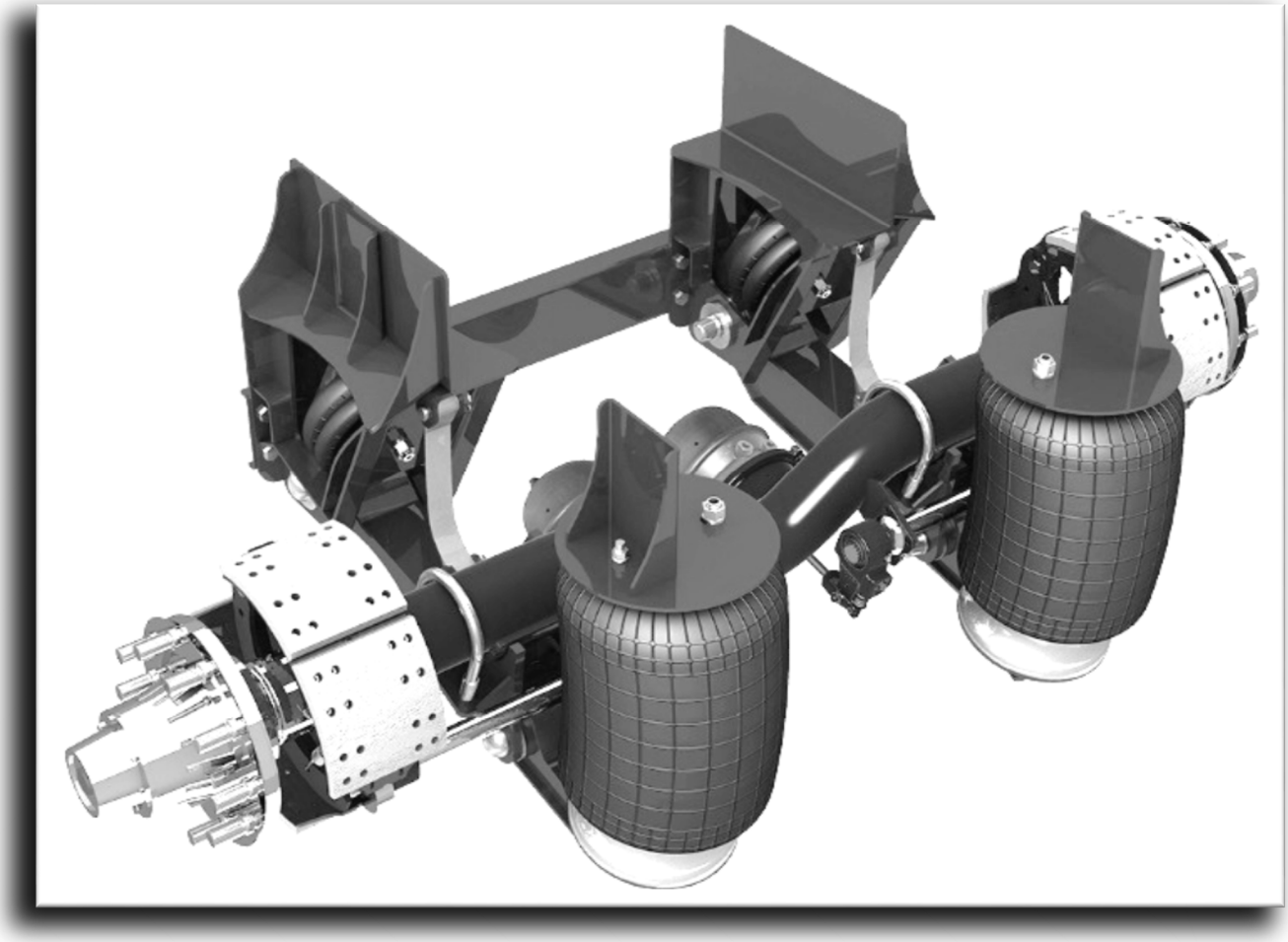
TECHNICAL PROCEDURE

NON-STEERABLE AUXILIARY SUSPENSION SYSTEMS

SUBJECT: AL2200 Installation Instructions

LIT NO: W&C213

DATE: Aug 2016 REVISION: A



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1. Introduction

This publication is to provide information for installation of the Watson & Chalin Auxiliary Liftable Air Ride Suspension Product Line and is intended for use only with this Product Line.

This manual includes installation information on Watson & Chalin model numbers:

AL2200

This manual assumes that the proper suspension has been chosen for the application. For information concerning suspension selection, contact Watson & Chalin Mfg., Inc.

Watson & Chalin reserves the right to change its products or manuals at any time. Contact Watson & Chalin at 1.800.445.0736 for information on recent changes to products.

Defective components should be returned to Watson & Chalin with a pre-arranged Returned Goods Authorization (RGA) number through the warranty department. If the defect is in compliance with warranty conditions, the defective component may then be replaced.

If the part is damaged in shipment, please contact the freight company to file a claim. The freight company is responsible for any damage to components during shipment.

IMPORTANT

The entire manual must be read and understood before proceeding with installation or service of any components.

This manual should be used in conjunction with corresponding drawings that come with Watson & Chalin suspensions upon delivery.

The vehicle manufacturer must approve any changes to the vehicle frame before the changes are done. Cutting or altering the vehicle's frame is normally not permitted by the manufacturer and affects the manufacturer's warranty coverage.

2. Prior to Installation

2.1 Installer Responsibilities

The installer of the suspension system must:

- Ensure that proper safety practices are followed during installation of the auxiliary axle suspension system. This includes disconnection of the vehicle's electrical and air systems, proper chocking of the vehicle's tires and immobilization of the vehicle, proper support of all vehicle and auxiliary axle suspension system components and proper use of personal protective equipment. Failure to follow proper safety practices can result in accidental activation, deactivation, and/or movement of the vehicle or auxiliary axle suspension system which can result in injury and/or death.
- Ensure proper installation of the auxiliary axle suspension system. Improper installation may cause premature failure of the auxiliary axle suspension system, its components, and/or other vehicle components, can lead to an accident, injury, and/or death, and will void the suspension system warranty.
- Ensure proper installation and performance of the brake system and all brake system components. Brake installation must comply with FMVSS121 specifications. Improper installation can lead to an accident, injury and/or death.
- Ensure that the vehicle will function properly under the increased weight and loading that will exist when the auxiliary axle suspension system is installed.
- Ensure the auxiliary axle suspension system is located to provide proper vehicle weight distribution when loaded.

The weight carried by each suspension system must not exceed its rated capacity. Improper weight distribution may cause premature failure of the auxiliary axle suspension system, its components, and/or other vehicle components.

- Ensure the ride height of the auxiliary axle suspension in the loaded condition is within the range specified on the suspension system drawing. Incorrect ride height may cause premature failure of the auxiliary axle suspension system, its components, and/or other vehicle components.

- Ensure the proper amount of tire-to-ground clearance exists for the intended application. Improper tire to ground clearance may cause premature failure of the auxiliary axle suspension system, its components, and/or other vehicle components.

- Ensure that proper clearances exist between the auxiliary axle suspension system and all other vehicle components, including the drive shaft. Improper clearance may cause premature failure of the auxiliary axle suspension system, its components, and/or other vehicle components.

- Ensure that any welding on, or of, the auxiliary axle suspension system components occurs only where specified by Watson & Chalin Mfg., Inc. and within this manual. Any welding on, or of, components that is not specified by Watson & Chalin Mfg., Inc. or in this manual may cause premature failure of the auxiliary axle suspension system, its components, and/or other vehicle components.

- Ensure that any welding on, or of, the auxiliary axle suspension system meets the minimum requirements for quality. All welds must be meet the minimum specifications for size as stated in this manual and must meet Visual Inspection Acceptance Criteria for Cyclically Loaded Non-tubular Connections and Tubular Connections as specified in AWS D1.1 Table 6.1. Improper welding may cause premature failure of the auxiliary axle suspension system, its components, and/or other vehicle components, can lead to an accident, injury, and/or death, and will void the suspension system warranty.

- Ensure that no alteration of any of the auxiliary axle suspension system components occurs unless specifically authorized in writing by Watson & Chalin Mfg., Inc Engineering Department. Any alteration of components that is not authorized by Watson & Chalin Mfg., Inc. Engineering Department in writing will void the suspension system warranty and may cause premature failure of the auxiliary axle suspension system, its components, and/or other vehicle components.

- Ensure that no installation deviations occur unless specifically authorized in writing by Watson & Chalin Mfg., Inc. Engineering Department. Any installation deviations that are not authorized by Watson & Chalin Mfg., Inc. Engineering Department in writing will void the suspension system warranty and may cause premature failure of the auxiliary axle suspension system, its components, and/or other vehicle components.

- Verify and properly center the axle on the suspension system and in the vehicle chassis. Improper centering of the axle may cause premature failure of the auxiliary axle suspension system, its components, and/or other vehicle components.

2.2. Pre-installation Checklist

Before beginning the installation, the following items must be verified:

- Verify the vehicle is on a flat level surface that is capable of supporting the vehicle weight.
- Verify the vehicle's wheels have been properly chocked and the vehicle properly immobilized so that it cannot move during installation.
- Verify that the vehicle's electrical system has been disconnected so that the auxiliary axle suspension system cannot be accidentally activated or deactivated during installation or maintenance.
- Verify that all required personal protective equipment is available, and is free from damage or defects that would impair proper function.
- Verify that all required tools and equipment are available and are free from damage or defects that would impair proper function.
- Verify that the auxiliary axle suspension system matches the specification provided by your production or engineering department.
- Verify that the frame width is within the allowable mounting range of the auxiliary axle suspension system and adjust the suspension if necessary. See the **Frame Width** section.
- Verify that the vehicle's cross members are correctly positioned and capable of supporting the loads from the auxiliary axle suspension system.
- Verify that the auxiliary axle suspension system will not interfere with any existing frame rail bracketry, mounting hardware, electrical, air or fuel lines, or any other vehicle components.
- Verify that the auxiliary axle suspension system will not interfere with the vehicle's driveshaft. Refer to the auxiliary axle suspension system drawing as required.
- Verify the correct mounting hardware, SAE Grade 8, is available. Mounting hardware is not provided by Watson & Chalin Mfg., Inc. It is the responsibility of the suspension installer to ensure the proper mounting hardware is specified and installed.

2.3 Safety Explanations

Watson & Chalin uses the following types of notes to warn against possible safety problems and to give information that helps to prevent damage to equipment.

IMPORTANT

An important message indicates a procedure that should be followed exactly.

WARNING

A warning indicates hazards or unsafe practices that could result in severe personal injury or death, if the procedure is not followed exactly.

WARNING

All safety statements should be read carefully to prevent bodily injury, to assure that parts are assembled properly and to retain the manufacturer's warranty.

2.4 Warnings

WARNING

Proper axle attachment is required for safe operation of the vehicle.

WARNING

No alteration of any Watson & Chalin suspension components is permitted without proper authorization from qualified Watson & Chalin personnel.

WARNING

No welding of any suspension components is permitted except when specified by Watson & Chalin.

2.5 Identifying Your Model

IMPORTANT

It is important that you know what model number has been assigned to your assembly in case you ever need to contact Watson & Chalin.

Identification Plate

Each suspension assembly has an identification plate located on the left side of the suspension assembly (driver's side of the vehicle – see **Figure 1**). The plate includes the model number, serial number and capacity in pounds for the assembly. It is important to record the model and serial number for future reference.

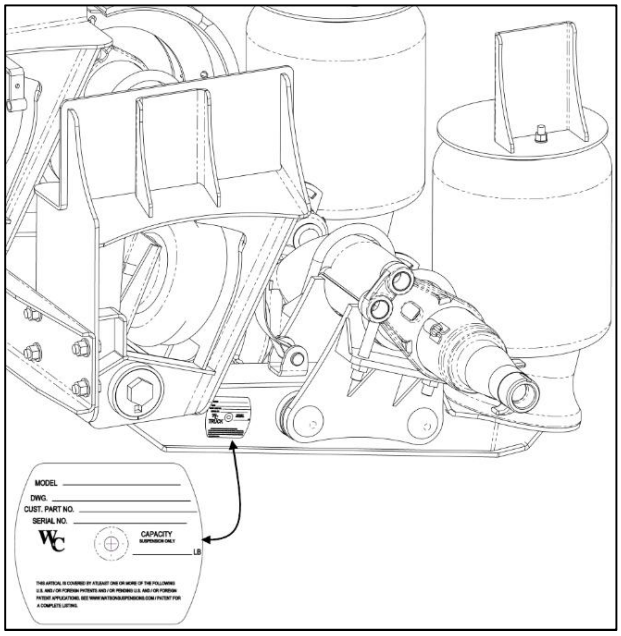


Figure 1

3. Ride Height

Watson & Chalin defines "ride height" as the distance between the suspension mounting surface (the bottom of the vehicle frame rail in the example below) and the spindle center of the auxiliary axle suspension system (See **Figure 2**). Correct installation requires that the suspension's ride height be within the range specified on the auxiliary axle suspension system drawing when the following occurs:

- The vehicle is loaded.
- The auxiliary axle suspension system's tires are in contact with the ground.
- The air spring pressure is properly set to carry the weight on the auxiliary axle suspension system.
- The weight the auxiliary axle suspension system is carrying is equal to or less than its rated capacity.

IMPORTANT

A correct installation requires that the suspension ride height be within the range specified on the corresponding drawing when the vehicle is in its loaded condition.

Watson & Chalin provides several variations of AL series suspension systems to accommodate different vehicle ride heights and capacities.

Calculating Ride Height

Proper Ride Height is calculated with the following equation:

A	Ground to Bottom of Vehicle Frame (loaded)	_____
B	Static Loaded Tire Radius	– _____
C	Ride Height	= _____

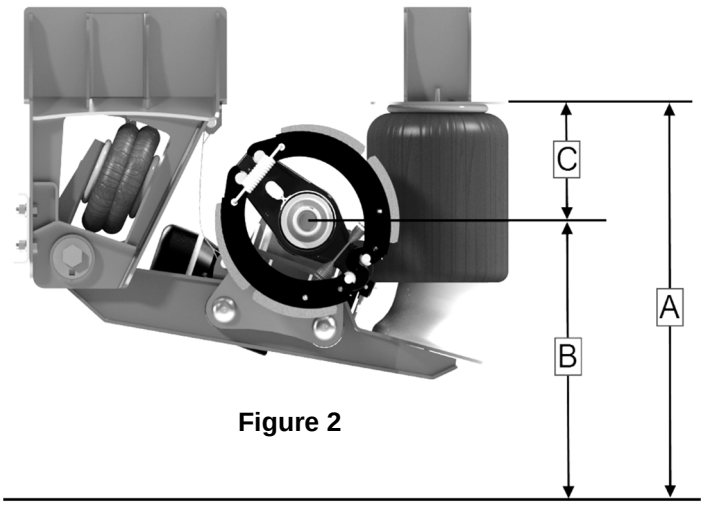


Figure 2

If the required run height is taller than the designed run height of the lift axle, a spacer may be required between the auxiliary axle suspension system's frame brackets and upper bag plates, and the vehicle's frame rails. For the AL2200 model suspension, a 3" spacer is the maximum allowed. If a spacer of more than 3" is required, contact Watson & Chalin Mfg., Inc. Customer Service or Engineering.

To determine the spacer thickness required, perform the following calculation:

A	Ground to Bottom of Vehicle Frame (loaded)	_____
B	Subtract Static Loaded Tire Radius	– _____
C	Subtract Designed Ride Height	– _____
	Equals Required Spacer Thickness	**=** _____

4. Frame Width

Unless a frame width was specified during the order process and the axle (if supplied) is fully welded into the suspension, a standard suspension system is set up for a 34" vehicle frame width with the axle only tack welded into the seats and the U-bolts "snugged" tight. (See **Figure 3**)

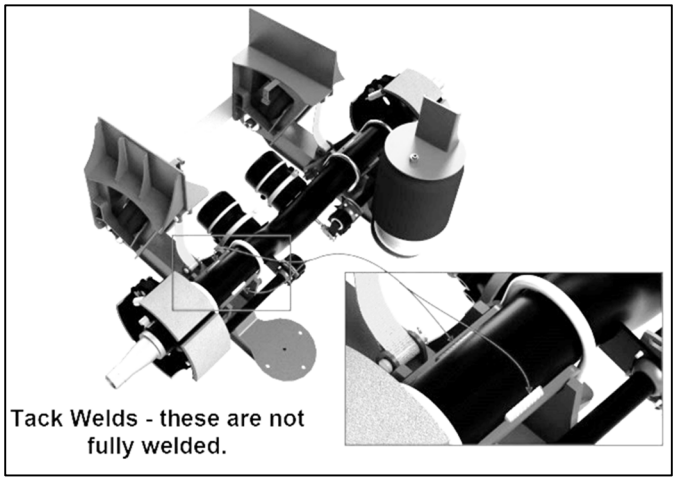


Figure 3

The standard suspension may be adjusted to fit frames from 33.5" wide to 34.5" wide by cutting the tack welds loose and repositioning the arm/axle seats to the appropriate amount for the required frame width. See instructions below.

The standard suspension cannot be mounted if the frame width exceeds 34.5"; however, the standard suspension can be mounted to a frame under 33.5" through the use of spacers. If spacers are used, equal thickness spacers must be used on each side to ensure the suspension remains be centered to the vehicle.

Vehicles with frame widths larger than 34.5" can be accommodated through Watson & Chalin Mfg., Inc.'s custom application engineering program. Contact Watson & Chalin Mfg., Inc. customer service or engineering for assistance and additional information.

To adjust the standard suspension for different frame widths between 33.5" and 34.5" proceed as follows:

1. Loosen and remove the U-bolts.
2. Carefully break or cut the tack welds, but DO NOT cut into the axle tube.
3. Adjust the trailing arm beams on the axle tube by moving them in or out the required distance.
4. Align the arm beams so that they are parallel to each other and perpendicular to the axis of the axle tube.
5. Tack the arm beams back into position.
6. Verify that the arm beams are parallel to each other and perpendicular to the axis of the axle tube.
7. Reinstall and snug the U-bolts.
8. Verify the suspension fits the frame rails properly and that the axle is centered in the chassis.
9. Verify required tire clearance at suspension and vehicle components (see **Figure 4**)
10. Refer to **Page 11** for axle mounting instructions and specifications.

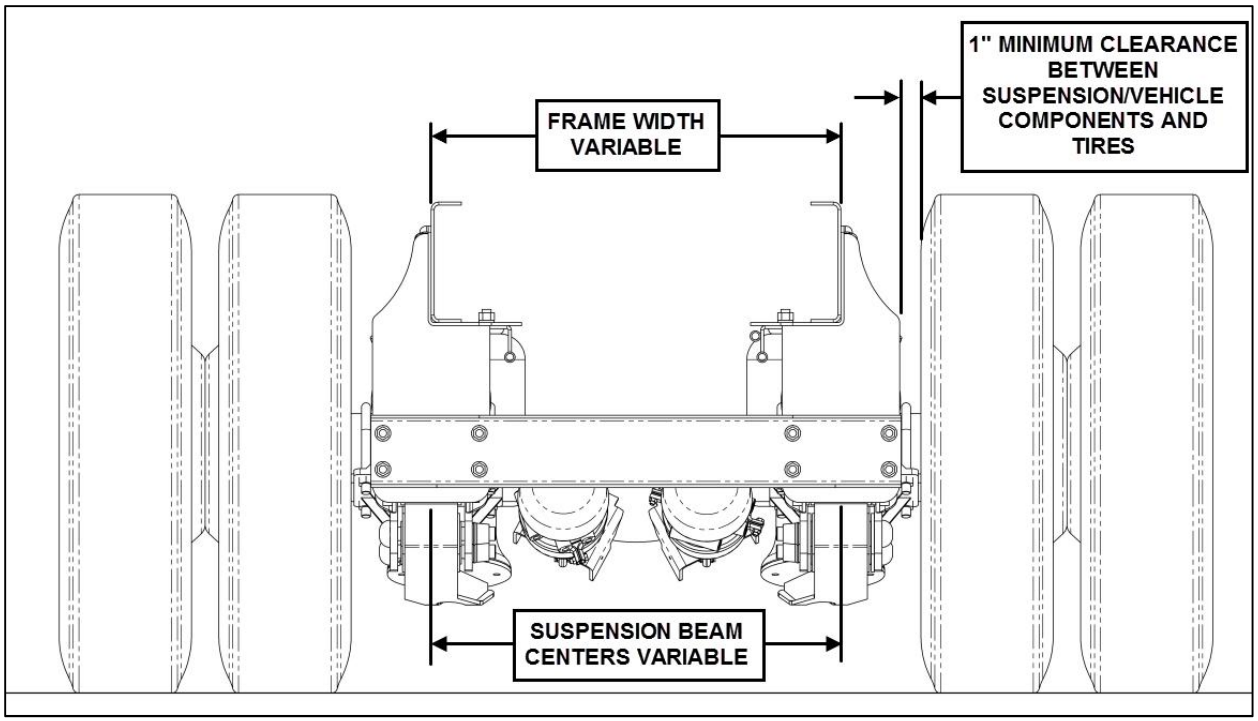


Figure 4

5. Installation

The following instructions are for installing the components of the Watson & Chalin AL Series Suspension systems. All model numbers in the series are installed using the same set of instructions. Watson & Chalin assumes that the correct auxiliary suspension and axle were chosen based on the individual design criteria.

The auxiliary axle suspension system must be installed with the proper amount of tire-to-ground clearance to ensure trouble free operation of the vehicle. If there is too much ground clearance, the suspension will not carry its share of the load, straining the other suspension components. When there is too little ground clearance or if the suspension is overloaded, the vehicle will bottom out while going over bumps and damage can be done to the suspension components or other components on the vehicle. Failure to correctly install the suspension may cause premature failure of the auxiliary axle suspension system, its components, and/or other vehicle components, and can lead to an accident, injury and/or death.

1. Locate the vehicle on a flat level surface.
2. Secure the vehicle so that it cannot move by chocking the vehicle's drive tires fore and aft.
3. Determine the location of the auxiliary axle.
   3.1. Mark the desired axle centerline on the outside of the vehicle's frame rail.
   3.2. Refer to the auxiliary axle suspension system drawing and mark the centerlines and boundary areas of the frame brackets and upper bag plates on the vehicle's frame rails (See **Figure 5**).

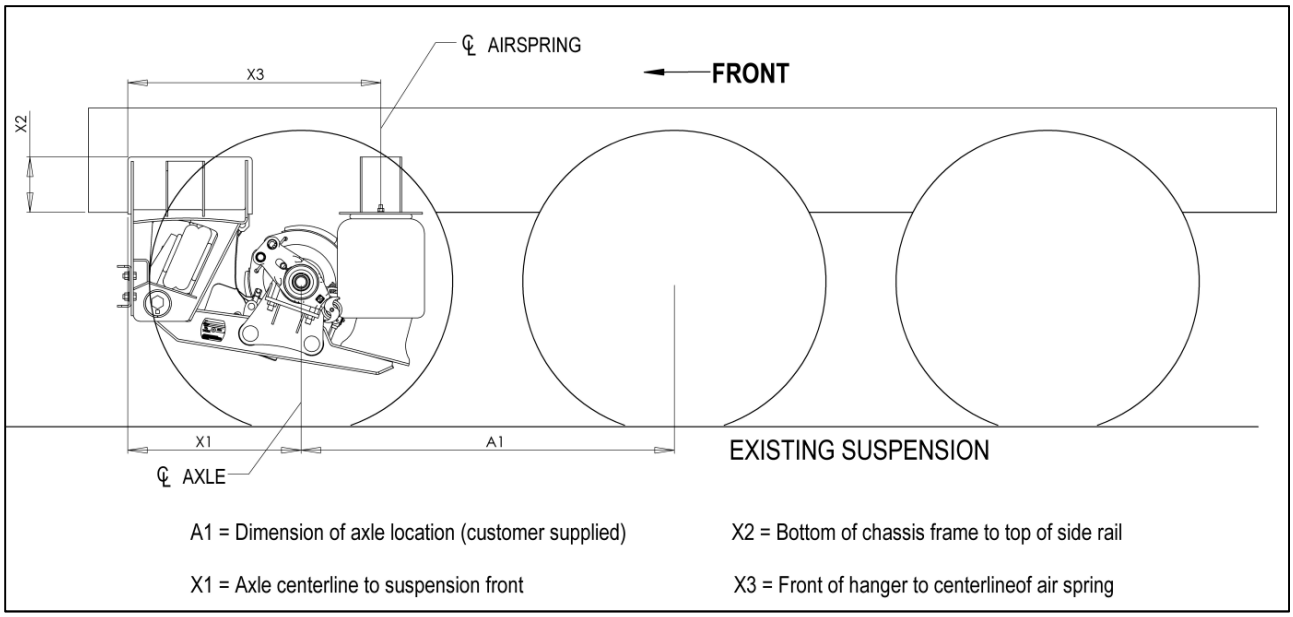


Figure 5

4. Verify that the suspension system will not interfere with any existing frame rail bracketry, mounting hardware, electrical, air or fuel lines, or any other vehicle components.
5. Verify that the suspension system will not interfere with the vehicle's driveshaft. Refer to the auxiliary axle suspension system drawing as required.
6. Review the suggested cross member locations (See **Figure 6**), and verify with the vehicle manufacturer that the chassis and cross members are capable of supporting the auxiliary axle suspension system.

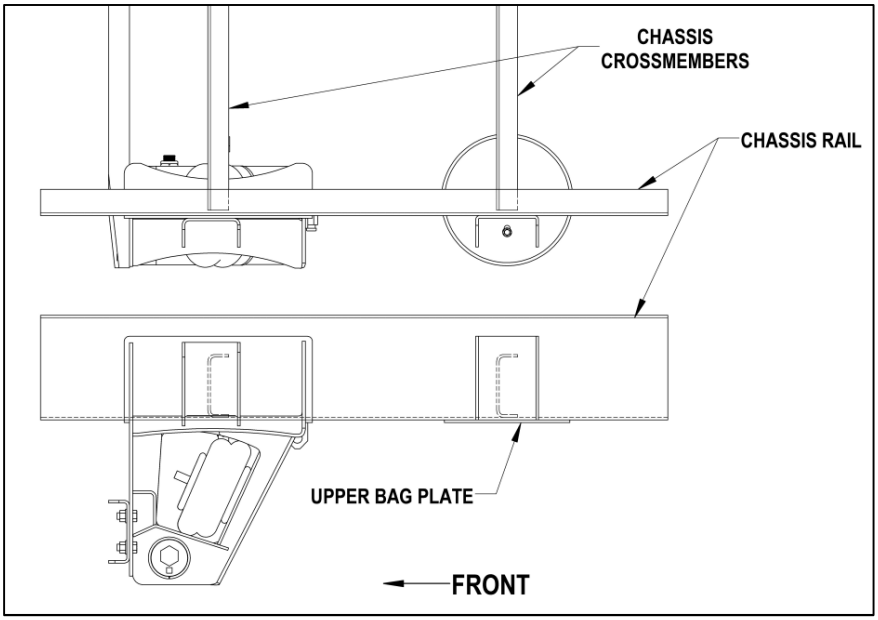


Figure 6

6.1. If the frame rails and cross members are not capable of supporting the auxiliary axle suspension system they will have to be reinforced. It is the responsibility of the installer to properly reinforce the vehicle's frame rails and cross members if required.

7. Verify the suspension is set to the proper frame rail width. See the **Frame Width** section.

8. Position the suspension system on the frame using the reference marks made in step 3.
   8.1. Clamp the frame brackets and upper frame brackets to the frame rails so that the suspension cannot move.
   8.2. The suspension system's frame brackets and upper bag plates must sit flush to the side and bottom surfaces of the vehicle's frame rails (See
   8.3. **Figure 7**).

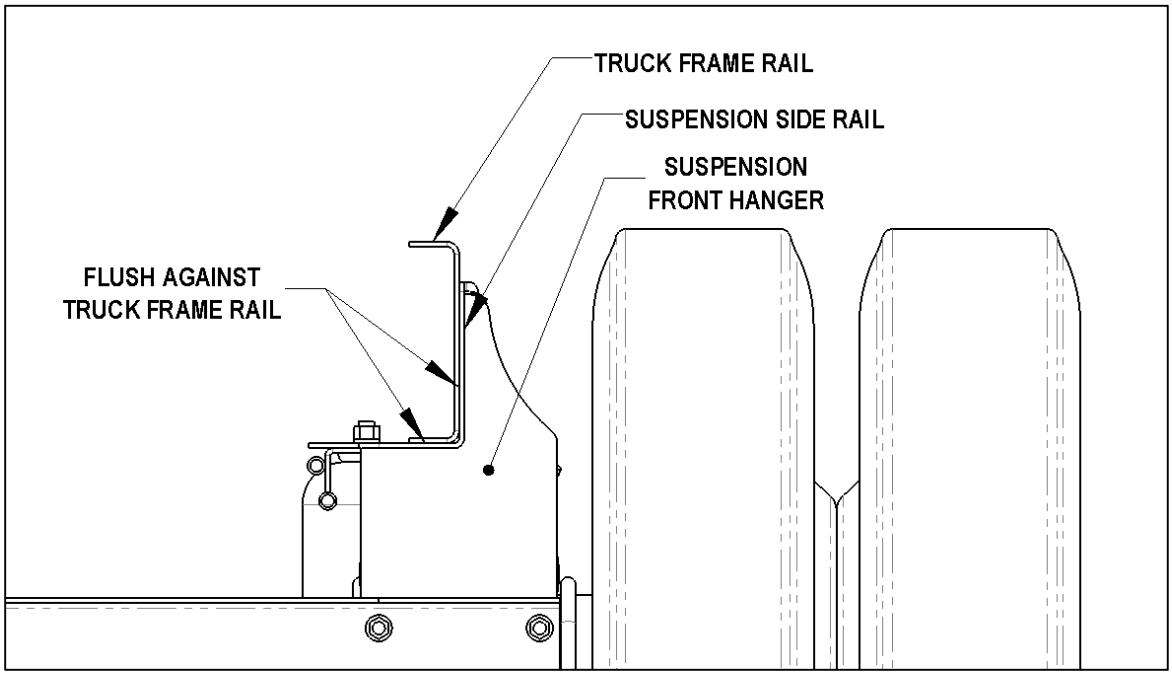


Figure 7

8.4. Failure to properly position the auxiliary axle suspension system properly will void the suspension system warranty and may cause premature failure of the auxiliary axle suspension system, its components, and/or other vehicle components.
8.5. Verify the suspension system is properly located.

9. Mark the mounting holes on the frame brackets and upper bag plates.
   9.1. Verify that there is no existing frame rail bracketry, mounting hardware, electrical, air or fuel lines, or any other vehicle components that will be damaged when drilling the frame brackets.
   9.2. Do not modify or alter the bottom or top flanges of the vehicle's frame rail in any way. Do not bolt through, weld, cut or reinforce these flanges without verifying suitability of the modifications with the vehicle manufacturer first. Failure to do so may void the vehicle warranty.

WARNING

Welding, drilling or bolting through the bottom flange of the suspension frame or vehicle rails may void the manufacturer's warranty.

10. Verify the suspension system is properly located, then drill two (2) 0.6875" (11/16")

diameter mounting holes through each frame bracket and the vehicle's frame rails.

11. Install 0.625" (5/8") SAE Grade 8 fasteners in each mounting hole, and snug tighten the fasteners. Verify that the bolts protrude through the nuts by at least three (3) full threads.
12. Verify the suspension system is properly located, then drill the remaining mounting holes in the frame brackets. Eight (8) holes minimum are required per frame bracket (See **Figure 8**).

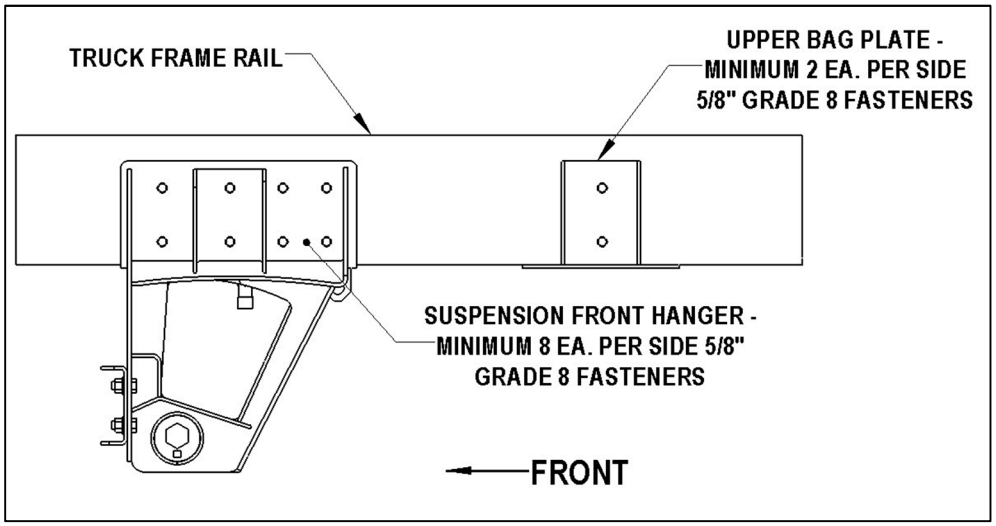


Figure 8

13. Install 0.625" (5/8") SAE Grade 8 fasteners in the remaining frame bracket mounting holes, and torque all fasteners to specification (See **Section 10 Torque Requirements**). Verify that all bolts protrude through the nuts by at least three (3) full threads
14. Verify the suspension system is properly located, then drill (2) 0.6875" (11/16") diameter mounting holes through each upper air spring plate and the vehicle's frame rails.
15. Install 0.625in (5/8) SAE Grade 8 fasteners in each mounting hole, and snug tighten the fasteners. Verify that the bolts protrude through the nuts by at least three (3) full threads.
16. Torque the frame bracket and upper air spring plate mounting fasteners to specification (See **Section 10 Torque Requirements**).
17. Install the cross member and torque the cross member fasteners to specification (See **Section 10 Torque Requirements**) or weld the cross member in place as required (See **Figure 9**).

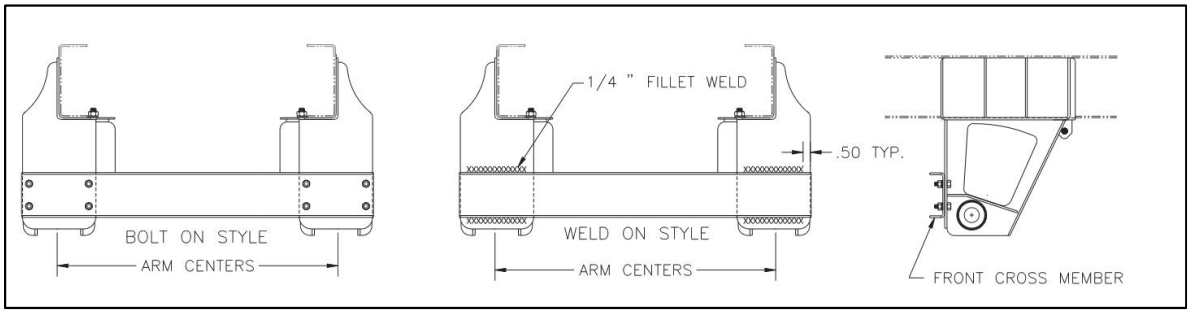


Figure 9

6. Axle Installation

The axle must be correctly centered in the suspension system for proper operation to occur. Centering of the axle must be completed before the vehicle can be operated. Failure to properly center the axle may cause premature failure of the auxiliary axle suspension system, its components, and/or other vehicle components, and can lead to an accident, injury and/or death.

1. Locate the vehicle on a flat level surface.
2. Secure the vehicle so that it cannot move by chocking the vehicle's drive tires fore and aft.
3. Measure the distance between the arm beam assemblies and inside drum face (See **Figure 10**) or other fixed location on the axle ends.

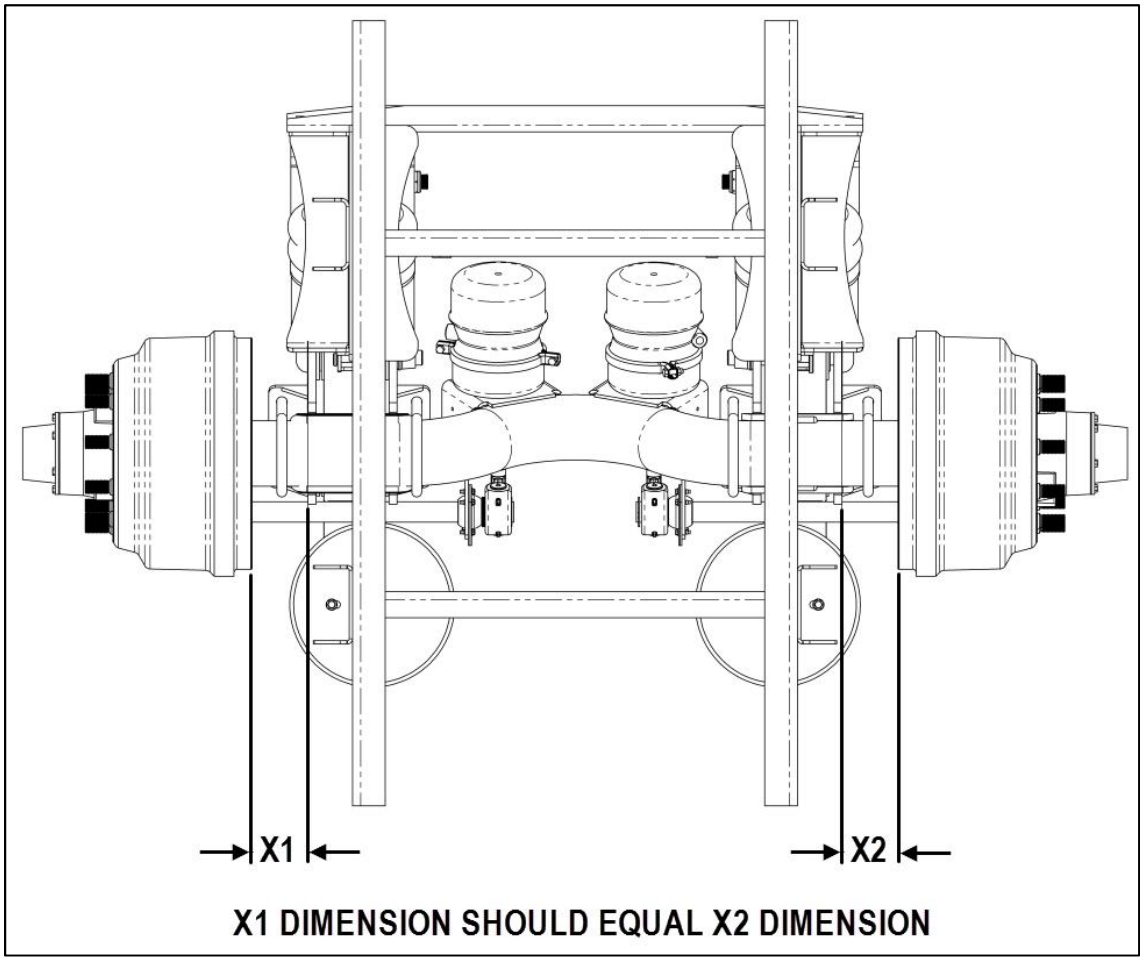


Figure 10

3.1. Measure dimensions X1 and X2 at the front edge and rear edge of the brake drums. Measure from the outside face of the axle seat to the inside face of the brake drum.

3.2. If the axle is properly centered, the front and rear measured dimensions on one side of the suspension will be the same, and dimension X1 will equal dimension X2 plus or minus (+/-) 0.125in (1/8).

3.3. If the axle is not properly centered, dimension X1 will not equal dimension X2, and the axle position must be adjusted.

4. To center the axle proceed as follows:
   4.1. Secure the axle so that it may not fall from the suspension when the U-bolts are removed and the tack welds are cut, but may be adjusted for centering.
   4.2. Remove the U-bolts.
   4.3. Cut the axle to seat tack welds.
      4.3.1. DO NOT cut into the axle tube when cutting the tack welds.
   4.4. Adjust the axle so that dimension X1 is equal to dimension X2, and the axle is centered on the suspension and in the vehicle chassis (See **Figure 10**).
   4.5. Verify there is 1.0" clearance between the S-cam and the top of the arm and 0.375" (3/8") between the S-Cam and axle seat (See **Figure 11**).

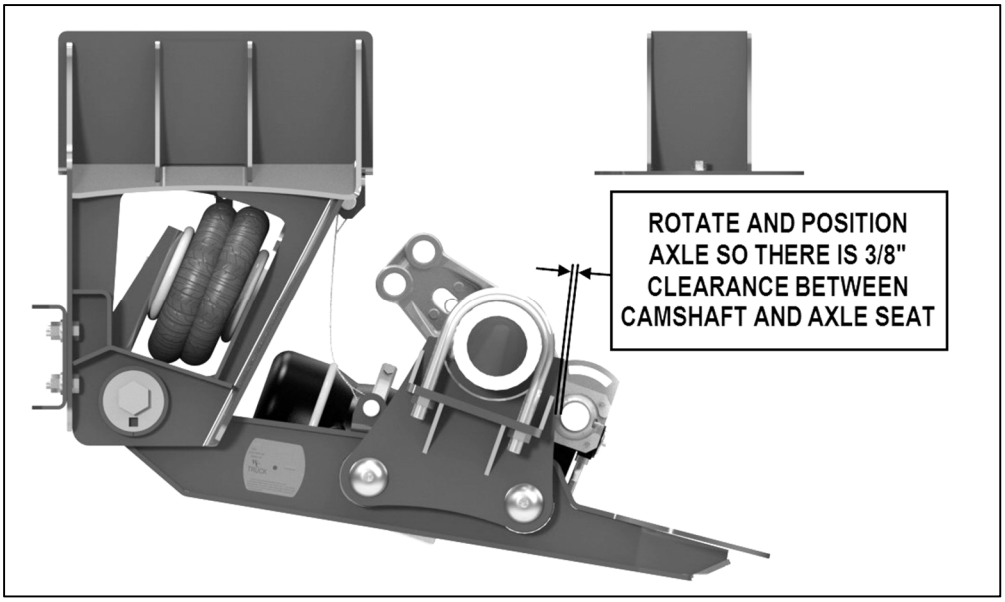


Figure 11

4.6. Inspect for any gap between the axle seat and axle when seated. The axle is to have contact with the seat, with no greater than 1/8" gap between the axle and one edge of the seat (See **Figure 12**). Verify the arm beams are parallel to each other, and the axle is perpendicular to the arm beams.

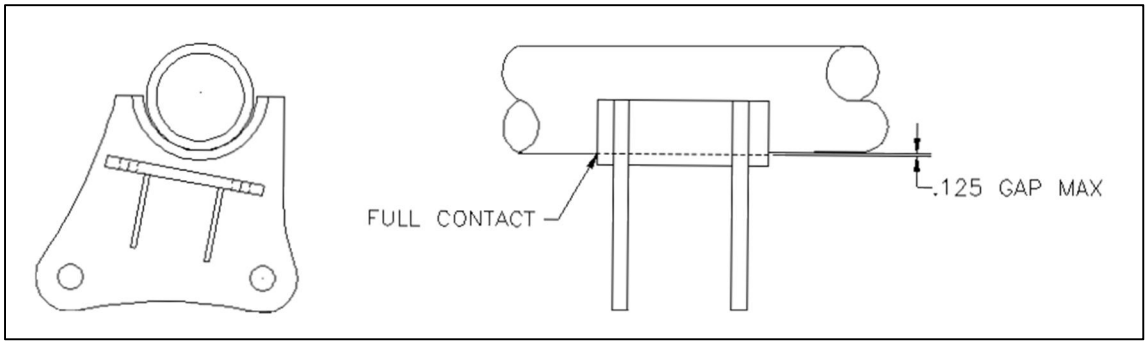


Figure 12

4.7. Tack weld the axle to the arm beams.
4.8. Verify the axle is properly centered on the suspension and in the vehicle chassis, the arm beams are parallel to each other, and the axle is perpendicular to the arm beams.

5. Fully weld the axle to the suspension as follows:
5.1. Remove the U-Bolts so that they are not damaged during welding.
5.2. Using a flap wheel or other appropriate tool remove any paint from all areas to be welded.
5.3. Clean the areas to be welded and remove all rust, grease, oil, dirt and/or debris. Make sure all surfaces to be welded are clean and rust free bare metal.
5.4. Preheat the axle and seat weld areas per the axle manufacturer's recommendation or see **Figure 13** for recommended guidelines.
5.5. Verify the axle is properly centered on the suspension and in the vehicle chassis, the arm beams are parallel to each other, and the axle is perpendicular to the arm beams.
5.6. Weld as specified in **Figure 13**.
5.7. Install the U-bolts, and torque to specification (See **Section 10 Torque Requirements**).

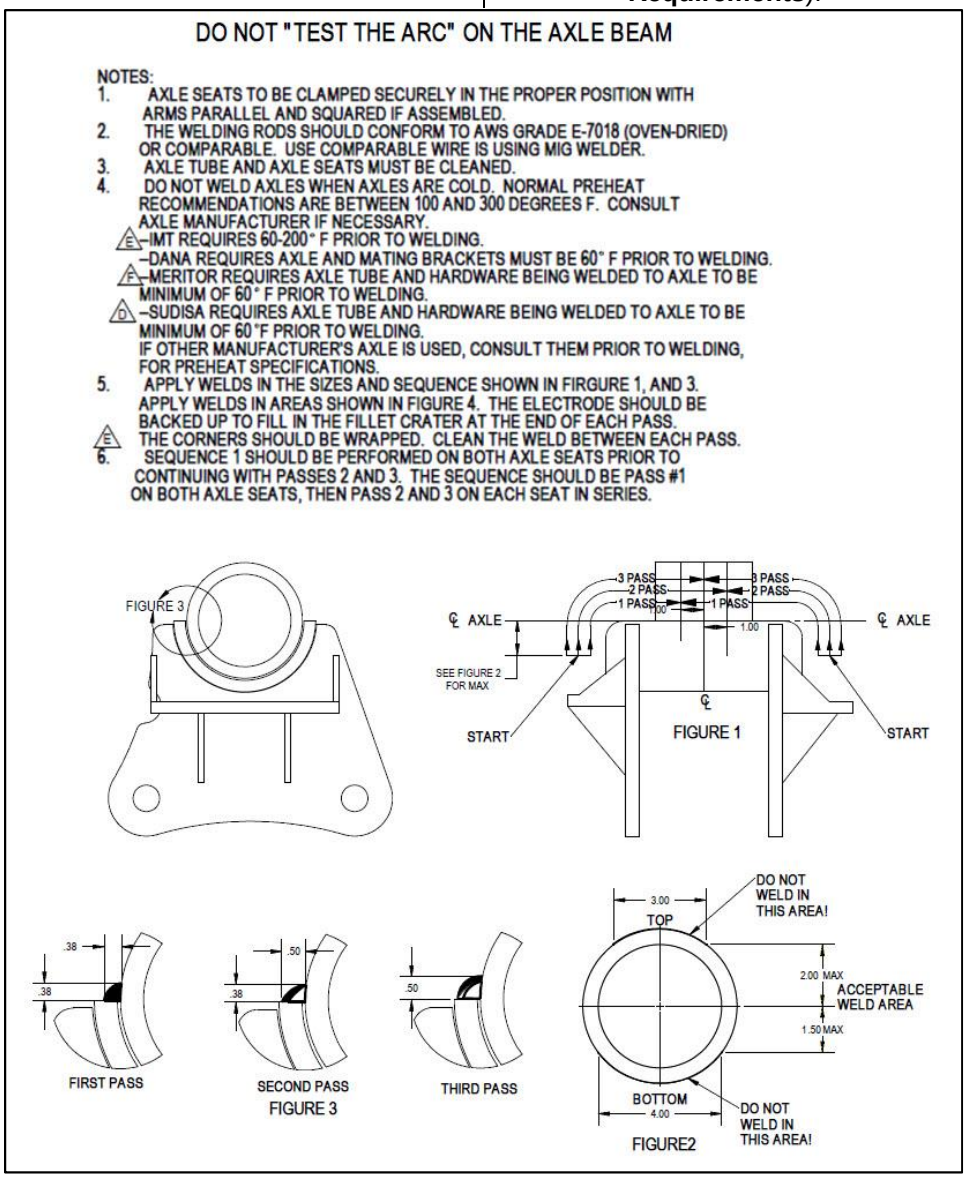
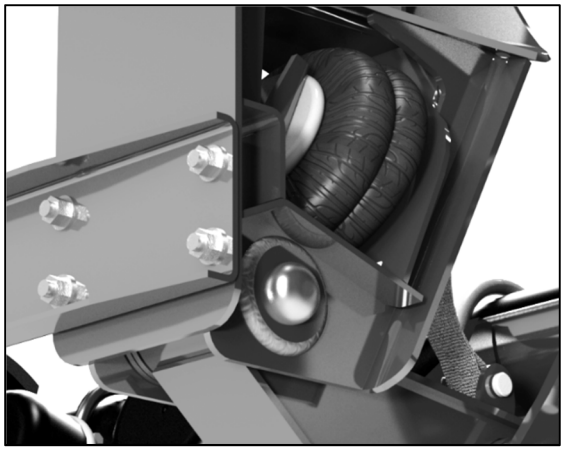


Figure 13

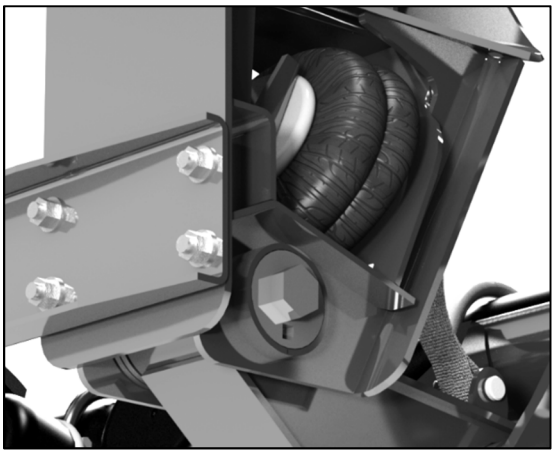
7. Axle Alignment

The axle must be correctly aligned with the vehicle's chassis for proper operation to occur. Alignment of the axle must be completed before the vehicle can be operated. Failure to correctly align the axle with the vehicle chassis may cause premature failure of the auxiliary axle suspension system, its components, and/or other vehicle components, and can lead to an accident, injury and/or death.

Watson & Chalin, Mfg. offers two different styles of pivot connections, with each having a different procedure to complete the axle alignment. Identify the style you have below, and then proceed to the corresponding section for the alignment procedure.



Weld Collar - Proceed to Section 7.1



Eccentric Collar - Proceed to Section 7.2

7.1. Weld Collar Style

1. Locate the vehicle on a flat level surface.
2. Secure the vehicle so that it cannot move by blocking the vehicles drive tires fore and aft.
3. Install the wheels and tires on the auxiliary axle suspension system.
4. Lower the auxiliary axle suspension system so that the tires contact the ground.
5. Release the brakes on the auxiliary axle suspension system.
6. Position the driver side arm beam pivot so that the alignment collar is in the center of the alignment slot on both the inboard and outboard side of the frame bracket.
7. Verify the driver side alignment collars are seated flush against the hanger side plates and the pivot fastener is perpendicular to the arm beam and frame bracket side plates.
8. Tack weld the driver side alignment collars to frame bracket in four (4) places, two (2) places on the outboard side, and two (2) places on the inboard side (See **Figure 14**).

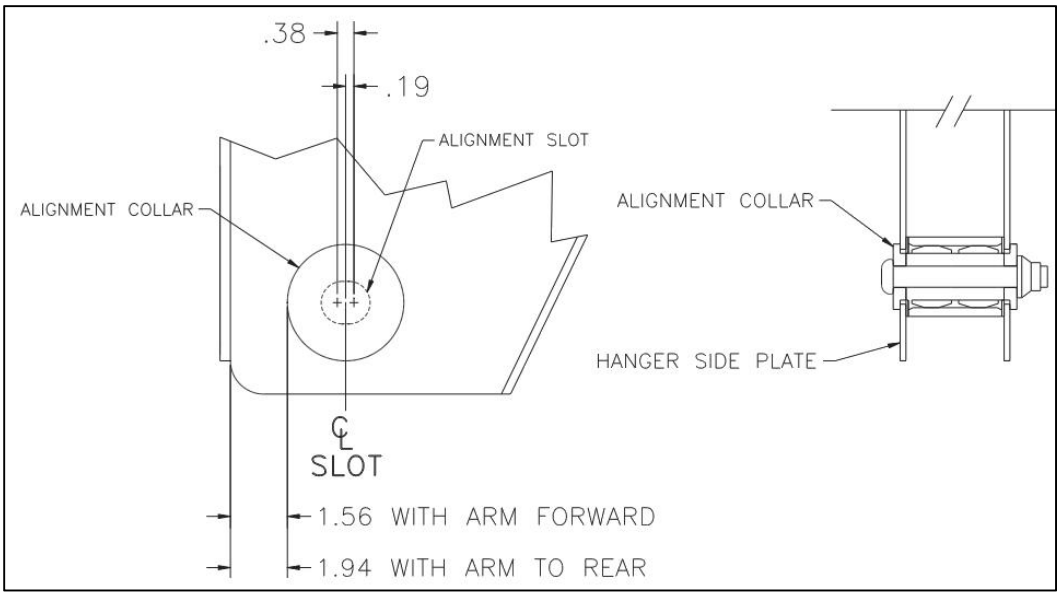


Figure 14

9. On both sides of the vehicle, measure horizontally from the center line of the spindle of the vehicle's front drive axle to the center line of the spindle of the pusher axle (or rear drive axle if aligning a tag axle).
10. Record the measurements.
11. Adjust the fore/aft position of the passenger side arm beam pivot so that the measurement from the drive axle spindle axis to the auxiliary axle spindle axis is equal on both sides of the vehicle plus or minus (+/-) 0.125" (1/8") (See **Figure 15**).

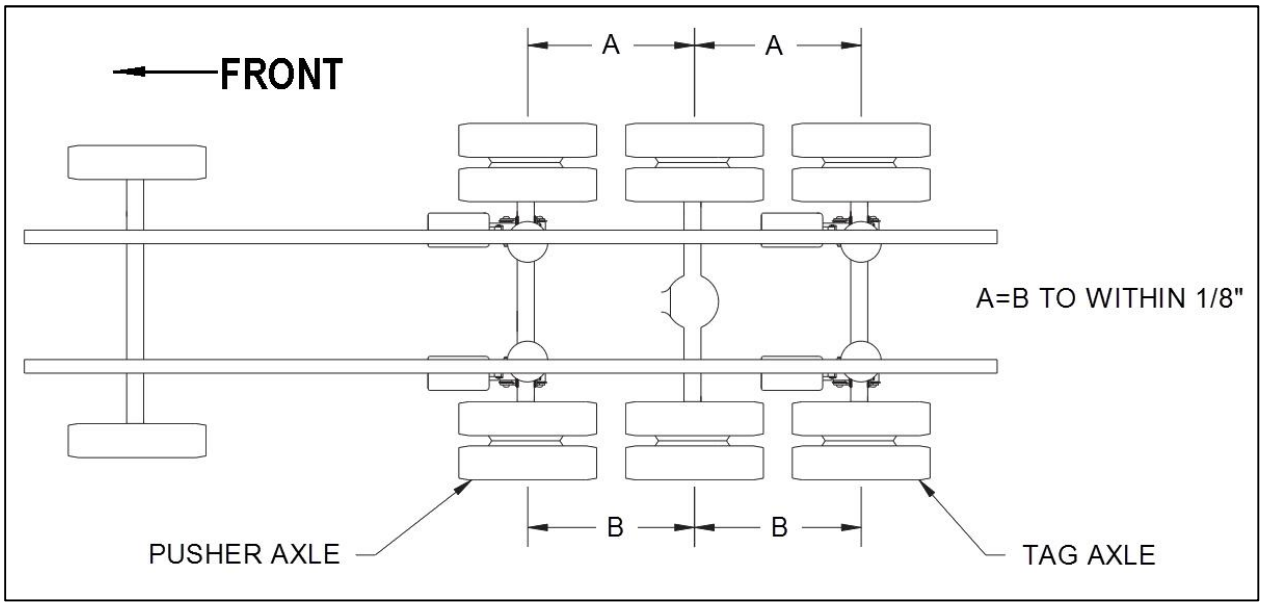


Figure 15

12. If alignment cannot be achieved due to insufficient available pivot fore/aft travel on the passenger side of the vehicle, break the tack welds on the driver side alignment collar and adjust its position in the slot so that additional alignment range can be achieved.
13. Verify that proper alignment was achieved and is within the allowable tolerance.
14. Tack weld the passenger side alignment collar to the frame bracket in four (4) places, two (2) places on the inboard side, and two (2) places on the outboard side.
15. Verify that proper alignment was achieved and is within the allowable tolerance.
16. Weld all four (4) alignment collars into position as specified (See **Figure 16**).

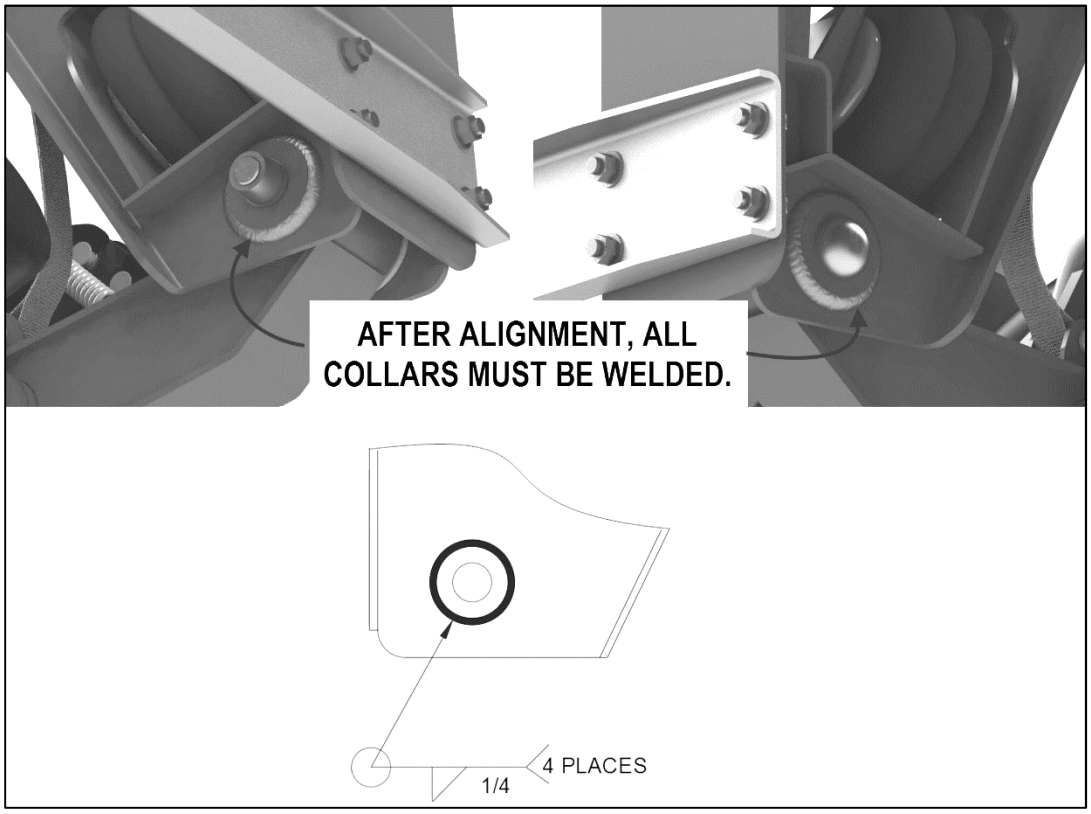


Figure 16

17. If the pivot fastener is a cap screw or bolt and nut, it must be torqued to specification (See **Section 10**).

7.2. Eccentric Collar Style

1. Locate the vehicle on a flat level surface.
2. Secure the vehicle so that it cannot move by blocking the vehicles drive tires fore and aft.
3. Install the wheels and tires on the auxiliary axle suspension system.
4. Lower the auxiliary axle suspension system so that the tires contact the ground.
5. Release the brakes on the auxiliary axle suspension system.
6. Adjust all four (4) eccentric collars so that the adjustment square is positioned vertically below the pivot fastener (See **Figure 17**).

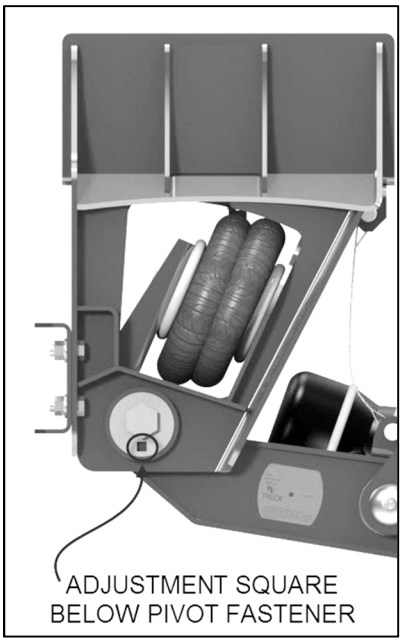


Figure 17

7. Snug tighten the driver side pivot fastener.
8. On both sides of the vehicle, measure horizontally from the center line of the spindle of the vehicle's front drive axle to center line of the spindle of the pusher axle (or rear drive axle if aligning a tag axle).
9. Record the measurements.
10. Using two (2) ½" break-over bars or ratchets, rotate the two (2) passenger side eccentric collars simultaneously to adjust the fore/aft position of the passenger side arm beam pivot so that the measurement from the drive axle spindle axis to the auxiliary axle spindle axis is equal on both sides of the vehicle plus or minus (+/-) 0.125" (1/8") (See **Figure 15**).
11. If alignment cannot be achieved due to insufficient available pivot fore/aft travel on the passenger side of the vehicle, loosen the driver side eccentric collar and adjust its position in the same manner so that additional alignment range can be achieved.
12. Verify that proper alignment was achieved and is within the allowable tolerance.
13. Snug tighten the passenger side eccentric collar.
14. Verify that the driver side inboard and outboard eccentric collars are aligned with each other (the adjustment squares are at the same orientation on both the inboard and outboard eccentric collars). (See **Figure 18**)
15. Torque both pivot fasteners to specification (See **Section 10 Torque Requirements**).

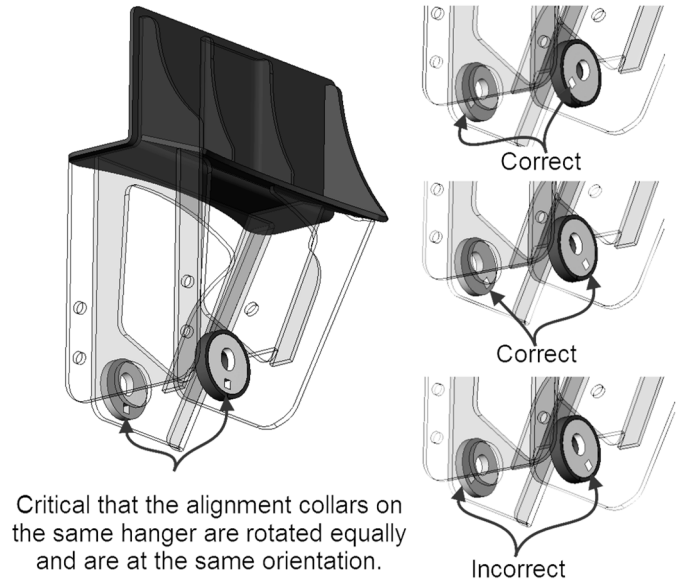


Figure 18

8. Air Controls

The auxiliary axle suspension system is actuated by the air control system. To activate (lower) the system, the load air springs are pressurized while the lift air springs are exhausted. To deactivate (raise) the system, the load air springs are exhausted while the lift springs are pressurized.

The air pressure supplied to the load springs is regulated to provide the proper weight carrying capacity for the intended load.

The air control system typically contains an air pressure gauge, air pressure regulator and, depending on operating preferences, a push/pull valve, toggle switch or electrical switch can be used to operate the system.

The regulator and gauge are used to adjust the pressure supplied to the load air springs for proper weight carrying capacity. Turning the regulator

knob in the clockwise direction will increase the pressure supplied to the load springs. Turning the regulator knob in the counter-clockwise direction will reduce the pressure supplied to the load springs.

For typical systems (See **Figure 19**), a chassis mounted push/pull valve is used to activate or deactivate the auxiliary axle suspension system. Per **Figure 19**, pushing the valve handle in will activate the auxiliary axle suspension system and lower the tires to ground. Pulling the valve handle out will deactivate the auxiliary axle suspension system and raise the tires away from the ground.

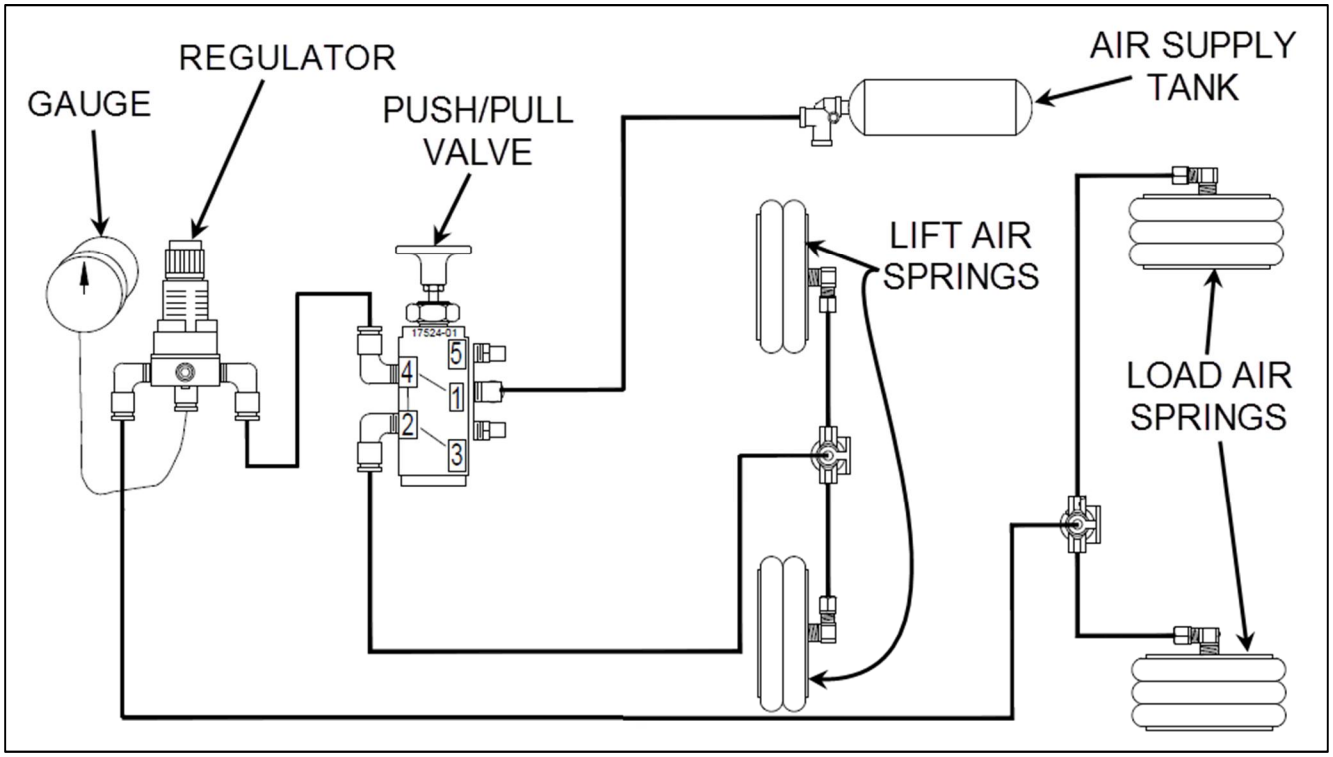


Figure 19

The chassis air pressure must reach 75psi minimum before the auxiliary axle suspension system can be operated. 75psi is the minimum pressure needed to operate the DOT required brake protection valve. The brake protection valve maintains safe air brake pressure in the event of air pressure loss downstream of the valve.

9. Air Pressure vs. Load

The following air pressure vs. load chart is to be used as a guide only (see **Table 1**). The actual air pressure required to support a given load depends on many factors related to the specific installation. To obtain an accurate air pressure vs. load calibration the suspension must be set up on a flat and accurate scale.

Table 1
Assumes 1500 lbs. ground weight with no (0) air pressure

Ground Axle Load	Ride Height		
	9"	10"	11"
5,000 lbs.	15 psi	15 psi	15 psi
10,000 lbs.	36 psi	36 psi	36 psi
15,000 lbs.	58 psi	58 psi	58 psi
20,000 lbs.	79 psi	79 psi	79 psi

10. Torque Requirements

Torque specifications listed in the following tables apply to nuts, but not bolts, and all torque requirements shown are recommended for fasteners as supplied by Watson & Chalin, Mfg. For fasteners not supplied by Watson & Chalin, Mfg., contact component manufacturer for specifications.

10.1 Torque Guidelines

The following tables show the proper torque requirements for cap screws, u-bolts and nuts described.

Fasteners have been torqued according to the following charts and should be re-torqued as part of any PDI (Pre-Delivery Inspection), and thereafter according to the schedule below.

Re-torque all fasteners at the following intervals:

1. After the first five (5) days of use.
2. After the first thirty (30) days of use.
3. After the first sixty (60) days of use.
4. After every six (6) months of use.

NOTE

Torque values in Table 2 do not apply to air springs or lower grade fasteners.

Cap screw/bolt Torque Requirements

Table 2

Fastener	Size	UNC Grade 8 Lubricated Torque (lb.-ft.)	UNF Grade 8 Lubricated Torque (lb.-ft.)
Front Pivot – Hanger-to-Trailing Arm	1 1/8”	965	1085
Axle Seat-to-Trailing Arm	1 1/8”	965	1085
Crossmember	5/8”	280	315

10.2 Torque Guidelines – U-Bolts

U-Bolts must be tightened as follows:

1. Thread all nuts onto the U-bolt so that the top of the nut is flush with the end of the leg.
2. Tighten all nuts in equal increments using the sequence shown until the nuts seat (See **Figure 20**).

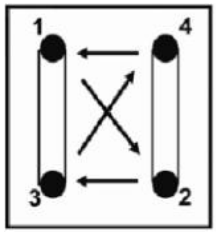


Figure 20

3. For 0.375” (3/8”) and 0.50” (1/2”) U-bolts, torque to specification using the sequence shown (See **Figure 20** and **Table 3**).
4. For 0.625” (5/8”), thru 1.125” (1-1/8”) U-bolts, torque to specification using the stepped procedure defined below:

4.1. Using the sequence shown in **Figure 20**, torque in 100lb.-ft. increments until the final torque specification is reached (See **Table 3**).

4.2. Decrease the torque step on the last increment as required to reach the specified torque (See **Table 3)**

U-Bolt Torque Requirements.

Table 3

Fastener	Size	UNC Grade 8 Lubricated Torque (lb.-ft.)	UNF Grade 8 Lubricated Torque (lb.-ft.)
Axle Seat U-bolts	3/4”		295

10.3 Torque Guidelines – Air Springs/Fittings

Air Spring Fastener Torque Requirements

Table 4

Size	Description	Max Torque Requirement (lb.-ft.)
3/8”	UNC Blind Nuts	50
1/2”	UNC Bolt or Stud	25
3/4”	UNC Stud	55
3/4”	UNF Combo Stud	50

Air Spring Fitting Torque Requirements

Table 5

Size	Max Torque Requirement (ft. /lbs.)
1/4” NPTF	50
1/2” NPTF	25
3/4” NPTF	55