

2006 ACCESSORIES & EQUIPMENT

Frame and Underbody - Equinox & Torrent

SPECIFICATIONS

FASTENER TIGHTENING SPECIFICATIONS

Fastener Tightening Specifications

Application	Specification	
	Metric	English
Ball Stud Castle Nut		
• First Pass	10 N.m	89 lb in
• Final Pass	+ 180°	
Frame to Body Bolts	155 N.m	114 lb ft
Front Transaxle Mount Through Bolt	110 N.m	81 lb ft
Rear Transaxle Mount to Frame Bolts	50 N.m	37 lb ft
Stabilizer Shaft Clamp Bolt	50 N.m	37 lb ft
Steering Gear to Frame Bolts	110 N.m	81 lb ft

DIAGNOSTIC INFORMATION AND PROCEDURES

ALIGNMENT CHECKING

Use a measuring tram gage as an accurate method of determining the alignment of the underbody. The tram gage set required to perform the recommended measuring checks must include a vertical pointer capable of reaching 457 mm (18 in).

The following 2 types of measurement may be made using a tram gage:

- Direct point to point measurements
- Measurements calculated on a horizontal plane (datum line) parallel to the underbody

Dimensions that are measured to gage holes are measured to the center of the holes and flush to the adjacent metal surface unless otherwise specified. It is recommended that the diagonal dimensions be cross body checked on both sides in order to verify the dimensional accuracy of the vehicle underbody. Set vertical pointers equally as needed per your application.

REPAIR INSTRUCTIONS

UNDERBODY INSPECTION

1. Raise and suitably support the vehicle. Refer to **Lifting and Jacking the Vehicle** in

General Information.

2. Check for obvious deterioration on the floor pan.
3. Check for loose dirt and corrosion around the inside of the floor pan reinforcement member access holes. This is the first indication that corrosion may exist in hidden areas.

Perform all repairs before the final cleaning and protective treatment is performed.

4. Using a chisel, ensure that the drain provisions in the floor pan reinforcement members are open.

Open the drain holes in the body side panels using a punch and a drift.

FRAME REPLACEMENT (LNJ)**Tools Required**

- **J 43828** Ball Joint Remover. See **Special Tools**.
- **SA9140E** Torque Angle Gage. See **Special Tools**.

Removal Procedure

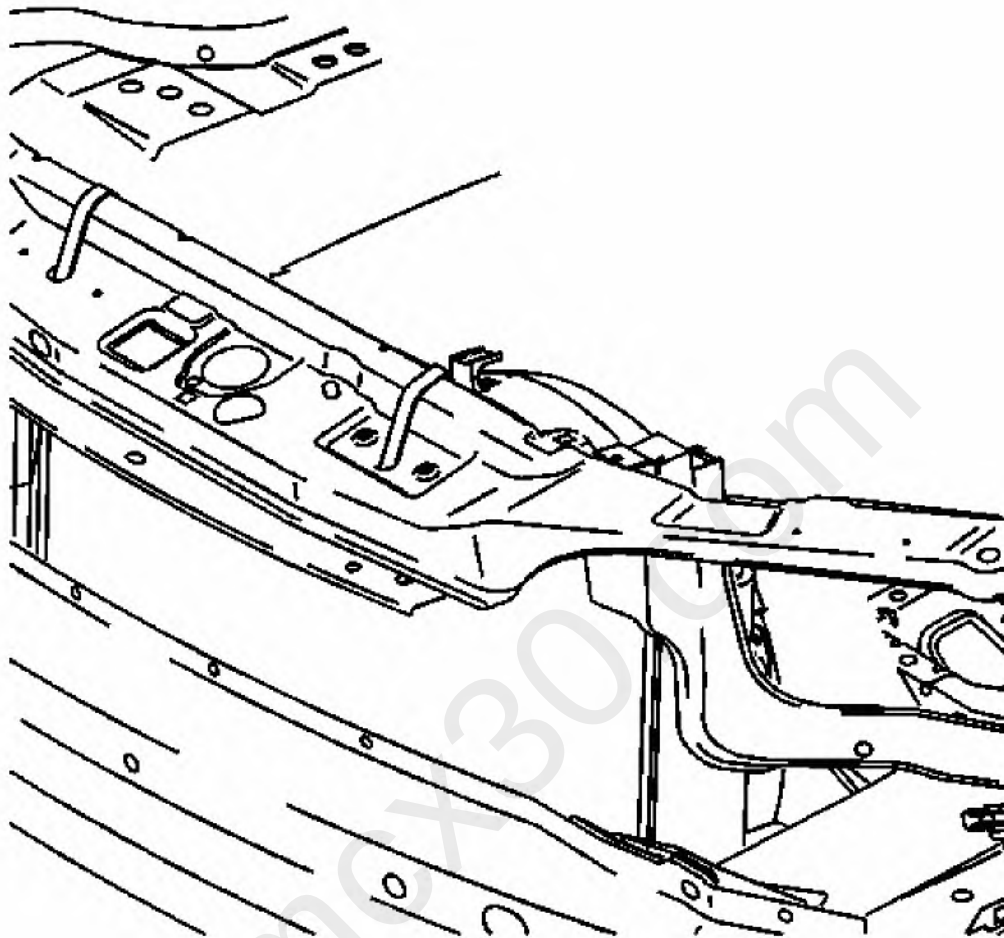


Fig. 1: Cooling Module Secured To Upper Body Structure
Courtesy of GENERAL MOTORS CORP.

1. Secure the radiator to the upper radiator support.
2. Raise and support the vehicle. Refer to **Lifting and Jacking the Vehicle** in General Information.
3. Remove the front wheels. Refer to **Tire and Wheel Removal and Installation** in Tires and wheels.
4. Remove the side splash shield-to-frame fasteners.
5. Remove the front air dam-to-frame fasteners.

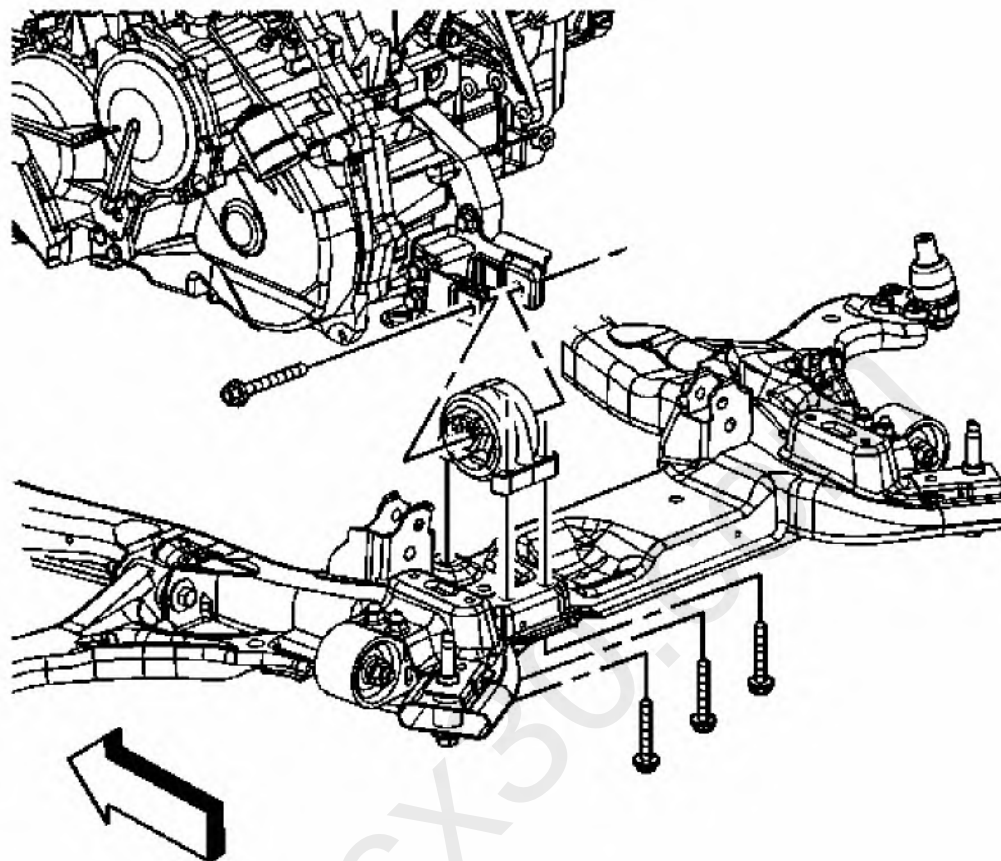


Fig. 2: View Of Rear Transmission Mount & Bolts
Courtesy of GENERAL MOTORS CORP.

6. Remove the rear transaxle mount-to-frame bolts.

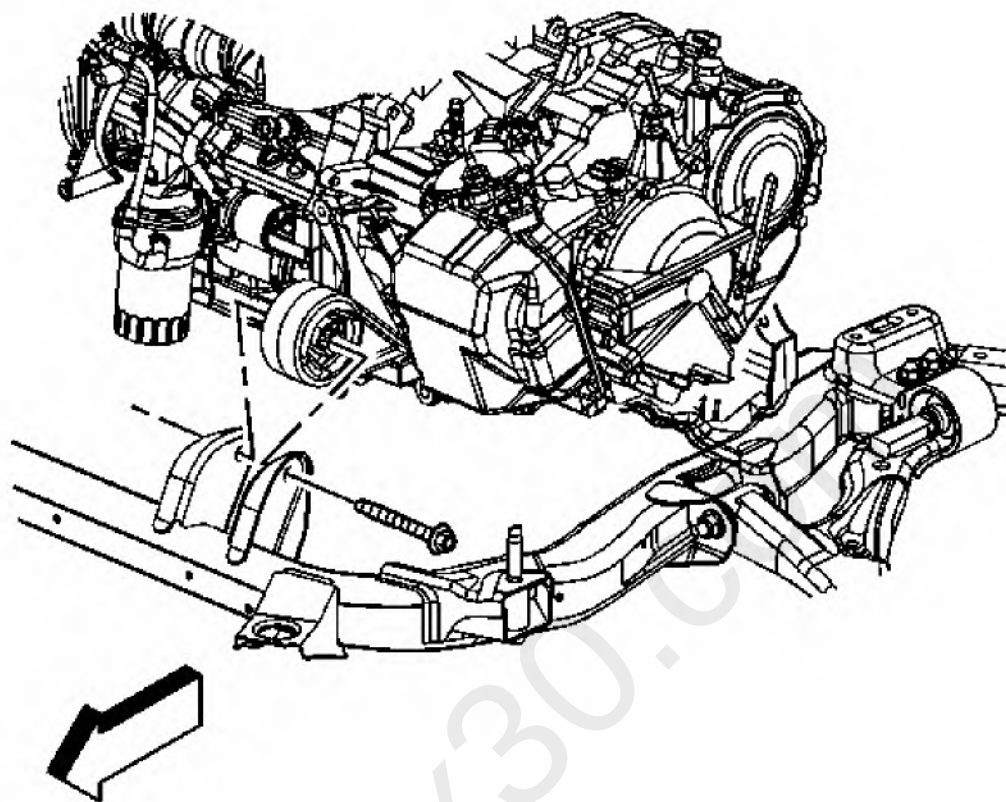


Fig. 3: View Of Transmission Mount Bolt
Courtesy of GENERAL MOTORS CORP.

7. Remove the front transaxle mount through bolt.

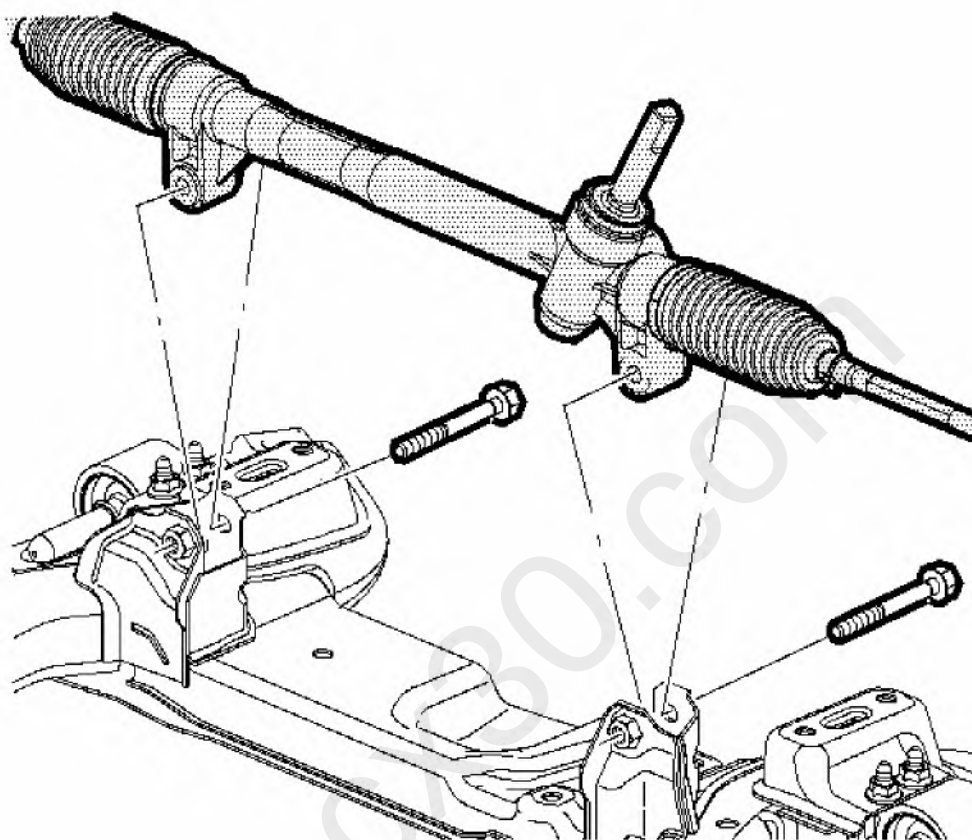


Fig. 4: View Of Steering Gear & Steering Gear-To-Frame Bolts
Courtesy of GENERAL MOTORS CORP.

8. Remove the steering gear-to-frame bolts.
9. Using mechanics wire, secure the steering gear to the exhaust.

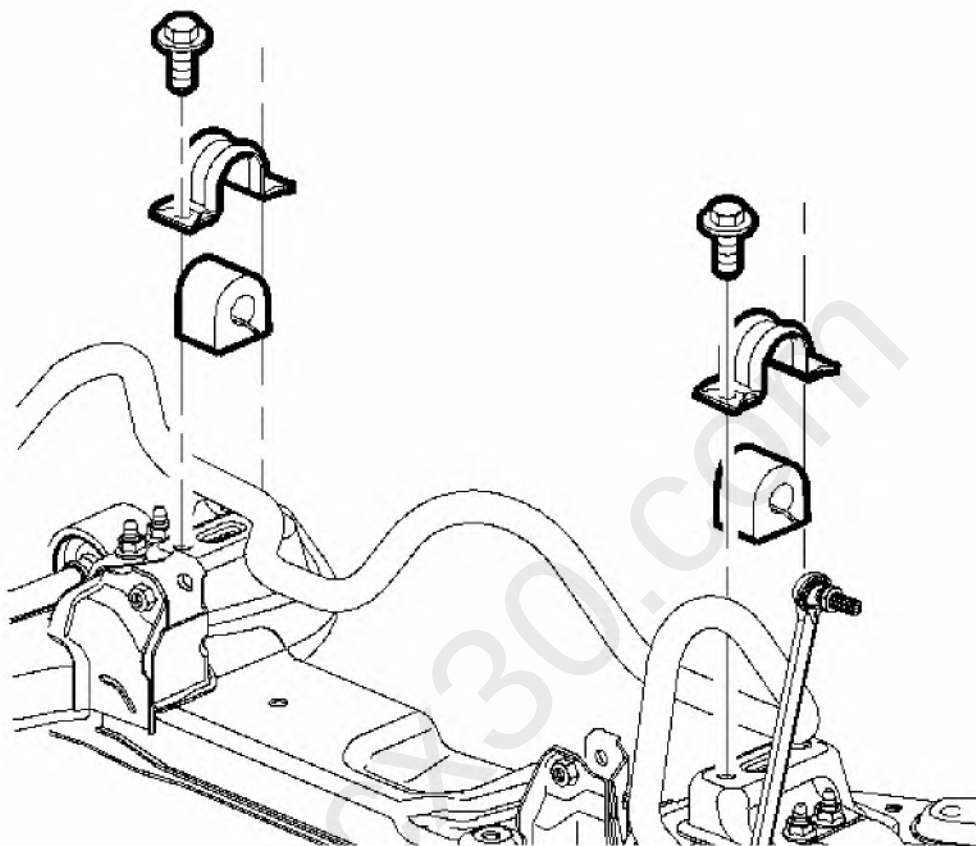


Fig. 5: View Of Stabilizer Bar Clamps, Bushings & Bolts
Courtesy of GENERAL MOTORS CORP.

10. Remove the stabilizer shaft clamp-to-frame bolts.

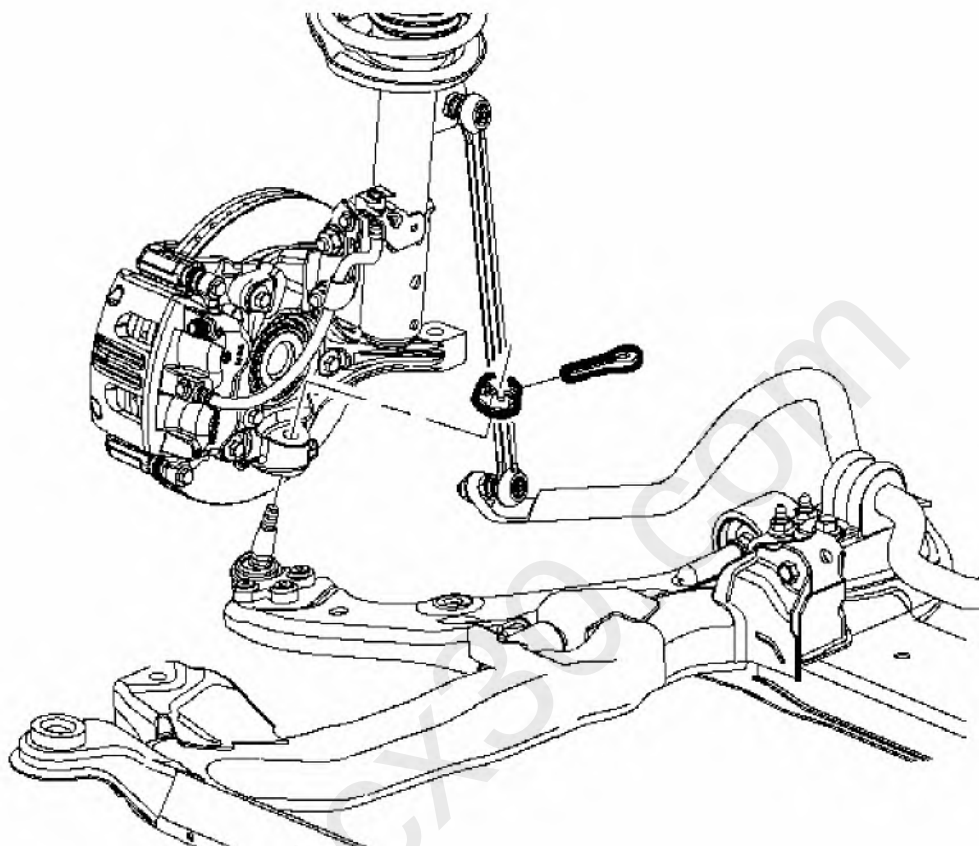


Fig. 6: View Of Lower Ball Joint Stud Cotter Pin & Nut
Courtesy of GENERAL MOTORS CORP.

11. Remove the lower ball joint cotter pins. Discard the cotter pins.

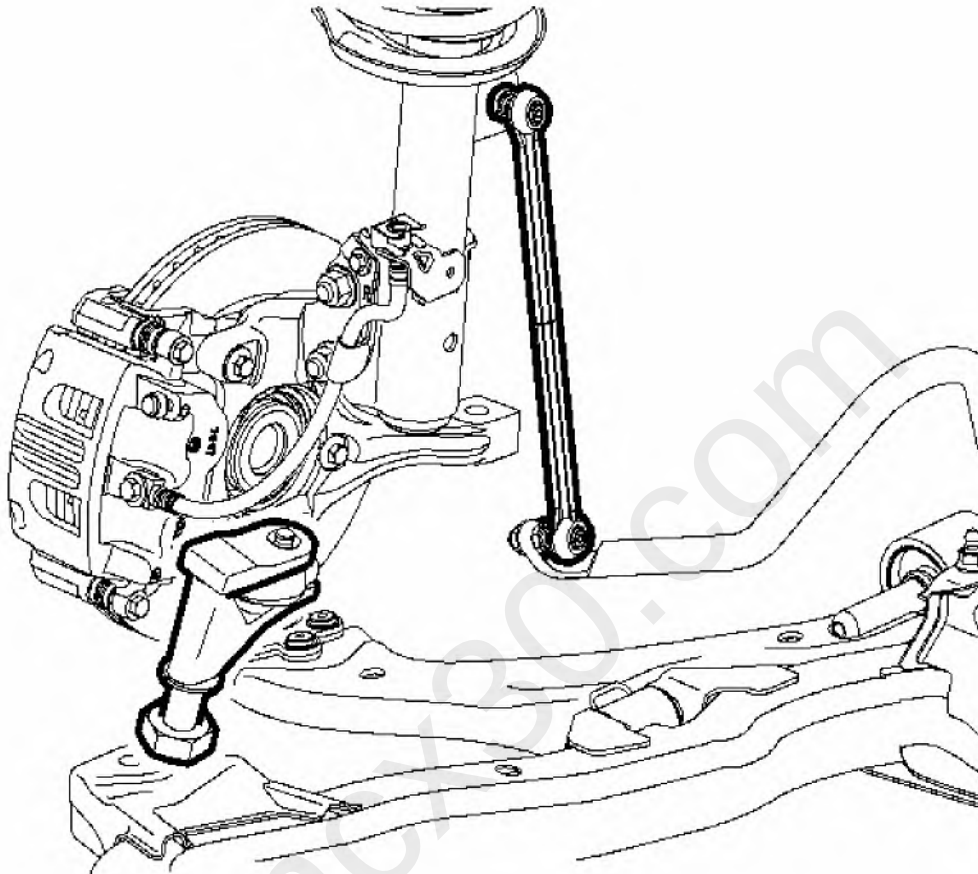


Fig. 7: View Of Steering Knuckle & Lower Control Arm
Courtesy of GENERAL MOTORS CORP.

12. Loosen the lower ball joint castle nut until the nut is level with the top of the ball stud.

NOTE: Do not free the ball stud by using a pickle fork or a wedge-type tool. Damage to the seal or bushing may result.

13. Using the **J 43828** , separate the lower control arm from the steering knuckle. See **Special Tools**.

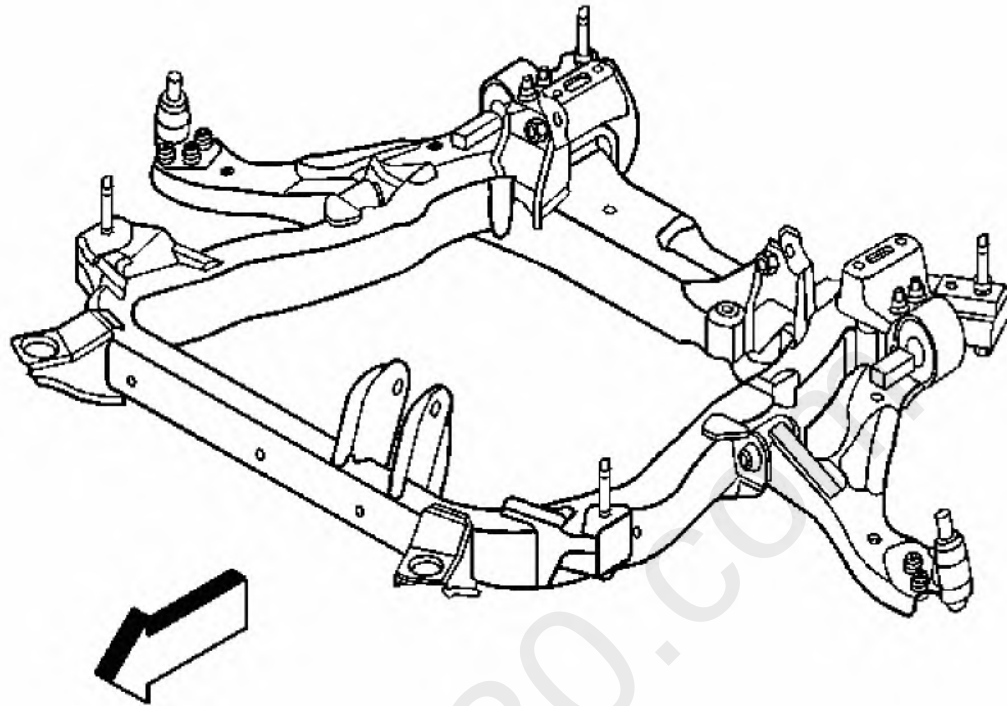


Fig. 8: View Of Frame
Courtesy of GENERAL MOTORS CORP.

14. Remove the frame-to-body bolts. Discard the bolts.
15. Carefully lower the frame from the vehicle.
16. Remove the lower control arms. Refer to **Lower Control Arm Replacement** in Front Suspension.

Installation Procedure

1. Install the lower control arms. Refer to **Lower Control Arm Replacement** in Front Suspension.
2. Raise the frame to the body.

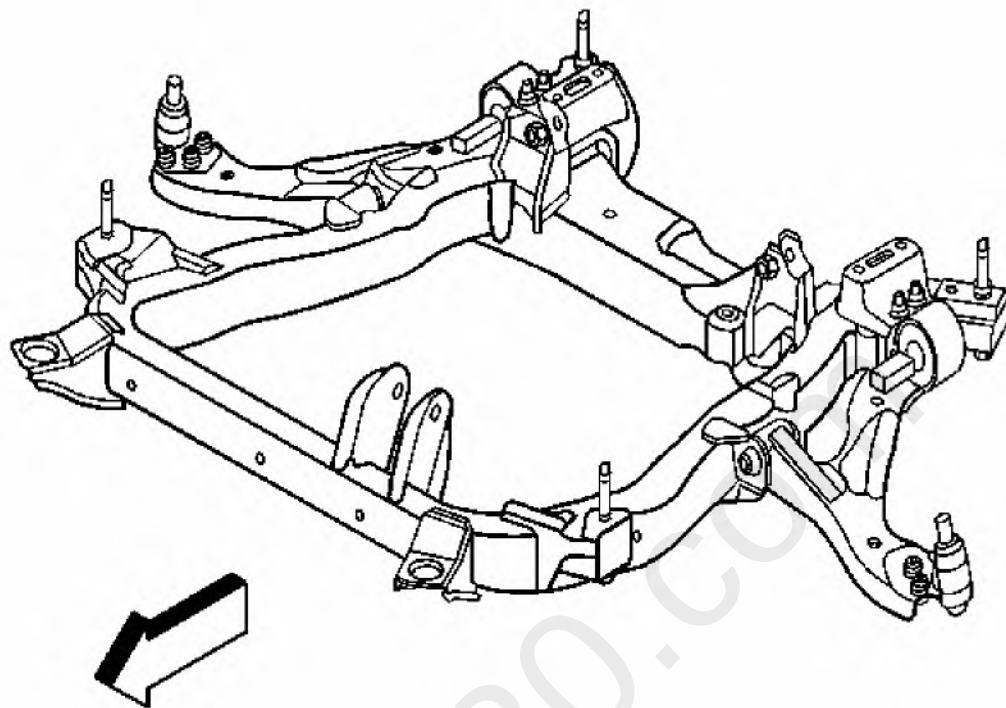


Fig. 9: View Of Frame
Courtesy of GENERAL MOTORS CORP.

IMPORTANT: Do not tighten the fasteners at this time.

3. Loosely install new frame-to-body bolts.

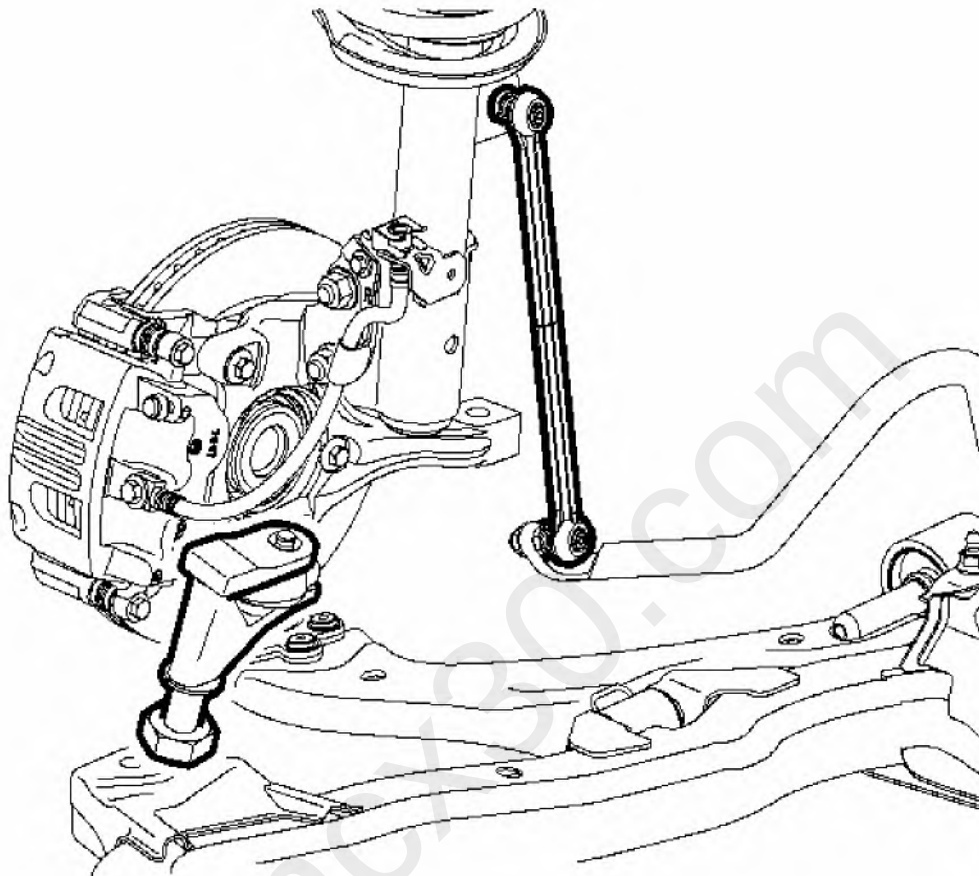


Fig. 10: View Of Steering Knuckle & Lower Control Arm
Courtesy of GENERAL MOTORS CORP.

4. Connect the ball joint stud to the steering knuckle.

NOTE: Refer to Fastener Notice in Cautions and Notices.

5. Using the SA9140E , install the ball stud castle nut. See Special Tools.

Tighten: Tighten the nut to 10 N.m (89 lb in) + 180 degrees.

IMPORTANT:

- Do not loosen the castle nut in order to align the cotter pin slots.
- Ensure the cutter pin ends do not contact the wheel

speed sensor harness.

6. Continue to tighten the castle nut to align the slots with the opening in the ball stud and install the ball stud cotter pin.

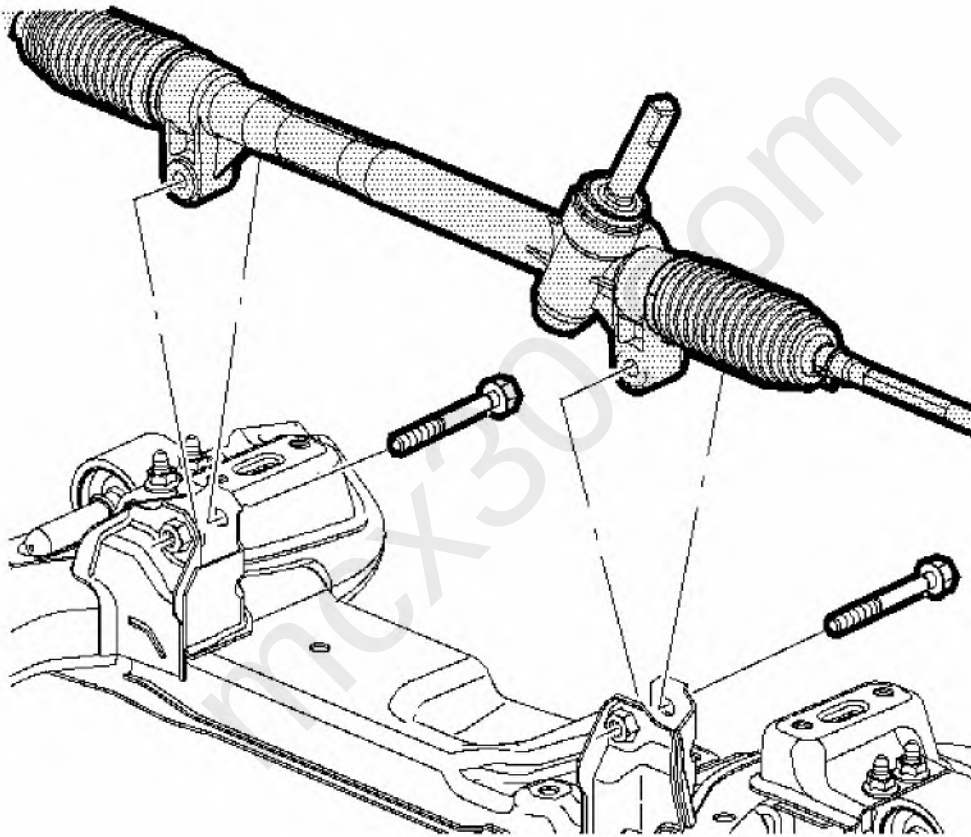


Fig. 11: View Of Steering Gear & Steering Gear-To-Frame Bolts
Courtesy of GENERAL MOTORS CORP.

7. Remove the mechanics wire and install the steering gear to the frame.

Tighten: Tighten the bolts to 110 N.m (81 lb ft).

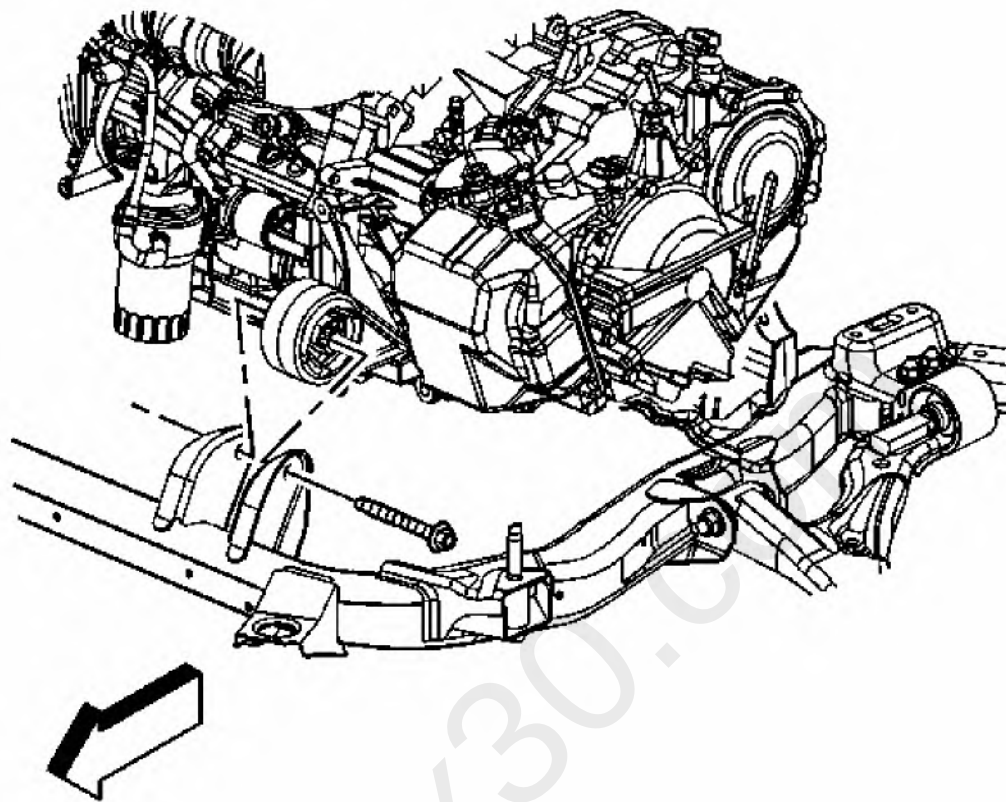


Fig. 12: View Of Transmission Mount Bolt
Courtesy of GENERAL MOTORS CORP.

8. Install the front transaxle mount through bolt.

Tighten: Tighten the bolt to 110 N.m (81 lb ft).

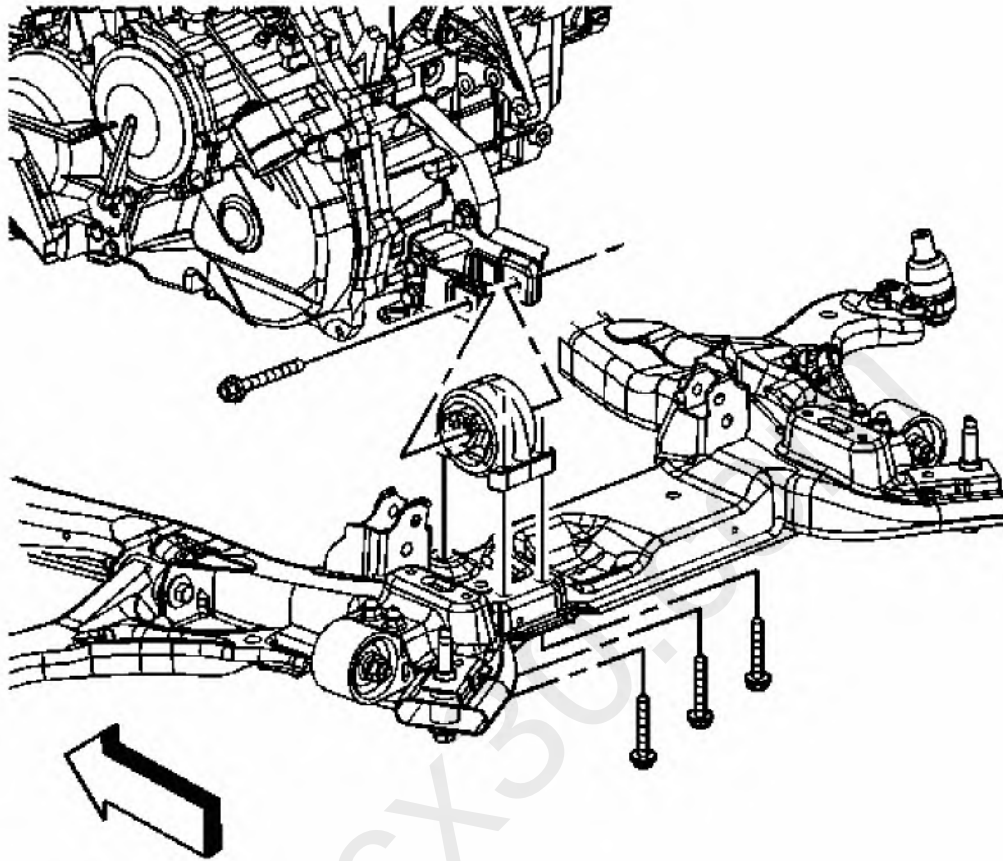


Fig. 13: View Of Rear Transmission Mount & Bolts
Courtesy of GENERAL MOTORS CORP.

9. Install the rear transaxle mount-to-frame bolts.

Tighten: Tighten the bolts to 50 N.m (37 lb ft).

10. Install the stabilizer shaft clamp.

Tighten: Tighten the bolts to 50 N.m (37 lb ft).

11. Tighten the frame-to-body bolts.

Tighten: Tighten the bolts to 155 N.m (114 lb ft).

12. Install the front air dam fasteners.

13. Install the side splash shield-to-frame fasteners.

14. Install the front wheels. Refer to **Tire and Wheel Removal and Installation** in Tires and Wheels.
15. Lower the vehicle.
16. Unsecure the radiator from the upper radiator support.
17. Align the front suspension. Refer to **Front Toe Adjustment**.

DESCRIPTION AND OPERATION

DATUM DESCRIPTION

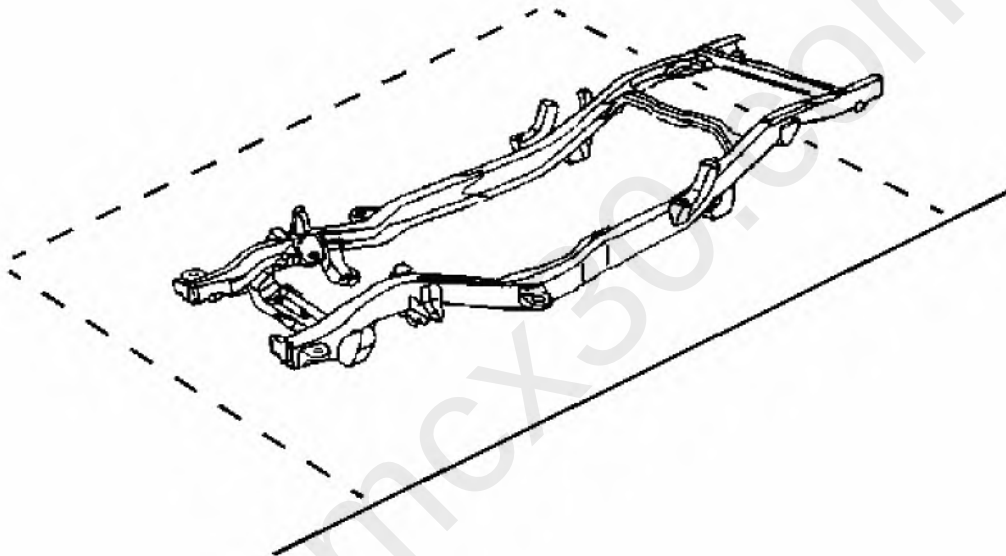


Fig. 14: Datum

Courtesy of GENERAL MOTORS CORP.

A datum is an imaginary horizontal plane that runs below and parallel to the vehicle. Height dimensions are calculated at right angles from the datum to the given control or reference points on the underbody.

The company that develops height dimensions determines the location of the datum based on the equipment being used. Therefore, different datum lines are established for the same vehicle. You can add or subtract an equal amount from all height dimensions and create a new datum line for your usage.

CENTERLINE DESCRIPTION

Plane

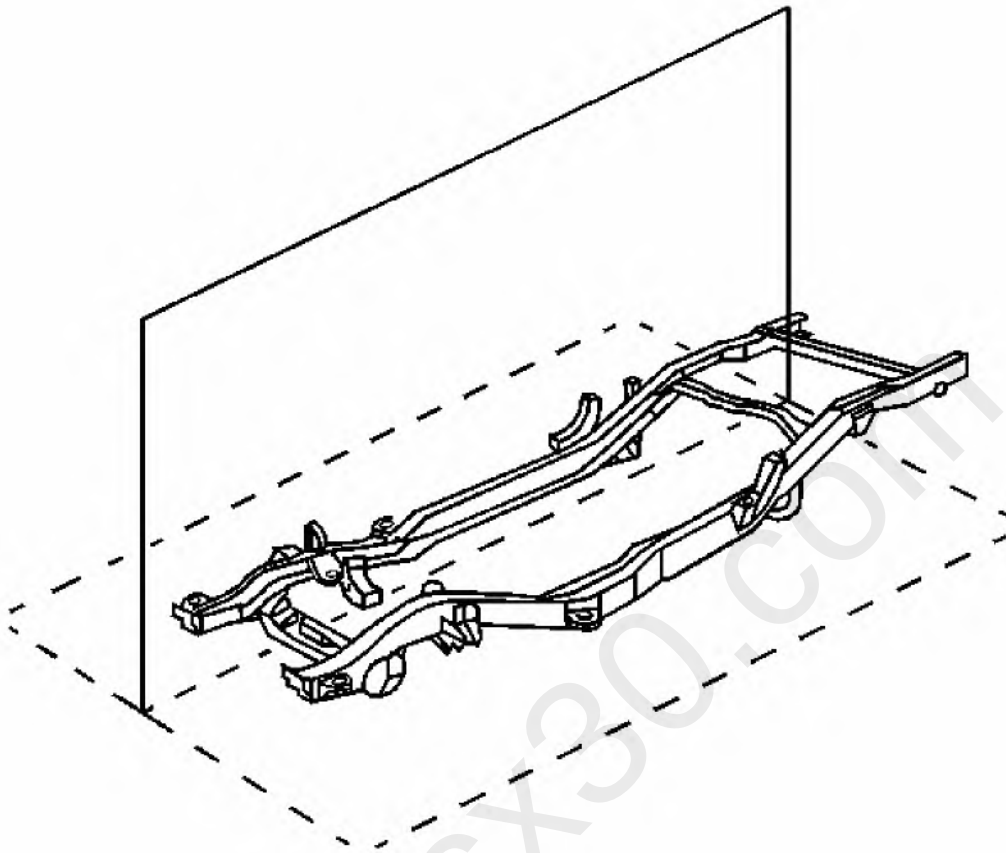


Fig. 15: Centerline

Courtesy of GENERAL MOTORS CORP.

A centerline is an imaginary vertical plane that is perpendicular to the length of the datum plane through the center of the vehicle. The centerline is any line drawn through the center of the vehicle's datum. The symbol for centerline is CL.

Length

Centerline length measurements are 3-dimensional measurements. The 3 dimensions are the following:

- Length - The distance between 2 points when the height is parallel to the center plane.
- Height - The measurement is parallel to the datum plane.
- Width - The measurement is parallel to the center plane.

When reading dimension charts, horizontal width and length dimensions of the underbody are shown as viewed from the bottom of the underbody. Vertical dimensions use the datum

plane as a base for all vertical (height) measurements.

Centerline measurements are used with universal measuring equipment.

VERTICAL BODY ZERO LINE

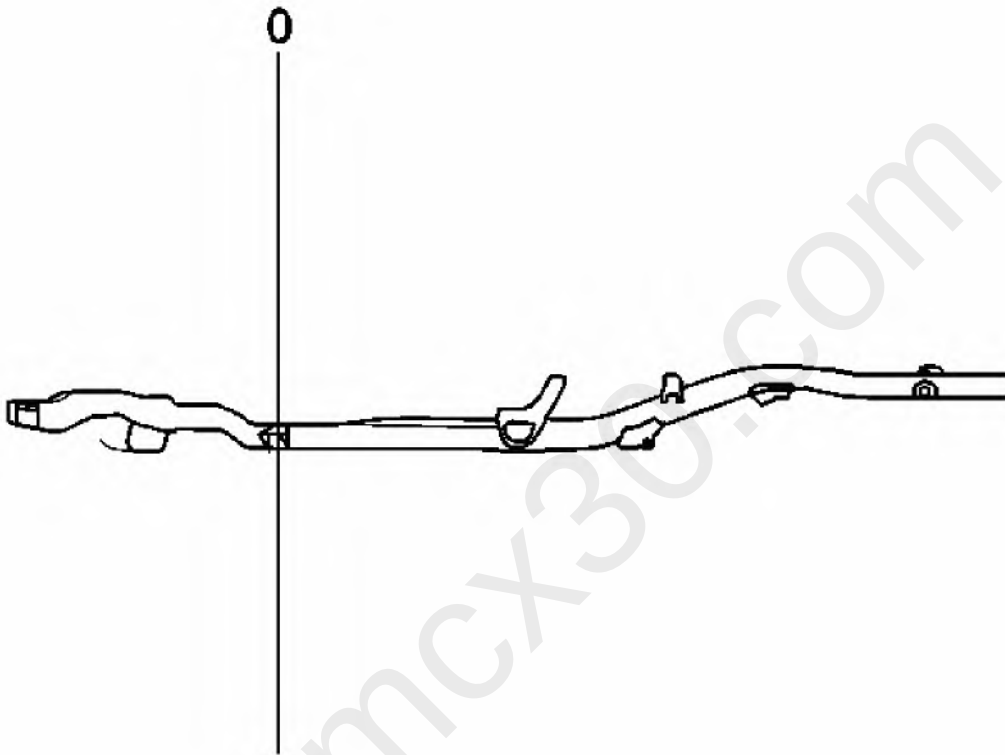


Fig. 16: View Of Vertical Body Zero Line
Courtesy of GENERAL MOTORS CORP.

The vertical body zero line is an imaginary line drawn through the frame either at the forward or rearward torque box area of the frame.

SPECIAL TOOLS AND EQUIPMENT

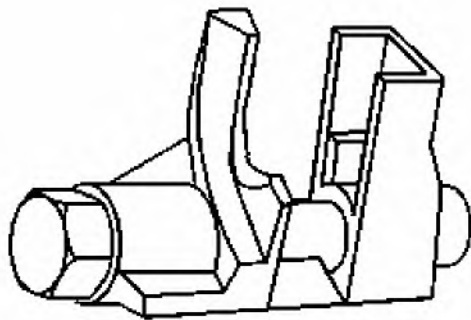
SPECIAL TOOLS

Special Tools

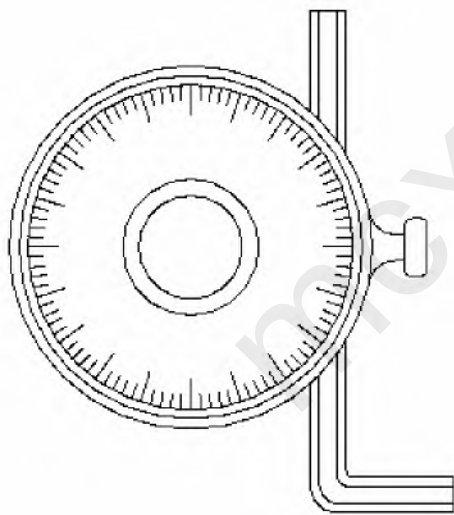
Illustration	Tool Number/ Description

2006 Chevrolet Equinox LS

2006 ACCESSORIES & EQUIPMENT Frame and Underbody - Equinox & Torrent



J 43828
Ball Joint Separator



SA9140E
Torque Angle Gage