

GROUP 2

FRAME, BUMPERS AND CHASSIS SHEET METAL

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SECTION 2A

FRAME AND BODY MOUNTS

CAUTION: All Frame fasteners are important attaching parts in that they could affect the performance of vital parts and systems. Do not use a replacement part of lesser quality or substitute design. Torque values must be used as specified during reassembly to assure proper retention. When required, a fastener must be replaced with one of the same part number or with an equivalent part.

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GENERAL DESCRIPTION

This section contains information relative to:

- The full frames and body mounts as used on B and G series vehicles as in Figures 2A-3, 4.
- A stub frame or cradle and mounts are used on A, C, E, and H series vehicles.

See Figure 2A-1

- On J and N series vehicles lower support assemblies are used.

See Figure 2A-2

The A, C, E, H, J and N series bodies are of unitized construction. Body alignment and service procedures may be found in the body manual.

Full Frame

Frames used on B and G series are full frames and are basically the same design consisting of full length right and left side members joined laterally by crossmembers. Several different frames are used in each line to meet the various vehicle size and function requirements but the basic shape for each line remains the same. Differences between frames in a given line exists only in metal gage, part size and

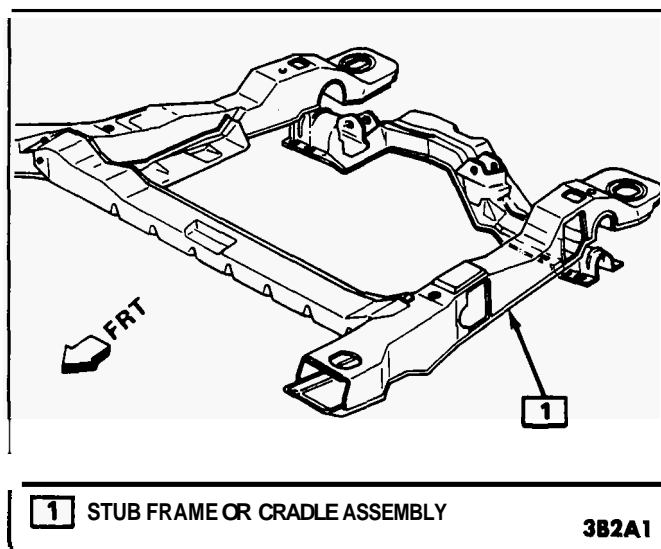


Figure 2A-1 Stub Frame or Cradle Assembly

numbers of parts necessary to meet the particular structural requirements of the models involved.

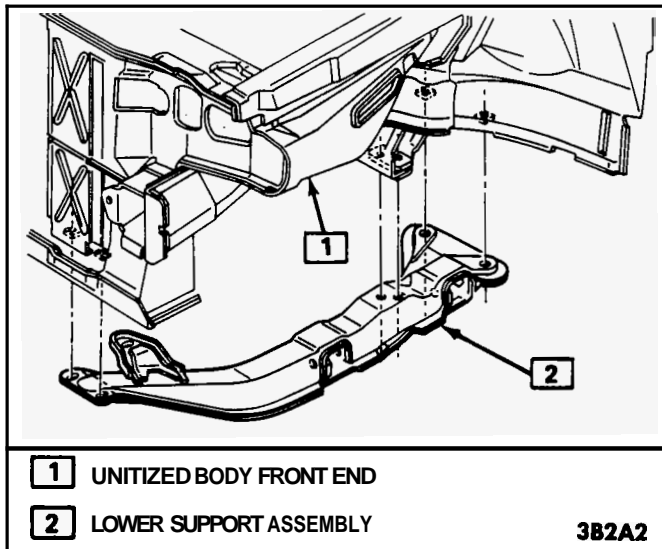


Figure 2A-2 Lower Support Assembly

STUB FRAME (CRADLE)

Front and side crossmembers that form a cradle are used to support engine, transaxle, front suspension and other mechanical components. Plastic covers are installed over the front end openings on "C, E and H" vehicle cradles to prevent the entry of dirt etc.

Unitized construction demands that underbody components be properly aligned to assure correct suspension location. In the event of collision damage, it is important that the underbody be thoroughly checked and, if necessary, realigned in order to accurately establish proper dimensions.

BODY MOUNTS

The body of the car is mounted to the chassis by means of thick rubber mounts. These mounts are specifically designed for each location to give the maximum amount of structure strength while at the same time providing maximum road noise isolation.

LOWER SUPPORT ASSEMBLIES

The engine compartment of J and N bodies have side rails built-in. They are part of the unitized construction and support the engine and transaxle. The lower support assemblies carry the front suspensions. There are no body mounts.

In the event of collision damage, it is important that the underbody be thoroughly checked and, if necessary, realigned in order to accurately establish proper dimensions.

DIAGNOSIS

DIAGNOSIS OF FRAME

To determine the extent of frame damage resulting from a collision on B-G Series, a dimension illustration chart in Figures 2A-3 and 2A-4 should be used. Any good frame measuring equipment can be used in the actual measuring of the frame. To bring a frame back into original specifications, any reputable frame straightening equipment can be used. The procedures with the equipment should be used to prevent damage to body and frame attachments (steering column, brake lines, etc.). Specifications and procedures for A, C, E, H, J and N series are in the Body Manual.

DIAGNOSIS OF BODY MOUNTS

Improper body mount installations may result in the following problems:

1. Structure shake.
2. Road noise.
3. Squeaks.

The above problems can sometimes be caused by the wrong part being installed or the mount not being properly torqued. Squeaks may be caused by an improperly located insulator rubbing on the frame rail. Body mounts with locator tabs must be positioned so the tab rests in the frame notch.

If a problem has been diagnosed as a body mount problem, two checks can be made to identify the problem. A color code check of the mounts to determine correct usage or a body bolt torque check can be used. If the wrong mount is used, it must be replaced with the correct mount.

ON CAR SERVICE

FRAME INSPECTION

1. Raise and suitably support car
2. Check for loose dirt and rust around the inside of the frame rails, on top and at the ends where corrosion may exist in hidden areas. Check especially in the frame box sections for accumulation of debris.

FRAME ALIGNMENT

Vehicles involved in an accident of any nature, which might result in a "bent" or "sprung" frame or cradle, should always be checked for proper frame alignment in addition to steering geometry and wheel alignment.

UNDERBODY INSPECTION

1. Raise and suitably support car.
2. Check for obvious floor pan deterioration.
3. Check for loose dirt and rust around the inside of the floor pan reinforcement member access holes. This is the first indication that corrosion may exist in hidden areas, and that repairs might be required 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.
5. There are drain holes in the body side panels also. These holes can be opened by using a punch or drift. The side panel drain holes are in the rear section of the rocker panels, and in the lower rear quarter panels.

UNDERBODY FLUSH

Due to the accumulation of road salts and corrosives on the underbody of the car, it is recommended that the entire underbody (suspension, exhaust, brake and gas line areas, etc.) be flushed with clean water each Spring. This will add to the life and strength of the underbody components.

REPLACING BODY MOUNTS

The removal of any one body mount necessitates the loosening of adjacent body mountings to permit the frame or cradle to be separated from the body. Care should be exercised to prevent breakage of plastic fan shroud, or damage to frame attachments such as steering column, brake pipes, etc., during replacement of body mounts. During installation of a body mount, caution should be used to insure that the body mount is properly seated in the frame mounting hole, otherwise a direct metal to metal contact will result between the frame and body. The tube spacer should

be in all bolt-in body mounts and the insulator or metal washer positioned to prevent contact with the frame side rail. Do not over-torque the body mount or a collapsed tube spacer or stripped bolt may result.

Do not use lubricants of any kind on the rubber parts of the mounts. Proper clamping by the mount depends on clean and dry surfaces. If the body mount bolt does not screw in smoothly, it may be necessary to run a tap through the cage nut in the body to remove foreign material. Caution should also be used to insure that tap doesn't punch through underbody.

FRAME (CRADLE) REPAIR

Cars involved in an accident of any nature which might result in a damaged cradle should always be checked for proper cradle alignment in addition to steering geometry and wheel alignment. Cradle checking dimensions may be found in the Body Manual.

The cradle can be removed from the car without removing the engine.

Two procedures are given for both "A" Series and "C" Series cradle removal. Both procedures should be reviewed to determine which one is best, for the type of service being performed.

Frame (Partial) "A" Series

Removal

1. Install engine support fixture (Figure 2A-16) with support bar J-22825-1 or BT-6603 centered over lifting bracket on rear of engine. Locate supports J-22825 as shown in Figure 2A-16. When fixture is properly located, torque fasteners to 41 N·m (30 ft. lbs.).

2. Place support hook J-22825-48 into lifting bracket at rear of engine (if used). Tighten coupling nut only enough to remove slack from support hook.

CAUTION: Engine support fixture must be located as shown in Figure 2A-16. Support fixture fasteners must be properly torqued before supporting engine. Support fixture is not intended to support entire weight of engine and transaxle. Bodily injury could result with improper use of this support fixture.

3. Rotate steering wheel so that intermediate shaft to steering gear stub shaft attaching bolt is in the up position. Remove bolt and disconnect intermediate shaft assembly from stub shaft.
4. Raise vehicle.
5. Position jack and block of wood under engine to act as a support during removal and installation.
6. Remove left front tire and wheel assembly.
7. Disconnect drive line vibration absorber if used.
8. Disconnect front stabilizer bar from left hand lower control arm.
9. Disconnect left hand lower ball joint at knuckle and discard bolt.
10. Remove both front stabilizer bar reinforcements and bushings from right and left side members.
11. Using a 1/2" drill bit, drill through spot weld located between rear holes of left hand rear stabilizer bar mounting (Figure 2A-15).
12. Disconnect engine and transaxle mounts from cradle.
13. Remove side to crossmember bolts.
14. Remove bolts from left hand body mounts.

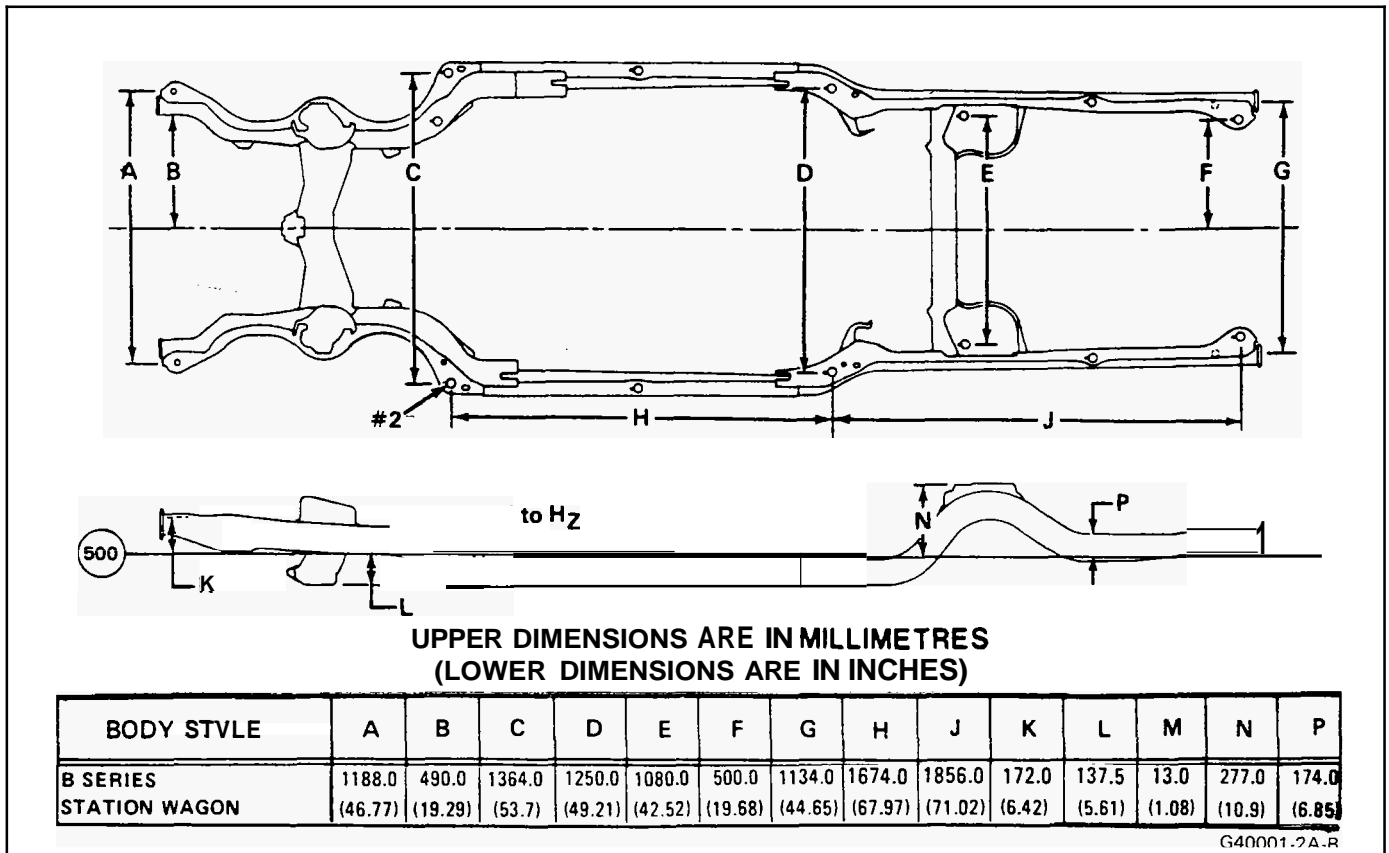


Figure 2A-3 Frame Dimensions "B" Series

WHEELBASE 2746 mm (108.1")

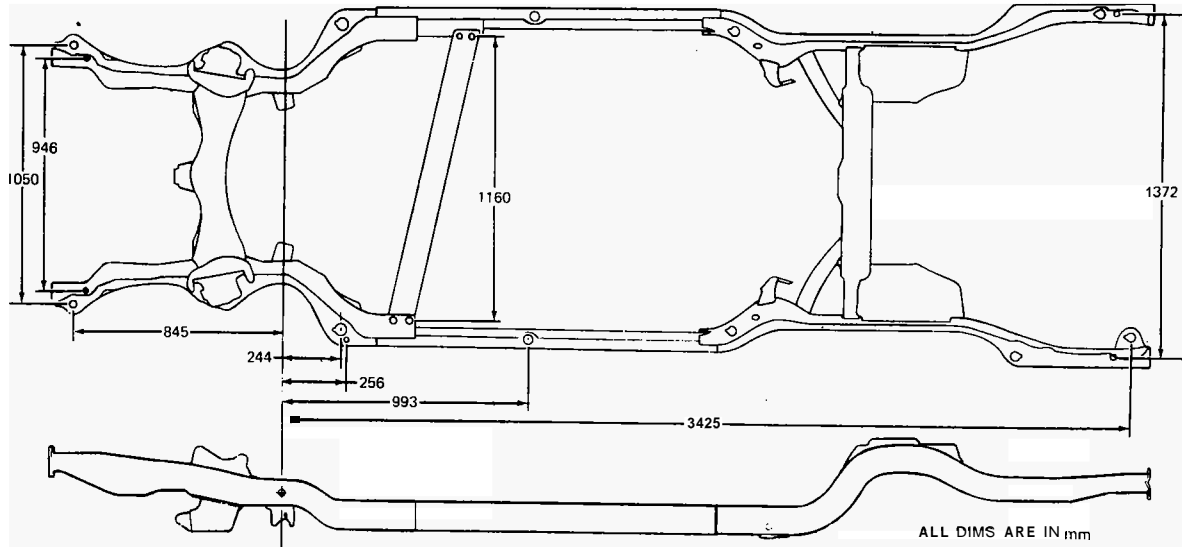
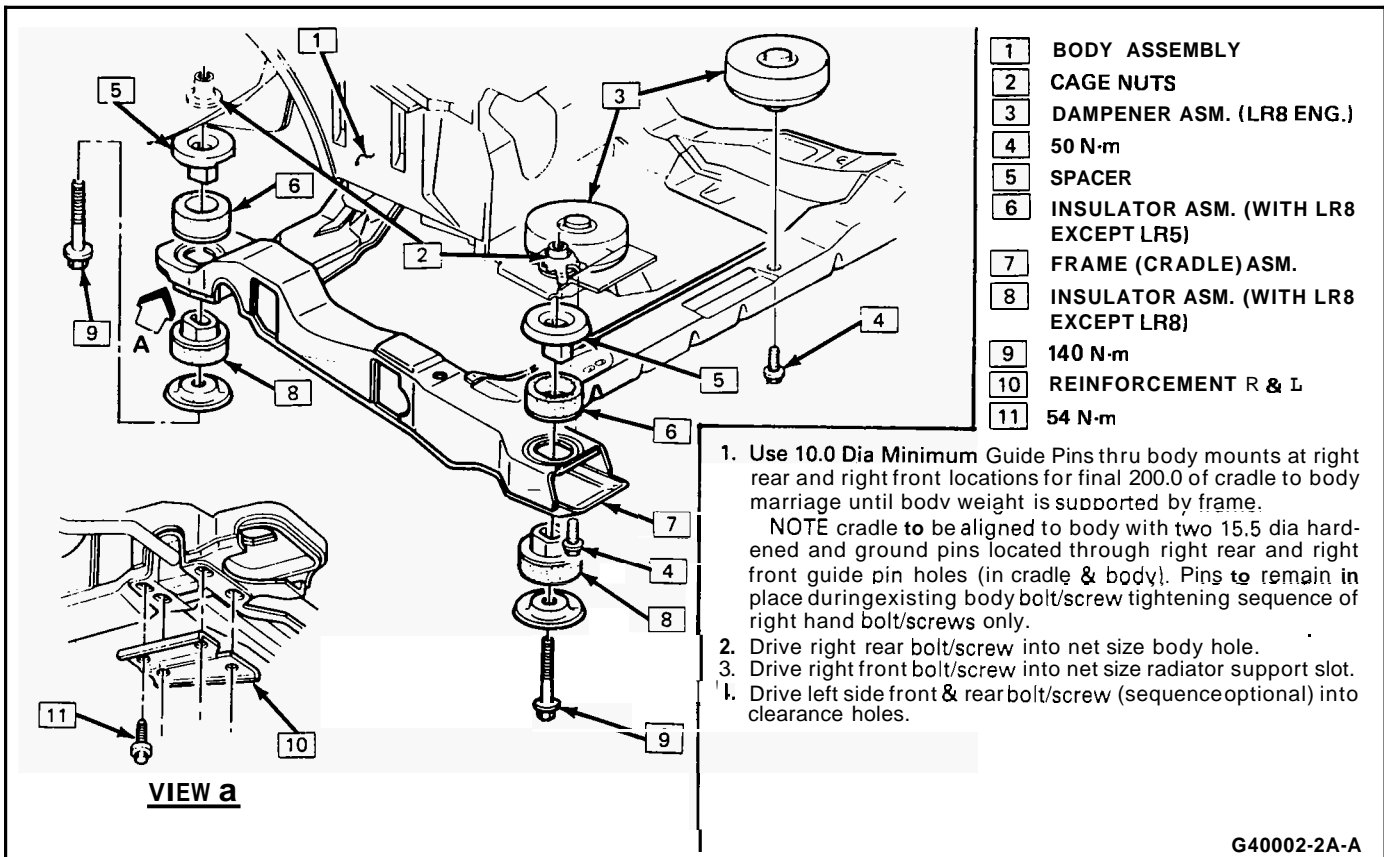


Figure 2A-4 Frame Dimensions "G" Series



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Figure 2A-5 Stub Frame or Cradle Mounts - "A" Series

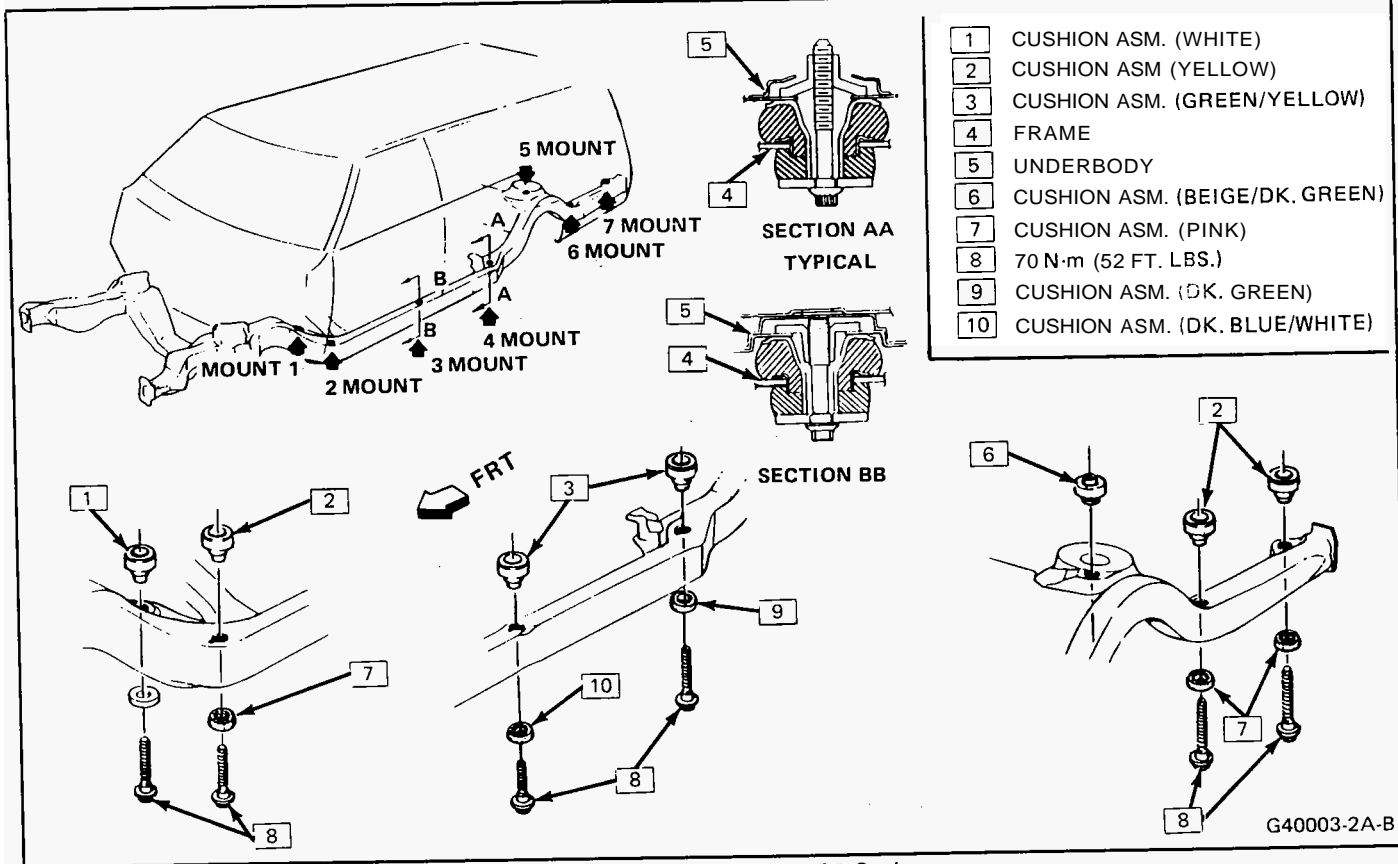


Figure 2A-6 Body Mounts "B" Series

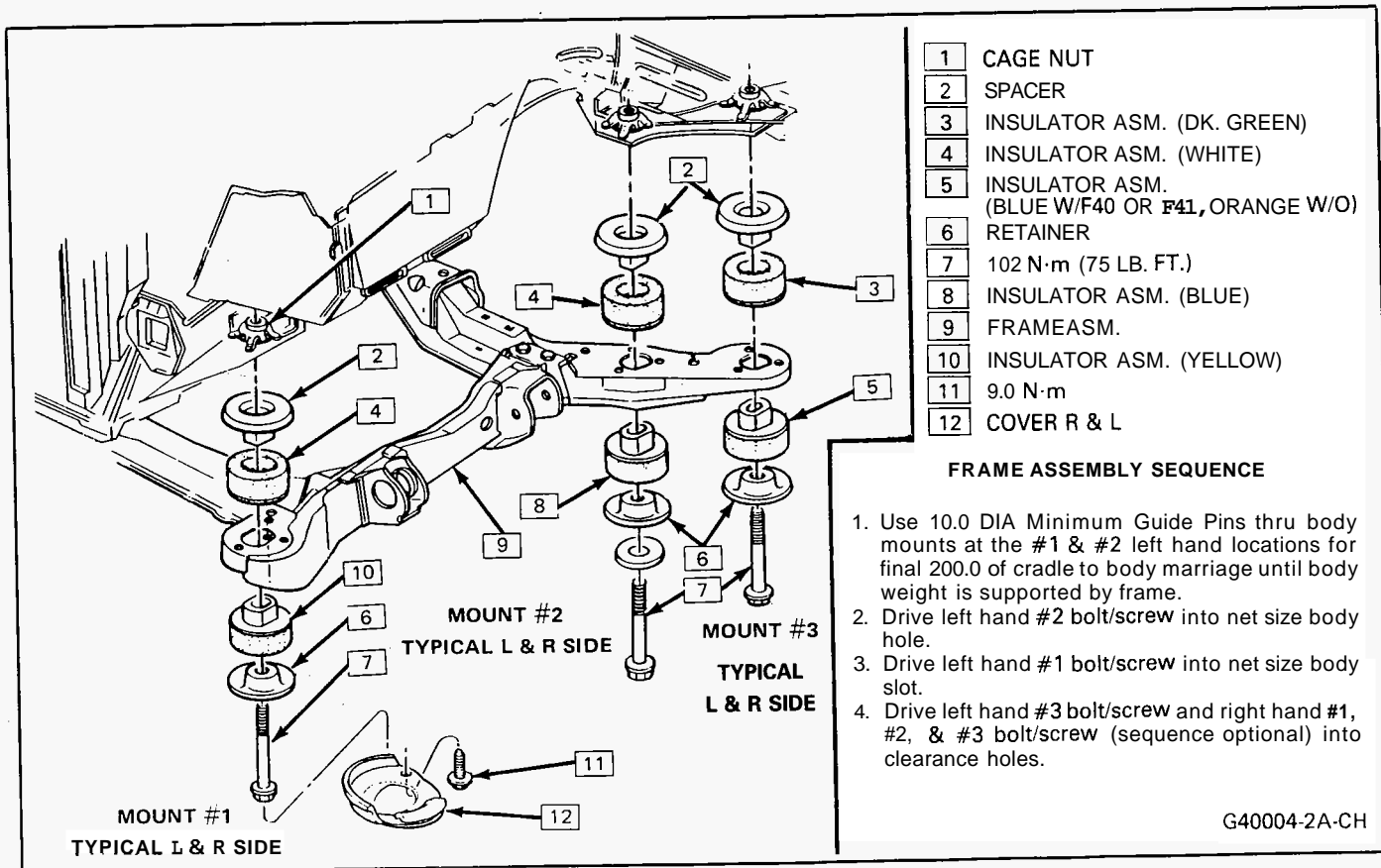


Figure 2A-7 Frame and Insulators "C-H" Series

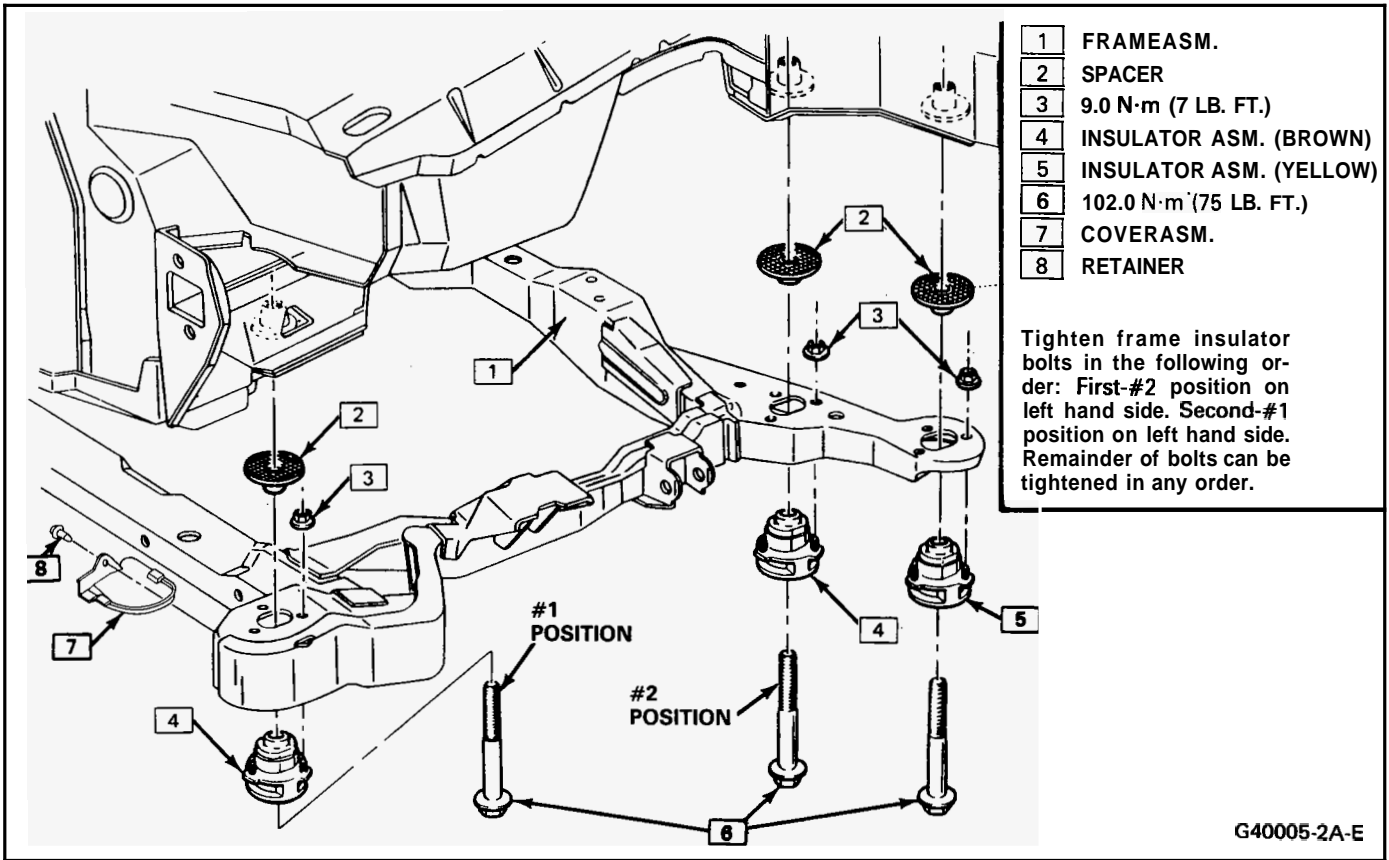


Figure 2A-8 Frame or Cradle Mounts "E" Series

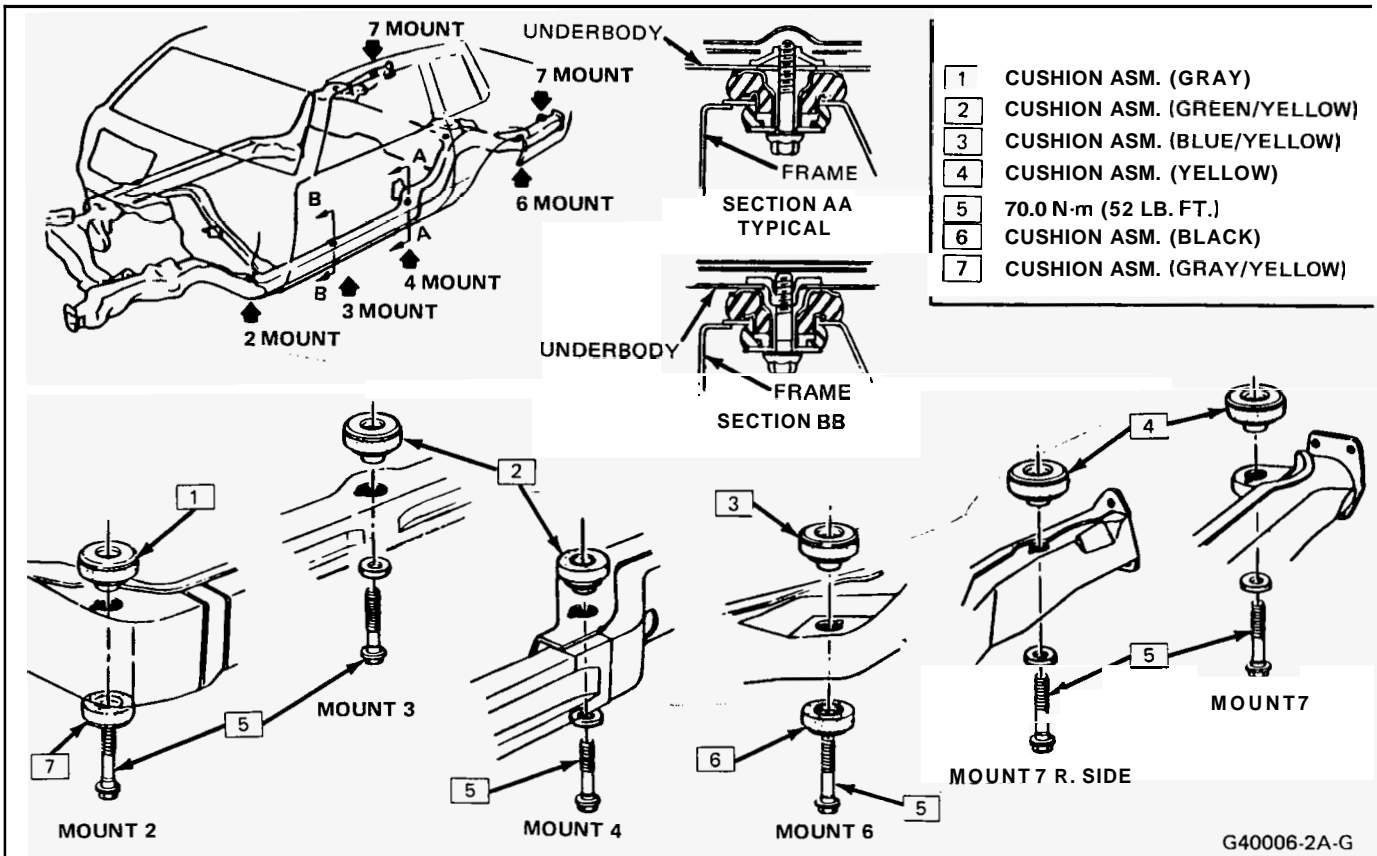


Figure 2A-9 Body Mounts "G" Series

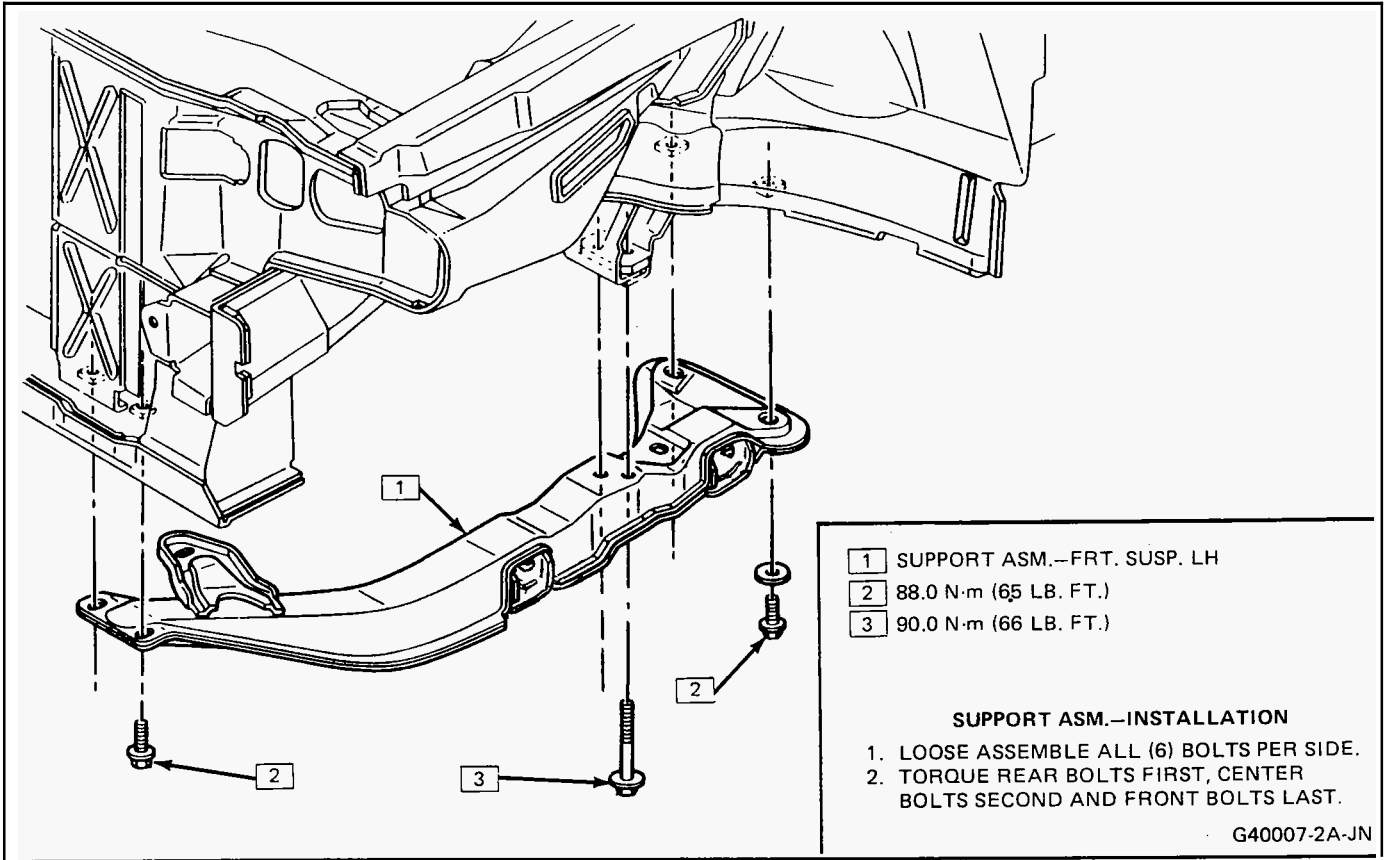


Figure 2A-10 Lower Support "J-N" Series

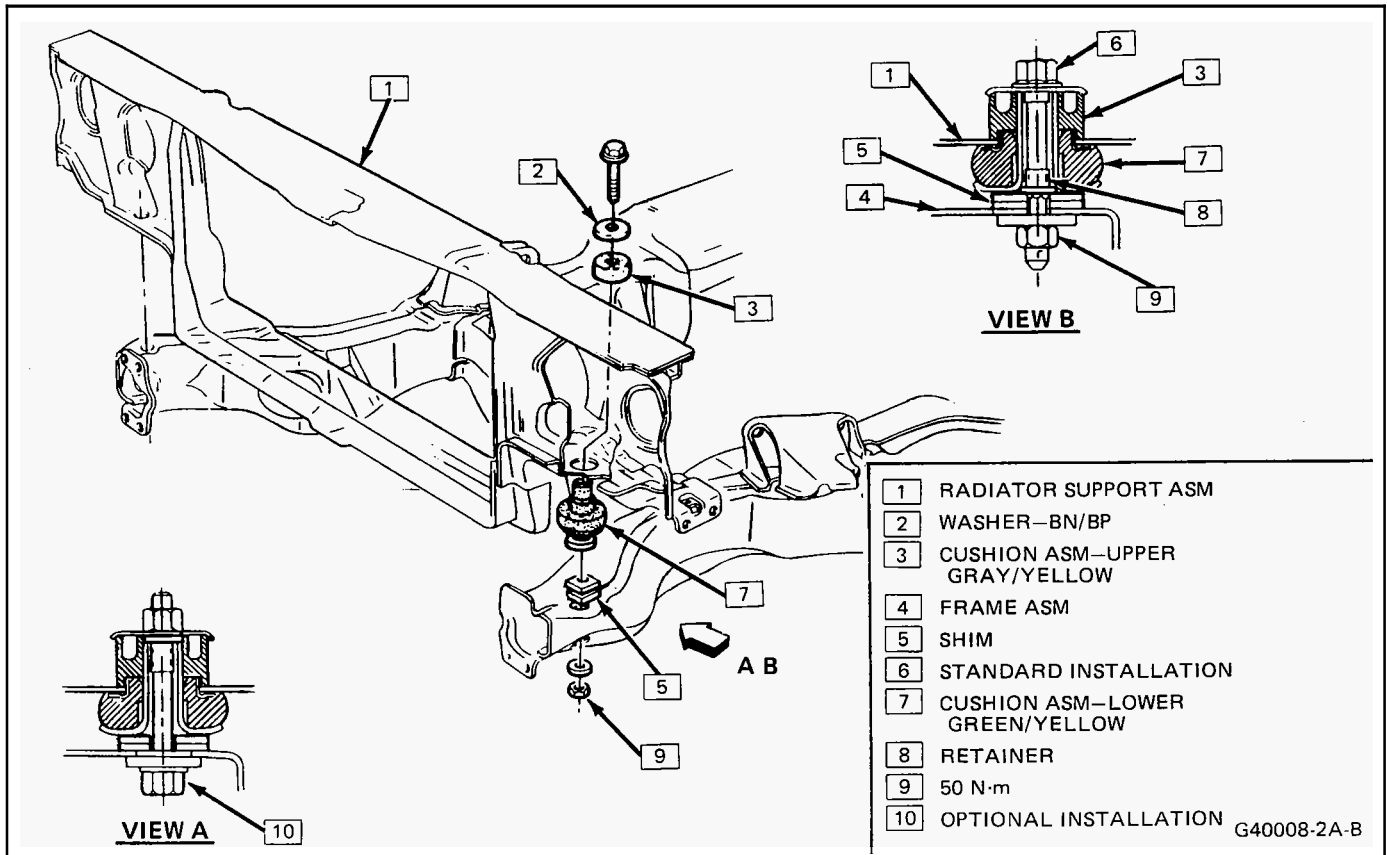


Figure 2A-11 Radiator Support to Frame Mounts "B"

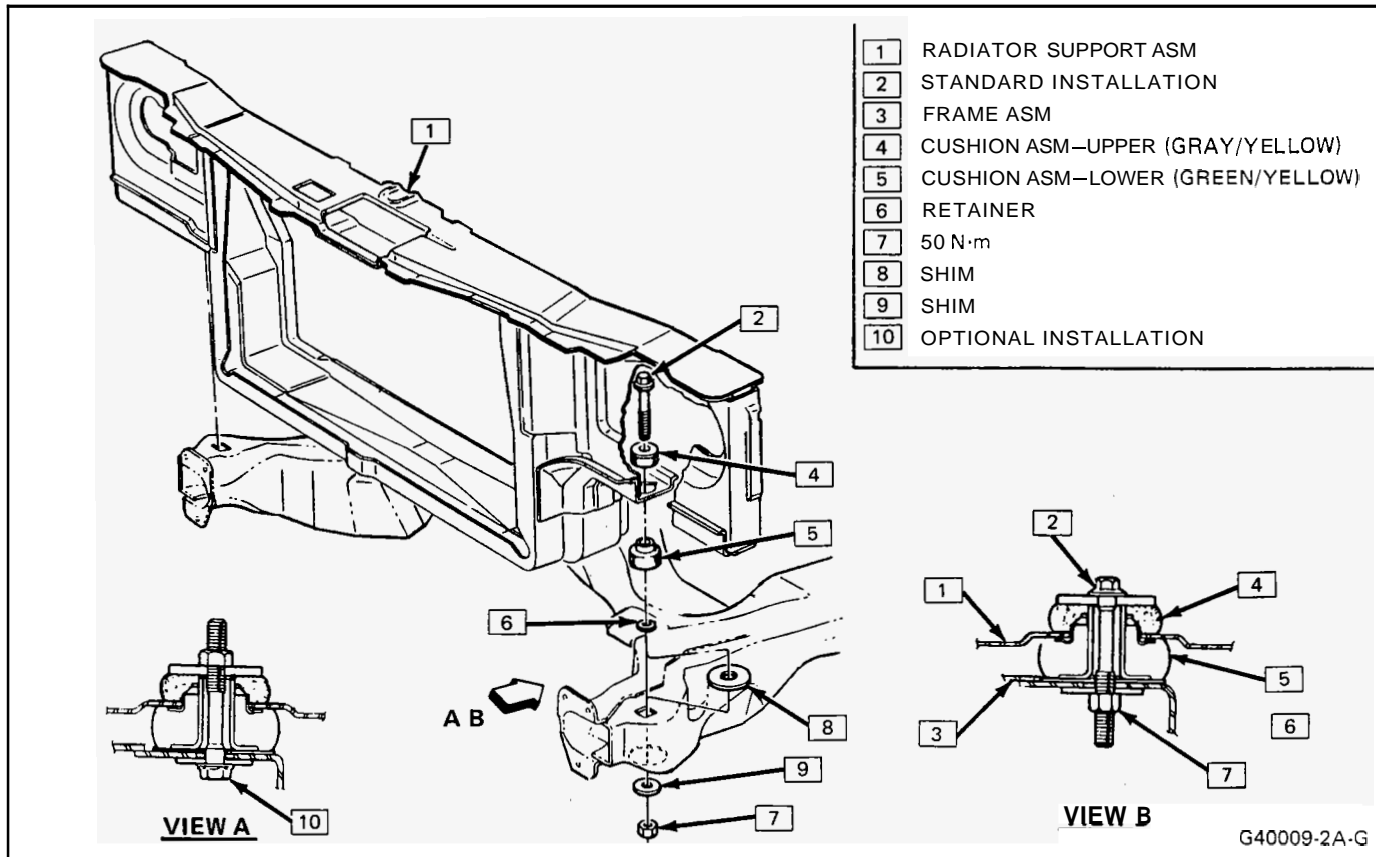


Figure 2A-12 Radiator Support to Frame Mounts "G"

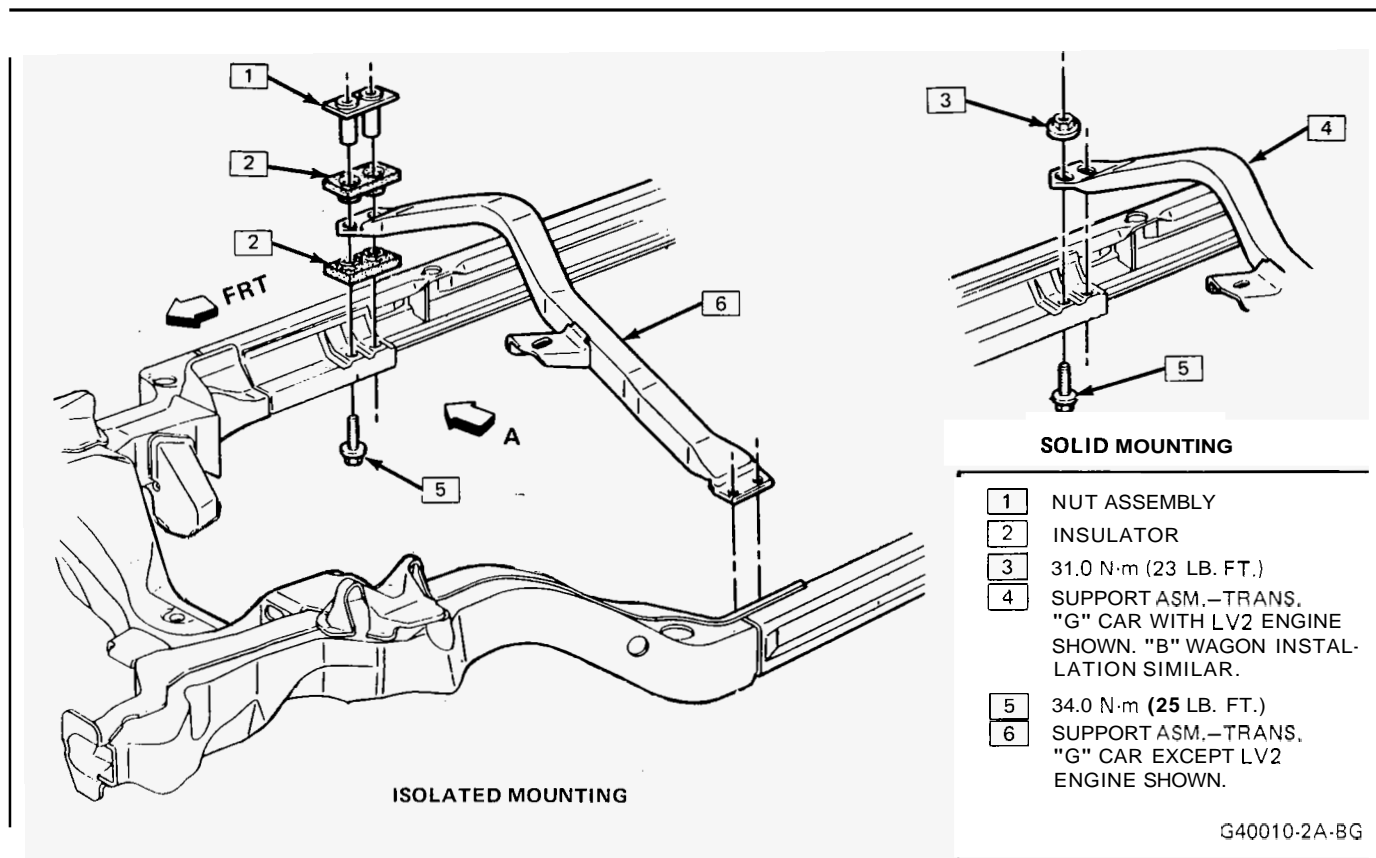


Figure 2A-13 Transmission Support Assembly "B-G" Series

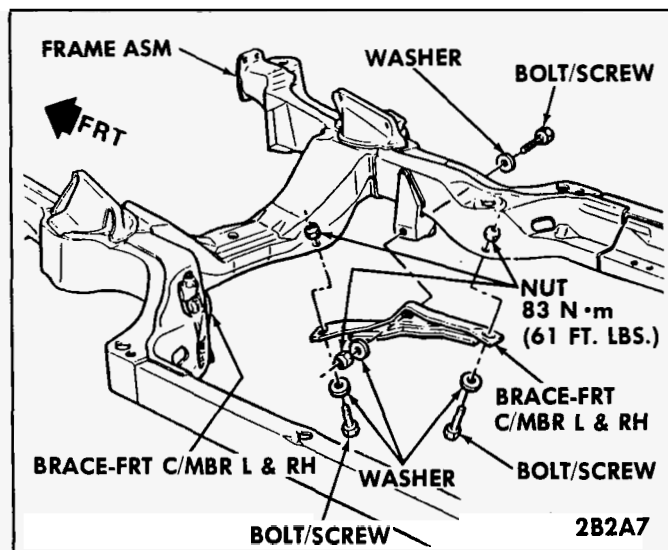


Figure 2A-14 Front Crossmember to Frame Brace "B" Series

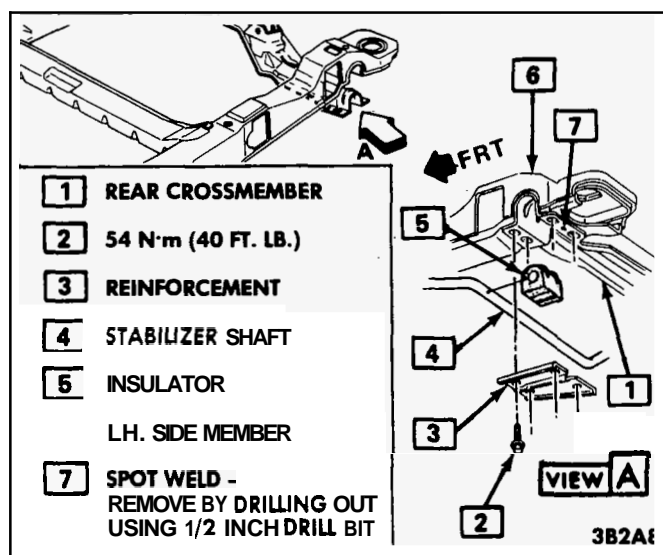


Figure 2A-15 Spotweld Location - "A" Series

Frame Assembly "A" Series

Removal

1. Install engine support fixture (Figure 2A-16) with support bar J-22825-A or BT-6603 centered over lifting bracket on rear of engine. Locate supports J-22825-45 as shown in Figure 2A-16. When fixture is properly located, torque fasteners to 41 N·m (30 ft. lbs.).
2. Place support hook J-22825-48 into lifting bracket at rear of engine (if used). Tighten coupling nut only enough to remove slack from support hook.

CAUTION: Engine support fixture must be located as shown in Figure 2A-16. Support fixture fasteners must be properly torqued before supporting engine. Support fixture is not intended to support entire weight of engine and transaxle. Bodily injury could result with improper use of this support fixture.

3. Rotate steering wheel so that intermediate shaft to steering gear stub shaft attaching bolt is in the up position. Remove bolt and disconnect intermediate shaft assembly from stubshaft.
4. Raise vehicle.
5. Position jack and block of wood under engine to act as a support during removal and installation.
6. Remove both front tire and wheel assemblies.
7. Remove exhaust crossover pipe (if necessary).
8. Remove power steering pressure and return line hose brackets.
9. Remove steering gear mounting bolts and support steering gear, refer to Section 3.
10. Disconnect drive line vibration absorber if used.
11. Remove front stabilizer bar.
12. Remove bolts at both lower ball joints and separate at knuckles.
13. Disconnect all engine and transaxle mounts.
14. Have an assistant hold cradle while removing 4 body mount bolts.
15. Remove cradle with both control arms and stabilizer bar attached. Remove by working cradle down toward rear of vehicle.
16. Remove control arms, frame reinforcements (if used) and damper assembly (if used) for installation on new cradle.

15. Remove left side and front crossmember assembly. It may be necessary to pull or gently pry crossmember loose.

Installation

1. Position side and crossmember assembly and install body mount bolts but do not tighten fully.
2. Insert 1/2" drill into hole drilled through rear cradle crossmember.
3. Install side to crossmember bolts and tighten to correct torque.
4. Tighten left hand body mount bolts to correct torque.
5. Connect engine and transaxle mounts.
6. Install stabilizer bar bushings, reinforcements and remove drill.
7. Connect front ball joint and install bolt.
8. Connect front stabilizer bar to control arm.
9. Connect drive line vibration absorber (if used).
10. Install tire and wheel assembly.
11. Remove jack and lower vehicle.
12. Assemble intermediate shaft assembly to stubshaft. install and tighten bolt.
13. Remove engine support fixture.

Installation

1. If removed install control arms, damper assembly (if used) and frame reinforcements (if used).
2. Position cradle, with the aid of an assistant and install 4 body mount bolts but do not fully tighten.
3. Tighten body mounts to correct torque specified in Figure 2A-5.
NOTICE: In order to maintain correct front end alignment, body mounts must be tightened in the following order:
Mount number 4
Mount number 3
Mount number 2
Mount number 1
4. Connect all engine and transaxle mounts (refer to Section 6).
5. Connect lower ball joints.
6. Install front stabilizer bar.
7. Connect drive line vibration absorber if used.
8. Install steering gear mounting bolts.

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9. Install power steering hose brackets.
10. Install exhaust crossover pipe (if removed).
11. Install both front tire and wheel assemblies.
12. Remove jack and lower vehicle.
13. Assemble intermediate shaft assembly to stubshaft, install and tighten bolt.
14. Remove engine support fixture.
15. Check front end toe-in and adjust if necessary.
3. Lift vehicle and adjust jack stands under front bumper.
4. Remove both front wheel assemblies.
5. Remove stabilizer links.
6. Disconnect lower control arms at frame and rotate out of way.
7. Remove front rubber splash shield.
8. Disconnect wiring harness from front crossmember.
9. Disconnect vibration dampener bracket from frame.
10. Rotate the intermediate steering shaft so that the steering gear stub shaft clamp bolt is in the up position and remove the clamp bolt. Disconnect the intermediate shaft from the stub shaft.

Frame (Partial) "C" Series

Removal

1. Open hood, install feeder covers and disconnect negative cable from battery.
2. Install engine support fixture J-28467. See Figure 2A-17.
3. Lift vehicle and adjust jack stands under front bumper.
4. Remove left front wheel assembly.
5. Disconnect left stabilizer link.
6. Remove lower control arm to frame bolts.
7. Disconnect control arm and rotate out of way.
8. Remove front rubber splash shield.
9. Disconnect wire harness from front crossmember.
10. Disconnect front engine mount at cradle.
11. Disconnect front transaxle mount at cradle.
12. Remove top bolts at rear of left side rail.
13. Remove lower bolts at rear of left side rail.
14. Remove top bolts at right end of front crossmember.
15. Remove lower bolts at right end of front crossmember.
16. Remove left front frame insulator cover.
17. Remove left front insulator bolt and lower partial frame.

Installation

1. Position partial frame in place then install insulator and bolt. Torque bolt to 103 N·m.
2. Install insulator cover and torque bolt to 10 N·m.
3. Loosely install lower and upper bolts at right end of front crossmember and rear of left side rail, then torque to 54 N·m.
4. Install front transaxle and engine mount nuts and torque to 41 N·m.
5. Connect wire harness to front crossmember.
6. Install rubber splash shield.
7. Rotate control arm into position and install bolts.
8. Torque front nut to 195 N·m and rear nut to 125 N·m.
9. Connect stabilizer link and torque nut to 17 N·m.
10. Install wheel assembly and torque nuts to 125 N·m.
11. Remove jack stands and lower vehicle.
12. Remove engine support fixture and connect battery cable.
13. Check front end alignment.

Frame Assembly

Removal

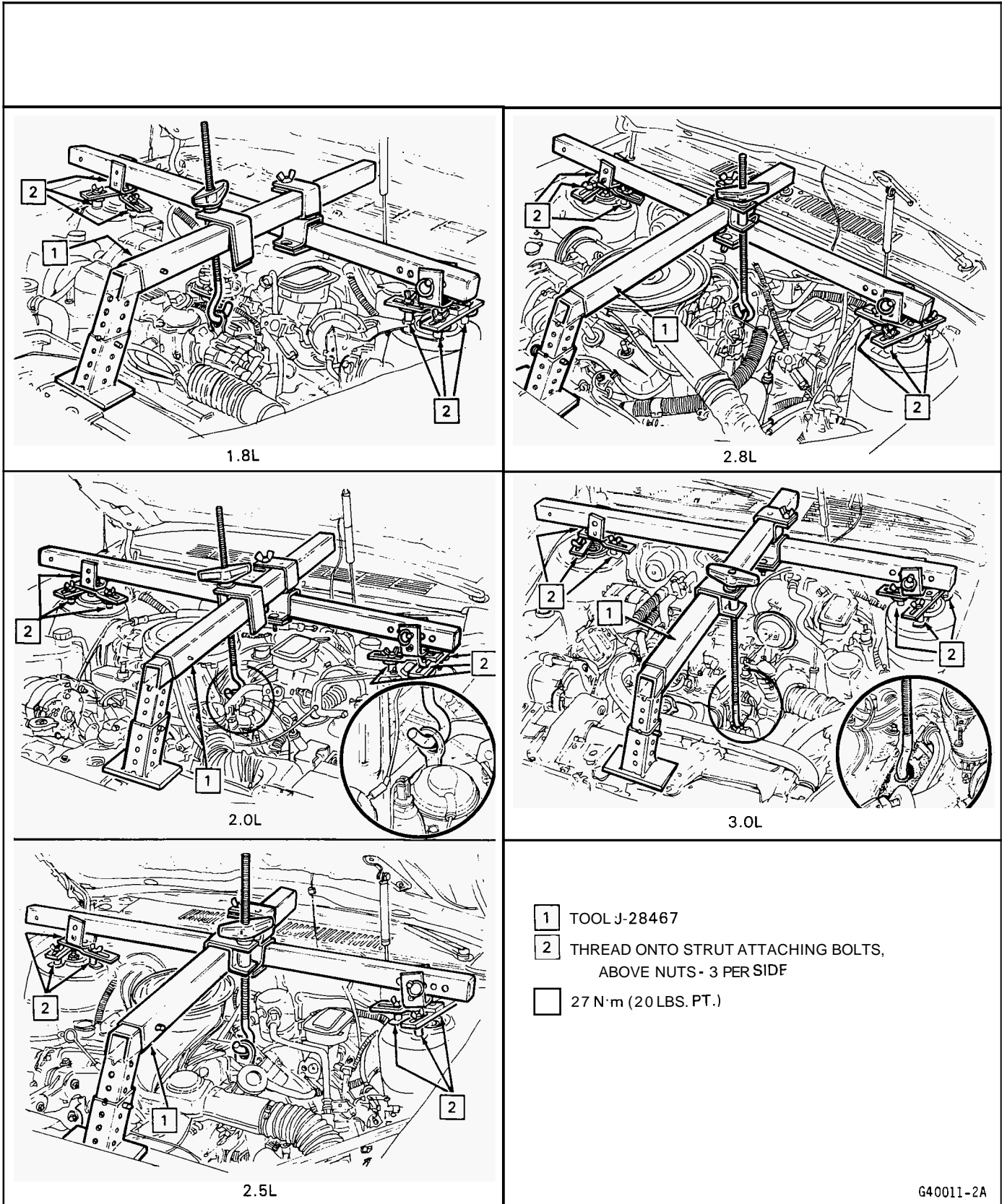
1. Open hood, install fender covers and disconnect negative cable at battery.
2. Install engine support fixture J-28467. See Figure 2A-17.

CAUTION: Failure to disconnect the intermediate shaft from the rack and pinion stub shaft can result in damage to the steering gear and/or intermediate shaft. This damage can cause loss of steering control which could result in a vehicle crash with possible bodily injury.

11. Disconnect rack and pinion from frame and support out of way.
12. Disconnect engine and transaxle mounts at frame.
13. Support frame.
14. Remove front frame insulator covers and six insulator bolts.
15. Carefully lower and remove frame assembly.
16. Remove stabilizer bar from frame.
17. Remove frame insulators.
18. Remove right rear transaxle mount bracket from frame.
19. Separate frame.

Installation

1. Assemble frame members and torque bolts to 54 N·m.
2. Install right rear transaxle mount bracket to frame. Torque bolts to 41 N·m.
3. Install frame insulators. Torque retaining nuts for diesel insulators to 9 N·m.
4. Assemble stabilizer bar to frame. Torque bolts to 50 N·m.
5. Lift frame into position and support.
6. Assemble frame insulators as required and install bolts. Torque to 103 N·m. Remove support.
7. Install front frame insulator covers and torque bolts to 10 N·m.
8. Install engine and transaxle mount to frame nuts and torque to 41 N·m.
9. Remove support and assemble rack and pinion to frame. Torque bolts to 67 N·m.
10. Connect intermediate shaft clamp to stub shaft and torque bolt to 62 N·m.
11. Connect vibration dampener bracket to frame and torque bolts to 25 N·m.
12. Attach wiring harness to front crossmember.
13. Install rubber splash shield.
14. Assemble lower control arms to frame. Torque front bolts to 195 N·m and rear bolts to 125 N·m.
15. Install stabilizer links and torque to 17 N·m.
16. Install front wheel assemblies and torque nuts to 125 N·m.
17. Remove jack stands and lower the vehicle.
18. Remove engine support fixture.
19. Connect negative cable to battery.
20. Align front end.



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Figure 2A-16 Engine Support Fixture

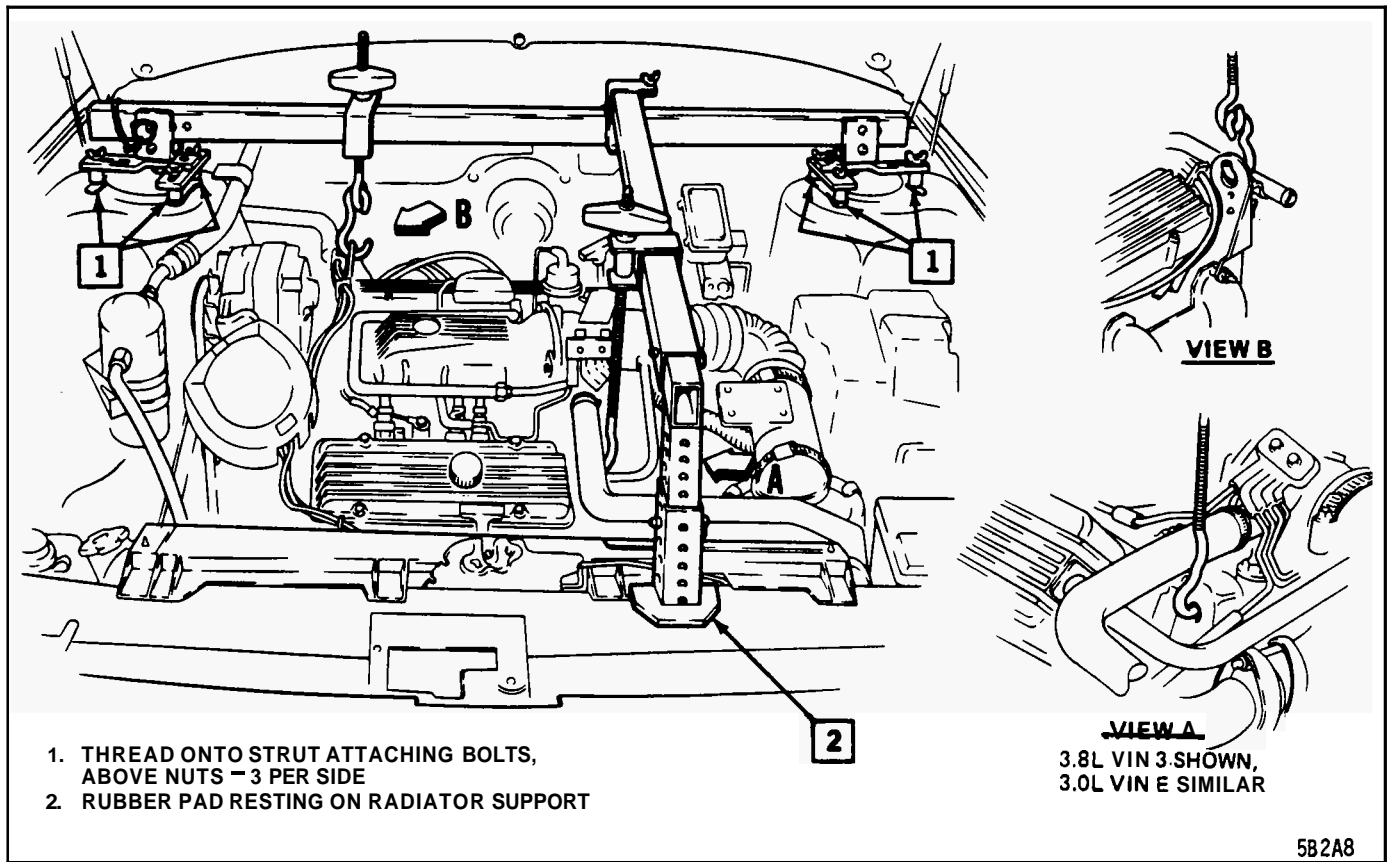


Figure 2A-17 Engine Support Fixture "C" and "H" Series