

SECTION 10-4 BUMPERS

CAUTION: To help avoid personal injury when a vehicle is on a hoist, provide additional support for the vehicle at the opposite end from which components are being removed. This will reduce the possibility of the vehicle falling off the hoist.

CAUTION: This vehicle is equipped with Supplemental Inflatable Restraint (SIR). Refer to CAUTIONS in Section 9J under On-Vehicle Service and the SIR Component and Wiring Location view in Section 9J before performing service on or around SIR components or wiring. Failure to follow CAUTIONS could result in possible air bag deployment, personal injury, or otherwise unneeded SIR system repairs.

NOTICE: The theft deterrent label found on some major sheet metal, engines, and transmissions must be masked prior to painting, rustproofing, undercoating, etc. The mask must be removed following the above operations. Failure to keep the label clean and readable may result in liability for violation of Federal Vehicle Theft Prevention Standard and subject the vehicle owner to possible suspicion that the part was stolen.

NOTICE: When fasteners are removed, always reinstall them at the same location from which they were removed. If a fastener needs to be replaced, use the correct part number fastener for that application. If the correct part number fastener is not available, a fastener of equal size and strength (or stronger) may be used. Fasteners that are not reused, and those requiring thread locking compound will be called out. The correct torque value must be used when installing fasteners that require it. If the above conditions are not followed, parts or system damage could result.

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GENERAL DESCRIPTION

BUMPERS

The front bumper assembly consists of an impact bar, covered with a polyurea fascia which is supported by the fender at each side. The bumper is attached to the body through left and right two-stage energy absorbing units. Attached to the bumper assembly are two bumper guards (Seville), moldings, side marker lamps (Eldorado), and fog lamps (if equipped).

Rear bumper design is similar to the front bumper. The rear bumper consists of an impact bar which is covered by a polyurea fascia. The bumper is attached to the body through left and right single-stage energy absorber units.

TWO-STAGE ENERGY ABSORBING UNIT

Figure 10-4-1

The bumpers are designed so that the vehicle can withstand collision into a fixed barrier at 4 km/h (2 1/2 mph) with limited damage. After absorbing the energy of the collision the two-stage energy absorbing (EA) units restore the bumper to its original position.

The energy absorbing device consists of two main sub-assemblies: the cylinder tube assembly and the piston tube assembly, Figure 10-4-1. The cylinder tube assembly is filled with a hydraulic fluid and consists of a body bracket, cylinder tube, rear mounting bracket and a metering pin. The piston tube assembly is filled with an inert gas under pressure and consists of a bumper bracket, piston tube, piston, piston seal, stop-ring, seal

and a breakaway brass blowout plug. The brass blowout plug replaces the calibrated orifice used in conventional single stage energy absorbers and it is this plug that provides the two stage action.

In vehicle impacts below 8 km/h (5 mph), the two stage energy absorber acts like a conventional single stage EA. As the energy absorber is collapsed, the hydraulic fluid in the cylinder tube is forced into the piston tube through an orifice in the brass blowout plug. The metering pin controls the rate at which the hydraulic fluid passes through the brass plug into the piston tube. The controlled movement of hydraulic fluid provides the energy absorbing action.

In vehicle impacts from 8 km/h (5 mph) to 48.2 km/h (30 mph), the brass plug is designed to blow off its seat, providing the second stage action. With the brass plug dislodged, the passageway for hydraulic fluid becomes greatly enlarged. The larger opening allows the fluid to move more rapidly from the cylinder tube to the piston tube providing energy absorption at greater impulses. Due to the one-time (non-repeatable) nature of the two-stage action, it is necessary to examine the EA

unit after a collision to verify its two-stage operation. **After a high-speed impact the unit must be replaced.**

In either stage of absorber action, the hydraulic fluid that is forced from the cylinder tube into the piston tube displaces the floating piston and compresses the inert gas behind it. After impact, the pressure of the compressed gas behind the floating piston forces the hydraulic fluid back into the cylinder tube assembly extending the EA unit to its normal position.

DIAGNOSIS

TESTING FRONT OR REAR ENERGY ABSORBER OPERATION

CAUTION: Heed the following when handling energy absorbing devices or personal injury may result.

- Do not apply heat to a unit.
- Do not weld in the area of a unit.

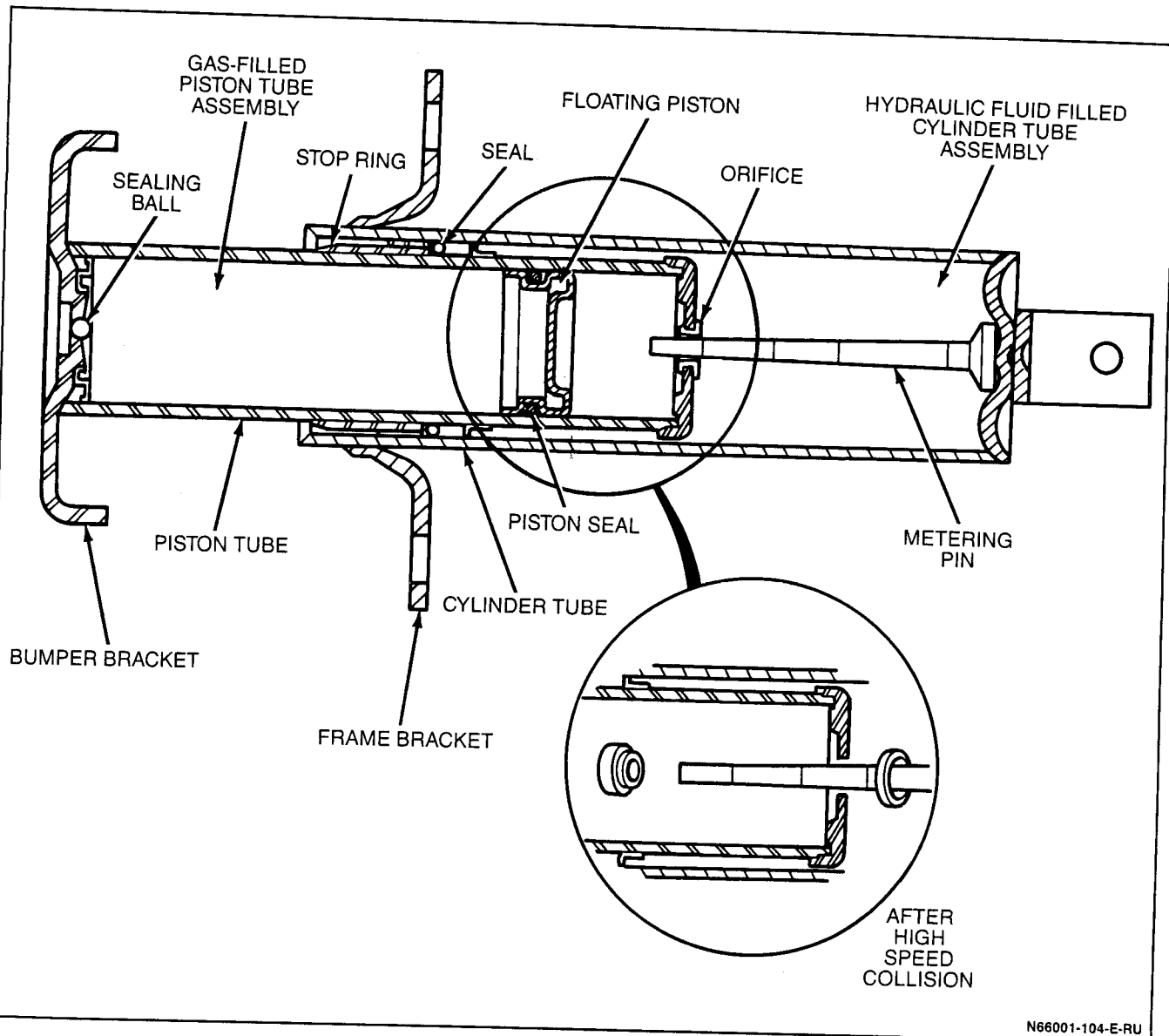


Figure 10-4-1 Energy Absorbing Unit

- Do not attempt to repair a damaged unit. Always replace with a new unit.
- If unit is bound-up as a result of a collision such that it cannot extend, take precautions to avoid spring-back when bending sheet metal. Provide a positive restraint, such as a chain or cable to hold the bumper in the position it is in. Wear safety glasses and drill a small hole in the piston tube near the bumper bracket to relieve gas pressure, Figure 10-4-2. Remove the EA units after gas pressure has been relieved.
- If unit is to be scrapped, relieve the gas pressure prior to disposal of a unit. Make an indentation with a center punch in the small cylinder section of the energy absorber.
- Use a 1/8 inch drill to penetrate the small cylinder wall.
- Be safe. Protect your eyes. Wear approved safety glasses.

The right and left Energy Absorbing Devices are to be diagnosed separately.

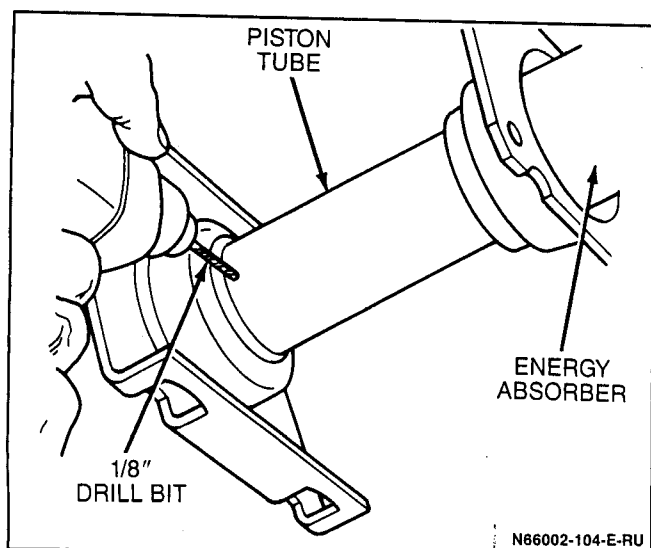


Figure 10-4-2 Scrapping EA Unit

NOTICE: An EA unit that has a dislodged blowout plug (due to an above 8 km/h (5 mph) impact) could have insufficient absorber action in impacts between 4 km/h (2 1/2 mph) and 8 km/h (5 mph). Complete diagnosis procedures must be followed after a collision to prevent excessive vehicle damage in any future low speed impacts.

The following checks and separate judgments are to be made on each unit:

Leakage

Some oil wetting may be visible due to the grease packed in the crimp recess. Therefore, a stain or trace of oil on the piston tube near the crimp is normal. However, if oil is dripping continuously from the crimp or the stud end of the unit, a leak is indicated and the unit should be replaced.

Damage

Observe the bumper bracket, piston tube, frame bracket and cylinder tube for evidence of visible distortion. Scuffing of the piston tube will occur when the unit is stroked and is considered normal. If there is obvious damage to the unit, it should be replaced.

On-Bench

1. Position EA unit lengthwise in arbor press. Note original position of unit, then use press to compress unit at least 10 mm (3/8"). Release pressure and determine whether unit has returned to original position. If not, discard unit.
2. Pick up the EA unit and shake it. Listen for a loose internal part. If a rattling is heard, the orifice has sheared and the unit must be replaced.

INSPECTION AFTER COLLISION

If the collision was so severe that the bumper did not return to its original position, the EA unit(s) should be replaced.

1. Stand clear of the bumper.
2. Provide a positive restraint, such as a chain or cable to hold the bumper in the position it is in.
3. Wear safety glasses and drill a small hole in the piston tube near the bumper bracket (Figure 10-4-2), to relieve gas pressure.
4. Remove the EA unit(s) after gas pressure has been relieved.

ON-VEHICLE SERVICE AND UNIT REPAIR

BUMPER FASCIA AND INSERTS

Complete procedures for replacement of fascia inserts can be found in "GENERAL BODY SERVICE" Section 10-1, along with fascia masking and painting procedures. For fascia service procedures, see bumper disassembly/assembly.

FRONT BUMPER

Figure 10-4-3



Remove or Disconnect

1. Three screws on each side at wheel opening securing fascia panel extension to front fascia assembly.
2. Left and right side marker lamp sockets (Eldorado).
3. Six fasteners retaining closeout/splash shield to bumper fascia.
4. Fog lamps from mounting brackets (if equipped).
5. Two bolts (one on each side) securing bumper to EA units.
6. Front bumper by pulling straight out from vehicle.

**Disassemble****Figures 10-4-4 and 10-4-5**

1. Front license plate bracket (if equipped).
2. Bumper guards (Seville). Refer to procedure in this Section.
3. Four (Eldorado) or two (Seville), plastic fasteners retaining fascia to impact bar (13).
4. Pry fascia (7) from impact bar upper snap tabs.
5. Impact bar (10).
6. Plastic rivets (6) retaining upper fascia side moldings (3). Release snap tab and remove molding.
7. Two plastic rivets retaining center molding (1).
8. Release plastic snap tabs from inside fascia to remove center molding.
9. Two screws securing side marker lamp (4) to fascia (Eldorado).
10. Side marker lamp from fascia.
11. Support bracket (5) (STS).

**Assemble**

1. Side marker lamp (4) to fascia (7) (Eldorado).
2. Two screws securing lamp to fascia.

3. Support bracket (5) (STS).
4. Position fascia center molding (1) to fascia. Engage snap tabs and secure with plastic rivets (6).
5. Position upper side moldings (3) to fascia. Engage snap tabs and secure with plastic rivets.
6. Fascia to impact bar engaging snap tabs.
7. Push pins (four Eldorado, two Seville) retaining fascia to impact bar (10).
8. Bumper guards (Seville).
9. License bracket (if equipped).

**Install or Connect****Figure 10-4-3**

1. With the aid of a helper, position the front bumper making sure to engage both sliding retainers (one on each side). Install two bolts (one on each side) at EA units.
2. Fog lamps to mounting brackets (if equipped).
3. Six fasteners retaining closeout/splash shield to bumper fascia.
4. Left and right side marker lamp sockets.
5. Three screws on each side securing fascia panel extension to front fascia.

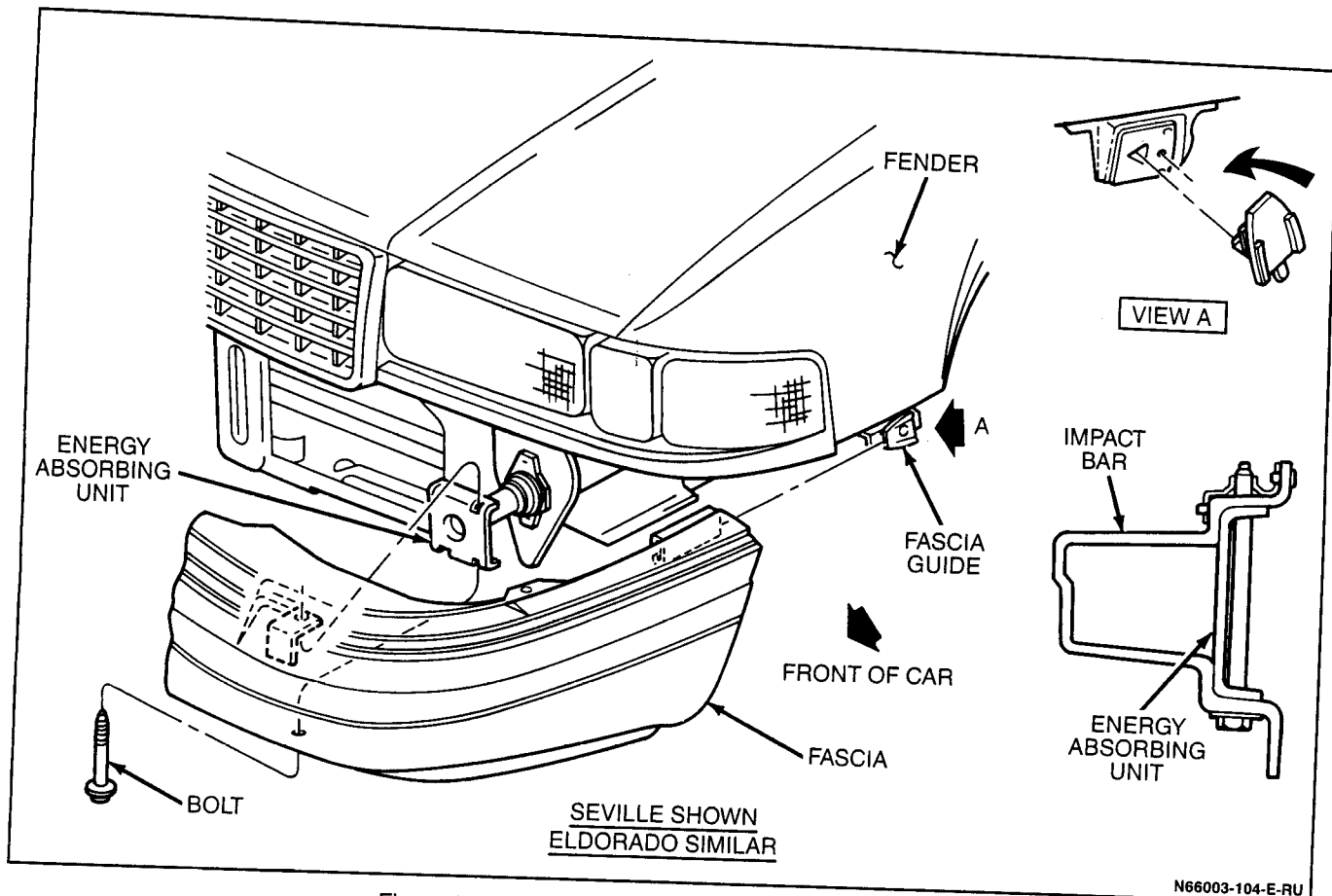


Figure 10-4-3 Front Bumper Removal and Installation

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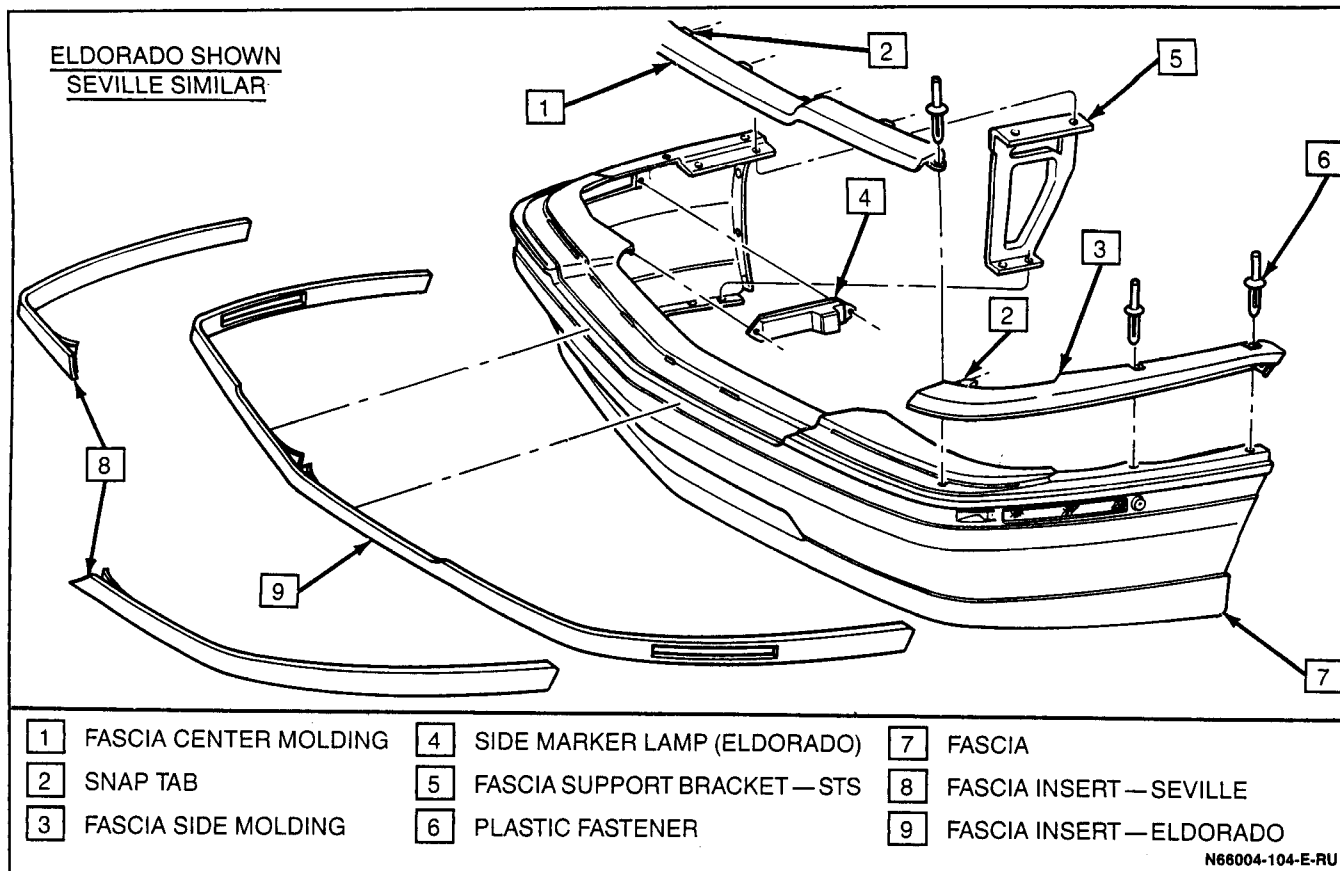


Figure 10-4-4 Front Bumper Disassembly

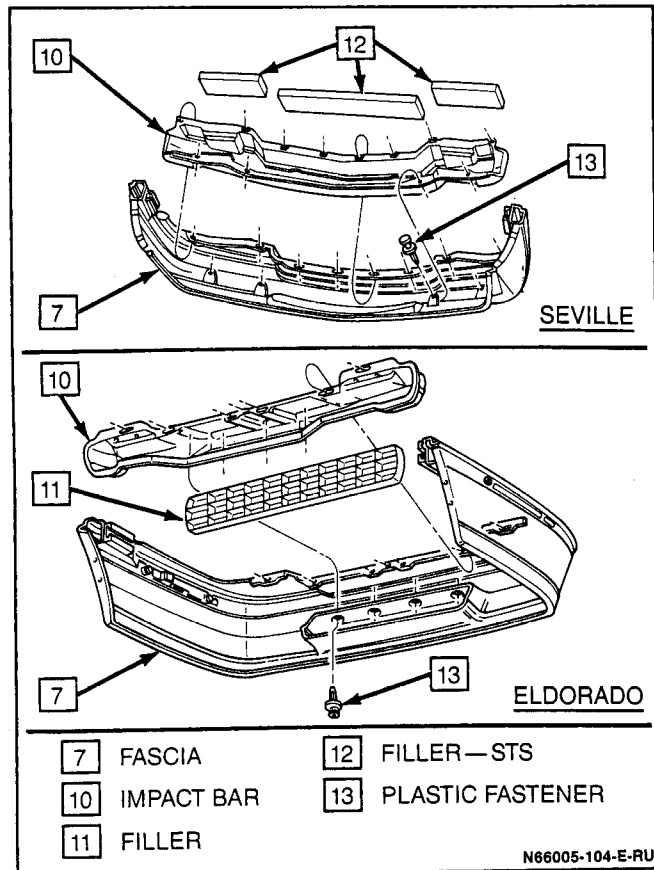


Figure 10-4-5 Impact Bar to Fascia

FRONT BUMPER GUARD—SEVILLE

Figure 10-4-6



Remove or Disconnect

1. Two nuts (4) and one bolt (3) securing bumper guard (2).
2. Front bumper guard (2).

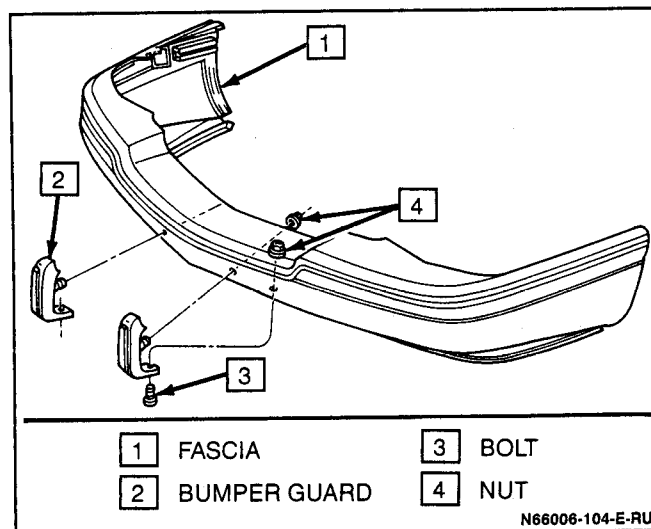


Figure 10-4-6 Front Bumper Guard Removal and Installation—Seville

**Install or Connect**

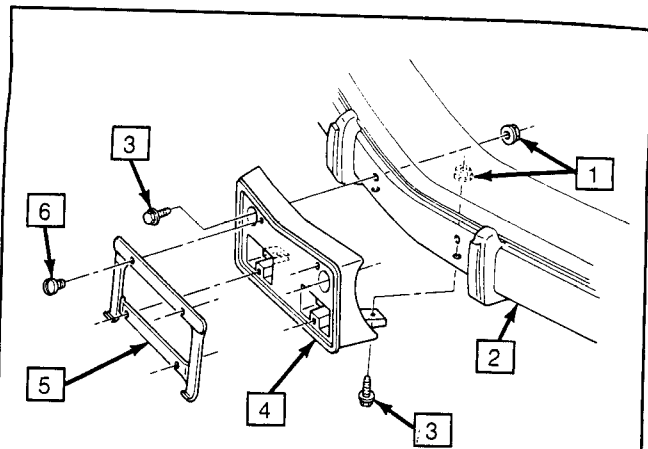
1. Position front bumper guard (2).
2. Two nuts (4) and one bolt (3) securing front bumper guard (2).

FRONT LICENSE BRACKET**Figure 10-4-7****Remove or Disconnect**

1. Screws (6) retaining bracket (option VL6 if equipped).
2. Screws (3) and nuts (1) retaining domestic or (non U.S. option VL4) bracket to bumper.

**Install or Connect**

1. Screws (3) and nuts (1) securing domestic or (option VL4) bracket to bumper.
2. Screws (6) securing bracket (non U.S. option VL6 if equipped).

**SEVILLE SHOWN — ELDORADO SIMILAR
DOMESTIC AND OPTION VL6****FRONT ENERGY ABSORBING UNIT****Figure 10-4-8****Remove or Disconnect**

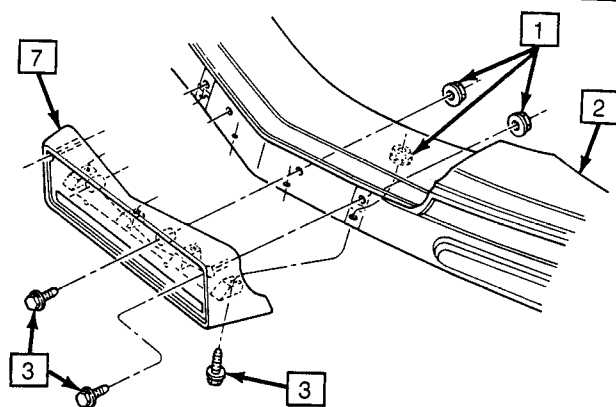
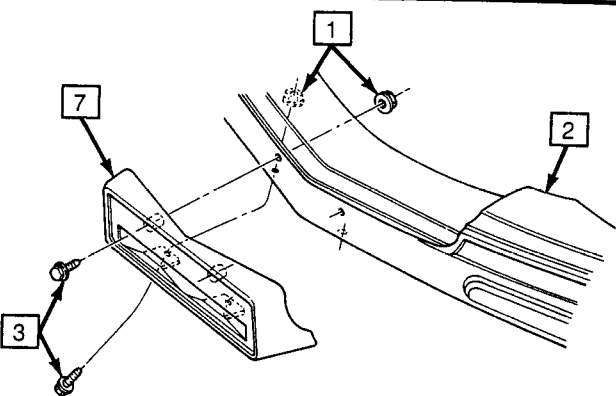
1. Front bumper assembly. Refer to procedure in this Section.
2. Two bolts (4) and nuts (1) securing each EA unit (2) to body.
3. Bolt (3) securing each EA unit rear bracket to rail.
4. EA unit (2).

**Install or Connect**

1. EA unit (2) into body.
2. Loosely assemble bolt (3) securing EA unit rear bracket to rail.
3. Bolts (4) and nuts (1) securing EA unit (2) to body.

**Tighten**

- Bolts (4) and nuts (1) to 26 N·m (19 lbs. ft.)
 - Bolt (3) to 26 N·m (19 lbs. ft.)
4. Front bumper assembly.

**SEVILLE OPTION VL4****ELDORADO OPTION VL4**

1	NUTS 2 N·m (18 lbs. in.)	5	LICENSE BRACKET OPTION VL6
2	BUMPER FASCIA	6	SCREW 2 N·m (18 lbs. in.)
3	SCREWS 2 N·m (18 lbs. in.)	7	LICENSE BRACKET OPTION VL4
4	LICENSE BRACKET		

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Figure 10-4-7 Front License Bracket**REAR BUMPER****Figure 10-4-9****Remove or Disconnect**

1. Raise vehicle on hoist. Refer to "GENERAL INFORMATION" Section 0A.
2. Side marker lamp sockets (Eldorado).
3. Three screws at wheel opening, securing fascia extension to fascia.
4. Two energy absorber to impact bar bolts (2).
5. Bumper (3).

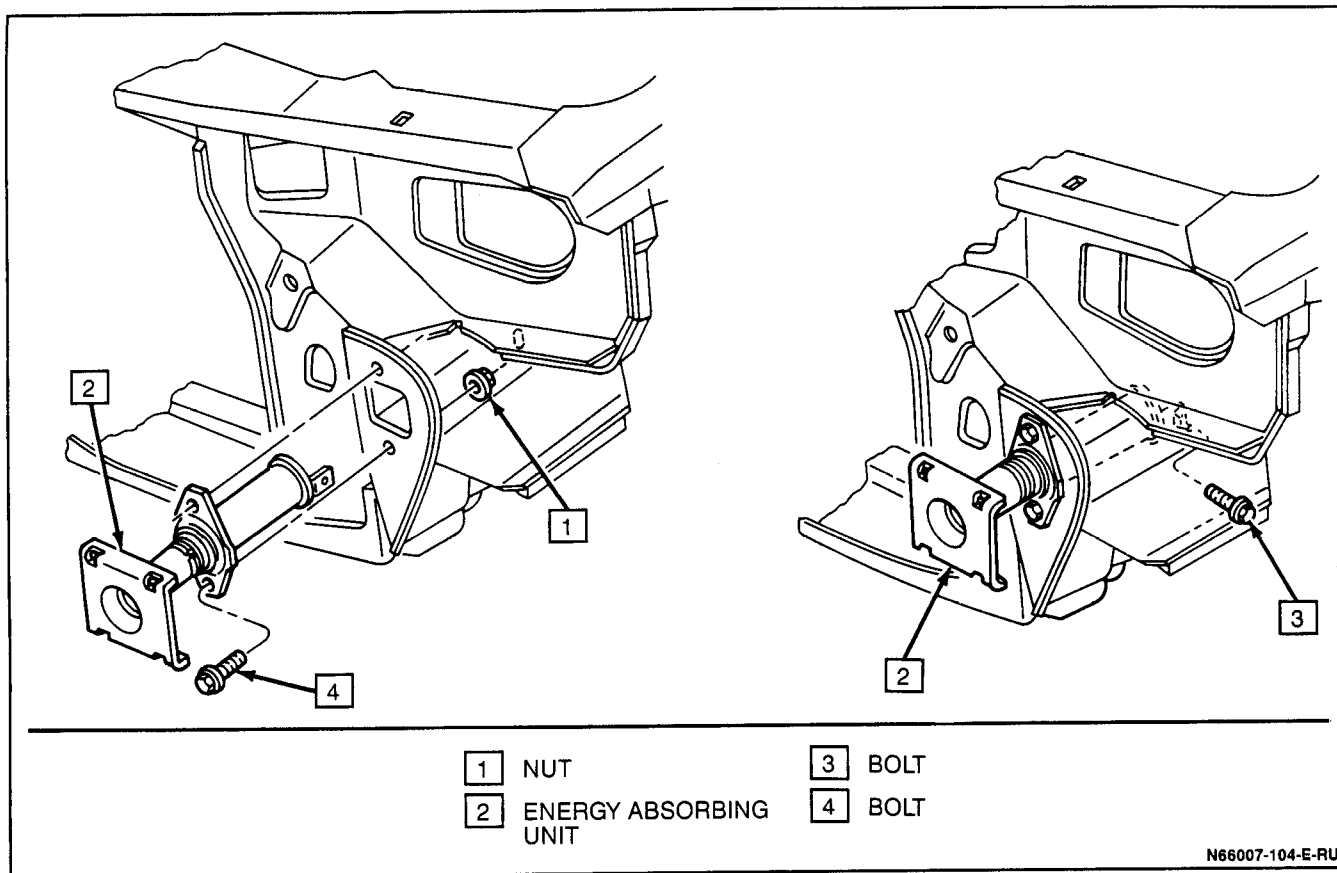


Figure 10-4-8 Front Bumper Energy Absorber

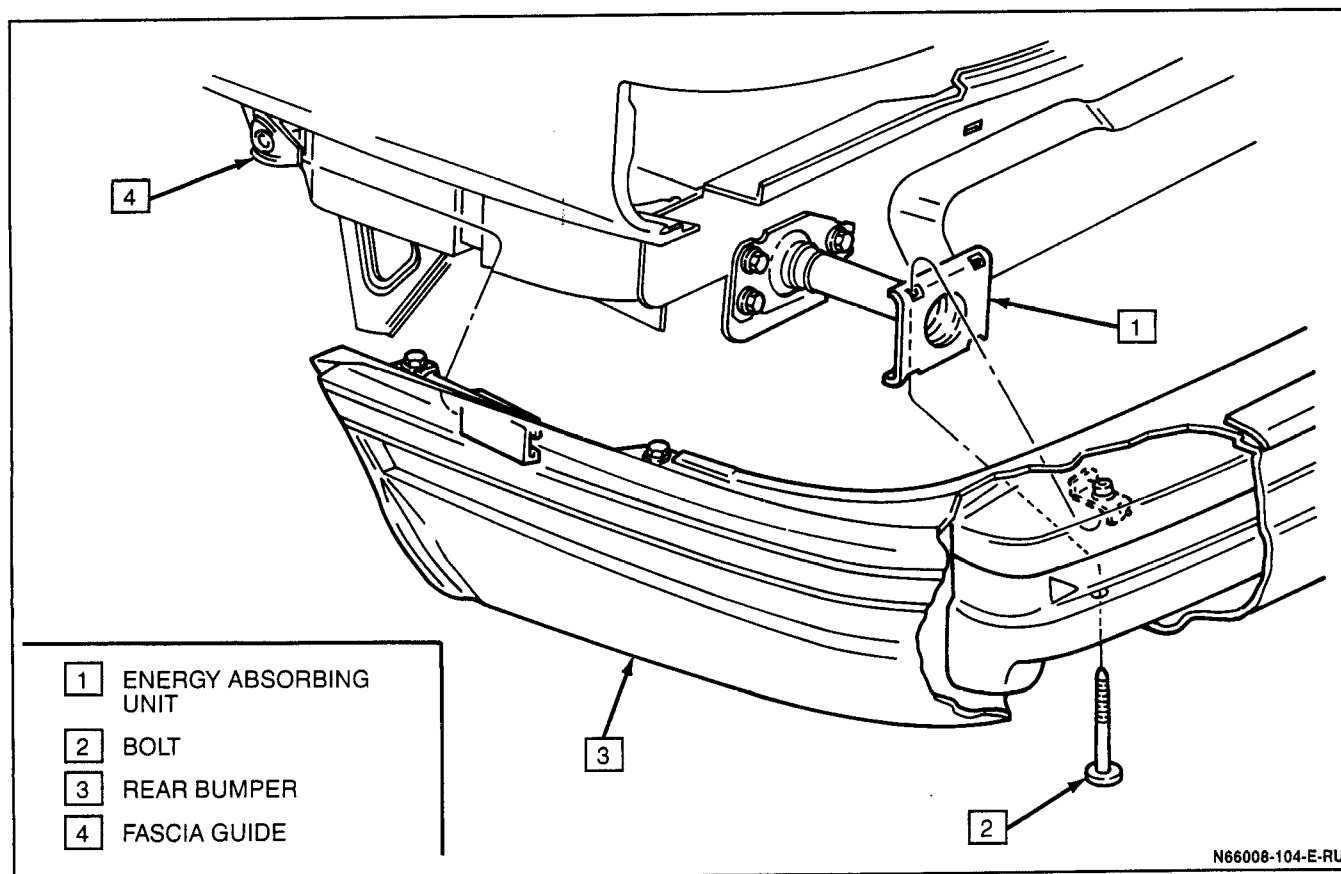


Figure 10-4-9 Rear Bumper Removal and Installation

**Disassemble****Figure 10-4-10**

1. Plastic fasteners retaining fascia to impact bar.
2. Impact bar (1) from fascia (7).
3. Three plastic rivets (9) on each side retaining fascia side moldings (2 & 8). Release snap tabs and remove moldings.
4. Two plastic rivets retaining center molding (3).
5. Release plastic snap tabs from inside fascia to remove fascia center molding.
6. Side marker lamp (4) and rear reflector (6).
7. Rub strip insert (5), if necessary.
8. Fascia support bracket (11) (STS).
9. Heat shield (10).

**Assemble**

1. Impact bar (10) to fascia (7).
2. Fascia support bracket (11) to fascia (7) (STS).
3. Side marker lamps (4) and rear reflectors (6).
4. Fascia center molding (3) engaging snap tabs.
5. Two plastic rivets (9) retaining center molding (3).
6. Side moldings (2 & 8) to fascia engaging snap tabs.
7. Three plastic rivets on each side retaining fascia side moldings.
8. Impact bar (1) to fascia.
9. Plastic fasteners retaining fascia to impact bar.

**Install or Connect****Figure 10-4-9**

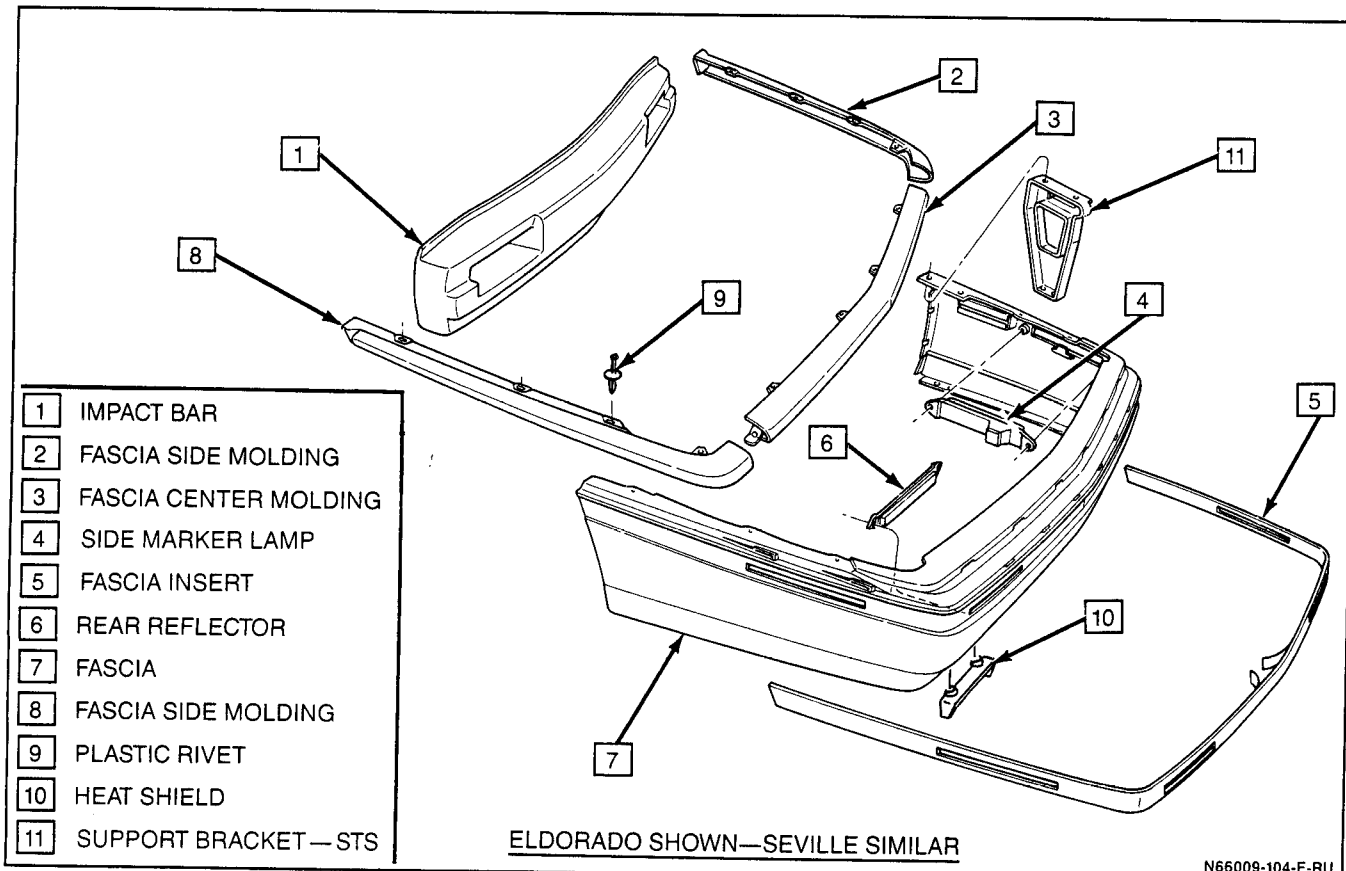
1. Bumper to vehicle, engaging fascia side retainers to guide on fender. Install two energy absorber bolts (2).

**Tighten**

- Bolts (2) 24 N·m (18 lbs. ft.)
2. Screws at wheel opening securing fascia extension to fascia.
 3. Side marker lamp sockets (Eldorado).
 4. Lower vehicle.
 5. Fascia insert. Refer to procedure in "GENERAL BODY SERVICE" Section 10-1.

REAR ENERGY ABSORBING UNIT**Figure 10-4-11****Remove or Disconnect**

1. Bumper assembly.
2. Three bolts (3) and nuts (4).
3. Bolt (2) securing EA unit rear bracket to body.
4. EA unit (1) from body.



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Figure 10-4-10 Rear Bumper Disassembly

**Install or Connect**

1. Loosely assemble EA unit (1) into body using three bolts (3) and nuts (4).
2. Bolt (2) securing EA unit rear bracket rail.

**Tighten**

- Bolt (2) to 26 N·m (19 lbs. ft.)
 - Screws and nuts 24 N·m (18 lbs. ft.)
3. Bumper assembly.

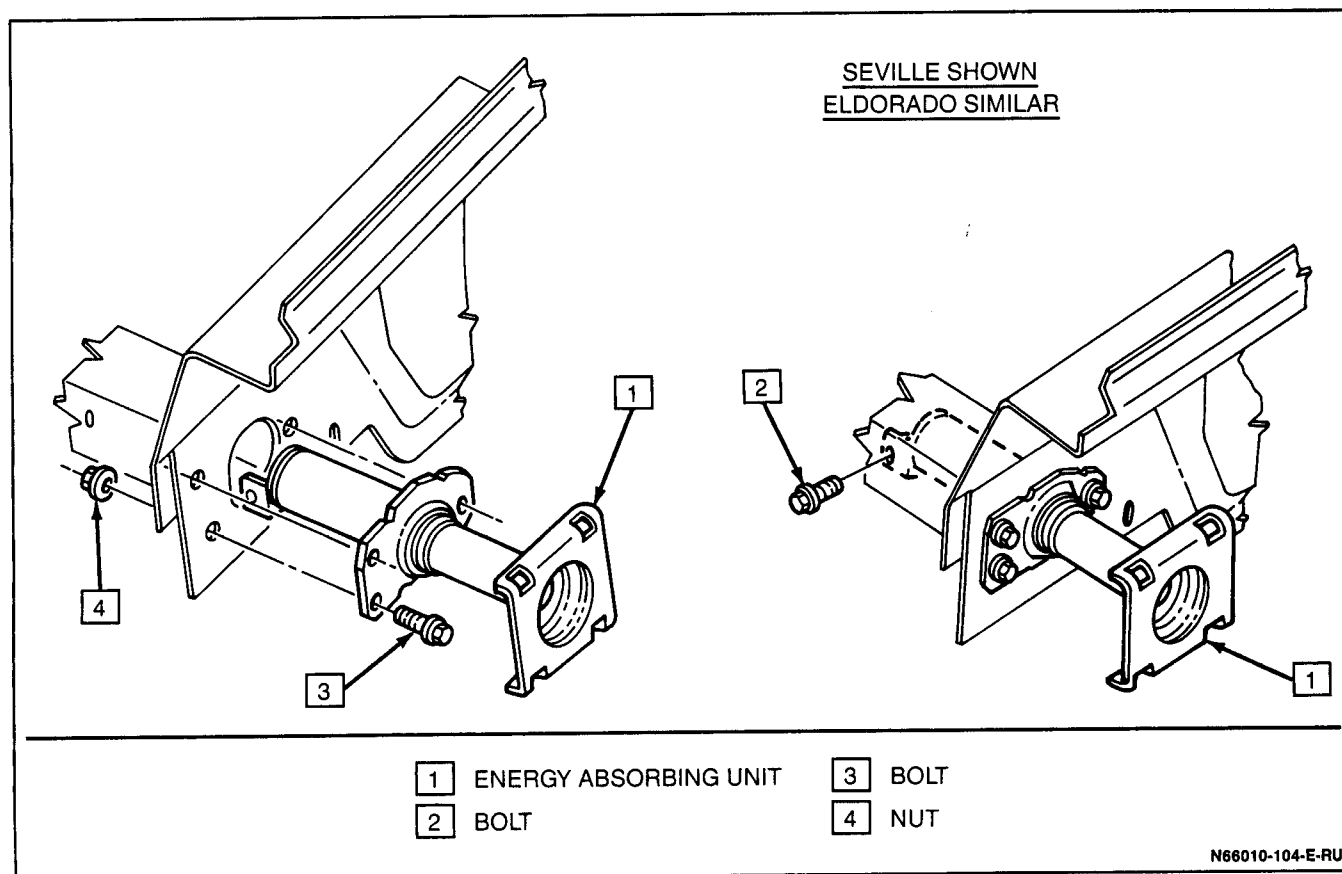


Figure 10-4-11 Rear Energy Absorbing Unit

TORQUE SPECIFICATION

APPLICATION	N·m	lbs. ft.
Front bumper guard to bumper	12	9
E.A. assembly to impact bar	24	18
End of absorber to rail	26	19