

# OWNERS MANUAL



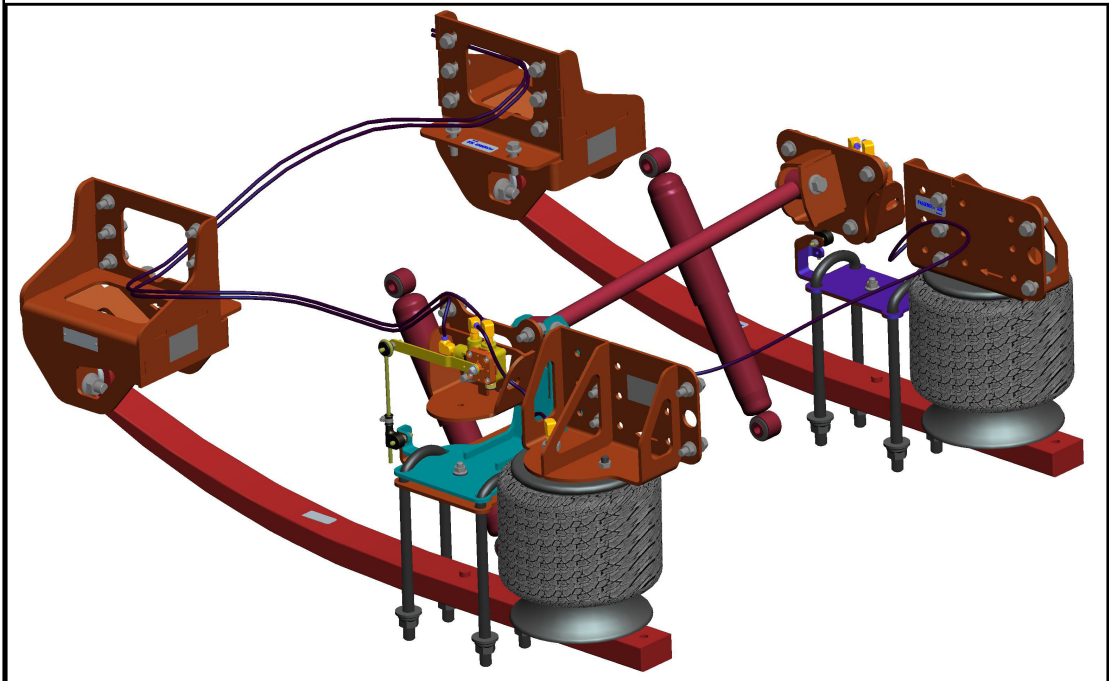
**GM C4500/C5500 4X2**

16,000-19,500 GVW RANGE

**2003-NEWER MODELS**

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

Link Part No. 8M000070



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

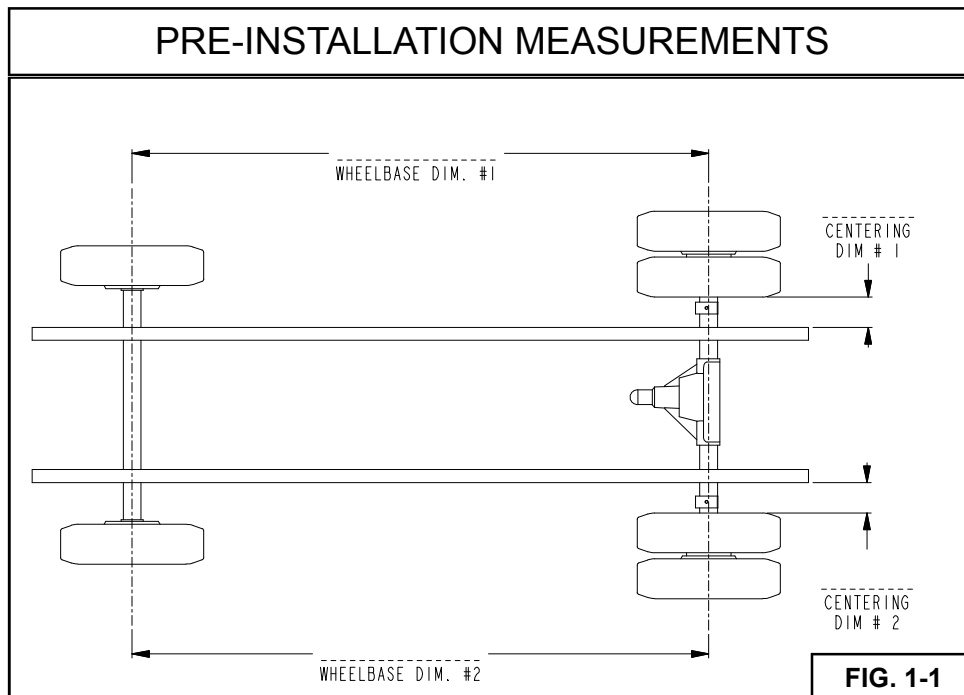
	This is the safety alert symbol. It is used to alert you to potential personal injury hazards. Obey all safety messages that follow this symbol to avoid possible injury or death.		The torque symbol alerts you to tighten fasteners to a specified torque value.
 WARNING	WARNING indicates a potentially hazardous 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.	 <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 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.</p>	

## 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 in Table 10-1 in the Maintenance Section of the instructions. Failure to maintain proper torque may cause component failure and may result in accident with consequent injury.
- ❑ If suspension is to be used on vehicles with GM RPO J-69, In-Wheel Park Brake Option, Link Mfg. Kit 800M0130 must also be ordered.
- ❑ 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 stabilizer bar re-installation kit is available from Link Mfg. (Part Number 800M0134).

## 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.



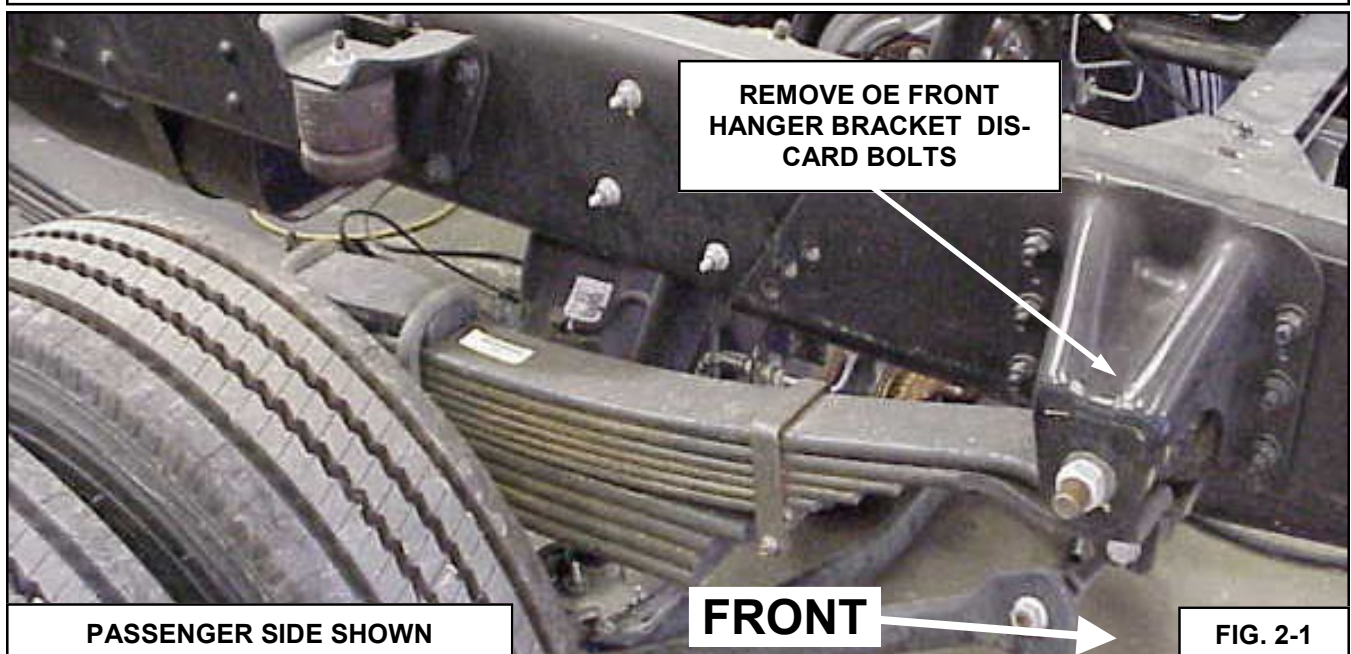


## 2. DRIVER SIDE DISASSEMBLY

**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**, while keeping the OE shock mounting hardware. New UltraRide tuned shock absorbers are provided and will OE shock mounting hardware.
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. The (4) Jounce Bumper Bracket frame holes will be shared with the Lateral Control Bracket.
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. Middle-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 stabilizer bar re-installation kit is available from Link Mfg. (Part Number 800M0134).

**Note!** If installing the 800M0134 Kit, the OE stabilizer bar mounting hardware and fasteners must be retained, as they are not included in the re-installation kit.



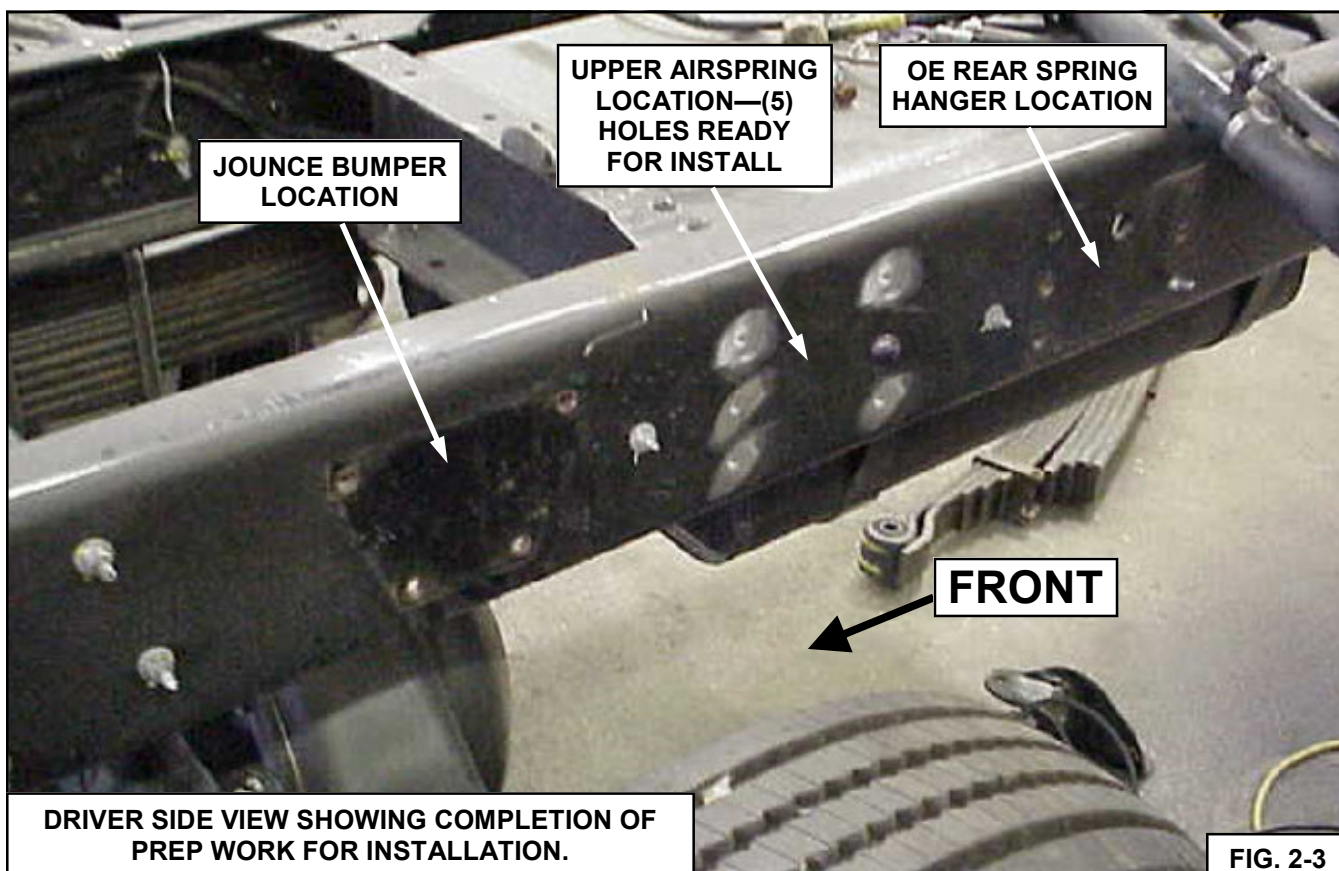
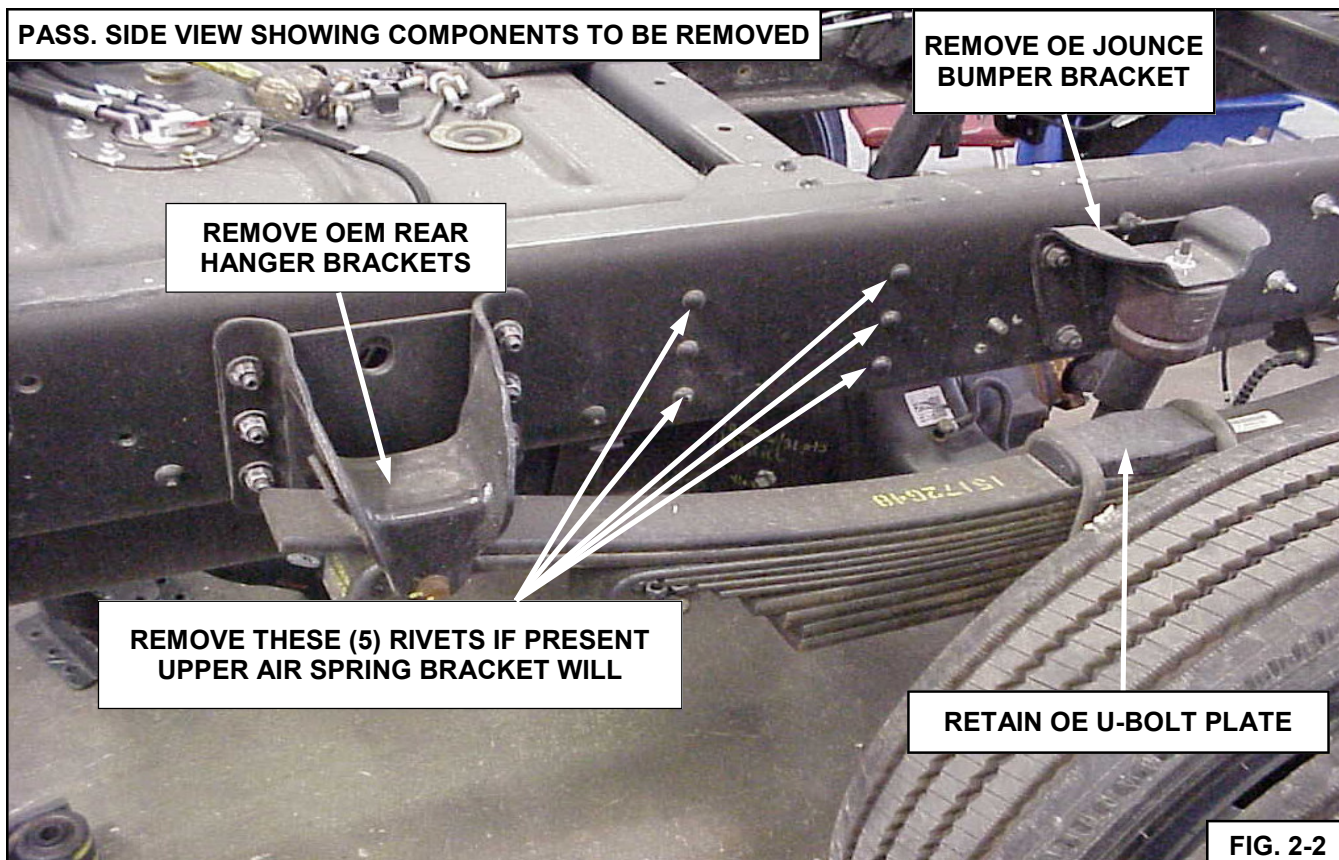






FIG. 2-4



**IMPORTANT!** If installing the 800M0134 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 10) to acquaint yourself with the various parts of the UltraRide suspension. Assemble Components Loosely as described below, torque later in Section 7.

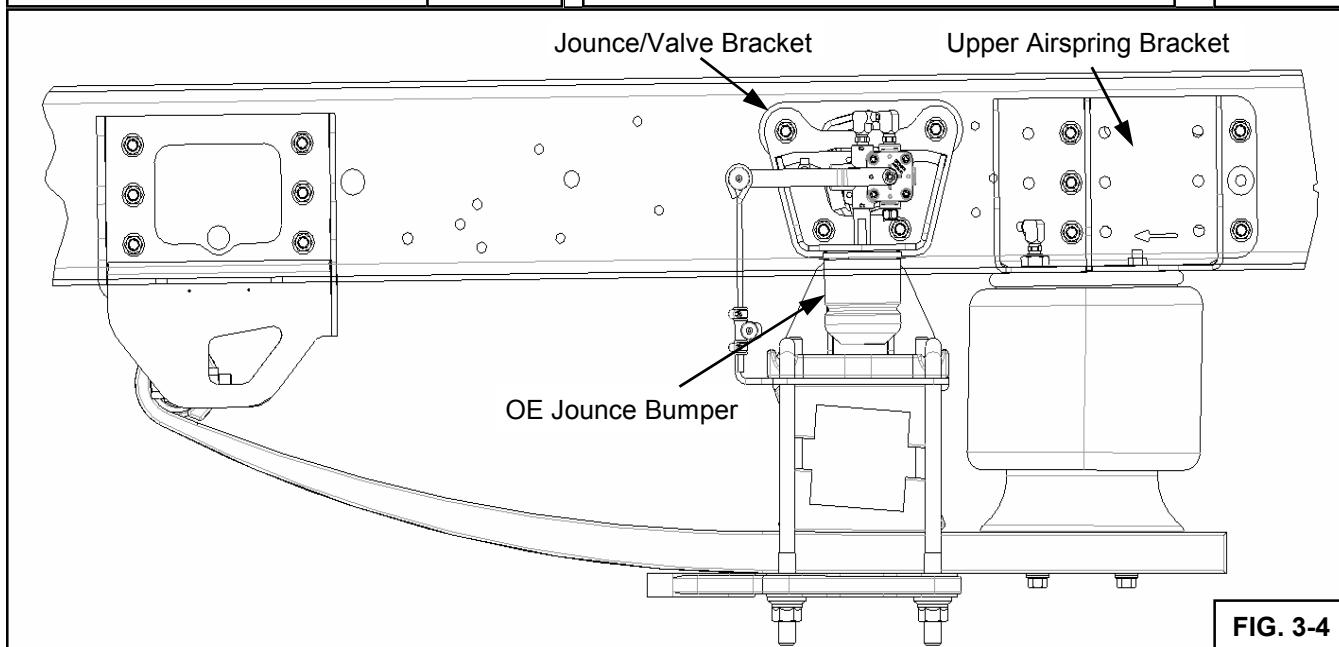
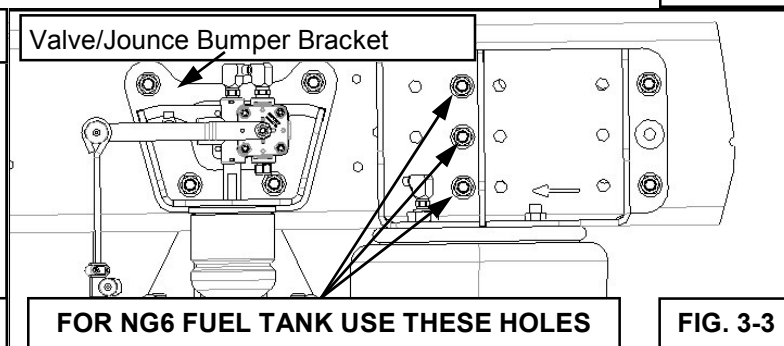
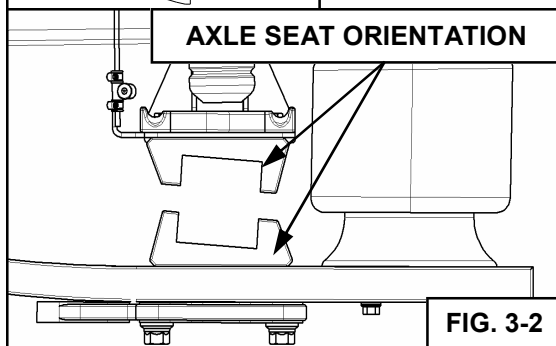
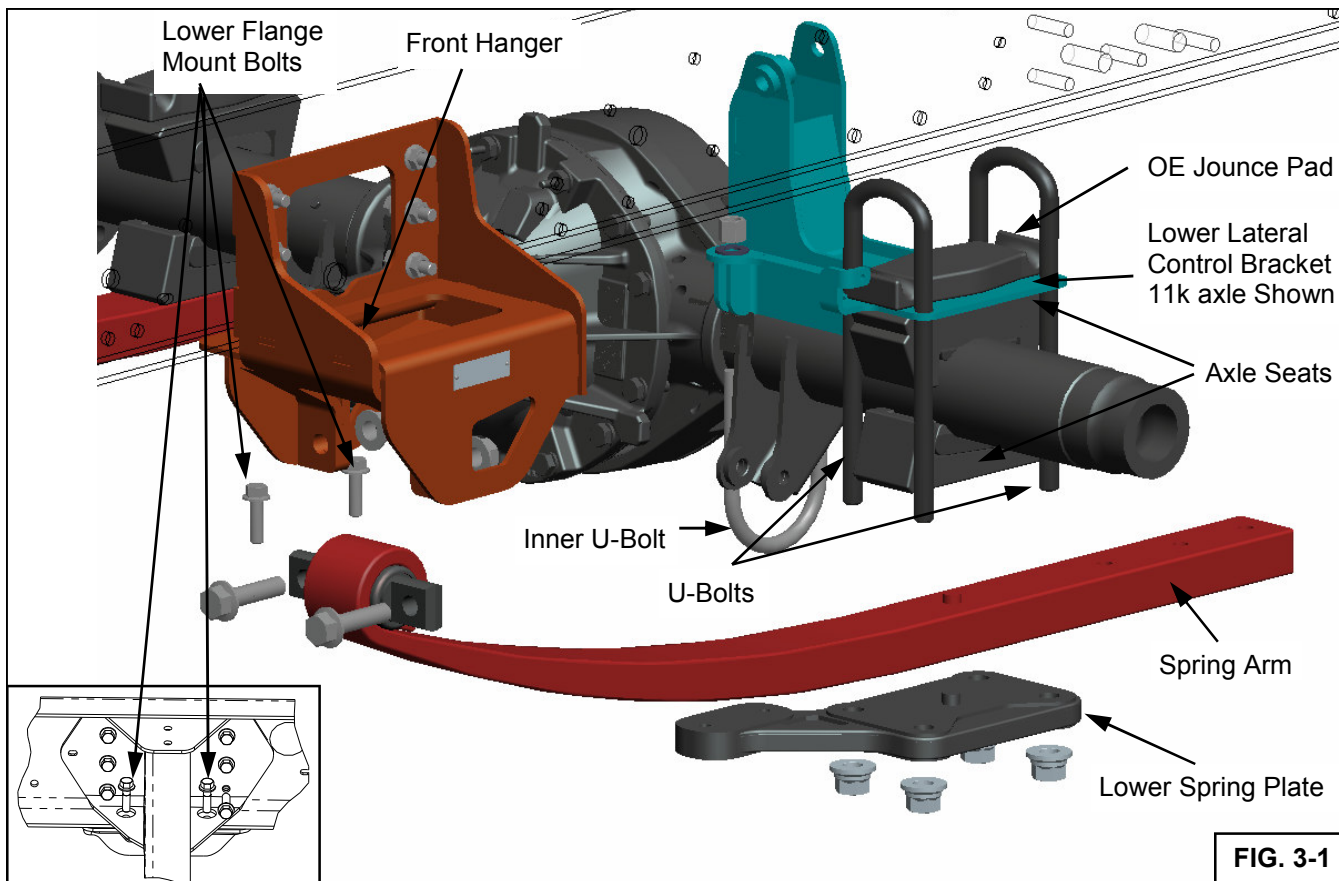


**IMPORTANT!** When tightening fasteners, do not use a high-speed air wrench. The heat generated between the nut and bolt threads may cause the nut to seize.

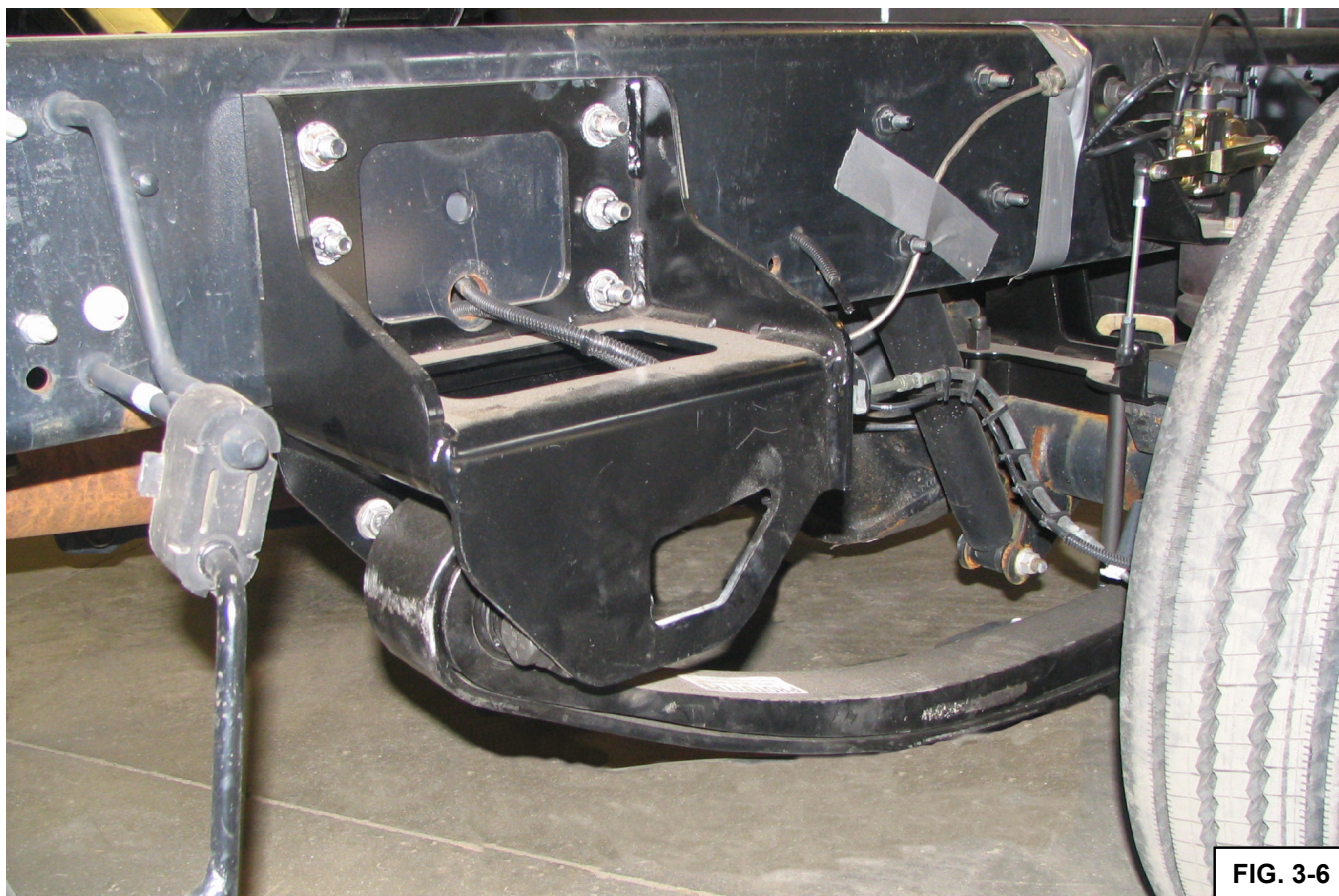
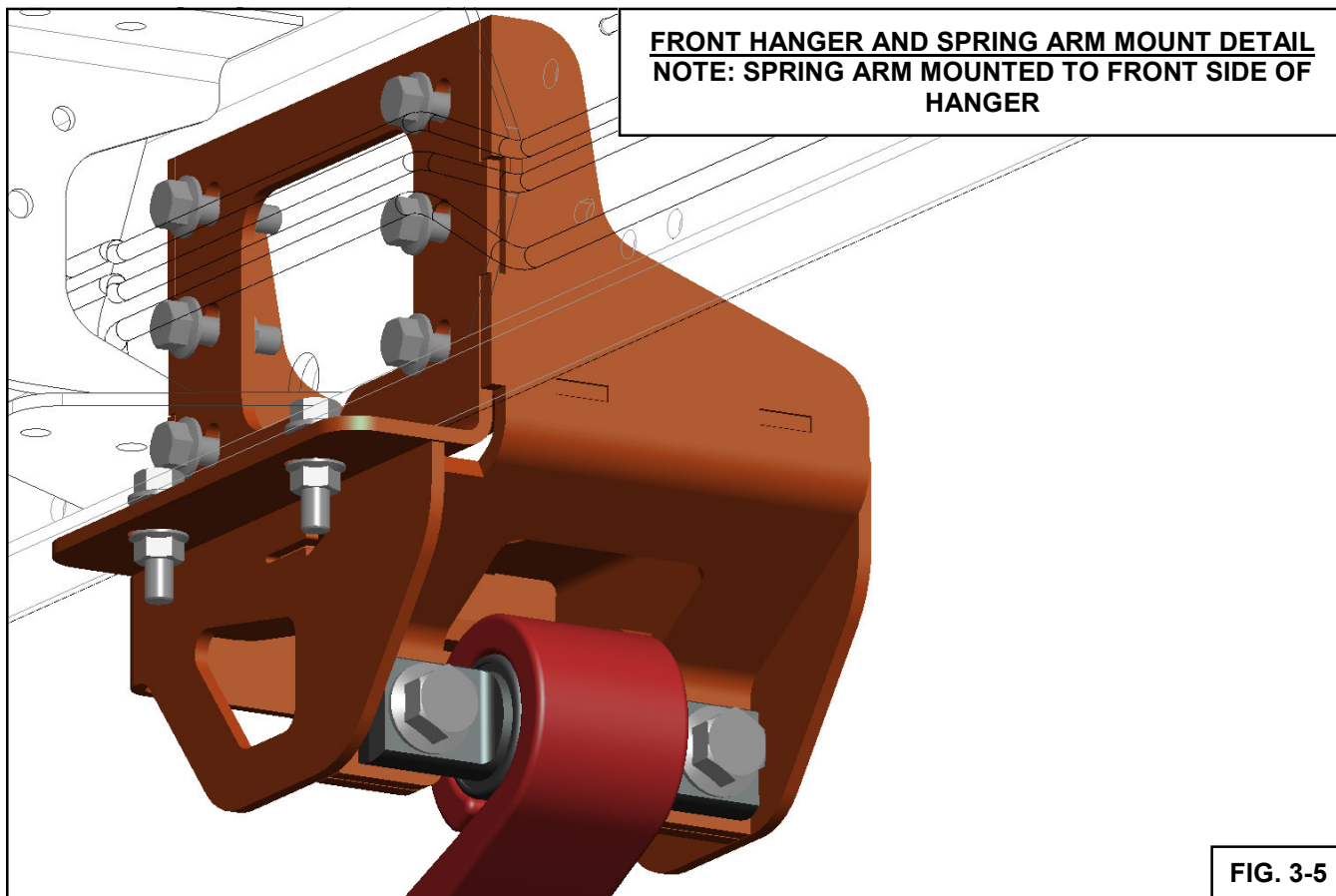
2. Loosely fasten the FRONT HANGER to the frame using (8) 1/2 x 1 3/4 UNC FLANGE BOLTS and (8) 1/2 UNC TOP LOCK FLANGE NUTS, supplied with kit. **Two of these fasteners are to be used in the bottom flange of the frame rail. (Shown in Fig. 3-1, and 3-5)** Drilling is required if the holes are not present in the frame flange. Orient all fasteners with nut on outside of frame. Torque Later. See Fig. 3-1 - 3-5 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. 3-3 and Fig. 3-4 for details.
4. Place the UPPER AIR SPRING BRACKET into position and fasten to the frame using (5) 1/2 X 1 3/4 UNC FLANGE BOLTS and (5) 1/2 UNC TOP LOCK FLANGE NUTS. **Orient All Frame Mount Bolts so that they point outward from the center of the vehicle.** If NG6 Fuel Tank option is used, drilling of holes may be required. See Fig. 3-3 & 3-4 for details.
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 can be purchased from Link to adjust axle alignment, (Part # 80001420) Contact Link Customer Service if needed. Torque Later.
6. Place the upper AXLE SEAT on top of the axle in the same orientation it was removed. See Fig. 3-2 for orientation.
7. **For 11k axles only (round)** Place the LOWER LATERAL CONTROL BRACKET on top of the UPPER AXLE SEAT, orientated as in Fig. 3-1. Fasten loosely with inner U-BOLT, AND U-BOLT SHIM.
8. **For 13.5k axles only (square)** Place AXLE MOUNT PLATE on top of the UPPER AXLE SEAT, orientated similar to the one shown in Fig. 5-1.
9. 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.**
10. 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 Free Spinning Lock Nuts. The U-bolt nuts will be torqued later. **U-BOLTS must be tightened gradually in a criss-cross pattern.** See Fig. 3-1.
11. Attach the lower AIRSPRING piston to the spring arm using (2) 1/2 x 2 3/4 FLANGE BOLTS and (2) 1/2 WASHERS. See Fig. 3-4 for details.



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







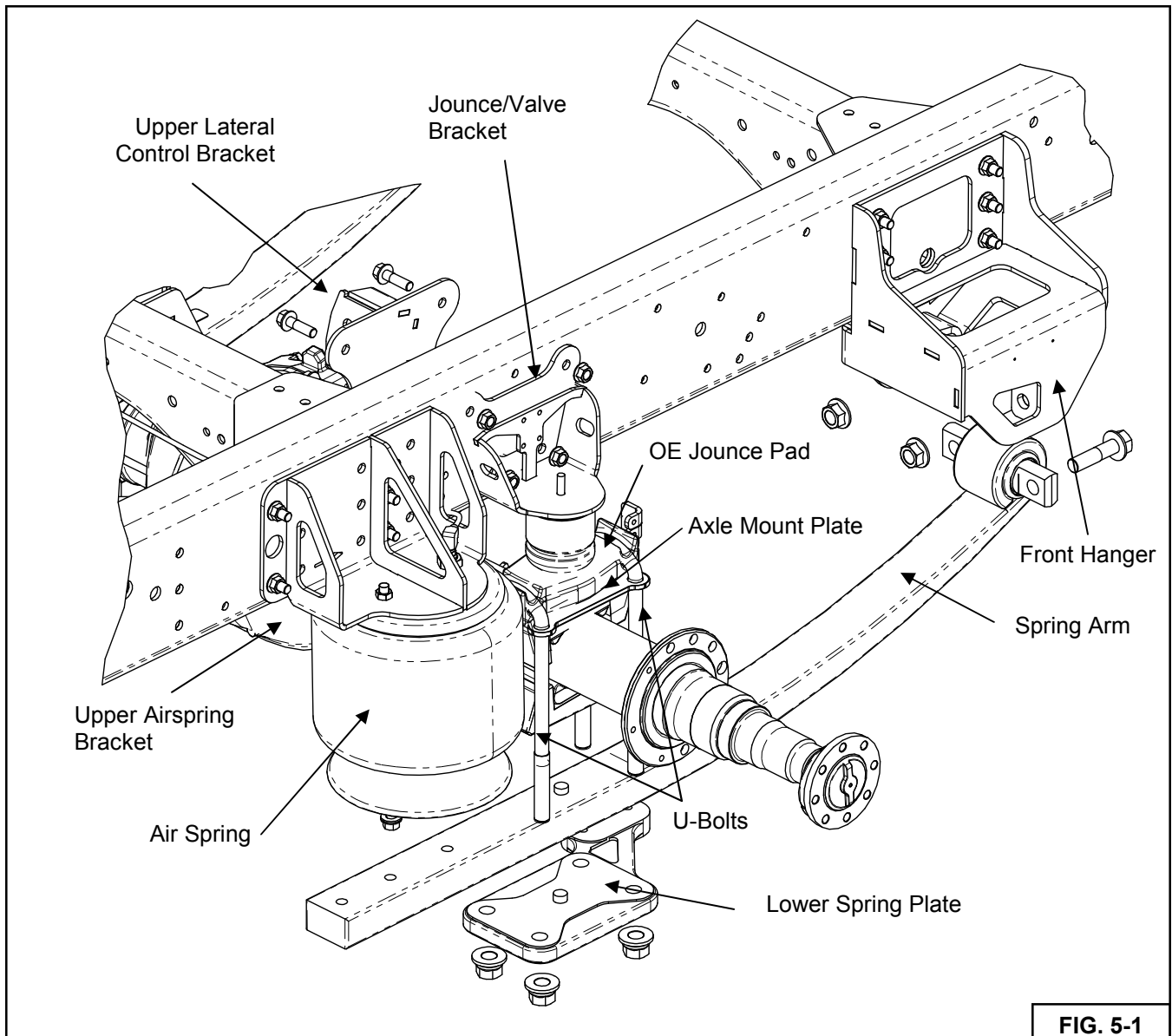
## 4. PASSENGER SIDE DISASSEMBLY

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 1 3/4 UNC FLANGE BOLTS and (4) 1/2 UNC TOP LOCK FLANGE NUTS. Attach the Jounce/Valve Bracket at the same time, using the new fasteners provided.

Double-check all fasteners for proper torque referred to in Table 10-1. Check all clearance points and all alignments. See Figure 5-1 for details.



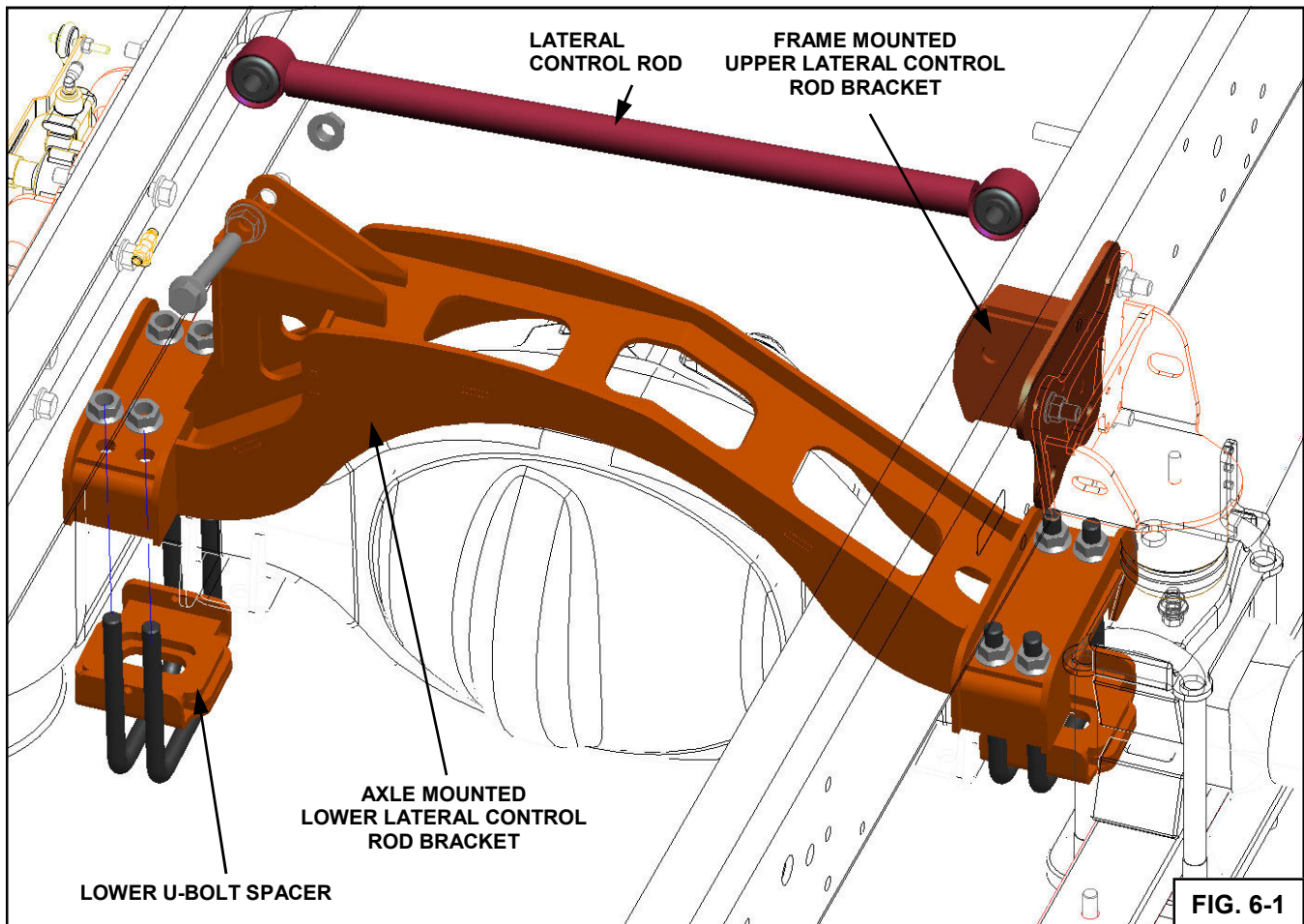
# 6.1. LATERAL CONTROL ROD

## 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 5/8 UNF FLANGE 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. Once both sides of the air suspension are installed, loosely assemble the LATERAL CONTROL ROD between the two sides using (2) 5/8 X UNC FLANGE BOLTS and (2) 5/8 UNC TOP LOCK NUTS. **Set truck to design (ride) height before tightening these fasteners as described in Section 10.** See Fig. 6-1 thru 6-5 for assembly details.



**WARNING!** Inspect Lateral Control Rod and it's 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.



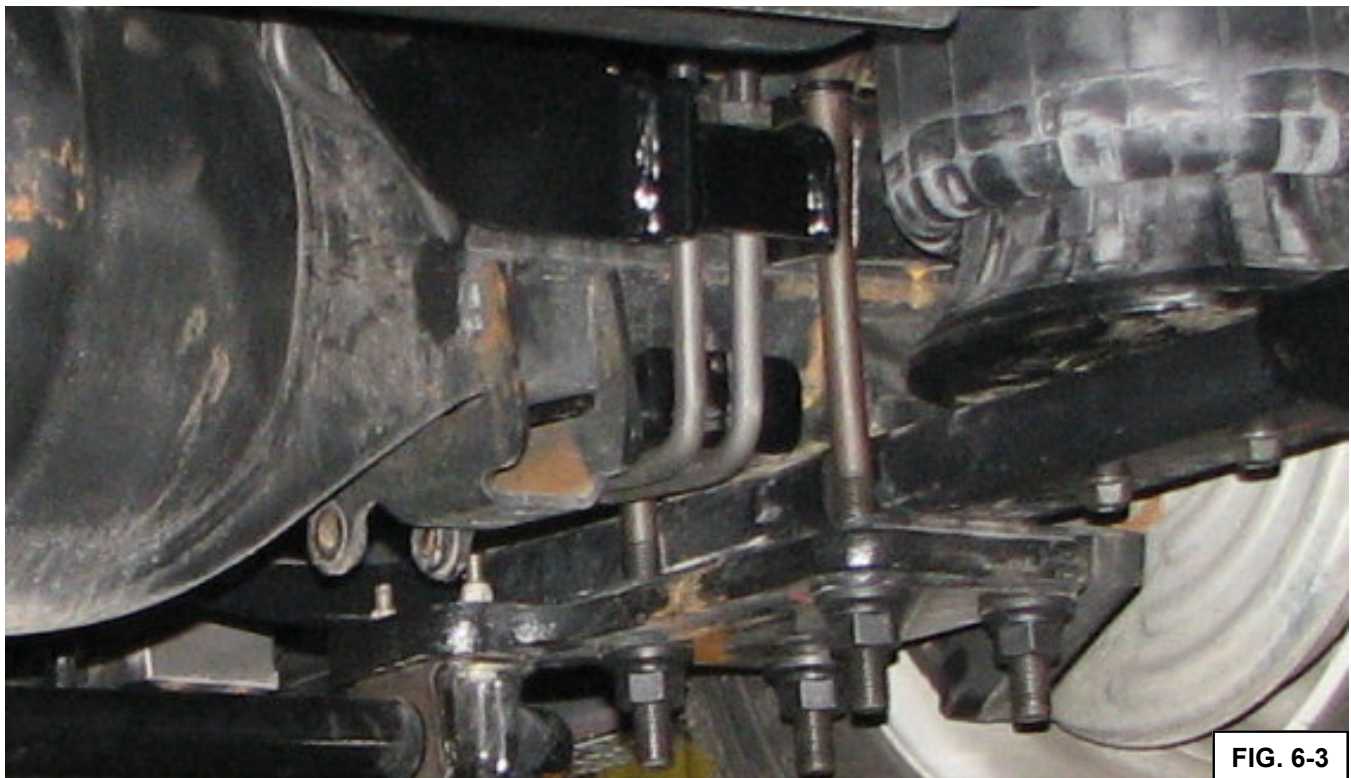
**FIG. 6-1**



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



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



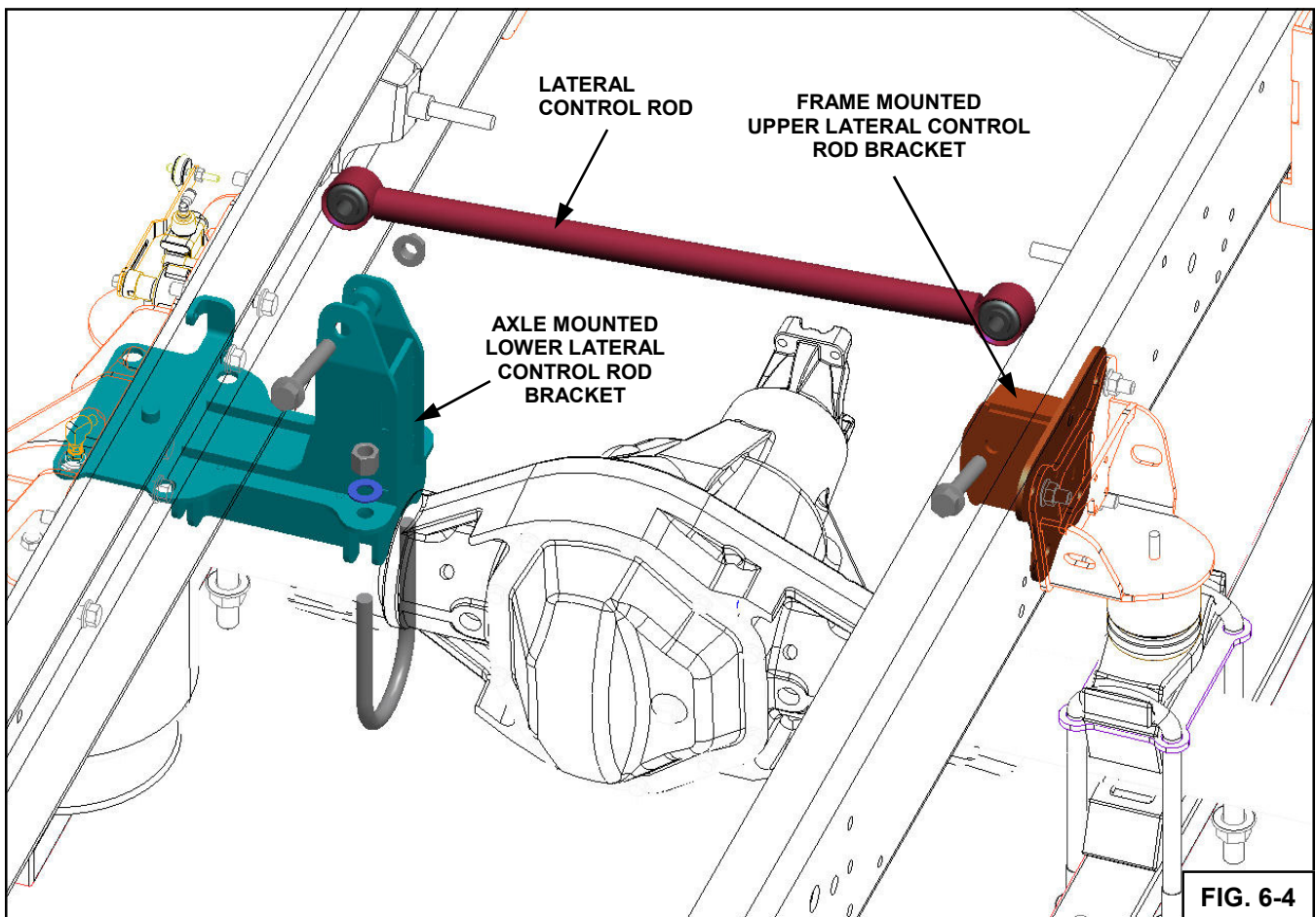
## 6.2. LATERAL CONTROL ROD

### 11K AXLE KIT SHOWN

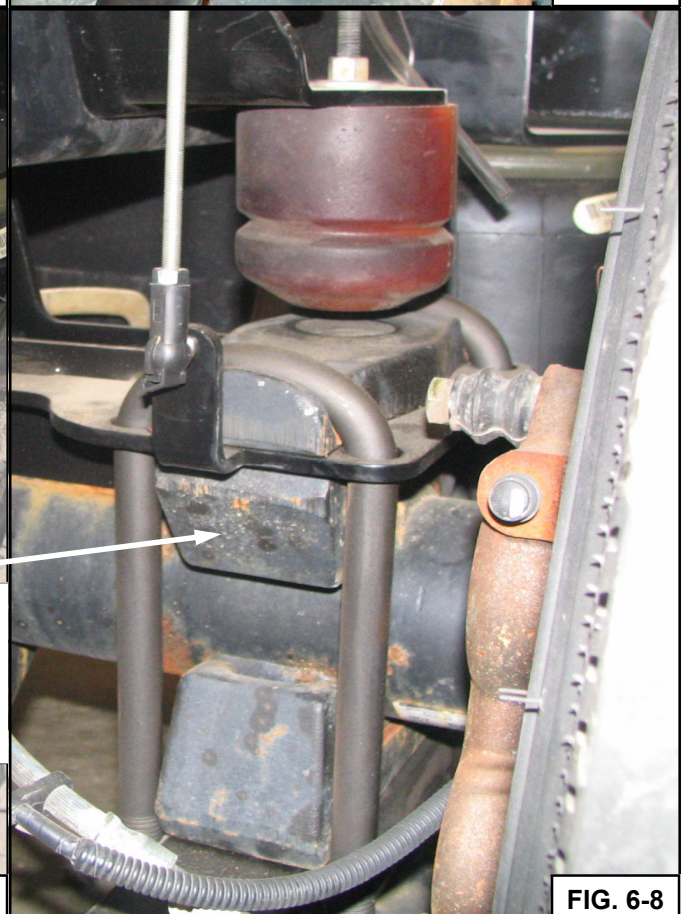
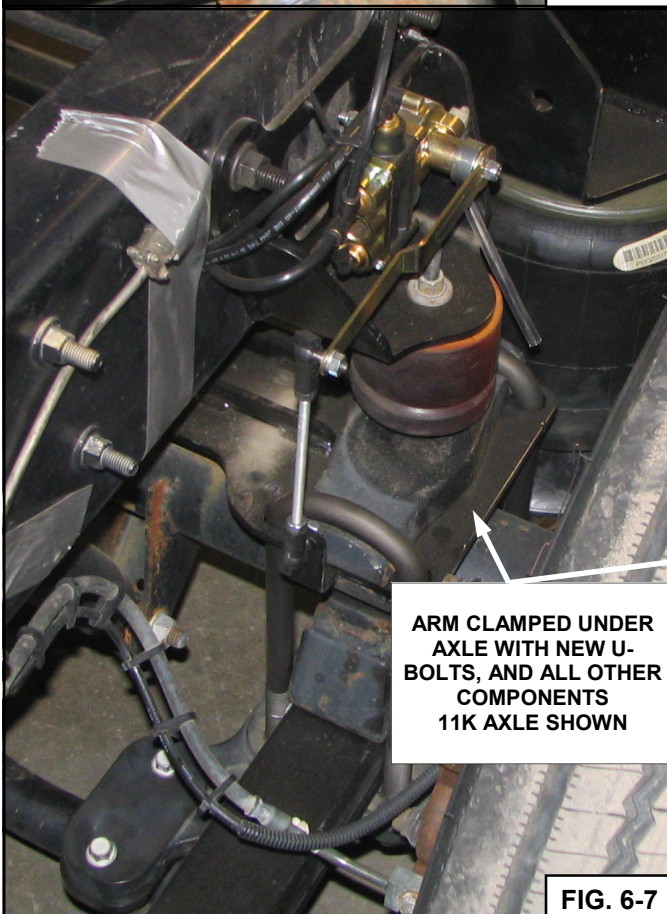
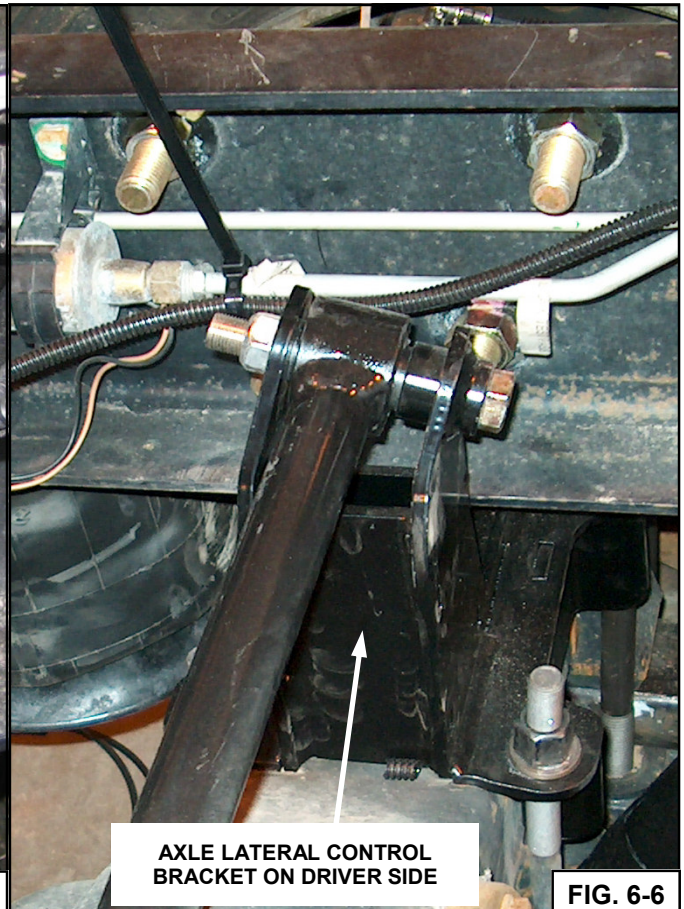
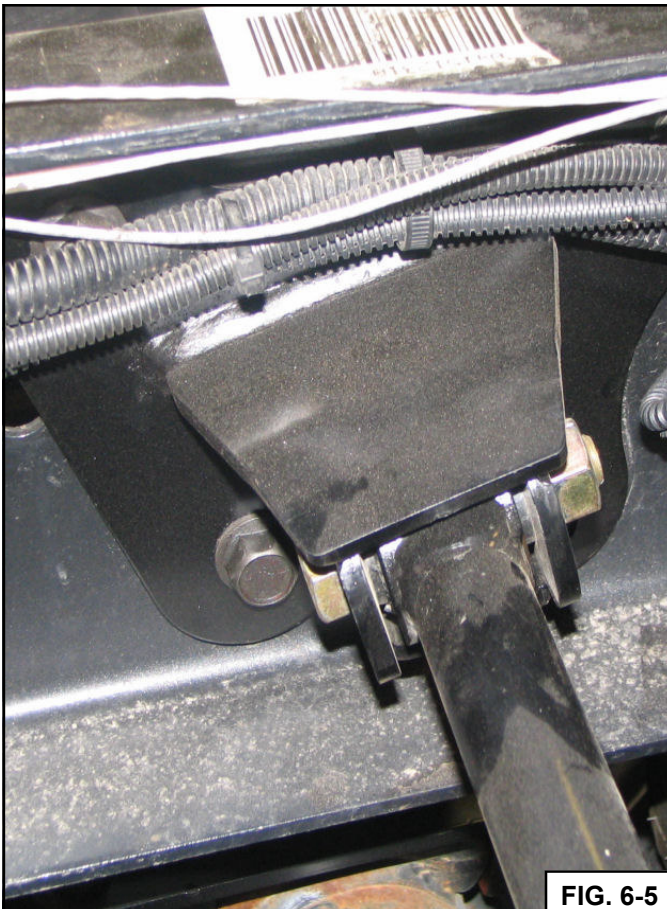
1. Check to insure the axle is centered between the frame rails, by measuring from the outside of the driver and passenger side frame rails to the inside of the wheel hub or tire.
2. Once both sides of the air suspension are installed, loosely assemble the LATERAL CONTROL ROD between the two sides using (2) 5/8 X UNC FLANGE BOLTS and (2) 5/8 UNC TOP LOCK NUTS. **Set truck to design (ride) height before tightening these fasteners as described in Section 10.** See Fig. 6-4 for assembly details.



**WARNING!** Inspect Lateral Control Rod and it's 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.







# 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.

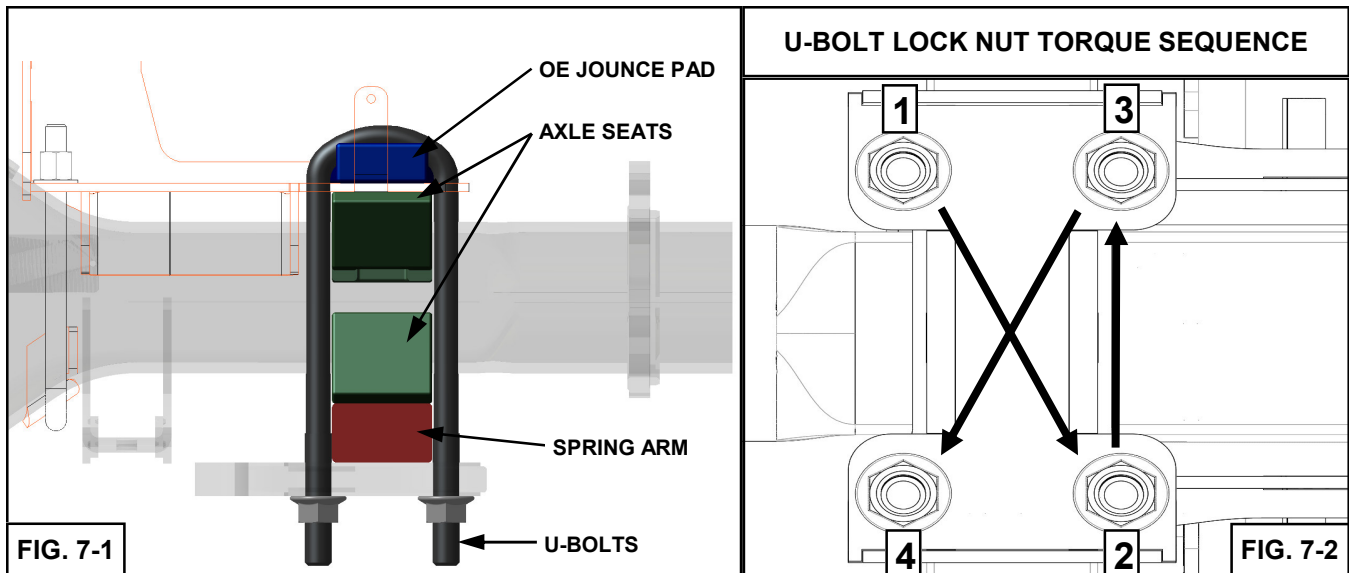
- ❑ See Torque Table below for appropriate Torque values.

1. Torque all 1/2 UNC FRONT AND REAR HANGER BRACKET nuts.
2. Torque (8) 1/2 UNC VALVE/JOUNCE BUMPER BRACKET nuts.
3. Torque the (8) M20 X 2.5mm AXLE U-BOLT Free Spinning Lock 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 (2) 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 (4) 1/2 UNC FLANGE BOLTS securing the lower piston of the AIRSPRING to SPRING ARM.
8. Install new UltraRide tuned SHOCK ABSORBERS using the same orientation as factory with the OE mounting hardware.

**IMPORTANT:** Route the all brake cables away from the air spring and other moving components.

TORQUE TABLE		
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
SPRING ARM AXLE LOCATION	M20 LOCK NUTS (U-BOLT)	315 FT-LBS
FRONT TRAILING ARM PIVOT BOLTS	3/4 UNC NUTS	275 FT-LBS
SHOCK ABSORBER	METRIC NUTS	60 FT-LBS
AIR CONTROL BOX	5/16 UNF NUTS	20 FT-LBS





## 8. AIR CONTROL SYSTEM ASSEMBLY

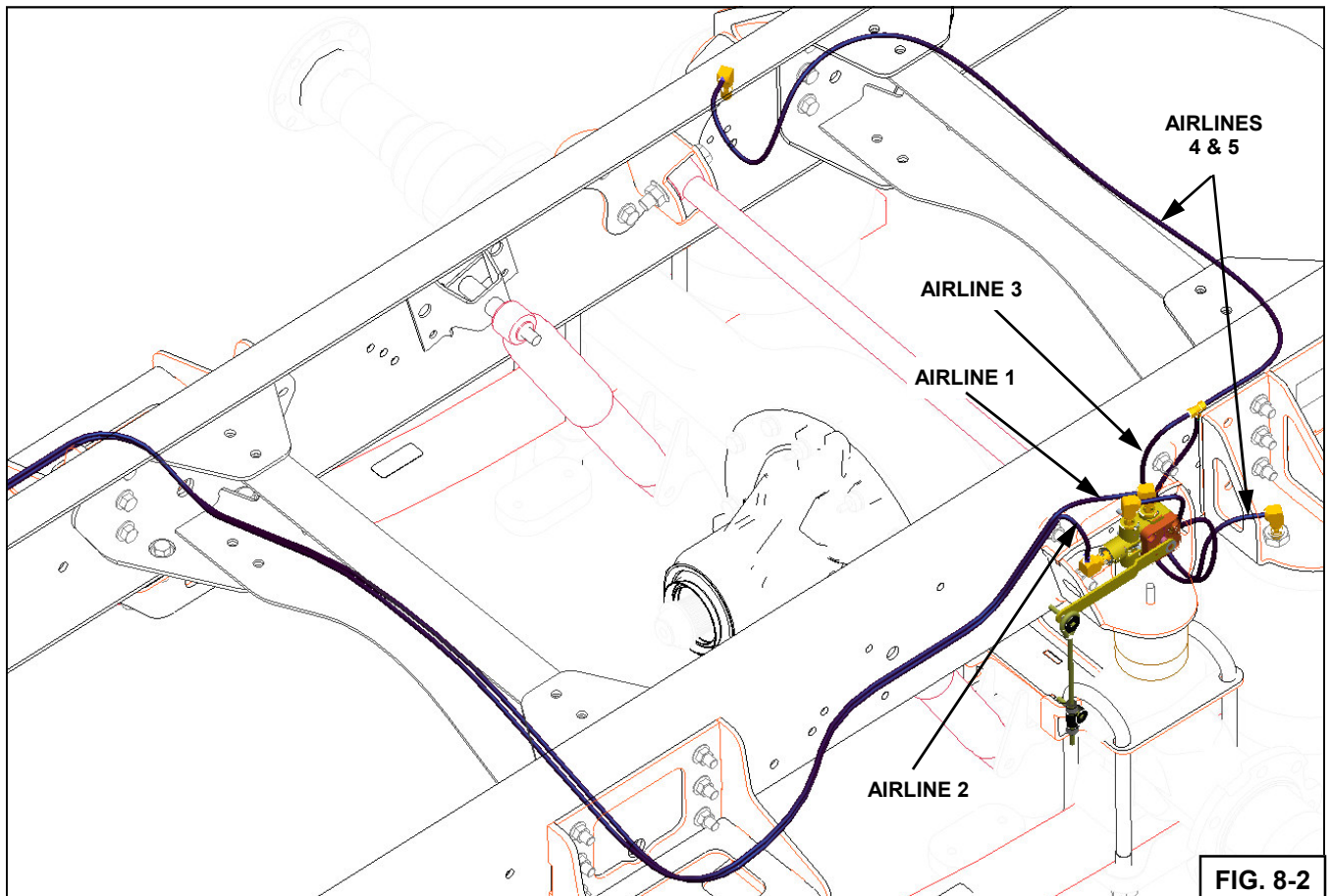
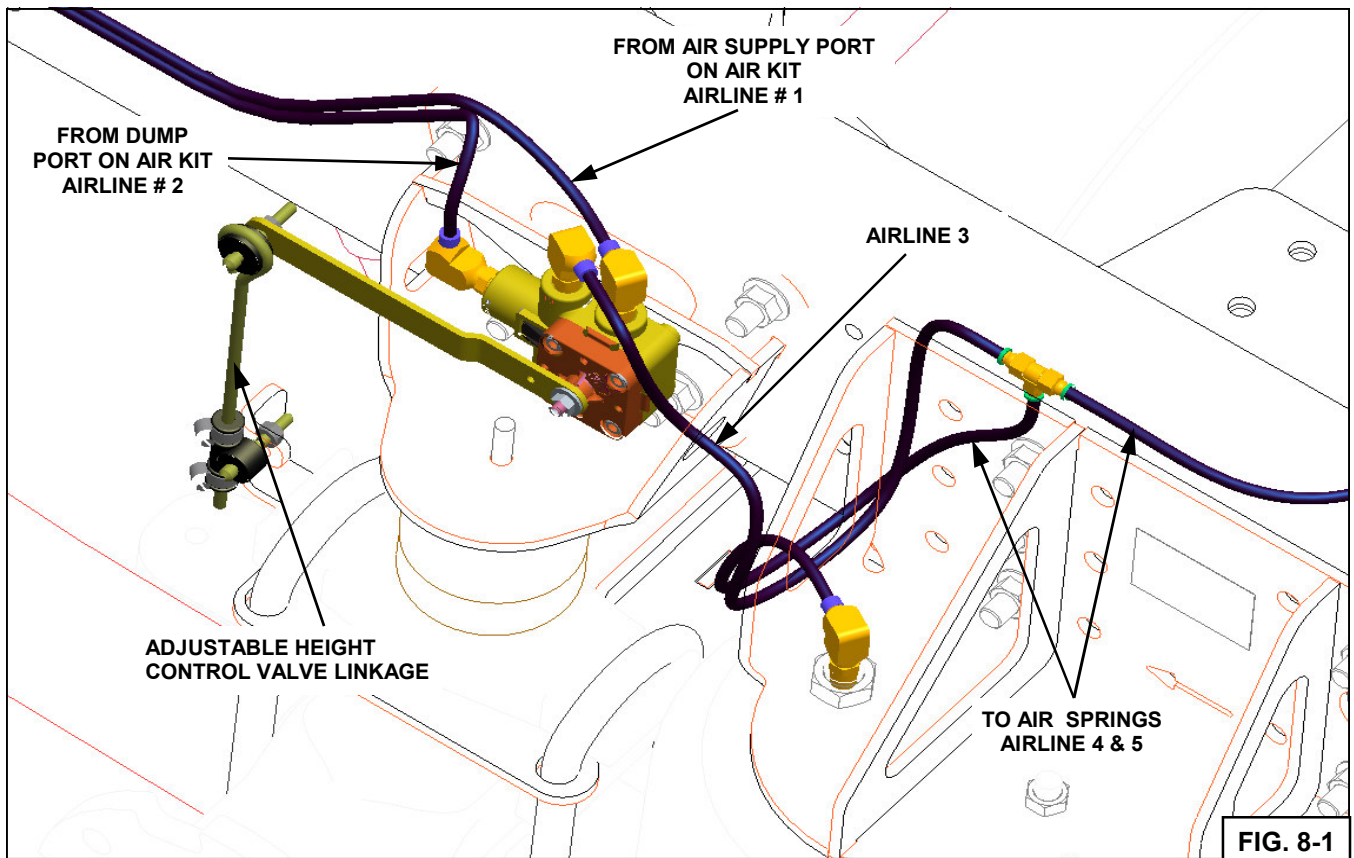


**CAUTION!** Route all airline away from exhaust, moving parts, and sharp objects. Be careful not to crimp the edges of the tubing, and that when cutting airline use an airline cutter to assure square cuts. When installing the airline, fully insert into fitting and give a slight pull to seat properly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

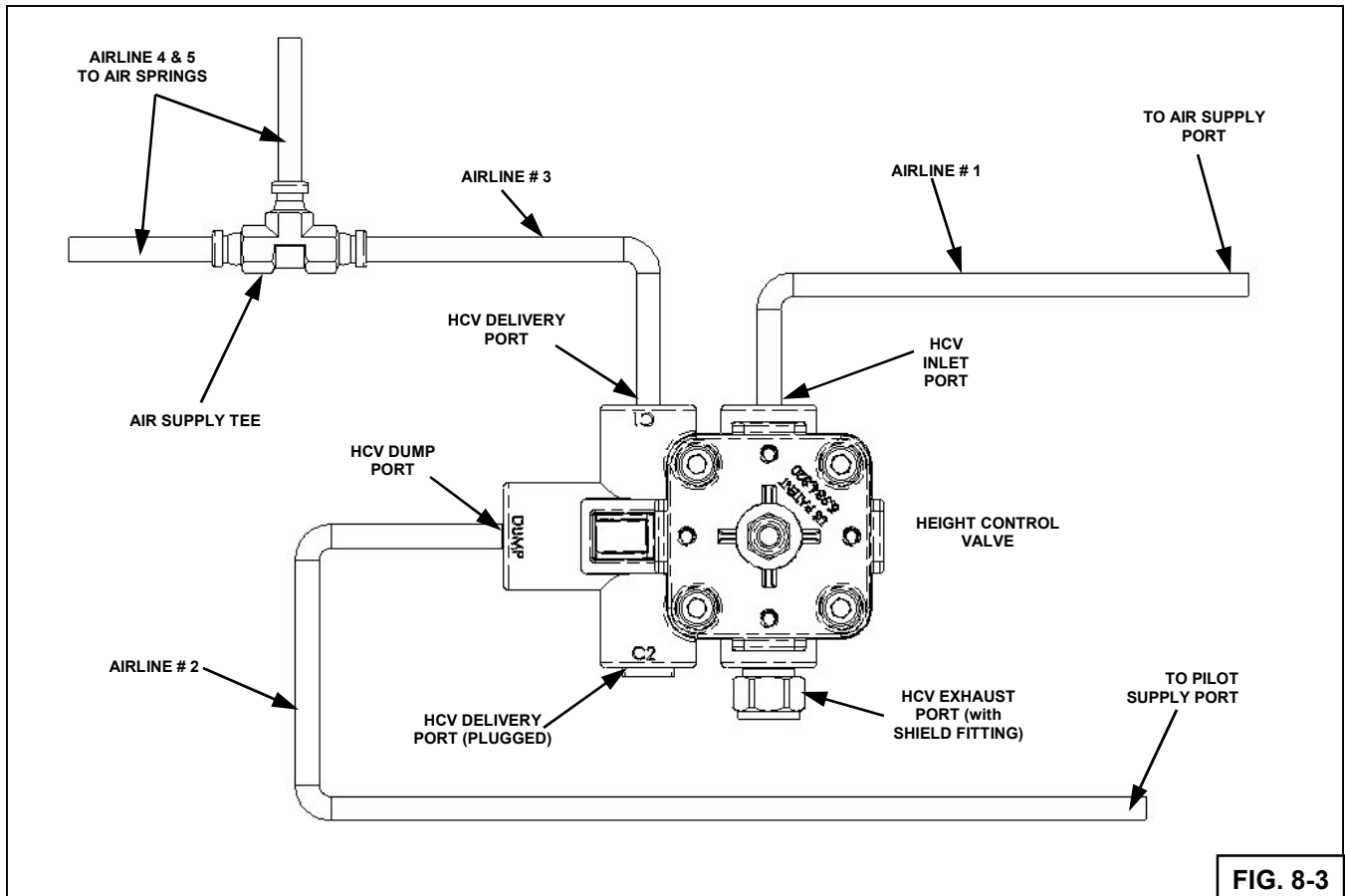
1. **Note:** The installer must find an appropriate location to install the UltraRide Air Control System. (4) frame holes will need to be drilled. If installing on the frame underneath the cab, make sure it is mounted as high on the frame as possible to allow for ground clearance below the air tank. 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 Table 10-1 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 5, as shown in Figures 8-1, 8-2, & 8-3.
  - 2.1. Route **AIRLINE 1** from the top supply "I/E" port of the HEIGHT CONTROL VALVE to the MAIN SUPPLY PORT of the AIR RESERVOIR SOLENOID.
  - 2.2. Route **AIRLINE 2** from the "DUMP" port in the HEIGHT CONTROL VALVE to the PILOT SUPPLY PORT of the AIR RESERVOIR SOLENOID.
  - 2.3. Route **AIRLINE 3** from the top delivery "C1" port of the HEIGHT CONTROL VALVE to the RUN TEE, then route **AIRLINE 4 & 5** to each AIR SPRING.
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 Lower Axle Mount Plate. Torque to 8-10 ft-lbs. See Fig. 8-4. Suspension height will be set later.



## AIR CONTROL KIT AIR CONTROL SCHEMATIC



## 9. ELECTRICAL SYSTEM

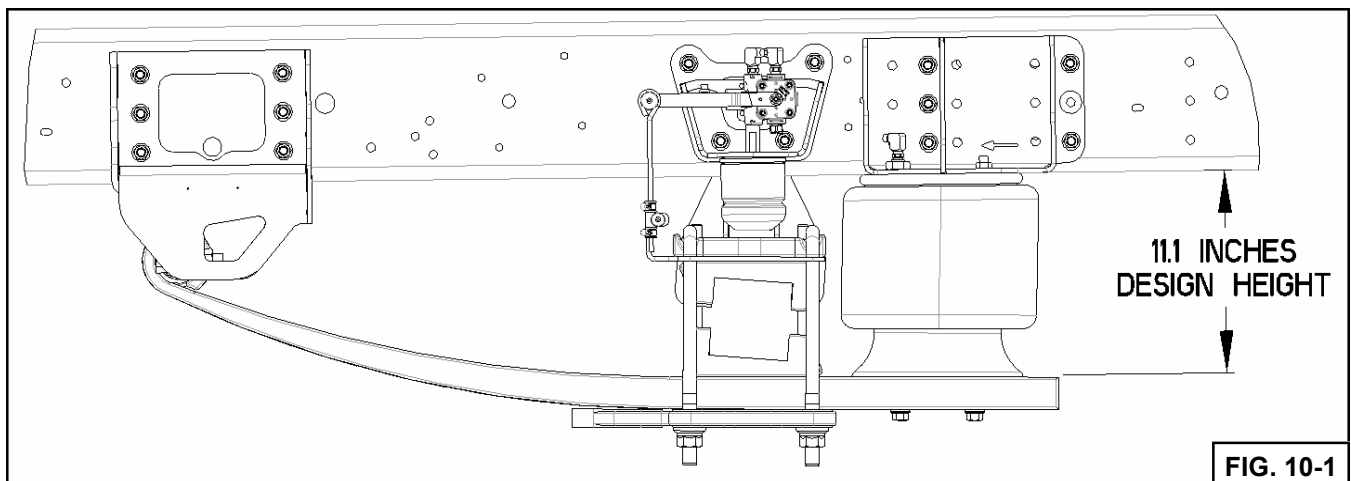


**CAUTION!** All wiring should be routed and secured neatly to avoid any functional or visual issues. Under hood and under-body wire routings should be clear of sharp edges (3/4 inches minimum) and direct sources of heat (4 inches minimum). All wiring should be routed away from high temperature areas 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 allowing the compressor fill the system. Using the service fill valve to fill the air reservoir to 120 psi is the recommended method. The maximum allowable tank pressure is 150 psi.
3. Check for proper operation of the height control valve. 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 Linkage 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 spring(s) by disconnecting one end of the linkage from the valve arm, and rotating the valve arm 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 clamp on the valve linkage when complete.

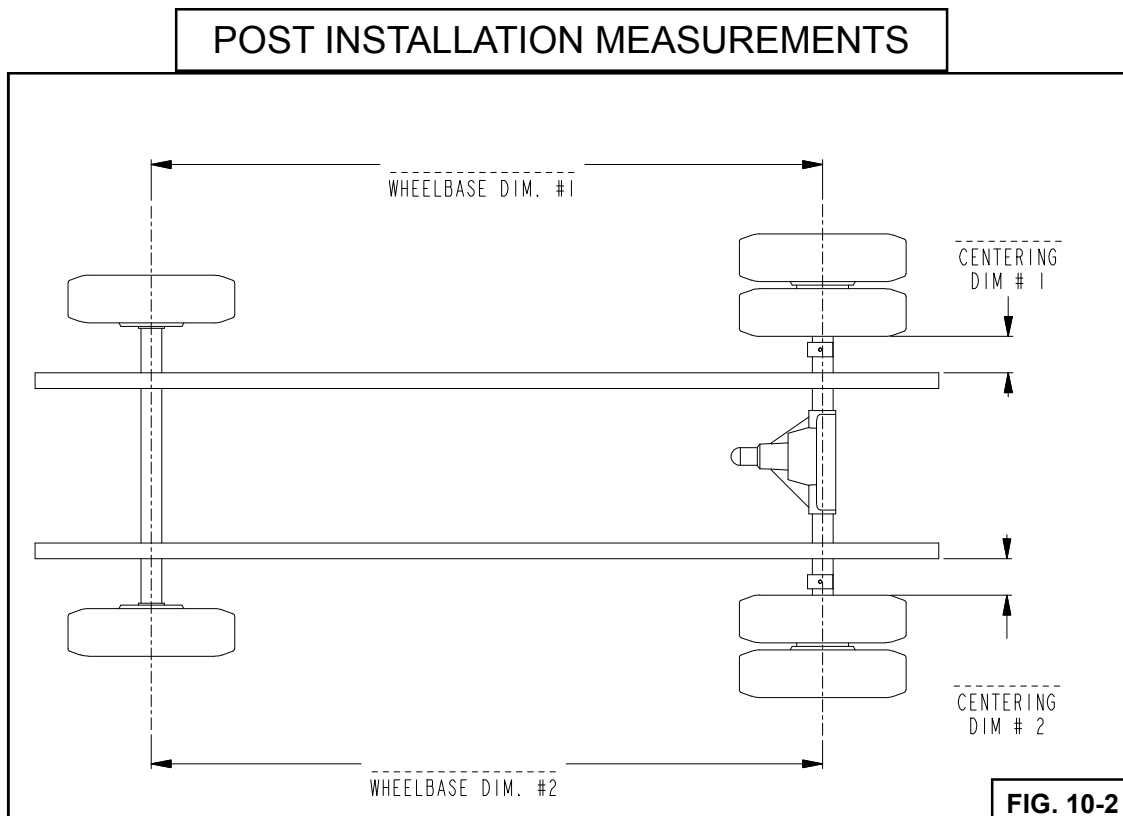




6. Double check that all fasteners are tightened to the specified torque given in Table 10-1. A good practice is to use a paint marker to mark each fastener across the nut and bolt threads as it is tightened. This practice gives a visual check later that all fasteners were properly tightened.
7. **IMPORTANT!** 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 drive-line 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 Low Pressure Warning Light indicates a severe drop in tank pressure (below 60 psi). If the light stays on for a significant period of time, corrective action should be taken to determine the cause of air loss or system malfunction. **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 the drain valve to not operate properly.

## **DAILY SERVICE:**

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



**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.**

## **CHECK AT EVERY VEHICLE SERVICE INTERVAL:**

- ☐ Check Design Height  $\pm 1/4$ ".
- ☐ 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

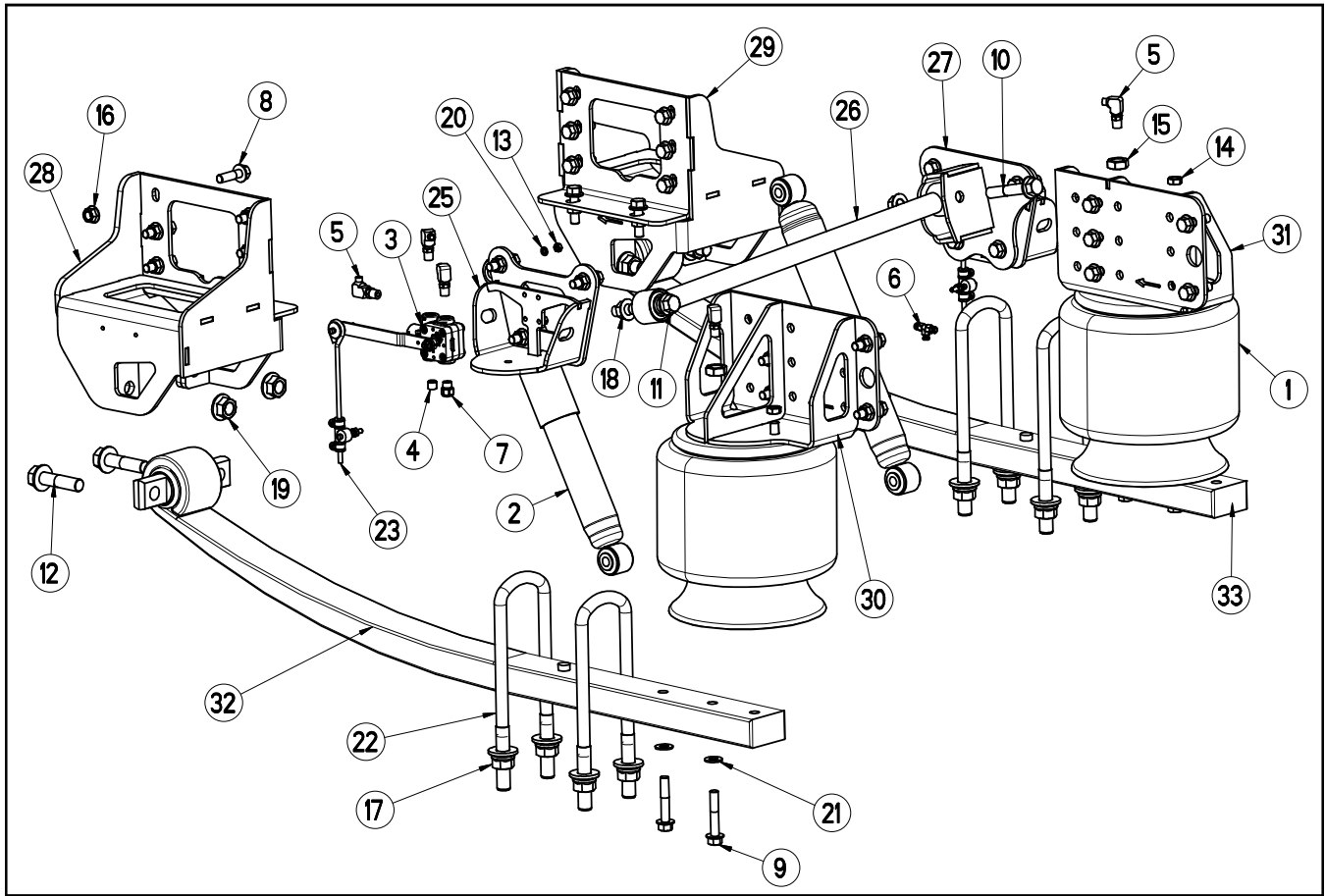
# ***UltraRide- GM C4500/C5500***

## **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	1210-0516	SHOCK ABSORBER	2	2		
3	13010064	VALVE-CONTROL, HEIGHT	1	1		
4	1302-2077	AIR FTG / PLUG (1/4 NPT)	1	1		
5	1302-5091	ELBOW, 1/4 TB 1/4 M-NPT, PUSH-IN DOT	5	5		
6	1302-5563	UNION TEE, 1/4 TB, PUSH-IN	1	1		
7	1302-9974	MUFFLER-EXHAUST, 1/4 M-NPT	1	1		
8	1411-1614	1/2 X 1 3/4 UNC FLANGE BOLT (GRADE 8)	34	34		
9	141A-1622	1/2 X 2 3/4 UNC FLANGE BOLT (GR 8) O&P	4	4		
10	141A-2028	5/8 X 3 1/2 UNC FLANGE BOLT (GR 8) O&P	1	1		
11	141A-2036	5/8 X 4 1/2 UNC FLANGE BOLT (GR 8) O&P	1	1		
12	141A-2424	3/4 X 3 UNC FLANGE BOLT (GR 8) O&P	4	4		
13	1470-0800	1/4 UNC HEX NUT (GR B)	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	1480-1604	1/2 UNC TOP LOCK FL NUT (GR G) O&P	34	34		
17	15060451	M20 X 2.5, CLASS10, FREE SPINNING LOCK NUT	8	8		
18	1480-2004	5/8 UNC TOP LOCK FL NUT (GR G) O&P	2	2		
19	1480-2404	3/4 UNC TOP LOCK FL NUT (GR G) O&P	4	4		
20	1485-0800	1/4 LOCK WASHER	2	2		
21	1488-1602	1/2 SAE HARDENED WASHER	4	4		
22	14950038	U-BOLT, M20 X 2.50, 79 X 315	4	4		
23	15000327	LINKAGE-VALVE, HEIGHT CONTROL, BARKSDALE	1	1		
24	1505-0023	HARNESS-WIRE, PIG-TAIL	1	1		
25	800M0112	BRACKET-MOUNT, VALVE-BUMPER	2	2		
26	800M0113	LATERAL CONTROL ROD	1	1		
27	800M0114	HANGER-BRACKET, LCR	1	1		
28	810M0051	HANGER-FRONT, ARM, DR	1	1		
29	810M0052	HANGER-FRONT, ARM, PASS	1	1		
30	810M0054	BRACKET-MOUNT, AIRSPRING, UPPER	1	1		
31	810M0055	BRACKET-MOUNT, AIRSPRING, UPPER	1	1		
32	820M0030	SPRING ARM-GM 4500/5500, 11K, 13.5K & 15K	1	1		
33	820M0031	SPRING ARM-GM 4500/5500, 11K, 13.5K & 15K	1	1		
34	8M000071	AXLE KIT-ULTRARIDE, 11K AXLE	1	0		
35	8M000092	AXLE KIT-ULTRARIDE, 13.5K AXLE	0	1		

**NOTE: AXLE KITS 8M000071 AND 8M000092 ARE NOT SHOWN. FOR DETAILED PARTS LISTS OF THESE AXLE KITS SEE FOLLOWING PAGES**

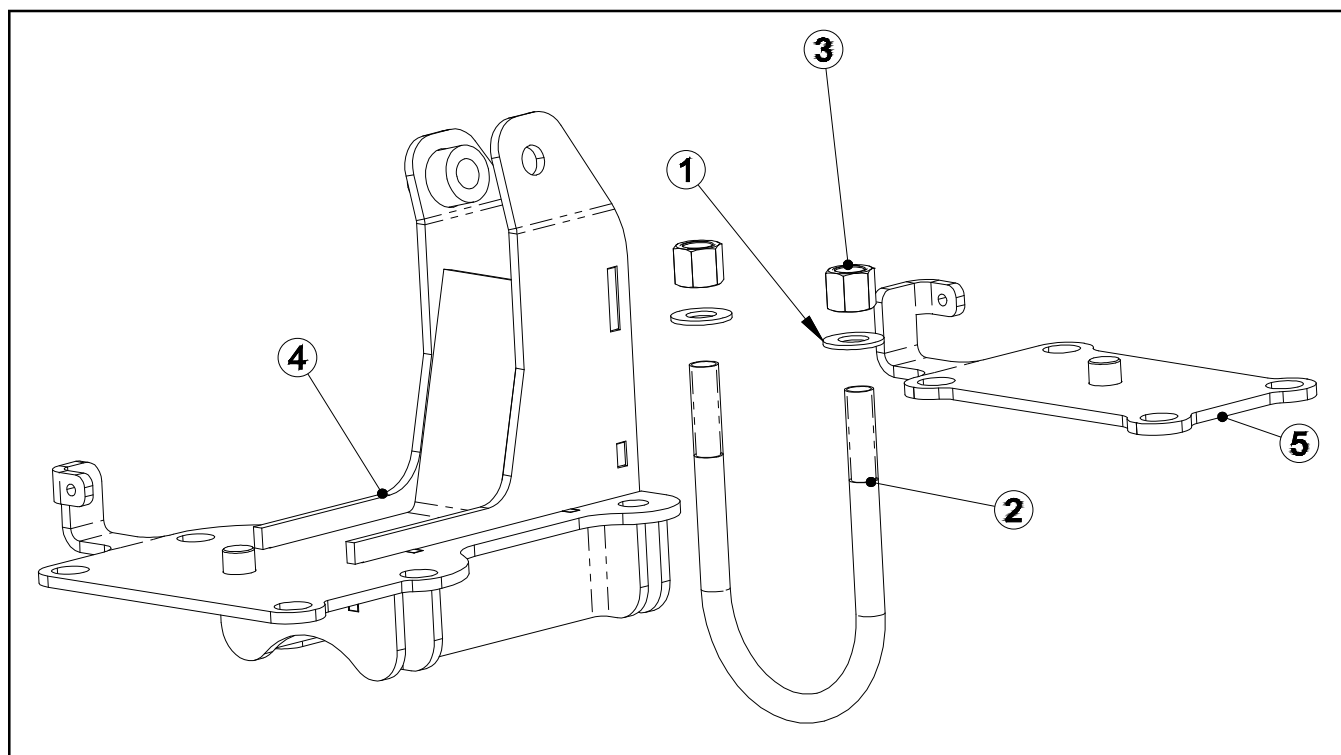
# ***UltraRide* – GM C4500/C5500** **PARTS LIST**



# ***UltraRide*** - 8M000071 AXLE KIT **11K AXLE**

## **PARTS LIST**

ITEM	PART NUMBER	DESCRIPTION	QTY
1	1488-2002	5/8 SAE HARDENED WASHER	2
2	1495-0018	U-BOLT, 5/8 UNF, 4.094 X 7.00	1
3	1506-0016	5/8 UNF HEX HIGH NUT	2
4	800M0118	BRACKET-MOUNT, LCR	1
5	800M0120	PLATE-MOUNT, AXLE	1

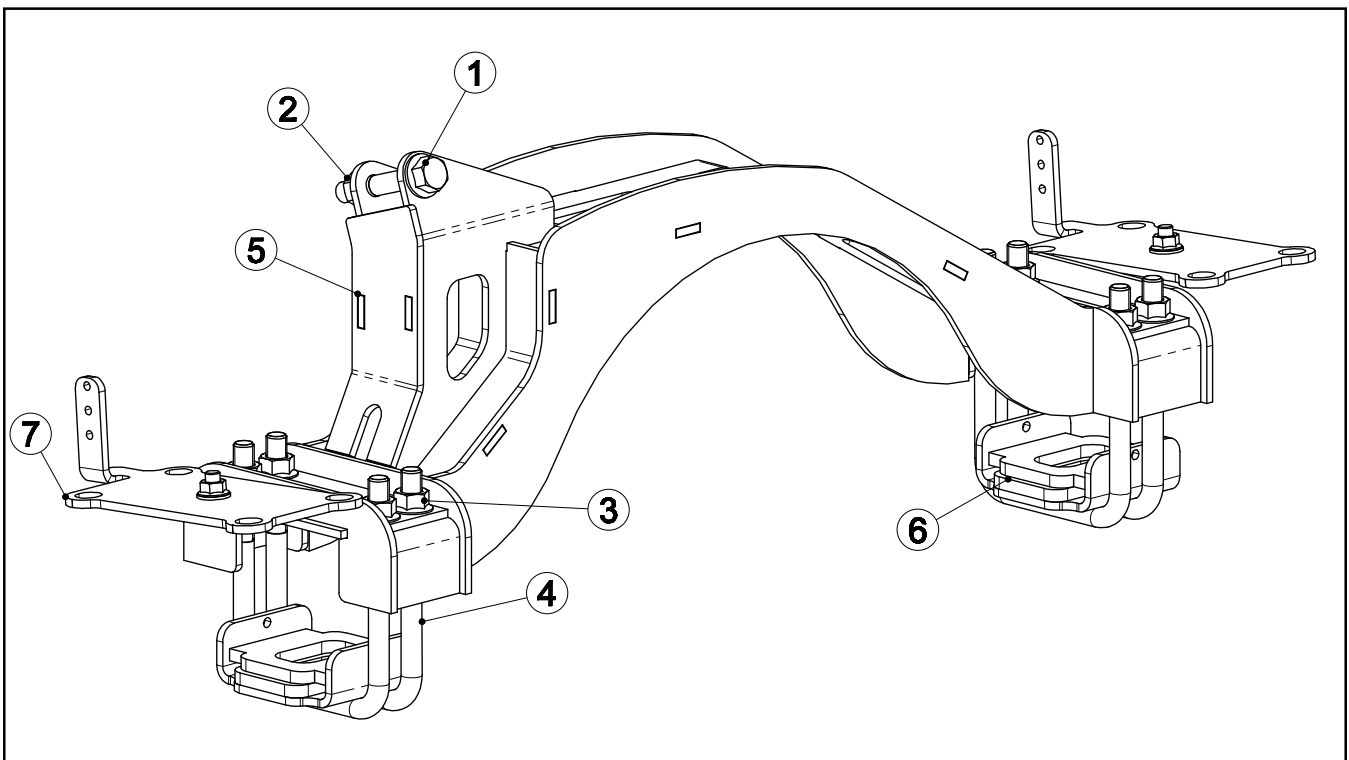


# ***UltraRide* - 8M000092 AXLE KIT**

## **13.5K AXLE**

### **PARTS LIST**

ITEM	PART NUMBER	DESCRIPTION	QTY
1	141A-2028	5/8 X 3 1/2 UNC FLANGE BOLT (GR 8) O&P	1
2	1480-2004	5/8 UNC TOP LOCK FL NUT (GR G) O&P	1
3	1480-2005	5/8 UNF TOP LOCK FL NUT (GR G) O&P	2
4	1495-0029	U-BOLT-SQUARE, 5/8 UNF, 5.25 x 8.50	4
5	800M0167	BRACKET-MOUNT, LCR	1
6	800M0168	CHANNEL-MOUNT, AXLE	2
7	800M0169	PLATE-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>	<b>A.</b> Improper height <b>B.</b> Air leakage	<b>A.</b> Adjust valve linkage to maintain proper air spring height. <b>B.</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.	<b>A.</b> 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 details.</b> <b>B.</b> Replace valve.
<b>Shock Absorber</b>	Insufficient damping effect	Replace shocks
<b>Lateral Control Rod</b>	<b>A.</b> Loose nuts on lateral control rod bolts <b>B.</b> Worn bushings	<b>A.</b> Tighten securely. <b>B.</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 a C4500/5500 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:

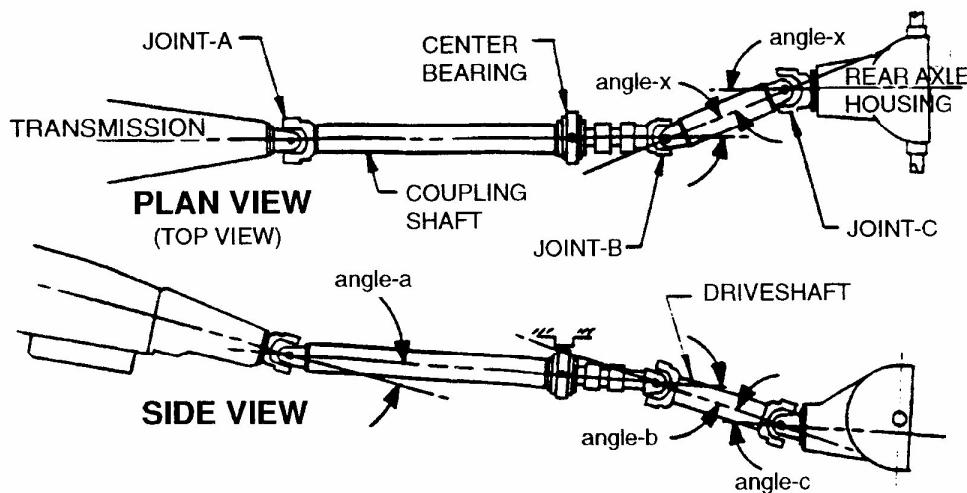
By example, using Figure 1:  
The NET OPERATING ANGLE at **JOINT - A** = (ea) =

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

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

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

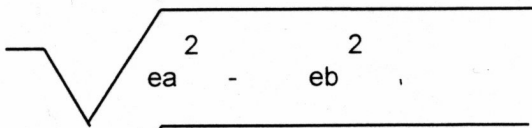
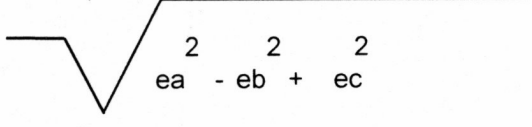
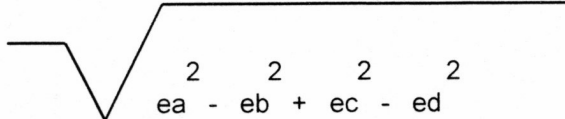
**Fig. 1**





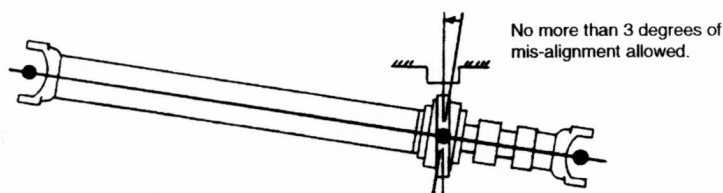
## Guideline - Driveline Angles (Continued)

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:

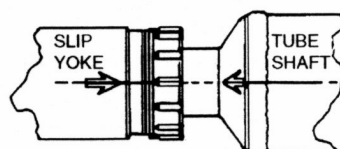
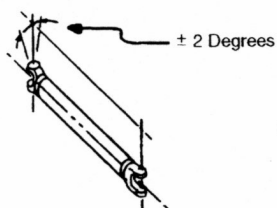
For a 1-shaft driveline: (2 - joint)	 $ea^2 - eb^2$	$\leq 3.0^\circ \text{ or } \leq 4.0^\circ$
For a 2-shaft driveline: (3-joint) (as exemplified in Figure-1)	 $ea^2 - eb^2 + ec^2$	$\leq 3.0^\circ \text{ or } \leq 4.0^\circ$
For a 3-shaft driveline: (4-joint)	 $ea^2 - eb^2 + ec^2 - ed^2$	$\leq 3.0^\circ \text{ or } \leq 4.0^\circ$

Rule #3: The center bearing mounting bracket, surrounding the rubber insulator, must be  **$90 \pm 3$  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  $\pm 2$  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 C4500/5500 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 Chevrolet 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 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.

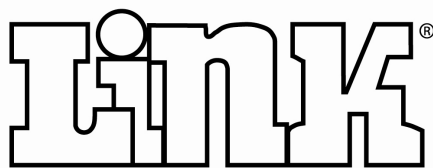
#### **USE OF DOUBLE CARDAN UNIVERSAL JOINTS FOR GREATER DRIVE ANGLES:**

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 C4500/5500).

#### **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 Chevrolet (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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