

## RESTRAINTS

### Seat Belts - CTS Sedan

## SPECIFICATIONS

### FASTENER TIGHTENING SPECIFICATIONS

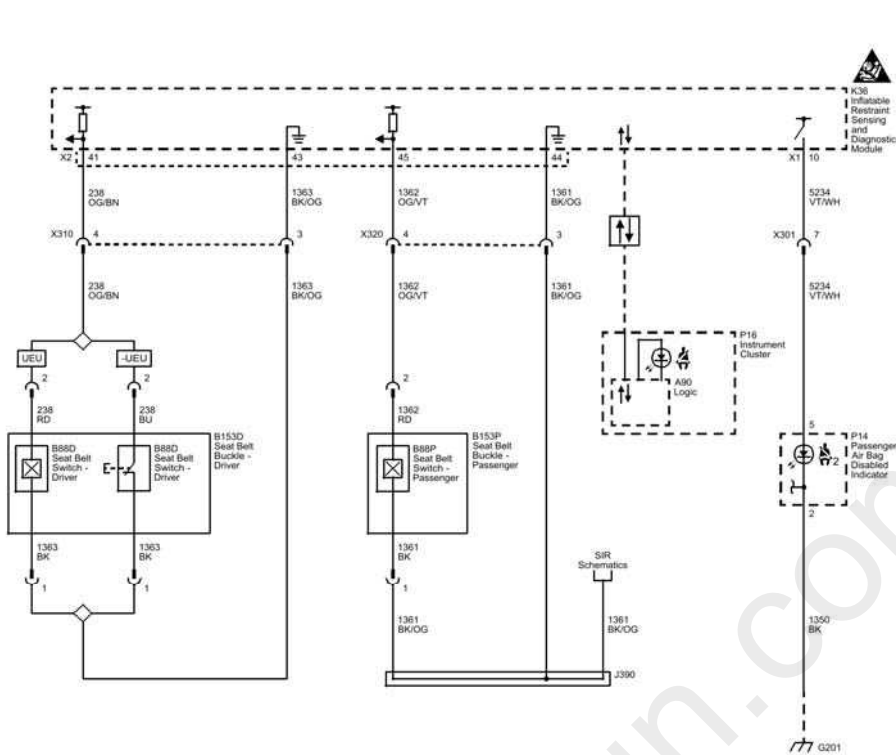
#### Fastener Tightening Specifications

| Application                                | Specification |          |
|--------------------------------------------|---------------|----------|
|                                            | Metric        | English  |
| Front Seat Belt Buckle Fastener            | 40 N.m        | 30 lb ft |
| Rear Center Seat Belt Retractor Fastener   | 45 N.m        | 33 lb ft |
| Rear Seat Belt Buckle Nut                  | 45 N.m        | 33 lb ft |
| Rear Seat Belt Retractor Anchor Plate Bolt | 45 N.m        | 33 lb ft |
| Rear Seat Belt Retractor Bolt (Lower)      | 45 N.m        | 33 lb ft |
| Rear Seat Belt Retractor Bolt (Upper)      | 45 N.m        | 33 lb ft |

## SCHEMATIC WIRING DIAGRAMS

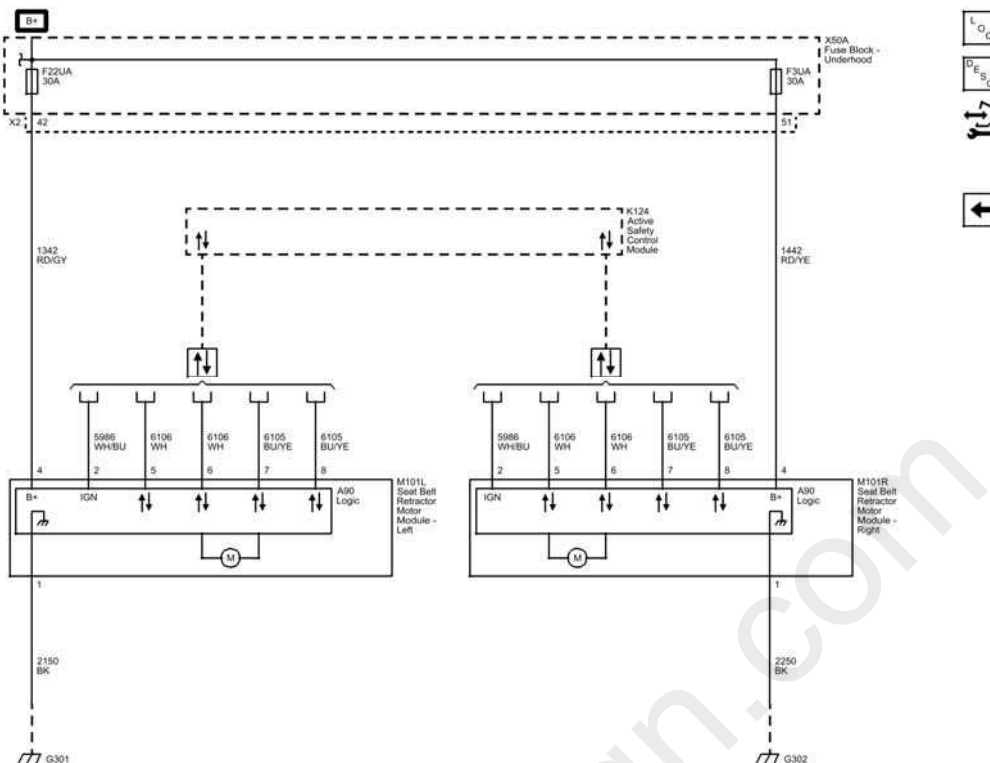
### SEAT BELT WIRING SCHEMATICS

#### Switches and Indicators



**Fig. 1: Switches and Indicators**  
**Courtesy of GENERAL MOTORS COMPANY**

**Motors (AX7)**



**Fig. 2: Motors (AX7)**

Courtesy of GENERAL MOTORS COMPANY

## DIAGNOSTIC INFORMATION AND PROCEDURES

### DIAGNOSTIC CODE INDEX

#### DIAGNOSTIC CODE INDEX

| DTC                              | Description                                                                                                                                                                                          |
|----------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b><u>DTC B0072 or B0073</u></b> | DTC B0072 Driver Seat Belt Switch Circuit<br>DTC B0073 Passenger Seat Belt Switch Circuit                                                                                                            |
| <b><u>DTC B059A</u></b>          | DTC B059A 01 Passenger Seat Belt Indicator Circuit Short to Battery<br>DTC B059A 02 Passenger Seat Belt Indicator Circuit Short to Ground<br>DTC B059A 04 Passenger Seat Belt Indicator Circuit Open |

### DTC B0072 OR B0073: SEAT BELT SWITCH

#### Diagnostic Instructions

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

## DTC Descriptors

### DTC B0072

Driver Seat Belt Switch Circuit

### DTC B0073

Passenger Seat Belt Switch Circuit

For symptom byte information refer to **Symptom Byte List** .

## Diagnostic Fault Information

| Circuit                                  | Short to Ground       | High Resistance                    | Open                  | Short to Voltage      | Signal Performance |
|------------------------------------------|-----------------------|------------------------------------|-----------------------|-----------------------|--------------------|
| Driver Seat Belt Buckle Signal           | B0072 02,<br>B0072 0B | B0072 04,<br>B0072 06,<br>B0072 0C | B0072 04,<br>B0072 06 | B0072 01,<br>B0072 05 | B0072 08           |
| Driver Seat Belt Buckle Low Reference    | -                     | B0072 04,<br>B0072 06,<br>B0072 0C | B0072 04,<br>B0072 06 | -                     | -                  |
| Passenger Seat Belt Buckle Signal        | B0073 02,<br>B0073 0B | B0073 04,<br>B0073 06,<br>B0073 0C | B0073 04,<br>B0073 06 | B0073 01,<br>B0073 05 | B0073 08           |
| Passenger Seat Belt Buckle Low Reference | -                     | B0073 04,<br>B0073 06,<br>B0073 0C | B0073 04,<br>B0073 06 | -                     | -                  |

## Circuit/System Description

The inflatable restraint seat belt buckle switch is within the seat belt buckle and provides an input to the inflatable restraint sensing and diagnostic module (SDM). The inflatable restraint sensing and diagnostic module supplies a low reference circuit and a seat belt buckle signal circuit to determine a buckled or unbuckled condition. The inflatable restraint sensing and diagnostic module monitors the seat belt buckle circuits and if a fault is detected a DTC will be set.

## Conditions for Running the DTC

Ignition voltage is between 9-16 V.

## Conditions for Setting the DTC

### B0072 01 or B0073 01

The seat belt buckle circuit is shorted to voltage.

**B0072 02 or B0073 02**

The seat belt buckle circuit is shorted to ground.

**B0072 04 or B0073 03**

The seat belt buckle circuit is open.

**B0072 05 or B0073 05**

The seat belt buckle circuit is shorted to voltage or open.

**B0072 06 or B0073 06**

The seat belt buckle circuit is shorted to ground or open.

**B0072 08 or B0073 08**

The seat belt buckle signal is invalid.

**B0072 0B or B0073 0B**

The seat belt buckle signal is above threshold.

**B0072 0C or B0073 0C**

The seat belt buckle signal is below threshold.

**Action Taken When the DTC Sets**

The inflatable restraint sensing and diagnostic module will store a DTC and illuminate the air bag indicator in the instrument cluster.

**Conditions for Clearing the DTC**

The condition for setting the DTC no longer exists.

**Reference Information**

Schematic Reference

**Seat Belt Schematics**

Connector End View Reference

**COMPONENT CONNECTOR END VIEWS - INDEX - SEDAN**

Description and Operation

### **Supplemental Inflatable Restraint System Description and Operation**

Electrical Information Reference

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

Scan Tool Reference

**Control Module References** for scan tool information

**Circuit/System Verification**

1. Ignition ON.
2. Verify the appropriate scan tool Seat Belt Status parameter changes between Buckled and Unbuckled when the seat belt is buckled and unbuckled.
  - **If the parameter does not change**  
  
Refer to Circuit/System Testing.
  - **If the parameter changes**
3. All OK.

**Circuit/System Testing**

**NOTE:** When removing connectors inspect for damage or corrosion. Damage or corrosion in the following requires repair or replacement of the affected component/connector.

- **B153D Seat Belt Buckle-Driver**
- **B153P Seat Belt Buckle-Passenger**
- **K36 Inflatable Restraint Sensing and Diagnostic Module**

1. Ignition OFF, disconnect the harness connector at the appropriate B153 Seat Belt Buckle. It may take up to 2 min for all vehicle systems to power down.
2. Test for less than 5 ohms between the low reference circuit terminal 1 and ground.
  - **If 5 ohms or greater**
    1. Ignition OFF, disconnect the harness connector at the K36 Inflatable Restraint Sensing and Diagnostic Module.
    2. Test for less than 2 ohms in the low reference circuit end to end.

- If 2 ohms or greater, repair the open/high resistance in the circuit.
  - If less than 2 ohms, replace the K36 Inflatable Restraint Sensing and Diagnostic Module.
- **If less than 5 ohms**
- 3. Ignition ON.
- 4. Verify the appropriate scan tool Seat Belt Status parameter is Buckled.
  - **If not Buckled**
    1. Ignition OFF, disconnect the harness connector at the K36 Inflatable Restraint Sensing and Diagnostic Module.
    2. Test for infinite resistance between the signal circuit terminal 2 and ground.
      - If less than infinite resistance, repair the short to ground on the circuit.
      - If infinite resistance, replace the K36 Inflatable Restraint Sensing and Diagnostic Module.
  - **If Buckled**
- 5. Install a 3 A fused jumper wire between the signal circuit terminal 2 and the low reference circuit terminal 1.
- 6. Verify the appropriate scan tool Seat Belt Status parameter is Unbuckled.
  - **If not Unbuckled**
    1. Ignition OFF, disconnect the harness connector at the K36 Inflatable Restraint Sensing and Diagnostic Module, ignition ON.
    2. Test for less than 1 V between the signal circuit and ground.
      - If 1 V or greater, repair the short to voltage on the circuit.
      - If less than 1 V
    3. Test for less than 2 ohms in the signal circuit end to end.
      - If 2 ohms or greater, repair the open/high resistance in the circuit.
      - If less than 2 ohms, replace the K36 Inflatable Restraint Sensing and Diagnostic Module.
  - **If Unbuckled**
- 7. Test or replace the B153 Seat Belt Buckle.

#### Component Testing

1. Ignition OFF, disconnect the harness connector at the B153 Seat Belt Buckle.
2. Test for infinite resistance between the signal terminal 2 and the low reference terminal 1.
  - **If less than infinite resistance**

Replace the B153 Seat Belt Buckle.
  - **If infinite resistance**
3. Insert the seat belt into the buckle.
4. Test for less than 5 ohms between the signal terminal 2 and the low reference terminal 1.
  - **If 5 ohms or greater**

Replace the B153 Seat Belt Buckle.

- If less than 5 ohms

5. All OK.

#### Repair Instructions

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

- **Front Seat Belt Buckle Replacement**
- **SIR/SRS Wiring Repairs**
- **Control Module References** for inflatable restraint sensing and diagnostic module replacement, programming, and setup.

#### DTC B059A: PASSENGER SEAT BELT INDICATOR

##### Diagnostic Instructions

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

##### DTC Descriptors

##### DTC B059A 01

Passenger Seat Belt Indicator Circuit Short to Battery

##### DTC B059A 02

Passenger Seat Belt Indicator Circuit Short to Ground

##### DTC B059A 04

Passenger Seat Belt Indicator Circuit Open

##### Diagnostic Fault Information

| Circuit                                  | Short to Ground | Open/High Resistance | Short to Voltage | Signal Performance |
|------------------------------------------|-----------------|----------------------|------------------|--------------------|
| Passenger Seat Belt Switch Signal        | 1               | 2                    | 2                | -                  |
| Passenger Seat Belt Switch Low Reference | -               | 2                    | -                | -                  |
| Passenger Seat Belt Indicator Control    | B059A 02, 3     | B059A 04, 3          | B059A 01, 4      | -                  |

|                                                                                                                                                                              |   |             |   |   |
|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---|-------------|---|---|
| Ground                                                                                                                                                                       | - | B059A 04, 3 | - | - |
| 1. Indicator will remain ON with Seat Belt Buckled.<br>2. Indicator will illuminate only for the bulb check.<br>3. Indicator will not illuminate.<br>4. Indicator always ON. |   |             |   |   |

#### **Circuit/System Description**

The Inflatable Restraint Sensing and Diagnostic Module (SDM) monitors the passenger seat status and the passenger Seat Belt Buckle switch and provides an output to the passenger seat belt indicator. When the Inflatable Restraint Sensing and Diagnostic Module detects the passenger seat is occupied and the seat belt is not fastened, the Inflatable Restraint Sensing and Diagnostic Module supplies a pulse width modulated signal to control the passenger seat belt indicator circuit. The Inflatable Restraint Sensing and Diagnostic Module monitors the passenger seat belt indicator circuits and if a fault is detected a DTC will be set.

#### **Conditions for Running the DTC**

Ignition voltage is between 9-16 V.

#### **Conditions for Setting the DTC**

##### **B059A 01**

The passenger seat belt indicator circuit is shorted to voltage.

##### **B059A 02**

The passenger seat belt indicator circuit is shorted to ground.

##### **B059A 04**

The passenger seat belt indicator circuit is open.

#### **Action Taken When the DTC Sets**

The Inflatable Restraint Sensing and Diagnostic Module will store the DTC.

#### **Conditions for Clearing the DTC**

The condition for setting the DTC no longer exists.

#### **Reference Information**

Schematic Reference

#### **Seat Belt Schematics**

Connector End View Reference

## **COMPONENT CONNECTOR END VIEWS - INDEX - SEDAN**

Description and Operation

### **Seat Belt System Description and Operation**

Electrical Information Reference

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

Scan Tool Reference

**Control Module References** for scan tool information

Circuit/System Testing

**NOTE:** When removing connectors inspect for damage or corrosion. Damage or corrosion in the following requires repair or replacement of the affected component/connector.

- **P14 Passenger Air Bag Disable Indicator**
- **K36 Inflatable Restraint Sensing and Diagnostic Module**

1. Ignition OFF, disconnect the harness connector at the P14 Passenger Air Bag Disable Indicator.
2. Test for less than 10 ohms between the ground circuit terminal 1 and ground.
  - **If 10 ohms or greater**
    1. Ignition OFF.
    2. Test for less than 2 ohms in the ground circuit end to end.
      - If 2 ohms or greater, repair the open/high resistance in the circuit.
      - If less than 2 ohms, repair the open/high resistance in the ground connection.
  - **If less than 10 ohms**
3. Connect a test lamp between the control circuit terminal 5 and ground, ignition ON.
4. Verify with a scan tool, command the Passenger Seat Belt Reminder Indicator ON and OFF, the test lamp should turn ON and OFF while changing between the commanded states.
  - **If the test lamp is always on**
    1. Ignition OFF, disconnect the harness connector at the K36 Inflatable Restraint Sensing and Diagnostic Module. Ignition ON.
    2. Test for less than 1 V between the control circuit and ground.

- If 1V or greater, repair the short to voltage on the circuit.
- If less than 1V, replace the K36 Inflatable Restraint Sensing and Diagnostic Module.
- **If the test lamp is always off**
- 1. Ignition OFF, disconnect the harness connector at the K36 Inflatable Restraint Sensing and Diagnostic Module.
- 2. Test for infinite resistance between the control circuit and ground.
  - If less than infinite resistance, repair the short to ground on the circuit.
- 3. Test for less than 2 ohms in the control circuit end to end.
  - If 2 ohms or greater, repair the open/high resistance in the circuit.
  - If less than 2 ohms, replace the K36 Inflatable Restraint Sensing and Diagnostic Module.
- **If test lamp turns on and off while changing between the commanded states**
- 5. Test or replace the P14 Passenger Air Bag Disable Indicator.

### Repair Instructions

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

- **Instrument Panel Airbag Arming Status Display Replacement** for passenger air bag disable indicator replacement
- **Control Module References** for Inflatable Restraint Sensing and Diagnostic Module replacement, programming, and setup

### SYMPTOMS - SEAT BELTS

**NOTE:** Review the seat belt system description and operation in order to familiarize yourself with the system and how it functions. Refer to **Seat Belt System Description and Operation**.

### Visual/Physical Inspection

- Inspect for aftermarket devices which could affect the operation of the seat belt system. Refer to **Checking Aftermarket Accessories**.
- Inspect the easily accessible or visible system components for obvious damage or conditions which could cause the symptom.

### Intermittent

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

### Symptom List

Refer to the following symptom diagnostic procedure in order to diagnose the symptom:

- **Seat Belt Indicator Malfunction - Driver**
- **Seat Belt Indicator Malfunction - Passenger**

## **SEAT BELT DOES NOT RETRACT**

1. Grab the seat belt webbing and slowly and firmly extract 15-25 mm (5/8-1 in) of webbing from the seat belt.
2. Release the seat belt and allow the webbing to slowly retract back into the retractor.
3. Check to see if the seat belt is released. If the seat belt is not released, repeat steps 1 and 2, two times more.
4. If the retractor does not release after repeating the steps, replace with a new retractor.

## **SEAT BELT INDICATOR MALFUNCTION - DRIVER**

### **Diagnostic Instructions**

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

### **Diagnostic Fault Information**

| <b>Circuit</b>                                                                                               | <b>Short to Ground</b> | <b>Open/High Resistance</b> | <b>Short to Voltage</b> | <b>Signal Performance</b> |
|--------------------------------------------------------------------------------------------------------------|------------------------|-----------------------------|-------------------------|---------------------------|
| Driver Seat Belt Buckle Signal                                                                               | 1                      | 2                           | 2                       | -                         |
| Driver Seat Belt Buckle Low Reference                                                                        | -                      | 2                           | -                       | -                         |
| 1. Indicator will remain ON with Seat Belt Buckled.<br>2. Indicator will illuminate only for the bulb check. |                        |                             |                         |                           |

### **Circuit/System Description**

The driver Seat Belt Buckle is a 2-wire switch wired to the Inflatable Restraint Sensing and Diagnostic Module (SDM) using a signal circuit and a low reference circuit. When the seat belt is unbuckled the switch is closed, and when the seat belt is buckled the switch is open. The Inflatable Restraint Sensing and Diagnostic Module sends the status of the driver seat belt via serial data to the instrument panel cluster. After receiving the message, the instrument panel cluster controls the illumination of the driver seat belt indicator.

### **Reference Information**

Schematic Reference

### **Seat Belt Schematics**

Connector End View Reference

## **COMPONENT CONNECTOR END VIEWS - INDEX - SEDAN**

Description and Operation

### **Seat Belt System Description and Operation**

Electrical Information Reference

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

Scan Tool Reference

**Control Module References** for scan tool information

Circuit/System Verification

1. Verify the driver seat belt indicator turns ON and OFF when commanding the instrument cluster all indicators ON and OFF with a scan tool.
  - **If the driver seat belt indicator does not turn ON and OFF as commanded .**  
  
Replace the P16 Instrument Cluster.
    - **If the driver seat belt indicator does turn ON and OFF as commanded**
2. Verify the scan tool Driver Seat Belt Status parameter changes between Buckled and Unbuckled when buckling and unbuckling the driver seat belt.
  - **If the parameter does not change**  
  
Refer to Circuit/System Testing.
    - **If the parameter changes**
3. All OK.

Circuit/System Testing

**NOTE:** When removing connectors inspect for damage or corrosion. Damage or corrosion in the following requires repair or replacement of the affected component/connector.

- **B153D Seat Belt Buckle - Driver**
- **Seat Belt Buckle harness connector**
- **K36 Inflatable Restraint Sensing and Diagnostic Module**

- **Inflatable Restraint Sensing and Diagnostic Module wiring harness connector**

1. Ignition OFF and all vehicle systems OFF, disconnect the harness connector at the B153D Seat Belt Buckle - Driver. It may take up to 2 minutes for all vehicle systems to power down.
2. Test for less than 5 ohms between the low reference circuit terminal 2 and ground.
  - **If 5 ohms or greater**
    1. Disconnect the X2 harness connector at the K36 Inflatable Restraint Sensing and Diagnostic Module.
    2. Test for less than 2 ohms in each low reference circuit end to end.
      - If 2 ohms or greater, repair the open/high resistance in the circuit.
      - If less than 2 ohms, replace the K36 Inflatable Restraint Sensing and Diagnostic Module.
  - **If less than 5 ohms**
3. Ignition ON.
4. Verify the scan tool Driver Seat Belt Status parameter is Buckled.
  - **If the parameter is not Buckled**
    1. Ignition OFF, disconnect the X2 harness connector at the K36 Inflatable Restraint Sensing and Diagnostic Module.
    2. Test for infinite resistance between the Seat Belt Buckle signal circuit terminal 1 and ground.
      - If less than infinite resistance, repair the short to ground on the circuit.
      - If infinite resistance, replace the K36 Inflatable Restraint Sensing and Diagnostic Module.
  - **If the parameter is Buckled**
5. Install a 3 A fused jumper wire between the signal circuit terminal 1 and the low reference circuit terminal 2.
6. Verify the scan tool Driver Seat Belt Status parameter is Unbuckled.
  - **If the parameter is not Unbuckled**
    1. Ignition OFF, disconnect the X2 harness connector at the K36 Inflatable Restraint Sensing and Diagnostic Module, ignition ON.
    2. Test for less than 1 V between the signal circuit and ground.
      - If 1 V or greater, repair the short to voltage on the circuit.
      - If less than 1 V
    3. Test for less than 2 ohms in the circuit end to end.
      - If 2 ohms or greater, repair the open/high resistance in the circuit.
      - If less than 2 ohms, replace the K36 Inflatable Restraint Sensing and Diagnostic Module.
  - **If the parameter is Unbuckled**
7. Test or replace the B153D Seat Belt Buckle - Driver.

#### **Component Testing**

1. Ignition OFF, disconnect the harness connector at the B153D Seat Belt Buckle - Driver, buckle the driver

seat belt.

2. Test for infinite resistance between the signal circuit terminal 1 and the low reference terminal 2.

- **If not infinite resistance**

Replace the B153D Seat Belt Buckle - Driver.

- **If infinite resistance**

3. Unbuckle the driver seat belt.

4. Test for less than 1 ohms between the signal circuit terminal 1 and the low reference terminal 2.

- **If 1 ohms or greater**

Replace the B153D Seat Belt Buckle - Driver.

- **If less than 1 ohms**

5. All OK.

#### Repair Instructions

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

- **Front Seat Belt Buckle Replacement**
- **Control Module References** for Inflatable restraint sensing and diagnostic module or instrument panel cluster replacement, programming and setup

#### SEAT BELT INDICATOR MALFUNCTION - PASSENGER

##### Diagnostic Instructions

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

##### Diagnostic Fault Information

| Circuit                                  | Short to Ground | Open/High Resistance | Short to Voltage | Signal Performance |
|------------------------------------------|-----------------|----------------------|------------------|--------------------|
| Passenger Seat Belt Buckle Signal        | 1               | 2                    | 2                | -                  |
| Passenger Seat Belt Buckle Low Reference | -               | 2                    | -                | -                  |
| Passenger Seat Belt Indicator Control    | 3               | 3                    | 4                | -                  |
| Ground                                   | -               | 3                    | -                | -                  |

1. Indicator will remain ON with Seat Belt Buckled.

2. Indicator will illuminate only for the bulb check.
3. Indicator will not illuminate.
4. Indicator always ON.

### **Circuit/System Description**

When an individual is sitting in the passenger seat the passenger presence sensor detects the individual. A signal to the Inflatable Restraint Sensing and Diagnostic Module indicates a person is in the passenger seat. The Inflatable Restraint Sensing and Diagnostic Module will turn the passenger seat belt indicator on. The passenger Seat Belt Buckle is a 2-wire switch wired to the Inflatable Restraint Sensing and Diagnostic Module (SDM) using a signal circuit and a low reference circuit. When the seat belt is unbuckled the switch is closed, and when the seat belt is buckled the switch is open. The Inflatable Restraint Sensing and Diagnostic Module sends the status of the passenger seat belt via a hard wire to the instrument panel multifunction switch. After receiving the message, the instrument panel multifunction switch controls the illumination of the passenger seat belt indicator.

### **Diagnostic Aids**

Objects on the passenger seat can cause the passenger seat belt reminder to be commanded on. Depending on the sensing technology used, a conductive object (computers, MP3 players, cell phones, diagnostic scan tool, wires, a hand, etc.) placed on the passenger seat may cause the Passenger Presence Detection Module to command the passenger air bag indicator ON and/or command the passenger seat belt indicator ON. The fasten seat belt chime will also sound.

### **Reference Information**

Schematic Reference

### **Seat Belt Schematics**

Connector End View Reference

### **COMPONENT CONNECTOR END VIEWS - INDEX - SEDAN**

Description and Operation

### **Seat Belt System Description and Operation**

Electrical Information Reference

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

Scan Tool Reference

## **Control Module References** for scan tool information

### **Circuit/System Verification**

1. Ignition ON.
2. Verify the passenger seat belt indicator turns ON and OFF when performing the Passenger Seat Belt Reminder Indicator On/Off Control Function with a scan tool.
  - **If the passenger seat belt indicator does not turn ON and OFF**  
  
Refer to Seat Belt Indicator Malfunction in Circuit/System Testing.
  - **If the passenger seat belt indicator turns ON and OFF**
3. Verify the scan tool Passenger Seat Belt Status parameter changes between Buckled and Unbuckled when buckling and unbuckling the seat belt.
  - **If the parameter does not change between Buckled and Unbuckled when buckling and unbuckling the seat belt**  
  
Refer to Seat Belt Switch Malfunction in Circuit/System Testing.
  - **If the parameter changes between Buckled and Unbuckled when buckling and unbuckling the seat belt**
4. All OK.

### **Circuit/System Testing**

#### **Seat Belt Buckle Malfunction**

**NOTE:** When removing connectors inspect for damage or corrosion. Damage or corrosion in the following requires repair or replacement of the affected component/connector.

- **B153 Seat Belt Buckle**
- **Seat Belt Buckle harness connector**
- **K36 Inflatable Restraint Sensing and Diagnostic Module**
- **Inflatable Restraint Sensing and Diagnostic Module harness connector**

1. Ignition OFF and all vehicle systems OFF, disconnect the harness connector at the B153P Seat Belt Buckle-Passenger. It may take up to 2 minutes for all vehicle systems to power down.
2. Test for less than 5 ohms between the low reference circuit terminal 2 and ground.
  - **If 5 ohms or greater**
    1. Disconnect the harness connector at the K36 Inflatable Restraint Sensing and Diagnostic Module.
    2. Test for less than 2 ohms in the low reference circuit end to end.
      - If 2 ohms or greater, repair the open/high resistance in the circuit.

- If less than 2 ohms, replace the K36 Inflatable Restraint Sensing and Diagnostic Module.
  - **If less than 5 ohms**
- 3. Ignition ON.
- 4. Verify the scan tool Passenger Seat Belt Status parameter is Buckled.
  - **If not Buckled**
    1. Disconnect the harness connector at the K36 Inflatable Restraint Sensing and Diagnostic Module.
    2. Test for infinite resistance between the Seat Belt Buckle signal circuit terminal 2 and ground.
      - If less than infinite resistance, repair the short to ground on the circuit.
      - If less than 2 ohms, replace the K36 Inflatable Restraint Sensing and Diagnostic Module.
  - **If Buckled**
- 5. Install a 3 A fused jumper wire between the signal circuit terminal 1 and the low reference circuit terminal 2.
- 6. Verify the scan tool Passenger Seat Belt Status parameter is Unbuckled.
  - **If not Unbuckled**
    1. Disconnect the harness connector at the K36 Inflatable Restraint Sensing and Diagnostic Module, ignition ON.
    2. Test for less than 1 V between the signal circuit and ground.
      - If 1 V or greater, repair the short to voltage on the circuit.
    3. Test for less than 2 ohms in each circuit end to end.
      - If 2 ohms or greater, repair the open/high resistance in the circuit.
      - If less than 2 ohms, replace the K36 Inflatable Restraint Sensing and Diagnostic Module.
  - **If Unbuckled**
- 7. Test or replace the B153P Seat Belt Buckle-Passenger.

### Seat Belt Indicator Malfunction

1. Ignition OFF, disconnect the harness connector at the P14 Passenger Air Bag Disable Indicator. It may take up to 2 minutes for all vehicle systems to power down.
2. Test for less than 10 ohms between the ground circuit terminal 1 and ground.
  - **If 10 ohms or greater**
    1. Ignition OFF.
    2. Test for less than 2 ohms in the ground circuit end to end.
      - If 2 ohms or greater, repair the open/high resistance in the circuit.
      - If less than 2 ohms, repair the open/high resistance in the ground connection.
    - **If less than 10 ohms**
3. Connect a test lamp between the control circuit terminal 5 and ground, ignition ON.
4. Verify with a scan tool, command the Passenger Seat Belt Reminder Indicator ON and OFF, the test lamp should turn ON and OFF while changing between the commanded states.
  - **If the test lamp is always ON**

1. Ignition OFF, disconnect the harness connector at the K36 Inflatable Restraint Sensing and Diagnostic Module, ignition ON.
2. Test for less than 1 V between the control circuit and ground.
  - If 1V or greater, repair the short to voltage on the circuit.
  - If less than 1V, replace the K36 Inflatable Restraint Sensing and Diagnostic Module.
  - **If the test lamp is always OFF**
1. Ignition OFF, disconnect the harness connector at the K36 Inflatable Restraint Sensing and Diagnostic Module.
2. Test for infinite resistance between the control circuit terminal 4 and ground.
  - If less than infinite resistance, repair the short to ground on the circuit.
3. Test for less than 2 ohms in the control circuit end to end.
  - If 2 ohms or greater, repair the open/high resistance in the circuit.
  - If less than 2 ohms, replace the K36 Inflatable Restraint Sensing and Diagnostic Module.
  - **If test lamp turns ON and OFF**
5. Replace the S48C Multifunction Switch 1 - Instrument Panel.

#### Component Testing

1. Ignition OFF, disconnect the harness connector at the B153P Seat Belt Buckle-Passenger, buckle the passenger seat belt.
2. Test for infinite resistance between the signal circuit terminal 1 and the low reference terminal 2.
  - **If not infinite resistance**  
  
Replace the B153P Seat Belt Buckle-Passenger.
  - **If infinite resistance**
3. Unbuckle the passenger seat belt.
4. Test for less than 1 ohms between the signal circuit terminal 1 and the low reference terminal 2.
  - **If 1 ohms or greater**  
  
Replace the B153P Seat Belt Buckle-Passenger.
  - **If less than 1 ohms**
5. All OK.

#### Repair Instructions

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

- **Front Seat Belt Buckle Replacement**
- **Instrument Panel Airbag Arming Status Display Replacement**
- **Control Module References** for Inflatable Restraint Sensing and Diagnostic Module or Instrument

Cluster replacement, programming and setup

## SEAT BELT RETRACTOR MOTOR MODULE MALFUNCTION

### Diagnostic Instructions

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

### Diagnostic Fault Information

| Circuit                                                            | Short to Ground | Open/High Resistance | Short to Voltage | Signal Performance |
|--------------------------------------------------------------------|-----------------|----------------------|------------------|--------------------|
| Motorized Seat Belt Battery Positive Voltage                       | 1               | 1                    | -                | -                  |
| Ground                                                             | -               | 1                    | -                | -                  |
| 1. Motorized seat belt retractor motor module will not pretension. |                 |                      |                  |                    |

### Circuit/System Description

The motorized seat belt retractor motor modules are motorized seat belt pretensioners that operated independent from each other, and from the inflatable restraint sensing and diagnostic module. The motorized seat belt retractor motor modules normally remove slack from the seat belt, and under certain conditions apply tension to the seat belt of the driver seat, and if occupied, the passenger seat as well. A motorized seat belt is a seat belt with a motor coupled to the shoulder belt retractor. The motor performs a reversible, pretightening action (retraction) to reduce the slack in the seat belt. The motorized seat belt provides the driver and passenger a sense of safety and, in the case of severe braking or a crash, more quickly couples the occupant to the vehicle, enhancing the safety to the occupant.

### Motorized seat belts monitor vehicle information to determine when to perform each of the following retractions

- Full retraction for such situations but not limited to: panic braking and or skidding
- Dynamic support for lateral and longitudinal dynamics
- Slack removal when the vehicle speed above enable speed

### Preconditions for motorized seat belt retractions

- Seat belt buckle is latched
- Vehicle speed greater than or equal to 25 kph (16 mph)
- All messages on serial data are received as valid

### Triggers that may cause motorized seat belt retractions

- Emergency Braking
- Sudden Emergency / Panic Braking
- High Vehicle Deceleration Detection
- Ice Braking Detection
- Oversteer and Understeer

### **Motorized seat belt inputs**

- Vehicle Power Mode
- Transmission Gear
- Wheel Speeds
- Vehicle Acceleration
- Accelerator Pedal Position
- Steering Wheel Angle and Gradient
- Yaw Rate and Lat/Long Acceleration
- Brake Pedal Position, Gradient, Pressure, Initial Travel
- Vehicle Stability

### **Motorized seat belt output signals**

- Driver information center message - motorized seat belt Failed "Service Automatic Seatbelt Tightening"
- Driver information center message - motorized seat belt Unavailable "Automatic Seatbelt Tightening Unavailable"

Motorized seat belt retractions are inhibited when seat belt unbuckled

Driver and passenger motorized seat belts operate independently

### **Diagnostic Aids**

Driver information center message "Automatic Seatbelt Tightening Unavailable" will have corresponding messages in the scan tool Seat Belt Retractor Motor Disable History Data

The scan tool Seat Belt Retractor Motor Disable History Data parameters are a list of the ten previous reasons the seat belt retractor motor module system was disabled. These parameters may help in the diagnosis of an intermittent concern or a customer concern which is the result of normal system operation. The following is a brief description of potential causes which may aid in diagnosis:

- Seat Belt Status
- Brake Pedal Pressure Signal Invalid
- Invalid Data Received From Yaw Rate Sensor Module
- Invalid Data Received From Steering Wheel Angle Sensor Module
- Accelerator Pedal Position Signal Invalid

- Non-Driven Wheel Speed Signal Invalid
- Driven Wheel Speed Signal Invalid
- Invalid Gear
- Overtemperature
- Overvoltage
- Undervoltage
- Exceeded Number of Attempts
- Overtemperature
- Overvoltage
- Undervoltage
- DTC Present

#### **Reference Information**

Schematic Reference

#### **Seat Belt Schematics**

Connector End View Reference

#### **COMPONENT CONNECTOR END VIEWS - INDEX - SEDAN**

Description and Operation

#### **Seat Belt System Description and Operation**

Electrical Information Reference

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

Scan Tool Reference

#### **Control Module References** for scan tool information

#### **Circuit/System Verification**

1. Verify the appropriate M101 Seat Belt Retractor Motor Module applies tension to the seat belt with the appropriate seat belt is buckled, and when commanding the M101 Seat Belt Retractor Motor Module - Seat Belt Retractor Motor with a scan tool.
  - **If the appropriate seat belt does not apply tension as commanded .**

Refer to Circuit/System Testing.

- **If the appropriate seat belt does apply tension as commanded**
- 2. All OK.

#### Circuit/System Testing

**NOTE:** When removing connectors inspect for damage or corrosion. Damage or corrosion in the following requires repair or replacement of the affected component/connector.

- **M101 Seat Belt Retractor Motor Module**
- **M101 Seat Belt Retractor Motor Module harness connector**

1. Ignition OFF and all vehicle systems OFF, disconnect the harness connector at the M101 Seat Belt Retractor Motor Module. It may take up to 2 min for all vehicle systems to power down.
2. Test for less than 10 ohms between the low reference circuit terminal 1 and ground.
  - **If 10 ohms or greater**
    1. Test for less than 2 ohms in the ground circuit end to end.
      - If 2 ohms or greater, repair the open/high resistance in the circuit.
      - If less than 2 ohms, repair the open/high resistance in the ground connection.
    - **If less than 10 ohms**
3. Verify a test lamp illuminates between the B+ circuit terminal 4 and ground.
  - **If the test lamp does not illuminate and the circuit fuse is good**
    1. Ignition OFF.
    2. Test for less than 2 ohms in the B+ circuit end to end.
      - If 2 ohms or greater, repair the open/high resistance in the circuit.
      - If less than 2 ohms, verify the fuse is not open and there is voltage at the fuse.
    - **If the test lamp does not illuminate and the circuit fuse is open**
      1. Ignition OFF.
      2. Test for infinite resistance between the B+ circuit and ground.
        - If less than infinite resistance, repair the short to ground on the circuit.
        - If infinite resistance, replace the disconnected control module.
      - **If the test lamp illuminates**
  - 4. Ignition ON, verify a test lamp illuminates between each ignition circuit terminal and ground.
    - **If the test lamp does not illuminate and the circuit fuse is good**
      1. Ignition OFF.
      2. Test for less than 2 ohms in the ignition circuit end to end.
        - If 2 ohms or greater, repair the open/high resistance in the circuit.
        - If less than 2 ohms, verify the fuse is OK and there is voltage at the fuse.

- **If the test lamp does not illuminate and the circuit fuse is open**

1. Ignition OFF.
2. Test for infinite resistance between the ignition circuit and ground.
  - If less than infinite resistance, repair the short to ground on the circuit.
  - If infinite resistance, replace the disconnected control module.

- **If the test lamp illuminates**

5. Ignition OFF and all vehicle systems OFF. It may take up to 2 min for all vehicle systems to power down.
6. Test for less than 2 ohms in each of the serial data circuits end to end between the control module harness connector and the DLC terminals High speed GMLAN serial data circuit terminal 6 and 14
  - **If 2 ohms or greater**

Repair the open/high resistance in the circuit.

- **If less than 2 ohms**

7. Replace the appropriate M101 Seat Belt Retractor Motor Module.

#### **Repair Instructions**

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

**Control Module References** for seat belt retractor motor module replacement, programming and setup

## **REPAIR INSTRUCTIONS**

### **REPAIRS AND INSPECTIONS REQUIRED AFTER A COLLISION**

**WARNING:** Restraint systems can be damaged in a collision. To help avoid injury and ensure that all parts in need of replacement are replaced:

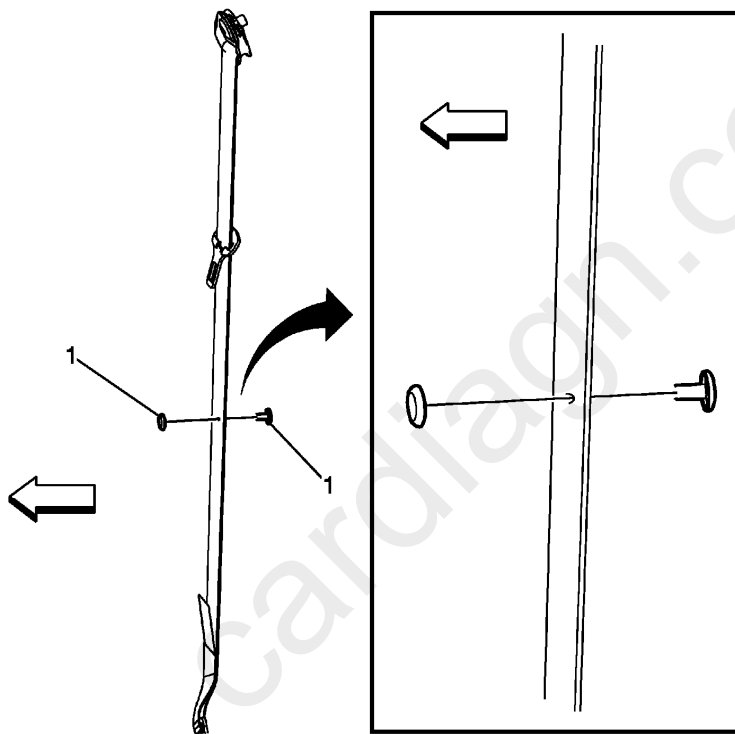
- Replace any seat belt system that was in use during the collision serious enough to deploy any automatic restraint device such as air bags and seat belt pretensioners. This not only includes seat belt systems in use by people of adult size, but seat belt systems used to secure child restraints, infant carriers and booster seats, including LATCH system and top tether anchorages.
- Replace any seat belt system that has torn, worn, or damaged components. This not only includes adult seat belt systems, but built-in child restraints and LATCH system components, if any.
- Replace any seat belt system if you observe the words "REPLACE" or "CAUTION", or if a yellow tag is visible. Do not replace a seat belt if only the child seat caution label is visible.
- Replace any seat belt system if you are doubtful about its condition. This not only includes adult seat belt systems, but built-in child

restraints, LATCH system components, and any restraint system used to secure infant carriers, child restraints, and booster seats.

**Do NOT** replace single seat belt system components in vehicles that have been in a collision as described above. Always replace the entire seat belt system with the buckle, guide and retractor assembly, which includes the latch and webbing material.

After a minor collision where no automatic restraint device was deployed, seat belt system replacement may not be necessary, unless some of the parts are torn, worn, or damaged.

### SEAT BELT LATCH STOP INSTALLATION



**Fig. 3: View Of Seat Belt Latch Stop Components**  
Courtesy of GENERAL MOTORS COMPANY

#### Seat Belt Latch Stop Installation

| Callout                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               | Component Name |
|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------|
| <b>Preliminary Procedure</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |                |
| <ol style="list-style-type: none"><li>1. Locate the hole in the seat belt webbing where the original seat belt stop button was located.</li><li>2. If the original hole in the seat belt webbing is not visible, perform the following:<ul style="list-style-type: none"><li>• If either the right or left stop button is missing use the opposing seat belt as a reference.</li><li>• With the opposing seat belt fully stowed, measure the distance between the seat belt lower</li></ul></li></ol> |                |

anchor and the stop button.

- Using the measurement obtained above, measure and mark the location of the missing stop button on the center of the seat belt webbing.

3. Ensure the seat belt latch plate is located above the mark or original hole.

#### Seat Belt Stop Button

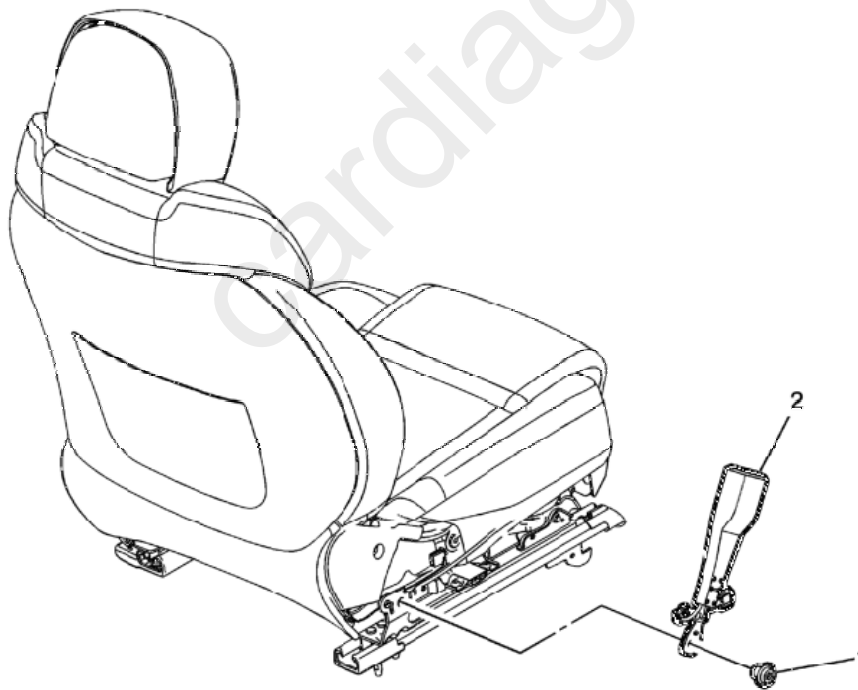
##### Procedure

1

1. Work the male half of the stop button through the hole in the webbing or at the marked location.
2. Align the female half of the stop button with the male half of the stop button.
3. Snap the two halves together.
4. Trim off any excess of the male half of the stop button flush with the female half of the stop button.

**TIP:** Ensure the male half of the stop button is facing forward in the vehicle in order to ensure the stop button will not snag customers clothing.

## FRONT SEAT BELT BUCKLE REPLACEMENT



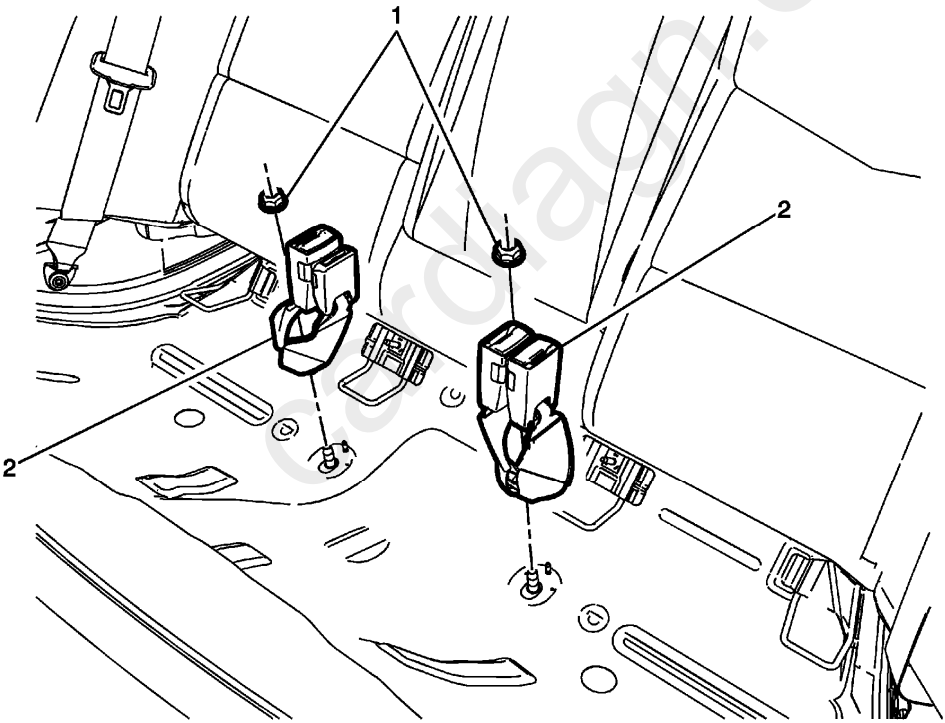
**Fig. 4: Front Seat Belt Buckle**

Courtesy of GENERAL MOTORS COMPANY

Front Seat Belt Buckle Replacement

| Callout                                                                                                                                  | Component Name                                                                                                                          |
|------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------|
| <b>Preliminary Procedure</b><br>Remove the driver or passenger seat. Refer to <u>Driver or Passenger Seat Removal and Installation</u> . |                                                                                                                                         |
| 1                                                                                                                                        | Front Seat Belt Buckle Fastener<br><br><b>CAUTION:</b><br>Refer to <u>Fastener Caution</u> .<br><br><b>Tighten</b><br>40 N.m (30 lb ft) |
| 2                                                                                                                                        | Front Seat Belt Buckle<br><b>Procedure</b><br>Disconnect the electrical connector.                                                      |

REAR SEAT BELT BUCKLE REPLACEMENT



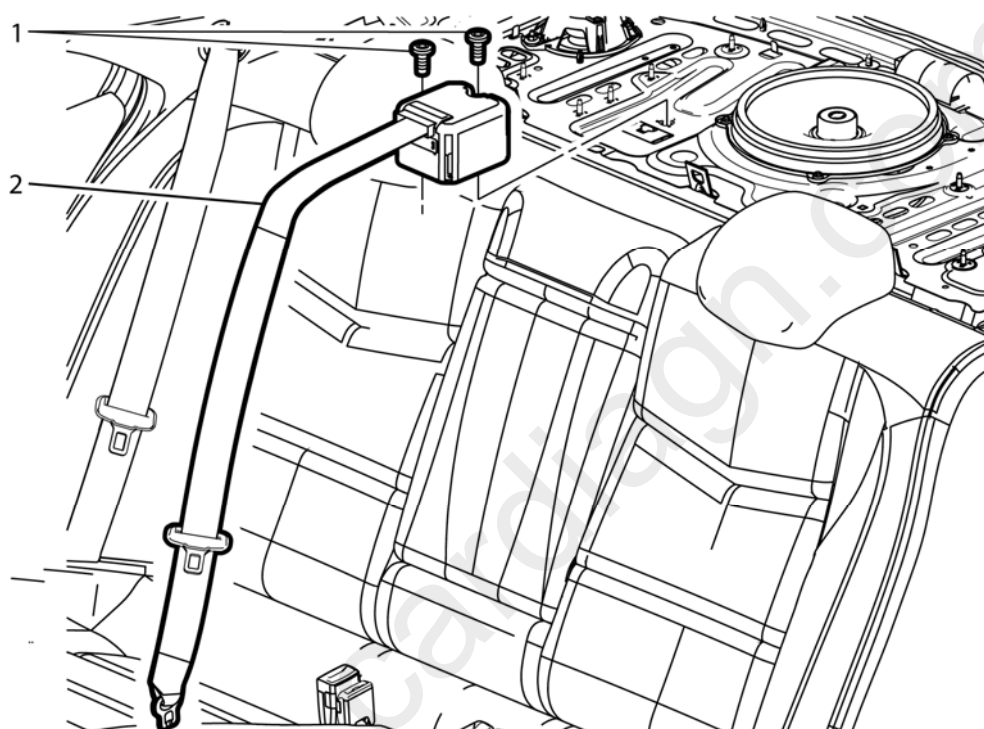
**Fig. 5: Rear Seat Belt Buckle**  
Courtesy of GENERAL MOTORS COMPANY

Rear Seat Belt Buckle Replacement

| Callout                                                                                                                    | Component Name |
|----------------------------------------------------------------------------------------------------------------------------|----------------|
| <b>Preliminary Procedure</b><br>Remove the rear seat cushion. Refer to <u>Rear Seat Cushion Removal and Installation</u> . |                |

|   |                                                                                              |
|---|----------------------------------------------------------------------------------------------|
| 1 | Rear Seat Belt Buckle Nut                                                                    |
|   | <b>CAUTION:</b><br>Refer to <u>Fastener Caution</u> .<br><br><b>Tighten</b><br>45 (33 lb ft) |
| 2 | Rear Seat Belt Buckle                                                                        |

## REAR CENTER SEAT BELT RETRACTOR REPLACEMENT



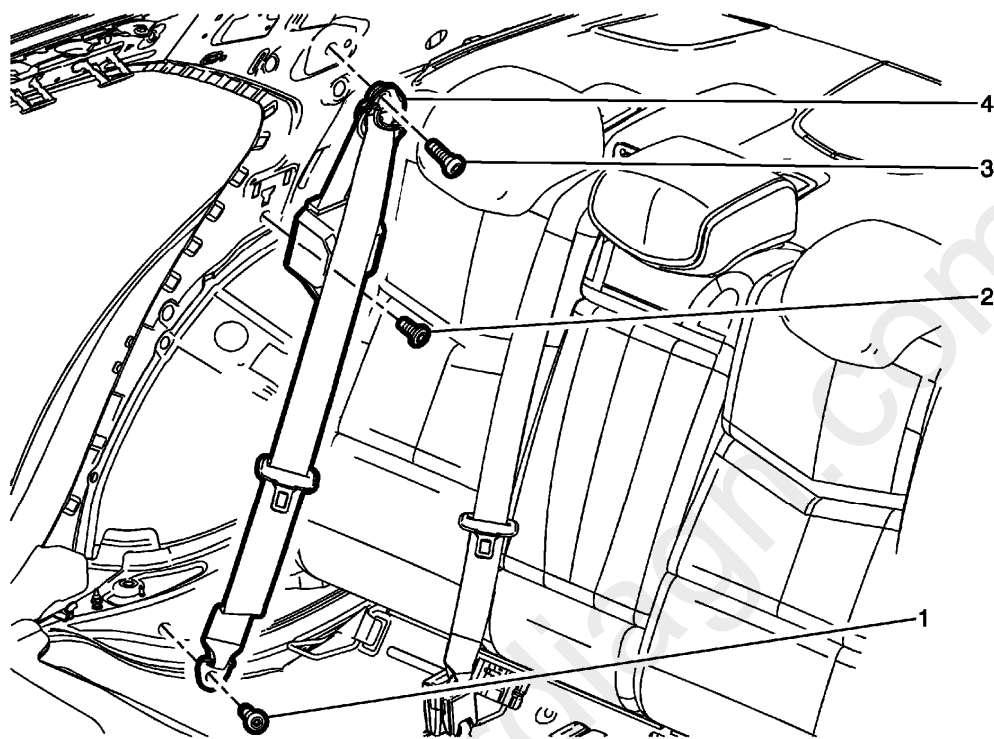
**Fig. 6: Rear Center Seat Belt Retractor**  
Courtesy of GENERAL MOTORS COMPANY

### Rear Center Seat Belt Retractor Replacement

| Callout                                                                                                                                                                                       | Component Name                                                                                                  |
|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------|
| <b>Preliminary Procedure</b><br>Remove the rear window panel trim. Refer to <u>Rear Window Panel Trim Replacement (With DB3)</u> ,<br><u>Rear Window Panel Trim Replacement (Without DB3)</u> |                                                                                                                 |
| 1                                                                                                                                                                                             | Rear Center Seat Belt Retractor Fasteners (Qty: 2)<br><br><b>CAUTION:</b><br>Refer to <u>Fastener Caution</u> . |

|   |                                     |
|---|-------------------------------------|
|   | <b>Tighten</b><br>45 N.m (33 lb ft) |
| 2 | Rear Center Seat Belt Retractor     |

## REAR SEAT BELT RETRACTOR REPLACEMENT



**Fig. 7: Rear Seat Belt Retractor**  
Courtesy of GENERAL MOTORS COMPANY

### Rear Seat Belt Retractor Replacement

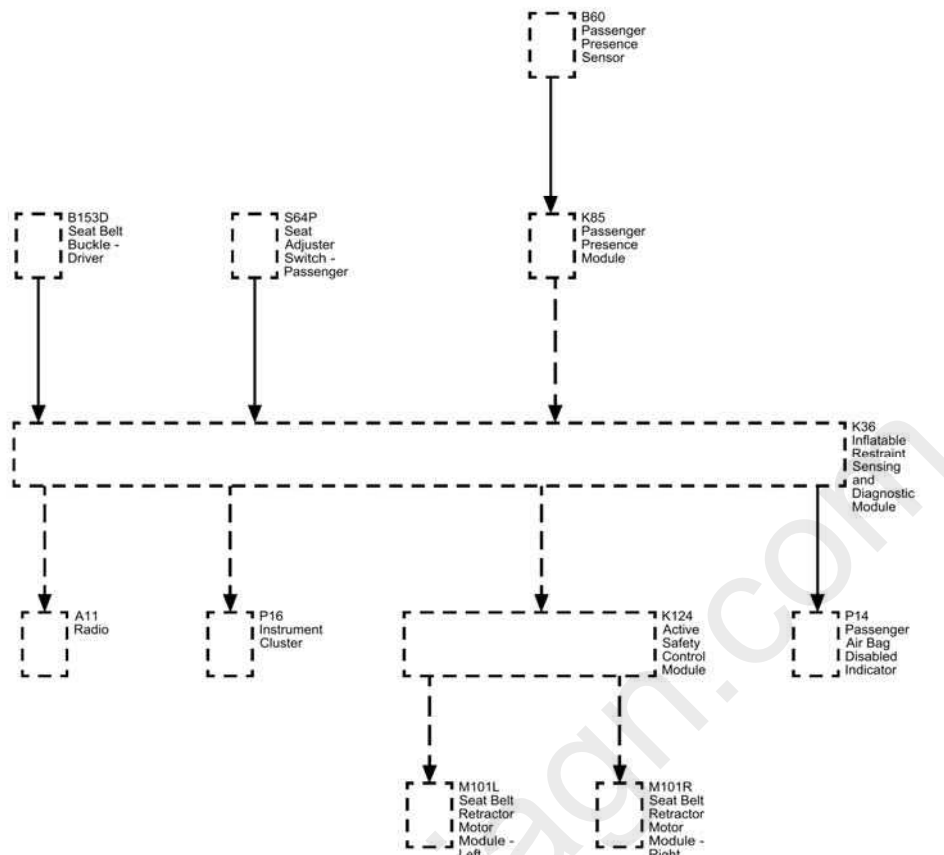
| Callout                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             | Component Name                             |
|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------|
| <b>Preliminary Procedures</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |                                            |
| <ol style="list-style-type: none"> <li>1. Remove the rear seat cushion. Refer to <b><u>Rear Seat Cushion Removal and Installation</u></b> .</li> <li>2. Remove the rear seat back cushion bolster, if equipped. Refer to <b><u>Rear Seat Back Bolster Replacement</u></b> .</li> <li>3. Remove the rear seat back cushion, if equipped with fixed seat back (without AM9). Refer to <b><u>Rear Seat Back Cushion Removal and Installation (40% with AM9)</u></b> , <b><u>Rear Seat Back Cushion Removal and Installation (60% with AM9)</u></b> , <b><u>Rear Seat Back Cushion Removal and Installation (without AM9)</u></b> .</li> <li>4. Remove the body side rear window garnish molding. Refer to <b><u>Body Side Rear Window Garnish Molding Replacement</u></b> .</li> </ol> |                                            |
|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     | Rear Seat Belt Retractor Anchor Plate Bolt |

|   |                                                                                                         |
|---|---------------------------------------------------------------------------------------------------------|
| 1 | <b>CAUTION:</b><br>Refer to <b><u>Fastener Caution</u></b> .<br><br><b>Tighten</b><br>45 N.m (33 lb ft) |
| 2 | Rear Seat Belt Retractor Bolt (lower)<br><b>Tighten</b><br>45 N.m (33 lb ft)                            |
| 3 | Rear Seat Belt Retractor Bolt (upper)<br><b>Tighten</b><br>45 N.m (33 lb ft)                            |
| 4 | Rear Seat Belt Retractor                                                                                |

## DESCRIPTION AND OPERATION

### SEAT BELT SYSTEM DESCRIPTION AND OPERATION

Seat Belt with P14, B60 and K85 Motorized Seat Belts



**Fig. 8: Seat Belt with P14, B60 and K85 Motorized Seat Belts**  
 Courtesy of GENERAL MOTORS COMPANY

| Callout | Component Name                  |
|---------|---------------------------------|
| HW      | Hard-Wired                      |
| DA      | Serial Data                     |
| HW      | Hard-Wired                      |
| HW      | Hard-Wired                      |
| DA      | Serial Data                     |
| DA      | Serial Data                     |
| DA      | Serial Data                     |
| DA      | Serial Data                     |
| DA      | Serial Data                     |
| HW      | Hard-Wired                      |
| B60     | B60 Passenger Presence Sensor   |
| B153D   | B153D Seat Belt Buckle - Driver |

|       |                                                        |
|-------|--------------------------------------------------------|
| S64P  | S64P Seat Adjuster Switch - Passenger                  |
| K85   | Passenger Presence Module                              |
| K36   | K36 Inflatable Restraint Sensing and Diagnostic Module |
| A11   | A11 Radio                                              |
| P16   | P16 Instrument Cluster                                 |
| K124  | Active Safety Control Module                           |
| M101L | Seat Belt Retractor Motor Module - Left                |
| M101R | Seat Belt Retractor Motor Module - Right               |
| P14   | P14 Passenger Air Bag Disabled Indicator               |

## Restraint System

**NOTE:** If the vehicle has been in a collision, refer to **Repairs and Inspections Required After a Collision** for additional information.

The vehicle has front and rear seat belts that are the primary means of occupant restraint. Seat belts help to keep the occupants inside the passenger compartment and to gradually reduce the impact forces during the following events:

- Frontal impact type crashes
- Rear impact type crashes
- Side impact type crashes
- Roll-over type crashes

All seat belt retractors have emergency locks. The retractors remain unlocked during normal operation and under normal driving conditions. The retractors remain unlocked during normal conditions in order to allow free movement of the upper body of each occupant. A pendulum locks the seat belt webbing into position. The pendulum causes a locking bar to engage a cog on the spool of the retractor mechanism when the following conditions occur:

- A rapid extraction of the seat belt webbing from the retractor
- An abrupt change in vehicle speed
- An abrupt change in vehicle direction
- Operation of the vehicle on a steep upgrade
- Operation of the vehicle on a downgrade

The seat belts have an automatic locking (cinch) feature. The cinch feature is activated when the seat belt webbing is completely extended from the retractor. The cinch feature prevents the webbing from extending beyond the position from which it is allowed to retract. Use of the cinch feature is recommended for securing a child seat. The cinch feature may be cancelled by allowing the webbing to wind back completely into the retractor. After the cinch feature is cancelled, the webbing is unlocked. After the cinch feature is cancelled, the webbing will extend from the retractor. This vehicle is also equipped with a supplemental inflatable restraint (SIR) system. Refer to **Supplemental Inflatable Restraint System Description and Operation** .

## **Motorized Seat Belts**

A motorized seat belt is a seat belt with a motor coupled to the shoulder belt retractor. The motor performs a reversible, pretightening action (retraction) to reduce the slack in the seat belt. The motorized seat belt provides the driver and passenger a sense of safety and, in the case of severe braking or a crash, more quickly couples the occupant to the vehicle, enhancing the safety to the occupant.

### **Motorized seat belts monitor vehicle information to determine when to perform each of the following retractions**

- Full retraction for such situations but not limited to: panic braking and or skidding
- Dynamic support for lateral and longitudinal dynamics
- Slack removal when the vehicle speed above enable speed

### **Preconditions for motorized seat belt retractions**

- Seat belt buckle is latched
- Vehicle speed greater than or equal to 25 kph (16 mph)
- All messages on serial data are received as valid

### **Triggers that may cause motorized seat belt retractions**

- Emergency Braking
- Sudden Emergency / Panic Braking
- High Vehicle Deceleration Detection
- Ice Braking Detection
- Oversteer and Understeer

### **Motorized seat belt inputs**

- Vehicle Power Mode
- Transmission Gear
- Wheel Speeds
- Vehicle Acceleration
- Accelerator Pedal Position
- Steering Wheel Angle and Gradient
- Yaw Rate and Lat/Long Acceleration
- Brake Pedal Position, Gradient, Pressure, Initial Travel
- Vehicle Stability

### **Motorized seat belt output signals**

- Driver information center message - motorized seat belt Failed "Service Automatic Seatbelt Tightening"

- Driver information center message - motorized seat belt Unavailable "Automatic Seatbelt Tightening Unavailable"

Motorized seat belt retractions are inhibited when seat belt unbuckled

Driver and passenger motorized seat belts operate independently

### Front Seat Belt System

The front seat belt system includes a driver and passenger seat belt pretensioner retractor. Both front seat belt pretensioners includes a seat belt switch in the seat buckle which controls a reminder lamp and a tone alarm.

**NOTE: The front passenger seat is equipped with a passenger presence detection sensor, which detects an occupant. If the passenger presence detection sensor detects an empty front passenger seat, then the passenger fasten safety belt indicator will be disabled.**

- When the driver seat belt is buckled and the ignition switch is turned ON, the following events will occur:
  - The tone alarm will not operate.
  - The reminder lamp will not operate.
- When the passenger seat belt is buckled with an occupant sitting in the passenger front seat, then the ignition switch is turned ON, the following events will occur:
  - The tone alarm will not operate.
  - The reminder lamp, which is located within the Driver Information Display, will not be turned ON.
- When the driver seat belt is not buckled and the ignition switch is in the ON position, the following events will occur:
  - The tone alarm will operate for 4-8 s and then go OFF.
  - The fasten safety belt indicator will turn ON for 20 s, until the driver seat belt is buckled.
- When the passenger seat belt is not buckled with an occupant sitting in the passenger front seat, then the ignition switch is turned ON, the following events will occur:
  - The tone alarm will operate for 4-8 s and then go OFF.
  - The reminder lamp, which is located within the Driver Information Display, will be turned ON.

### Rear Seat Belt System

The Rear Seat Belt System includes the following components:

- The rear seat belt retractor is located at the wheelhouse panel and attached to the floor panel by the rear seat shoulder belt retractor bracket.
- The rear seat belt buckles and the center seat belt buckle are attached to each seat.
- Each of the rear seat belts include a seat belt switch in the seat buckle which controls a reminder lamp and a tone alarm.
- When the rear doors are closed and the vehicle is started the 3 rear seat belt indicators show as gray

indicators in the DIC.

- When the ignition switch is turned ON, a rear seat belt is buckled, the rear doors are closed and the speed exceeds 10kph (6.5mph) the following events will occur:
  - The tone alarm will not operate.
  - The green rear seat belt indicators in the Driver Information Center will illuminate for 35 s.
- When the ignition switch is turned ON, a rear seat belt is not buckled for the duration of the ignition cycle, the rear doors are closed and the speed exceeds 10kph (6.5mph) the following events will occur:
  - The tone alarm will not operate.
  - The green rear seat belt indicator in the Driver Information Center will not operate.
- When the ignition switch is turned ON, a rear seat belt is buckled and during that ignition cycle is unbuckled with the rear doors closed at all times and the speed exceeding 10kph (6.5mph) the following events will occur:
  - The tone alarm will operate for 3 s.
  - The red rear seat belt indicator in the Driver Information Center will illuminate and remain on until the seat belt is buckled again or the ignition cycle ends.

#### Child Seat Restraint System

**WARNING:** A child in a rear-facing child restraint can be seriously injured if the right-front passengers air bag inflates. This is because the back of a rear-facing child restraint would be very close to the inflating air bag. NEVER use a rear-facing child restraint in this vehicle. If a forward-facing child restraint is suitable for your child, ALWAYS move the front passenger seat as far back as it will go and then install the child restraint. Be sure the child restraint position does not conflict with any additional requirements provided by the manufacturer. For more information, refer to the vehicle owners manual and the instruction that came with the child restraint.

A child in a rear-facing child restraint can be seriously injured if the right-front passengers air bag inflates. This is because the back of a rear-facing child restraint would be very close to the inflating air bag. NEVER use a rear-facing child restraint in this vehicle. If a forward-facing child restraint is suitable for your child, ALWAYS move the front passenger seat as far back as it will go and then install the child restraint. Be sure the child restraint position does not conflict with any additional requirements provided by the manufacturer. For more information, refer to the vehicle owners manual and the instruction that came with the child restraint.

The child seat may only be used in a forward facing seating location. The child seat should be installed and secured according to the manufacturer's directions. If the child seat has a top strap, the seat will need to be anchored. Passengers should not be allowed to sit at locations where the seat belts are being used to secure the child seat.

All vehicles are equipped with a dual-mode type retractor with emergency and automatic locking features. The automatic locking feature is for restraint of a child seat. The child seat can be secured by pulling the seat belt all the way out to lock it. Then tighten the seat belt around the child seat.

If a child seat is to be used in the second seat position, a special dealer-installed anchor must be used in order to

anchor the child seat top strap. This only applies to the seats designed with the top strap provision and for the vehicles sold in Canada. In order to ensure the correct top strap angle, the child seat is only to be used at the seating position for which the top strap anchor is installed.

### **Fasten Safety Belt Indicators**

There are three fasten safety belt indicators for this vehicle. The driver fasten safety belt reminder is displayed in the instrument cluster, the passenger fasten safety belt reminder is displayed in the inflatable restraint instrument panel module indicator, and the rear fasten safety belt reminder is displayed in the driver information center. The fasten safety belt indicator may only be ON during RUN. The fasten safety belt indicator illuminates under the following conditions:

- During the bulb check
- The inflatable restraint sensing and diagnostic module (SDM) sends the status of the driver seat belt to the instrument cluster via serial data. The passenger seat belt status is sent to the inflatable restraint instrument panel module indicator via serial data. The rear seat belt status is sent to the driver information center via serial data. If any of the seat belts are unfastened, the instrument cluster will send a message requesting a chime sound to be turned ON after a bulb check.