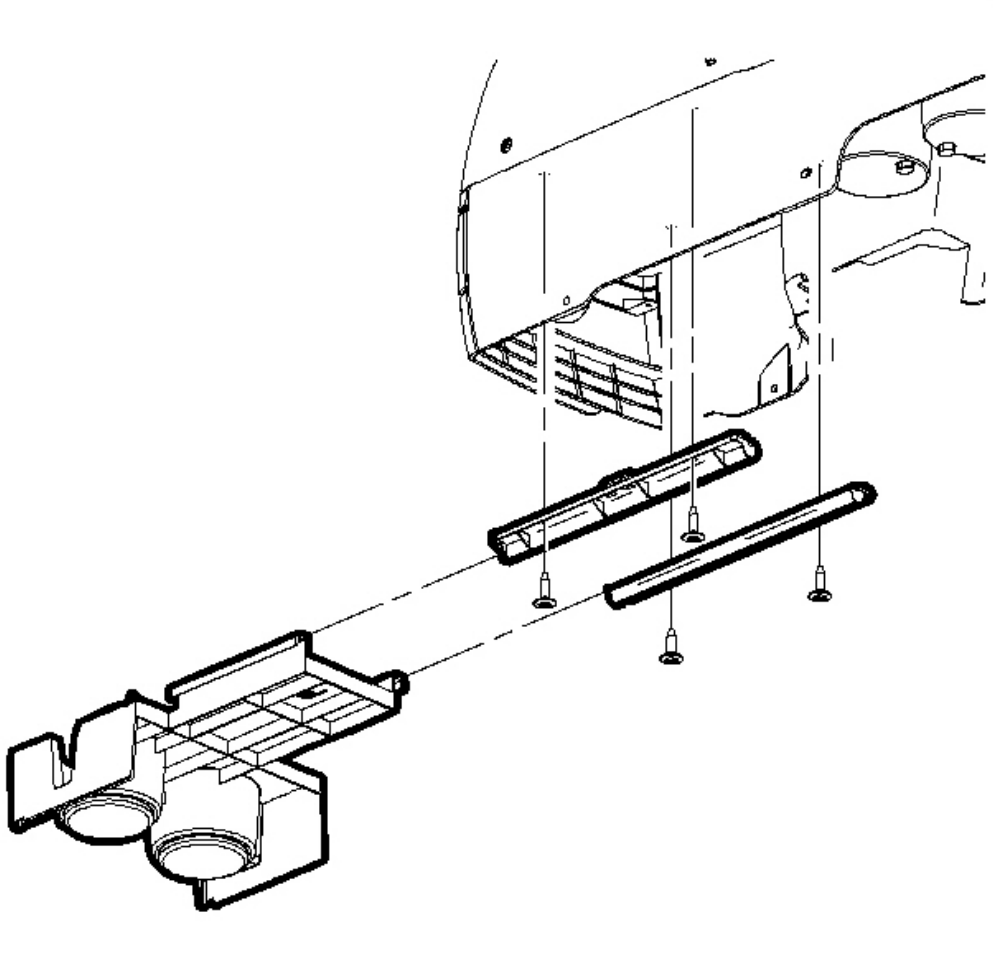


Fig. 142: View Of Front Floor Console Cup Holder
Courtesy of GENERAL MOTORS CORP.

1. Remove the front floor console. Refer to **Console Replacement - Front Floor** .
2. Pull all the way out on the cup holder.
3. Remove the screws from the cup holder track.
4. Remove the cup holder and the track from the console.
5. Pull to separate the cup holder from the track.

Installation Procedure

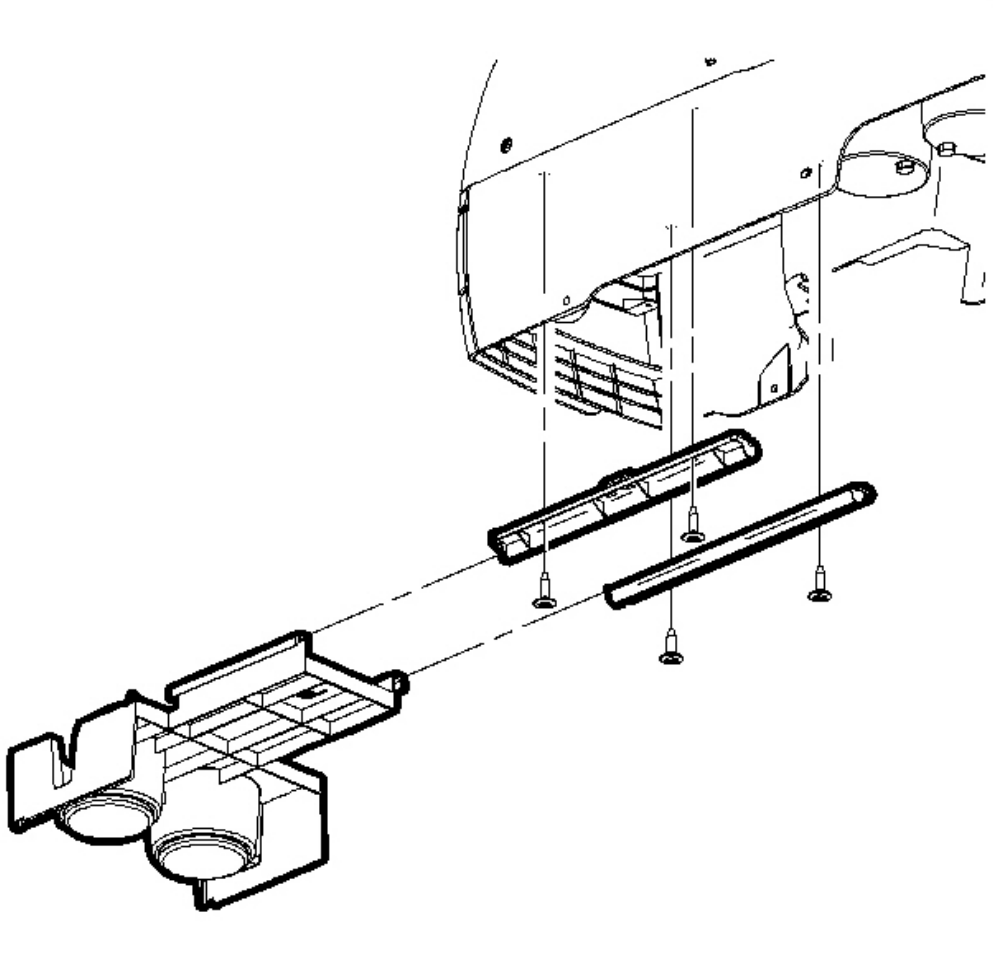


Fig. 143: View Of Front Floor Console Cup Holder
Courtesy of GENERAL MOTORS CORP.

1. Install the cup holder to the track.
2. Position the track in the console assembly.

NOTE: Refer to Fastener Notice in Cautions and Notices.

3. Install the console track screws.

Tighten: Tighten the screw to 2.5 N.m (22 lb in).

4. Install the front floor console. Refer to **Console Replacement - Front Floor** .

CONSOLE REPLACEMENT

Removal Procedure

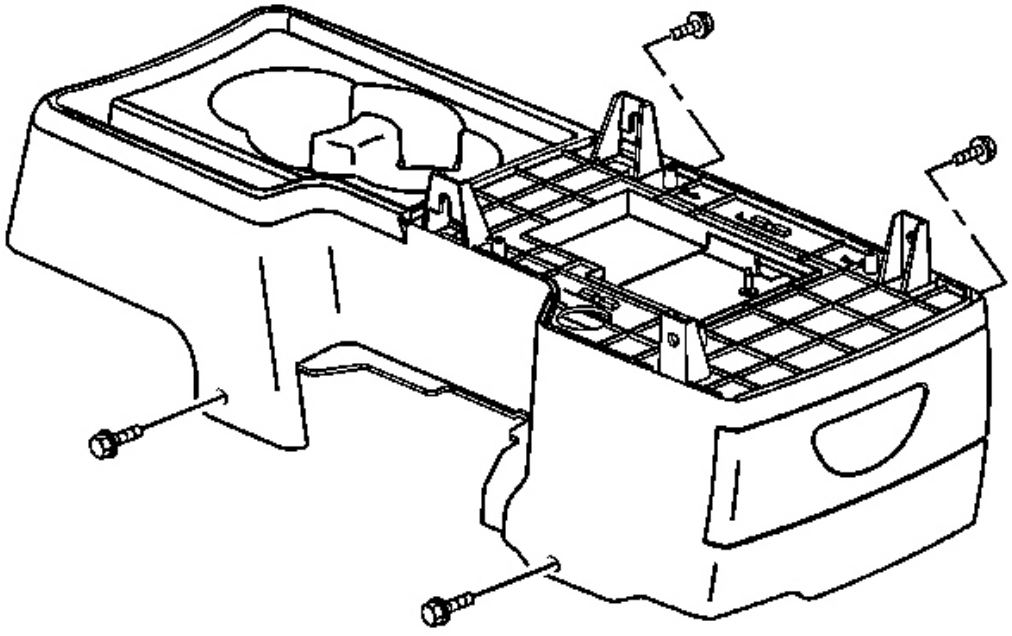


Fig. 144: Removing/Installing Console Screws
Courtesy of GENERAL MOTORS CORP.

1. Position the front seats rearward.
2. Reach under the front seats to access the lower console screws.
3. Remove the console screws.

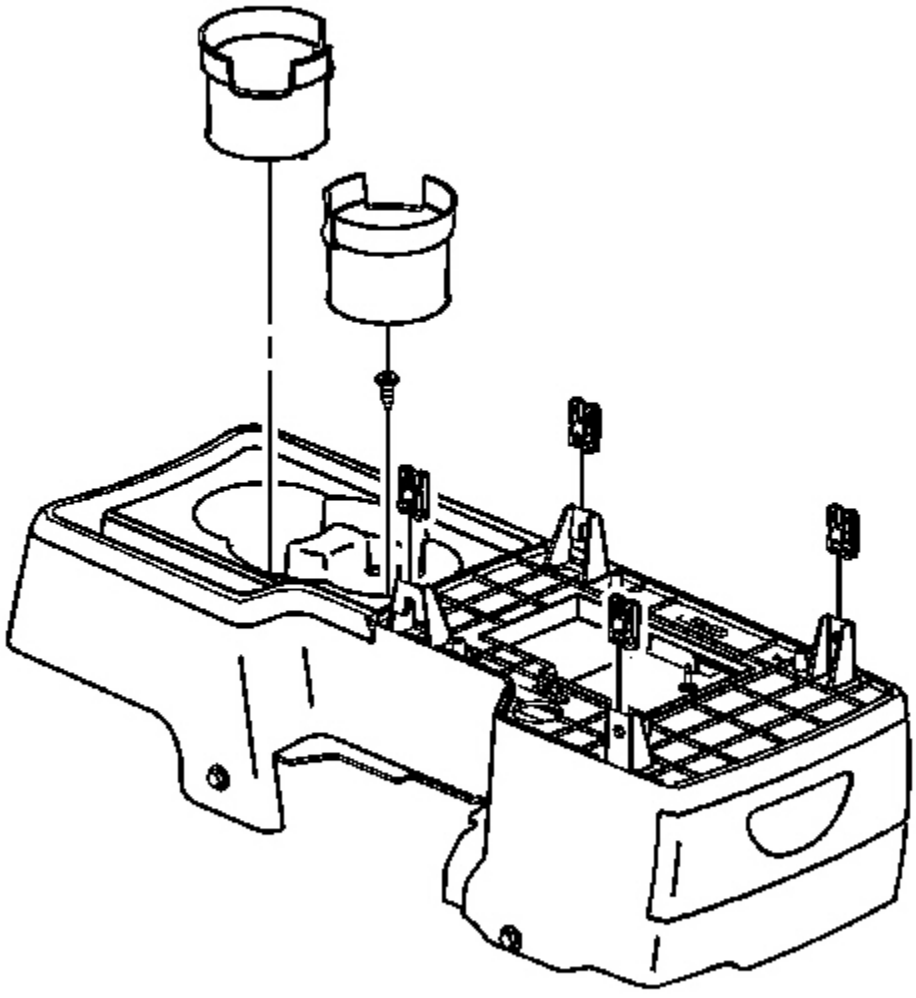


Fig. 145: Removing/Installing Cup Holder Liner
Courtesy of GENERAL MOTORS CORP.

4. Remove the cup holder liner.
5. Remove the cup holder screw.

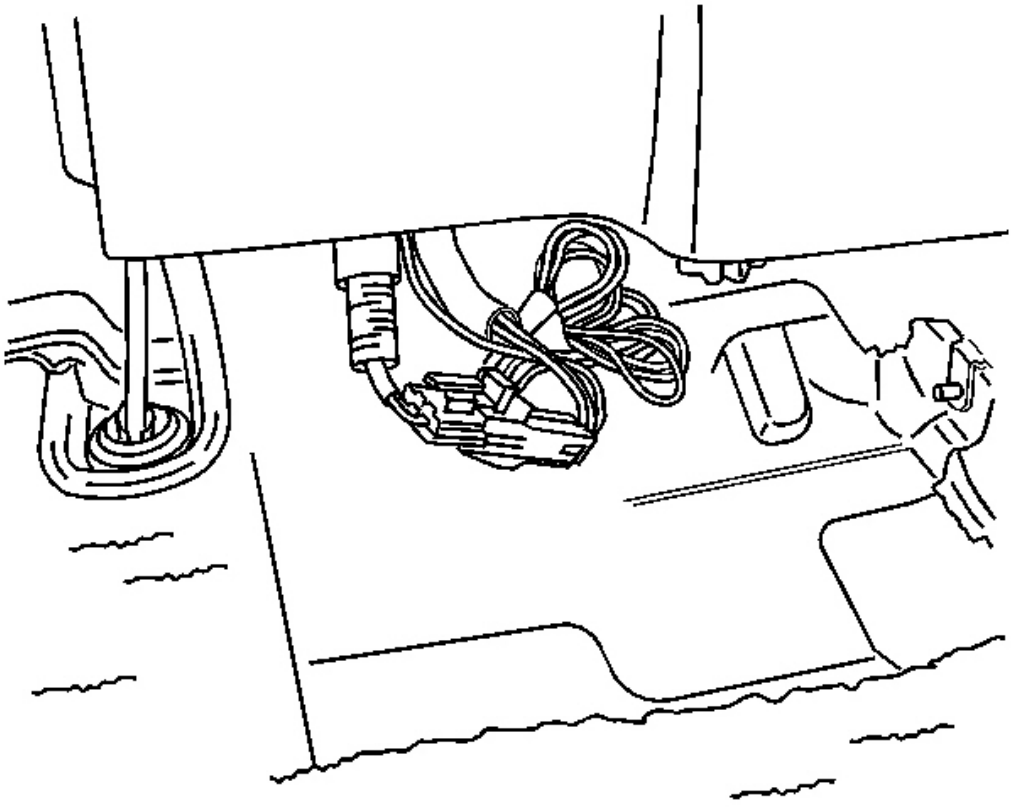


Fig. 146: Disconnecting/Connecting Electrical Connector To The Auxiliary Power Outlet
Courtesy of GENERAL MOTORS CORP.

6. Lift the rear of the center floor console.
7. Disconnect the electrical connector to the auxiliary power outlet.
8. Slide the center floor console rearward to access the upper console screws.

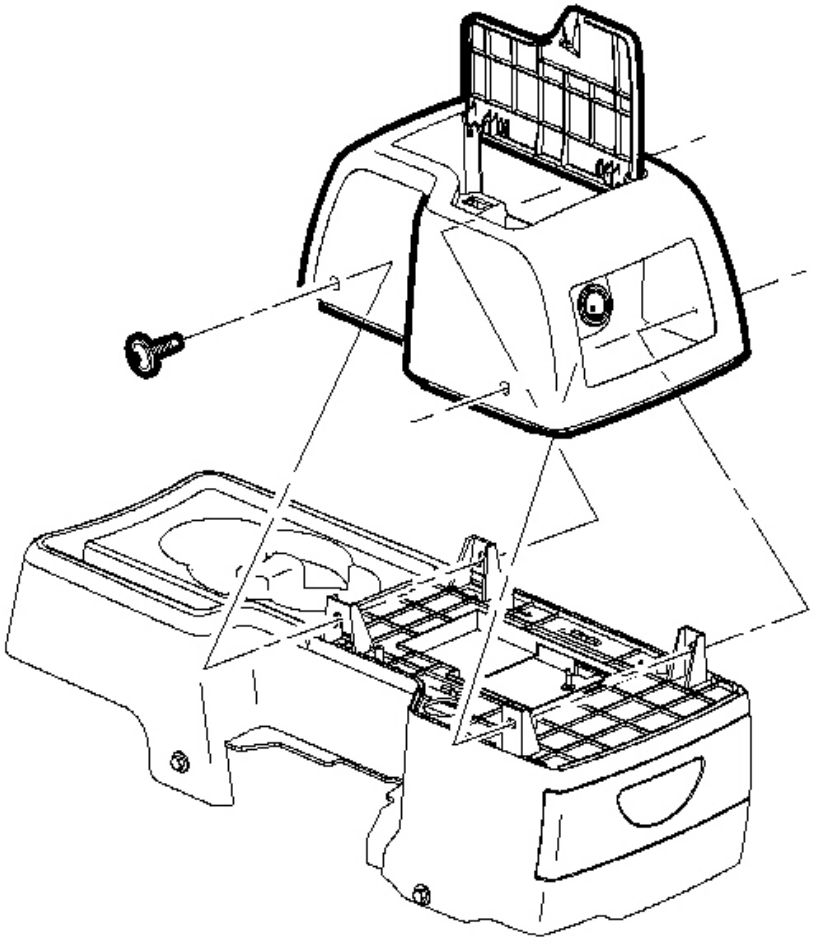


Fig. 147: Removing/Installing Console Screws
Courtesy of GENERAL MOTORS CORP.

9. Remove the console screws.
10. Remove the upper console.

Installation Procedure

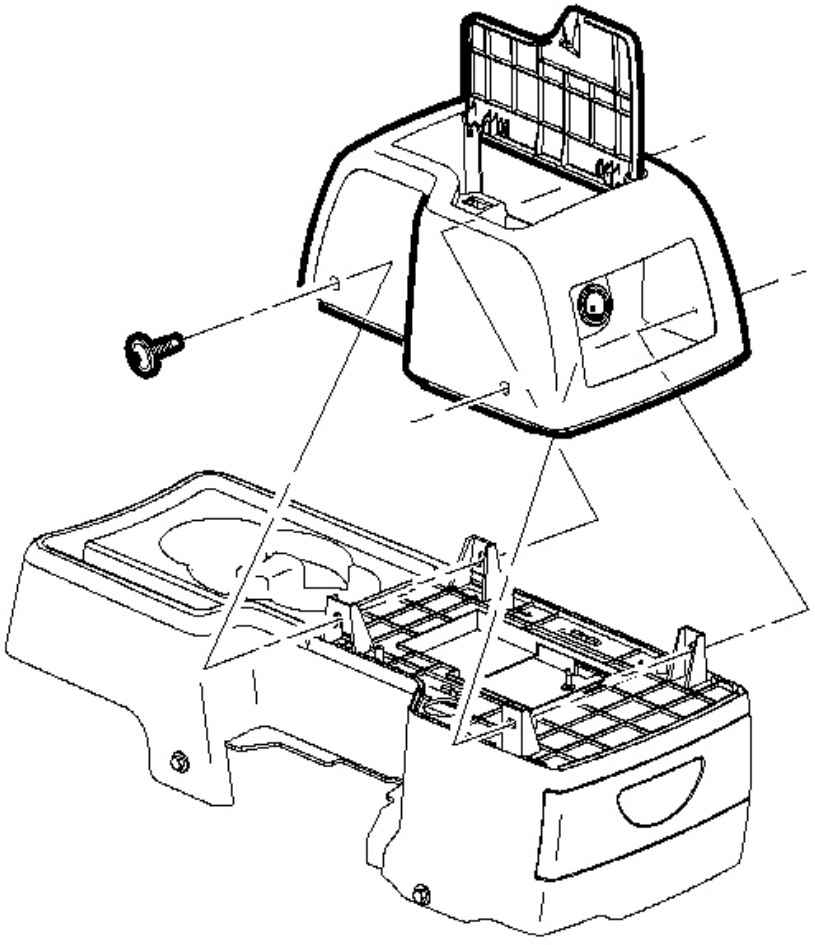


Fig. 148: Removing/Installing Console Screws
Courtesy of GENERAL MOTORS CORP.

1. Position the console on top of the center floor console.

NOTE: **Refer to Fastener Notice in Cautions and Notices.**

2. Install the console screws.

Tighten: Tighten the screws to 2.5 N.m (22 lb in).

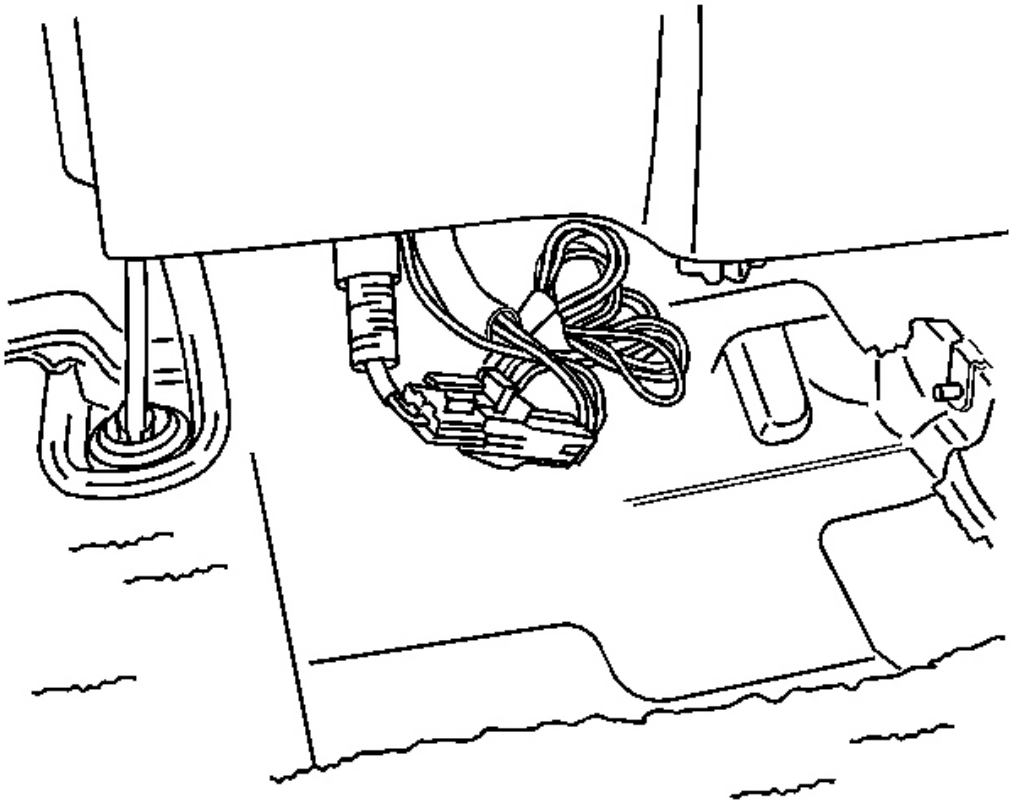


Fig. 149: Disconnecting/Connecting Electrical Connector To The Auxiliary Power Outlet
Courtesy of GENERAL MOTORS CORP.

3. Connect the electrical connector to the auxiliary power outlet.
4. Reposition the center console.

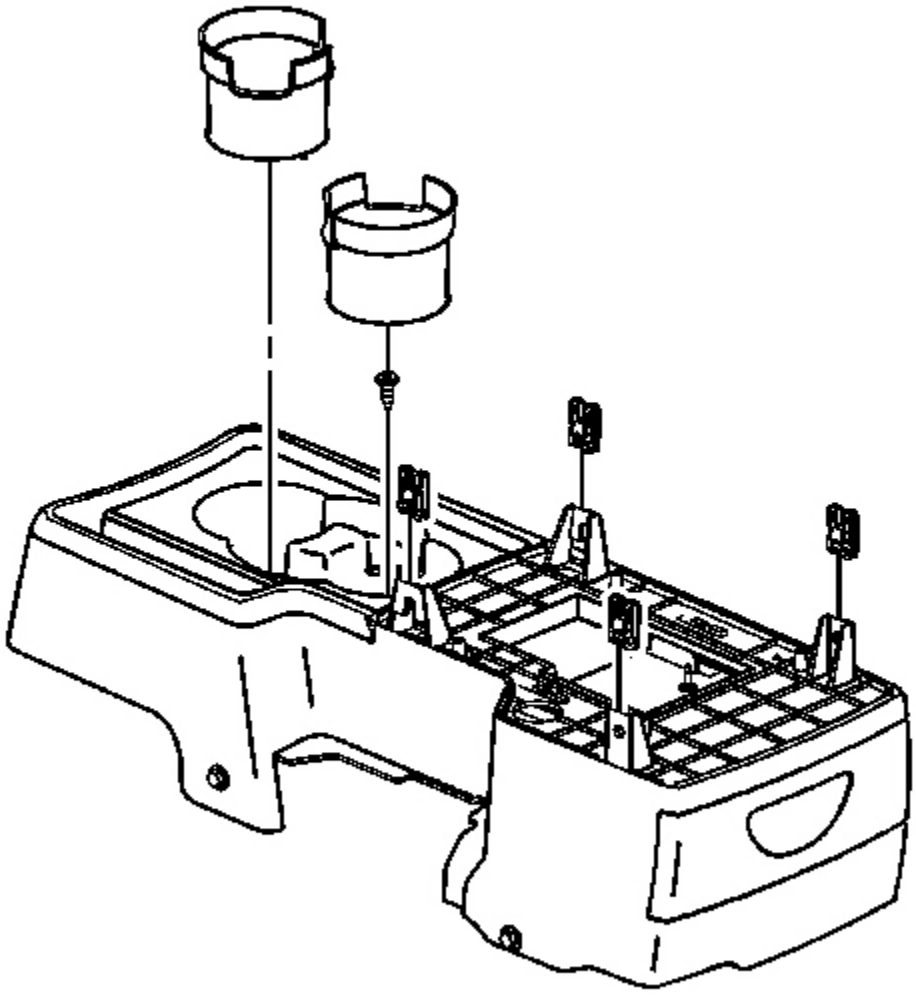


Fig. 150: Removing/Installing Cup Holder Liner
Courtesy of GENERAL MOTORS CORP.

5. Install the cup holder screw.

   Tighten: Tighten the screws to 2.5 N.m (22 lb in).

6. Install the cup holder liner.

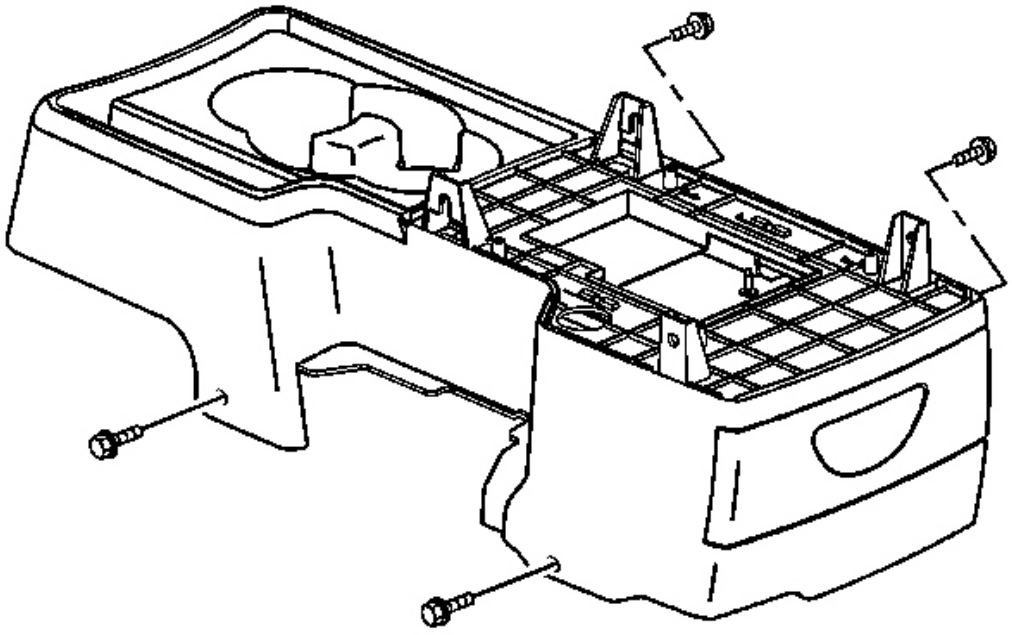


Fig. 151: Removing/Installing Console Screws
Courtesy of GENERAL MOTORS CORP.

7. Reach under the front seats to access the lower console screws.
8. Install the center console screws.

   Tighten: Tighten the screws to 2.5 N.m (22 lb in).

9. Position the front seat forward to the original position.

CONSOLE REPLACEMENT - FRONT FLOOR

Removal Procedure

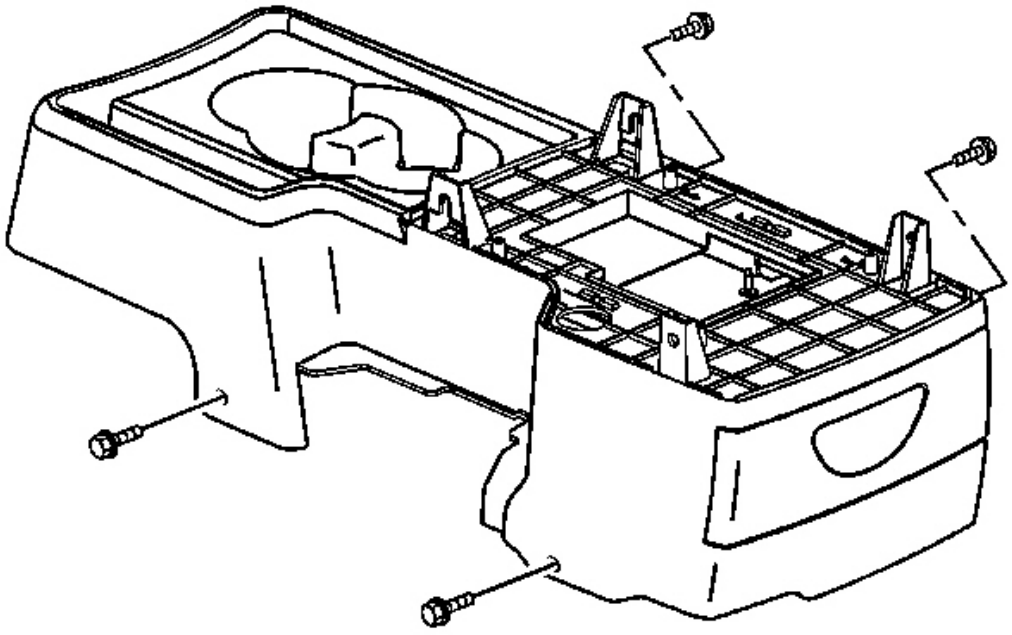


Fig. 152: View Of Front Floor Console
Courtesy of GENERAL MOTORS CORP.

1. Position the front seats rearward.
2. Reach under the front seats to access the lower console screws.
3. Remove the console screws.

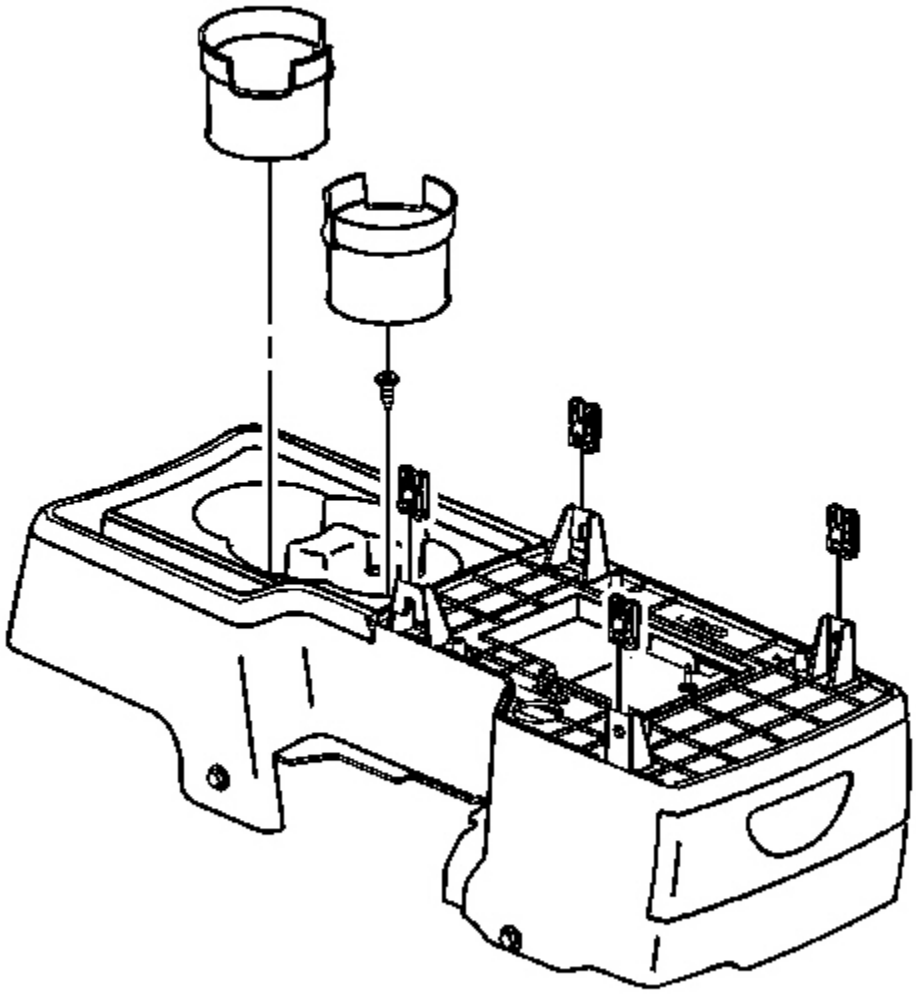


Fig. 153: Removing/Installing Cup Holder Liner
Courtesy of GENERAL MOTORS CORP.

4. Remove the cup holder liner.
5. Remove the cup holder screw.

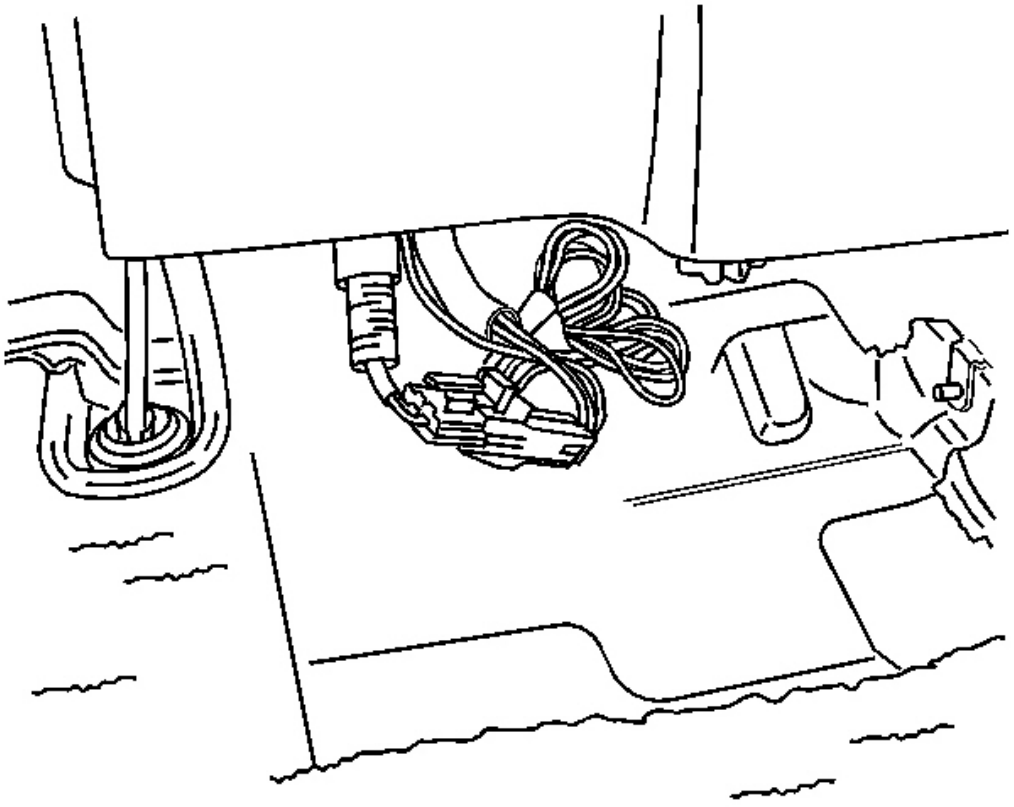


Fig. 154: Disconnecting/Connecting Electrical Connector To The Auxiliary Power Outlet
Courtesy of GENERAL MOTORS CORP.

6. Lift the rear of the center floor console.
7. Disconnect the electrical connector to the auxiliary power outlet.
8. Remove the console from the vehicle.

Installation Procedure

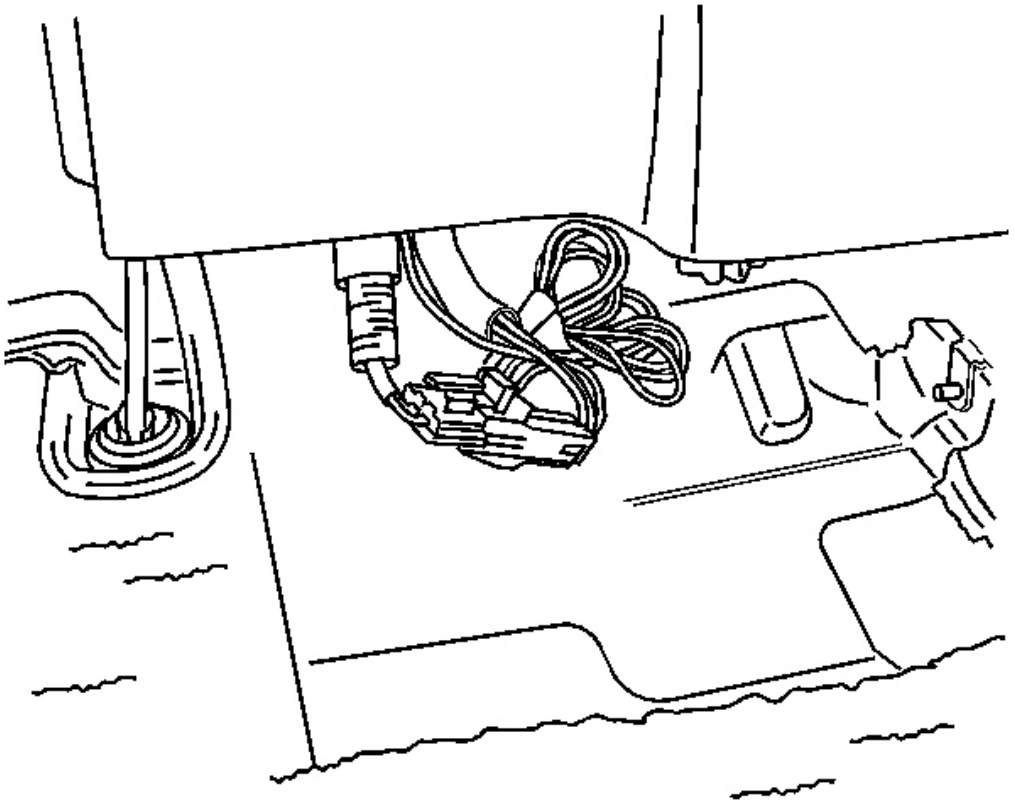


Fig. 155: Disconnecting/Connecting Electrical Connector To The Auxiliary Power Outlet
Courtesy of GENERAL MOTORS CORP.

1. Position the console between the front bucket seats.
2. Connect the electrical connector to the auxiliary power outlet.
3. Reposition the center console.

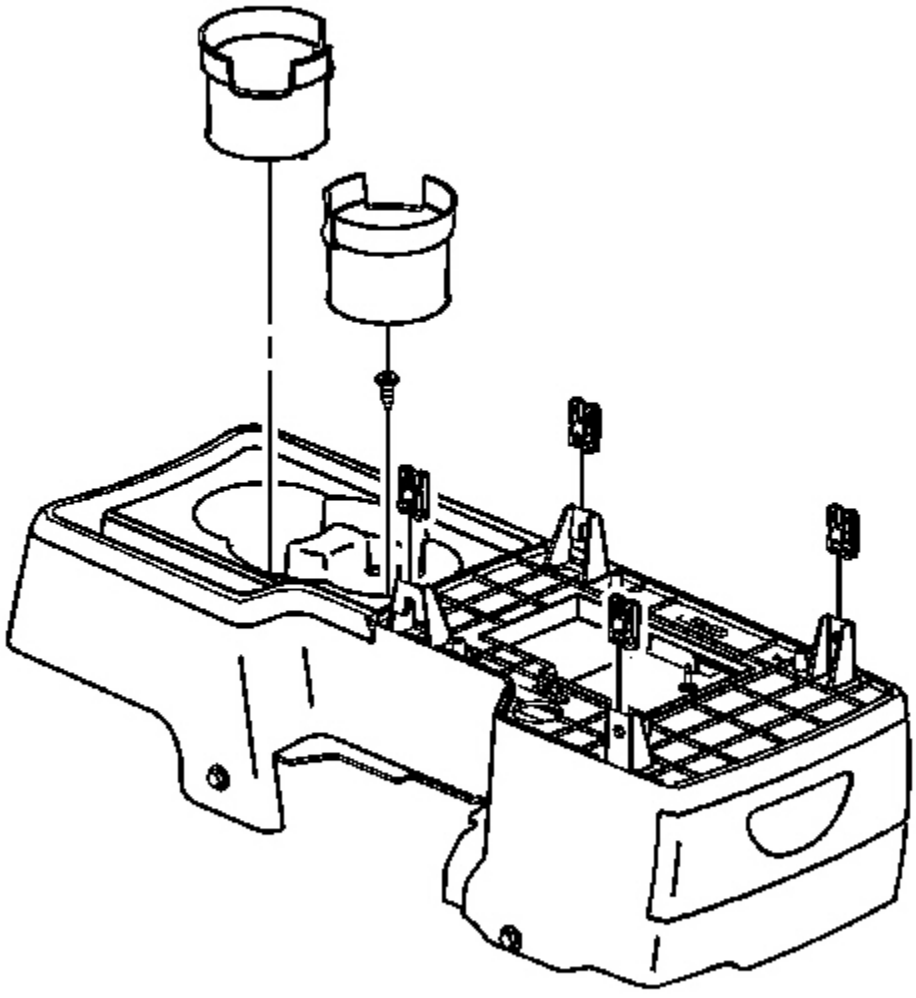


Fig. 156: Removing/Installing Cup Holder Liner
Courtesy of GENERAL MOTORS CORP.

NOTE: Refer to Fastener Notice in Cautions and Notices.

4. Install the cup holder screw.

   Tighten: Tighten the screws to 2.5 N.m (22 lb in).

5. Install the cup holder liner.

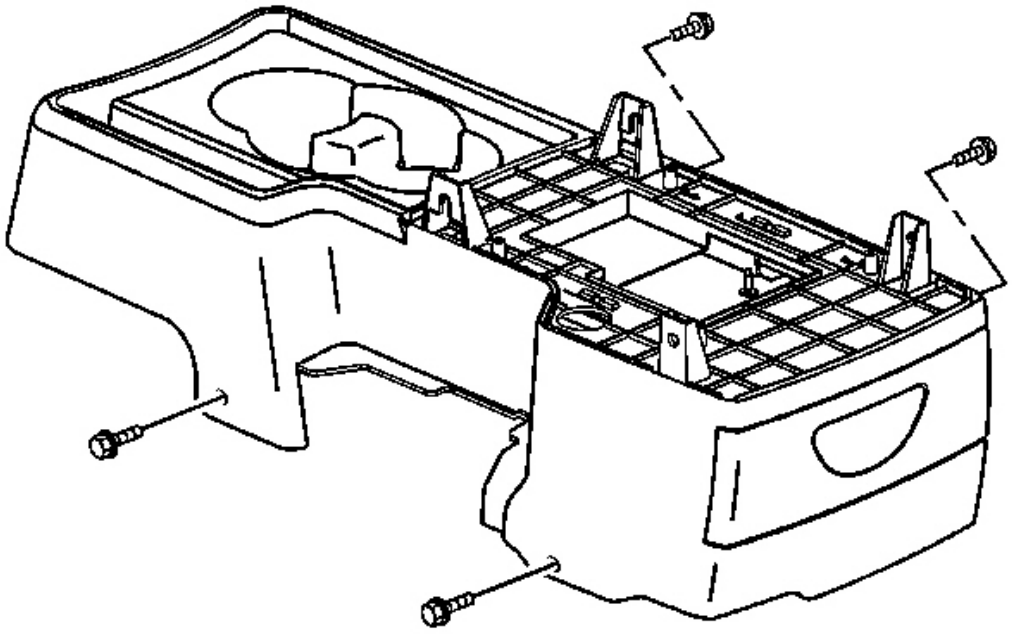


Fig. 157: Removing/Installing Console Screws
Courtesy of GENERAL MOTORS CORP.

6. Reach under the front seats to access the lower console screws.
7. Install the center console screws.

   Tighten: Tighten the screws to 2.5 N.m (22 lb in).

8. Position the front seat forward to the original position.

DESCRIPTION AND OPERATION

INSTRUMENT PANEL CLUSTER (IPC) DESCRIPTION AND OPERATION

Displays Test

Certain instrument panel cluster (IPC) features are tested when the ignition is turned on in order to verify that the features are working properly. The following indicators illuminate briefly at key up:

- ABS
- Air bag-Flashes 7 times

- Brake system
- Charging system
- Change Engine Oil
- Engine Coolant Temperature
- High beam indicator
- Low Coolant
- Low Fuel
- Low oil pressure indicator
- Low Traction indicator
- Malfunction indicator lamp (MIL)-Check engine
- Reduced Engine Power indicator
- Security indicator
- Service Vehicle Soon indicator
- Traction off
- Upshift indicator (manual transmission)

Indicators and Warning Messages

Refer to **Indicator/Warning Message Description and Operation** .

Engine Coolant Temperature Gage

The engine control module (ECM) sends coolant temperature as determined by the coolant temperature sensor to the body control module (BCM) via the controller area network (CAN) serial data. The instrument panel cluster (IPC) displays the engine coolant temperature with the gage when the BCM sends a class 2 message to the IPC indicating coolant temperature percentage. The engine coolant temperature (ECT) gage defaults to cold (0°) or below if:

- The ECM detects a malfunction in the ECT sensor circuit.
- The IPC detects a loss of class 2 communications with the BCM.
- The BCM detects a loss of CAN communications with the ECM.

Fuel Gage

The engine control module (ECM) sends fuel level percent to the body control module (BCM) via the controller area network (CAN) serial data. The instrument panel cluster (IPC) displays the fuel level as determined by the BCM. The fuel gage defaults to E (empty) if:

- The ECM detects a malfunction in the fuel level sensor circuit.
- The IPC detects a loss of class 2 communications with the BCM.
- The BCM detects a loss of CAN communications with the ECM.

When the fuel level is less than a pre-determined value, the Low Fuel indicator message illuminates.

Odometer

The odometer shows how far the vehicle has been driven, in either miles (domestic) or kilometers (export). The odometer is shown on display when any of the following occur:

- Ignition is in ACC
- Ignition is in RUN, with no messages On
- The trip reset stem is pressed with the ignition OFF

Odometer readings are displayed in the instrument panel cluster (IPC) based on a class 2 message from the body control module (BCM). The engine control module (ECM) calculates the distance traveled from the vehicle speed sensor (VSS) input. The BCM receives a controlled area network (CAN) serial data message from the ECM and stores the current mileage.

The IPC stores the last valid odometer reading from the BCM in non-volatile memory. When a new valid odometer reading is received from the BCM, the IPC will update the display and store the new reading.

The IPC also receives class 2 messages from the BCM regarding VIN and vehicle content information. Valid information is stored in non-volatile memory at the first key-up with a new IPC. If the VIN or option content do not match the stored information, the odometer will display ERROR.

Speedometer

The instrument panel cluster (IPC) displays the vehicle speed based on the information from the body control module (BCM). The engine control module (ECM) calculates the vehicle speed based on the controlled area network (CAN) serial data message indicating the wheel reference speed from the electronic brake control module (EBCM). The ECM sends a CAN serial data message to the BCM indicating the vehicle speed. The BCM sends a class 2 message to the IPC indicating the vehicle speed.

The speedometer defaults to 0 km/h (0 mph) when any of the following occur:

- The EBCM detects a malfunction in the vehicle speed sensor circuit.
- The ECM detects a loss of CAN communications with the EBCM.
- The BCM detects a loss of CAN communications with the ECM.
- The IPC detects a loss of class 2 communications with the BCM.

Tachometer

The instrument panel cluster (IPC) displays the engine speed as determined by the body control module (BCM) via a class 2 message. The engine control module (ECM) determines the engine speed and sends a controlled area network (CAN) serial data message to the BCM indicating the engine speed. The tachometer will default to 0 RPM if:

- The ECM detects a malfunction in the engine speed sensor circuit.

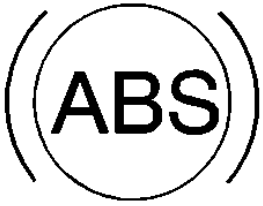
- The BCM detects a loss of CAN communications with the ECM.
- The IPC detects a loss of class 2 communications with the BCM.

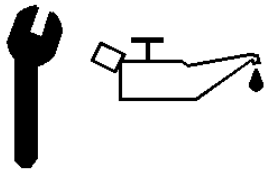
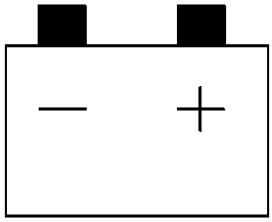
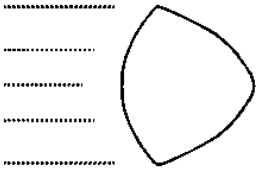
Trip Odometer

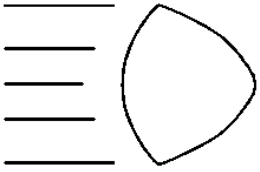
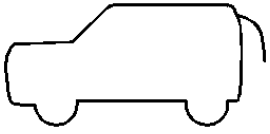
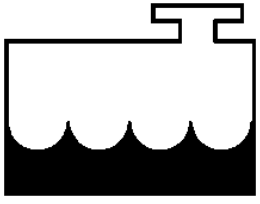
Trip odometer readings are calculated by the instrument panel cluster (IPC) based on the odometer reading received through a class 2 message from the body control module (BCM). The trip odometer is shown when selected with the odometer trip reset stem. To reset the trip odometer, press and hold the trip reset stem for about 2 seconds, until the trip odometer shows zero.

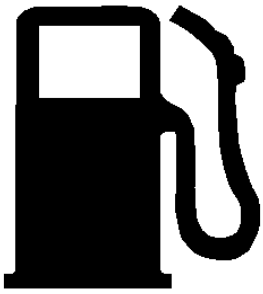
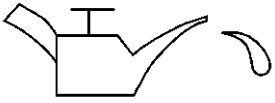
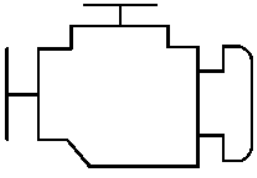
INDICATOR/WARNING MESSAGE DESCRIPTION AND OPERATION

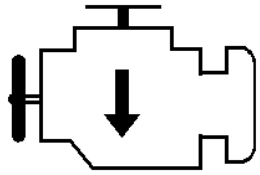
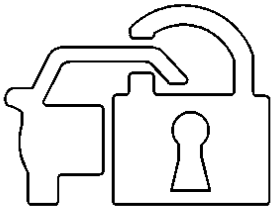
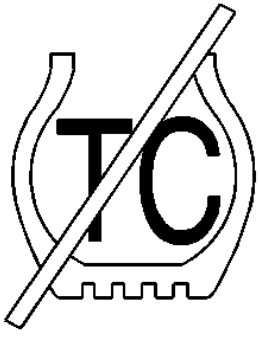
Indicator/Warning Message Description and Operation

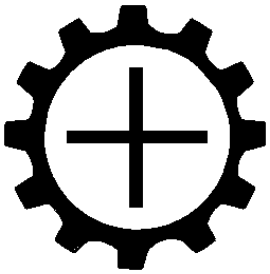
Symbol	Description
	ABS: Refer to **ABS Description and Operation** in Anti-Lock Brake System
	Air Bag: Refer to **SIR System Description and Operation** in SIR
	Brake: Refer to **Brake Warning System Description and Operation** in Hydraulic Brakes

	Change Engine Oil: Refer to Indicator/Warning Message Description and Operation
	Charge: Refer to **Charging System Description and Operation** in Engine Electrical
	DRL: Refer to **Exterior Lighting Systems Description and Operation** in Lighting Systems
	Engine Coolant Temperature: Refer to **Cooling System Description and Operation** in Engine Cooling
	Fasten Seat Belt: Refer to **Seat Belt System Description and Operation** in Seat Belts

	
	High Beam: Refer to **Exterior Lighting Systems Description and Operation** in Lighting Systems
	Liftgate Ajar: Refer to **Liftgate Ajar Indicator Description and Operation** in Body Rear End
	Low Coolant: Refer to **Cooling System Description and Operation** in Engine Cooling

	Low Fuel: Refer to Indicator/Warning Message Description and Operation
	Low Oil Pressure: Refer to Indicator/Warning Message Description and Operation
	Low Traction: Refer to **ABS Description and Operation** in Anti-Lock Brake System
	MIL: Refer to **Engine Control Module (ECM) Description** in Engine Controls - 2.2L or to **Powertrain Control Module (PCM) Description** in Engine Controls - 3.5L
	Reduced Engine Power: Refer to Indicator/Warning Message Description and Operation

	
	Security: Refer to **Theft Systems Description and Operation** in Theft Deterrent
	Service Vehicle Soon: Refer to Indicator/Warning Message Description and Operation
	Traction Off: Refer to **ABS Description and Operation** in Anti-Lock Brakes
	Turn Signals: Refer to **Exterior Lighting Systems Description and Operation** in Lighting Systems

	
	Upshift Indicator: Refer to Indicator/Warning Message Description and Operation

CHANGE ENGINE OIL

The IPC illuminates the CHANGE ENGINE OIL indicator when a class 2 message from the body control module (BCM) requests illumination. The BCM receives a CAN serial data message from the engine control module (ECM) when the ECM determines that the engine oil should be changed. After the oil is changed, reset the engine oil monitor. Refer to **GM Oil Life System - Resetting** in Maintenance and Lubrication.

LOW FUEL

The IPC illuminates the Low Fuel indicator when the IPC detects that the fuel level is less than a pre-determined value. The IPC receives a class 2 message indicating the fuel level percent from the BCM.

LOW OIL PRESSURE

The IPC illuminates the engine oil pressure indicator when the engine control module (ECM) detects low engine oil pressure, and the signal circuit is low. The ECM sends a CAN serial data message to the BCM indicating low engine oil pressure. The BCM sends a class 2 message to the IPC requesting illumination when the engine oil pressure is low.

REDUCED ENGINE POWER

The IPC illuminates the REDUCED POWER indicator when a class 2 message from the body control module (BCM) requests illumination. The BCM receives a CAN serial data message from the engine control module (ECM) when the ECM determines that a certain amount of engine power has been lost.

SERVICE VEHICLE SOON

The IPC illuminates the service vehicle soon indicator during any of the following conditions:

- The BCM detects a security failure. The BCM sends a class 2 message to the IPC requesting illumination.
- The BCM detects a malfunction in the passive trunk release system. The BCM sends a class 2 message to the IPC requesting illumination.
- The BCM detects a failure in the traction control system. The BCM sends a class 2 message to the IPC requesting illumination.
- The IPC detects a mismatch between its part number and the vehicle platform configuration sent by the BCM via a class 2 message.
- The IPC receives a class 2 message from the BCM when certain malfunctions that are not related to the emissions system are detected.

Upshift Indicator

The BCM receives a CAN serial data message from the ECM when the ECM determines that the vehicle should be shifted to the next higher gear. The IPC illuminates the shift indicator when the BCM sends a class 2 message requesting illumination.

AUDIBLE WARNINGS DESCRIPTION AND OPERATION

The audible warnings alert the driver of a system concern or a critical vehicle condition. The body control module (BCM) generates the audible warnings. The BCM receives audible warning requests via the class 2 serial data line or the controller area network (CAN) data line. If the BCM receives multiple audible warning requests, the warning with the highest priority sounds first. The following lists the audible warning priority and the pulse rate:

1. Fast rate chime-200 pulses per minute
2. Medium rate chime-150 pulses per minute
3. Slow rate chime-50 pulses per minute
4. Single chime

Fasten Safety Belt Warning

The BCM activates the fasten safety belt audible warning as requested by the sensing and diagnostic module (SDM). The SDM sends a class 2 message to the BCM. The fasten safety belt warning sounds and the fasten safety belt indicator illuminates when the following occurs:

- The ignition switch transitions to ON.
- The inflatable restraint SDM detects that the driver seat belt is not buckled and or the signal is low. The BCM receives a class 2 message from the SDM indicating the driver seat belt status.

If the seat belt is buckled when the ignition is turned ON, the chime does not sound. If the seat belt is buckled while the chime is sounding, the chime stops. If the seat belt is unbuckled after the initial transition to ON, the chime does not sound.

Key in Ignition Warning

The BCM monitors the signal circuit of the ignition switch. The BCM activates the key-in-ignition audible warning. The key-in-ignition warning sounds when the following occurs:

- The ignition switch is OFF.
- The BCM determines that the driver door is open and the signal circuit is low.
- The BCM determines that the key-in-ignition switch is closed and the signal circuit is low.

Lights On Warning

The BCM activates the lights on warning. The BCM chimes a frequency of a fast rate and a continuous duration. The lights on warning sounds when the following occurs:

- The ignition is OFF.
- The BCM determines that the driver door is open and the signal circuit is low.
- The BCM determines that the headlamp switch is in the park or head position.

Park Brake Warning

The BCM activates the park brake audible warning. The park brake warning sounds and the BRAKE indicator illuminates when the following occurs:

- The ignition is ON.
- The vehicle speed is greater than 5 km/h (3.1 mph). The BCM receives a CAN serial message from the ECM indicating the vehicle speed.
- The BCM determines that the park brake is engaged and the signal circuit is low.