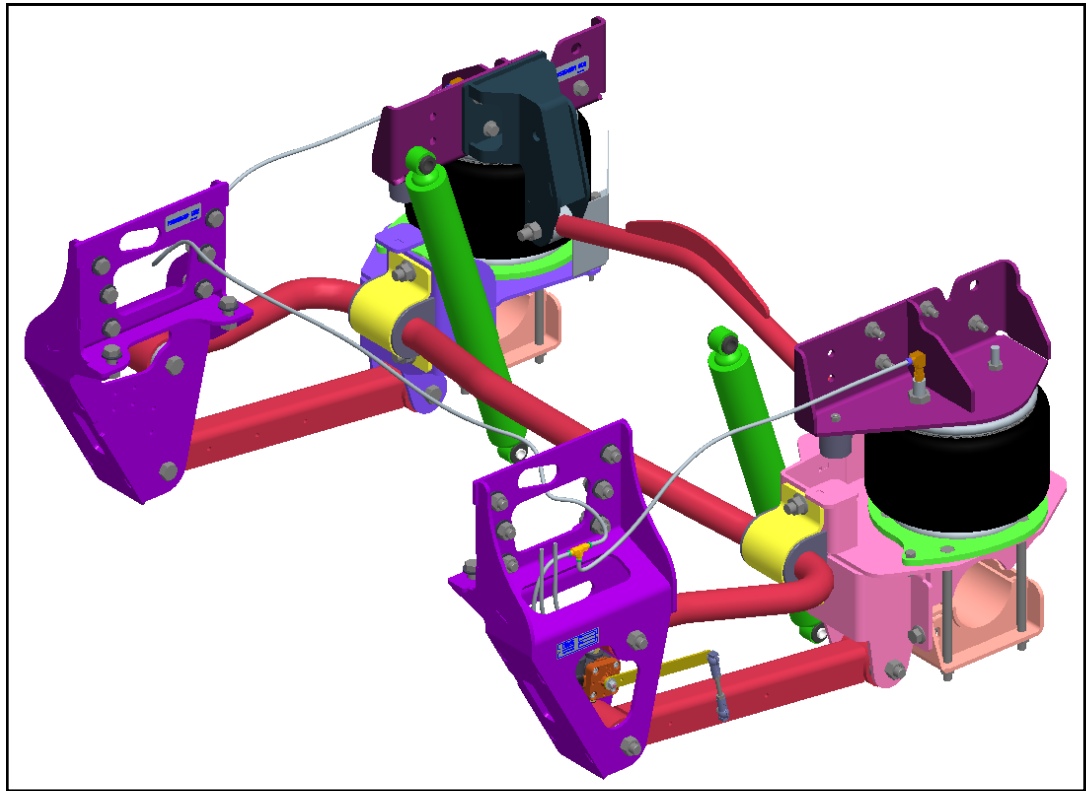




**FORD F350 SUPER DUTY CHASSIS
CABS W/ AMBULANCE PREP PACKAGE
2005-2007 MODELS
Link Part Nos. 8M000068**



Questions ? Contact this Professional Installer :

Company : _____

Phone : _____

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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

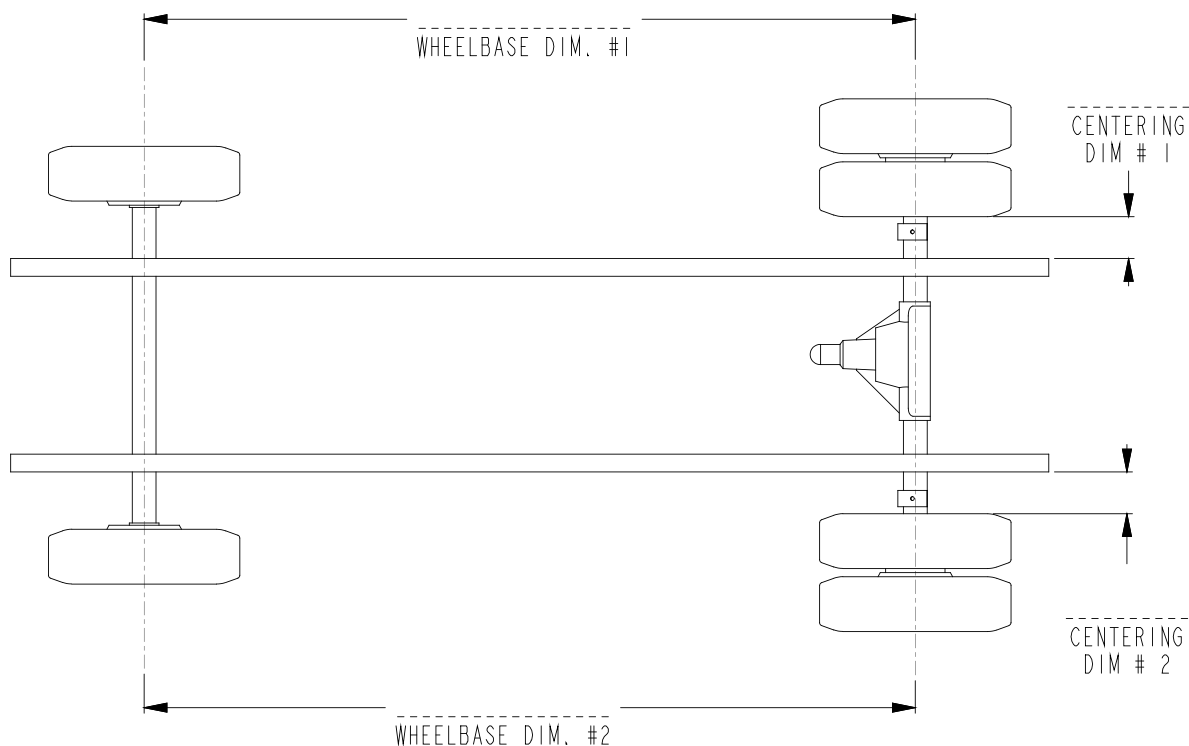
- ❑ Installer is responsible for installing the product in accordance with Link Mfg. specifications and installation instructions.
- ❑ Installer is responsible for providing proper vehicle components and attachments as well as required or necessary clearance for suspension components, axles, wheels, 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.	<p>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.</p> 	

PRE-INSTALLATION CHECKLIST

- ❑ Check the vehicle wheel alignment prior to installation to insure no precondition already exists; record the information for verification.
- ❑ 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.
- ❑ Measure & record the wheelbase and centering dims before beginning installation.



INTRODUCTION (cont.)

INSTALLATION NOTES:

- ❑ Drilling of “4” new frame holes will be required for mounting of the Air Spring brackets during the suspension installation.
- ❑ **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)

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).

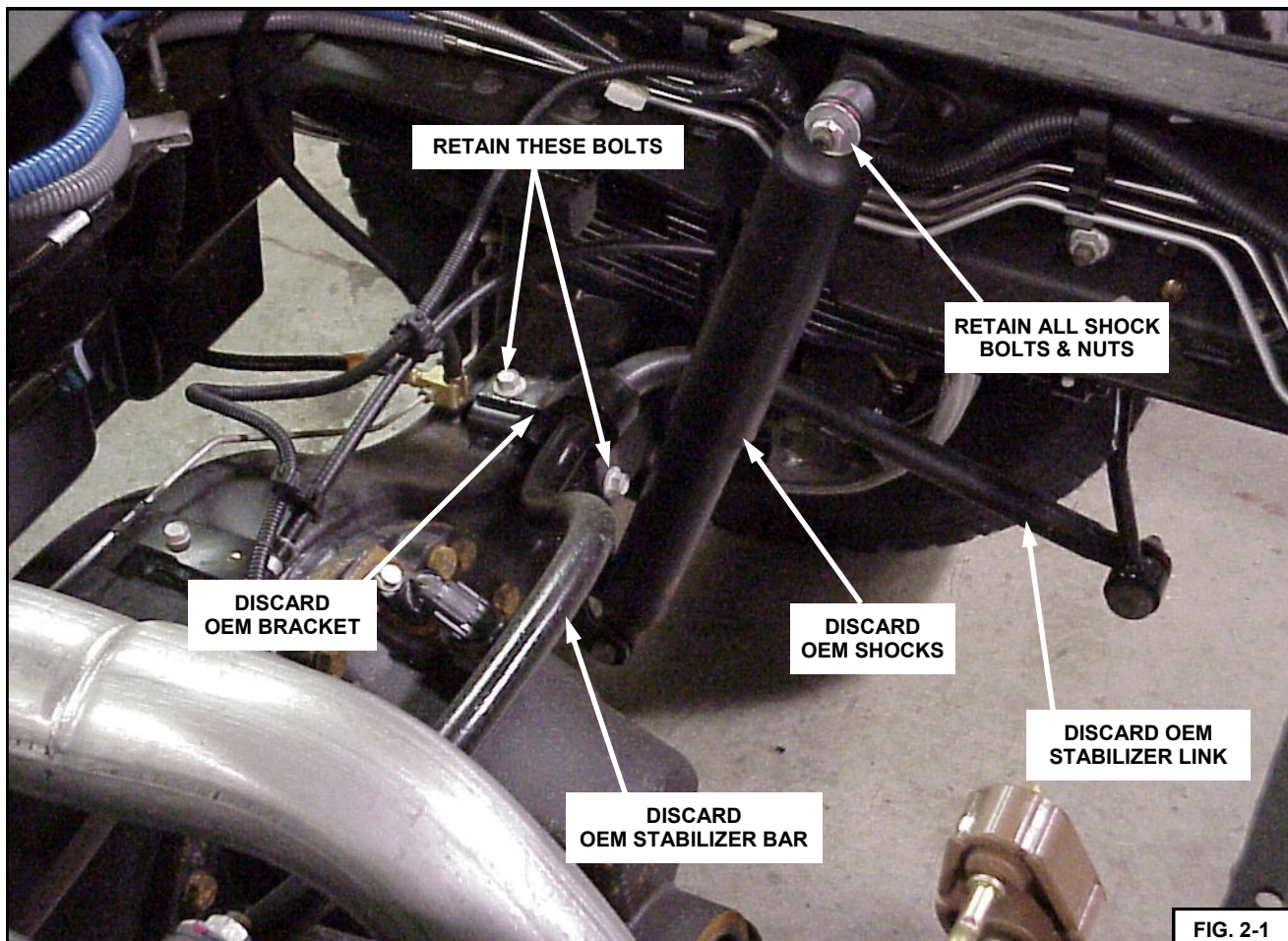


FIG. 2-1

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.



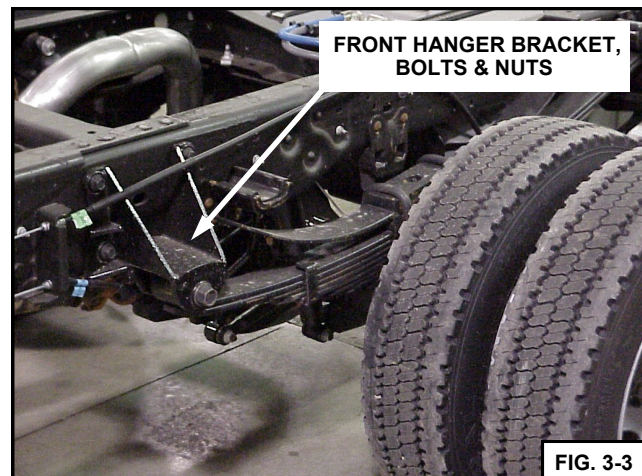
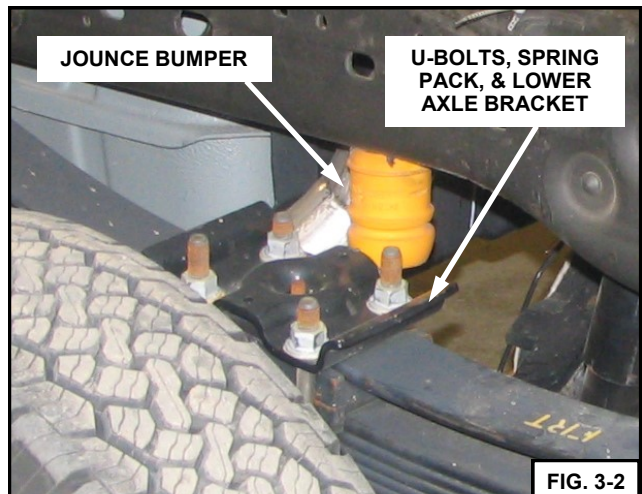
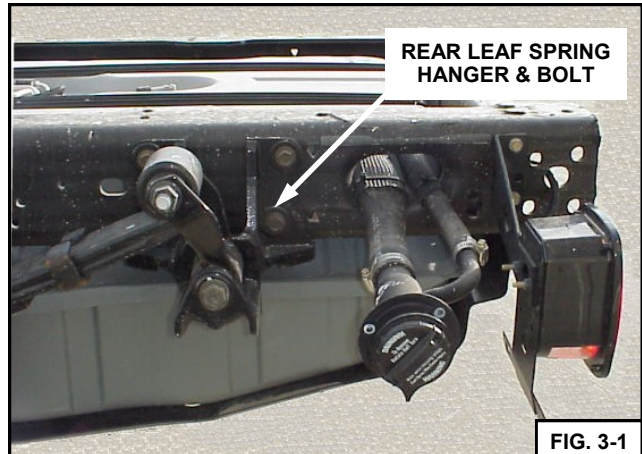
CAUTION: Take care when removing the leaf spring bolt(s). The leaf spring may move unexpectedly.

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 these components. See Figure 3-2.
3. Remove the **front spring hanger bracket**, **rear leaf spring hanger bracket**, and any **overload spring brackets**. 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 3-1 & 3-3.

NOTE: Removal of the rear leaf spring hanger bracket is not required for suspension fit.

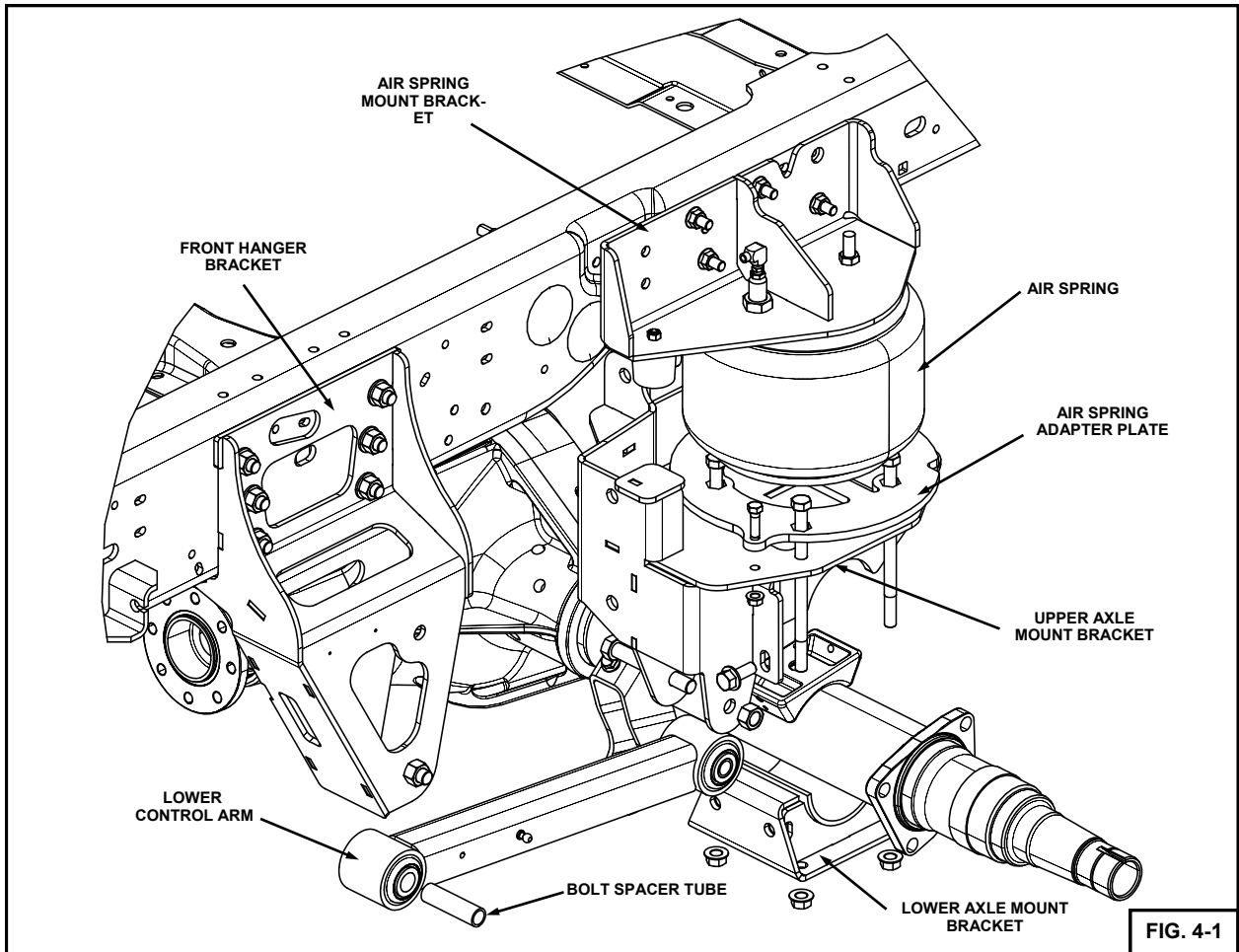
NOTE: In removing the front hanger brackets it will also be necessary to remove the rivets on the bottom of the frame attaching the crossmember to the frame.


4. Remove the **OE jounce bumper**. See Figure 3-2.

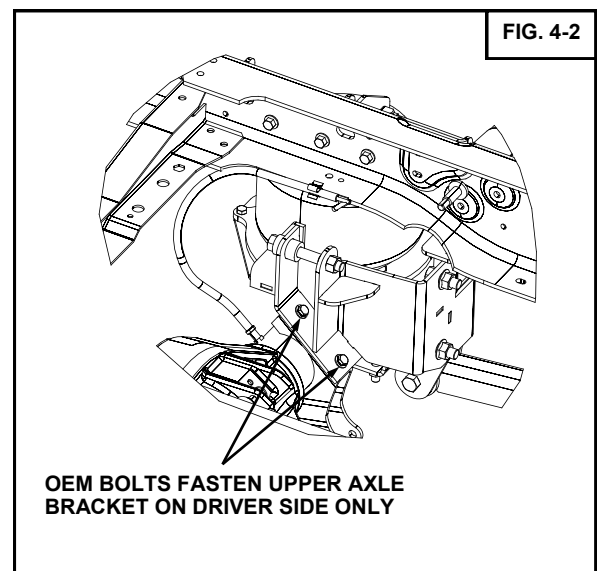



4. DRIVER SIDE ASSEMBLY


1. Review Figures 4-1 & 12-3 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.  Fasten the Front Hanger to the frame using the (8) 9/16 x 1 1/2 UNF BOLTS, (8) 9/16 UNF NUTS and (16) 9/16 FLAT WASHERS. (See Table 12-1 for appropriate Torque)
4. Place the Upper Axle Bracket onto the top of the axle and spaced appropriately over the axle seat. Insert the (4) 1/2 x 8 UNC BOLTS into the Upper Axle Bracket.




-  5. Place the air spring assembly onto the Upper Axle Bracket. Ream the indicated holes to 0.47" to insure clearance. Also drill 2 new holes as indicated to 0.47" Fasten the Upper Air Spring Mount to the frame using the (5) 7/16 x 1 1/4 UNC FLANGE BOLTS and (5) 7/16 UNC TOP LOCK FLANGE NUTS with the nuts on the outside of the frame. See Figure 4-3 & 4-4. (See Table 12-1 for appropriate Torque) **Notes: Some holes in the bracket are clearance holes only. The passenger side will have 4 of the 5 bolts as welded in studs on the Lateral Control Rod Mount.**

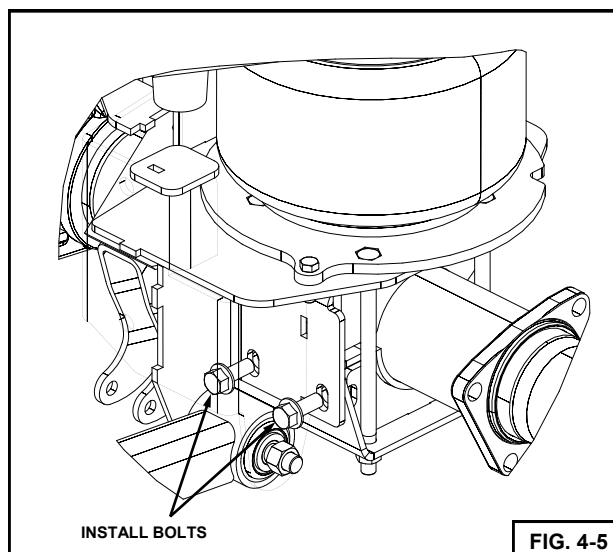
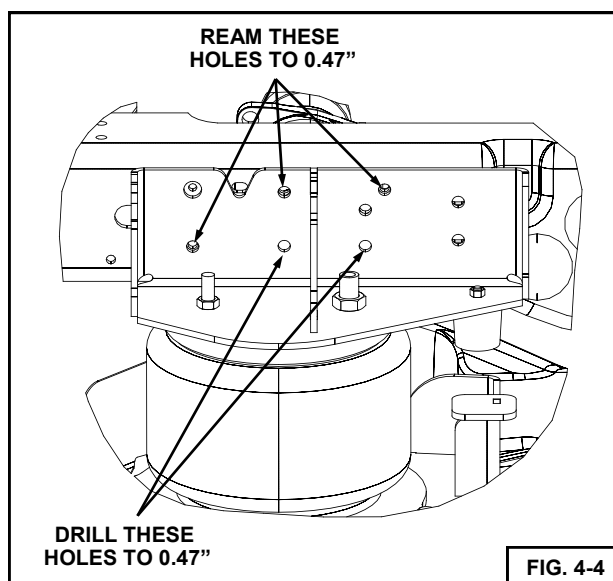
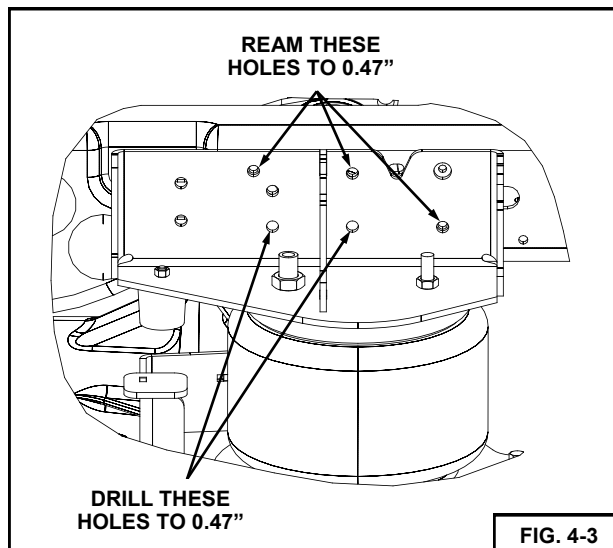
-  6. **DRIVER SIDE ONLY:** Fasten the Upper Axle Bracket to the OEM stabilizer bar mount location on the axle using the 10mm OEM fasteners that were retained from Section 2.2. See Figure 4-2. (See Table 12-1 for appropriate Torque) **Note:** Do not over-tighten these bolts to prevent stripping the captive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

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

-  8. Bolt the Upper Axle Bracket to the Lower Axle Bracket from the front using (2) 1/2 x 1 1/4 UNC FLANGE BOLTS. See Figure 4-5. (See Table 12-1 for appropriate Torque)

-  9. Bolt the Air Spring Adapter Plate to the Upper Axle Bracket using the (2) 3/8 X 1 1/4 UNC HEX BOLTS and (2) 3/8 UNC TOP LOCK FLANGE NUTS. **PASSENGER SIDE ONLY:** Bolt the heat shield around the Air Spring with the 1/4 X 1 CARRIAGE HEAD BOLT, WASHER, and NUT. (See Table 12-1 for appropriate Torque)

10. Insert the bolt spacer tube into the bushing IDs of the Lower Control Arm. Loosely fasten the Lower Control Arm to the Lower Axle Bracket using the 5/8 x 4 1/2 UNF BOLT and 5/8 UNF TOP LOCK NUT.

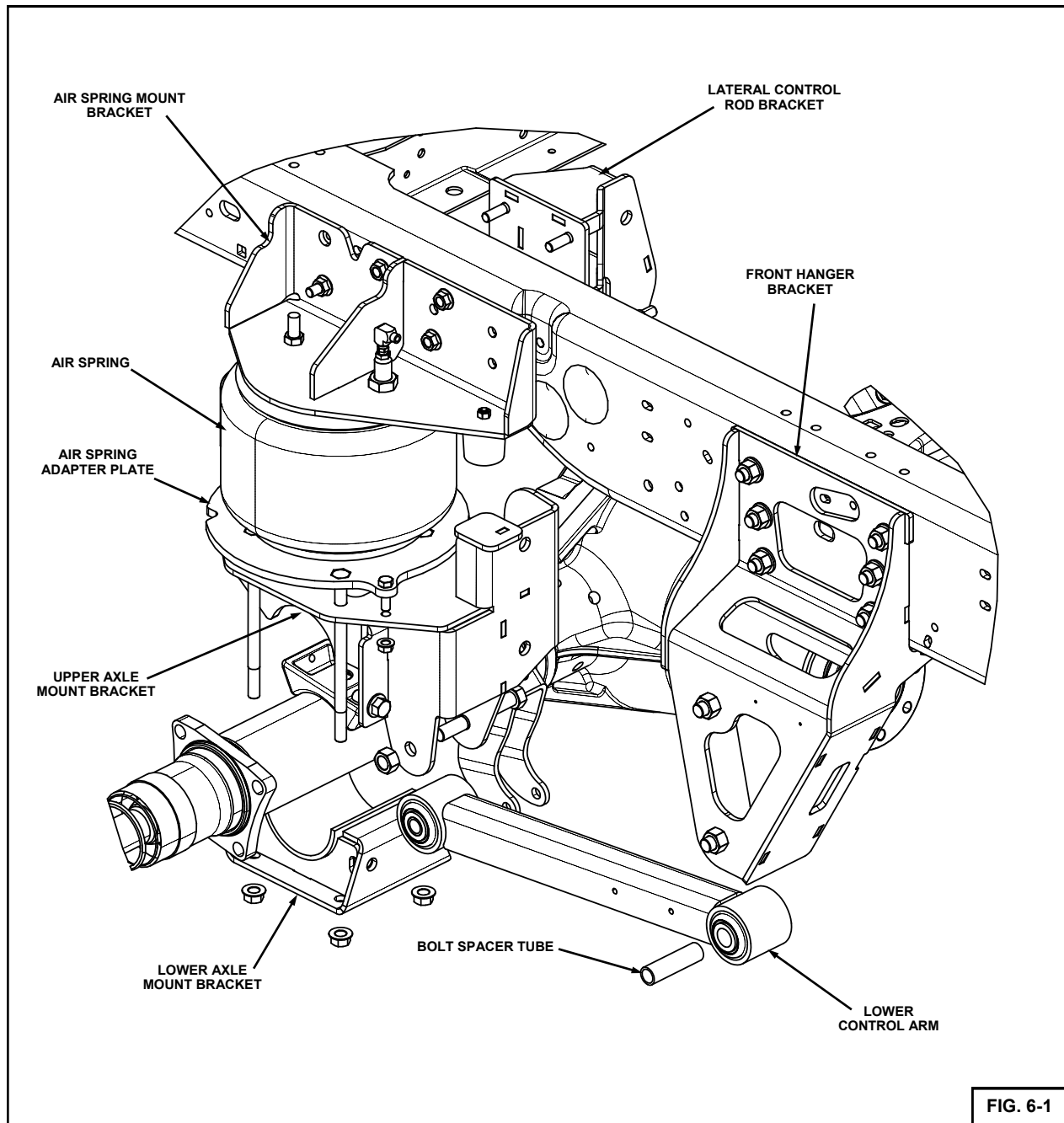


5. PASSENGER SIDE DISASSEMBLY

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

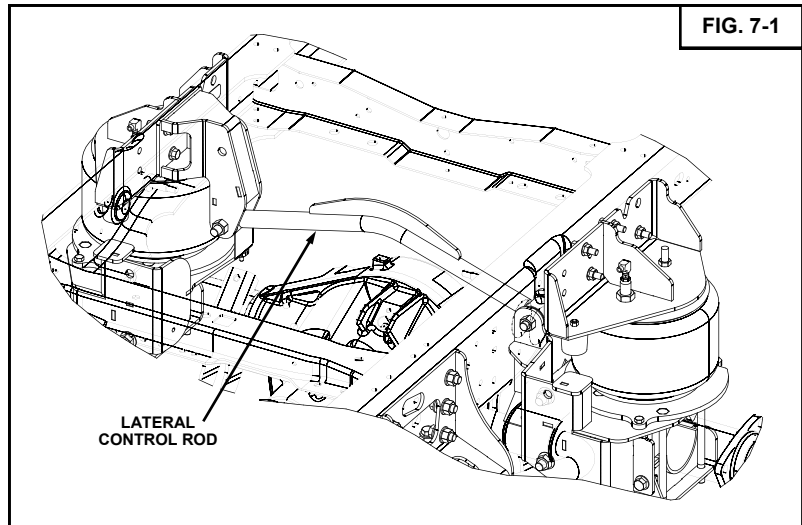
6. PASSENGER SIDE ASSEMBLY

1. Repeat Section 3 for the passenger's side of the truck.



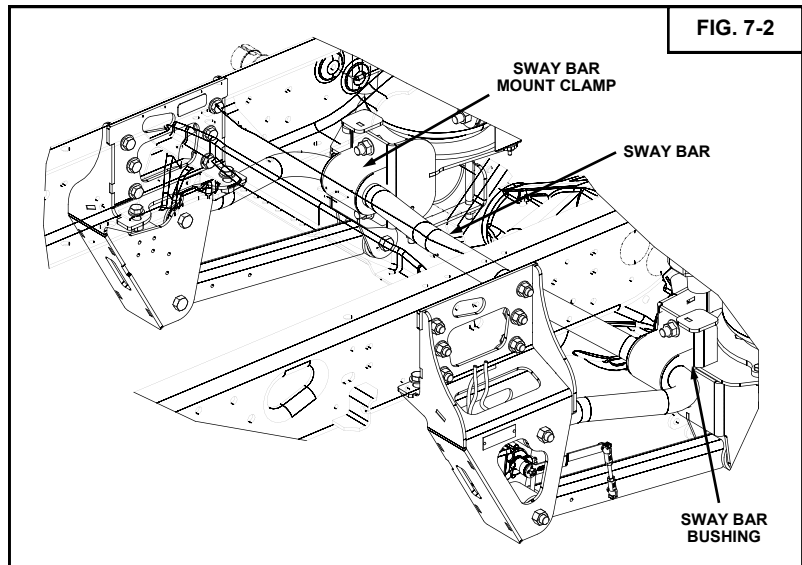
7. LATERAL CONTROL ROD & STABILIZER BAR

1. Loosely mount the Lateral Control Rod between the two sides using (1) 5/8 X 3 1/2 UNF BOLT (on the passenger side), (1) 5/8 X 4 1/2 UNF BOLT (on the driver side) and (2) 5/8 UNF TOP LOCK NUTS. See Figure 7-1 for details.



2. Install the Stabilizer bar with the center bend pointing up, away from the pinion. Insert the Bolt Spacer in the front arm bushings IDs and loosely fasten to the Front Hanger Bracket using the (2) 5/8 x 4 1/2 UNF BOLT and (2) 5/8 UNF TOP LOCK NUT.

3. 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 axle brackets, and fasten to the Upper Axle Mounts using the stabilizer bar mount clamp and (4) 5/8 x 1 1/2 UNF FLANGE BOLTS and (4) 5/8 UNF FLANGE NUTS. (See Table 12-1 for appropriate Torque) See Figure 7-2.



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.

8. SHOCKS AND BRAKE LINE ROUTING

1. Install the new shock absorbers using the same orientation as factory, and factory hardware.
2. **Route the brake cable away from the air spring and other moving components.** It may need to be tied, or slightly repositioned in order to accommodate this. If the chassis has the passenger side parking brake cable in the front of the axle, reposition it by doing the following:
 - a Cut the rivet that holds the cable on the top of the differential, **carefully** cut the metal ferule, lengthwise to release it from the cable (**do not cut into the cable**).
 - b Slide approximately 3" of excess brake cable from the driver side to the passenger side, reclamp the ferule into the differential clamp and bolt together where the rivet was located (as shown in Fig. 8-1).
 - c Now drill a 5/16" hole in the Axle Bracket as shown in Fig. 8-2, and bolt the brake rod guide into the hole.

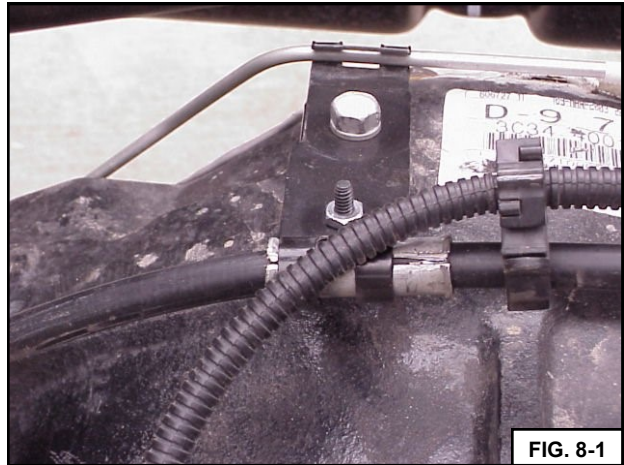


FIG. 8-1

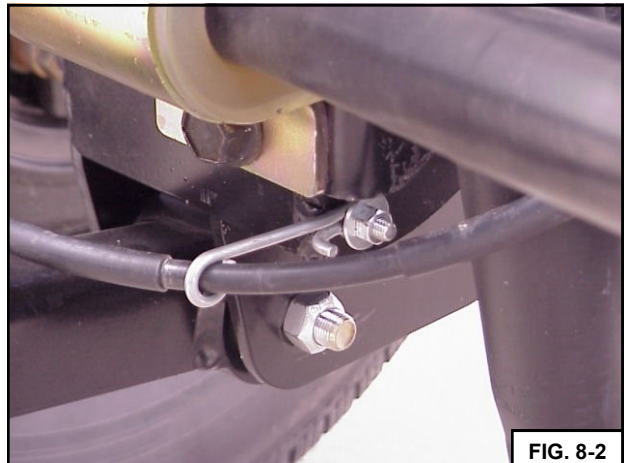


FIG. 8-2

9. AIR CONTROL SYSTEM ASSEMBLY

1. Mount the Air Control Box to the vehicle as directed in the Air Control Kit installation instructions.



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.

2. Route the (5) airlines as shown in Figure 9-1, 9-2 and 9-3.
 - ❑ Route AIRLINE 1 from the supply port of the Height Control Valve to the lower outlet port of the Air Reservoir Solenoid.
 - ❑ Route AIRLINE 2 from the dump port in the Height Control Valve to the top elbow on the Air Reservoir Solenoid.

- ❑ Route AIRLINE 5 from the del port of the Height Control Valve to the union tee supplying the Air Springs.
- ❑ Route AIRLINES 3 & 4 from the Union Tee to the Air Springs.

3. Place supplied corrugated loom onto all airlines. Use supplied cable ties and airline clips to secure airline and to keep it away from all hazardous objects. See Figure 9-2 for details.

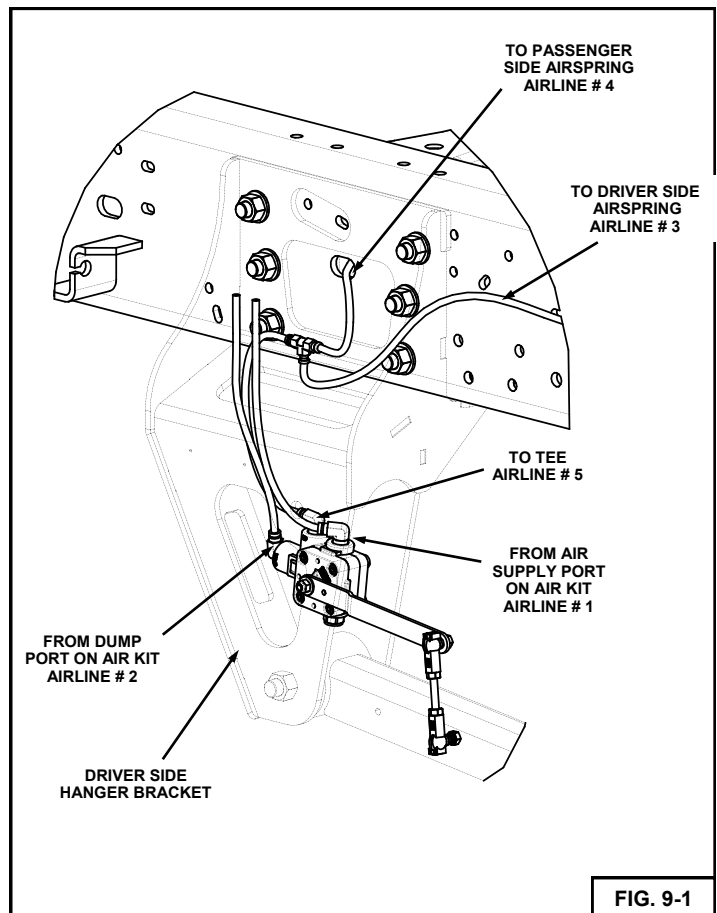


FIG. 9-1

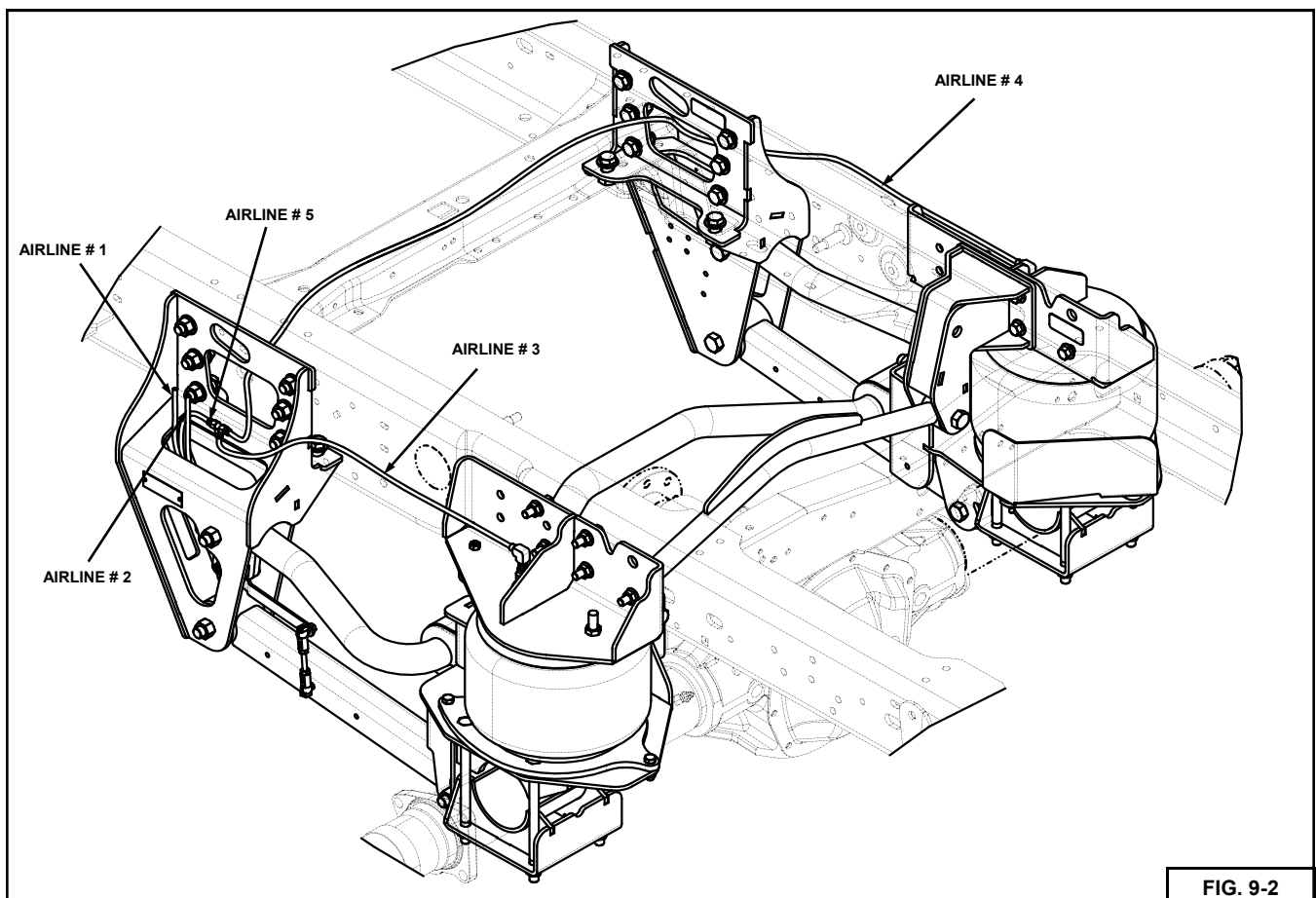
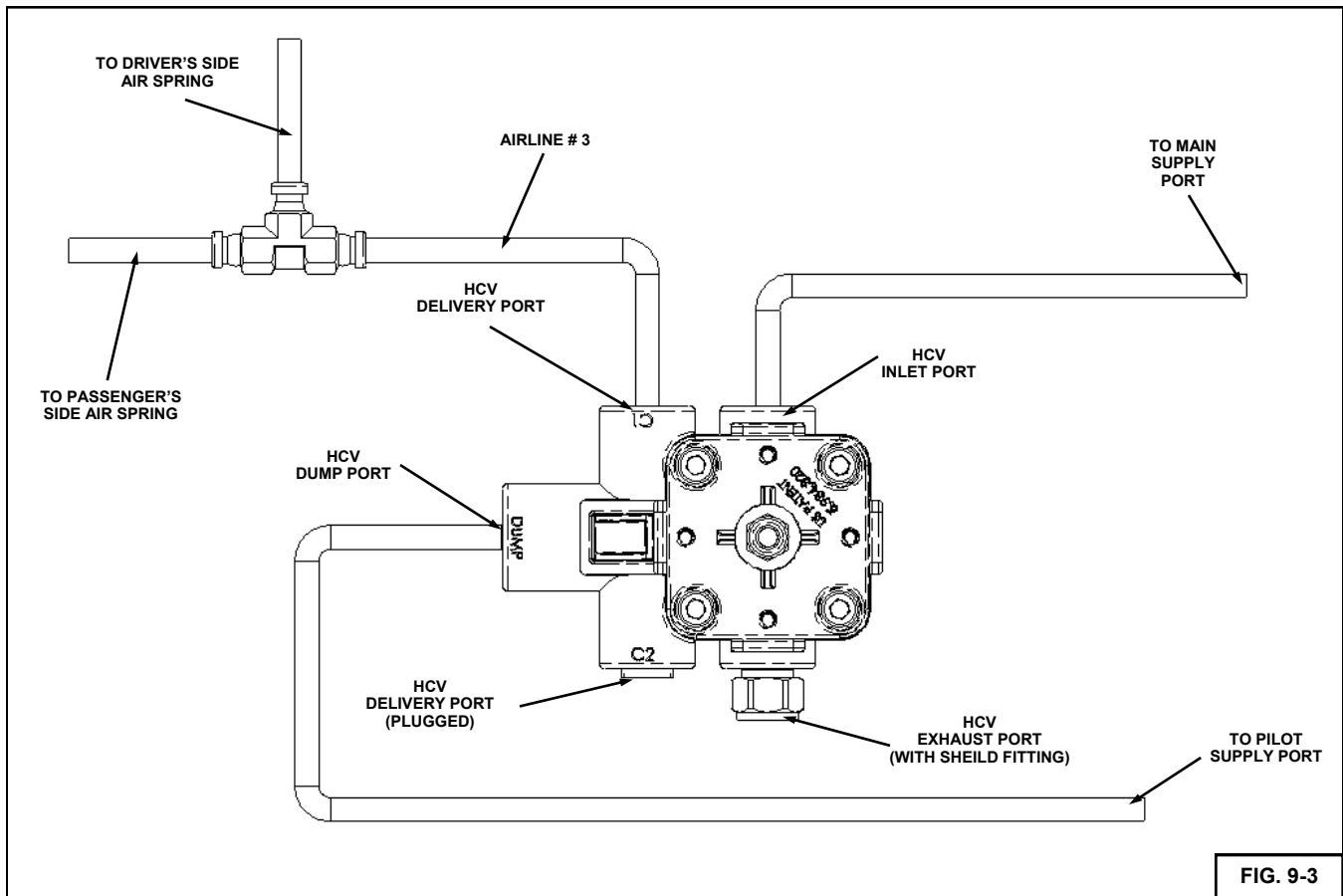


FIG. 9-2

AIR CONTROL KIT AIR CONTROL SCHEMATIC



10. ELECTRICAL SYSTEM

1. Refer to **AIR CONTROL SYSTEM INSTALLATION INSTRUCTIONS** for further details on electrical system installation and parts list.



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.

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 switching the compressor switch to "ON". Note: the maximum allowable pressure in the air tank is 150 psi. It is recommended to 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.

☐ Height Control Valve Operation Check.

With one end of the valve linkage disconnected rotate the valve arm down 45°, air should exhaust from the air springs. Rotating the valve arm up 45° should cause the valve to fill the air springs.

☐ Measure & Record the "Design Height" of the air springs.

Measure design height of the AIR SPRING at the middle of the air spring and compare with the value called out in Fig. 11-1.

To adjust the design height complete the following steps (see Figures 11-2)

- Disconnect one end of the valve linkage and adjust accordingly.
- Turn the plastic ball end joint to change the length of the linkage (increasing the length will increase the Design Height, and vise-versa).
- Tighten the lock nuts on the valve linkage when complete.

Once the design height is set, reconnect the linkages. Jostle the suspension up and down and then allow it to come back to design height. Recheck the initial measurement and adjust if needed. **Note: This procedure to set design height can be done when empty or under light load**

☐ 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 11-1 for appropriate Torque)



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

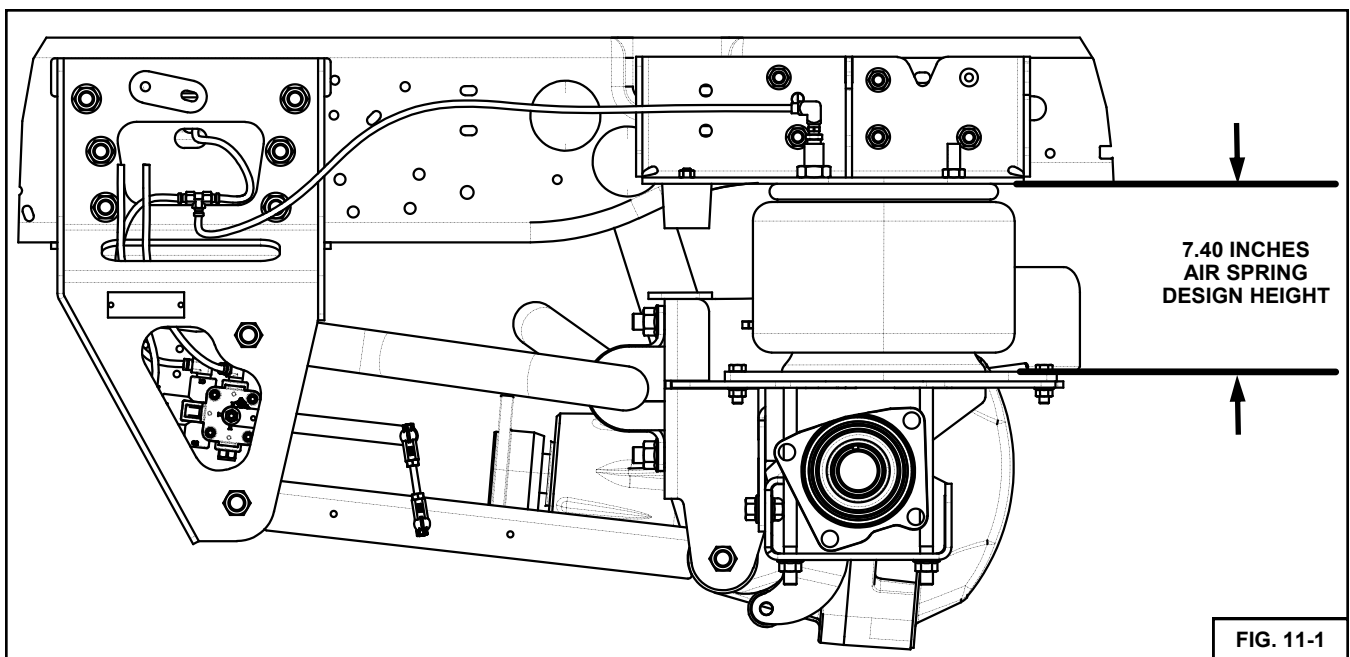
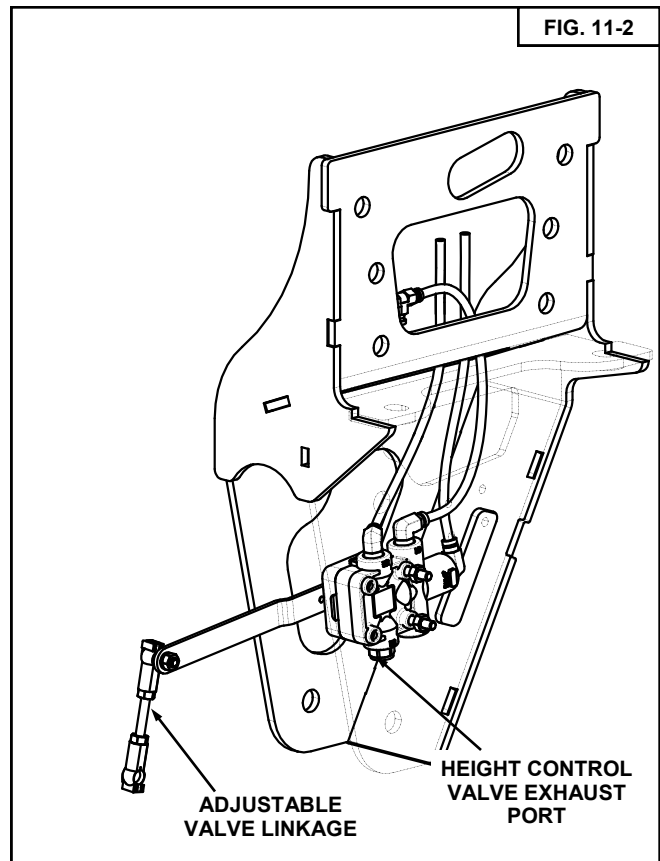


FIG. 11-1

- ☐ 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 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.
- **Kneeling Operation:** Moving the switch "ON" to Dump will exhaust all air from the air springs and lower the rear of the vehicle approximately 3-4 inches. Air springs will inflate when the switch is returned to the "OFF" position. **WARNING: Do not drive the vehicle while the Dump Switch is on and the air springs are deflated.**
- **IMPORTANT!** During servicing check tightness of all fasteners and for any air system leaks.
- **IMPORTANT!** Immediate corrective action should be taken if malfunctions occur.
- **Air Spring Design Height Setting Procedure for Systems with Dual Height Control Valves**
 1. Deflate the passenger side air bag by disconnecting the linkage from the arm.
 2. With the driver side linkage connected, measure the design height and adjust accordingly by the methods mentioned above,
 3. Once the design height is set for the driver side, repeat the same steps for the passenger side, including deflating the driver side air bag.
 4. Once the design height is set, reconnect the linkages.
 5. Jostle the suspension up and down and then allow it to come back to design height. Recheck the initial measurement and adjust if needed. **Note: this procedure to set design height can be done when empty or under light load.**



TORQUE TABLE (Table 12-1)

LOCATION	FASTENER	TORQUE
FRAME MOUNTED FRONT HANGER	9/16 UNF NUTS	134 FT-LBS
AIR SPRING BRACKET	7/16 UNC NUTS	70 FT-LBS
DRIVER SIDE OE D-BUSHING ATTACHMENT	10 mm OE BOLTS	33 FT-LBS
AXLE BRACKET (LONG BOLTS)	1/2 UNC NUTS	106 FT-LBS
AXLE BRACKET (SHORT BOLTS)	1/2 UNC BOLTS	106 FT-LBS
AIR SPRING ADAPTER PLATES	3/8 UNC NUTS	31 FT-LBS
HEAT SHEILD	1/4 UNC NUT	8 FT-LBS
STABILIZER BAR D-BUSHING MOUNTS	5/8 UNF NUTS	180 FT-LBS
LOWER CONTROL ARM & STABILIZER BAR BUSHINGS	5/8 UNF NUTS	180 FT-LBS
LATERAL CONTROL ROD BUSHINGS	5/8 UNF NUTS	170 FT-LBS

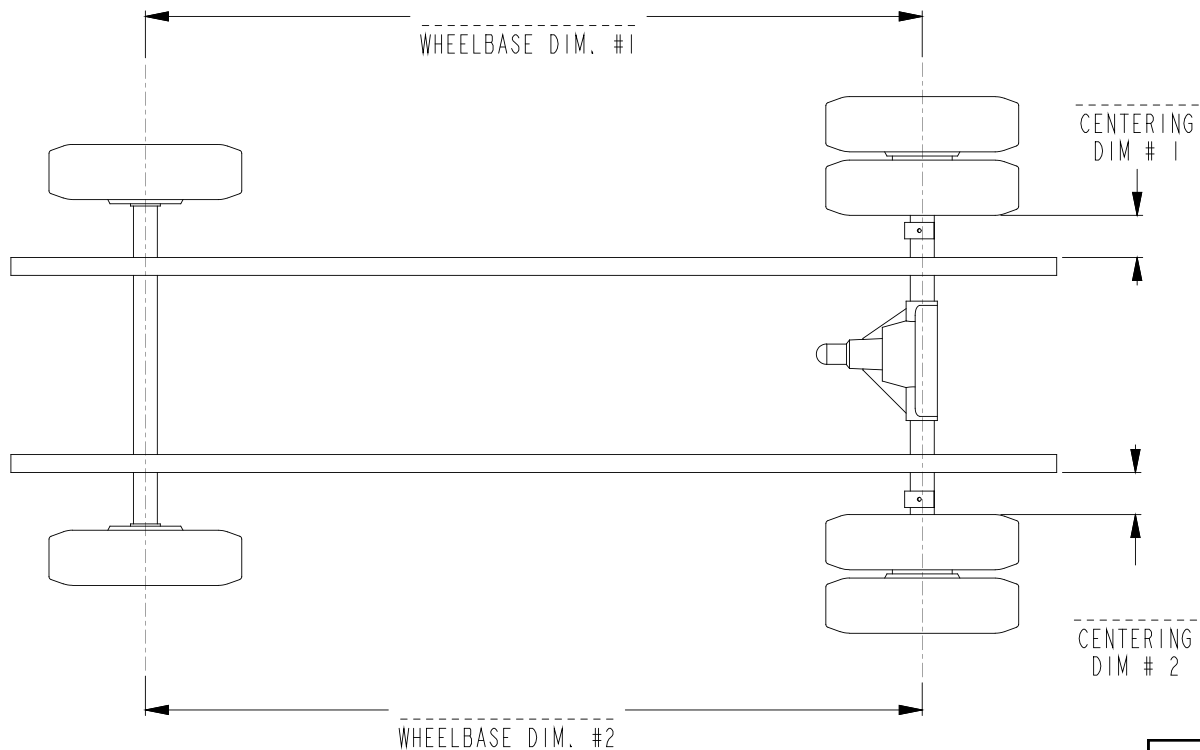


FIG. 12-2

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 on following page 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.

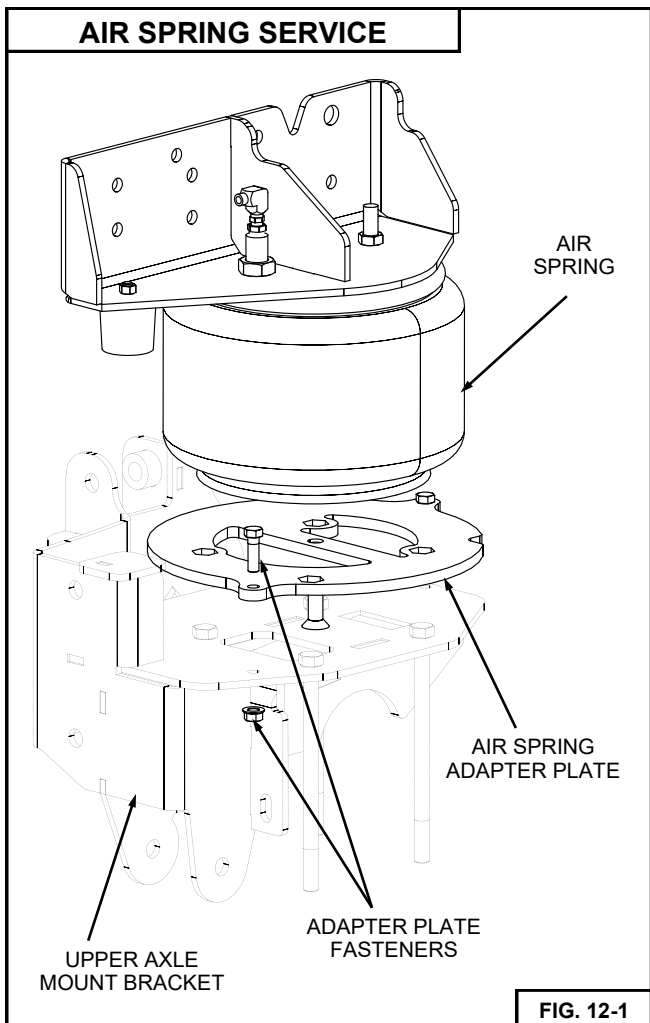
Note: It is important to release any moisture contained within the air reservoir on a daily basis. See Air Kit Manual for details. Not releasing the moisture on a regular basis will cause the drain valve to not operate properly, and may cause the valve to malfunction. Excess moisture in the system can 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 Upper Air Spring Mount (See figure 12-1).

SERVICE & MAINTENANCE CHECK LIST

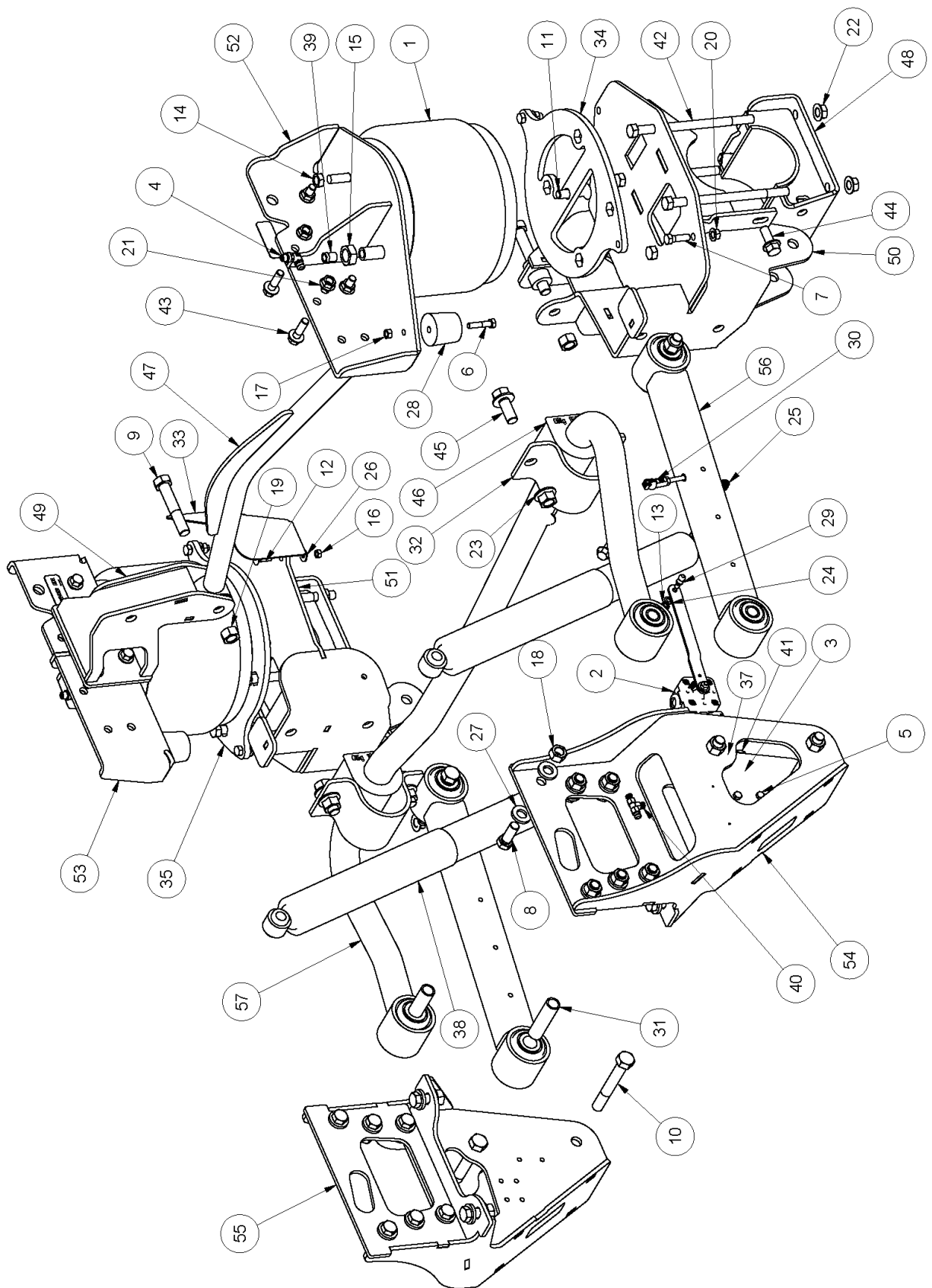
- ☐ Check and document OE rear axle alignment
- ☐ Verify Design Height at 7.40 inches
- ☐ Verify suspension function via dump and reinflation
- ☐ Check for air leaks and system integrity
- ☐ Check clearances throughout suspension motion range
- ☐ Check driveline angle
- ☐ 4 wheel alignment



UltraRide® – FORD F350 4X4 AMBULANCE PREP PARTS LIST

ITEM	PART #	DESCRIPTION	QTY	ITEM	PART #	DESCRIPTION	QTY
1	11030503	SPRING-AIR	2	30	15000242	LINKAGE-VALVE, HEIGHT CONTROL (3.50)	1
2	13010064	VALVE-CONTROL, HEIGHT	1	31	80000601	BUSHING-SPACER	6
3	13022077	AIR FTG / PLUG (1/4 NPT)	1	32	80000603	CLAMP-MOUNT, SWAY BAR	2
4	13025090	ELBOW, 1/4 TB 1/8 M-NPT, PUSH-IN DOT	2	33	80000840	SHEILD-EXHAUST	1
5	14010808	1/4 X 1 UNC HEX CAP SCR (GR 5)	2	34	80000880	PLATE-ADAPTER, AIR SPRING	1
6	14011012	5/16 X 1 1/2 UNC HEX CAP SCR (GR 5)	2	35	80000881	PLATE-ADAPTER, AIR SPRING	1
7	14011210	3/8 X 1 1/4 UNC HEX CAP SCR (GR 5)	4	36	80001508	MANUAL-INSTALLATION, ULTRARIDE, F-350	1
8	14041812	9/16 X 1 1/2 UNF HEX CAP SCR (GR 8)	16	37	80002113	BRACKET-MOUNT, HCV	1
9	14042028	5/8 X 3 1/2 UNF HEX CAP SCR (GR 8)	1	38	1210-0502	SHOCK ABSORBER	2
10	14042036	5/8 X 4 1/2 UNF HEX CAP SCR (GR 8)	7	39	1302-2014	REDUCER, 1/8 F-NPT 1/4 M-NPT	2
11	14171616	1/2 X 2 UNC SOC FLAT CSK HD CAP SCREW	2	40	1302-5563	UNION TEE, 1/4 TB, PUSH-IN	1
12	14350808	1/4 X 1 UNC RND HD SQ NK BOLT (GRADE 5)	1	41	1302-9974	MUFFLER-EXHAUST, 1/4 M-NPT	1
13	14700800	1/4 UNC HEX NUT (GR B)	6	42	140B1664	1/2 X 8 UNC HEX CAP SCR (GR 8) O&P	8
14	14741600	1/2 UNC HEX JAM NUT	2	43	141A1412	7/16 X 1 1/2 UNC FLANGE BOLT (GR 8) O&P	6
15	14752400	3/4 UNF HEX JAM NUT	2	44	141A1610	1/2 X 1 1/4 UNC FLANGE BOLT (GR 8) O&P	4
16	14760800	1/4 UNC HEX CTR LOCK NUT (GR B)	1	45	141D2012	5/8 X 1 1/2 UNF FLANGE BOLT (GRADE 8) O&P	4
17	14761000	5/16 UNC HEX CTR LOCK NUT (GR B)	2	46	1500-0843	BUSHING-SWAY BAR, POLYURETHANE	2
18	14771801	9/16 UNF HEX TOP LOCK NUT (GR C)	16	47	800M0022	LATERAL CONTROL ROD	1
19	14772001	5/8 UNF HEX TOP LOCK NUT (GR C)	8	48	800M0057	BRACKET-MOUNT, AXLE, LOWER	2
20	14801204	3/8 UNC TOP LOCK FL NUT (GR G) O&P	4	49	800M0145	BRACKET-MOUNT, LATERAL CONTROL ROD	1
21	14801404	7/16 UNC TOP LOCK FL NUT (GR G) O&P	10	50	800M0146	BRACKET-MOUNT, AXLE-LCR, UPPER	1
22	14801604	1/2 UNC TOP LOCK FL NUT (GR G) O&P	8	51	800M0147	BRACKET-MOUNT, AXLE, UPPER	1
23	14802005	5/8 UNF TOP LOCK FL NUT (GR G) O&P	4	52	810M0076	BRACKET-MOUNT, AIRSPRING	1
24	14850800	1/4 LOCK WASHER	1	53	810M0077	BRACKET-MOUNT, AIRSPRING	1
25	14850802	1/4 INT TOOTH LOCK WASHER, SS	1	54	810M0079	BRACKET-MOUNT, HANGER	1
26	14870800	1/4 TYPE A PLAIN WASHER	1	55	810M0080	BRACKET-MOUNT, HANGER	1
27	14881802	9/16 HARDENED WASHER, ZINC PLATED	32	56	820M0005	CONTROL ARM	2
28	15000070	BUMPER-JOUNCE, 1.75	2	57	820M0028	SWAY BAR ASSEMBLY	1
29	15000224	BALL-PIVOT, THREADED	2				

UltraRide® — FORD F350 4X4 AMB. PREP PARTS LIST



***UltraRide* - TROUBLE SHOOTING GUIDE**

COMPONENT	POSSIBLE PROBLEM	CORRECTIVE ACTION
Airlines	Air leaks	Replace airline
Fittings	Air leaks	Remove fitting and apply fresh joint compound. Reinstall fitting, but Do Not Over tighten. Do not use Teflon tape.
Air Springs	A. Improper height B. Air leakage	A. Adjust valve linkage to maintain proper air spring height. B. Replace air spring.
Height Control Valve	Air spring(s) will not inflate when weight is added to the chassis. <div style="text-align: center;">OR</div> Air spring(s) will not deflate when weight is removed from the chassis.	A. Inspect valves to insure alignment indicator is located correctly. The alignment indicator should be aligned with the exhaust port of the valve. If not, loosen lever nut (but do not remove completely) and pull lever loose from drive bearing, rotate drive bearing until the alignment indicator is in the correct position and re-secure lever by tightening lever nut. See Fig. 9-2 for orientation details B. Replace valve.
Shock Absorber	Insufficient damping effect	Replace shocks
Lateral Control Rod	A. Loose nuts on lateral control rod bolts B. Worn bushings	A. Tighten securely. B. Replace lateral control rod.

FORD F350 OWNERS GUIDELINES

The UltraRide suspension needs no lubrication and little maintenance. However, immediate corrective action should be taken if a serious malfunction occurs.



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

PRODUCT OWNER RESPONSIBILITIES

- ❑ Owner is solely responsible for pre-operation inspection, periodic inspections, maintenance, and use of the product as specified in the particular LINK MFG. instructions available by product model, except as provided in this warranty, and for maintenance of other vehicle components. Of particular importance is the re-torque of fasteners including axle u-bolts, torque rod bolts and track rod bolts. This re-torque must be performed within 90 days of the suspension being put in service.
- ❑ Owner is responsible for “down time” expenses, cargo damage, and all business costs and losses resulting from a warrantable failure.
- ❑ The UltraRide Chassis Air Suspension is fully automatic in controlling the height of the chassis. No manual intervention to control air pressure or ride height is needed during the course of operation.
- ❑ The Compressor Switch must be on for the compressors to operate. During difficult starting circumstances, (i.e. extremely cold weather) it is recommended to turn the compressor switch off until the vehicle is running, so it will not draw current from the battery. The compressors are controlled by the pressure switch located in the Air Control Box. This switch automatically turns the compressors on when the tank pressure falls below 100 psi, and turns them off at 120 psi.
- ❑ The Low Pressure Warning Light indicates a severe drop in tank pressure (below 60 psi). Immediate corrective action should be taken to determine the cause of air loss. Compressor switch should be turned off if Low Pressure Warning Light is on, and remains on even after the compressors have run for a normal period of time. **NOTE:** The Low Pressure Warning Light could come on briefly when the “Dump” feature is being used.
- ❑ It is important to release any moisture contained within the air tank on a daily basis. This is done by pulling on the attached release cable for approximately 5 seconds. See Air Control Kit Owners Manual for location of this cable. Not releasing the moisture on a regular basis will cause the drain valve to not operate properly.

CHECK AT EVERY VEHICLE SERVICE INTERVAL:

- ❑ Check Design Height $\pm\frac{1}{4}$ ".
- ❑ Check for air leaks around fittings.

CHECK AFTER THE FIRST 1000 MILES:

- ❑ Recheck & tighten any loose fasteners.
- ❑ Check for any loose or worn components.

CHECK AFTER EVERY 30,000 MILES:

- ❑ Check arm pivot bushings and lateral control rod bushings for wear; replace if worn

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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, or 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:

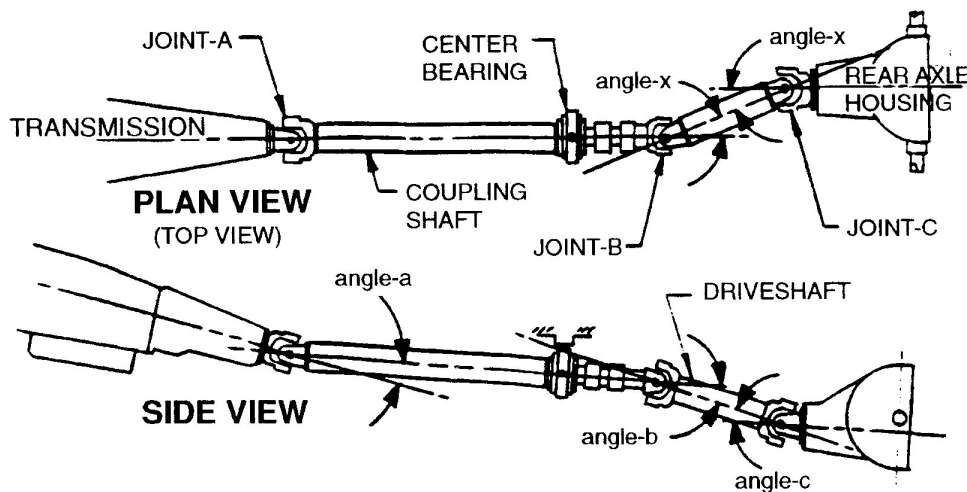
By example, using Figure 1:
The NET OPERATING ANGLE at **JOINT - A** = (ea) =

The NET OPERATING ANGLE at **JOINT - B** = (eb) =

The NET OPERATING ANGLE at **JOINT - C** = (ec) =

$$\begin{array}{l}
 \left[\begin{array}{c} \text{Plan View} \\ \text{Angle} \end{array} \right]^2 + \left[\begin{array}{c} \text{Side View} \\ \text{Angle} \end{array} \right]^2 \\
 (0)^2 + (\text{angle} - a)^2 \quad \geq 0.5^\circ \quad \leq 3.0^\circ \text{ or } \leq 4.0^\circ \\
 (\text{angle} - x)^2 + (\text{angle} - b)^2 \quad \geq 0.5^\circ \quad \leq 3.0^\circ \text{ or } \leq 4.0^\circ \\
 (\text{angle} - x)^2 + (\text{angle} - c)^2 \quad \geq 0.5^\circ \quad \leq 3.0^\circ \text{ or } \leq 4.0^\circ
 \end{array}$$

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:

For a 1-shaft driveline:
(2 - joint)

$$\begin{array}{c} \text{Diagram: A line with a single V-shaped joint.} \\ \text{Formula: } \begin{array}{c} 2 \qquad 2 \\ \text{ea} \quad - \quad \text{eb} \end{array} \end{array} \leq 3.0^\circ \text{ or } \leq 4.0^\circ$$

For a 2-shaft driveline:
(3-joint)
(as exemplified in Figure-1)

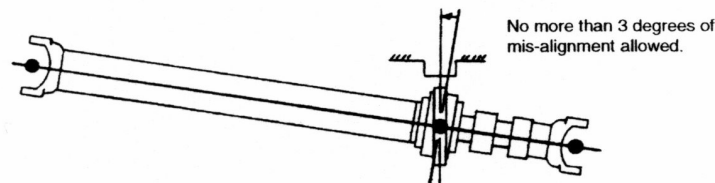
$$\begin{array}{c} \text{Diagram: A line with two V-shaped joints.} \\ \text{Formula: } \begin{array}{c} 2 \quad 2 \quad 2 \\ \text{ea} \quad - \quad \text{eb} \quad + \quad \text{ec} \end{array} \end{array} \leq 3.0^\circ \text{ or } \leq 4.0^\circ$$

For a 3-shaft driveline:
(4-joint)

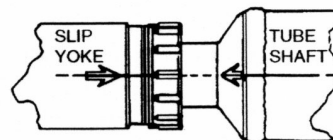
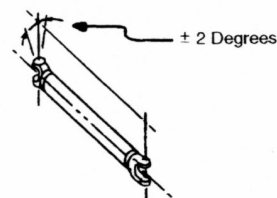
$$\begin{array}{c} \text{Diagram: A line with three V-shaped joints.} \\ \text{Formula: } \begin{array}{c} 2 \quad 2 \quad 2 \quad 2 \\ \text{ea} \quad - \quad \text{eb} \quad + \quad \text{ec} \quad - \quad \text{ed} \end{array} \end{array} \leq 3.0^\circ \text{ or } \leq 4.0^\circ$$

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 ½ 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 of trucks (F250, F350, F450, and F550) can 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 light 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 marked with a yellow dot on the yoke or pilot bearing flange. The OEM driveshafts are also marked with a yellow dot 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 dots and maintain this match when the drivetrain is reassembled after modification. Remanufactured or modified driveshafts should also have their "light" sides matched to the yellow dot.

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.

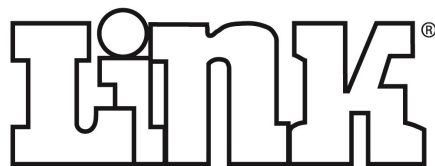
USE OF DOUBLE CARDAN UNIVERSAL JOINTS FOR GREATER DRIVE ANGLES:

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.



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