



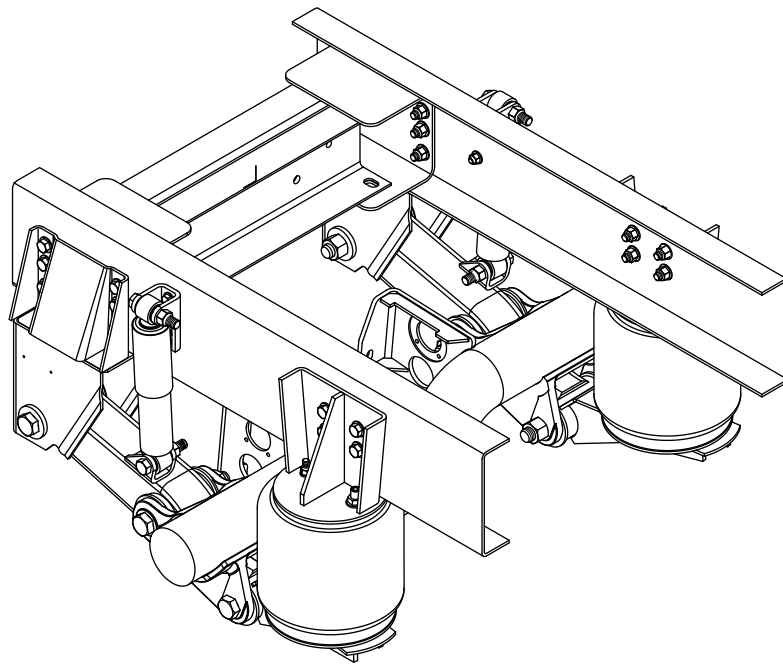
CA SERIES

MAINTENANCE AND PARTS LIST



CA-115

Non-Lift, Non-Steer
Auxiliary Axle Air Suspension
Maintenance and Parts List Manual



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INTRODUCTION

This manual provides you information necessary for the care, maintenance, inspection, and safe operation of Holland Neway CA Series non-lift, auxiliary air suspension.

This suspension uses air drawn from the vehicle's air system to pressurize the air springs.

NOTE: Contact the vehicle OEM or Dealer Service Center with all service/maintenance questions.

WARRANTY

A copy of the appropriate North American Holland Product Warranty can be viewed and/or printed from The Holland Group web site (www.thehollandgroupinc.com).

It may also be ordered by calling 1-888-396-6501.

AIR CONTROL SYSTEM

Contact the vehicle OEM or Dealer Service Center for all air control system service/maintenance questions.

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.

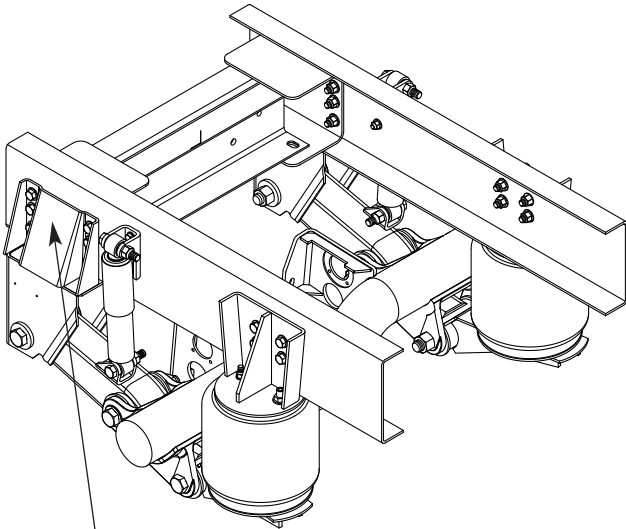
▲CAUTION Indicates a potentially hazardous situation which, if not avoided, may result in minor or moderate injury.

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

MODEL IDENTIFICATION

For suspension identification purposes, a serial number tag is attached to the curbside frame bracket. This tag supplies valuable information regarding the exact components used to manufacture the suspension.

FIGURE 1
Serial Number Tag Location



Serial Number Tag location may be on either frame bracket

Depending upon OEM configuration, the serial number tag may not provide the exact kit or parts list number. If so, the vehicle OEM should be able to identify the suspension model and its components using the vehicle's VIN number.

IMPORTANT: Make sure you have the correct parts list for your particular chassis application. Parts may vary depending on chassis application.

For easy reference, we suggest listing information from the suspension's serial tag in the spaces below.

Model Number _____

Part Number _____

Serial Number _____

In Service Date _____

MODEL NOMENCLATURE

NON-LIFT AUXILIARY

SINGLE AXLE

SUSPENSION SERIES AXLE CAPACITY
15,000 LBS.

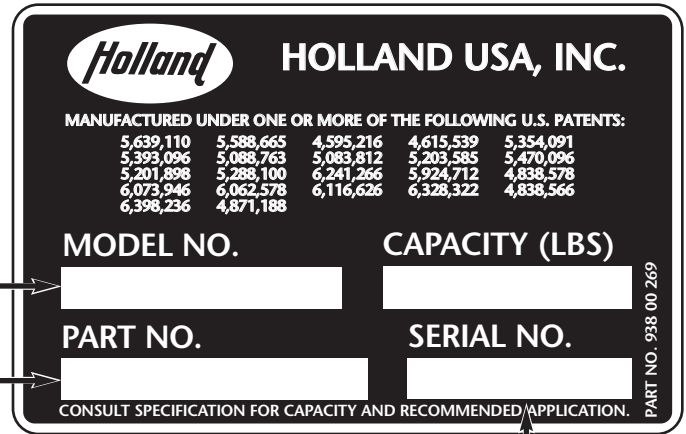
CA - 1 15

IMPORTANT: This manual applies to the suspension model or series listed below. It is important to determine your specific model number, serial number, and part list number. Record those numbers on this page, and refer to them when obtaining information or replacement parts.

Models:

CA-115: 6.5", 7.5" and 9.0" ride heights.

FIGURE 2
Serial Number Tag



OPERATING AND MAINTENANCE INSTRUCTIONS

CA-115 Suspension Operation

The CA-115 Suspension is controlled by one height control valve. When properly adjusted, it automatically maintains the specified ride height under both unloaded to loaded conditions. The height control valve automatically adds air to, or exhausts air from, the air springs to maintain a constant ride height.

Before putting the vehicle in operation, build air pressure in excess of 100 psig (6.9 bars). This will open the pressure protection valve and allow air flow to the height control valve.

IMPORTANT

Routine Maintenance and Daily Inspection

Daily Inspection

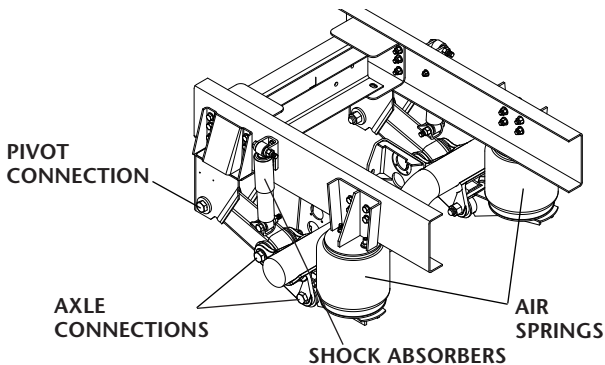
Daily or before each trip, visually inspect the suspension. Inspect air springs for sufficient and equal pressure.

Initial 5,000 Mile (8,000 km) or 100 Hours of Service Inspection

1. After initial 5,000 miles (8,000 km) or 100 hours of service, inspect bolts and nuts at the pivot connections and axle connections to ensure they are properly torqued. Check all other nuts and bolts for proper torque. Retorque as necessary thereafter. Another time to inspect is when performing a brake inspection.

NOTE: Depending on the severity of operation it may be necessary to perform the described checks more frequently than specified above.

Each inspection should include the following checks:



- Air system - full function and minimum pressure for pressure protection valve (PPV) regulator function.
 - Torque on all bolts - see torque chart on this page.
2. With vehicle on level surface and air pressure in excess of 100 psig (6.9 bars), all air springs should be of sufficient and equal firmness.

Routine Maintenance – 50,000 Miles (80,000 km) or 1,000 Hours of Service or More Frequently as Needed by Application

At 50,000 miles or 1,000 hours of service, or when servicing vehicle brake system, inspect suspension components per 5,000 mile inspection. Also check all other suspension components for any sign of damage, looseness, wear or cracks. Replace any damaged parts to prevent equipment breakdown.

TORQUE CHART

SIZE	ITEM	TORQUE IN FT. LBS. NL MODELS	NM
1/2" and 3/4"	Ride Air Spring	35	47
5/8"	Frame Bracket	110	149
5/8"	Spr. Up. Mtg Plate	110	149
3/4"	Shock (Upper Bolt)	150	203
3/4"	Shock (Lower Bolt)	150	203
1 1/8"	Axle Connection	800	1083
1 1/8"	Pivot Connection	600	812

TORQUE NOTE:

Torque specifications are with clean lubricated threads.

IMPORTANT:

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

General Information

1. The torque specifications listed throughout the manual are applied to the nut, not the bolt.
2. Torque specifications: \pm 5% tolerance.
3. Lubricated Vs. Non-Lubricated Threads:

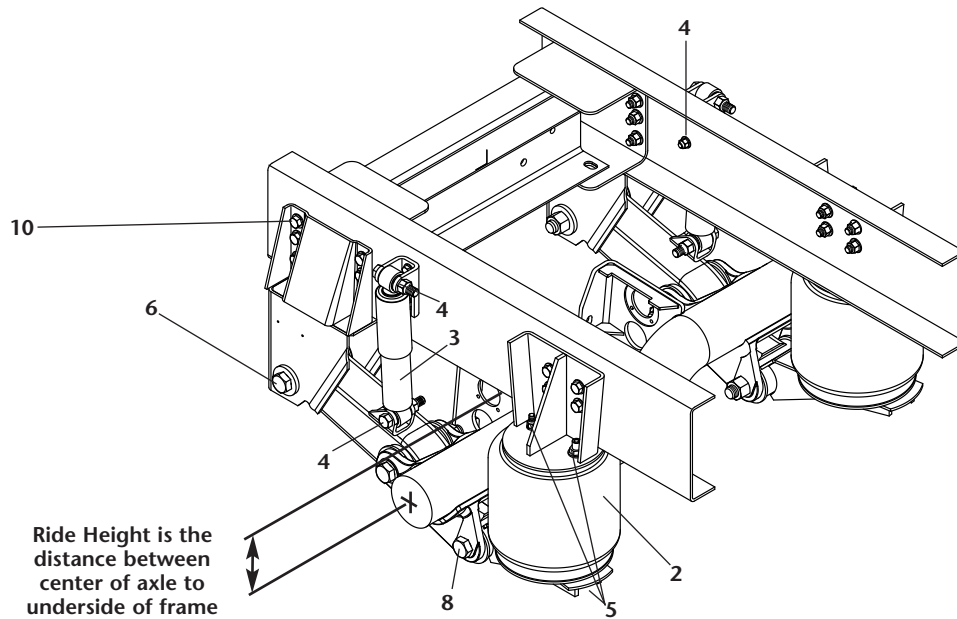
The torque specifications stated are for lubricated fasteners. Holland defines lubricated vs. non-lubricated as follows:

Lubricateda bolted connection, such as the pivot bolt/nut arrangement, that has a lubricant—like motor oil—pre-applied or applied to the thread surfaces, providing a lower torque requirement for a predetermined clampload.

Non-Lubricated ...a bolted connection, either new or in service, that has little or no lubricant on the thread surfaces. Typically, this applies to bolted connections that have been in service for a certain length of time where the original protective coating has evaporated or deteriorated due to environmental exposure. Thus, a “non-lube” torque specification is commonly required for in-service torque check or retorquing procedures. A “non-lube” specification could be required for new installations if the pivot bolt has seen sufficient shelf life to allow for evaporation and deterioration of the protective coating.

PRE-OPERATIONAL CHECKLIST

FIGURE 3
CA-115



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

1. Build the vehicle's air pressure above 100 psig (6.9 bars). With the vehicle shut off, check the system for air leaks.
2. Minimum clearance around ride air springs must be 3" (76mm).
3. Check the shock absorbers for proper installation.
4. 3/4" Shock absorber nuts must be torqued to the specification found on page 4.
5. 1/2" and 3/4" air spring mounting nuts must be torqued to the specification found on page 4.
6. A 1 1/8" pivot nut must be torqued to the specification found on page 4.
7. Check axle alignment. Axles must be within 1/8" of each other (see page 11).
8. A 1 1/8" axle nut must be torqued to the specification found on page 4.

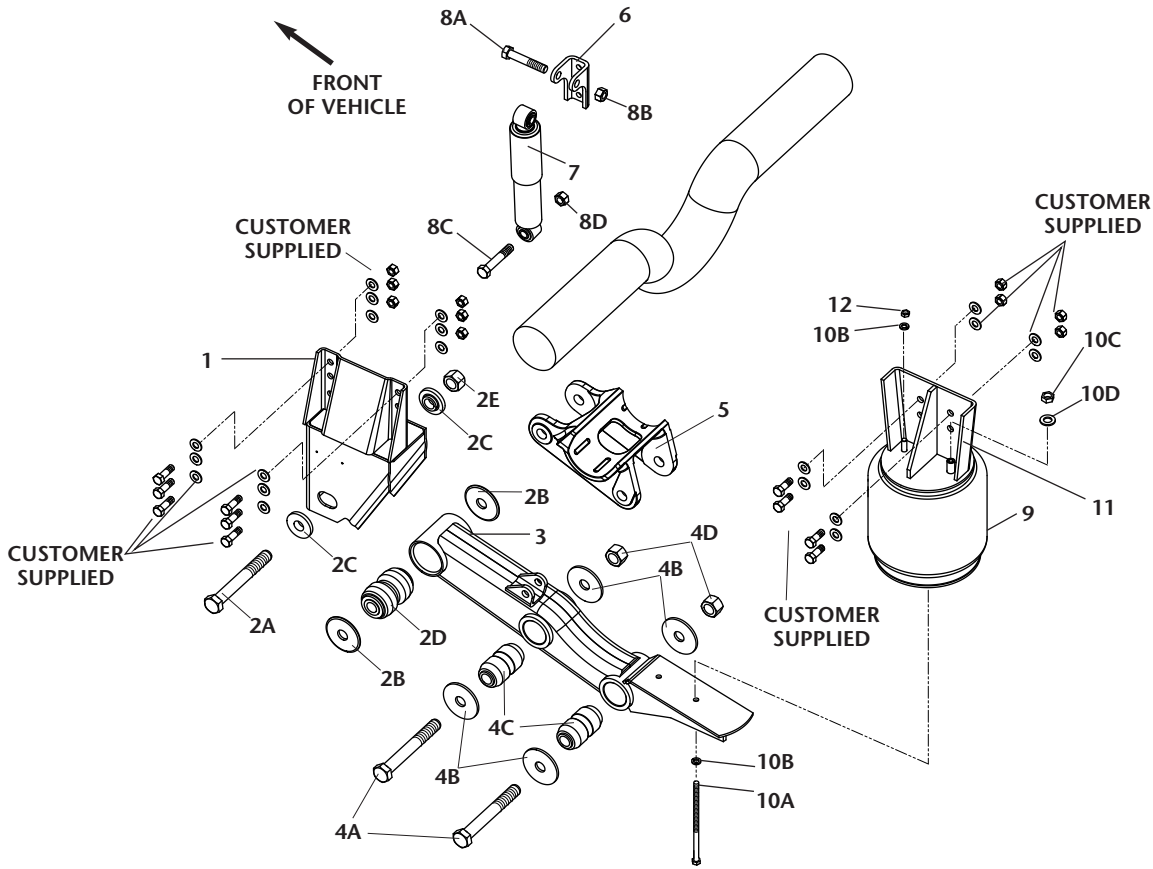
9. The lower flange of the frame bracket must be securely attached by a fastener to the bottom of the crossmember. An adequate crossmember is required between frame brackets.
10. 5/8" Frame bracket mounting bolts must be torqued to OEM specifications. OEM-supplied spacers must be used between the frame bracket and crossmember.
11. With the vehicle on a level surface and the air supply pressure in excess of 100 psig (6.9 bars), check all the air springs for equal firmness.
12. The suspension ride height should be within range for this model.

NOTE: Ride height (underside of frame to center line of axle) must be within operating range of model installed to prevent overextension of air springs and shock absorbers.

PARTS LIST – CA-115 SERIES

FIGURE 5

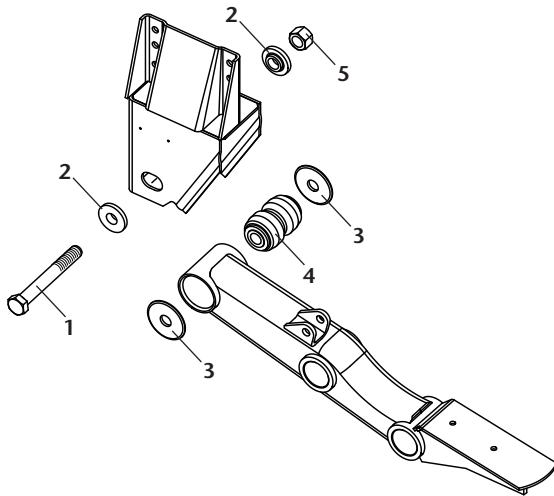
Model CA-115
(Lefthand shown)



ITEM #	DESCRIPTION	HOLLAND PART NO.	QTY.
1	Frame Bracket - LH	905 21 791	1
	Frame Bracket - RH	905 21 793	1
2A	Hex Bolt 1.125"-7 x 8.5" GR 8	932 01 051	2
2B	Flat Narrow Washer 1.12"	936 00 174	4
2C	Alignment Bushing	900 08 198	2
2D	Rubber Bushing - Front Pivot	900 08 253	2
2E	Hex Lock Nut 1.125"-7 GR C	934 00 506	2
3	Equalizing Beam Assembly with Axle Adapter (incl. mounting h/w, LH)	905 17 091	1
	Equalizing Beam Assembly with Axle Adapter (incl. mounting h/w, RH)	905 17 092	1
4A	Hex Bolt 1.125"-7 x 8.5" GR 8	932 01 051	4
4B	Spacer Washer 1.141"	900 36 177	8
4C	Rubber Bushing - Axle	900 08 255	4
4D	Hex Lock Nut 1.125"-7 GR C	934 00 506	4
5	Axle Adapter - LH	900 01 284	1
	Axle Adapter - RH	900 01 285	1
6	Shock Bracket, Upper	900 18 542	2
7	Shock Absorber	900 45 526	2
8A	Hex Bolt 0.75"-10 x 4.25" GR 8	930 03 617	2
8B	Hex Nut 3/4"-10 GR B	934 00 150	2
8C	Hex Bolt 3/4"-10 x 4.25" GR 8	930 03 617	2
8D	Hex Nut - Lower Shock 3/4"-10 GR C	934 00 150	2
9	Air Spring	*	2
10A	Hex Bolt M12-1.75 x 120 GR 10.9	*	2
10B	Lock Washer 1/2"	936 00 072	2
10C	Hex Nut 3/4"-16 GR A	934 00 417	2
10D	Washer .78"	936 00 156	2
11	Upper Mounting Plate, Air Spring	905 31 347	2
12	Hex Nut 1/2"-13 GR B	934 00 136	2
	Fastener Kit	330 05 298	1

* Refer to the OE/vehicle manufacturer's build specifications to properly identify the Holland Newway part numbers for the components noted with "*".

SERVICE REPAIR KITS



Pivot Connection — CA-115

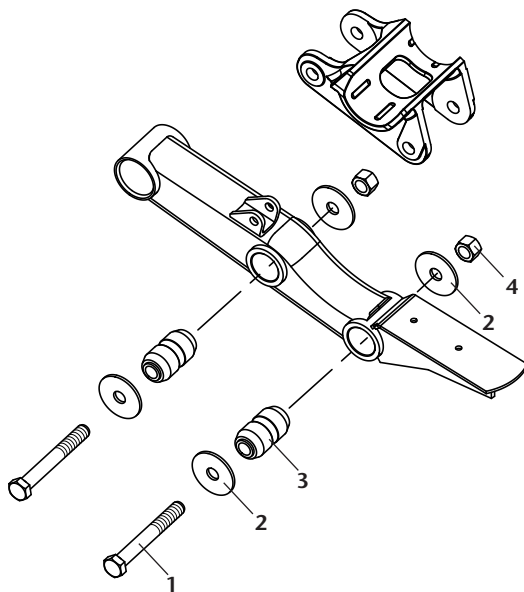
SRK-582: 481 00 446

ITEM	PART NO.	DESCRIPTION	QTY.
1	932 01 069	Bolt Hex 1 ¹ / ₈ " - 7 x 8-1/2" GR 8	2
2	900 08 242	Alignment Block	2
3	900 36 177	Washer Flat	4
4	900 08 253	Rubber Bushing	2
5	934 00 506	Nut Hex Lock 1 ¹ / ₈ " - 7	2

NOTE: One SRK-582 kit services one axle.

Place item 3, flat washer, on the inside of the frame bracket on each side of equalizing beam (two per beam).

NOTE: New alignment bushings recommended when alignment bushing surface becomes deformed. Refer to parts list.



Axle Connection — CA-115

SRK-569: 481 00 433

ITEM	PART NO.	DESCRIPTION	QTY.
1	932 01 051	Bolt Hex 1 ¹ / ₈ " - 7 x 8.5"	4
2	900 36 177	Washer Flat 1.141" - 7	8
3	900 08 255	Rubber Bushing	4
4	934 00 506	Nut Hex Lock 1 ¹ / ₈ " - 7	4

NOTE: One SRK-569 kit services one axle.

Place item 2, flat washer, on the inside of the axle adapter on each side of equalizing beam (four per beam).

NOTE: For clarity, the axle adapter is shown above beam.

PART REPLACEMENT INSTRUCTIONS

Replacing Pivot and Axle Connection Rubber Bushings

IMPORTANT: When replacing the rubber bushings at these connections be sure to order all necessary parts to service one axle. It may be advantageous to service both pivot and axle connections at the same time.

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

IMPORTANT: It is recommended that the vehicle be unloaded and on a level surface. Block vehicle to prevent rolling. Vehicle must be at approximate ride height before beginning service procedures.

⚠ WARNING Always chock wheels to prevent rollaway—serious injury or death could occur.

1. Support vehicle frame with adequate jack stands. Set jack stand height at approximately ride height.

⚠ WARNING During service, always use jack stands of sufficient strength and position them according to OEM recommendations when supporting frame. Failure to do so may cause the vehicle to fall, resulting in vehicle damage and/or serious personal injury.

2. Jack up the rear of the vehicle using jack points and procedure provided in vehicle maintenance manual.
3. Exhaust air springs.

⚠ CAUTION Exhaust all air pressure from the system or personal injury may occur.

4. If servicing all equalizing beam bushings, equalizing beam must be completely removed.
5. Disconnect ride air spring and shock absorber at lower connections.

NOTE: If servicing the front bushing only and using the Bushing Service Tool, remove the pivot bolt and carefully roll axle forward to rotate front of equalizing beam downward to gain access to bushing.

6. Disconnect front pivot and axle connection hardware then remove equalizing beam (**FIGURE 6**).

NOTE: Note the position of the following:

Pivot connection: Note spacer placement for frame width below.

Pivot Connection Washer Placement

Measurements refer to 34.2" axle beam centers.

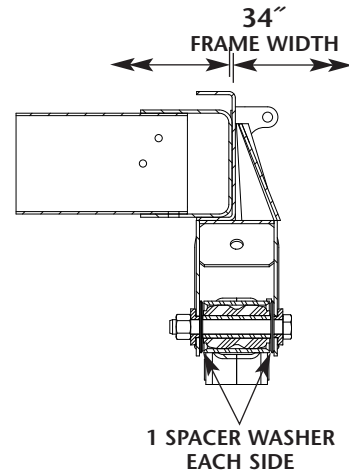
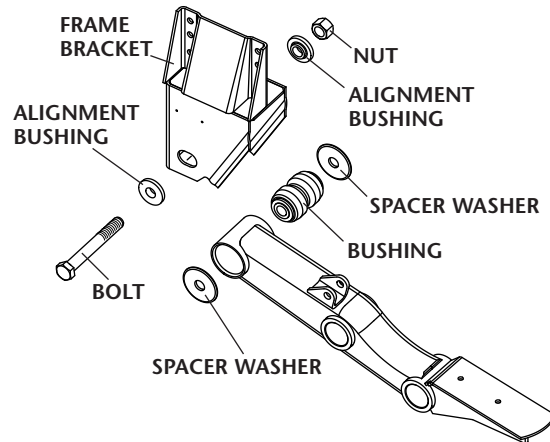


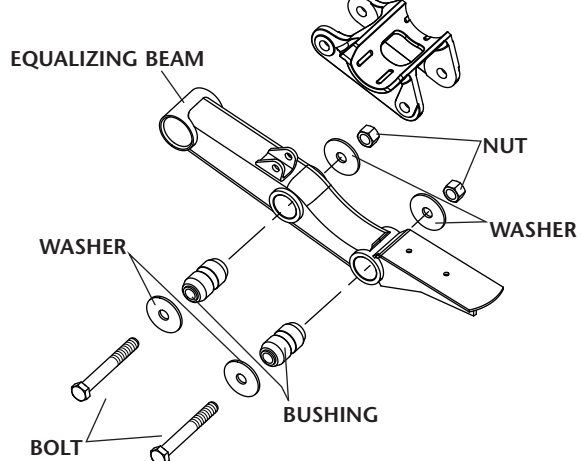
FIGURE 6

PIVOT CONNECTION HARDWARE

SPACER WASHERS,
(6 places on each beam)



AXLE CONNECTION HARDWARE



NOTE: For clarity, the axle adapter is shown above the beam.

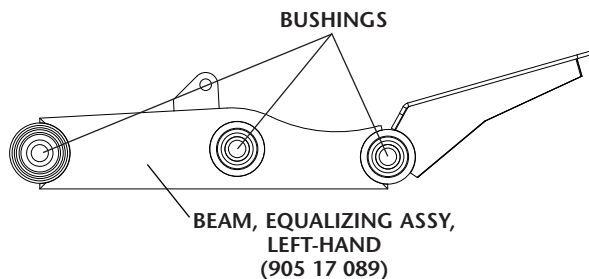
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PART REPLACEMENT INSTRUCTIONS *continued*

- Inspect axle adapters for wear, cracks and failed welds. Weld axle adapters per Holland Neway NS-65-117 specifications for CA Series. Replace all worn or cracked axle adapters.
- Inspect equalizing beams for wear, cracks and failed welds. Replace cracked equalizing beams (**FIGURE 7**).

⚠ WARNING Never repair a cracked equalizing beam. If cracks are detected anywhere on the equalizing beam, replace the beam; otherwise, secondary weld failures during use may cause loss of vehicle control and could cause serious injury or death.

FIGURE 7



- Press out old bushing(s).

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

- Clean out all foreign material from bushing receptacle(s). Lubricate new bushing(s) with approved lubricant.

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

- Press new bushing(s) into the 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's tendency to creep.
- Reassemble new or rebushed equalizing beam to frame bracket. Install spacer washers same as prior configuration.
- Reassemble axle connection and front pivot connection using new wear washers, bolts and nuts. Be sure to install wear washers in proper locations (see **FIGURE 4** or inset figure above **FIGURE 6** on page 8). Position at ride height, torquing nuts to the specifications found on page 4.
- Reconnect air springs and shock absorbers, torquing nuts to the specifications found on page 4.
- Reinstall wheels if necessary. Remove jacks and jack stands.
- Build air reservoir pressure in excess of 100 psig (6.9 bars) and check for leaks at all air system connections.
- Check for proper ride height, and restore suspension to normal travel operation.

Replacing 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 unidentifiable, contact your vehicle OEM for assistance.

IMPORTANT: It is recommended that the vehicle be unloaded and on a level surface before beginning service procedures. Block vehicle to prevent rolling. Vehicle must be at approximate ride height or below to assure that tension is relieved on air springs.

⚠ WARNING Always chock wheels to prevent rollaway—serious injury or death could occur.

- Support vehicle frame with adequate jack stands. Set jack stand height at suspension's specified ride height.

⚠ WARNING During service always use jack stands of sufficient strength and position them according to OEM recommendations. Failure to do so may cause the vehicle to fall, resulting in vehicle damage and/or serious personal injury.

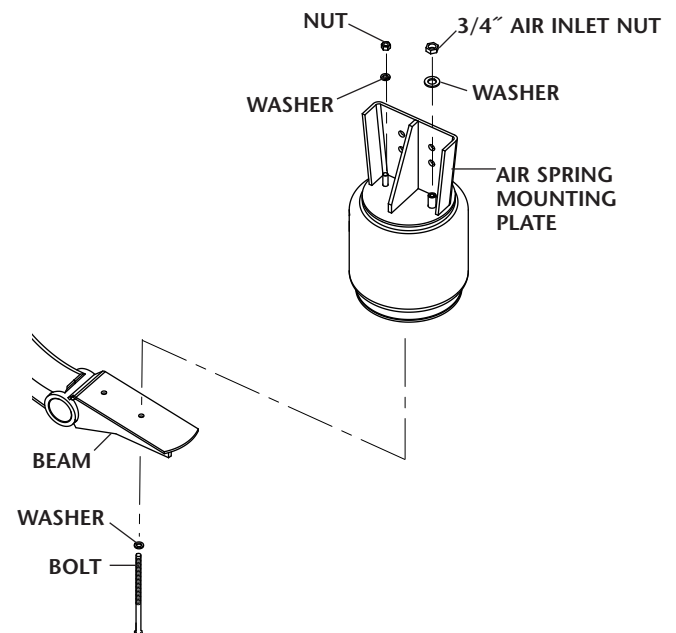
- Completely exhaust air springs by setting pressure regulator valve to 0 (zero) psig and then bleed air inlet connection slowly to release pressure.

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

⚠ CAUTION Exhaust all air pressure from the system or personal injury may occur.

- Disconnect air fittings and fasteners from air spring (**FIGURE 8**).

FIGURE 8



continued

PART REPLACEMENT INSTRUCTIONS *continued*

4. Squeeze air spring, exhausting residual air, and remove old air spring assembly.
5. Install new air spring assembly, and torque 1/2" mounting nuts to the specification found on page 4.
6. Reconnect air supply line, and torque 3/4" supply line fitting to the specification found on page 4.
7. Remove jack stands and jack.
8. Recharge air system in excess of 100 psig (6.9 bars), and check system for leaks.

CAUTION While system pressure capabilities may be in excess of 120 psig (8.3 bars), the air spring pressure must not be set above 100 psig (6.9 bars) or the rubber air spring could tear or fracture.

9. Check for proper ride height, and restore suspension to normal travel operation.

Replacing Shock Absorbers

IMPORTANT: Be sure proper Holland Neway brand Shock Absorber replacement is installed.

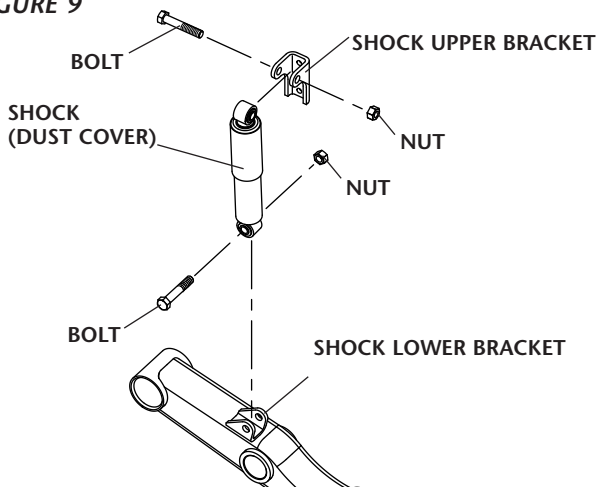
IMPORTANT: It is recommended the vehicle be unloaded and on a level surface. Block vehicle to prevent rolling. Vehicle must be at approximate ride height or below to assure that tension is relieved on shocks.

WARNING Always chock wheels to prevent rollaway—serious injury or death could occur.

1. Completely exhaust air springs by setting pressure regulator valve to 0 (zero) psig.
2. Use appropriate jack and jack stands to position and support axle to relieve tension on axle during removal of fasteners.
3. Remove upper and lower mounting bolts and shock absorber (**FIGURE 9**).

NOTE: Shock orientation is with the dust cover near the top mounting bolt.

FIGURE 9



4. Replace with correct shock absorber, and reinstall bolts.
5. Torque both upper and lower 3/4" nuts to the specification found on page 4.
6. Remove jack stands, and restore suspension to normal operation.

Replacing Frame Brackets

Frame Bracket Installation

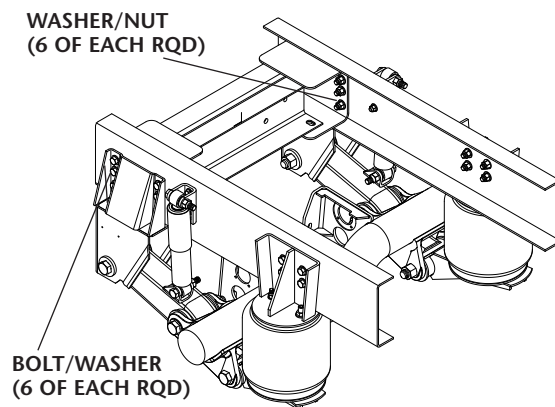
When installing frame brackets to equalizing beam assemblies, washer placement is important to get beam assemblies aligned to the frame (see **FIGURE 4** to determine beam centers).

1. Prior to removing the frame bracket, the vehicle must be unloaded. Support the vehicle frame and axle with adequate jack stands at the approximate ride height.

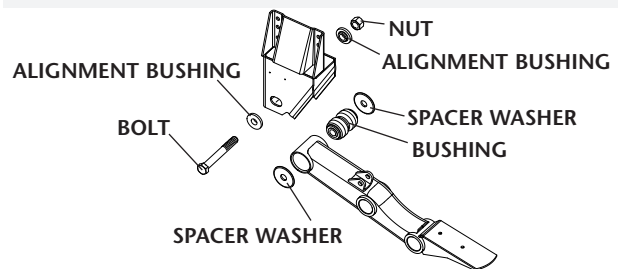
WARNING During service always use jack stands of sufficient strength and position them according to OEM recommendations. Failure to do so may cause the vehicle to fall, resulting in vehicle damage and/or serious personal injury.

2. Disconnect frame bracket and remove (**FIGURE 10**). Make note of the spacer washer placement for proper reassembly (see **FIGURE 4** to determine beam centers).
3. Replace pivot bushing, if necessary.

FIGURE 10



NOTE: Minimum SAE grade 8, 5/8"-11 UNC fasteners with hardened washers or equivalent flange-head bolts.



4. Reassemble pivot connection. Position spacer washers as previously noted in Step 2. To torque nut(s), see the Torque Chart on page 4.

continued

PART REPLACEMENT INSTRUCTIONS *continued*

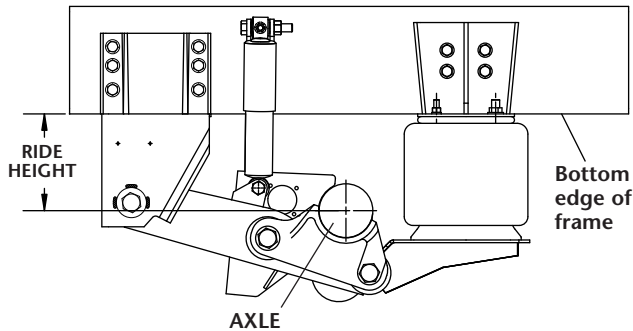
Auxiliary Axle Alignment Procedure

NOTE: The following steps assume that the pivot connection is assembled with the proper hardware based on the frame width.

Suspension alignment should be done under the following conditions with suspension at proper ride height (**FIGURE 11**):

- Preventive maintenance
- Alignment problem: After bushings and other damaged suspension components have been replaced.

FIGURE 11



To align the auxiliary axle:

- Inspect for broken or damaged components.
- Repair or replace components as required to ensure suspension is restored to normal operation.

NOTE: Use of spindle extensions produces more accurate measurements.

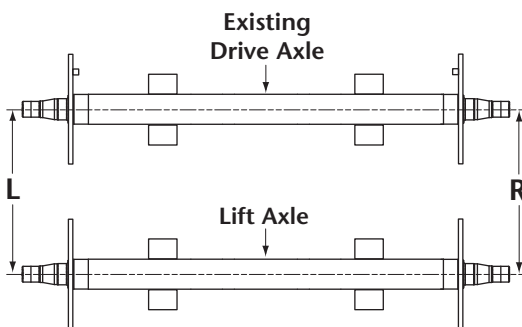
- Install all spindle extensions.

NOTE: Mechanical measuring devices may stretch when pulled to measure long distances. In this case, use equal force for both sides to get accurate measurements.

NOTE: Suspension must be at proper ride height when taking measurements.

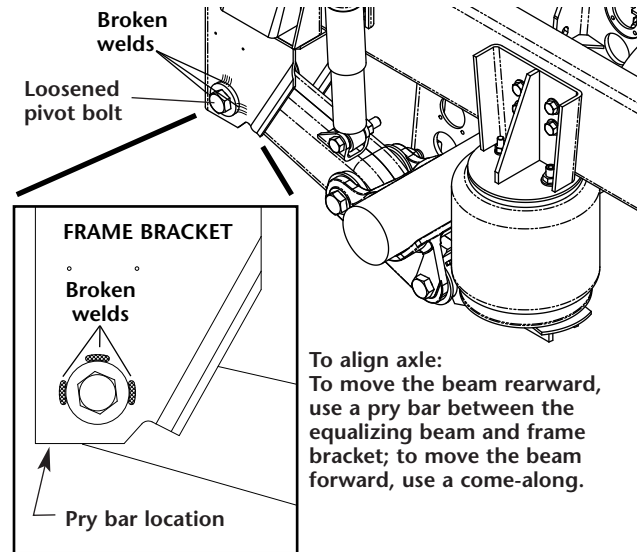
- Measure and record distance between spindle extensions (L and R—**FIGURE 12**) on axle and nearest drive axle.

FIGURE 12



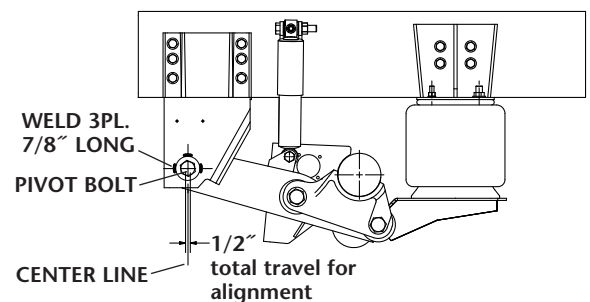
- Compare values for each side to ensure the difference (L minus R) is $\leq 1/8"$.
- Before adjusting beam position on an existing suspension, loosen pivot bolt and break welds on alignment block located on each side of beam.
- If values are not within $1/8"$, use a pry bar between the front end of the beam and the frame bracket to move the suspension rearward (**FIGURE 13**). To adjust axle alignment to within $1/8"$ by moving the beam forward, use a come-along.

FIGURE 13



- Torque $1 1/8"$ pivot bolts to the specification found on page 4.
- Weld alignment blocks on both sides of frame brackets as shown in **FIGURE 14**.
- Repeat step 8 (**FIGURE 14**).

FIGURE 14



NOTE:

WELDS - weld alignment blocks to both sides of frame bracket, welding in three places approximately $7/8"$ long as shown above.

Allow the alignment block to cool for a minimum of 3 minutes and then retorque connection to the specification found on page 4.

ALIGNMENT BLOCK - $1/2"$ (13mm) travel for alignment ($1/4"$ fore and $1/4"$ aft travel from alignment slot center line).

- Remove spindle extensions.

TROUBLESHOOTING

Problem

Possible Cause and Remedy

Poor handling or stability.

Axle or beam components. Check axle alignment, bushing wear, and joint torque.

If problems continue, check axle alignment, bushing wear, and joint torque.

Note: CA suspension system contributes to roll stability (resists vehicle lean) of vehicle system. Use caution when evaluating stability or handling scenarios.

1. *Axle wanders and or moves laterally more than 0.75" or otherwise more than expected movement laterally and/or fore and aft.* Check that Pivot Bolt has proper torque and alignment bushings are in good shape. If bushing(s) are worn, replace bushings and spacers.
2. *Alignment bushings worn and/or bushing core worn* – This indicates joint was run loose. Replace any worn components. Inspect faces and insides of mating components for excessively displaced material. Replace any components that would not result in a tight connection with new bushings and spacer washers. When joint is reassembled, make sure that bolt torque is maintained.
3. *Axle is misaligned* – Inspect tires for evidence of wear showing signs of angular wear patterns—signs of misalignment. Grind off welds securing alignment blocks to frame brackets.

CAUTION Make sure removal operations don't cut into frame bracket parent material. Cutting into frame bracket parent material or excessive heat can cause stress risers or undesirable metallurgical conditions in material.

Clean up any surfaces in the frame bracket slots so new alignment collars will slide fore/aft in slot. Follow axle alignment instructions on page 11.

4. *Axle aligned and pivot connection functional* – Inspect and repair axle connection.
5. *Pivot/axle bolt loose* – To be functional these joints require bushings that are completely clamped against the stationary member. The pivot stationary member is the frame bracket and the axle is the axle adapter. If these items lose clamp force they allow increased relative movement, reducing joint rigidity. In addition, when these joints lose clamp force the joint is subject to dynamic impacts, usually resulting in increased wear and eventually bolt failure, causing the joined components to disconnect. These joints should be monitored at preventive maintenance intervals as required by the experience of the application as a minimum to the recommended guidelines in this manual.
6. *Torque* – See Torque Chart on page 4.

Tire Wear.

Axle or beam components or shocks. Check tire manufacturers publications for descriptions of problems and solutions. Some issues are due to normal use and are unavoidable. These issues can be minimized by monitoring tire wear characteristics on a regular basis, implementing preventive maintenance strategies, and noting what is "normal" operation. Suspension components may be involved when you observe:

- Lateral or angled bands across entire tread.
 1. *Axle wanders and or moves laterally more than 0.75" or otherwise more than expected movement laterally and/or fore and aft.* Check that Pivot Bolt has proper torque and alignment bushings are in good shape. If bushing(s) are worn, replace bushings and spacers.
 2. *Alignment bushings worn and/or bushing core worn* – This indicates joint was run loose. Replace any worn components. Inspect faces and insides of mating components for excessively displaced material. Replace any components that would not result in a tight connection with new bushings and spacer washers. When joint is reassembled, make sure that bolt torque is maintained.

continued

TROUBLESHOOTING *continued*

Problem	Possible Cause and Remedy
Tire wear.	<ul style="list-style-type: none">• Flat spots—repeated non-uniform wear in one spot or multiple spots around the circumference that can't be explained by recent braking incidents.<ol style="list-style-type: none">1. Check shocks for wear (see page 10).2. Check air system – pressure control may be irregular. See pressure control manufacturer's documentation.• Cupping – Odd wear patterns throughout tread circumference.<ol style="list-style-type: none">1. Tire inflation.2. Overload.
Rough or harsh ride. (Road or terrain events can be heard or felt that do not appear to be from any other suspension system.)	Axle or beam components. Check items that follow. If problems continue, check items below. <ol style="list-style-type: none">1. <i>Ride height and model choice.</i> Check ride height and compare to the range for your model; if outside of range, contact Holland.2. <i>Inspect the shocks.</i> See "Shock absorber" below.3. When measured on level ground, the ride height is measured from the center of the axle to the under side of the frame.
Shock absorber broken (casing pulled apart) or elongated shock mounts.	Check shocks. Mislocated shock brackets. Improper length shocks installed. Check ride height and model choice. Check ride height and compare to the range for your model; if outside of range, contact Holland.
Shock absorber (loss of fluid).	Check shocks. Mislocated shock brackets. Improper length shocks installed. Visible appearance of large quantities of fluid or adhered on layer of oil soaked dirt (not normal mud or other reasonable sources). More axle travel or less effective recovery after normal road/terrain events occur. It is normal for a small amount of misting of oil to occur when the shock is functional. Check ride height and model choice. Check ride height and compare to the range for your model; if outside of range, contact Holland.
Shock absorber dust shield broken or has wrinkled appearance. (Failed shock casing has angled tear, or shock mount eyes deflected toward body of eyes.)	Check shocks. Mislocated shock brackets. Improper length shocks installed. Check ride height and model choice. Check ride height and compare to the range for your model; if outside of range, contact Holland.
Air spring failure – punctured, torn or abraded (cause not obvious from circumstances).	Check air springs and clearances. Air spring(s) worn out. Replace. Tires, rims or other objects are rubbing the air spring. Check the clearance between the air spring and the tire. Air springs should have a minimum of 3" (76mm) clearance.

continued

TROUBLESHOOTING *continued*

Problem	Possible Cause and Remedy
Air spring failure. (Bellows abraded around base, cuts/tears around top bead ring, deformed mounting around top bead ring, bumper inside bag not secure.)	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. Inspect areas near air springs to ensure adequate clearances. Check ride height and model choice. Check ride height and compare to the range for your model; if outside of range, contact Holland.
Broken frame bracket or crossmember.	Cracked or loose frame crossmembers. Repair or replace damaged frame members, and torque all nuts and bolts to proper torque specifications. Loose frame bolts or attachments. Tighten frame bolts and attaching parts to proper specifications.
Broken/damaged equalizing beam (trailing arm beam).	Axle or beam components. Check axle alignment (page 11), bushing wear (page 8), and joint torque (page 4).
Broken/damaged axle.	Axle or beam components. Check axle alignment (page 11), bushing wear (page 8), and joint torque (page 4). Inspect axle and axle stops for wear.
Air system.	Air system function. There is a regulator valve that can be used to set ride air spring operating pressure. See pressure control manufacturer's documentation.

continued

TROUBLESHOOTING *continued*

Problem	Possible Cause and Remedy
Insufficient air pressure - <i>continued</i>	<p>Regulator – Make sure that regulator valves in the system are not restricting air flow.</p> <p>Leaks – Inspect lines and connections. Soapy water can be applied to visually inspect for bubbles which indicate leaks. Work systematically from tank to air springs and make repairs as needed. Air spring components can be visually inspected and/or inspected with soapy water.</p> <p>Obstructions – Check for air flow between connection points. If air isn't flowing between points work forward from first point where flow is known to exist. Trace lines up to next joint and inspect for damaged lines and repair as needed. Inspect each connection for debris or other obstructions. If moisture is detected in any line, drain and inspect lines and connections for corrosion. Consider adding a dryer to system: moisture in lines will lead to leaks, corrosion and obstructions.</p>

Contact your vehicle OEM for recommendations if these possible causes and effects do not solve the vehicle handling problem.

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