

**OWNERS MANUAL**



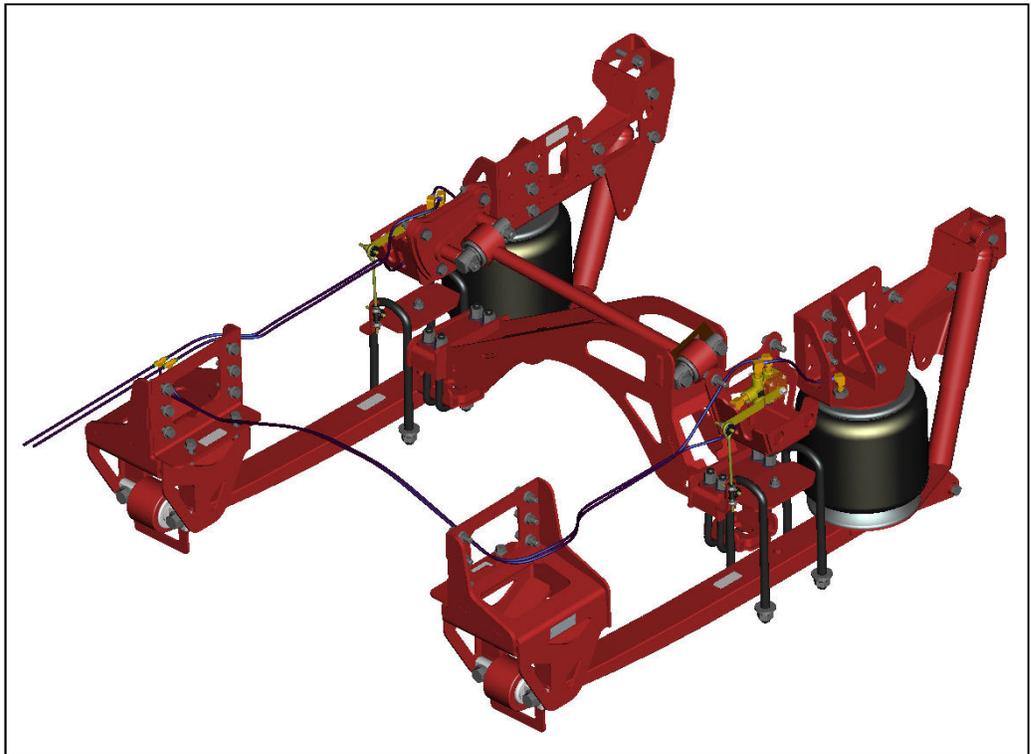
**GM C4500/C5500 4X2**

16,000-19,500 GVW RANGE

**2006-NEWER MODELS**

DANA MODEL 80 (11K), & S110 (13.5K) REAR AXLE

Link Part No. 8M000087



Questions? Contact this Professional Installer :

Company : \_\_\_\_\_

\_\_\_\_\_

Phone : \_\_\_\_\_

Installer : \_\_\_\_\_ Date : \_\_\_\_\_

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# 1. INTRODUCTION

**NOTE:** 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 suspension to vehicle attachments.
- ❑ Installer is responsible for assuring necessary clearance for vehicle and suspension components, such as axle, wheels, tires, exhaust, and air springs to ensure safe operation.
- ❑ Installer is responsible for advising the owner of proper use, service and required maintenance, and for supplying maintenance and other instruction supplied by Link Mfg.

## SAFETY SYMBOLS, TORQUE SYMBOL, and NOTES

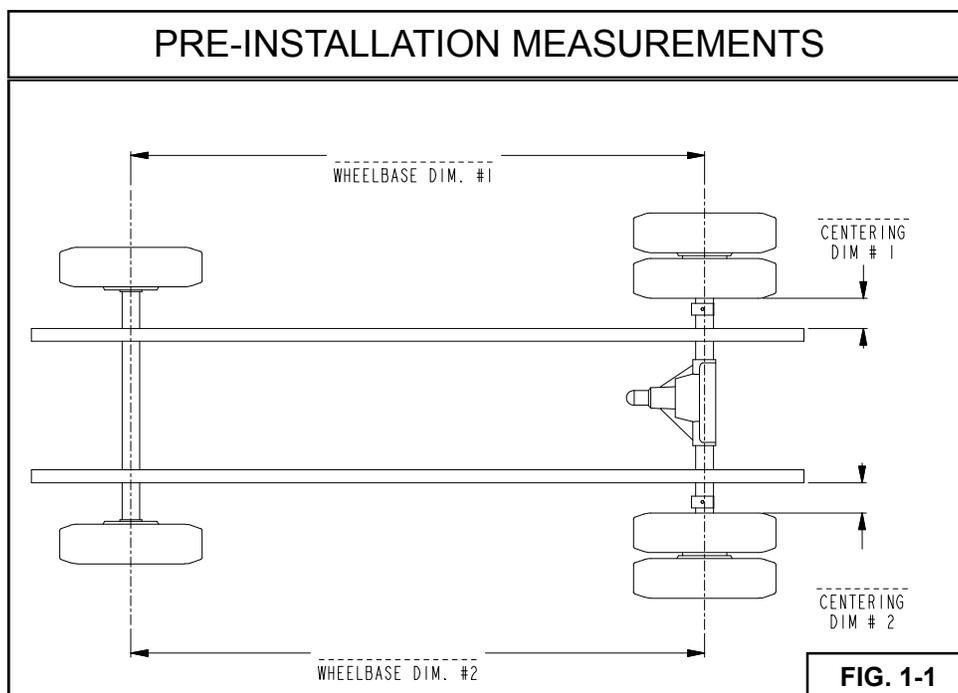
	This is the safety alert symbol. It is used to alert you to potential personal injury hazards. Obey all safety messages that follow this symbol to avoid possible injury or death.		The torque symbol alerts you to tighten fasteners to a specified torque value.
 WARNING	WARNING indicates a potentially hazardous 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.		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 10-1 in the Final Assembly section of the instructions. Failure to maintain proper torque can cause component failure resulting in accident with consequent injury.

## INSTALLATION NOTES:

- ❑ Proper tightening of U-Bolt nuts and frame mounting nuts is required for proper operation. Critical torque values are indicated by a wrench symbol. Required torque values are located Torque Table in section 7. Failure to maintain proper torque may cause component failure and may result in accident with consequent injury.
- ❑ Suspension **will not** fit vehicles with GM RPO J-69, In-Wheel Park Brake Option.
- ❑ Drilling of frame holes may be required for installation of the suspension, depending on the vehicle's fuel tank option. Air control system mounting will require drilling of holes into the frame at the location of the installer's choice.
- ❑ When installing the UltraRide suspension on the GM chassis, please reference the appropriate sections of the GM Service Manual for additional requirements.
- ❑ The OE stabilizer bar is not required with the UltraRide suspension. However, if desired, a rear stabilizer bar kit (Part Number 800M1051 for use with Automatic Chains) and a stabilizer bar re-installation kit are available from Link Mfg. (Part Number 800M1044).

## PRE-INSTALLATION CHECKLIST

- ❑ Check the vehicle wheel alignment prior to installation to insure no precondition already exists; record the information for verification.
- ❑ Measure the wheelbase and axle centering dimensions before beginning installation. Record the information below in Fig 1-1.
- ❑ Remove the attached body, if necessary. Remember to disconnect all electrical connections to the body, and fuel filler tube, before removing the body. The installation may also be completed using a lift to raise the vehicle. If using a lift, chassis body removal may not be necessary. Removal of rear wheels will aid in installation. *Refer to GM Document 812944 and 827666.*
- ❑ When installing the suspension without using a lift:
  - ❑ Block the front wheels (both sides, front and rear of tire) and apply the emergency brake so the vehicle cannot roll.
  - ❑ Jack up the rear frame of the chassis in order to unload the rear leaf springs (or use an overhead hoist).
  - ❑ Do not lift the wheels off the ground.
  - ❑ Do not jack on any part of the axle.
- ❑ Install the suspension in the sequence listed in this instruction manual. Install one side of the suspension at a time. First, install the driver side completely, then install the passenger side.

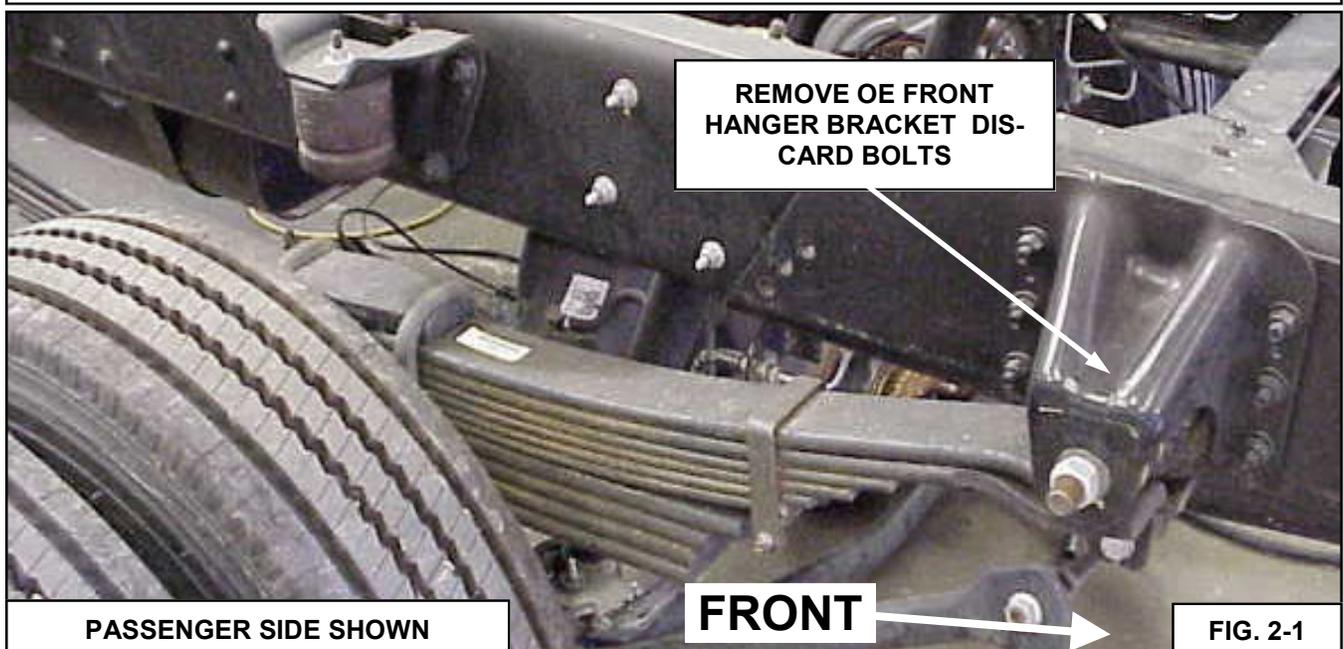


## 2. DRIVER SIDE DISASSEMBLY

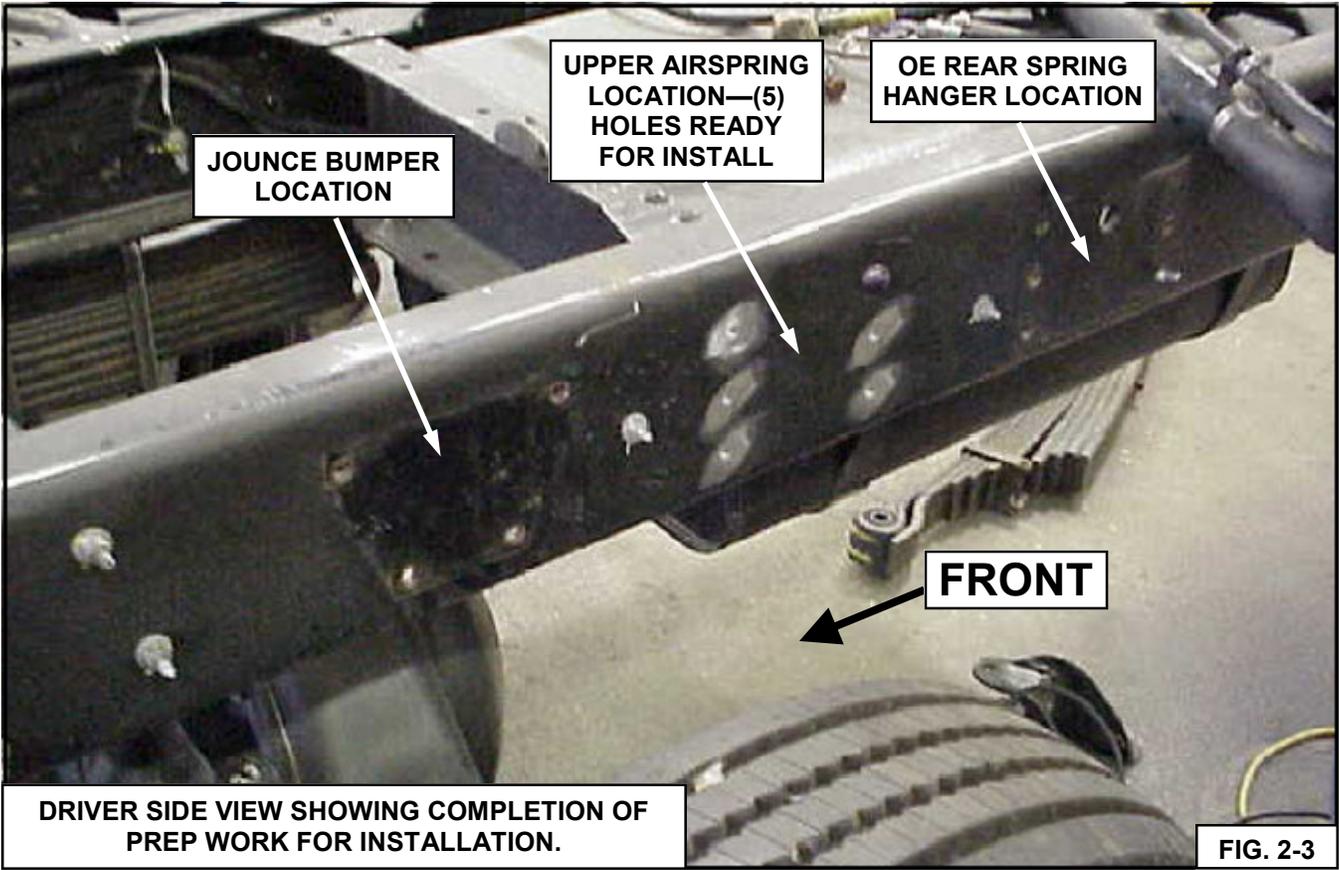
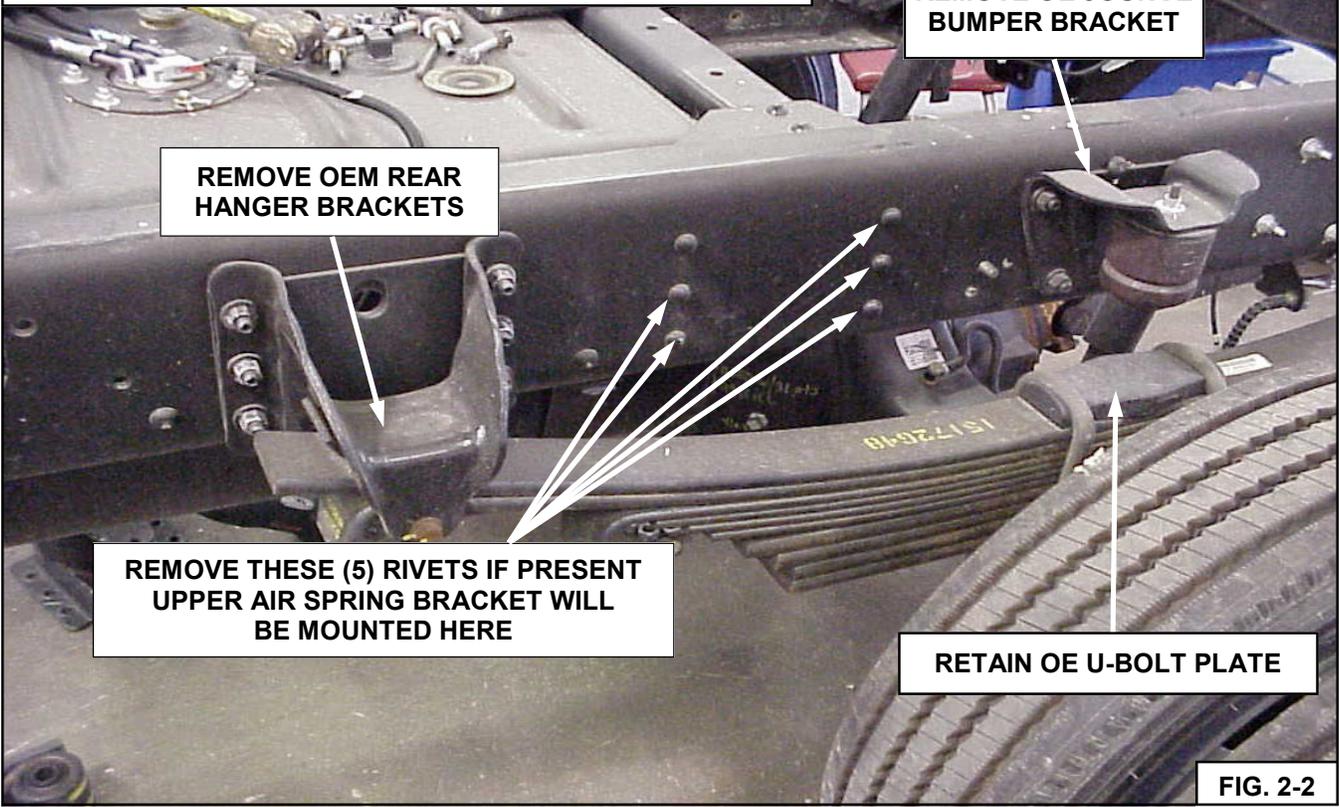
**Note:** Keep All Original Equipment Components that are removed, some will be re-used later.

1. With weight taken off the rear springs, as noted in pre-installation checklist, remove the mount bolts or rivets from the **Front Leaf Spring Hanger Bracket**. Remove the bolts or rivets attaching the **Rear Spring Hanger Bracket**, **DO NOT** re-use the fasteners that mount the hanger bracket, or the leaf spring itself. New fasteners are provided, and must be used to achieve proper clamp load on the hanger. See Figure 2-1, 2-2, 2-3. Refer to GM Documents 800862 and 1202795.
2. Remove existing **U-bolts** that attach the **Axle** to the **Leaf Spring**. Remove the leaf spring and attached brackets from the axle. Retain **Lower Spring Plate**, **Axle Seats**, and **U-Bolt Plate**. **DO NOT** re-use the U-bolts or nuts; new fasteners are provided. See Fig. 2-2 and 2-3.
3. Remove the OE **Shock Absorbers**, and OE shock mounting hardware. New UltraRide tuned shock absorbers and shock mounting hardware are provided.
4. Remove the Original Equipment (OE) **Jounce Bumper Bracket**. Retain the bumper and bumper fasteners for reinstallation. A new bracket and bracket mounting fasteners are provided. See Fig. 2-2 and 2-3 for details. Note: The (4) Jounce Bumper Bracket frame holes will be shared with the Lateral Control Bracket on the Passenger Side.
5. Grind/remove 5 rivets that connect the aft of axle cross-member to the frame. These can be removed by grinding, or air chiseling, the heads off the factory-installed rivets. This is where the upper air spring mount will be located. Top-Rear rivet can be left in tact. See Figures 2-2 through 2-3 for location of these rivets.
6. Remove **OE Stabilizer Bar**, if present. See Fig. 2-4 for details. The stabilizer bar is not required with the UltraRide suspension. However, if desired, a rear stabilizer bar kit (Part Number 800M1051 for use with Automatic Chains) and a stabilizer bar re-installation kit are available from Link Mfg. (Part Number 800M1044).

**Note!** If installing the 800M1044 Kit, the OE stabilizer bar mounting hardware and fasteners must be retained, as they are not included in the re-installation kit.



PASS. SIDE VIEW SHOWING COMPONENTS TO BE REMOVED



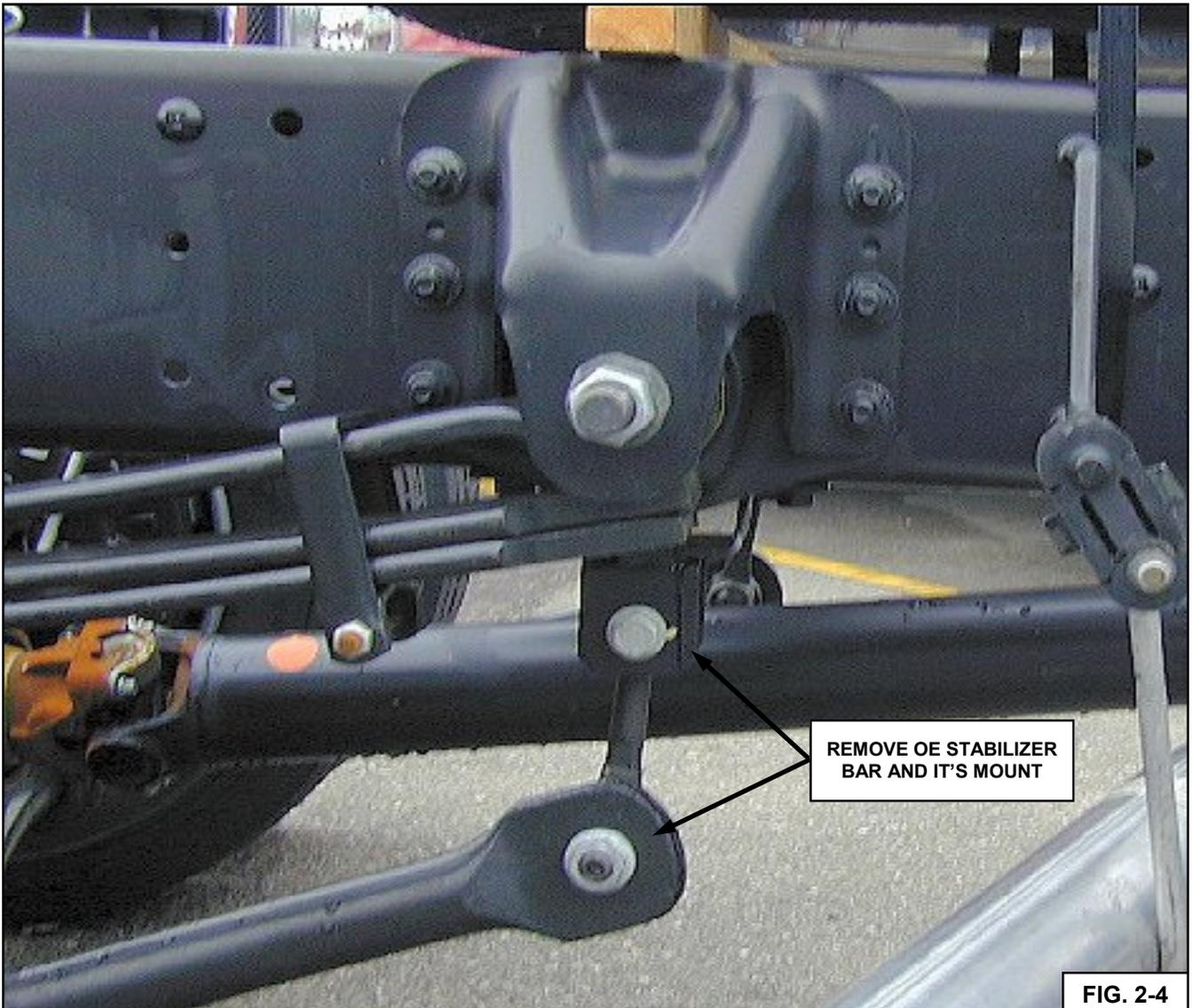


FIG. 2-4



**NOTE:** If installing the 800M1044 Kit, the OE stabilizer bar mounting hardware and fasteners must be retained, as they are not included in the re-installation kit.

# 3. DRIVER SIDE ASSEMBLY

1. Review Figures in Section 3 & Parts List/Drawing (Section 11) to acquaint yourself with the various parts of the UltraRide suspension. Assemble Components Loosely as described below, torque later in Section 7.



**IMPORTANT!** When tightening fasteners, do not use a high-speed air wrench. The heat generated between the nut and bolt threads may cause the nut to seize.

2. Loosely fasten the FRONT HANGER to the frame using (8) 1/2 x 1 3/4 UNC FLANGE BOLTS and (8) 1/2 UNC TOP LOCK FLANGE NUTS, supplied with kit. **Two of these fasteners are to be used in the bottom flange of the frame rail. (Shown in Fig. 3-1, and 3-2)** Drilling is required if the holes are not present in the frame flange. Orient all fasteners with nut on outside of frame. Torque Later. See Fig. 3-1, 3-2 for details.
3. Place the VALVE/JOUNCE BUMPER BRACKET on the outside of the frame, and attach loosely with (4) 1/2 X 1 3/4 UNC FLANGE BOLTS. Install the OE JOUNCE BUMPER back on the new VALVE/JOUNCE BUMPER BRACKET See Fig. 3-1, 3-3 for details. Torque Later.
4. Place the UPPER AIR SPRING BRACKET into position and fasten to the frame using (7) 1/2 X 1 3/4 UNC FLANGE BOLTS and (7) 1/2 UNC TOP LOCK FLANGE NUTS. Five fasteners must be located over the AIRSPRING, and two in the SHOCK ABSORBER mount location as shown in Fig. 3-4. Drilling may be required for rearmost fasteners in shock location. **Orient All Frame Mount Bolts so that they point outward from the center of the vehicle.** See Fig. 3-1, 3-6, & 3-7 for details. Torque Later.
5. Loosely fasten the SPRING ARM to the FRONT HANGER using (2) 3/4 X 3 UNC FLANGE BOLTS, AND (2) 3/4 UNC FLANGE NUTS. Mount the SPRING ARM to the **Front Side** of the FRONT HANGER as shown in Fig. 3-1 and Fig. 3-5. Shims are supplied with suspension to adjust axle alignment. 3 shims per side should be installed for initial alignment. Torque Later.
6. Place the upper AXLE SEAT on top of the axle in the same orientation it was removed. See Fig. 3-1, 3-3 for orientation.
7. With front of the SPRING ARM loosely fastened, raise the rear of the SPRING ARM so that all components are aligned into position. Be sure that all locating pins are aligned with their respective holes. A jack or stand may be necessary to raise and hold components in place. **Before tightening of U-Bolts ensure that spring arm and U-bolts are properly aligned with the axle and axle seats as shown in Fig. 3-5.** Torque Later.
8. Place OE JOUNCE PAD on top of the AXLE MOUNT PLATE, and drop (2) M20 X 315 U-BOLTS down through the front AXLE MOUNT PLATE, LOWER SPRING PLATE. Loosely attach using (4) M20 Flange Nuts. The U-bolt nuts will be torqued later. **U-BOLTS must be tightened gradually in a criss-cross pattern.** See Fig. 3-1. and Fig. 7-2. **Note:** If installing with 800M1051 rear Stabilizer Bar Kit, install Sway Bar Mount Brackets now. Refer to Rear Stabilizer Bar Kit Installation Instructions.
9. Attach the lower AIRSPRING piston through the LOWER SHOCK MOUNT BRACKET and the SPRING ARM using (2) 1/2 x 2 3/4 FLANGE BOLTS and (2) 1/2 WASHERS. Attach LOWER SHOCK MOUNT BRACKET to the SPRINGARM using (1) 1/2 UNC BOLT and NUT. See Fig. 3-1 for details. Torque Later
10. Attach lower end of HEIGHT CONTROL VALVE LINKAGE to the center hole of the AXLE MOUNT PLATE using supplied 1/4 UNC mount stud and hex nut.



**WARNING!** Route all brake lines/cables away from airspring and other moving components.

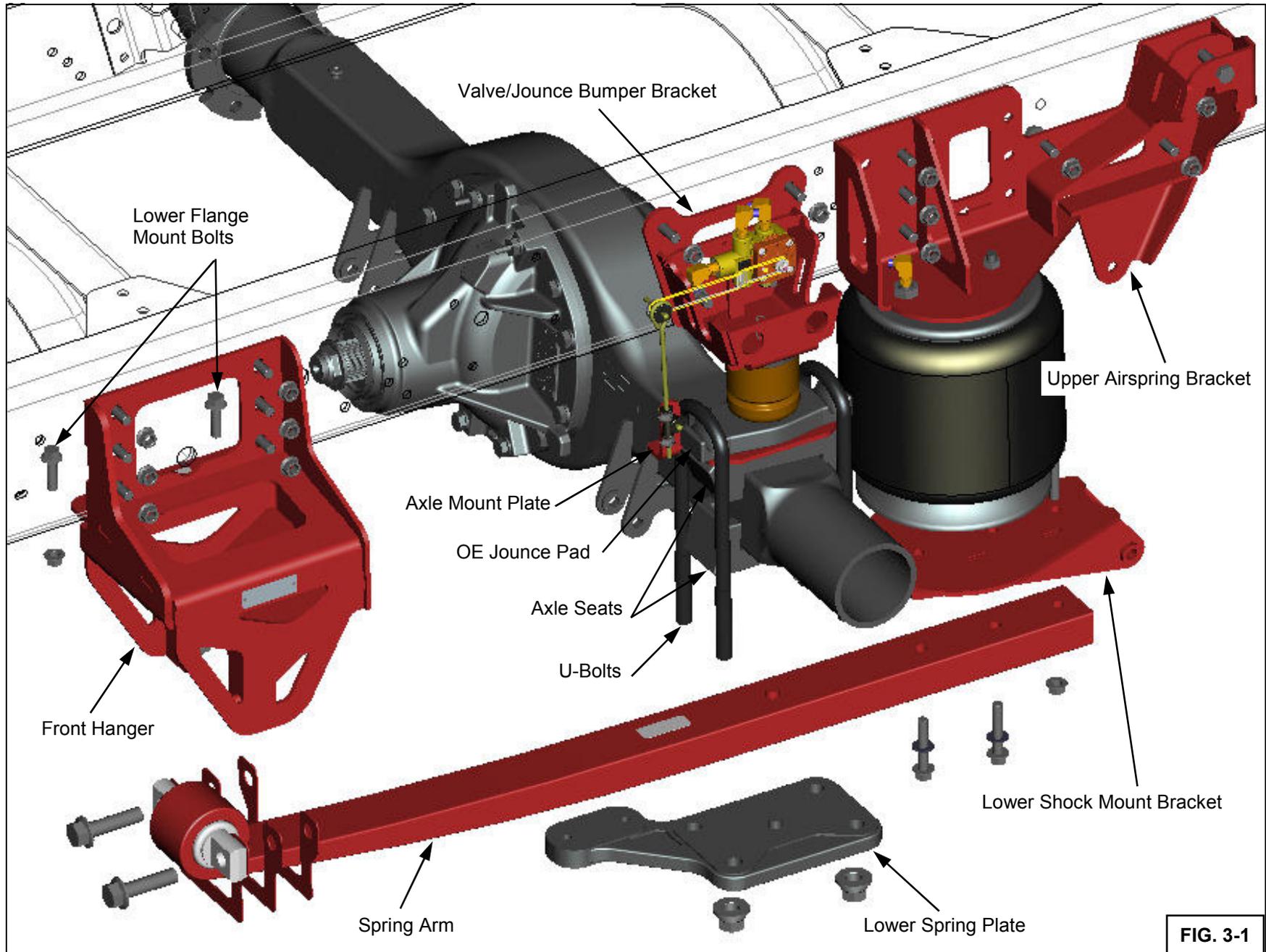
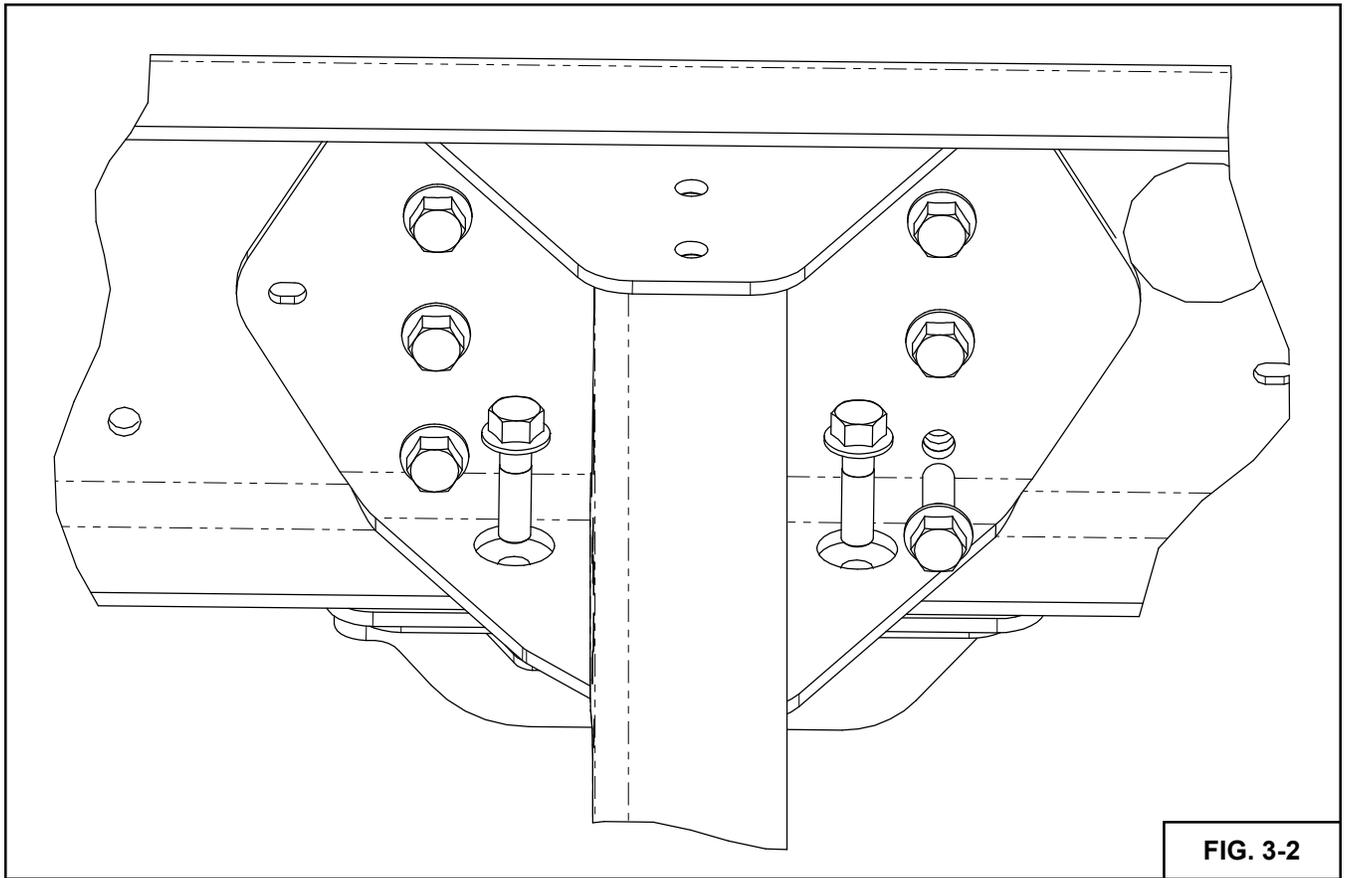
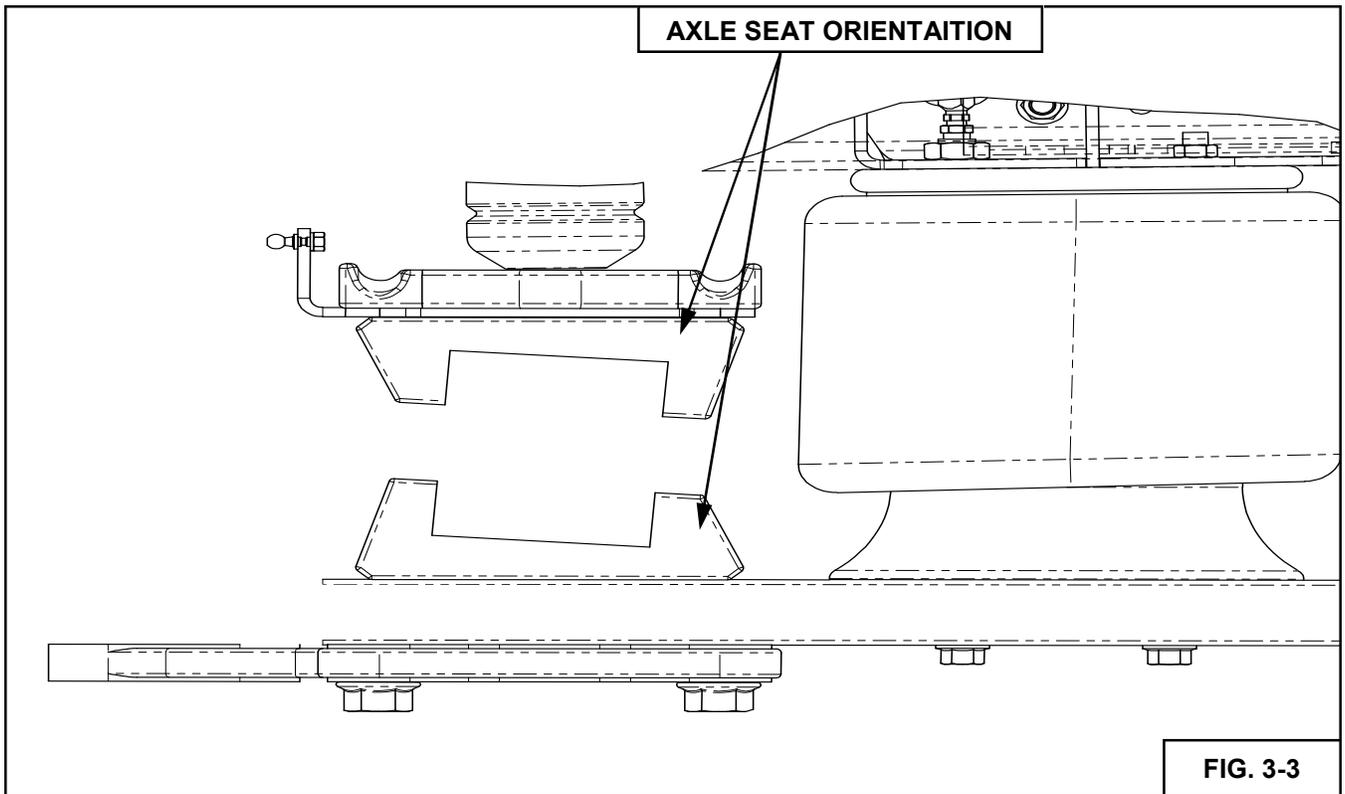


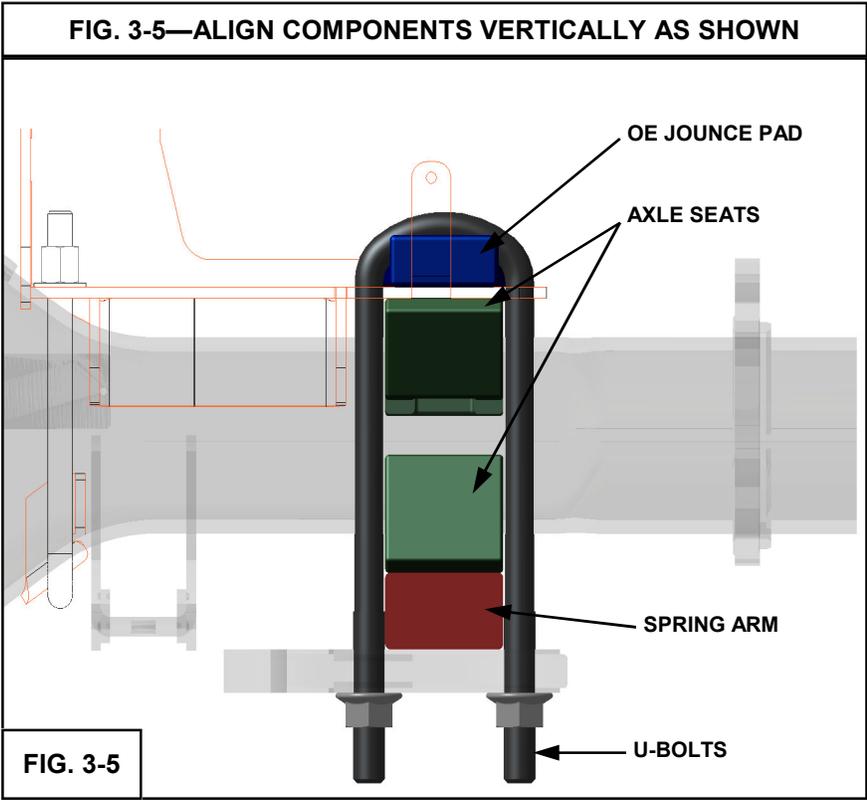
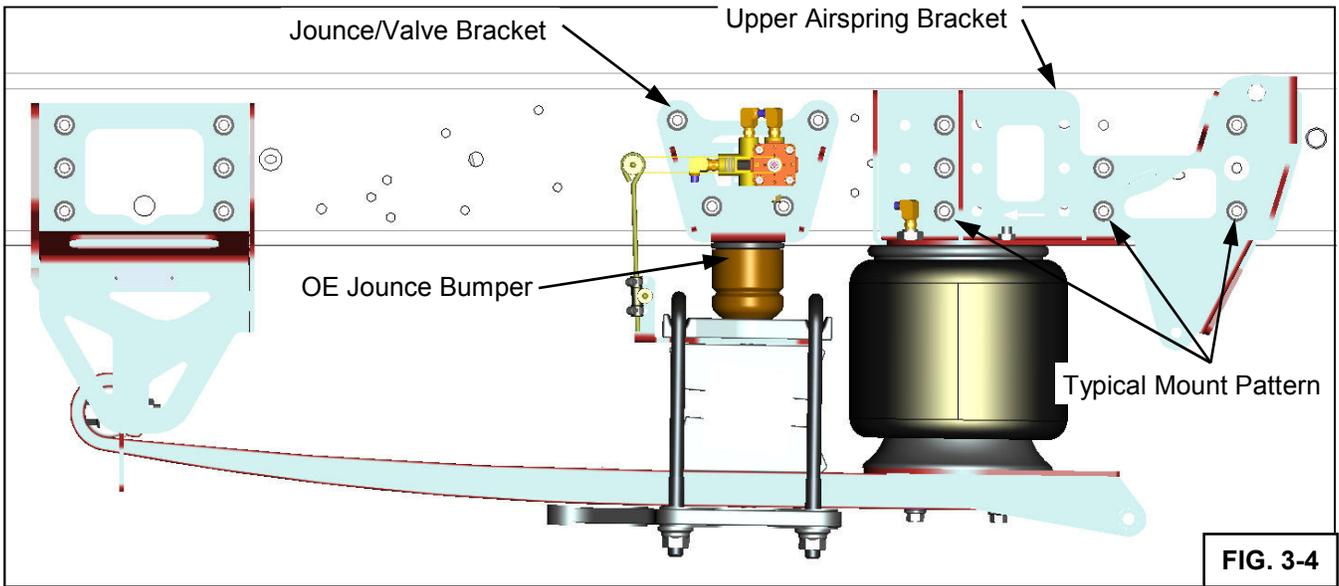
FIG. 3-1



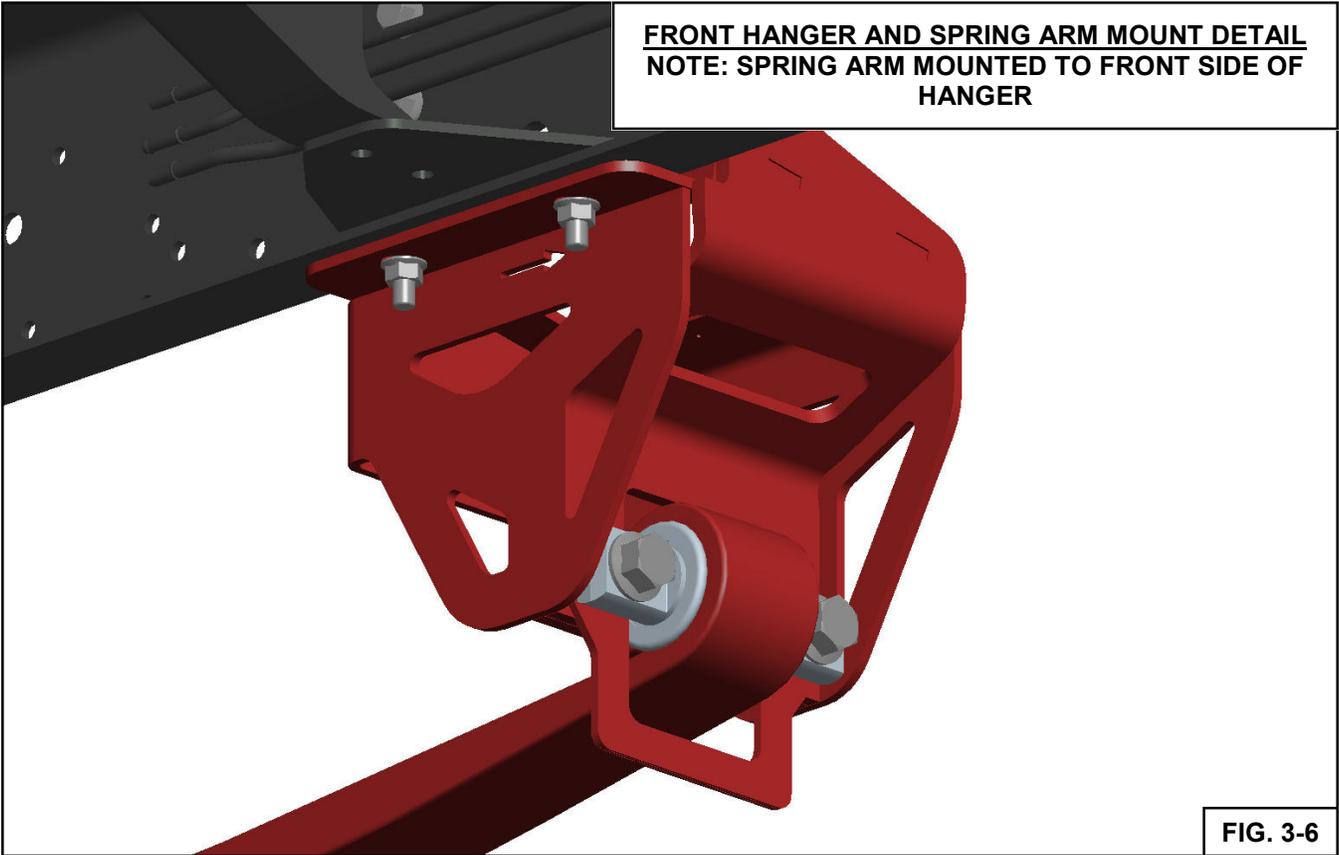
**FIG. 3-2**



**FIG. 3-3**

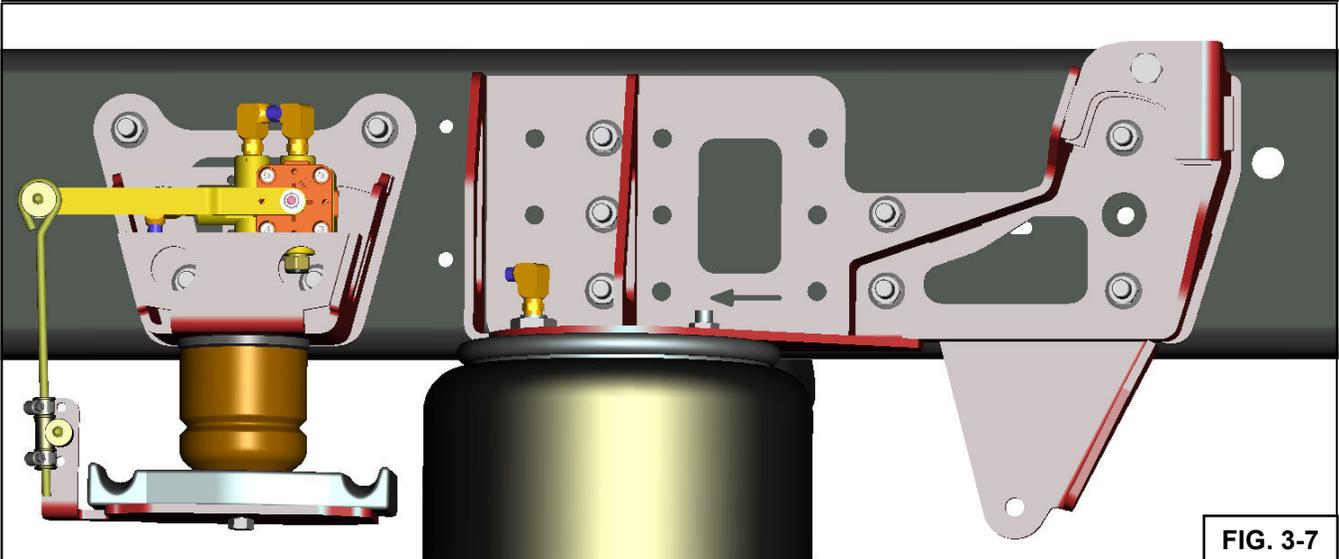


**FRONT HANGER AND SPRING ARM MOUNT DETAIL**  
**NOTE: SPRING ARM MOUNTED TO FRONT SIDE OF HANGER**



**FIG. 3-6**

**UPPER AIRSPRING BRACKET TYPICAL MOUNT DETAIL**  
**NOTE: MINIMUM OF 5 BOLTS OVER AIRSPRING AND 2 IN SHOCK LOCATION**



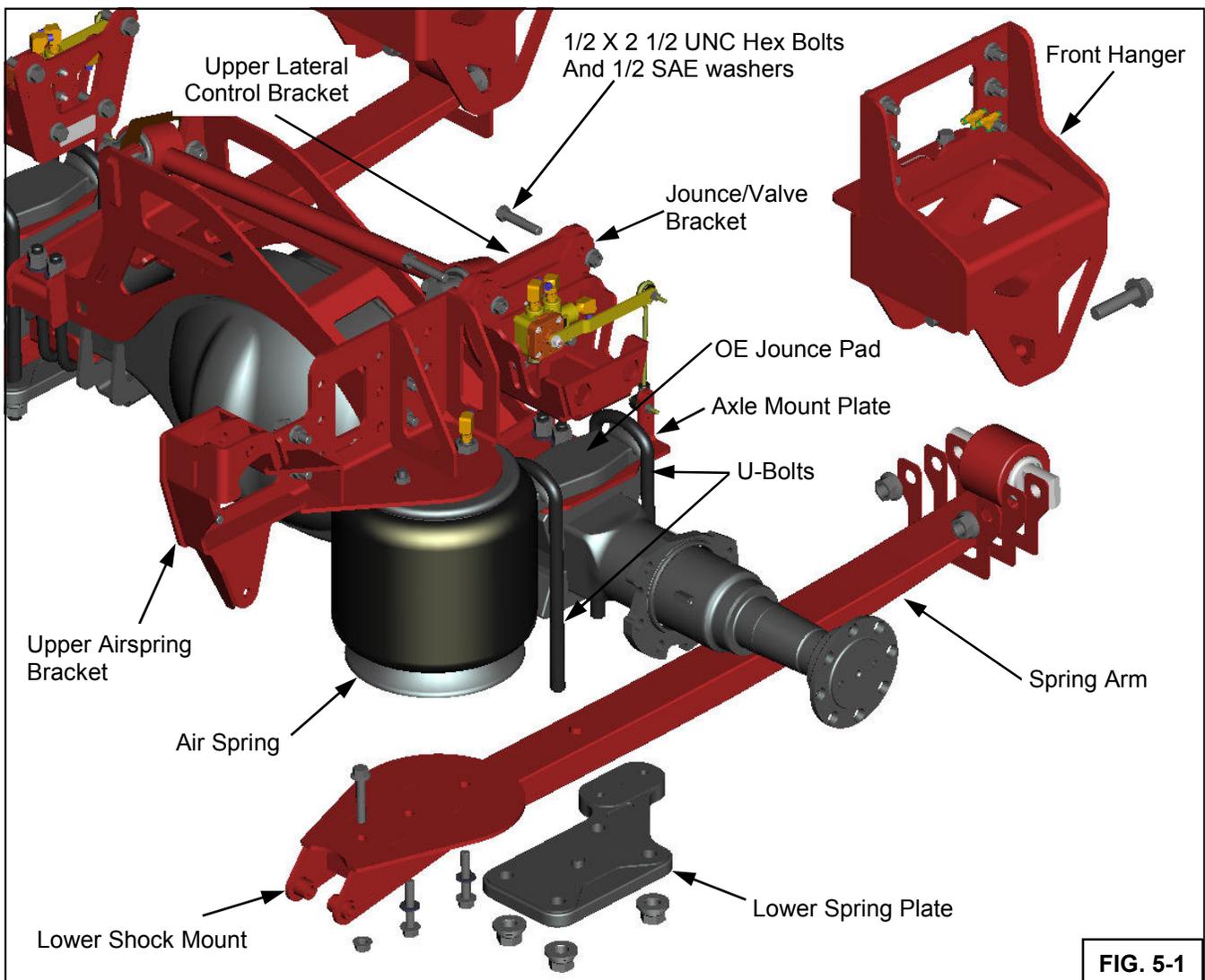
**FIG. 3-7**

## 4. PASSENGER SIDE DISASSEMBLY

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

## 5. PASSENGER SIDE ASSEMBLY

1. Repeat Section 3 for the passenger's side of the truck. **NOTE: Install the AXLE MOUNT PLATE between the OE JOUNCE PAD and AXLE SEAT.**
2. Remove the OE jounce bumper bracket from the frame. Assemble the UPPER LATERAL CONTROL BRACKET to the inside of the frame using (4) 1/2 x 2 1/2 UNC HEX BOLTS (4) 1/2 SAE HARDENED FLAT WASHERS and (4) 1/2 UNC TOP LOCK FLANGE NUTS.
  - ❑ Note: These bolts are longer than other frame attachment fasteners.
  - ❑ Attach the Jounce/Valve Bracket at the same time, using the new fasteners provided.

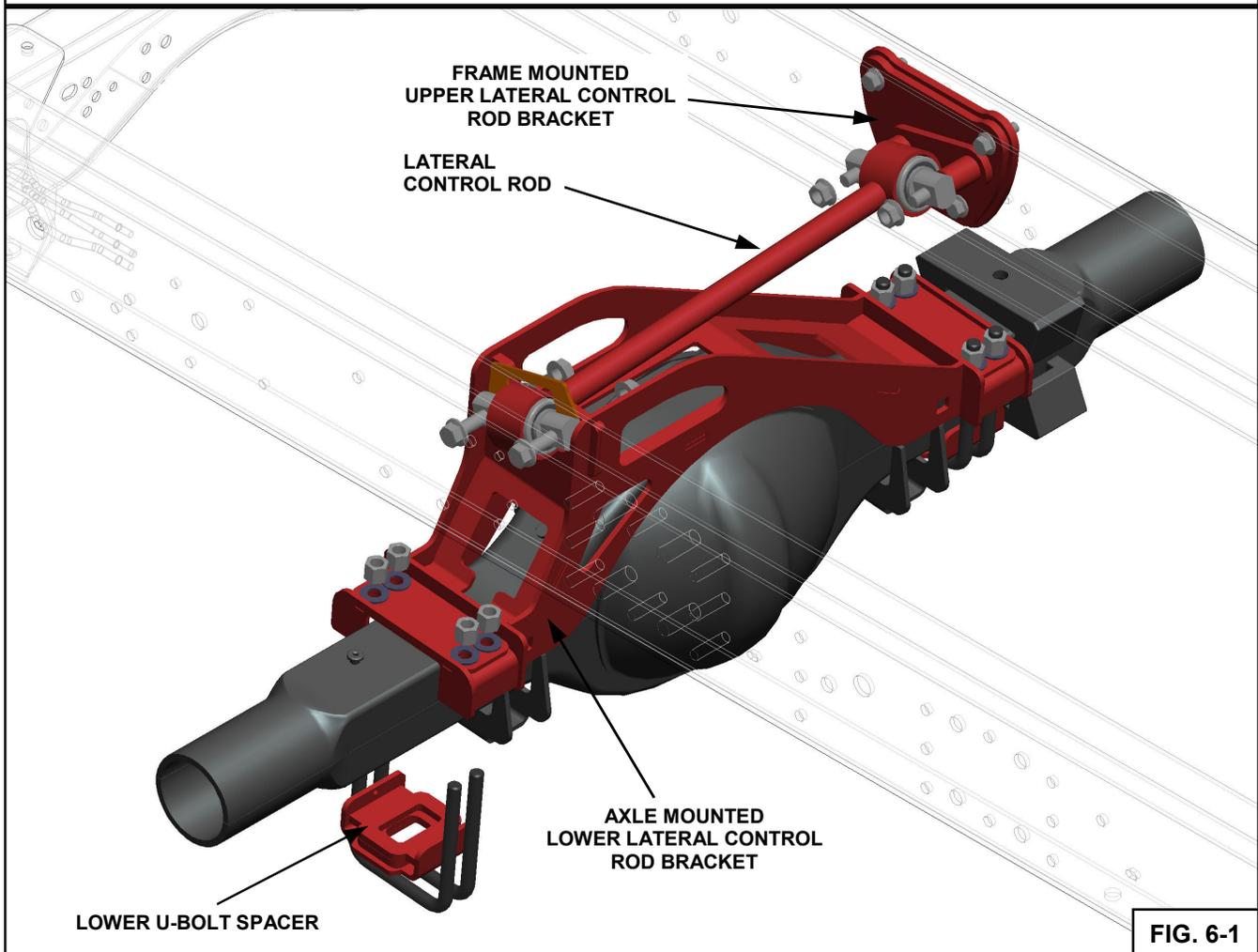


# 6. LATERAL CONTROL ROD

## 13.5K AXLE KIT SHOWN

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. Position AXLE MOUNTED LOWER LATERAL CONTROL ROD BRACKET onto axle as shown in Fig. 6-1, and loosely fasten to axle using (4) 5/8 UNF U-BOLTS and (8) 5/8 UNF NUTS. **Be sure to place a LOWER U-BOLT SPACER between the U-BOLTS and axle one both sides as shown in Fig. 6-1.**
3. Loosely assemble the LATERAL CONTROL ROD between the two sides using (4) 5/8 X UNC FLANGE BOLTS and (4) 5/8 UNC TOP LOCK NUTS as shown in Fig. 6-1. ALIGNMENT SHIMS are provided, but are not required. Use these only as needed to center the axle between the frame rails. If more shims are needed contact Link Mfg. customer service. See Parts List page 27, 28 for part numbers. **Set truck to design (ride) height before tightening these fasteners as described in Section 10.** See Fig. 6-1 thru 6-3 for assembly details.

**⚠ WARNING!** Inspect Lateral Control Rod and its mounting brackets for any interference with other components, paying close attention to clearance with any flexible components such as brake and fuel lines, axle breathers and wiring.

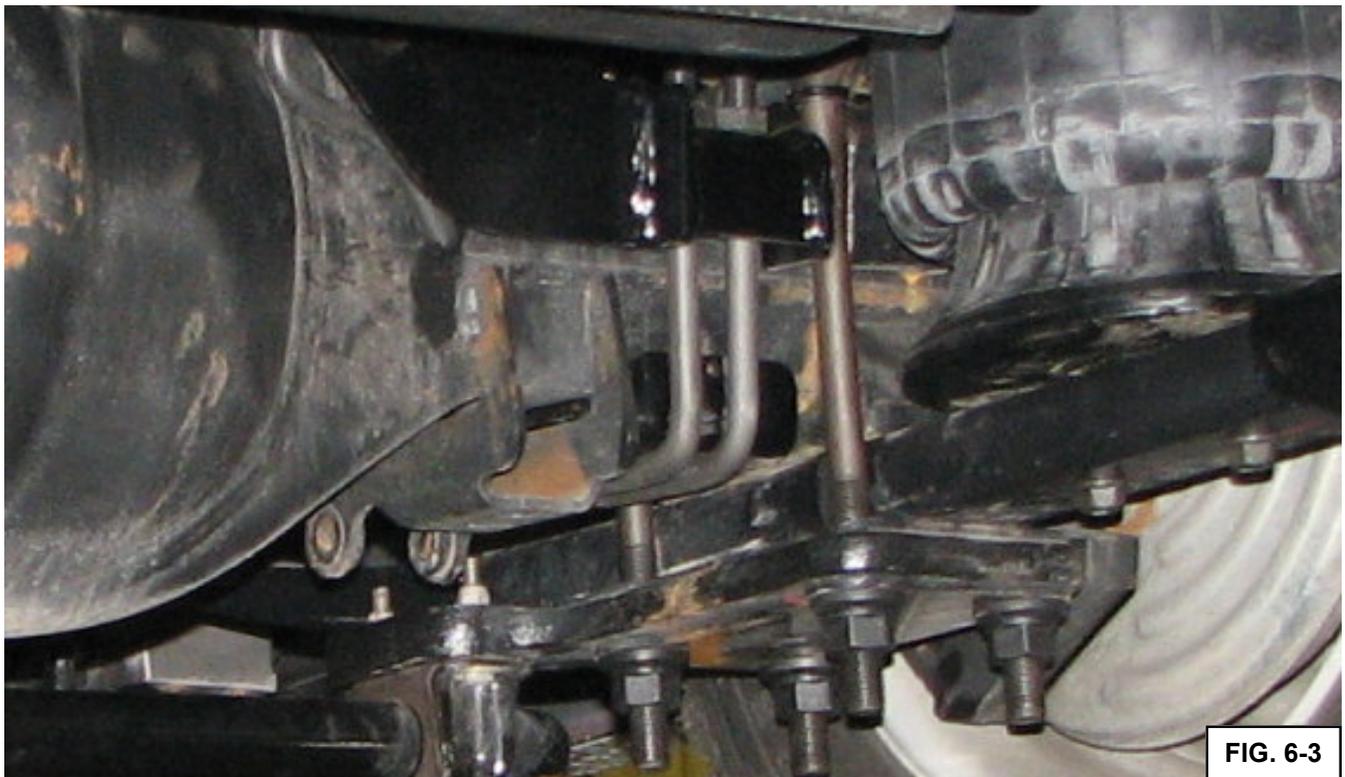


**Place Lower U-Bolt Spacer onto Bottom Side of Axle as shown**



**FIG. 6-2**

**Attach to axle with 5/8 UNF U-Bolts as shown**



**FIG. 6-3**

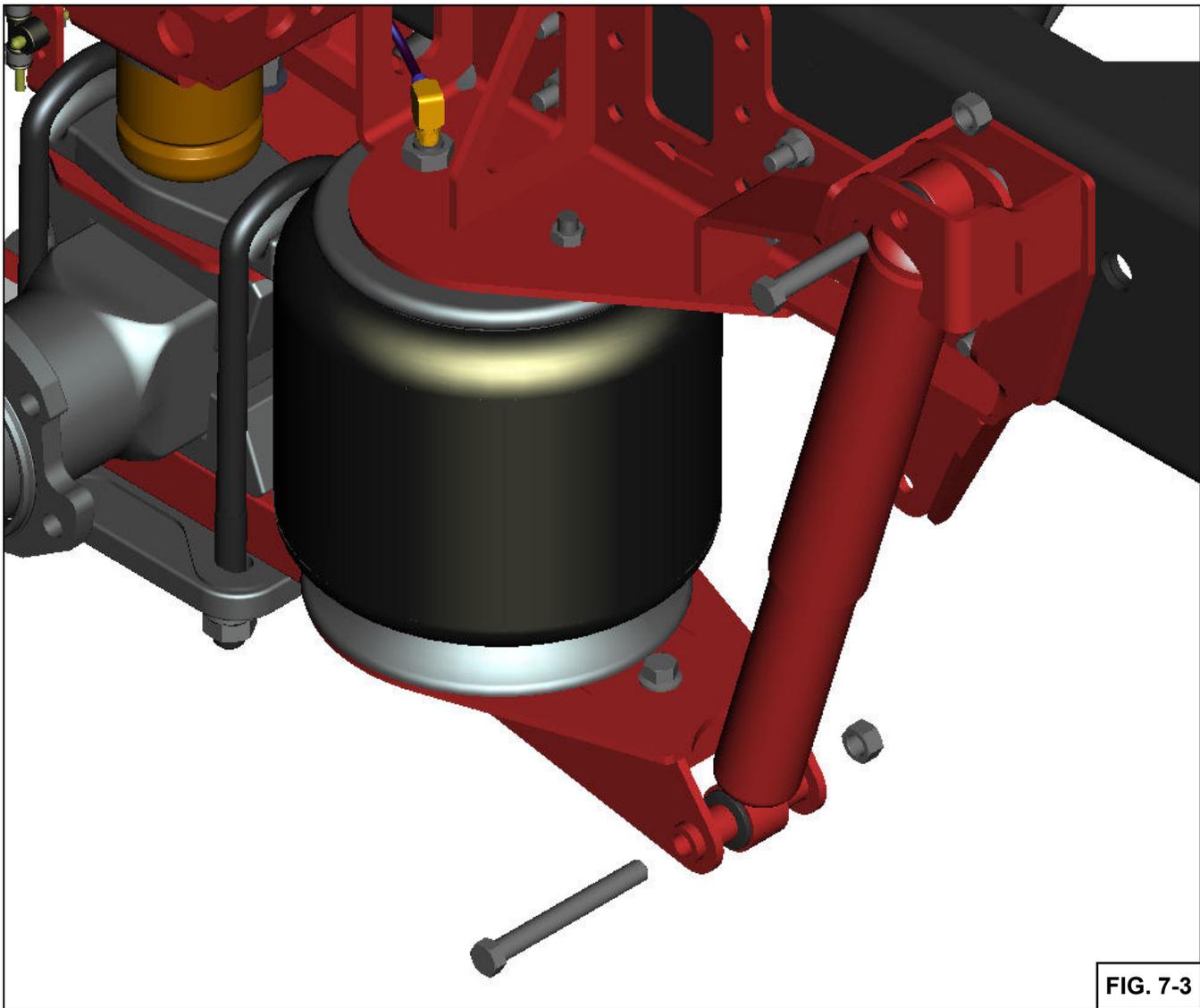
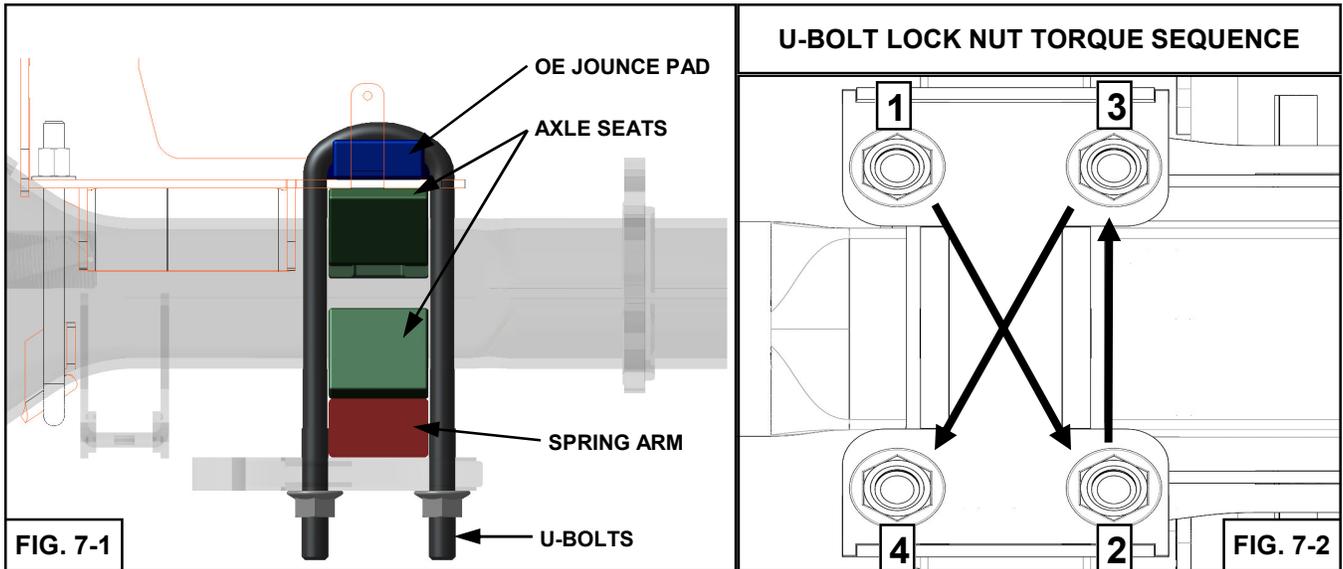
# 7. FINAL INSTALLATION AND SUSPENSION COMPONENT TORQUING

**IMPORTANT:** Before final torquing of fasteners, adjust the Frame and Axle vertical height until the Frame is at the Ride Height described in Section 10 and 11 and shown in Figure 10-1. Setting the Frame to Ride Height before the Final Torquing assures the Axle and Suspension will not shift when the Suspension is later inflated to Ride Height. Before tightening of U-Bolts ensure that spring arm and U-bolts are properly aligned with the axle and axle seats. See Fig. 7-1, Components should align vertically as shown.

□ See Torque Table below for appropriate Torque values.

1. Torque all 1/2 UNC FRONT HANGER, AND UPPER AIRSPRING BRACKET nuts.
2. Torque (8) 1/2 UNC VALVE/JOUNCE BUMPER BRACKET nuts.
3. Torque the (8) M20 X 2.5mm AXLE U-BOLT Nuts in a **criss-cross pattern, gradually increasing the tightening torque. Ensure SPRING ARM, AXLE SEATS, and all axle components are properly aligned prior to this.** See Fig. 7-1 for details
4. Torque the (4) 3/4 UNC SPRING ARM FRONT PIVOT Nuts.
5. Torque the (8) 5/8 UNF LOWER LATERAL CONTROL BRACKET NUTS, located at the inner U-bolt.
6. Torque the (4) 5/8 UNC FLANGE NUTS that secure the LATERAL CONTROL ROD.
7. Torque the (6) 1/2 UNC FLANGE BOLTS securing the lower piston of the AIRSPRING to SPRING ARM, and the LOWER SHOCK BRACKET to the SPRING ARM. NOTE: These fasteners have different torque values!
8. Install new UltraRide tuned SHOCK ABSORBERS using the orientation shown in Fig. 7-3, using new fasteners provided with this kit.
9. Torque the (4) 9/16 UNC NUTS securing the SHOCK ABSORBERS.

<b>TORQUE TABLE</b>		
LOCATION	FASTENER	TORQUE
FRAME MOUNTED FRONT HANGER	1/2 UNC NUTS	100 FT-LBS
FRAME MOUNTED UPPER AIR SPRING BRACKET	1/2 UNC NUTS	100 FT-LBS
FRAME MOUNTED LATERAL CONTROL ROD BRACKET	1/2 UNC NUTS	100 FT-LBS
AXLE MOUNTED LATERAL CONTROL ROD BRACKET	5/8 UNF NUTS (U-BOLT)	150 FT-LBS
LATERAL CONTROL ROD	5/8 UNC NUTS	160 FT-LBS
AIR SPRING TOP STUD	3/4 UNC JAM NUTS	50 FT-LBS
AIR SPRING BOTTOM	1/2 UNC BOLTS	30 FT-LBS
LOWER SHOCK MOUNT (Bracket to Spring Arm)	1/2 UNC NUTS	100 FT-LBS
TRAILING ARM AXLE LOCATION	M20 FLANGE NUTS (U-BOLT)	275 FT-LBS
FRONT TRAILING ARM PIVOT BOLTS	3/4 UNC NUTS	275 FT-LBS
SHOCK ABSORBER BOLTS	9/16 UNC NUTS	115 FT-LBS
AIR CONTROL BOX	5/16 UNF NUTS	20 FT-LBS



# 8. AIR CONTROL SYSTEM ASSEMBLY

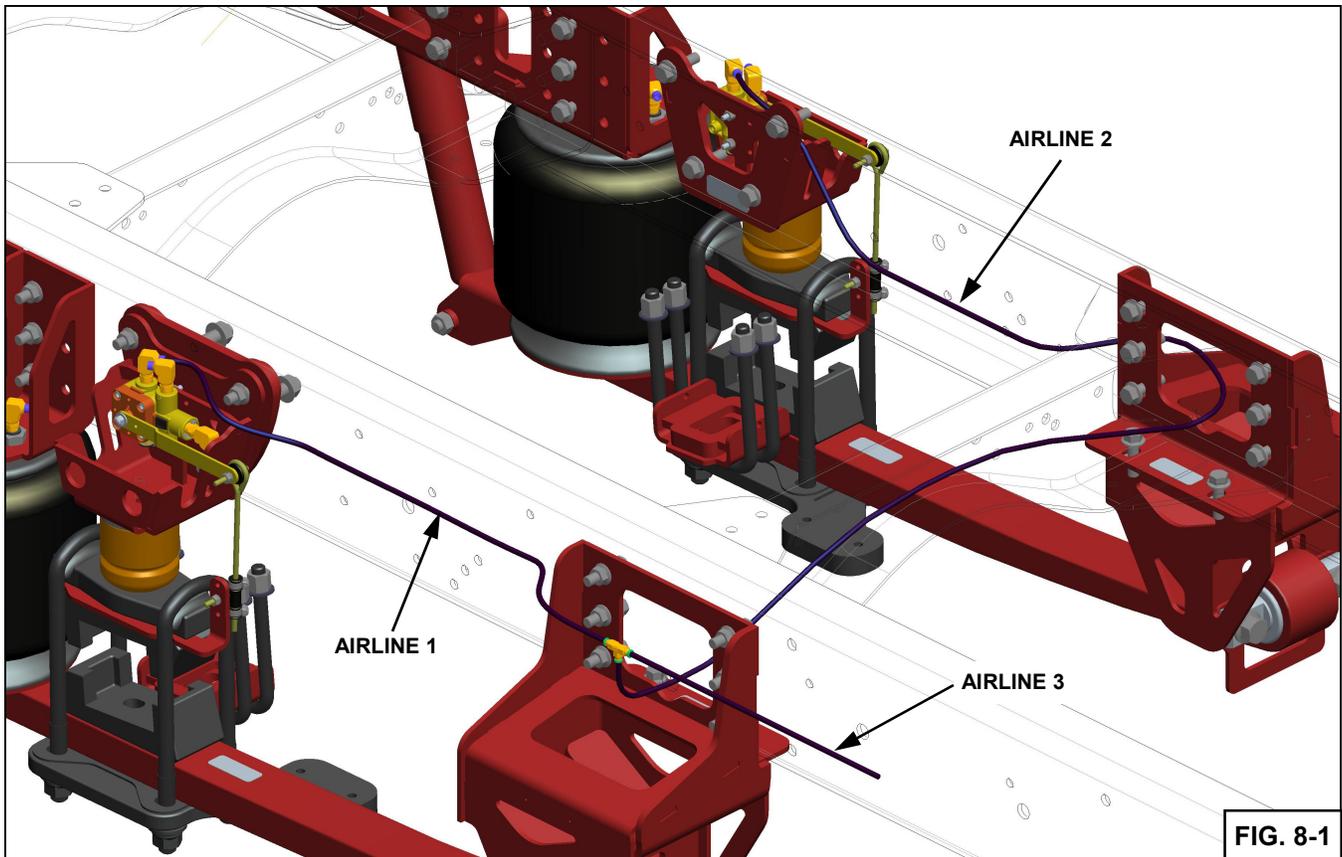


**CAUTION!** Route all airline away from exhaust, moving parts, and sharp objects. Be careful not to crimp the edges of the tubing, and that when cutting airline use an airline cutter to get assure square cuts. When installing the airline, fully insert into fitting and give a slight pull to seat properly and to be sure airline will not pull out.

1. **Note:** The installer must find an appropriate location to install the UltraRide Air Control System. (4) frame holes will need to be drilled. If installing on the frame underneath the cab, make sure it is mounted as high on the frame as possible to allow for ground clearance below the air tank. If the system will be mounted to the inside of the frame, a mounting bracket is required (Link Mfg. Part 80001515).



1. Use (4) 5/16 X 1 3/4 UNF FLANGE BOLTS and (4) 5/16 UNF TOPLOCK FLANGE NUTS to fasten the Air Control Box to the frame, placing the RUBBER ISOLATORS between the box and frame (See Torque Table in Section 7 for appropriate Torque). The back of the Air Control Kit must not contact any bolts protruding from the frame, to properly isolate the Air Kit from the chassis. For additional information, see **AIR CONTROL KIT OWNERS MANUAL**.
2. Route the main airlines, #1 through 8, as shown in Figures 8-1 thru 8-5.
  - 2.1. Route **AIRLINES 1 & 2** from the supply "I/E" port of each HEIGHT CONTROL VALVE to a supplied TEE, then **AIRLINE 3** from the TEE to the MAIN SUPPLY PORT of the AIR RESERVOIR SOLENOID. See Fig. 8-1, 8-2, and 8-3 for details.



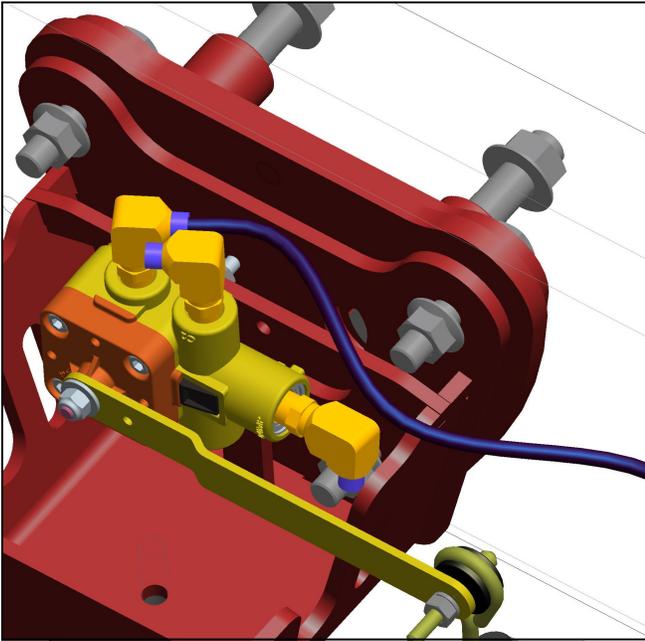


FIG. 8-2 (PASS SIDE SUPPLY DETAIL)

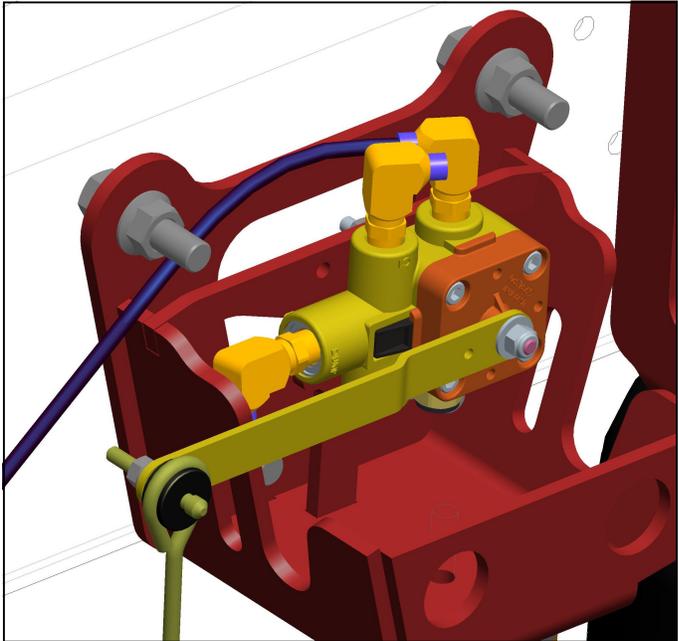


FIG. 8-3 (DRIVER SIDE SUPPLY DETAIL)

2.2. Route **AIRLINES 4 & 5** from the “DUMP” port (Drivers Side) and “DUMP” port (Passenger Side) in the HEIGHT CONTROL VALVE to a supplied TEE, then **AIRLINE 6** from the Tee to the PILOT SUPPLY PORT of the AIR RESERVOIR SOLENOID. See Fig. 8-4, 8-5, and 8-6 for details.

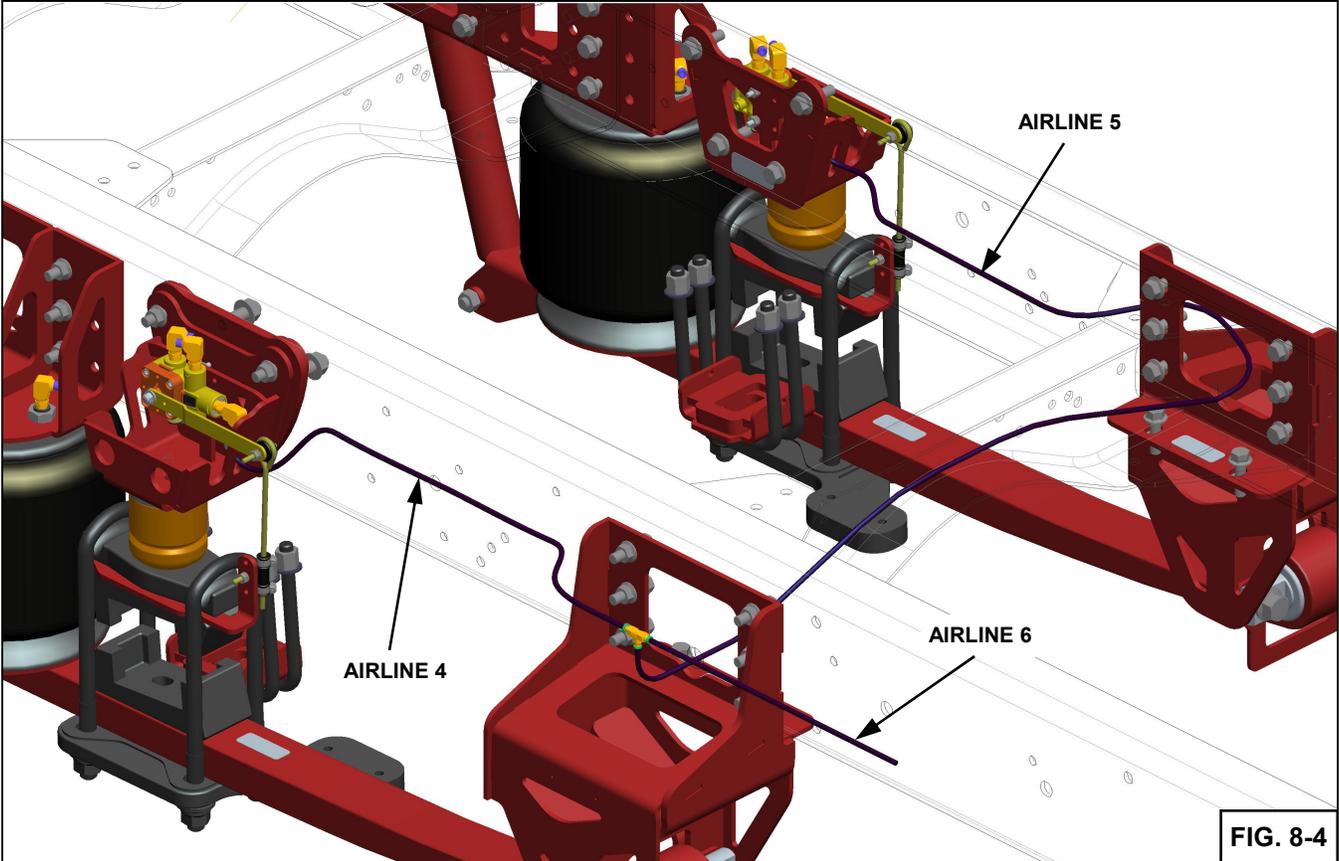


FIG. 8-4

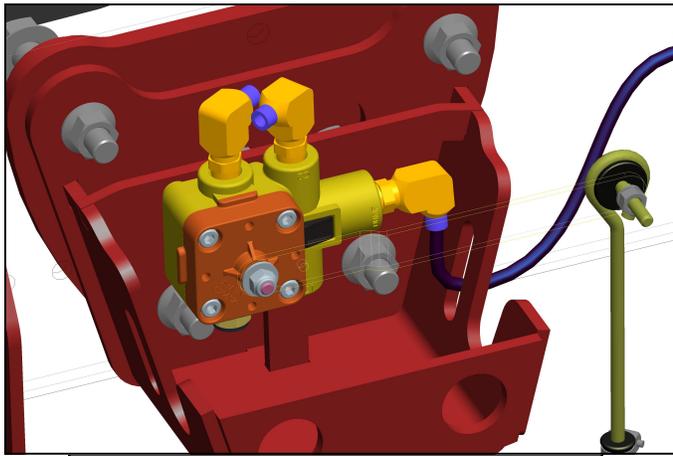


FIG. 8-5 (PASS SIDE PILOT DETAIL)

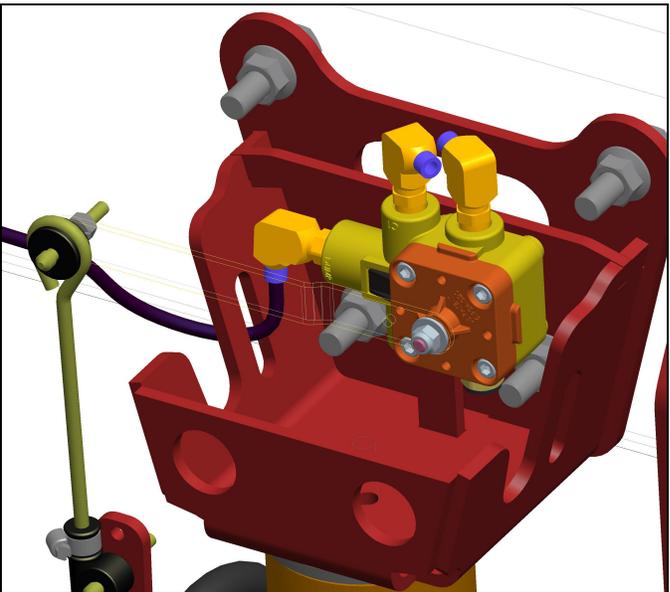


FIG. 8-6 (DRIVER SIDE PILOT DETAIL)

2.3. Route **AIRLINE 7** from the delivery "C2" port Passenger Side HEIGHT CONTROL VALVE and **AIRLINE 8** from the delivery "C1" Driver Side HEIGHT CONTROL VALVE to inlet port of each airspring. See Fig. 8-7, 8-8 for details.

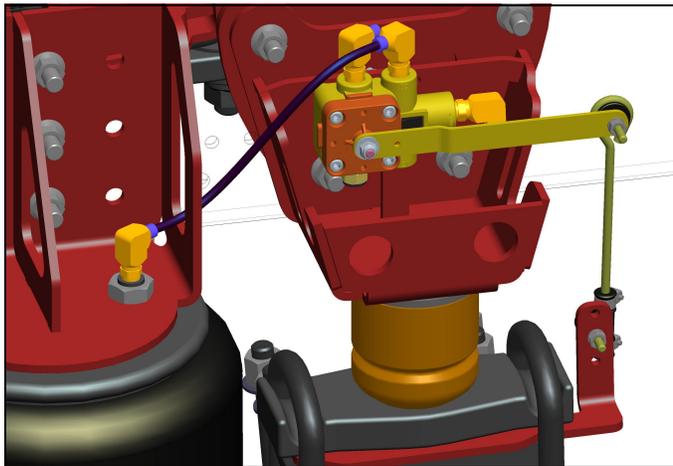


FIG. 8-7 (PASS SIDE AIRSPRING DETAIL)

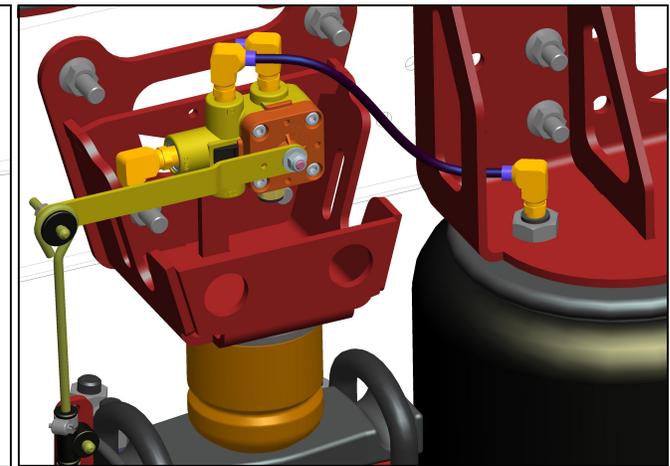
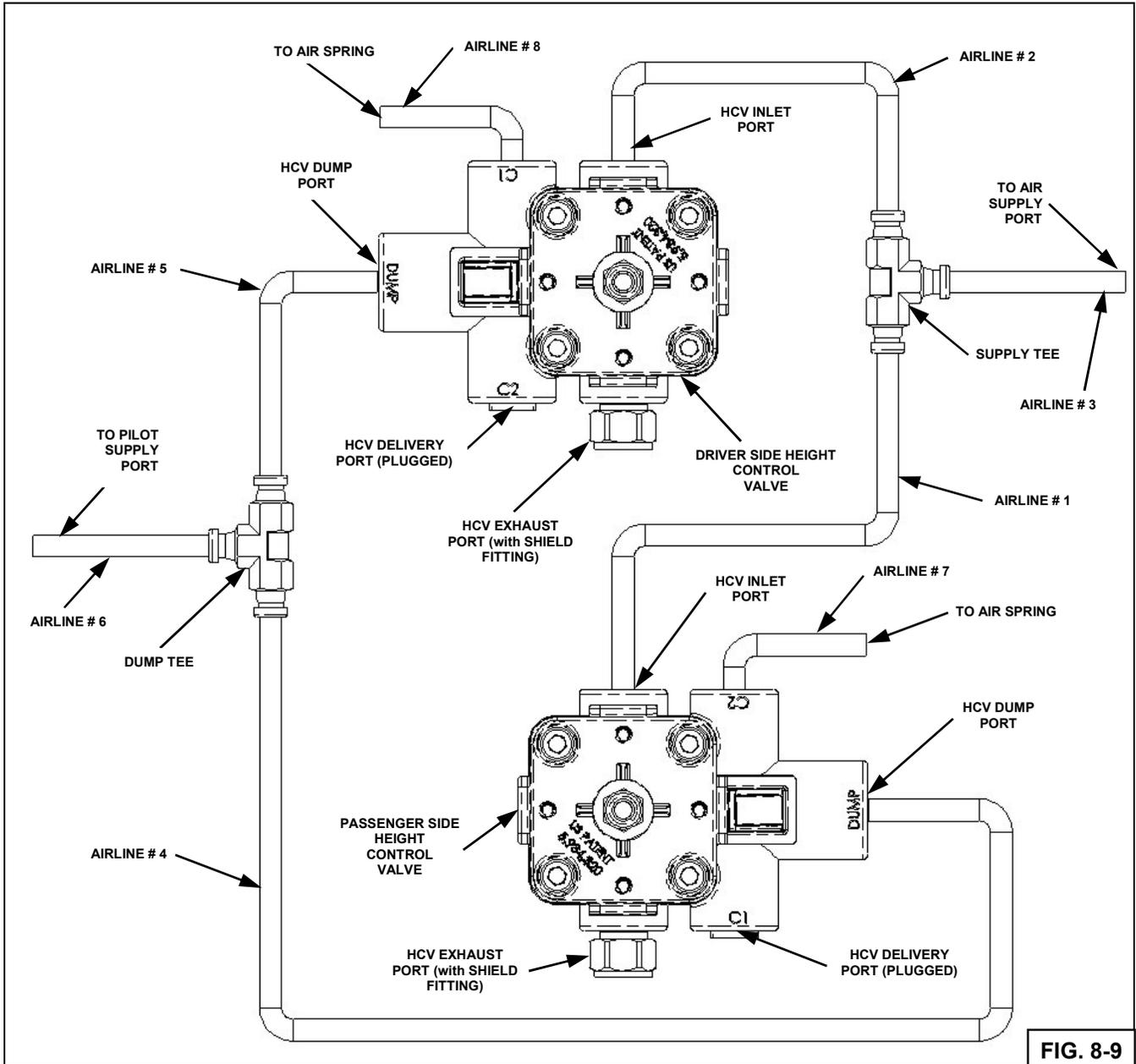


FIG. 8-8 (DRIVER SIDE AIRSPRING DETAIL)

3. Place supplied Corrugated Loom onto all airlines. Use supplied cable tie clips to secure airline and to keep it away from all hazardous objects such as tires and exhaust.
4. Install the Valve Linkage onto the Lever Arm and Axle Mount Plate. Torque to 8-10 ft-lbs. See Fig. 8-7 and 8-8. Suspension height will be set later.

# AIR CONTROL KIT AIR CONTROL SCHEMATIC



**FIG. 8-9**

## 9. ELECTRICAL SYSTEM

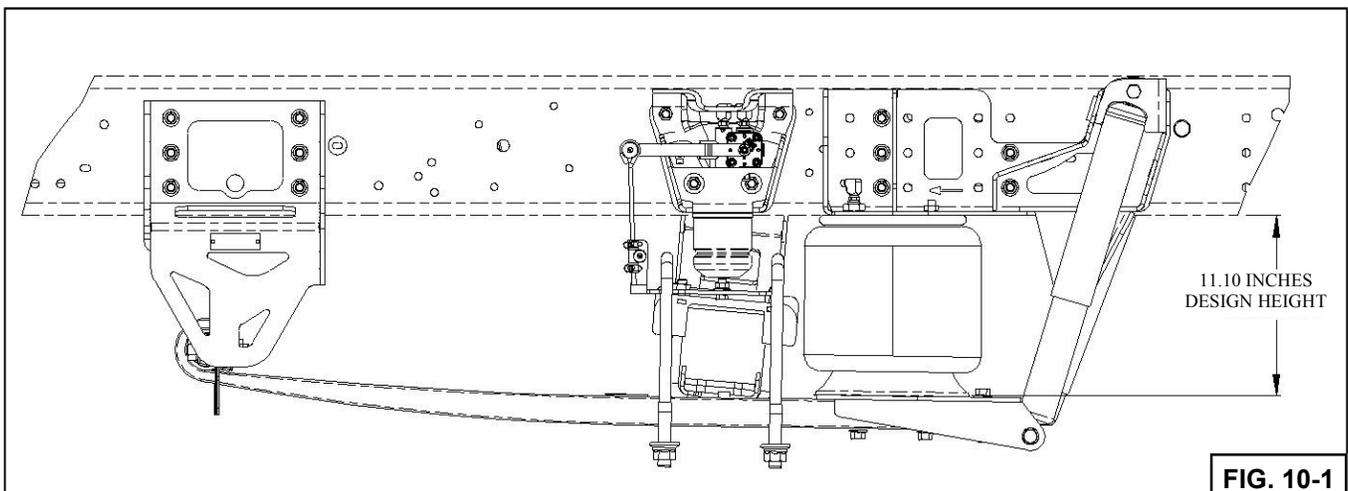


**CAUTION!** All wiring should be routed and secured neatly to avoid any functional or visual issues. Under hood and under-body wire routings should be clear of sharp edges (3/4 inches minimum) and direct sources of heat (4 inches minimum). All wiring should be routed away from high temperature areas around exhaust. 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. Disconnect the battery cables before servicing any electrical components. See GM Documents 173237 and 173165. Refer to the GMT560 Best Practices Manual for more information on tying into electrical components.

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

# 10. FINAL ASSEMBLY AND INSPECTION

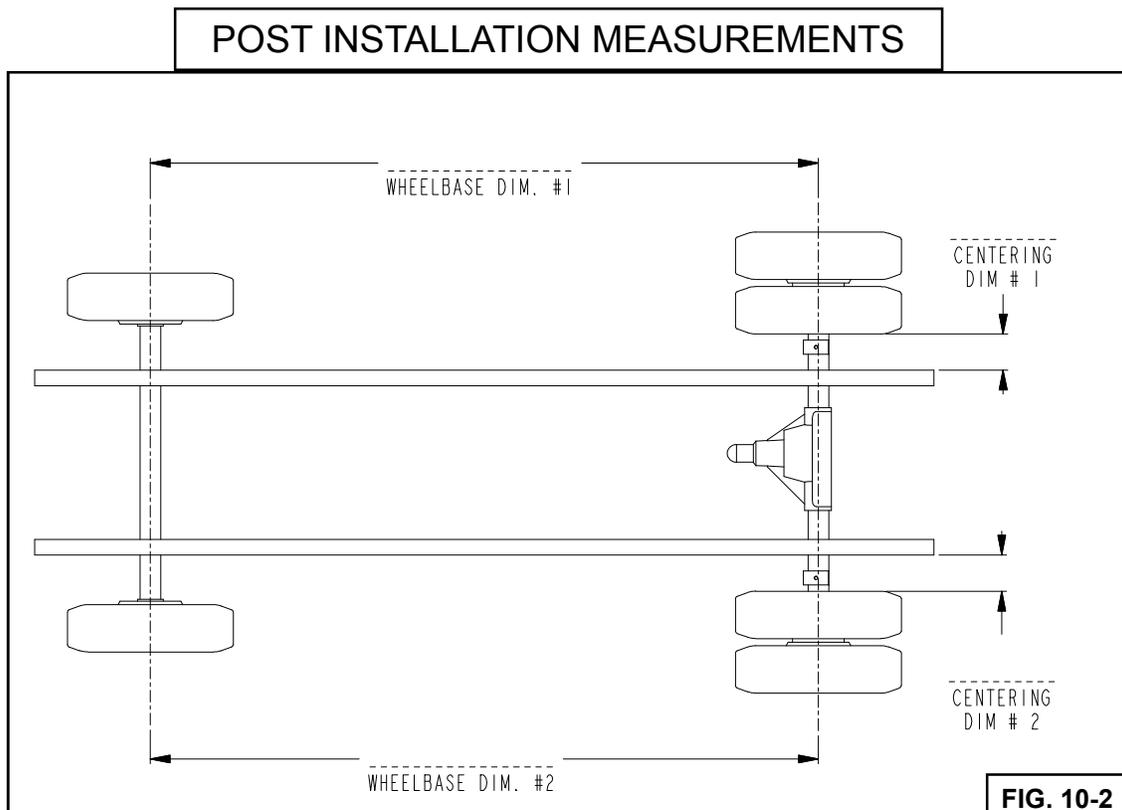
1. Double check all electrical connections and wire routings for proper connection and safe location.
2. Remove all jacks and fill the air system by either using the service fill valve on the air tank or by starting the vehicle and switching the compressor switch to "ON". Filling may be aided by using the service fill valve to fill the air reservoir to 120 psi. The maximum allowable tank pressure is 150 psi.
3. Check for proper operation of the height control valves. 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.
4. Disconnect the Valve Linkages and 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.
  - 1) Minimum clearance between the exhaust and air spring is 3 inches, unless a heat shield is used
  - 2) Minimum clearance between the tire and air spring is 1.5 inches.
  - 3) Minimum clearance between the exhaust and any suspension hard point (such as the Lateral Control Rod) is 1.0 inch throughout the suspension's entire range of motion.
5. Measure the "Design Height" of the air springs. The design height must be *measured at the middle of the air spring (from the side)*, and should be set to the value in Fig 10-1. If the design height needs adjustment, set the design height using the following sequence:
  - 1) Deflate the air springs by disconnecting one end of the linkage from the valve arms, and rotating the valve arms to exhaust air from the system.
  - 2) Adjustment to linkage length may be needed to achieve proper ride height. (Increasing the length will increase Design Height, and vise-versa). The linkage length can be adjusted by loosening the clamps on the lower rubber barrel and sliding it on the steel rod.
  - 3) **Re-tighten linkage clamps after ride height has been set. Failure to do this could cause the linkage to come apart, resulting in suspension or vehicle damage.**
  - 4) Allow chassis to come up to ride height, and allow enough time for truck height to settle. Re-adjust linkage and measure until correct design height is reached. Jostle the suspension up and down and allow it to come back to design height and re-measure for verification. Tighten the lock nuts on the threaded rod when complete.



6.  Double check that all fasteners are tightened to the specified torque given in Table 10-1. A good practice is to use a paint marker to mark each fastener across the nut and bolt threads as it is tightened. This practice gives a visual check later that all fasteners were properly tightened.
7. **IMPORTANT!** Check all fittings and airline connections for air leaks by squirting with soap/water mixture or other leak checking fluid.
8. Reinstall the chassis body (if applicable).
9. 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.
10. Kneeling (Dump) Operation: Moving the Dump switch to the "ON" position 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.

### FINAL ASSEMBLY AND INSPECTION CHECKLIST

- Check and document OE rear axle alignment
- Set Design Height to **11.1** inches as shown in Fig. 10-1.
- Verify suspension function via dump and re-inflation
- Check for air leaks and system integrity
- Check clearances throughout suspension motion range
- Check driveline angle (see end of instructions)
- 4 wheel alignment, as recommended by chassis manufacturer
- After installation measure and record wheelbase and centering dims below (Fig. 10-2)



# 11. OPERATION & MAINTENANCE

The UltraRide® suspension needs no lubrication and little maintenance. The following components should be checked at the time the vehicle is being serviced. However, immediate corrective action should be taken if a serious malfunction occurs. See the Parts List Drawing on following page for details.



**WARNING!** 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.

## 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 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.
- ❑ If not using an automatic drain valve, 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



**CAUTION!** Do not operate the vehicle while the Dump Switch is on and the air springs are deflated. **This may damage the air springs and suspension components.**

the drain valve to not operate properly.

## DAILY SERVICE:

- ❑ Release any moisture in air tank by pulling on air release cable.

## CHECK AT EVERY VEHICLE SERVICE INTERVAL:

- ❑ Check Design Height  $\pm\frac{1}{4}$ ".
- ❑ Check for air leaks around fittings.
- ❑ Check air compressor filter and replace annually.
- ❑ Visually check Valve/Linkage Hardware for Function and that components/fasteners are intact.

## 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

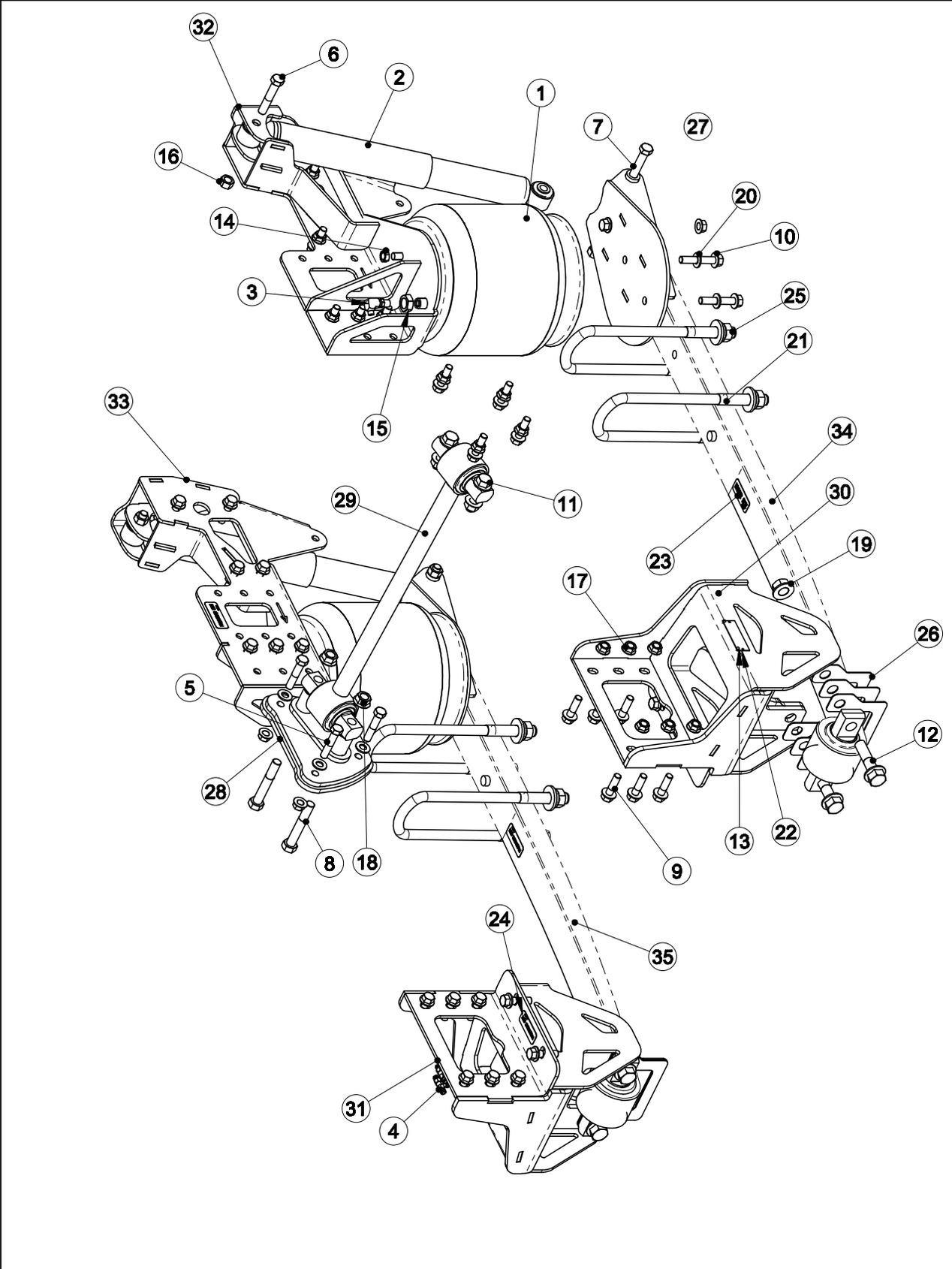
# **UltraRide - GM C4500/C5500**

## **PARTS LIST**

			<b>11K</b>	<b>13.5K</b>
<b>ITEM</b>	<b>PART NUMBER</b>	<b>DESCRIPTION</b>	<b>QTY</b>	<b>QTY</b>
1	11030507	SPRING-AIR	2	2
2	12100524	SHOCK ABSORBER	***	***
2	12100525	SHOCK ABSORBER	***	***
3	1302-5091	ELBOW, 1/4 TB 1/4 M-NPT, PUSH-IN DOT	2	2
4	1302-5563	UNION TEE, 1/4 TB, PUSH-IN	2	2
5	1402-1620	1/2 X 2 1/2 UNC HEX CAP SCR (GR 8)	4	4
6	140B-1824	9/16 X 3 UNC HEX CAP SCR (GR 8) O&P	2	2
7	140B-1840	9/16 X 5 UNC HEX CAP SCR (GR 8) O&P	2	2
8	140B-2032	5/8 X 4 UNC HEX CAP SCR (GR 8) O&P	2	2
9	1411-1614	1/2 X 1 3/4 UNC FLANGE BOLT (GRADE 8)	34	34
10	141A-1622	1/2 X 2 3/4 UNC FLANGE BOLT (GR 8) O&P	6	6
11	141A-2020	5/8 X 2 1/2 UNC FLANGE BOLT (GR 8) O&P	2	2
12	141A-2424	3/4 X 3 UNC FLANGE BOLT (GR 8) O&P	4	4
13	1455-0404	#4 X 1/4 DRIVE SCREW	2	2
14	1475-1600	1/2 UNF HEX JAM NUT	2	2
15	1475-2402	3/4 UNF HEX JAM NUT, O&P	2	2
16	1476-1806	9/16 UNC HEX TOP LOCK NUT (GR C) O&P	4	4
17	1480-1604	1/2 UNC TOP LOCK FL NUT (GR G) O&P	40	40
18	1480-2004	5/8 UNC TOP LOCK FL NUT (GR G) O&P	4	4
19	1480-2404	3/4 UNC TOP LOCK FL NUT (GR G) O&P	4	4
20	1488-1602	1/2 SAE HARDENED WASHER	8	8
21	14950038	U-BOLT, M20 X 2.50, 79 X 315	4	4
22	1500-1305	TAG-SERIAL, CABMATE	1	1
23	1500-1324	LABEL-IDENTIFICATION, DRIVER SIDE	3	3
24	1500-1325	LABEL-IDENTIFICATION, PASS. SIDE	3	3
25	15060451	NUT-FLANGE, M20X2.5	8	8
26	80001420	SHIM-SPRING ARM	6	6
27	800M0175	BRACKET-MOUNT, SHOCK	2	2
28	800M0176	BRACKET-MOUNT, LCR, UPPER	1	1
29	800M0186	LATERAL CONTROL ROD	1	1
30	810M0097	HANGER-FRONT, ARM, DR	1	1
31	810M0098	HANGER-FRONT, ARM, PASS	1	1
32	810M0111	BRACKET-MOUNT, AIRSPRING, UPPER	1	1
33	810M0112	BRACKET-MOUNT, AIRSPRING, UPPER	1	1
34	820M0036	SPRING ARM	1	1
35	820M0037	SPRING ARM	1	1
NS	8M000093	AXLE KIT-GMC C4500/C5500, 11K	1	0
NS	8M000094	AXLE KIT-GMC C4500/C5500, 13.5K	0	1

**NOTE: AXLE KITS 8M000093 AND 8M000094 ARE NOT SHOWN. FOR DETAILED PARTS LISTS OF THESE AXLE KITS SEE FOLLOWING PAGES  
 \*\*\* TWO SHOCKS PART NUMBERS AVAILABLE FOR THIS SUSPENSION, CONSULT LINK MFG. CUSTOMER SERVICE FOR CORRECT APPLICATION \*\*\***

# UltraRide – GM C4500/C5500 8M000087 — PARTS LIST

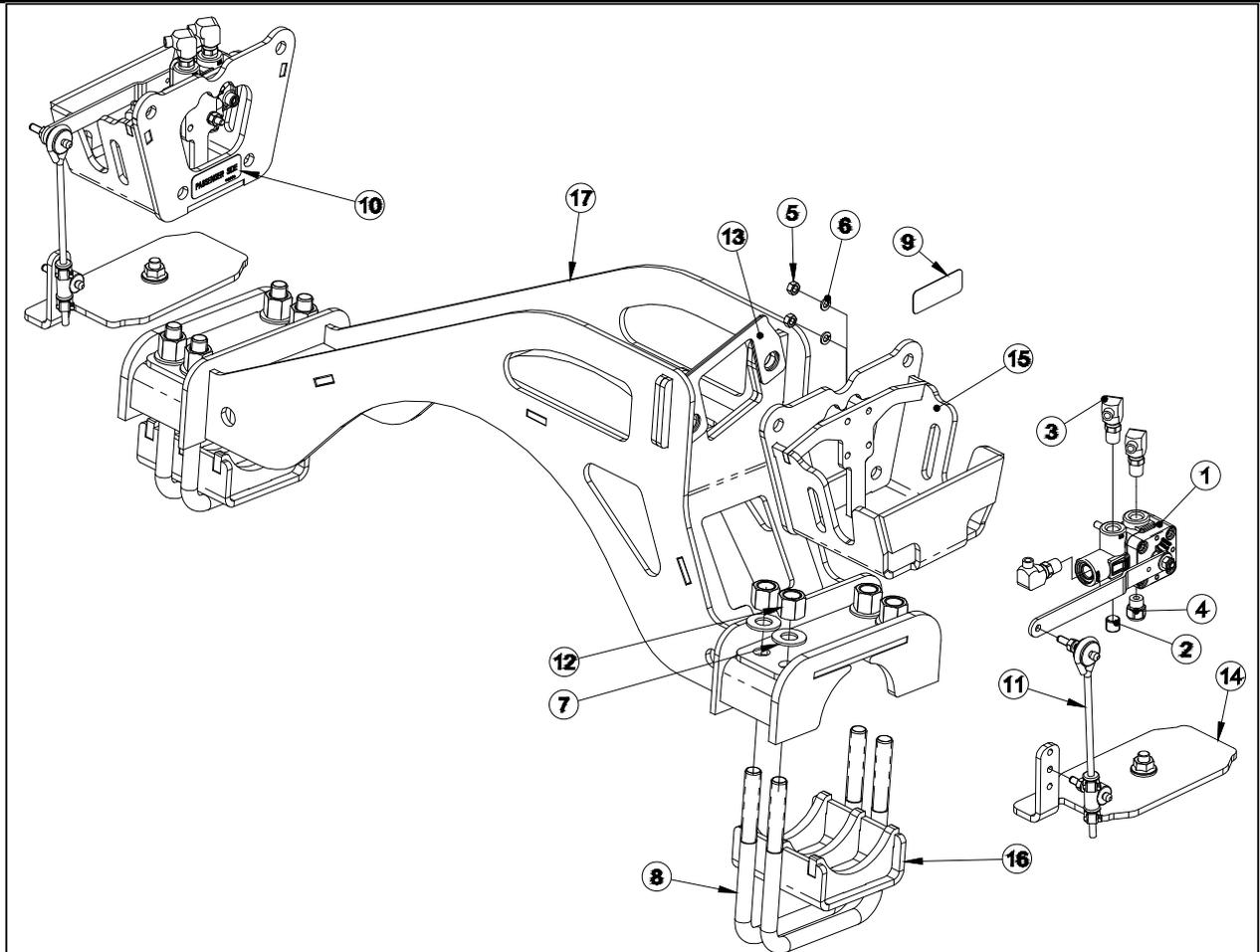


# ***UltraRide* - 8M000093 AXLE KIT**

## **11K AXLE**

### **PARTS LIST**

ITEM	PART NUMBER	DESCRIPTION	QTY
1	13010064	VALVE-CONTROL, HEIGHT	2
2	1302-2077	AIR FTG / PLUG (1/4 NPT)	2
3	1302-5091	ELBOW, 1/4 TB 1/4 M-NPT, PUSH-IN DOT	6
4	1302-9974	MUFFLER-EXHAUST, 1/4 M-NPT	2
5	1470-0800	1/4 UNC HEX NUT (GR B)	4
6	1485-0800	1/4 LOCK WASHER	4
7	1488-2002	5/8 SAE HARDENED WASHER	8
8	14950029	U-BOLT-SQUARE, 5/8 UNF, 5.06 X 7.00	4
9	1500-1324	LABEL-IDENTIFICATION, DRIVER SIDE	1
10	1500-1325	LABEL-IDENTIFICATION, PASS. SIDE	1
11	15000315	LINKAGE-VALVE, HEIGHT CONTROL, HALDEX	2
12	1506-0016	5/8 UNF HEX HIGH NUT	8
13	80001819	SHIM-SPRING ARM	2
14	800M0178	PLATE-MOUNT, AXLE	2
15	800M0182	BRACKET-MOUNT, VALVE-BUMPER	2
16	800M0183	CHANNEL-MOUNT, AXLE	2
17	800M0184	BRACKET-MOUNT, LCR, LOWER	1

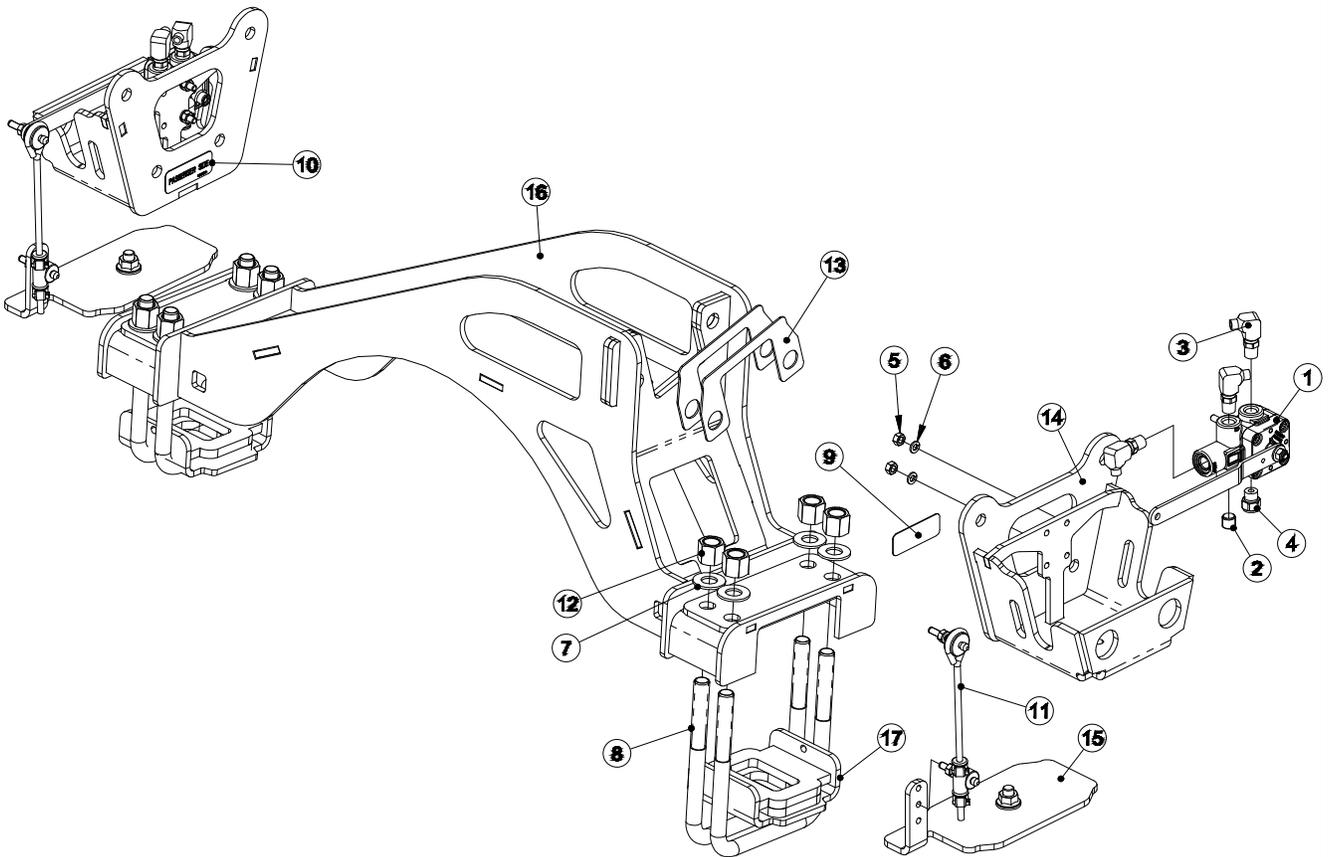


# ***UltraRide* - 8M000094 AXLE KIT**

## **13.5K AXLE**

### **PARTS LIST**

ITEM	PART NUMBER	DESCRIPTION	QTY
1	13010064	VALVE-CONTROL, HEIGHT	2
2	1302-2077	AIR FTG / PLUG (1/4 NPT)	2
3	1302-5091	ELBOW, 1/4 TB 1/4 M-NPT, PUSH-IN DOT	6
4	1302-9974	MUFFLER-EXHAUST, 1/4 M-NPT	2
5	1470-0800	1/4 UNC HEX NUT (GR B)	4
6	1485-0800	1/4 LOCK WASHER	4
7	1488-2002	5/8 SAE HARDENED WASHER	8
8	14950029	U-BOLT-SQUARE, 5/8 UNF, 5.06 X 7.00	4
9	1500-1324	LABEL-IDENTIFICATION, DRIVER SIDE	1
10	1500-1325	LABEL-IDENTIFICATION, PASS. SIDE	1
11	15000315	LINKAGE-VALVE, HEIGHT CONTROL, HALDEX	2
12	1506-0016	5/8 UNF HEX HIGH NUT	8
13	80001819	SHIM-SPRING ARM	2
14	800M0177	BRACKET-MOUNT, VALVE-BUMPER	2
15	800M0178	PLATE-MOUNT, AXLE	2
16	800M0179	BRACKET-MOUNT, LCR, LOWER	1
17	800M0181	CHANNEL-MOUNT, AXLE	2



# ***UltraRide*** – TROUBLE SHOOTING GUIDE

<b>COMPONENT</b>	<b>POSSIBLE PROBLEM</b>	<b>CORRECTIVE ACTION</b>
<b>Airlines</b>	Air leaks	Replace airline
<b>Fittings</b>	Air leaks	Remove fitting and apply fresh joint compound. Reinstall fitting, but <b>Do Not Over tighten. Do not use Teflon tape.</b>
<b>Air Springs</b>	A. Improper height B. Air leakage	A. Adjust valve linkage to maintain proper air spring height. B. Replace air spring.
<b>Height Control Valve</b>	Air spring(s) will not inflate when weight is added to the chassis.  <b>OR</b> Air spring(s) will not deflate when weight is removed from the chassis.	A. Inspect valve/s to ensure it is oriented correctly. Check that the airlines and fittings are assembled to their correct ports. <b>See Section 8 for orientation details</b> B. Replace valve.
<b>Shock Absorber</b>	Insufficient damping effect	Replace shocks
<b>Lateral Control Rod</b>	A. Loose nuts on lateral control rod bolts B. Worn bushings	A. Tighten securely. B. Replace lateral control rod.

## 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) =

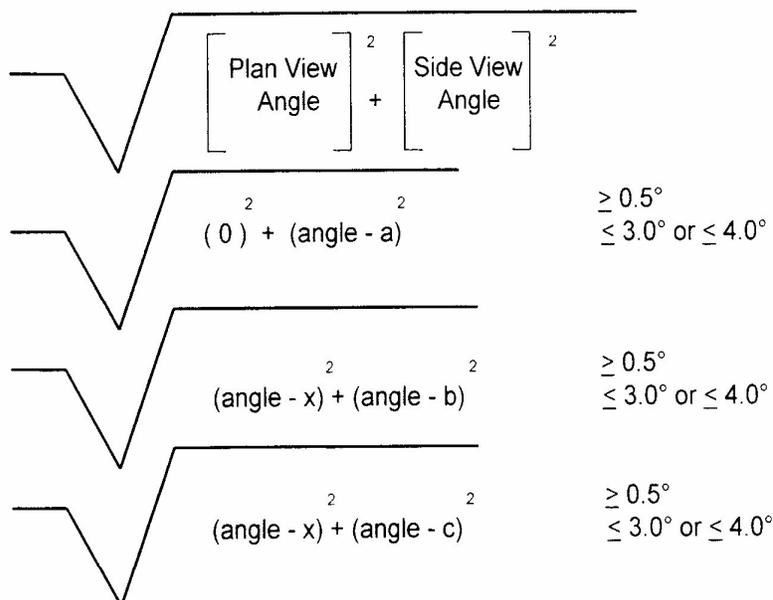
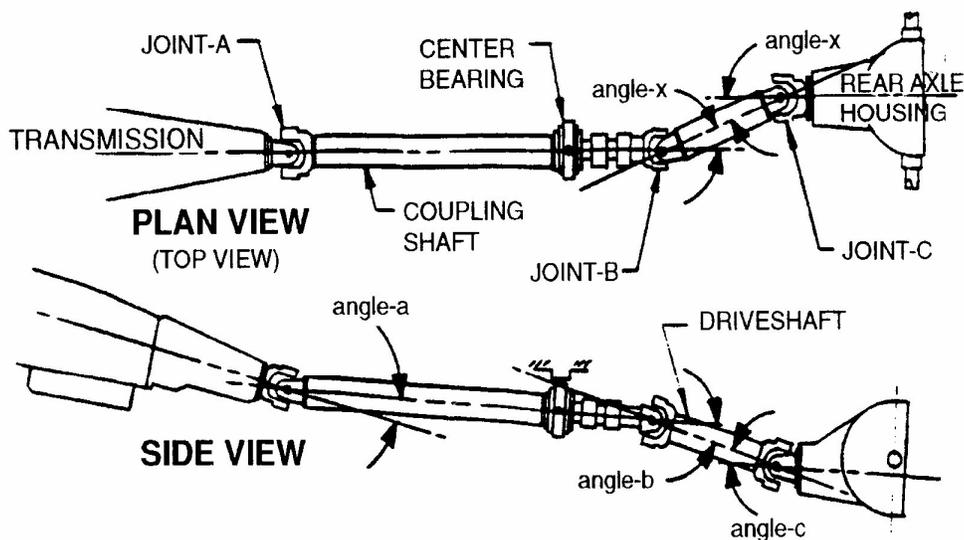
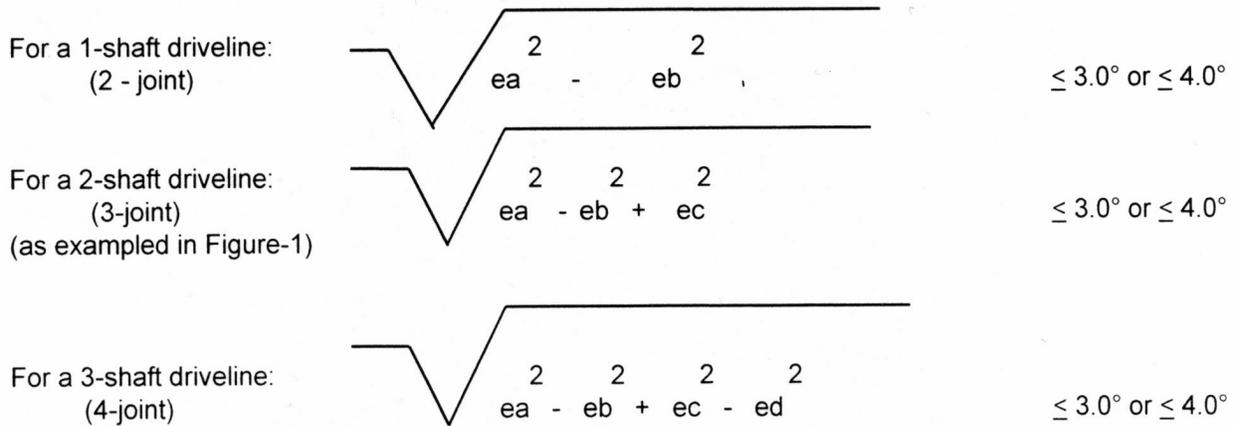


Fig. 1



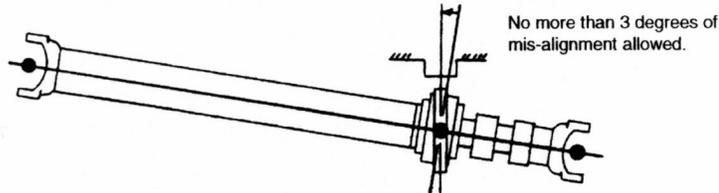
Guideline - Driveline Angles (Continued)

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:

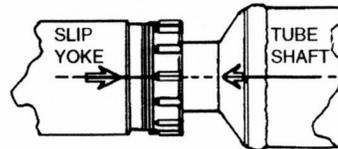
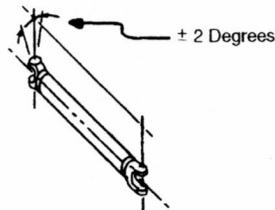


Rule #3: The center bearing mounting bracket, surrounding the rubber insulator, must be **90 ± 3 degrees** to the center bearing. In other words, no more than 3 degrees of mis-alignment can be absorbed by the rubber surrounding the center bearing. See Figure 2.

**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 alignments 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.

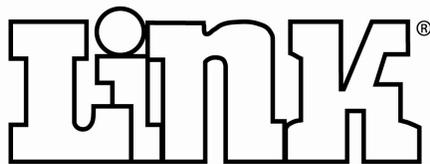
### **USE OF DOUBLE CARDAN UNIVERSAL JOINTS FOR GREATER DRIVE ANGLES:**

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.



Link Mfg. Ltd.  
223 15th St. NE  
Sioux Center, IA USA  
51250-2120

(712) 722-4874

<http://www.linkmfg.com/>