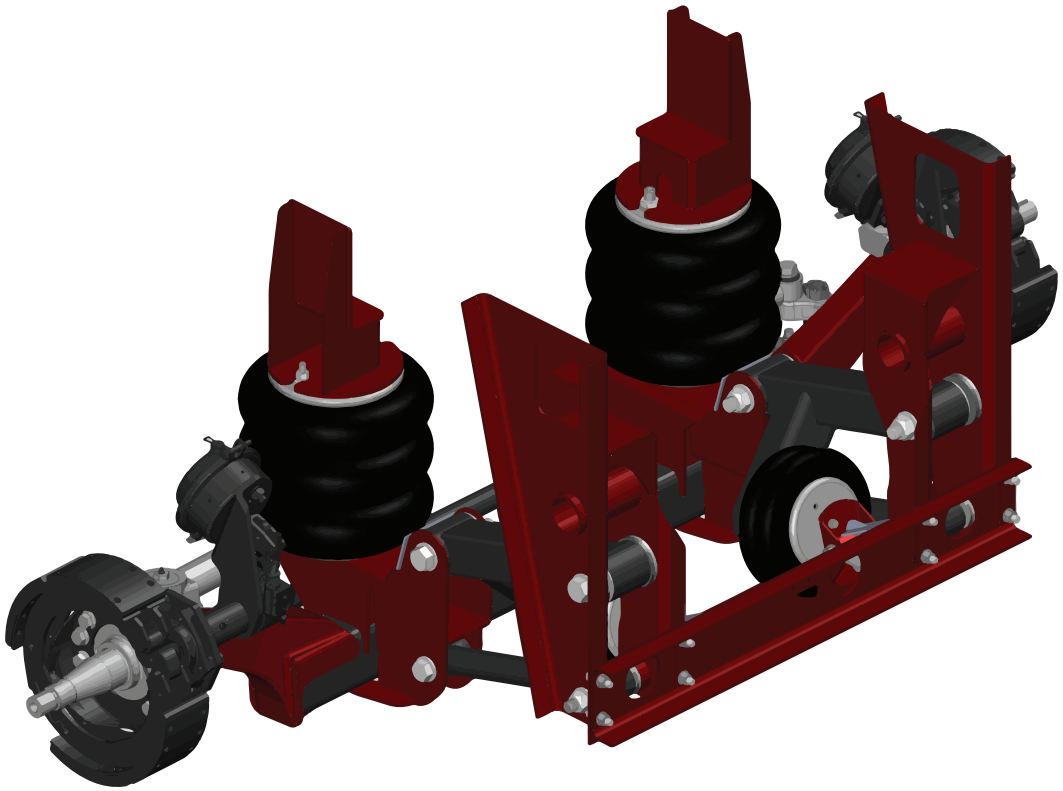
Reyco Granning SUSPENSIONS

LiftMaster Auxiliary Lift Axle — Owner's Manual

Model: ALAP-13 (PS)

Maintenance Instructions
Service Parts



Document #: D707183
Revision: A
Revision Date: 3/17

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Introduction

This Service Manual describes the correct Installation procedures for the ReycoGranning® LiftMaster auxiliary liftable suspension model ALAP13PS and ALAP13PSH, with 13,200 lbs. Gross Axle Weight Rating (GAWR). Overloading the suspension may result in adverse ride and handling characteristics.

You must read and understand all procedures and safety precautions presented in this manual before conducting any service work on the suspension.

It is important that the proper suspension be selected for the vehicle application. The required capacity, loaded frame to ground measurement, driveline clearance, axle travel, and axle spacing must all be taken into account.

ReycoGranning® uses the following types of notices for potential safety problems and to give information that will prevent damage to equipment.

⚠ WARNING

A warning indicates procedures that must be followed exactly. Serious personal injury can occur if the procedure is not followed.

⚠ CAUTION

A caution indicates procedures that must be followed exactly. Damage to equipment or suspension components and personal injury can occur if the procedure is not followed.

NOTE

A note indicates an operation, procedure or instruction that is important for correct service.

Special Notes

Proper tools must be used to perform the installation procedures in this manual. Some procedures require the use of special tools for safe and correct service. Failure to use the proper and/or special tools when required can cause personal injury and/or damage to suspension components.

⚠ CAUTION

The ALAP13PS and ALAP13PSH suspension systems, as with all air suspension systems, must be installed with the proper tire to ground clearance to insure trouble free operation. If there is too much ground clearance, the suspension will not carry its share of the load. Too little ground clearance may damage the suspension or other vehicle components.

You must follow your company safety procedures and use proper safety equipment when you service or repair the suspension.

The information contained in this manual was current at the time of printing and is subject to change without notice or liability. ReycoGranning® reserves the right to modify the suspension and/or procedures and to change specifications at any time without notice and without incurring obligation.

Defective or Incorrect components are to be returned to ReycoGranning® in exchange for replacement components, conditionally based upon warranty requirements being met.

For additional information concerning suspension selection, contact the ReycoGranning® Customer Service Department at (800) 753-0050.

Installer Responsibilities:

To insure that the vehicle will function properly under the increased weight conditions and loading that will exist when an additional axle is installed.

NOTE

A correct installation must result in a loaded ride height that is within the range specified on the ALAP13PS, ALAP13PSH, height chart.

To determine the correct location of the suspension in order to provide the proper vehicle load distribution.

To insure that the load carried by each axle on the vehicle does not exceed the rated capacity of the components involved or exceed State and Federal laws where the truck is operated.

To insure that proper clearance exists between:

- The drive shaft and the auxiliary axle on pusher units.
- Tires in the lateral, fore, aft, and vertical directions.
- Air springs when they are at their maximum diameter.
- Any other moving suspension components not listed.

No welding is permitted on any of the suspension components, except where specified by ReycoGranning®.

NOTE

The Vehicle manufacturer should be consulted before making any changes to the vehicles frame. Typically, cutting or altering the vehicles frame or side rail is not permitted and may affect the manufacturer's warranty coverage.

No alterations are permitted to any of the suspension components.

Suspension identification

The suspension model and serial number are stamped on an aluminum tag that is riveted to the suspension (Figure 1). The serial number is used by Reyco Granning® for control purposes and should be referred to when servicing the suspension or requesting technical support (Figure 2).

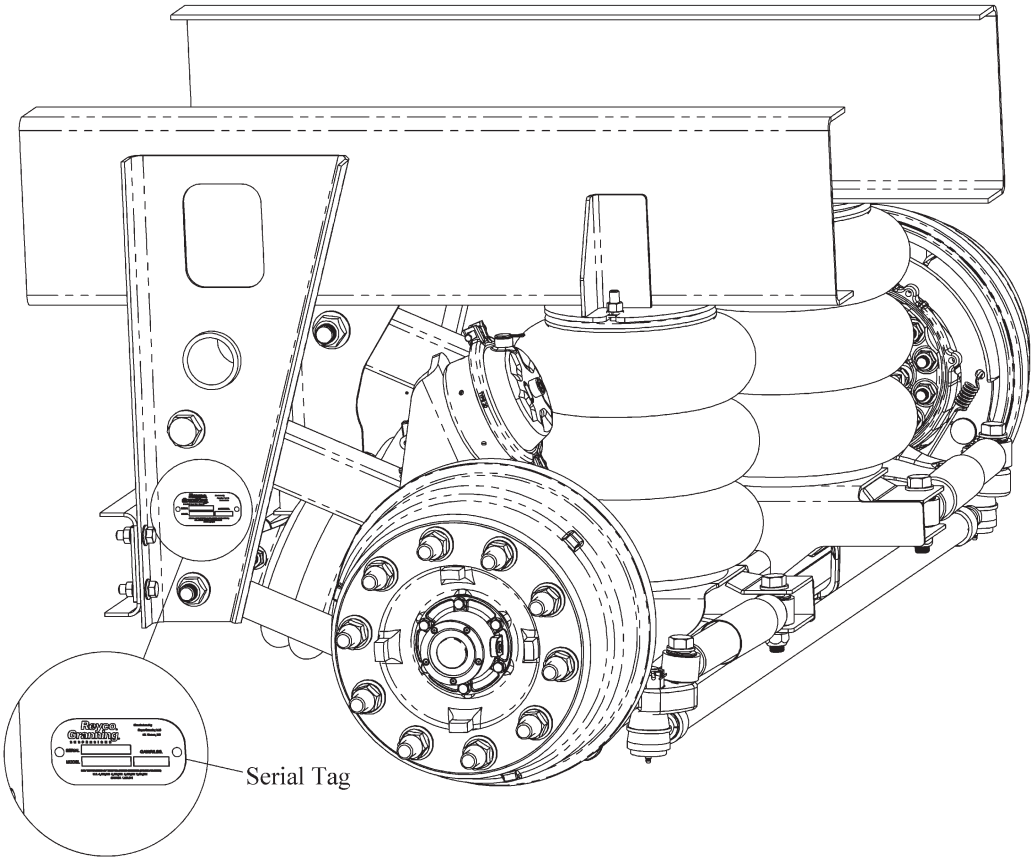


Figure 1- Suspension Identification Location
(ALAP13PS shown)

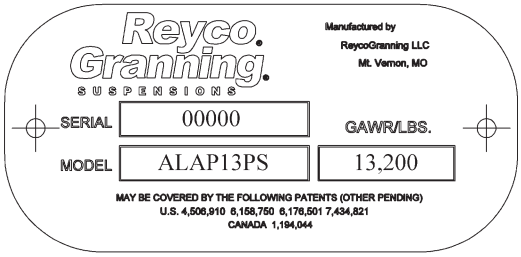


Figure 2 - Suspension Serial Number Tags

Required Supplies

The following materials and equipment are needed when installing ALAP13PS & ALAP13PSH auxiliary liftable air ride suspensions:

1. Recommended frame fasteners – 3/4" grade 8 flange bolts and 3/4″ Grade G prevailing torque nuts.
2. Torque wrench (should be capable of 450 Lb-Ft minimum for frame bolt installation)
3. Tape measure and tri-square.
4. Overhead hoist or Floor jack capable of lifting suspension.
5. Hammer and center punch.
6. A frame drill set up with a 25/32″ diameter drill bit for the frame bolts.
7. An air compressor.
8. An impact gun
9. Necessary air fittings, tubing and associated tools.
10. Socket set and wrenches sizes:

9/16″	15/16″
5/8″	1 1/8″
3/4″	1 5/16″
7/8″	1 1/2″

11. "C" clamps or bar clamps with minimum opening equal to the vehicle frame height.
12. Suspension assembly installation drawing and air system drawing.
13. Angle measuring instrument for measuring caster.
14. Wheel chocks
15. Jacks stands of the proper load rating for support of the frame.

Pre- Installation Checklist & Procedures

Before beginning the installation:

1. Check that the suspension you received matches the specification provided to you by your production or engineering department.
2. Verify that the suspension model configuration (height, width, and axle type) is compatible with the vehicles loaded frame to ground measurement, intended tire size and driveline clearance. (See the Table 2
3. Check Table 2 for the drive shaft clearance for your suspension and verify that the vehicles drive shaft does not protrude past the frame lower than that dimension at the desired installation location.
4. When using the chart, start at the row which most closely matches the vehicles *loaded* frame to ground dimension. Round up if needed.
5. Follow that row over to the number closest to the loaded tire radius. Round down if needed.
6. Follow that column down to the bottom to find the correct suspension model, drive shaft clearance, and axle lift.
7. On any auxiliary axle application:
   Verify that axle spacing conforms to Federal and local bridge laws.
   Verify that the auxiliary suspension location is based on front axle steering angle, vehicle wheelbase and maximum recommended auxiliary axle spacing from center of tandem. (See Table 3).

Verify that the vehicle will have the proper load distribution after installation.
Verify that there is sufficient fore/aft frame rail clearance to mount the auxiliary suspension(s).

8. On Truck frames:
   Verify that the frame width is within the allowable mounting range of the suspension (See Table 1).
   Mark the location of the Front Hangers & Air Spring Mounts on the frame rails. (See Figure 7a & 7b). Check for interferences with any existing brackets and bolts.
   Check for any interferences between the axle and the drive shaft, if applicable.
   Verify that the vehicle cross members and backing plates are correctly positioned for proper support of suspension.

⚠ WARNING

Adequate suspension support must be provided within the vehicle frame. See the suspension drawing for suggested frame crossmember locations.

9. Confirm that the components listed have been provided in sufficient quantities. (See Figure 3) Contact ReycoGranning® Customer Service Department if any missing or damaged components are found.

⚠ WARNING

When installing a kit, the customer supplied axle and related components must be in good working order and meet the original equipment manufacturer's specifications.

Components shipped:
1) (1) Lift Axle
2) (2) Ride Springs (boxed)
3) (2) Upper Air Spring Mount (boxed)
4) (1) Air Kit, if ordered (boxed)
5) (1) Air Springs Mounting Hardware (boxed)

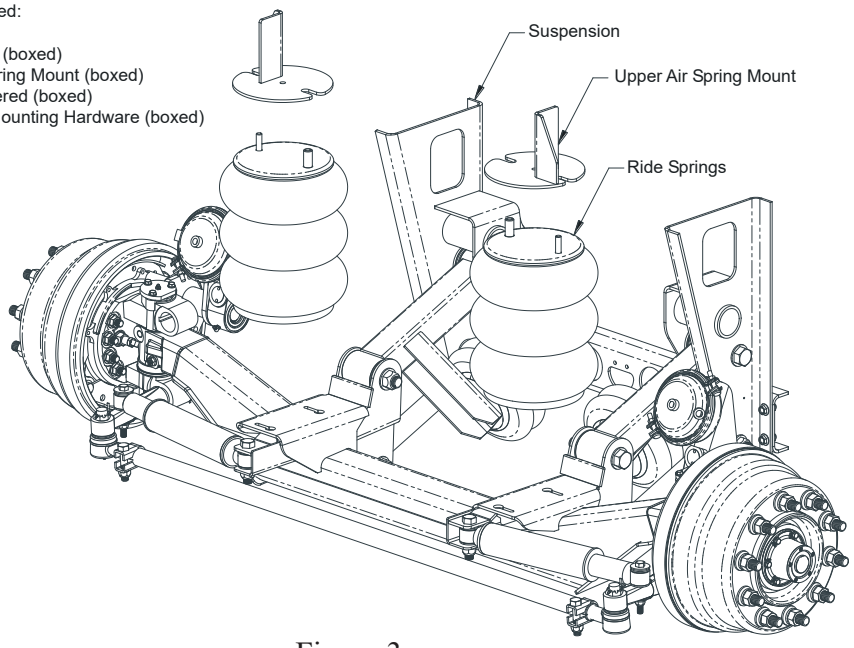
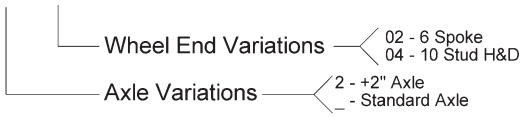


Figure 3

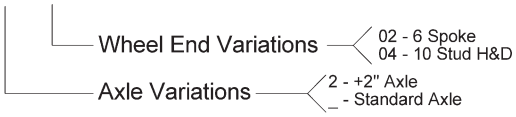
Axle Applications - Table 1

Unit Number
ALAP13PSX-0X



Unit No.	Frame Width	Axle Asy	Wheel Ends
ALAP13PS-02	33.50" - 35.00"	706031-02	6 Spoke
ALAP13PS-04		706031-04	10 Stud H&D
ALAP13PS2-02		706812-02	6 Spoke
ALAP13PS2-04		706812-04	10 Stud H&D

Unit Number
ALAP13PSHX-0X

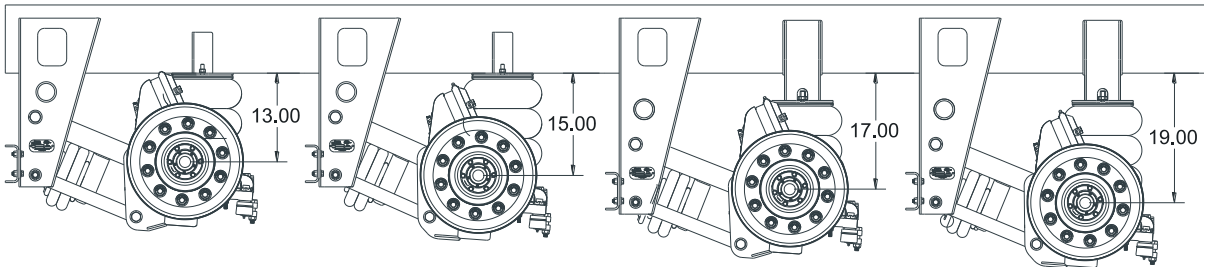


Unit No.	Frame Width	Axle Asy	Wheel Ends
ALAP13PSH-02	33.50" - 35.00"	706031-02	6 Spoke
ALAP13PSH-04		706031-04	10 Stud H&D
ALAP13PSH2-02		706812-02	6 Spoke
ALAP13PSH2-04		706812-04	10 Stud H&D

Application by Frame Height – Table 2

ALAP13PS / ALAP13PS2 / ALAP13PSH /ALAP13PSH2/ Axle Table 5.0" Drop

Loaded Vehicle - Bottom of Frame to Ground	Loaded Tire Radius (inches) - 5.0" Axle Drop																			
25.0	15.0																			
25.5	15.5	15.0																		
26.0	16.0	15.5	15.0																	
26.5	16.5	16.0	15.5	15.0																
27.0	17.0	16.5	16.0	15.5	15.0															
27.5	17.5	17.0	16.5	16.0	15.5	15.0														
28.0	18.0	17.5	17.0	16.5	16.0	15.5	15.0													
28.5	18.5	18.0	17.5	17.0	16.5	16.0	15.5	15.0												
29.0	19.0	18.5	18.0	17.5	17.0	16.5	16.0	15.5	15.0											
29.5	19.5	19.0	18.5	18.0	17.5	17.0	16.5	16.0	15.5	15.0										
30.0	20.0	19.5	19.0	18.5	18.0	17.5	17.0	16.5	16.0	15.5	15.0									
30.5	20.5	20.0	19.5	19.0	18.5	18.0	17.5	17.0	16.5	16.0	15.5	15.0								
31.0	21.0	20.5	20.0	19.5	19.0	18.5	18.0	17.5	17.0	16.5	16.0	15.5	15.0							
31.5	21.5	21.0	20.5	20.0	19.5	19.0	18.5	18.0	17.5	17.0	16.5	16.0	15.5	15.0						
32.0		21.5	21.0	20.5	20.0	19.5	19.0	18.5	18.0	17.5	17.0	16.5	16.0	15.5	15.0					
32.5			21.5	21.0	20.5	20.0	19.5	19.0	18.5	18.0	17.5	17.0	16.5	16.0	15.5	15.0				
33.0				21.5	21.0	20.5	20.0	19.5	19.0	18.5	18.0	17.5	17.0	16.5	16.0	15.5	15.0			
33.5					21.5	21.0	20.5	20.0	19.5	19.0	18.5	18.0	17.5	17.0	16.5	16.0	15.5	15.0		
34.0						21.5	21.0	20.5	20.0	19.5	19.0	18.5	18.0	17.5	17.0	16.5	16.0	15.5	15.0	
34.5							21.5	21.0	20.5	20.0	19.5	19.0	18.5	18.0	17.5	17.0	16.5	16.0	15.5	
35.0								21.5	21.0	20.5	20.0	19.5	19.0	18.5	18.0	17.5	17.0	16.5	16.0	
35.5									21.5	21.0	20.5	20.0	19.5	19.0	18.5	18.0	17.5	17.0	16.5	
36.0										21.5	21.0	20.5	20.0	19.5	19.0	18.5	18.0	17.5	17.0	
36.5											21.5	21.0	20.5	20.0	19.5	19.0	18.5	18.0	17.5	
37.0												21.5	21.0	20.5	20.0	19.5	19.0	18.5	18.0	
37.5													21.5	21.0	20.5	20.0	19.5	19.0	18.5	
38.0														21.5	21.0	20.5	20.0	19.5	19.0	
38.5															21.5	21.0	20.5	20.0	19.5	
39.0																21.5	21.0	20.5	20.0	
Axle Lift	**6.5**	**7.0**	**7.5**	**8.0**	**8.5**	**9.0**	**9.5**	**8.0**	**8.5**	**9.0**	**9.5**	**8.0**	**8.5**	**9.0**	**9.5**	**8.0**	**8.5**	**9.0**	**9.5**
Ride Height	**10.0**	**10.5**	**11.0**	**11.5**	**12.0**	**12.5**	**13.0**	**13.5**	**14.0**	**14.5**	**15.0**	**15.5**	**16.0**	**16.5**	**17.0**	**17.5**	**18.0**	**18.5**	**19.0**
D Shaft Clrn.	**8.3**							**10.3**				**12.3**				**14.3**			
Configuration	**ALAP13PS**							**ALAP13PS2**				**ALAP13PSH**				**ALAP13PSH2**			



ALAP13PS
Standard Seat
Standard Hanger

ALAP13PS2
+2″ Seat
Standard Hanger

ALAP13PSH
Standard Seat
+4″ Hanger

ALAP13PSH2
+2″ Seat
+4″ Hanger

Axle Location Chart

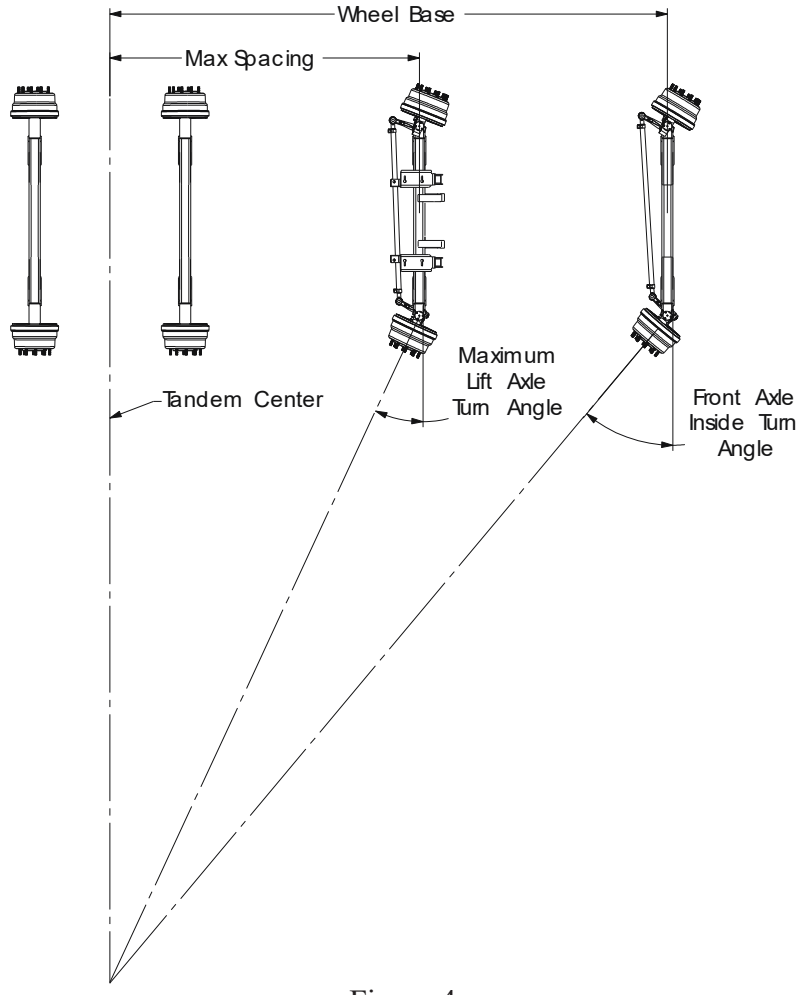


Figure 4

Auxiliary Suspension Location

1. Locate your wheelbase in Table 3 that best describes your vehicle.
2. Follow the row to the right column that most closely matches your vehicles maximum turn angle on the front inside wheel.

The number where these two meet is the maximum distance that the auxiliary axle may be positioned forward of the rear tandem center, or the center of the rear axle in single axle vehicles. (See figure 4)

Maximum Axle Spacing - Table 3

Vehicle Wheel Base	Front Axle Inside Turn Angle		
	30°	35°	40°
140″	113″	93″	77″
160″	129″	106″	88″
180″	145″	119″	100″
200″	161″	133″	111″
220″	177″	146″	122″
240″	193″	159″	133″
260″	209″	173″	144″
280″	226″	186″	155″

Frame Height Variations

ReycoGranning® provides a wide variety of suspensions to accommodate most common frame heights. The loaded frame to ground dimension and the intended tire size are used to find the correct ride height of the suspension.

The following formula may be helpful in finding the correct ride height:

Loaded Frame to Ground − Static Loaded Tire Radius = Required Ride Height

NOTE

The loaded frame to ground measurement should be acquired at the desired suspension location on a LOADED vehicle.

⚠ CAUTION

The ALAP13PS Suspensions are custom fit for a specific frame height. Using a spacer will result in component overload.

The suspension ride height is the distance between the center of the axle spindle and the bottom of the frame to which the suspension is attached. (See Figure 5.)

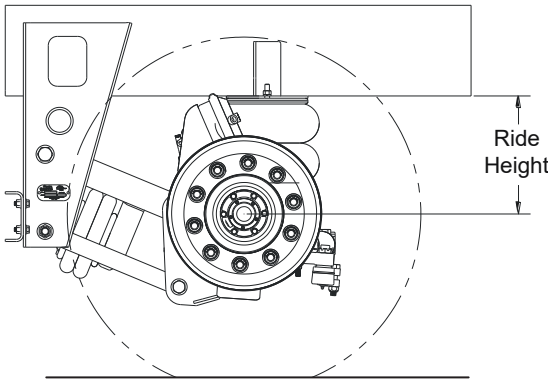


Figure 5

The installed suspension ride height must be within the range specified on the Height Table for the model being installed when it is in the LOADED condition.

⚠ CAUTION

Installing a suspension with an out of range ride height may result in insufficient axle lift, inadequate ground clearance, improper loading at the axle, and suspension component overload.

Frame Width Variations

The ALAP13PS & ALAP13PSH, are available in 1/4" width increments from 33 1/2" to 35". If you find that your suspension was not ordered to the correct frame width, it can be adjusted as desired (See Tables 4 and 5).

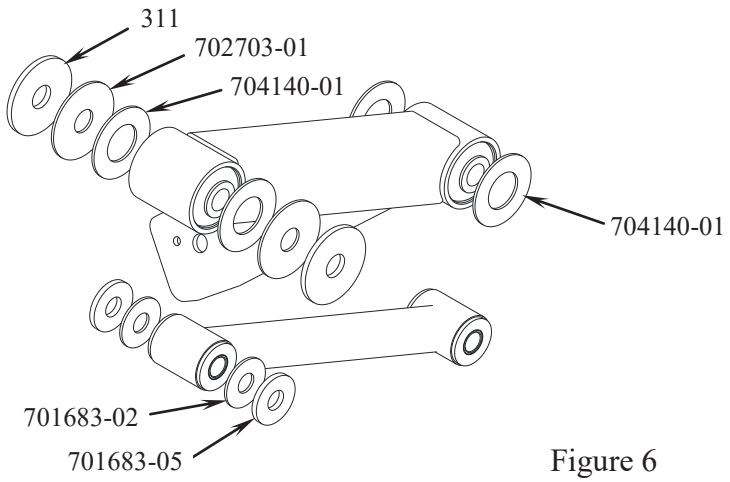


Figure 6

Upper Control Arm Spacer Configuration - Table 4

	Shim Spacer Installation Based on Frame Width @ Axle Saddle Pivot Bolts				
	Shim Spacer #702703-01 is .125 thick				
	Shim Spacer #311 is .250 thick				
	Frame Width	Susp. Left Hand		Susp. Right Hand	
#		Outboard	Inboard	Inboard	Outboard
1	33.50"	702703-01	(3) 702703-01 / 311 / 311	(3) 702703-01 / 311 / 311	702703-01
2	33.75"	(2) 702703-01	(2) 702703-01 / 311 / 311	(2) 702703-01 / 311 / 311	(2) 702703-01
3	34.00"	702703-01 / 311	(3) 702703-01 / 311	(3) 702703-01 / 311	702703-01 / 311
4	34.25"	(2) 702703-01 / 311	(2) 702703-01 / 311	(2) 702703-01 / 311	(2) 702703-01 / 311
5	34.50"	(3) 702703-01 / 311	702703-01 / 311	702703-01 / 311	(3) 702703-01 / 311
6	34.75"	(2) 702703-01 / 311 / 311	(2) 702703-01	(2) 702703-01	(2) 702703-01 / 311 / 311
7	35.00"	(3) 702703-01 / 311 / 311	702703-01	702703-01	(3) 702703-01 / 311 / 311

Lower Control Arm Spacer Configuration - Table 5

	Shim Spacer Installation Based on Frame Width @ Axle Saddle Pivot Bolts				
	Shim Spacer #701683-02 is .125 thick				
	Shim Spacer #701683-05 is .250 thick				
	Frame Width	Susp. Left Hand		Susp. Right Hand	
#		Outboard	Inboard	Inboard	Outboard
1	33.50"	701683-02	(3) 701683-02 / (2) 701683-05	(3) 701683-02 / (2) 701683-05	701683-02
2	33.75"	(2) 701683-02	(2) 701683-02 / (2) 701683-05	(2) 701683-02 / (2) 701683-05	(2) 701683-02
3	34.00"	701683-02 / 701683-05	(3) 701683-02 / 701683-05	(3) 701683-02 / 701683-05	701683-02 / 701683-05
4	34.25"	(2) 701683-02 / 701683-05	(2) 701683-02 / 701683-05	(2) 701683-02 / 701683-05	(2) 701683-02 / 701683-05
5	34.50"	(3) 701683-02 / 701683-05	701683-02 / 701683-05	701683-02 / 701683-05	(3) 701683-02 / 701683-05
6	34.75"	(2) 701683-02 / (02) 701683-05	(2) 701683-02	(2) 701683-02	(2) 701683-02 / (02) 701683-05
7	35.00"	(3) 701683-02 / (2) 701683-05	701683-02	701683-02	(3) 701683-02 / (2) 701683-05

Installation Procedures

Before installing the suspension

1. Review the Pre-Installation Section
2. Position the vehicle on a level firm surface.
3. Check vehicle rake angle. If truck is sloped more than 2 degrees forward, see Castor Angle section before drilling any holes in the frame.
4. Determine the desired location of the auxiliary axle and mark frame on the outside surface at the front edge of the front hanger as shown in Figure 7a. Repeat for opposite side as shown in Figure 7b. For ALAP13PSH see Figure 7c.

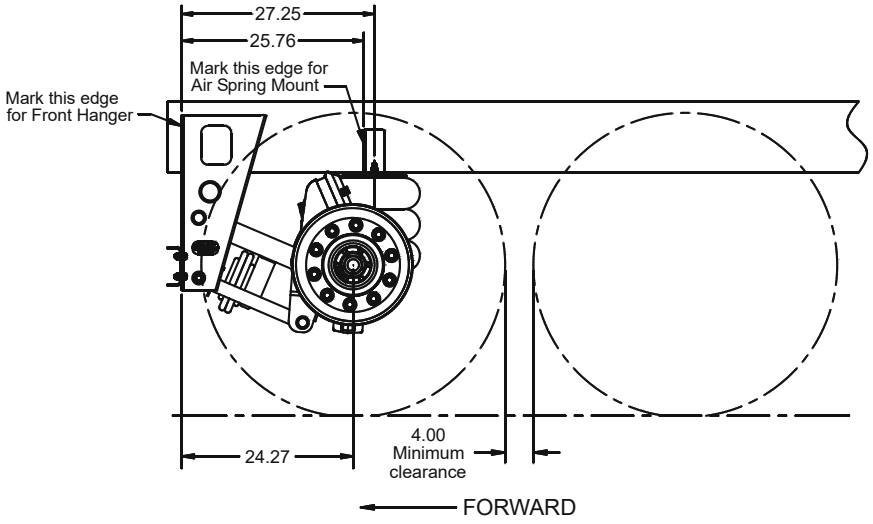


Figure 7a
ALAP13PS Driver side
(Std. hanger)

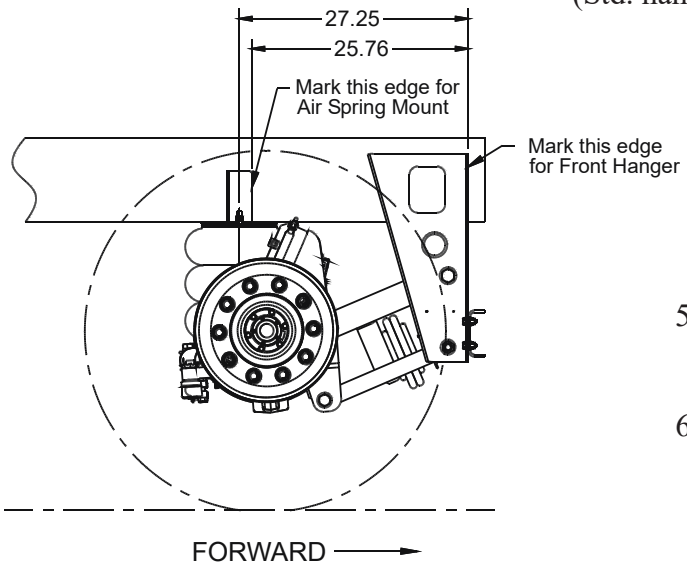


Figure 7b
ALAP13PS Passenger side
(Std. Hanger)

5. Check frame for any interfering hardware in the area of installation. Correct any interference noted.
6. Check that cross members and backing plates are correctly positioned for the intended axle location (See Figure 8 and 9).

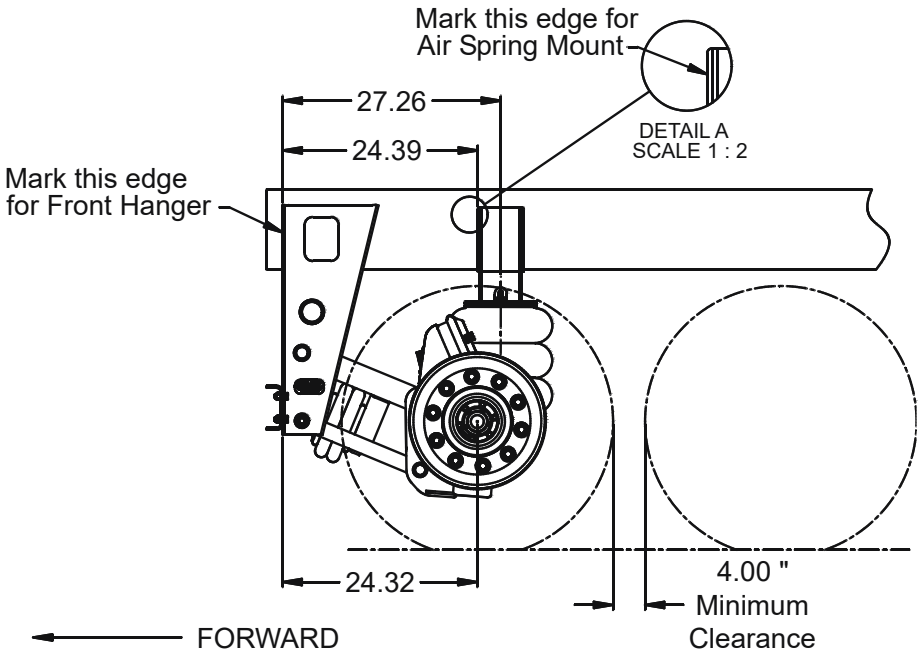


Figure 7c
ALAP13PSH Driver side
(+4″ Hanger)

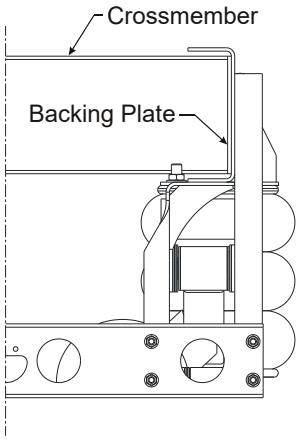


Figure 8

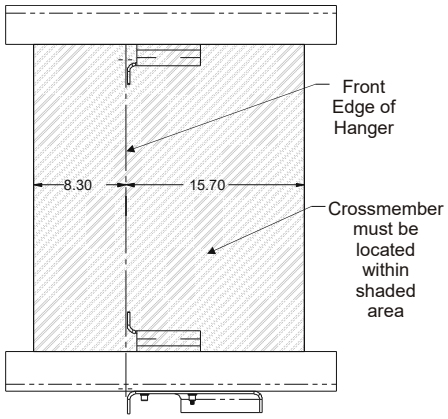


Figure 9

⚠ CAUTION

Failure to properly support the suspension, or reinforce the vehicle frame can result in premature frame failure and loss of suspension warranty coverage.

Suspension Hanger Installation

1. Once the cross members and backing plates are in the desired location, raise the suspension into position. Use the marks on the frame rail as a guide to align the front hangers.
2. Using "C" clamps, clamp the front hanger to prevent movement.

NOTE

The mounting surfaces of both the front hanger and rear upper air spring mount must be flush with the frame or spacers used. Failure to do so will void all of the suspension warranty.

3. During installation, keep the auxiliary axle in alignment with all other properly aligned vehicle axles, using a trammel bar and tape measure. (see Figure 10)

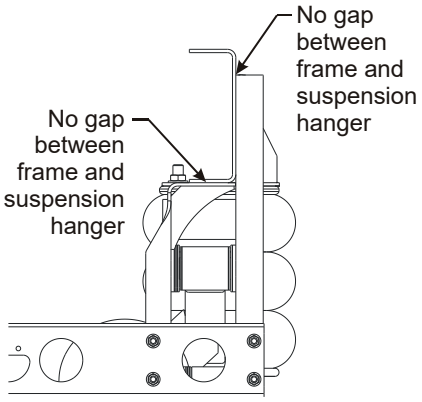


Figure 10

NOTE

Because the auxiliary axle is of the self steer type, it may be very difficult to measure to the true center of the spindle, therefore alignment measurements should be taken at the leading edge of the front hanger.

4. Layout the desired bolt hole pattern near the outside edge of the hanger. Center punch all marks. (See Figure 11)
5. NOTE: Recommended hole pattern. May have to be shifted or modified for double frames.

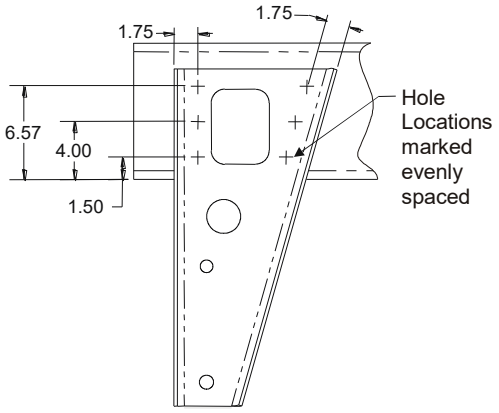


Figure 11

⚠ CAUTION

Do not drill any holes through the bottom flange of the vehicle frame rails! Always check with the vehicle manufacturer for their warranty disclaimer on vehicle frame rail modifications.
Prior to drilling any holes through the frame rail, inspect the inside of the frame rail for any obstruction such as fuel or brake lines that might be damaged by the drilling. Drill holes only after adjustments for clearance have been made.

6. Drill one 25/32" diameter hole through the front hanger; vehicle frame rail & the customer supplied backing plate. Re-inspect the suspension position. Fasten the suspension to the frame with one 3/4" flange head grade 8 bolt, and one 3/4-grade G prevailing torque nut. Tighten the nut and bolt.

7. Drill, install and tighten the remaining 5 fasteners on the first hanger.

NOTE

Because the ALAP13PS & ALAP13PSH, suspensions were designed without an alignment feature, it is extremely important that the front hangers be parallel to the properly aligned axles already on the vehicle.

8. Inspect the position of the suspension on the opposite side of the vehicle. Repeat steps 4 through 6 the opposite side of the suspension.
9. Remove the "C" clamps from both front hangers.

Upper Air Spring Mount Installation

1. Raise and position the upper air spring mount under the frame rail. Once in position, clamp it to the vehicle frame rail with "C" clamps.
2. With the upper air spring mount tight against the frame, mark the location of the mounting holes. Center punch each mark. (See Figure 12 and 13.)

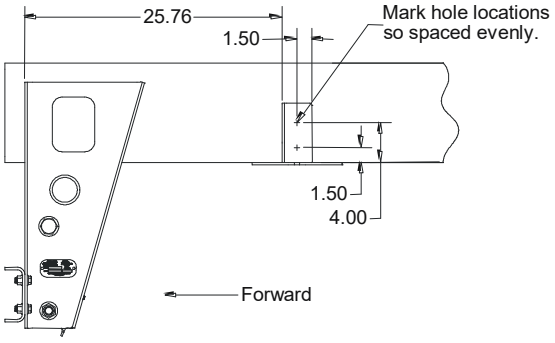


Figure 12
(Driver side)

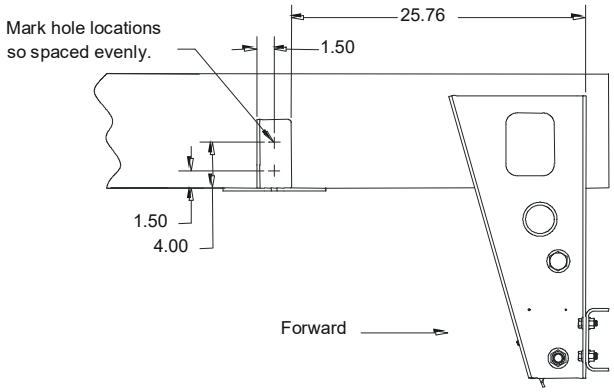


Figure 13
(Passenger side)

3. Drill one 25/32" diameter hole through the air spring mount, vehicle frame rail & the customer supplied backing plate. Re-inspect the suspension position. Fasten the suspension to the frame with one 3/4" flange head grade 8 bolt, and one 3/4-grade G prevailing torque nut. Tighten the nut and bolt.
4. Drill, install and tighten the remaining fasteners on that side.
5. Inspect the position of the hanger on the opposite side of the vehicle. Repeat steps 1 through 4 on the opposite side of the suspension.
6. Remove all clamps from both sides of the vehicles frame rail.

Caster Angle

Caster is the fore aft angle of the axle king pin with respect to the vertical position. (See Figure 14.) Positive caster is when the top of the king pin is positioned rearward of the vertical position. Negative caster is defined as the top of the king pin being ahead of the vertical position. All ALAP13PS & ALAP13PSH suspensions are built with preset positive caster from the factory. If your frame has more than 2 degrees of rake, this can have an adverse affect on steering. Please contact ReycoGranning ® Customer Service for further instructions if this condition exists.

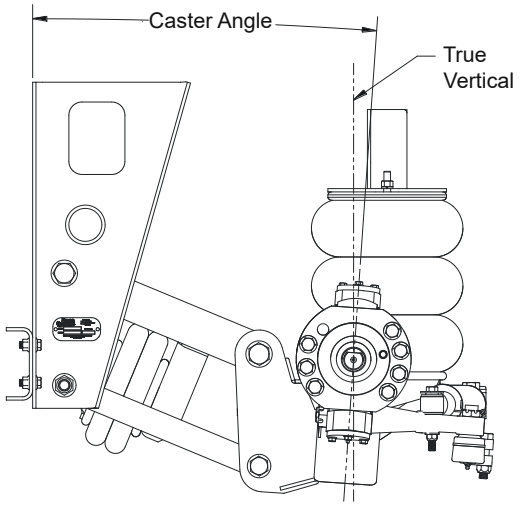


Figure 14

Camber Angle

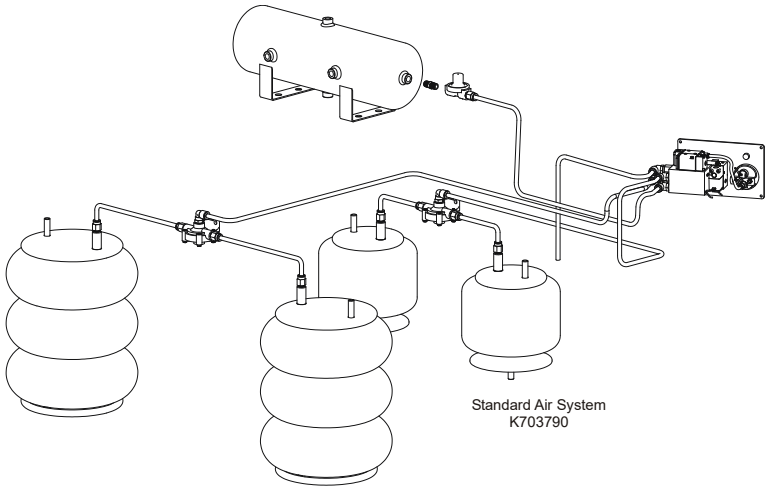
A camber angle of 0.5° is preset at the factory.

Air Kits

ReycoGranning® offers a wide range of air control systems for use with the ALAP13PS & ALAP13PSH auxiliary air suspensions. When installing your air kit please refer to the drawing that is included with the kit for installation information.

The following applies to ReycoGranning® air kits:

1. Never add lubrication or antifreeze to the air system.
2. Avoid drawing the air lines tight, kinking the air lines or passing them through areas that might cause damage.
3. Use only DOT approved air line fittings to plumb the system.
4. DOT type brake line should be used to plumb the system (customer supplied).



Standard Air System
K703790

Axle Controls

When operating a truck in reverse, a steerable auxiliary axle must be raised. Only air control kits that allow this should be used.

Final assembly

1. Install the air control kit and plumbing.
2. Install wheels and torque lug nuts to wheel manufacturer's recommended torque values.
3. Check that the steering axle wheel bearings are filled with oil.
4. Install brake lines for steer brakes, per the chassis manufacturer's specifications.
5. Inspect brakes and adjust if necessary.

Final assembly Check

1. Check that all suspension bolts are tightened to the recommended torque values. (See Torque Tables)
2. Check air system for leaks and proper air lift functionality.
3. Cycle the suspension through its entire range with wheels and tires installed, and check for interference between the tires, wheel, axle, brake chambers etc. and the truck frame, body, or other components.

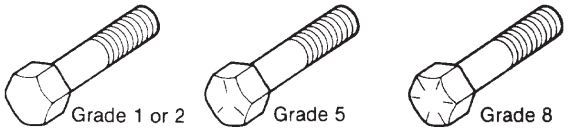
⚠ CAUTION

With the vehicle unloaded, the ride air spring pressure should not exceed 20 PSI to avoid improper vehicle loading or component damage.

4. Inspect lug nuts for proper torque.
5. Make sure that wheels rotate freely.
6. Make sure that brakes are properly adjusted.
7. Insure oil in the hubs is at the proper level

Torque Table

Threaded fasteners are covered by specifications that define required mechanical properties, such as tensile strength, yield strength, proof load, and hardness. These specifications are carefully considered when a fastener is selected for a particular application. To assure continued safe vehicle performance and suspension operation, replacement fasteners used must of the same mechanical and physical properties as the fasteners originally provided.



Grade Markings on Bolts

Grade	Lock Nut Grade B, F	Lock Nut: Grade C, G
Identification	 3 Dots	 6 Dots

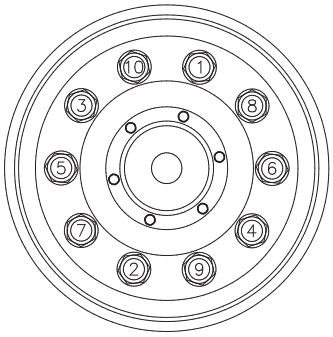
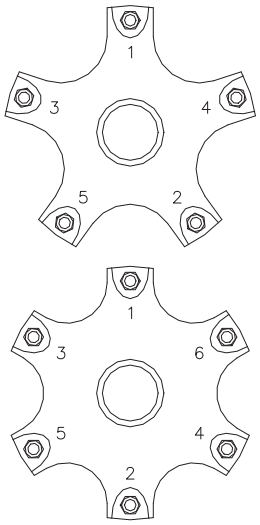
Grade Markings on Lock Nuts

Most fasteners have identification markings as shown that indicate the fastener strength or grade. Care must be taken to insure replacement fastener strength or grade is the same as the original fastener.

Table 6

Application	Nut Size	Torque Specification (cleaned and lubricated)	Torque Sequence (if required)
Upper Control Arm Bolts	1-14 Grade G	660 - 720 ft.-lbs.	n/a
Lower Control Arm Bolts	7/8-9 Grade G	475 ft.-lbs.	n/a
Crossmember Bolts	1/2-20 Grade G	110 ft.-lbs.	n/a
Air Spring Pivot Bolts	5/8-18 Grade G Locking Flange	180 ft.-lbs.	n/a
Lift and Ride Air Spring Mounting (upper)	3/4-16 Grade 5 1/2-13 Grade 5	35 ft.-lbs. 35 ft.-lbs.	n/a n/a
Lift and Ride Air Spring Mounting (lower)	1/2-13 Grade 5	35 ft.-lbs.	n/a
Hub Cap Bolts	5/16-18 Grade 5	12 to 18 ft.-lbs.	n/a
Hub Spindle Nuts	Refer to Installation Drawing	Refer to Installation Drawing	Refer to Installation Drawing
Axle Seat to Axle	3/4-16 Grade C	310 ft.-lbs.	Criss-Cross Pattern

Torque Table 7

	Hub and Drum Type: Hub Piloted Hubs: M22x1.5 Stud Piloted Hubs: 3/4-16 or 1 1/8 -16	Step torque to: 50 ft.-lbs. 450 to 500 ft.-lbs. 50 ft.-lbs. 450 to 500 ft.-lbs.	
Spoke Wheel Nuts Verify with vehicle owners manual	Hub and Drum Type: Spoke 5 or 6: 3/4-16	Step torque to: 200 to 260 ft.-lbs.	

Service Notes

This Owner′s Manual describes the basic operation, and service of the ReycoGranning® ALAP13PS & ALAP13PSH Auxiliary Liftable Suspension models with 13,200 lbs. Gross Axle Weight Rating (GAWR). Overloading the suspension may result in adverse ride and handling characteristics.

You must read and understand all procedures and safety precautions presented in this manual before conducting any service work on the suspension.

Proper tools must be used to perform the maintenance and repair procedures in this manual. Some procedures require the use of special tools for safe and correct service. Failure to use the proper and/or special tools when required can cause personal injury and/or damage to suspension components.

You must follow your company safety procedures and use proper safety equipment when you service or repair the suspension.

The information contained in this manual was current at the time of printing and is subject to change without notice or liability. ReycoGranning® reserves the right to modify the suspension and/or procedures and to change specifications at any time without notice and without incurring obligation.

ReycoGranning® uses the following types of notices for potential safety problems and to give information that will prevent damage to equipment.

⚠ WARNING

A warning indicates procedures that must be followed exactly. Serious personal injury can occur if the procedure is not followed.

⚠ CAUTION

A caution indicates procedures that must be followed exactly. Damage to equipment or suspension components and personal injury can occur if the procedure is not followed.

NOTE

A note indicates an operation, procedure or instruction that is important for correct service.

Suspension identification

The suspension model and serial number are stamped on an aluminum tag that is riveted to the suspension (Figure 1). The serial number is used by ReycoGranning® for control purposes and should be referred to when servicing the suspension or requesting technical support (Figure 2).

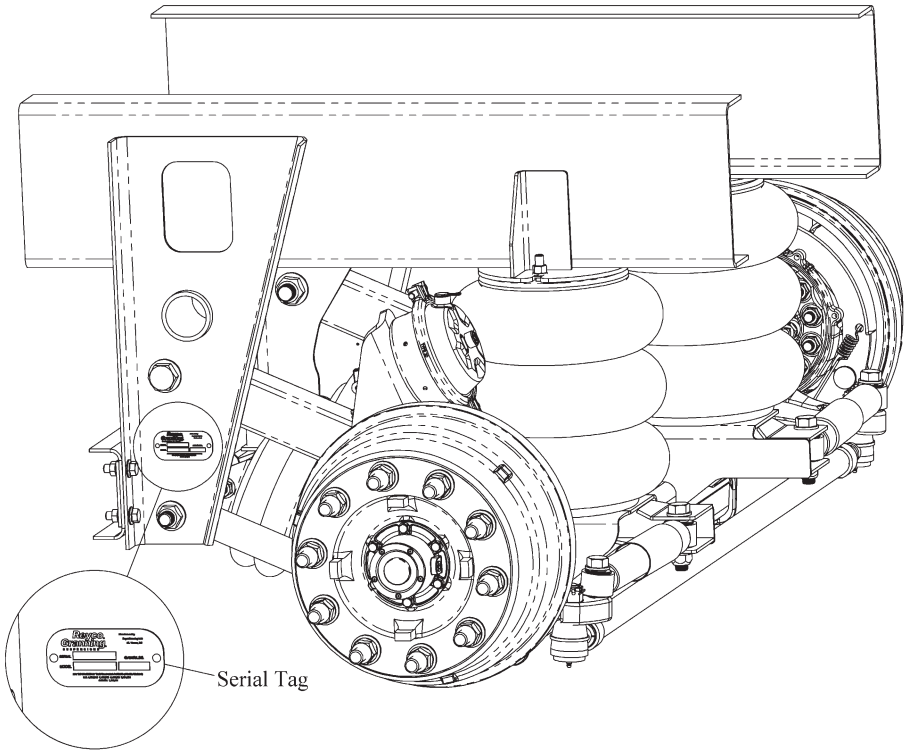


Figure 1- Suspension Identification Location

(ALAP13PS shown)

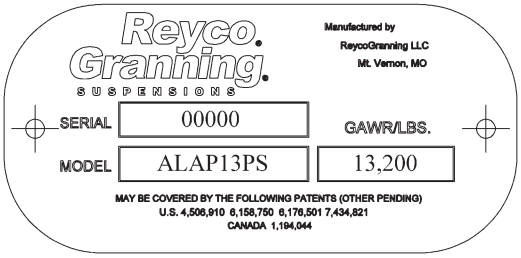


Figure 2 - Suspension Serial Number Tags

Instructions For Suspension Operation

Raising The Lift Axle

1. Set the truck's parking brake.
2. Turn the ignition switch to the "ON" position and then start the vehicle.
3. Allow the truck to idle until the air system has reached the cut-out pressure. (This is normally close to 120PSI)
4. If the lift control is inside the truck, move the lever or switch to the "UP" position

⚠ WARNING

Do not operate lift controls if the truck is moving in excess of 15 MPH. Area surrounding lift axle should be clear of all personnel.

5. If the lift controls are outside the truck, insure that the parking brakes are still activated, exit the vehicle and go to the air control. Move the lever or switch to the "UP" position.
6. At this point the suspension should be lifting. Verify that this is the case.

NOTE

Air pressure may drop during this operation.

7. The axle should be completely lifted when the truck's air system returns to the cut-out pressure.
8. The suspension is now fully lifted and the truck is ready to go.

Lowering The Lift Axle

1. Set the truck's parking brake.
2. Turn the ignition switch to the "ON" position and then start the vehicle.
3. Allow the truck to idle until the air system has reached the cut-out pressure. (This is normally close to 120PSI)
4. If the lift control is inside the truck, move the lever or switch to the "DOWN" position

⚠ WARNING

Do not operate lift controls if the truck is moving in excess of 15 MPH. Area surrounding lift axle should be clear of all personnel.

5. If the lift controls are outside the truck, insure that the parking brakes are still activated, exit the vehicle and go to the air control. Move the lever or switch to the "DOWN" position.
6. At this point the suspension should be lowering. Verify that this is the case.

NOTE

Air pressure may drop during this operation.

7. The axle should be completely down when the truck's air system returns to the cut-out pressure.
8. The suspension is now fully lowered and supporting the pre-determined load; the truck is ready to go.

Maintenance Schedule

Periodic Inspection and Service Timetable

Table 1

General Maintenance	Service to be Performed	Mileage Interval (in thousands)				
		1	3	15	30	60[2]
Control Arm Pivot Connections	Check locknut torque	x	x	x	x	x
	Inspect for worn bushings		x[4]	x[4]	x[4]	x[4]
	Inspect for looseness from worn components		x	x	x	x
Air Springs	Inspect for proper clearance (1 inch minimum)		x	x	x	x
	Check mount nut torque		x			
	Inspect for chafing or wear		x	x	x	x
	Check air line fitting connections		x			
	Inspect for air leaks		x			
Air Fittings and Lines	Inspect for leaks	x	x	x	x	x
	Inspect for damage	x	x	x	x	x
Wheels and Hubs	Check wheel nut torque [1]	x	x	x	x	x
	Check hub end play	x	x	x	x	x
Brakes	Check slack setting	x	x	x	x	x
	Check brake shoe wear	x	x	x	x	x
Automatic Slack Adjuster, and Brake Cam Bushings	Grease [3]	x[3]	x[3]	x[3]	x[3]	x[3]

Axle Lubrication Schedule

Axle Component	Lubrication Interval	Lubrication Type
King Pin	3 mo. / 2500 miles	Multipurpose NLGI 2 or any good equivalent chassis lubrication
Tie Rod Ends	3 mo. / 2500 miles	Multipurpose NLGI 2 or any good equivalent chassis lubrication
Wheel Bearing Lubrication	1000 miles	EP-SAE 90 gear oil or any good equivalent petroleum base or synthetic lubricant

[1] Wheel Nut torque must be checked after the first 50 to 100 miles of service.
[2] Continue to perform period inspections every 15,000 miles or at regular engine service intervals.
[3] Grease the brake automatic slack adjuster and the cam bushings at 2,500 mile intervals.

[4] When replacing bushings on the control arms, be sure to use the K707274 for all required replacement parts.

Maintenance Record

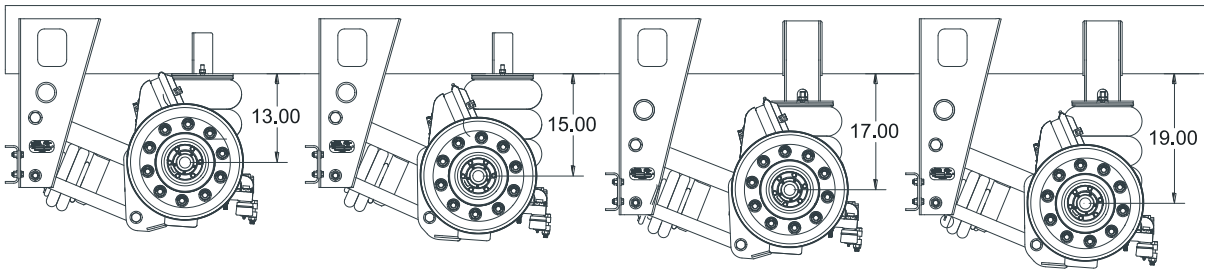
Name of Owner		Address of Owner	
Date of Purchase	Name and Address of Dealer		
Model of Vehicle	Vehicle Identification Number		
Suspension Model Number: **ALAP13PS / ALAP13PSH**	Suspension Serial Number:		
Inspection and Maintenance Item	Date	Mileage	Service Performed

ALAP13PS Unit Assembly

Table 2

ITEM NO.	QTY.	PART NO.	DESCRIPTION	ITEM NO.	QTY.	PART NO.	DESCRIPTION
1	4	100122-P1	LN 7/8 UNC Stover, Gr. C	25	1	705523-01	Crossmember Assembly
2	8	104098	HFW 7/8 .968x1.780x.160 ZP	26	2	704203-01	Asy, Upper Air Spring Pad
3	2	167	HHB 1-14 x 6 ZY	27	1	706031-02	Axle Assembly
4	2	188	Pop Rivet 1/8" dia. x .525" long			706031-04	
5	8	2571	HFW 1″ 1.062 x 2.00 x .134			706812-02	
6	1	2617	Plate-Serial No.			706812-04	
7	4	263	HFW 3/8 .406x.812x.065 ZN	28	4	713430-01	Plate, Crossmember Reinforcement
8	8	307	FHB 1/2-13 x 1.5", GR. 8, ZN	29	2	8103323	SLW 1/2" .523 x .873 x .134, PL
9	8	308	LFN 1/2-13, Gr. G Zinc	30	2	8120378	N 1/2-13, Gr. 5, ZP
10	4	311	Shim 3.50x1.00x.25 thk	31	8	8120382	SLW 3/8" .393 x .683 x .104, ZN
11	2	4599	LFN 5/8-18, Gr. G, PH	32	4	8131017	FW 3/4" .812 x 1.469 x .134, ZP
12	2	700020-01	HHB 1-14 x 7, Gr. 8, ZN	33	8	8180121	HHB 3/8-16 x 7/8, Gr. 5, ZN
13	8	701683-02	HFW 7/8"	34	4	8219758	JN 3/4-16, Gr. 5, ZP
14	4	701683-05	HFW 7/8"	35	2	8221	Air Spring (Ride)
15	8	702703-01	Shim 3.50x1.00x.125 thk.	36	2	8223552	HHB 7/8-9 X 5, GR.8, ZN
16	8	704140-01	Wear Spacer, Polyethylene	37	2	8223821	HHB 5/8-18 x 4.25, Gr. 8, ZN
17	2	704154-01	Spacer	38	2	89415543	FW ½ .531 x 1.25 x .100 ZN
18	2	704155-01	Pivot, Air Spring	39	4	89422312	LN 1-14, Gr. C, CP
19	2	704185-01	Air Spring	40	2	89422850	HFW 5/8 .656 x 1.312 x .095, PL/ZN
20	2	704576-01	Asy, Lower Control Arm	41	2	89430594	HHB 7/8-9 X 7, GR.8
21	1	704938-01	UCA Asy with Bushings, LH				
22	1	704938-02	Asy, Upper Control Arm, RH				
23	1	705519-01	Asy, Hanger, LH				
		706106-01					
24	1	705519-02	Asy, Hanger, RH				
		706106-02					

Axle and Hanger Styles

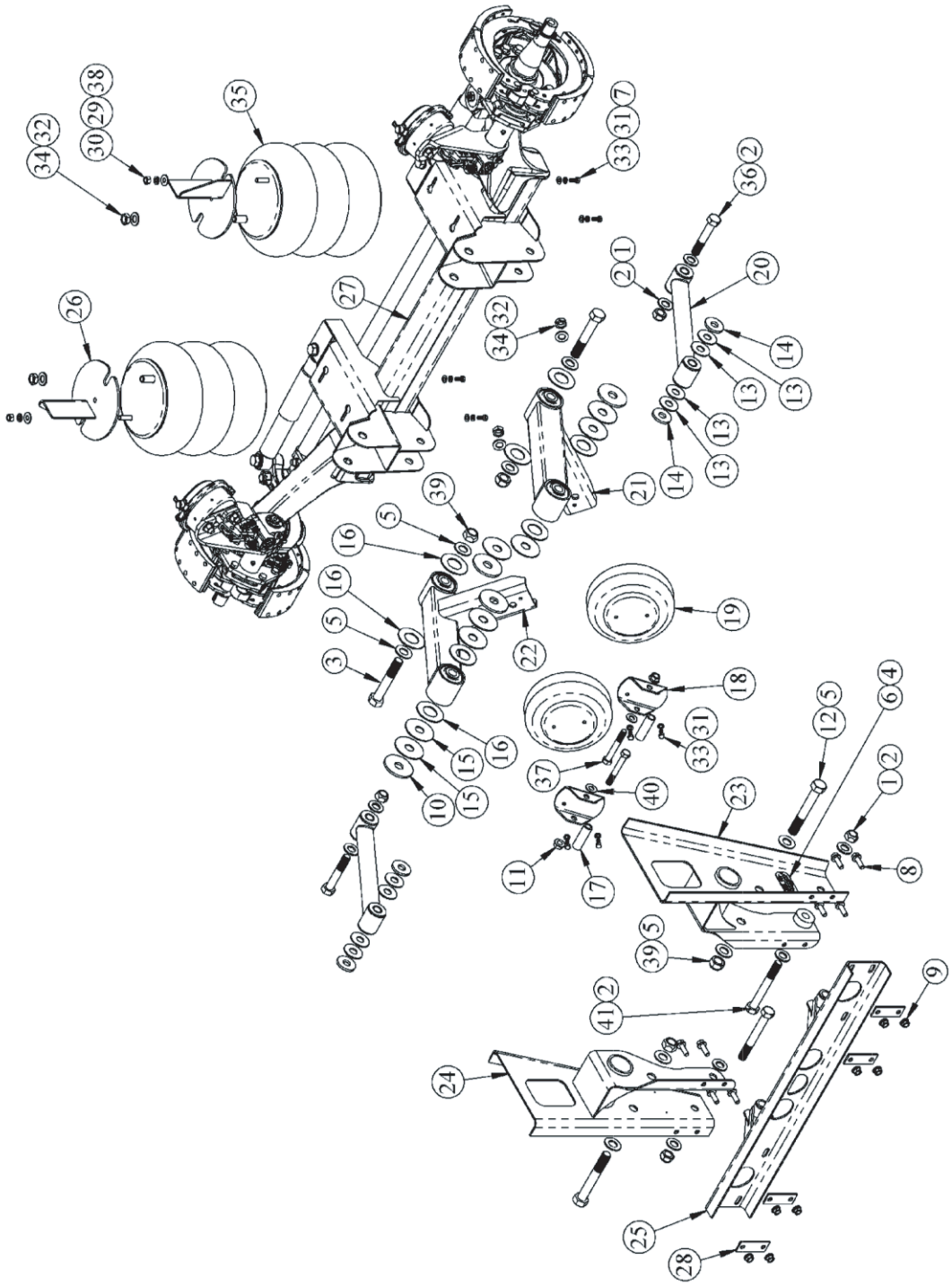


ALAP13PS
Standard Axle
Standard Hanger

ALAP13PS2
+2″ Axle
Standard Hanger

ALAP13PSH
Standard Axle
+4″ Hanger

ALAP13PSH2
+2″ Axle
+4″ Hanger



ALAP13PS Suspension
(See Table 2, page 8)

Alignment / Toe-In

The toe in is set at the factory to 1/8".The toe can be adjusted by loosening the tie rod tube clamps and turning the tie rod until the proper toe is achieved.

Caster Angle

Caster is the fore aft angle of the axle king pin with respect to the vertical position. (See Figure 14.) Positive caster is when the top of the king pin is positioned rearward of the vertical position. Negative caster is defined as the top of the king pin being ahead of the vertical position. All ALAP13PS and ALAP13PSH suspensions are built with preset positive caster from the factory. If your frame has more than 2 degrees of rake, this can have an adverse affect on steering. Please contact ReycoGranning® Customer Service for further instructions if this condition exists.

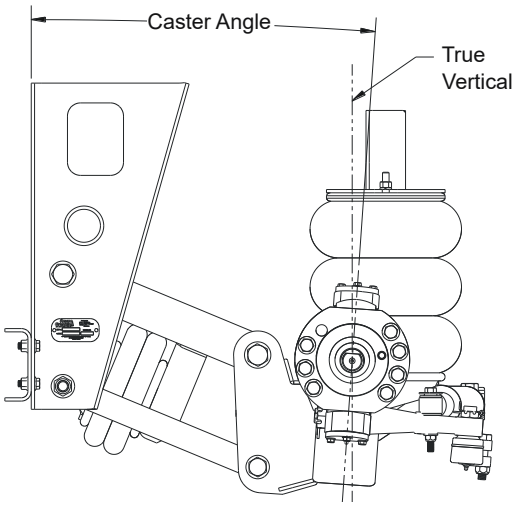


Figure 14

Camber Angle

A camber angle of 0.5° is preset at the factory.

Kingpin Bushing Inspection

The kingpin bushings are replaceable items that shows wear over time. This wear could lead to improper camber leading to shortened tire life. Therefore, it is important that the kingpin be properly maintained. If the maintenance schedule is followed, the kingpin should provide many years of trouble free use.

Identifying kingpin bushing wear:

1. Raise the axle and support with jack stands. The axle must be firmly supported and not move.
2. Apply the parking brakes to eliminate any movement between the spindle and hub.
3. Measure down 17.5 inches from the spindle and place a piece of tape on the tire to mark this location.
4. Set up a dial indicator at the tape mark to measure side to side motion.
5. Apply a force above the centerline of the tire and take the reading from the dial indicator.
6. If the indicator shows more than .063" of movement, contact the ReycoGranning® Customer Service Department at 1 (800) 753-0050 for replacement parts.

Setting The Pressure:

All air control kits used on the ALAP13PS & ALAP13PSH use a pressure regulator to control the pressure in the ride springs. The lift springs use full system air pressure to firmly hold the suspension in the lifted position.

To properly adjust the air pressure in the ride springs:

1. Determine the load that you wish to carry on the axle.

2. Locate the load in the right hand column of Table 4 below.
3. The required pressure is in the left hand column.
4. The chart is only a reference and should only be used as a starting point.
5. Rotate the regulator until the pressure desired is displayed in the gage.
6. Rotate clockwise to increase pressure, rotate counterclockwise to decrease pressure.
7. Take the truck to a verified scale to check the weight at the auxiliary axle.
8. Record the pressure for future reference.

Table 4
Air Spring Pressure vs. Axle Load

Ride Air Spring Pressure (PSI)	Axle Load (LBS)
20	2000
40	4000
55	6000
75	8000
90	10000
110	12000
120	13200

NOTE

Table 4 lists the approximate ride spring pressure versus axle load. It is to be used as a guide only; to obtain accurate air pressure to load readings, the vehicle must be weighed on a certified level scale.

⚠ WARNING

1. When lifting or lowering the suspension, insure that all personnel are a safe distance away prior to operation. Failure to do so may result in serious bodily injury, or death.
2. Avoid suspension components during operation as they move at a rapid rate.
3. Never override the lift on reverse option of the ALAP13PS & ALAP13PSH suspension air systems.
4. Do not shift or lower suspension while traveling at speeds in excess of 15 MPH
5. When traveling backwards, make sure the gear selector is in reverse to provide the lift signal to the lift on reverse air kit.

NOTE

Always check the state and local laws of areas though which you will be traveling for legal load limits and axle configurations.

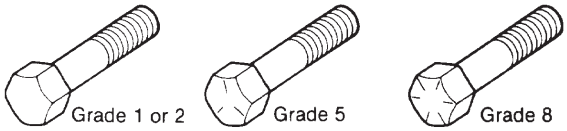
Troubleshooting

Axle System – General –Table 5

Symptoms	Possible Causes	Remedies
Abnormal tire wear	Toe-In out of adjustment	Check Toe-In as described in the Manual and adjust as required
	Camber out of adjustment	Check Camber as described in the Manual
	Worn bushings	Inspect Bushing for wear and replace as required
	Worn or loose bearings	Adjust wheel end play - Refer to the Manual
	Wheel bent	Replace wheel
Tire wobble	Worn bushings	Inspect Bushing for wear and replace as required
	Worn or loose bearings	Adjust wheel end play - Refer to the Manual
	Wheel bent	Replace wheel
Air Chamber leaking	Diaphragm punctured or torn	Replace diaphragm
	Broken spring	Replace spring and diaphragm
	Impact damage	Replace air Chamber
Brake not working properly	Air chamber spring is broken	Replace spring and diaphragm in the air chamber
	Brake shoe return springs broken	Replace brake shoe return springs
	Bent push rod	Straighten or replace
	Autoslack broken	Replace
	Autoslack out of adjustment	Adjust autoslack
	Cam sticking	Lubricate the cam
	Cam bushings worn	Replace the cam bushings
	Cam and rollers worn	Replace the cam and cam rollers
	Worn brake shoes	Replace brake shoes
Suspension cycles slowly	Air control valve plugged	Replace or clean the air valve
	Pinched air line	Inspect and replace damaged air line

Torque Table

Threaded fasteners are covered by specifications that define required mechanical properties, such as tensile strength, yield strength, proof load, and hardness. These specifications are carefully considered when a fastener is selected for a particular application. To assure continued safe vehicle performance and suspension operation, replacement fasteners used must of the same mechanical and physical properties as the fasteners originally provided.



Grade Markings on Bolts

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Identification	 3 Dots	 6 Dots

Grade Markings on Lock Nuts

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Table 6

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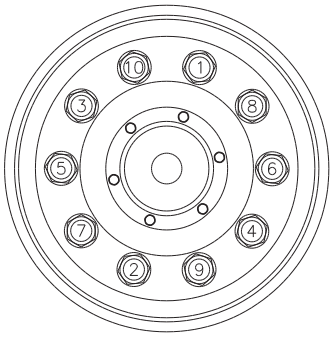
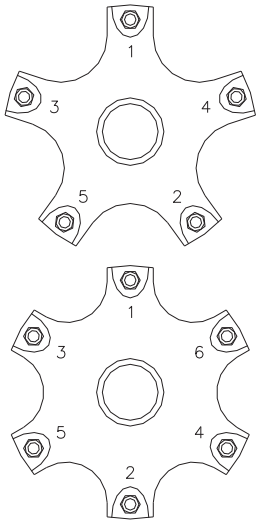
Air Spring Pivot Bolts	5/8-18 Grade G Locking Flange	180 ft.-lbs.	n/a
Lift and Ride Air Spring Mounting (upper)	3/4-16 Grade 5 1/2-13 Grade 5	35 ft.-lbs. 35 ft.-lbs.	n/a n/a
Lift and Ride Air Spring Mounting (lower)	1/2-13 Grade 5	35 ft.-lbs.	n/a
Hub Cap Bolts	5/16-18 Grade 5	12 to 18 ft.-lbs.	n/a
Hub Spindle Nuts	Refer to Installation Drawing	Refer to Installation Drawing	Refer to Installation Drawing
Axle seat to axle	3/4-16 Grade C	310 ft.-lbs.	Criss-cross pattern

Torque Table 7

	Hub and Drum Type: Hub Piloted Hubs: M22x1.5 Stud Piloted Hubs: 3/4-16 or 1 1/8 -16	Step torque to: 50 ft.-lbs. 450 to 500 ft.-lbs. 50 ft.-lbs. 450 to 500 ft.-lbs.	
Spoke Wheel Nuts Verify with vehicle owners manual	Hub and Drum Type: Spoke 5 or 6: 3/4-16	Step torque to: 200 to 260 ft.-lbs.	

Revision History

Item	ECR #	Date	Change Description	By
A	TBD	11/4/15	Released for Production	JAS

Environmental Practices

Reyco Granning is committed to practicing environmentally friendly and sustainable procedures. We encourage you to do your part for our environment by properly disposing of or recycling any Recyo Granning materials that may be at the end of their service life while in your possession.

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SUSPENSIONS

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