

INSTALLATION GUIDE



FORD F450 & 550 SUPER DUTY CHASSIS CABS 4X2 & 4X4 2005-NEWER MODELS

Link Part No. 8M000097
(Capacity 14,707 lbs) Rear Axle



Questions ? Contact this Professional Installer :

Company : _____

Phone : _____

Installer : _____ Date : _____

INSTALLATION INSTRUCTIONS INDEX

1.0	INTRODUCTION	pg. 3
2.0	OE SHOCK AND ROLL BAR REMOVAL.....	pg. 5
3.0	DRIVER SIDE DISASSEMBLY.....	pg. 6
4.0	DRIVER SIDE ASSEMBLY.....	pg. 7
5.0	PASSENGER SIDE DISASSEMBLY	pg. 9
6.0	PASSENGER SIDE ASSEMBLY	pg. 9
7.0	CROSSMEMBER, LATERAL CONTROL ROD, & STABILIZER BAR	pg. 11
8.	E-BRAKE LINE ROUTING, AND SHOCK RE-INSTALLATION. .	pg. 14
9.0	AIR CONTROL SYSTEM & ELECTRICAL.....	pg. 18
10.0	AXLE ALIGNMENT.....	pg. 19

INSPECTION AND SERVICE INSTRUCTIONS INDEX


11.0	FINAL INSPECTION CHECKLIST.....	pg. 20
12.0	OPERATION GUIDELINES.....	pg. 21
13.0	SERVICE & MAINTENANCE	pg. 23

MISCELLANEOUS INFORMATION

TORQUE TABLE.....	pg. 22
PARTS LIST.....	pg. 24
DRIVELINE INFORMATION	pg. 26

1. INTRODUCTION








IMPORTANT! It is important that the entire installation instructions be read thoroughly before proceeding with suspension installation.

 **WARNING!** A correct installation must result in the suspension and axle being “loaded” within the range specified by axle and suspension manufacturers. Please check vehicle specifications and intended usage to insure axle will be within Gross Axle Weight Rating (GAWR). No alteration of any suspension component is permitted. Link Mfg. Is not responsible for damages from improper installation or operations beyond design capability. Link Mfg. In its sole discretion shall determine whether or not any product is defective or otherwise covered by warranty.

PRODUCT INSTALLER RESPONSIBILITIES

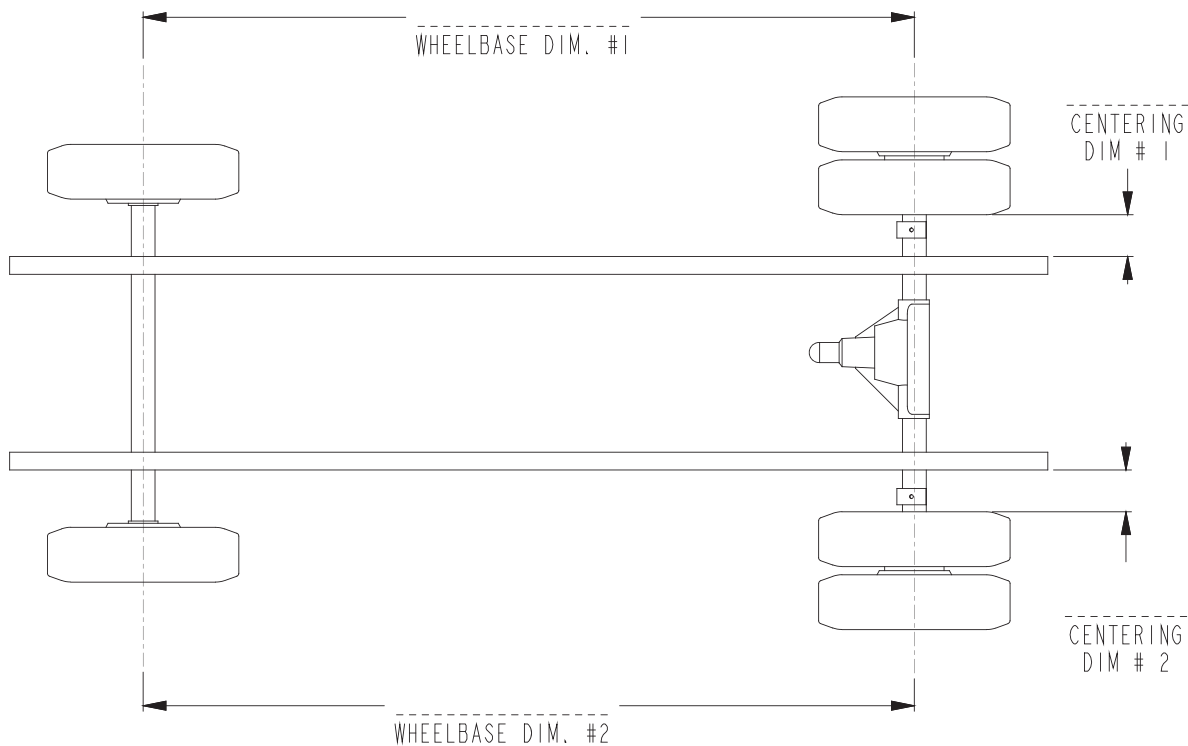
- ❑ Installer is responsible for installing the product in accordance with Link Mfg. specifications and installation instructions.
- ❑ Installer is responsible for providing proper vehicle components and attachments as well as required or necessary clearance for suspension components, axles, wheels, tires, and other vehicle components to ensure a safe and sound installation and operation.
- ❑ Installer is responsible for advising the owner of proper use, service and maintenance required by the product and for supplying maintenance and other instruction as readily available from Link Mfg..

SAFETY SYMBOLS, TORQUE SYMBOL, and NOTES

	This is the safety alert symbol. It is used to alert you to potential personal injury hazards. Obey all safety messages that follow this symbol to avoid possible injury or death.		The torque symbol alerts you to tighten fasteners to a specified torque value.
 WARNING	WARNING indicates a potentially hazardous situation which, if not avoided, could result in death or serious injury.	NOTE:	A Note provides information or suggestions that help you correctly perform a task.
 CAUTION	CAUTION indicates a potentially hazardous situation which, if not avoided, could result in minor or moderate injury.		The electrical symbol indicates the presence of electric shock hazards which, if not avoided, may result in injury to personnel or damage to equipment.
CAUTION	CAUTION used without the safety alert symbol indicates a potentially hazardous situation which, if not avoided, may result in property damage.	 WARNING! Proper tightening of U-Bolt nuts and mounting nuts are required for proper operation. Need for proper Torque value is indicated by wrench symbol and values will be found in Table 12-1 in Maintenance section of the instructions. Failure to maintain proper torque can cause component failure resulting in accident with consequent injury. 	

PRE-INSTALLATION CHECKLIST

- ❑ Check the vehicle wheel alignment prior to installation to insure no precondition exists; record the information for verification.
- ❑ Measure & record the wheelbase and centering dims before beginning installation.
- ❑ Remove the attached body, if applicable. Remember to disconnect all electrical connections to the body, and fuel filler tube, before removing the body. The installation can also be completed using a lift to raise the vehicle. If using a lift, chassis body removal may not be necessary but removal of rear wheels will aid in installation.
- ❑ If not using a lift, block the front wheels and apply the emergency brake so the vehicle cannot roll.
- ❑ Jack up the rear frame of the truck in order to unload the rear leaf springs (or use an overhead hoist). Do not lift the wheels off the ground (if not using a lift to install the suspension). Do not jack on the axle itself.
- ❑ Install the suspension in the listed sequence. Install one side of the suspension at a time. First, install the driver side completely, then install the passenger side. Removal of the rear wheels may aid in installation, but it is not necessary.



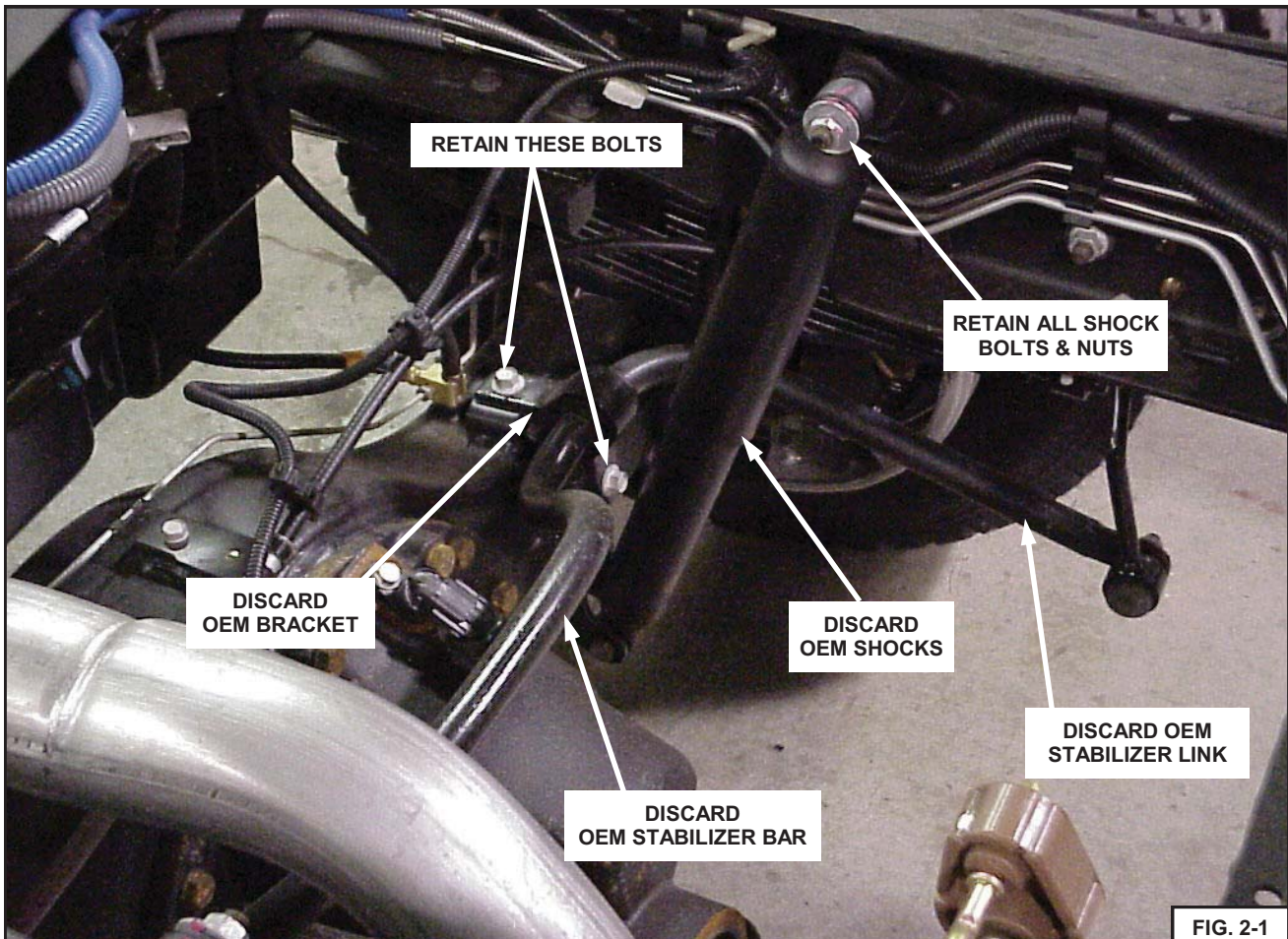
INTRODUCTION (cont.)

INSTALLATION NOTES:

- ❑ Drilling of new frame holes is required for installation of the suspension.
- ❑ The Ford F450 UltraRide is shown throughout these installation instructions, there is no difference for the F550. It will follow the same sequence and setup as depicted.
- ❑ **Minimum clearances required for proper suspension operation**
 - Between Exhaust and Air Spring: 3 inches (unless heat shield is provided)
 - Between Tire and Air Spring: 1.5 inches.
 - Between Exhaust and any suspension hard point: 1.0 inch
(e.g. Lateral Control Rod)
 - Between Exhaust and Cross-member/LCR Mount: 0.3 inch

2. OE SHOCK AND ROLL BAR REMOVAL

1. Remove the OEM **shock absorbers** and retain the mounting fasteners for later use.
2. Remove the OEM **stabilizer bar** and **brackets/linkages** from the axle and frame. Retain the bolts from the axle brackets for future use. See Figure 2-1. Reattach the brake cable to the passenger side stabilizer bar bracket location (same location as before removing brackets).



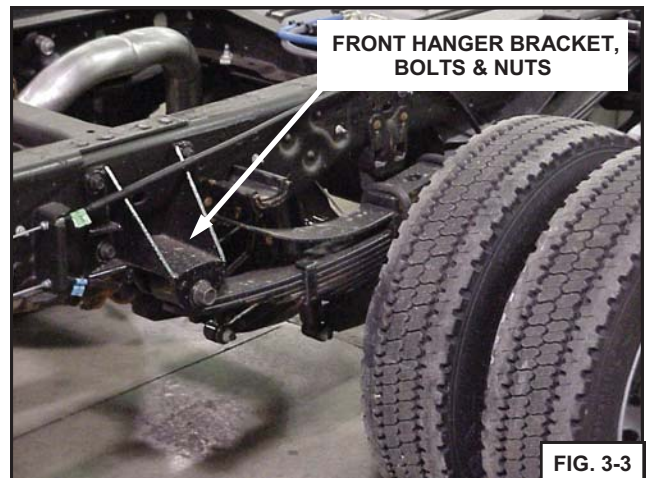
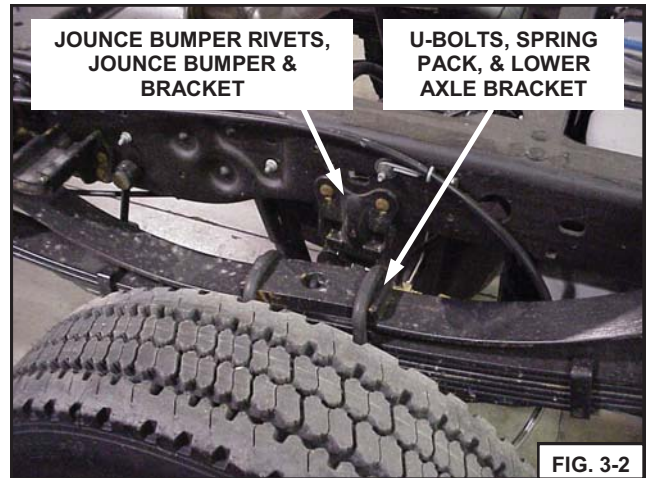
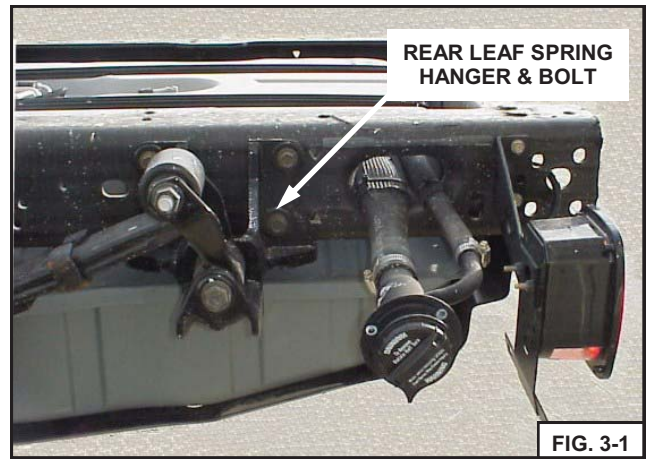
3. DRIVER SIDE DISASSEMBLY

1. With weight taken off the rear springs, as noted in pre-installation checklist, remove the **front and rear bolts** from the leaf spring. See Figure 3-1.



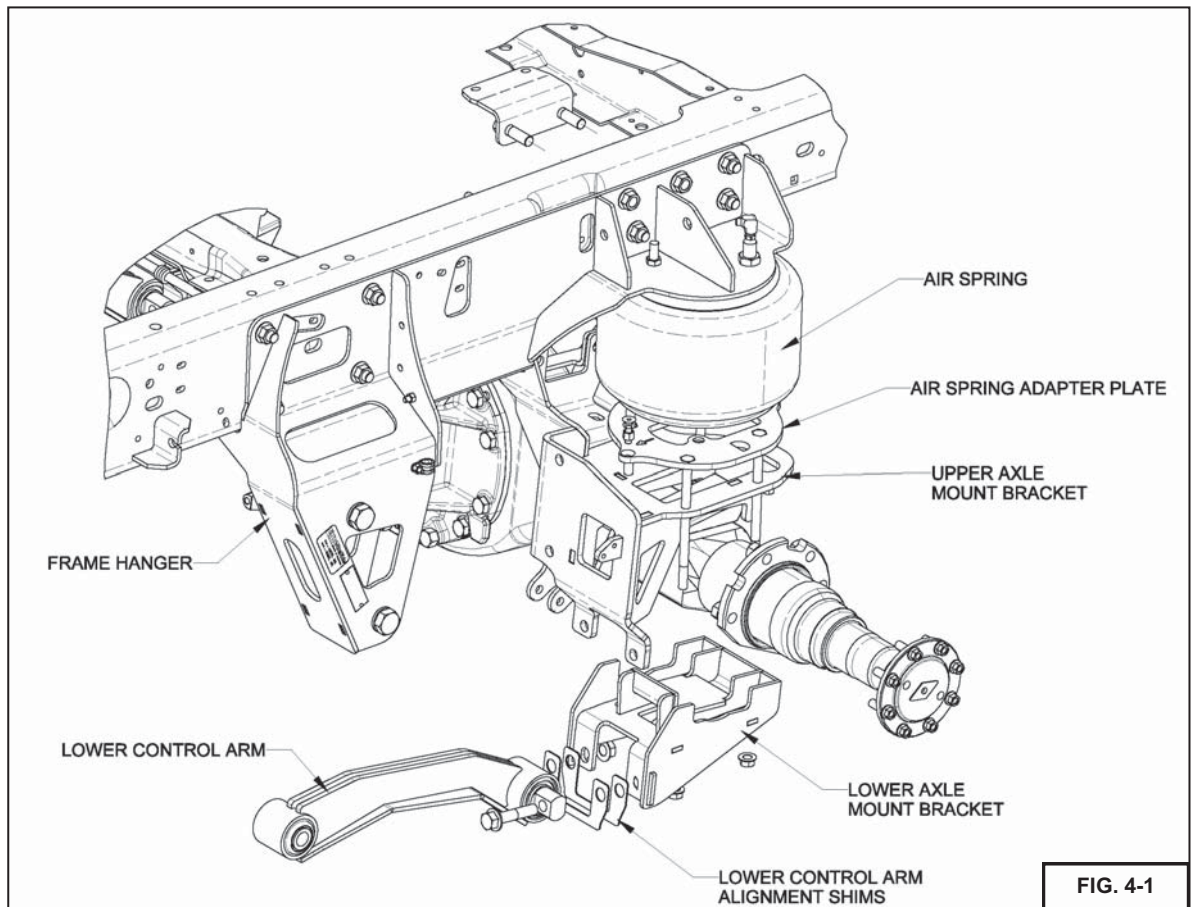
CAUTION: Take care when removing the leaf spring bolt(s). The leaf spring may move unexpectedly.

2. Remove existing **U-bolts** that attach the axle to the leaf spring. After this is done, axle, spring, and hanger will be loose. Remove and discard OE U-bolts, Washers, and Nuts. See Figure 3-2.
3. Remove the **front** spring hanger bracket and **front** overload spring bracket. **NOTE:** Removal of the rear leaf spring hanger bracket and rear overload bracket is not required for suspension fit, but may be removed if preferred. These can be removed by grinding or air chiseling the heads off the factory-installed rivets, and using a hammer and punch to remove remainder of the rivet. See Figures 3-2 & 3-3.
4. Remove the driver and passenger side chassis jounce bumper from the frame. See Figure 3-2.
5. On some trucks a resonator bracket must be cut off of the exhaust pipe to create clearance for the Link Upper Lateral Control Rod Bracket. The resonator is used to dampen certain exhaust system frequencies that are present when the vehicle is unloaded and is not required. See figures 3-4 & 3-5.



4. DRIVER SIDE ASSEMBLY

1. Review Figures 4-1 & 13-2 to acquaint yourself with the various parts of the UltraRide suspension.

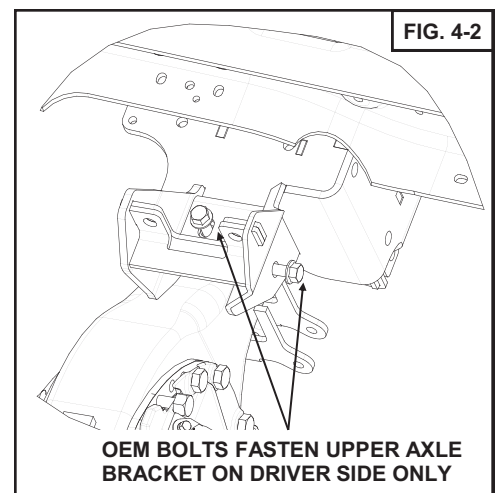


2. If the parking brake cable runs in front of the axle on the passenger side, remove the attachment bolt from the axle/shock bracket. It will be repositioned in Section 8.

3. **Important:** On 2011 and later trucks, the Brake Line Mounting Bracket must be modified as shown in Assembly Addendum Included at the end of this manual.

4. Place the OE Axle Seat onto the top of the axle as shown in Fig. 4-1. Place the Upper Axle Bracket onto the top of the axle over the axle seat. Insert (4) 1/2 x 8 UNC BOLTS into the Upper Axle Bracket.

5. **DRIVER SIDE ONLY:** Fasten the Upper Axle Bracket to the OEM stabilizer bar mount location on the axle using the 10mm OEM fasteners that were retained from Section 2.2. See Figure 4-2. (See Table 12-1 on page 18 for appropriate Torque) **Note:** Do not over-tighten these bolts to prevent stripping the captive nut.





5. Fasten the Lower Axle Bracket to the Upper Axle Bracket using (4) 1/2 UNC TOP LOCK NUTS. (See Table 12-1 page for appropriate Torque) **Note: if contacting the brake lines, slightly bend the brake line bracket down and towards the axle to make clearance at least 1/4" between the brake line and the axle brackets.**



6. Fasten the Frame Hanger to the frame using (4) 5/8 x 1 1/2 UNC FLANGE BOLTS, (4) 5/8 UNC TOP LOCK NUTS, (2) 9/16 x 1 3/4 UNF HEX CAP SCREWS, (2) 9/16 UNF TOP LOCK NUTS, and (4) 9/16 WASHERS, using the holes from the removed OE Front Spring hanger. Using the Frame Hanger as a template, drill the six remaining .625" mounting holes into the frame. Bolt the Frame Hanger to the frame using the remaining (4) 5/8 x 1 1/2 UNC FLANGE BOLTS, (2) 5/8 x 2 UNC FLANGE BOLTS, and (6) 5/8 UNC TOP LOCK NUTS, with the nuts on the outside of the frame. The longer 5/8 bolts should be used to connect the DRIVER SIDE CROSS MEMBER BRACKET. See Figures 4-1, 4-3, and 6-1. (See Table 12-1 for appropriate Torque) **NOTE: Depending on model year some holes may only need to be drilled out to size.**

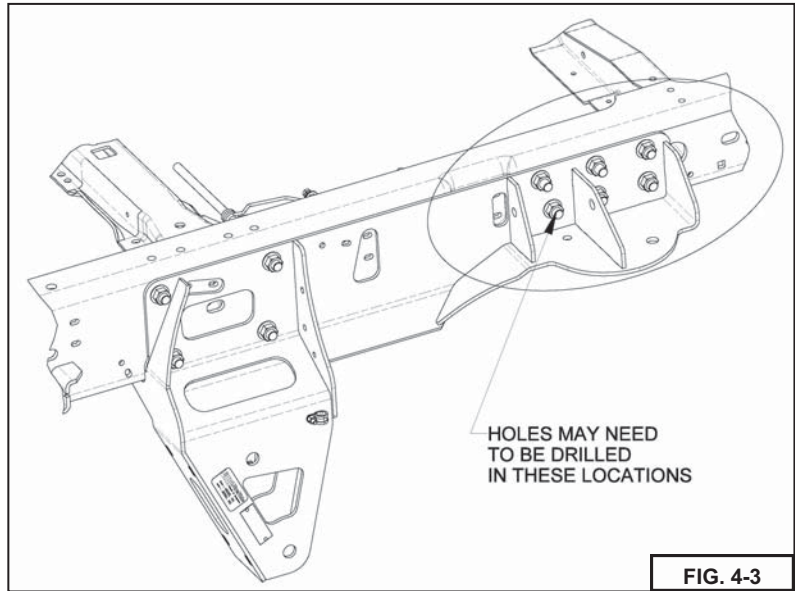


FIG. 4-3



7. Attach the adapter plate to the lower piston of the AIRSPRING using (2) 1/2 x 1 UNC FLAT-HEAD SCREWS. Make sure that the orientation matches that shown in Fig 4-4, to connect the AIRSPRING to the FRAME HANGER on top, and the ADAPTER PLATE to the Upper Axle Bracket below. **NOTE: The Bottom Piston of the Airspring may need to be rotated to fit the orientation shown. In order to rotate the Piston, the bolt holding the Piston to the Spring must be loosened. Tighten after complete.** Torque the bolt and screws. See Table 12-1 for appropriate torque.



8. Bolt the Air Spring Adapter Plate to the Upper Axle Bracket using (2) 3/8 X 1 1/4 UNC FLAT HEAD COUNTERSINK SCREWS and (2) 3/8 UNC HEX JAM NUTS. The Four Hex shaped holes in the ADAPTER PLATE need to fit over the four bolt heads connecting the Upper and Lower Axle Brackets. These bolts may need to be oriented for proper fit.

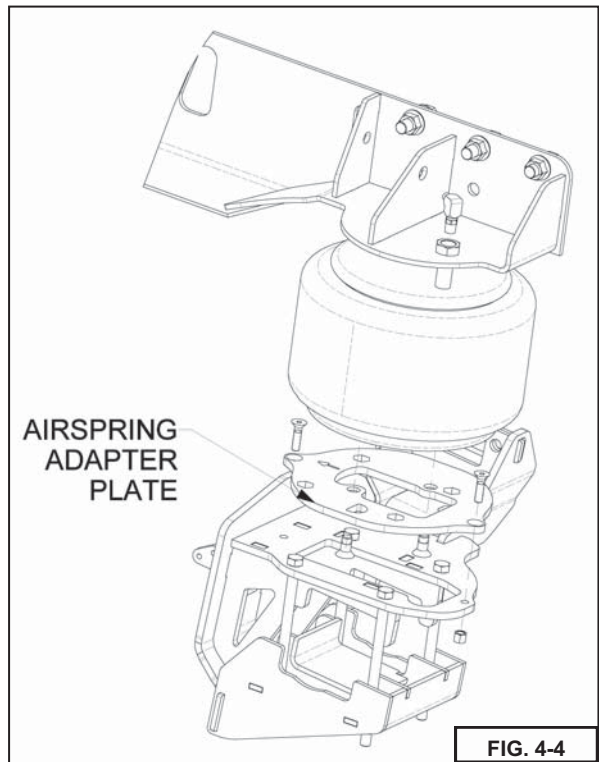
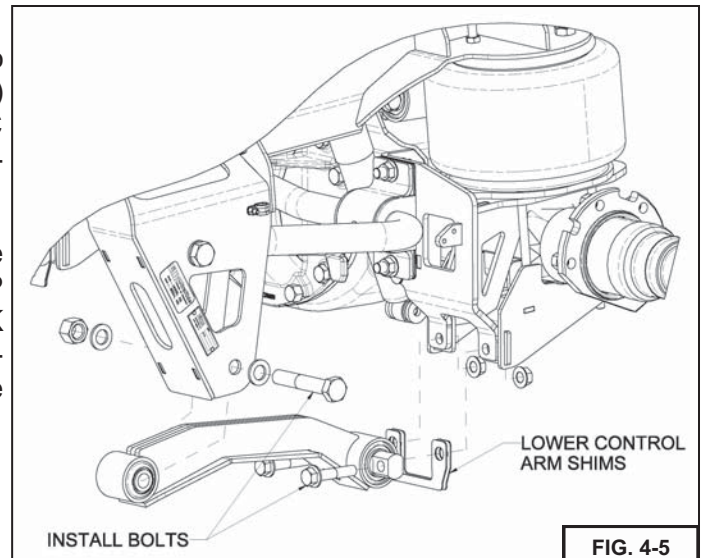


FIG. 4-4

9. Compress the AIRSPRING enough so that the studs on the top plate can be inserted into the corresponding holes on the FRAME HANGER. Fasten using (1) 3/4 UNF JAM NUT, and (1) 1/2 UNC JAM NUT. Torque Later, See Fig. 4-4. With all components installed as described, upper and lower plates of the AIRSPRING should be relatively in line.

- Loosely Connect the Lower Control Arm to the Upper and Lower Axle Brackets using (2) 5/8 x 3 UNC FLANGE BOLTS, (2) 5/8 UNC TOP LOCK FLANGE NUTS, AND (2) CONTROL ARM SHIMS. See Fig. 4-5.
- Connect the Lower Control Arm to the Frame Hanger using (1) M22 x 2.5 HEX CAP SCREW, (1) M22 x 2.5 HEX TOP LOCK NUT, and (2) 22mm HARDENED WASHERS. (See Table 12-1 for appropriate Torque)



5. PASSENGER SIDE DISASSEMBLY

- Repeat Section 2 for the passenger's side of the truck.

6. PASSENGER SIDE ASSEMBLY

- Repeat Section 3 for the passenger's side of the truck.
- DO NOT install the Passenger side crossmember bracket until section 7.
- PASSENGER SIDE ONLY:** Fasten the heat shield around the Air Spring, underneath the upper axle bracket using the 2 rear bolts, see Fig 6-1. (See Table 12-1 for appropriate Torque)

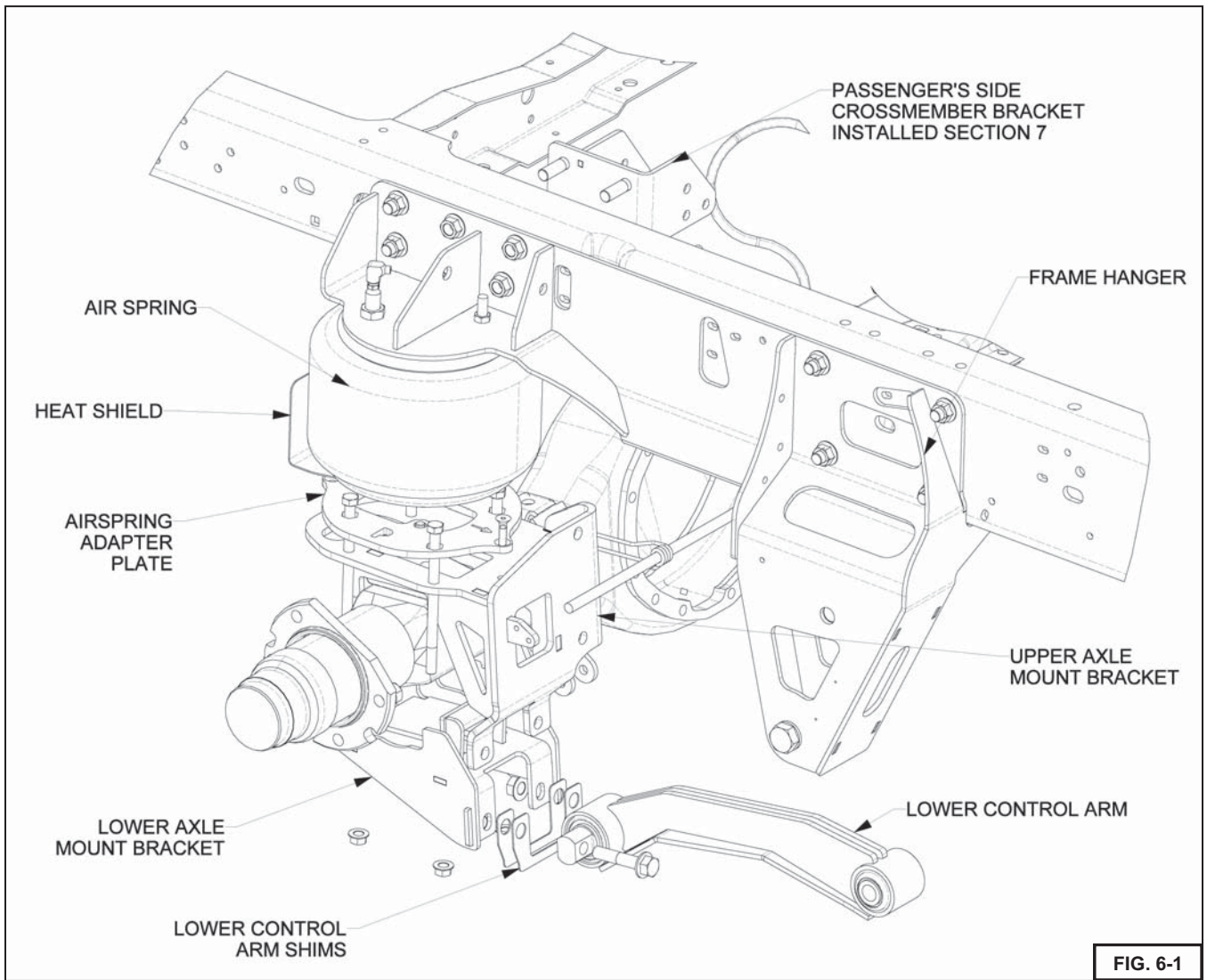
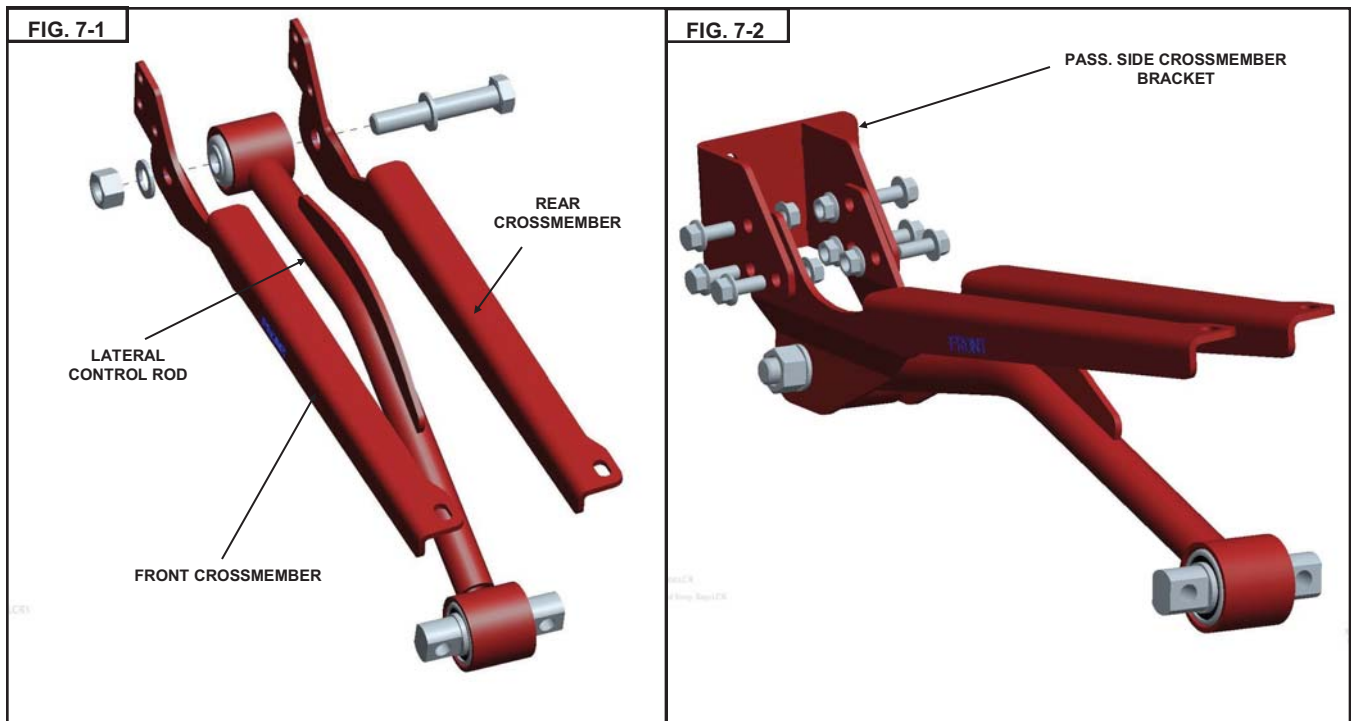





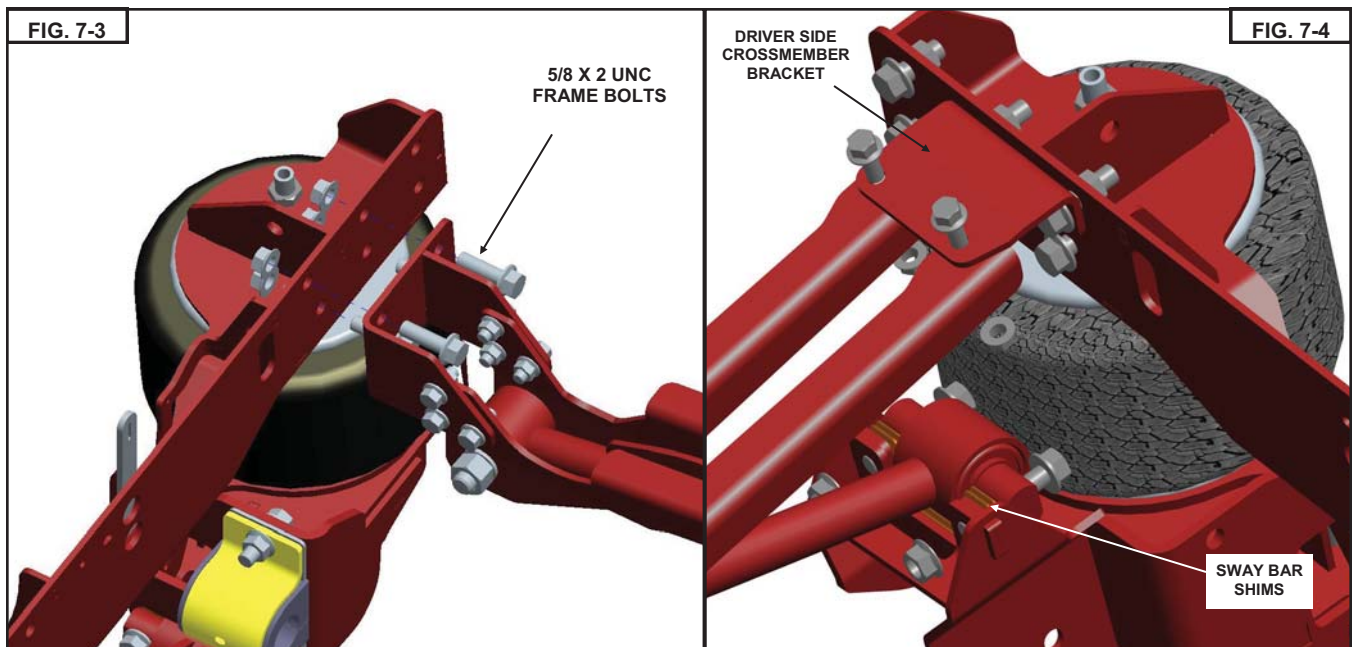
FIG. 6-1

7A. CROSSMEMBER AND LATERAL CONTROL ROD INSTALLATION

1. Check to insure the axle is centered between the frame rails, by measuring from the outside of the driver and passenger side frame rails to the inside of the wheel hub or tire.
2. Loosely assemble the FRONT AND REAR CROSSMEMBER components to the Lateral Control Rod as shown in Fig. 7-1. Note the CROSSMEMBER CHANNEL marked "Front" must be assembled towards the front of the vehicle and the rib of the Lateral Control Rod must be facing up. Use (1) M22 x 2.5 HEX CAP SCREW, (1) M22 x 2.5 HEX TOP LOCK NUT, and (2) 22mm HARDENED WASHERS. The Bolt Head should face the Rear Crossmember Channel to prevent interference with the exhaust. See Fig 7-1. Torque later.



- 
 3. Fasten the Crossmembers to the inside of the Passenger Side Crossmember Bracket using (6) 1/2 X 1 1/4 UNC FLANGE BOLTS and (6) 1/2 UNC TOP LOCK FLANGE NUTS. The bolt heads should face outward as shown in Fig 7-2. (See Table 12-1 for appropriate Torque)
- 
 4. This assembly should now be fastened to the Passenger Side Frame, using the (4) 5/8 x 2 UNC FLANGE BOLTS and (4) 5/8 FLANGE NUTS. The nuts should face outward from the vehicle. See Fig 7-3. (See Table 12-1 for appropriate Torque)
- 
 5. Fasten the Crossmember Channels to the Driver Side Crossmember Bracket using (2) 1/2 X 1 1/4 UNC Flange Bolts and (2) 1/2 UNC FLANGE NUTS, as shown in Fig 7-4. (See Table 12-1 for appropriate Torque)
6. ALIGNMENT SHIMS are provided to ensure axle is centered between frame rails. Install the LATERAL CONTROL ROD initially using (2) shims as a starting point. Use (2) 5/8 X UNC FLANGE BOLTS and (2) 5/8 UNC TOP LOCK NUTS to loosely attach lower end of LATERAL CONTROL ROD. See Fig. 7-4 for details.



7B. STABILIZER BAR INSTALLATION

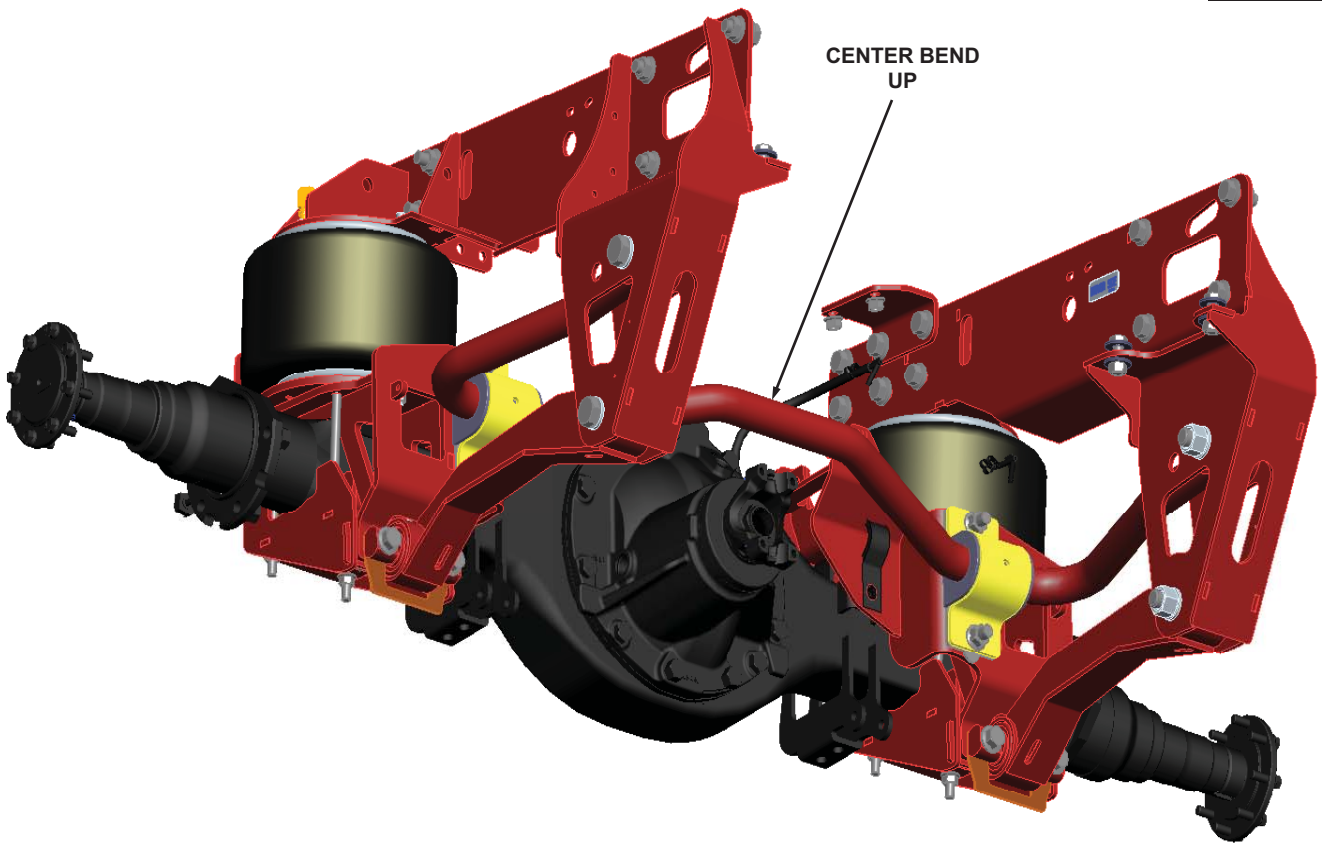
1. Install the Stabilizer bar with the center bend pointing up, away from the pinion. Loosely fasten to the Frame Hangers using the (2) M22 x 2.5 HEX CAP SCREWS, (2) M22 x 2.5 HEX TOP LOCK NUTS, and (4) 22mm HARDENED WASHERS. (See Table 12-1 for appropriate Torque)

CAUTION: Ensure (2) M22 HEX BOLTS are installed with nut on D-BRACKET side as shown in Fig. 7-5 and 7-6. Interference with AIRSPRING could occur if orientation is not as shown.

2. Apply Lithium grease, or other lubricant, to the inside of the polyurethane D bushings (this will reduce any potential noise transmission). Place the polyurethane D bushings over the bar in the appropriate locations on the Upper Axle brackets, and loosely fasten to the Upper Axle Mounts using the stabilizer bar mount clamp and (4) 5/8 x 2 UNC FLANGE BOLTS, (4) 5/8 UNC TOP LOCK FLANGE NUTS AND (4) STABILIZER BAR SHIMS (2 for each side). See Figure 7-5.

NOTE: Inspect Lateral Control Rod and Stabilizer Bar for any interference with other components, paying close attention to clearance with any flexible components such as brake and fuel lines.

FIG. 7-5



IMPORTANT: Ensure (2) M22 HEX BOLTS are installed with nut on D-BRACKET side as shown in Fig. 7-5 and 7-6. Interference with AIRSPRING could occur if orientation is not as shown.

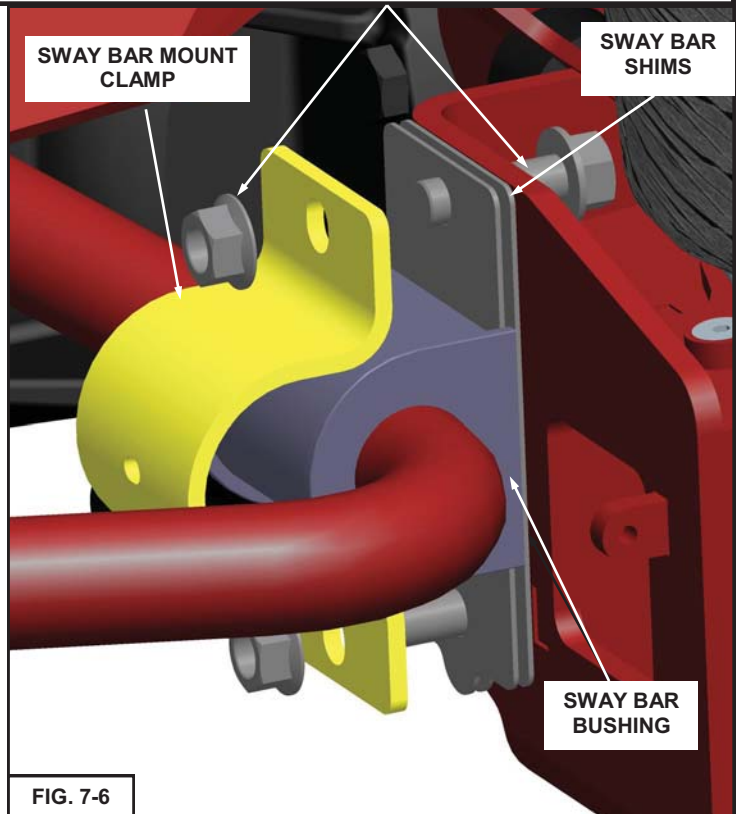


FIG. 7-6

8. EMERGENCY BRAKE LINE ROUTING, AND SHOCK RE-INSTALLATION

PASSENGER SIDE CABLE

1. Route the brake cable away from the air spring and other moving components. See following procedure for routing the Emergency brake cables to accommodate the new suspension.
2. Locate and remove fastener from OE Brake line holder on Passenger side shock bracket. See Fig. 8-1



FIG. 8-1

3. Re-position the OE Brake Cable Holder, and attach to new Axle Bracket using (1) 5/16 UNC Flange Bolt and (1) 5/16 UNC Nylock Nut and (1) 5/16 UNC Flat Washer. See Fig. 8-2.

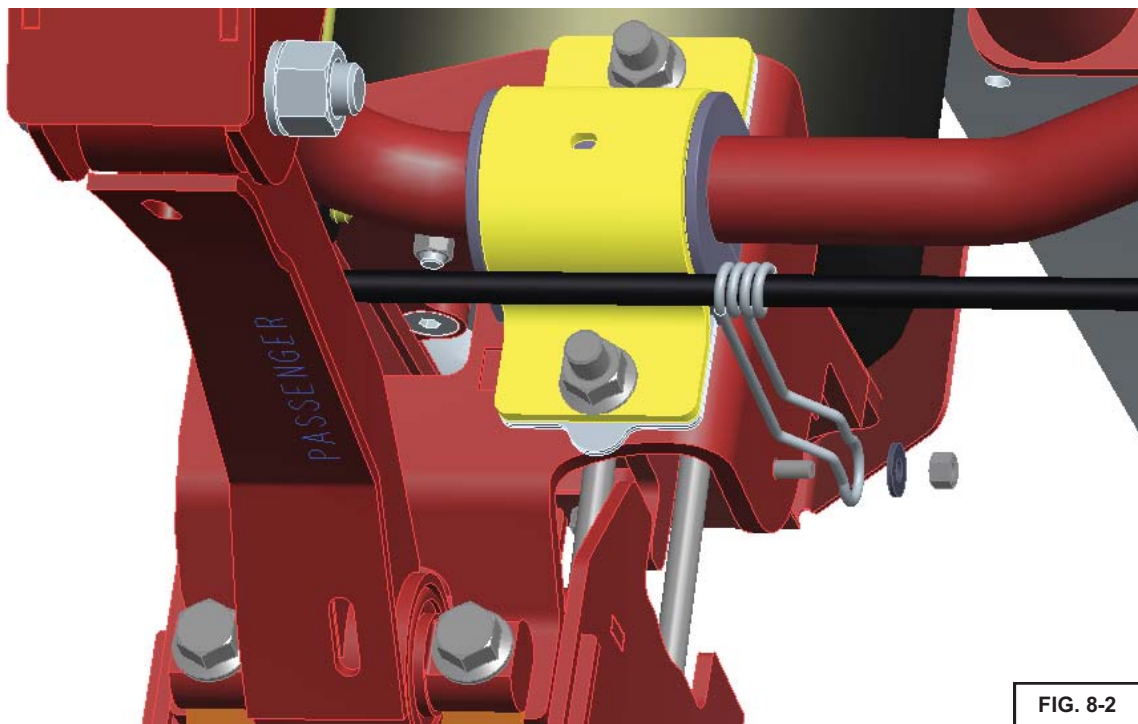
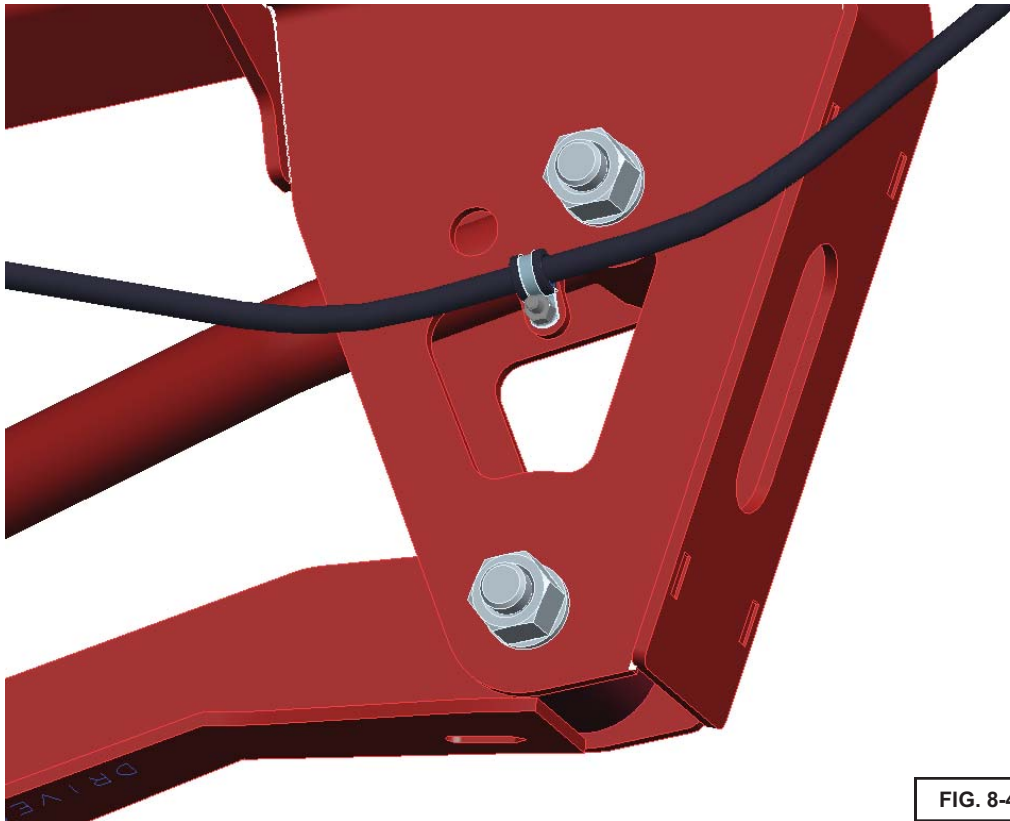


FIG. 8-2

4. Locate and reposition Brake Cable Holder on under-side of driver side frame rail, as shown in Fig. 8-3. Use Cable Ties as needed to hold all wires away from components.



5. Route OE Brake Cable through supplied P-Clip, and attach to inside of Driver Side Hanger Bracket as shown in Fig. 8-4 using (1) 1/4 UNC Hex Bolt and (1) 1/4 UNC Nylock Nut

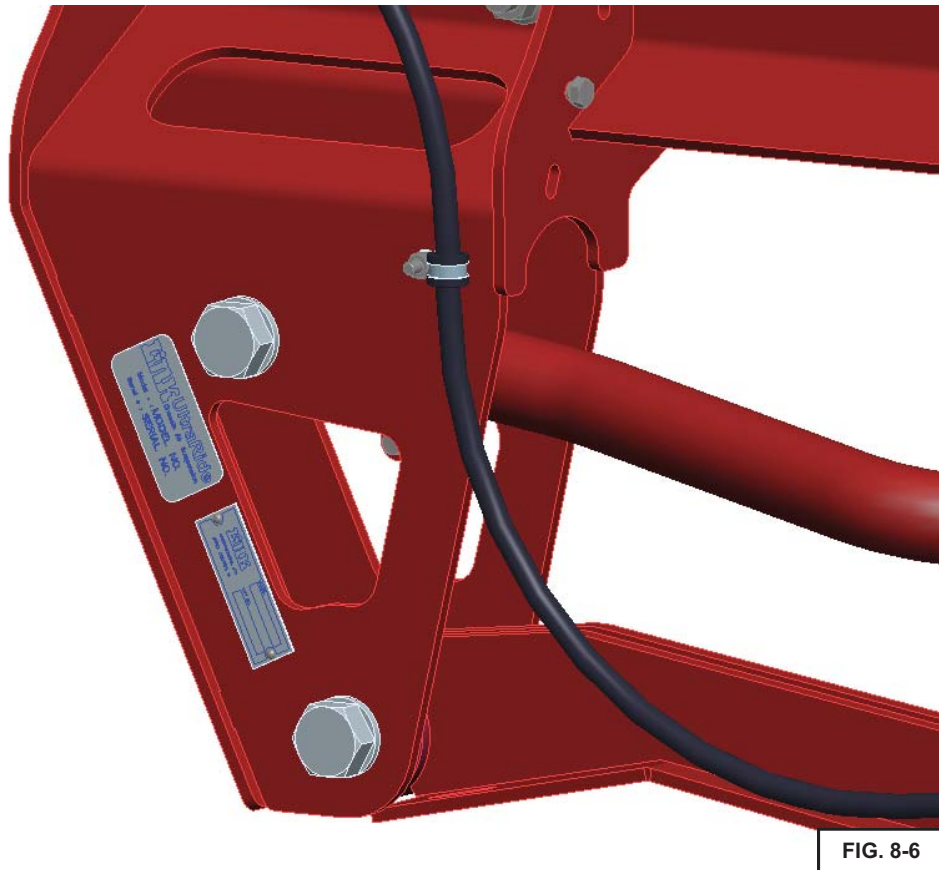


DRIVER SIDE CABLE

1. **Route the brake cable away from the air spring and other moving components.** See following procedure for routing the Emergency brake cables to accommodate the new suspension.
2. Re-install Brake Cable Holder into OE position, using original fasteners, as shown in Fig. 8-5.



3. Route OE Brake Cable through supplied P-Clip, and attach to outside of Driver Side Hanger Bracket as shown in Fig. 8-6 using (1) 1/4 UNC Hex Bolt and (1) 1/4 UNC Nylock Nut.





4. Install New Shock Absorbers from Shock Absorber Kit, re-use OE Fasteners.

9. AIR CONTROL AND ELECTRICAL SYSTEM

ASSEMBLY

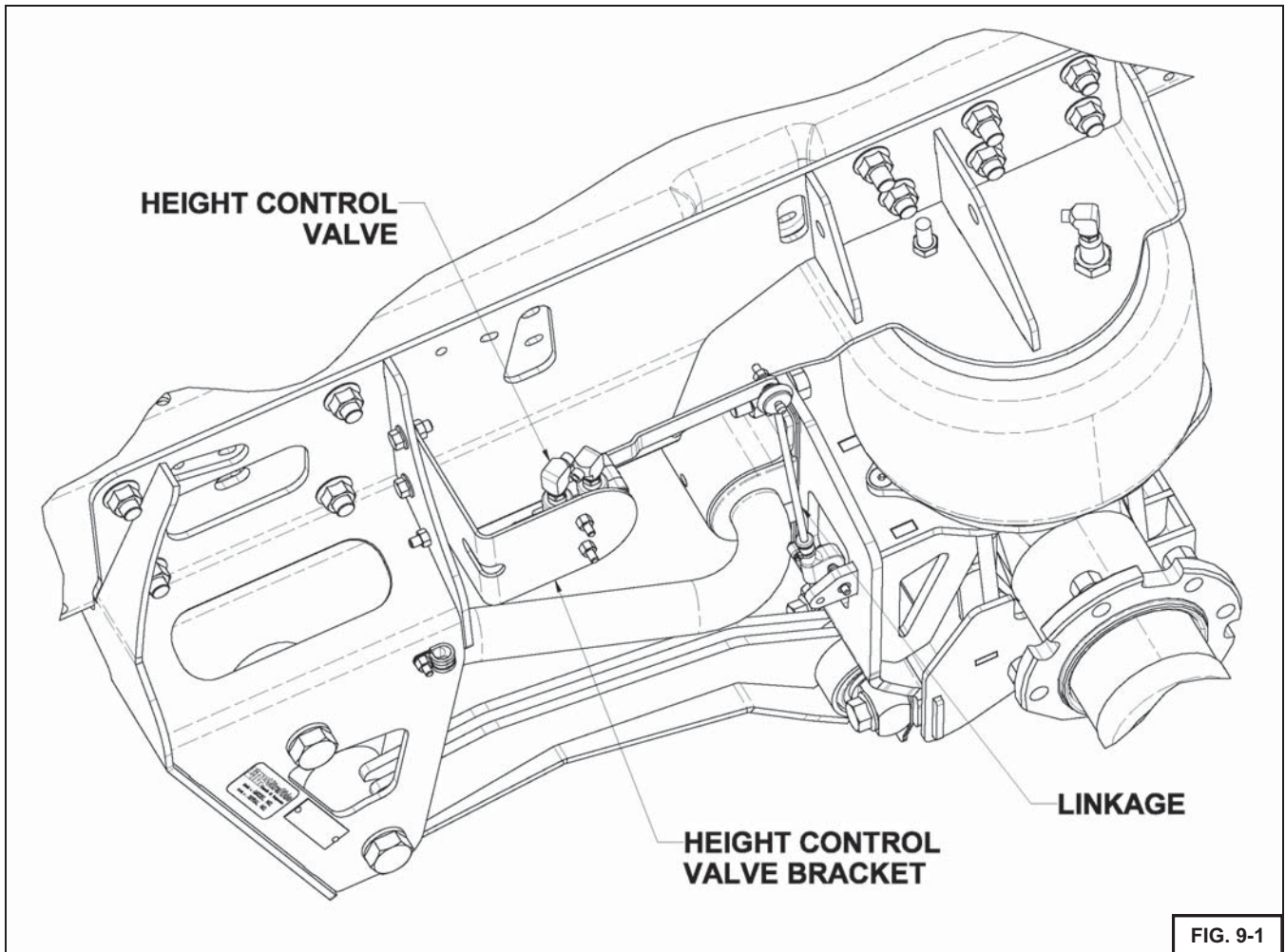


CAUTION! Route all airline away from exhaust, moving parts, and sharp objects. Be careful not to crimp the edges of the tubing. When installing the airline, fully insert into fitting and give a slight pull to seat properly and to be sure airline will not pull out.

1. Instructions for mounting the Air Control Box and routing the airlines can be found in the Air Control Kit installation instructions.
2. For suspensions using the electronic height control system (800M1400), refer to the Electronic Air Kit Manual. With the electronic air kit, use the provided 3/8" tubing elbow fittings in the air springs.
3. For systems using the Mechanical Height Control Valve Kit (800M1060), mount (1) Valve Bracket to the driver side frame hanger using (2) 3/8 x 1 UNC FLANGE BOLTS, and (2) 3/8 UNC TOP LOCK FLANGE NUTS. Mount the Height Control Valve to the inside of the Mount Bracket using (2) 1/4 UNC HEX NYLOC NUTS. Undo the 1/4 UNC HEX NUT and Lock Washer on the free end of the linkage and connect the linkage to the tab on the Upper Axle Bracket. See Fig. 9-1. For suspensions using dual mechanical valve kits, repeat installation for the Passenger side. With the mechanical valve kit, install the provided 1/4" tubing elbow fittings in the air springs.

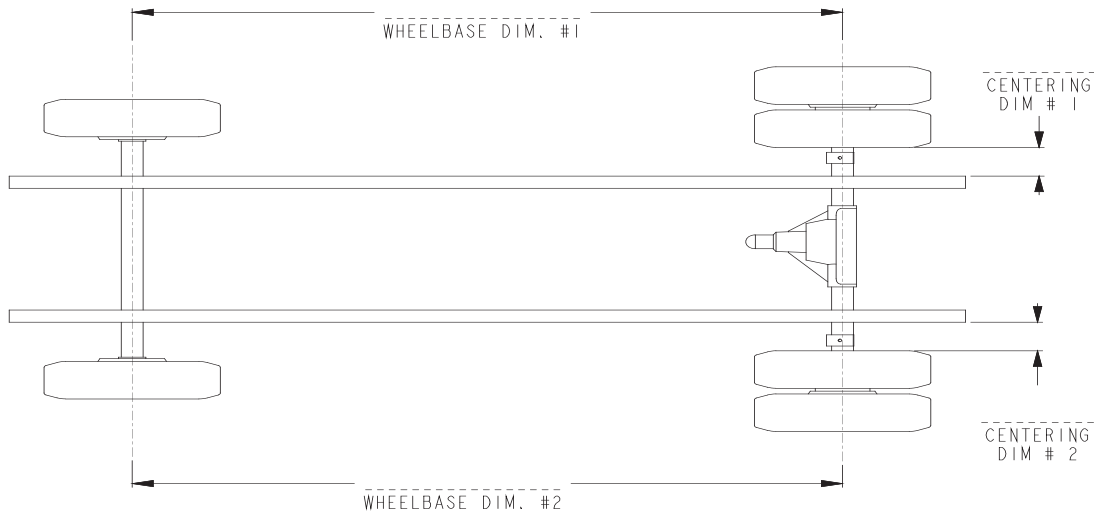


CAUTION! All wiring should be routed and secured neatly to avoid any functional or visual issues. Under hood and under-body wire routings should be clear of sharp edges (3/4 inches minimum) and direct sources of heat (4 inches minimum). Wiring located in the passenger compartment should be routed away from high temperature areas over the muffler. Wiring should not be routed through wheel well areas where it may be damaged by tire or road debris, and it should not be routed over the exhaust system. Wiring should not contact the brake lines or fuel lines.



10. AXLE ALIGNMENT

1. To adjust front-to-rear axle alignment, remove shims to both the lower control arm and sway bar bushing on the side (driver or passenger) that needs to be moved forward. Note that both components (lower control arm and sway bar) need to be moved together to ensure proper suspension geometry.
2. To adjust pinion angle, remove shims from both sides (driver and passenger) of the sway bar bushing (to increase pinion angle) or lower control arm (to decrease pinion angle).
3. To adjust side-to-side axle location, add or remove shims from the lateral control rod.
4. After alignment is complete, measure and mark dimensions on Fig. 10-1.



11. FINAL INSPECTION CHECKLIST

Air System Start Up and Check

Remove all jacks and air system up by either using the fill valve on the air tank or by starting the vehicle and allowing the compressor to fill the system. If available, fill the air tank using the supplied Schraeder valve so that the compressors are not taxed too much by running for a long period of time.

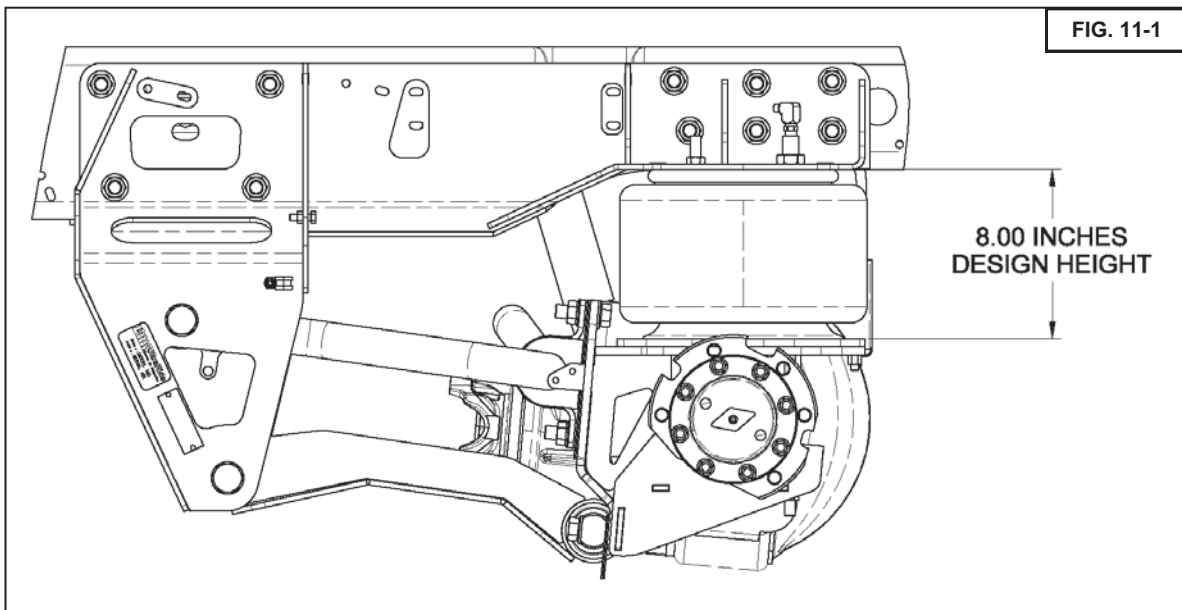
Set Ride Height to 8.00 inches (see Fig. 11-1) according to the instructions in your air control kit.



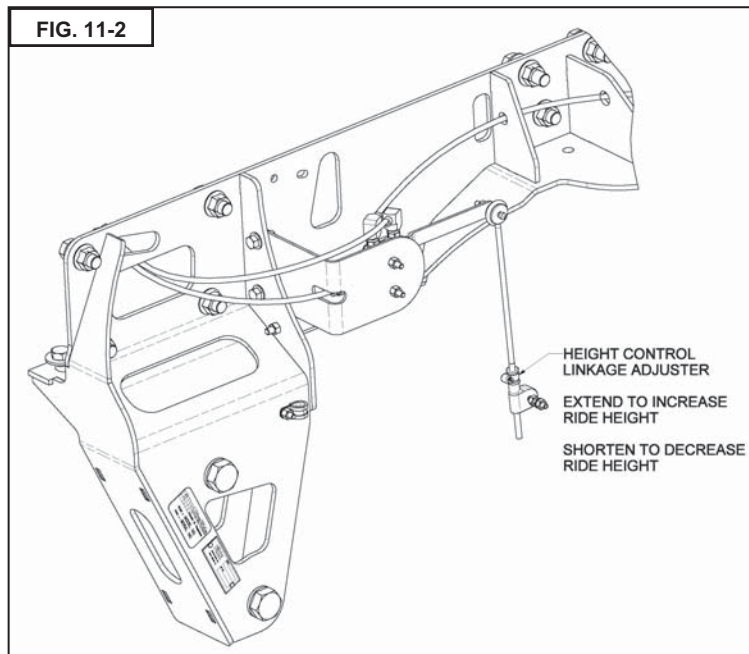
Bushing Bolts Final Torque

With the suspension at design height torque all bushing fasteners. This will include all fasteners for the Control Arm, Sway Arm and LCR bushings. (See Table 12-1 for appropriate Torque) - Mark all fasteners with a paint pen as they are torqued.

Recheck the air spring design height and repeat the above setting procedure if the design height needs to be adjusted.



- ❑ Move the suspension throughout its entire range of motion, by inflating and deflating the air springs to achieve full travel. Check for any interferences with the lateral control rod, axle, shocks, exhaust, frame, brake lines (**especially on the driver side**), fuel lines, etc. Reconnect the valve/sensor linkage to the lever. **Note: if contacting the brake lines, hand caulk the line to make clearance at least 1/4”.**
- ❑ Recheck all fasteners for specified torque.
- ❑ Double check all electrical connections and wire routings.
- ❑ **IMPORTANT!** Check all fittings and airlines for air leaks.
- ❑ Reinstall the chassis body (if applicable).
- ❑ Measure and record wheelbase and centering dims on following page.

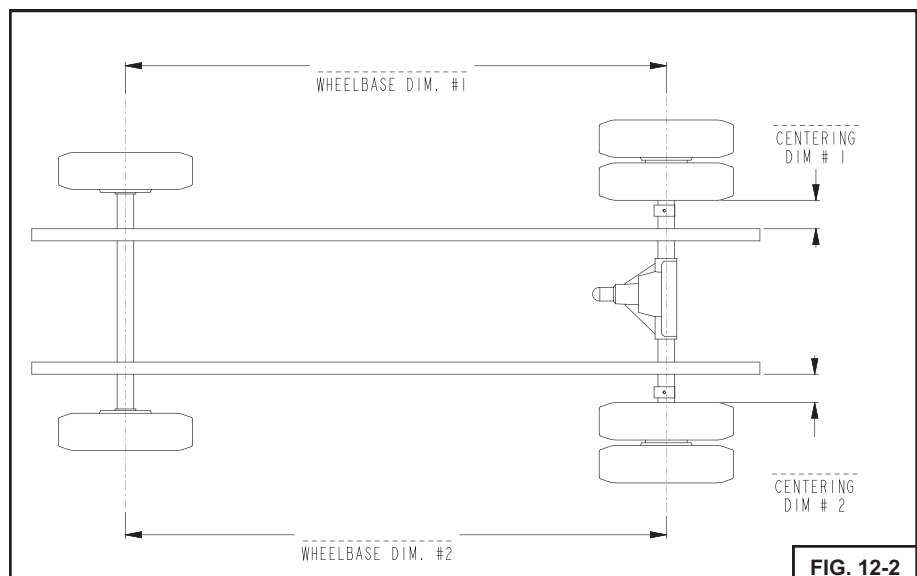


12. OPERATION GUIDELINES

- After all final checks are complete, it is recommended to complete a full four- wheel alignment and drive line angle check. The pages following the installation instructions describe the proper method for checking driveline angles. Note: improper driveline angles may have a detrimental effect on ride, u-joints, and transmission. If any driveline vibration (or out of spec. angle measurement) occurs, use factory axle seat shims to modify driveline angle.
- **IMPORTANT!** During servicing check tightness of all fasteners and for any air system leaks.
- **IMPORTANT!** Immediate corrective action should be taken if malfunctions occur.

TORQUE TABLE (Table 12-1)

LOCATION	FASTENER	TORQUE
FRAME HANGER	9/16 UNF NUTS	134 FT-LBS
FRAME HANGER	5/8 UNC NUTS	200 FT-LBS
DRIVER SIDE AXLE BRACKET AT OE D-BUSHING LOCATION	10 mm OE BOLTS	53 FT-LBS
AXLE BRACKET (LONG BOLTS)	1/2 UNC NUTS	106 FT-LBS
AIR SPRING ADAPTER PLATES	3/8 UNC NUTS	31 FT-LBS
CROSSMEMBER	1/2 UNC NUTS	100 FT-LBS
STABILIZER BAR D-BUSHING MOUNTS	5/8 UNC NUTS	200 FT-LBS
LOWER CONTROL ARM AT AXLE BRACKET	5/8 UNC NUTS	200 FT-LBS
AIR SPRING TOP STUD	1/2 UNC JAM NUT	30 FT-LBS
AIR SPRING TOP STUD	3/4 UNF JAM NUTS	50 FT-LBS
STABILIZER BAR BUSHINGS AND CONTROL ARM AT FRAME HANGER	M22 X 2.5 NUTS	610 FT-LBS
LATERAL CONTROL ROD (PASS.)	M22 X 2.5 NUTS	610 FT-LBS
LATERAL CONTROL ROD (DRIVER)	5/8 UNC NUTS	200 FT-LBS
AIRSPRING ADAPTER TO UPPER AXLE BRACKET	3/8 UNC FLAT HEAD BOLTS	30 FT-LB
AIRSPRING ADAPTER TO AIRSPRING PISTON BOLTS	1/2 UNC FLAT HEAD BOLTS	35 FT-LBS
UPPER SHOCK NUT	12MM HEX FLANGE NUT	52 FT-LBS
LOWER SHOCK NUT	12MM HEX FLANGE NUT	66 FT-LBS



13. SERVICE & MAINTENANCE

The UltraRide suspension needs no lubrication and little maintenance. The following components should be checked at the time the truck is being serviced. However, immediate corrective action should be taken if a serious malfunction occurs. See Exploded Assembly Figure 13-2 for details.



CAUTION! If maintenance or service is to be done on the air system, be sure to drain **all** air from system. Serious injury could occur if components are removed while system is full of air.

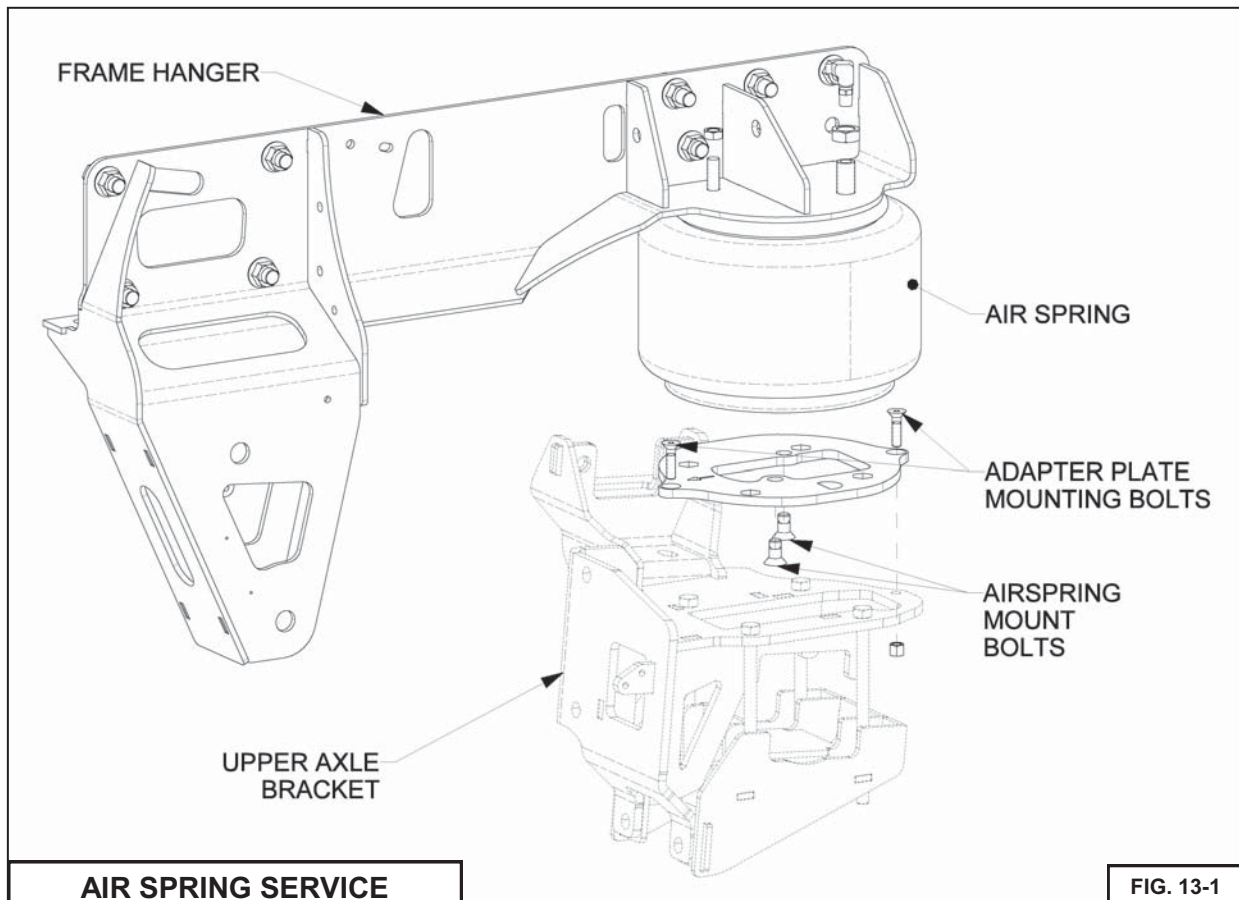
Note: It is important to release any moisture contained within the air reservoir on a daily basis. See Air Kit Manual for details. Not releasing the moisture on a regular basis will cause the drain valve to not operate properly, and may cause the valve to malfunction. Excess moisture in the system can also cause premature failure of other components including the tank itself.

AIR SPRING SERVICE

The air spring can be serviced without removing the axle brackets from the axle. Simply unbolt the adapter plate from the Upper Axle Mount, and also detach the air spring bead plate from the Frame Hanger. (See figure 13-1).

SERVICE & MAINTENANCE CHECK LIST

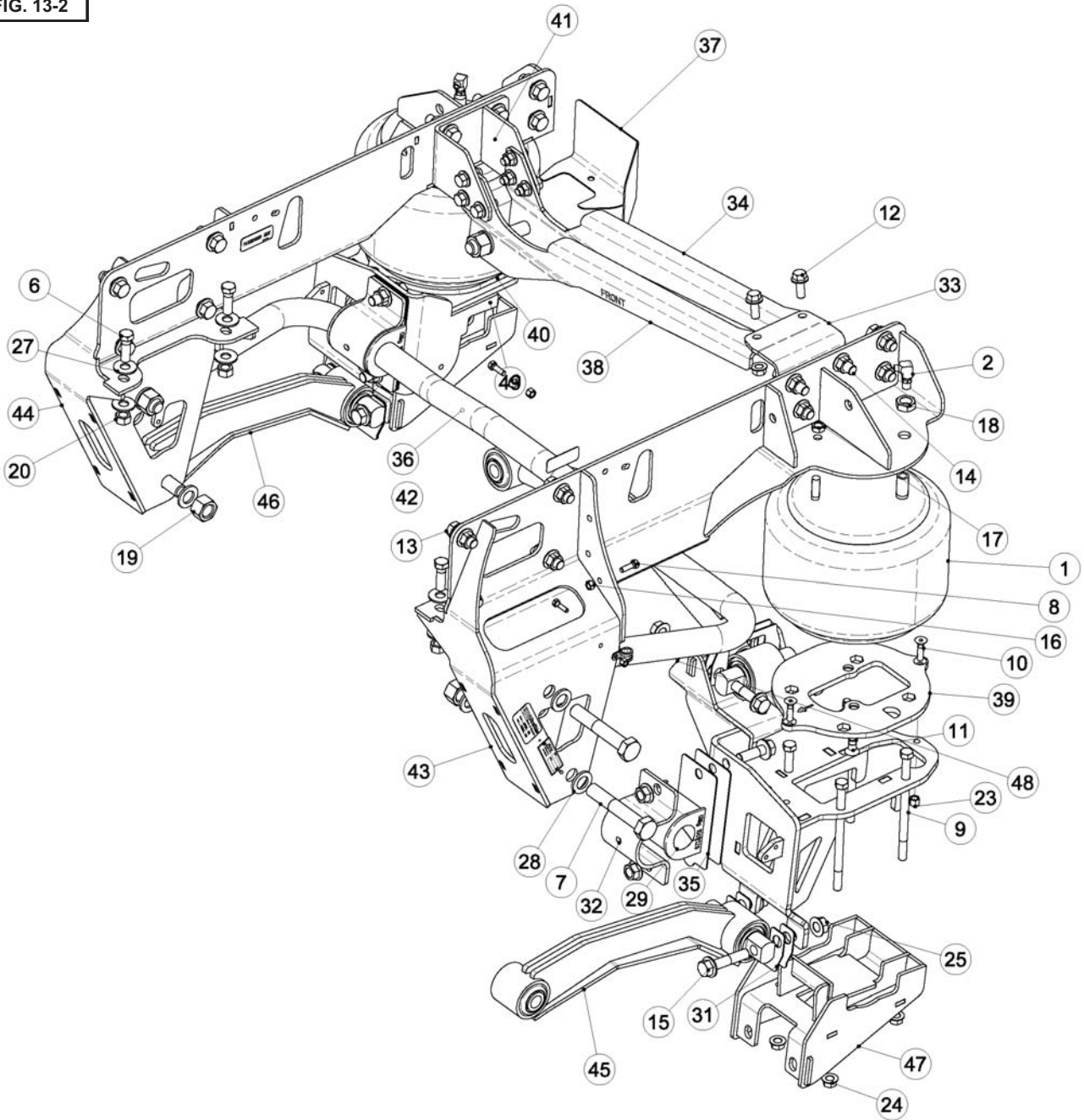
- Check and document OE rear axle alignment
- Verify Design Height at 8.0 inches
- Verify suspension function via dump and reinflation
- Check for air leaks and system integrity



UltraRide® FORD F450/550 BASE SUSPENSION PARTS LIST

ITEM	PART NUMBER	DESCRIPTION	QTY	ITEM	PART NUMBER	DESCRIPTION	QTY
1	11030501	SPRING-AIR	2	26	14871000	5/16 TYPE A PLAIN WASHER	1
2	1302-5091	ELBOW, 1/4 TB 1/4 M-NPT, PUSH-IN DOT	2	27	14871800	9/16 TYPE A PLAIN WASHER	8
3	13025104	ELBOW-3/8 TB, 1/4 M-NPT	2	28	14892200	WASHER-HARDENED, 22mm	10
4	1401-0808	1/4 X 1 UNC HEX CAP SCR (GR 5)	2	29	1500-0843	BUSHING-SWAY BAR, POLYURETHANE	2
5	1401-1008	5/16 X 1 UNC HEX CAP SCR (GR 5)	1	30	1500-0865	1/2 SS CUSHIONED CABLE CLAMP	2
6	14041814	9/16 X 1 3/4 UNF HEX CAP SCR (GR 8)	4	31	80001819	SHIM-LATERAL CONTROL ROD	6
7	14062226	HEX CAP SCREW, M22 X 2.5 X 130, CLASS 10.9, O&P	5	32	80001954	CLAMP-MOUNT, SWAY BAR	2
8	140B-1008	5/16 X 1 UNC HEX CAP SCR (GR 8) O&P	1	33	80001960	BRACKET-MOUNT, CROSSMEMBER	1
9	140B-1664	1/2 X 8 UNC HEX CAP SCR (GR 8) O&P	8	34	80001962	BRACKET-MOUNT, LATERAL CONTROL	1
10	1417-1212	3/8 X 1 1/2 UNC SOC FLAT CSK HD CAP SCREW	4	35	80001963	SHIM-SWAY BAR	4
11	14171608	1/2 X 1 UNC SOC FLAT CSK HD CAP SCREW	4	36	80001974	SWAY BAR ASSEMBLY	1
12	141A1610	1/2 X 1 1/4 UNC FLANGE BOLT (GR 8) O&P	8	37	80001979	SHIELD- HEAT	1
13	141A2012	5/8 X 1 1/2 UNC FLANGE BOLT (GR 8) O&P	14	38	80001981	BRACKET-MOUNT, LATERAL CONTROL	1
14	141A2016	5/8 X 2 UNC FLANGE BOLT (GR 8) O&P	10	39	80002986	PLATE-ADAPTER, AIR SPRING	1
15	141A2024	5/8 X 3 UNC FLANGE BOLT (GR 8) O&P	6	40	80002987	PLATE-ADAPTER, AIR SPRING	1
16	1470-1000	5/16 UNC HEX NUT (GR B)	1	41	800M1058	BRACKET-MOUNT, CROSSMEMBER	1
17	1474-1600	1/2 UNC HEX JAM NUT	2	42	800M1119	LATERAL CONTROL ROD	1
18	1475-2400	3/4 UNF HEX JAM NUT	2	43	810M0113	BRACKET-MOUNT, FRAME	1
19	1476-2207	HEX TOP LOCK NUT, M22 X 2.5, CLASS 10	5	44	810M0114	BRACKET-MOUNT, FRAME	1
20	14771801	9/16 UNF HEX TOP LOCK NUT (GR C)	4	45	820M0047	CONTROL ARM	1
21	1478-0800	1/4 UNC HEX NYLOCK NUT (GR B)	2	46	820M0048	CONTROL ARM	1
22	1478-1000	5/16 UNC HEX NYLOCK NUT (GR B)	1	47	830M0003	BRACKET-MOUNT, LOWER AXLE	2
23	1478-1200	3/8 UNC HEX NYLOCK NUT (GR B)	4	48	830M0007	BRACKET-MOUNT, UPPER AXLE	1
24	1480-1604	1/2 UNC TOP LOCK FL NUT (GR G) O&P	16	49	830M0008	BRACKET-MOUNT, UPPER AXLE	1
25	1480-2004	5/8 UNC TOP LOCK FL NUT (GR G) O&P	30				

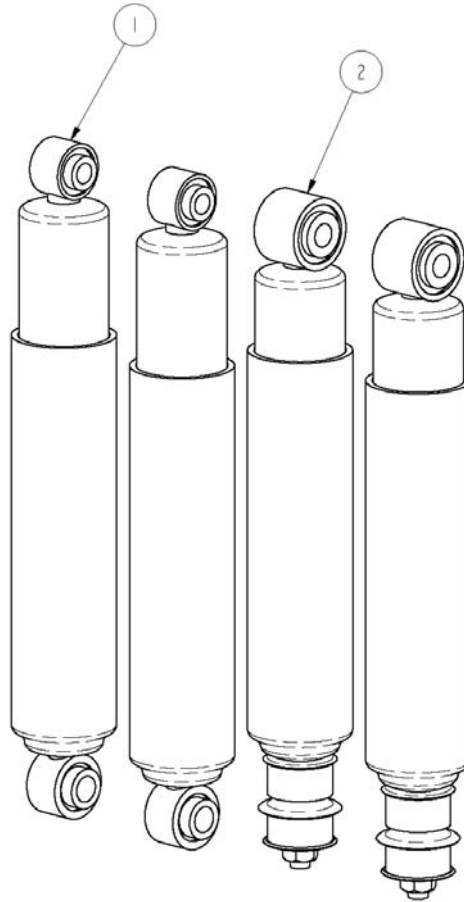
FIG. 13-2



Note:
Fittings are provided with the suspension to connect 1/4" and 3/8" air-line to the air springs. The installer should select the appropriate fittings to install based on the air kit used.

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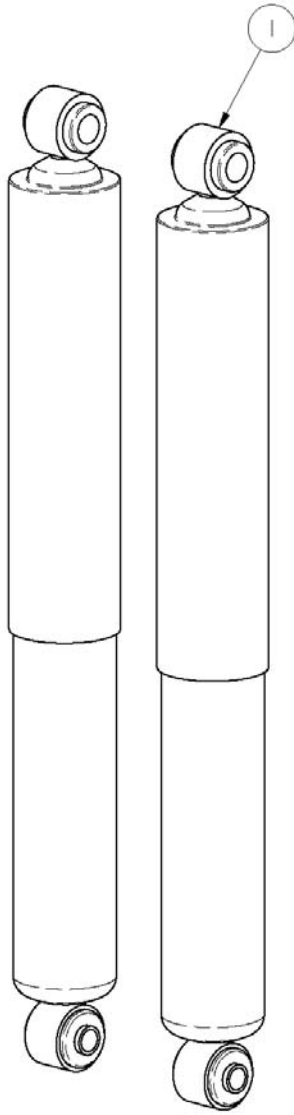
PREMIUM SHOCK KIT



ITEM	PART NUMBER	DESCRIPTION	QTY
1	12100021	SHOCK ABSORBER-KONI	2
2	12100022	SHOCK-KONI	2

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SHOCK KIT



ITEM	PART NUMBER	DESCRIPTION	QTY
1	12100529	SHOCK ABSORBER	2

Next 3 pages taken from Ford MVE Ship Thru Guide.

Guideline -Driveline Angles

After vehicle build is complete, the driveline angles must meet the following "rules", both at unloaded, and fully-loaded, vehicle attitudes .

Rule #1: The NET OPERATING ANGLE, at any individual joint, must be at least 1/2 degree, and not to exceed 3 degrees. The net operating angle at any individual joint on an F Super Duty (F250, F350, F450, F550) must not exceed 4 degrees. The preferred maximum angle is 2 degrees.

The NET OPERATING ANGLE (e) at any one joint is the combination of the joint angles in both the side view and the plan (top) view. This NET OPERATING ANGLE (e) equals:

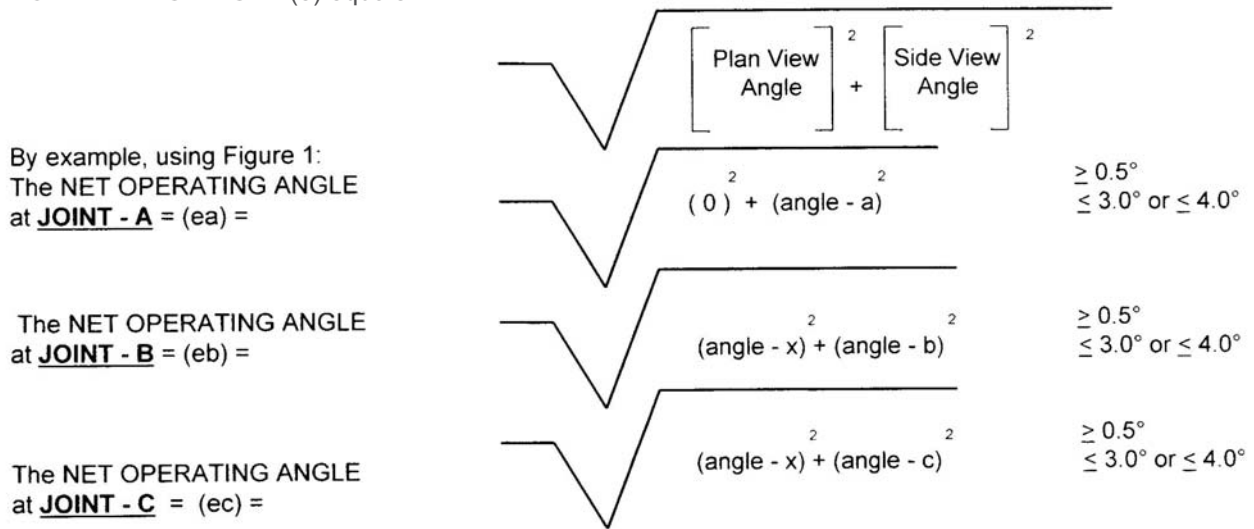
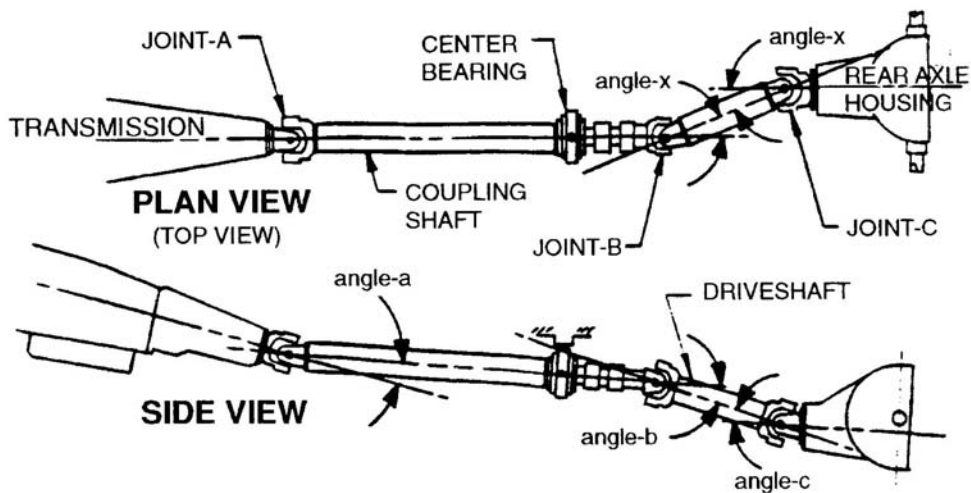
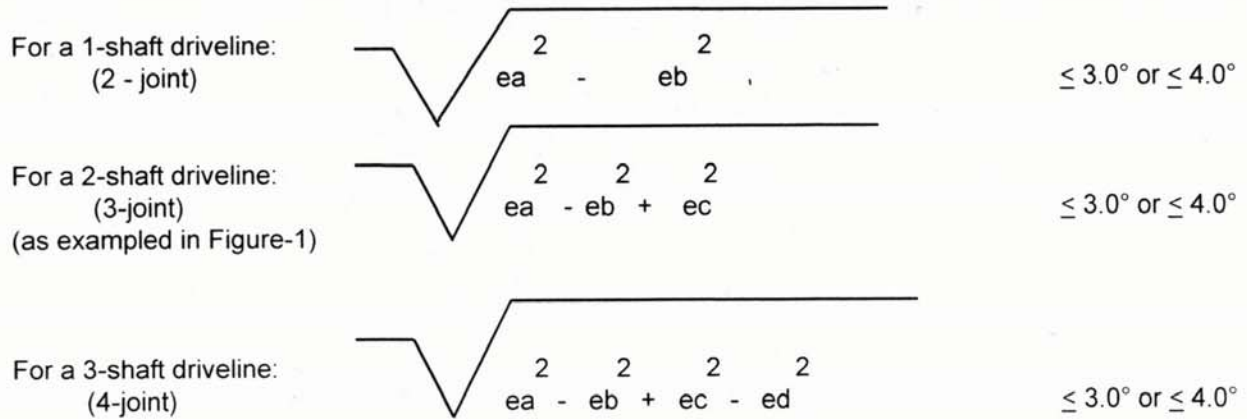


Fig. 1



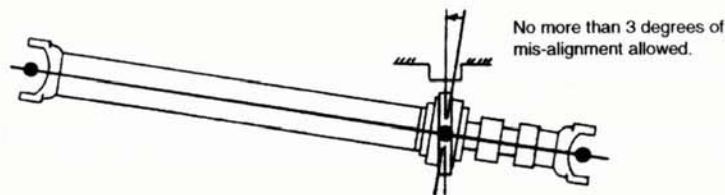
Guideline - Driveline Angles (Continued)

Rule #2: The combination of NET OPERATING ANGLES, throughout the whole driveline, **must** "cancel". It is preferred that the NET OPERATING ANGLES at either end of a shaft be within 1 degree of each other. However, at a minimum, the following formulas must be satisfied for sufficient "cancellation" to occur:

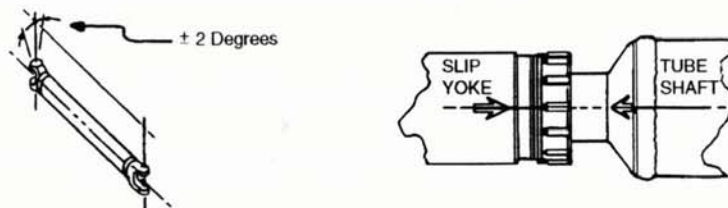


Rule #3: The center bearing mounting bracket, surrounding the rubber insulator, must be **90 ± 3 degrees** to the center bearing. In other words, no more than 3 degrees of mis-alignment can be absorbed by the rubber surrounding the center bearing. See Figure 2.

Fig. 2



- A. Ensure that u-joints are in-line to within ± 2 degrees.
- B. Ensure matching alignment arrows between slip yoke and tube shaft



Observe alignment arrows stamped on parts. If there are no alignment marks, then add them before disassembly to ensure proper phasing alignment of shaft and yoke.

GUIDELINE - DRIVELINE COMPONENT PHASING

MINIMUM UNIVERSAL JOINT OPERATING ANGLE:

A slight angle is required to prevent universal joints from brinelling. Therefore, a minimum operating angle of 1/2 degree is required.

MAXIMUM UNIVERSAL JOINT OPERATING ANGLE:

Universal joint operating angles can be quite high, sometimes as high as 12 degrees. But to get a vehicle to operate successfully above 3 degrees often requires larger universal joints, double cardan or constant velocity joints, or restrictions on operating speed. A reduction in universal joint life becomes noticeable when they are operated at more than 3 degrees if precautions are not taken. That having been stated, the **F Super Duty series** tolerate angles up to 4 degrees. However, maximum angles of 2 degrees are preferable for all vehicles.

Two shafts connected with a single cardan joint and turning at a constant speed with no joint angle, have no angular acceleration that could cause a vibration. When there is an angle between them and the input shaft is turning at a constant speed, the driven shaft is forced to continuously accelerate and decelerate, twice per revolution, creating a vibration. If the speed changes are small, the vibration is not objectionable. The guidelines in this appendix limit driveline angular acceleration to a maximum of 400 radians per second per second. This is the requirement for all **Ford trucks**. (SAE specifies 500.) Some modified drivelines have been measured at over 11,000 radians per second per second causing driveline failures at very low mileage.

DRIVELINE ANGLE MEASUREMENT:

Driveline angle measurements should be made with the vehicle supported by the tires and resting on a level surface. Avoid hoisting a vehicle by the frame since this will distort the chassis enough to make any measurements inaccurate.

MATCH MOUNTING DRIVESHAFTS TO THE REAR AXLE:

Runout is measured on OEM rear axle input shafts and the maximum measurement is shown with a dot or other marking on the yoke or pilot bearing flange. The OEM driveshafts may also be marked with indicative marking on the "light" side. When the parts are assembled, the marks are aligned to aid the overall system balance. Vehicle modifiers should look for these alignment marks and maintain this match when the drivetrain is reassembled after modification. Remanufactured or modified driveshafts should also have their "light" sides matched to the mark on the yoke or pilot bearing flange.

DRIVELINE VIBRATION DAMPERS:

Driveline vibration dampers are sometimes added to driveshafts or axles to reduce noise, vibration, and harshness (NVH). If the chassis has these devices when it is received, they should be retained on the modified chassis.

USE OF DOUBLE CARDAN UNIVERSAL JOINTS FOR GREATER DRIVE ANGLES:

In general, the use of these joints can allow increased drive angles up to as much as 8 degrees. However, when used at the rear of a coupling shaft a double cardan universal joint will prevent cancellation from occurring at the forward end of the shaft. Therefore the single cardan joint must still be maintained at less than 3 degrees (or 4 degrees for the **F Super Duty series**).

GENERAL COMMENTS:

It is good practice, for any chassis that will have a driveline modification, to measure and record the driveline angles in each of the following conditions for later comparison.

- A. The chassis as first received from Ford (note that the drive angles may not conform exactly to this bulletin in this incomplete condition).
- B. The completed vehicle, unloaded.
- C. The completed vehicle loaded to GVWR with maximum front GAWR.
- D. The completed vehicle loaded to GVWR with maximum rear GAWR.

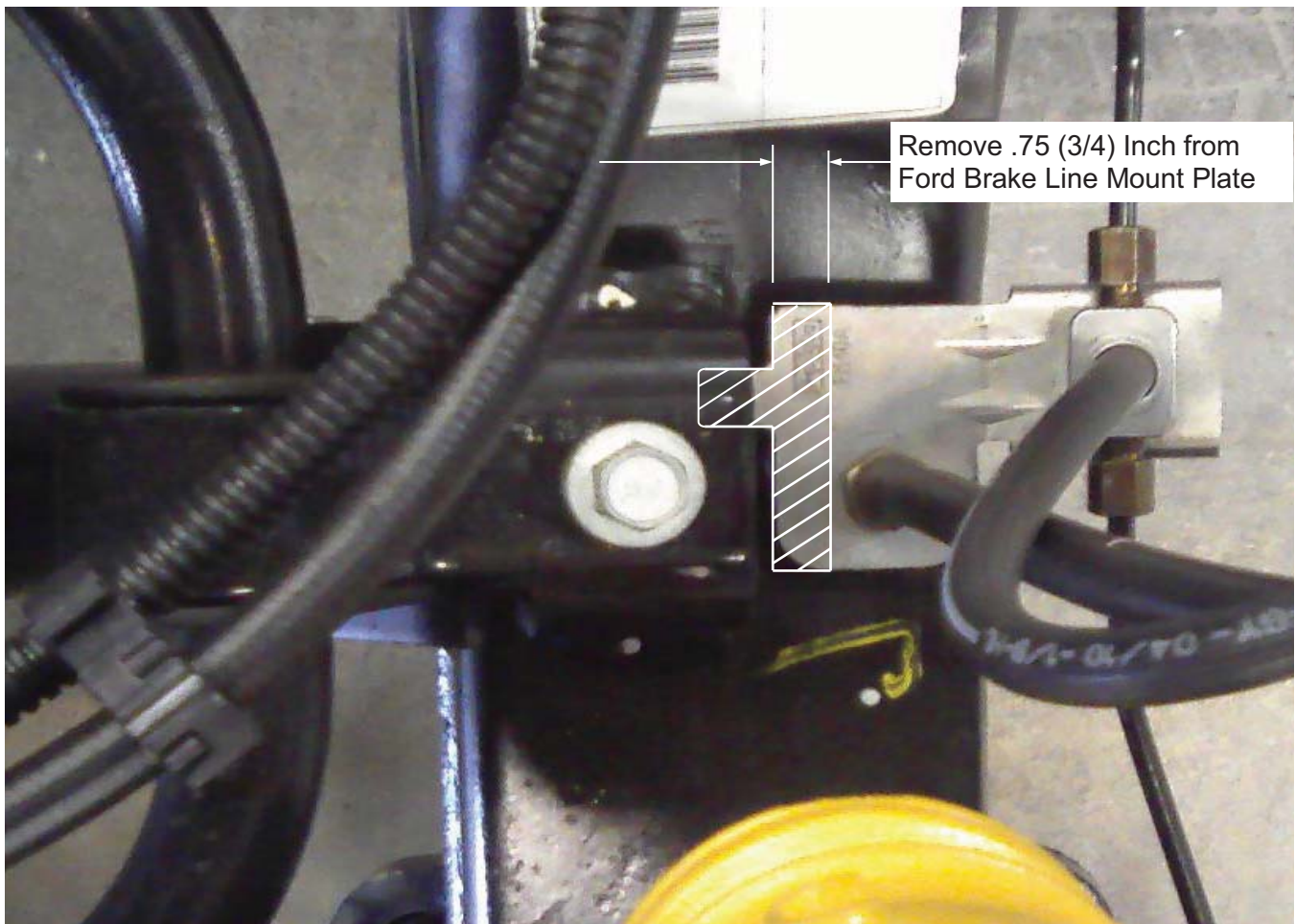
Link® UltraRide® Chassis Air Suspension

8M000097—UltraRide Assembly Addendum

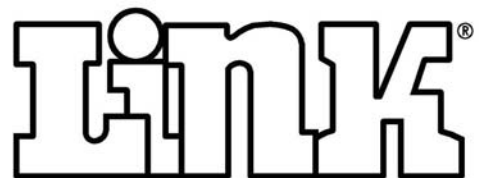
IMPORTANT!!!

This manual addendum contains important information regarding installation of the UltraRide 8M000097 suspension.

1. On 2011 Ford F-450 and F-550 trucks a brake line mounting plate has been added. This plate interferes with the Link Upper Axle Bracket (part number 830M0005).
2. Before Installing Link Upper Axle Bracket, cut away .75 inches of the Ford Brake Line Mounting Plate as shown in picture below.



3. With portion of Brake Line Mount Plate removed, Link Upper Axle Bracket can now be installed per Installation Manual.



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