

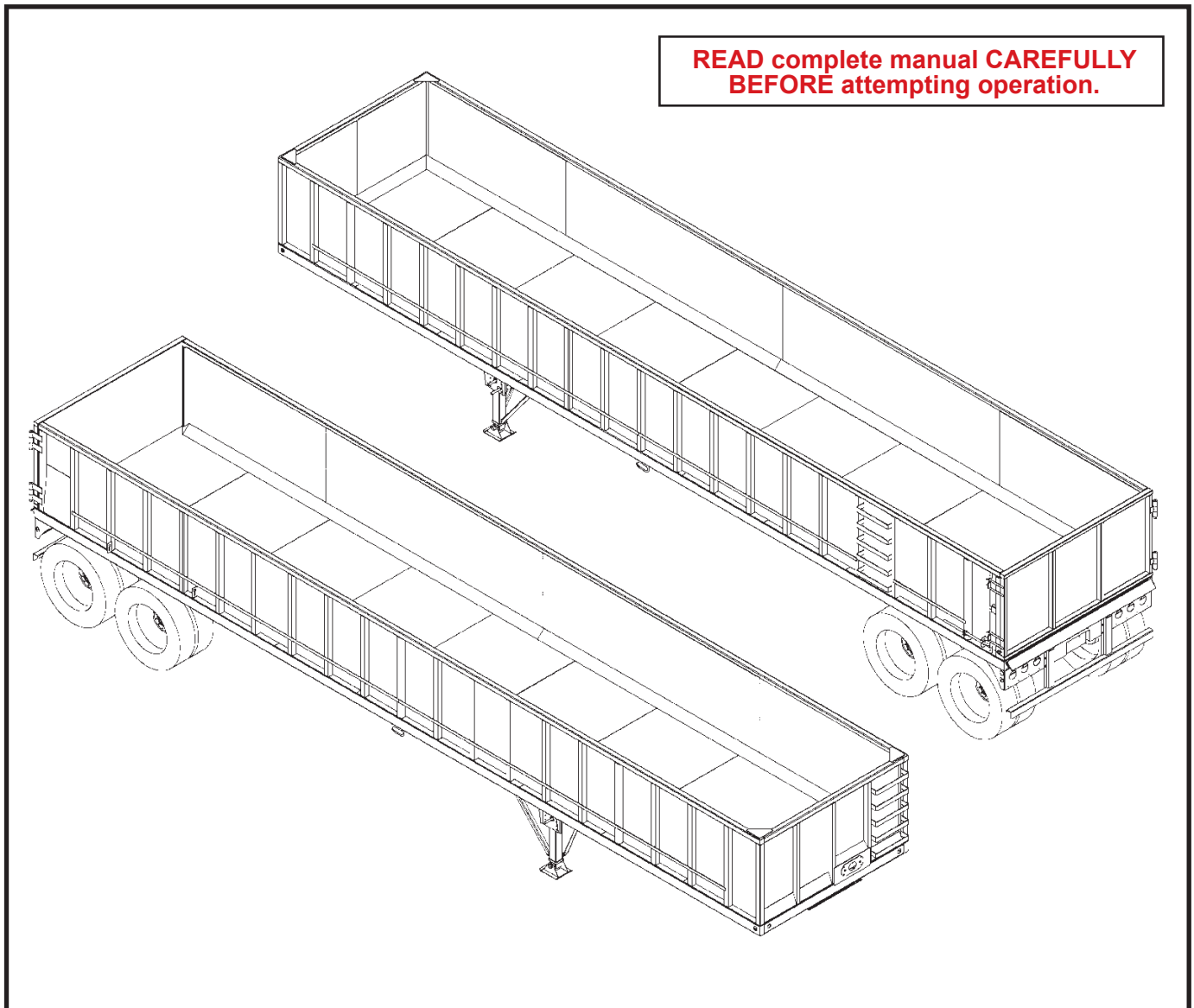


Doing Our Best to Provide You the Best

8SB00001, Rev AE

7/26/18

GONDOLA TRAILER



OPERATOR MANUAL

CONGRATULATIONS and THANK YOU for purchasing a Demco Gondola Trailer.

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INTRODUCTION

At Demco we strive to design, produce and deliver the highest quality trailer on the market. Our employees have a strong background of knowledge and combined experience in manufacturing to put quality workmanship into our products.

In this manual you will find information covering all models of the Demco Gondola Trailer line. Use the table of contents to locate specific areas of interest.

GENERAL INFORMATION

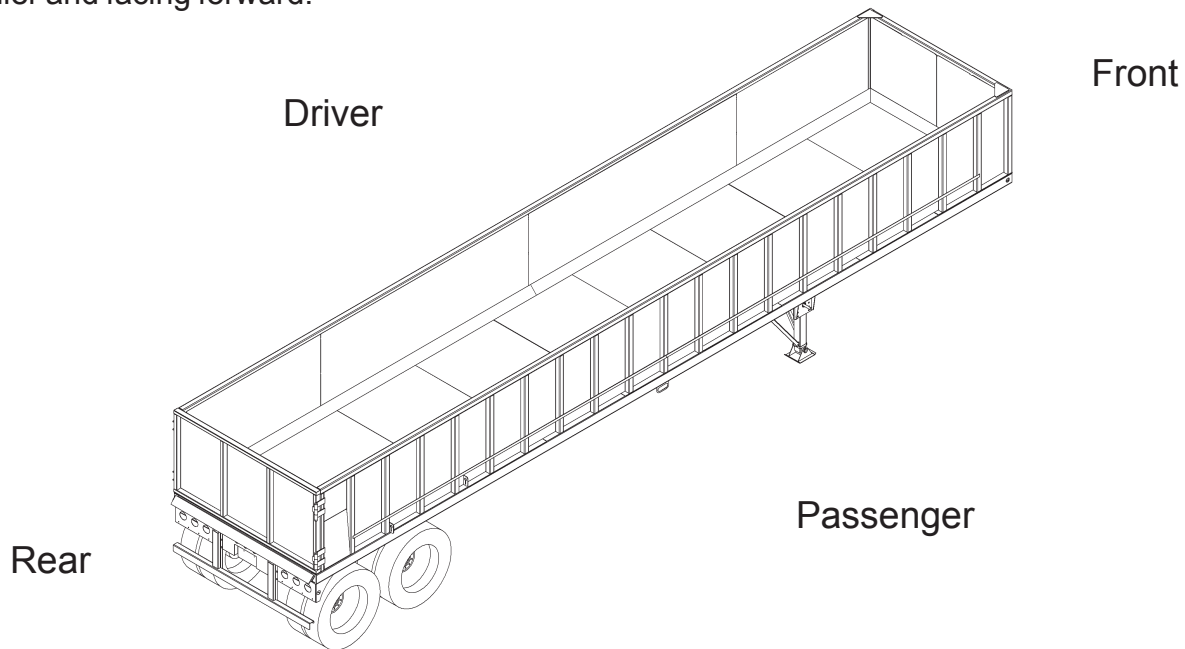
Demco requires that you and anyone else who will be operating and maintaining the trailer read and understand the guidelines in the manual for safe, efficient, and trouble free operations. Proper maintenance, adjustments and use will result in many years of service. Keep this manual handy for frequent reference and to pass on to new operators or owners. If assistance, information, or additional copies of the manual are needed, contact the nearest dealer, a distributor, or Demco.

PLEASE NOTE:

All documents within the manual referring to products not manufactured by Demco have been printed with the permission of the manufacturer specified.

PLEASE NOTE

All references to driver, passenger, front and rear of the trailer are determined from a position behind the trailer and facing forward.



PRODUCT DISCLAIMER

In this document you will find information based on available knowledge at the time of its publication. To be accurate with the information, every effort was made but may not cover all details or variations of a trailer or provide every possibility in connection with its production, operation and maintenance. A Feature and Option may be presented in the manual that is not relevant to this trailer. Demco assumes no obligation of notice, to holders of this document, with changes made to a product.

SPECIFICATIONS AND DESIGN ARE SUBJECT TO CHANGE WITHOUT NOTICE.

Demco is often making improvements and developing new designs. In doing so, we reserve the right to make changes and/or improvements without obligation for equipment sold beforehand. Self-modification to our trailers may affect the operation, function, and safety, so this is not advised. If a replacement part is necessary, Demco should supply it, please contact your nearest dealer or Demco.

DEMCO STATEMENT OF PRODUCT SAFETY

As a producer of agricultural and transportation equipment, Demco is fully aware of its responsibility of providing its customers products that perform their expected use, in a truly safe manner. Safety considerations shall be a fundamental and high precedence part of all engineering/design analysis and judgments involving Demco products. It is our stated policy that our products will be manufactured to coincide with the safety standards specified by the National Association of Trailer Manufacturers and/or any other officially recognized standards at the time manufactured. However, this statement should not be translated to mean that our product will uphold against a customer's own carelessness or disregard for common safety practices specified in each product's manual, nor will we be accountable for any such occurrence.

TRAILER INFORMATION

GAWR (Gross Axle Weight Rating): The maximum gross weight that an axle can support. It is the lowest of axle, wheel, or tire rating. Usually the tire or wheel rating is lower than the axle rating and determines the GAWR. The GAWR is listed on the VIN plate.

GVWR (Gross Vehicle Weight Rating): The maximum allowable gross weight of the trailer and its contents. The gross weight of the trailer includes the weight of the trailer and all of the items with it. GVWR is sometimes referred to as GTWR (Gross Trailer Weight Rating) or MGTW (Maximum Gross Trailer Weight). GVWR, GTWR and MGTW are all the same rating.

The sum total of the GAWR for all trailer axles may be less than the GVWR for the trailer, because some of the trailer load is to be carried by the tow vehicle, rather than by the trailer axle(s). The total weight of the cargo and trailer must not exceed the GVWR, and the load on an axle must not exceed its GAWR. The GVWR is listed on the VIN Plate.

VIN (Vehicle Identification Number): Identifies the trailer in four sections. The first section of three characters identifies the manufacturer. The second section consists of five characters (VIN positions 4-8), these are the attributes of the vehicle. The third section is one character which is the check digit. The fourth section consists of eight characters (VIN positions 10-17). The first character represents the vehicle model year, the second character represents the plant of manufacture. The third through eighth characters are a sequential production number. The VIN Plate is located on the main frame at the front, passenger side of the trailer.

PSI (Pounds Per Square Inch): The tire pressure measurement. The PSI is listed on the VIN Plate.

Empty Weight: Some information that comes with the trailer is not a reliable source for 'empty' weight. The shipping documents list average or standard weights and your trailer may be equipped with options. To determine the 'empty' or weight of your trailer, have trailer weighed at a commercial scale.

Kingpin: The coupler on the front of the trailer that connects to the fifth wheel plate of the tow vehicle.

Fifth Wheel Plate: A device on the tow vehicle that pulls and supports the weight of the trailer.

Trailer Lighting and Braking Connectors: A device that connects electrical power from the tow vehicle to the trailer. If your trailer has electric brakes, the connector will also supply power to the brakes from the tow vehicle.

Landing Gear: A device on the trailer that is often referred to as the 'jack', used to raise and lower the trailer and for storage of the trailer. To operate the landing gear, pull the crank shaft outward for high gear and push in for low gear speed. Demco uses the Holland - Atlas 55 as standard equipment on all Gondola Trailers.

Hardox: Hardox 450 is a wear-resistant plate with a typical hardness of 450 HBW. The characteristic feature of the steel grade is the unique combination of toughness and hardness and also the fact that, in spite of its hardness, it is fabrication-friendly.

Registration Holder: This is located on the center of the kingpin. Use this to keep the registration with the trailer at all times. The registration holder is often referred to as the "manifest" holder.

SAFETY

TAKE NOTE! THIS SAFETY ALERT SYMBOL FOUND THROUGHOUT THIS MANUAL IS USED TO CALL YOUR ATTENTION TO INSTRUCTIONS INVOLVING YOUR PERSONAL SAFETY AND SAFETY OF OTHERS. FAILURE TO FOLLOW THESE INSTRUCTIONS CAN RESULT IN INJURY OR DEATH!



**THIS SYMBOL MEANS:
ATTENTION!
BECOME ALERT!
YOUR SAFETY IS INVOLVED!**

SIGNAL WORDS

Note use of following signal words **DANGER**, **WARNING**, and **CAUTION** with safety messages. The appropriate signal word for each has been selected using the following guidelines:

DANGER: Indicates an imminently hazardous situation that, if not avoided, will result in death or serious injury. This signal word is to be limited to most extreme situations typically for machine components which, for functional purposes, cannot be guarded.

WARNING: Indicates a potentially hazardous situation that, if not avoided, could result in death or serious injury, and includes hazards that are exposed when guards are removed. It may also be used to alert against unsafe practices.

CAUTION: Indicates a potentially hazardous situation that, if not avoided, may result in minor or moderate injury. It may also be used to alert against unsafe practices.



EQUIPMENT SAFETY GUIDELINES

Every year many accidents occur which could have been avoided by a few seconds of thought and a more careful approach to handling equipment. You, the operator, can avoid many accidents by observing the following precautions in this section. To avoid personal injury, study the following precautions and insist those working with you, or you yourself, follow them.

Operator should be a responsible adult. **DO NOT ALLOW PERSONS TO OPERATE THIS UNIT UNTIL THEY HAVE DEVELOPED A THOROUGH UNDERSTANDING OF SAFETY PRECAUTIONS AND HOW IT WORKS.**

DO NOT modify the trailer in anyway. Doing so may impair the function and/or safety and could affect the life of the trailer.

Never exceed the maximum capacity of the trailer. By doing so you risk damage to your Demco trailer. If it's ability to do a job, or to do so safely is in question **DON'T TRY IT.**

Review safety instructions with all users annually.

Replace any caution, warning, danger or instruction safety decal that is not readable or is missing. Location of such decals is indicated in this booklet.

Do not paint over, remove, or deface any safety signs or warning decals on your equipment. Observe all safety signs and practice instructions on them.



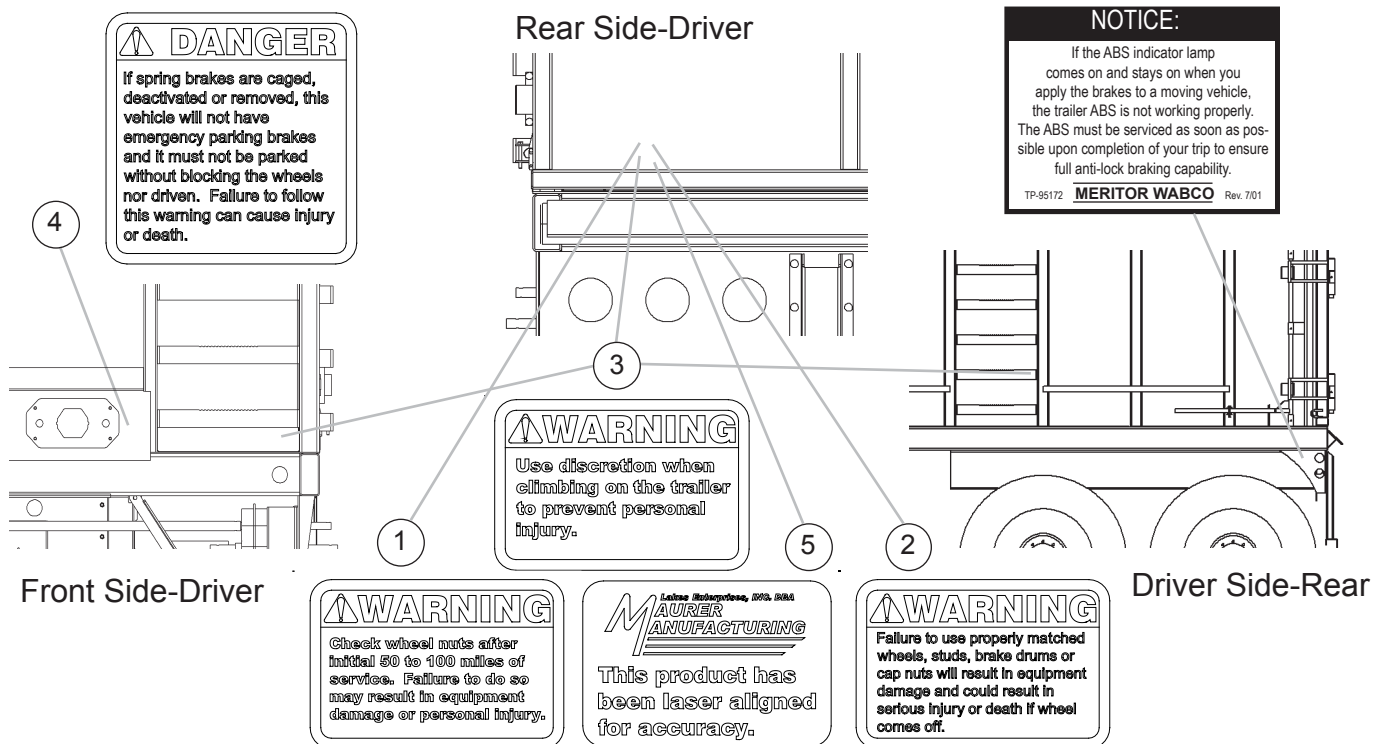
SAFETY SIGN LOCATIONS

Types of safety sign and locations on equipment are shown in illustration below. Good safety requires that you familiarize yourself with various safety signs, type of warning, and area or particular function related to that area, that requires your SAFETY AWARENESS.



SAFETY SIGN CARE

- ◆ Keep safety signs clean and legible at all times.
- ◆ Replace safety signs that are missing or have become illegible.
- ◆ Replacement parts that display a safety sign should also display current sign.
- ◆ Safety signs are available from Demco Spencer Plant.



HOW TO APPLY SAFETY DECALS

1. Be sure that the installation area is clean and dry.
2. Be sure temperature is above 50°F(10°C).
3. Decide on exact position before removing the backing paper.
4. Remove smallest portion of split backing paper.
5. Align decal over specified area and carefully press the small portion with the exposed sticky backing in place.
6. Slowly peel back remaining paper and carefully smooth remaining portions of decal into place.
7. Small air pockets can be pierced with a pin and smoothed out using a piece of decal backing paper.

| REF. NO. | PART NO. | QTY. | DESCRIPTION |
|----------|-------------|------|--|
| 1. | 1AQAJ000000 | 1 | Check Wheel Nuts |
| 2. | 1AQAR000000 | 1 | Failure to Use Properly Matched Wheels |
| 3. | 1AQAH000000 | 1 | Use Discretion When Climbing |
| 4. | 1AQAK000000 | 1 | If Spring Brakes Are Caged |
| 5. | 1QAY000000 | 1 | Product Has Been Laser Aligned |



LOAD DISTRIBUTION SAFETY

The total weight of the load you put on the trailer, plus the empty weight of the trailer itself, must not exceed the trailer's Gross Vehicle Weight Rating (GVWR). You must distribute the load on the trailer such that the load on any tire or axle does not exceed the tire load rating or the Gross Axle Weight Rating (GAWR). If you do not know the weight of your trailer you must weigh it at a commercial scale. See your VIN Plate for proper ratings. Not following these guidelines could cause serious injury or even death. **Demco prohibits the compression or compacting of material inside the gondola trailer and considers this as improper operation.** Using heavy equipment to compress or compact material in your trailer may permanently damage the frame of your trailer.



LOAD SECUREMENT AND CARGO CONTAINMENT

It is the operators' responsibility to conform and comply with laws and regulations pertaining to load securement and the containment of cargo being hauled. For more information about Load Securement and Cargo Containment contact the Federal Motor Carrier Safety Association (FMCSA) or the Federal Motor Vehicle Safety Standards (FMVSS).



TIRE AND LUG NUT SAFETY

It is essential to inspect the trailer tires and wheels before each tow. Trailer tires are more likely to fail compared to car tires due to the heavier load the trailer carries. Please follow the list of guidelines and/or possibilities below that could cause serious injury or even death.

- ◆ Replace the tire before towing if the tire has a bald spot, cut, bulge, is showing any cords, or is cracked.
- ◆ If uneven tread is noticed, take the trailer to a dealer service center for an inspection. Tire imbalance, axle misalignment, or incorrect inflation could cause the uneven tread.
- ◆ Too little of tread will not be adequate enough for traction and can cause loss of control on wet highways.
- ◆ Tire pressure that is improper causes an unstable trailer and could blowout the tire causing loss of control.
- ◆ Check the tire pressure before towing, while the tire is cold. For the recommended PSI, see the VIN Plate or the side wall of the tire.
- ◆ Always order and install tires and wheels with appropriate type and load capacity to meet or exceed gross weight of unit.

The inspection of the tire and wheel lug nuts is necessary since they are prone to loosen after first being assembled. Please follow the list of guidelines and/or possibilities below that could cause serious injury or even death.

- ◆ When towing a new trailer, check the lug nuts after the first 50 to 100 miles of driving.
- ◆ Metal creep between the wheel and the lug nuts will cause wheel to loosen and could come off. Check to make sure the lug nuts are tight before each tow.
- ◆ Improper torque could cause the wheel to separate from trailer. A torque wrench should be used to tighten the lug nuts. If one is not available use a lug wrench then take to a trailer dealer or service garage to tighten them to the required torque.

BOLT TORQUE

TORQUE DATA FOR STANDARD NUTS, BOLTS, AND CAPSCREWS.

Tighten all bolts to torques specified in chart unless otherwise noted. Check tightness of bolts periodically, using bolt chart as guide. Replace hardware with same grade bolt.

NOTE: Unless otherwise specified, high-strength Grade 5 hex bolts are used throughout assembly of equipment.

Bolt Torque for Standard bolts *



Torque Specifications

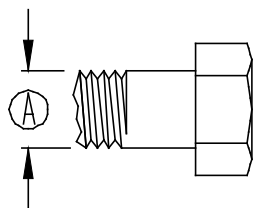
| "A" | GRADE 2 | | GRADE 5 | | GRADE 8 | |
|-------|---------|-------|---------|-------|---------|--------|
| | lb-ft | (N.m) | lb-ft | (N.m) | lb-ft | (N.m) |
| 1/4" | 6 | (8) | 9 | (12) | 12 | (16) |
| 5/16" | 10 | (13) | 18 | (25) | 25 | (35) |
| 3/8" | 20 | (27) | 30 | (40) | 45 | (60) |
| 7/16" | 30 | (40) | 50 | (70) | 80 | (110) |
| 1/2" | 45 | (60) | 75 | (100) | 115 | (155) |
| 9/16" | 70 | (95) | 115 | (155) | 165 | (220) |
| 5/8" | 95 | (130) | 150 | (200) | 225 | (300) |
| 3/4" | 165 | (225) | 290 | (390) | 400 | (540) |
| 7/8" | 170 | (230) | 420 | (570) | 650 | (880) |
| 1" | 225 | (300) | 630 | (850) | 970 | (1310) |

Bolt Torque for Metric bolts *

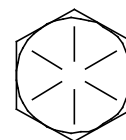
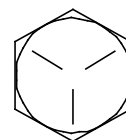
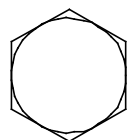
| "A" | CLASS 8.8 | | CLASS 9.8 | | CLASS 10.9 | |
|-----|-----------|-------|-----------|-------|------------|--------|
| | lb-ft | (N.m) | lb-ft | (N.m) | lb-ft | (N.m) |
| 6 | 9 | (13) | 10 | (14) | 13 | (17) |
| 7 | 15 | (21) | 18 | (24) | 21 | (29) |
| 8 | 23 | (31) | 25 | (34) | 31 | (42) |
| 10 | 45 | (61) | 50 | (68) | 61 | (83) |
| 12 | 78 | (106) | 88 | (118) | 106 | (144) |
| 14 | 125 | (169) | 140 | (189) | 170 | (230) |
| 16 | 194 | (263) | 216 | (293) | 263 | (357) |
| 18 | 268 | (363) | -- | -- | 364 | (493) |
| 20 | 378 | (513) | -- | -- | 515 | (689) |
| 22 | 516 | (699) | -- | -- | 702 | (952) |
| 24 | 654 | (886) | -- | -- | 890 | (1206) |

Torque figures indicated are valid for non-greased or non-oiled threads and heads unless otherwise specified. Therefore, do not grease or oil bolts or capscrews unless otherwise specified in this manual. When using locking elements, increase torque values by 5%.

* GRADE or CLASS value for bolts and capscrews are identified by their head markings.



GRADE-2 GRADE-5 GRADE-8



CLASS 8.8 CLASS 9.8 CLASS 10.9



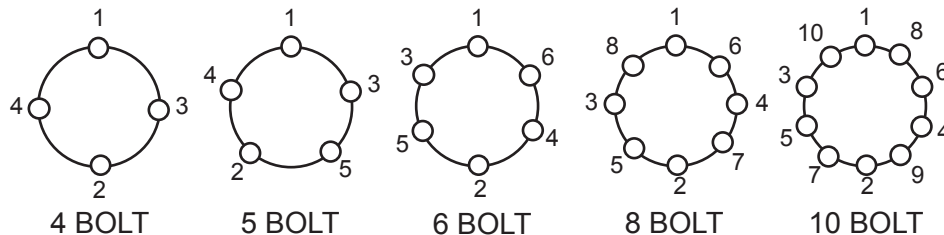
TORQUE REQUIREMENTS

It is extremely important to apply and maintain proper wheel mounting torque on your trailer axle. Torque is a measure of the amount of tightening applied to a fastener (nut or bolt) and is expressed as length times force. For example, a force of 90 pounds applied at the end of a wrench one foot long will yield 90 lbs-ft of torque. Torque wrenches are the best method to assure the proper amount of torque is being applied to a fastener.

Note: Wheel nuts or bolts must be applied and maintained at the proper torque levels to prevent loose wheels, broken studs, and possible dangerous separation of wheel from your axle.

Be sure to use only the fasteners matched to the cone angle of your wheel (usually 60 degrees or 90 degrees). The proper procedure for attaching your wheels is as follows:

1. Start all bolts or nuts by hand to prevent cross threading.
2. Tighten bolts or nuts in the following sequence.
3. The tightening of the fasteners should be done in stages. Following the recommended sequence, tighten fasteners per wheel torque requirements diagram:



4. Wheel nuts or bolts should be torqued before first road use and after each wheel removal. Check and re-torque after the first 50 miles and again at 100 miles. Check periodically thereafter.

WHEEL AND RIM TORQUE REQUIREMENTS

| Description | Application | Minimum Torque | Maximum Torque |
|----------------------|------------------------|----------------|----------------|
| | | (lbs-ft) | (lbs-ft) |
| 1/2" Cone Nut | 12" – 13" Wheel | 50 | 65 |
| | 14" – 15" Wheel | 90 | 120 |
| 5/8" Cone Nut | Flat Disc Wheel | 175 | 225 |
| 3/4" Hex Nut | Demountable Ring Clamp | 210 | 260 |
| 3/4" Spherical Nut | Single Wheel | 450 | 500 |
| | Inner Dual | 450 | 500 |
| 1-1/2" Spherical Nut | Outer Dual | 450 | 500 |
| 5/8" Flange Nut | Wheels | 275 | 325 |



TRAILER TOWING GUIDE

Driving a vehicle while towing a trailer is completely different from driving the same vehicle without a trailer. Acceleration, manipulation and braking are all reduced. It takes longer to get up to speed; you need more room to turn and pass, and more distance to stop. You will need to spend time adjusting to the different feel and maneuverability of the vehicle with a loaded trailer. Because of the considerable differences in all aspects of manipulation when towing a trailer, the dangers and risks of injury are also much greater than when driving without a trailer. You are responsible for keeping your vehicle and trailer in control, and for all the damage that is caused if you lose control of your vehicle and trailer.

Before you start towing the trailer, you must follow all of the instructions for inspection, testing, loading and coupling. Also, before you start towing, adjust the mirrors so you can see the trailer as well as the area to the rear of it.

Drive slowly at first, 5 m.p.h. or so, and turn the wheel to get the feel of how the vehicle and trailer combination responds. Next, make some right and left hand turns. Watch in your side mirrors to see how the trailer follows the vehicle. Turning with a trailer attached requires more room. Stop a few times from speeds no greater than 10 m.p.h. Try using different combinations of trailer/air brakes and vehicle brakes. Note the effect that the trailer brakes have when they are the only brakes used.



TRAILER TOWING SAFETY GUIDELINES

- ◆ Before towing, check coupling, trailer brakes, tires, wheels and lights.
- ◆ Check the lug nuts and bolts for proper tightness.
- ◆ Check coupler tightness after towing 50 miles.
- ◆ Use your mirrors to verify that you have room to change lanes or pull into traffic.
- ◆ Use your turn signals well in advance.
- ◆ Allow plenty of stopping distance for your trailer and vehicle.
- ◆ Do not drive so fast that the trailer begins to sway due to speed.
- ◆ Allow plenty of room for passing. A rule of thumb is that the passing distance with a trailer is four times the passing distance without a trailer.
- ◆ Shift your automatic transmission into a lower gear for city driving.
- ◆ Use lower gears for climbing and descending grades.
- ◆ Do not ride the brakes while descending grades; they may get so hot that they stop working. Then you will potentially have a runaway vehicle and trailer.
- ◆ To conserve fuel, don't use full throttle to climb a hill. Instead, build speed on the approach.
- ◆ Slow down for bumps in the road. Take your foot off the brake when crossing the bump.
- ◆ Do not brake while in a curve unless absolutely necessary. Instead, slow down before you enter the curve and power through the curve. This way, the towing vehicle remains "in control."
- ◆ Do not apply the brakes to correct extreme trailer swaying. Continued pulling of the trailer, and even slight acceleration, will provide a stabilizing force.



OPERATION SAFETY

- ♦ Carefully study and understand the Owner's Manual and all safety decals before operating, servicing, adjusting or repairing.
- ♦ It is the owner/operators responsibility to read the manual and instruct other operators to read the manual before operating.
- ♦ Before towing, check kingpin, trailer brakes, tires, wheels and lights.
- ♦ Always follow state and local regulations regarding safety chains and auxiliary lighting when towing.
- ♦ Check the lug nuts and bolts for proper tightness.
- ♦ Keep wheels and lug nuts tightened to specific torque.
- ♦ Secure wheels when trailer is not being used.
- ♦ Assure tires are inflated evenly.
- ♦ Make sure the brakes are evenly adjusted.
- ♦ Visually inspect trailer for any loose bolts, worn parts, or cracked welds, and make necessary repairs. (Follow maintenance safety instructions included in this manual.)
- ♦ Securely attach to towing vehicle.
- ♦ Make sure that tow rating on vehicle is high enough for what is being towed.
- ♦ Check coupler tightness after towing 50 miles.
- ♦ Clean reflectors and lights and check to make sure that they are working.
- ♦ Use your mirrors to verify that you have room to change lanes or pull into traffic.
- ♦ Use your turn signals well in advance.
- ♦ Allow plenty of stopping distance for your trailer and vehicle.
- ♦ Do not drive so fast that the trailer begins to sway due to speed.
- ♦ Allow plenty of room for passing. A rule of thumb is that the passing distance with a trailer is four times the passing distance without a trailer.
- ♦ Always drive at a safe speed and ensure that you are driving slow enough to make an emergency stop if necessary.
- ♦ No passengers allowed – Do not carry passengers anywhere on the trailer.
- ♦ Beware of bystanders, particularly children, always look around and make sure it is safe to start engine of tow vehicle or move the trailer. This is particularly important with higher noise levels, as you may not hear people shouting.
- ♦ When halting operations, even periodically, set towing vehicles parking brake, shut off engine, and remove the ignition key, to prevent unauthorized operation.
- ♦ Keep hands, feet, hair and clothing away from all moving and/or rotating parts.
- ♦ A safe working environment is provided for the operator and bystanders just by following the recommended procedures throughout this manual.
- ♦ Be extra careful on inclines.
- ♦ Use lower gears for climbing and descending grades.
- ♦ Do not ride the brakes while descending grades; they may get so hot that they stop working. Then you will potentially have a runaway vehicle and trailer.
- ♦ To conserve fuel, don't use full throttle to climb a hill. Instead, build speed on the approach.
- ♦ Do not brake while in a curve unless absolutely necessary. Instead, slow down before you enter the curve and power through the curve. This way, the towing vehicle remains "in charge."
- ♦ Do not apply the brakes to correct extreme trailer swaying. Continued pulling of the trailer, and even slight acceleration, will provide a stabilizing force.
- ♦ Slow down for bumps in the road. Take your foot off the brake when crossing the bump.
- ♦ Shift your automatic transmission into a lower gear for city driving.



OPERATION SAFETY (continued)

- ◆ In addition to the design and configuration of a trailer, hazard control and accident prevention are dependent upon the knowledge, concern, and common sense of personnel involved in the operation, transportation, maintenance and storage of the trailer.
- ◆ Practice the operations and functions of your trailer. Don't hurry the learning process or take it for granted.
- ◆ Untrained operators are not qualified to operate the trailer.
- ◆ If the operation safety is followed, along with a good maintenance program your trailer will provide you with years of trouble-free service.
- ◆ With ideal road conditions follow the posted speed limit but do not exceed 60 mph.



SERVICE AND MAINTENANCE SAFETY

Carefully read this section on trailer service and maintenance safety. Good maintenance is your responsibility. Performing maintenance according to the schedule will prolong the performance and life of you trailer and ensure the safety and liability of the operation. If you cannot perform the required maintenance talk to your dealer about having them done. Also check the relevant component manufacturer's manual if available.

- ◆ Make sure there is plenty of ventilation. Never operate engine of towing vehicle in a closed building. Exhaust fumes may cause asphyxiation.
- ◆ Always block wheels and never use a jack as sole support.
- ◆ Always use proper tools or equipment for job at hand.
- ◆ Use extreme caution when making adjustments.
- ◆ Follow torque chart in this manual when tightening bolts and nuts.
- ◆ Openings in skin and minor cuts are susceptible to infection from brake fluid.
- ◆ After servicing, be sure all tools, parts and equipment are removed
- ◆ Do not allow grease or oil to build up on any step or platform.
- ◆ When replacing bolts, use the same size and grade.
- ◆ Refer to bolt torque chart for head identification marking.
- ◆ When replacement parts are necessary for periodic service and maintenance, genuine factory replacement parts must be used to restore your trailer. **Manufacturer will not claim responsibility for use of unapproved parts and/or accessories or other damages.**
- ◆ If the trailer has been altered in any way from original design, any liability for injury or warranty will not be accepted by Demco.
- ◆ A fire extinguisher and first aid kit should be kept accessible while performing any service and maintenance on the trailer.



COUPLING THE TRAILER TO TOW VEHICLE

- ◆ Inspect Fifth Wheel
 1. Check for damage/missing parts.
 2. Check to see that mounting to tractor is secure, no cracks in frame.
 3. Be sure that the fifth wheel plate is greased as required. Failure to keep the fifth wheel plate lubricated could cause steering problems due to friction between the tractor and trailer.



COUPLING THE TRAILER TO TOW VEHICLE (continued)

4. Check if fifth wheel is in proper position for coupling. Wheel tilted down towards rear of tractor, jaws open, safety unlocking handle in automatic lock position.
 5. If you have a sliding fifth wheel, make sure it is locked.
 6. Make sure the trailer kingpin is not bent or broken.
- ♦ **Inspect Area**
 1. Make sure area around vehicle is clear.
 2. Be sure trailer spring brakes are on.
 3. Check that cargo is secured against movement due to tractor being coupled to the trailer.
 - ♦ **Position Tractor**
 1. Put the tractor directly in front of the trailer. Never back under the trailer at an angle, you could push the trailer sideways and damage the landing gear.
 2. Check position using outside mirrors and looking down both sides of the trailer.
 - ♦ **Back Slowly**
 1. Back up until the fifth wheel is just touching the trailer. Don't hit the trailer.
 - ♦ **Secure Tractor**
 1. Put parking brake on and transmission in neutral.
 - ♦ **Check Trailer Height**
 1. The trailer should be low enough that it is raised slightly by the tractor when the tractor is backed under. Raise and lower the trailer as needed. If trailer is too low, the tractor may strike and damage the front of trailer. If the trailer is too high, it may not couple correctly.
 2. Check that the kingpin and fifth wheel are aligned.
 - ♦ **Connect Air Lines to Trailer**
 1. Make sure airlines are safely supported where they won't be crushed or caught while tractor is backing under the trailer.
 2. Connect tractor emergency red airline to trailer emergency red glad hand. This provides continuous air supply to trailer.
 3. Connect service blue airline to trailer service blue glad hand. This provides air to trailer only when brake is applied.
 - ♦ **Supply Air to Trailer**
 1. From cab, push in "air supply" knob or move tractor protection valve control from the "emergency" to the "normal" position to supply air to the trailer brake system.
 2. Wait until the air pressure is normal.
 3. Check brake system for crossed airlines.
 4. Shut engine off so you can hear brakes.
 5. Apply and release trailer brakes, listen for sound of brakes being applied and released. You should hear the brakes move when applied and air escape when the brakes are released.
 6. Check air brake system pressure gauge for signs of major air loss.



COUPLING THE TRAILER TO TOW VEHICLE (continued)

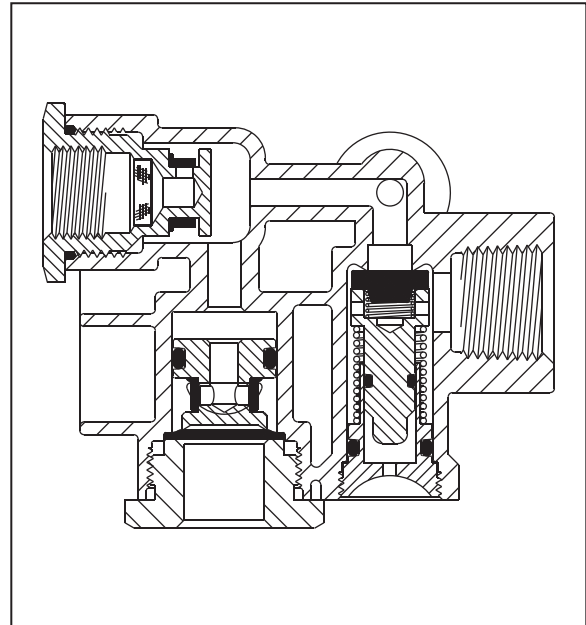
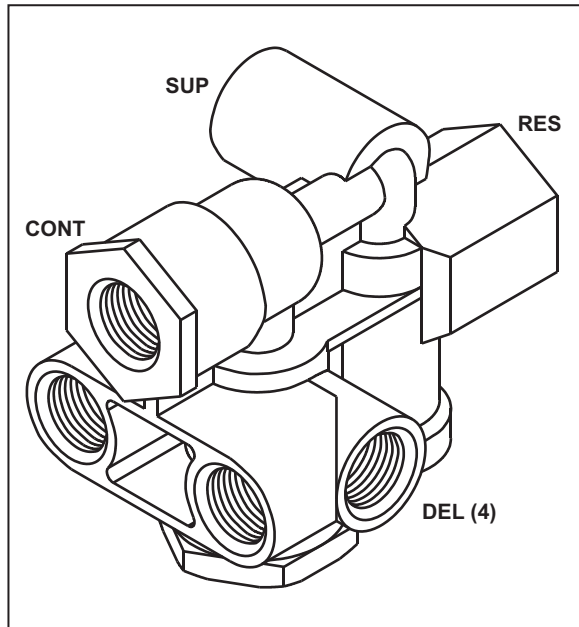
7. When you are sure trailer brakes are working, start engine.
 8. Check again that the air pressure is up to normal.
- ◆ Lock Trailer Brakes
 1. Pull out the “air supply” knob, or move the tractor protection valve control from “normal” to “emergency”.
 - ◆ Back Under Trailer
 1. Use lowest reverse gear.
 2. Back trailer slowly to avoid hitting the kingpin too hard.
 3. Stop when the kingpin is locked into the fifth wheel.
 - ◆ Check Connection for Security
 1. Raise trailer landing gear slightly off the ground.
 2. Pull tractor gently forward while the trailer brakes are still applied.
 3. Check and make sure that the trailer is locked onto the tractor.
 - ◆ Secure Vehicle
 1. Put parking brake on and transmission in neutral.
 2. Shut off engine and take key with you so someone else won't move the truck while you are under it.
 - ◆ Inspect Coupling
 1. Use flashlight if necessary.
 2. Make sure there is no spacing between trailer and fifth wheel. If there is a space something is wrong. **Kingpin may be on top of closed fifth wheel jaws; trailer will come loose very easily.**
 3. Go under the trailer and look into the back of the fifth wheel. Make sure jaws are closed around the shank of the kingpin.
 4. Check that the locking lever is in the “lock” position.
 5. Check that the safety catch is in a position over locking lever. On some fifth wheels the catch must be put in place by hand.
 6. If the coupling isn't right, fix before operating.
 - ◆ Connect the Electrical Cord and Check Air Lines
 1. Plug the electrical cord into the trailer and fasten the safety catch.
 2. Check both airlines and electrical lines for signs of damage.
 3. Make sure air and electrical lines will not hit any moving parts on vehicle.
 - ◆ Raise Trailer Landing Gear
 1. Use low gear to begin raising the landing gear, once free of weight, switch to high gear.
 2. Raise the landing gear all the way up. Never drive with the landing gear only part way up, one or both could catch on objects.
 3. After raising landing gear, secure the crank handle safely.
 4. When full weight of trailer is resting on tractor:
 5. Check for enough clearance between rear of tractor frame and landing gear. When the tractor/trailer makes a sharp turn, the landing gear must clear the back of the tractor.
 6. Check that there is enough clearance between the top of the tractor tires and the nose of the trailer.



UNCOUPLING THE TRAILER FROM TOW VEHICLE

- ◆ Position the Tractor and Trailer
 1. Make sure surface can support weight of trailer.
 2. Have the tractor aligned with the trailer, pulling out at an angle can cause damage to the landing gear.
- ◆ Ease Pressure on Locking Jaw
 1. Shut off trailer air supply to lock trailer brakes.
 2. Ease pressure on fifth wheel locking plate by backing up gently, this will help you release the fifth wheel locking lever.
 3. Put parking brake on while tractor is pushing against the kingpin. This will hold the tractor with pressure off the locking jaw.
- ◆ Inspect Area
 1. Make sure area around the vehicle is clear.
- ◆ Lower the Landing Gear
 1. Lower the landing gear until it makes firm contact with the ground, turn crank in low gear a few extra turns; this will lift some weight off the tractor. Do not lift trailer off the fifth wheel. This will make it easier to unlatch the fifth wheel and easier to couple next time.
- ◆ Disconnect Airlines and Electrical Cables
 1. Disconnect airlines from trailer. Connect glad hands to dummy coupler at back of cab, or couple them together.
 2. Hang electrical cable plug down to prevent moisture from entering the end.
 3. Make sure lines are supported so they won't be damaged while driving the tractor.
- ◆ Unlock Fifth Wheel
 1. Pull the release handle to "open" position.
 2. Keep legs and feet clear of the rear tractor wheel to avoid serious injury in case the vehicle moves.
- ◆ Drive Tractor Partially Clear of Trailer
 1. Drive tractor forward until fifth wheel comes out from under the trailer.
 2. Stop the tractor frame under trailer; this prevents the trailer from falling to ground if landing gear should sink or fail.
- ◆ Secure Tractor
 1. Apply parking brake and place transmission in neutral.
- ◆ Inspect Trailer Landing Gear
 1. Make sure ground is supporting the trailer and landing gear is not damaged.
- ◆ Pull Tractor Clear of Trailer
 1. Release parking brake.
 2. Check the area and drive tractor clear of trailer.

SPRING BRAKE CONTROL VALVES - SPRING BRAKE PRIORITY



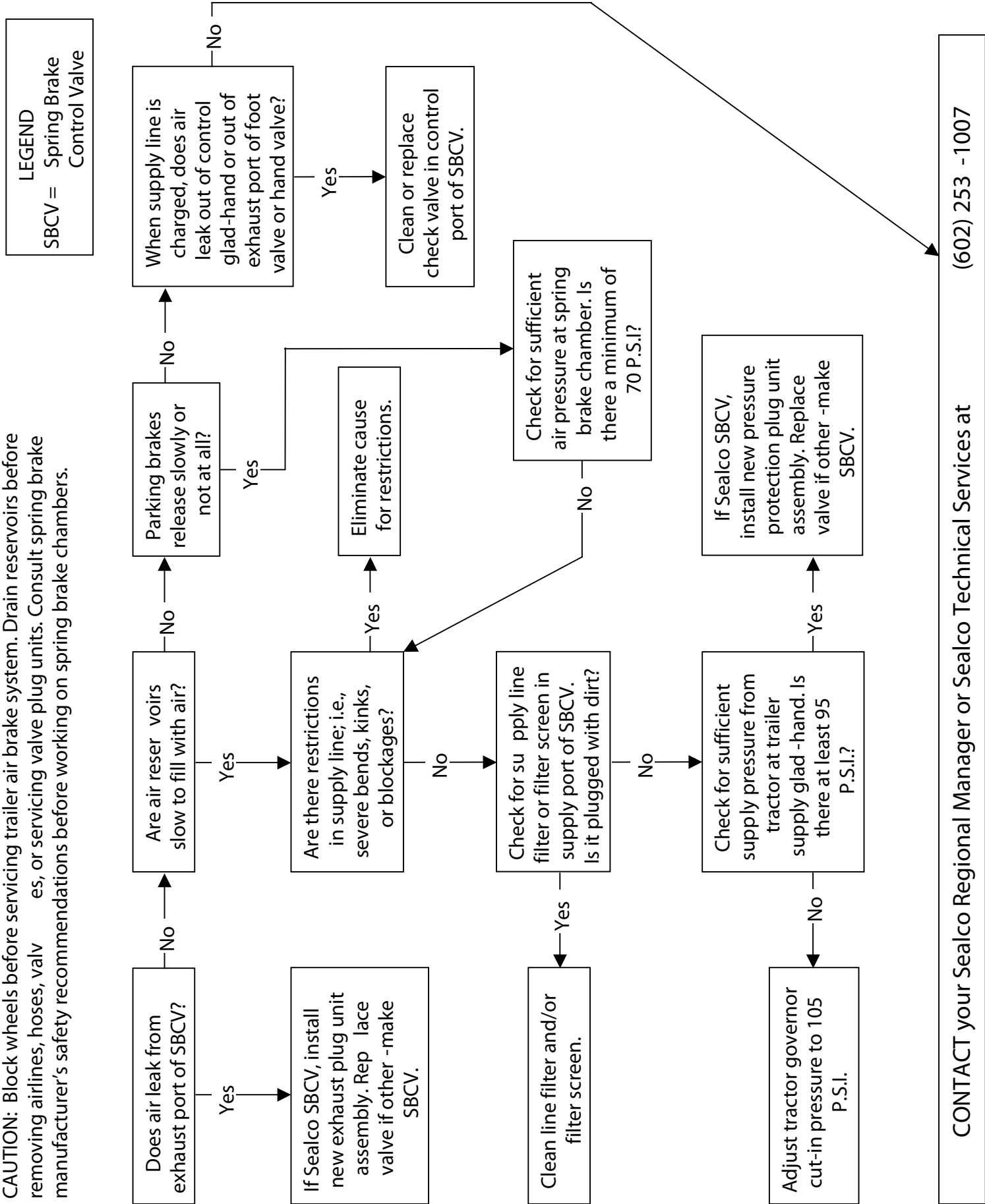
- ♦ The spring brake priority immediately provides supply air to release the spring brakes, the internal Pressure Protection Valve opens to also fill the reservoir at approximately 80 psi.
- ♦ Complies with all changes to FMVSS 121, Docket 90-3 Effective October 8, 1992.
- ♦ Designed for use with a single reservoir on a typical single or tandem axle trailer.
- ♦ May also be used with two 1,400 cubic inch (nominal) reservoirs on tandem axle trailers.
- ♦ **PLUG UNIT ASSEMBLY 1105815** for pressure protection.
- ♦ **PLUG UNIT ASSEMBLY 110520** for movable seat.
- ♦ **REPAIR KIT 110501**

For complete information view the Sealco website at www.sealcocvp.com

| Part Number | PORT SIZES (NPT) | | | | COMMENTS |
|-------------|------------------|---------|-----------|-------------|-------------------------------|
| | Supply | Control | Reservoir | Delivery(4) | |
| 110500 | 3/8" | 3/8" | 1/2" | 3/8" | None |
| 110505 | 3/8" | 3/8" | 1/2" | 3/8" | Delivery Back Ports B plugged |
| 110510 | 3/8" | 3/8" | 1/2" | 3/8" | Delivery Side Ports A plugged |

TROUBLESHOOTING GUIDE
Trailer Emergency / Supply For 121 System

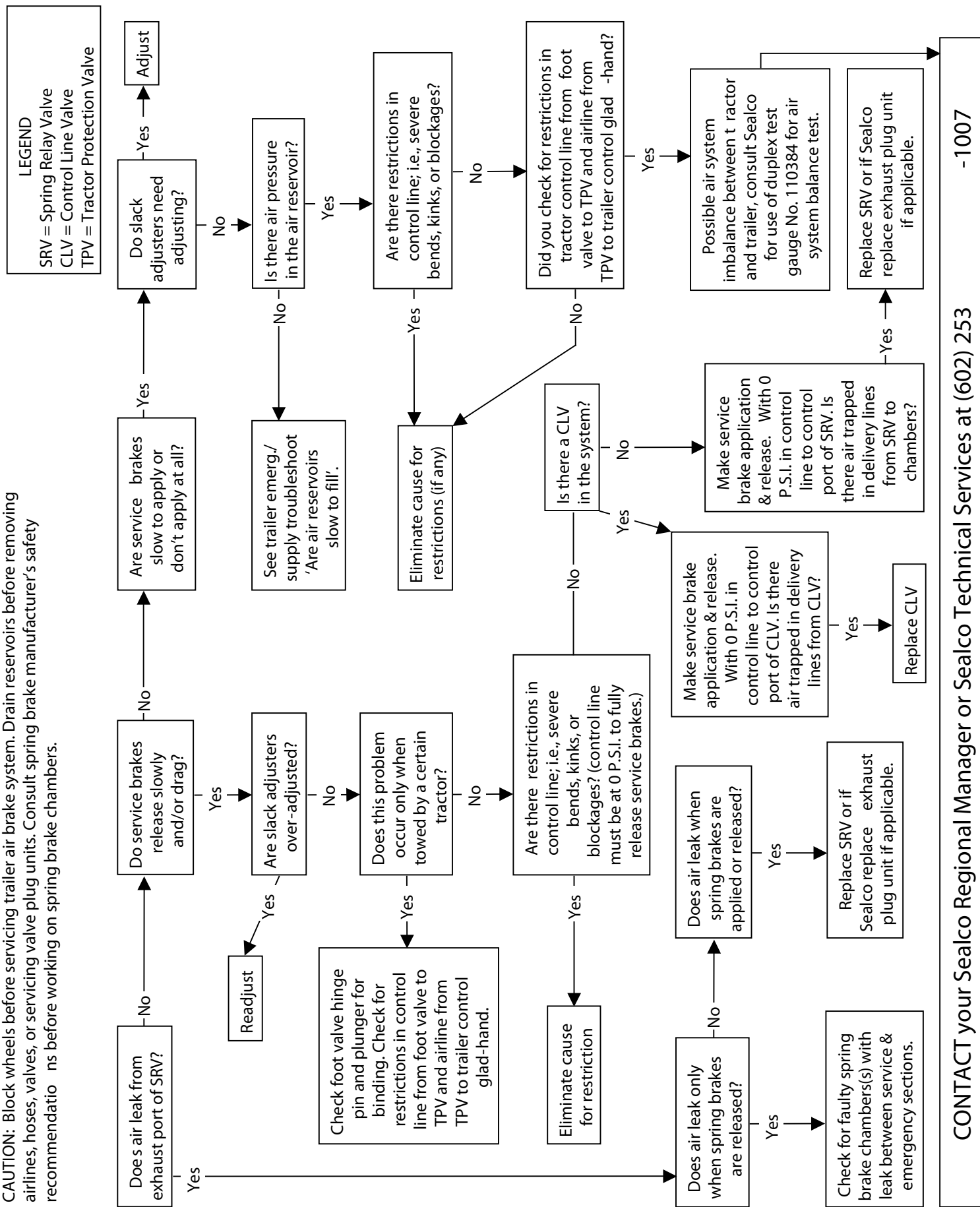
CAUTION: Block wheels before servicing trailer air brake system. Drain reservoirs before removing airlines, hoses, valves, or servicing valve plug units. Consult spring brake manufacturer's safety recommendations before working on spring brake chambers.



TROUBLESHOOTING GUIDE

Trailer Service / Supply For 121 System

CAUTION: Block wheels before servicing trailer air brake system. Drain reservoirs before removing airlines, hoses, valves, or servicing valve plug units. Consult spring brake manufacturer's safety recommendations before working on spring brake chambers.



HOW TO BRAKE WITH ABS

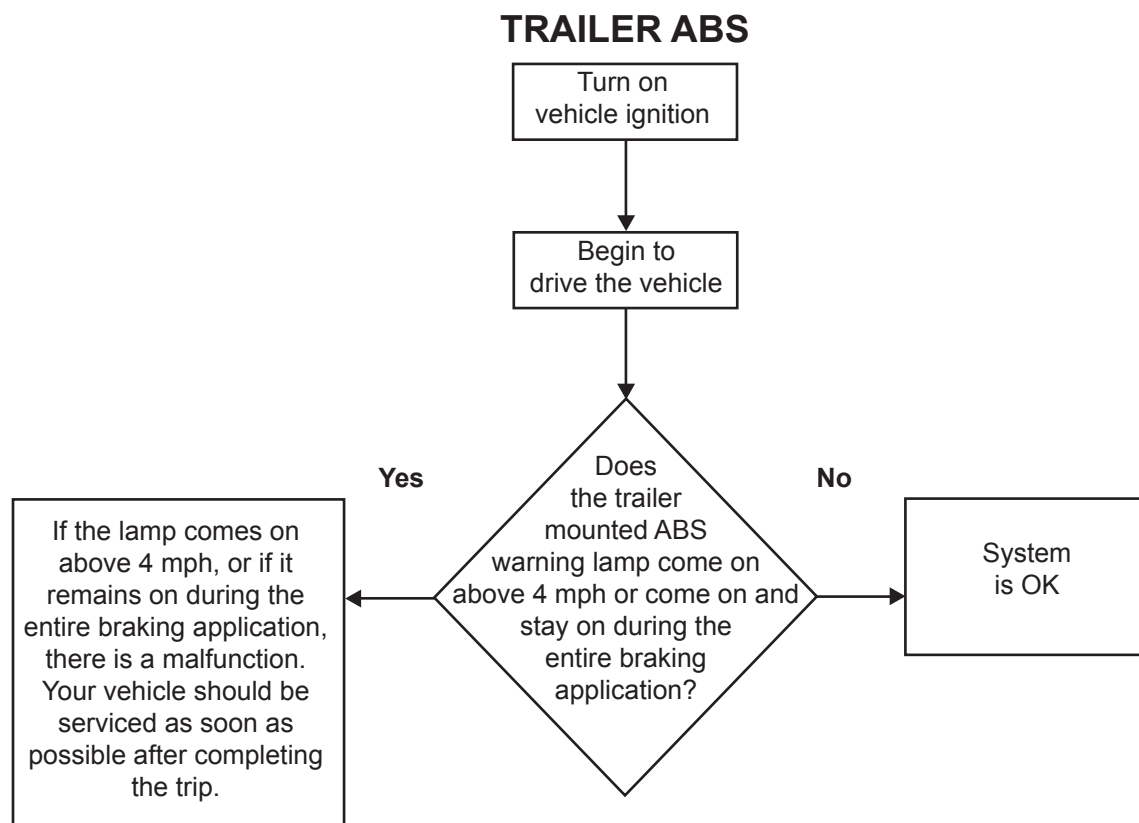
Do what good drivers have always been doing: brake just the way you always have.

Apply brakes as normal to stop in time. When your ABS starts working, don't release your brakes, maintain brake pressure.

- ♦ **If driving with a single trailer, doubles or triples...**
Watch your trailer(s) through your mirrors and correct brake pressure as necessary to keep in a straight line.
- ♦ **If only your tractor has ABS...**
Use your rig's brakes as necessary to straighten out your trailer if it swings out. Watch the trailer through your mirrors to make sure it follows your tractor properly.
- ♦ **If only your trailer has ABS...**
Use your rig's brakes as necessary to maintain control and keep your combination in its lane.

Avoid rapid "pumping" of the brakes. During a brake application that could result in a wheel lock. Meritor WABCO ABS automatically releases and applies the brake up to five times per second, obviously much faster than you could do pumping the brake pedal.

Always remember that *you are the most important* element in the safe operation of your vehicle. ABS is not an excuse to take unnecessary risks. Always drive carefully and stay a safe distance away from the vehicle in front of you.

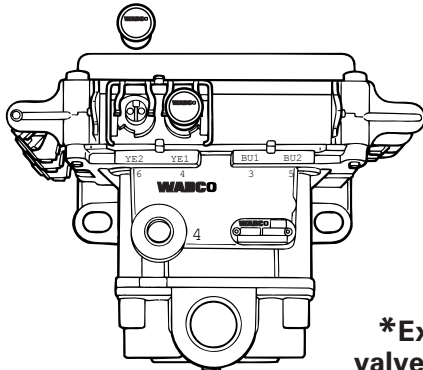


NOTE: Depending how the ABS is powered, the lamp may come on briefly at ignition and then go off, or briefly flash each time you apply the brakes on a moving vehicle.

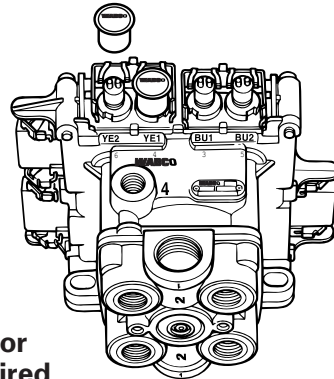
MERITOR WABCO

Easy-Stop™ and Enhanced Easy-Stop with PLC Trailer ABS Blink Code Diagnostic Guide

**Easy-Stop
2S/1M Basic**
ECU/Modulator Valve Assembly



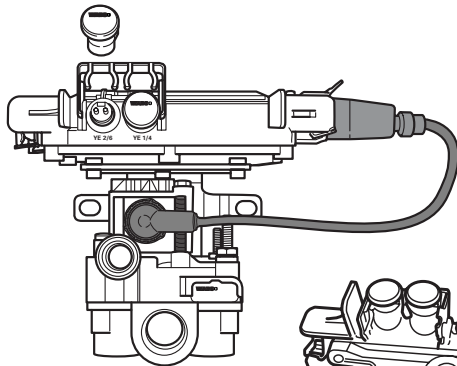
**Easy-Stop 2S/1M,
2S/2M*, 4S/2M*, 4S/3M* Basic**
ECU/Modulator Valve Assembly



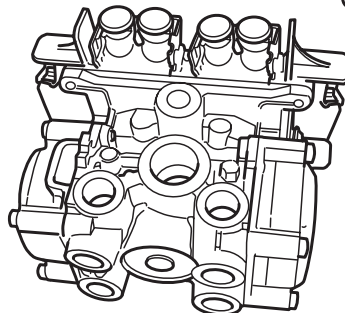
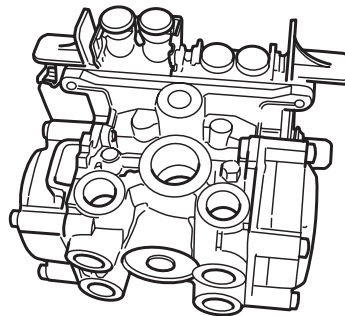
***External modulator
valve and cable required.**

Enhanced Easy-Stop with PLC

**2S/1M Basic ECU/Single
Modulator Valve Assembly**



**2S/2M Basic ECU/Dual
Modulator Valve Assembly**

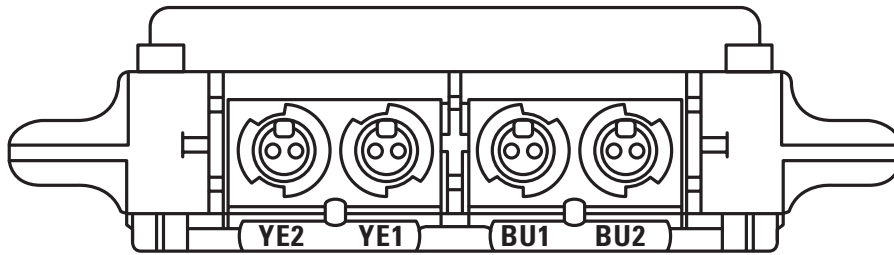


**2S/2M, 4S/2M,
4S/3M* Premium ECU/Dual
Modulator Valve Assembly**

***External modulator valve and cable required.**

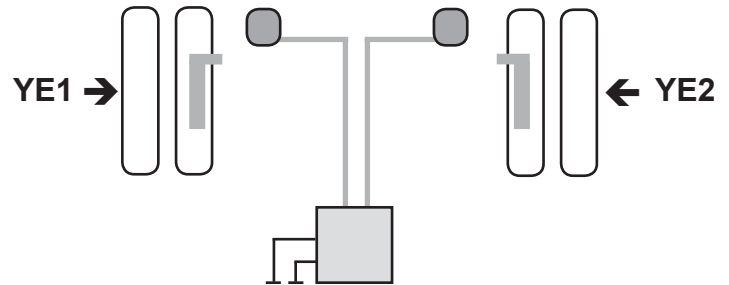
This publication covers all Enhanced Easy-Stop ECU/Valve Assemblies and Easy-Stop ECU/Valve Assemblies with serial numbers 3080002746 and higher. For Easy-Stop ECU/Valve Assemblies with serial numbers 3080002745 or lower, please call 1-800-535-5560 for assistance. Serial numbers are located on the bar-code label on the side of the ECU/Valve Assembly.

Typical Sensor Locations



EASY-STOP - 2S/1M

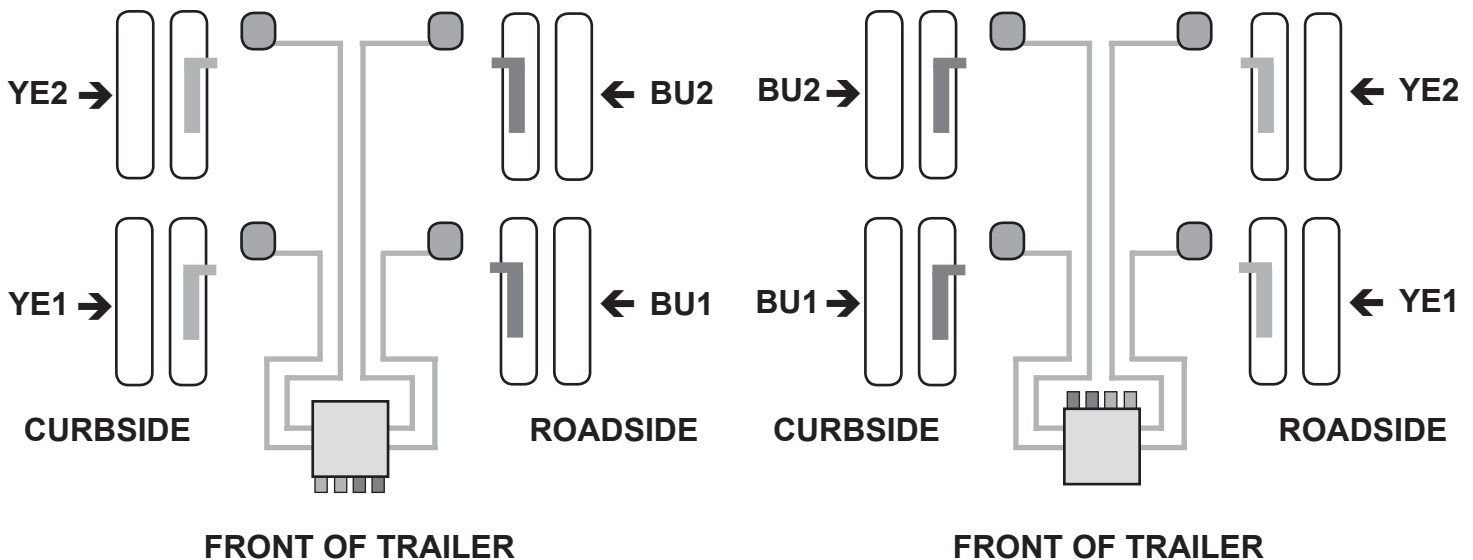
Most Easy-Stop ECUs have a blink code lamp on the top of the ECU. Some early version 2100 Basic ECUs do not have a blink code switch or remote diagnostic tool. Instead, power the ECU, the LED lamp on top of the ECU/Valve Assembly will repeatedly flash the blink code if there is a fault.



ENHANCED EASY-STOP - 4S/2M

ECU/VALVE ASSEMBLY MTD WITH SENSORS
FACING FRONT OF TRAILER

ECU/VALVE ASSEMBLY MTD WITH SENSORS
FACING REAR OF TRAILER



Enhanced Easy-Stop blink codes may be accessed by ignition circuit and counting flashes on the trailer ABS indicator lamp on the side of the trailer.

To access blink codes:

- ◆ Turn ignition ON for one second.
- ◆ Turn OFF for one second,
- ◆ Turn ignition ON and count the flashes on the ABS Lamp.

With Enhanced Easy-Stop, the blink code tool and the ABS Lamp on the trailer do not function simultaneously.

Easy-Stop Troubleshooting and Repair

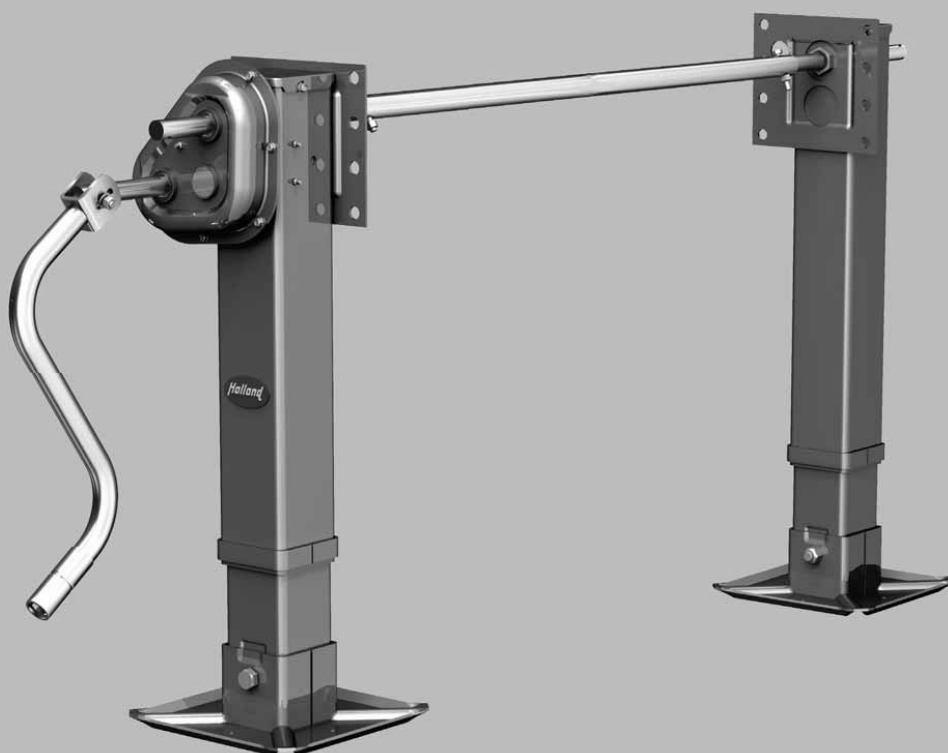
| BLINK CODE | CAUSE OF FAULT | ACTION REQUIRED |
|------------|---|--|
| 0 | No faults | System okay. No action required |
| 3 | Sensor BU1: Cable break, short circuit or out of adjustment. | Check sensor, sensor cable connection; adjust sensor; or check for excessive hub runout, a sensor gap that is too wide or damage to the tooth wheels. |
| 4 | Sensor YE1: Cable break, short circuit or out of adjustment. | Check sensor, sensor cable connection; adjust sensor; or check for excessive hub runout, a sensor gap that is too wide or damage to the tooth wheels. |
| 5 | Sensor BU2: Cable break, short circuit or out of adjustment. | Check sensor, sensor cable connection; adjust sensor; or check for excessive hub runout, a sensor gap that is too wide or damage to the tooth wheels. |
| 6 | Sensor YE2: Cable break, short circuit or out of adjustment. | Check sensor, sensor cable connection; adjust sensor; or check for excessive hub runout, a sensor gap that is too wide or damage to the tooth wheels. |
| 7 | Ext. Modulator (RD): Short to power, cable break or open, short to ground or cable damaged, or ECU/Valve Assembly failure. | Check ABS valve and cable. Replace as required. |
| 9 | Easy-Stop: External Modulator (BU) Enhanced Easy-Stop: Internal Modulator Failure, Inlet Valve #2: Short to power, cable break or open, short to ground or cable damaged, or ECU/Valve Assembly Failure. | Easy-Stop: Check ABS valve and cable. Replace as required. Enhanced Easy-Stop: Verify proper installation. If code continues, contact Meritor WABCO for assistance. |
| 10 | Easy-Stop: ECU/Valve Assembly Modulator (YE) Enhanced Easy-Stop: Internal Modulator Failure, Inlet Valve #2: Short to power, cable break or open, short to ground or cable damaged, or ECU/Valve Assembly Failure. | Easy-Stop: Check ABS valve and cable. Replace as required. Enhanced Easy-Stop: Verify proper installation. If code continues, contact Meritor WABCO for assistance. |
| 11 | Internal Modulator Failure, Outlet Valve. Enhanced Easy-Stop Only. | Verify proper installation. If code continues, contact Meritor WABCO as assistance. |
| 14 | Power Supply: Over or under voltage, current low, or internal failure. | Repair vehicle power supply, check vehicle voltage output and connector; check ECU's configuration. |
| 15 | ECU – Internal Failure Internal failure. | Internal failure, contact Meritor WABCO. |
| 16 | SAE J 1708 Failure | Internal failure, contact Meritor WABCO. |
| 17 | Generic SAE J 2497 Failure | Internal failure, contact Meritor WABCO. |
| 18 | Generic I/O Failure | Verify proper electrical installation. Check power supply. Make necessary corrections. |

Note: (Easy-Stop only) If the blink code indicates there are no faults, but the trailer ABS indicator lamp continues to come on and stay on when you apply the brakes to the moving vehicle, there is an intermittent fault that must be repaired. Refer to Maintenance Manual 33, *Expert Mode Diagnostics*.

For further information on blink code diagnostics, refer to Maintenance Manual 33 (Easy-Stop),
Maintenance Manual No. 0180 (Enhanced Easy-Stop) or call:
Meritor WABCO at **800-535-5560**.

Installation, Operation and Maintenance Manual

Atlas 55, Atlas 65 and Atlas iM



1. Safety Instructions

General and Servicing Safety Instructions

- Read and observe all Warning and Caution hazard alert messages. The alerts provide information that can help prevent serious personal injury, damage to components, or both.

⚠ WARNING Failure to follow the instructions and safety precautions in this manual could result in improper servicing or operation leading to component failure which, if not avoided, could result in death or serious injury.

- All maintenance should be performed by a properly trained technician using proper/special tools, and safe procedures.

NOTE: In the United States, workshop safety requirements are defined by federal and/or state Occupational Safety and Health Act (OSHA). Equivalent laws may exist in other countries. This manual is written based on the assumption that OSHA or other applicable employee safety regulations are followed by the location where work is performed.

IMPORTANT: Verify before installation that the landing gear selected will withstand the load and have the correct travel/extension requirements for the trailer.

- DO NOT operate the landing gear if it is cracked, bent, or any other damage is present. Using damaged landing gear could result in death or serious injury.

⚠ WARNING Failure to check condition of landing gear prior to operating could result in unexpected performance which, if not avoided, could result in death or serious injury.

⚠ WARNING Using damaged landing gear could result in unexpected performance which, if not avoided, could result in death or serious injury.

- Properly support and secure the vehicle from unexpected movement when servicing the landing gear.

NOTE: If possible, unload the trailer before performing any service procedures.

⚠ WARNING Failure to secure the trailer from rolling, when operating the landing gear, could result in death, serious injury or property damage.

⚠ WARNING Failure to properly support and secure the trailer during installation of landing gear could create a crush hazard which, if not avoided, could result in death or serious injury.

- DO NOT walk/crawl underneath a trailer during coupling/uncoupling or while it is supported by the landing gear/kingpin stand.

- If possible, unload the trailer before performing any maintenance or service procedures.

⚠ WARNING Failure to keep clear from underneath the trailer could create a crush hazard which, if not avoided, could result in death or serious injury.

7. Landing Gear Operation

7.1 Pre-Operation Inspection

The landing gear should be visually inspected prior to use. Make sure the legs are square to the trailer on both sides. Visually check for damaged, loose or broken components. Repair or replace the damaged landing gear.

⚠ WARNING

Failure to check the condition of the landing gear prior to operating could result in use of damaged product which, if not avoided, could result in death or serious injury.

7.2 Landing Gear Orientation

Determine if the landing gear is an outside (conventional) or an inside (reverse) mount before operation. The mount determines how the landing gear operates.

Landing gear with an outside mount (**Figure 16**):

- Push the crank handle in for high speed.
- Pull the crank handle out for low speed.
- Turn the crank clockwise to retract the leg.
- Turn the crank counter-clockwise to extend the leg.

Landing gear with an inside mount (**Figure 17**):

- Push the crank handle in for low speed.
- Pull the crank handle out for high speed.
- Turn the crank clockwise to extend the leg.
- Turn the crank counter-clockwise to retract the leg.

Figure 16

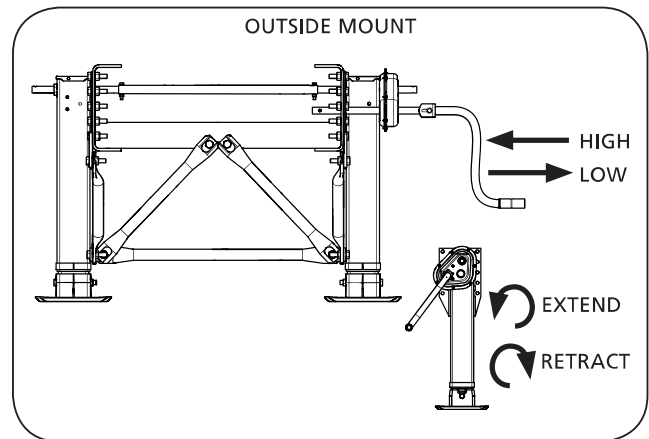
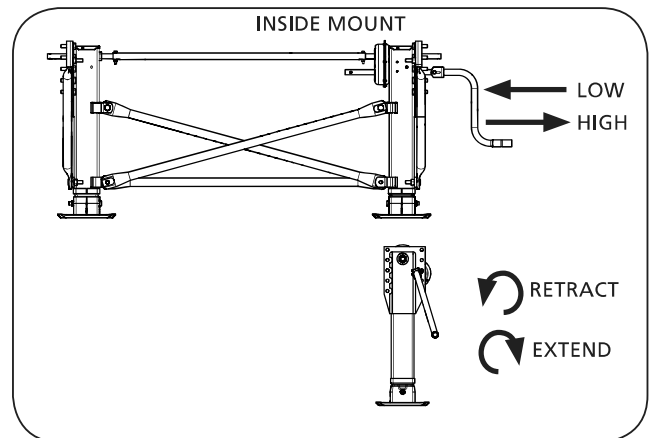


Figure 17



7.3 Landing Gear Operation During Coupling

CAUTION

Failure to perform procedures in a lighted area that is clear of obstacles and personnel could lead to a hazardous situation which, if not avoided, could result in minor or moderate injury.

NOTE: For specific coupling instructions relating to the fifth wheel, tractor, and trailer, refer to the respective manufacturer's instructions.

1. Make sure the coupling area is flat, level and clear of persons and obstacles.
2. Prepare the fifth wheel, tractor and trailer for coupling per the manufacturer's instructions.
3. Back up to the trailer per the fifth wheel, tractor, and trailer manufacturer's instructions, centering the kingpin with the throat of the fifth wheel as illustrated (**Figure 18**).

IMPORTANT: DO NOT attempt to couple until steps 4-6 are completed.

IMPORTANT: DO NOT couple the tractor and trailer at an angle.

CAUTION

Failure to align the tractor and the trailer properly could result in damage to the landing gear.

4. Engage the tractor parking brake, and chock the trailer wheels. Connect the brake lines and the electrical connections. Support the slack in the line to prevent interference.
5. Make sure that the landing gear is in low gear and engage the crank handle (**Figure 19**).

CAUTION

Failure to lift and lower the trailer in LOW GEAR could result in damage to the landing gear.

6. With two hands on the crank handle, adjust the trailer height according to the fifth wheel, tractor, and trailer manufacturer's recommendations.

WARNING

Failure to maintain two hand control of the handle and release SLOWLY could cause spring back, which, if not avoided, could result in death or serious injury.

7. Release the tractor parking brake. Couple and verify that the fifth wheel jaws are locked per the fifth wheel manufacturer's recommendations.
8. Engage the tractor parking brake. While still in low gear, retract the landing gear until the pads just come off the ground (**Figure 20**).

Figure 18

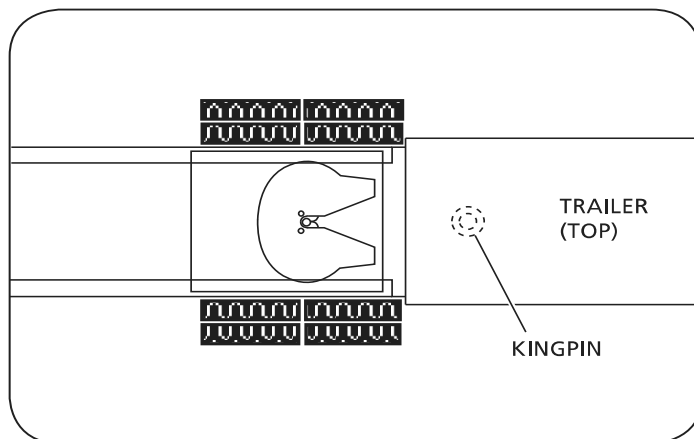


Figure 19

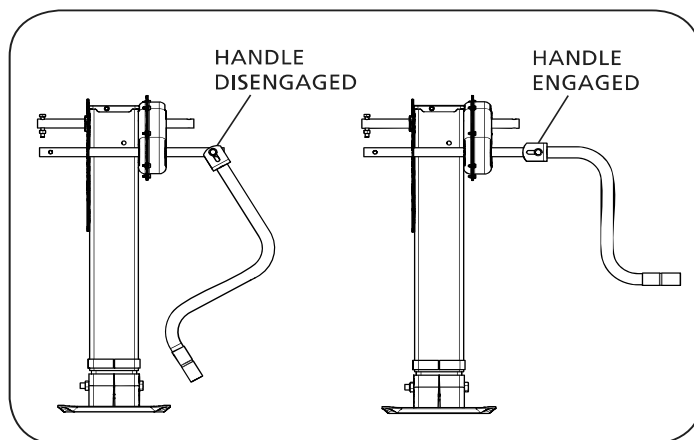
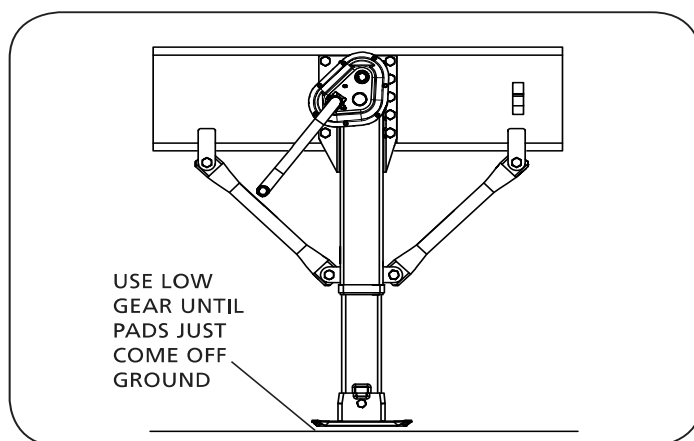


Figure 20



9. Release the tractor parking brake. Re-verify that the fifth wheel jaws are locked per the fifth wheel manufacturer's recommendations. Reapply the tractor parking brake.
10. Shift the landing gear into high gear and fully retract. Shift the landing gear into low gear and secure the crank handle (**Figure 21**).

CAUTION

Failure to retract the landing gear fully before moving the trailer could result in property damage.

CAUTION

Failure to secure the crank handle when NOT in use could allow unplanned landing gear extension which, if not avoided, could result in property damage.

11. Complete all pre-trip inspection and operation procedures.

7.4 Landing Gear Operation During Uncoupling

NOTE: For specific uncoupling instructions relating to the fifth wheel, tractor, and trailer, refer to the respective manufacturer's instructions.

1. Position the tractor and the trailer on a well lit, level surface, clear of persons and obstacles. Verify that the surface beneath the landing gear is capable of supporting the trailer weight. Also ensure that the tractor and trailer are in line with each other.

NOTE: If necessary, place landing gear pads on a support plank to prevent the landing gear from sinking into the supportive surface. (This is especially important with liquid cargo, where a shift in the contents could overturn the trailer).

CAUTION

Failure to align the tractor and trailer properly could result in damage to the landing gear.

WARNING

Failure to rest the landing gear pads on a hard, flat surface, could result in trailer tip-over which, if not avoided, could result in death or serious injury.

2. Engage the trailer brakes. Slowly back tractor tightly against the trailer. Set the tractor brakes, and chock the trailer wheels.
3. Engage the landing gear crank handle and shift to high gear (**Figure 22**).

Figure 21

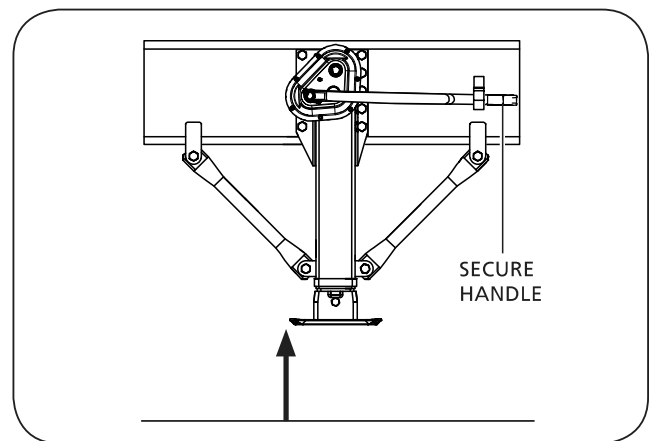
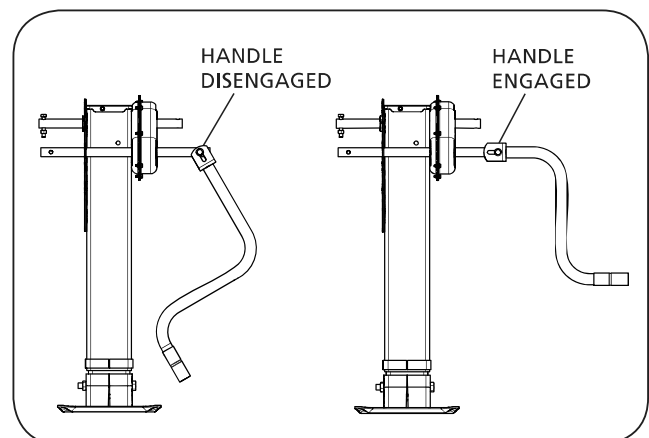


Figure 22



4. Extend the landing gear until the pads just touch the ground (**Figure 23**).

CAUTION

Failure to operate the landing gear within the maximum extension or retraction including repeated winding to its physical stops could, if not avoided, cause damage to the landing gear.

⚠ WARNING

Failure to maintain two hand control of the handle and release **SLOWLY** could cause spring back which, if not avoided, could result in death or serious injury.

5. Shift the landing gear into low gear and secure the crank handle in the crank hanger (**Figure 24**).

CAUTION

Failure to secure the crank handle when **NOT** in use could, allow unplanned landing gear operation which, if not avoided, could result in property damage.

6. Per the manufacturer's instructions, release the fifth wheel, disconnect the air lines and the electrical cord. Release the tractor brakes. Slowly drive away from the trailer until the fifth wheel disengages from the kingpin but remains under the trailer.
7. Engage the tractor parking brake. Get out and inspect the landing gear and the support surface for proper trailer support.

⚠ WARNING

Failure to properly support the trailer could result in trailer instability which, if not avoided, could result in death, serious injury or property damage.

8. Complete the uncoupling procedures per the fifth wheel, tractor, and trailer manufacturer's recommendations.

Figure 23

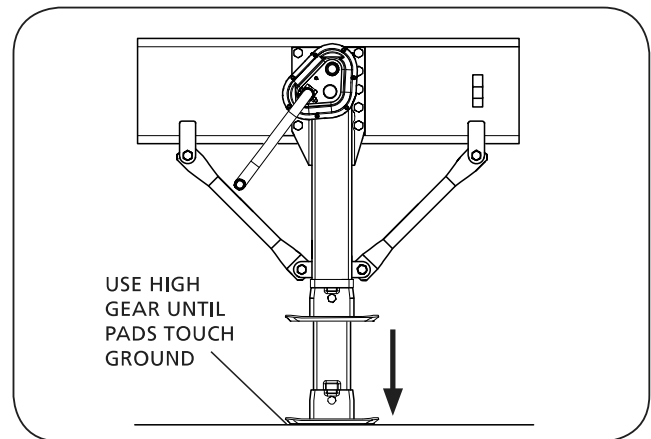
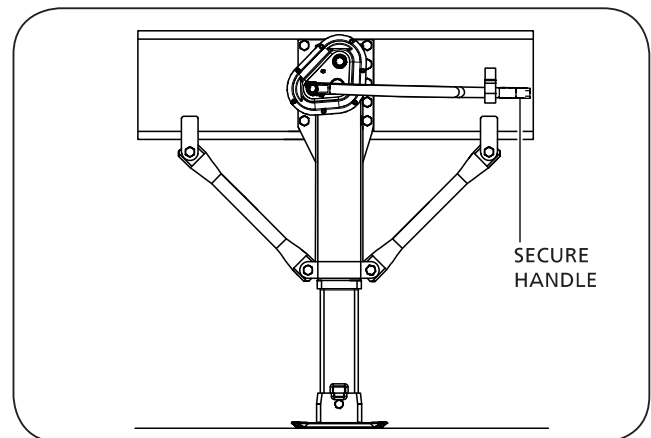


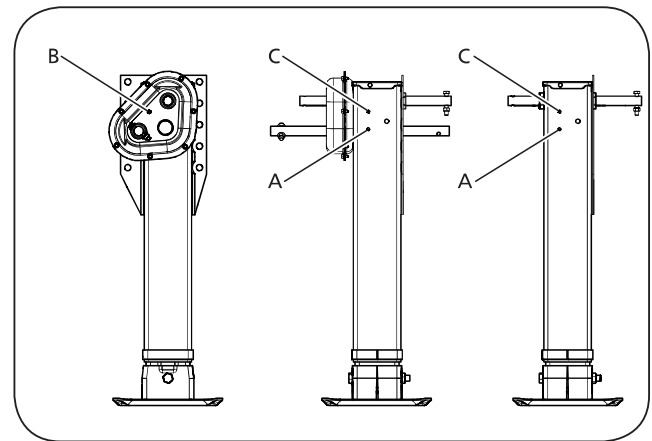
Figure 24



8. Routine Service and Inspection

Table 1

| Procedure | Interval | Notes |
|-------------------------|--|---|
| Landing Gear Inspection | Every use | Replacement/repair required if components visibly damaged, loose, or broken. |
| Lubrication | Every six (6) months *Unless No Lube™ option selected. | More frequently in excessively moist and dusty conditions, as well as if not used for extended periods of time. |
| Cleaning | With the vehicle | |
| Hardware Inspection | Every 6 months | |
| Landing Gear Alignment | Every 6 months | Inspection required if landing gear are visibly bent or damaged. |

Figure 25


8.1 Landing Gear Inspection (Before Use)

Before use, inspect the landing gear for cracks, bent components, or damaged/missing hardware, and any noticeable defects. The landing gear must be repaired prior to operation to avoid damage and possible injury.

⚠ WARNING Failure to check the condition of landing gear prior to operating could result in use of damaged product which, if not avoided, could result in death or serious injury.

8.2 Lubrication

The landing gear requires lubrication whether it is used frequently or sits idle for extended periods of time. If left idle and un-greased, hard cranking could result. Use high quality grease for normal applications. For low temperature applications, use low temperature grease. Follow these steps to maintain expected performance (**Figure 25**):

CAUTION Failure to properly lubricate the landing gear when required could result in damage to the landing gear.

1. Place the trailer on level ground, chock the tires, and support the trailer independently of the landing gear.
2. Fully retract the landing gear, then using high gear, extend the leg 2-3 turns and lubricate the lift-screw assembly through grease fitting "A". Apply 1/2 lb. of grease.
3. Lubricate the gearbox, using grease fitting "B". Apply 1/4 lb. of grease.
4. Lubricate the bevel gear, using grease fitting "C". Apply 1/4 lb. of grease.
5. Distribute the lubrication by fully extending and retracting the leg several times.

8.3 Cleaning

No special cleaning of the landing gear is required; however, the landing gear should be cleaned with the rest of the vehicle.

NOTE: DO NOT directly aim water at the landing gear shafts and bushings or up into the retract assembly. Water infiltration into the gearbox and housing may cause corrosion.

CAUTION

Failure to prevent water infiltration into the shafts, bushings and retract assembly, could result in damage to the landing gear.

8.4 Hardware Inspection

Perform the following procedures to ensure the landing gear is in proper working order:

1. Tighten or replace the mounting bolts as necessary.
2. Inspect the mounting bracket for cracks or other signs of damage.
3. Repair or replace any broken or damaged part of the landing gear assembly or mounting structure.

WARNING

Failure to repair or replace damaged landing gear components can result in unsafe product conditions which, if not avoided, could result in death or serious injury.

4. Inspect the crank handle bolt and the lock nut. Tighten or replace as necessary.
5. Inspect the crank handle. If the handle connecting tabs, tube or grip are bent or damaged, replace the handle.
6. Cross shaft connection bolts and lock nuts should be secure, but allow side-to-side play in the cross shaft.
7. Inspect the footware for damage and replace if the components are bent or cracked. If removable footware is present, ensure all mounting bolts and fasteners are tightened and footware is secure.
8. Check for proper shift shaft engagement in both high and low gear and proper shifting between gears. Rebuild if necessary.

NOTE: The crank shaft should translate approximately 5/8" between high and low gear.

9. Rebuild or replace the landing gear with excessive play in the shafts and bushings.

8.5 Landing Gear Alignment

Check to make sure the landing gear legs are in alignment with the trailer and parallel with each other using a square (**Figure 26**). Bent or damaged legs are an indication of possible damage to the lift screw, lift nut or other internal components and should be replaced.

NOTE: Atlas 55, 65 and iM landing gear utilize a floating nut retract tube design. A retract tube that appears to be angled slightly compared to the upper housing DOES NOT constitute a damaged leg (**Figure 27**). However, if the landing gear housing shows signs of fracture or cracking around the band area, the landing gear must be replaced.

Figure 26

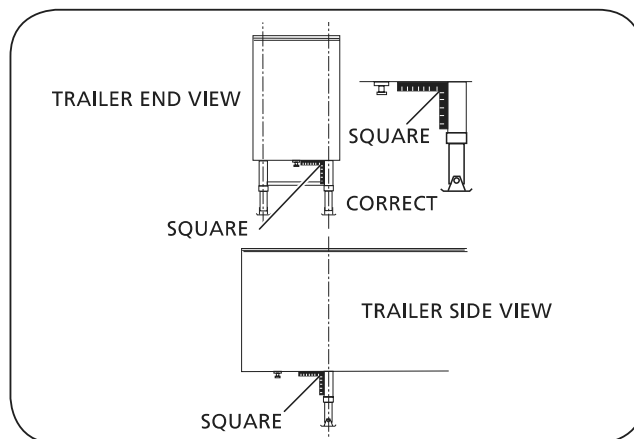
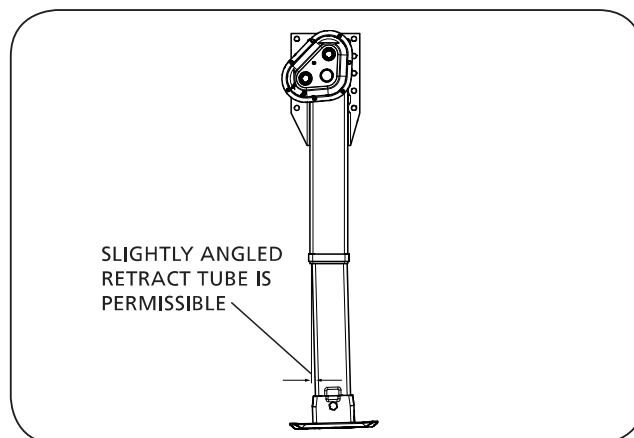


Figure 27



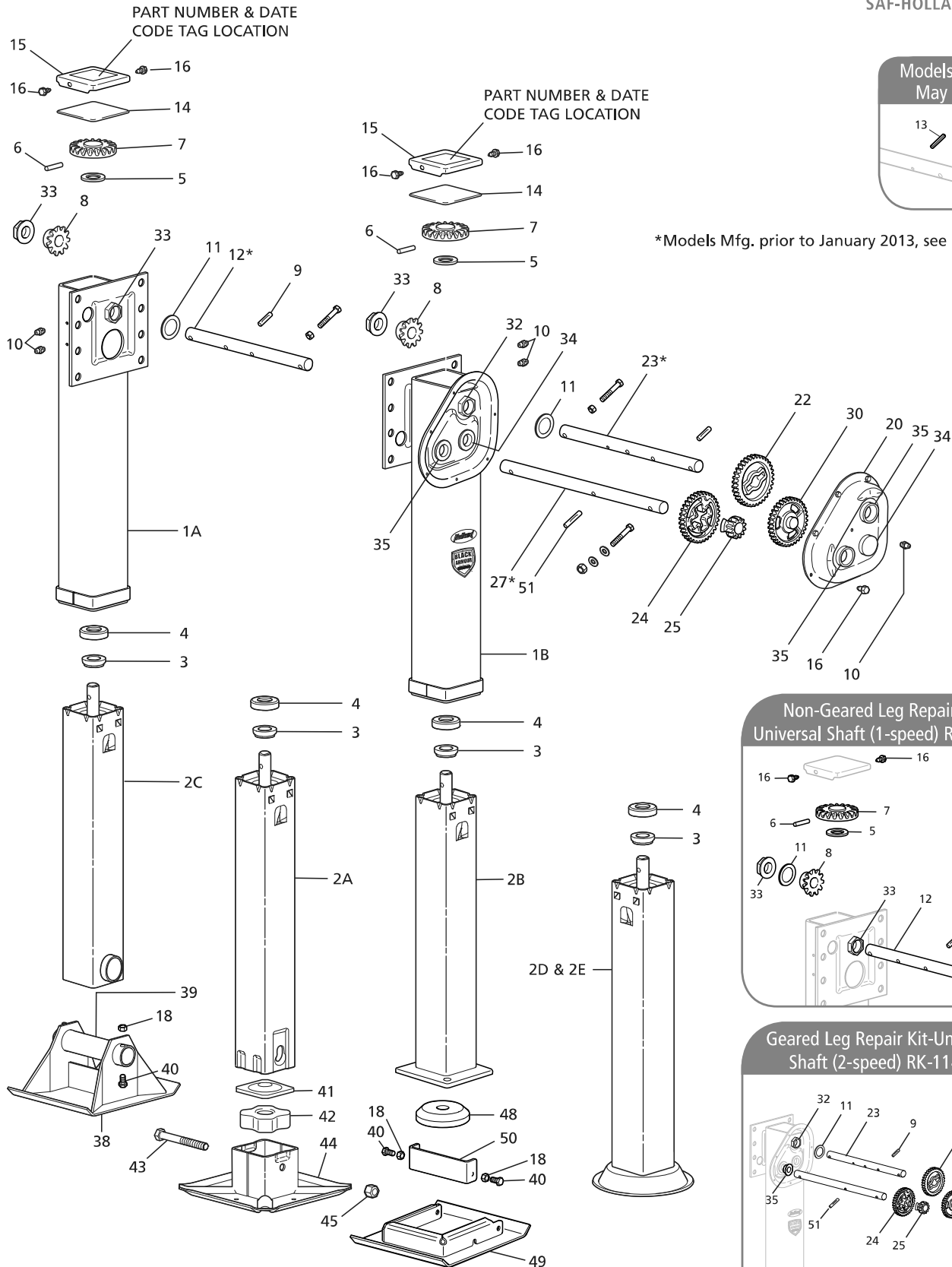
9. Troubleshooting

| PROBLEM | POSSIBLE CAUSE | RESOLUTION |
|---|---|--|
| Hard to Crank Landing Gear | Turning the crank in the wrong direction | Refer to "Landing Gear Operation" for proper crank rotation. |
| | Attempting to raise or lower trailer in high gear. | Shift into low gear. DO NOT ATTEMPT TO LIFT OR LOWER IN HIGH GEAR. Doing so could result in damage to the landing gear. |
| | Cross shaft binding. | Inspect cross shaft bolts. Back off bolts to allow lateral (side to side) movement of the cross shaft. Straighten or shorten cross shaft to eliminate binding. |
| | Misaligned landing gear legs. | Legs MUST be parallel and extend and retract evenly. Remove cross driveshaft and adjust landing gear legs to same height. |
| | Lack of grease. | Grease landing gear legs as provided in the "Lubrication" section. |
| | Damaged lift screw or nut. | Check landing gear for signs of impact (accident) damage. Disconnect cross shaft and crank legs individually to determine which leg is damaged. Replace entire retract assembly or damaged leg. |
| | Interference between powder metal bushing or jackshaft of gearbox and trailer mounting surface. | Trailer mounting surface may need to be modified to ensure no interference between bushing or jackshaft and trailer surface. |
| | Upper housing or retract tube may be bent. | Replace damaged part(s) or landing gear. |
| | Excessive wear or damage to pinion, bevel, input, idler and/or output gears. | Replace damaged gears. |
| | Bearing boss is pushed inside housing. | Replace jackshaft and O-ring with jackshaft repair kit designed for landing gear models sold after January 2013. |
| | Weld blow through where strut bracket is welded to housing. | Grind weld as required and re-weld. (With no-load on landing gear, the retract tube should have free play inside the housing.) |
| Hard to crank landing gear under load only. | Damaged collar. | Replace the collar |
| | Damaged thrust bearing. | Replace the thrust bearing. |
| Crankshaft jams or skips while turning. | Inner leg screw damaged. | Examine the lift nut and screw of the inner leg assembly for impact (accident) damage. Replace components or leg as necessary. |
| | Worn, broken, or damaged gears (missing teeth). | Examine pinion, bevel pinion and all gearbox gears for missing teeth or other signs of damage or wear. Replace components as necessary. |
| Landing gear will NOT shift between gears. | Low input gear is frozen or binding on the shift shaft. | Follow procedures in the Troubleshooting Guide XL-LG11424TS-en-US to restore easy shifting. |
| Gearbox leg operates but opposite leg DOES NOT. | Broken/damaged cross driveshaft bolt. | Replace cross driveshaft bolt. |
| | Broken/damaged cross driveshaft. | Replace cross driveshaft. |
| | Bevel gear pin/pinion gear pin sheared in non-gearbox leg. | Remove upper leg cover. Check for damaged or missing pins under bevel gear, or in pinion gear and replace as necessary. |
| | Bevel gear/pinion gear damaged in non-gearbox leg. | Remove upper leg cover. Check for damaged gears and replace as necessary. |
| Non-gearbox leg operates, but gearbox leg DOES NOT. | Bevel gear pin/pinion gear pin sheared in gearbox leg. | Remove upper leg cover. Check for damaged or missing pins under bevel gear, or in pinion gear and replace as necessary. |
| | Bevel gear/pinion gear damaged in gearbox leg. | Remove upper leg cover. Check for damaged gears and replace as necessary. |
| Both legs will NOT operate, shift shaft will turn but output shaft DOES NOT turn. | Damaged input, idler, and/or output gear. | Remove gearbox cover. Inspect and replace broken gears. |
| | Gear pin(s) sheared in gearbox. | Remove gearbox cover. Inspect and replace broken pins. |
| Both legs will NOT operate, but shift shaft and output shaft turn. | Bevel gear pin/pinion gear pin sheared in both legs. | Remove upper leg covers. Check for damaged or missing pins under bevel gear, or in pinion gear and replace as necessary. |
| | Bevel gear/pinion gear damaged in both legs. | Remove upper leg covers. Check for damaged gears and replace as necessary. |
| Legs locked and will NOT turn | Bent retracting screw or damaged riser nut and screw. | Check landing gear for signs of impact (accident) damage. Disconnect cross shaft and attempt to crank legs individually to determine which leg is damaged. Replace entire retract assembly or damaged leg. |

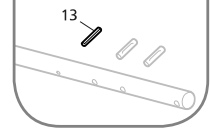
ATLAS 55 Standard - Exploded View



SAF-HOLLAND Group

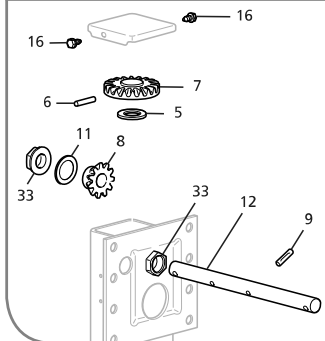


Models before
May 2011

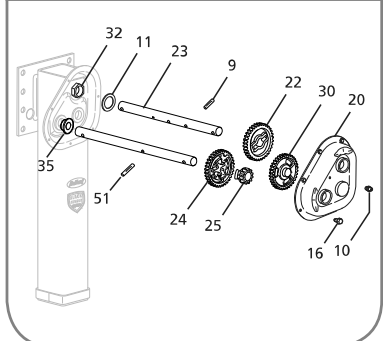


*Models Mfg. prior to January 2013, see page 1-17.

Non-Geared Leg Repair Kit-
Universal Shaft (1-speed) RK-11442



Geared Leg Repair Kit-Universal
Shaft (2-speed) RK-11443





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ATLAS 55 Standard - Parts List

| NO. | DESCRIPTION | RETRACT TUBE CODE | TRAVEL | | | | | |
|-----|----------------------------------|----------------------|-----------|-----------|-----------|-----------|-----------|-----------|
| | | | 13.50" | 15.50" | 17" | 17" CAN. | 17" MRL | 19" |
| 2A | Retract Tube - RCF | 0 or 5 (MRL) | LG3053-01 | LG3053-02 | LG3053-04 | N/A | LG3053-03 | LG3053-05 |
| 2B | Retract Tube - Low Profile RCF | 0 | LG3097-01 | LG3097-02 | LG3097-03 | N/A | N/A | NA |
| 2C | Retract Tube - Axle | 0 | LG3012-01 | LG3012-02 | LG3012-03 | N/A | N/A | LG3012-04 |
| 2D | Retract Tube - Shockfoot 10" DIA | 0,6 (CAN) or B | LG3061-02 | LG3061-03 | LG3061-04 | LG3061-07 | LG3061-10 | LG3061-13 |
| 2E | Retract Tube - Shockfoot 12" DIA | 0,6 (CAN) or B | LG3061-01 | N/A | LG3061-05 | LG3061-08 | LG3061-11 | LG3061-14 |

| NO. | DESCRIPTION | PART NO. | SPEED | |
|-----|---|----------------|-------|-----|
| | | | ONE | TWO |
| 1A | Upper Housing LH | N/A | - | - |
| 1B | Upper Housing RH | N/A | - | - |
| 3 | Collar | XB-LG0544 | 1 | 1 |
| 4 | Thrust Bearing | XB-BRG-013-77 | 1 | 1 |
| 5 | Washer - FL 2" OD x 1.19" ID x .13" THK | XB-PW-016-62 | 1 | 1 |
| 6 | Pin - DIA .38" x 2" | XA-CRP-V-06635 | 1 | 2 |
| 7 | Bevel Gear | LG2884 | 1 | 1 |
| 8 | Pinion Gear | LG1823-02 | 1 | 1 |
| 9 | Groove Pin - DIA .38" x 1.50" | XB-GP-014-18 | 1 | 1 |
| 10 | Ftg - Grease .25"-28 Self Tapping | XB-GRF-022-16 | 2 | 3 |
| 11 | O-Ring, #319 | 2024100000100 | 1 | 1 |
| 12 | Jack Shaft LH - Universal Mount | LG2964-01 | 1 | - |
| | - I-Beam Mount, 6.50" | LG2964-04 | 1 | - |
| | - I-Beam Mount, 10.00" | LG2964-05 | 1 | - |
| | - Conventional Mount | LG2964-02 | 1 | - |
| | - Reverse Mount | LG2964-03 | 1 | - |
| 13 | Pin - Spring DIA .25" x 1.5" (Not Required) | N/A | - | - |
| 15 | Top Cover | 2111100004080 | 1 | 1 |
| 16 | Self-Tapping Screw .25"-20 x .5" Lg | XB-STS-008-11 | 2 | 9 |
| 17 | Screw, Hex Cap .38"-16 x 2.25" Lg GR5 | XB-HHC-050-42 | 1 | 2 |
| 18 | Self-Locking Nut .38"-16 - Sandshoe | XB-SLN-012-04 | 2 | 3 |
| | - Low Profile RCF | XB-SLN-012-04 | 3 | 4 |
| | - RCF | | 1 | 2 |
| 19 | Washer .38" Std Type A | XB-PW-016-03 | - | 2 |
| 20 | Gearbox Half, Outside w/Hole for Grease Fitting | LG2996 | - | 1 |
| 22 | Output Gear | LG2980 | - | 1 |
| 23 | Jackshaft RH - Universal Mount | LG2963-01 | - | 1 |
| | - I-Beam Mount, 6.50" | LG2963-04 | - | 1 |
| | - I-Beam Mount, 10.00" | LG2963-05 | - | 1 |
| | - Conventional Mount | LG2963-02 | - | 1 |
| | - Reverse Mount | LG2963-03 | - | 1 |
| 24 | Gear, Drive, High Speed - Machined | 2040100000060 | - | 1 |
| 25 | Gear, Drive, Low Speed - Machined | 2040100000050 | - | 1 |
| 26 | Groove Pin, Type E DIA .38" x 2.00" Lg | XB-GP-052-21 | - | 1 |
| 27 | Shift Shaft - Universal | 2111100003400 | - | 1 |
| | - I-Beam & Conventional | 2111100003410 | - | 1 |
| | - Reverse | 2111100003420 | - | 1 |
| 30 | Idler Gear | LG2975 | - | 1 |
| 32 | Boss, Hex Lock - Oversized | 2022100000180 | - | 1 |
| 33 | Hex Lock Boss - Sealed | LG2926-10 | 2 | 1 |
| 34 | Idler Shaft Bushing (Included in Item #23) | LG3005 | - | 2 |
| 35 | Boss Bearing - Sealed (Included in Item #20) | LG0659-10 | - | 3 |

| NO. | DESCRIPTION | PART NO. | SPEED | |
|-----|--|---------------|-------|-----|
| | | | ONE | TWO |
| 38 | Sandshoe - 10" x 10" x 4.50" | 50616001 | 1 | 1 |
| | - 10" x 12" x 4.50" | 50616000 | 1 | 1 |
| | - 10" x 10" x 2.00" | 50616008 | 1 | 1 |
| | - 10" x 12" x 2.00" | 50616007 | 1 | 1 |
| 39 | Sandshoe Axle - Hollow Axle 8.50" Lg | LG0070-02 | 1 | 1 |
| 40 | Screw, Hex Cap .38"-16 x .75" Lg GR5 - Sandshoe | XB-HHC-050-69 | 1 | 1 |
| | Screw, Hex Cap .38"-16 x .75" Lg GR5 - Low Profile RCF | XB-HHC-050-69 | 2 | 2 |
| 41 | Cushion Foot Plate | LG0725 | 1 | 1 |
| 42 | Cushion Foot Rubber | XB-LG0726 | 1 | 1 |
| 43 | Bolt - Hex Head .63" -11 x 5.50" | XB-HHB-050-70 | 1 | 1 |
| 44 | R.C.F. - DIA 10" | LG0718-01 | 1 | 1 |
| | - DIA 12" | LG0740-01 | 1 | 1 |
| | - 10" x 10" | LG0732-01 | 1 | 1 |
| 45 | Self-Locking Nut - .63"-11" | XB-SP0012-10 | 1 | 1 |
| 48 | Cushion Foot Pad - Low Profile RCF | 728003 | 1 | 1 |
| 49 | Interchangeable Collar - Low Profile RCF | 730640 | 1 | 1 |
| 50 | Interchangeable Strap | 730638 | 1 | 1 |
| 51 | Pin Groove, .31" Dia. x 2.00" Lg | XB-GP-052-52 | - | 1 |

For technical assistance please go to
www.safholland.us or call 800.876.3929

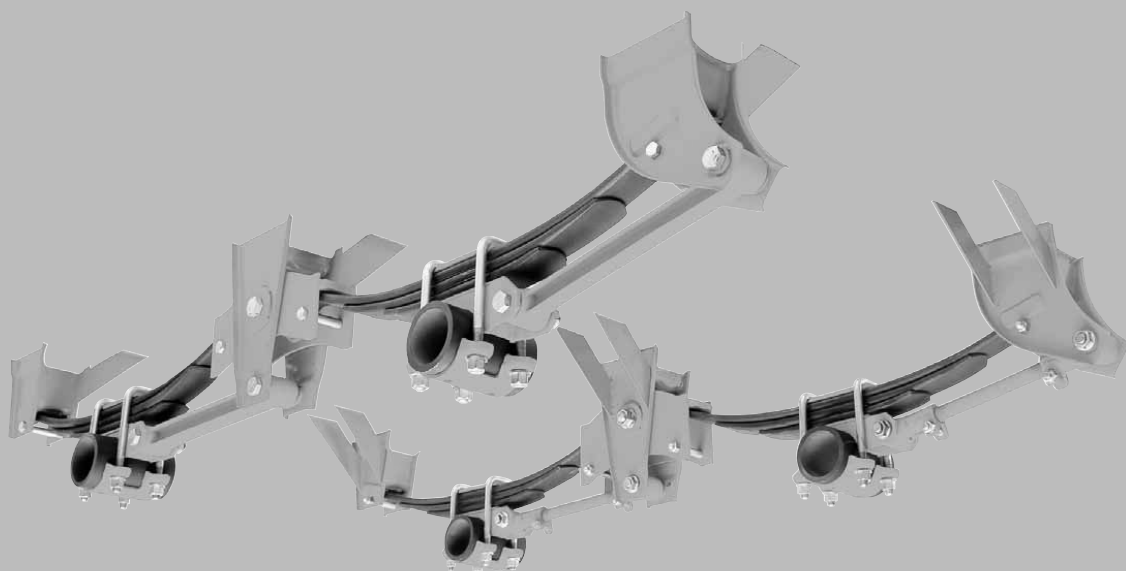


SAF-HOLLAND Group

Installation and Maintenance Manual

DuraLite® Series

Mechanical Suspension



XL-MS175 Rev E



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Introduction

This manual provides you basic information necessary for the installation and maintenance of the DuraLite® suspension.

IMPORTANT: It is the responsibility of the installer to determine the proper location of the suspension on the frame, provide an adequate structure to support the suspension, ensure adequate clearances with other components, and to determine if the rated suspensions and axle capacity are adequate for the trailer applications.

Warranty

Refer to the complete warranty for the country in which the product will be used. A copy of the written warranty is included with the product and can be found on the SAF-HOLLAND website (www.safholland.us).

Notes, Cautions, and Warnings

You must read and understand all of the safety procedures presented in this manual before starting any work on the suspension.

Proper tools must be used to perform the maintenance and repair procedures described in this manual. Many of these procedures require special tools.

NOTE: In the United States, workshop safety requirements are defined by federal and/or state Occupational Safety and Health Act. Equivalent laws may exist in other countries. This manual is written based on the assumption that OSHA or other applicable employee safety regulations are followed by the location where work is performed.

IMPORTANT: Read this manual before using this product. Keep this manual in a safe location for future reference.

WARNING

Failure to follow the instructions and safety precautions in this manual can result in death or serious injury.

Throughout this manual, you will notice the terms “NOTE”, “IMPORTANT”, “CAUTION”, and “WARNING” followed by important product information. So that you may better understand the manual, those terms are as follows:

NOTE: Includes additional information to enable accurate and easy performance of procedures.

IMPORTANT: Includes additional information that if not followed could lead to hindered product performance.

CAUTION

Used without the safety alert symbol, indicates a potentially hazardous situation which, if not avoided, could result in property damage.

CAUTION

Indicates a potentially hazardous situation which, if not avoided, could result in minor or moderate injury.

WARNING

Indicates a potentially hazardous situation which, if not avoided, could result in death or serious injury.



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General Installation Information

1. General Safety Instructions

Read and observe all Warning and Caution hazard alert messages in this publication. They provide information that can help prevent serious personal injury, damage to components, or both.

⚠ WARNING Failure to properly support the vehicle and axles prior to commencing work could create a crush hazard which, if not avoided, could result in death or serious injury.

Please observe the following safety instructions in order to maintain the operational and road safety of the suspension system.

1. Only the wheel and tire sizes approved by the trailer builder may be used.
2. Before operating vehicle, ensure that the maximum permissible axle load is not exceeded and that the load is distributed equally and uniformly.
3. Observe the operating recommendation of the trailer manufacturer for off-road operation of the installed suspension.

IMPORTANT: The definition of OFF-ROAD means driving on non-asphalted/non-concreted routes, e.g. gravel roads, agricultural and forestry tracks, on construction sites and in gravel pits.

IMPORTANT: Off-road operation of suspensions beyond the approved application design could result in damage and impair suspension system performance.

4. All suspension systems require routine service, inspection and maintenance in order to maintain optimum performance and operational safety as well as an opportunity to recognize wear.
5. In the event of suspension component failure, quickly reduce speed as safely as possible and remove the vehicle from traffic. If unable to remove vehicle from traffic, follow DOT safety requirements regarding emergency situations.
6. Contact a qualified towing and/or service company to assist in repairing vehicle or to move it to a qualified repair facility.

We highly recommend the use of only SAF-HOLLAND Original Parts.

A list of SAF-HOLLAND technical support locations to supply SAF-HOLLAND Original Parts can be found at www.safholland.us or contact SAF-HOLLAND Customer Service at 888-396-6501.

Updates to this manual will be published as necessary online at www.safholland.us.

2. Installation Preparation

The proper installation of the suspension is critical to assure trouble free operation. Before proceeding with suspension installation, check the tire size and trailer design to make sure that there is lateral tire clearance and a vertical tire clearance of at least 4-1/2" (114 mm) when the trailer is empty.

⚠ WARNING Failure to maintain tire clearance between tires and the nearest point of contact on the suspension or vehicle could cause fire or loss of vehicle control which, if not avoided, could result in death or serious injury.

Vertical tire clearance may be adjusted by using different height spring seats or high, medium or low arch springs. HOLLAND DuraLite suspensions are rated at 22,400 pounds (358,400 kg) GAWR (Gross Axle Weight Rating) with one, two or three leaf springs and 24,000 lbs. (384,000 kg) GAWR with heavy duty leaf springs. (SAF-HOLLAND does not supply springs.)

For leaf spring selection and mounting height information, refer to appropriate Table in Section 12. Check that adequate clearance is provided to all components of the trailer, including but not limited to tires, brakes and air lines.

IMPORTANT: The suspension hangers must be on the same centers as the spring seats and springs, within the tolerances shown. The springs must be square with the axles and located the same distance from the axle centerline within the tolerances shown.

IMPORTANT: Improperly installed suspension components can lead to the following trailer problems: trailer lean, improper tracking, premature tire wear and shortened suspension life.

CAUTION Failure to correctly install suspension components will reduce suspension performance which, if not avoided, could result in premature suspension failure.

3. Welding Standards

3.1 Scope

Your SAF-HOLLAND suspension has been designed to be installed onto a trailer frame. When welding the suspension observe the requirements below. Customers may not weld on an SAF-HOLLAND suspension without our prior approval, including the application of the American Welding Society standards by SAF-HOLLAND engineering. This specification applies to all components supplied by SAF-HOLLAND, and its products. The customer assumes all responsibility for weld integrity if weld material and procedure differ from those listed below.

3.2 Material

Frame attachment components made from low carbon or high strength alloy steel are to be welded with AWS filler metal specification AWS A5.18, filler metal classification ER-70S-3, ER-70S-6 or equivalent unless specified on the installation drawing.

NOTE: Any substitution for filler material from the above standard must comply, as a minimum, with the following mechanical properties:

Tensile Strength - 72k psi (496 MPa)
Yield Strength - 60k psi (414 MPa) o F (-17.7o C)
% Elongation - 22%

The recommended welding gas for gas metal arc welding (GMAW) is 90% Argon / 10% CO₂. If a different gas is used, welds must comply with penetration requirements in shown below. Where the installation drawing specifies different than above, the drawing shall prevail.

3.3 Procedures

Tack welds used for positioning components are to be located in the center of the final weld, where practical. Tack weld should be completely fused to the finish weld. DO NOT break arc at the end of the weld. Back up all finish welds at least 1/2" (12 mm) or a sufficient amount to prevent craters at the end of the weld. Where weld is shown to go around corners, it is assumed the corner represents a stress concentration area. DO NOT start or stop weld within 1" (25 mm) of the corner. Particular care should be taken to prevent undercutting in this area.

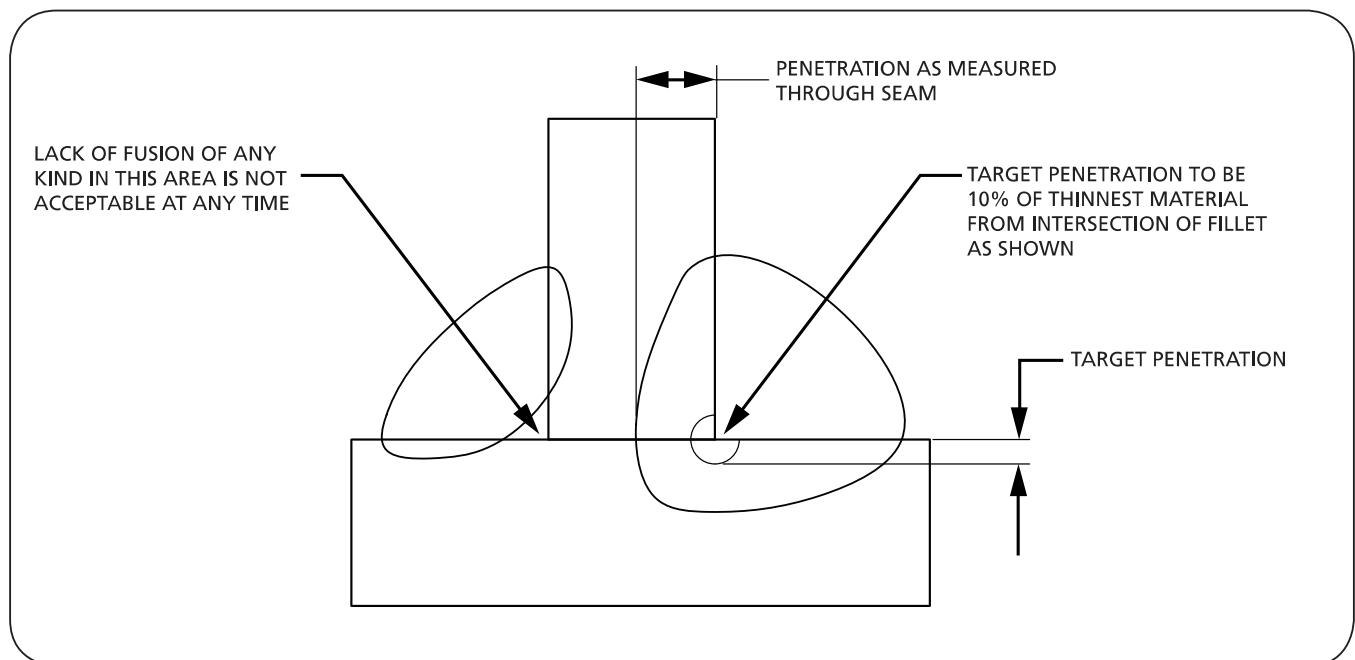
3.4 Workmanship

It is the responsibility of the Customer to provide good workmanship when attaching components to the frame structure.

3.5 Weld Size

If weld size is not specified, the effective throat of the weld must be a minimum of the thinnest material being welded (**Figure 1**).

Figure 1



4. Trailer Frame Hanger Brackets Location – All Styles

The DuraLite suspension is available in five hanger bracket mounting styles: under mount, flange mount, straddle mount, side mount and straddle/under mount. The DuraLite suspension may be used as a single axle, tandem axle or triple axle. The base suspension is the single axle – adding a multi-axle conversion kit converts the single axle to a tandem and a second multi-axle kit will make a triple axle suspension. The DuraLite suspension is available in overslung (axle below the spring) or underslung (axle above the spring) configuration.

NOTE: The following instructions for hanger bracket location apply to all hanger bracket styles listed above. After the hanger brackets have been properly located and tack welded to the trailer frame, proceed to the appropriate bracket type in this section for installation instructions.

1. Measure and mark hanger bracket locations on bottom of trailer frame referencing the dimensions provided for single axle (**Figure 2a**), tandem axle (**Figure 2b**) or triple axle (**Figure 2c**).

- Hanger spacing is always measured from center line to center line of hanger (**Figure 2**).
- The front and rear hangers are always located an equal distance from the center hanger and should not vary from dimension shown more than plus or minus 1/16" (1 mm).
- Hangers must be located on both sides of sub-frame in exactly the same distances from front and rear of trailer frame.
- Hangers on one side of sub-frame must not be in front of or behind corresponding hangers on other side of sub-frame by more than plus or minus 1/16" (1 mm).

IMPORTANT: Frame surface where hanger brackets are to be attached must be clean and free of any surface rust. Use wire brush or light-duty grinder to clean surface.

2. Position hanger brackets on frame according to location marks determined in Step 1. Position and tack weld all hangers in position and double check dimensions before completing welding of hangers (**Figure 2a, 2b and 2c**).

IMPORTANT: Hangers must be mounted in proper alignment with one another and must not be cocked or tilted in respect to the sub frame mounting surface.

Figure 2

Figure 2a (Under mount style shown)

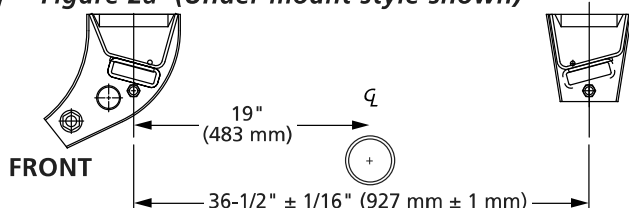


Figure 2b (Under mount style shown)

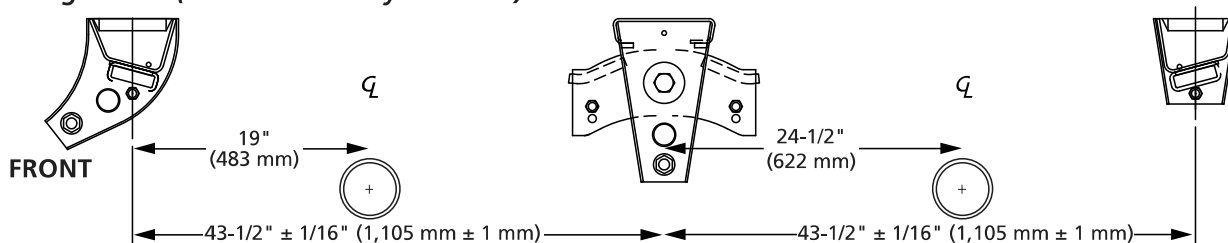
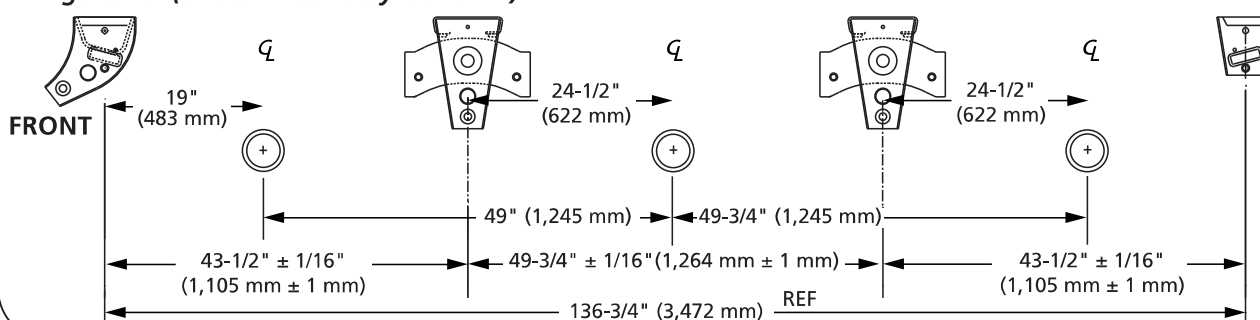


Figure 2c (Under mount style shown)



Under Mount Hanger Brackets Installation

NOTE: For flange, straddle, sidemount or straddle/under style brackets installation, refer to specific instructions later in this section.

IMPORTANT: The under mount style hanger brackets must be located on the trailer frame to match the axle spring center (**Figure 3**).

1. Install a 1-1/4" schedule 40 pipe or 1.66 O.D. x .109 standard mechanical tubing through the front and center hangers. The pipe brace should be 6" (152 mm) longer than the spring

centers that will provide approximately 3" (76 mm) of pipe to protrude equally on each side. Tack weld the pipe brace in place (**Figure 3**).

2. Add 3/16" (4 mm) minimum diagonal braces between the front, center and rear hangers and the frame of the trailer (**Figure 3**).
3. Re-verify position of hanger and pipe bracket.
4. Weld the suspension hangers in place (**Figures 4a, 4b and 4c**). Weld the pipe braces and diagonal braces in place (**Figure 3**).

Figure 3

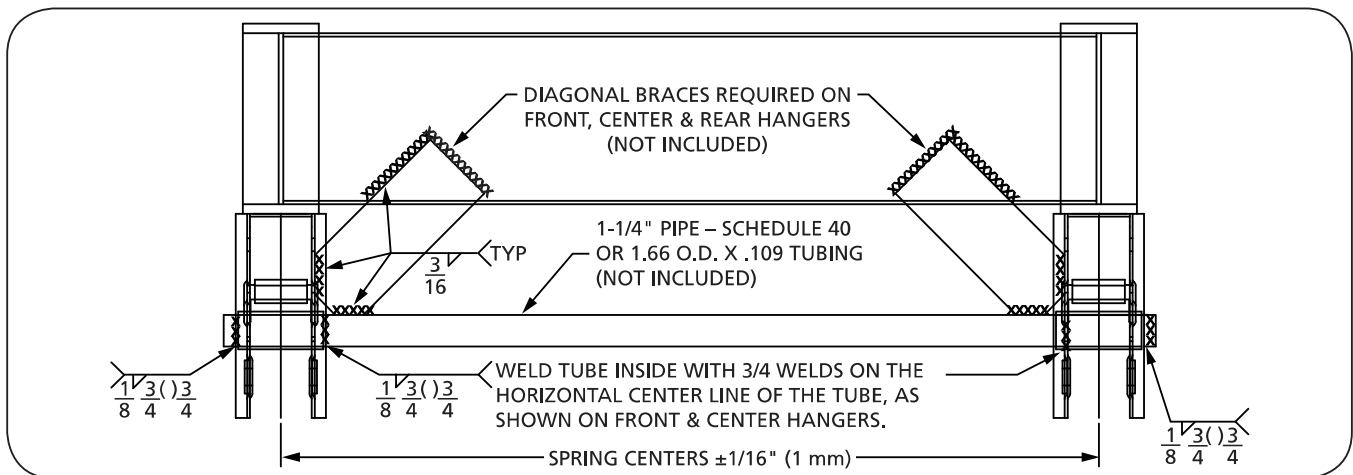


Figure 4

Figure 4a

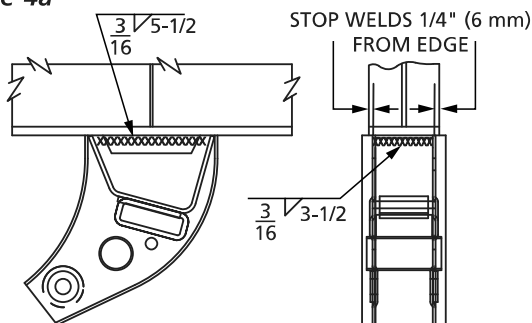


Figure 4b

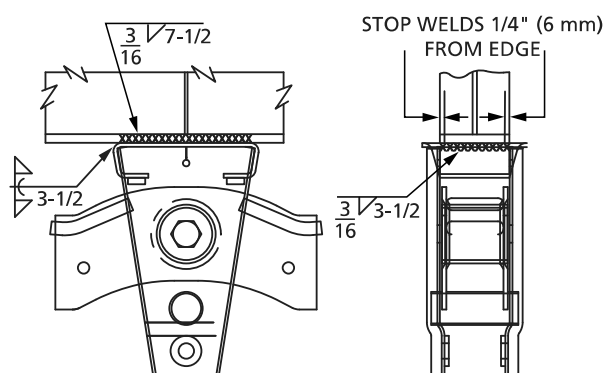
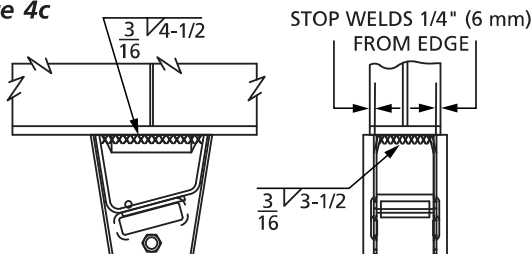


Figure 4c



Flange Hanger Brackets Installation

1. Install a 1-1/4" schedule 40 pipe or 1.66 O.D. x .109 standard mechanical tubing through the front and center hangers. The pipe brace should be 6" (152 mm) longer than the spring centers that will provide approximately 3" (76 mm) of pipe to protrude equally on each side. Tack weld the pipe brace in place (**Figure 5**).
2. Add 3/16" (4 mm) minimum diagonal braces between the front, center and rear hangers and the frame of the trailer (**Figure 5**).
3. Re-verify position of hanger and pipe bracket.
4. Weld the suspension hangers in place (**Figures 6a, 6b and 6c**). Weld the pipe braces and diagonal braces in place (**Figure 5**).

Figure 5

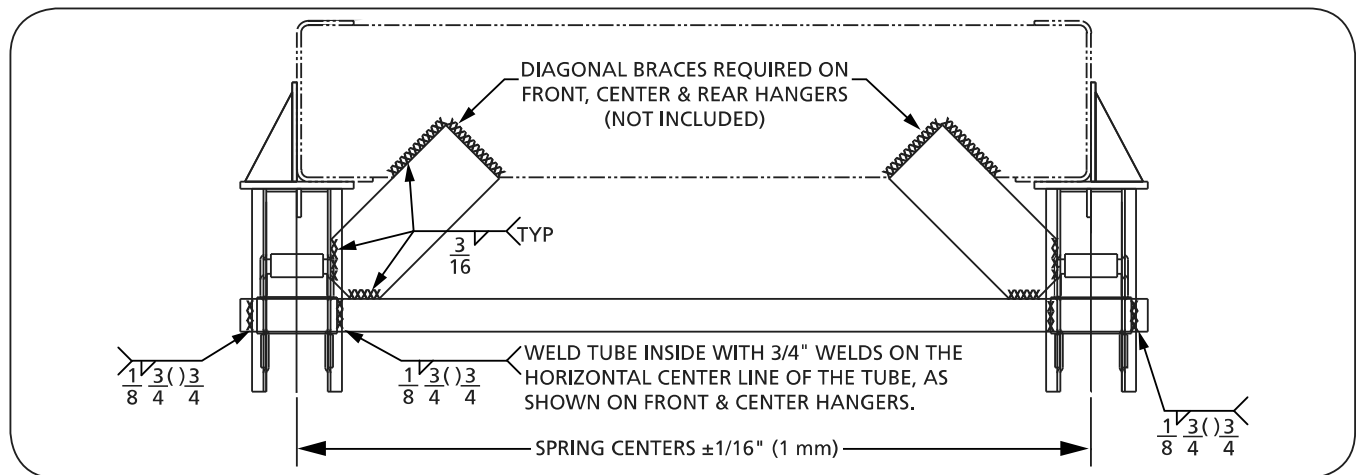
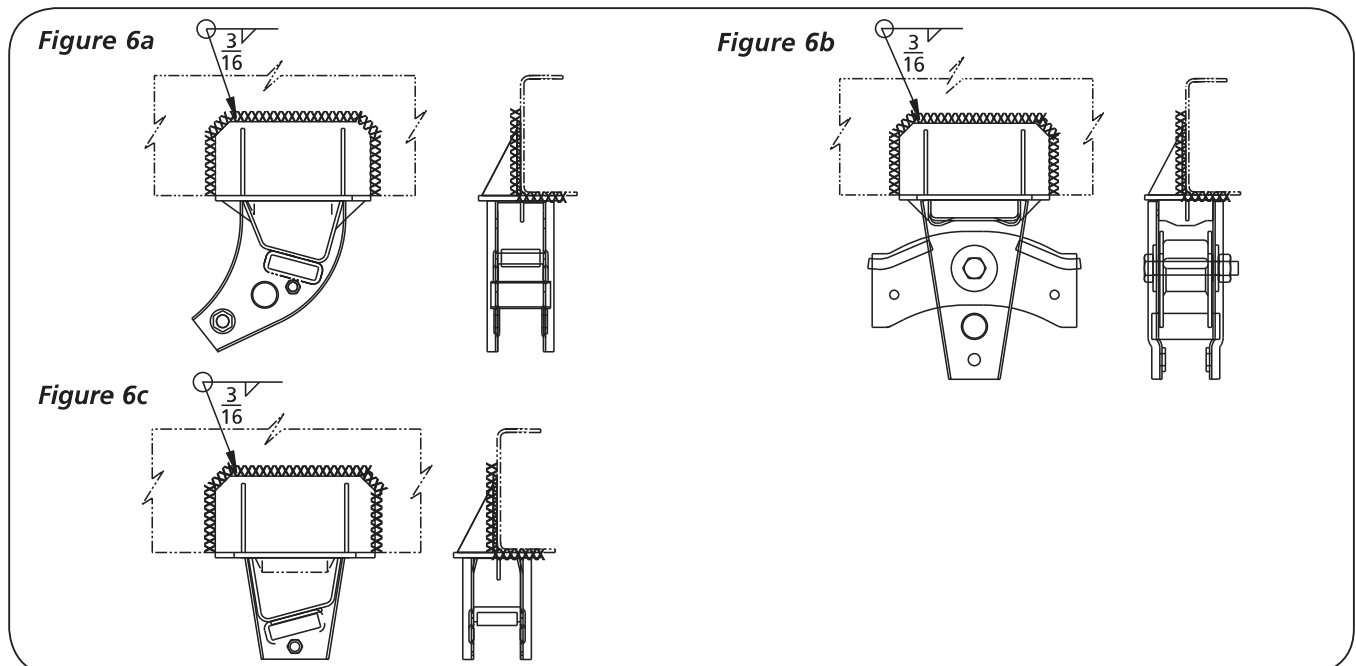


Figure 6



Straddle Hanger Brackets Installation

1. Install a 1-1/4" schedule 40 pipe or 1.66 O.D. x .109 standard mechanical tubing through the front and center hangers. The pipe brace should be 6" (152 mm) longer than the spring centers that will provide approximately 3" (76 mm) of pipe to protrude equally on each side. Tack weld the pipe brace in place (**Figure 7**).
2. Re-verify position of hanger and pipe bracket.
3. Weld the suspension hangers in place (**Figures 8a, 8b and 8c**). Weld the pipe braces in place (**Figure 7**).

Figure 7

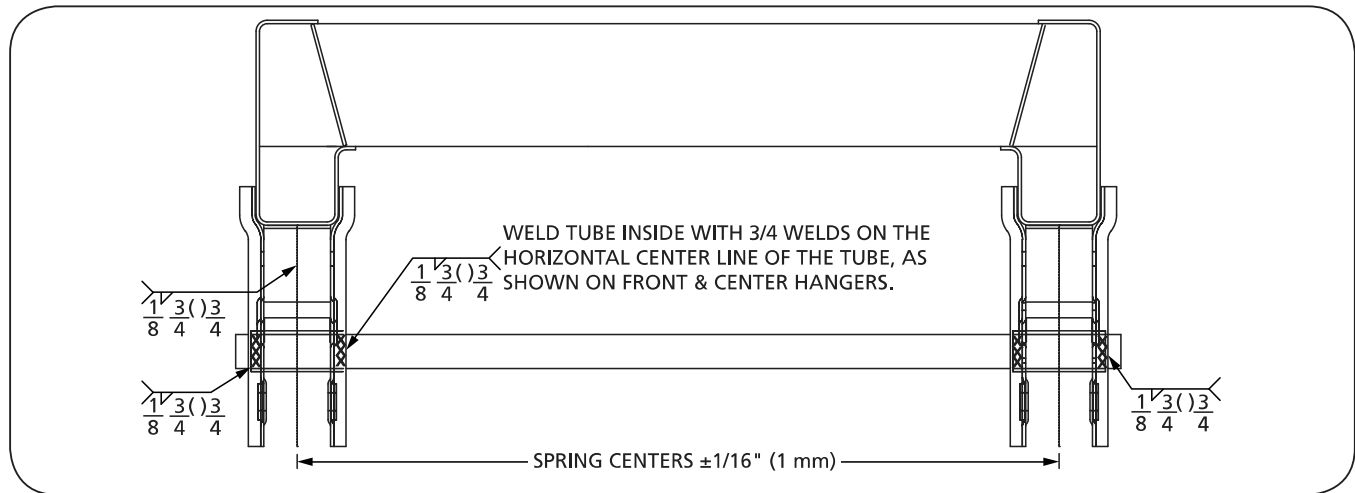
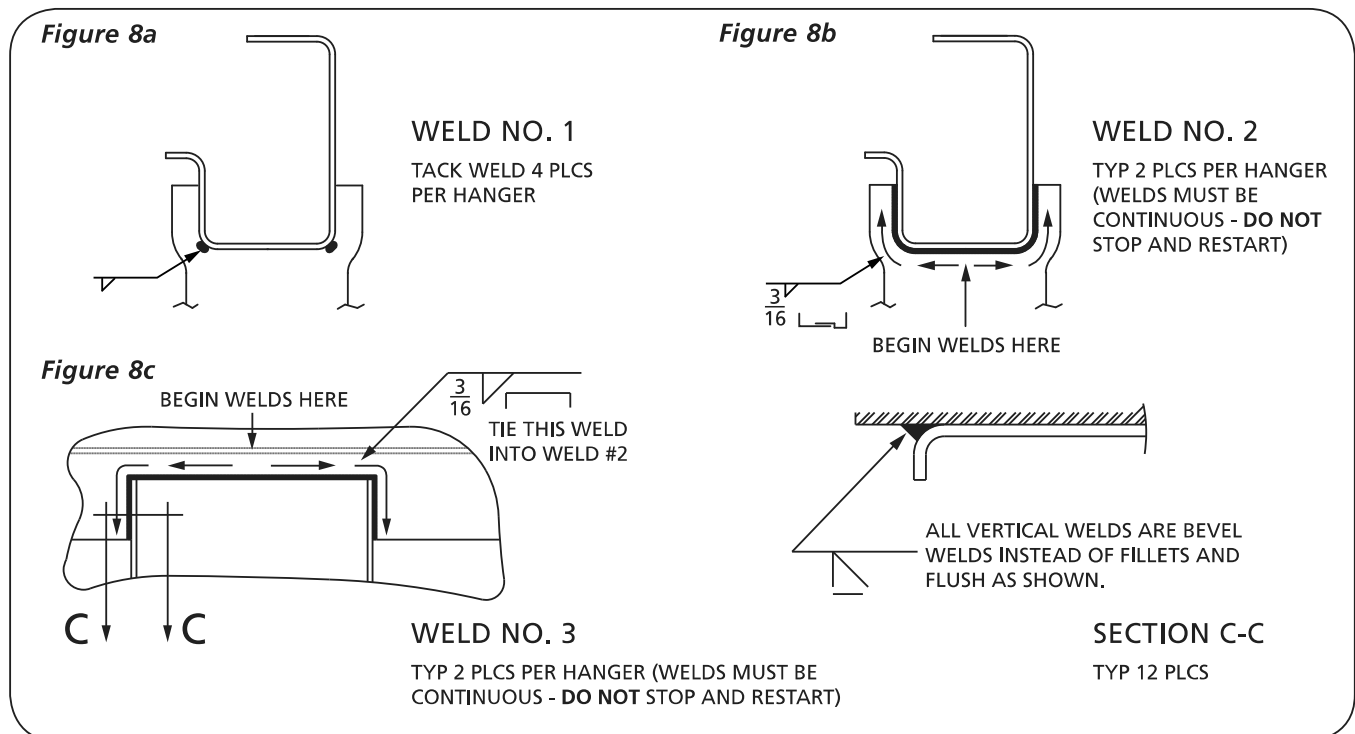


Figure 8



Side Mount

1. Install a 1-1/4" schedule 40 pipe or 1.66 O.D. x .109 standard mechanical tubing through the front and center hangers. The pipe brace should be 6" (152 mm) longer than the spring centers that will provide approximately 3" (76 mm) of pipe to protrude equally on each side. Tack weld the pipe brace in place (**Figure 9**).
2. Re-verify position of hanger and pipe bracket.
3. Weld the suspension hangers in place (**Figures 10a, 10b and 10c**). Weld the pipe braces in place (**Figure 9**).

Figure 9

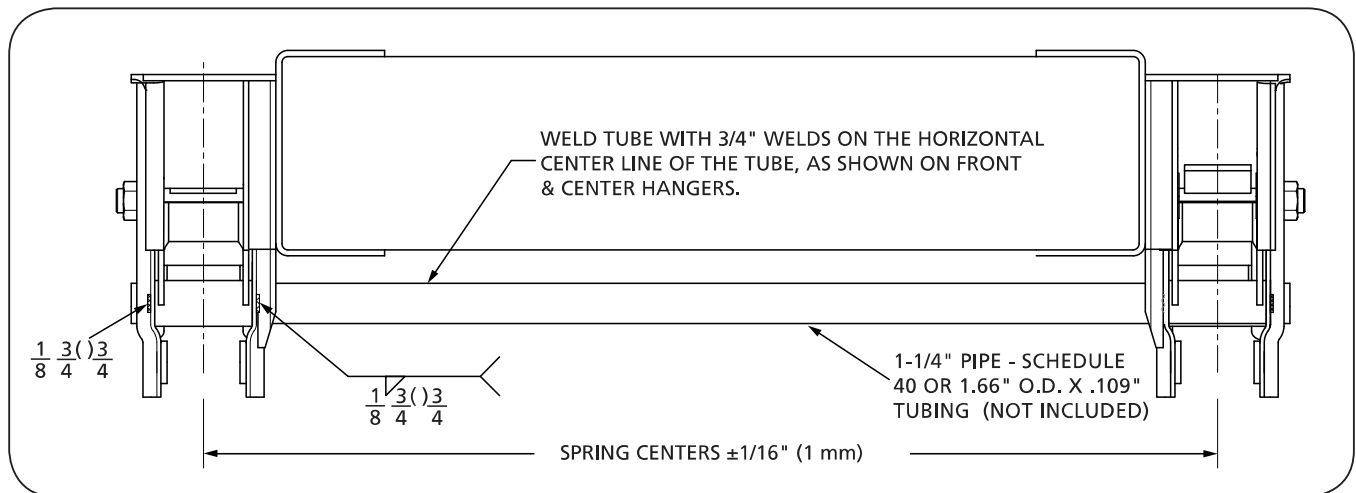
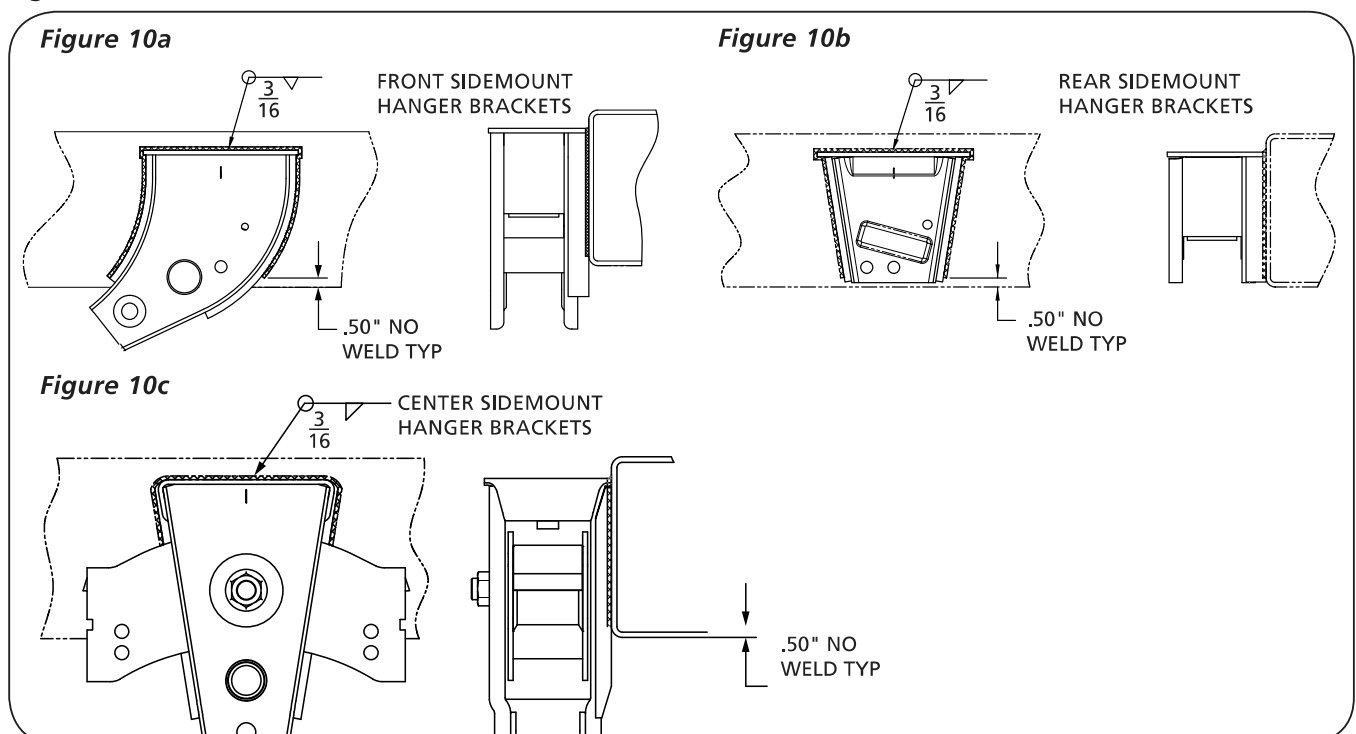


Figure 10



Straddle/Under Mount

1. Install 3/16" thick angle braces at Front, Center, and Rear hangers. Brace should be at approximately a 45° angle and extend at least to the mid-point of the hanger. Tack weld the braces in place. **(Figure 11).**
2. Re-verify position of hanger and angle braces.
3. Weld the suspension hanger brackets in place **(Figures 12a, and 12b).** Weld the angle braces in place **(Figure 11).**

Figure 11

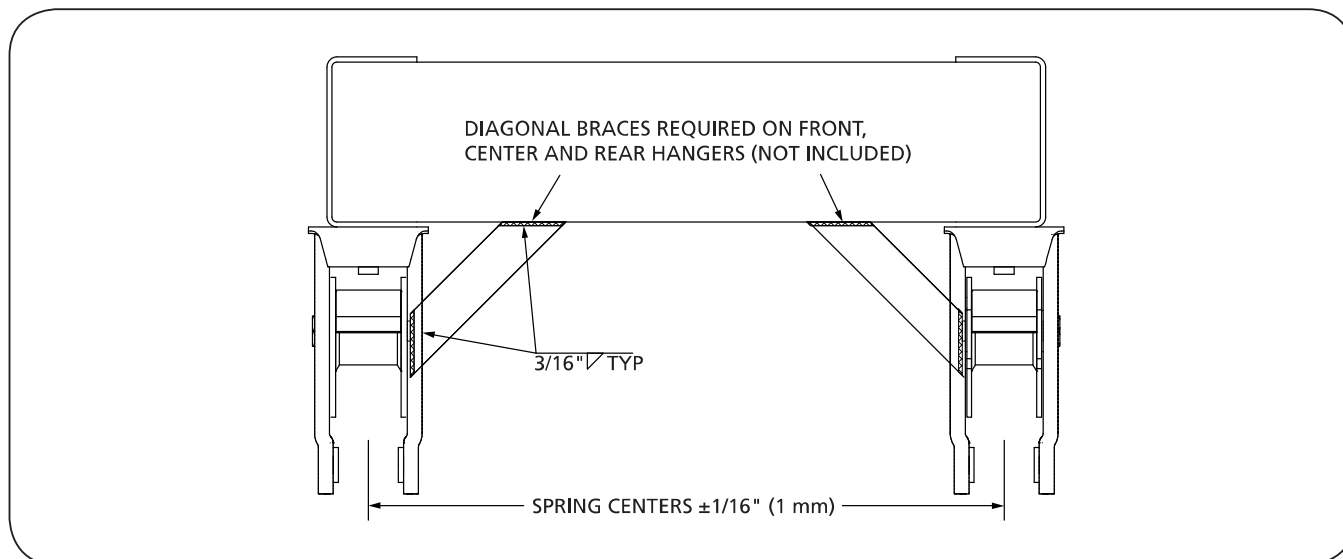
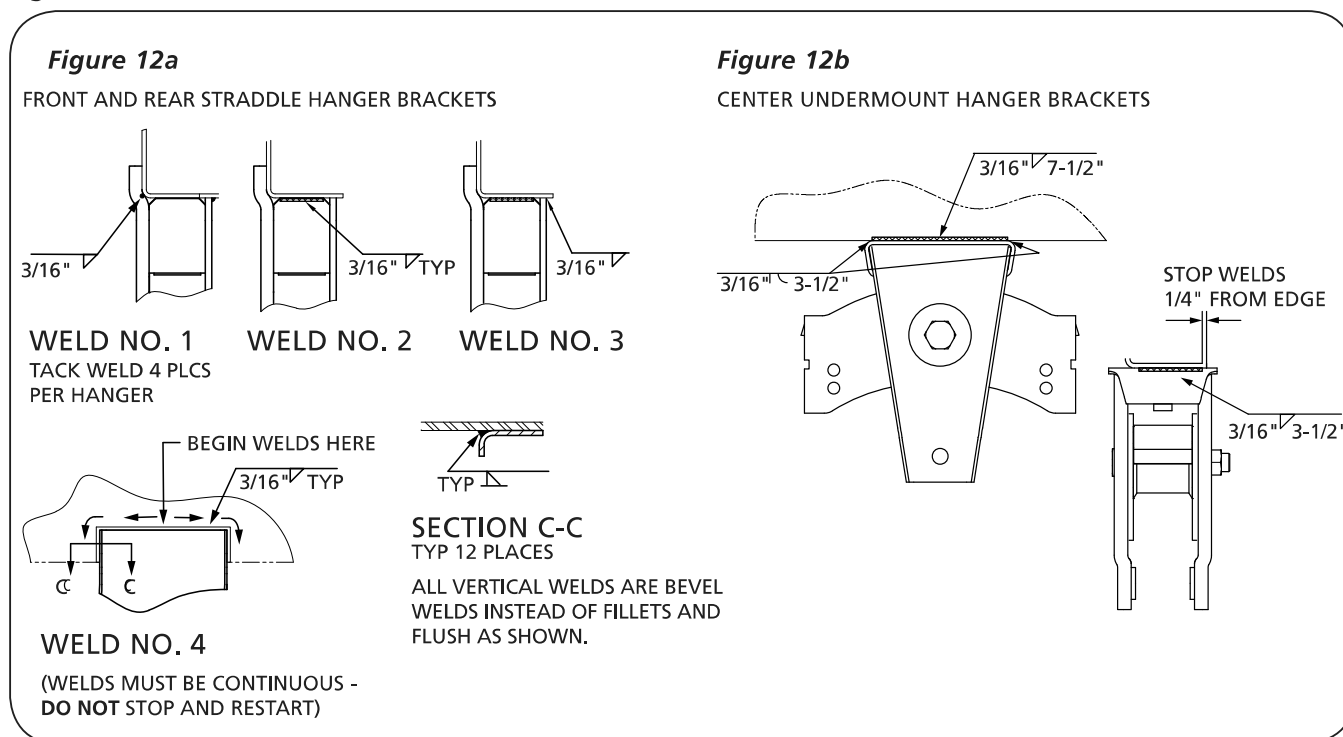


Figure 12



5. Weld Axle Seats To Axles Instructions

IMPORTANT: The axle seats and bottom plates that are welded to the axle are compatible with all low hydrogen welding processes suitable for welding to steel axles.

Overslung Axle Style

1. The axle seats should be located on the spring centers within .06" (1 mm). The axle seats should be the same distance from the center of the axle within .03" (.7 mm). The camshaft should be oriented per the axle manufacturer's specification.

NOTE: When the cams are forward, the cam must be below the horizontal centerline when axle seats of 2" (51 mm) or shorter height are used.

2. Clamp the axle seats and bottom plates to the axle. The axle **MUST** contact the axle seat and bottom plate at the top and bottom center of the adapters or contact at least two points no more than 1-1/2" (38 mm) from center of the axle (**Figure 13**).
3. Verify correct connection. Using a .006" (0.15 mm) feeler gage be sure it is **NOT** able to slide between axle and spring seat or bottom plate more than 1/4" (6 mm) in contact area (**Figure 14**). If a greater gap is present, these parts may be clamped to the axle or adjusted to fit by grinding the axle seat.

⚠ WARNING

Failure to maintain proper clearance between the axle and parts welded to it may result in premature weld failure, which if not avoided, could result in death or serious injury.

4. Following the axle manufacturer's recommendations, weld the axle seats and bottom plates to the axles (**Figure 14**).

Figure 13

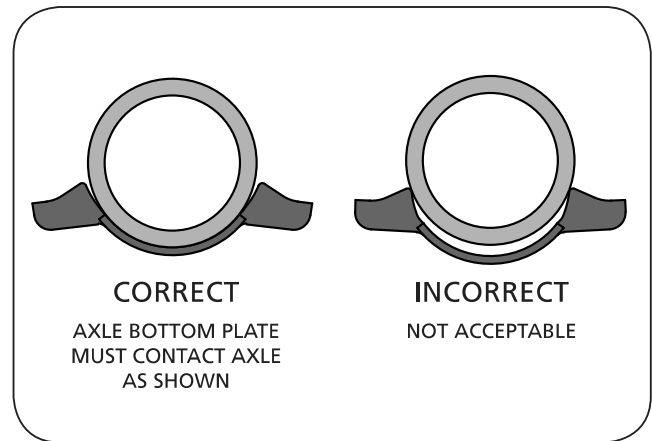
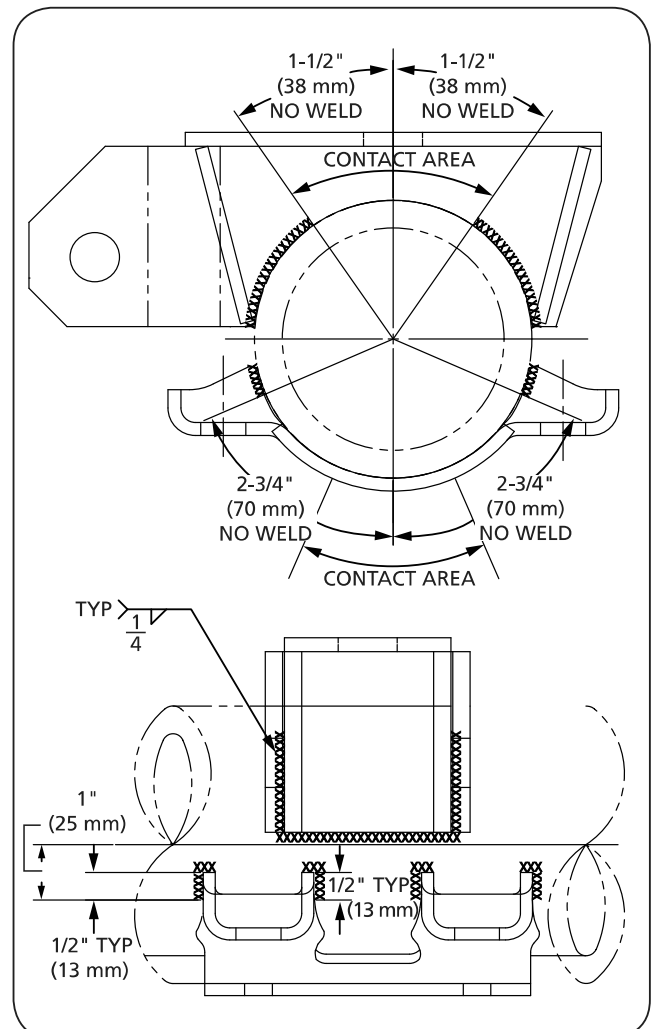


Figure 14



Underslung Axle Style

IMPORTANT: The axle seats and bottom plates that are welded to the axle are compatible with all low hydrogen welding processes suitable for welding to steel axles.

1. The axle seats should be located on the spring centers within .06" (1 mm). The axle seats should be the same distance from the center of the axle within .03" (.7 mm). The camshaft should be oriented per the axle manufacturer's specification.

NOTE: When the cams are forward, the cam must be below the horizontal centerline when axle seats of 2" (51 mm) or shorter height are used.

2. Clamp the axle seats and bottom plates to the axle. The axle **MUST** contact the axle seat and bottom plate at the top and bottom center of the adapters or contact at least two points no more than 1-1/2" (38 mm) from center of the axle (**Figure 15**).
3. Verify correct connection. Using a .006" (0.15 mm) feeler gage be sure it is **NOT** able to slide between axle and spring seat or bottom plate more than 1/4" (6 mm) in contact area. If a greater gap is present, these parts may be clamped to the axle or adjusted to fit by grinding the axle seat.

⚠ WARNING

Failure to maintain tire clearance between tires and the nearest point of contact on the suspension or vehicle could cause fire or loss of vehicle control which, if not avoided, could result in death or serious injury.

4. Following the axle manufacturer's recommendations, weld the axle seats and bottom plates to the axles (**Figure 16**).

Figure 15

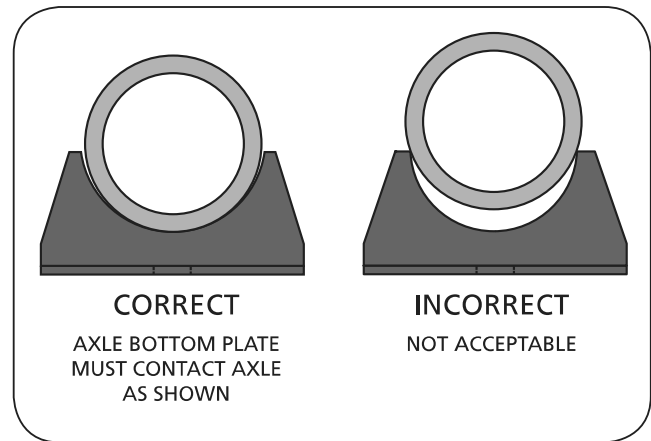
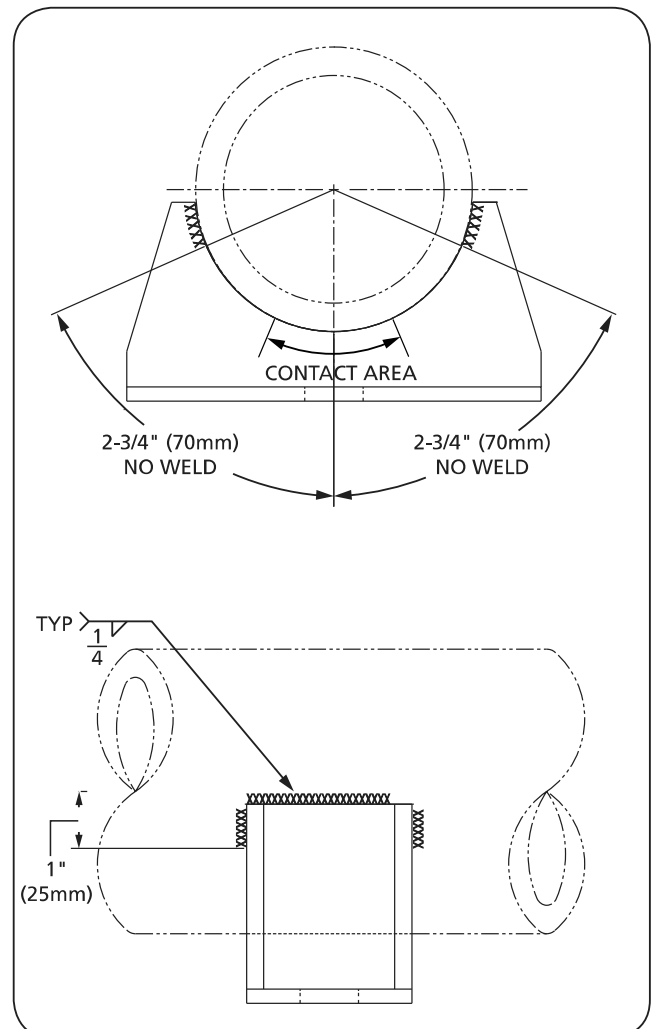


Figure 16



6. Leaf Springs and Torque Arms Assembly

Overslung Axle Style

NOTE: It is recommended that fasteners be installed with the nuts on the outside (closest to tires).

NOTE: Torque specifications are with clean lubricated/coated threads. All new SAF-HOLLAND fasteners come pre-coated from the factory.

IMPORTANT: The use of special lubricants with friction modifiers, such as Anti-Seize or Never-Seize, without written approval from SAF-HOLLAND Engineering, will void warranty and could lead to over torquing of fasteners or other component issues.

Torque Arms and Springs Installation

1. Position the supplied spring liner on top of the springs and set it on top of the axle spring seat (**Figure 17**). Place the top plate on top of the spring.
2. Install the springs on the axles with the appropriate U-bolts, nuts and washers. The U-bolts will fit into the detents stamped into the top plate (**Figure 17**).

IMPORTANT: On tandem axle suspensions the big hook end of the spring should be arranged to fit in the equalizer (**Figure 18a**). On single axle suspensions it should point to the rear (**Figure 18**). Arrange the springs so that they are on the correct centers ± 0.03 " (1 mm) and perpendicular to the axle.

3. Tighten the U-bolts to 275-300 ft.-lbs. (373-407 N•m) of torque using an alternating pattern (**Figure 17a**). Check the spring centers and adjust if necessary.

CAUTION DO NOT hit steel parts with a steel hammer as parts could break, sending flying steel fragments in any direction creating a hazard which, if not avoided, could result in minor to moderate injury.

4. Install the axles with springs into the suspension hangers. Install the 5/8" spring retainer bolts and spacers in the front and rear hangers, and the equalizer on tandem axles to hold the springs in place. Tighten 5/8" bolts to 35-50 ft.-lbs. (47-68 N•m) (**Figure 18**).

IMPORTANT: DO NOT overtighten as this may damage the spacers.

5. Install the torque arms between the hangers and the spring seats on the axles. It is recommended that the adjustable torque arms be installed on the roadside and the fixed (cast) torque arms be installed on the curbside (**Figure 19**). Install the 7/8" nuts and bolts to secure the torque arms in place and torque to 275-300 ft.-lbs. (373-407 N•m) (**Figure 19**).
6. With the suspension installed, check that there is $1/8" \pm 3/32"$ (3 mm \pm 2 mm) clearance between the springs and the sides of the hangers and that all the springs are contacting the bottoms of the hangers (**Figure 19a**).
7. Position the decal, XL-MS189-01, in clear view on the roadside of the vehicle as close as practical to the suspension.

Figure 17

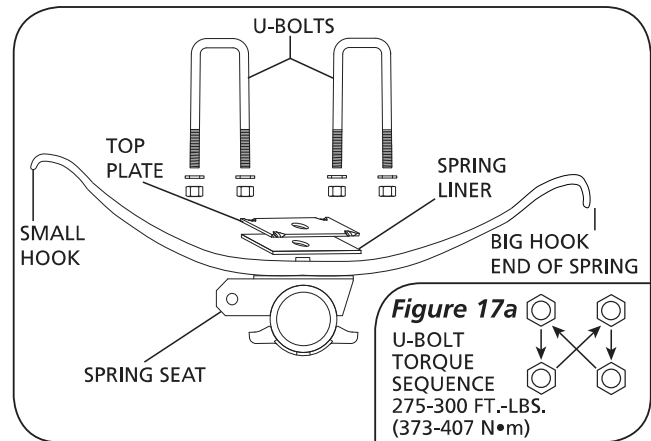


Figure 18

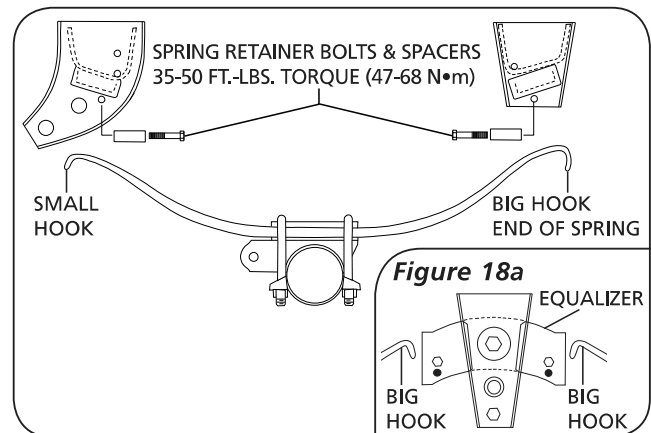
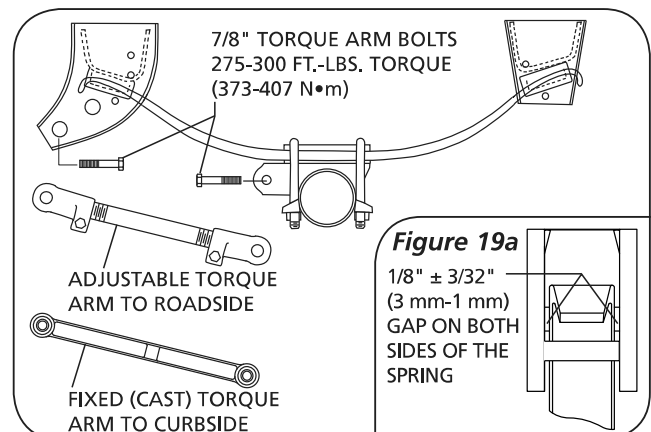


Figure 19



Underslung Axle Style

NOTE: It is recommended that fasteners be installed with the nuts on the outside (closest to tires).

NOTE: Torque specifications are with clean lubricated/coated threads. All new SAF-HOLLAND fasteners come pre-coated from the factory.

Torque Arms and Springs Installation

1. Assemble the springs. Position the supplied spring liner on top of the springs and set it on top of the axle spring seat (**Figure 9**). Place the top plate on top of the spring.
2. Install the springs to the axles with the appropriate U-bolts, nuts and washers.

IMPORTANT: On tandem axle suspensions the big hook end of the spring should be arranged to fit in the equalizer (**Figure 21a**). On single axle suspensions it should point to the rear (**Figure 21**). Arrange the springs so that they are on the correct centers ± 0.03 " (1 mm) and perpendicular to the axle.

3. Tighten the U-bolts to 275-300 ft.-lbs. (373-407 N•m) of torque using an alternating pattern (**Figure 20a**). Check the spring centers and adjust if necessary.

CAUTION DO NOT hit steel parts with a steel hammer as parts could break, sending flying steel fragments in any direction creating a hazard which, if not avoided, could result in minor to moderate injury.

4. Install the axles with springs into the suspension hangers. Install the 5/8" spring retainer bolts and spacers in the front and rear hangers, and the equalizer on tandem axles to hold the springs in place. Tighten 5/8" bolts to 35-50 ft.-lbs. (47.68 N•m) (**Figure 21**).

IMPORTANT: DO NOT overtighten as this may damage the spacers.

5. Install the torque arms between the hangers and the bottom plates on the axles. It is recommended that the adjustable torque arms be installed on the roadside and the fixed torque arms be installed on the curbside (**Figure 22**). Install the 7/8" nuts and bolts to secure the torque arms in place and torque to 275-300 ft.-lbs. (373-407 N•m) (**Figure 22**).
6. With the suspension installed, check that there is $1/8" \pm 3/32"$ (3 mm \pm 2 mm) clearance between the springs and the sides of the hangers and that all the springs are contacting the bottoms of the hangers (**Figure 22a**).
7. Position the decal, XL-MS189-01 in clear view on the roadside of the vehicle as close as practical to the suspension.

Figure 20

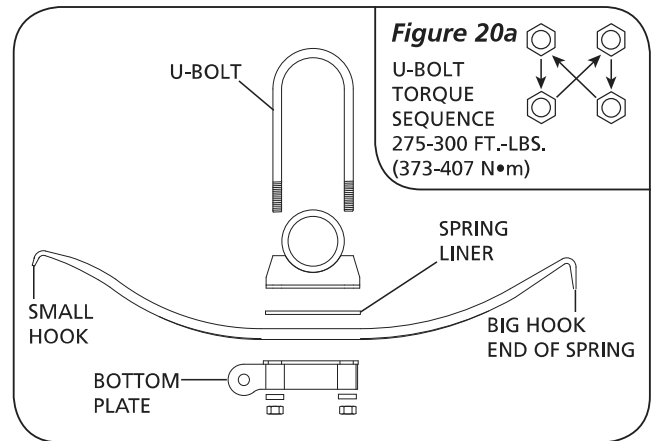


Figure 21

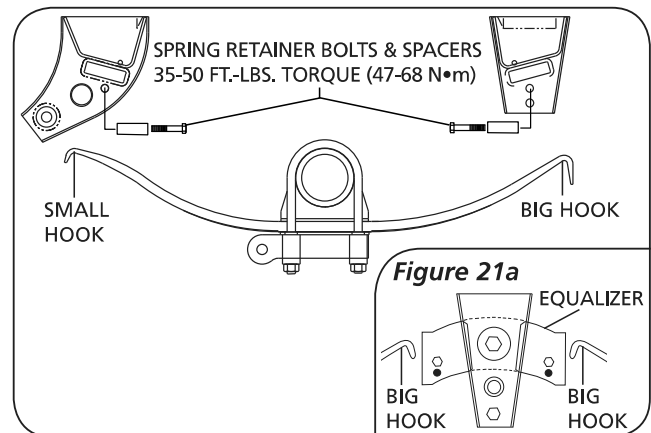
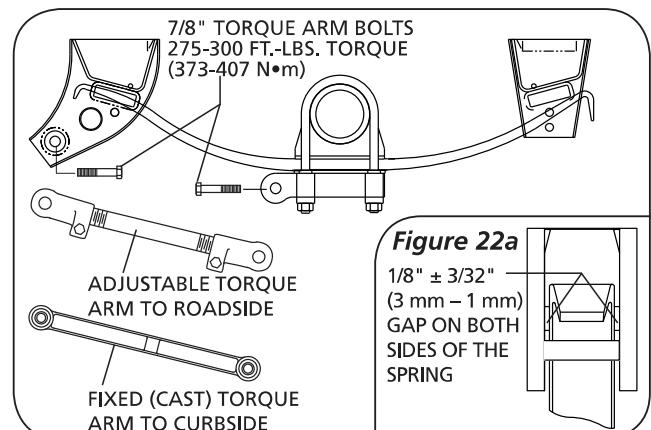


Figure 22



7. Axle Alignment

IMPORTANT: Axle alignment should always be done while the trailer is empty.

1. Pull the trailer in a straight line for a sufficient distance to ensure there are no binds in the suspension.
2. Engage the trailer park brakes.
3. Check that the ends of the springs are contacting the bottom wear pads in all hangers.
4. Loosen the 5/8" clamp bolts on the adjustable torque arms.
5. Disengage the trailer parking brakes and ensure the trailer is empty.
6. Manually measure or use an optical device specifically designed for alignment measuring to determine the following:
 - a. Measure the distance from the king pin to the centerline of the front axle spindles. It is recommended that spindle extensions be utilized.
 - b. Dimensions A and B (**Figure 23**) must be equal to within 1/8" (3 mm).
 - c. Measure the distance from the centerline of the front axle spindles to the centerline of the rear axle spindles.
 - d. Dimensions C and D (**Figure 23**) must be equal to within 1/16" (1 mm).
7. Tighten the clamp bolts on the adjustable torque arm to 85-95 ft.-lbs. (108-129 N•m) of torque.

8. Final Inspection

1. Verify that the hanger brackets to mounting sub-frame and axle seat welds have been completed per specifications, refer to Section 4.
2. Check all suspension fastener connections for proper torque settings (**Figures 25**).
3. Check adjustable torque arm clamp nuts to be certain that 85-95 ft.-lbs. (115-129 N•m) torque is maintained.
4. Check for proper suspension mounting height.
5. Check for proper 4-1/2" (114 mm) vertical tire clearance (**Figure 24**).
6. Verify that the front axle alignment does not exceed a maximum variation of 1/8" (3 mm) kingpin to front axle and a maximum variation of 1/16" (1 mm) axle to axle on any additional axles (**Figure 15**).

9. Operating Recommendations

1. Observe the operating recommendation of the trailer manufacturer for off-road operation of the installed axles, refer to Section 1.

Figure 23

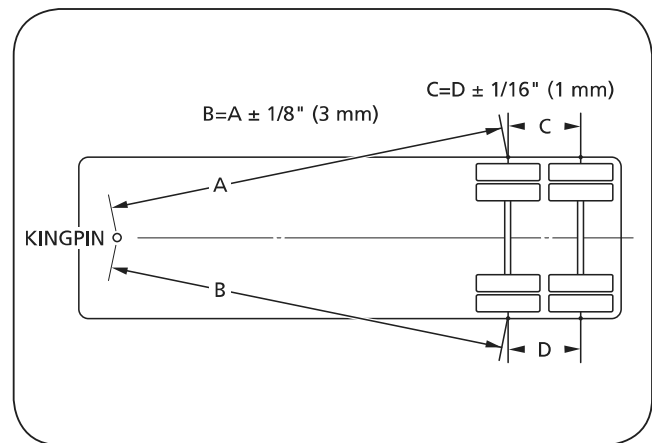
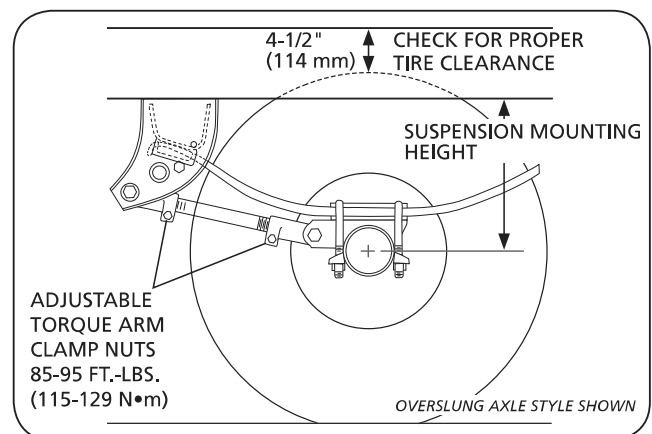


Figure 24



10. Maintenance

DuraLite® suspensions, by design, require a minimum of maintenance. However, suspensions in "over-the-road" operations require periodic checks to be certain of continued trouble free performance.

- After an initial loaded run-in period of at least 1,000 miles (1,609 km), re-check the trailer alignment and correct, if required.
- Daily or before each trip, check the suspension to be sure it is fully operational.
- Inspect all decals to ensure they are clearly legible and intact. Clean with a terry cloth towel, soap and water.
- Routine visual inspections and appropriate maintenance of suspension is required every six months or 25,000 miles (40, 234 km), whichever comes first.
- All fasteners, especially U-bolts (**Figure 25**), should be re-torqued to the following specifications.

NOTE: Failure to maintain proper fastener torque values could result in suspension component damage and loss of vehicle control which, if not avoided, could result in death or serious injury.

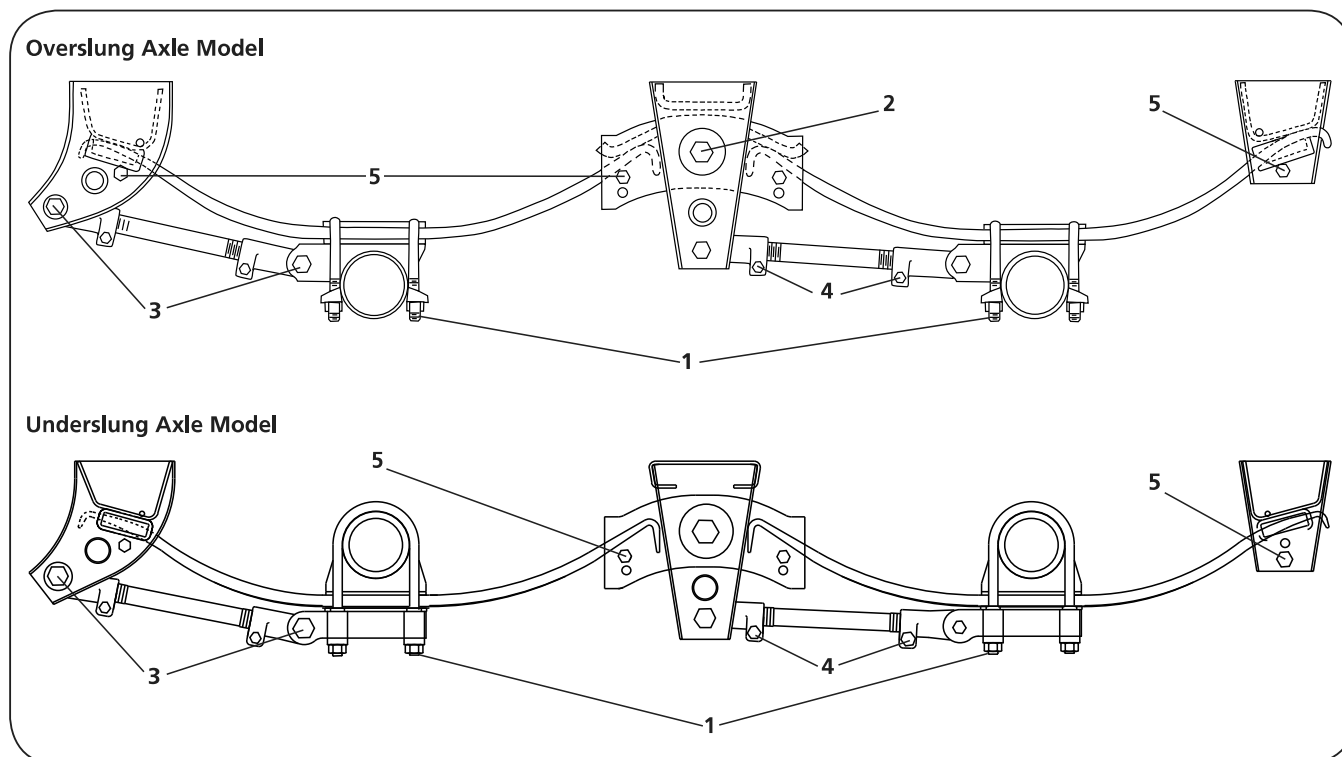
IMPORTANT: The use of special lubricants with friction modifiers, such as Anti-Seize or Never-Seize, without written approval from SAF-HOLLAND Engineering, will void warranty and could lead to over torquing of fasteners or other component issues.

1. Check 3/4"-16 U-bolt nuts to be certain that 275-300 ft.-lbs. (373-407 N•m) torque is maintained.
2. Check 1-14" equalizer bolt to be certain that 450-500 ft.-lbs. (610-678 N•m) torque is maintained
3. Check 7/8"-14 torque arm bolts to be certain that 275-300 ft.-lbs. (373-407 N•m) torque is maintained.
4. Check adjustable torque arm clamp nuts to be certain that 85-95 ft.-lbs. (115-129 N•m) torque is maintained.
5. Check spring retainer bolts to be certain that 35-50 ft.-lbs. (47-68 N•m) torque is maintained.



Loose, damaged, or missing fasteners can cause loss of vehicle control which, if not avoided, could result in death or serious injury.

Figure 25





11. Leaf Spring Selection

⚠ WARNING Failure to maintain tire clearance between tires and the nearest point of contact on the suspension or vehicle could cause fire or loss of vehicle control which, if not avoided, could result in death or serious injury.

SAF-HOLLAND DuraLite suspensions are rated up to 25,000 lbs. (11,340 kg) GAWR with proper springs, axles and brakes. The following widely available SAF-HOLLAND leaf springs are suitable for use with DuraLite suspensions:

| SPRING TYPE | SINGLE LEAF | TWO LEAF | THREE LEAF | THREE LEAF HD |
|-------------|-------------|----------|------------|---------------|
| Low Arch | SP0363 | SP0326 | SP0356 | SP9365-01 |
| Medium Arch | — | SP0325 | SP0355 | — |
| High Arch** | SP0360* | SP0324 | SP0354 | SP0365 |

* Not approved for single axle applications.

** SAF-HOLLAND does NOT recommend use of high arch springs in single axle applications.

IMPORTANT: It is the installer's responsibility to select the correct mounting height. There should be 4-1/2" (114 mm) of vertical tire clearance with an unloaded vehicle. In addition, clearance must be provided at the side, front, and rear of the tires to prevent tire contact during suspension movement. The mounting heights, shown below, are nominal values and may vary due to variations in the leaf springs and other components.



RL SERIES

MAINTENANCE MANUAL

RL Series Top Mount Suspensions for Fixed Frame Trailer Applications

Maintenance Manual



*For Parts Information, refer to
Parts List (Part No. XL-AR405-01).*

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INTRODUCTION

This manual provides you information necessary for the care, maintenance, inspection, and safe operation of SAF-HOLLAND’s RL Series trailer air suspensions.

The SAF-HOLLAND Trailer Air Suspension is designed and engineered to provide trouble-free service. In the event of minor breakdown, such as a loss of air in the air springs, there are safety features designed into the suspension that will allow the vehicle to be driven CAUTIOUSLY at slow speed, to the nearest service facility.

This suspension uses air drawn from the tractor air system to pressurize the air springs. The height control valve regulates the air pressure required for varying loads and maintains the design ride height. This suspension can provide a cushioned ride throughout the load range, from empty to fully loaded.

The suspension also provides excellent side-to-side and axle-to-axle loading which helps equalize and control braking.

WARRANTY

Refer to the complete warranty for the country in which the product will be used. A copy of the written warranty is included with the product as well as on the SAF-HOLLAND Web Site (www.safholland.us)

It may also be ordered directly from the address shown on the back cover.

NOTES, CAUTIONS, AND WARNINGS

You must read and understand all of the safety procedures presented in this manual before starting any work on the suspension.

Proper tools must be used to perform the maintenance and repair procedures described in this manual. Many of these procedures require special tools.

Failure to use the proper equipment could result in personal injury and/or damage to the suspension.

Safety glasses must be worn at all times when performing the procedures covered in this manual.

Throughout this manual, you will notice the terms “NOTE,” “IMPORTANT,” “CAUTION” and “WARNING” followed by important product information. So that you may better understand the manual, those terms are as follows:

NOTE:

Includes additional information to enable accurate and easy performance of procedures.

IMPORTANT:

Includes additional information that if not followed could lead to hindered product performance.

CAUTION

Used without the safety alert symbol, indicates a potentially hazardous situation which, if not avoided, may result in property damage.

⚠CAUTION

Indicates a potentially hazardous situation which, if not avoided, may result in minor or moderate injury.

⚠WARNING

Indicates a potentially hazardous situation which, if not avoided, could result in death or serious injury.

SERIAL NUMBER TAG INFORMATION

Model Identification

The RL Series Suspension Serial Tag is normally located on the roadside frame bracket (**FIGURE 1**).

NOTE: This manual applies to the suspension series or the models listed on the front cover. However, we urge you to determine your specific model number, write that information below and refer to it when obtaining information or replacement parts.

NOTE: Refer to the serial number tag attached to the frame bracket for information.

Model Number _____

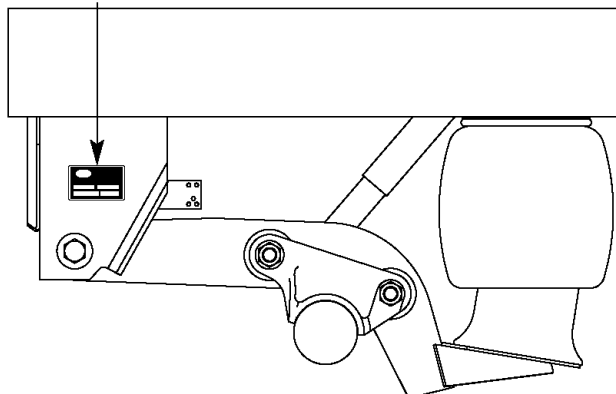
Parts List Number _____

Serial Number _____

In Service Date _____

FIGURE 1 Serial Number Tag Location

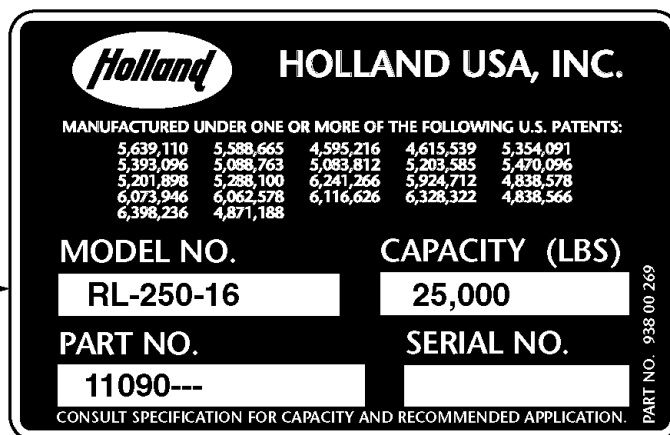
SERIAL NUMBER TAG
LOCATED ON ROADSIDE
FRAME BRACKET



Model Nomenclature

The sample tag shown below will help you interpret the information on the SAF-HOLLAND, USA, Inc. serial number tag. The model number is on the first line along with the suspension capacity. The second line contains the parts list number and serial number (**FIGURE 2**).

FIGURE 2 Serial Number Tag



NOTE: Some models have an additional designation after the ride height.

Example: RL-230-16-HMS (see below)

RL-250 - 16 - H M S

Special Features

HMS - Hanger Mounted Shocks
SBF - Shock Below Frame
SS - Single Stud Air Spring
OFS - Offset Stud Air Spring

Ride Height

12" (305mm)
13" (330mm)
14" (356mm)
15" (381mm)
16" (406mm)
17" (432mm)

Axle Capacity & Suspension Series

22,500 RL-228 Series
23,000 RL-230 Series
25,000 RL-250 Series
30,000 RL-300 Series

Model Nomenclature *continued*

To correctly identify the model requiring replacement parts, check the serial tag for any special feature designations (in **bold** below, also **FIGURE 3**). Identify suspension characteristics by breaking down each part number as shown in the examples below:

Example 1:

- RL-230-17-3-SS
- 230 = 23,000 lbs. axle capacity
 - 17 = 17" ride height
 - 3" = axle travel (up)
 - **SS** = Single stud air spring

Example 2:

- RL-230-15-4-HMS
- 230 = 23,000 lbs. axle capacity
 - 15 = 15" ride height
 - 4" = axle travel (up)
 - **HMS** = Hanger Mounted Shock
(only available with models having 4" of axle travel)

Example 3:

- RL-250-17-3-SBF
- 250 = 25,000 lbs. axle capacity
 - 17 = 17" ride height
 - 3" = axle travel (up)
 - **SBF** = Shock Below Frame

Example 4:

- RL-300-15-OFS
- 300 = 30,000 lbs. axle capacity
 - 15 = 15" ride height
 - **OFS** = Offset Stud Air Spring
(only available with models having 14", 15", and 16" ride heights)

How to Identify Your Suspension Model

When ordering replacement parts, it is important to identify the correct suspension model by noting any special feature designation. Refer to special feature designation at the end of the model number below the serial number tag on page 3.

If the serial number tag is missing, suspension model verification can be achieved by noting the characteristics of each suspension series.

Identifying an RL-228 Series: The equalizing beam has a distinctive shape at the air spring mounting plate area at the rear of the beam (see **FIGURE 3**).

Identifying an RL-230 Series: The equalizing beam has a distinctive shape (see **FIGURE 3**).

Identifying an RL-250 Series: Due to many variations within the RL Series family, closer inspection may be required to determine which model you have. The RL-250 standard suspension is shown below in **FIGURE 3**. If closer examination is required, check the shock absorber part number, which will be located at the base of the shock to assist in determining the ride height.

Identifying an RL-300 Series: Due to many variations and close resemblance to the RL-250 Series suspension, the RL-300 Series suspension requires closer examination by checking the shock absorber part number, which will be located at the base of the shock to assist in determining the ride height.

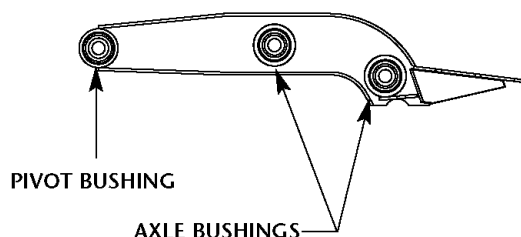
To correctly identify your specific model requiring replacement parts, proceed (1) by identifying the style of equalizing beam (**FIGURE 3**), and (2) by identifying the shock's mounting orientation and part number.

IMPORTANT: If you find you need further assistance with identifying your specific suspension model, reference *XL-AR405-01, RL Series - Parts List*.

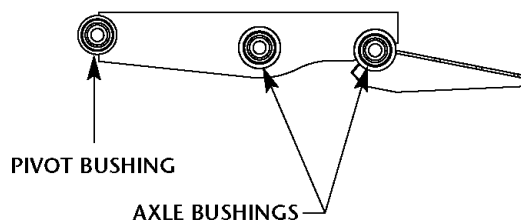
FIGURE 3

Equalizing Beam Styles

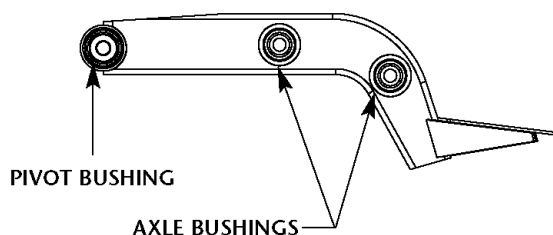
RL-228



RL-230



RL-250/300



SERVICE REPAIR KITS (SRK)

Common Replacement Parts Come in Service Repair Kits (SRKs)

To simplify ordering the correct number of common replacement parts, Service Repair Kits were formed to offer you proper components having correct quantities, making maintenance easier by doing tasks correctly the first time.

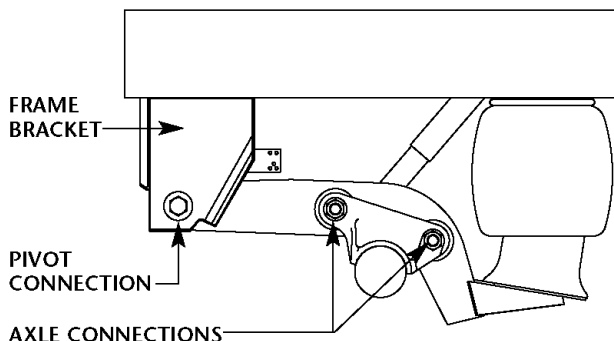
The RL Series suspension provides Service Repair Kits (SRK's) for the replacement of pivot/axle connections (**FIGURE 4**).

IMPORTANT: For easier field replacement of RL Series frame brackets the EZ-Align (non-welded) style frame bracket **must** be used to replace a welded alignment style frame bracket. Kit includes all pivot connection components, except the pivot bushings.

IMPORTANT: Check the head of the pivot bolt. Bolts have **1051, 1055** or **1069** on the bolt head, reducing the number of possible kits associated with your type of bolt (see *Pivot and Axle Connection Service Repair Kit Chart* on page 5 of XL-AR405-01).

FIGURE 4

Pivot and Axle Connections



Pivot and Axle Connection Rubber Bushings

IMPORTANT: When replacing the rubber bushings at these connections be sure the proper SAF-HOLLAND SRK (Service Repair Kit) is used as they contain all necessary parts to service one axle. It may be advantageous to service both pivot and axle connections at the same time. (See *Pivot and Axle Connection Service Repair Kit Chart* on page 5 of XL-AR405-01.)

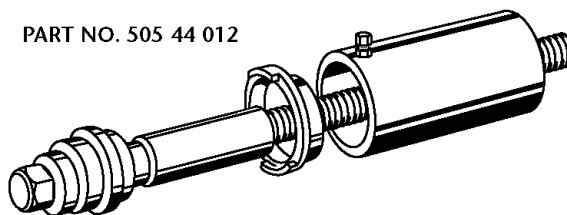
NOTE: The SAF-HOLLAND Bushing Service Tool, Part No. 505 44 012 (**FIGURE 5**), is available to ease removal and replacement of bushings. Contact your SAF-HOLLAND distributor or Parts List for details.

IMPORTANT: It is recommended that the vehicle be unloaded before beginning service procedures.

FIGURE 5

Bushing Service Tool

PART NO. 505 44 012



OPERATION AND MAINTENANCE INSTRUCTIONS

The RL Series Trailer Air Suspension models covered in this manual are controlled by a single height control valve (standard air control system). When properly adjusted, the height control valve will maintain a constant ride height by controlling the air pressure in the air springs to support the load being carried.

The trailer air pressure must be maintained in excess of 75 psig (5.2 bars) before operation. 75 psig (5.2 bars) is required to open the Air Pressure Protection Valve, which maintains safe air brake pressure in the event of an air loss in the suspension system.

In the event that an air loss should occur, it is recommended the Height Control Valve Linkage be disconnected to assure all air springs are completely deflated. The trailer can be temporarily operated on the air spring's internal rubber bumpers, which carry the load if there is tire clearance. In the event of inadequate air pressure, operate the trailer CAUTIOUSLY, at a slow speed, to the nearest place of repair. To deflate the air suspension, refer to page 15, step 2.

Before transporting the vehicle to a service center, check tire clearances. DO NOT operate the vehicle if any tire(s) is rubbing the vehicle.

⚠ WARNING Tire clearance must be maintained between tires and the nearest point of contact on the suspension or vehicle. Fire or loss of vehicle control could occur if clearances are not maintained which, if not avoided, could result in death or serious injury.

IMPORTANT

ROUTINE MAINTENANCE AND DAILY INSPECTION

Daily Inspection

Daily or before each trip, check the suspension to be sure it is fully operational. Visually inspect air springs for sufficient and equal pressure and to see that suspension is set at proper ride height. See page 10 for ride height measurement and re-setting instructions. Service as necessary.

Initial 5,000 Mile (8,000 km) Service Inspection

1. Suspension ride height (underside of frame to centerline of axle) MUST BE WITHIN $\pm 1/4"$ OF RECOMMENDED DESIGN HEIGHT. See page 10 for instructions on measuring ride height.

⚠ CAUTION An improperly set ride height could result in suspension component damage and/or poor vehicle ride performance.

2. After initial 5,000 miles (8,000 km) of service, inspect bolts and nuts at the pivot and axle connections to assure they are properly torqued. Check all other nuts and bolts for proper torque. Re-torque as necessary thereafter.
3. With vehicle on level surface and air pressure in excess of 75 psig (5.2 bars), all air springs should be of sufficient and equal firmness.

NOTE: Check all air control system fittings for air leaks, by applying a soapy water solution and checking for bubbles at all air connections and fittings.

Routine Physical Inspections

Every 100,000 Miles* (160,000 km) or 1 year, whichever comes first

When servicing vehicle brake system, inspect suspension components per pre-operational checklist on page 7. Also check all other suspension components for any sign of damage, looseness, torque loss, wear or cracks. Repair, tighten or replace damaged part(s) to prevent equipment breakdown.

Visual Inspection Procedure

***IMPORTANT:** A schedule for physical and visual inspections should be established by the operator based on severity of operation or damage to the vehicle could occur.

IMPORTANT: During each pre-trip and safety inspection of the vehicle, a visual inspection of the suspension should be done or damage to the vehicle could occur.

Visually check for:

- **Bolt movement** - loose dirt, rust or metal wear around bolt head and nut.
- **Air springs** - clearances, wear damage, and proper inflation.
- **Shock absorbers** - leaking or damaged.
- **Cracked parts or welds.**

PRE-OPERATIONAL CHECKLIST

Prior to placing unit in service, check the following items:

⚠ WARNING Failure to chock tires prior to beginning maintenance could allow vehicle rollaway which, if not avoided, could result in death or serious injury.

1. Build air pressure above 75 psig (5.2 bars). With the vehicle shut off, check the system for air leaks.
2. With the vehicle on a level surface and air supply pressure in excess of 75 psig (5.2 bars), check the air springs for equal firmness.
3. Check the shock absorbers for proper installation. The 3/4" shock absorber nuts must be torqued to specifications (see **TABLE 1 Torque Chart** on page 8).
4. The 1/2" and 3/4" air spring mounting nuts must be torqued to specifications (see **TABLE 1 Torque Chart** on page 8).
5. Check for 1" (25mm) minimum clearance around the air springs with vehicle loaded (**FIGURE 6**).
6. The 1 1/8" axle connection nuts must be torqued to specifications (see **TABLE 1 Torque Chart** on page 8).
7. The suspension ride height should be within $\pm 1/8$ " of the recommended design height. See "Height Control Valve Adjustment" on page 10 for the proper setting.

8. Visually check the welding of all axle adapters to axles — 1/2" (13mm) minimum fillet weld required (**FIGURE 6**).
9. Visually check the welding of all curbside fixed alignment pivot connections on both sides of frame bracket (**FIGURE 8**).

If welds are not present, weld the alignment plates in-board and out-board of the frame bracket per SAF-HOLLAND NS-65-07-CI specification—consult SAF-HOLLAND publication XL-AR353-01— and as shown in **FIGURE 8**. Weld all around with 5/16" (8mm) weld.

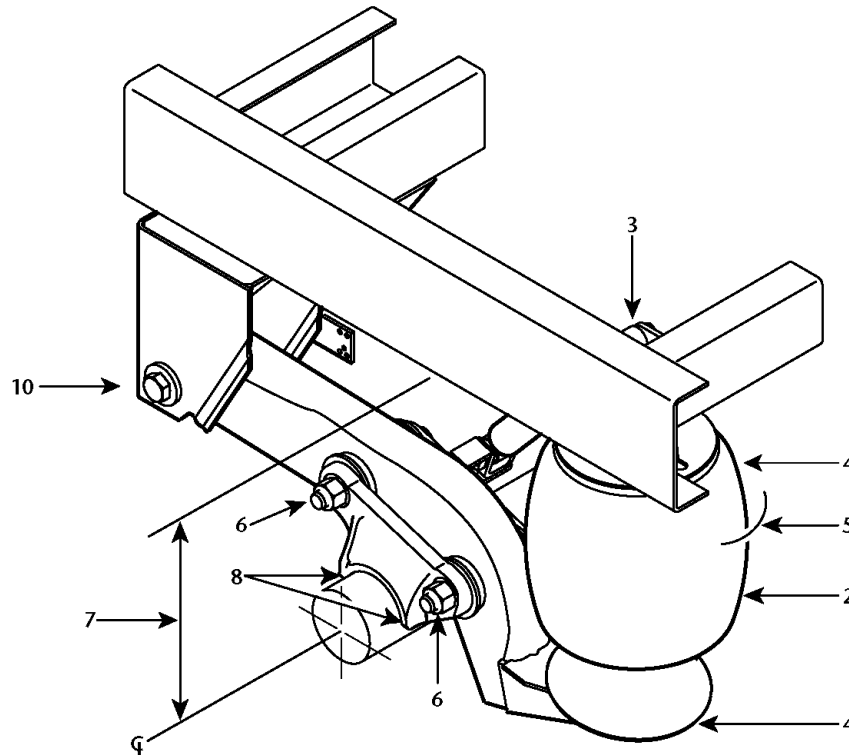
IMPORTANT: The EZ-Align design maintains proper alignment under correct torque without welding; DO NOT weld alignment blocks (**FIGURE 7**).

NOTE: EZ-Align pivot connections (non-welded) are on roadside and fixed alignment pivot connections (welded) are on curbside. However, some manufacturers use EZ-Align on both sides. See page 14 for "EZ-Align (Non-welded) Connection Axle Alignment" procedure.

10. A 1 1/8" pivot nut must be torqued to specifications (see **TABLE 2 Pivot Bolt Torque Chart** on page 8).

continued

FIGURE 6
RL Series Suspension Pre-Operational Checklist Items



PRE-OPERATIONAL CHECKLIST *continued*


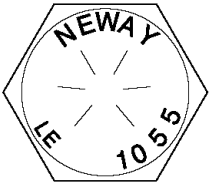
TABLE 1
Torque Chart

| SIZE | TORQUE FT. LBS. | TORQUE NM |
|----------------------|--------------------|--------------|
| 3/4" | 150 | 203 |
| 1 1/8" (Axle Conn.) | 800 | 1083 |
| 1 1/8" (Pivot Conn.) | See Table 2 | |
| 1/2" - Air Spring | 30 - 40 | 41 - 54 |
| 3/4" - Air Spring | 40 - 45 | 54 - 61 |

| BOLT SIZE | SOCKET SIZE |
|-----------|-------------|
| 1/2" | 3/4" |
| 3/4" | 1 1/8" |
| 1 1/8" | 1 1/16"* |

*Deep Well Socket

TABLE 2
Pivot Bolt Torque Chart

| IDENTIFIER | NEW PIVOT BOLT | OLD PIVOT BOLT |
|----------------------|--|---|
| Bolt Head Marking |  |  |
| Color | Silver | Black |
| Surface Appearance | Dry | Wet - Oily |
| Torque Specification | 550 FT. LBS. (745 Nm) | 800 FT. LBS. (1083 Nm) |

⚠ WARNING DO NOT torque **old** pivot bolt to the new torque specification of 550 ft. lbs. (745 Nm). Pivot may loosen causing premature wear or fracturing of the bolt and other suspension components that could result in a loss of vehicle control and could cause serious injury or death.

⚠ CAUTION DO NOT torque **new** pivot bolt to the old torque specification of 800 ft. lbs. (1083 Nm). Removal or loosening of pivot bolt for service, repair, or axle alignment may become difficult if the new bolt is torqued to 800 ft. lbs. (1083 Nm).

IMPORTANT: Torque requirements listed are for clean and lubricated threads.

Use of special lubricants with friction modifiers, such as Anti-Seize or Never-Seize, without written approval from SAF-HOLLAND Engineering will void warranty and could lead to premature bolt failure or other component issues.

FIGURE 7
EZ-Align (Non-welded) Axle Alignment
NON-WELDED STYLE SIDE VIEW

IMPORTANT: The EZ-Align design maintains proper alignment under correct torque without welding. See page 14 for "EZ-Align (Non-welded) Connection Axle Alignment" procedure.

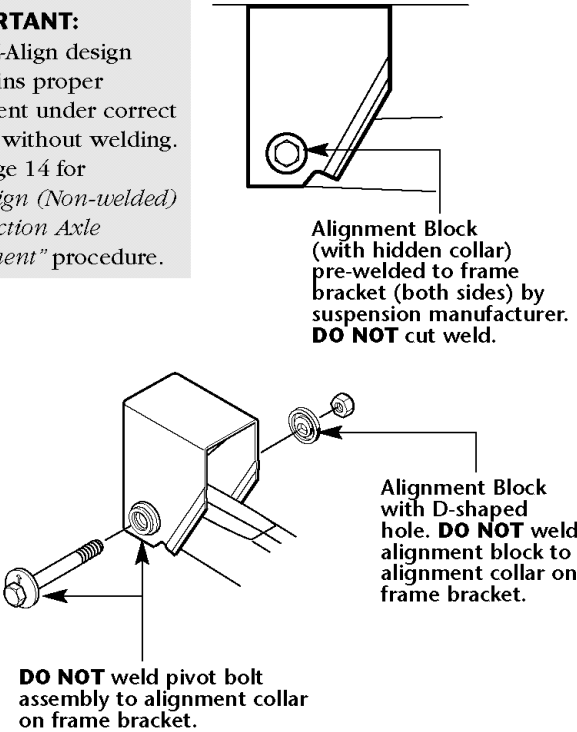
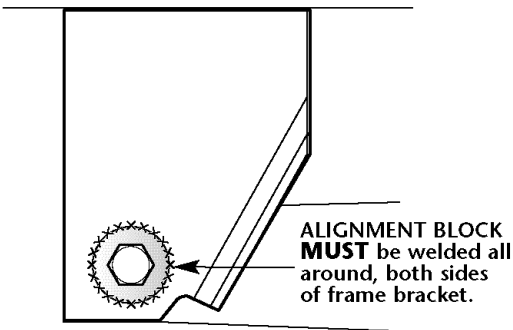


FIGURE 8
Welded Adjustable Axle Alignment
WELDED STYLE SIDE VIEW



STANDARD AIR CONTROL SYSTEM

The Air Control System shown (*FIGURE 9*) depicts a standard RL Series tandem piping diagram.

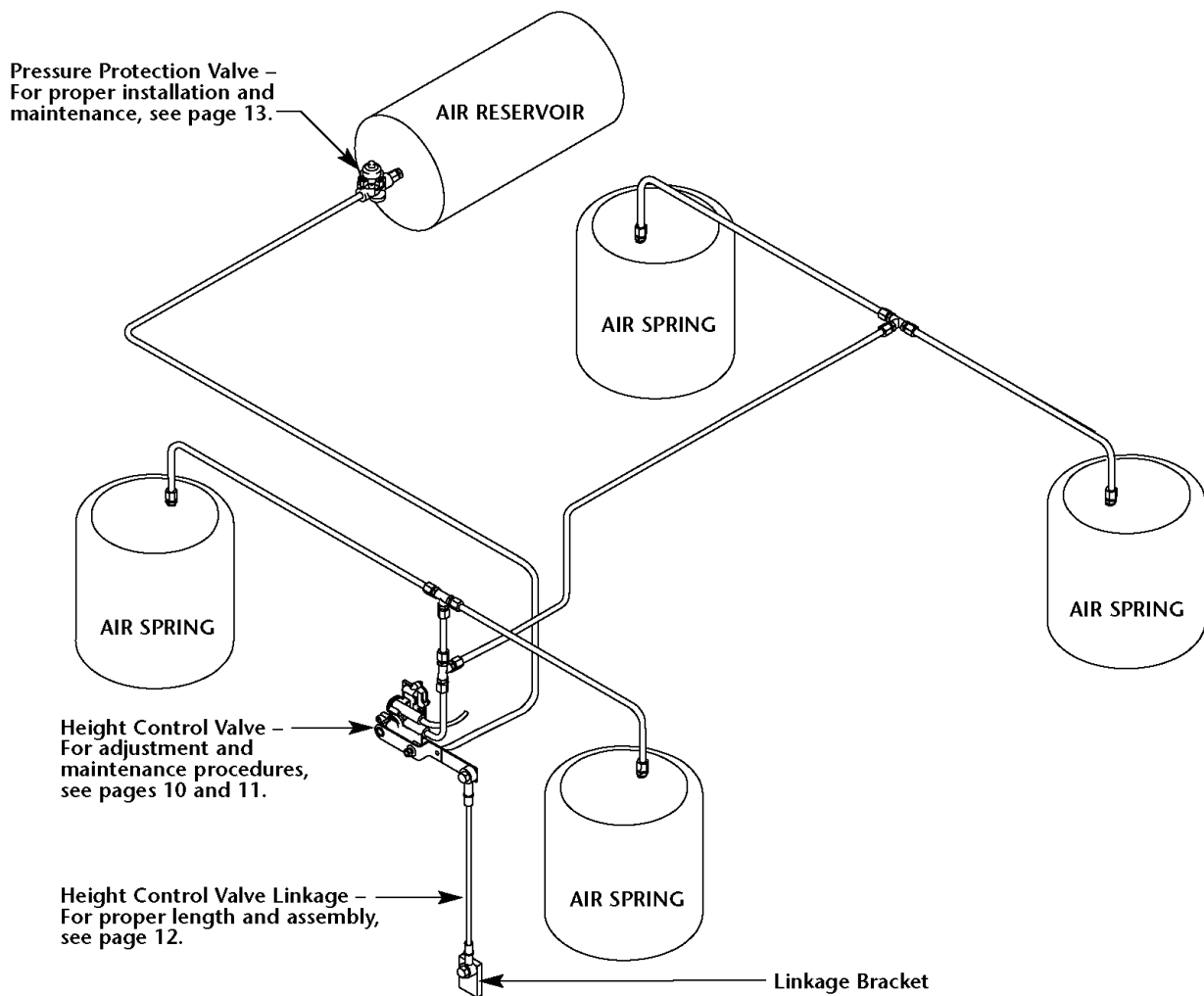
The air control system of the RL Series suspension uses air drawn from the tractor air system to pressurize the suspension's air springs. The suspension, working with the air control system, provides optimum suspension performance only when all air control system components are installed and operating properly.

The height control valve regulates the air pressure required for varying capacities of load. It is critical to make sure the height control valve is set at the proper suspension ride height (*FIGURE 11*). See pages 10-12 for height control valve detail.

A pressure protection valve is attached to the air reservoir and must be used to maintain proper air pressure. See page 13 for maintenance.

IMPORTANT: Air pressure protection valve maintains safe brake pressure. Approximately 75 psig (5.2 bars) opens valve, 65 psig (4.5 bars) closes valve (*FIGURE 9*).

FIGURE 9
Air Control System



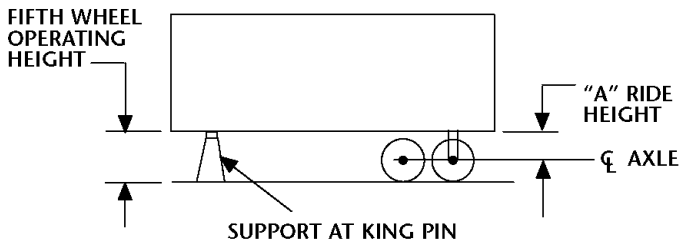
HEIGHT CONTROL VALVE INFORMATION

Adjustment Procedure for a One HCV System

⚠ WARNING Failure to properly support suspension during maintenance may allow suspension to fall which, if not avoided, could result in death or serious injury.

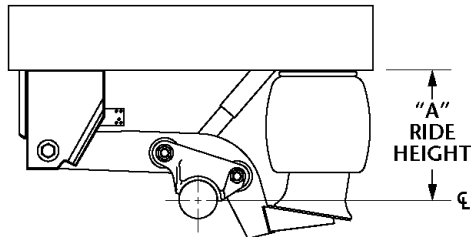
1. Prior to adjustment, the vehicle must be in an unladen condition on a level floor and supported on a king pin stand or coupled to a tractor (*FIGURE 10*). If supported with a king pin stand, front of trailer must be supported at operating height.

FIGURE 10
Trailer Supported at Fifth Wheel Height



2. Disconnect height control valve linkage to lower mounting bracket (*FIGURE 14*, page 12), move control arm to "up" (45°) position and hold for 10-15 seconds to raise vehicle (*FIGURE 12*). Return control arm to center (neutral) position (*FIGURE 13*).

FIGURE 11
Obtaining Proper Ride Height

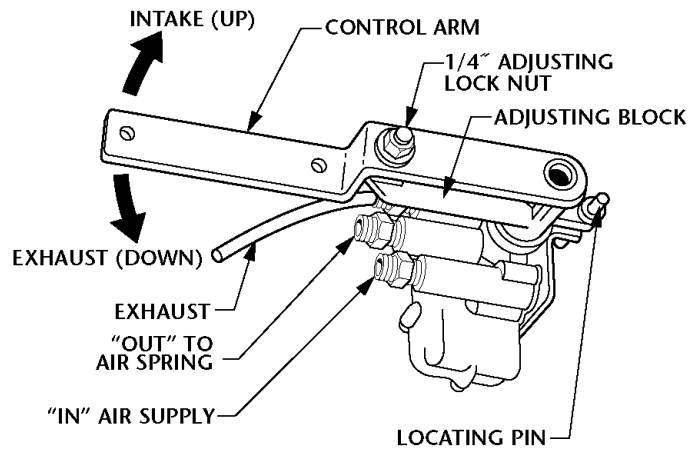


⚠ WARNING Failure to properly support suspension during maintenance may allow suspension to fall which, if not avoided, could result in death or serious injury.

NOTE: It may be necessary to shim jack stands to achieve proper ride height.

3. Place jack stands between the trailer frame and ground. Place one stand on each side at proper ride height (*FIGURE 11*). With jack stands in position, move control arm to 45° "down" position and lower vehicle and deflate all air from air springs and system. Return control arm to center (neutral) position and recheck for proper "A" ride height (*FIGURE 11*).

FIGURE 12
Height Control Valve



4. With the control arm in the center (neutral) position (*FIGURE 13*), insert locating pin into the adjusting block and bracket on the height control valve (*FIGURE 12*). Loosen the 1/4" adjusting lock nut located on the adjusting block (*FIGURE 12*). This will allow the control arm to move up and down approximately 1" (25mm).
5. Reconnect the lower linkage, and torque to 30-40 in. lbs. (3.75-5 Nm).
6. Retighten the 1/4" lock nut at the adjusting block to 30-40 in. lbs. (3.75-5 Nm).
7. Remove locating pin inserted in Step 4, then raise vehicle to remove the jack stands.

NOTE: The height control valve may be used as an improvised jack by disconnecting the linkage at the lower bracket. Move control arm 45° to an "up" position to raise vehicle and remove jack stands. Move control arm 45° to "down" position, completely exhausting system, then reconnect lower linkage, and torque to 30-40 in. lbs. (3.75-5 Nm). The suspension system will return to and maintain the proper ride height.

HEIGHT CONTROL VALVE MAINTENANCE

Height Control Valve Inspection

IMPORTANT: DO NOT grease height control valve.

1. Visually inspect the valve and linkage on a regular basis for proper clearance, operation and adjustment.
2. Dirt or foreign particles in the air line may harm the internal workings of the valve. Even though it contains a protective filter to eliminate foreign matter, normal air brake system maintenance should be practiced.
3. Drain moisture from air tank periodically. In severe cold weather an air dryer and/or an alcohol evaporator is recommended to avoid valve freezing and damage.

Height Control Valve Performance Check

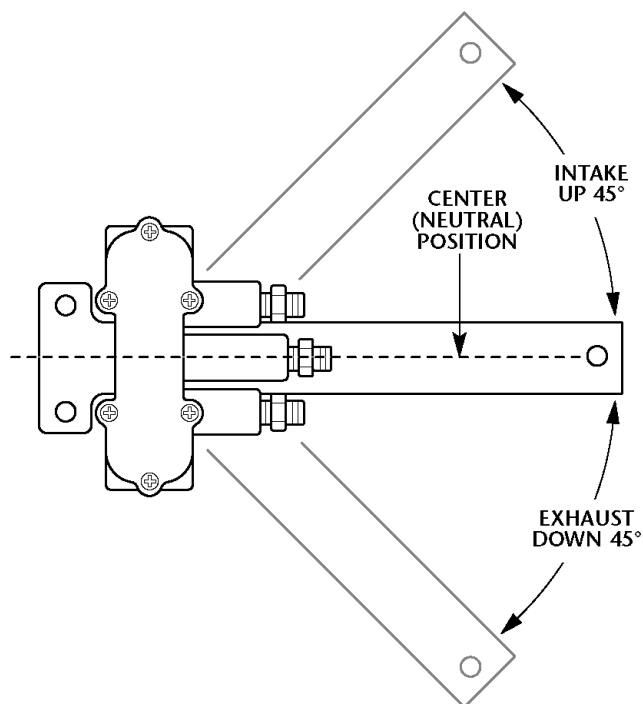
IMPORTANT: Proper inspection can eliminate unnecessary replacement of height control valve.

1. Apply air system pressure in excess of 75 psig (5.2 bars).
2. Disconnect lower connection of the link assembly from mounting bracket (**FIGURE 14**).
3. Move control arm up to 45° for 10-15 seconds - air should flow to air spring(s) (**FIGURE 13**).
4. Move control arm to center (neutral) position - valve should shut off air flow (**FIGURE 13**).
5. Move control arm down 45° for 10-15 seconds - air should exhaust (**FIGURE 13**).
6. Move control arm to center (neutral) position - valve should shut off air flow.
7. Valve is good if performance is as noted.

NOTE: If the valve does not perform correctly, replace the valve.

8. Reconnect lower link assembly to mounting bracket and torque to 30-40 in. lbs. (3.75-5 Nm).

FIGURE 13
Height Control Valve Performance Check



IMPORTANT: If 75 psig (5.2 bars) air system pressure cannot be achieved, check pressure protection valve and vehicle air compressor to see if they are operating properly. Also check the air lines for obstructions caused by dirt particles, foreign debris, ice, etc.

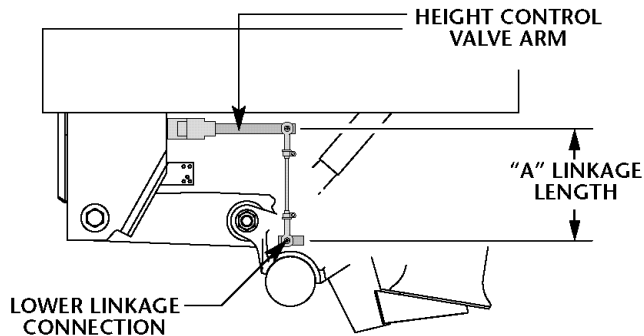
continued

Check Height Control Valve Linkage for Proper Length and Assembly

1. With suspension set at proper ride height, determine length of link assembly required ("A" Dim.) (FIGURE 15). This can be achieved by measuring the distance from center line of height control valve arm hole to center line of lower connection bracket hole (FIGURE 14).

IMPORTANT: "A" measurement must be taken with suspension set at proper ride height (see FIGURE 11 on page 10).

FIGURE 14
Linkage Length



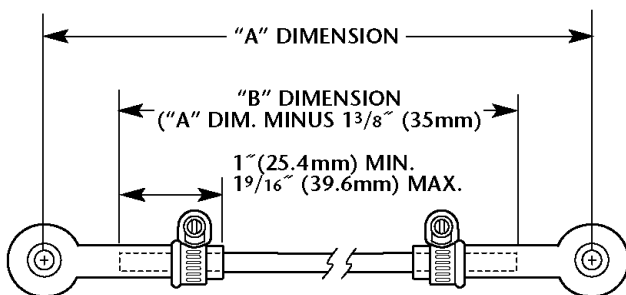
2. Determine length of rod required ("B" Dim.) by subtracting $1\frac{3}{8}$ " (35mm) from "A" Dim. (FIGURE 15).

Example:

$13\frac{3}{4}$ " (349mm) "A" Dim. minus
 $1\frac{3}{8}$ " (35mm) = $12\frac{3}{8}$ " (314mm)
 "B" Dim. is the length of the Rod required.

3. If new rod link is required, cut rod to length required; remove any sharp edges that may cause damage to the rubber link ends during assembly.

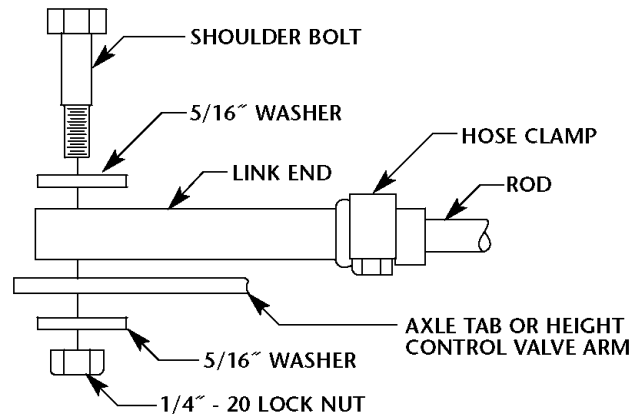
FIGURE 15
Determine Length of Link Assembly



4. Assemble clamps, link ends and rods as shown (FIGURE 15). Insert rod into link end equal distance both ends, observing the minimum and maximum tolerance. Be certain the link ends are aligned to each other (FIGURE 15).
5. With link ends properly aligned and link assembly at required length, tighten clamps.
6. Install link assembly.

IMPORTANT: 5/16" washers **must** be inserted between nut and control arm or axle tab bracket, 5/16" washer between bolt head and rubber link. Torque to 30-40 in. lbs. (3.75-5 Nm) (FIGURE 16).

FIGURE 16
Link End Assembly



PRESSURE PROTECTION VALVE

Proper Installation

The new Air Pressure Protection Valve (PPV) (**FIGURE 17A**) should be installed so that the air supplied from the Air Reservoir enters the port marked "IN" on the PPV. If the Optional valve is used (**FIGURE 17B**), the arrows on the bottom of the valve should point away from the Air Reservoir towards the air suspension, while making sure the Cap is in the upright (TOP) position.

Install air lines to the air suspension and support lines where necessary (**FIGURE 9**), using clip supports, grommets and bulk head fittings. When installing pressure protection valve (PPV), use a drop of oil or loctite to lubricate threaded connections. **DO NOT USE** a pipe compound or teflon tape as they may clog valve. After PPV has been installed, pressurize air system with a constant supply of air in excess of 75 psig (5.2 bars), and check all connections for air leaks (**FIGURE 9**).

Periodic Maintenance

IMPORTANT: Air pressure protection valves maintain safe brake pressure; **only** optional valve (905 54 107) cleans air by using a removable filter. Set at factory, approximately 75 psig (5.2 bars) opens the valve and 65 psig (4.5 bars) closes valve. (Attach PPV onto air reservoir—see **FIGURE 9**).

Drain all moisture from the Air Reservoir at regular intervals. Check the PPV for proper air flow. If optional PPV is used replace the filter every 3 months or when the air flow is reduced (**FIGURE 17B**).

The PPV must be checked for proper operation during each brake system inspection. The purpose of the valve is to maintain at least brake operating pressure in event of a serious air leak in the suspension system.

To test the PPV, charge the air system to 90+ psig and disconnect air line supply from downstream (suspension) side of PPV. Air should stop flowing through the PPV before the spring brakes begin to apply or before the tank pressure is reached.

IMPORTANT: If air does not stop flowing, replace the pressure protection valve.

FIGURE 17A
Pressure Protection Valve

PRESSURE PROTECTION VALVE,
905 60 109

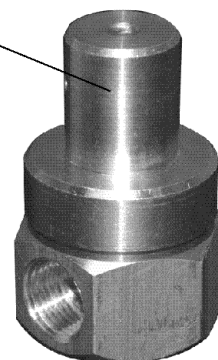
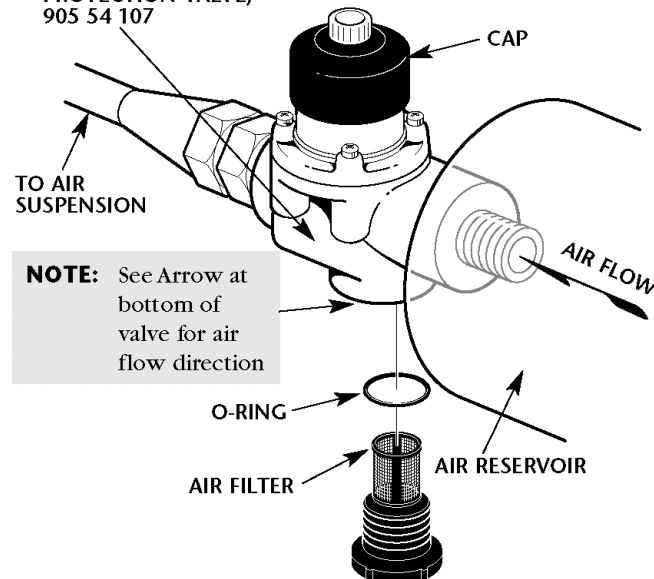


FIGURE 17B
Optional Pressure Protection Valve

PRESSURE
PROTECTION VALVE,
905 54 107

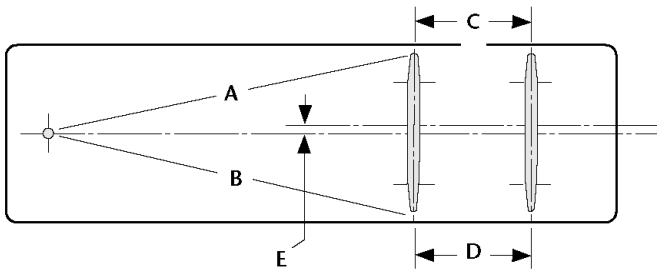


AXLE ALIGNMENT

IMPORTANT: Axle alignment can only be achieved if the frame bracket pivot holes are the same distance from the kingpin, left and right. Axle alignment should always be done while the trailer is empty.

1. To properly align the suspension, the trailer should be pulled in a straight line for a sufficient distance to insure there are no binds in the suspension.
2. Alignment can be achieved with an optical device designed especially for this purpose or manually by the following manner: Measure the distance from the king pin to the center line of the spindles on the front axles. It is recommended that spindle extensions be utilized. Dimensions A and B must be equal within 1/8" (3mm). Dimension E is equal to the distance between the trailer center line and the axle center line (*FIGURE 18*).

FIGURE 18
Slider Suspension Alignment



$$A = B \pm 1/8'' (3\text{mm})$$

$$C = D \pm 1/16'' (1.6\text{mm})$$

$$E \leq 1/16'' (1.6\text{mm})$$

EZ-Align (Non-welded) Connection Axle Alignment

1. Loosen the 1 1/8" pivot bolt connection nut (*FIGURE 19*).
- IMPORTANT:** DO NOT remove weld from bolt head.
2. Rotate bolt head clockwise to move axle forward (A arrows); counterclockwise to move axle rearward (B arrows) (*FIGURE 19*).
 3. Retorque the pivot bolt connection nut, no weld required (see *FIGURE 7* on page 8). See *TABLE 2 Pivot Bolt Torque Chart* on page 8.

IMPORTANT: DO NOT weld EZ-Align pivot bolt (alignment block) assembly to alignment collars on frame brackets (*FIGURE 20*).

FIGURE 19
EZ-Align

Alignment arrow indicates (neutral position of) alignment adjustment

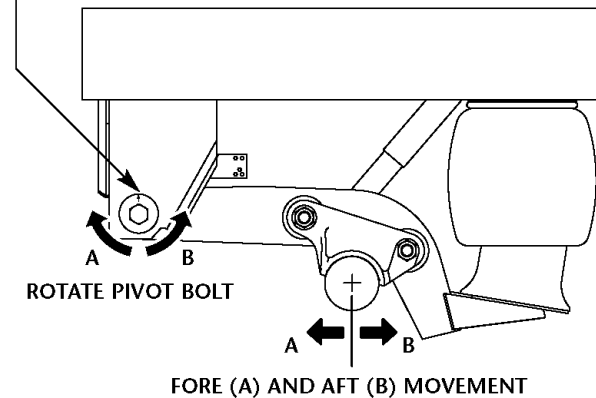
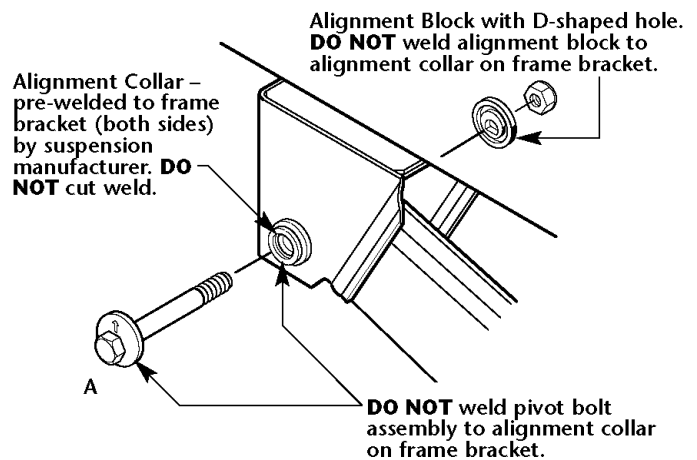


FIGURE 20
EZ-Align Non-Welded Style Assembly



IMPORTANT: The EZAlign design maintains proper alignment under correct torque without welding.

COMPONENT REPLACEMENT INSTRUCTIONS

Suspension Air Springs

IMPORTANT: Air springs must be replaced with the proper air spring for your application. Check the flexible member and piston for the part number. If the part number is not available, refer to **FIGURE 2** on page 3 to identify your specific model or refer to the OEM vehicle build specifications.

NOTE: For further assistance with air spring part number identification contact SAF-HOLLAND technical assistance at 888-396-6501.

IMPORTANT: It is recommended that the vehicle be unloaded before beginning service procedures.

1. Support vehicle frame with adequate jack stands. Set jack stand height at approximately 2" (51mm) above the suspension's specified ride height (**FIGURE 11** on page 10).

⚠ WARNING Failure to properly support suspension during maintenance may allow suspension to fall which, if not avoided, could result in death or serious injury.

NOTE: The height control valve may be used as an improvised jack by disconnecting the lower height control valve (HCV) linkage and moving the HCV control arm to "up" position to raise vehicle (**FIGURE 13** on page 11). With vehicle raised above the height specified in step 1, position jack stands under vehicle frame at OEM specified locations and move control arm to "down" position to lower vehicle onto jack stands. Hold control arm down until air springs are completely exhausted.

⚠ CAUTION Failure to completely exhaust air springs prior to removal may result in unexpected air spring movement which, if not avoided, may result in minor or moderate injury.

2. Exhaust air from suspension system by:
 - Automatic control – use height control valve by disconnecting link at lower connection, then rotate control arm to exhaust (approx. 45° down) position, or
 - Disconnect air supply line from air spring.

IMPORTANT: If air spring has a leak and is deflated, step 2 must still be performed.

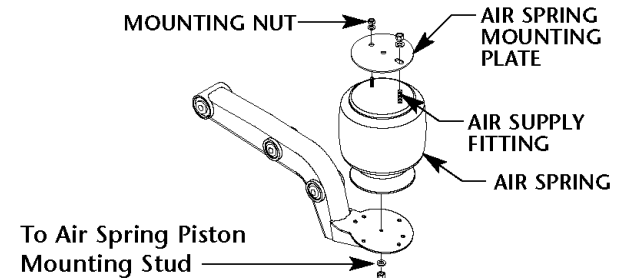
3. Disconnect and remove old air spring assembly (**FIGURE 21**).
4. Install new air spring assembly and torque fasteners (see *Torque Charts* on page 8).
5. Reconnect air supply line and link connections.
6. Recharge air system in excess of 75 psig (5.2 bars), and check system for leaks.

Suspension Air Springs *continued*

IMPORTANT: It is the responsibility of the air system installer to secure all air lines and check for any air leaks. If air leaks are detected, repair as required. Failure to eliminate the air leaks may compromise the suspension performance.

FIGURE 21
Suspension Air Spring

NOTE: Refer to RL Series Parts List, XL-AR405-01 for correct part replacements.



Shock Absorbers

IMPORTANT: Shock absorber must be replaced with the proper shock absorber. Check shock for part number. If part number is not available, refer to **FIGURE 2** on page 3 to identify your specific model (the last two digits of the model number relate to ride height), or refer to the OEM vehicle build specifications.

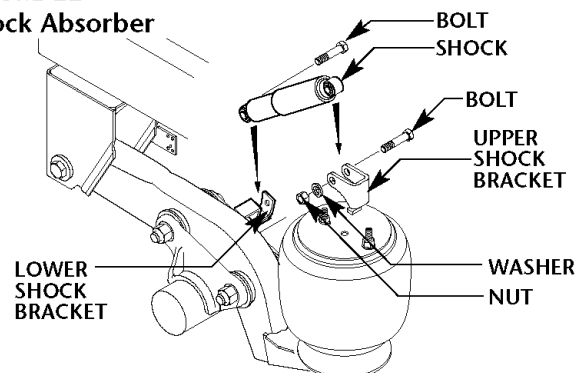
1. It is recommended the vehicle be unloaded. Block vehicle to prevent rolling.

⚠ WARNING Failure to chock tires prior to beginning maintenance could allow vehicle rollaway which, if not avoided, could result in death or serious injury.

2. Vehicle must be at model's specified ride height or below to assure that tension is relieved on shocks.
3. Remove upper and lower mounting bolts and shock absorber (**FIGURE 22**).
4. Replace with correct shock absorber and fasteners.
5. Torque nuts to 150 ft. lbs. (203 Nm) lubricated.
6. If ride height was changed, you must return the ride height to your model's ride height requirement.

continued

FIGURE 22
Shock Absorber

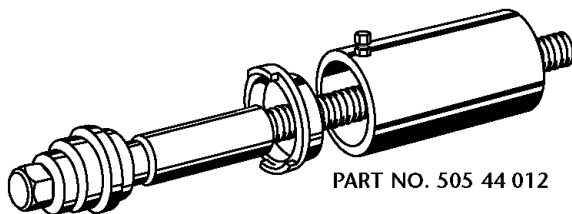


Pivot and Axle Connection Rubber Bushings

IMPORTANT: When replacing the rubber bushings at these connections be sure the proper SAF-HOLLAND SRK (Service Repair Kit) is used as they contain all necessary parts to service one axle (2 kits per tandem). Refer to Service Repair Kit section of RL Series Suspension Parts List (XL-AR405-01) for proper SRK. It may be advantageous to service both pivot and axle connections at the same time.

NOTE: The SAF-HOLLAND Bushing Service Tool, Part No. 505 44 012 is available to ease removal and replacement of bushings. Contact your SAF-HOLLAND distributor or Parts List for details.

FIGURE 23
Bushing Service Tool



IMPORTANT: It is recommended that the vehicle be unloaded before beginning service procedures.

1. Support vehicle frame with adequate jack stands. Set jack stand height at approximately 2" (51mm) above the suspension's specified ride height (**FIGURE 11** on page 10).

⚠ WARNING Failure to properly support suspension during maintenance may allow suspension to fall which, if not avoided, could result in death or serious injury.

NOTE: The height control valve may be used as an improvised jack by disconnecting the lower height control valve (HCV) linkage and moving the HCV control arm to "up" position to raise vehicle (**FIGURE 13** on page 11). With vehicle raised above the height specified in step 1, position jack stands under vehicle frame at OEM specified locations and move control arm to "down" position to lower vehicle onto jack stands. Hold control arm down until air springs are completely exhausted.

⚠ CAUTION Failure to completely exhaust air springs prior to removal may result in unexpected air spring movement which, if not avoided, may result in minor or moderate injury.

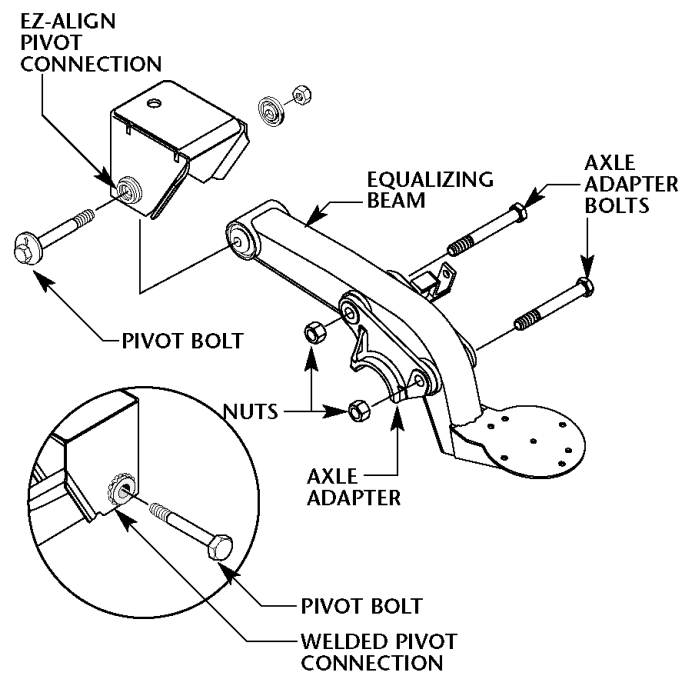
2. Exhaust air from the suspension system by:
 - Automatic control — use height control valve by disconnecting link at lower connection, then rotate control arm to exhaust (approx. 45° down) position, or
 - Disconnect air supply line from air spring.

3. If servicing all equalizing beam bushings, equalizing beam must be completely removed.

NOTE: If servicing the front pivot bushing only and using the SAF-HOLLAND Bushing Service Tool, remove the pivot bolts and rotate front of equalizing beams downward to gain access to bushing.

4. Disconnect air spring and shock absorber at lower connections.
5. Disconnect height control valve linkage at lower connection (**FIGURE 14**, page 12).
6. Disconnect front pivot and axle connection hardware then remove equalizing beam (**FIGURE 24**).

FIGURE 24
Pivot and Axle Connections



7. Inspect axle adapters for wear, cracks and failed welds. Axle adapters should have a 1/2" (13mm) (3 pass) fillet weld (refer to proper SAF-HOLLAND NS-65-83 or NS-65-86 specifications for RL Series). Replace all worn or cracked axle adapters.
8. Inspect equalizing beams for wear, cracks and failed welds. Replace cracked equalizing beams.

IMPORTANT: NEVER repair a cracked equalizing beam. DO NOT weld cracks. Secondary weld failures during use may cause loss of vehicle control.

⚠ WARNING Failure to replace a cracked equalizing beam may cause loss of vehicle control which, if not avoided, could result in death or serious injury.

continued

Pivot and Axle Connection Rubber Bushings *continued*

9. Press out old bushing(s) using a Bushing Service Tool, Part No. 505 44 012.

IMPORTANT: DO NOT use an open flame or other heat source to remove the bushings.

10. Clean out all foreign material from bushing receptacle(s). Lubricate new bushing(s) with approved lubricant, or a soap and water solution.

IMPORTANT: DO NOT use oil-based lubricant or brake fluid, as it can cause damage to the rubber.

FIGURE 25
Equalizing Beam Bushings Location

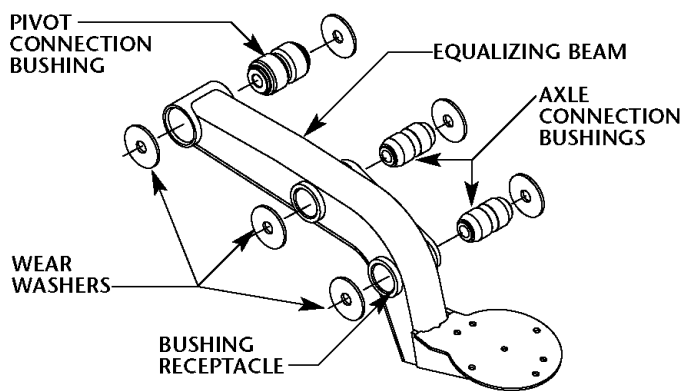


FIGURE 26
Centering Bushings in Equalizing Beam

Top View of Beam

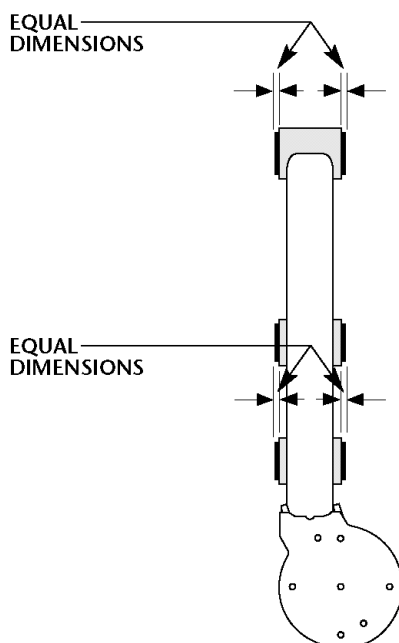
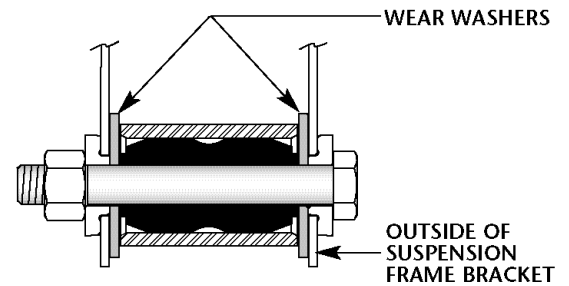
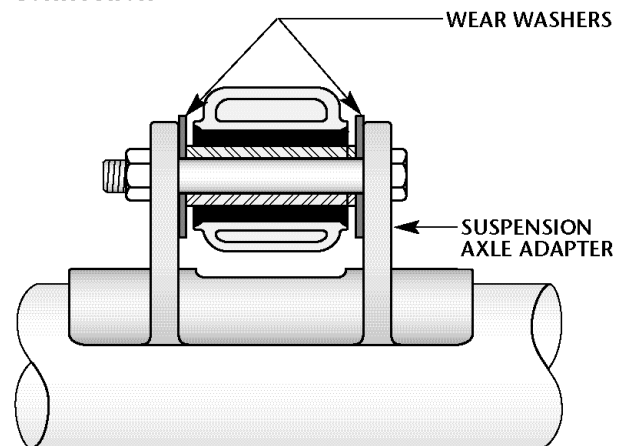


FIGURE 27
Wear Washer Locations

Pivot Connection



Axle Connection



11. Press new bushing(s) in beam. Bushing(s) must be centered in beam receptacles. It may be necessary to push bushing past center approximately 1" (25.4mm) and then re-center the bushing to relieve the rubber (FIGURES 25 and 26).
12. Re-install equalizing beam with new wear washers, bolts and nuts. Be sure to install wear washers in proper locations (FIGURE 27). Position at ride height and properly torque fasteners (see *Torque Charts* on page 8).
13. Reconnect air springs, shock absorbers and height control valve linkage. Properly torque fasteners (see *Torque Chart* on page 8).
14. Remove jack stands. Build system air pressure in excess of 75 psig (5.2 bars) and check for leaks in air system at all connections.

IMPORTANT: It is the responsibility of the air system installer to secure all air lines and check for any air leaks. If air leaks are detected, repair as required. Failure to eliminate the air leaks may compromise the suspension performance.

continued

Equalizing Beam

IMPORTANT: It is recommended that the vehicle be unloaded before beginning service procedures.

1. Support vehicle frame with adequate jack stands. Set jack stand height at approximately 2" (51mm) above the suspension's specified ride height (**FIGURE 11** on page 10).

⚠ WARNING Failure to properly support suspension during maintenance may allow suspension to fall which, if not avoided, could result in death or serious injury.

NOTE: The height control valve may be used as an improvised jack by disconnecting the lower height control valve (HCV) linkage and moving the HCV control arm to "up" position to raise vehicle (**FIGURE 13**) - page 11). With vehicle raised above the height specified in step 1, position jack stands under vehicle frame at OEM specified locations and move control arm to "down" position to lower vehicle onto jack stands. Hold control arm down until air springs are completely exhausted.

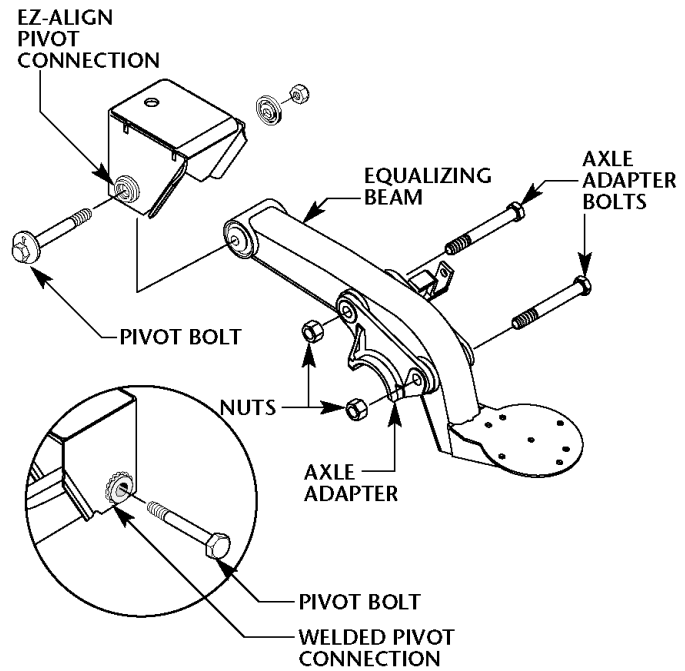
⚠ CAUTION Failure to completely exhaust air springs prior to removal may result in unexpected air spring movement which, if not avoided, may result in minor or moderate injury.

2. Exhaust air from the suspension system by:
 - Automatic control — use height control valve by disconnecting link at lower connection, then rotate control arm to exhaust (approx. 45° down) position, or
 - Disconnect air supply line from air spring.
3. Disconnect air springs, shock absorbers and height control valve linkage at the lower connections.
4. Disconnect front pivot and axle connection hardware then remove equalizing beam(s) (**FIGURE 28**).
5. Install new equalizing beam(s) with new wear washers, bolts and nuts. Be sure to install wear washers in proper location (**FIGURE 27**). Position at ride height and properly torque fasteners (see *Torque Charts* on page 8).
6. Reconnect air springs, shock absorbers and height control valve linkage. Properly torque fasteners (see *Torque Charts* on page 8). Check air system connections, including air springs for leaks.

IMPORTANT: It is the responsibility of the air system installer to secure all air lines and check for any air leaks. If air leaks are detected, repair as required. Failure to eliminate the air leaks may compromise the suspension performance.

7. Remove jack stands. Build system air pressure in excess of 75 psig (5.2 bars).

FIGURE 28
Pivot and Axle Connections



Frame Bracket

When replacing frame bracket(s), see RL Series Suspension Parts List Manual, XL-AR405-01, for correct Service Repair Kit.

1. Place jack stands at necessary height.

⚠ WARNING Failure to properly support suspension during maintenance may allow suspension to fall which, if not avoided, could result in death or serious injury.

2. Remove tires.
3. On the side of the trailer frame, mark the mounting location of the frame bracket to be replaced.
4. Remove old frame bracket.

IMPORTANT: Carefully air arc the welds connecting the frame bracket to the frame. **Do not** use frame if frame material is damaged. Repair the frame and then install the frame brackets.

⚠ WARNING Failure to repair damaged frame may cause damage to suspension with possible loss of vehicle control which, if not avoided, could result in death or serious injury.

5. Install a new frame bracket per location marks, and weld per SAF-HOLLAND NS-65-07-CI specification.
6. Realign trailer per instructions on page 14.
7. Reinstall tires and other suspension components, then remove jack stands.

TROUBLESHOOTING

| Problem | Possible Cause and Remedy |
|---|--|
| All air springs flat (no air). | <p>Insufficient air pressure to suspension. Build air pressure in excess of 75 psig (5.2 bars). Malfunctioning air pressure protection valve – test the valve using instructions on page 13. Replace if necessary. Check air compressor. HCV control valve not working – follow HCV inspection procedure (see page 11).</p> <p>Air leakage from the suspension air system or the air brake system. Test for air leakage due to loose fittings or damaged air lines, air springs, brake actuators or control valve. Tighten loose fittings to stop leakage and/or replace worn or damaged parts.</p> |
| Air springs deflate rapidly when vehicle is parked. | <p>Air leakage from the suspension air system. Test for air leakage due to loose fittings between air tank and air suspension or damaged air lines, air springs or height control valve. Apply a soapy solution to connections and air springs if necessary to check for bubbles (leaks). Tighten loose fittings to stop leakage and/or replace worn or damaged parts with new ones.</p> |
| Ride height too high or too low. | <p>Height control valve out of adjustment. Re-adjust the height control valve.</p> |
| Air springs ruptured. | <p>Tire, tire rim or brake component rubbing air spring. Check inside to inside tire dimension. There must be 1" (25.4mm) minimum clearance around air spring. If not, it may be necessary to reinstall suspension. Use tire rim back spacers to provide more clearance.</p> <p>Spring brake chamber rubbing air spring. Relocate chamber or rotate clamp ring for more clearance.</p> |
| Air spring failed. | <p>Continual or repeated over-extension of the air spring. Visually inspect for broken or loose shock absorber or shock absorber mounting bracket. Reconnect loose parts and replace any defective parts. Check the adjustment of the height control valves (see page 10).</p> <p>Air spring(s) worn out. Replace.</p> <p>Air leak or damaged line. Locate and repair. Air spring punctured or leaking – replace with proper air spring. Then check for proper clearance around air spring, 1" (25.4mm) minimum. Also check shock absorbers.</p> <p>"Temporary Operation." If air loss occurs in the air suspension system and after attempts to repair have failed to correct the problem, it is recommended that the Height Control Valve Linkage be disconnected and all air exhausted from the system. There is an internal rubber bumper built into the air spring which makes it possible to operate the vehicle cautiously while driving at a reduced speed to the nearest place of repair.</p> <p>Restricted air line(s) between the height control valve and the air spring(s). Disconnect the height control valve linkage and rotate the actuating lever to the 45° down position. If the air spring(s) remain inflated, check for pinched or blocked line(s).</p> |
| Front pivot connection worn and loose. | <p>Welded pivot alignment plate(s) not welded. Weld per installation instructions (see NS-65-78 and also <i>FIGURE 8</i> on page 8).</p> <p>Worn pivot alignment plate(s). If alignment plates are worn, replace and realign axles (see page 14).</p> <p>EZ-Align pivot alignment block(s) worn. If alignment blocks are worn, replace and realign axles (see page 14).</p> <p>Front pivot bolt loose. Connection not properly tightened, refer to page 7, step 10 for tightening procedure. Replace all worn or damaged components.</p> <p>Excessive lateral axle walk. 3/4" (19mm) is maximum. Axle connection bolts loose – properly tighten, see step 6 on page 7. Axle adapter welds failed – replace adapters or remove old welds and reweld. Refer to proper SAF-HOLLAND specifications for applicable model. Front pivot and/or axle connection bushings worn – replace with proper SRK (see RL Series Suspension Parts List Manual, XL-AR405-01).</p> |

continued

| Problem | Possible Cause and Remedy |
|--------------------------|---|
| Shock absorber failures. | Over-extending shock absorbers. Suspension set at improper ride height – re-adjust height control valve. Suspension mounted at wrong ride height – check specification sheet, or refer to page 10 for correct ride height and adjustment procedure. Wrong length or improper replacement shock absorber(s) – replace if necessary (see page 15). |
| Excessive tire wear. | Alignment plates are not welded, are worn, or the axle is out of alignment. Inspect for damage and replace components as necessary or realign and weld to specifications on welded style alignments. Realign and tighten to specifications on EZ-Align (non-weld) style alignments (see page 8). Loose or worn bushings at pivot or axle connection. Inspect for damage and replace components as necessary (see pages 16 and 17), or if loose, tighten connection(s) to proper specification (see page 8). Then, check axle alignment and realign if necessary (see page 14). If worn, replace with proper Service Repair Kit (see RL Series Suspension Parts List Manual, XL-AR405-01). Worn bushing tube ends and/or face of wear washers at axle connections. Contact SAF-HOLLAND Service Department. Suspension not properly installed. Contact SAF-HOLLAND Service Department and/or check Trailer manufacturer for proper suspension installation; correct where necessary. |



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LUBRICATION

Wheel-End Lubrication

This section provides information on lubricating Meritor trailer axle wheel-ends with oil. **Figure 14.2.**

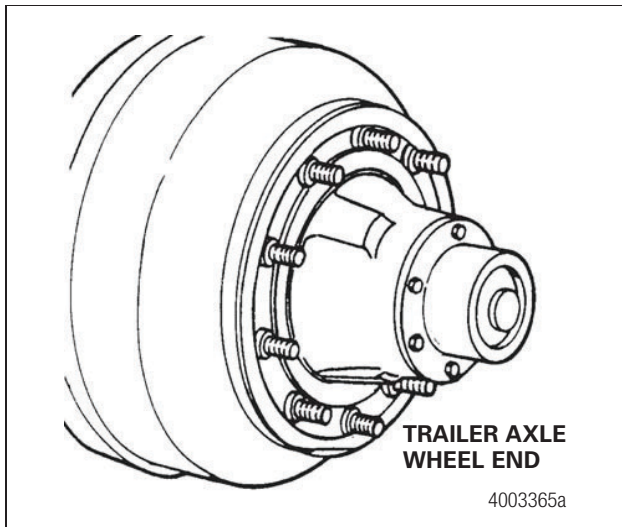


Figure 14.2

Oil Lubricated

1. The most common oils used in Meritor trailer axle wheel-ends have a designation of API-GL-5 (American Petroleum Institute – Gear Lubricant No. 5). This oil is also approved under military specification MIL-2105D. Refer to **Table L** in this section.
2. In addition to the GL-5 oils listed, oils with API grades GL-1, GL-2, GL-3 and GL-4 can also be used in trailer axle wheel-ends. These oils cannot be used in drive axles, or any application which employs hypoid, amboid, spiral, bevel, or planetary gearing.
3. Oil viscosity should be suitable for the climate in which the axle will be operated.
 - a. Low viscosity single grade gear oils, such as SAE 75W (Society of Automotive Engineers), should only be used in cold climates. Oil seals must be in excellent condition when using low viscosity oils to insure against loss of these thin fluids.
 - b. Multigrade oils, such as 80W/90, should be used where vehicles operate in both warm and cold climates.
4. Do not use thinning agents such as kerosene, gasoline, or other solvents that lower the viscosity of lubricants.
5. The recommended frequency of wheel-end oil changes depends on such factors as environment, speeds, and loads imposed on axle. For example, applications such as container chassis service put limited stress on wheel-end lubricant, allowing maintenance intervals to be extended. Other applications, such as off-highway dump trailer service, put severe stress on the wheel-end lubricant, requiring that maintenance be performed more frequently. The following information is therefore intended as a general guideline:
 - a. **General** – Change oil whenever it is contaminated or when wheel-end cavity is disrupted by removing spoke wheel or hub.
 - b. **Standard-Duty Service** – For standard-duty on-highway service, change oil every 100,000 miles or 12 months, whichever comes first.
 - c. **Heavy-Duty Service** – For heavy-duty on-highway, off-highway or combined on/off highway service, change oil every 30,000 miles or 6 months, whichever comes first.
6. Guidance for lubricating a wheel-end with approved gear oil (**Table L**) is as follows:
 - a. Coat bearing cones with oil.
 - b. Apply a light film of NLGI #1 or #2 **grease (not oil)** to axle spindle bearing journals to help protect them from fretting corrosion.

Figure 14.3.

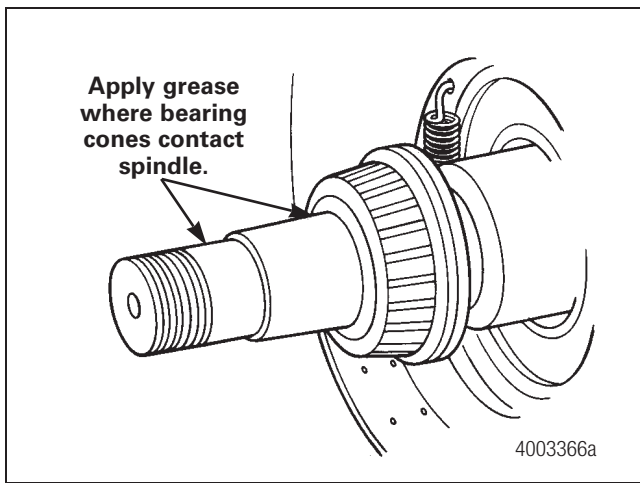


Figure 14.3



CAUTION

It is important not to overfill the wheel-end cavity with lubricant. Wheel-end oil level should never exceed the middle of the hubcap. Also, make sure any excess oil is wiped away since it can contaminate brake linings and cause poor brake performance.

- c. Fill wheel-end with an approved gear oil to hubcap fill line. Note that oil must be given sufficient time to settle prior to final check of oil level. This is especially important in cold conditions. **Figure 14.4.**

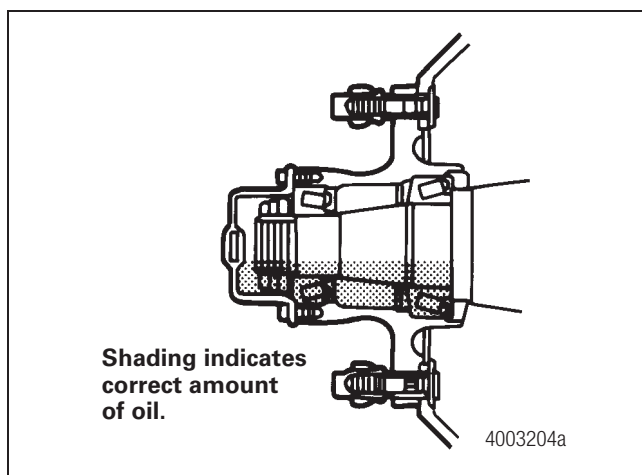


Figure 14.4

7. Inspect wheel-end oil level at least every 1,000 miles (1,600 km). To check, make sure vehicle is on level ground then clean hubcap window and observe oil level. Add lubricant if oil level is down more than 0.25 inch (6.3 mm) from fill line. **Figure 14.5.**

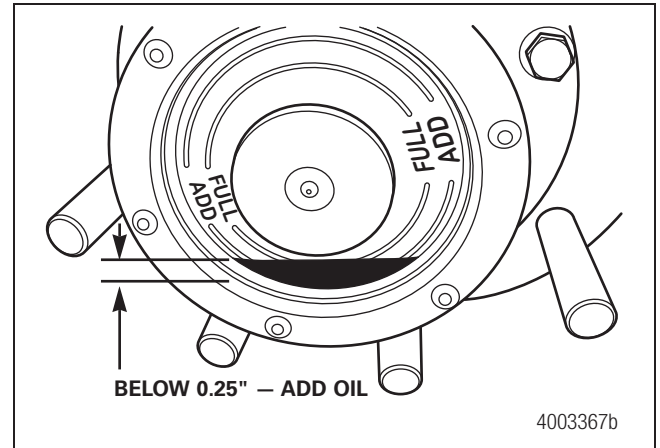
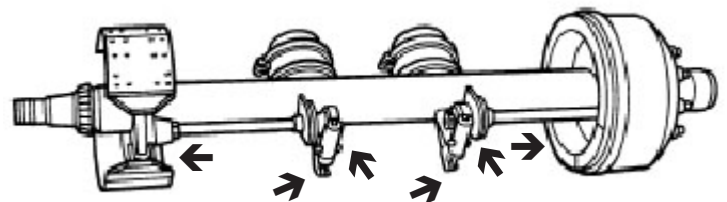


Figure 14.5

Greasing the Axle

On each axle there are six grease zerks that need to be greased every six months or every 10,000 miles. The grease zerks are located by the arrows shown below.



CAUTION

Make sure any excess grease or oil is wiped away since it can contaminate brake linings and cause poor brake performance. If necessary, clean the disc or the drum and replace contaminated linings.

Hinges on Back Door(s)

Generously grease hinges monthly. This will help to force moisture and dirt from the hinges.

Conventional Trailer Axle Wheel-End Lubrication Intervals and Specifications

Table L: Conventional Trailer Axle Wheel-End Oil Change Intervals and Specifications

| Check Oil Level | Oil Change* | Meritor Specification | Specification Approval | Oil Description | Outside Temperature | | | |
|-----------------------|---|--------------------------------|-------------------------------|------------------|---------------------|------|------|------|
| | | | | | °F | | °C | |
| | | | | | Min. | Max. | Min. | Max. |
| 1,000 miles (1600 km) | Linehaul and General Service: For 100,000 miles (160 000 km) or more a year, change the oil every 100,000 miles (160 000 km). For less than 100,000 miles (160 000 km) a year, change the oil once a year. Heavy Service: For 60,000 miles (96 000 km) or more a year, change the oil every 30,000 miles (48 000 km). For less than 60,000 miles (96 000 km) a year, change the oil every six months. Conditions That Require an Oil Change: Change the oil if the wheel end is disturbed during wheel or hub removal or if the oil is contaminated. | O-76-A Gear Oil | MIL-PRF-210 5-E and SAE J2360 | GL-5 SAE 85W/140 | -10 | None | -12 | None |
| | | O-76-D Gear Oil | | GL-5 SAE 80W/90 | -15 | None | -26 | None |
| | | O-76-E Gear Oil | | GL-5 SAE 75W/90 | -40 | None | -40 | None |
| | | O-76-J Gear Oil | | GL-5 SAE 75W | -40 | 35 | -40 | 2 |
| | | O-76-L Gear Oil | | GL-5 SAE 75W/140 | -40 | None | -40 | None |
| | | O-76-M Full-Synthetic Gear Oil | | GL-5 SAE 75W/140 | -40 | None | -40 | None |
| | | O-76-N Full-Synthetic Gear Oil | | GL-5 SAE 75W/90 | -40 | None | -40 | None |
| | | O-81 Full-Synthetic Oil | | SAE 50 | -40 | None | -40 | None |

*The recommended oil change interval is based on operating conditions, mileage, speeds and loads. Limited service applications may allow the recommended interval to be increased. Severe or heavy service applications may require the recommended interval to be reduced. For more information, contact the Meritor OnTrac™ Customer Call Center at 866-668-7221.

WIRING

Junction Box

Demco Gondola Trailers use a Truck-Lite 88 sealed wiring harness. A 7-pole nose box is used in conjunction with the wire harness.

Trailer Lights

The table below provides wire color codes for all trailers:

| | | | |
|--------------------|---------------------|--|----------------|
| Yellow - Left Turn | Brown - Tail Lights | Green - Right Turn | White - Ground |
| Red - Stop Light | Blue - A.B.S | Black - Clearance, Cluster and License Plate | |

CLEANING THE TRAILER

It is imperative trailers constructed of steel be kept clean of salt and other harmful elements. Failure to wash your trailer regularly and properly care for the paint and body may void any paint warranty claims if the trailer shows signs of neglect or abuse.

When cleaning the trailer use a mild soap and rinse. Wash underneath kingpin, suspension areas and outside walls.

Keeping your trailer clean will help rid your trailer of salt and other harmful elements. This will help keep your trailer looking new and improve it's resale value.

VISUAL INSPECTION

For safe operating conditions and longer component life make these visual inspections before the trailer is released for work. Remember the Department of Transportation mandates you do this inspection.

1. Check the angle of the chassis.
To get conditions for least tire wear, a loaded trailer must travel parallel to the highway. A level angle of the chassis permits correct wheel chamber without toe-in or toe-out.
2. Check the tires.
The tires of each dual wheel must be matched to a minimum of 0.125" (3.2 mm) of the same rolling radius and a minimum of 0.75" (19 mm) of the same rolling circumference. The tires also must have equal air pressures.
3. Check the brake drums and linings.
Both wheel ends of each axle must have the same type of lining and drum equipment. Both tandem axles also must have the same kind of lining and drum equipment.

NOTE: All Demco trailers are supplied with Meritor Q+™ brake linings.

4. Check the thickness of the brake lining.
The thickness of the brake lining must be the same on each shoe of the brake and on each side of the axle.
5. Check the brake system.
Apply the brake and check for air leaks at the brakes, air tanks, hoses and valves. When the brakes are applied, the brake shoes must move quickly and the lining must press against the drum. When the brakes are released, the brake shoes must retract fully.
6. Check for leaking lubricant at the wheel ends.
Leaking lubricant is caused by worn or damaged seal, or wrong gasket or seal installation.

GONDOLA TRAILER LIMITED GENERAL WARRANTY

This warranty applies to all gondola trailers manufactured by Demco. All goods manufactured by Demco shall be free from all defects in materials or workmanship under normal use and service, with loads not to exceed Manufacturer's rated capacity and speed. Applied only to the original owner, as evidenced by a completed warranty registration on file at Demco, for a period ending 12 months from the date of delivery.

THE WARRANTY REGISTRATION MUST BE COMPLETED AND RETURNED TO DEMCO WITHIN 30 DAYS OF DELIVERY OF THE PRODUCT TO THE ORIGINAL OWNER OR ALL WARRANTIES WILL BE NULL AND VOID.

All claims, for defective goods arising under this limited warranty, must be made in writing immediately upon discovery, but in no event, later than 12 months from the date of delivery to the original owner.

The limited warranty is the sole and exclusive warranty made or given by Demco in connection with the manufacture of sale of goods and is in lieu of all other warranties of any type or kind whatsoever, whether expressed or implied, written or oral. The provision hereof may not be modified, altered, or extended except in writing signed by an authorized representative of Demco.

- ♦ This warranty applies only to parts or components manufactured by Demco, which is defective in material or workmanship.
- ♦ This warranty does not cover normal maintenance, service or adjustments.
- ♦ This warranty does not cover depreciation or damage as a result of accident, negligent handling, inadequate maintenance, or improper operation.
- ♦ This warranty does not cover damage due to unauthorized modifications or repairs by purchaser prior to Demco inspection and approval.
- ♦ This warranty does not cover any purchased components such, as but not limited to; couplers, tires, axle assemblies, suspensions or any nonstandard feature or items specified by the purchaser.
- ♦ This warranty does not expand, enlarge upon, or alter in any way, the warranties provided by the manufacturers of purchased components.

In the event that a claim shall arise under this limited warranty, Demco may at its option repair the affected goods, replace the affected goods, or refund an equitable portion of the purchase price of the affected goods. The purchaser understands and agrees that, in the event of a defect in material or workmanship, the remedies are limited to repair or replacement, at Demco's option, such part or parts which examination shall disclose to manufacturer's satisfaction to have been defective.

All affected goods shall be held for inspection by Demco or its representatives and no claim hereunder shall be payable in connection with repairs made by purchaser prior to Demco's inspection or without Demco's prior consent.

No claim shall be payable under this limited warranty unless purchaser shall provide Demco with the following information in writing in a timely manner:

- ◆ VIN (Vehicle Identification Number) of affected goods.
- ◆ Number of days, weeks or months affected goods in service.
- ◆ Location of affected goods.
- ◆ Description and pictures of alleged defect.

In no event shall company be liable to purchaser for indirect, incidental or consequential damages or injuries including, but not limited to downtime, cost of labor or materials, loss of profits to purchaser's business or goodwill, resulting from breach of warranty hereunder and all damages resulting from defective goods, whether arising in tort, contract, or warranty except as specifically herein provided are waived by purchaser.

With respect to all other parts not manufactured by Demco, the respective manufacturers warranty will be assigned to the purchaser.

| | |
|-----------------------------|----------------------------------|
| Axle Beam | limited 5 years |
| Axle Hub & Bearing Assembly | limited 1 year |
| Spring Suspension | limited 5 years |
| Air Ride Suspension | limited 3 years |
| Landing Legs | limited 2 years |
| Anti-Lock Braking System | limited 3 years or 300,000 miles |
| Lights | limited 1 year |
| Valves | limited 6 months |

Tire Warranty can be found in the manifest holder on the kingpin.

There are no warranties for used products or products that have been repaired, altered, modified, overlooked, subjected to misuse, negligence, accident or ordinary wear and tear.

Operator is required to check wheel nuts, U-Bolts, radius rod bolts, and all other fasteners. Axle alignment, tire wear, and oil level in hubs must be inspected. If needed, operator should make proper adjustments to insure full life of equipment. **These item's need to be checked the first 100 miles and again at 500 miles and periodically thereafter.** These inspections and adjustments are very important and must be performed.

State and Federal Laws require a daily inspection of this vehicle by the operator.

Demco, products are sold without any express warranty except as set forth by this warranty.

This warranty is effective May 1, 2010 and supersedes all previous Demco, warranty policies.

Demco
1300 38th Avenue West
Spencer, IA 51301

NOTES

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DEMCO GONDOLA TRAILER LIMITED WARRANTY REGISTRATION

Your Gondola Trailer is covered by a limited warranty.
To initiate the warranty this form **MUST** be completed and returned to
Demco within **30 days** of delivery.

PLEASE PRINT OR TYPE

| | |
|---|-------------------------------|
| Owner's Name | Vehicle Identification Number |
| PO Box / Street Address | Trailer Description |
| City, State, Zip | Dealership Name |
| Telephone Number | City, State, Zip |
| Date of Purchase | Telephone Number |
| Intended Use: <input type="checkbox"/> Rental <input type="checkbox"/> Personal <input type="checkbox"/> Farm/Ranch <input type="checkbox"/> Commercial <input type="checkbox"/> Government | Dealer Representative |
| <p>The Owner's Manual has been given to me and explained. I have read and fully understand the safe operation and the proper servicing and maintenance of the above trailer and the terms of the limited warranty shown inside the manual.</p> <p>Purchaser's Signature: _____ Date: _____</p> | |
| <p>Pre-Delivery Service: This trailer was carefully prepared for delivery, inspected and adjusted according to factory recommendations before delivery to the retail purchaser.</p> <p>Delivery Service: The limited warranty was explained and a copy was presented to the retail purchaser along with the Owner's Manual.</p> <p>Dealer Representative Signature: _____</p> | |

Please mail to the following:

**DEMCO
4010 320 ST
BOYDEN, IA 51234**

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4010 320th St., Boyden, IA. 51234

Phone: (712) 725-2311

Fax: (712) 725-2380

Toll Free: 1-800-54DEMCO (1-800-543-3626)

**Demco warranty policies, operator manuals, and product registration
can be found online:**

www.demco-products.com

