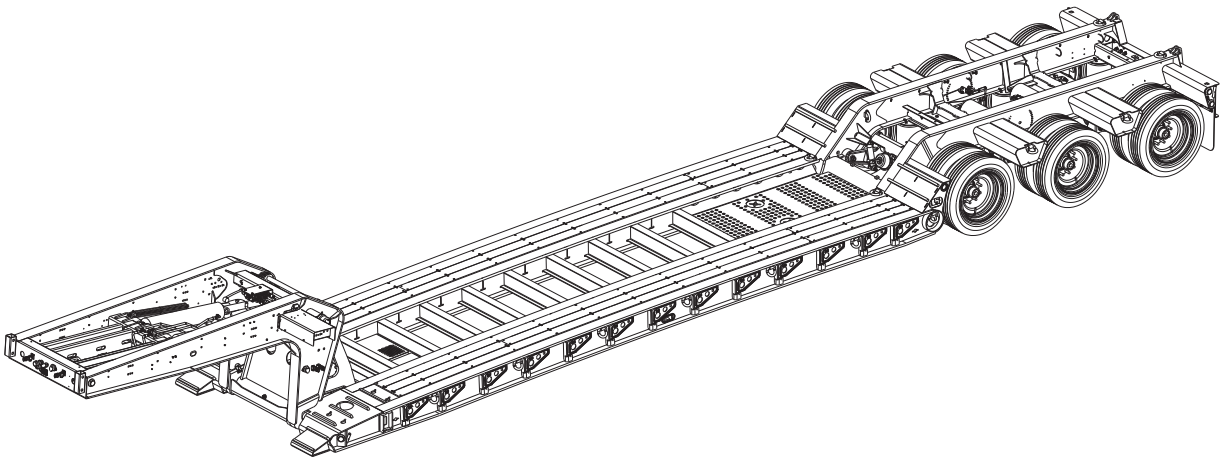
855F / 860F
Detachable Semitrailer
Operator's Manual



LANDOLL COMPANY, LLC
1900 North Street
Marysville, Kansas 66508
(785) 562-5381
800-428-5655 ~ WWW.LANDOLL.COM

F-1122-2601

Instructions for Ordering Parts

**** Repair parts must be ordered through an Authorized Dealer ****

DEALER INSTRUCTIONS FOR ORDERING PARTS FROM LANDOLL PARTS DISTRIBUTION CENTER

Phone #: 800-423-4320 or 785-562-5381 **Fax #: 888-527-3909**
Order online: dealer.landoll.com

IDENTIFICATION PLATE

The identification plate, which lists the model number and serial number, is located on the front of the frame.

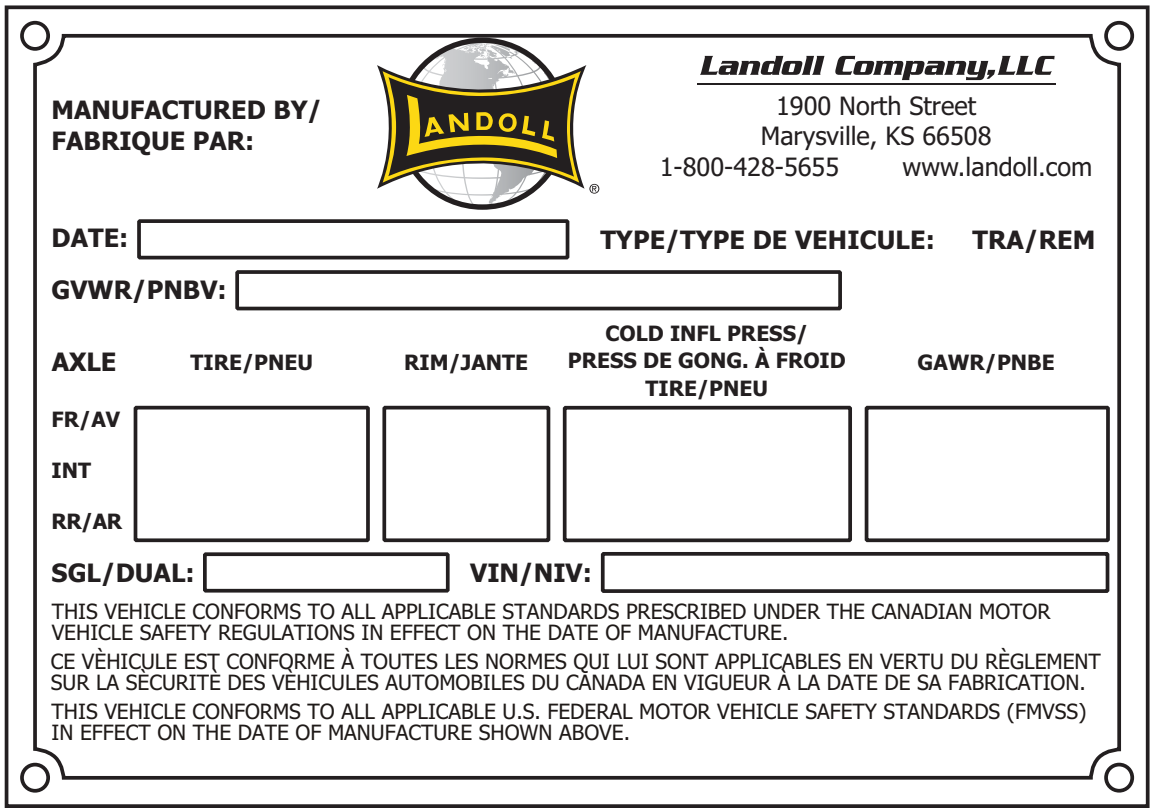
SERIAL NUMBER

The serial number is located on the identification plate.
The Following information will help decode the trailer serial number

AAABBBCDEFGHJJJJJ

AAA	= world manufacturer identifier
BBB	= model
C	= length
D	= axle type
E	= federal check digit

F	= model year
G	= plant of manufacture
H	= model version
JJJJJ	= serial number



Identification Plate and Location

Manuals for 855F/860F Detachable Semitrailer

Manual Number	Manual Type
F-1122	Operator's Manual
F-1123	Parts Manual



DANGER

DO NOT operate or perform any maintenance tasks on this equipment until you have completed the following:

1. **Receive proper training to operate this equipment safely.**
2. **Read and understand the operator's manual.**
3. **Be thoroughly trained on inspection and repair procedures.**

Failure to comply with this warning will result in serious injury or possibly death.

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Chapter 1

Introduction and Safety Information

Introduction

This manual provides operating, servicing, and maintenance instructions for the most common components and options of the Model 855 and 860 Detachable Trailer, manufactured by Landoll Company, LLC., Marysville, Kansas 66508. If an option is not covered, contact an Authorized Landoll Dealer for assistance. This trailer manual is available online through the Dealer Portal at **dealer.landoll.com**.

CHAPTER 1 — Gives basic instructions on the use of this manual and understanding the safety statements.

CHAPTER 2 — Gives product specifications for the trailer, including measurements and component specifications. A Standard Bolt Torque Table is provided to give guidelines for bolt torques to be used when servicing this product.

CHAPTER 3 — Gives instructions for the proper operation of the trailer components.

CHAPTER 4 — Gives instructions for the proper operation of the trailer.

CHAPTER 5 — Gives general maintenance procedures, a maintenance schedule, and a lubrication schedule. Improper maintenance will void your warranty.

IF YOU HAVE ANY QUESTIONS CONTACT:
LANDOLL COMPANY, LLC.
1900 NORTH STREET
MARYSVILLE, KANSAS 66508
PHONE # (785) 562-5381 or (800) 428-5655

CHAPTER 6 — Is a troubleshooting guide to aid in diagnosing and solving problems with the trailer.

CHAPTER 7 — Gives manufacturer references to assist in the troubleshooting, service, and maintenance of trailer components.The trailer manual manufacturer references are available online through the Dealer Portal at **dealer.landoll.com**.

PARTS MANUAL — Is a separate manual showing the various assemblies, sub-assemblies, systems, and diagrams that are useful for parts identification and during maintenance procedures. Refer to that manual when ordering replacement parts from your authorized Landoll dealer. The trailer manual is available online through the Dealer Portal at **dealer.landoll.com**.

WARRANTY — The Warranty Registration form is included with the product documents. Fill it out and mail it within 10 days of purchase.

NOTE: IMPROPER ASSEMBLY, MODIFICATION, OR MAINTENANCE OF YOUR LANDOLL MACHINE CAN VOID YOUR WARRANTY.

COMMENTS — Address comments or questions regarding this publication to:

LANDOLL COMPANY, LLC.
1900 NORTH STREET
MARYSVILLE, KANSAS 66508
ATTENTION: PUBLICATIONS - DEPT. 55

DANGER

DO NOT operate or perform any maintenance tasks on this equipment until you have completed the following:

1. **Receive proper training to operate this equipment safely.**
2. **Read and understand the operator's manual.**
3. **Be thoroughly trained on inspection and repair procedures.**

Failure to comply with this warning will result in serious injury or possibly death.

Understanding Safety Statements

You will find various types of safety information on the following pages and on the machine signs (decals) attached to the vehicle. This section explains their meaning.

The Safety Alert Symbol means ATTENTION! YOUR SAFETY IS INVOLVED!

DANGER

Danger means a life-threatening situation exists. Death will occur if safety measures or instructions on this label are not properly followed.

WARNING

Warning means serious injury or death could occur if safety measures or instructions on this label are not properly followed.

CAUTION

Caution means minor or moderate injury could occur if instructions on this label are not properly followed.

NOTICE

Special notices that include helpful hints. Read and understand thoroughly.

IMPORTANT

Means that failure to follow these instructions could cause damage to the equipment or cause it to operate improperly.

NOTE

Make sure you read and understand the information contained in this manual and on the machine signs (decals) before you attempt to operate or maintain this vehicle.

The safety statements contained in this manual relate to the operation of the Models 855F-860F Detachable Trailer.

Trailer Specifications

General Specifications	
GOOSENECK	**(855)** 10’-9” **(855-860)** 12’-5” w/ 7 Positions, Hydraulic Fifth Wheel Ride Height
AIR HOOKUP	Color Coded Gland Hands
ELECTRICAL HOOKUP	7-Way Connector, 12 VDC System
KINGPIN SETTING	**(855)** 10’-9” Gooseneck = 15” **(855-860)** 12’-5” Gooseneck Dual Pins = 15” & 33”
LOADED DECK HEIGHT	Standard = 19.5”
LOADED GROUND CLEARANCE	6.5”
BRAKES	Air Actuated, 16.5” X 7” Drum, Anti-Lock Brakes
TIRE SIZE 255/70R22.5	Load Range: H Wheel Dimensions: 22.5” X 8.25” Single Max Load @120 psi (827 kPa)=5,510 lbs (2499 kg) Dual Max Load @120 psi (827 kPa)=5,070 lbs (2300 kg)
TIRE SIZE 275/70R22.5	Load Range: J Wheel Dimensions: 22.5” X 8.25” Single Max Load @125 psi (862 kPa)=6,610 lbs (2998 kg) Dual Max Load @125 psi (862 kPa)=6,175 lbs (2801 kg)

Load Capacity	
NOTICE	Capacity Ratings listed below are frame capacities **ONLY**. Some restrictions on load capacities are Tire and Wheel Load Ratings, Brake Size, Gross Axle Weight Rating (GAWR), Gross Vehicle Weight Rating (GVWR), Truck Towing Capacity, and State, Federal, Provincial, Local, and Industrial Regulations.
FRAME CAPACITY	**(855)** 110,000 lbs (49,895 kg) Distributed/Concentrated in 12 ft (3.7 m) **(860)** 120,000 lbs (54431 kg) Distributed/Concentrated in 14 ft (4.3 m)
BOLSTERS	Half Front Bolster w/Traction Bars, Lowered Bolster Between Tires 20,000 lbs (9072 kg) Rear Bolster 17,500 lbs (7938 kg)
SWING OUT OUTRIGGERS MAXIMUM CAPACITY	55,000 lbs (24948 kg) Distributed 55,000 lbs (24948 kg) Concentrated in 12 ft (3.7 m)

General Specifications Hydraulic Hookup	
NOTICE The hydraulic power supply must be capable of operating at the flow rate and deadhead pressure listed below.	
OPERATING FLOW	20 gpm max (76 Lpm), with a minimum reservoir size of 30 gallons (114 liters), minimum of 3/4 in diameter hoses, with a pressure relief on the hydraulic supply.
MAXIMUM PRESSURE RELIEF VAVLE SETTINGS	**(Hydraulic Supply Pump)** 2,500-2,600 psi (17,237-17926 kPa) **(Trailer Control Valve)** 2,500 psi (17,237 kPa)
QUICK COUPLERS	Flat Face, 3/4 in Body Size

Specific Bolt Torques

Air Spring Assembly	Ft. lbs	Nm
3/8" - AIR SPRING BOLTS (CLEAN, DRY, NON-LUBRICATED THREADS) DEXTER CORP	15 - 20	21 - 27
1/2" - AIR SPRING BOLTS (CLEAN, DRY, NON-LUBRICATED THREADS) DEXTER CORP SAF - HOLLAND	 25 - 30 30 - 40	 34 - 40 41 - 54
3/4" - AIR SPRING BOLTS (CLEAN, DRY, NON-LUBRICATED THREADS) DEXTER CORP SAF - HOLLAND	 40 - 45 30 - 40	 55 - 61 41 - 54
Suspension Assembly - Air Ride		
1-1/8" - PIVOT AND ADAPTER BOLTS (CLEAN, DRY, NON-LUBRICATED THREADS) DEXTER CORP SAF - HOLLAND	 750 - 800 550 - 600	 1017 - 1084 746 - 813
7/8" - PIVOT BOLT LOCK NUTS (CLEAN, DRY, NON-LUBRICATED THREADS) DEXTER CORP **7/8" - JAM NUT** (CLEAN, DRY, NON-LUBRICATED THREADS) DEXTER CORP	 500 - 550 150	 678 - 745 204
3/4" - SHOCK ABSORBER MOUNT BOLTS (CLEAN, DRY, NON-LUBRICATED THREADS) DEXTER CORP SAF - HOLLAND	 150 - 175 150 - 175	 204 - 237 204 - 237
1/2" - RIDE HEIGHT AIR VALVE CONTROL ROD & LINKAGE NUTS (CLEAN, DRY, NON-LUBRICATED THREADS)	50	68
1/4" - RIDE HEIGHT AIR VALVE & LINKAGE NUT (CLEAN, DRY, NON-LUBRICATED THREADS)	5	7
Wheel Fasteners		
OUTER SPINDLE NUTS	300 - 400	407 - 542
HUB CAP AND GASKET MOUNT BOLTS	10 - 15	14 - 20
FLANGE NUTS, LUG NUTS, OR PILOT WHEEL NUTS	450 - 500	611 - 677

General Torque Specifications

LANDOLL
FASTENER TORQUE SPECIFICATIONS
(Rev. 23/04)

This chart provides general torque specifications for Standard Nuts and Caps Screws (as received condition) that are not called out on processes or drawings.

This **DOES NOT** apply if special lubrication such as graphite moly-disulfide or other extreme pressure lubricants are used.

Add 33% to the listed torque specification if the fastener is dry (solvent cleaned).

Cap screw grades are indicated by markings on the head, these vary among manufacturers.

Thick Nuts must be used on grade 8 cap screws.

SAE TORQUE SPECIFICATIONS (FOOT-POUNDS)

[ ] Indicates specifications for Prevailing Torque Nuts.

UNC Size	Grade 2	Grade 5	Grade 8
1/4 - 20	4 [5]	6 [7]	9 [11]
5/16 - 18	8 [10]	13 [16]	18 [22]
3/8 - 16	15 [19]	23 [29]	35 [43]
7/16 - 14	24 [30]	35 [43]	55 [62]
1/2 - 13	35 [43]	55 [62]	80 [100]
9/16 - 12	55 [62]	80 [100]	110 [137]
5/8 - 11	75 [94]	110 [137]	170 [212]
3/4 - 10	130 [162]	200 [250]	280 [350]
7/8 - 9	125 [156]	320 [400]	460 [575]
1 - 8	190 [237]	408 [506]	680 [850]
1-1/8 - 7	270 [337]	600 [750]	960 [1200]
1-1/4 - 7	380 [475]	840 [1050]	1426 [1782]
1-3/8 - 6	490 [612]	1100 [1375]	1780 [2225]
1-1/2 - 6	650 [812]	1460 [1825]	2360 [2950]

See back side for SAE UNF and Metric torques.

Form No. F-257-0322

SAE TORQUE SPECIFICATIONS (FOOT POUNDS)

[ ] Indicates specifications for Prevailing Torque Nuts.

UNF Size	Grade 2	Grade 5	Grade 8
1/4 - 28	5 [6]	7 [9]	10 [12]
5/16 - 24	9 [11]	14 [17]	20 [25]
3/8 - 24	17 [21]	25 [31]	35 [44]
7/16 - 20	27 [34]	40 [50]	60 [75]
1/2 - 20	40 [50]	65 [81]	90 [122]
9/16 - 18	60 [75]	90 [112]	130 [162]
5/8 - 18	85 [106]	130 [162]	180 [225]
3/4 - 16	150 [188]	220 [275]	320 [400]
7/8 - 14	140 [175]	360 [450]	500 [625]
1 - 14	210 [263]	540 [675]	760 [950]
1-1/8 - 12	300 [375]	660 [825]	1080 [1350]
1-1/4 - 12	420 [525]	920 [1150]	1500 [1875]
1-3/8 - 12	560 [700]	1260 [1575]	2010 [2512]
1-1/2 - 12	730 [912]	1640 [2050]	2660 [3325]

METRIC TORQUE SPECIFICATIONS

This chart provides torque specification for phosphate coated, Rockwell "C" 38-45 Metric Coarse Thread Class 10.9 Fasteners, Class 10.0 Nuts and Harden Flat Washers.

[ ] Indicates specifications for Prevailing Torque Nuts.

MM Size	Newton - Meters	Foot-Pounds
6	10 [14]	7 [10]
7	16 [22]	12 [16]
8	23 [32]	17 [24]
10	46 [60]	34 [47]
12	80 [101]	60 [75]
14	125 [155]	90 [115]
16	200 [240]	150 [180]
18	275 [330]	205 [245]
20	385 [450]	290 [335]
24	670 [775]	500 [625]
27	980 [1105]	730 [825]
30	1330 [1470]	990 [1090]
33	1790 [1950]	1730 [1870]
36	2325 [2515]	1730 [1870]
39	3010 [3210]	2240 [2380]

See front side for SAE UNC and notes.

Figure 2-1: General Torque Specifications

Hydraulic Fitting Torque Specifications

LANDOLL
HYDRAULIC FITTING TORQUE SPECIFICATIONS (REV. 23/04) AEROQUIP BRAND FITTINGS 37° JIC; ORS & ORB

This chart provides torque specifications for Plated Carbon Steel and Stainless Steel Fittings (as received condition) that are not called out on processes or drawings.

This **DOES NOT** apply if special lubrication such as graphite moly-disulfide or other extreme pressure lubricants are used.

Minus 65% from the listed torque specification for Brass Fittings.

TORQUE SPECIFICATIONS (FOOT-POUNDS)

[ ] Indicates specifications for Prevailing Torque Nuts.

DASH Size	37 Degree JIC	O-Ring (ORS)	O-Ring Boss (ORB)
-4	11-12	10-12	14-16
-5	15-16	-----	18-20
-6	18-20	18-20	24-26
-8	38-42	32-35	50-60
-10	57-62	46-50	72-80
-12	79-87	65-70	125-135
-14	-----	-----	160-180
-16	108-113	92-100	200-220
-20	127-133	125-140	240-280
-24	158-167	150-165	270-360
-32	245-258	-----	-----

FORM NO. F-263-2304 (1 of 3)

LANDOLL
HYDRAULIC FITTING TORQUE SPECIFICATIONS (REV. 23/04) GATES BRAND FITTINGS 37° JIC; ORS & ORB

This chart provides torque specifications for Plated Carbon Steel and Stainless Steel Fittings (as received condition) that are not called out on processes or drawings.

This **DOES NOT** apply if special lubrication such as graphite moly-disulfide or other extreme pressure lubricants are used.

Minus 65% from the listed torque specification for Brass Fittings.

TORQUE SPECIFICATIONS (FOOT-POUNDS)

[ ] Indicates specifications for Prevailing Torque Nuts.

DASH Size	37 Degree JIC	O-Ring (ORS)	O-Ring Boss (ORB)
-4	10-11	10-12	14-16
-5	13-15	-----	-----
-6	17-19	18-20	24-26
-8	34-38	32-40	37-44
-10	50-56	46-56	50-60
-12	70-78	65-80	75-83
-14	-----	65-80	-----
-16	94-104	92-105	111-125
-20	124-138	125-140	133-152
-24	156-173	150-180	156-184
-32	219-243	-----	-----

FORM NO. F-263-2304 (2 of 3)

LANDOLL
HYDRAULIC FITTING TORQUE SPECIFICATIONS (REV. 23/04) PARKER BRAND FITTINGS 37° JIC; ORS & ORB

This chart provides torque specifications for Plated Carbon Steel and Stainless Steel Fittings (as received condition) that are not called out on processes or drawings.

This **DOES NOT** apply if special lubrication such as graphite moly-disulfide or other extreme pressure lubricants are used.

Minus 65% from the listed torque specification for Brass Fittings.

TORQUE SPECIFICATIONS (FOOT-POUNDS)

[ ] Indicates specifications for Prevailing Torque Nuts.

DASH Size	37 Degree JIC	O-Ring (ORS)	O-Ring Boss (ORB)
-4	11-13	15-17	13-15
-5	14-16	-----	21-23
-6	20-22	34-36	25-29
-8	43-47	58-62	40-44
-10	55-65	100-110	58-62
-12	80-90	134-146	75-85
-14	-----	-----	-----
-16	115-125	202-218	109-121
-20	160-180	248-272	213-237
-24	185-215	303-327	238-262
-32	250-290	-----	310-340

FORM NO. F-263-2304 (3 of 3)

Figure 2-2: Hydraulic Fitting Torque Specifications

Table provided for general use.

NOTES:

Chapter 3

Trailer Overview

General

This section supplies information for operation of the trailer. It describes and locates controls and gives general operation procedures. Read all instructions, warnings, cautions, and danger notes before attempting to operate the trailer. Operators must have proper training before operating the trailer.

WARNING

DO NOT operate the trailer with any known fault that might endanger the occupants, nearby workers, other traffic, the load, or the equipment.

Trailer Components

WARNING

DO NOT operate the trailer until you have read the operator's manual and completely understand the proper use and function of all controls. Improper use can cause personal injury, damage to your trailer and cargo, and cause time-consuming breakdowns.

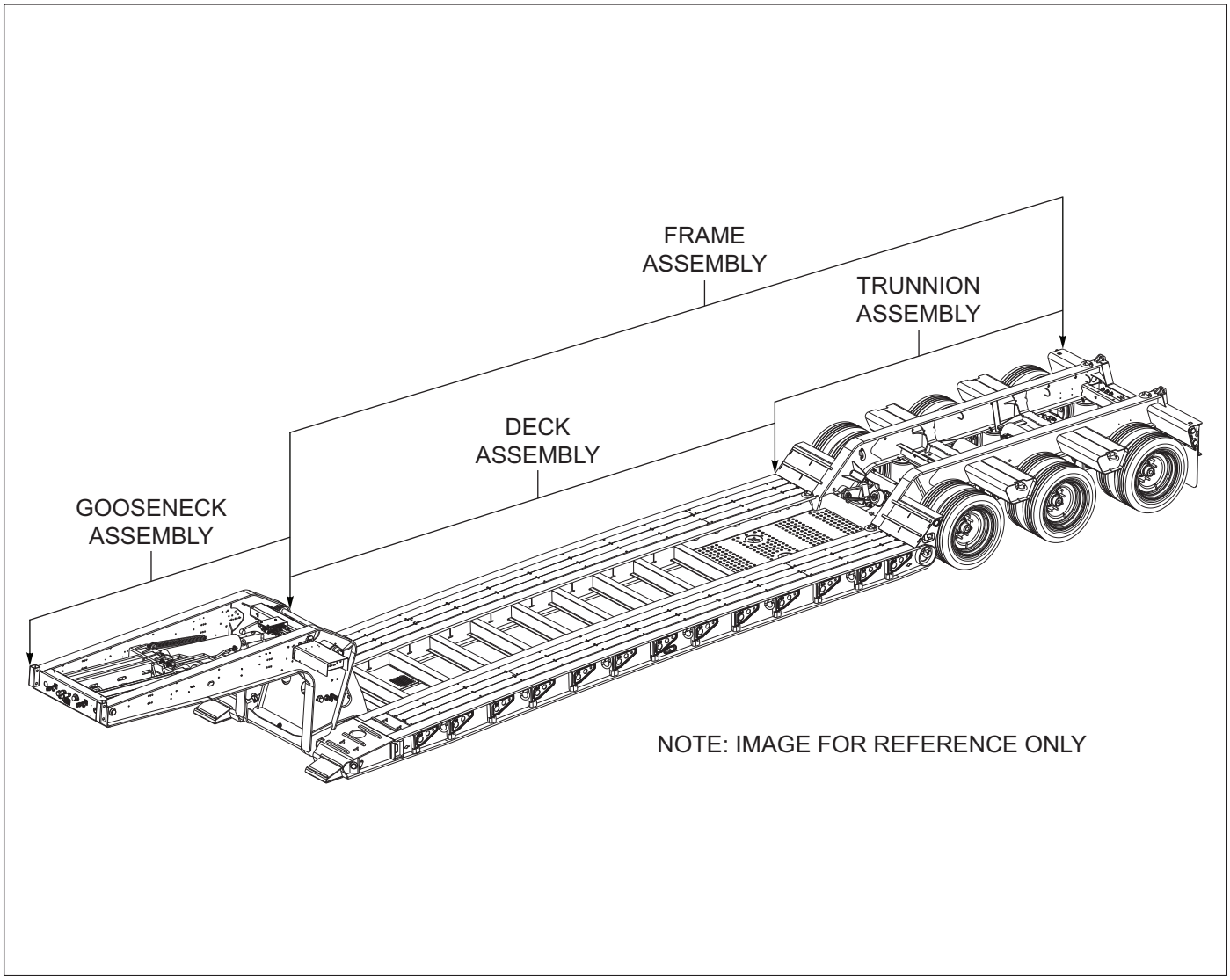


Figure 3-1: Trailer Components (1 of 7)

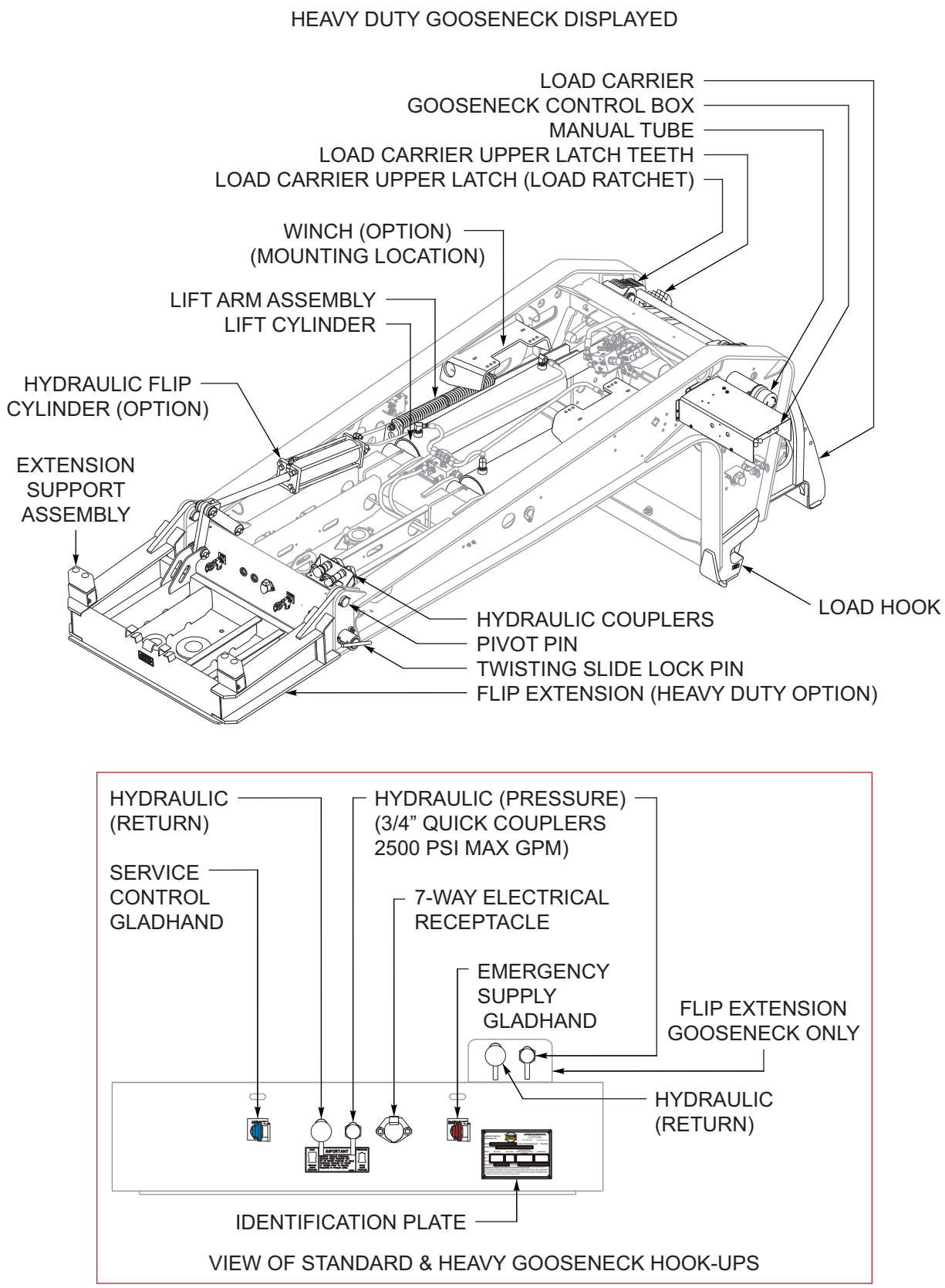


Figure 3-2: Trailer Components (2 of 7)

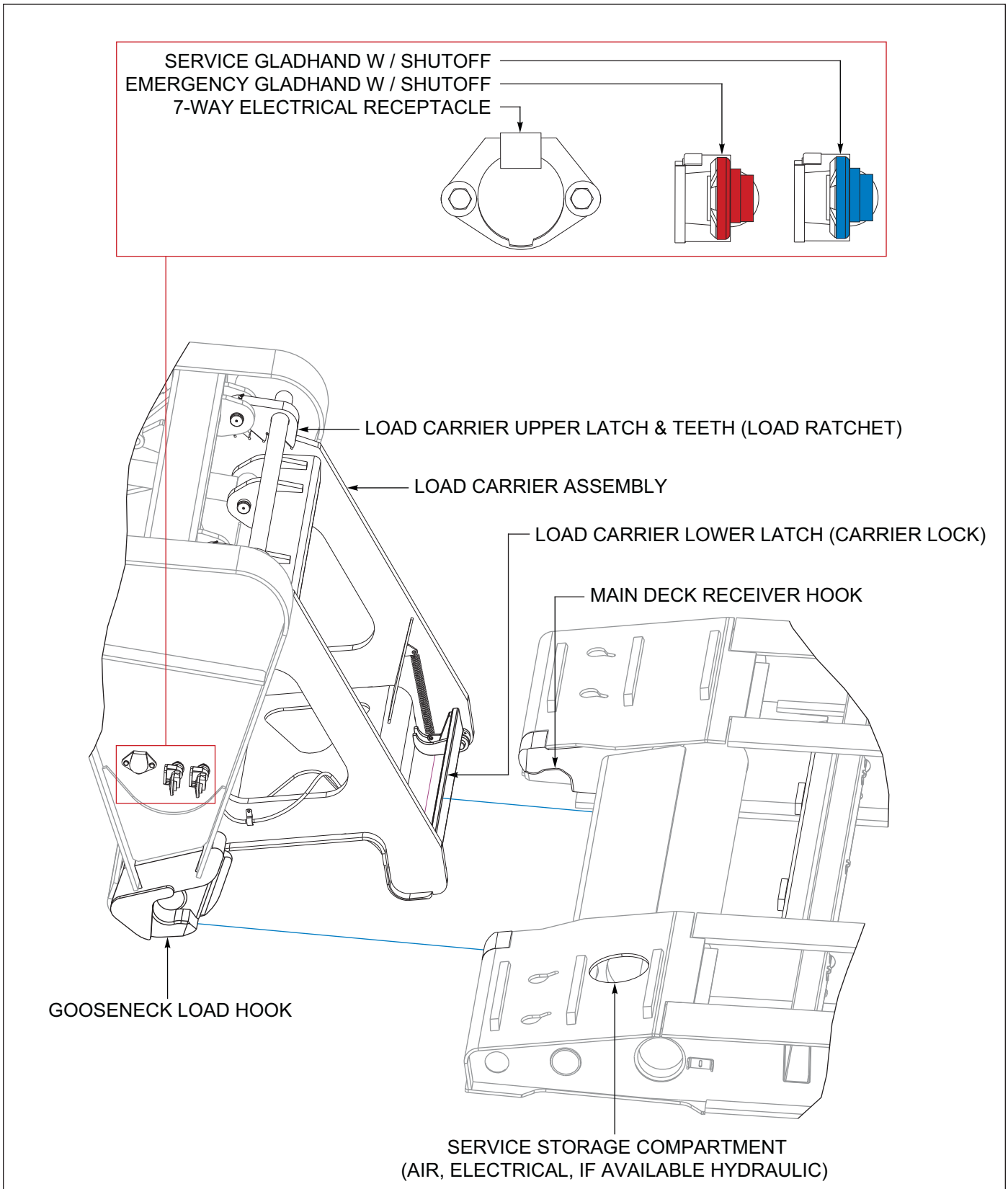
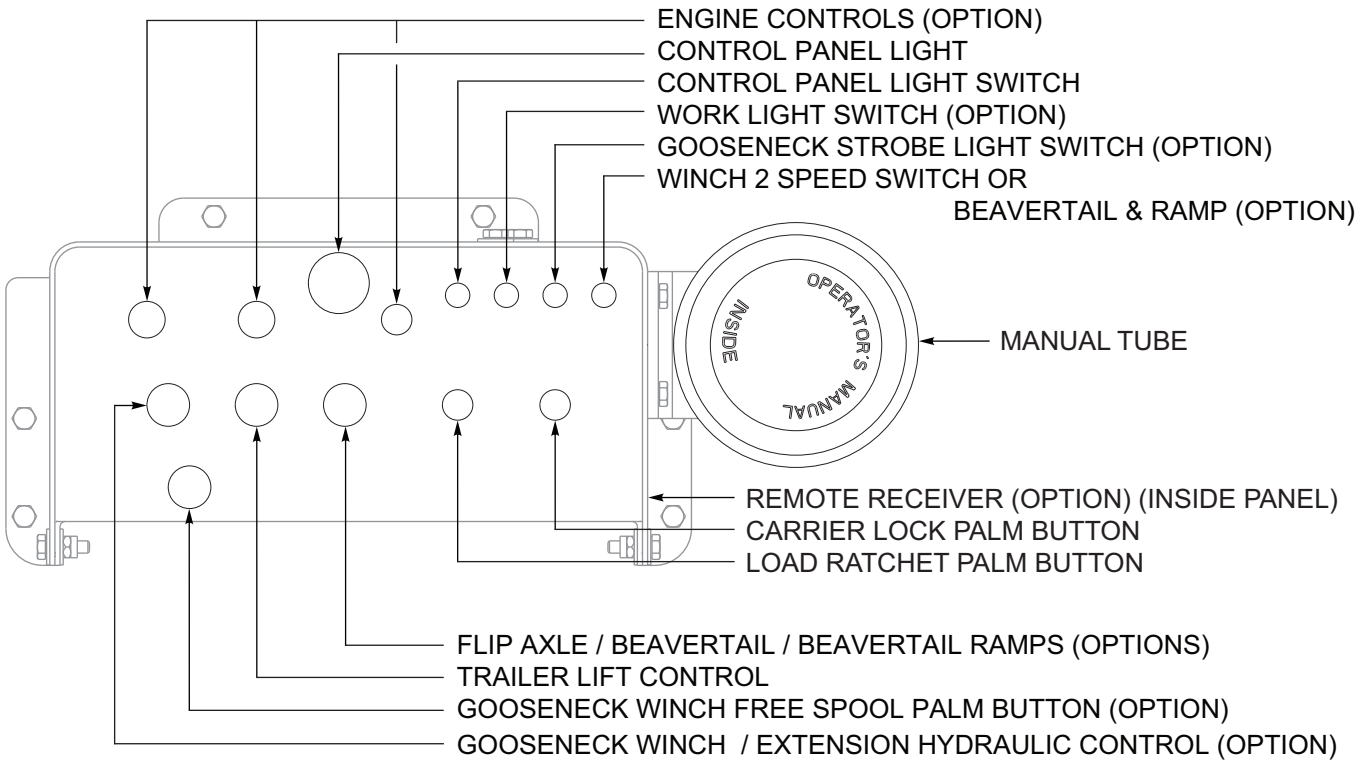
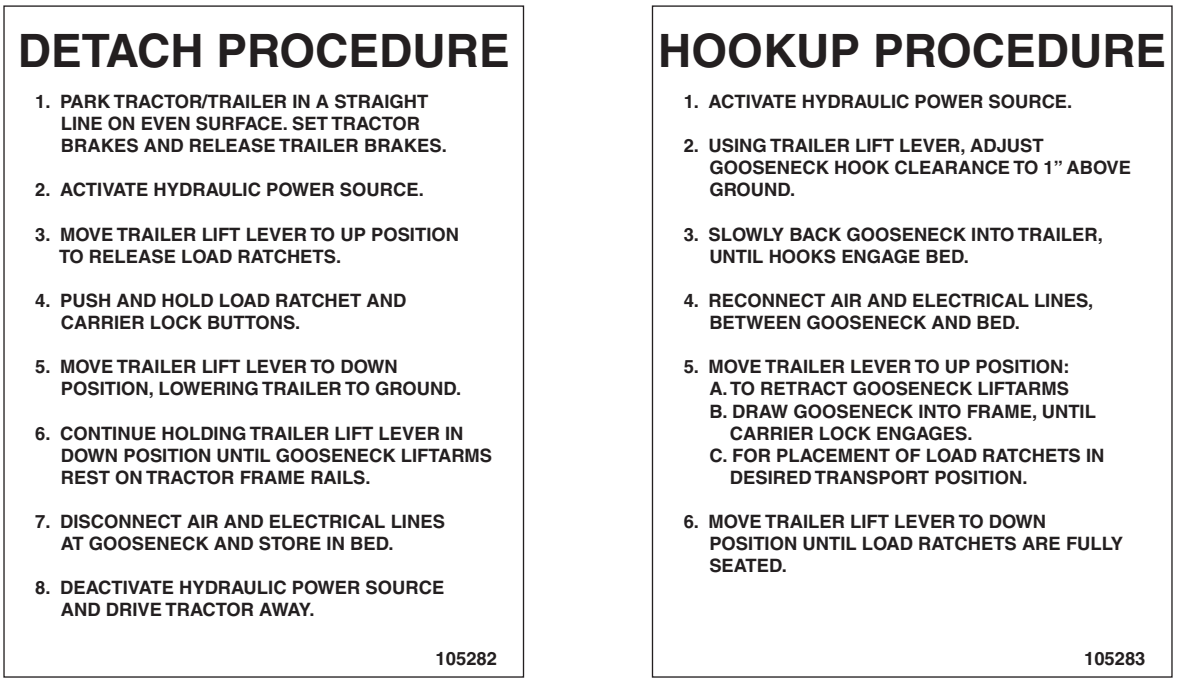


Figure 3-3: Trailer Components (3 of 7)



NOTE: CONTROL FUNCTIONS MAY DEPEND ON OPTIONS PURCHASED

VIEW OF STREET SIDE GOOSENECK CONTROL BOX



VIEW OF GOOSENECK CONTROL BOX DECALS

Figure 3-4: Trailer Components (4 of 7)

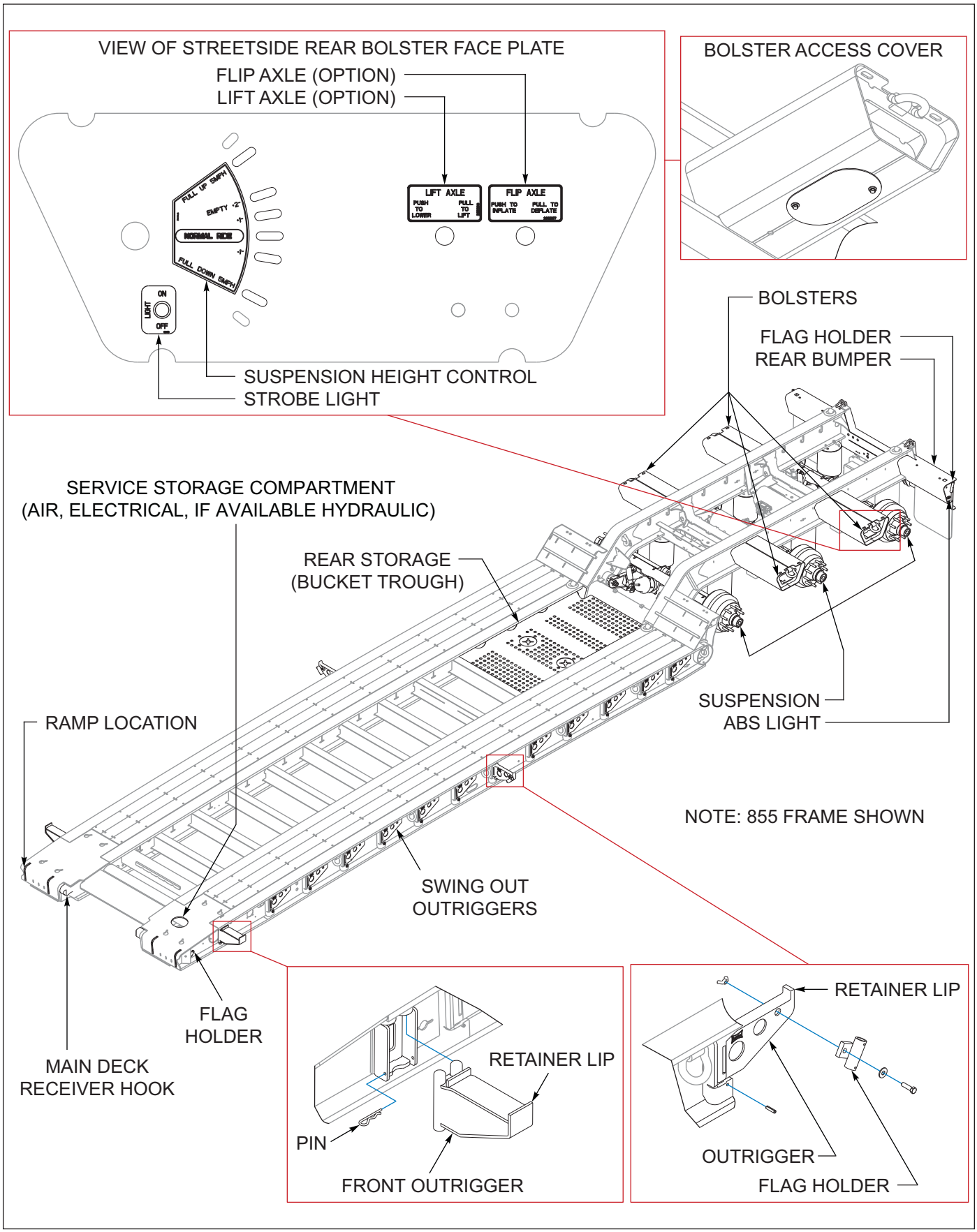
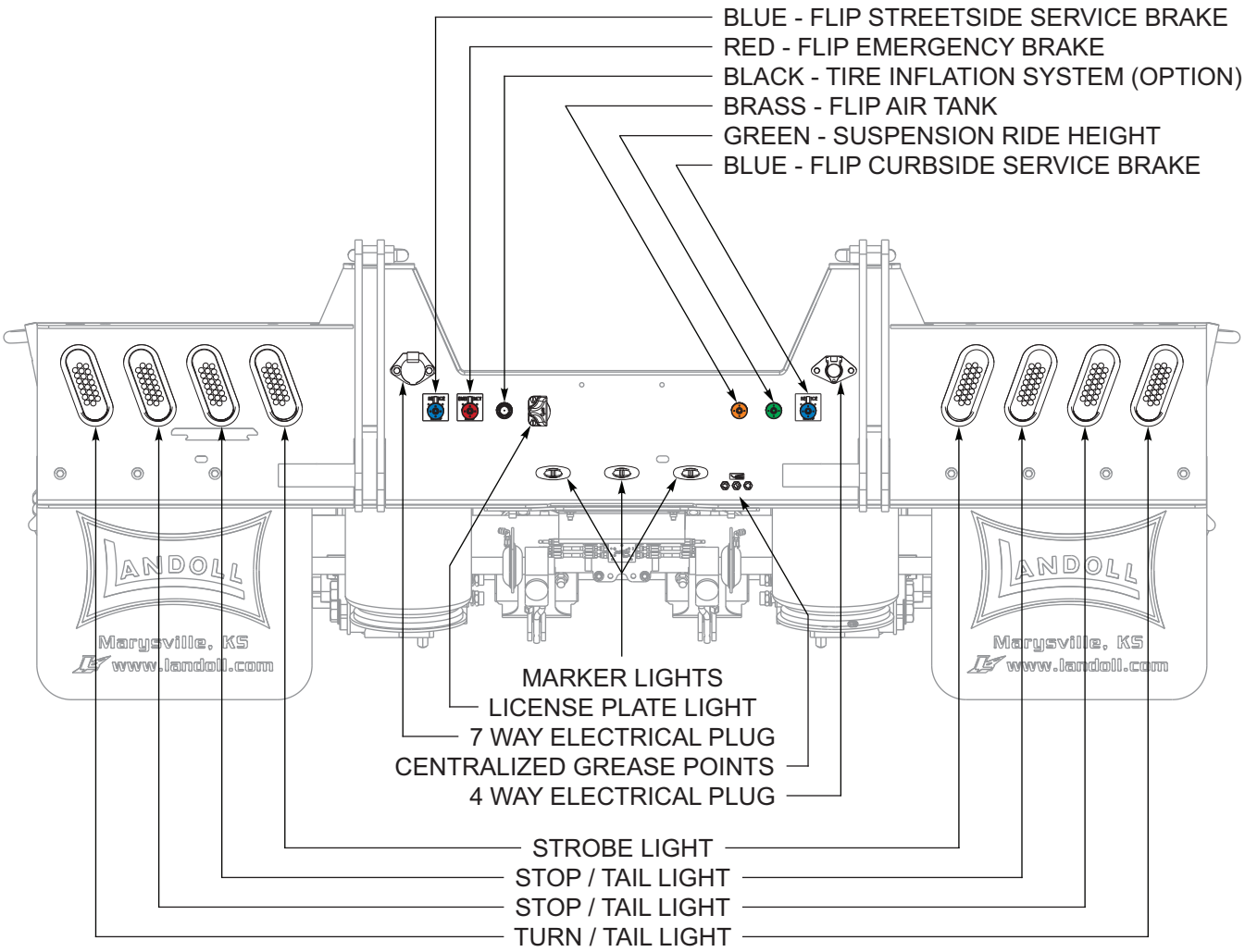


Figure 3-5: Trailer Components (5 of 7)



VIEW OF STANDARD TRAILER REAR BUMPER

Figure 3-6: Trailer Components (6 of 7)

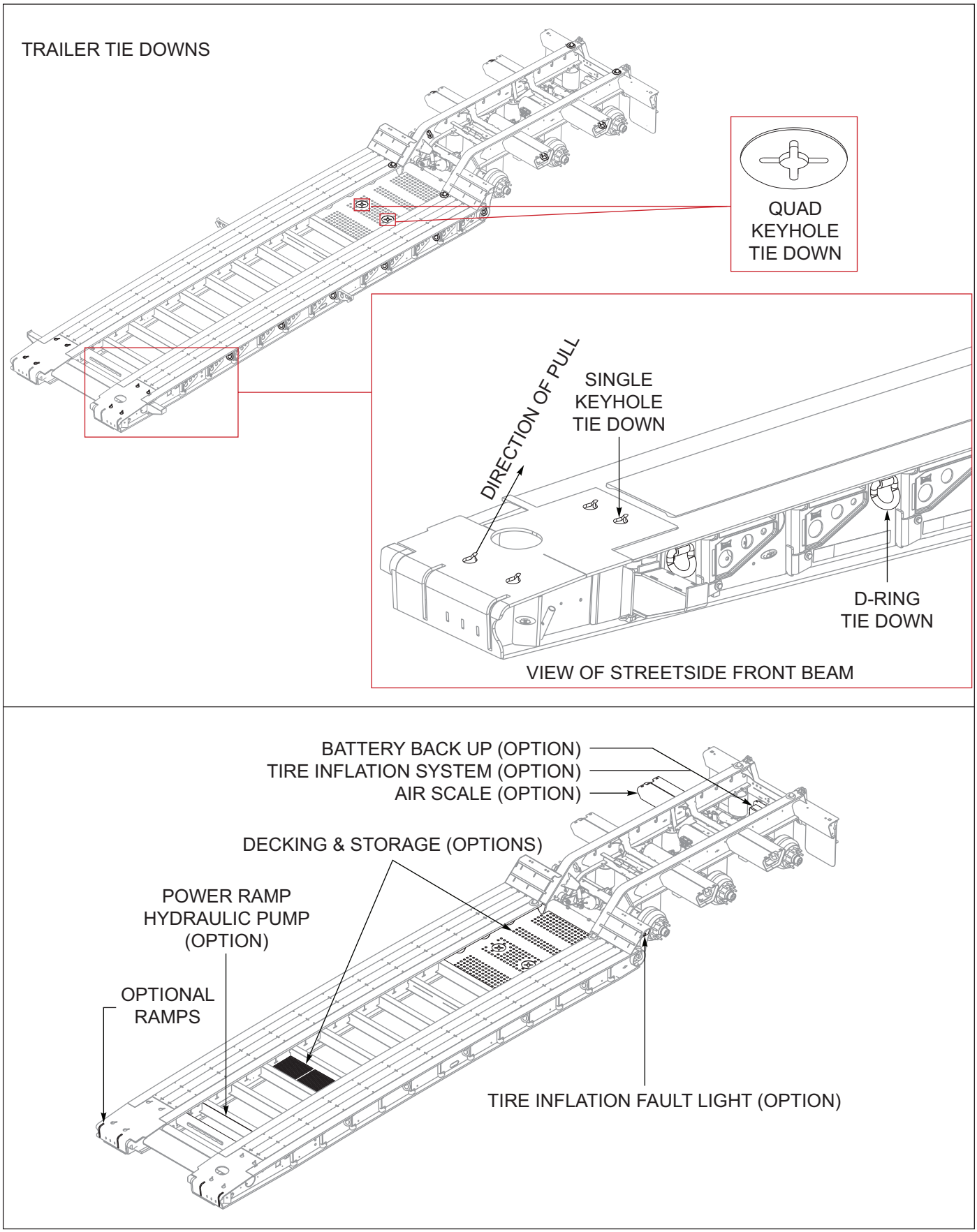


Figure 3-7: Trailer Components (7 of 7)

Gooseneck Assembly

The gooseneck assembly is a hydraulic quick detach hitch assembly that allows for front loading and unloading of the trailer. Hydraulic power is required from the tractor or an optional gooseneck mounted power unit to operate the lift cylinders and other hydraulic options available. The gooseneck control center provides a central location to operate many of the trailer's air, electrical, and hydraulic functions. It also interlocks the tractor air and electrical systems to operate the trailer anti-lock brakes, lights, and other available options.

Air System

The gooseneck requires air to operate the latching system and other available gooseneck air options while detached from the trailer frame assembly. The streetside gladhand manual control air valves shut off the tractor's emergency supply and service control air to the trailer frame, allowing the airlines to be disconnected and stored. After the gooseneck is attached to the trailer frame, the airlines must be connected to the gooseneck gladhand manual control air valves and turned "On" to operate the trailer anti-lock brakes, air ride suspension, and other available air options.

Air Brake System

The air brake system of the trailer is operated from the tractor after coupling. The tractor's air system must be coupled to the trailer and charged to 90 psi (621 kpa) minimum before the brakes can adequately function. ***See Trailer Components (2 of 7) on Page 3-2*** and ***See Trailer Components (3 of 7) on Page 3-3***.

Emergency/Parking Brake

The parking brakes are automatically applied by spring pressure with the air actuators, when air pressure in the emergency line drops below 50 psi (345 kpa) This may be done within the truck using the trailer parking/emergency valve or by disconnecting the emergency glad hands.

Gooseneck Palm Control Buttons

The Palm Control Buttons supply or exhausts air pressure to operate the Load Carrier Upper and Lower Latch Air Cylinders.

The Palm Control Buttons are located on the Streetside Control Panel of the Gooseneck Assembly. ***See Trailer Components (4 of 7) on Page 3-4***.

PALM CONTROL BUTTONS	
LOAD RATCHETS	Push and Hold the Left Palm Button to raise the Load Carrier's Upper Latch Load Ratchets from the teeth. This will allow downward movement.
CARRIER LOCK	Push and Hold the Right Palm Button to release the Load Carrier Lower Latch Lock from the Frame. This will allow the Detaching of the Gooseneck From the Trailer Frame.

Electrical System

The gooseneck requires electrical power to operate the electrical functions and other available electrical options while detached from the trailer frame assembly. To operate the trailer lights, anti-lock brakes and other available options, the trailer frame electrical cable must be connected to the gooseneck streetside receptacle.

Connect the tractor's electrical cable plug to the trailer electrical receptacle. Align key way, press firmly, and the cover should lock it in place.

It is necessary that the tractor blue wire be connected to the appropriate electrical source on the tractor. ***See Figure 3-9***

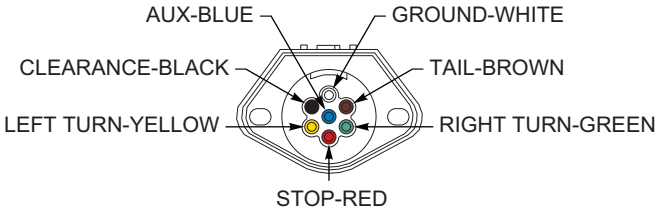


Figure 3-8: Connector 7-Pin

Gooseneck, Control Panel Light

The Control Panel Light Switch is located on the Gooseneck Control Panel. It illuminates the Control Panel. ***See Trailer Components (4 of 7) on Page 3-4.***

Gooseneck, Work Light (Option)

The Work Light Switch is located on the Gooseneck Control Panel. It illuminates the optional work lights mounted on the Gooseneck. ***See Trailer Components (4 of 7) on Page 3-4.***

Gooseneck, Accessories (Option)

The Accessory Switches are located on the Gooseneck Control Panel. They will supply power to additional options available for purchase. ***See Trailer Components (4 of 7) on Page 3-4.***

Hydraulic System

IMPORTANT

Tractor must be equipped with a relief valve set at a maximum 2500 psi (17,237 kpa).

Hydraulic Power (Options)

Hydraulic Power is required to operate the Gooseneck Lift Cylinders and other hydraulic options available.

PTO and Wet Kits Options are available if the tractor is not fitted with one. ***See Hydraulic Hookup on Page 2-2.***

Or the Trailer may be fitted with a Engine Package that is available.

The **25HP Kohler Package** is an electric start, gas operated, Electronic Fuel Injected, air cooled, 4-cycle, overhead valve, V-Twin cylinder, side shaft Engine powering a gear pump with .77 cubic inch (12.6 ccm) displacement.

For Operation and Maintenance procedures resource the Manufactures References, ***See Chapter 7, Manufacturer Index on Page 7-1.***

Trailer Controls

DANGER

ALWAYS check behind and under the truck and trailer for persons or objects before moving. Failure to check will lead to serious personal injury or death to others, or damage to property.

IMPORTANT

Tractor must be equipped with a relief valve set at a maximum 2500 psi (17,237 kPa).

The Control Levers that operate the standard and optional hydraulic functions are located on the Streetside Gooseneck Control Panel. The levers are a push and pull type function that activates the Hydraulic Control Valve to direct hydraulic pressure. Movement speed may be controlled by the amount of pressure applied to the lever. A hydraulic pump must be coupled to the trailer hydraulic system before any hydraulic controls can function. The hydraulic system is designed to operate at 2500 psi (17,237 kPa) maximum pressure and approximately 20 gpm (76 Lpm) flow capacity.

The control valve has built-in flow control that can handle 50 gpm (189 Lpm) max and it limits the functions to 20 gpm (76 Lpm), ***See Hydraulic Hookup on Page 2-2.***

Trailer Lift Control

The Trailer Lift Control is the middle lever on the Streetside Gooseneck Control Panel. It controls the raising and lowering of the trailer frame by directing hydraulic pressure to the Gooseneck Hydraulic Cylinders. It pivots the Load Carrier Assembly causing the Frame to raise or lower. This will be used during Trailer Coupling and Uncoupling, Gooseneck Attaching and Detaching and setting Frame Transport Height. ***See Trailer Components (4 of 7) on Page 3-4***.

TRAILER LIFT CONTROL	
UP-PUSH	Push in on the lever will raise the trailer frame. The load carrier upper latches will ratchet into the load carrier teeth as the frame rises.
CENTER	Moving the lever to the center position places it into the neutral position. This will stop the movement of the load carrier assembly. It is held in the center position by spring pressure in the hydraulic control valve.
DOWN-PULL	Pull out on the lever will lower the trailer frame to seat the carrier load ratchets into the load carrier teeth for desired transport height. If more movement is needed, push and hold load ratchet palm button.

Front Flip Extension, Manual or Hydraulic (Options)

DANGER

1. **ALWAYS check behind and under the truck and trailer for persons or objects before moving. Failure to check will lead to serious personal injury or death to others, or damage to property.**
2. **To prevent serious injury or death from pinching: Keep all persons and objects clear while any part of the machine is in motion.**
3. **DO NOT allow to free fall. This assembly weights 630 lbs (286 kg). Failure to comply will lead to serious personal injury or death to others, or damage to property.**

WARNING

1. **DO NOT move the Flip Extension Assembly with air, electrical, or hydraulic couplings connected. Could cause damage to hoses, cables and personal injury.**

The Flip Extension is a manual or hydraulic operated pin-on swing down assembly that gives an additional 36 inches (91 cm) of kingpin distance. This function is required to be conducted before coupling the tractor to the trailer. It is also compatible with a winch option. ***See Trailer Components (2 of 7) on Page 3-2.***

Manually Operation

To Manually Extend, using a mechanical lifting device, lower the Flip Extension fully down to rest against the gooseneck. Manually lock into position by pushing in the two twisting slide lock pins on both sides of the assembly and secure with the flip locks**.**

To Manually Stow, manually unlock the two twisting slide lock pins on both sides of the assembly. Using a mechanical lifting device, raise the Flip Extension until the Support Assembly fully rests on the Gooseneck Frame.

Hydraulic Operation

The Hydraulic Control (Option) requires hydraulic power from either the tractor or engine pack. If a engine pack is install, the hoses should be secured from path rotation. If the tractor supplies hydraulic power to the trailer, **DO NOT** couple the trailer. Hook up the hydraulic lines by routing them to the streetside and between the extension assembly and gooseneck. Secure the hoses from movement and being pinched in the path of rotation. May have to raise or lower the gooseneck to allow rotation from hitting the tractor.

The Flip Extension Control Lever is located in the Streetside Gooseneck Control Panel. Depending on the hydraulic options purchased, the control lever will be to the right or left of the Trailer Lift Control Lever.

To Hydraulically Extend, push in on the control lever to lower the Flip Extension fully down to rest against the gooseneck. Manually lock into position by pushing in the two twisting slide lock pins on both sides of the assembly and secure with the flip locks**.**

To Hydraulically Stow, manually unlock the two twisting slide lock pins on both sides of the assembly. Pull out on the control lever to raise the Flip Extension until the Support Assembly fully rests on the Gooseneck Frame.

GOOSENECK FLIP EXTENSION CONTROL	
UP-PUSH	Push in on the lever will raise the Flip Extension in stow position
CENTER	Moving the lever to the center position places it into the neutral position. This will stop the movement of the Flip Extension. It is held in the Center Position by spring pressure in the Hydraulic Control Valve.
DOWN-PULL	Pull out on the lever will lower the Flip Extension to rest on the front of the gooseneck frame.

Frame Assembly

The frame assembly consists of the deck and trunnion assemblies. ***See Trailer Components on Pages 3-1, 3-3, 3-5.***

The deck assembly is the load carrying platform and consists of two areas.

The center area contains the gooseneck receiving hooks for securing the gooseneck and also supports the track area. It also provides for storage and tie down capabilities and other available options.

The track area refers to the outside platforms that provides the loading surface to carry and secure the load. The swing out extension outriggers and planks allow the track section to extend on each side an additional 10-7/8 inches (27.62 cm).

The trunnion assembly contains the axles and air ride suspension system that supports the trailer during transportation. Attached to the trunnion assembly are weight bearing bolsters for supporting load requirements. The streetside rear bolster is the control center for the air ride height and strobe light functions of the trailer. Additional trunnion options are available for fenders, an additional axle, beavertail, or ramps. ***See Load Capacity on Page 2-1.***

Air System

The trailer frame requires air to operate the anti-lock brakes, air ride suspension, and other available air options. When the gooseneck is attached, the air lines must be connected and the streetside gooseneck gladhand manual control valves turned “On” to charge the trailer frame air system. When the gooseneck is detached, the airlines must be secured in the trailer frame streetside service storage compartment to prevent damage.

Suspension Height Control Lever

CAUTION

If suspension air loss should occur, completely deflate suspension and temporarily operate on the air springs internal rubber bumpers. Carefully proceed to the nearest trailer service facility. To deflate the air suspension, disconnect the lower connection on the linkage of the automatic air valves. Rotate the valve control arms down about 45° to exhaust the air. To restore to normal operation, simply reverse the procedure.

The Suspension Height Control Lever is located in the streetside rear frame bolster, ***See Figure 3-9*** & ***See Trailer Components (5 of 7) on Page 3-5.*** Trailer air pressure must be maintained above 90 psi (621 kPa) before operating. **PROTECTION VALVES** are used to maintain 65 psi (448 kPa) air brake pressure during suspension or remote system air loss.

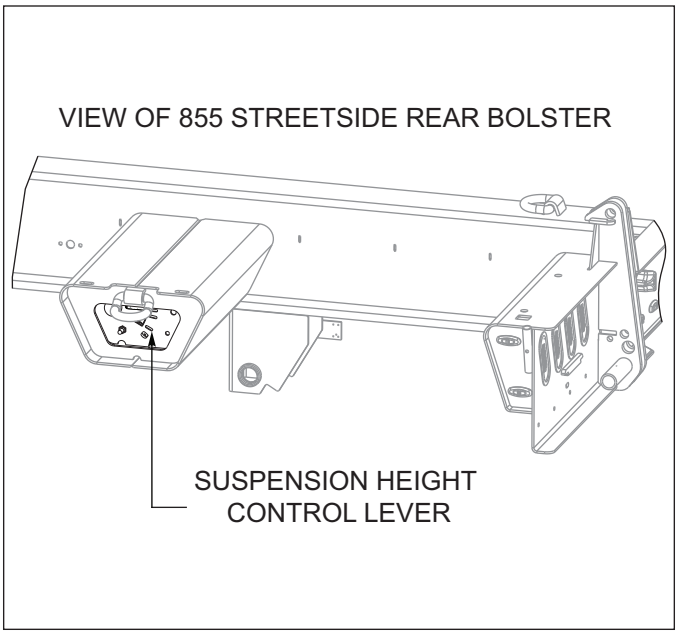


Figure 3-9: Suspension Height Control Lever

Control Lever Operation and Adjustment

1. To operate, slightly pull out on the handle, rotate to desired position, and release.
2. A loaded trailer may be operated at **NORMAL RIDE, +1", of -1"** position.
3. An empty trailer with the 1st or 3rd axle lifted may be operated at **+2.5"** above normal ride position for additional tire clearance for lift axle.
4. **FULL UP** or **FULL DOWN** is **ONLY** for temporary use under **5 mph**, ***See Trailer Components (5 of 7) on Page 3-5.***

Lift Axle Palm Button (Option)

⚠ WARNING

Failure to adhere to these directions could result in overload fines, premature equipment failure and/or vehicle accident.

⚠ CAUTION

DO NOT OVERLOAD AXLE.

The lift axle may be operated in the raised position as follows:

1. **When vehicle is unloaded or partially loaded as long as adjacent axles are not overloaded.**
2. **When vehicle is loaded and off highway, but at a reduced and safe speed.**
3. **When vehicle is loaded and on highway, but as the government law allows for turning purposes and then at reduced and safe speed.**
4. **Whenever it is necessary for reasons of safety to maintain traction or sufficient load on other vehicle driving, steering, braking, or cornering axles.**

The **Air Axle Lift Option** is located in the streetside rear frame bolster and does not require the Suspension Height Control to be lowered to operate. The Air Axle Lift Palm Control Button activates a dual action air valve that will supply and exhaust air pressure at the same time. ***See Trailer Components (5 of 7) on Page 3-5.***

AIR LIFT AXLE PALM CONTROL BUTTON	
PUSH TO LOWER	Pushing in on the Button will exhaust air pressure from the Air Lift Bag and will inflate the Suspension Air Bags to the Height Control Setting.
PULL TO LIFT	Pulling out on the Button will supply air pressure to the Air Lift Bag and exhaust air pressure from the Suspension Air Bags.

Scale, Digital (Option)

The Scale Digital Display Module is located in the curbside rear frame bolster just in front of the taillights. ***See Figure 3-10*** & ***See Trailer Components (7 of 7) on Page 3-7.***. It calculates the air pressure in the Height Control System and will display a digital reading of the estimated weight in Pounds or Kilograms.

The Scale Display Module receives power from the Trailer Wiring Harness. A wide variety of Scale options are available.

Parts are available through an authorized Landoll Dealer, ***See Parts Manual listed on Page 7-1.***

For Operation and Maintenance procedures resource the Manufactures References, ***See Chapter 7, Manufacturer Index on Page 7-1.***

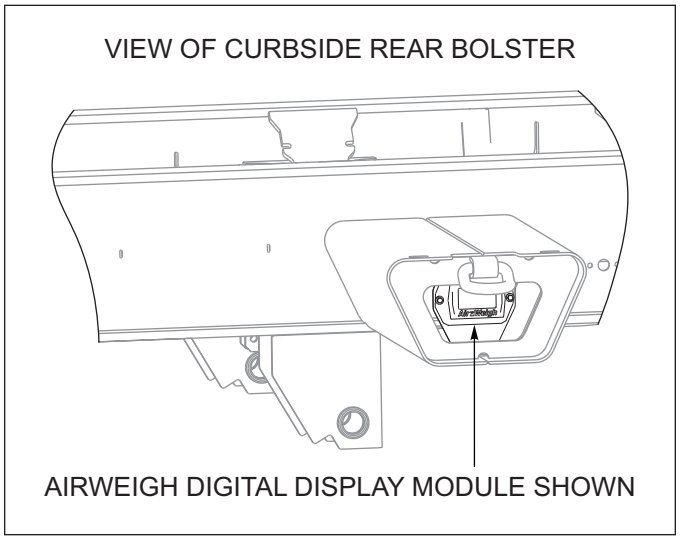


Figure 3-10: Scale, Digital (Option)

Tire Inflation System (Option)

The Tire Inflation System is an in-line Air Control Box that regulates air tank pressure from over inflating the tires. The Control Box is mounted in front of the rear bumper and has a manually operated System Pressure Regulator mounted inside, ***See Figure 3-11***. If this air pressure fluctuates, the Flow Sensing Switch will activate the Tire Inflation Fault Light located on the front end of the streetside trunnion, ***See Figure 3-12***. The Control Panel receives power from the Trailer Wiring Harness.

Parts are available through an authorized Landoll Dealer, ***See Parts Manual listed on Page 7-1.***

For Operation and Maintenance procedures resource the Manufactures References, ***See Chapter 7, Manufacturer Index on Page 7-1.***

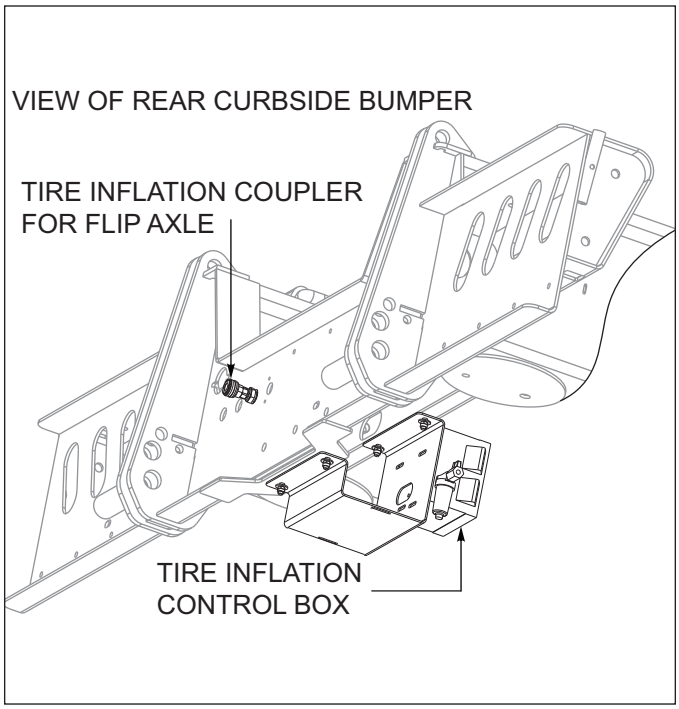


Figure 3-11: Tire Inflation System

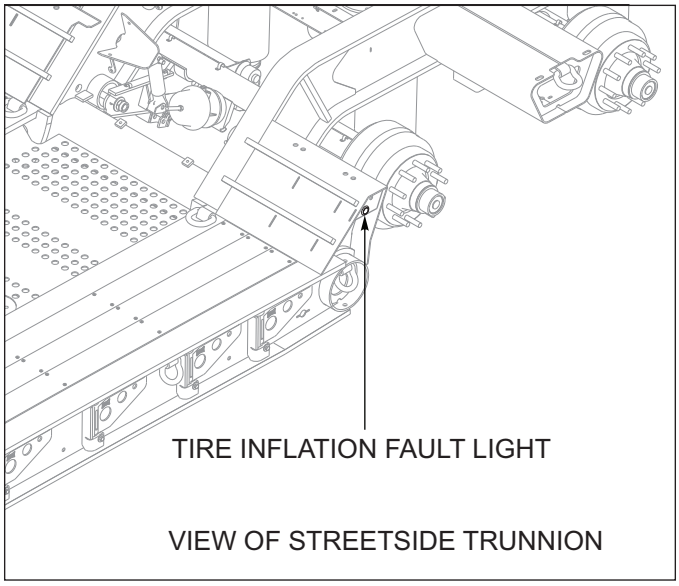


Figure 3-12: Tire Inflation Fault Light

Electrical System

The trailer frame receives electrical power to operate the tails lights, anti-lock brakes, and other electrical options from the gooseneck. When the gooseneck is attached, the trailer frame electrical plug must be connected to the gooseneck streetside electrical receptacle. When the gooseneck is detached, the electrical cable and plug must be stowed in the trailer frame streetside service storage compartment to prevent damage.

Anti-Lock Brake System (ABS)

WARNING

The auxiliary (blue) circuit is for powering the trailer ABS. This circuit must be hot when the tractor key switch is on. No other electrical devices may be powered by this circuit while the trailer is moving forward.

WARNING

If a fault exists in the trailer ABS, normal braking will occur, but wheels may lock. Service the ABS as soon as possible.

The Anti-Lock Brake System of the trailer is constantly powered by the auxiliary (BLUE) circuit of the seven way electrical connector, with backup power from the stop lamp (RED) circuit, and ground through the white wire. It is necessary that the blue circuit is hot when the tractor key switch is on. The blue circuit on the trailer may not be used to power any additional auxiliary devices while the trailer is moving forward. However, additional devices such as remote controls may be powered from the auxiliary circuit while the trailer is stationary. If a fault exists in the ABS, normal braking will occur, but the wheels may lock. Service the ABS as soon as possible. Vehicle standards FMVSS No. 121, anti-lock brake system requires all trailers manufactured after March 1, 1998 with air brake systems to have ABS. Each trailer (including a trailer converter dolly) shall be equipped with an anti-lock brake system that controls the wheels of at least one axle of the trailer. Wheels on other axles of the trailer may be indirectly controlled by the anti-lock brake system.

NHTSA Docket 92-29; notice 11 published September 23, 1996 specifies the ABS warning light be mounted near the rear of the left side of the trailer, ***See Trailer Components (5 of 7) on Page 3-5.***.

Decal or lens marking with ABS to identify the lamp.

The lamp must illuminate one time whenever power is supplied to the ABS. At any time the light remains on when power is supplied there is a malfunction to the system.

The ABS used on the trailer is a commercial unit. Single axle trailers use a two sensor, one modulator system. Tandem and Triple axle trailers use a four sensor, two modulator system. Sensors are located at each hub of the front and rear axles, and each modulator controls one side of the trailer.

Parts are available through an authorized Landoll Dealer, ***See Parts Manual listed on Page 7-1.***

For Operation and Maintenance procedures resource the Manufactures References, ***See Chapter 7, Manufacturer Index on Page 7-1.***

Trailer, Strobe Light

The Trailer Strobe Light Switch is located in the Streetside Trailer Rear Bolster. It activates the Strobe Lights mounted on the trailer rear bumper only. ***See Trailer Components (5 of 7) on Page 3-5.***

Trailer, Strobe Light Battery Backup (Option)

The Battery Backup (Option) powers the Strobe Lights when the trailer is disconnected from the tractor. It is mounted on the front of the rear bumper and is charged by the tractor when attached. ***See Trailer Components (7 of 7) on Page 3-7.***

Hydraulic System

IMPORTANT

Tractor must be equipped with a relief valve set at a maximum 2500 psi (17,236 kPa).

The standard trailer frame assembly does not come with hydraulic functions. To operate the available hydraulic options, the trailer frame must be connected to the gooseneck streetside hydraulic quick couplers and controlled from the gooseneck control box control levers. When the gooseneck is detached, the hydraulic hoses must be secured in the trailer frame streetside service storage compartment to prevent damage. ***See Hydraulic System on Page 3-9.***

Outrigger Extensions

The Frame Assembly is equipped with outriggers and planks to increase the width of the platform.

One Front Pin-On Outrigger, twelve Swing Out Outriggers and two 4 foot (1.22 m) Planks per side. ***See Load Capacity on Page 2-1.***

DANGER

DO NOT operate if any extension is not locked in place. Inspect all extensions to ENSURE each is locked securely in position.

WARNING

1. **Top of extension planks must be flush with main deck boards.**
2. **Centerline of tracks or tires must be loaded on the main deck, not on extension brackets.**
3. **Failure to load extension brackets properly could result in equipment damage and personal injury.**

WARNING

1. **DO NOT overload extensions. over-width ratings are given in the Specifications Chapter.**
2. **DO NOT secure load to over-widths. Secure load frame to mounted D-Rings or gotchas located in the approach plate and frame beam flanges. Failure to do so could cause serious injury or death.**

1. To swing out the Outriggers, lift before rotating into position.
2. Set the planks between the trailer frame and retainer lip of the Outrigger. ***See Trailer Components (5 of 7) on Page 3-5.***
3. Center the load on the trailer. **DO NOT** load to one side. Position the load for proper weight distribution. ***See Load Capacity on Page 2-1.***

Flip Axle Assembly (Option)

DANGER

1. **ALWAYS check behind and under the truck and trailer for persons or objects before moving. Failure to check will lead to serious personal injury or death to others, or damage to property.**
2. **Stand clear of wings while folding/unfolding. Charge hydraulic fold cylinders with hydraulic oil before attempting to fold/unfold wings.**
3. **To prevent serious injury or death from pinching: Keep all persons and objects clear while any part of the machine is in motion.**
4. **DO NOT allow to free fall. This assembly weights 2500 lbs (1134 kg). Failure to comply will lead to serious personal injury or death to others, or damage to property.**
5. **DO NOT incorrectly connect air couplings. Failure to correctly connect air couplings will lead to serious personal injury or death to others, or damage to property.**

WARNING

1. **DO NOT fold or unfold the Flip Axle Assembly with air or electrical couplings connected. May cause damage to hoses, cables and personal injury.**
2. **DO NOT Move or store with the Flip Axle Suspension Air Bags inflated. Could cause damage to equipment and personal injury.**
3. **DO NOT use the bumper lifting shackles as load securing tie downs.**

The Flip Axle Assembly is a manual or hydraulic operated pin-on assembly that provides an additional road axle for better weight distribution. It mounts to the rear bumper assembly with two top pivot hinge pins (manual lift) or three top pivot hinges pins (hydraulic lift), and locks into road position by a twisting spring lock pin assembly when folded down for road use. When in the storage position, it rests on top of the trailer and is support by two rubber bumper support assemblies. The Flip Axle Suspension Air Bag Palm Control Button location is in the rear streetside bolster. It is a single action air valve that will supply or exhaust air pressure from the flip axle suspension air bags.

Air System

The flip axle air system is controlled by the trailer air system. The air couplings are color coded to the trailer and control different air functions. Improper connections will cause the flip axle air system to malfunction, causing damage to equipment and/or property and may cause personal injury or death. **ENSURE** the trailer and flip axle air couplings are clearly marked to the function they operate ***See Figure 3-13***.

COUPLING COLOR CODES & QUANTITY	
BLUE (2 EACH)	Provides the Service/Control air for the streetside and curbside service brakes.
RED (1 EACH)	Provides the Emergency/Supply air for the emergency brakes.
BLACK (OPTION) (1 EACH)	Provides the Tire Inflation System air.
BRASS (1 EACH)	Connects the flip axle air tank to the trailer air tanks to increase the air tank capacity needed to support the flip assembly.
GREEN (1 EACH)	Provides Suspension Ride Height air for the flip axle suspension air bags during inflation and deflation.

FLIP AXLE PALM CONTROL BUTTON	
PUSH IN ENGAGE	Pushing in on the Button will supply trailer suspension ride height air to the Flip Axle Suspension Air Bags.
PULL OUT DISENGAGE	Pulling out on the Button will exhaust air from the Flip Axle Suspension Air Bags. This reduces the stress on the air bags and shocks from over expanding, and unlocking the lower slide lock pins.

Electrical System

The 7-Pole Plug provides power to the flip axle rear bumper receptacle, stop, turn, tail, license plate, and marker lights. The 4-Pole Plug provides power to the flip axle strobe lights and switch. The flip axle strobe lights operate separately from the trailer strobe lights and must be switch on from the flip axle rear bumper. ***See Figure 3-13***

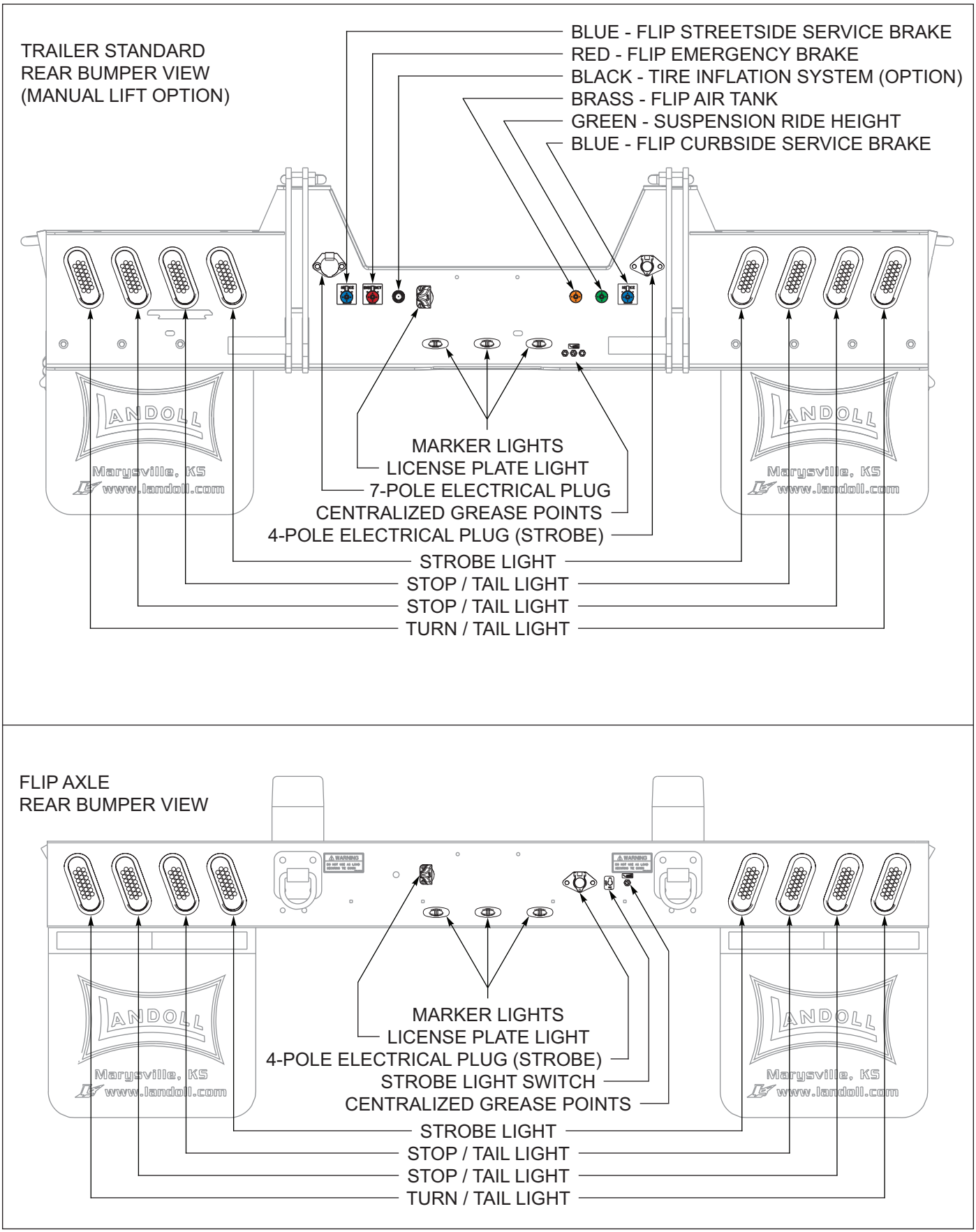


Figure 3-13: Standard Trailer Rear Bumper

IMPORTANT

1. **Highly recommended the ONLY time the flip axle suspension air bags should be inflated, is when the axle is in the road position and secured by the twisting slide lock pin assembly.**
2. **Highly recommended to disconnect all air and electrical connections when the flip axle is not road position.**
3. **Highly recommended the flip axle remains attached to the same trailer. The flip assembly axle requires re-alignment to the each trailer's rear axle.**

Flip Axle Fold Down Procedures

To Fold Down the Flip Axle Assembly. **ENSURE** the flip axle suspension air bag palm control button is pulled out and the flip axle suspension air bags are deflated. ***See Figure 3-14***

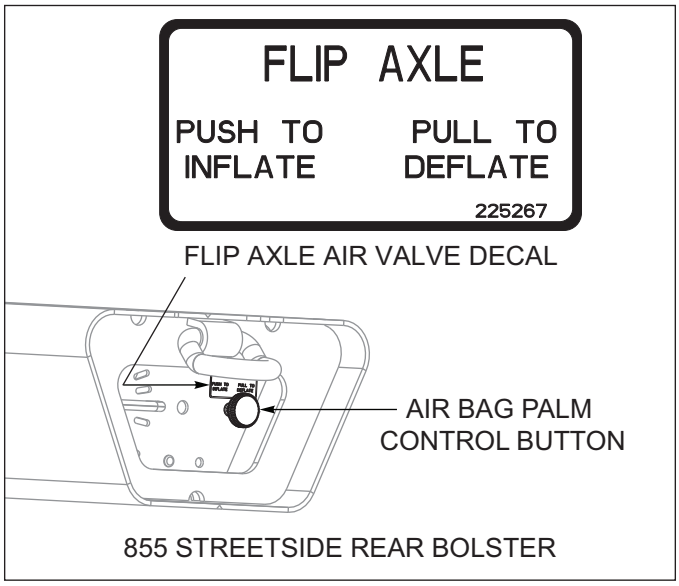


Figure 3-14: Flip Axle Palm Control Button

Disconnect all air and electrical couplings that connect the trailer to the flip axle assembly. ***See Figure 3-13 on Page 3-16.***

On the streetside trailer rear bumper, push in on the twisting spring lock pin handle until spring retaining pin and collar clears the inside bumper stop plate notch. Twist the handle slightly away from the bumper and pull out until the lock pins contact the lock pin stop bolts. Twist the handle slightly towards the bumper and rest the spring retaining pin and collar in the bumper stop plate notch. ***See Figure 3-15***

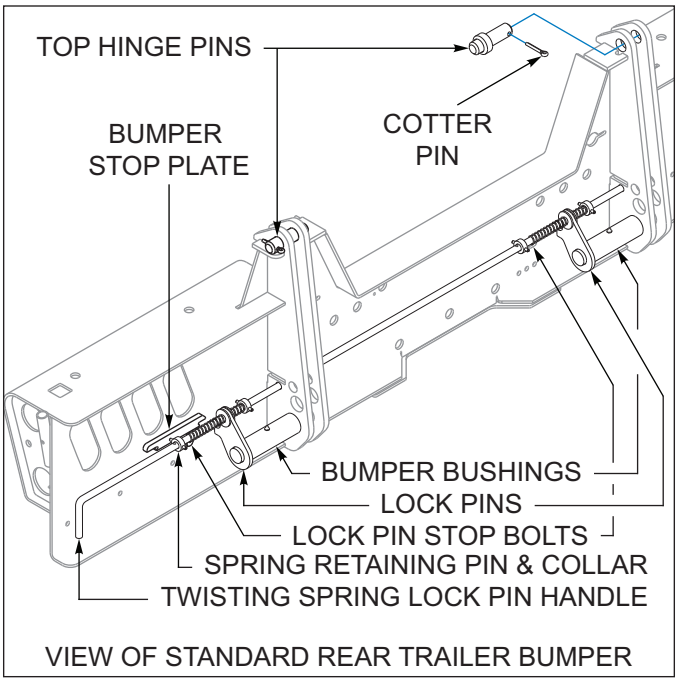


Figure 3-15: Twisting Spring Lock Pin Assembly

To Manually Fold Down, hook a sling up to the lifting rings or flip axle anchor, ***See Figure 3-16***. Using a mechanical lifting device, lower the flip axle assembly to the ground and align the lower spring pin holes.

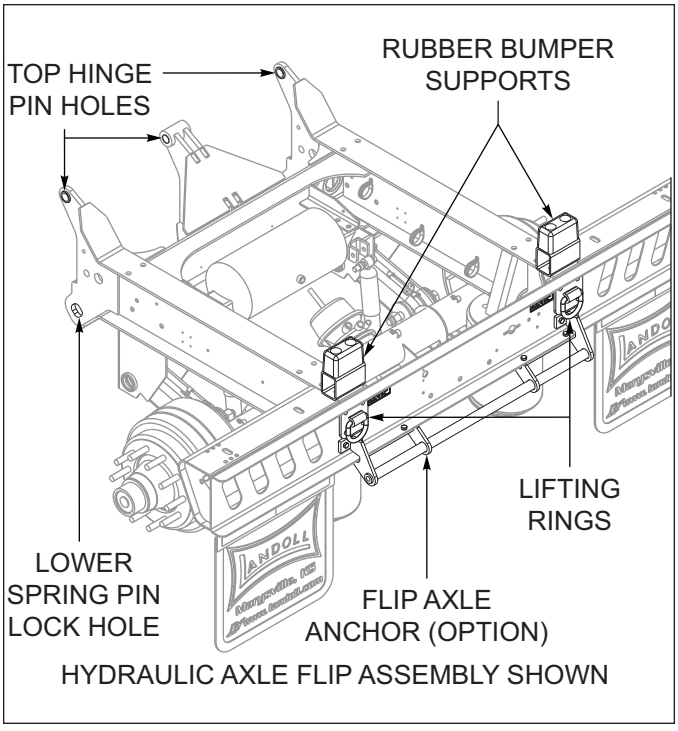


Figure 3-16: Flip Axle Assembly

To Hydraulically Fold Down, pull out on the Flip Axle Control Lever located in the streetside gooseneck control box to the right of the trailer lift control lever. Lower the flip axle assembly to the ground and align the lower spring pin holes. ***See Trailer Components (4 of 7) on Page 3-4.***

On the streetside trailer rear bumper, pull out on the twisting spring lock pin handle until the spring retaining pin and collar clears the outside bumper stop plate notch. Twist the handle away from the bumper and push in until the lock pins are fully seated and securing the flip axle lower pin lock holes. Twist the handle slightly towards the bumper and rest the spring retaining pin and collar in the inside bumper stop plate notch. ***See Figure 3-15***

ENSURE the lock pin plates are touching the bumper bushings. If they are not fully seated, raise, or lower the flip axle assembly to fully engage the twisting spring lock pins. ***See Figure 3-16***

Connect the 7-Pole trailer lights and 4-Pole strobe lights electrical plugs, and color-coded air couplings to the trailer. ***See Figure 3-13***

Push in the flip axle suspension air bag palm control button located in the streetside rear bolster to inflate the flip axle suspension air bags. ***See Figure 3-14 on Page 3-17.***

Flip Axle Fold Up Procedures

To Fold Up the Flip Axle Assembly. Pull out the flip axle suspension air bag palm control button located in the streetside rear bolster to deflate the flip axle suspension air bags. ***See Figure 3-14 on Page 3-17.***

On the streetside trailer rear bumper, push in on the twisting spring lock pin handle until spring retaining pin and collar clears the inside bumper stop plate notch. Twist the handle slightly away from the bumper and pull out until the lock pins contact the lock pin stop bolts. Twist the handle slightly towards the bumper and rest the spring retaining pin and collar in the bumper stop plate notch. ***See Figure 3-15.***

Disconnect all air and electrical couplings that connect the trailer to the flip axle assembly. ***See Figure 3-13***

To Manually Fold Up, hook a sling up to the lifting rings or flip axle anchor, ***See Figure 3-16.***. Using a mechanical lifting device, raise the flip axle assembly to swing into the storage position resting on two rubber bumper stops.

To Hydraulically Fold Up, push in on the Flip Axle Control Lever located in the streetside gooseneck control box to the right of the trailer lift control lever. Raise the flip axle assembly to swing into the storage position resting on two rubber bumper stops. ***See Trailer Components (4 of 7) on Page 3-4.***

On the streetside trailer rear bumper, pull out on the twisting spring lock pin handle until the spring retaining pin and collar clears the outside bumper stop plate notch. Twist the handle slightly away from the bumper and push in until the lock pins are fully seated. Twist the handle slightly towards the bumper and rest the spring retaining pin and collar in the inside bumper stop plate notch. ***See Figure 3-15.***

Flip Beavertail & Ramp Assembly (Option)

DANGER

1. **ALWAYS check behind and under the truck and trailer for persons or objects before moving. Failure to check will lead to serious personal injury or death to others, or damage to property.**
2. **Stand clear of wings while folding/unfolding. Charge hydraulic fold cylinders with hydraulic oil before attempting to fold/unfold wings.**
3. **To prevent serious injury or death from pinching: Keep all persons and objects clear while any part of the machine is in motion.**
4. **DO NOT allow to free fall. The beavertail assembly weights 1250 lbs (567 kg), the ramps weigh 425 lbs (193 kg) each, for a combined weight of 2100 lbs (953 kg). Failure to comply will lead to serious personal injury or death to others, or damage to property.**

The Flip Beavertail is a manual or hydraulic operated pin-on assembly that provides an additional 36-inches (91 cm) of trailer length. It mounts to the rear bumper assembly with two top pivot hinge pins (manual lift) or three top pivot hinge pins (hydraulic lift), and locks into position by a twisting spring lock pin assembly when in the fully down position.

The Flip Ramps consist of two, 21-inch (53 cm) wide by 83-1/4-inch (211 cm) pin-on ramps that attach for rear loading capabilities and are operated hydraulically (standard) or manually (optional). The ramps can be stored in the up position behind the load and secure by a chain to the beavertail, or flat in-line with the beavertail on top of the trunnion.

Electrical System

The 7-Pole Plug provides power to the flip beavertail rear bumper receptacle, stop, turn, tail, license plate, and marker lights. The 4-Pole Plug provides power to the flip beavertail strobe lights and switch. The flip beavertail strobe lights operate separately from the trailer strobe lights and must be switch on from the flip beavertail rear bumper,***See Figure 3-17***. To view the trailer rear bumper ***See Figure 3-13 on Page 3-16.***.

If equipped with the dual hydraulic flip beavertail and ramps option, a 12-vdc diverter valve is installed to direct the hydraulic flow to the required system. The diverter valve is controlled by a switch located in the streetside gooseneck control box.

Switch in the “Ramps” position, applies power to the diverter valve, allowing the ramps to raise and lower. When ramp movement is complete, place switch in the “Tail + Ramps” position to reduce damage to the diverter valve.

Switch in the “Tail + Ramps” position, shuts off power to the diverter valve and directs hydraulic flow to fold or unfold the beavertail. ***See Figure 3-18.***

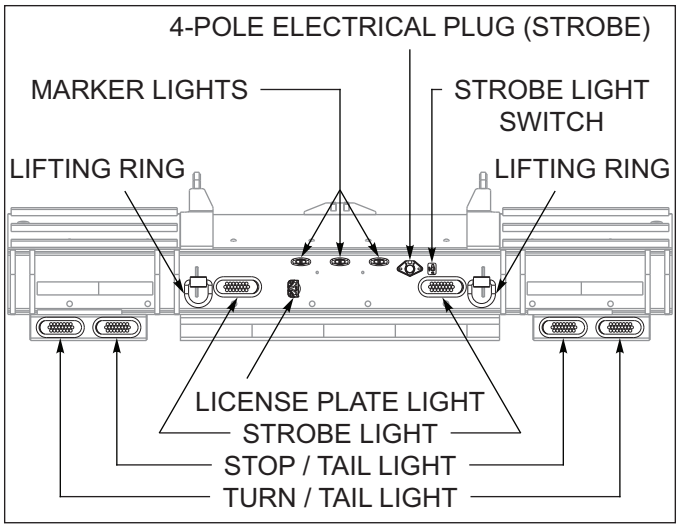


Figure 3-17: Beavertail Rear Bumper

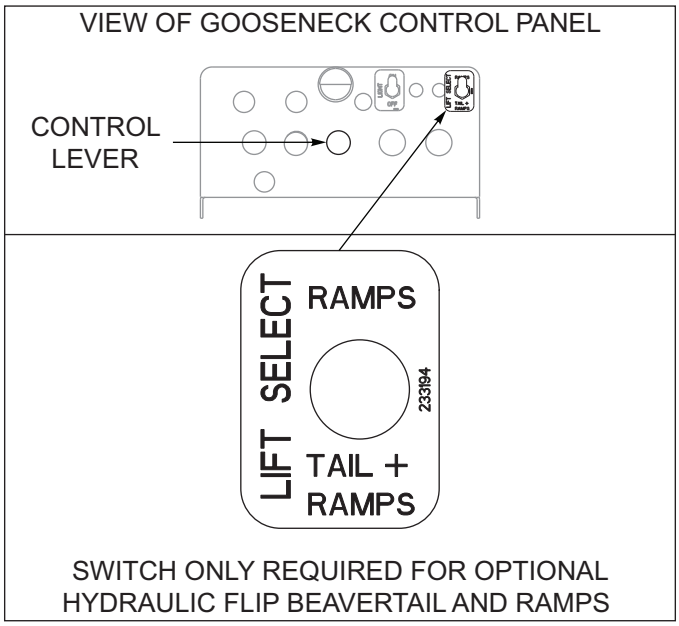


Figure 3-18: Diverter Valve Switch

Beavertail Fold Down Procedures

On the streetside trailer rear bumper, push in on the twisting spring lock pin handle until spring retaining pin and collar clears the inside bumper stop plate notch. Twist the handle slightly away from the bumper and pull out until the lock pins contact the lock pin stop bolts. Twist the handle slightly towards the bumper and rest the spring retaining pin and collar in the bumper stop plate notch. ***See Figure 3-15 on Page 3-17.***

If manual ramps are installed, **ENSURE** that the ramp pivot lock pins are installed in each ramp to secure the ramps from pivoting. ***See Figure 3-19.***

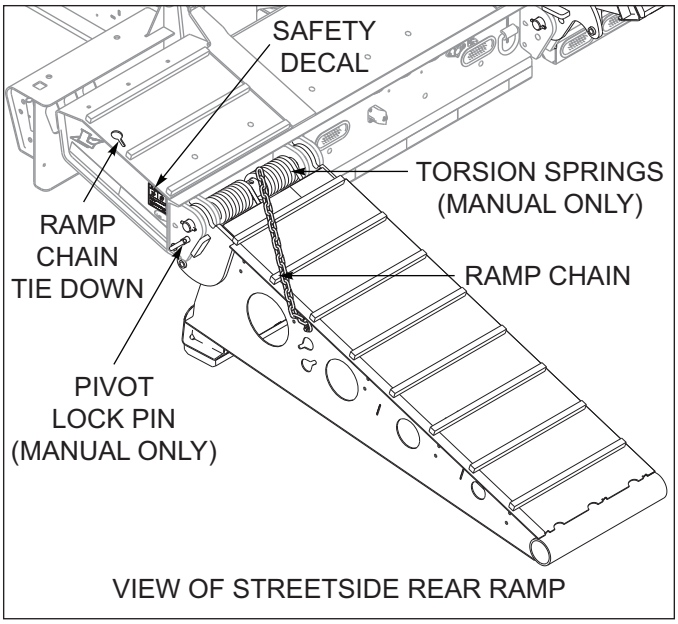


Figure 3-19: Manual Ramp Pivot Lock Pin

To Manually Fold Down, hook a sling to the lifting rings, ***See Figure 3-17.*** Using a mechanical lifting device, lower the flip beavertail assembly to the ground and align the lower spring pin holes. On each ramp, pull out and twist the ramp lock pins letting them rest on the beavertail plates to allow ramp movement.

To Hydraulically Fold Down, place the diverter valve switch into the Tail + Ramps position, ***See Figure 3-18.*** Pull out on the Flip Beavertail Control Lever located in the streetside gooseneck control box to the right of the trailer lift control lever. Lower the flip beavertail assembly to the ground and align the lower spring pin holes.

On the streetside trailer rear bumper, pull out on the twisting spring lock pin handle until the spring retaining pin and collar clears the outside bumper stop plate notch. ***See Figure 3-15 on Page 3-17.***

Twist the handle away from the bumper and push in until the lock pins are fully seated, securing the flip beavertail lower pin lock holes. Twist the handle slightly towards the bumper and rest the spring retaining pin and collar in the inside bumper stop plate notch.

ENSURE the lock pin plates are touching the bumper bushings. If they are not fully seated, raise, or lower the flip beavertail assembly to fully engage the twisting spring lock pins. ***See Figure 3-15 on Page 3-17.***

Connect the 7-Pole trailer lights and 4-Pole strobe light electrical plugs to the trailer, if needed.

Beavertail Fold Up Procedures

On the streetside trailer rear bumper, push in on the twisting spring lock pin handle until spring retaining pin and collar clears the inside bumper stop plate notch. Twist the handle slightly away from the bumper and pull out until the lock pins contact the lock pin stop bolts. Twist the handle slightly towards the bumper and rest the spring retaining pin and collar in the bumper stop plate notch. ***See Figure 3-15 on Page 3-17.***

If manual ramps are installed, **ENSURE** that the ramp pivot lock pin in each ramp are securing the ramps from pivoting. ***See Figure 3-19.***

To Manually Fold Up, hook a sling up to the lifting rings, ***See Figure 3-19***. Using a mechanical lifting device, raise the flip beavertail assembly to swing into the storage position resting on top of the trunnion assembly.

To Hydraulically Fold Up, place the diverter valve switch into the “Ramps” position and align ramps to the beavertail angle. Place diverter switch into the “Tail + Ramps” position. Push in on the Flip Beavertail Control Lever located in the streetside gooseneck control box to the right of the trailer lift control lever. Raise the flip beavertail assembly to swing into the storage position on top of the trunnion assembly. ***See Figure 3-19.***

On the streetside trailer rear bumper, pull out on the twisting spring lock pin handle until the spring retaining pin and collar clears the outside bumper stop plate notch. ***See Figure 3-15 on Page 3-17.***

Twist the handle slightly away from the bumper and push in until the lock pins are fully seated. Twist the handle slightly towards the bumper and rest the spring retaining pin and collar in the inside bumper stop plate notch.

Beavertail Ramp Fold Down Procedures

The following procedures cover the ramp operations when the beavertail has been unfolded and secured with the lower lock pin assembly.

Manual Ramps (Option)

Remove the ramp transport chain from the beavertail ramp chain tie down. Using a mechanical lifting device and sling, lower the ramp until in contacts the ground or mechanical stop. Repeat process to lower the second ramp. ***See Figure 3-19 on Page 3-19.***

Hydraulic Ramps Only (Standard)

Pull out on the Ramp Control Lever located in the streetside gooseneck control box to the right of the trailer lift control lever. Both ramps will lower to the ground. ***See Figure 3-18 on Page 3-19.***

Hydraulic Ramps and Flip Beavertail (Option)

Place the diverter valve switch into the Ramps position. Pull out on the Flip Beavertail and Ramp Control Lever located in the streetside gooseneck control box to the right of the trailer lift control lever. Both ramps will lower to the ground. Place the diverter valve switch into the “Tail + Ramps” position to shut power off to the diverter valve. ***See Figure 3-18 on Page 3-19.***

Beavertail Ramp Fold Up Procedures

The following procedures cover the ramp operations when the beavertail has been unfolded and secured with the lower lock pin assembly.

Manual Ramps (Option)

Using a mechanical lifting device and sling, raise the ramp until it contacts the mechanical stop. Tightly secure the ramp chain in the beavertail chain tie down notch. Repeat process to raise the second ramp. ***See Figure 3-19 on Page 3-19.***

Hydraulic Ramps Only (Standard)

Push in on the Ramp Control Lever located in the streetside gooseneck control box to the right of the trailer lift control lever. Both ramps will raise from the ground. Tightly secure the ramp chain in the beavertail chain tie down notch. ***See Figure 3-18 on Page 3-19.***

Hydraulic Ramps and Flip Beavertail (Option)

Place the diverter valve switch into the “Ramps” position. Push in on the Flip Beavertail and Ramp Control Lever located in the streetside gooseneck control box to the right of the trailer lift control lever. Raise both ramps to mechanical stop, Place the diverter valve switch into the “Tail + Ramps” position to shut power off to the diverter valve. Tightly secure the ramp chain in the beavertail chain tie down notch. ***See Figure 3-18 on Page 3-19.***

Ramps

Ramps are used to reduce the incline grade and increase traction between surfaces during loading and unloading operations. Other options are available for purchase.

Front Pin-On, 16”

The 16” Front Pin-On Ramp is 16 inches (41 cm) long, 19 inches (48 cm) wide at ground level and 23-7/8 inches (61 cm) wide at deck level. May be removed or left on during transport. ***See Figure 3-20.***

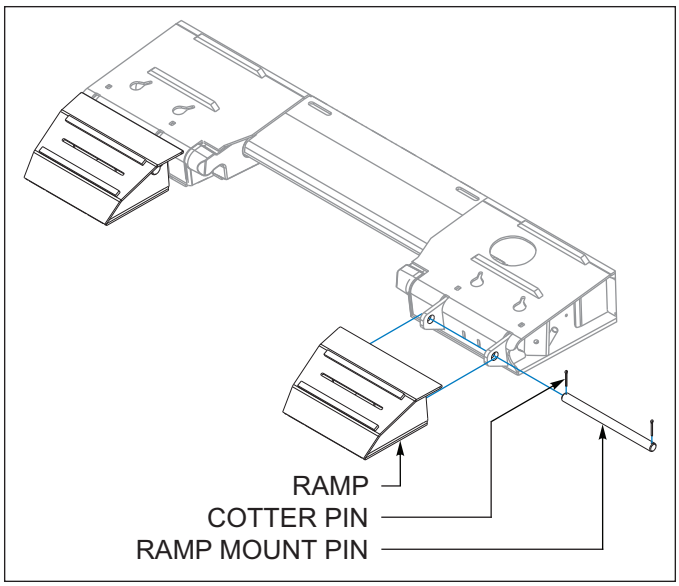


Figure 3-20: Front Pin-On, 16”

Front Pin-On, 24” Flip (Option)

The 24” Front Pin-On Flip Ramp is 24-1/4 inches (62 cm) long from pin center to ground level and 18-15/16 inches (48 cm) wide. It is secured up by a chain assembly for transport and manually flips down to use.
See Figure 3-21.

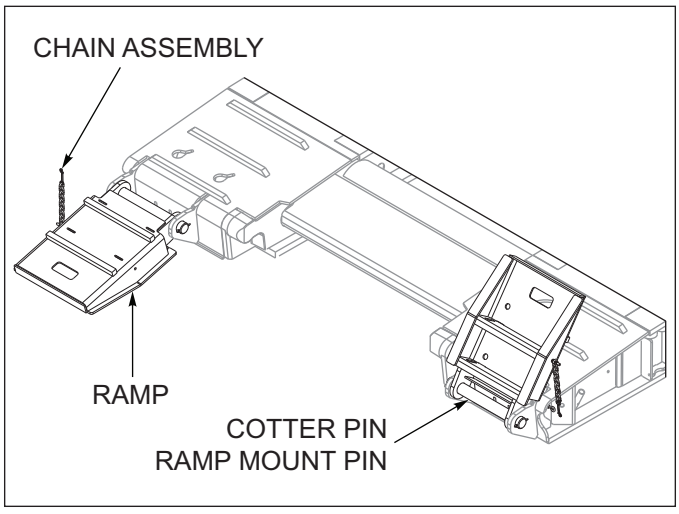


Figure 3-21: Front Pin-On, 24” Flip (Option)

Front Power Ramp (Options)

DANGER

1. **ALWAYS check behind and under the truck and trailer for persons or objects before moving. Failure to check will lead to serious damage to property, personal injury or death.**
2. **When crawling under the trailer is necessary, chock all wheels of the trailer and tractor. When jacking is necessary, chock all wheels and support the trailer undercarriage with jack stands sufficient to withstand the weight of the trailer and load. Failure to take adequate safety measures will result in serious personal injury or death.**
3. **To prevent serious injury or death from pinching: Keep all persons and objects clear while any part of the machine is in motion.**
4. **DO NOT allow to free fall. The Short Ramp Assembly weights 450 lbs (204 kg), the Long Ramp Assembly weights 950 lbs (431 kg). Failure to comply will lead to serious damage to property, personal injury or death.**

WARNING

1. **Mixing hydraulic oils could result in damage to the Power Unit.**
2. **Operating under low battery voltage conditions could result in damage to the Power Unit.**

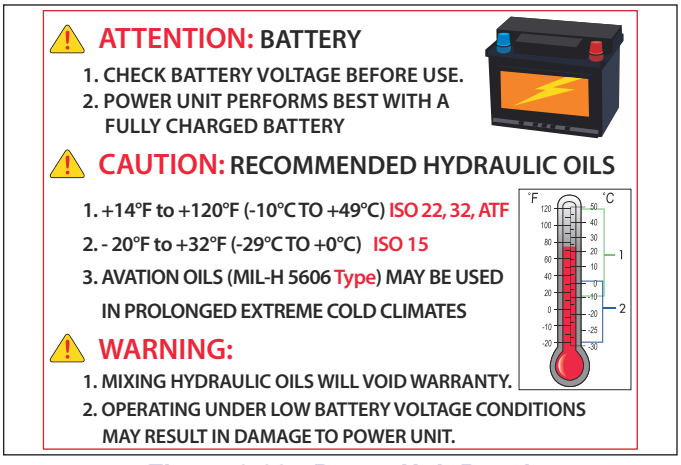


Figure 3-22: Power Unit Decal

The Front Power Ramp is a mounted, self-contained electric 12 volt direct current, hydraulic activated assembly, that stows behind the Gooseneck during transport. The ramp semi-floats between the lift arms for better contact on uneven surfaces.

The **Short Ramp** option is 36 inches (91 cm) long from deck to ground level and 102-1/4 (260 cm) inches wide.

The **Long Ramp** option is 61 inches (155 cm) long from deck to ground level and 102-1/4 (260 cm) inches wide. ***See Figure 3-24 on Page 3-24.***

Parts are available through an authorized Landoll Dealer, ***See Parts Manual listed on Page 7-1.***

For Power Unit Operation and Maintenance procedures resource the Manufactures References, ***See Chapter 7, Manufacturer Index on Page 7-1.***

Normal Operation

1. Uncouple the tractor from the trailer. Store air, electrical, and if available the hydraulic lines in the service storage compartment.
2. Remove the cable remote from the storage compartment. Extend the remote out to the maximum travel that the cable will allow.
3. **ENSURE** the ramp and bridge assembly travel areas are clear from all personnel and obstacles.
4. To Lower the ramp, press and hold the remote control down button to lower the ramp to the fully down position.
5. Install two rectangle bridge filler plates over the openings between the ramp and bridge assembly.
6. Install one round service filler plate over the trailer service storage compartment.
7. To Raise the ramp, remove one round service filler plate from the service storage compartment
8. Remove two rectangle filler plate from between the bridge assembly and ramp.
9. Press and hold the remote control up button to raise the ramp to the fully up position. ***See Figure 3-24 on Page 3-24.***

Loss of Power Operation

DANGER

To prevent serious injury or death from pinching:

Keep all persons and objects clear while any part of this machine is in motion.

IMPORTANT

This procedure is for immediate loss of battery power during operation and not for normal ramp operations. Troubleshoot and repair system as soon as possible.

1. Using a 12-vdc Portable Power Pack or 12-vdc Jumper Cables, attach to the Trailer Battery Jumper Terminals. These are located to the right of the streetside ramp drive shield and remote control storage compartment. The top terminal is POSITIVE (RED), and the bottom black terminal is NEGATIVE (BLACK). ***See Figure 3-24 on Page 3-24.***
2. Press the remote control and operate the system normally.
3. After task completion, proceed to troubleshooting. ***See Ramp, Front Power (Option) Problems on Page 6-8.***

System Failure Operation (Emergency)

IMPORTANT

These procedures are ONLY to be used if the Loss of Power Operation above failed. Once task is complete, remove trailer from service and get to maintenance for repair and to perform bleed procedures.

Ramp In Up/Transport Position

DANGER

To prevent serious injury or death from pinching:

Keep all persons and objects clear while any part of this machine is in motion.

1. Unlock the ramp by pulling the Manual Override Valve Handle fully down to open. ***See Figure 3-23.***
2. Stand on the track area of the trailer, standing clear of the center and rear bridge movement, ***See Figure 3-24***. Watch for Pinch Points and Trip Hazards, slowly push the ramp over to the down/load position.
3. Leave the Manual Override Valve Handle fully down in the open position and complete the task. ***See Figure 3-23.***
4. After task completion, leave the Manual Override Valve Handle fully down in the open position and proceed to Step #2 in Ramp Down/Unload Position.

Ramp In Down/Unload Position

DANGER

To prevent serious injury or death from pinching:

Keep all persons and objects clear while any part of this machine is in motion.

1. Unlock the ramp by pulling the Manual Override Valve Handle fully down to open. ***See Figure 3-23.***
2. Watch for Pinch Points and Trip Hazards. Use a mechanical lifting device, like a forklift to slowly lift the ramp to the up/transport position.
3. Use straps or chains to secure the ramp in the up/transport position to the trailer.
4. Leave the Manual Override Valve Handle fully down in the open position, until repair has been completed, ***See Figure 3-23***. Remove trailer from service and proceed to Troubleshooting. ***See Ramp, Front Power (Option) Problems on Page 6-8***.

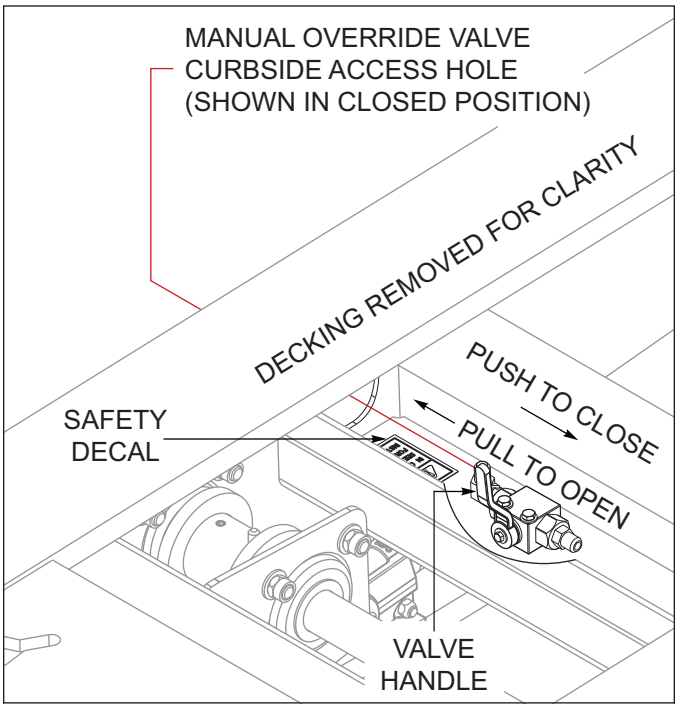


Figure 3-23: Manual Override Valve

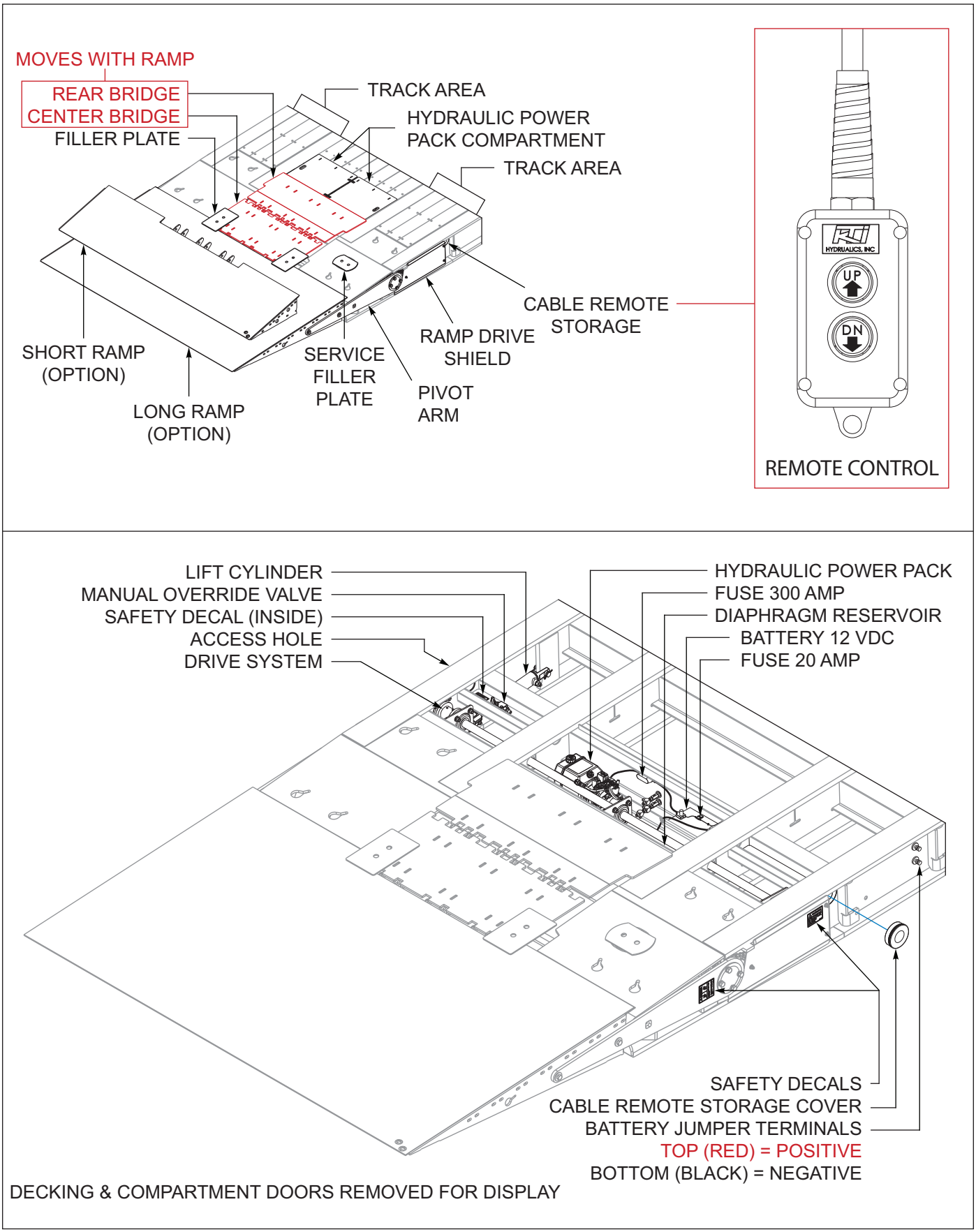


Figure 3-24: Front Power Ramp Components (Option)

Storage

Gooseneck, Load Carrier Rack, Chain and Binder (Option)

A lockable 12 slot rack that bolts to the Load Carrier and has a welded hinged lid that secures the hook ends of the chains and binders down. ***See Figure 3-25.***

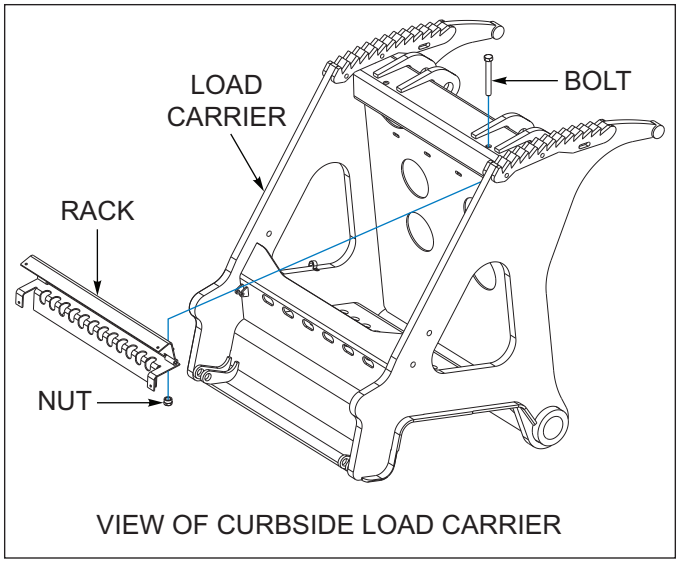


Figure 3-25: Gooseneck Load Carrier Rack, Chain and Binder (Option)

Gooseneck Toolbox, Curbside (Options)

IMPORTANT

Not Compatible with 24 inch or Bi-Fold Ramps.

Lockable toolbox that mounts on the curbside of the gooseneck, The outside measurements are 24 inches (61 cm) high, 14 inches (36 cm) wide and 22-1/2 inches (57 cm) deep. The hinged lid outside measurements are 22-5/32 inches (26 cm) high, 12-1/4inches (31 cm) wide and 1-1/16 inches (3 cm) deep. ***See Figure 3-26.***

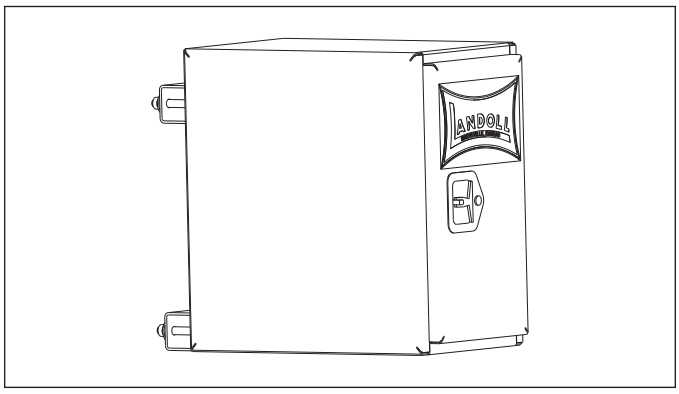


Figure 3-26: Gooseneck Toolbox (Option)

Frame, Storage (Options)

Frame Storage Options are located between the trailer beams and many options available. ***See Trailer Components (7 of 7) on Page 3-7.***

Tie Down Anchors

IMPORTANT

USE THE ONLY APPROVED Trailer Tie Down Anchors listed in this section to secure any cargo.

Landoll offers multiple tie down anchor options that provide the operator the ability to properly secure the cargo to the trailer.

IMPORTANT

Use of the products demonstrates an understanding of the warnings and the potential risks involved.

The purpose of these warning statements is to be used as a standard to identify only those risks that are common.

The ultimate responsibility and understanding of proper use and application of cargo securing devices rest with the end user.

Reading and understanding all Federal, State, and Local regulations associated with cargo securement is a responsibility of the end user.

Securing devices and anchors shall be used in accordance with all State, Federal, Provincial, Local, and Industry Regulations.

⚠ DANGER

Proceed with extreme caution. Failure to heed notice will cause injury or death to the person and/or damage to product and property.

- **NEVER exceed the working load limits of any tie down device or anchor.**
  - **The working load limit of a combined securing system (example: chain, binder, & anchor) is only as strong as the weakest point.**
- **DO NOT allow slack in tie downs. Shifting cargo may create enough momentum to break tie downs devices or anchors.**
- **ALWAYS match the tie down devices to the equivalent grade and working load limits.**
- **ALWAYS secure the tie down devices to prevent them from becoming loose, opened, or released while vehicle is in transit according to Federal guidelines.**

DANGER

Proceed with extreme caution. Failure to heed notice will cause injury or death to the person and/or damage to product and property.

- **Deviation from straight line pulls will result in reduced working load limits on the trailer anchors.**

WARNING

Failure to follow safety procedures could cause equipment damage and personal injury.

- **Prior to the use of any product from Landoll Company, LLC.**
  - **Carefully read and follow all applicable instructions, warnings and safety information enclosed, supplied, and attached to the product.**
- **It is the responsibility of the Owner/Operator to inspect and evaluate the condition of all devices used to secure cargo.**
  - **Including but not limited to chains, straps, winches, binders, and anchor points.**
  - **It is prohibited to use any device or anchor that shows damage.**
  - **Before use, any damaged items should be repaired or replaced.**

All cargo should be properly loaded, blocked, and braced to prevent cargo shifts, and to comply to the following sections of the Department of Transportation Federal Motor Carriers Safety Regulations.

- **Sections 393.100 through 393.114, Protection Against Shifting or Falling Cargo.**
  - Including Front End Structures.
- **Section 393.116 through 393.136, Specific Securement Requirements by Commodity Type.**

NOTICE

More information about cargo securement may be found at:

- **https://www.ecfr.gov/current/title-49/subtitle-B/chapter-III/subchapter-B/part-393/subpart-I**
- **https://www.fmcsa.dot.gov/regulations/cargo-securement/cargo-securement-rules**

Remember that regulations vary from state to state. State regulations may be found at:

- **http://www.fhwa.dot.gov/webstate.htm**

Tie Downs - Not Approved

IMPORTANT

- **DO NOT use the upper/lower trailer flange or any frame component not approved in this section as a tie down anchor. *See Figure 3-27.***
- **These are NOT designed or approved as a tie down anchor options, in accordance with State, Federal, Provincial, Local, and Industrial Regulations.**
- **Using ANY unapproved frame components as a tie down anchor will stress, bend, and damage the trailer frame.**
- **These will NOT, in accordance with State, Federal, Provincial, Local, and Industrial Regulations, properly secure the tie down device from becoming loose and disconnecting from the trailer.**

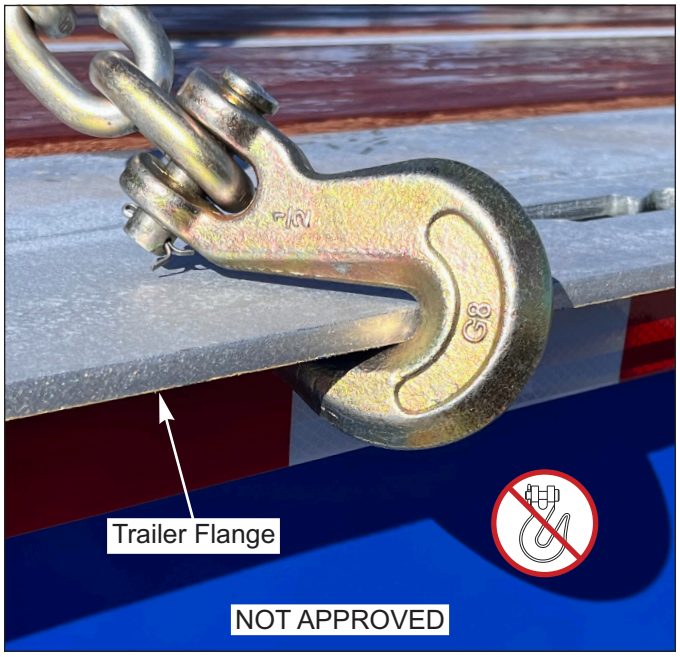


Figure 3-27: Trailer Flange Example

D-Ring Tie Downs - Approved

D-Ring Tie Downs are pivoting rings that are anchored to the trailer frame.

IMPORTANT

- **D-Ring Tie Downs are only designed to anchor one tie down line per D-Ring.**
- **DO NOT attach the chain hook to the D-Ring Tie Down.**

D-Ring Tie Down Procedures

- Select a D-Ring that provides the proper tie down angle to secure the cargo in accordance with all State, Federal, Provincial, Local, and Industrial Regulations.
- Pivot the D-Ring to the up position, ***See Figures 3-28*** to ***Figure 3-29***.
- Insert the chain hook from the outside to the inside of the opening.
- Secure hook to the chain **ONLY**.

Angled D-Ring

Angled D-Rings are mounted on the sides of the trailer, ***See Figure 3-28.***

See D-Ring Tie Down Procedures above.



Figure 3-28: Angled D-Ring

Straight D-Ring

Straight D-Rings are mounted on the top of the trailer, ***See Figure 3-29.***

See D-Ring Tie Down Procedures above.



Figure 3-29: Straight D-Ring

Keyhole Tie Downs - Approved

Keyhole Tie Downs, also known as Chain Gotchas, are machined into the top plates of the trailer. The notches point in the direction of pull.

IMPORTANT

- **Keyhole Tie Downs are ONLY designed to anchor one tie down line per Keyhole.**
- **DO NOT attach the chain hook to the Keyhole Tie Down, or damage will occur. *See Figure 3-30.***



Figure 3-30: Incorrect Usage

IMPORTANT

- **DO NOT apply multiple directions of pull to any Keyhole Tie Down.**
- **Keyhole Tie Downs are designed to anchor ONLY one direction of pull at a time, *See Figure 3-31.***

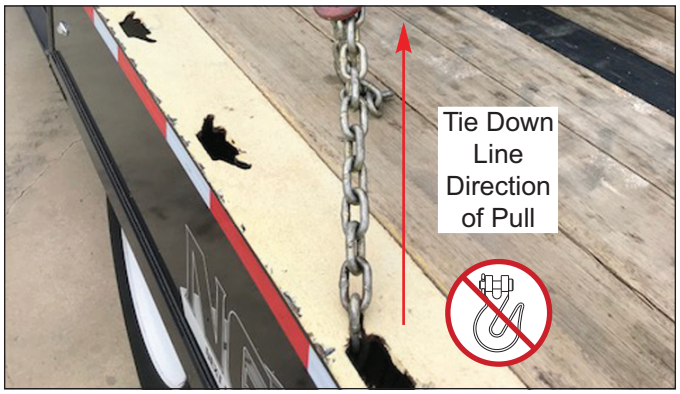


Figure 3-31: Direction of Pull

IMPORTANT

- **Keyhole Tie Downs require one chain link at a minimum below the notch to hold the chain in place, *See Figure 3-32.***
- **Keyhole Tie Downs are designed to anchor ONLY one direction of pull at a time, *See Figure 3-31.***

Keyhole Tie Down Procedures

- Select a Keyhole that provides the proper tie down angle to secure the cargo in accordance with all State, Federal, Provincial, Local, and Industrial Regulations.
- Remove chain hook, if available.
- Insert one chain link at a minimum below the opening to hold the chain in place, ***See Figures 3-32*** to ***Figure 3-34***.
- Slide a link of chain fully into the notch pointing in the direction of pull.

Single Keyhole

Depending of the model of trailer, Single Keyhole Tie Downs are located on each side of the main deck approach plate, ***See Figure 3-32.***

See Keyhole Tie Down Procedures above.

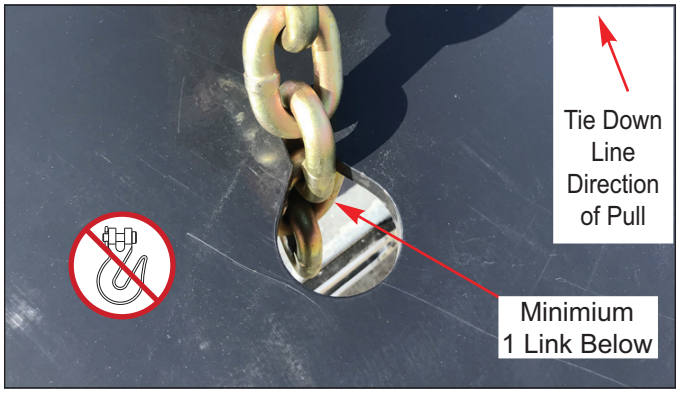


Figure 3-32: Single Keyhole

Double Keyhole

Double Keyhole Tie Downs are located on the outside beams of the trailer, ***See Figure 3-33.***

Certain trailer models also contain double keyhole tie downs on each side of the main deck towards the front.

See Keyhole Tie Down Procedures above.



Figure 3-33: Double Keyhole

Quad Keyhole

Quad Keyhole Tie Down, also known as 4-Way Gotchas, are located in the center of the trailer, ***See Figure 3-34.***

See Keyhole Tie Down Procedures above.



Figure 3-34: Quad Keyhole

Rub Rail Tie Downs - Approved

Rub Rails are full length tie down rails that protrude from one or both sides of the trailer.

They have evenly spaced supports that create a gap behind the rail allowing tie down chains to pass through.

IMPORTANT

- **Rub Rail Tie Downs are only designed to anchor one tie down line per rail support.**
- **Chain and hooks may slide along rail if not properly routed and secured to a rail support.**

Rub Rail - Chain Tie Down Procedures

- Select a Rail Support that provides the proper tie down angle to secure the cargo in accordance with all State, Federal, Provincial, Local, and Industrial Regulations.
- Slide the chain hook through the top of the rub rail on the far side of the rail support, away from the cargo. ***See Figure 3-35.***
- Hook the chain hook to the rub rail on the cargo side of the rail support, towards the cargo. ***See Figure 3-35.***
- Pull any excess chain back through the top of the far side of the rub rail.

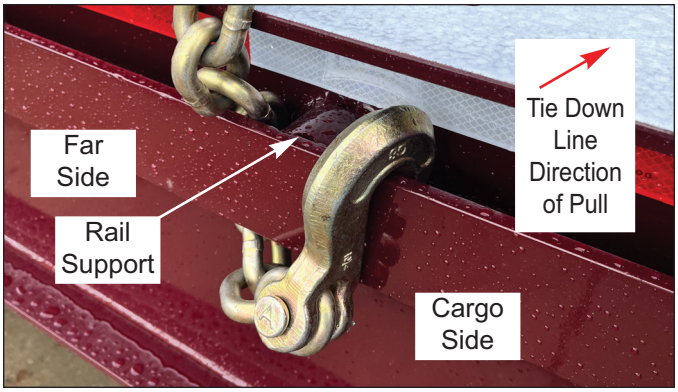


Figure 3-35: Rub Rail

Rub Rail - Strap Tie Down Procedures

IMPORTANT

Always place a rail support between the strap hook and direction of pull to prevent strap hook slippage.

- Select a Rail Support that provides the proper tie down angle to secure the cargo in accordance with all State, Federal, Provincial, Local, and Industrial Regulations.
- Properly orientate the strap's web breaking strength line in accordance with all State, Federal, Provincial, Local, and Industrial Regulations.
- Slide the strap hook with the hook opening facing outward up through the far side bottom of the rub rail, on the opposite side of chain hook shown in ***Figure 3-38***.

IMPORTANT

The rail support must prevent the strap hook slipping in the direction of pull.

- Rest the strap hook opening over the top of the outside of the rub rail. Example ***See Figure 3-38.***

- During tie down procedures, readjust the tie down strap to cover and apply pressure to the outside of the strap hook. Example ***See Figure 3-38.***

Strap J-Hook Tie Downs - Approved

Strap J-Hooks are evenly spaced hook style tie downs that protrude from one or both sides of the trailer.

These are intended to be ONLY used with D-Ring style tie down straps, ***See Figure 3-36.***

Strap Ratchets may also be available on the opposite side adjacent to the J-Hook for securing the tie down strap, ***See Strap J-Hook Tie Down Procedures on Page 3-30.***

IMPORTANT

Strap J-Hook Tie Downs are only designed to anchor one tie down line per hook.

Strap J-Hook Tie Down Procedures

- Select a J-Hook that provides the proper tie down angle to secure the cargo in accordance with all State, Federal, Provincial, Local, and Industrial Regulations.
- Properly orientate the strap's web breaking strength line in accordance with all State, Federal, Provincial, Local, and Industrial Regulations.
- Slide the D-Ring of the strap onto the J-Hook, ***See Figure 3-36.***
- During tie down procedures, readjustment of the tie down strap may be required to properly seat the strap hook to the J-hook.

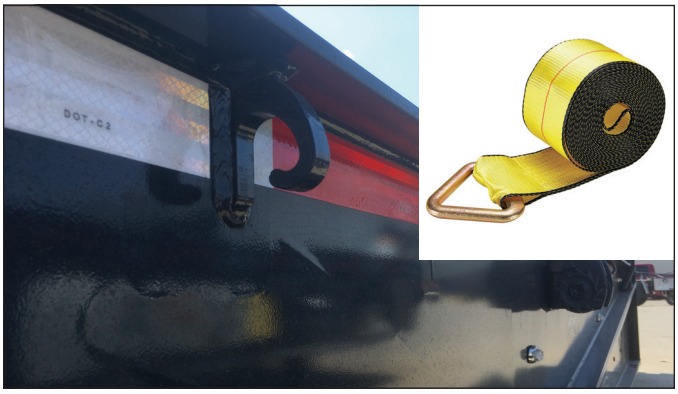


Figure 3-36: Strap J-Hook

Strap Pocket Tie Downs - Approved

Strap Pockets are evenly spaced 1-7/8 inch by 4 inch brackets that protrude from one or both sides of the trailer.

IMPORTANT

- **Strap Pocket Tie Downs are only designed to anchor one tie down line per pocket.**
- **Chain and hooks may slide along pocket if not properly routed and secured to a rail support.**

Strap Pocket - Chain Tie Down Procedures

- Select a Strap Pocket that provides the proper tie down angle to secure the cargo in accordance with all State, Federal, Provincial, Local, and Industrial Regulations.
- Slide the chain hook through the top of the strap pocket and trailer, ***See Figure 3-37.***
- Pull extra chain through the bottom of the gap.
- Position chain against the cargo side of the strap pocket.
- Secure the chain hook to the strap pocket.
- Pull excess chain back through the top of the strap pocket.



Figure 3-37: Chain - Strap Pocket

Strap Pocket - Strap Tie Down Procedures

- Select a Strap Pocket that provides the proper tie down angle to secure the cargo in accordance with all State, Federal, Provincial, Local, and Industrial Regulations.
- Properly orientate the strap's web breaking strength line in accordance with all State, Federal, Provincial, Local, and Industrial Regulations.
- Slide the strap hook up through the bottom of the strap pocket with the hook opening facing outward, ***See Figure 3-38.***
- Rest the strap hook opening over the top outside of the strap pocket.

- During tie down procedures, readjust the tie down strap to cover and apply pressure to the outside of the strap hook. ***See Figure 3-38.***



Figure 3-38: Strap - Strap Pocket

Strap Ratchet Tie Downs - Approved

Strap Ratchets are evenly spaced manually locking, manually rotated winch style tie down anchors, that protrude from one or both sides of the trailer.

These are intended to be **ONLY** used with nylon tie down straps.

IMPORTANT

Strap Ratchet Tie Downs are ONLY designed to anchor one tie down line per Ratchet.

Strap Ratchet Tie Down Procedures

To Tighten:

- Select a Strap Ratchet that provides the proper tie down angle to secure the cargo in accordance with all State, Federal, Provincial, Local, and Industrial Regulations.
- Properly orientate the strap's web breaking strength line to the strap winch in accordance with all State, Federal, Provincial, Local, and Industrial Regulations.
- Slide the strap through the ratchet slot / bars, ***See Figures 3-39*** to ***Figure 3-40***.
- Pull all excess strap through the ratchet assembly.
- Manually flip the ratchet lock down to engage the strap ratchet locking teeth.
- Insert a handle into the ratchet socket to tighten.

To Release:

- Insert a handle into the ratchet socket, ***See Figures 3-39*** to ***Figure 3-40***.
- Slightly tighten the strap ratchet release tension on the ratchet lock.
- Manually flip the ratchet lock up to release the strap ratchet locking teeth.
- Slowly rotate the strap winch handle to release the strap tension.

3-Bar Strap Ratchet

3-Bar Strap Ratchet Tie Downs are located on the outside beams of the trailer, ***See Figure 3-39.***

See Strap Ratchet Tie Down Procedures above.

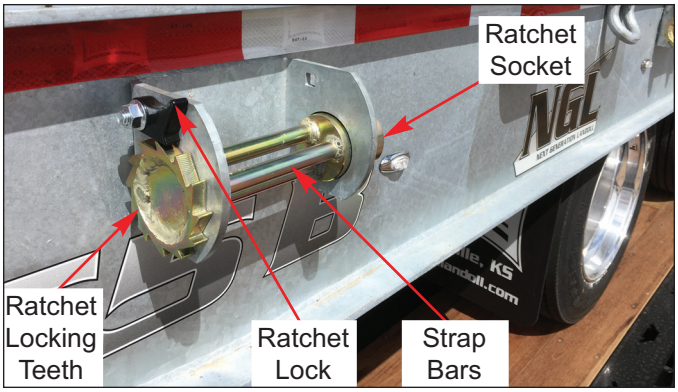


Figure 3-39: 3-Bar Strap Ratchet

Low Profile Strap Ratchet

Low Profile Strap Ratchet Tie Downs are located on the outside beams of the trailer, ***See Figure 3-40.***

See Strap Ratchet Tie Down Procedures above

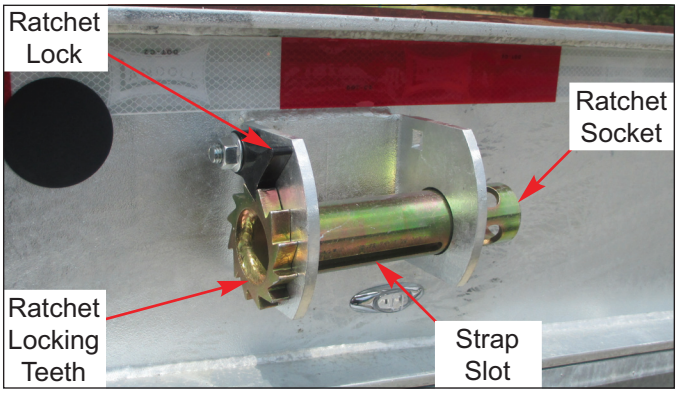


Figure 3-40: Low Profile Strap Ratchet

Gooseneck, Tie Downs

The Gooseneck comes with two D-Ring Tie downs. Loop D-Ring Tie downs are mounted to the upper back of the Gooseneck Beams. They consist of a loop that pivots in an anchor that is welded to the trailer.

Bolt-On Tie down Options come individually and bolt to the sides of the Gooseneck Beam.

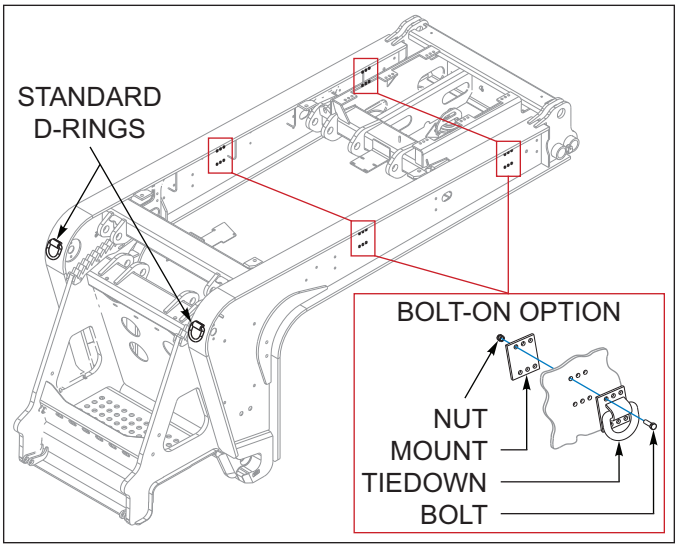


Figure 3-41: Gooseneck, Tiedowns

Trailer, Tie Downs

The Trailer comes with D-Ring, Single and Quad Keyhole Tie Downs.

Single and Quad Keyholes Tie Downs are also called Gotchas and are machined into the top plates of the trailer. **ALWAYS** use the keyhole notches that points in the direction of pull. Using the incorrect notch may cause the chain to slide out of the notch and become loose. To use, direct chain into hole and slide link into the notch to secure the chain.

D-Ring Tie Downs are mounted to the sides and beams of the trailer. They consist of a loop that pivots in an anchor that is welded to the trailer.

Angled Loop D-Rings are mounted on the sides of the trailer to better operate around obstacles.

Loop D-Rings are mounted where obstacles **DO NOT** interfere with the tie downs. ***See Trailer Components (7 of 7) on Page 3-7***

Winch (Options)

Warn 20K (9072Kg) and 30K (13,608 Kg) winches are air or manual free spool clutched, hydraulic driven with a 36:1 gear reduction and uses 5/8 inch (15.875 mm) by 85 foot (25.9 m) long steel cable, with an electrical 12-vdc 2 speed solenoid. Winches are set up for straight pulling and may be mounted on the gooseneck.

The **Gooseneck Option** allows the 20K (9072Kg) or 30K (13,608 Kg) winch to mount above the Load Carrier Lift Cylinders. It is set up to pull towards the back of the gooseneck. ***See Figure 3-42.***

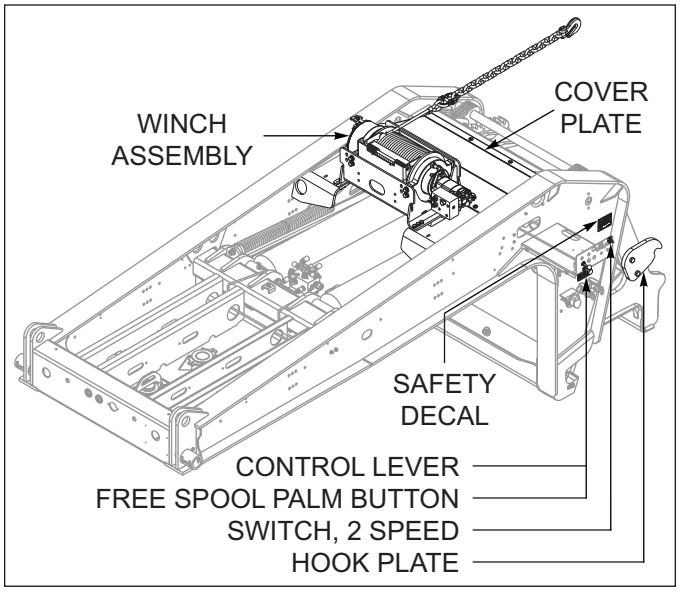


Figure 3-42: Gooseneck Winch (Option)

Free Spool Palm Button

Warn Series XL winches are equipped with either a manual or air operated Free Spool Clutch depending on the model.

1. The Manual Free Spool Clutch is operated by depressing the detent latch and turning the Winch Clutch Handle located on the winch gearbox housing as indicated on the winch label.
2. The Air Free Spool Clutch is operated by a Palm Button Valve that supplies/releases air pressure to/from the winch gearbox housing. It requires 50-120 psi (245-827 Kpa) of air pressure to disengage the free spool clutch. The Gooseneck Winch Free Spool Palm Button is located the Streetside Control Panel, ***See Trailer Components (4 of 7) on Page 3-4***.

PALM CONTROL BUTTONS	
PUSH IN ENGAGE	Pushing in on the Button will exhaust air pressure from the winch assembly and engage the clutch for hydraulic operation.
PULL OUT DISENGAGE	Pulling out on the Button will supply air pressure to the winch assembly to disengage the clutch.

Switch, 2 Speed, Warn

The Winch 2 Speed Switch supplies electrical power to the winch assembly for HI and LOW operation.

The Gooseneck Winch 2 Speed Switch is located on the Gooseneck Control Panel. ***See Trailer Components (4 of 7) on Page 3-4.***

Wireless Remote (Option)

The Wireless Remote (Option) only operates the winch options. The receiver is mounted on the side of the Gooseneck Control Panel and gets power from the trailer wiring harness. The receiver harness also plugs into the Hydraulic Control Valve to activate the solenoids directing hydraulic pressure to the winch. ***See Trailer Components (4 of 7) on Page 3-4***

Parts are available through an authorized Landoll Dealer, ***See Parts Manual listed on Page 7-1.***

For Operation and Maintenance procedures resource the Manufactures References, ***See Chapter 7, Manufacturer Index on Page 7-1.***

Winch Control Lever

DANGER

1. **The winch is not designed or intended to be used for lifting or moving people. Using it this way will cause serious injury or death.**
2. **NEVER attempt to disengage the winch cable spool when the cable is under tension. The load can roll away. Serious injury or death will result if people are in the path of the rolling load.**
3. **Failure to leave at least five winch cable wraps on the winch cable spool could allow the cable to come off the spool, resulting in serious personal injury or death.**

WARNING

DO NOT handle the winch cable during winching operations. Hands or clothing could get caught in the cable and be pulled into the spool causing serious personal injury.

The Winch Control Lever is the left lever located on the Streetside Gooseneck Control Panel.direction of rotation of the winch drum. ***See Trailer Components (4 of 7) on Page 3-4.***

WINCH HYDRAULIC LEVER	
IN- PUSH	This position will cause the winch to reel cable onto the winch spool when the winch clutch handle is engaged.
CENTER	This is the neutral position. This position will not operate the winch.
OUT-PULL	This position will cause the winch to reel cable off of the winch spool when the winch is engaged.

Table provided for general use.

NOTES:

Anti-Lock Brake System (ABS)

WARNING

The auxiliary (blue) circuit is for powering the trailer ABS. This circuit must be hot when the tractor key switch is on. No other electrical devices may be powered by this circuit while the trailer is moving forward.

WARNING

If a fault exists in the trailer ABS, normal braking will occur, but wheels may lock. Service the ABS as soon as possible.

Cold Weather Operation

1. Cold weather causes lubricants to congeal, insulation and rubber parts to become hard, which may lead to problems found in bearings, electrical systems, and air systems. Moisture attracted by warm parts can condense, collect and freeze to immobilize equipment. The truck/trailer operator must **ALWAYS** be alert for indicators of cold weather malfunctions.
2. During any extended stop period, neither the service nor parking brake should be used as they can freeze up. Use wheel chocks to secure the vehicle from moving.
3. Check all structural fasteners, air system fittings, gaskets, seals and bearings for looseness that can develop due to contraction with cold. **DO NOT** over-tighten.
4. Check tire inflation. Tire inflation decreases when the temperature decreases.
5. Periodically check drain holes in the bottom of the relay valve (for trailers with air brakes) and storage compartments. They must be open at all times to avoid moisture entrapment.

Hot Weather Operation

1. Hot weather operation can create certain problems which must be checked. Expansion of parts result in tightening of bearings, fasteners, and moving parts. Failure of gaskets or seals can occur.
2. The trailer should be parked in the shade if possible. Long exposure to the sun will shorten service life of rubber components (i.e., tires, light and hose grommets, hoses, etc.) and paint life.
3. Check tire pressure early in the day before beginning operations while the tire is cool. Replace all valve stem caps after checking.
4. If the area is extremely humid, protect electrical terminals with ignition insulation spray. Clean, prime and paint bare metal surfaces.

The use of a filter-lubricator in the tractor's air delivery system is recommended.

Pre-Coupling the Trailer

DANGER

Proceed with extreme caution. Failure to heed notice will cause injury or death to the person and/or damage to product and property.

- **ALWAYS check behind and under the truck and trailer for persons or objects before moving.**
- **ALWAYS chock trailer wheels to prevent movement of the trailer.**

WARNING

Failure to chock trailer wheels could allow movement of the trailer resulting in serious personal injury, death, or damage to property in its path.

CAUTION

Hydraulic operating pressures greater than 2500 psi (17,237 kPa) can cause damage to the trailer.

IMPORTANT

If using the tractor hydraulics, some oil may need to be removed from the tractor reservoir to allow room for 5.5 gallons (21 liters) of additional oil displaced from the trailer hydraulic system.

1. Drain all air and moisture from the tractor's air brake system following manufacturer's instructions, ***See Daily Inspection on Page 5-23***. Connect the tractors service and emergency air hoses to the trailer glad hands. Red emergency line to the glad hand with the "EMERGENCY" tag, and the blue service line to the glad hand with the "SERVICE" tag. Activating the trailer air supply valve on the tractor and set the parking brakes, ***See Trailer Components (2 of 7) on Page 3-2***.
2. Slowly back the tractor up to the front end of the trailer so the kingpin of the trailer is centered between the tractor fifth wheel jaws. Stop just ahead of the trailer. Set tractor parking brake.
3. Chock the trailer wheels.
4. Verify the frame assembly air lines, electrical plug, and if available the hydraulic hoses are connected to the gooseneck. Turn on the gooseneck air valves.
5. Check that the trailer kingpin plate is in the horizontal position. The kingpin plate should be the same height, to slightly lower, than the latch area of the fifth wheel plate of the tractor. If necessary, connect the tractor hydraulic lines, or start the trailer hydraulic power engine. Push and hold the load ratchet palm Button, and the trailer lift control lever to raise or lower the kingpin plate sufficiently to set proper coupling height, ***See Trailer Components (4 of 7) on Page 3-4***.
6. Pre-Coupling Air Brake Checks:
   a. Apply brakes and inspect brake action on all wheels for prompt application.
   b. Release brakes. All brakes should release immediately. Air pressure should discharge quickly from the relay emergency valve.
   c. Disconnect the emergency air line from the trailer glad hand. Trailer brakes should promptly set.
   d. Re-connect the emergency air line to the trailer and activate the trailer air supply valve. The trailer brakes should set.

Coupling and Uncoupling the Trailer

DANGER

1. Keep all personnel clear of front, rear, and sides of the tractor and trailer during coupling, component operations, and uncoupling. Failure to stay clear will result in serious personal injury or death.

DANGER

2. Failure to support the trailer fully on the gooseneck load ratchet upper latches during transport and parking will result in damage to the load, the trailer, and possible serious injury or death to individuals near the trailer. The gooseneck may be used in the lowered or raised positions to avoid low clearance obstacles or high centering. NEVER exceed 2 miles an hour when transporting the trailer in this manner.

WARNING

Failure to chock trailer wheels could allow movement of the trailer resulting in serious personal injury, death, or damage to property in its path.

Coupling the Trailer

1. Verify the trailer wheels are chocked and brakes function properly.
2. Make certain the tractor's fifth wheel is open by pulling the latch handle.
3. Back up slowly so the fifth wheel contacts the front of the kingpin plate on the trailer, and slips under it. Continue backing until the fifth wheel coupler locks onto the trailer kingpin.
4. Verify the vehicle coupling is secure by attempting to pull the tractor forward. If the tractor disconnects from the trailer, locate source of coupling failure; repair before continuing; and repeat Steps 3 and 4. If the tractor remains coupled, set the parking brake and verify coupler lock is fully engaged.

IMPORTANT

1. **Keep park brakes engaged for remainder of hookup, checkout procedures, and parking.**
2. **The key on the plug and the key way in the socket must be properly aligned before inserting the plug into the trailer socket.**

5. Connect the tractor's 7-pole electrical plug to the electrical receptacle on the front of the gooseneck, ***See Figure 4-1***.
6. Connect the tractor's air lines to the gooseneck's emergency and service connectors. ***See Anti-Lock Brake System (ABS) on Page 4-1***.
7. Connect the tractor's hydraulic lines if equipped to the gooseneck, if you have not already done so.***See Anti-Lock Brake System (ABS) on Page 4-1.***

8. Verify the frame assembly 7-pole electrical plug is connected to the gooseneck streetside receptacle. ***See Trailer Components (3 of 7) on Page 3-3.***
9. Verify the frame assembly air lines are connected to the gooseneck streetside air couplings and the valves are turned on.
10. Verify the frame assembly hydraulic lines are connected to the gooseneck streetside hydraulic couplings, if available.
11. Using the Trailer Lift Control Lever, raise the front of frame assembly until Load Carrier Upper Latches clicks into transportation height. ***See Trailer Lift Control on Page 3-9*** & ***See Trailer Lift Control on Page 3-9.***
12. Using the Trailer Lift Control Lever, lower the front of the frame until the Load Carrier Upper Latches rest fully in the Load Carrier Latch Teeth. ***See Trailer Lift Control on Page 3-9.***
13. Continue to Tractor and Trailer Inspection.

Uncoupling the Trailer

1. Park the trailer according to instructions, ***See Parking the Trailer on Page 4-7***.
2. Using the trailer lift control lever, slightly raise the front of the trailer to release pressure on the load carrier upper latches, ***See Figure 4-2.***.
3. Push and Hold the load ratchet palm button to disengage the load carrier upper latches. ***See Gooseneck Palm Control Buttons on Page 3-8.***
4. Using the trailer lift control lever, lower the front of the frame until the load carrier upper latches rest fully in the load carrier latch teeth, ***See Figure 4-3.***.
5. Release the load ratchet palm button.
6. Disconnect the emergency and service air lines and attach them to the tractor glad hand holders. If present, install dummy glad hands on trailer couplings.
7. Disconnect the 7-pole cable and if available the hydraulic lines from the trailer and store with the tractor.
8. Pull the tractor fifth wheel plate latch release lever.
9. Attempt to pull the tractor forward. If the tractor uncouples, verify all service lines are disconnected and trailer wheels are chocked. If tractor does not disconnect, repeat steps 4 and 5.
10. Pull the tractor away from the trailer.

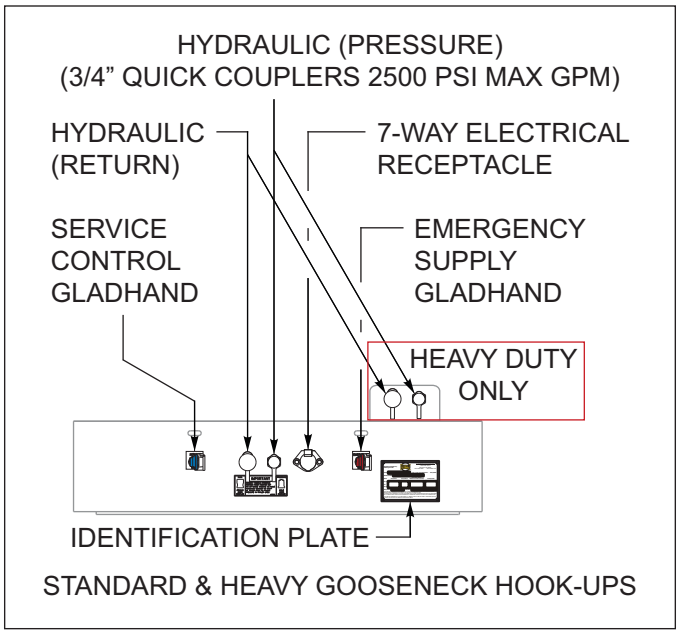


Figure 4-1: Service Hook Ups

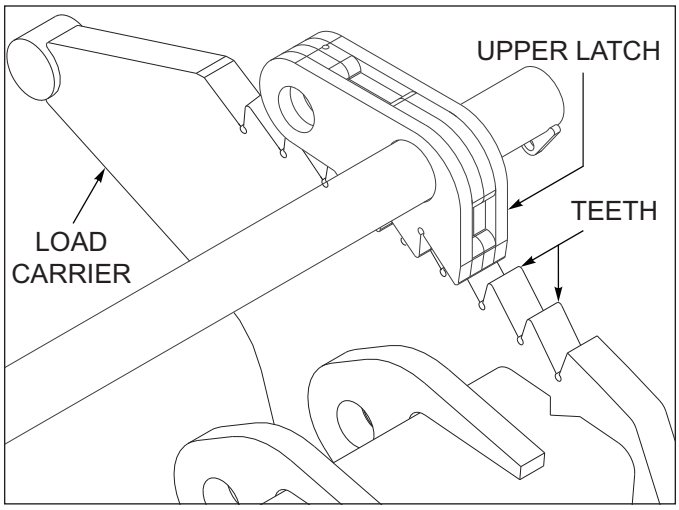


Figure 4-2: Upper Latches

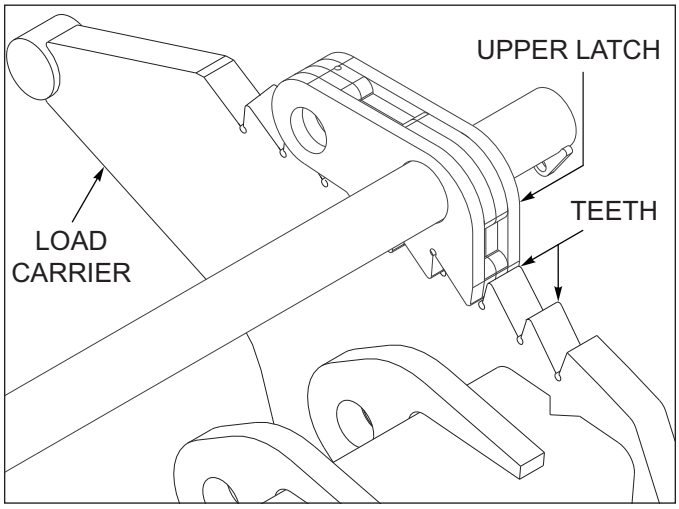


Figure 4-3: Upper Latches Resting

Tractor and Trailer Inspection

DANGER

1. **Keep all personnel clear of front, rear, and sides of the tractor and trailer during coupling, component operations, and uncoupling. Failure to stay clear will result in serious personal injury or death.**
2. **Failure to support the trailer fully on the gooseneck load ratchet upper latches during transport and parking will result in damage to the load, the trailer, and possible serious injury or death to individuals near the trailer. The gooseneck may be used in the lowered or raised positions to avoid low clearance obstacles or high centering. NEVER exceed 2 miles an hour when transporting the trailer in this manner.**

WARNING

Failure to properly set and check parking brake and chock wheels when parking and storage, could allow movement of the truck/trailer resulting in serious personal injury, death, or damage to property in its path.

1. Check the operation of all lights and signals on the trailer for proper response to switch positions (Stop, Right Turn, Left Turn, and Clearance). Check operation of remote function if present
2. Check the operation of all lights and signals on the trailer for proper response to switch positions (Stop, Right Turn, Left Turn, and Clearance). Check operation of remote function if present.
3. Check tire inflation, adjust as needed to the pressure listed on the trailer VIN plate, located on the front of the trailer.
4. Check tractor and trailer for air leaks. If air leakage is found, repair the defect before transporting.
5. Check the oil in each hub for proper level and freedom from contamination. If hubs are contaminated with water, dirt or some other foreign material, clean before transporting.
6. Check tractor air pressure. Pressure must not fall below 90 psi (621 kPa), even after activating brakes a couple of times. Set parking brake and carefully remove all wheel chocks. Set emergency brake and try pulling forward. The trailer wheels must not rotate. If trailer brakes **DO NOT** apply, **DO NOT** transport until defect, or defects, are repaired.

Attaching and Detaching the Gooseneck

DANGER

1. **Failure to support the trailer fully on the gooseneck load ratchet upper latches during transport and parking will result in damage to the load, the trailer, and possible serious injury or death to individuals near the trailer. The gooseneck may be used in the lowered or raised positions to avoid low clearance obstacles or high centering. NEVER exceed 2 miles an hour when transporting the trailer in this manner.**
2. **Be sure to keep feet and all other parts of your body clear of the bottom of the trailer during lowering operation. Failure to keep your feet or body clear will result in serious personal injury or death.**

WARNING

1. **The trailer must be coupled to a tractor.**
2. **Before operating: DO NOT exceed the gross axle weight ratings for any axle on your vehicle. The combined weight of the trailer and cargo must not exceed the gross vehicle weight rating (GVWR) of the trailer.**

Attaching the Gooseneck

1. Secure the load, following the steps as outlined in, ***See Securing the Load on Page 4-6***. Backup the tractor until the Gooseneck is within a few inches of the front of the trailer.
2. Start the hydraulic power system.
3. Using the trailer lift control lever, raise or lower the gooseneck to align the gooseneck load hooks with the main deck receiver hooks, ***See Trailer Components (4 of 7) on Page 3-4***.
4. Slowly back the gooseneck load hooks into the main deck receiver hooks, ***See Trailer Components (3 of 7) on Page 3-3***.

5. Using the trailer lift control lever, lower the front of the frame until the load carrier upper latches rest fully in the load carrier latch teeth. ***See Trailer Components (3 of 7) on Page 3-3*** & ***See Figure 4-2.***
6. Continue raising the main deck until load carrier lower latch locks into place and enough clearance for transportation is obtained, ***See Trailer Components (3 of 7) on Page 3-3.***
7. Using the trailer lift control lever, lower the front of the frame until the load carrier upper latches rest fully in the load carrier latch teeth, ***See Figure 4-3***.
8. Reconnect the frame air and electrical lines from the frame storage compartment. After glad hands are connected, open shutoff valves. Then connect the 7-Pin electrical connector, press firmly to lock into place with cover. And if available, connect the hydraulic hoses, ***See Trailer Components (3 of 7) on Page 3-3.***

Detaching the Gooseneck

1. Park the tractor/trailer in a straight line on level even surface. Set the tractor brakes and release the trailer brakes.
2. Start the hydraulic power system.
3. Shut off glad hands and disconnect the air, electrical, and hydraulic lines from the gooseneck and store in the main deck storage compartment provided in the driver's side approach plate, ***See Trailer Components (3 of 7) on Page 3-3.***
4. Using the trailer lift control lever, slightly raise the front of the trailer to release pressure on the load carrier upper latches, ***See Figure 4-2.***
5. Push and hold load ratchet palm button to disengage the load carrier upper latches, ***See Gooseneck Palm Control Buttons on Page 3-8***
6. Push and hold the carrier lock palm button to disengage the load carrier lower latch to allow carrier to rotate when activating the trailer lift control lever, ***See Gooseneck Palm Control Buttons on Page 3-8***.
7. Continue to push both palm buttons while moving trailer lift control lever to the down position, lowering the trailer to the ground.
8. Continue down until the gooseneck lift arms rest on the tractor frame rails. A clearance of 1/8 in to 1/4 in (3.175-6.35 mm) should be obtained between the gooseneck load hooks and the main deck receiver hooks, ***See Trailer Components (3 of 7) on Page 3-3.***
9. Pull the tractor forward slightly to determine that the gooseneck has detached from the main deck. If it does not detach, repeat Steps 7 and 8**.** When gooseneck does detach, proceed to pull the tractor away from the main deck.

Loading and Unloading the Trailer

DANGER

When moving the load, ENSURE that the load is steering straight so it does not maneuver off the side of the trailer. Failure to so will result in damage to equipment, injury, or death.

WARNING

1. **Top of extension planks must be flush with main deck boards.**
2. **Centerline of tracks or tires must be loaded on the main deck, not on extension brackets.**
3. **Failure to load extension brackets properly could result in equipment damage and personal injury.**

WARNING

1. **DO NOT overload extensions. over-width ratings are given in the Specifications Chapter.**
2. **DO NOT secure load to over-widths or undercarriage. Secure load frame to mounted D-Rings or gotchas located in the approach plate and frame beam flanges. Failure to do so could cause serious injury or death.**

CAUTION

1. **Model 855 trailer max concentrated load in a 12 ft (3.7m). area is 110,000 lbs (49,895 kg).**
2. **Model 860 trailer max concentrated load in a 14 ft (4.3 m). area is 120,000 lbs (54,431 kg).**

Loading the Trailer

1. Practice all standard industrial safety standards. **DO NOT** load any payload that will overload any component of the trailer or cause an unsafe condition.

2. Lower any lifted axles to support load, ***See Lift Axle Palm Button (Option) on Page 3-12.***
3. Prepare to load the trailer by following the steps outlined in ***Detaching the Gooseneck on Page 4-5*****.**
4. If transporting a wide load, support excess overhang by setting up swing-out outriggers and extension planks, ***See Winch (Options) on Page 3-32***.
5. Drive or winch the load onto the trailer. **ENSURE** that the load is steering straight up onto the trailer and does not maneuver off the side of the trailer. Load a stationary load by means of a forklift, crane, or other means satisfactory to the constitution of the load. Position the load accordingly for proper weight distribution, ***See Figure 4-4***.
6. Chain the load down in accordance with instructions in ***See Securing the Load on Page 4-6*** **&** ***See Trailer Components (7 of 7) on Page 3-7.***
7. Attach the gooseneck to the trailer following the steps as outlined in ***Attaching the Gooseneck on Page 4-4*****.**
8. Shut down hydraulic power system.

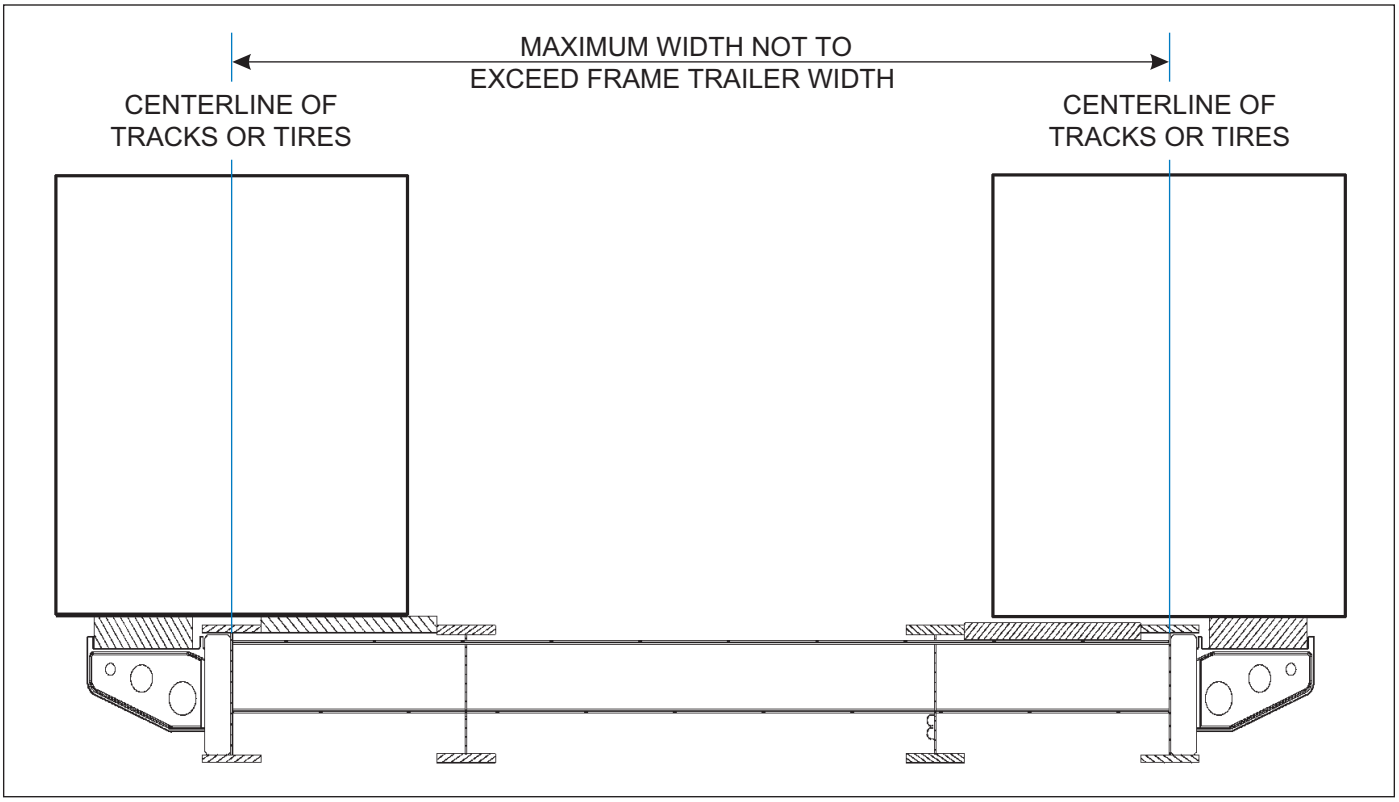


Figure 4-4: Load Center

Unloading the Trailer

1. Prepare to unload the trailer by following the steps outlined in ***Detaching the Gooseneck on Page 4-5*****.**
2. Remove the chains and binder or the tie-straps from the load.
3. Drive the load off the front of the trailer or remove a stationary load by means of a forklift, crane, or other means satisfactory to the constitution of the load.
4. Attach the gooseneck to the trailer following the steps as outlined in ***Attaching the Gooseneck on Page 4-4*****.**
5. Shut down hydraulic power system.

Securing the Load

DANGER

DO NOT allow slack in tie downs. A shifting load may create enough momentum to break hi-test chains or strap ties. Slack in tie downs will result in damage to the load, and death or serious injury to persons near the load.

IMPORTANT

1. More information about cargo securement may be found at: http://www.fmcsa.dot.gov/cargosecurement.pdf.

2. Remember that regulations vary from state to state. State Regulations may be found at: http://www.fhwa.dot.gov/webstate.htm.

1. All items of the trailer load must be securely tied to the deck, front and rear, using **ONLY** Approved Tie Down Anchors on the trailer frame. ***See Tie Down Anchors on Page 3-25.***
   - The load must be tied with chain or ratchet straps sufficient to withstand the weight of the load using standard approved tie down methods.
2. No slack is allowed in the tie down chains or straps. Use binders with chains or a ratchet type buckle on straps to eliminate any slack in the tie downs.

Towing the Trailer

DANGER

ALWAYS check behind and under the truck and trailer for persons or objects before moving. Failure to check will lead to serious, or damage to property.

CAUTION

1. **Model 855 trailer max concentrated load in a 12 ft (3.7m). area is 110,000 lbs (49,895 kg).**
2. **Model 860 trailer max concentrated load in a 14 ft (4.3 m). area is 120,000 lbs (54,431 kg).**
3. **When operating railer, DO NOT back over curb. This will cause severe damage to undercarriage.**
4. **If a fault exists in the trailer ABS, normal braking will occur, but wheels may lock. Service the ABS as soon as possible.**

Driving with the trailer coupled behind requires constant attention to the overall length of the combination. The “hinged-in-the-middle” configuration of the tractor and trailer, load, and weight effect performance. Turning, passing, acceleration, braking, stopping, and backup require special considerations. When executing steep grades or turning tight curves, the trailer must not be allowed to push the tractor, or jack knifing the tractor may the result. Application of the trailer brakes to keep the trailer in tow will help prevent this pushing. Braking should begin before descending a hill or attempting a curve, to assure control.

1. Make a moving test of the trailer brakes at low, and medium speeds before traveling at highway speed.
   a. The Anti-Lock Brake System (ABS) warning lamp mounted at left rear side of the trailer should come on when power is supplied to the ABS by turning the tractor key switch on. The warning lamp should go off once the trailer exceeds 4 mph (6 km). If the warning lamp does not go off, a fault exists in the trailer ABS. Once the vehicle speed exceeds 4 mph (6 km), the light should remain off unless a fault occurs or the key switch is turned off, then on again.
2. Monitor the air pressure gauge on the dash of the tractor. Pressure should not fall below 90 psi (621 kPa) at any time.
3. The trailer wheels track to the inside of the tractor during turns. Thus, turning corners requires a wide swing to prevent “curb hopping,” and to allow the trailer wheels to clear any obstacle on the inside of the corner.
4. To stop, use a gradual and smooth application of brakes. If grabbing occurs, apply less pressure - grabbing brakes are not efficient.
5. Backing should be done with care. Tail overhang, trailer length, and allowable space must be taken into consideration when backing the trailer.

Parking the Trailer

DANGER

ALWAYS check behind and under the truck and trailer for persons or objects before moving. Failure to check will lead to serious, or damage to property.

WARNING

When leaving the trailer unattended, position all hydraulic controls to the “neutral” or “off” position or disconnect the tractor hydraulic hook-up.

CAUTION

When operating trailer, DO NOT back over curb. This could cause severe damage to undercarriage.

1. Position truck and trailer on a level, solid surface.
2. Set the Parking Brake, **not the trailer hand brake**, and check for proper brake holding.

3. Chock wheels of trailer.
4. Check for any air leaks in lines, relay valve, brake pods, or any other air system component.

General

DANGER

Proceed with extreme caution. Failure to heed notice will cause injury or death to the person and/or damage to product and property.

- **DO NOT operate the trailer with defective, broken or missing parts.**
- **ALWAYS chock trailer wheels to prevent movement of the trailer.**

IMPORTANT

- **Landoll Company, LLC. Is not responsible for any equipment that is not properly maintained.**
- **Troubleshooting, Repairing and Servicing must be performed by a trained technician.**
- **It is highly recommended to contact the Landoll Trailer Service Department at Landoll.com or phone 800-446-5175 / 888-522-3634.**
- **For service and repair parts, simply record the equipment serial and model number from the identification plate and contact the Landoll Trailer Service Department at Landoll.com or phone 800-446-5175 / 888-522-3634.for assistance.**

This section contains instructions necessary for proper maintenance of the equipment. This equipment is designed for years of service with minimal maintenance. However, proper preventive maintenance is important for durability and safe operation and is an owner/user responsibility.

A well-planned preventive maintenance & inspection program is important to ensure safe and proper function of the equipment. Determine the cause of the broken, damaged or faulty part and get it repaired immediately.

Landoll Company, LLC. is not responsible for any equipment that is not properly maintained.

The operator has the most responsibility for the overall condition of the equipment. They become the most familiar with the feel, function, performance, sight, smell and sound of the equipment. When findings, faults or symptoms are found, they must effectively communicate this in writing or verbally to the technician for repair.

The technician has the responsibility of correcting the findings, faults or symptoms reported by the operator.

To include correcting the findings, faults or symptoms found periodically during the technician inspections and services. The technician also has the responsibility to report any findings, faults, symptoms, causes and corrections to their supervisor.

Tools, Equipment & Personnel

Tools, equipment, and personnel normally found in a facility capable of making truck and trailer repairs will be adequate for maintenance of the trailer.

Electrical System

The electrical system does require specialized personnel, tools, equipment, or test procedures for troubleshooting, servicing, or repair.

Hydraulic System

The hydraulic system does require specialized personnel, tools, equipment or test procedures for troubleshooting, servicing or repair.

Structural Components

The structural components do require specialized personnel, tools or equipment for repair.

Maintenance Tasks

Equipment maintenance includes periodic inspection and lubrication.

For recommended Maintenance Schedules, see table below. Checklists have been provided to assist with the preventive maintenance & inspection program.

MAINTENANCE & INSPECTION SCHEDULE	
Equipment of Low Usage	*See Page 5-2*
Trailer Maintenance Schedule	*See Page 5-12*
Hydraulic Engine Maintenance	*See Page 5-16*

Cleaning

WARNING

Proceed with caution. Failure to heed warning could cause injury to person and/or damage product and property.

- **Paint thinner and other solvents are flammable and toxic to eyes, skin, and respiratory tract.**
- **Avoid skin and eye contact.**
- **Good general ventilation is normally adequate.**
- **Keep away from open flames or other combustible items.**
- **DO NOT use a wire brush on any bearing parts or surfaces. Use a natural or synthetic bristle brush.**
- **DO NOT use compressed air, or spin bearing parts when cleaning. These practices can throw solvents, dirt, or metal particles into your eyes.**
- **DO NOT use paint thinner to clean any rubber components such as grommets and hoses. The paint thinner will dry out the rubber and cause it to deteriorate.**

1. **Dirt and Grime:**
   - Wash the equipment with mild detergent to remove all accumulated dirt and grime.
2. **Grease and Fluid:**
   - Use any mineral spirits paint thinner (or its equivalent) to remove grease and fluid from all parts of the equipment.
   - Rinse degreasing solution off with low pressure cold water.
   - Dry clean parts with lint free, clean, soft absorbent, cloth or paper. Wash and dry hands.
   - **DO NOT** use paint thinner to clean any rubber components. Wipe off any grease or fluid accumulated with a rag.
3. **Corrosion and Rust:**
   - Scrape, sand, prime, and spot paint areas where finish is missing or where there is evidence of corrosion.
4. **Optional Hydraulic Engine Reservoir Filler Cap and Strainer:**
   - Remove the filler breather strainer assembly from the reservoir.
   - Separate the filler and strainer assembly.
   - Soak in mineral spirits paint thinner (or its equivalent) to remove grease and fluid from the strainer.
   - Allow to dry, then lightly wipe the interior and exterior to remove any debris.

Inspection

These inspections look for broken, defective, and leaking components, structural damage, and functionality of the equipment.

Equipment of Low Usage

Equipment that sits for 30 days or more without being operated.

Landoll recommends conducting preventive maintenance every 30 days that includes:

- Conducting the Daily, Weekly, and Monthly Maintenance Schedule checks. ***See Maintenance Schedule on Page 5-12.***
- Road Testing a minimum of 5 miles.
- Exercise all equipment functions.

Exercising the equipment will reduce premature component failure by:

- Lubricating all internal components and seals. Reducing rust and corrosion build up internally and externally.
- Reducing flat spots to form in seals, tires, and component metal-to metal contact.
- Identifies any possible equipment failure.

Fluid Leak Classification

Fluid loss and possible contamination in a leaking system may cause poor function and premature failure within the components.

Leaks may be visible by signs of wetness appearing around components seals, gaskets, fittings, and hose/line connections. Leaking hoses may also show signs of staining that also indicates leakage.

- If any fittings or connections are loose, tighten.
- If any items are broken or defective report it.

IMPORTANT

- **Any signs of a leaking fuel system or brake system, DO NOT operate and report it to your supervisor or maintenance immediately.**
- **Report any Class 3 leak to your supervisor or maintenance immediately and DO NOT operate.**

NOTE

- **Class 1 or 2 leaks may be operated but closely monitored and the fluid level checked more frequently.**
- **Report any leak to your supervisor or maintenance.**

Fluid Leak Classifications:

- **Class 1:** Signs of wetness or stains that do not form drops.
- **Class 2:** Signs of drops forming but not dripping.
- **Class 3:** Signs of drops dripping.

Inspection Overview

1. Inspect the trailer, and trailer parts periodically for damage or signs of pending failure, ***See Maintenance Schedule on Page 5-12.***
   - Damaged or broken parts must be repaired or replaced at once.
   - Determine the cause of any binding or hydraulic leakage at once.
   - Correct the problem before using the tractor or trailer.
2. Use the ***See Troubleshooting Guide on Page 6-1*** to check for “SYMPTOMS” and “PROBLEMS” of any trailer system not functioning correctly, or where wear, distortion, or breakage are found. Administer “REMEDY” according to the right-hand column of the troubleshooting section.

Lubrication

During inspections of the trailer, if lubricants are dirty, those parts should be cleaned with paint thinner, dried, and then lubricated immediately.

Dirt in the lubricant forms an abrasive compound that will wear parts rapidly.

For Lubrication Points and Specifications, see table below.

LUBRICATION POINTS AND SPECIFICATIONS	
Gooseneck	***See Page 5-6***
Centralized Undercarriage	***See Page 5-7***
Flip Axle	***See Page 5-8***
Flip Beavertail Ramp	***See Page 5-9***
Ramp, Front Power (Option)	***See Page 5-10***
Lubrication Specifications	***See Page 5-11***

Repair Parts

An operator and parts manual come with the trailer and stored in the manual holder tube located on the side of the gooseneck control box from the factory.

- **These manuals do receive updates, which may be determined by the revision number of the manual.**
  - The revision number is the last four digits of the manual’s part number.
  - Before 1 January 2023, the revision number format was the month/year (example: 0422).
  - After 1 January 2023, the revision number format changed to the year/month (example: 2301).
- **When re-ordering new or updated manuals, DO NOT include the last four digits of the manual, it may be out of date.**
  - Each manual has its own part number and revision, which may be found at the bottom of the pages (example: F-1234-2401).
  - Both manuals are listed on the backside of the front cover at the bottom of the Instructions for Ordering Parts page.
  - The back cover of each manual lists the replacement part number for that specific manual.

NOTICE

These manuals only cover the most common parts and options.

If a particular part or option is needed:

- Record the equipment VIN/NIV number from the identification plate and contact your locally authorized Landoll Dealer.

The operator’s manual covers the operation, troubleshooting, maintenance procedures, and torque limits needed during equipment service and repairs.

It also lists additional manufacturer references to assist in the troubleshooting, servicing, and repairing of outsourced components applied to the equipment at the factory.

Manufacturer references are also available through your locally authorized Landoll Dealer.

The parts manual displays mechanical, air, electrical, hydraulic components (with part numbers), and schematical diagrams.

It is highly recommended that all service and repair parts are acquired through an authorized Landoll Dealer.

- Simply record the equipment VIN/NIV number from the identification plate, build the parts list, and contact a dealer near you.
- To find that dealer, please visit **landoll.com**, or call 1-800-423-4320 for assistance.

Dealers Only: Parts, Trailer Manuals, and Manufacturer References are available online through the Dealer Portal at **dealer.landoll.com.**

Structural Defects

If any structural defect is found, the fault must be corrected before further use of the equipment.

Continued usage could endanger the equipment, its cargo, personnel, traffic, and properties.

If any cracks or breaks are found, contact the Landoll Service Department for repairs at **Landoll.com** or phone 800-446-5175 / 888-522-3634.

Inspect the deck daily for broken or missing decking or attachments.

Repair or replace any defective parts promptly.

Torque Specifications

Torque specifications are intended as a guide for applications involving typical stresses and mechanical surfaces.

Values are based on the physical limitations of clean, plated, and lubricated hardware.

In all cases, when an individual torque value is specified, it takes priority over the general torque values given in the general torque tables.

Replace original fasteners with hardware of equal grade.

For torque specification, see table below.

TORQUE SPECIFICATIONS	
Air Spring Assembly	***See Page 2-3***
Suspension Assembly - Air Ride	***See Page 2-3***
Wheel Fasteners	***See Page 2-3***
SAE, General	***See Page 2-4***
Metric, General	***See Page 2-4***
Hydraulic Fittings	***See Page 2-5***

Weather Tips

Cold Weather

IMPORTANT

- **Cold weather may cause lubricants to thicken and possible solidify, rubber to harden, and metal to contract.**
- **The moisture attracted by warm parts may condense, collect, and freeze causing immobilized components.**
- **Which may lead to problems found in bearings, electrical systems, and air systems.**

1. During any extended stop period, neither the service nor parking brake should be used as they can freeze up. Use wheel chocks to secure the vehicle from moving.
2. Check all structural fasteners, air system fittings, gaskets, seals, and bearings for looseness that can develop due to contraction with cold. **DO NOT OVER-TIGHTEN**.
3. Check tire inflation. Tire inflation decreases when the temperature decreases.
4. Periodically check drain holes in the bottom of the relay valve (for trailers with air brakes) and storage compartments. They must be open at all times to avoid moisture entrapment.

Hot Weather

IMPORTANT

- **Hot weather may cause lubricants to become extremely thin, rubber to soften, and metal to expand.**
- **Moisture attracted by hot parts may condense, collect, and rust causing immobilized components.**
- **Which may lead to problems found in bearings, electrical systems, and air systems.**

1. Hot weather operation can create certain problems which must be checked. Expansion of parts results in tightening of bearings, fasteners, and moving parts. Failure of gaskets or seals can occur.
2. The trailer should be parked in the shade if possible. Long exposure to the sun will shorten service life of rubber components (i.e. tires, lights, grommets, hoses, etc.) and paint life.
3. Check tire pressure early in the day before beginning operations while the tire is cool. Replace all valve stem caps after checking.
4. If the area is extremely humid, protect electrical terminals with ignition insulation spray. Clean, prime,

and paint bare metal surfaces.

5. The use of a filter-lubricator in the tractor's air delivery system is recommended.

Wood Deck Care

Sunlight, weather, and the cargo being hauled will damage the wooden deck and surface sealer.

Applying a good water sealer that contains a UV inhibitor to all visible surfaces of the deck wood will help protect the wood, ***See Lubrication Specifications on Page 5-11.***

Using a hand held roller or hand held pump sprayer, apply every 6 months (recommend spring and fall).

More frequent applications may be required due to environmental conditions and cargo damage.

Lubrication Points & Specifications

Gooseneck Lubrication Points

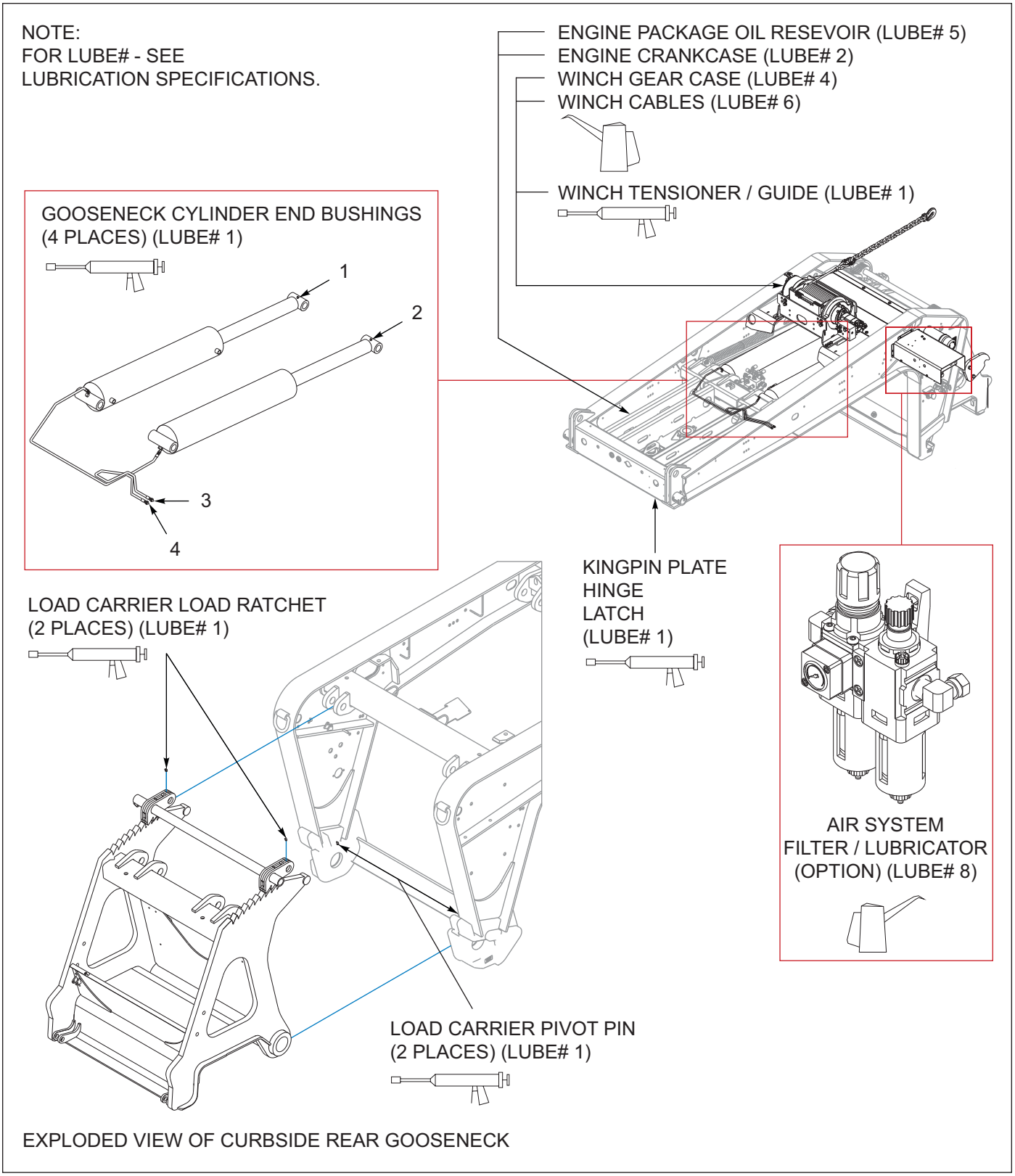


Figure 5-1: Gooseneck Lubrication Points

Centralized Lubrication Points

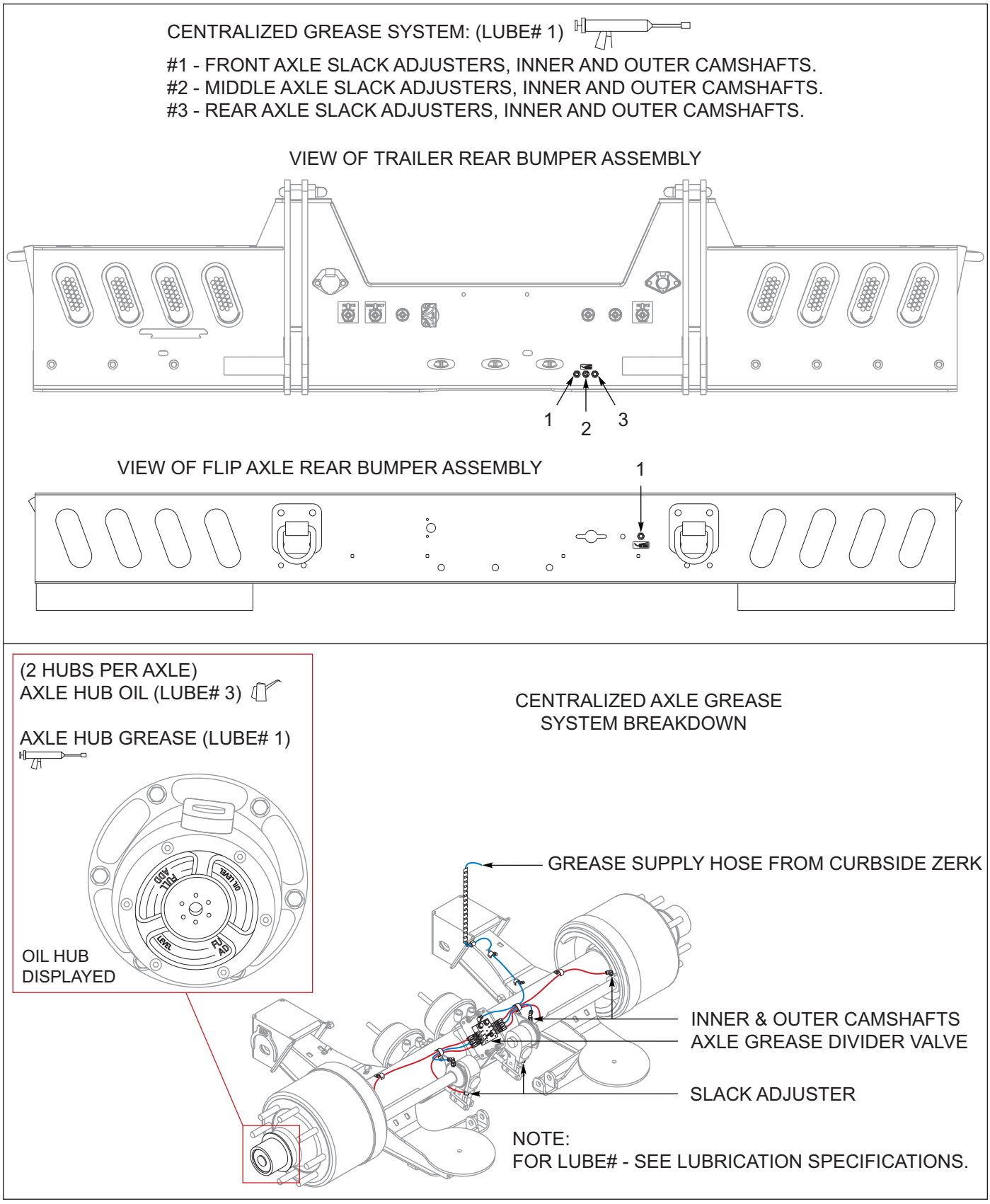


Figure 5-2: Centralized Grease Points

Flip Axle, Pivot Spring Lock Pins Lubrication Points (OPTION)

VIEW OF TRAILER REAR BUMPER (OPTION)

BUMPER IMAGE FOR REFERENCE ONLY

NOTE:
FOR LUBE# - SEE LUBRICATION SPECIFICATIONS.

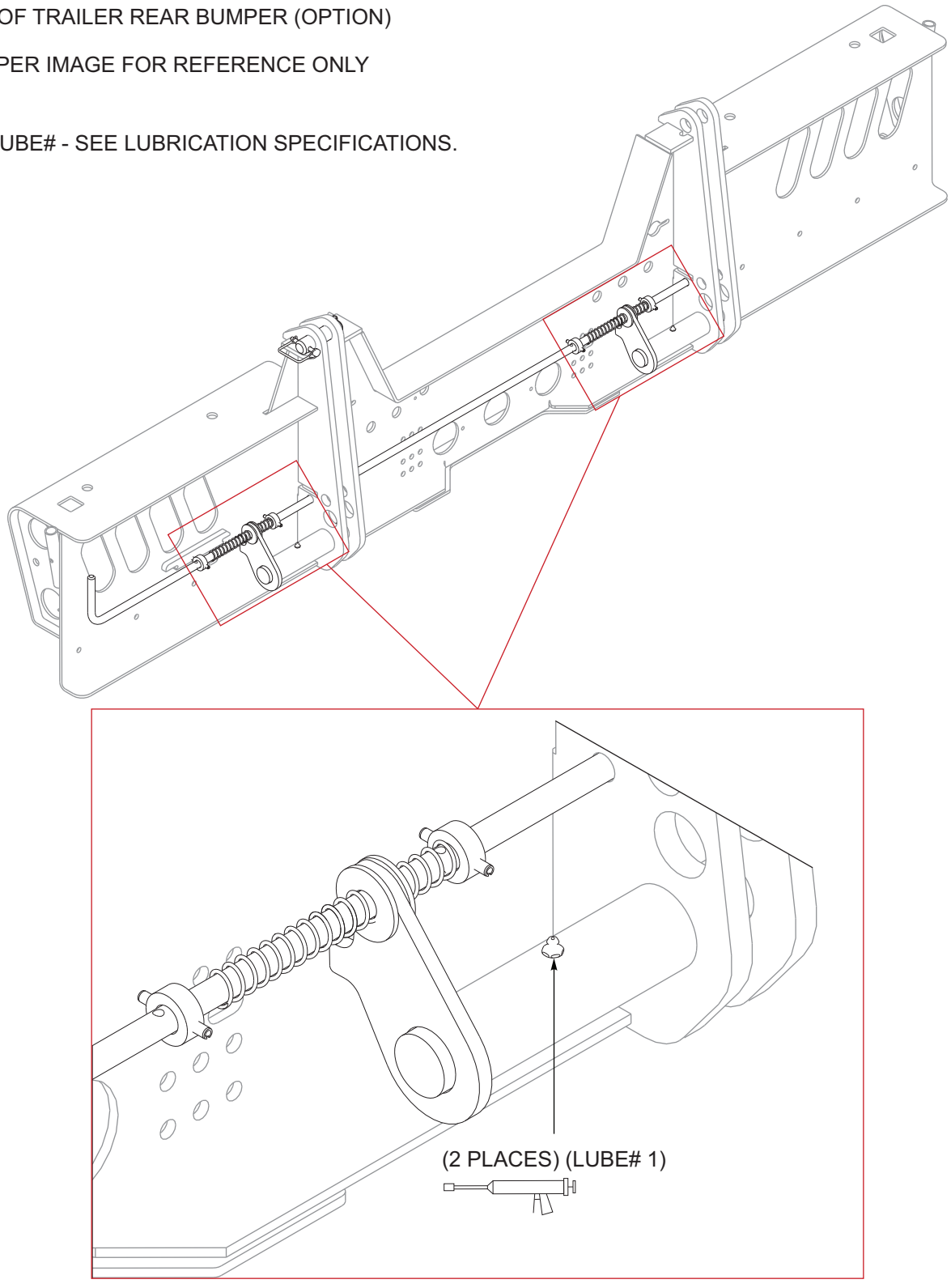
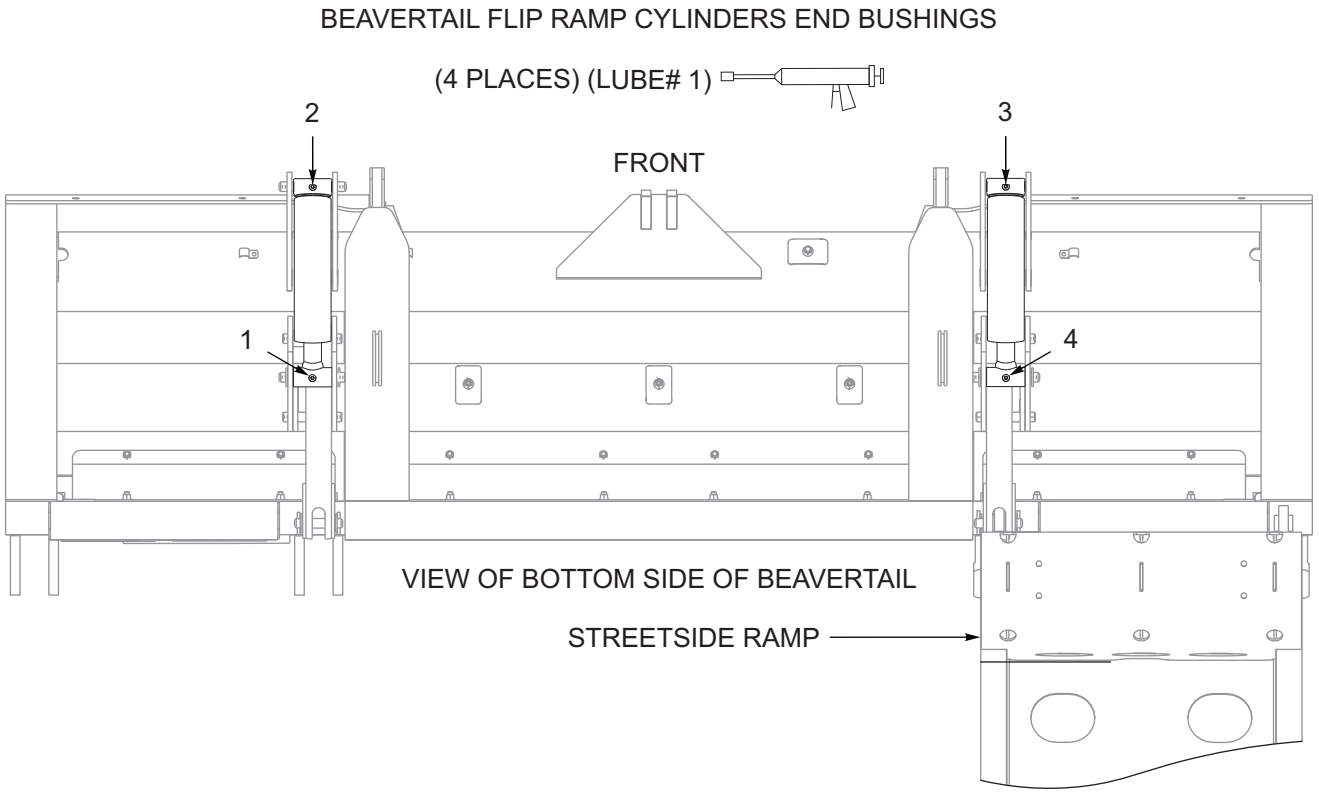


Figure 5-3: Flip Axle, Pivot Spring Lock Pins Lubrication Points (OPTION)

Flip Beavertail, Flip Ramp Lubrication Points (OPTION)



NOTE:
FOR LUBE# - SEE LUBRICATION SPECIFICATIONS.

Figure 5-4: Flip Beavertail, Flip Ramp Lubrication Points (OPTION)

Ramp, Front Power (OPTION)

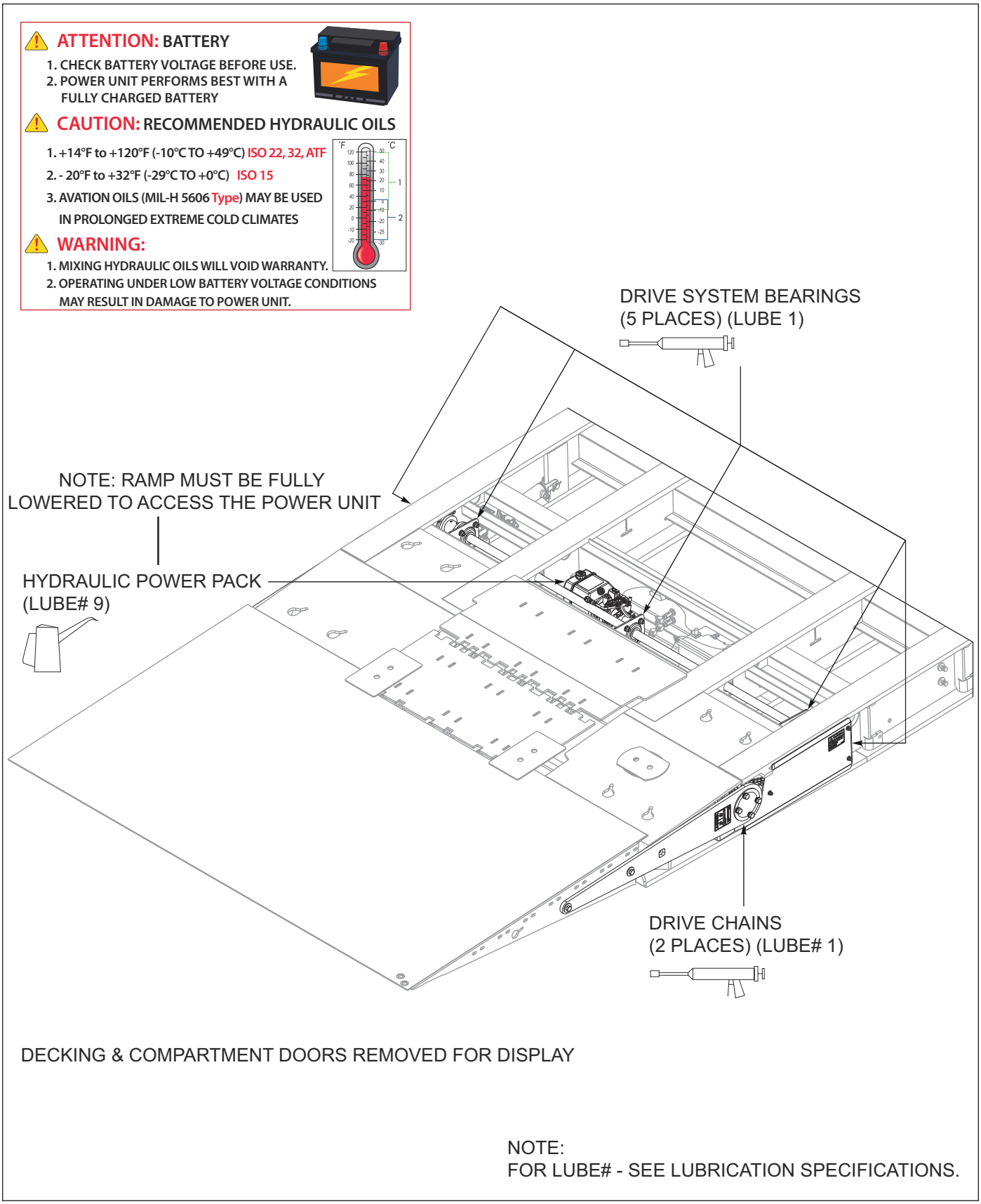


Figure 5-5: Ramp, Front Power (OPTION)

Lubrication Specifications

LUBE #	LUBRICATION	CAPACITIES	EXPECTED TEMPERATURES ABOVE 15° F (-9° C) GRADE	EXPECTED TEMPERATURES BELOW 15° F (-9° C) GRADE
1	GREASE, MULTI PURPOSE	N/A	**LITHIUM MULTI -PURPOSE EP2 NLGI 2**	**LITHIUM MULTI -PURPOSE EP2 NLGI 2**
2	OIL, ENGINE	CRANKCASE (ENGINE OPTION) (1.7 - 2 QT) (1.6-1.9 L)	**SAE 10W-30**	**SAE 5W-20 / 5W-30**
3	OIL, GEAR	AXLE HUBS	**SAE 80W-90**	**SAE 80W-90**
4	OIL, GEAR	WINCH CASE (OPTION)	**SAE 85W-140**	**SAE 75W-90**
5	OIL, HYDRAULIC	RESEVOIR ENGINE PACK OPTION (30 GAL) (113 L) WET KIT OPTION (35 GAL) (132 L)	**ISO GRADE 32**	**ISO GRADE 32**
6	OIL, MULTI PURPOSE	WINCH CABLE (OPTION)	**RUST & OXIDATION PROHIBITING ISO 32**	**RUST & OXIDATION PROHIBITING ISO 32**
7	WATER, SEALANT	WOODEN DECK	**WATER SEALER W/UV PROTECTION THOMPSON'S, WATER SEAL, BOILED LINSEED OIL, PENOFIN, WOOD GUARD**	
8	OIL, AIR TOOL	AIR LUBRICATING SYSTEM	**AIR TOOL OIL, STANDARD GRADE**	**AIR TOOL OIL, WINTER GRADE**
9	OIL, HYDRAULIC	FRONT POWER RAMP (OPTION) RESEVOIR (3 QT) (2.83 L) SYSTEM (1.75 GAL) (4.5 L)	**DEXTRON III ISO GRADE 22 ISO GRADE 32**	**SNOW PLOW HYDRAULIC OIL H-5606A**

Maintenance Schedule

ITEM	1st 5 Hours or 50 Miles (80 Km)	Weekly or 500 Miles (805 Km)	Monthly or 2,000 Miles (3219 Km)	6 Months or 12,000 Miles (19,312 Km)	Yearly or 25,000 Miles (40,234 Km)
KEY	**C**-Clean, **I**-Inspect, **L**-Lubricate, **R**-Replace, **T**-Tighten/Adjust Torque ***Daily Inspections:*** *Conduct before and after each use.* ***Severe or Extreme Operating Conditions:*** *Shorten service interval time.*				
Air System Maintenance	• **For Details, See Air System Maintenance Schedule on Page 5-17.**				
Air Tanks Drained Trailer Flip Axle (Option)	**DAILY**				
Air System Gooseneck Load Carrier Upper Lock Latch Load Carrier Lower Lock Latch Trailer Flip Axle (Option)	**DAILY**	**I**			
Air Ride Suspension Trailer Flip Axle (Option)	**I**	**I**			
Brake Protection Valve & Filter		**I**	**I,R**	**I,R**	**I,R**
	• **Replace filter every 3 months, unless air flow has become restricted.**				
System Filter & Lubricator (Option)		**I,L**	**I,R**	**I,R**	**I,R**
	• **See Lube# 8, See Lubrication Specifications on Page 5-11.** • **Replace filter every 3 months, unless air flow has become restricted.**				
Tire Inflation System Filter		**I**	**I,R**	**I,R**	**I,R**
	• **Replace filter every 3 months, unless air flow has become restricted.**				
Axle Maintenance					
Axle Hub, Oil (STANDARD)	**DAILY**				**C,I,R**
Trailer Flip Axle (Option)	• **See Check Fluid Level - Wheel Bearings, Oil (Standard) on Page 5-22.** • **See Lube# 3, See Lubrication Specifications on Page 5-11.**				
Wheel Bearing (Oil)					**C,I,T**
Trailer Flip Axle (Option)	• **See Adjust - Wheel Bearings on Page 5-21.**				
Axle Hub, Grease (Option)	**DAILY**			**C,I,L**	
Trailer Flip Axle (Option)	• **See Lube# 1, See Lubrication Specifications on Page 5-11.**				
Wheel Bearing (Grease)				**C,I,T**	
Trailer Flip Axle (Option)	• **See Adjust - Wheel Bearings on Page 5-21.**				
Tire Inflation & Wear	**DAILY**	**I**			
Trailer Flip Axle (Option)	• **For Tire Pressures, see the Identification Plate on the trailer.**				
Wheel Fasteners (Lug Nuts)	**I,T**	**I**	**I,T**		
Trailer Flip Axle (Option)	• **Torque Specifications, See Wheel Fasteners on Page 2-3.**				
Brake Maintenance	• **For Details, See Brake Maintenance on Page 5-23.**				
Brake Components Trailer Flip Axle (Option)	**DAILY**		**I**		
Slack Adjustment & Lining Wear	**I**		**I,T**		
Trailer Flip Axle (Option)	• **See Brake Maintenance on Page 5-23.**				
Brake Chambers	**I**		**I,T**		
Trailer Flip Axle (Option)	• **See Brake Maintenance on Page 5-23.**				

Maintenance Schedule

KEY	**C**-Clean, **I**-Inspect, **L**-Lubricate, **R**-Replace, **T**-Tighten/Adjust Torque ***Daily Inspections:*** *Conduct before and after each use.* ***Severe or Extreme Operating Conditions:*** *Shorten service interval time.*				
ITEM	1st 5 Hours or 50 Miles (80 Km)	Weekly or 500 Miles (805 Km)	Monthly or 2,000 Miles (3219 Km)	6 Months or 12,000 Miles (19,312 Km)	Yearly or 25,000 Miles (40,234 Km)
Brake Maintenance (cont)	• For Details, See Brake Maintenance on Page 5-23.				
Camshaft Bushing	**I**	**I,L**			
Trailer Flip Axle (Option)	• See Lube# 1, See Lubrication Specifications on Page 5-11. • See Centralized Lubrication Points on Page 5-7.				
Slack Adjusters	**I**	**I,L**			
Trailer Flip Axle (Option)	• See Lube# 1, See Lubrication Specifications on Page 5-11. • See Centralized Lubrication Points on Page 5-7.				
Electrical System Maintenance	• For Details, See Electrical Maintenance on Page 5-33.				
Lights & Electrical Accessories Trailer Flip Axle (Option) Flip Beavertail (Option)	**DAILY**		**I**		
Anti-Lock Brake System	**I**		**I**		
Battery, Back-Up (Option)	**I**		**I**		
Remote Control System (Option)	**I**		**I**		
Tire Inflation System (Option)	**I**		**I**		
Trailer Wiring & Connectors	**I**		**I**		
Winch, 2-Speed System (Option)	**I**		**I**		
Work Lights (Options)	**I**		**I**		
Frame Maintenance	• For Details, See Frame Maintenance on Page 5-33.				
Covers, Plates, Storage Compartments	**DAILY**			**I,T**	
	• See General Torque Specifications on Page 2-4.				
Decals				**I**	
Decking, Wood	**DAILY**			**APPLY**	**APPLY**
	• See Wood Deck Care on Page 5-5. • See Lube# 7, See Lubrication Specifications on Page 5-11.				
Mud Flaps	**DAILY**		**I,T**		**I,T**
	• See General Torque Specifications on Page 2-4.				
Tie Down Anchors	**DAILY**				
Outrigger (Options) Pull-Out Extensions Swing-Outs Wood Planks	**DAILY**		**I**		
Flip Axle (Option)					
Bumpers, Rubber, Contact	**DAILY**			**I,T**	
Covers, Plates	**DAILY**			**I,T**	
Decals				**I**	
Decking, Wood (Option)	**DAILY**			**APPLY**	**APPLY**
	• See Wood Deck Care on Page 5-5. • See Lube# 7, See Lubrication Specifications on Page 5-11.				
Locking & Pivot Pin (Options) Pivot Pins, Upper Locking Pins, Manual (Option) Locking Pins, Spring Back (Option)	**I**	**I,L**			
	• **Spring Back Pins Only:** See Lube# 1, See Lubrication Specifications on Page 5-11.				
Mud Flaps	**DAILY**		**I,T**		**I,T**
	• See General Torque Specifications on Page 2-4.				
Tie Down Anchors	**DAILY**				

Maintenance Schedule

KEY	**C**-Clean, **I**-Inspect, **L**-Lubricate, **R**-Replace, **T**-Tighten/Adjust Torque ***Daily Inspections:*** *Conduct before and after each use.* ***Severe or Extreme Operating Conditions:*** *Shorten service interval time.*				
ITEM	1st 5 Hours or 50 Miles (80 Km)	Weekly or 500 Miles (805 Km)	Monthly or 2,000 Miles (3219 Km)	6 Months or 12,000 Miles (19,312 Km)	Yearly or 25,000 Miles (40,234 Km)
Flip Beavertail (Option)					
Covers, Plates	**DAILY**			**I,T**	
Decals				**I**	
Pivot Pins	**I**	**I**			
Tie Down Anchors	**DAILY**				
Flip Beavertail Ramps (Option)					
Decals				**I**	
Decking, Wood (Option)	**DAILY**			**APPLY**	**APPLY**
	• **See Wood Deck Care on Page 5-5.** • **See Lube# 7, See Lubrication Specifications on Page 5-11.**				
Pivot Pin (Options)					
Pivot Pins (Hydraulic Option)	**I**	**I**			
Pivot Pins, Torsion Springs, Support Tube (Manual Option)	**I**	**I**			
Travel Pin Lock	**I**	**I**			
Gooseneck Maintenance					
Covers, Plates, Storage Compartments	**DAILY**			**I,T**	
	• **See General Torque Specifications on Page 2-4.**				
Decals				**I**	
Decking, Wood	**DAILY**			**APPLY**	**APPLY**
	• **See Wood Deck Care on Page 5-5.** • **See Lube# 7, Lubrication Specifications on Page 5-11.**				
Flip Extension (Option)					
Bumpers, Rubber, Contact & Spacers	**DAILY**			**I,T**	
Decals				**I**	
Kingpin / Hitch Plate	**DAILY**		**C,I,L**		
	• **See Lube# 1, See Lubrication Specifications on Page 5-11.**				
Locking & Pivot Pins	**I**	**I**			
Kingpin / Hitch Plate & Load Carrier Assembly	**DAILY**		**C,I,L**		
	• **See Lube# 1, See Lubrication Specifications on Page 5-11.**				
Mud Flaps (Option)	**DAILY**		**I,T**		**I,T**
	• **See General Torque Specifications on Page 2-4.**				
Ramp Storage (Option)	**DAILY**			**I,T**	
Tie Down Anchors	**DAILY**				
Hydraulic System Maintenance	• **For Details, See Hydraulic Maintenance on Page 5-42.**				
Hydraulic System	**DAILY**	**I**			
	• **See Fluid Leak Classification on Page 5-2.** • **See Hydraulic Fitting Torque Specifications on Page 2-5.**				
Hydraulic Fluid (Fill as needed)	**I,R**	**I,L**			**R**
	• **See Lube# 5, See Lubrication Specifications on Page 5-11.**				
Hydraulic Filter	**I,R**				**R**
Flip (Options)					
Flip Axle, Lift Cylinder (Options)	**I**	**I**		**I**	
	• **See Fluid Leak Classification on Page 5-2.** • **See Hydraulic Fitting Torque Specifications on Page 2-5.**				
Flip Beaver Tail, Lift Cylinders (Option)	**I**		**C,I,L**		

Maintenance Schedule

KEY	C-Clean, I-Inspect, L-Lubricate, R-Replace, T-Tighten/Adjust Torque ***Daily Inspections:*** *Conduct before and after each use.* ***Severe or Extreme Operating Conditions:*** *Shorten service interval time.*				
ITEM	1st 5 Hours or 50 Miles (80 Km)	Weekly or 500 Miles (805 Km)	Monthly or 2,000 Miles (3219 Km)	6 Months or 12,000 Miles (19,312 Km)	Yearly or 25,000 Miles (40,234 Km)
	• See Fluid Leak Classification on Page 5-2. • See Hydraulic Fitting Torque Specifications on Page 2-5.				
Hydraulic System Maintenance (cont)	• For Details, See Hydraulic Maintenance on Page 5-42.				
Flip Beaver Tail Ramps, Lift Cylinders (Option)	I		C,I,L		
	• See Fluid Leak Classification on Page 5-2. • See Hydraulic Fitting Torque Specifications on Page 2-5.				
Gooseneck Assembly					
Lift/Tilt Cylinders	I	I		L	
	• See Lube# 1, See Lubrication Specifications on Page 5-11.				
Load Carrier Assembly	I	I		L	
	• See Lube# 1, See Lubrication Specifications on Page 5-11.				
Suspension Maintenance	• For Details, See Suspension Maintenance on Page 5-62.				
Suspension Control System	I,T		I	I,T	I,T
Trailer Flip Axle (Option)	• Torque Specifications, See Specific Bolt Torques on Page 2-3.				
Trailing Beams & Shocks Trailer Flip Axle (Option)	DAILY				
Ramp, Power Full Width (Option)					
Battery, 12VDC	DAILY	I		I	I
Covers, Plates	DAILY			I,T	
Drive Bearings	I	I,L		I,L	I,L
Drive Chain	I	I,L		I,L	I,L
Pivot Shaft Bearings	I	I,L		I,L	I,L
Reservoir (Fill as needed)	I	I			
Engine Hydraulic Power (Option)	• See Lube# 2, See Lubrication Specifications on Page 5-11. • See Maintenance Schedule - Hydraulic Engine (Option) on Page 5-16.				
Retrieval System Maintenance					
Winch Drive (Option)					
Cable & Chain Assembly	DAILY	I,L		I,L	
	• See Lube# 6, See Lubrication Specifications on Page 5-11.				
Cable Tensioner, Guide Rollers & Pins (Options)	DAILY	C,I,L		C,I,L	
	• See Lube# 1, See Lubrication Specifications on Page 5-11.				
Free Spool Clutch	DAILY	I		I	
Gear Case (Fill as needed)	I,R	I,L		I,R	
	• See Lube# 4, See Lubrication Specifications on Page 5-11.				
Winch Drum (Varies between models)	I,L	I,L		I,L	
	• See Lube# 1, See Lubrication Specifications on Page 5-11.				

DANGER

Proceed with extreme caution. Failure to heed notice may cause injury or death to the person and/or damage to product and property.

- **Breathing exhaust gases can result in severe injury or death.**
- **DO NOT use air cleaner, exhaust elbow, or connecting parts as a supporting step.**
- **Damage to these, and connecting parts, can cause an exhaust leak.**

Maintenance Schedule - Hydraulic Engine (Option)

KEY	**C**-Clean, **I**-Inspect, **L**-Lubricate, **R**-Replace, **T**-Tighten/Adjust Torque ***Daily Inspections:*** *Conduct before and after each use.* ***Severe or Extreme Operating Conditions:*** *Shorten service interval time.* *For Operation and Maintenance procedures resource the Manufactures References,* ***See Chapter 7 - Manufacturer Index on Page 7-1.*** *Parts are available through an authorized Landoll Dealer. For a list of available Landoll publications,* ***See Chapter 7 on Page 7-1.***					
ITEM	Daily	Weekly or 25 Hours	Yearly or 100 Hours	150 Hours	200 Hours	500 Hours
Engine Oil Level (Fill as needed, DO NOT Overfill)	**I**		**R**			
	• **See Lube# 2, Lubrication Specifications on Page 5-11.**					
Fuel Level (Fill as needed)	**I**					
Fuel System Components (Replace items as needed)	**I**					
Cooling System / Area (Clear obstructions)	**I,C**		**I,C**			
Air Cleaner Housing, Components & Shrouds	**I,C,T**		**I.C**			
Air Filter & Precleaner or Inner Element		**I,C**	**R**			
Equipment Covers & Guards	**I,C,T**		**I.C**			
Spark Arrestor (If equipped)	**I**					
Oil Cooler Fins (If equipped)			**I,C**			
Heavy Duty Filter Minder (If equipped)				**I**		
Fuel Filter					**R**	
Oil Filter					**R**	
Spark Plugs						**R**

Air System Maintenance

Air System Maintenance Schedule

NOTE

See Parts Manual on Page 7-1 for mechanical, air, electrical and hydraulic components and diagrams.

1. The air tanks must be completely drained daily.
   - Moisture in the system causes rust and corrosion to build inside the components and may lead to system failure.
2. Inspect the air system weekly.
   - If the air system lubricator option is installed, check and refill weekly.
3. Check the brake protection valve filters every 3 months or when the air flow becomes restricted, ***See Figure 5-6.***
   - The filters may be cleaned or replaced.

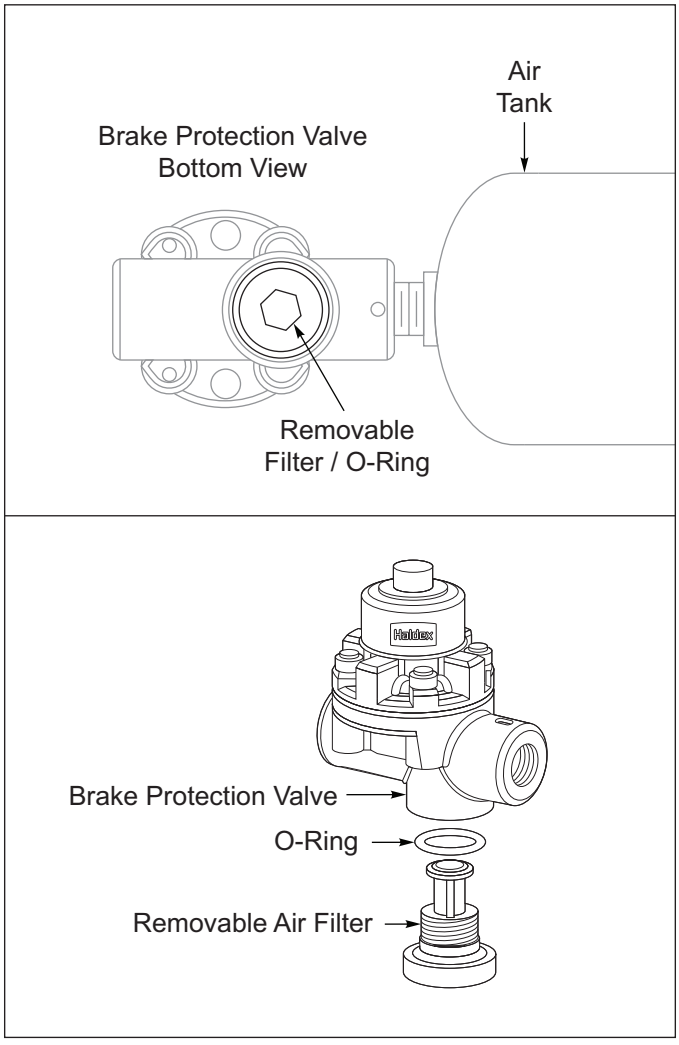


Figure 5-6: Brake Protection Valve Filter

Axle Maintenance

Alignment, Suspension

IMPORTANT

Proper axle-to-kingpin alignment is necessary to obtain straight tracking. If axle alignment is off, "dog-tracking" occurs. "Dog tracking" means the rear of the vehicle will angle, appearing to travel sideways, with its rear end off to one side.

Check alignment manually or by using a trailer alignment machine. In either case, a thorough inspection of the complete suspension must be performed and all defects corrected before aligning.

Alignment, Air Ride, 1st Axle

IMPORTANT

It is highly recommended to contact an authorized Landoll Service Center for servicing and repair.

1. Position trailer on a firm and level surface. Eliminate any suspension binding or restrictions due to sharp turns or unusual maneuvers. Make sure that the undercarriage is in the rear most transport position.
2. Uncouple the tractor from the trailer. If needed, jack up the front of the trailer to allow measurement under the trailer.
3. Inspect the suspension for serviceability. Replace parts as required before aligning.
4. Suspend a plumb bob from the center of the kingpin and set at axle center height.
5. Measure **Curbside (D)** from the plumb bob to the 1st axle center. Measure **Streetside (D1)** from the plumb bob to the 1st axle center. **Curbside (D)** should be about 1/8 in (3.18 mm) shorter than **Streetside (D1)**. ***See Figure 5-8.***
6. Align if measurement requires:

- **1-1/8 in Pivot Bolts:** Loosen pivot bolt lock nuts and rotate eccentric pivot bolts clockwise or counterclockwise to adjust. Repeat Steps 5 through 6 until measurement is achieved. ***See Figure 5-7.***
  - **SAF-Holland Only:** Break welds holding the inner nuts to the eccentric alignment blocks.
- **7/8 in Pivot Bolts:** Break welds, if present, between hanger mounts/eccentric collars and pivot lock nuts/jam nuts. Loosen jam nuts if installed. Loosen lock nuts. Rotate eccentric pivot bolts clockwise or counterclockwise to adjust. Repeat Steps 5 through 6 until measurement is achieved. ***See Figure 5-7.***

7. Tighten and torque suspension pivot bolts and lock nuts. ***See Suspension Assembly - Air Ride on Page 2-3.***
8. **7/8 in Pivot Bolts ONLY:** Install new jam nuts if damaged or not present. Tighten and torque jam nuts to 150 Ft.-Lbs (204 Nm). ***See Suspension Assembly - Air Ride on Page 2-3.***

IMPORTANT

DO NOT tack weld Dexter suspension pivoting hardware.

9. **SAF-Holland Only:** Tack weld the inner nuts to the eccentric alignment blocks.

Alignment, Air Ride, 2nd / 3rd Axle

IMPORTANT

It is highly recommended to contact an authorized Landoll Service Center for servicing and repair.

The air ride suspension is aligned at the factory and should not need realignment, until suspension maintenance requires.

1. Align the 1st axle using the method outlined in ***See Alignment, Air Ride, 1st Axle*.**
2. Measure from 1st axle center to the trailer 2nd axle center on the curbside then the streetside. Measurements should be the same. Use **(Y)** and **(Y1)** as reference. ***See Figure 5-8.***
3. **Align if measurement requires:**

- **1-1/8 in Pivot Bolts:** Loosen pivot bolt lock nuts and rotate eccentric pivot bolts clockwise or counterclockwise to adjust. Repeat Steps 2 through 3 until measurement is achieved. ***See Figure 5-7.***
  - **SAF-Holland Only:** Break welds holding the inner nuts to the eccentric alignment blocks.
- **7/8 in Pivot Bolts:** Break welds, if present, between hanger mounts/eccentric collars and pivot lock nuts/jam nuts. Loosen jam nuts if installed. Loosen lock nuts. Rotate eccentric pivot bolts clockwise or counterclockwise to adjust. Repeat Steps 2 through 3 until measurement is achieved. ***See Figure 5-7.***

4. Tighten and torque suspension pivot bolts and lock nuts. ***See Suspension Assembly - Air Ride on Page 2-3.***
5. **7/8 in Pivot Bolts ONLY:** Install new jam nuts if damaged or not present. Tighten and torque jam nuts to 150 Ft.-Lbs (204 Nm). ***See Suspension Assembly - Air Ride on Page 2-3.***

IMPORTANT

DO NOT tack weld Dexter suspension pivoting hardware.

6. **SAF-Holland Only:** Tack weld the inner nuts to the eccentric alignment blocks.
7. If additional trailer axles are available, use the same procedures performed on the previous axle aligned and repeat steps 2 through 6.

Alignment, Air Ride, Flip Axle (OPTION)

IMPORTANT

It is highly recommended to contact an authorized Landoll Service Center for servicing and repair.

The flip axle air ride suspension is aligned at the factory and should not need realignment, until suspension maintenance requires.

- **OR if the flip axle is installed onto another trailer, which requires alignment to the new trailer.**

1. Verify trailer axle alignment, ***See Alignment, Air Ride, 2nd / 3rd Axle*.**
2. Measure from flip assembly axle center to the trailer rear axle center on the curbside then the streetside. Measurements should be the same. Use **(Y)** and **(Y1)** as reference. ***See Figure 5-8.***
3. **Align if measurement requires:**

- **1-1/8 in Pivot Bolts:** Loosen pivot bolt lock nuts and rotate eccentric pivot bolts clockwise or counterclockwise to adjust. Repeat Steps 2 through 3 until measurement is achieved. ***See Figure 5-7.***
  - **SAF-Holland Only:** Break welds holding the inner nuts to the eccentric alignment blocks.
- **7/8 in Pivot Bolts:** Break welds, if present, between hanger mounts/eccentric collars and pivot lock nuts/jam nuts. Loosen jam nuts if installed. Loosen lock nuts. Rotate eccentric pivot bolts clockwise or counterclockwise to adjust. Repeat Steps 2 through 3 until measurement is achieved. ***See Figure 5-7.***

4. Tighten and torque suspension pivot bolts and lock nuts. ***See Suspension Assembly - Air Ride on Page 2-3.***
5. **7/8 in Pivot Bolts ONLY:** Install new jam nuts if damaged or not present. Tighten and torque jam nuts to 150 Ft.-Lbs (204 Nm). ***See Suspension Assembly - Air Ride on Page 2-3.***

IMPORTANT

DO NOT tack weld Dexter suspension pivoting hardware.

6. **SAF-Holland Only:** Tack weld the inner nuts to the eccentric alignment blocks.

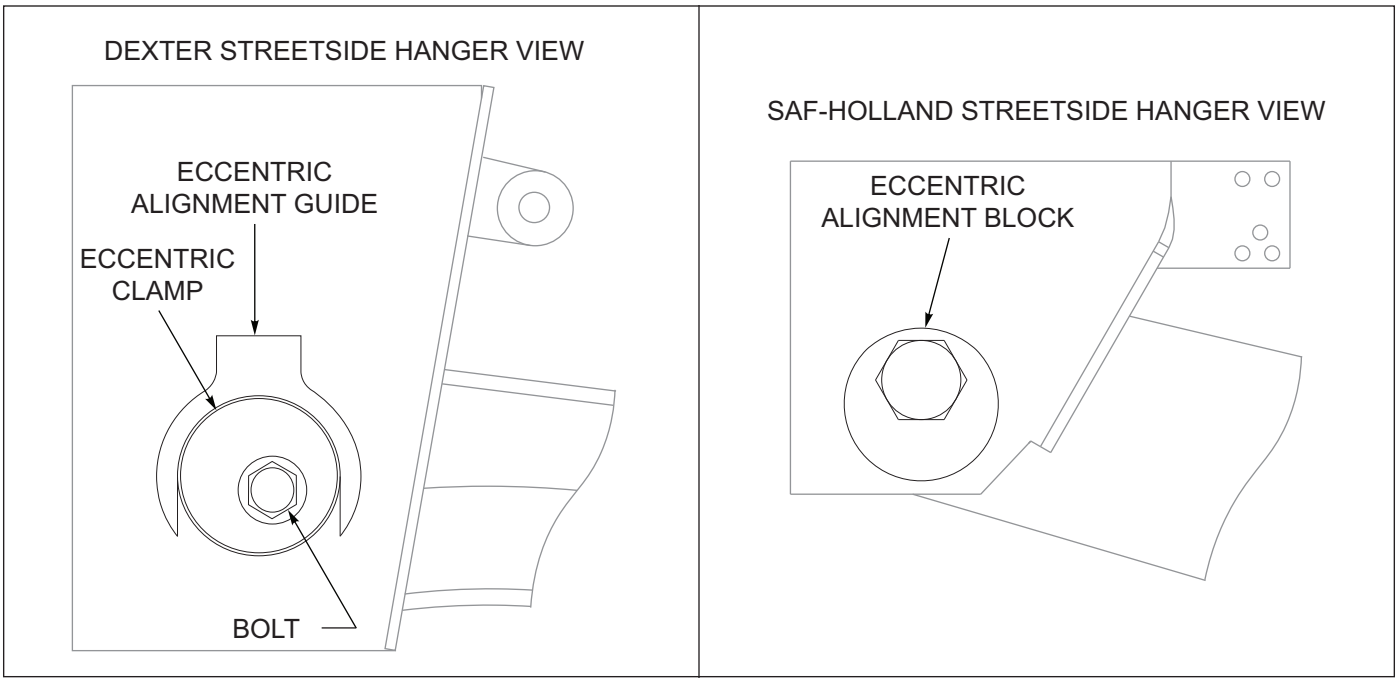


Figure 5-7: Streetside Suspension Hanger

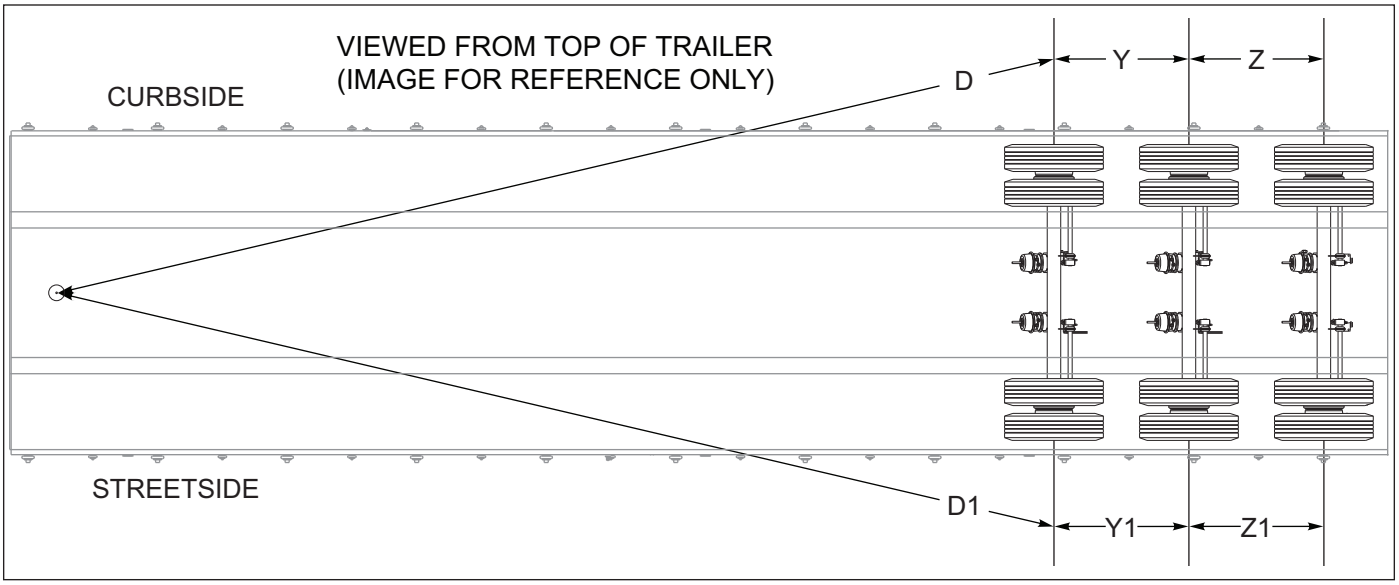


Figure 5-8: Checking Axle Alignment

Alignment, Wheel

DANGER

To prevent a life threatening accident:

1. **Support trailer so tires are off the ground.**
2. **Support the trailer on jack stands with sufficient capacity to support the total weight of the trailer and any load which it may be carrying.**

When trailer tires show signs of scuffing, feather-edging or uneven wear, examine the trailer for damaged suspension (frame, shocks, linkage, etc.), axle, wheel bearings and wheels. Proper wheel alignment and wheel bearing adjustment is essential for proper tire wear.

The simplest form of checking wheel alignment “toe” is by running the trailer over a “SCUFF GAUGE”. A scuff gauge reading of 16 ft (5 m) or less per mile is considered satisfactory.

If a scuff gauge is not readily available, or edge wear on one side of a tire is occurring signifying positive or negative camber, alignment can be checked as follows:

1. Remove wheel, hub and bearing assemblies.
2. Place a 3-point axle gauge against the front side of the axle, and adjust each axle gauge point to the axle. (Double point end against the inner and outer wheel bearing surfaces of the spindle being checked and the other point on the inner bearing surface on the other spindle). ***See Figure 5-9.***
3. Move the axle gauge and place against the back side of the axle. If either of the points of double point end fails to touch the axle surface, a bent spindle is evident. A point gap of 0.015 inch (.381 mm) or more is considered excessive tire “toe” and the axle must be replaced ***See Figure 5-9.***
4. Follow the same procedures as in Steps 2 and 3, except place the axle gauge above and below the axle. If gauge point gap is found, the axle has positive or negative camber. The trailer axle has no camber from the factory. If it is found to have positive or negative camber, axle replacement is necessary. ***See Figure 5-9*** for examples of camber.

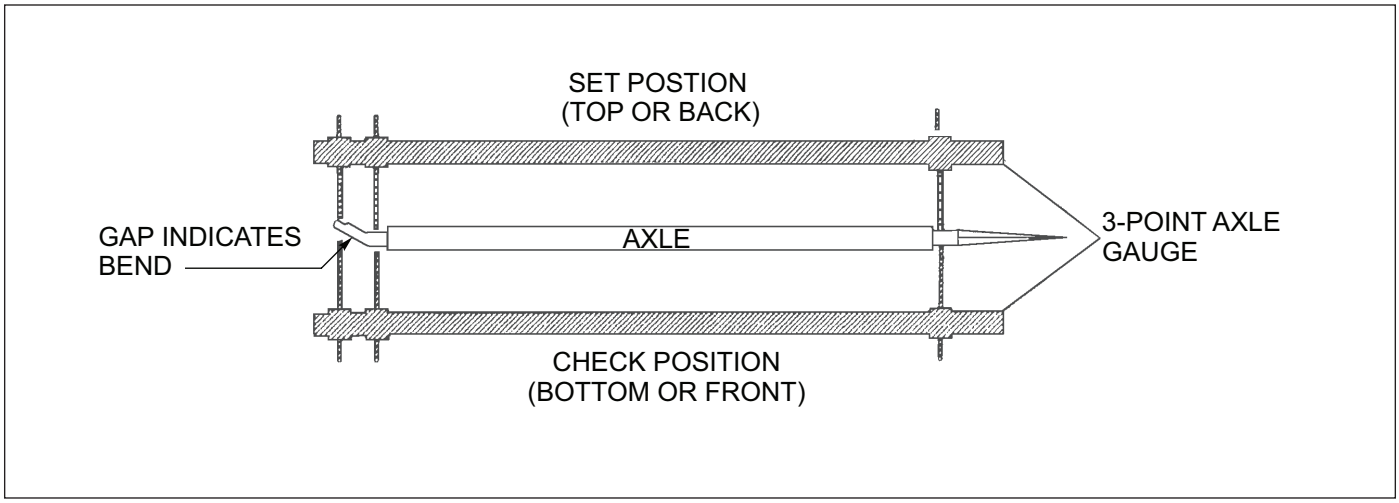


Figure 5-9: Checking Axle Straightness

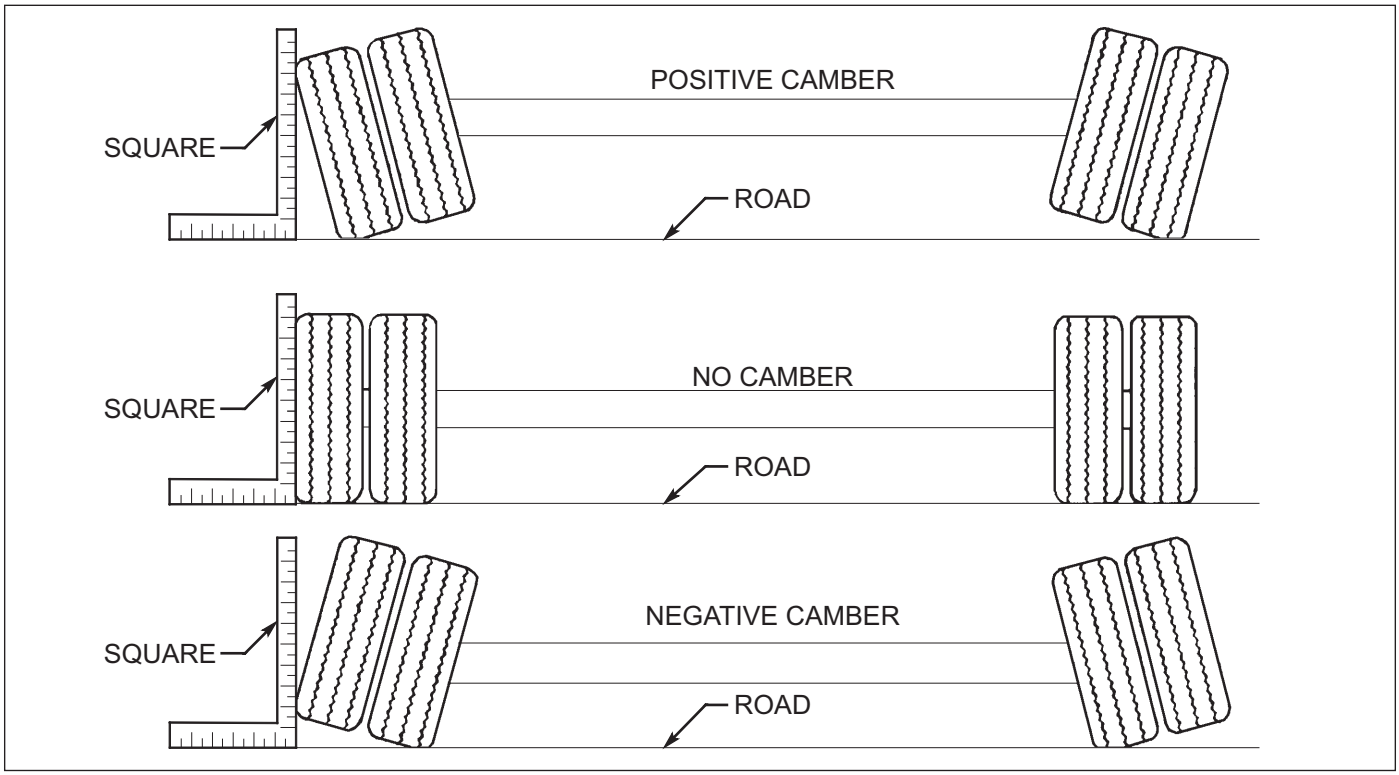


Figure 5-10: Checking Axle Camber

Axle Hub & Wheel Bearing Maintenance

Remove - Hub & Wheel Bearings

1. Remove the brake drum**.** It may be necessary to release the slack adjuster.
2. Remove hub cap and catch lubricant in a pan.
3. Remove outer spindle nut, tang washer, spindle locking washer, inner spindle nut, and outer bearing cone. Remove hub from axle.
4. Remove hub seal using a seal removal tool and lift out the inner bearing cone.
5. Using an appropriate driver, remove inner and outer bearing cups from hub.
6. Clean the hub cavity thoroughly to reduce any contamination to lubricant. Using commercial grade cleaner and soft rags, clean inside hub and dry all components with absorbent cloth or paper towel.
7. Test fit the hub into the drum, be careful not to damage the stud threads. Inspect the hub moves freely in and out of the drum pilot hole. Inspect hub studs are properly seated into the hub flange and fit flat against the drum surface.

Install - Hub & Wheel Bearings

IMPORTANT

DO NOT mix new cups with old cones or new cones with old cups.

1. Install the inner and outer bearing cups into the hub. Thoroughly clean hub. ***See Figure 5-11.***
2. Insert the inner bearing cone, and install the seal using appropriate seal driver.
3. Align the hub bore with the axle spindle, careful not to damage seal slide hub onto spindle and support hub.
4. Install the outer bearing cone and inner spindle nut. Tightening the nut until it is snug against the outer bearing cone. Remove the hub support allowing the hub to rest on the bearings.
5. Install and adjust bearings, ***See Adjust - Wheel Bearings on Page 5-21.***.
6. Install the hub cap and proper gasket. Tighten the cap screws in a star or cross pattern sequence to 10-15 ft-lbs (14-20 Nm) of torque. ***See Figure 5-11.***
7. Remove the filler plug and fill the hub cavity to the recommended level with a gear type oil. ***See Lubrication Specifications on Page 5-11.***.
8. Install Brake Drum, be care not to damage any stud threads sliding the drum on.

Adjust - Wheel Bearings

DANGER

Proceed with extreme caution. Failure to heed notice will cause injury or death to the person and/or damage to product and property.

- **Failure to torque the outer spindle nut properly could cause the wheel to come off during vehicle operation.**

1. With a drain pan under the hub cap, remove the hub cap assembly allowing oil to drain.
2. Lift the wheel off of the ground.
3. Adjust the automatic slack adjuster to eliminate brake drag during tire/wheel rotation.
4. Remove outer spindle nut, tang washer and spindle lock washer.
5. Torque the inner spindle nut to 200 Ft.-Lbs (271 Nm), while rotating wheel, to make sure proper seating of the bearings and cups in the wheel hub.
6. Back off the inner spindle nut one full turn.
7. Torque the inner spindle nut to 50 Ft.-Lbs (68 Nm). while rotating the wheel, to properly position the bearings for the final adjustment.
8. Back off the inner spindle nut 1/4 to 1/3 turn.
9. Align the spindle lock washer tang with the axle spindle groove and slide it onto the inner spindle nut dowel.
   - If the inner spindle nut dowel does not align with a hole in the spindle lock washer, tighten or loosen the inner spindle nut to fit in the nearest spindle lock washer hole.
10. Install the tang washer and outer spindle nut, and torque to 300-400 Ft.-Lbs (407-542 Nm).
11. Measure the Wheel End Play using a dial indicator, readings should be 0.001 to 0.005 (0.025-0.013 Nm).
12. Bend tang washer over outer lock nut.
13. Install the hub cap with a new gasket, and torque screws to 10-15 Ft.-Lbs (14-20 Nm) **IN SEQUENCE**, ***See Figure 5-11.***
14. Fill with oil to the full mark**.** ***See Check Fluid Level - Wheel Bearings, Oil (Standard) on Page 5-22*****.**
15. ***Adjust - Slack Adjuster on Page 5-26.***
16. Check hub oil level after the wheel has sat level in one position for a few minutes to allow the oil to work into the bearings.

Check Fluid Level - Wheel Bearings, Oil (Standard)

1. Park trailer on a level surface with the drain/fill plug towards the top.
2. Look through the axle hub sight window, ***See Figure 5-11.***
3. Oil level should be visible and between ADD and Full.
4. Fill oil as needed.
   - Remove drain / fill plug.
5. Fill the hub to the bottom FULL line on the hub cap window. ***See Lubrication Specifications on Page 5-11.***
6. Allow oil level to settle.
   - Repeat steps 3 to 4 until oil does not settle.
7. Install drain/fill plug and torque to 5-9 Ft.-Lbs (7-12 Nm), ***See Figure 5-11.***

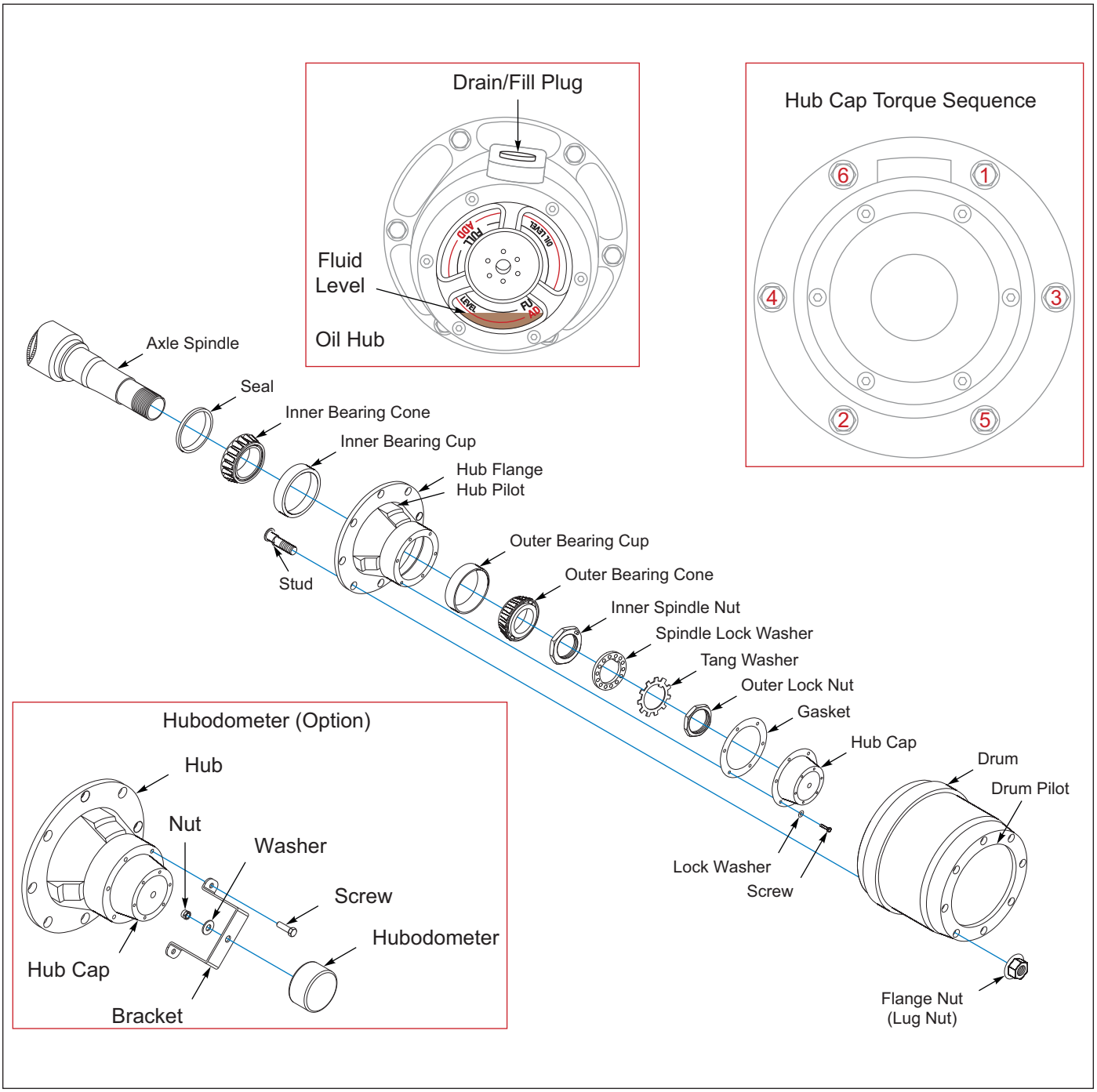


Figure 5-11: Hub Assembly

Brake Maintenance

DANGER

1. **When crawling under the trailer is necessary, chock all wheels of the trailer and tractor. When jacking is necessary, chock all wheels and support the semitrailer with jack stands sufficient to withstand the weight of the trailer and load. Failure to take adequate safety measures will result in serious personal injury or death.**
2. **Use great care if wheels or brake drums must be handled. They may be very hot and will cause serious burns.**

NOTE

See Parts Manual on Page 7-1 for mechanical, air, electrical and hydraulic components and diagrams.

Daily Inspection

A daily general inspection will reveal the most common problems found in the spring brake system.

This inspection should include the following:

1. Check air hoses for chafing, bends, kinks, or damaged fittings. Replace defective hoses.
2. Check the brake system for loose, missing, deformed, or corroded fasteners. Replace and tighten defective hardware.
3. Check brake linings for excessive wear or distortion.
4. Drain air reservoir daily. A drain cock on the bottom of each air reservoir vents the tank to drain collected water and oil. If held open, air pressure in the tanks is relieved, causing the emergency or parking brakes to be applied, ***See Figure 5-12.***

Disc Brakes (Option)

The 16-1/2 in disc brakes are an option available at the time of trailer purchase. This manual does not cover the maintenance procedures for the disc brakes, ***Refer to Manufacturer Index listed on Page 7-1.*** Contact an authorized Landoll Dealer for parts or assistance with the manufacturer reference.

Drum Brakes (Standard)

The 16-1/2 in X 7 in drum brakes and 22.5-wheel rims are standard for all 855 and 860 trailers. Maintenance procedures for the drum brakes are covered in the manual below. Contact an authorized Landoll Dealer for parts or assistance with the manufacturer reference, ***See Chapter 7 - Manufacturer Index on Page 7-1.***

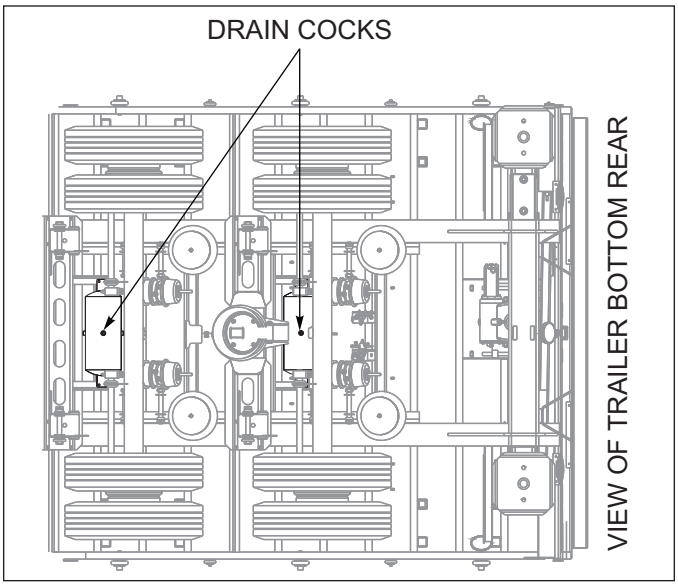


Figure 5-12: Drain Cock Locations

Drum Brake Scheduled Maintenance

WARNING

1. **DO NOT allow grease to contact brake linings as this could result in reduced braking performance.**
2. **Failure to replace faulty brake drums will result in an unreliable braking system, and could lead to an accident.**

CAUTION

Replace brake drums in pairs to achieve the same braking power on both wheels and maintain an even braking load on the axle. Failure to do this could significantly reduce the performance, service life, and/or safety of your vehicle.

This trailer is equipped with automatic slack adjusters which compensate for brake lining wear and keep brakes adjusted. Brakes should not be adjusted manually, except when relining brakes. The brake assemblies should be inspected and adjusted every 2,000 miles (3219 Km) or monthly. Examine the brake linings visually to locate the lining showing the greatest amount of wear. The wheel and drum should be removed and the linings replaced if the thinnest portion of the lining is 3/8 in (9.5 mm) or less. **DO NOT** allow the linings to wear thin enough that the lining rivet contacts the drum, ***See Figure 5-13.*** Lubricate brake assembly per ***Figure 5-2 on Page 5-7.***

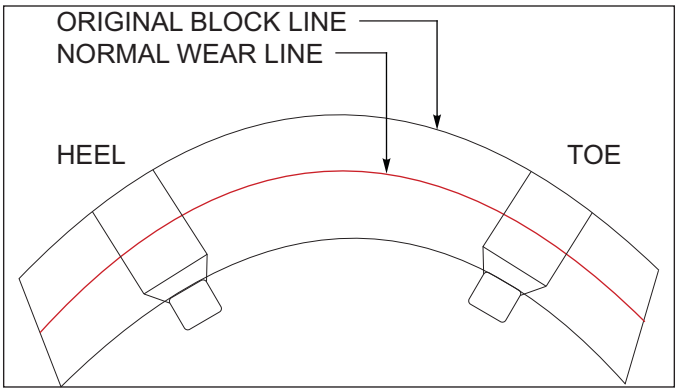


Figure 5-13: Brake Lining Wear

Drum Brake Maintenance

Disassemble - Drum Brake, 16-1/2” x 7"

1. Release brakes and back off slack adjuster. ***See Figure 5-15***
2. Remove slack adjuster lock ring and slack adjuster.
3. Remove drum assembly.***See Figure 5-11***
4. Disengage the roller retainers from the rollers.
5. Press down on the bottom brake shoe and remove the lower cam roller. Lift the top shoe and take out the top cam roller.
6. Lift out the shoe retractor spring, which is now free of tension.
7. Swing the lower shoe back approximately 180^{o} to relieve the tension on the shoe keeper springs. Remove the springs and slip the shoes off the anchor pins.
8. Remove camshaft lock ring, spacer washer(s) and camshaft.
9. After removing the shoes, completely inspect all brake components, servicing as necessary.

Inspect and Repair - Drum Brake

Clean and inspect the brake drums whenever relining the brakes. To be suitable for further service, the brake drum should pass the following checks.

1. The brake surface should be free of scoring, excessive heat checks and cracks.
2. The brake surface diameter should be within the maximum diameter cast or stamped on the drum.
3. The mounting holes and pilot must be round and true.
4. The mounting surface must be clean and flat.

Replace the brake drum if any of the following conditions exist:

1. The brake drum is cracked.
2. The brake surface is heat checked, grooved or worn beyond the maximum diameter.
3. The back plate is cracked.
4. The bolt holes are elongated.
5. The brake drum has been severely overheated.
6. The brake drum is out-of-round.

Resurfacing - Drum Brake

DANGER

Turning a brake drum beyond 0.040 inches (1.016 mm) under the maximum diameter will result in a weaker brake drum and may result in an accident.

It may be necessary to turn or resurface the braking surface to remove small heat checks or other surface defects resulting from normal use.

1. The maximum diameter is casted into the drum back plate. Discard the drum if any portion exceeds the maximum diameter. If the maximum diameter is not present, **DO NOT** exceed 120 of a new drum diameter.
2. When resurfacing a drum, allow at least 0.040 inches (1.016 mm) under the maximum diameter for additional wear.

Assemble - Drum Brake, 16-1/2” x 7"

1. Install new anchor pin bushings, camshaft bushing and camshaft seals into the spider.***See Figure 5-14.***

IMPORTANT

When installing camshaft seals, the seal on the slack adjuster side is installed facing into spider. This allows grease to purge outside the brake assembly when greasing the camshaft bushing.

2. Install cam roller, retainer clip and retractor spring retainers onto the camshaft.
3. Install 1/8 inch (3.175 mm) thick camshaft washer onto the camshaft.
4. Install the camshaft into the spider. Install spacer washer and lock ring retainer on camshaft before sliding the camshaft through the camshaft support bracket. Install the slack adjuster, washer and lock ring retainer.
5. Install the brake keeper onto the shoes. Install shoes onto the spider by placing shoes in place on the anchor pins, then “wrap” the two shoes into place about the spider.
6. Install the shoe retractor spring onto the shoes.
7. Connect slack adjuster to brake chamber push rod.
8. Adjust automatic slack adjuster as outlined in ***Adjust - Slack Adjuster on Page 5-26***.

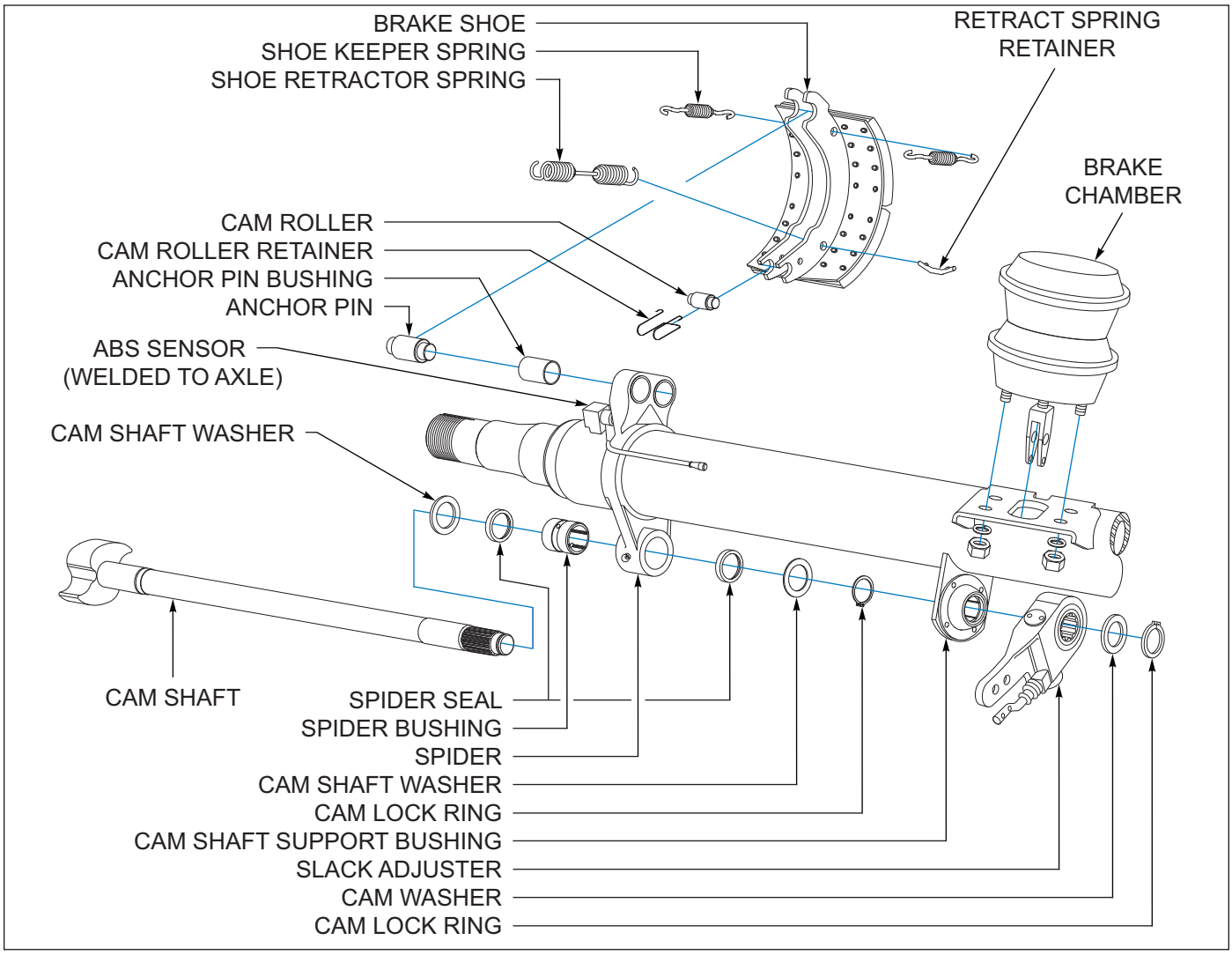


Figure 5-14: Axle and Brake Assembly

Relay Valve, Emergency

Every 3600 operating hours, 100,000 miles (160,935 Km), or yearly, the Emergency Relay Valve should be disassembled, cleaned, and lubricated by a trained technician.

Slack Adjuster

DANGER

The installation guide must be used when installing or reinstalling automatic slack adjuster. Failure to do so will result in improperly adjusted brakes which will cause brake damage or lead to brake failure.

The trailer automatic slack adjusters provide the means for routine brake adjustment to compensate for lining wear. Inspect slack adjusters every 2,000 miles (3219 Km) to assure correct operation. ***See Maintenance Schedule on Page 5-12.***.

Operational Checks - Slack Adjuster

1. Block wheels to prevent vehicle from rolling.
2. Check that the push rod is fully retracted, apply air to release spring brake, ***See Figure 5-14.***
3. Turn adjustment hex counterclockwise to create an excessive clearance condition. (A ratcheting sound will occur.)

4. Make a full service brake application. On release, allow sufficient time for brake to fully retract. During the brake release, observe rotation of the adjustment hex (attach a wrench on the hex to make this movement easier to see.) This rotation indicates that an excessive clearance condition has been determined by the slack adjuster, and it is making an adjustment to compensate. On each subsequent brake release the amount of adjustment and push rod travel will be reduced until the desired clearance is achieved.
5. The push rod stroke should be 1-1/2 in (2.54 cm) to 2 inch (5.08 cm) with an 100 to 105 psi (689 to 724 kPa) service brake application.
6. Measure the movement of the push rod from the completely released position to the applied position by marking the push rod where it exits the air chamber before and after application.
7. If the brakes have been running tight, the control arm location should be checked.

Remove - Slack Adjuster

1. Chock wheels to prevent vehicle from rolling. Release spring and service brake. Air chamber push rod must be **fully released.**
2. To maintain a fully released parking brake, a minimum of 105 psi (724 kPa) reservoir pressure must be maintained. If air pressure is not available the spring brake must be manually caged.
3. Remove the existing slack adjuster and clevis - **DO NOT** REMOVE EXISTING JAM NUT. ***See Figure 5-14.***

Install - Slack Adjuster

1. Install the new clevis, with 1/2 in (12.7 mm) pin onto the push rod up to the jam nut -**DO NOT TIGHTEN JAM NUT.**
2. Fit the installation guide over the cam splines so the 1/2 in (12.7 mm) pin slots face the air chamber.
3. Swing the guide into the clevis until the appropriate slot totally engages 1/2 in (12.7 mm) pin.
4. **Observe the guide pointer arrow:**
   If the guide pointer is **above** the clevis pointer, adjust clevis CCW for alignment.
   If the guide pointer is **below** the clevis pointer, adjust clevis CW for alignment.
5. Reposition clevis until the guide pointer aligns with the clevis pointer.
6. Verify by engaging 1/4 in (6.35 mm) pin through the clevis and guide.
7. Tighten jam nut to 50 ft-lbs (68 Nm) torque min.
8. Remove the guide from cam shaft.
9. If the push rod threads extend through the clevis more than 1/16 in (1.5875 mm), remove clevis and cut rod to length.
10. If the push rod is not fully engaged in clevis body, install a new push rod - cut to length.
11. Install the slack adjuster on the cam shaft.
12. Rotate the manual adjuster shaft CW until the slack adjuster arm holes align with the clevis. Install 1/2 in (12.7 mm) and 1/4 in (6.35 mm) pins and cotter pins.

Adjust - Slack Adjuster

1. Rotate the manual adjuster clockwise until brake shoes contact drum, ***See Figure 5-14.***
2. Back off manual adjuster one half turn (counterclockwise)
3. Manually uncage the spring brake.
4. Build up vehicle air pressure.
5. Fully apply and release the brakes several times to check for adequate clearance to all adjacent components.
6. Measure the distance from air chamber to 1/2 in (12.7 mm) pin. Apply brakes with 100-105 psi (689 to 724 kPa) air pressure and remeasure distance to 1/2 in (12.7 mm) pins.
7. The stroke (difference of these two measurements) must be less than 2 in (5.08 cm).

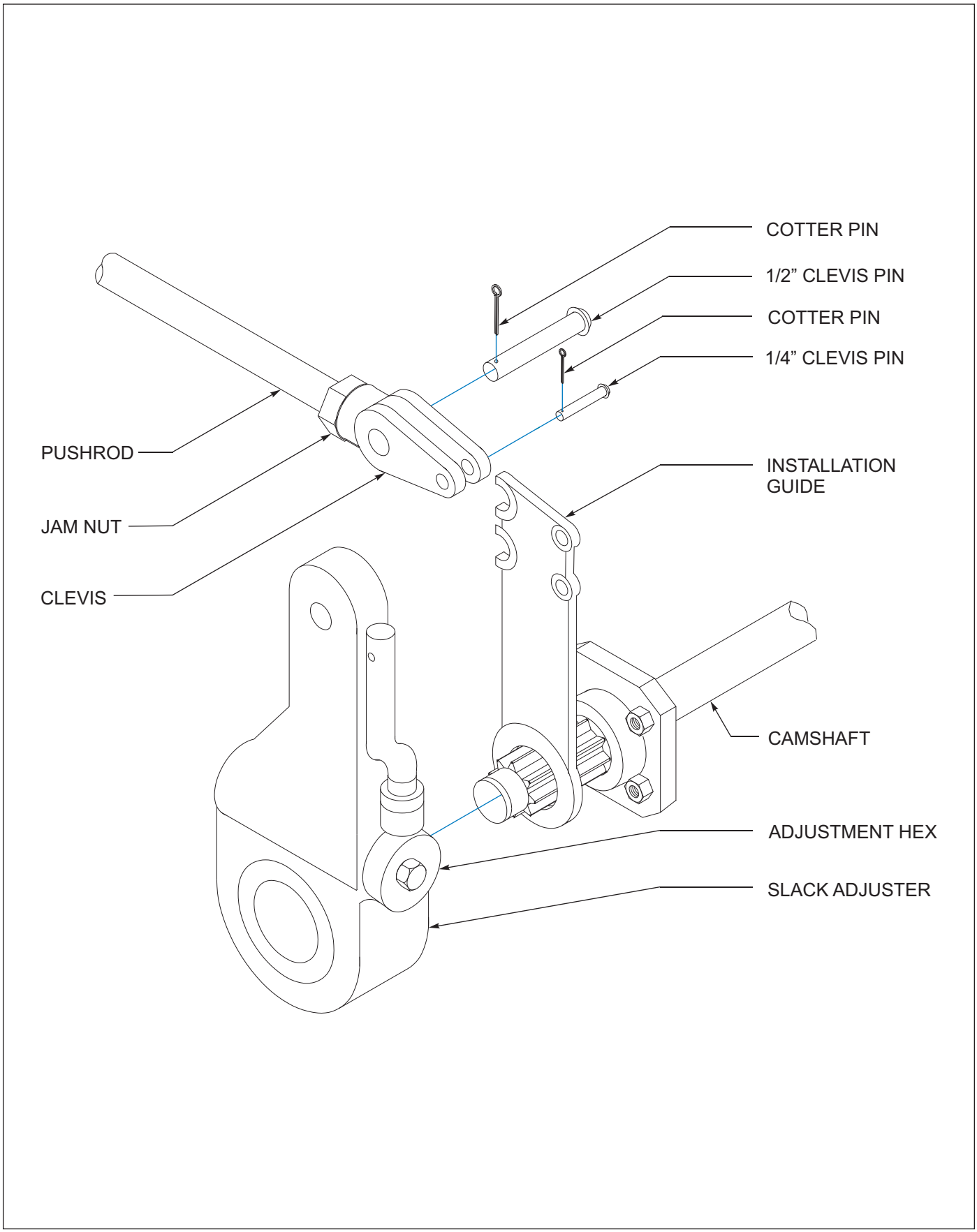


Figure 5-15: Slack Adjuster

Spring Brake Air Chambers

DANGER

The spring brake chamber employs a spring with high forces. service should not be attempted. Serious injury or death will result.

Check for faulty units. Check the condensation holes on the underside of the brake chambers to make sure they are open. The spring brake has two brake chambers, a service chamber and an emergency chamber or spring chamber. Service brake chambers should be disassembled and cleaned at 50,000 miles (80,468 Km) or yearly. The diaphragm and any marginal parts should be replaced. When replacing the service diaphragm, replace the corresponding parts for the other chamber on the same axle (to aid in even brake application and release.) Examine yoke pin for wear and replace as necessary. The spring chamber should not be serviced. Replace entire unit (both service and spring chamber) if spring chamber becomes faulty.

Cage - Spring Brake Air Chamber

1. Chock the trailer wheels.
2. Remove dust cap from spring brake chamber.
3. Remove the release bolt from it's holding brackets and insert it into the spring brake chamber. **DO NOT USE AN IMPACT WRENCH TO CAGE THE SPRING BRAKE.**
4. Turn the bolt until the spring brake is caged. This should be 2-1/4 in to 2-1/2 in (5.715-6.35 cm) of release bolt extension.
5. The brakes should now be totally released. **DO NOT** operate loaded trailer with brake manually released.
6. To reset the spring brake, turn the release bolt until the spring is released. Remove the release bolt and store it in its brackets.
7. Snap the dust cap back in place on the chamber.

Remove - Spring Brake Air Chamber

1. Chock all tractor and trailer wheels and drain the air system.
2. Mark the brake chamber for proper air line port alignment for reassembly.
3. Cage the power spring following the steps outlined in ***See Cage - Spring Brake Air Chamber*** above**.**
4. Disconnect the slack adjuster from the connecting rod by removing the clevis pin. ***See Figure 5-15.***
5. Mark all air service lines for proper re-installation and disconnect from the brake chamber.
6. Remove the brake chamber from the axle brackets.

Install - Spring Brake Air Chamber

1. CAGE the power spring following the steps outlined in ***Cage - Spring Brake Air Chamber*****.**
2. Position the inlet ports by loosening the service chamber clamp bands and rotating center housing such that ports are located according to alignment marks made during disassembly, then re-tighten the clamp bands.
3. Position the breather hole in the downward facing position by loosening the clamp bands on the spring brake chamber and rotating the chamber housing until the breather hold faces downward. Re-tighten the clamp bands.
4. Remount the brake chamber on the axle brackets and reconnect the air service hoses and the slack adjuster connecting rod. ***See Figure 5-14.***

IMPORTANT

Be sure the service line is on the service chamber port and the emergency line is on the spring brake port.

5. Check for leakage by charging the air system to a minimum of 90 psi (621 kPa) and applying soap suds to the brake chamber and connections. If a growing bubble is detected or bubbles are blown away, locate the source of the leak and repair.
6. **ENSURE** that the clamp band is properly seated and tight before uncaging the power spring.

Gooseneck Maintenance

Front Flip Extension Assembly (Option)

DANGER

1. **ALWAYS check behind and under the truck and trailer for persons or objects before moving. Failure to check will lead to serious damage to property, personal injury or death.**
2. **To prevent serious injury or death from pinching: Keep all persons and objects clear while any part of the machine is in motion.**
3. **DO NOT allow to free fall. This assembly weighs 630 lbs (286 Kg). Failure to comply will lead to serious damage to property, personal injury or death.**

WARNING

DO NOT hook any air hoses or electrical cables up prior to moving the Flip Extension Assembly. Could cause damage to hoses, cables and personal injury.

Remove - Front Flip Extension Assembly

NOTE

See Parts Manual on Page 7-1 *for mechanical, air, electrical and hydraulic components and diagrams.*

1. Park on level surface, set parking brakes and chock the wheels.
2. Uncouple the tractor from the trailer. **ENSURE** gooseneck is fully secured to the trailer.
3. Lower the flip extension assembly to the fully down position and secure with the manually operated twisting slide lock pins on both sides of the gooseneck.
4. Level the extension assembly by raising or lower the gooseneck with the trailer lift control lever.
5. Remove the extension hydraulic cylinder and linkages (OPTION), if available. ***See Remove - Hydraulic Cylinder, Front Flip Assembly on Page 5-30.***
6. Remove two extension support assemblies. ***See Remove - Support Assembly, Front Flip Assembly on Page 5-31.***
7. Remove two twisting slide lock pins. ***See Remove - Twisting Slide Lock Pin, Front Flip Assembly on Page 5-32.***
8. Remove the cotter pins on the two top hinge pins.
9. Use a punch, drive in the two top hinge pins.
10. Remove assembly from the trailer hinge brackets.
11. Set on blocks of wood to level the assembly high enough to clear the kingpin.

Inspect and Repair - Front Flip Extension Assembly

1. Inspect trailer hinge/lock mount brackets and mating surfaces for bends, burrs, cracks in metal or welds, dents, wear, distortion, and visual defects. Repair if defective, ***See Structural Defects on Page 5-4.***
2. Inspect trailer hinge/lock mount brackets and mating surfaces for corrosion, dirt, rust, grease. ***See Cleaning on Page 5-2.***
3. Inspect hinge and lock pins for bends, breaks, burrs, cracks, dents, wear, signs of fatigue or brittle, visual defects and missing or defective parts. Replace if defective, ***See Repair Parts on Page 5-3.***
4. Inspect hinge and lock pins for corrosion, dirt, grease, and rust, ***See Cleaning on Page 5-2.***
5. Inspect extension assembly and kingpin for bends, burrs, cracks in metal or welds, dents, wear, distortion, and visual defects. Repair if defective, ***See Structural Defects on Page 5-4.***
6. Inspect extension assembly and kingpin for corrosion, dirt, rust, grease, ***See Cleaning on Page 5-2.***
7. Inspect extension support assemblies for bends, breaks, burrs, cracks, dents, wear, signs of fatigue or brittle, visual defects and missing or defective parts. Replace if defective, ***See Repair Parts on Page 5-3.***
8. Inspect extension support assemblies for corrosion, dirt, rust, grease. ***See Cleaning on Page 5-2.***

Install - Front Flip Extension Assembly

NOTE

See Parts Manual on Page 7-1 *for mechanical, air, electrical and hydraulic components and diagrams.*

1. Using a mechanical lifting device, raise the Extension Assembly and slide into the trailer hinge brackets. Aligning the holes on both sides.
2. Install the two top hinge pins to secure the extension assembly to the trailer.
3. Install two cotter pins on each of the top hinge pins to secure to the gooseneck assembly.
4. Install two twisting slide lock pins, ***See Install - Twisting Slide Lock Pin, Front Flip Assembly on Page 5-33.***
5. Install two extension support assemblies, ***See Install - Support Assembly, Front Flip Assembly on Page 5-32.***
6. **ENSURE** the twisting slide lock pins are not engaged. Use the mechanical lifting device, fully raise, and lower assembly to test pivoting motion.
7. Engage the twisting slide lock pins on both sides of the gooseneck.
8. Install the hydraulic cylinder and linkages (Option) if available. ***See Install - Hydraulic Cylinder, Front Flip Assembly on Page 5-31.***

Front Flip Extension - Hydraulic Cylinder (Option)

DANGER

1. **ALWAYS check behind and under the truck and trailer for persons or objects before moving. Failure to check will lead to serious damage to property, personal injury or death.**
2. **To prevent serious injury or death from pinching: Keep all persons and objects clear while any part of the machine is in motion.**
3. **DO NOT allow to free fall. This assembly weighs 630 lbs (286 Kg). Failure to comply will lead to serious damage to property, personal injury or death.**

WARNING

1. **DO NOT hook any air hoses or electrical cables up prior to moving the Flip Extension Assembly. Could cause damage to hoses, cables and personal injury.**
2. **The hydraulic cylinder weighs 75 lbs (34 kg). Failure to comply could lead to serious damage to property, personal injury or death.**
3. **When working on a hydraulic system, ALWAYS ENSURE hydraulic lines have been depressurized. Hydraulic injection could cause loss of fingers and even death.**

Remove - Hydraulic Cylinder, Front Flip Assembly

NOTE

See Parts Manual on Page 7-1 for mechanical, air, electrical and hydraulic components and diagrams.

1. Start the hydraulic power source. If the tractor supplies the hydraulic power, **DO NOT** couple to the trailer. **ONLY** hook up the hydraulic hoses by routing them to the streetside between the flip extension and gooseneck. Secure the hoses away from the rotation path to avoid pinching the hoses.
2. Lower the flip extension assembly to the fully down position and secure with the manually operated twisting slide lock pins on each side of the gooseneck.
3. Shut “OFF” off hydraulic power source. If the tractor supplies the hydraulic power, disconnect the hydraulic hoses, and remove to avoid possible damage.
4. Zero out hydraulic pressure in hoses by pushing in and pulling out the control lever located in the gooseneck control box.
5. Place a drip pan under the cylinder.
6. Loosen two hydraulic hoses enough from the restricter fittings to bleed off any residual pressure remaining in the hoses.
7. Label both hydraulic hoses where they go and remove both hoses.
8. Plug the open ends of the hoses and cylinder fittings.
9. Remove two cotter pins and flat washers from cylinder rod end clevis pivot pin.
10. Using a punch, drive the pin through the linkages and cylinder clevis.
11. Rotate the linkages out of the way.
12. Remove two cotter pins from the cylinder base end pivot pin.
13. Using a punch, drive the pin out of the mount.
14. Remove the cylinder from the gooseneck.
15. Remove one restricter fitting and 90-degree elbow from each end of the cylinder.
16. Remove two cotter pins and flat washers from front linkage lower pivot pin.
17. Using a punch, drive the pin through the linkage and mount.
18. Remove two cotter pins and flat washers from two rear linkages lower pivot pin.
19. Using a punch, drive the pin through the linkages and mount.

Inspect and Repair - Hydraulic Cylinder, Front Flip Assembly

1. Inspect Hydraulic Hoses for bends, breaks, bulges, cuts, deterioration, flat spots, kinks, wear, wet spots, signs of fatigued or brittle and visual defects. Replace if defective, ***See Repair Parts on Page 5-3.***
2. Inspect Hydraulic Hose Fittings for cracks, dents, corrosion, thread damage, wear, and visual defects. Replace if defective, ***See Repair Parts on Page 5-3.***
3. Inspect Hydraulic Hoses and Fittings for corrosion, dirt, rust, grease. ***See Cleaning on Page 5-2.***
4. Inspect Cylinder, Shaft, and Clevis for bends, breaks, burrs, cracks, dents, wear, signs of fatigue or brittle, visual defects and missing or defective parts. Repair or replace if defective, ***See Repair Parts on Page 5-3.***
5. Inspect Cylinder Fittings for cracks, dents, corrosion, thread damage, wear, and visual defects. Replace if defective, ***See Repair Parts on Page 5-3.***
6. Inspect Cylinder and Fittings for corrosion, dirt, rust, grease. ***See Cleaning on Page 5-2.***

7. Inspect Extension Mount Brackets and mating surfaces for bends, burrs, cracks in metal or welds, dents, wear, distortion, and visual defects. Repair if defective, ***See Structural Defects on Page 5-4.***
8. Inspect Extension Mount Brackets and mating surfaces for corrosion, dirt, rust, grease. ***See Cleaning on Page 5-2.***
9. Inspect Pivot Pins and Flat Washers for bends, breaks, burrs, cracks, dents, wear, signs of fatigue or brittle, visual defects and missing or defective parts. Replace if defective, ***See Repair Parts on Page 5-3.***
10. Inspect Pivot Pins and Flat Washers for corrosion, dirt, grease, and rust. ***See Cleaning on Page 5-2.***
11. Inspect Front and Rear Linkages for bends, breaks, burrs, cracks, dents, wear, signs of fatigue or brittle, visual defects and missing or defective parts. Replace if defective, ***See Repair Parts on Page 5-3.***
12. Inspect Front and Rear Linkages for corrosion, dirt, grease, and rust. ***See Cleaning on Page 5-2.***

Install - Hydraulic Cylinder, Front Flip Assembly

NOTE

See Parts Manual on Page 1-2 *for mechanical, air, electrical and hydraulic components and diagrams.*

1. Align two rear linkages to the gooseneck mount and install the lower pivot pin.
2. Install one flat washer and cotter pin on each side of the lower pivot pin.
3. Align one front linkage to the extension mount and install the lower pivot pin.
4. Install one flat washer and cotter pin on each side of the lower pivot pin. Bend over the cotter pins to secure to the pivot pin.
5. Install one restricter fitting and 90 degree elbow on each end of the cylinder.
6. With the fittings on top, align the cylinder base end with the gooseneck mount and install the pivot pin.
7. Install one cotter pin on each side of the pivot pin.
8. Align the cylinder rod end clevis with the linkages and install the pivot pin. The Rear linkages go on the outside and Front in the center of the clevis.
9. Install one flat washer and cotter pin on each side of the pivot pin.
10. Remove plugs and install the hydraulic hoses to the cylinder fittings labeled to. ***See Hydraulic Fitting Torque Specifications on Page 2-5.***
11. Manually unlock the twisting slide lock pins on each side of the gooseneck.
12. Start the hydraulic power source. If the tractor supplies the hydraulic power, **DO NOT** couple to the trailer. **ONLY** hook up the hydraulic hoses by routing them to the streetside between the flip extension and gooseneck. Secure the hoses away from the rotation path to avoid pinching the hoses.
13. Test and bleed air from the hydraulic system and operation by fully raising and lowering the extension assembly multiple times.
14. Observe cylinder, hoses, and fittings for leaks. Also observe functionality and smooth operation.

Front Flip Extension - Support Assembly

DANGER

1. **ALWAYS check behind and under the truck and trailer for persons or objects before moving. Failure to check will lead to serious damage to property, personal injury or death.**
2. **To prevent serious injury or death from pinching: Keep all persons and objects clear while any part of the machine is in motion.**
3. **DO NOT allow to free fall. This assembly weighs 630 lbs (286 Kg). Failure to comply will lead to serious damage to property, personal injury or death.**

WARNING

DO NOT hook any air hoses or electrical cables up prior to moving the Flip Extension Assembly. Could cause damage to hoses, cables and personal injury.

Remove - Support Assembly, Front Flip Assembly

NOTE

See Parts Manual on Page 7-1 *for mechanical, air, electrical and hydraulic components and diagrams.*

1. Lower the flip extension assembly to the fully down position and secure with the manually operated twisting slide lock pins on both sides of the gooseneck.
2. Remove two flange nuts, bolts and flat washers holding the rubber bumper and spacer to the mount or support extension.
3. If support extension is present, remove two flange nuts, bolts and flat washers holding the support to the mount.

4. Remove two flange nuts, bolts and flat washers holding the mount to the extension frame assembly.

Inspect and Repair - Support Assembly, Front Flip Assembly

1. Inspect Flange Nuts, Bolts and Flat Washers for bends, breaks, burrs, cracks, dents, wear, signs of fatigue or brittle, tread condition and visual defects. Replace if defective, ***See Repair Parts on Page 5-3.***
2. Inspect Flange Nuts, Bolts and Flat Washers for corrosion, dirt, grease, and rust. ***See Cleaning on Page 5-2.***
3. Inspect Rubber Bumper for bends, breaks, bulges, cuts, deterioration, flat spots, kinks, wear, wet spots, signs of fatigued or brittle and visual defects. Replace if defective, ***See Repair Parts on Page 5-3.***
4. Inspect Rubber Bumper for corrosion, dirt, grease, and rust. ***See Cleaning on Page 5-2.***
5. Inspect Mount, Support and Mount, support and spacer for bends, burrs, cracks in metal or welds, dents, wear, distortion, and visual defects. Repair if defective, ***See Repair Parts on Page 5-3.***
6. Inspect Mount, Support and Spacer for corrosion, dirt, grease. ***See Cleaning on Page 5-2.***
7. Inspect Extension Assembly to support mating surfaces for bends, burrs, cracks in metal or welds, dents, wear, distortion, and visual defects. Repair if defective, ***See Structural Defects on Page 5-4.***
8. Inspect Extension Assembly to support mating surfaces for corrosion, dirt, grease. ***See Cleaning on Page 5-2.***

Install - Support Assembly, Front Flip Assembly

NOTE

See Parts Manual on Page 7-1 *for mechanical, air, electrical and hydraulic components and diagrams.*

1. Lower the flip extension assembly to the fully down position and secure with the manually operated twisting slide lock pins on both sides of the gooseneck.
2. Install the mount to the extension frame assembly with two flange nuts, bolts, and flat washers. ***See General Torque Specifications on Page 2-4.***
3. If support extension is present, install the support extension to the mount using two flange nuts, bolts, and flat washers. ***See General Torque Specifications on Page 2-4.***
4. Install spacer and rubber bumper to mount or support extension using two flange nuts, bolts, and flat washers. ***See General Torque Specifications on Page 2-4.***

Front Flip Extension - Twisting Slide Lock Pin

DANGER

1. **ALWAYS check behind and under the truck and trailer for persons or objects before moving. Failure to check will lead to serious damage to property, personal injury or death.**
2. **To prevent serious injury or death from pinching: Keep all persons and objects clear while any part of the machine is in motion.**
3. **DO NOT allow to free fall. This assembly weighs 630 lbs (286 Kg). Failure to comply will lead to serious damage to property, personal injury or death.**

Remove - Twisting Slide Lock Pin, Front Flip Assembly

NOTE

See Parts Manual on Page 7-1 *for mechanical, air, electrical and hydraulic components and diagrams.*

1. Pull the twisting slide lock pin to the fully unlock position.
2. Using a punch, drive out the roll pin.
3. Pull the twisting slide lock pin out of the slide lock collar.
4. Remove one bolt, flat washer, and flip pin lock from the goose neck frame.

Inspect and Repair - Twisting Slide Lock Pin, Front Flip Assembly

1. Inspect Slide Lock Collar and mating surfaces for bends, burrs, cracks in metal or welds, dents, wear, distortion, and visual defects. Repair if defective, ***See Structural Defects on Page 5-4.***
2. Inspect Slide Lock Collar and mating surfaces for corrosion, dirt, rust, grease. ***See Cleaning on Page 5-2.***
3. Inspect Twisting Slide Lock Pin for bends, breaks, burrs, cracks, dents, wear, signs of fatigue or brittle, visual defects and missing or defective parts. Replace if defective, ***See Repair Parts on Page 5-3.***
4. Inspect Twisting Slide Lock Pin for corrosion, dirt, grease, and rust. ***See Cleaning on Page 5-2.***

5. Inspect Roll Pin for bends, breaks, burrs, cracks, dents, wear, signs of fatigue or brittle, visual defects and missing or defective parts. Replace if defective, ***See Repair Parts on Page 5-3.***
6. Inspect Roll Pin for corrosion, dirt, grease, and rust. ***See Cleaning on Page 5-2.***
7. Inspect Flip Pin Lock Bolt and Flat Washer for bends, breaks, burrs, cracks, dents, wear, signs of fatigue or brittle, tread condition and visual defects. Replace if defective, ***See Repair Parts on Page 5-3.***
8. Inspect Flip Pin Lock Bolt and Flat Washer for corrosion, dirt, grease, and rust. ***See Cleaning on Page 5-2.***
9. Inspect Flip Pin Lock Plate for bends, breaks, burrs, cracks, dents, wear, signs of fatigue or brittle, visual defects and missing or defective parts. Replace if defective, ***See Repair Parts on Page 5-3.***
10. Inspect Flip Pin Lock Plate for corrosion, dirt, grease, and rust. ***See Cleaning on Page 5-2.***

Install - Twisting Slide Lock Pin, Front Flip Assembly

NOTE

See Parts Manual on Page 7-1 *for mechanical, air, electrical and hydraulic components and diagrams.*

1. Install the flip pin lock plate with one bolt and flat washer. Apply Loctite to bolt threads and tighten enough to allow the plate to rotate with little resistance.
2. Insert twisting slide lock pin into the slide lock collar and align the roll pin hole with the slot in the collar.
3. Drive the roll pin in flush with the collar from the front, the roll pin should extend past the collar on the backside.

Electrical Maintenance

NOTE

See Parts Manual on Page 7-1 *for mechanical, air, electrical and hydraulic components and diagrams.*

1. Maintenance of the electrical system consists of inspection and minor servicing. Any wire, connection or electrical component showing signs of corrosion, wear, breakage or unraveling must be replaced.
2. Frayed or unraveling wire must have the defective harness removed and replaced. Seal all connections and insulate.
3. Corroded terminals must have the corrosion removed, source of corrosion neutralized and the terminals resealed, protected, and insulated.
4. Fuse or circuit breaker blown-out usually indicates an electrical short-circuit, although a fuse can occasionally fail from vibration. Insert a second fuse or reset the breaker. If this fuse immediately burns out or the breaker trips, locate the cause of the electrical short and repair.
5. A light that repeatedly burns-out usually indicates a loose connection, poor system ground, or a malfunctioning voltage regulator. Locate the source of the problem and repair. System grounds must be grounded to bare metal surfaces. Paint, grease, wax, and other coatings act as insulators. Replacement lamps must be equivalent to the factory installed lamp.

Frame Maintenance

DANGER

When crawling under the trailer is necessary, chock all wheels of the trailer and tractor. When jacking is necessary, chock all wheels and support the trailer with jack stands sufficient to withstand the weight of the trailer and load. Failure to take adequate safety measures will result in serious personal injury or death.

1. Wash and clean top, bottom and sides of the trailer frame from dirt, grease and debris that will obstruction inspection clarity. ***See Cleaning on Page 5-2.***
2. Inspect the frame assembly for burrs bends, bulges, corrosion, cracks, dents, distortion, loosen fasteners, rust, visual defects and missing/defective components or decals. ***See Repair Parts on Page 5-3.***
3. Repair structural defects before placing the trailer back in service. ***See Structural Defects on Page 5-4.***
4. Clean, prime and paint any areas that have corrosion or rust build up. ***See Cleaning on Page 5-2.***

Flip Axle & Beavertail (Options) Maintenance

Flip Assembly

DANGER

1. **ALWAYS check behind and under the truck and trailer for persons or objects before moving. Failure to check will lead to serious personal injury or death to others, or damage to property.**
2. **Stand clear of wings while folding/unfolding. Charge hydraulic fold cylinders with hydraulic oil before attempting to fold/unfold wings.**
3. **To prevent serious injury or death from pinching: Keep all persons and objects clear while any part of the machine is in motion.**
4. **DO NOT allow to free fall. If working on the flip axle assembly, it weighs 1500 lbs (680 Kg). If working on the beavertail assembly it weighs 1250 lbs (567 Kg), the ramps weigh 425 lbs (193 Kg) each, for a combined weight of 2100 lbs (953 Kg). Failure to comply will lead to serious personal injury or death to others, or damage to property.**

WARNING

1. **DO NOT move the flip axle assembly with air or electrical couplings connected. Could cause damage to hoses, cables and personal injury.**
2. **DO NOT Move or store with the flip axle suspension air bags inflated. Could cause damage to equipment and personal injury.**
3. **DO NOT use the bumper lifting shackles as load securing tie downs.**

Remove - Flip Assembly

NOTE

See Parts Manual on Page 7-1 *for mechanical, air, electrical and hydraulic components and diagrams.*

1. Perform Fold Up procedures, ***See Flip Axle Fold Up Procedures on Page 3-18 or See Beavertail Fold Up Procedures on Page 3-20.***
2. Park on level surface, set parking brakes and chock the wheels.
3. Uncouple the tractor from the trailer, leave gooseneck secured to the trailer.
4. For Hydraulic Beavertail Ramps Only, remove streetside and curbside hydraulic ramp cylinders. ***See Remove - Hydraulic Cylinder, Beavertail Ramp on Page 5-45.***
5. For Beavertail Ramps Only, remove streetside and curbside ramp assemblies. ***See Remove - Beavertail Ramp on Page 5-43.***
6. For Hydraulic Flip Assemblies Only, remove the flip assembly hydraulic cylinder and linkage (Option) if available, ***See Remove - Hydraulic Cylinder, Flip Assembly on Page 5-36.***
7. Perform Manual Fold Down procedures, ***See Flip Axle Fold Down Procedures on Page 3-17 or See Beavertail Fold Down Procedures on Page 3-19.***
8. Using a mechanical lifting device and a sling, support the flip assembly. ***See Figure 5-16.***

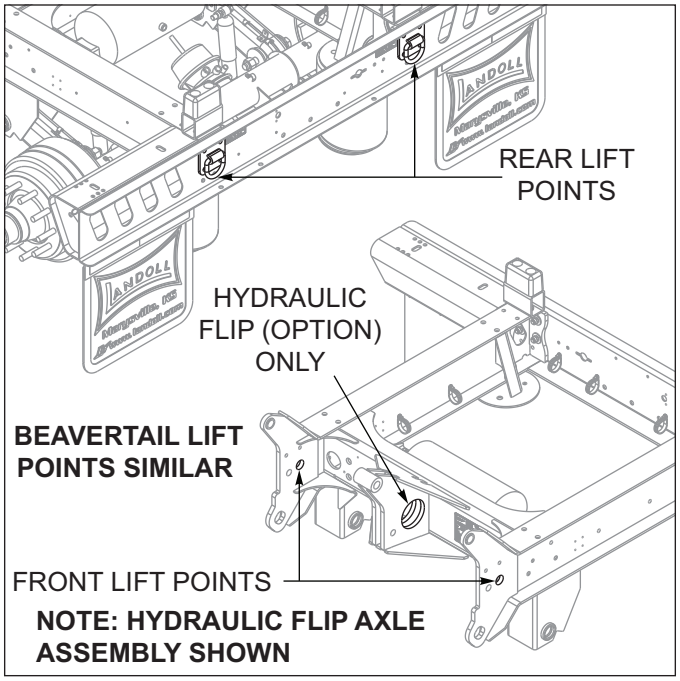


Figure 5-16: Flip Axle Lift Points

9. For Flip Axle Only, pull out on the flip axle palm control button to deflate the flip axle suspension air bags. ***See Figure 3-14 on Page 3-17.***
10. Unlock the lower lock pin assembly. ***See Figure 3-15 on Page 3-17.***
11. Disconnect all air and electrical couplings that connect the trailer to the flip assembly. For Hydraulic beavertail ramps **ONLY**, disconnect the hydraulic couplings from the trailer that operates the ramp hydraulic cylinders in the beavertail. Route the hoses out from behind the trailer rear bumper.
12. For hydraulic flip assemblies **ONLY**, remove one cotter pin from each side of the top center hinge pins.

13. For Standard Duty Trailer Bumpers Only, remove one cotter pin from each of the two top outside hinge pins that secures the flip assembly to the trailer. ***See Figure 3-15*** and ***See Figure 3-16 on Page 3-17.***
14. For Heavy Duty Trailer Bumpers Only, remove one mud flap retaining quick pin from each of the two top outside hinge pins that secures the flip assembly to the trailer.
15. Adjust flip assembly with the mechanical lifting device and sling.
16. Using a punch, drive out the two top outside hinge pins.
17. Remove the flip assembly from the trailer assembly using the mechanical lifting device.
18. Remove Spring Lock Pin Assembly, ***See Remove - Spring Lock Pin Assembly, Flip Assembly on Page 5-40.***

Inspect and Repair - Flip Assembly

1. Inspect Top Hinge Pins and Hardware for bends, breaks, burrs, cracks, dents, wear, signs of fatigue or brittle, visual defects and missing or defective parts. Replace if defective, ***See Repair Parts on Page 5-3.***
2. Inspect Top Hinge Pins and Hardware for corrosion, dirt, grease, and rust. ***See Cleaning on Page 5-2.***
3. Inspect Trailer Top Pivot Holes, Lower Lock Pin/Handle Assembly and Mating Surfaces for bends, burrs, cracks in metal or welds, dents, wear, distortion, and visual defects. Repair if defective, ***See Structural Defects on Page 5-4.***
4. Inspect Trailer Lower Lock Pin Assembly, Handle and Mating Surfaces for bends, breaks, burrs, cracks, dents, wear, signs of fatigue or brittle, visual defects and missing or defective parts. Replace if defective, ***See Repair Parts on Page 5-3.***
5. Inspect Trailer Top Pivot Holes, Lower Lock Pin/Handle Assembly and Mating Surfaces for corrosion, dirt, rust, grease. ***See Cleaning on Page 5-2.***
6. Inspect Flip Assembly Mount and Mating Surfaces for bends, burrs, cracks in metal or welds, dents, wear, distortion, and visual defects. Repair if defective, ***See Structural Defects on Page 5-4.***
7. Inspect Flip Assembly Mounting and Mating Surfaces for corrosion, dirt, rust, grease. ***See Cleaning on Page 5-2.***
8. Inspect Air Lines for bends, breaks, bulges, cuts, deterioration, kinks, wear, signs of fatigued or brittle and visual defects. Replace if defective, ***See Repair Parts on Page 5-3.***
9. Inspect Air Line Fittings for cracks, dents, corrosion, thread damage, wear, and visual defects. Replace if defective, ***See Repair Parts on Page 5-3.***
10. Inspect Air Lines and Fittings for corrosion, dirt, rust, grease. ***See Cleaning on Page 5-2.***
11. Inspect Electrical Harness Insulation for bends, breaks, bulges, cuts, deterioration, dry rot, dents, kinks, wear, and visual defects. Replace if defective, ***See Repair Parts on Page 5-3.***
12. Inspect Electrical Harness Connectors for defects that might cause poor conductivity. Replace if defective, ***See Repair Parts on Page 5-3.***
13. Inspect Electrical Harness and Connectors for corrosion, dirt and grease build up. ***See Cleaning on Page 5-2.***
14. Inspect Hydraulic Hoses for bends, breaks, bulges, cuts, deterioration, flat spots, kinks, wear, wet spots, signs of fatigued or brittle and visual defects. Replace if defective, ***See Repair Parts on Page 5-3.***
15. Inspect Hydraulic Hose Fittings for cracks, dents, corrosion, thread damage, wear, and visual defects. Replace if defective, ***See Repair Parts on Page 5-3.***
16. Inspect Hydraulic Hoses and Fittings for corrosion, dirt, rust, grease. ***See Cleaning on Page 5-2.***

Install - Flip Assembly

NOTE

See Parts Manual on Page 7-1 *for mechanical, air, electrical and hydraulic components and diagrams.*

1. Replace Spring Lock Pin Assembly, ***See Install - Spring Lock Pin Assembly, Flip Assembly on Page 5-41.***
2. Using a mechanical lifting device and a sling, support the flip assembly. ***See Figure 5-16 on Page 5-34.***
3. Align flip assembly top two outside hinge pin holes to the trailer using the mechanical lifting device.
4. For Standard Duty Trailer Bumpers Only, from the inside, install two hinge pins to secure the flip assembly to the trailer. Install one cotter pin to the outside of each of the two top outside hinge pins and bend the tangs over. ***See Figure 3-15*** and ***See Figure 3-16 on Page 3-17.***
5. For Heavy Duty Trailer Bumpers Only, from the outside, install two hinge pins to secure the flip assembly to the trailer. Install one mud flap retaining quick pin to the inside of each of the two top outside hinges pins and fasten.
6. For Hydraulic Flip Assemblies Only, install one **Pivot Pin #5**, 1-1/4 x 8-1/4 inch (3.175 x 20.955 cm) to secure the flip assembly top center hinge to the trailer. Install one flat washer and one cotter pin to each side of the top center hinge pin and bend the tangs over. ***See Figure 5-17 on Page 5-39.***

7. Lower the mechanical lifting device until the flip assembly is fully resting on the ground. Leave the rear sling attached and remove the sling supporting the front of the flip assembly.
8. For Hydraulic Beavertail Ramps Only, route the ramp hydraulic cylinder hoses down behind the trailer rear bumper and connect to the trailer couplers.
9. Using the mechanical lifting device, fold up the flip assembly until it fully rest on the rubber bumper stops (Flip Axle Only) or the top of the trunnion (Flip Beavertail Only)
10. For Hydraulic Flip Assemblies Only, install the flip assembly hydraulic cylinder and linkage. ***See Install - Hydraulic Cylinder, Flip Assembly on Page 5-37.***
11. For Beavertail Ramps Only, replace streetside and curbside ramp assemblies. ***See Install - Beavertail Ramp on Page 5-44. See Manual Ramp (Option) Only on Page 5-44.***
12. For Hydraulic Beavertail Ramps Only, install streetside and curbside hydraulic ramp cylinders. ***See Install - Hydraulic Cylinder, Beavertail Ramp on Page 5-46.***
13. Pre-Couple the tractor to the trailer. ***See Anti-Lock Brake System (ABS) on Page 4-1.***
14. Perform function test. **ENSURE** the flip assembly air and electrical connections are disconnected from the trailer and secured to the flip assembly. Fold the flip a assembly down and up several times ending with the flip assembly down. Observe mechanical function for erratic or binding operation. Observe the flip assembly folds up and rest on the rubber bumper stops (Flip Axle Only) or trunnion assembly (Beavertail Only). Observe the flip assembly folds down and able to be secured with the lower lock pin assembly. Check hydraulic system for leaks, if available. For fold down and up operations, ***See Flip Axle Assembly (Option) on Page 3-15 or See Flip Beavertail & Ramp Assembly (Option) on Page 3-18.***
15. Secure with the lower lock pins.
16. Connect the flip assembly electrical and color-coded air couplings to the trailer. ***See Standard Trailer Rear Bumper on Page 3-16.***
17. For Flip Axle Only, push in on the flip axle palm control button to inflate the flip axle suspension air bags and observe for air system leaks. ***See Figure 3-14 on Page 3-17.***
18. Perform Pre-Coupling Air Brake Checks, ***See Anti-Lock Brake System (ABS) on Page 4-1.***
19. For Flip Axle Only, verify the flip assembly axle alignment. ***See Alignment, Air Ride, Flip Axle (OPTION) on Page 5-18.***

Flip Assembly - Hydraulic Cylinder (Option)

DANGER

1. **ALWAYS check behind and under the truck and trailer for persons or objects before moving. Failure to check will lead to serious damage to property, personal injury or death.**
2. **Stand clear of wings while folding/unfolding. Charge hydraulic fold cylinders with hydraulic oil before attempting to fold/unfold wings.**
3. **To prevent serious injury or death from pinching: Keep all persons and objects clear while any part of the machine is in motion.**

WARNING

1. **DO NOT hook any air hoses or electrical cables up prior to moving the Flip Extension Assembly. Could cause damage to hoses, cables and personal injury.**
2. **The hydraulic cylinder weighs 75 lbs (34 Kg). Failure to comply could lead to serious damage to property, personal injury or death.**
3. **When working on a hydraulic system, ALWAYS ENSURE hydraulic lines have been depressurized. Hydraulic injection could cause loss of fingers and even death.**

Remove - Hydraulic Cylinder, Flip Assembly

NOTE

See Parts Manual on Page 7-1 *for mechanical, air, electrical and hydraulic components and diagrams.*

1. Perform Fold Up procedures, ***See Flip Axle Fold Up Procedures on Page 3-18 or Beavertail Fold Up Procedures on Page 3-20.***
2. Park on level surface, set parking brakes and chock the wheels.
3. Shut off hydraulic power source.
4. Zero out hydraulic pressure in hoses by pushing in and pulling out the control lever located in the gooseneck control box.
5. Uncouple the tractor from the trailer, leave gooseneck secured to the trailer.
6. Place a drip pan under the cylinder. ***See Figure 5-17 on Page 5-39.***
7. Loosen both hydraulic hoses enough from the cylinder fittings to bleed off any residual pressure remaining in the hoses.

8. Label both hydraulic hoses where they go and remove both hoses.
9. Plug the open ends of the hoses and cylinder fittings.
10. Block the hydraulic cylinder from falling.
11. Remove two cotter pins and two narrow flat washers from the linkage hinge pin that secures flip linkage to the cylinder clevis. ***See Figure 5-17 on Page 5-39.***
12. Using a punch, drive the pin through the linkage and cylinder clevis.
13. Remove two rollers from the trailer mount.
14. Remove two cotter pins and two wide flat washers from the linkage hinge pin that secures flip linkage to the flip assembly.
15. Using a punch, drive the pin out of the flip assembly and linkage.
16. Remove the linkage.
17. Remove two cotter pins from the cylinder base end pivot pin.
18. Using a punch, drive the pin through the mount and cylinder base end clevis.
19. Remove the cylinder from the trailer mount.
20. Remove one 90-degree elbow from each end of the cylinder.
21. Remove one set screw and remove cylinder rod end clevis.
22. For Flip Beavertail (Option) Only, remove two cotter pins and two narrow washers from the two pivot pins that secures the link adapter mount to the beavertail.
23. Using a punch, drive the pins through the link adapter mount and beavertail assembly.

Inspect and Repair - Hydraulic Cylinder, Flip Assembly

1. Inspect Hydraulic Hoses for bends, breaks, bulges, cuts, deterioration, flat spots, kinks, wear, wet spots, signs of fatigued or brittle and visual defects. Replace if defective, ***See Repair Parts on Page 5-3.***
2. Inspect Hydraulic Hose Fittings for cracks, dents, corrosion, thread damage, wear, and visual defects. Replace if defective, ***See Repair Parts on Page 5-3.***
3. Inspect Hydraulic Hoses and Fittings for corrosion, dirt, rust, grease. ***See Cleaning on Page 5-2.***
4. Inspect Cylinder, Shaft, and Clevis for bends, breaks, burrs, cracks, dents, wear, signs of fatigue or brittle, visual defects and missing or defective parts. Repair or replace if defective, ***See Repair Parts on Page 5-3.***
5. Inspect Cylinder Fittings, Clevis, and Set Screw for cracks, dents, corrosion, thread damage, wear, and visual defects. Replace if defective, ***See Repair Parts on Page 5-3.***
6. Inspect Cylinder Fittings, Clevis, and Set Screw for corrosion, dirt, rust, grease. ***See Cleaning on Page 5-2.***
7. Inspect Cylinder Mount Brackets and mating surfaces for bends, burrs, cracks in metal or welds, dents, wear, distortion, and visual defects. Repair if defective, ***See Structural Defects on Page 5-4.***
8. Inspect Cylinder Mount Brackets and mating surfaces for corrosion, dirt, rust, grease. ***See Cleaning on Page 5-2.***
9. Inspect Pivot Pins and Flat Washers for bends, breaks, burrs, cracks, dents, wear, signs of fatigue or brittle, visual defects and missing or defective parts. Replace if defective, ***See Repair Parts on Page 5-3.***
10. Inspect Pivot Pins and Flat Washers for corrosion, dirt, grease, and rust. ***See Cleaning on Page 5-2.***
11. Inspect Linkage for bends, breaks, burrs, cracks, dents, wear, signs of fatigue or brittle, visual defects and missing or defective parts. Replace if defective, ***See Repair Parts on Page 5-3.***
12. Inspect Linkage for corrosion, dirt, grease, and rust. ***See Cleaning on Page 5-2.***
13. Inspect Flip Linkage and Flip Assembly Mating Surfaces for bends, burrs, cracks in metal or welds, dents, wear, distortion, and visual defects. Repair if defective, ***See Structural Defects on Page 5-4.***
14. Inspect Flip Linkage and Flip Assembly Mating Surfaces for corrosion, dirt, rust, grease. ***See Cleaning on Page 5-2.***

Install - Hydraulic Cylinder, Flip Assembly

NOTE

See Parts Manual on Page 7-1 *for mechanical, air, electrical and hydraulic components and diagrams.*

1. For Flip Beavertail (Option) Only, with the hinge bushing on top, align the linkage adapter mount to the beavertail assembly. ***See Figure 5-17.***
2. For Flip Beavertail (Option) Only, install **Pivot Pins #1**, 1 x 3-5/8 inch (2.54 cm x 9.2075 mm), that secures the linkage adapter mount to the beavertail assembly.
3. For Flip Beavertail (Option) Only, install one narrow flat washer and cotter pin on each side of the pivot pins and bend the tangs over.
4. Install one 90-degree elbow in each end of the cylinder. The fittings should be facing each other. ***See Hydraulic Fitting Torque Specifications on Page 2-5.***
5. Install the cylinder rod end clevis and install one set screw, **DO NOT** tighten set screw.

6. Align the cylinder base end clevis to the trailer mount, position the hydraulic fittings on the top side of the cylinder. ***See Figure 5-17.***
7. Install **Pivot Pin #2**, 1 x 7-3/4 inch (2.54 x 19.685 cm), that secures the cylinder base end to the trailer mount.
8. Install one cotter pin on each side of the pivot pin and bend the tangs over.
9. Block and support the cylinder up.
10. Align the linkage to the flip assembly linkage mount. The bend should form to the flip assembly.
11. Install **Pivot Pin #3** that secures the linkage to the flip assembly mount. The Flip Axle uses a 1 x 4-1/4 inch (2.54 x 10.795 cm) and the Beavertail uses a 1-1/4 x 3-1/2 inch (3.175 x 8.89 cm) pivot pin.
12. Install one flat washer and cotter pin on each side of the pivot pin and bend the tangs over. The flat washer for the Flip Axle is wide and the Beavertail is narrow.
13. Align the rollers, cylinder rod end clevis and flip linkage. Manually adjust cylinder in or out to align.
14. Install **Pivot Pin #4,** 1-1/4 x 7-3/4 inch (3.175 x 19.685 cm), that secures the linkage to the cylinder rod end clevis.
15. Install one narrow flat washer and cotter pin on each side of the pivot pin and bend the tangs over.
16. Remove the block supporting the cylinder.
17. Torque cylinder rod end clevis set screw between 273 to 275 in-lbs (370-373 Nm).
18. Remove plugs and install the hydraulic hoses to the cylinder fittings labeled to. ***See Hydraulic Fitting Torque Specifications on Page 2-5.***
19. Test and bleed air from the hydraulic system and operation by fully raising and lowering the flip axle assembly multiple times. For Flip Axle Fold Down and Up Procedures, ***See Page 3-17 and Page 3-18.*** For Flip Beavertail Fold Down and Up Procedures, ***See Page 3-19 and Page 3-20.***
20. Observe cylinder, hoses, and fittings for leaks. Also observe functionality and smooth operation.

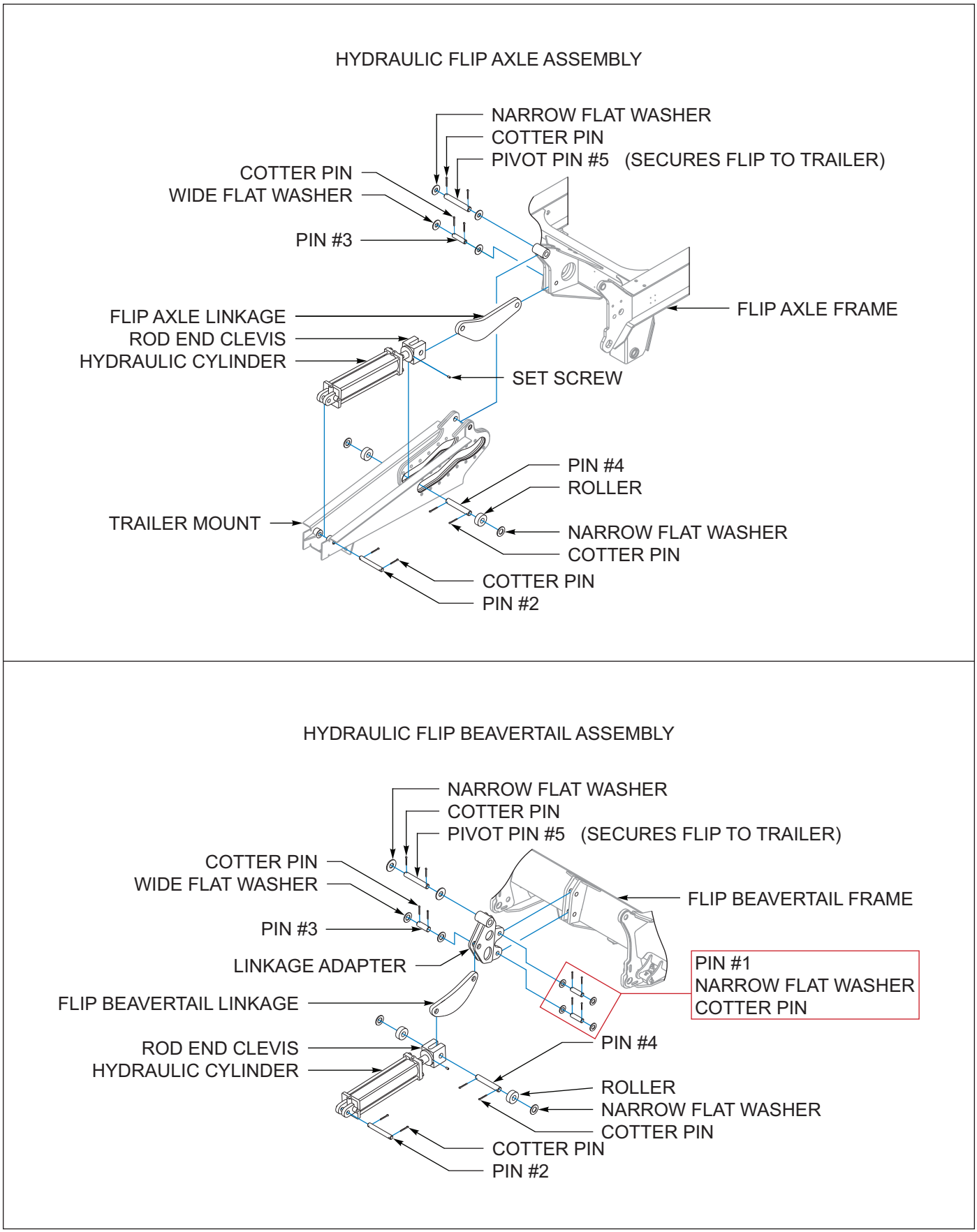


Figure 5-17: Hydraulic Flip Assembly

Flip Assembly - Spring Lock Pin Assembly

IMPORTANT

These springs if compressed store 11-inch pounds (1.24 Nm) of force each. May cause damage to equipment and personal injury.

Remove - Spring Lock Pin Assembly, Flip Assembly

NOTE

See Parts Manual on Page 7-1 *for mechanical, air, electrical and hydraulic components and diagrams.*

1. Park on level surface, set parking brakes and chock the wheels. The Flip Assembly must be folded up or removed.
2. On the streetside trailer rear bumper, push in on the twisting spring lock pin handle until the spring retaining pin and collar clears the inside bumper stop plate notch, slightly twist the handle towards the bumper. ***See Figure 5-18.***
3. Push in on the handle until both right-hand lock pin springs rotate easily.
4. Drive out the curbside right-hand spring collar retaining pin and remove the collar, spring, and flat washer.
5. Drive out the streetside right-hand spring collar retaining pin.
6. Release tension on the handle.
7. Drive out the streetside and curbside left-hand spring collar retaining pins.
8. Pull the handle rod out of the curbside lock pin and remove the left-hand flat washer, spring, and collar.
9. Pull the handle rod out of the rear bumper assembly.
10. Remove the streetside right-hand collar, spring, and flat washer.
11. Pull the handle rod out of the streetside lock pin and remove the left-hand flat washer, spring, and collar.
12. Rotate the curbside and streetside lock pins to clear the lock pin stop bolts and pull them from the bumper bushings.
13. Remove curbside and streetside lock pin stop bolts. Remove one lock nut, two flat washer, and one bolt from each side of the trailer.
14. Remove one grease zerk each from the curbside and streetside bumper bushings.

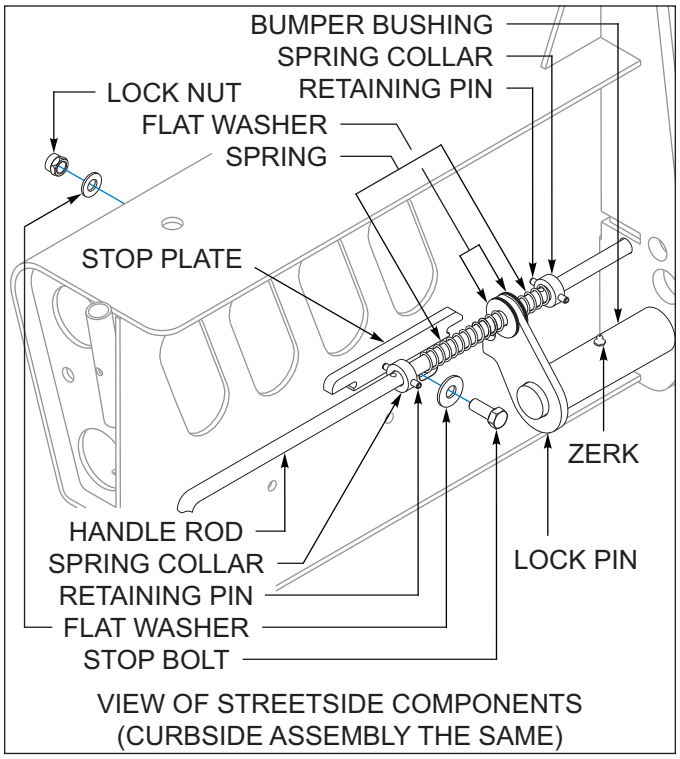


Figure 5-18: Spring Lock Components

Inspect and Repair- Spring Lock Pin Assembly, Flip Assembly

1. Inspect Rear Bumper Bushings, Rod Support Holes, and Stop Plate surfaces for bends, burrs, cracks in metal or welds, dents, wear, distortion, and visual defects. Repair if defective, ***See Structural Defects on Page 5-4.***
2. Inspect Rear Bumper Bushings, Rod Support Holes, and Stop Plate surfaces for corrosion, dirt, grease. ***See Cleaning on Page 5-2.***
3. Inspect Lock Pins for bends, burrs, cracks in metal or welds, dents, wear, distortion, and visual defects. Repair if defective, ***See Structural Defects on Page 5-4.***
4. Inspect Lock Pins for bends, breaks, burrs, cracks, dents, wear, signs of fatigue or brittle, visual defects and missing or defective parts. Replace if defective, ***See Repair Parts on Page 5-3.***
5. Inspect Lock Pins for corrosion, dirt, grease. ***See Cleaning on Page 5-2.***
6. Inspect Spring Collars, Retaining Pins, and Flat Washers for bends, breaks, burrs, cracks, dents, wear, signs of fatigue or brittle, visual defects and missing or defective parts. Replace if defective, ***See Repair Parts on Page 5-3.***
7. Inspect Spring Collars and Retaining Pins, and Flat Washers for corrosion, dirt, grease, and rust. ***See Cleaning on Page 5-2.***

8. Inspect Lock Pin Stop Bolts and Lock Nuts for bends, breaks, burrs, cracks, dents, wear, signs of fatigue or brittle, tread condition and visual defects. Replace if defective, ***See Repair Parts on Page 5-3.***
9. Inspect Lock Pin Stop Bolts and Lock Nuts for corrosion, dirt, grease, and rust. ***See Cleaning on Page 5-2.***
10. Inspect Springs for bends, breaks, burrs, chips, cracks, dents, pits, wear, distortion, signs of fatigued or brittle and visual defects. Replace if defective, ***See Repair Parts on Page 5-3.***
11. Measure Spring outside diameter and length for compression or stretch. Spring outside diameter should be between ..830 to ..860 inches (21.082-21.844 mm). Spring length should be between 3.90 to 4.10 inches (99.06-104.14 mm). If out of tolerance, ***See Repair Parts on Page 5-3.***
12. Inspect Springs for corrosion, dirt, grease. ***See Cleaning on Page 5-2.***
13. Inspect Handle for bends, burrs, cracks in metal or welds, dents, wear, distortion, and visual defects. Repair if defective, ***See Repair Parts on Page 5-3.***
14. Inspect Handle for corrosion, dirt, grease. ***See Cleaning on Page 5-2.***

Install - Spring Lock Pin Assembly, Flip Assembly

NOTE

See Parts Manual on Page 7-1 *for mechanical, air, electrical and hydraulic components and diagrams.*

1. Install one grease zerk each into the curbside and streetside bumper bushings. ***See Figure 5-18 on Page 5-40.***
2. Install one lock pin stop bolt, two wide flat washers, one lock nut in the curbside and streetside slide lock pin stop locations.
3. Apply light film of grease to both lock pin shafts.
4. Install the lock pins into the curbside and streetside bumper bushings. Rotate pins to clear lock pin stop bolts.
5. Install one spring collar on the long end of the handle rod and move it towards the bend. With the handle up, align the streetside left-hand spring collar and drive in one retaining pin. ***See Figure 5-18 on Page 5-40.***

NOTE

All spring collars and retaining pins will face the same direction.

6. Install one spring and one flat washer onto the handle rod. ***See Figure 5-18 on Page 5-40.***
7. Insert the handle rod through the streetside lock pin, slide on one flat washer, one spring, and one spring collar.
8. Insert the handle rod through the streetside rear bumper support holes.
9. Install one spring collar onto the handle rod. Align the curbside left-hand spring collar to handle rod hole and drive in one retaining pin in the same direction as streetside.
10. Install one spring and one flat washer onto the handle rod.
11. Rotate handle slightly towards the trailer rear bumper to clear the streetside bumper stop plate notch.
12. Insert the handle rod through the curbside lock pin, install one flat washer, one spring, and one spring collar.
13. Insert the handle rod through the curbside rear bumper support holes.
14. Push in on the handle until the streetside and curbside right-hand springs collars can be aligned easily to the handle rod holes.
15. Drive one retaining pin into the streetside and curbside spring collars.
16. Insert grease into the streetside and curbside bumper bushings.
17. Perform function test. Move the handle in and out several times. Observe lock pin for smooth operation and not binding. Push in on the handle until the left-hand spring retaining pin and collar clears the inside bumper stop plate notch. Slightly twist the handle towards the bumper and rest the left-hand/front retaining pin in the notch. Observe that the retaining pin is long enough to fully secure the handle in the locked position. Push in and slightly twist the hand away from the bumper. Pull out on the handle until the right-hand/rear spring retaining pin and collar clears the outside bumper stop plate notch. Slightly twist the handle towards the bumper and rest the right-hand retaining pin in the notch.
18. Push the handle back in and store the lock pins in the locked position.

Hydraulic Maintenance

DANGER

Proceed with caution. Failure to heed warning will cause injury to person and/or damage to product and property.

- **DO NOT operate if the fuel system or brake system is leaking. Report it immediately to your supervisor or maintenance.**
- **ALWAYS report any Class 3 leak to your supervisor or maintenance immediately.**

IMPORTANT

Tractor must be equipped with a relief valve set at a maximum 2500 psi (17,237 kpa).

This trailer requires hydraulic power to operate, supplied by either the tractor or a trailer mounted hydraulic power pack.

Maintenance of the hydraulic system consists of inspection and minor servicing.

Fluid is lost and possible contamination in a leaking system and may cause poor function and premature failure within the components.

Fluid Leak Classification

IMPORTANT

- Any signs of a leaking fuel system or brake system, DO NOT operate and report it to your supervisor or maintenance immediately.
- Report any Class 3 leak to your supervisor or maintenance immediately and DO NOT operate.

NOTE

- Class 1 or 2 leaks may be operated but closely monitored and the fluid level checked more frequently.
- Report any leak to your supervisor or maintenance.

Leaks may be visible by signs of wetness appearing around components seals, gaskets, fittings, and hose/line connections. Leaking hoses may also show signs of staining that also indicates leakage.

- If any fittings or connections are loose, tighten.
- If any items are broken or defective report it.

Fluid Leak Classifications

- **Class 1:** Signs of wetness or stains that do not form drops.
- **Class 2:** Signs of drops forming but not dripping.
- **Class 3:** Signs of drops dripping.

Hydraulic Maintenance Schedule

NOTE

See Parts Manual on Page 7-1 *for mechanical, air, electrical and hydraulic components and diagrams.*

1. The hydraulic fluid level in the reservoir must be checked weekly, ***See Maintenance Schedule on Page 5-12.***

- Unless a leak/leaks develop, classify it, report it and monitor it more frequently.
  a. Retract all hydraulic cylinders.
  b. Hydraulic pump shut off.
  c. Operate the hydraulic control levers to release any line pressure back to the reservoir.
  d. Check fluid level in the reservoir. **DO NOT** overfill the reservoir, allow for fluid heat expansion.
  e. Use only recommended hydraulic fluid, ***See Lubrication Specifications on Page 5-11.***

2. Inspect the hydraulic system weekly.
   a. Start the hydraulic pump
   b. Operate each hydraulic control lever and observe for any leaks and the functionality of the system.
   c. Place the trailer back into travel position.
   d. Shut off the hydraulic pump.
3. Change hydraulic filter every 12 months or 25,000 miles, which ever comes first, ***See Maintenance Schedule on Page 5-12.***
   - Under adverse conditions, change more frequently.

Ramp Maintenance

Beavertail Ramp

DANGER

1. **ALWAYS check behind and under the truck and trailer for persons or objects before moving. Failure to check will lead to serious personal injury or death to others, or damage to property.**
2. **Stand clear of wings while folding/unfolding. Charge hydraulic fold cylinders with hydraulic oil before attempting to fold/unfold wings.**
3. **To prevent serious injury or death from pinching: Keep all persons and objects clear while any part of the machine is in motion.**
4. **DO NOT allow to free fall. The beavertail assembly weighs 1250 lbs (567 Kg), the ramps weigh 425 lbs (193 Kg) each, for a combined weight of 2100 lbs (953 Kg). Failure to comply will lead to serious personal injury or death to others, or damage to property.**

WARNING

1. **When working on a hydraulic system, ALWAYS ENSURE hydraulic lines have been depressurized. Hydraulic injection could cause loss of fingers and even death.**
2. **The Manual Raise Ramps (Option) uses torsion springs to assist in raising the ramp assembly. To prevent serious injury or death from pinching: Keep all persons and objects clear while any part of the machine is in motion.**

Remove - Beavertail Ramp

NOTE

See Parts Manual on Page 7-1 *for mechanical, air, electrical and hydraulic components and diagrams.*

1. Perform Beavertail Fold Down Procedures, ***See Beavertail Fold Down Procedures on Page 3-19.***
2. Perform Beavertail Ramp Raising Procedures, **ENSURE** the ramps are secured in the fully up position with the ramp chain. ***See Beavertail Ramp Fold Up Procedures on Page 3-20.***
3. Park on level surface, set parking brakes and chock the wheels.
4. For Hydraulic Ramps Only, remove the hydraulic cylinder and linkages. ***See Remove - Hydraulic Cylinder, Beavertail Ramp on Page 5-45.***
5. Using a mechanical lifting device and a sling, support the beavertail ramp and unsecure the ramp chain from the beavertail.
6. Remove two roll pins from the ramp pivot pin that secures the ramp to the beavertail. ***See Figure 5-19 on Page 5-44.***
7. For Manual Ramps (Option) Only, **ENSURE** ramp is in the fully up position to release the torsion spring tension.
8. Using a punch, drive the pivot pin through the beavertail and ramp hinge plates.
9. For Manual Ramps (Option) Only, remove two torsion springs and one spring support tube.
10. Remove the ramp from the beavertail using the mechanical lifting device.
11. Remove one lock nut, one wide flat washer, and one bolt that secures the chain assembly to the ramp.
12. For Manual Ramps (Option) Only, remove one lock nut, two narrow flat washers, and one spring that secures the pin lock to the beavertail assembly. Remove the pin lock from the beavertail.
13. Repeat steps 4 to 12 if second ramp needs removed.

Inspect and Repair - Beavertail Ramp

1. Inspect Ramp Assembly and Mating Surfaces for bends, burrs, cracks in metal or welds, dents, wear, distortion, and visual defects. Repair if defective, ***See Structural Defects on Page 5-4.***
2. Inspect Ramp Assembly and Mating Surfaces for corrosion, dirt, rust, grease. ***See Cleaning on Page 5-2.***
3. Inspect Pivot Pins for bends, breaks, burrs, cracks, dents, wear, signs of fatigue or brittle, visual defects and missing or defective parts. Replace if defective, ***See Repair Parts on Page 5-3.***
4. Inspect Pivot Pins for corrosion, dirt, grease, and rust. ***See Cleaning on Page 5-2.***
5. Inspect Beavertail Hinge Plate and Mating Surfaces for bends, burrs, cracks in metal or welds, dents, wear, distortion, and visual defects. Repair if defective, ***See Structural Defects on Page 5-4.***
6. Inspect Beavertail Hinge Plate and Mating Surfaces for corrosion, dirt, rust, grease. ***See Cleaning on Page 5-2.***
7. Inspect Ramp Chain for bends, breaks, burrs, cracks, dents, wear, signs of fatigue or brittle and visual defects. Inspect all links move freely. Replace if defective, ***See Repair Parts on Page 5-3.***

8. Inspect Ramp Chain for corrosion, dirt, grease, and rust. ***See Cleaning on Page 5-2.***
9. Inspect Ramp Chain Mounting Hardware for bends, breaks, burrs, cracks, dents, wear, signs of fatigue or brittle, tread condition and visual defects. Replace if defective, ***See Repair Parts on Page 5-3.***
10. Inspect Ramp Chain Mounting Hardware for corrosion, dirt, grease, and rust. ***See Cleaning on Page 5-2.***

Manual Ramp (Option) Only

11. Inspect Torsion Springs for bends, breaks, burrs, chips, cracks, dents, pits, wear, distortion, signs of fatigued or brittle and visual defects. Replace if defective, ***See Repair Parts on Page 5-3.***
12. Measure Torsion Spring inside diameter and length for compression or stretch. Spring inside diameter should be between 2.9950 to 3.2550 inches (76.073-82.677 mm). Spring tang leg length should be between 7.70 to 8.3 inches (195.58-210.82 mm). If out of tolerance, ***See Repair Parts on Page 5-3.***
13. Inspect Torsion Springs for corrosion, dirt, grease. ***See Cleaning on Page 5-2.***
14. Inspect Torsion Support Tube for bends, burrs, cracks in metal or welds, dents, wear, distortion, and visual defects. Repair if defective, ***See Repair Parts on Page 5-3.***
15. Inspect Torsion Support Tube for corrosion, dirt, rust, grease. ***See Cleaning on Page 5-2.***
16. Inspect Ramp Lock Pin for bends, breaks, burrs, cracks, dents, wear, signs of fatigue or brittle, tread condition and visual defects. Replace if defective, ***See Repair Parts on Page 5-3.***
17. Inspect Ramp Lock Pin for corrosion, dirt, rust, grease. ***See Cleaning on Page 5-2.***
18. Measure Ramp Lock Pin Spring outside diameter and length for compression or stretch. Spring inside diameter should be between .830 to .860 inches 21.082-21.844 mm). Spring tang leg length should be between 3.90 to 4.10 inches (99.06-104.14 mm). If out of tolerance, ***See Repair Parts on Page 5-3.***
19. Inspect Ramp Lock Pin Spring for corrosion, dirt, grease. ***See Cleaning on Page 5-2.***
20. Inspect Ramp Lock Pin Mounting Hardware for bends, breaks, burrs, cracks, dents, wear, signs of fatigue or brittle, tread condition and visual defects. Replace if defective, ***See Repair Parts on Page 5-3.***
21. Inspect Ramp Lock Pin Mounting Hardware for corrosion, dirt, grease. ***See Cleaning on Page 5-2.***

Install - Beavertail Ramp

NOTE

See Parts Manual on Page 7-1 *for mechanical, air, electrical and hydraulic components and diagrams.*

1. For manual ramps (OPTION) **ONLY**, Install pin lock through the beavertail hinge plate lower hole. Install one narrow flat washer, one spring, one narrow flat washer, and one lock nut to secure the lock pin to the beavertail, ***See Figure 5-19***
2. Install the one bolt, one wide flat washer, and one lock nut to secure the chain assembly to the ramp's outside.
3. Using a mechanical lifting device and sling, support the beavertail ramp.
4. Align ramp hinge pin holes to the beavertail hinge pin holes using the mechanical lifting device.
5. For manual ramps (OPTION) **ONLY**, install two torsion springs onto the spring support tube. Position the spring tangs to be against the beavertail assembly. Align the top spring tangs with the ramp support plate holes.
6. Install the pivot pin that secures the ramp to the beavertail.
7. Install one roll pin on each side of the pivot pin.
8. Secure the ramp chain to the beavertail tie down, remove the sling and mechanical lifting device.
9. For hydraulic ramps **ONLY**, install the hydraulic cylinder and linkages, ***See Install - Hydraulic Cylinder, Beavertail Ramp on Page 5-46.***
10. Repeat steps 1 to 9 if second ramp needs installed.

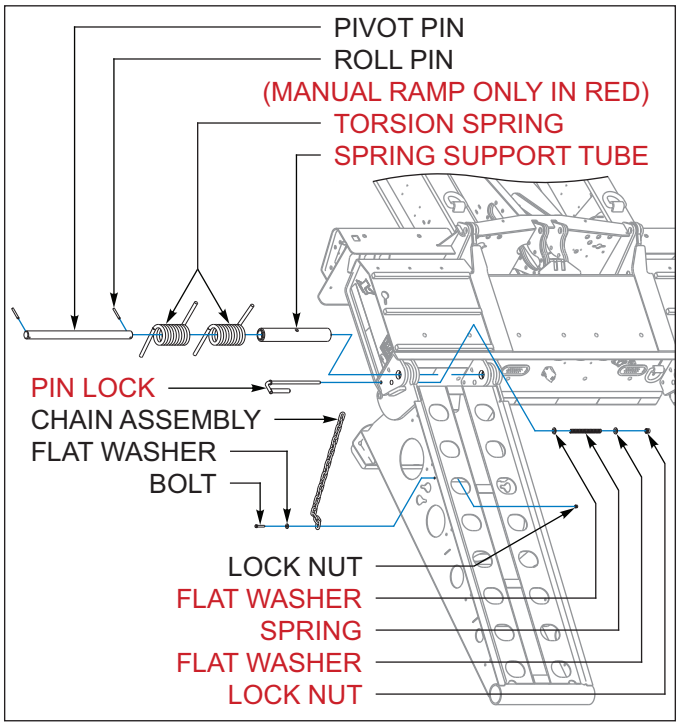


Figure 5-19: Beavertail Ramp

Beavertail Ramp - Hydraulic Cylinder

DANGER

1. **ALWAYS check behind and under the truck and trailer for persons or objects before moving. Failure to check will lead to serious personal injury or death to others, or damage to property.**
2. **Stand clear of wings while folding/unfolding. Charge hydraulic fold cylinders with hydraulic oil before attempting to fold/unfold wings.**
3. **To prevent serious injury or death from pinching: Keep all persons and objects clear while any part of the machine is in motion.**
4. **DO NOT allow to free fall. The beavertail assembly weighs 1250 lbs (567 Kg), the ramps weigh 425 lbs (193 Kg) each, for a combined weight of 2100 lbs (953 Kg). Failure to comply will lead to serious personal injury or death to others, or damage to property.**

WARNING

1. **When working on a hydraulic system, ALWAYS ENSURE hydraulic lines have been depressurized. Hydraulic injection could cause loss of fingers and even death.**
2. **The manual raise ramps (OPTION) uses torsion springs to assist in raising the ramp assembly. To prevent serious injury or death from pinching: Keep all persons and objects clear while any part of the machine is in motion.**

CAUTION

1. **The hydraulic cylinder weighs 20 lbs (10 Kg). Failure to comply could lead to serious damage to property, personal injury or death.**

Remove - Hydraulic Cylinder, Beavertail Ramp

NOTE

See Parts Manual on Page 7-1 *for mechanical, air, electrical and hydraulic components and diagrams.*

1. Perform beavertail fold down procedures, ***See Beavertail Fold Down Procedures on Page 3-19.***
2. Perform beavertail ramp raising procedures, **ENSURE** the ramps are secured in the fully up position with the ramp chain, ***See Beavertail Ramp Fold Up Procedures on Page 3-20.***
3. Park on level surface, set parking brakes and chock the wheels.
4. Shut off hydraulic power source.
5. Zero out hydraulic pressure in hoses by pushing in and pulling out on the assigned control lever located in the gooseneck control box. For **Hydraulic Flip Beavertail and Ramps (Option)**, place the diverter valve switch into the Ramps position located in the gooseneck control box.
6. Then pushing in and pulling out on the assigned control lever located in the gooseneck control box. Place the diverter valve switch into the Tails + Ramps position to shut power off to the diverter valve.
7. Place a drip pan under the cylinder.
8. Loosen two hydraulic hoses enough from the cylinder fittings to bleed off any residual pressure remaining in the hoses, ***See Figure 5-20.***
9. Label both hydraulic hoses where they go and remove both hoses.
10. Plug the open ends of the hoses and cylinder fittings.
11. Remove two cotter pins and two narrow flat washers from the top pivot pin that secures the inside link to the ramp inside hinge plate, ***See Figure 5-20.***
12. Using a punch, drive the pin through the link and ramp hinge plate.
13. Remove two cotter pins from the bottom pivot pin that secures the inside link to outside links.
14. Using a punch, drive the pin through the outside and inside links and remove the inside link.
15. Remove two cotter pins and two narrow flat washers from the pivot pin that secures the hydraulic cylinder to the two-outside links.
16. Using a punch, drive the pin through the outside links and hydraulic cylinder rod end clevis.
17. Remove two cotter pins from the pivot pin that secures the hydraulic cylinder base end clevis to the beavertail mount.
18. Using a punch, drive the pin through the beavertail mount and hydraulic cylinder base end clevis.
19. Remove the cylinder from the beavertail mount.
20. Remove two cotter pins from the top pivot pin that secures the outside links to the beavertail mount.
21. Using a punch, drive the pin through the outside links and beavertail mount.
22. Remove one 90° elbow, and one straight fitting, from the cylinder.

23. Repeat steps 6 to 21 if second ramp cylinder needs removed.

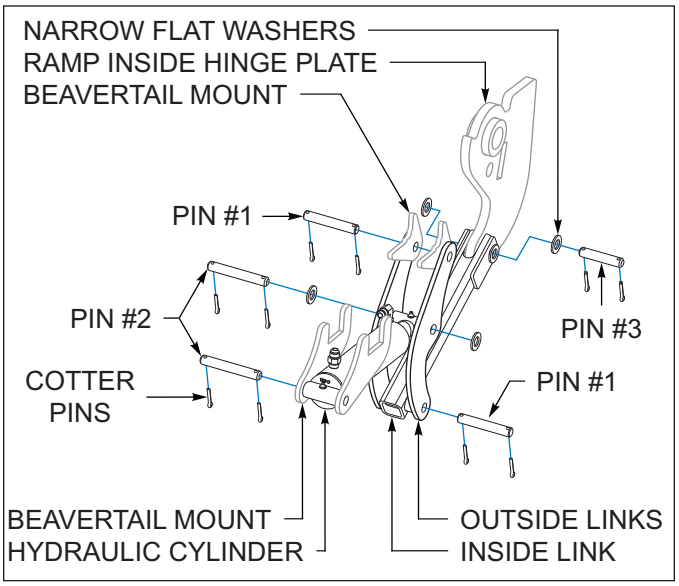


Figure 5-20: Beavertail Hydraulic Cylinder

Inspect and Repair - Hydraulic Cylinder, Beavertail Ramp

1. Inspect hydraulic hoses for bends, breaks, bulges, cuts, deterioration, flat spots, kinks, wear, wet spots, signs of fatigued or brittle and visual defects. Replace if defective, ***See Repair Parts on Page 5-3.***
2. Inspect hydraulic hose fittings for cracks, dents, corrosion, thread damage, wear, and visual defects. Replace if defective, ***See Repair Parts on Page 5-3.***
3. Inspect hydraulic hoses and fittings for corrosion, dirt, rust, grease. ***See Cleaning on Page 5-2.***
4. Inspect cylinder, shaft, and clevis for bends, breaks, burrs, cracks, dents, wear, signs of fatigue or brittle, visual defects and missing or defective parts. Repair or replace if defective, ***See Repair Parts on Page 5-3.***
5. Inspect cylinder fittings for cracks, dents, corrosion, thread damage, wear, and visual defects. Replace if defective, ***See Repair Parts on Page 5-3.***
6. Inspect cylinder and fittings for corrosion, dirt, rust, grease, ***See Cleaning on Page 5-2.***
7. Inspect pivot pins and flat washers for bends, breaks, burrs, cracks, dents, wear, signs of fatigue or brittle, visual defects and missing or defective parts. Replace if defective, ***See Repair Parts on Page 5-3.***
8. Inspect pivot pins and flat washers for corrosion, dirt, grease, and rust. ***See Cleaning on Page 5-2.***
9. Inspect linkages for bends, breaks, burrs, cracks, dents, wear, signs of fatigue or brittle, visual defects and missing or defective parts. Replace if defective, ***See Repair Parts on Page 5-3.***
10. Inspect linkages for corrosion, dirt, grease, and rust. ***See Cleaning on Page 5-2.***
11. Inspect flip beavertail and ramp mount brackets and mating surfaces for bends, burrs, cracks in metal or welds, dents, wear, distortion, and visual defects. Repair if defective, ***See Structural Defects on Page 5-4.***
12. Inspect flip beavertail and ramp mount brackets and mating surfaces for corrosion, dirt, rust, grease, ***See Cleaning on Page 5-2.***

Install - Hydraulic Cylinder, Beavertail Ramp

NOTE

See Parts Manual on Page 7-1 *for mechanical, air, electrical and hydraulic components and diagrams.*

1. Install one straight fitting on the base end, and one 90° elbow, on the cylinder rod end that faces the base end of the cylinder, ***See Hydraulic Fitting Torque Specifications on Page 2-5.***
2. Align the two-outside links to the beavertail mount, ***See Figure 5-20.***
3. Install **Pivot Pin #1**, 3/4 in x 4-5/8 in (1.905 x 11.7475 cm), to secure the two-outside links to the upper beavertail mount.
4. Install one cotter pin on each side of the pivot pin and bend the tangs over.
5. Align the hydraulic cylinder base end clevis to the beavertail mount with the fittings facing the bottom of the beavertail assembly
6. Install **Pivot Pin #2**, 3/4 in x 5-1/4 in (1.905 x 13.335 cm), to secure the cylinder base end clevis to the beavertail mount.
7. Install one cotter pin on each side of the pivot pin and bend the tangs over.
8. Align the hydraulic cylinder rod end clevis to the two-outside links middle hole.
9. Install **Pivot Pin #2**, 3/4 in x 5-1/4 in (1.905 x 13.335 cm), pivot pin to secure the cylinder rod end clevis to the two-outside links.
10. Install one cotter pin and one narrow flat washer on each side of the pivot pin and bend the tangs over.
11. Align the outside links bottom hole to the inside link extension bushing. The extended side of the bushing will face to the outside of the trailer.
12. Install **Pivot Pin #1**, 3/4 in x 4-5/8 in (1.905 x 11.7475 cm), to secure the outside links to the lower inside link.
13. Install one cotter pin on each side of the pivot pin and bend the tangs over.
14. Align the inside link to the ramp hinge plate.

15. Install **Pivot Pin #3**, 3/4 in x 3-3/4 in (1.905 x 9.525 cm), to secure the inside link to the ramp hinge plate.
16. Install one cotter pin and one narrow flat washer on each side of the pivot pin and bend the tangs over.
17. Remove plugs and install the hydraulic hoses to the cylinder fittings labeled to. ***See Hydraulic Fitting Torque Specifications on Page 2-5.***
18. Repeat steps 1 to 17 if second ramp cylinder needs replaced.
19. Test and bleed air from the hydraulic system and operation by fully raising and lowering the flip axle assembly multiple times. ***See Beavertail Ramp Fold Down Procedures on Page 3-20*** and ***See Beavertail Ramp Fold Up Procedures on Page 3-20***
20. Observe cylinder, hoses, and fittings for leaks. Also observe functionality and smooth operation.

Front Power Ramp Assembly

DANGER

1. **ALWAYS check behind and under the truck and trailer for persons or objects before moving. Failure to check will lead to serious damage to property, personal injury or death.**
2. **When crawling under the trailer is necessary, chock all wheels of the trailer and tractor. When jacking is necessary, chock all wheels and support the trailer with jack stands sufficient to withstand the weight of the semitrailer and load. Failure to take adequate safety measures will result in serious personal injury or death.**
3. **To prevent serious injury or death from pinching: Keep all persons and objects clear while any part of the machine is in motion.**
4. **DO NOT allow to free fall. The Short Ramp Assembly weighs 450 lbs (240Kg), the Long Ramp Assembly weighs 950 lbs (431 Kg). Failure to comply will lead to serious damage to property, personal injury or death.**

WARNING

1. **When working on a hydraulic system, ALWAYS ENSURE hydraulic lines have been depressurized. Hydraulic injection could cause loss of fingers and even death.**

WARNING

2. **The Long Ramp Option (ONLY) uses torsion springs to assist in raising the ramp assembly. It is highly recommended to contact an authorized Landoll Service Center for servicing and repair. To prevent serious injury or death from pinching: Keep all persons and objects clear while any part of the machine is in motion.**

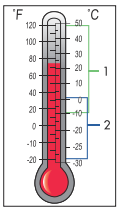
ATTENTION: BATTERY

1. CHECK BATTERY VOLTAGE BEFORE USE.
2. POWER UNIT PERFORMS BEST WITH A FULLY CHARGED BATTERY



CAUTION: RECOMMENDED HYDRAULIC OILS

1. +14°F to +120°F (-10°C TO +49°C) ISO 22, 32, ATF
2. - 20°F to +32°F (-29°C TO +0°C) ISO 15
3. AVATION OILS (MIL-H 5606 Type) MAY BE USED IN PROLONGED EXTREME COLD CLIMATES



WARNING:

1. MIXING HYDRAULIC OILS WILL VOID WARRANTY.
2. OPERATING UNDER LOW BATTERY VOLTAGE CONDITIONS MAY RESULT IN DAMAGE TO POWER UNIT.

Bleed Procedures - Front Power Ramp Hydraulic Power Pack (Option)

1. **ENSURE** the manual override valve handle is pulled fully down to the open position, ***See Figure 5-21***
2. Clear the ramp's travel path for personnel or obstructions.
3. Remove any straps or chains that are securing the ramp in the up position.
4. Press and hold the remote up button running the pump for 5 seconds. The ramp should not move, and the pump should run.
5. Press and hold the remote down button running the pump for 5 seconds. The ramp should not move, and the pump should run.
6. Close the manual override valve by pushing the handle to the fully up position, ***See Figure 5-21***
7. Using the cable remote, press and hold the down button and lower the ramp to the fully down position.
8. Check hydraulic fluid level in the reservoir. If fluid shows signs of air or foam, allow to settle before continuing. Fill reservoir if below ½ full. ***See Lubrication Specifications on Page 5-11.***
9. Perform bleed procedures: Using the cable remote, operate the ramp normally up and down two times, observe function and check for leaks.

10. Check hydraulic fluid level in the reservoir. If fluid shows signs of air or foam, allow to settle before continuing. Fill reservoir if below ½ full. ***See Lubrication Specifications on Page 5-11.***
11. Perform function test: Using the cable remote, raise the ramp to the fully up position. Observe drive chains, drive sprockets, and ramp assembly for erratic or binding operation. Check for leaks in the hydraulic system. Inspect that the ramp assembly is fully up and resting against the stop blocks. Using the cable remote, lower the ramp to the fully down position. Observe drive chains, drive sprockets, and ramp assembly for erratic or binding operation. Check for leaks in the hydraulic system. Inspect the ramp assembly fully rest on and slightly adjust to the ground level. If faults exist, ***See Ramp, Front Power (Option) Problems on Page 6-8.***
12. Raise the ramp to the fully up position.
13. The trailer may be placed back in to service.

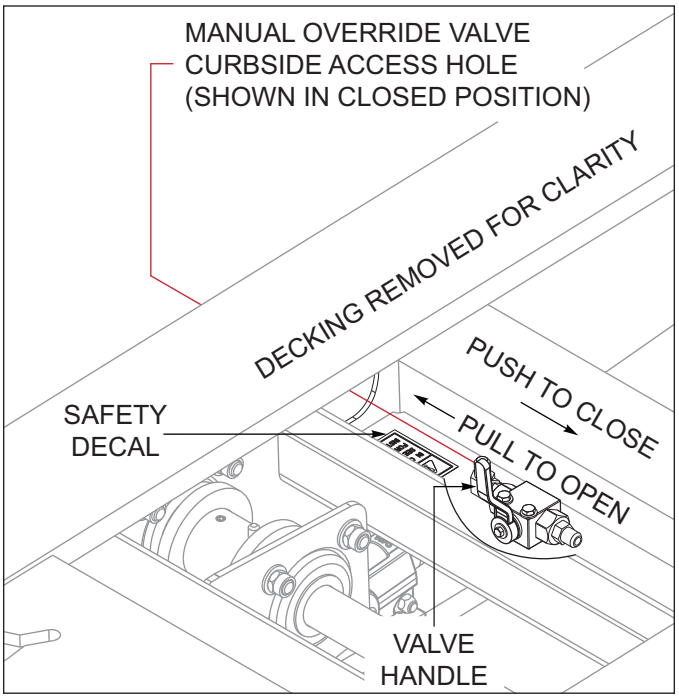


Figure 5-21: Manual Override Valve

Remove - Front Power Ramp Assembly

NOTE

See Parts Manual on Page 7-1 *for mechanical, air, electrical and hydraulic components and diagrams.*

1. Park on level surface, set parking brakes and chock the wheels. Detach the gooseneck assembly from the trailer.
2. Leave the Front Power Ramp Assembly in the fully up position to access mounting hardware. For long ramp option, will also release spring torsion.
3. Remove bridge assembly, ***See Remove - Bridge Assembly, Front Power Ramp on Page 5-49.***
4. Disconnect the hydraulic power unit battery terminals from the battery located in the hydraulic power unit compartment. ***See Figure 3-24 on Page 3-24.***
5. Using a mechanical lifting device and sling, support the ramp assembly in the fully up position.
6. Remove the top mount bolt, two wide flat washers, one bushing, one square washer, and one lock nut from each side that secures the ramp to the pivot arms. The ramp assembly will pivot to square up to the sling.
7. Remove the lower mount bolt, one wide flat washer, one narrow flat washer one bushing, one square washer, and one lock nut from each side that secures the ramp to the pivot arms.
8. Lift the ramp from the pivot arms with the mechanical lifting device.

Inspect and Repair - Front Power Ramp Assembly

1. Inspect Bolts, Washers, Bushings and Lock Nuts for bends, breaks, burrs, cracks, dents, wear, signs of fatigue or brittle, tread condition and visual defects. Replace if defective, ***See Repair Parts on Page 5-3.***
2. Inspect Bolts, Washers, Bushings and Lock Nuts for corrosion, dirt, grease, and rust. ***See Cleaning on Page 5-2.***
3. Inspect Ramp Assembly for burrs, cracks in metal or welds, dents, wear, distortion, and visual defects. Repair if defective, ***See Repair Parts on Page 5-3.***
4. Inspect Ramp Assembly for bends, burrs, cracks in metal or welds, dents, wear, distortion, and visual defects. Repair if defective, ***See Repair Parts on Page 5-3.***
5. Inspect Ramp Assembly for corrosion, dirt, grease. ***See Cleaning on Page 5-2.***
6. Inspect Pivot Arm Assemblies for burrs, cracks in metal or welds, dents, wear, distortion, and visual defects. Repair if defective, ***See Repair Parts on Page 5-3.***
7. Inspect Pivot Arm Assemblies for bends, burrs, cracks in metal or welds, dents, wear, distortion, and visual defects. Repair if defective, ***See Structural Defects on Page 5-4.***
8. Inspect Pivot Arm Assemblies for corrosion, dirt, grease. ***See Cleaning on Page 5-2.***

Install - Front Power Ramp Assembly

NOTE

See Parts Manual on Page 7-1 *for mechanical, air, electrical and hydraulic components and diagrams.*

1. **ENSURE** pivot arms are in the fully up position to access mounting hardware. For long ramp option **ONLY**, will also release spring torsion.
2. Using a mechanical lifting device and sling, lower the ramp assembly between the pivot arms.
3. Align the lower mount holes.
4. Install the lower mount bolt, one wide flat washer, one bushing, one square washer, one narrow flat washer, and one lock nut on each side that secures the ramp to the pivot arms. The Bushings should protrude slightly to allow movement.
5. Align the upper mount holes.
6. Install the upper mount bolt, one wide flat washer, one bushing, one square washer, one wide flat washer, and one lock nut on each side that secures the ramp to the pivot arms. The Bushings should protrude slightly to allow movement. ***See General Torque Specifications on Page 2-4.***
7. Check hydraulic power unit fluid level in reservoir is over 1/2 full. ***See Ramp, Front Power (OPTION) on Page 5-10.***
8. Connect the hydraulic power unit battery terminals to the battery located in the hydraulic power unit compartment. ***See Figure 3-24 on Page 3-24.***
9. Install front power ramp bridge assembly, ***See Install - Bridge Assembly, Front Power Ramp on Page 5-50.***
10. Remove the mechanical lifting device and sling.
11. Perform bleed procedures, ***See on Page 5-47.***

Front Power Ramp - Bridge Assembly

DANGER

1. **ALWAYS check behind and under the truck and semitrailer for persons or objects before moving. Failure to check will lead to serious damage to property, personal injury or death.**
2. **When crawling under the semitrailer is necessary, chock all wheels of the trailer and tractor. When jacking is necessary, chock all wheels and support the semitrailer with jack stands sufficient to withstand the weight of the semitrailer and load. Failure to take adequate safety measures will result in serious personal injury or death.**
3. **To prevent serious injury or death from pinching: Keep all persons and objects clear while any part of the machine is in motion.**

WARNING

1. **DO NOT allow to free fall. This assembly weighs 200 lbs (91 Kg). Failure to comply could lead to serious damage to property, personal injury or death.**
2. **The Long Ramp Option (ONLY) uses torsion springs to assist in raising the ramp assembly. It is highly recommended to contact an authorized Landoll Service Center for servicing and repair.**
3. **To prevent serious injury or death from pinching: Keep all persons and objects clear while any part of the machine is in motion.**

Remove - Bridge Assembly, Front Power Ramp

NOTE

See Parts Manual on Page 1-2 *for mechanical, air, electrical and hydraulic components and diagrams.*

1. Park on level surface, set parking brakes and chock the wheels. Detach the gooseneck assembly from the trailer.
2. Leave the Front Power Ramp Assembly in the fully up position to access mounting hardware. For long ramp option, will also release spring torsion.
3. Secure the front power ramp assembly in the fully up position to the trailer with straps or chains.
4. Secure and support the rear bridge from downward movement.
5. Drive two roll pins each out of the three lower hinge pins that secure the center bridge to the rear bridge.
6. Drive three lower hinge pins out that secure the center bridge to the rear bridge and move the rear bridge out of the way.
7. Secure and support the center bridge from falling and rotation.
8. Drive two roll pins each out of the three upper hinge pins that secure the center bridge to the ramp.
9. Drive three upper hinge pins out that secure the center bridge to the ramp and move center bridge out of the way.

Inspect and Repair - Bridge Assembly, Front Power Ramp

1. Inspect Trailer area where bridge assembly contacts for bends, burrs, cracks in metal or welds, dents, wear, distortion, and visual defects. Replace if defective, ***See Repair Parts on Page 5-3.***

2. Inspect Trailer area where bridge assembly contacts for bends, burrs, cracks in metal or welds, dents, wear, distortion, and visual defects. Repair if defective, ***See Structural Defects on Page 5-4.***Inspect Trailer area where bridge assembly contacts for corrosion, dirt, rust, grease. ***See Cleaning on Page 5-2.***.
3. Inspect Trailer area where bridge assembly contacts for corrosion, dirt, rust, grease. ***See Cleaning on Page 5-2.***
4. Inspect Center and Rear Bridge Assemblies for bends, burrs, cracks in metal or welds, dents, wear, distortion, and visual defects. Replace if defective, ***See Repair Parts on Page 5-3.***
5. Inspect Center and Rear Bridge Assemblies for bends, burrs, cracks in metal or welds, dents, wear, distortion, and visual defects. Repair if defective, ***See Structural Defects on Page 5-4.***
6. Inspect Center and Rear Bridge Assemblies for corrosion, dirt, rust, grease. ***See Cleaning on Page 5-2.***
7. Inspect Hinge and Roll Pins for bends, breaks, burrs, cracks, dents, wear, signs of fatigue or brittle, visual defects and missing or defective parts. Replace if defective, ***See Repair Parts on Page 5-3.***
8. Inspect Hinge and Roll Pins for corrosion, dirt, grease, and rust. ***See Cleaning on Page 5-2.***

Install - Bridge Assembly, Front Power Ramp

NOTE

See Parts Manual on Page 7-1 *for mechanical, air, electrical and hydraulic components and diagrams.*

1. Park on level surface, set parking brakes and chock the wheels. Detach the gooseneck assembly from the trailer.
2. Leave the Front Power Ramp Assembly in the fully up position to access mounting hardware. For long ramp option, will also release spring torsion.
3. Secure and support the center bridge from falling and rotation.
4. Align center bridge and ramp hinge points.
5. Drive three hinge pins in that secure center bridge to ramp.
6. Drive two roll pins in each of the three hinge pins to secure the hinge pins.
7. Elevate and support the rear bridge, aligning the center and rear bridge hinge points.
8. Drive two roll pins in each of the three hinge pins to secure the hinge pins.
9. Remove any straps or chains that are securing the ramp in the up position.

Front Power Ramp - Lift System

DANGER

1. **ALWAYS check behind and under the truck and semitrailer for persons or objects before moving. Failure to check will lead to serious damage to property, personal injury or death.**
2. **When crawling under the semitrailer is necessary, chock all wheels of the trailer and tractor. When jacking is necessary, chock all wheels and support the semitrailer with jack stands sufficient to withstand the weight of the semitrailer and load. Failure to take adequate safety measures will result in serious personal injury or death.**
3. **To prevent serious injury or death from pinching: Keep all persons and objects clear while any part of the machine is in motion.**
4. **DO NOT allow to free fall. The Short Ramp Assembly weighs 450 lbs (240Kg), the Long Ramp Assembly weighs 950 lbs (431 Kg). Failure to comply will lead to serious damage to property, personal injury or death.**

WARNING

1. **The Long Ramp Option (ONLY) uses torsion springs to assist in raising the ramp assembly. It is highly recommended to contact an authorized Landoll Service Center for servicing and repair.**
2. **To prevent serious injury or death from pinching: Keep all persons and objects clear while any part of the machine is in motion.**

Remove - Lift System, Front Power Ramp

NOTE

See Parts Manual on Page 7-1 *for mechanical, air, electrical and hydraulic components and diagrams.*

1. Park on level surface, set parking brakes and chock the wheels. Detach the gooseneck assembly from the trailer.
2. Leave the Front Power Ramp Assembly in the fully up position to access mounting hardware. **ONLY** the long ramp option uses torsion springs, the fully up position release spring torsion pressure.

3. Using a mechanical lifting device, raise the front end of the trailer and support to work underneath.
4. Zero out hydraulic pressure in the hoses by pulling the Manual Override Valve Handle to the open position, ***See Figure 5-21 on Page 5-48.***
5. Remove front power ramp, ***See Remove - Front Power Ramp Assembly on Page 5-48.***
6. Remove the drive shield front mount bolt, flat washer, and lock nut. Remove the remaining three lock nuts, fifteen flat washers, and three bolts that secure the shields on each side of the trailer.
7. Remove chain idler pulley mount bolt, idler bushing support, idler bushing washer, and lock nut on each side of the trailer.
8. Disconnect the chain master link and remove the chain on each side of the trailer.
9. Remove four bolts and four lock washer that secure the pivot arm cover, pivot arm, two pivot spacers, and sprocket to the pivot arm anchor on each side of the trailer.
10. Pull out the pivot arm anchor on each side of the trailer.
11. Remove one shim and two bearing bands from the pivot arm anchors.
12. For Long Ramp Option Only: The torsion springs are directional and specific to each side of the trailer and are not labeled. Recommend labeling them to the sided being pulled from. Pull out one pivot arm torsion spring from each side of the trailer.

Inspect and Repair - Lift System, Front Power Ramp

1. Inspect Mounting Hardware, Idler Bushing Supports and Washers for bends, breaks, burrs, cracks, dents, wear, signs of fatigue or brittle, tread condition and visual defects. Replace if defective, ***See Repair Parts on Page 5-3.***
2. Inspect Mounting Hardware, Idler Bushing Supports and Washers for corrosion, dirt, grease, and rust. ***See Cleaning on Page 5-2.***
3. Inspect Drive Shields for bends, burrs, cracks, dents, wear, distortion, and visual defects. Replace if defective, ***See Repair Parts on Page 5-3.***
4. Inspect Drive Shields for corrosion, dirt, rust, grease. ***See Cleaning on Page 5-2.***
5. Inspect Drive Chains for bends, breaks, burrs, cracks, dents, wear, signs of fatigue or brittle and visual defects. Inspect all links move freely. Replace if defective, ***See Repair Parts on Page 5-3.***
6. Inspect Drive Chains for corrosion, dirt, grease, and rust. ***See Cleaning on Page 5-2.***
7. Inspect Drive Chain Sprockets and Spacers for bends, breaks, burrs, cracks, dents, wear, signs of fatigue, brittle, or warping and visual defects. Replace if defective, ***See Repair Parts on Page 5-3.***
8. Inspect Drive Chain Sprockets and Spacers surfaces for corrosion, dirt, grease. ***See Cleaning on Page 5-2.***
9. Inspect Idler Pulleys for bends, breaks, burrs, cracks, dents, wear, signs of fatigue or brittle and visual defects. Inspect pulley spins freely. Replace if defective, ***See Repair Parts on Page 5-3.***
10. Inspect Idler Pulleys surfaces for corrosion, dirt, grease. ***See Cleaning on Page 5-2.***
11. Inspect Pivot Arms and Covers for bends, burrs, cracks, dents, wear, distortion, and visual defects. Replace if defective, ***See Repair Parts on Page 5-3.***
12. Inspect Pivot Arms and Covers for corrosion, dirt, rust, grease. ***See Cleaning on Page 5-2.***
13. Inspect Pivot Anchors and Trailer mating surfaces for bends, breaks, burrs, cracks in metal or welds, dents, wear, distortion, thread condition and visual defects. Repair if defective, ***See Repair Parts on Page 5-3.***
14. Inspect Pivot Anchors and Trailer mating surfaces for corrosion, dirt, grease. ***See Cleaning on Page 5-2.***
15. Inspect Pivot Anchor Shims and Bearing Bands for bends, breaks, burrs, chips, cracks, dents, pits, wear, distortion, signs of fatigued or brittle and visual defects. Replace if defective, ***See Repair Parts on Page 5-3.***
16. For Long Ramp Option Only: Inspect Anchor Pivot Torsion Springs for bends, breaks, bulges, cuts, deterioration, kinks, wear, signs of fatigued or brittle and visual defects. Replace if defective, ***See Repair Parts on Page 5-3.***
17. For Long Ramp Option Only: Inspect Anchor Pivot Torsion Springs for corrosion, dirt, grease. ***See Cleaning on Page 5-2.***

Install - Lift System, Front Power Ramp

NOTE

See Parts Manual on Page 7-1 *for mechanical, air, electrical and hydraulic components and diagrams.*

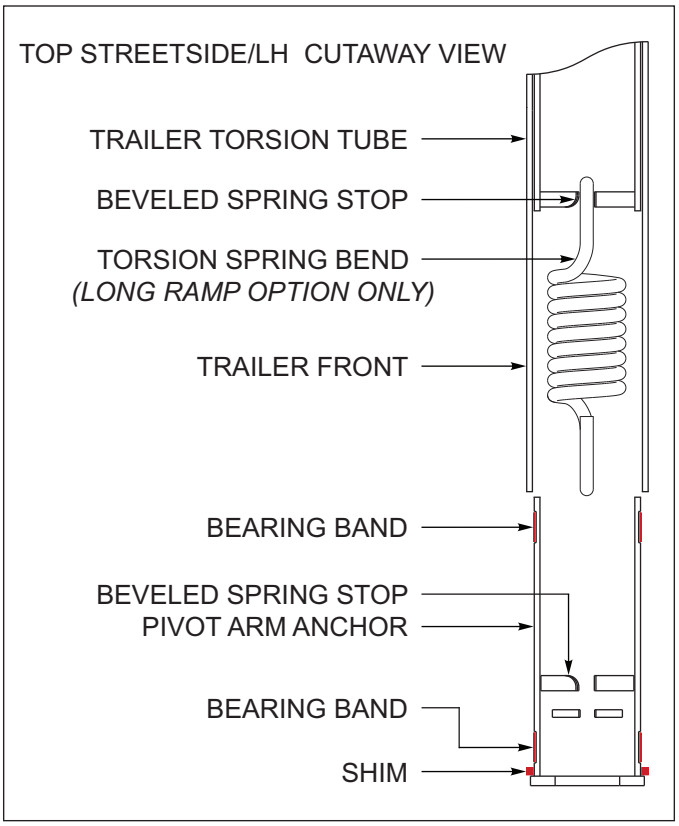


Figure 5-22: Pivot Anchor Assembly

1. For Long Ramp Option Only: The torsion springs are directional and specific to each side of the trailer. Align the torsion spring bend to the trailer torsion tube beveled spring stop. Push in the spring until it stops. Inspect torsion spring bend forms to the trailer torsion tube bevel stop. And if the top of the spring rotates forward, the spring will coil tighter and not uncoil. ***See Figure 5-22.***
2. Install one shim and two bearing bands onto the pivot arm anchor for each side of the trailer. ***See Figure 5-22.***
3. For Long Ramp Option Only: On each side of the trailer rotate and align the pivot arm anchor beveled spring stop to the torsion spring bend. Push in the pivot arm anchor until it stops. Inspect torsion spring bend forms to the pivot arm anchor bevel stop. ***See Figure 5-22.***
4. For Short Ramp Option Only: Push in the pivot arm anchor until it stops on each side of trailer.
5. Position the pivot arm fully up and against the trailer pivot arm stop block. Install four bolts, four lock washers, pivot arm cover, pivot arm, one pivot spacer, sprocket, and one pivot spacer and secure it to the pivot anchor on both side of the trailer.
6. Install the drive chain around the drive and lift sprockets, fasten the chain ends together with the master link on each side of the trailer. To adjust the drive chain, add or remove ½ links to obtain fit.
7. Install chain idler pulley with one mount bolt, idler bushing support, idler bushing washer, and one lock nut on each side to the trailer. ***See General Torque Specifications on Page 2-4.***
8. Install the drive shield front mount bolt, flat washer, and lock nut. Install the remaining three lock nuts, fifteen flat washers, and three bolts that secure the shields to each side of the trailer.
9. Install front power ramp, ***See Install - Front Power Ramp Assembly on Page 5-48.***
10. Perform bleed procedures, ***See on Page 5-47.***

Front Power Ramp - Drive System

DANGER

1. **ALWAYS check behind and under the truck and semitrailer for persons or objects before moving. Failure to check will lead to serious damage to property, personal injury or death.**
2. **When crawling under the semitrailer is necessary, chock all wheels of the trailer and tractor. When jacking is necessary, chock all wheels and support the semitrailer with jack stands sufficient to withstand the weight of the semitrailer and load. Failure to take adequate safety measures will result in serious personal injury or death.**
3. **To prevent serious injury or death from pinching: Keep all persons and objects clear while any part of the machine is in motion.**
4. **DO NOT allow to free fall. The Short Ramp Assembly weighs 450 lbs (204 Kg), the Long Ramp Assembly weighs 950 lbs (431 Kg). Failure to comply will lead to serious damage to property, personal injury or death.**

WARNING

1. **The Long Ramp Option (ONLY) uses torsion springs to assist in raising the ramp assembly. It is highly recommended to contact an authorized Landoll Service Center for servicing and repair.**
2. **To prevent serious injury or death from pinching: Keep all persons and objects clear while any part of the machine is in motion.**

Remove - Drive System, Front Power Ramp

NOTE

See Parts Manual on Page 7-1 *for mechanical, air, electrical and hydraulic components and diagrams.*

1. Park on level surface, set parking brakes and chock the wheels. Detach the gooseneck assembly from the trailer.
2. Leave the Front Power Ramp Assembly in the fully up position to access mounting hardware. **ONLY** the long ramp option uses torsion springs, the fully up position release spring torsion pressure.
3. Secure the front power ramp assembly in the fully up position to the trailer with straps or chains.
4. Using a mechanical lifting device, raise the front end of the trailer and support to work underneath.
5. Zero out hydraulic pressure in the hoses by pulling the manual override valve to the fully down position, ***See Figure 5-21 on Page 5-48.***
6. Inspect that the straps or chains securing the ramp assembly have not loosen, tighten if needed.
7. Remove bridge assembly, ***See Remove - Bridge Assembly, Front Power Ramp on Page 5-49.***
8. Disconnect the hydraulic power unit battery terminals from the battery located in the hydraulic power unit compartment. ***See Figure 3-24 on Page 3-24.***
9. Remove hydraulic power unit compartment lid assembly, by unhooking the double ended snap from the retaining chain.
10. Remove drive shield front mount bolt, flat washer, and lock nut. Remove the remaining three lock nuts, fifteen flat washers, and three bolts that secure the shields on each side of the trailer.
11. Remove chain idler pulley mount bolt, idler bushing support, idler bushing washer, and lock nut on each side of the trailer.
12. Disconnect the chain master link and remove the chain on each side of the trailer.
13. Remove lift sprocket set screw and pull the sprocket off the drive shaft on each side of the trailer.
14. Remove square key from drive shaft on both sides.
15. Remove two cotter pins from the pivot pin that secures the cylinder rod end clevis to drive shaft collar on both sides of trailer.
16. Drive out pivot pins from both cylinder rod end clevises.
17. Remove two set screws from the drive shaft collar of each side of the trailer.
18. Push drive shaft in enough to remove the drive shaft collar and square key from both sides of the trailer.
19. Pull drive shaft out through the flanged bearings.
20. Remove four carriage bolts, four flat washer, and four lock nuts that secure the five flanged bearings to the trailer.

Inspect and Repair- Drive System, Front Power Ramp

1. Inspect Mounting Hardware, Idler Bushing Supports, Washers, Pivot Pins, Set Screws, and Square Keys for bends, breaks, burrs, cracks, dents, wear, signs of fatigue or brittle, tread condition and visual defects. Replace if defective, ***See Repair Parts on Page 5-3.***
1. Inspect Mounting Hardware, Idler Bushing Supports, Washers, Pivot Pins, Set Screws, and Square Keys for corrosion, dirt, grease, and rust. ***See Cleaning on Page 5-2.***
2. Inspect Hydraulic Power Unit Compartment Lid Assembly and mating surfaces for bends, burrs, cracks in metal or welds, dents, wear, distortion, and visual defects. Repair if defective, ***See Structural Defects on Page 5-4.***
3. Inspect Hydraulic Power Unit Compartment Lid Assembly for bends, breaks, burrs, cracks, dents, wear, signs of fatigue or brittle, visual defects and missing or defective parts. Replace if defective, ***See Repair Parts on Page 5-3.***
4. Inspect Hydraulic Power Unit Compartment Lid Assembly for corrosion, dirt, grease, and rust. ***See Cleaning on Page 5-2.***
5. Inspect Drive Shields for bends, burrs, cracks, dents, wear, distortion, and visual defects. Replace if defective, ***See Repair Parts on Page 5-3.***
6. Inspect Drive Shields for corrosion, dirt, rust, grease. ***See Cleaning on Page 5-2.***
7. Inspect Drive Chains for bends, breaks, burrs, cracks, dents, wear, signs of fatigue or brittle and visual defects. Inspect all links move freely. Replace if defective, ***See Repair Parts on Page 5-3.***
8. Inspect Drive Chains for corrosion, dirt, grease, and rust. ***See Cleaning on Page 5-2.***
9. Inspect Drive Sprocket for bends, breaks, burrs, cracks, dents, wear, signs of fatigue or brittle, tread condition and visual defects. Replace if defective, ***See Repair Parts on Page 5-3.***
10. Inspect Drive Chain Sprockets surfaces for corrosion, dirt, grease. ***See Cleaning on Page 5-2.***
11. Inspect Idler Pulleys for bends, breaks, burrs, cracks, dents, wear, signs of fatigue or brittle and visual defects. Inspect pulley spins freely. Replace if defective, ***See Repair Parts on Page 5-3.***
12. Inspect Idler Pulleys surfaces for corrosion, dirt, grease. ***See Cleaning on Page 5-2.***

13. Inspect Drive Shaft Collars for bends, burrs, cracks in metal or welds, dents, wear, distortion, and visual defects. Replace if defective, ***See Repair Parts on Page 5-3.***
14. Inspect Drive Shaft Collars surfaces for corrosion, dirt, grease. ***See Cleaning on Page 5-2.***
15. Inspect Drive Shaft and Square Key Notches for bends, breaks, burrs, cracks, dents, wear, signs of fatigue or brittle, visual defects and missing or defective parts. Replace if defective, ***See Repair Parts on Page 5-3.***
16. Inspect Drive Shaft and Square Key Notches surfaces for corrosion, dirt, grease. ***See Cleaning on Page 5-2.***
17. Inspect Flanged Bearings for bends, breaks, burrs, cracks, dents, wear, signs of fatigue or brittle and visual defects. Inspect bearing spins freely and grease fitting functions. Replace if defective, ***See Repair Parts on Page 5-3.***
18. Inspect Flanged Bearings for corrosion, dirt, grease. ***See Cleaning on Page 5-2.***

Install - Drive System, Front Power Ramp

NOTE

See Parts Manual on Page 7-1 *for mechanical, air, electrical and hydraulic components and diagrams.*

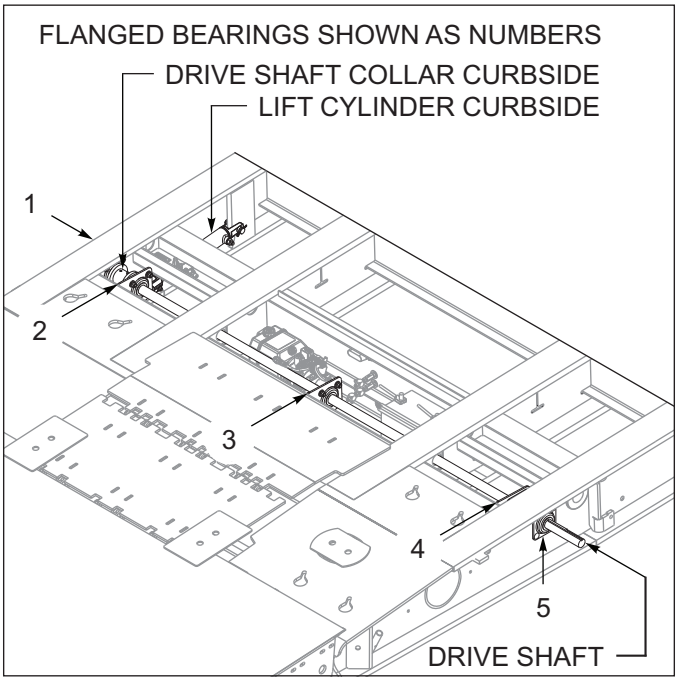


Figure 5-23: Flange Bearings

1. Install flanged bearings #1, #2, and #3 on the curbside of the mount brackets. Install flanged bearings #4 and #5 on the streetside of the mount brackets. Position grease fittings for easy access. Secure with four carriage bolts, four flat washer, and four lock nuts per flanged bearing. ***See Figure 5-23*** and ***See General Torque Specifications on Page 2-4.***
2. Align the drive shaft to an outside flanged bearing and push it through.
3. Apply anti-seize to the inside of each drive shaft collar, lift sprockets, and around each square key.
4. Install a drive shaft collar and a long square key to each side of the drive shaft.
5. Install two set screws into each drive shaft collar, **DO NOT** tighten.
6. Install a lift sprocket and short square key to each side of the drive shaft.
7. Install one set screw into each lift sprocket and torque between 273 to 275 in-lbs (370-373 Nm).
8. Align the cylinder rod end clevis to the drive shaft collar and install pivot pin on both lift cylinders.
9. Install one cotter pin on each side of the pivot pin, bend over to secure on both lift cylinders.
10. Tighten two set screws on each drive shaft collar and torque between 273 to 275 in-lbs (370-373 Nm).
11. Inspect that the front power ramp assembly is in the fully up position and resting against the stop blocks.
12. Install the drive chain around the drive and lift sprockets, fasten the chain ends together with the master link on each side of the trailer. To adjust the drive chain, add or remove ½ links to obtain fit.
13. Install chain idler pulley with one mount bolt, idler bushing support, idler bushing washer, and one lock nut on each side to the trailer. ***See General Torque Specifications on Page 2-4.***
14. Install the drive shield front mount bolt, flat washer, and lock nut. Install the remaining three lock nuts, fifteen flat washers, and three bolts that secure the shields to each side of the trailer. ***See General Torque Specifications on Page 2-4.***
15. Install hydraulic power unit compartment lid assembly and hook the double ended snap to the retaining chain.
16. Connect the hydraulic power unit battery terminals to the battery located in the hydraulic power unit compartment. ***See Figure 3-24 on Page 3-24.***
17. Install bridge assembly, ***See Install - Bridge Assembly, Front Power Ramp on Page 5-50.***
18. Remove any straps or chains that are securing the ramp in the up position.
19. Perform bleed procedures,***See on Page 5-47.***

20. Using mechanical lifting device lower trailer from the supports to the ground.

Front Power Ramp - Hydraulic Cylinder

DANGER

1. **ALWAYS check behind and under the truck and semitrailer for persons or objects before moving. Failure to check will lead to serious damage to property, personal injury or death.**
2. **When crawling under the semitrailer is necessary, chock all wheels of the trailer and tractor. When jacking is necessary, chock all wheels and support the semitrailer with jack stands sufficient to withstand the weight of the semitrailer and load. Failure to take adequate safety measures will result in serious personal injury or death.**
3. **To prevent serious injury or death from pinching: Keep all persons and objects clear while any part of the machine is in motion.**
4. **DO NOT allow to free fall. The Short Ramp Assembly weighs 450 lbs (240Kg), the Long Ramp Assembly weighs 950 lbs (431 Kg). Failure to comply will lead to serious damage to property, personal injury or death.**

WARNING

1. **The hydraulic cylinder weighs 55 lbs (25 Kg). Failure to comply could lead to serious damage to property, personal injury or death.**
2. **When working on a hydraulic system, ALWAYS ENSURE hydraulic lines have been depressurized. Hydraulic injection could cause loss of fingers and even death.**

Remove - Hydraulic Cylinder, Front Power Ramp

NOTE

See Parts Manual on Page 7-1 *for mechanical, air, electrical and hydraulic components and diagrams.*

1. Park on level surface, set parking brakes and chock the wheels. Detach the gooseneck assembly from the trailer.
2. Leave the Front Power Ramp Assembly in the fully up position to access mounting hardware. **ONLY** the long ramp option uses torsion springs, the fully up position release spring torsion pressure.
3. Secure the front power ramp assembly in the fully up position to the trailer with straps or chains.
4. Using a mechanical lifting device, raise the front end of the trailer and support to work underneath.
5. Zero out hydraulic pressure in the hoses by pulling the Manual Override Valve Handle to the fully down position, ***See Figure 5-21 on Page 5-48.***
6. Inspect that the straps or chains securing the ramp assembly have not loosen, tighten if needed.
7. Remove bridge assembly, ***See Remove - Bridge Assembly, Front Power Ramp on Page 5-49.***
8. Disconnect the hydraulic power unit battery terminals from the battery located in the hydraulic power unit compartment. ***See Figure 3-24 on Page 3-24.***
9. Place a drip pan under the cylinder.
10. Loosen two hydraulic hoses enough from the fittings to bleed off any residual pressure remaining in the hoses.
11. Label both hydraulic hoses where they go and remove both hoses.
12. Plug the open ends of the hoses and cylinder fittings.
13. Remove two cotter pins from cylinder rod end clevis pivot pin.
14. Using a punch, drive the pin through the drive shaft collar and cylinder clevis.
15. Remove two cotter pins from the cylinder base end pivot pin.
16. Using a punch, drive the pin out of the mount.
17. Remove the cylinder from the trailer.
18. Remove one straight adapter fitting from the base end and a 90-degree fitting from the rod end of the cylinder.

Inspect and Repair- Hydraulic Cylinder, Front Power Ramp

1. Inspect Hydraulic Hoses for bends, breaks, bulges, cuts, deterioration, flat spots, kinks, wear, wet spots, signs of fatigued or brittle and visual defects. Replace if defective, ***See Repair Parts on Page 5-3.***.
2. Inspect Hydraulic Hose Fittings for cracks, dents, corrosion, thread damage, wear, and visual defects. Replace if defective, ***See Repair Parts on Page 5-3.***
3. Inspect Hydraulic Hoses and Fittings for corrosion, dirt, rust, grease. ***See Cleaning on Page 5-2.***
4. Inspect Cylinder, Shaft, and Clevis for bends, breaks, burrs, cracks, dents, wear, signs of fatigue or brittle, visual defects and missing or defective parts. Repair or replace if defective, ***See Repair Parts on Page 5-3.***

5. Inspect Cylinder Fittings for cracks, dents, corrosion, thread damage, wear, and visual defects. Replace if defective, ***See Repair Parts on Page 5-3.***
6. Inspect Cylinder and Fittings for corrosion, dirt, rust, grease. ***See Cleaning on Page 5-2.***
7. Inspect Drive Shaft Collar for bends, burrs, cracks in metal or welds, dents, wear, distortion, and visual defects. Replace if defective, ***See Repair Parts on Page 5-3.***
8. Inspect Drive Shaft Collar for corrosion, dirt, rust, grease. ***See Cleaning on Page 5-2.***
9. Inspect Pivot Pins for bends, breaks, burrs, cracks, dents, wear, signs of fatigue or brittle, visual defects and missing or defective parts. Replace if defective, ***See Repair Parts on Page 5-3.***
10. Inspect Pivot Pins for corrosion, dirt, grease, and rust. ***See Cleaning on Page 5-2.***
11. Inspect Trailer Cylinder Mounting Surfaces for bends, breaks, burrs, cracks, dents, wear, signs of fatigue or brittle, visual defects and missing or defective parts. Repair if defective, ***See Structural Defects on Page 5-4.***
12. Inspect Trailer Cylinder Mounting Surfaces for corrosion, dirt, grease, and rust. ***See Cleaning on Page 5-2.***

Install - Hydraulic Cylinder, Front Power Ramp

NOTE

See Parts Manual on Page 7-1 *for mechanical, air, electrical and hydraulic components and diagrams.*

1. Install 90-degree fitting in the rod end opening and point it at the rear opening and tighten. ***See Hydraulic Fitting Torque Specifications on Page 2-5.***
2. Install straight fitting in the base end opening and tighten. ***See Hydraulic Fitting Torque Specifications on Page 2-5.***
3. Test fit the cylinder between the trailer mount surface and drive shaft collar. Manually extend or retract the cylinder to align with the pivot pin holes.
4. Install cylinder with fittings to the inside, align the base end cylinder mount hole with the trailer mount hole and secure with a pivot pin.
5. Install one cotter pin on each side of the pivot pin and bend the tangs over.
6. Align the rod end clevis mount hole with the drive shaft collar hole and secure with a pivot pin.
7. Install one cotter pin on each side of the pivot pin and bend the tangs over.
8. Remove plugs and install the hydraulic hoses to the cylinder fittings labeled to. ***See Hydraulic Fitting Torque Specifications on Page 2-5.***
9. Connect the hydraulic power unit battery terminals to the battery located in the hydraulic power unit compartment. ***See Figure 3-24 on Page 3-24.***
10. Install bridge assembly, ***See Install - Bridge Assembly, Front Power Ramp on Page 5-50.***
11. Remove any straps or chains that are securing the ramp in the up position.
12. Perform bleed procedures, ***See on Page 5-47.***
13. Using mechanical lifting device lower trailer from the supports to the ground.

Front Power Ramp - Power Unit

DANGER

1. **ALWAYS check behind and under the truck and semitrailer for persons or objects before moving. Failure to check will lead to serious damage to property, personal injury or death.**
2. **When crawling under the semitrailer is necessary, chock all wheels of the trailer and tractor. When jacking is necessary, chock all wheels and support the semitrailer with jack stands sufficient to withstand the weight of the semitrailer and load. Failure to take adequate safety measures will result in serious personal injury or death.**
3. **To prevent serious injury or death from pinching: Keep all persons and objects clear while any part of the machine is in motion.**
4. **DO NOT allow to free fall. The Short Ramp Assembly weighs 450 lbs (240Kg), the Long Ramp Assembly weighs 950 lbs (431 Kg). Failure to comply will lead to serious damage to property, personal injury or death.**

WARNING

1. **The hydraulic power unit weighs 60 lbs (27 Kg). Failure to comply could lead to serious damage to property, personal injury or death.**
2. **When working on a hydraulic system, ALWAYS ENSURE hydraulic lines have been depressurized. Hydraulic injection could cause loss of fingers and even death.**

Remove - Power Unit, Front Power Ramp

NOTE

See Parts Manual on Page 7-1 *for mechanical, air, electrical and hydraulic components and diagrams.*

1. Park on level surface, set parking brakes and chock the wheels. Detach the gooseneck assembly from the trailer.
2. Leave the Front Power Ramp Assembly in the fully up position to access mounting hardware. **ONLY** the long ramp option uses torsion springs, the fully up position release spring torsion pressure.
3. Secure the front power ramp assembly in the fully up position to the trailer with straps or chains.
4. Using a mechanical lifting device, raise the front end of the trailer and support to work underneath.
5. Zero out hydraulic pressure in the hoses by pulling the Manual Override Valve Handle to the fully down position, ***See Figure 5-21 on Page 5-48.***
6. Inspect that the straps or chains securing the ramp assembly have not loosen, tighten if needed.
7. Remove bridge assembly, ***See Remove - Bridge Assembly, Front Power Ramp on Page 5-49.***
8. Disconnect the hydraulic power unit battery terminals from the battery located in the hydraulic power unit compartment. ***See Figure 3-24 on Page 3-24.***
9. Remove hydraulic power unit compartment lid assembly, by unhooking the double ended snap from the retaining chain.
10. Disconnect the 300-amp positive cable terminal from the power unit start solenoid. ***See Figure 5-24 on Page 5-58.***
11. Disconnect the negative chassis ground from the 12-vdc motor side ground bolt.
12. Disconnect the remote-control extension cable from the power unit quick disconnect.
13. Place a drip pan under the power unit.
14. Loosen two hydraulic hoses enough from the power unit ports A (up/extend) and B (down/retract) fittings, to bleed off any residual pressure remaining in the hoses.
15. Label top hydraulic hose to port A and bottom hydraulic hose port B.
16. Remove the hoses and plug the open ends of the hoses and power unit fittings.
17. Remove two bolts, two lock washers, and two narrow flat washers that secure the power unit base to the trailer chassis.
18. Remove the power unit from the storage compartment.
19. Disconnect the remote control quick disconnect from the power unit start solenoid. ***See Figure 5-24 on Page 5-58.***
20. Remove 90-degree fittings from the hydraulic power unit ports A (up/extend) and B (down/retract).

Inspect and Repair - Power Unit, Front Power Ramp

1. Inspect Battery for bends, breaks, burrs, cracks, dents, wear, signs of fatigue or brittle, post condition and visual defects. Replace if defective, ***See Repair Parts on Page 5-3.***
2. Inspect Battery for corrosion, dirt and grease build up. ***See Cleaning on Page 5-2.***
3. Inspect Cables and Fuse Holders for bends, breaks, burrs, cracks, dents, wear, signs of fatigue or brittle, tread condition and visual defects. Replace if defective, ***See Repair Parts on Page 5-3.***
4. Inspect Cables and Fuse Holders for defects that might cause poor conductivity. Replace if defective, ***See Repair Parts on Page 5-3.***
5. Inspect Cables and Fuse Holders for corrosion, dirt and grease build up. ***See Cleaning on Page 5-2.***
6. Inspect 20 and 30-Amp fuses for defects that might cause poor conductivity. Replace if defective, ***See Repair Parts on Page 5-3.***
7. Inspect 20 and 30-Amp fuses for corrosion, dirt, grease. ***See Cleaning on Page 5-2.***
8. Inspect Hydraulic Hoses for bends, breaks, bulges, cuts, deterioration, flat spots, kinks, wear, wet spots, signs of fatigued or brittle and visual defects. Replace if defective, ***See Repair Parts on Page 5-3.***
9. Inspect Hydraulic Fittings for cracks, dents, corrosion, thread damage, wear, and visual defects. Replace if defective, ***See Repair Parts on Page 5-3.***
10. Inspect Power Unit Mounting Hardware for bends, breaks, burrs, cracks, dents, wear, signs of fatigue or brittle, tread condition and visual defects. Replace if defective, ***See Repair Parts on Page 5-3.***
11. Inspect Power Unit Mounting Hardware for corrosion, dirt, grease, and rust. ***See Cleaning on Page 5-2.***
12. Inspect Power Unit Remote Quick Disconnect and Extension Cable for bends, breaks, bulges, cuts, deterioration, dry rot, dents, kinks, wear, and visual defects. Replace if defective, ***See Repair Parts on Page 5-3.***
13. Inspect Power Unit Remote Quick Disconnect and Extension Cable for defects that might cause poor conductivity. Replace if defective, ***See Repair Parts on Page 5-3.***

14. Inspect Power Unit Remote Quick Disconnect and Extension Cable for corrosion, dirt and grease build up. ***See Cleaning on Page 5-2.***
15. Inspect Power Unit Start Solenoid Terminals for bends, breaks, burrs, cracks, dents, wear, signs of fatigue or brittle, thread condition, visual defects and missing or defective parts. Replace if defective, ***See Repair Parts on Page 5-3.***
16. Inspect Power Unit Start Solenoid Terminals for corrosion, dirt and grease build up. ***See Cleaning on Page 5-2.***
17. Inspect Power Unit Hydraulic Ports A and B for bends, breaks, burrs, cracks, dents, wear, signs of fatigue or brittle, tread condition and visual defects. Replace if defective, ***See Repair Parts on Page 5-3.***
18. Inspect Power Unit Hydraulic Ports A and B for corrosion, dirt and grease build up. ***See Cleaning on Page 5-2.***
19. Inspect Trailer Mount and Mating Surfaces for bends, burrs, cracks in metal or welds, dents, wear, distortion, and visual defects. Repair if defective, ***See Structural Defects on Page 5-4.***
20. Inspect Trailer Mount and Mating Surfaces for corrosion, dirt, rust, grease. ***See Cleaning on Page 5-2.***

Install - Power Unit, Front Power Ramp

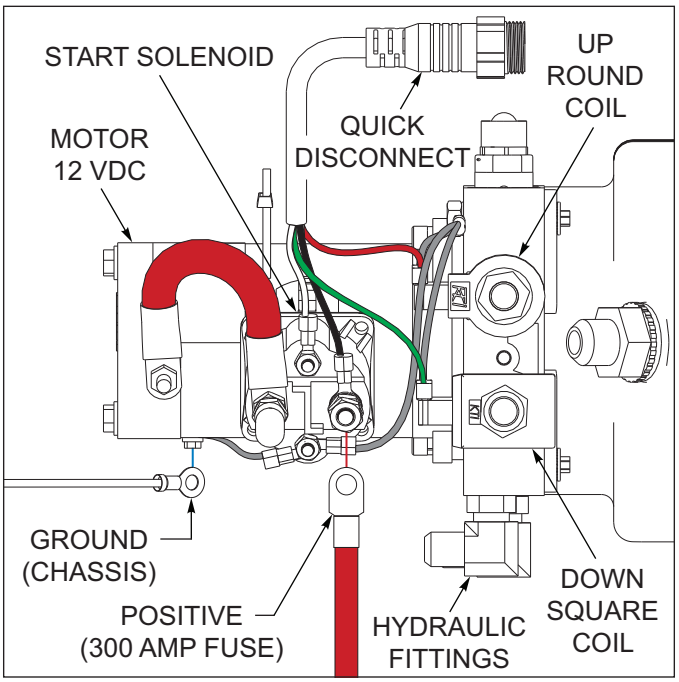


Figure 5-24: Power Unit Start Solenoid

NOTE

See Parts Manual on Page 7-1 *for mechanical, air, electrical and hydraulic components and diagrams.*

1. Install 90-degree fittings into the hydraulic power unit ports A (extend) and B (retract) facing streetside of trailer. ***See Hydraulic Fitting Torque Specifications on Page 2-5.***
2. Connect the remote control quick disconnect to the power unit start solenoid, ***See Figure 5-24 on Page 5-58.*** Or ***refer to Installation Instructions-12vdc Double-Acting - INST0003 Dec 2015 listed on Page 7-1.***
3. Position the power unit into the storage compartment.
4. Install two bolts, two lock washers, and two narrow flat washers to secure the power unit base to the trailer chassis. ***See General Torque Specifications on Page 2-4.***
5. Remove plug from the open ends of the hoses and power unit fittings.
6. Install both hydraulic hoses to the power unit ports A (extend) and B (retract). ***See Hydraulic Fitting Torque Specifications on Page 2-5.***
7. Connect the remote-control extension cable to the power unit quick disconnect. ***See Figure 5-24 on Page 5-58.*** Or ***refer to Installation Instructions-12vdc Double-Acting - INST0003 Dec 2015 listed on Page 7-1.***
8. Connect the negative chassis ground to the 12-vdc motor side ground bolt.
9. Connect the 300-amp positive cable terminal to the power unit start solenoid.
10. Install hydraulic power unit compartment lid assembly, by hooking the double ended snap to the retaining chain.
11. Connect the positive and negative terminals to the battery in the hydraulic power unit compartment.
12. Install bridge assembly, ***See Install - Bridge Assembly, Front Power Ramp on Page 5-50.***
13. Remove any straps or chains that are securing the ramp in the up position.
14. Perform bleed procedures, ***See on Page 5-47.***
15. Using mechanical lifting device lower trailer from the supports to the ground.

Front Power Ramp - Reservoir, Diaphragm

DANGER

1. **ALWAYS check behind and under the truck and semitrailer for persons or objects before moving. Failure to check will lead to serious damage to property, personal injury or death.**
2. **When crawling under the semitrailer is necessary, chock all wheels of the trailer and tractor. When jacking is necessary, chock all wheels and support the semitrailer with jack stands sufficient to withstand the weight of the semitrailer and load. Failure to take adequate safety measures will result in serious personal injury or death.**
3. **To prevent serious injury or death from pinching: Keep all persons and objects clear while any part of the machine is in motion.**
4. **DO NOT allow to free fall. The Short Ramp Assembly weighs 450 lbs (240Kg), the Long Ramp Assembly weighs 950 lbs (431 Kg). Failure to comply will lead to serious damage to property, personal injury or death.**

WARNING

1. **When working on a hydraulic system, ALWAYS ENSURE hydraulic lines have been depressurized. Hydraulic injection could cause loss of fingers and even death.**

Remove - Diaphragm Reservoir, Front Power Ramp

NOTE

See Parts Manual on Page 7-1 *for mechanical, air, electrical and hydraulic components and diagrams.*

1. Park on level surface, set parking brakes and chock the wheels. Detach the gooseneck assembly from the trailer.
2. Leave the Front Power Ramp Assembly in the fully up position to access mounting hardware. **ONLY** the long ramp option uses torsion springs, the fully up position release spring torsion pressure.
3. Secure the front power ramp assembly in the fully up position to the trailer with straps or chains.
4. Using a mechanical lifting device, raise the front end of the trailer and support to work underneath.
5. Zero out hydraulic pressure in the hoses by pulling the Manual Override Valve Handle to the fully down position, ***See Figure 5-21 on Page 5-48.***
6. Inspect that the straps or chains securing the ramp assembly have not loosen, tighten if needed.
7. Remove bridge assembly, ***See Remove - Bridge Assembly, Front Power Ramp on Page 5-49.***
8. Disconnect the negative and positive terminals from the battery in the hydraulic power unit compartment. ***See Figure 3-24 on Page 3-24.***
9. Remove hydraulic power unit compartment lid assembly, by unhooking the double ended snap from the retaining chain.
10. Place a drip pan under the diaphragm reservoir.
11. Loosen one hydraulic hose enough from the diaphragm reservoir fitting, to bleed off any residual pressure remaining in the hose. ***See Figure 5-25 on Page 5-60.***
12. Remove the hose and plug the open ends of the hose and diaphragm reservoir fitting.
13. Remove one adapter fitting from the diaphragm reservoir.
14. Remove four lock nuts, four narrow flat washer, and two U-bolts that secure the diaphragm reservoir to the trailer.
15. Remove the diaphragm reservoir from the power unit storage compartment.

Inspect and Repair - Diaphragm Reservoir, Front Power Ramp

1. Inspect Diaphragm Reservoir Mounting Hardware for bends, breaks, burrs, cracks, dents, wear, signs of fatigue or brittle, tread condition and visual defects. Replace if defective, ***See Repair Parts on Page 5-3.***
2. Inspect Diaphragm Reservoir Mounting Hardware for corrosion, dirt, grease, and rust. ***See Cleaning on Page 5-2.***
3. Inspect Diaphragm Reservoir for bends, breaks, burrs, cracks, dents, wear, signs of fatigue or brittle, visual defects and missing or defective parts. Replace if defective, ***See Repair Parts on Page 5-3.***
4. Inspect Diaphragm Reservoir Fitting for cracks, dents, corrosion, thread damage, wear, and visual defects. Replace if defective, ***See Repair Parts on Page 5-3.***
5. Inspect Diaphragm Reservoir and Fitting for corrosion, dirt, rust, grease. ***See Cleaning on Page 5-2.***

6. Inspect Hydraulic Hose for bends, breaks, bulges, cuts, deterioration, flat spots, kinks, wear, wet spots, thread condition, signs of fatigued or brittle and visual defects. Replace if defective, ***See Repair Parts on Page 5-3.***
7. Inspect Hydraulic Hose Fitting for cracks, dents, corrosion, thread damage, wear, and visual defects. Replace if defective, ***See Repair Parts on Page 5-3.***
8. Inspect Hydraulic Hoses and Fittings for corrosion, dirt, rust, grease. ***See Cleaning on Page 5-2.***
9. Inspect Diaphragm Reservoir Trailer Mounting Surface for bends, burrs, cracks in metal or welds, dents, wear, distortion, and visual defects. Replace if defective, ***See Structural Defects on Page 5-4.***
10. Inspect Diaphragm Reservoir Trailer Mounting Surface for corrosion, dirt, rust, grease. ***See Cleaning on Page 5-2.***

Install - Diaphragm Reservoir, Front Power Ramp

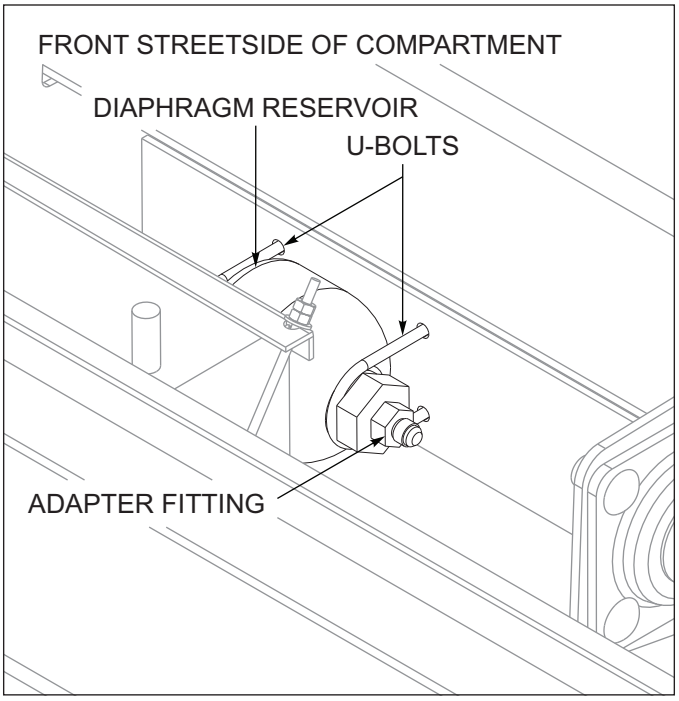


Figure 5-25: Diaphragm Reservoir

NOTE

See Parts Manual on Page 7-1 *for mechanical, air, electrical and hydraulic components and diagrams.*

1. Position the diaphragm reservoir into the power unit storage compartment. ***See Figure 5-25 on Page 5-60.***
2. Install two U-bolts around the narrow ends of the diaphragm reservoir, secure with four narrow flat washers, and four lock nuts to the trailer frame. ***See General Torque Specifications on Page 2-4.***
3. Remove plugs from the hydraulic hose and diaphragm reservoir fitting.
4. Install hydraulic hose to the diaphragm reservoir fitting. ***See Hydraulic Fitting Torque Specifications on Page 2-5.***
5. Install hydraulic power unit compartment lid assembly, by hooking the double ended snap to the retaining chain.
6. Connect the positive and negative terminals to the battery in the hydraulic power unit compartment.
7. Install bridge assembly, ***See Install - Bridge Assembly, Front Power Ramp on Page 5-50.***
8. Remove any straps or chains that are securing the ramp in the up position.
9. Perform bleed procedures, ***See on Page 5-47.***
10. Using mechanical lifting device lower trailer from the supports to the ground.

Front Power Ramp - Valve, Manual Override

DANGER

1. **ALWAYS check behind and under the truck and semitrailer for persons or objects before moving. Failure to check will lead to serious damage to property, personal injury or death.**
2. **When crawling under the semitrailer is necessary, chock all wheels of the trailer and tractor. When jacking is necessary, chock all wheels and support the semitrailer with jack stands sufficient to withstand the weight of the semitrailer and load. Failure to take adequate safety measures will result in serious personal injury or death.**
3. **To prevent serious injury or death from pinching: Keep all persons and objects clear while any part of the machine is in motion.**
4. **DO NOT allow to free fall. The Short Ramp Assembly weighs 450 lbs (240Kg), the Long Ramp Assembly weighs 950 lbs (431 Kg). Failure to comply will lead to serious damage to property, personal injury or death.**

WARNING

1. **When working on a hydraulic system, ALWAYS ENSURE hydraulic lines have been depressurized. Hydraulic injection could cause loss of fingers and even death.**

Remove - Manual Override Valve, Front Power Ramp

NOTE

See Parts Manual on Page 7-1 *for mechanical, air, electrical and hydraulic components and diagrams.*

1. Park on level surface, set parking brakes and chock the wheels. Detach the gooseneck assembly from the trailer.
2. Leave the Front Power Ramp Assembly in the fully up position to access mounting hardware. **ONLY** the long ramp option uses torsion springs, the fully up position release spring torsion pressure.
3. Secure the front power ramp assembly in the fully up position to the trailer with straps or chains.
4. Using a mechanical lifting device, raise the front end of the trailer and support to work underneath.
5. Zero out hydraulic pressure in the hoses by pulling the Manual Override Valve Handle to the fully down position, ***See Figure on Page 5-62.***
6. Inspect that the straps or chains securing the ramp assembly have not loosen, tighten if needed.
7. Remove bridge assembly, ***See Front Power Ramp - Bridge Assembly on Page 5-49.***
8. Disconnect the hydraulic power unit battery terminals from the battery located in the hydraulic power unit compartment. ***See Figure 3-24 on Page 3-24.***
9. Place drip pan under the trailer where the manual override valve mounts.
10. Loosen curbside manual override valve hydraulic hose enough from the 90-degree fitting, to bleed off any residual pressure remaining in the hose. If the handle moved while loosening the hose fitting, open valve by pulling it to the fully down position. ***See Figure on Page 5-62.***
11. Label and remove the hose, plug the open ends of the hose and manual override valve 90-degree fitting.
12. Remove streetside manual override valve hydraulic hose from the adapter fitting. ***See Figure on Page 5-62.***
13. Remove two bolts, four narrow flat washers, and two lock nuts that secure the valve to the trailer chassis.
14. Remove the manual override valve through the curbside access hole.
15. Remove 90-degree and adapter fittings from the manual override valve.

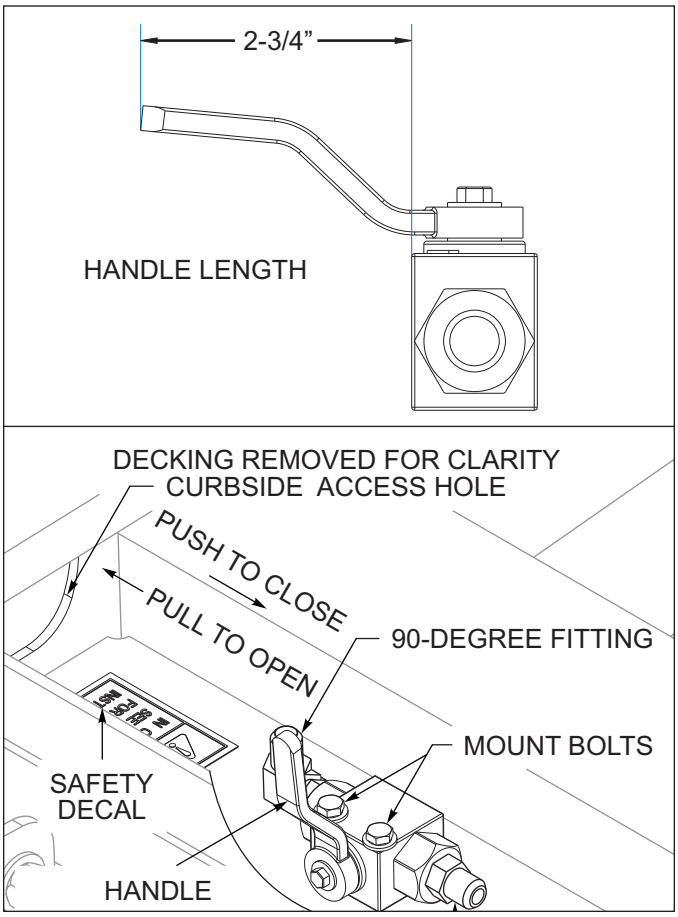


Figure 5-26: Manual Override Valve Assembly

Inspect and Repair - Manual Override Valve, Front Power Ramp

1. Inspect Trailer Mount Mating Surfaces for corrosion, dirt, rust, grease. ***See Cleaning on Page 5-2.***
2. Inspect Trailer Mount Mating Surfaces for bends, burrs, cracks in metal or welds, dents, wear, distortion, and visual defects. Repair if defective, ***See Structural Defects on Page 5-4.***
3. Inspect Mounting Hardware for bends, breaks, burrs, cracks, dents, wear, signs of fatigue or brittle, tread condition and visual defects. Replace if defective, ***See Repair Parts on Page 5-3.***
4. Inspect Mounting Hardware for corrosion, dirt, grease, and rust. ***See Cleaning on Page 5-2.***
5. Inspect Manual Override Valve for bends, breaks, burrs, cracks, dents, wear, functionality, signs of fatigue or brittle, visual defects and missing or defective parts. Replace if defective, ***See Repair Parts on Page 5-3.***
6. If the Manual Override valve is being replaced. Compare the valve handle length to the bad valve, the handle may need modification to fit and function when mounted. ***See Figure on Page 5-62.***

7. Inspect Manual Override Valve Fittings for cracks, dents, corrosion, thread damage, wear, and visual defects. Replace if defective, ***See Repair Parts on Page 5-3.***
8. Inspect Manual Override Valve and Fittings for corrosion, dirt, rust, grease. ***See Cleaning on Page 5-2.***
9. Inspect Hydraulic Hoses for bends, breaks, bulges, cuts, deterioration, flat spots, kinks, wear, wet spots, thread condition, signs of dry rot, fatigued or brittle and visual defects. Replace if defective, ***See Repair Parts on Page 5-3.***
10. Inspect Hydraulic Hose Fittings for cracks, dents, corrosion, thread damage, wear, and visual defects. Replace if defective, ***See Repair Parts on Page 5-3.***
11. Inspect Hydraulic Hoses and Fittings for corrosion, dirt, rust, grease. ***See Cleaning on Page 5-2.***

Install - Manual Override Valve, Front Power Ramp

NOTE

See Parts Manual on Page 7-1 *for mechanical, air, electrical and hydraulic components and diagrams.*

1. If the manual override valve is being replace. Compare the valve handle length to the bad valve, the handle may need modification to fit and function when mounted. ***See Figure 5-26 on Page 5-61.***
2. Install the 90-degree fitting with the hose end in the straight up position. ***See Hydraulic Fitting Torque Specifications on Page 2-5.***
3. Install the adapter fitting, ***See Hydraulic Fitting Torque Specifications on Page 2-5.***
4. Install two bolts and two narrow flat washers in the top of the manual override valve.
5. Align the manual override valve with the mount holes in the curbside access hole, position the handle towards the front of the trailer.
6. Install two narrow flat washer and two lock nuts to secure the manual override valve to the trailer chassis. ***See General Torque Specifications on Page 2-4.***
7. Install streetside hydraulic hose to the manual override valve adapter fitting. ***See Hydraulic Fitting Torque Specifications on Page 2-5.***
8. Install curbside hydraulic hose to the manual override valve 90-degree fitting. ***See Hydraulic Fitting Torque Specifications on Page 2-5.***
9. Connect the positive and negative terminals to the battery in the hydraulic power unit compartment.
10. Install bridge assembly, ***See Install - Bridge Assembly, Front Power Ramp on Page 5-50.***
11. Remove any straps or chains that are securing the ramp in the up position.
12. Perform bleed procedures, ***See on Page 5-47.***
13. Using mechanical lifting device lower trailer from the supports to the ground.

Suspension Maintenance

Air Ride Suspension

1. Physically check all nuts, bolts, and air line fittings for proper torque. ***See on Page 2-2***.
2. Check all other suspension components for any sign of damage, looseness, wear or cracks. ***See Figures 5-27, Figure 5-28*** & ***Figure 5-29***.
3. With trailer on level surface and air pressure in excess of 65 psi (448 kPa), all air springs should be of equal firmness. The height control valve located on the streetside above the center axle, controls all air springs on axle suspensions.

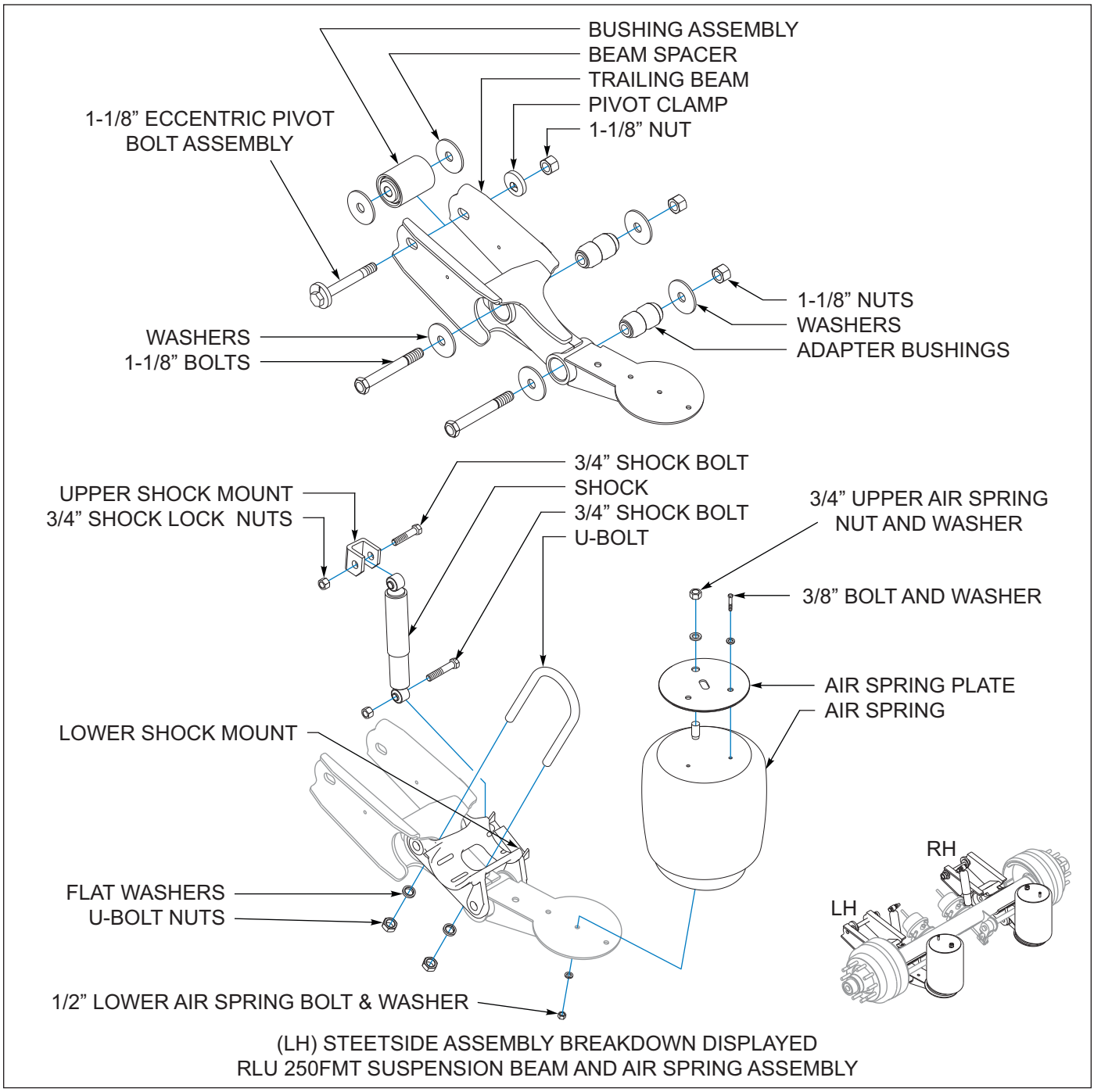
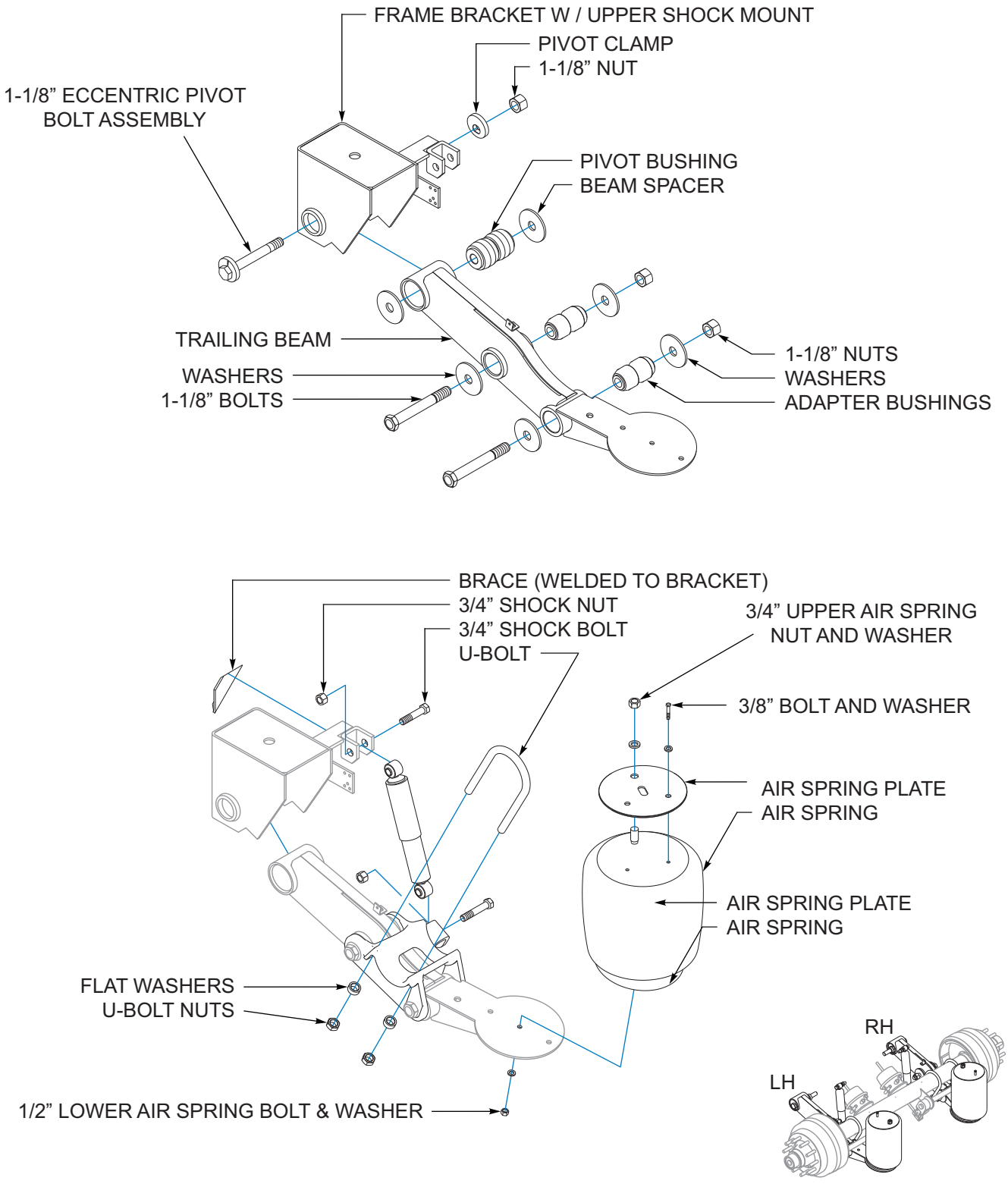


Figure 5-27: RLU 250FMT Suspension Components



(LH) STEETSIDE ASSEMBLY BREAKDOWN DISPLAYED
RLU 250-9-4 SUSPENSION BEAM AND AIR SPRING ASSEMBLY

Figure 5-28: RLU 250-9-4 Suspension Components

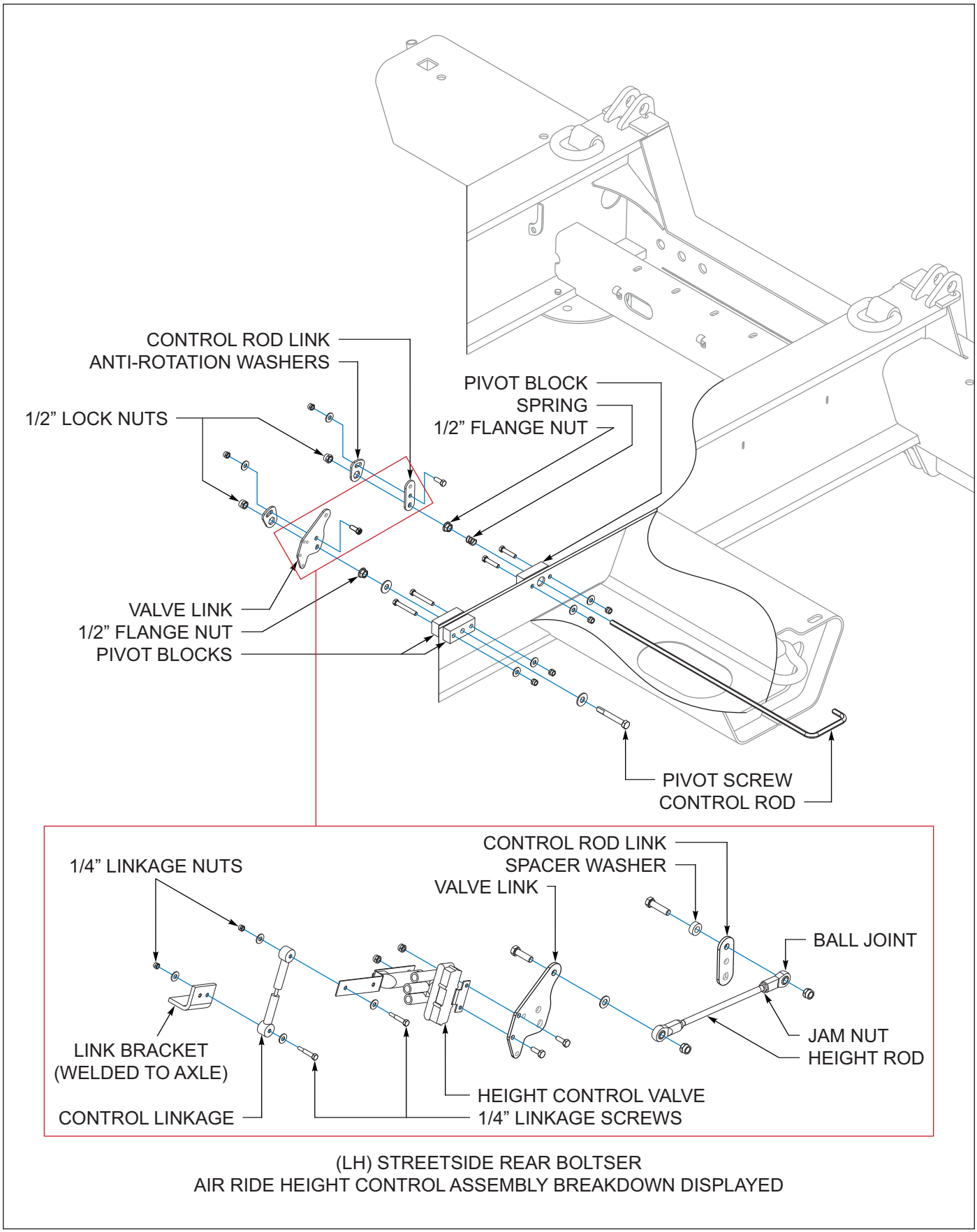


Figure 5-29: Ride Height Control Components

Ride Height Adjustment

WARNING

1. **Not following proper installation and adjustment procedures can result in broken shock absorbers, burst air bags and/or over height problems. This potentially hazardous situation could result in death or serious injury.**
2. **DO NOT adjust by loosening the 1/4 inch Adjusting Lock Nut and Bolt. This procedure could cause damage to the valve and require replacement. Contact Landoll Service Department for detailed instructions on Suspension Ride Height Adjustment.**

IMPORTANT

This manual does not cover the suspension ride height installation or adjustment procedures, due to the setup steps variation of the different trailers frames. For proper ride height installation and adjustment, simply record the equipment VIN/NIV number from the identification plate and contact the Landoll Trailer Service Department. Please visit https://landoll.com/contact-us/service-contacts/landoll-trailer-service/ or call 1-800-446-5175 for assistance.

NOTE

See Parts Manual on Page 7-1 for mechanical, air, electrical and hydraulic components and diagrams.

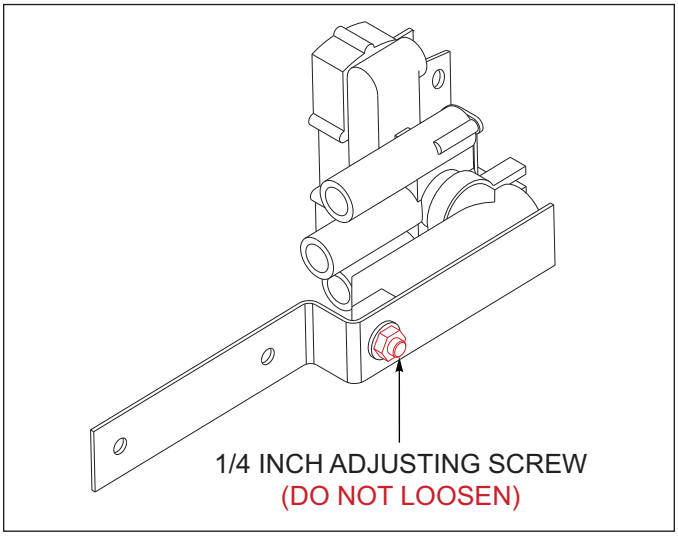


Figure 5-30: Height Control Valve

Tire Maintenance

Both tires on the same spindle must be the same size in order to properly distribute the load and braking forces between them. The tire must be mounted on a rim and properly inflated before measuring. If there is an allowable difference in size the smaller tire should be mounted to the inside position of the duals.

Tire Inflation

Tire inflation will cause tire to ground contact characteristics as shown in ***Figure 5-31***. Tire inflation should be checked daily while the tire is cold, and during road stops. Checking the tire pressures while tires are hot will give a faulty increased pressure reading. Adjusting tire air pressure to the specified amount while tires are hot will produce improper tire to road contact and thus abnormal wear. **DO NOT** exceed cold inflation pressure listed on the semitrailer VIN plate located on the front of the trailer. Exceeding cold inflation pressure will result in damaged tire bodies, rims, and wheels. Replace all valve stem caps when pressure checking/adjusting has been completed. Remove any foreign objects from between duals.

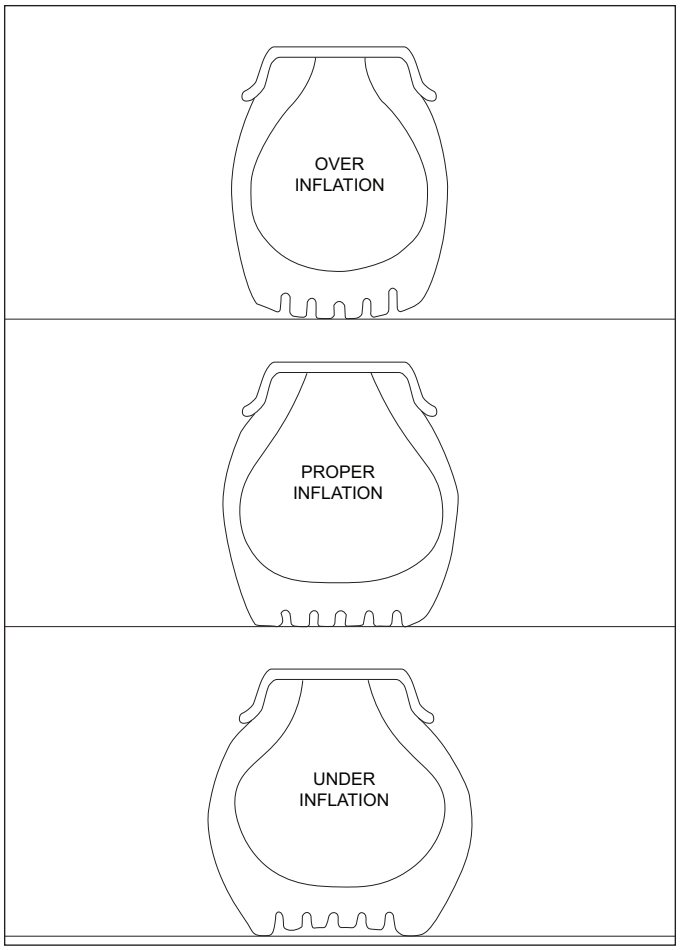


Figure 5-31: Tire Inflation Examples

Tire Matching & Methods

Both tires on the same spindle must be the same size in order to properly distribute the load and braking forces between them. The tire must be mounted on a rim and properly inflated before measuring. If there is an allowable difference in size the smaller tire should be mounted to the inside position of the duals.

Tape Measuring Method

Measure around each tire on the tread surface. A maximum difference of 3/4 inch (19.05 mm) is allowed between the two mating tires of a dual. ***See Figure 5-32***.

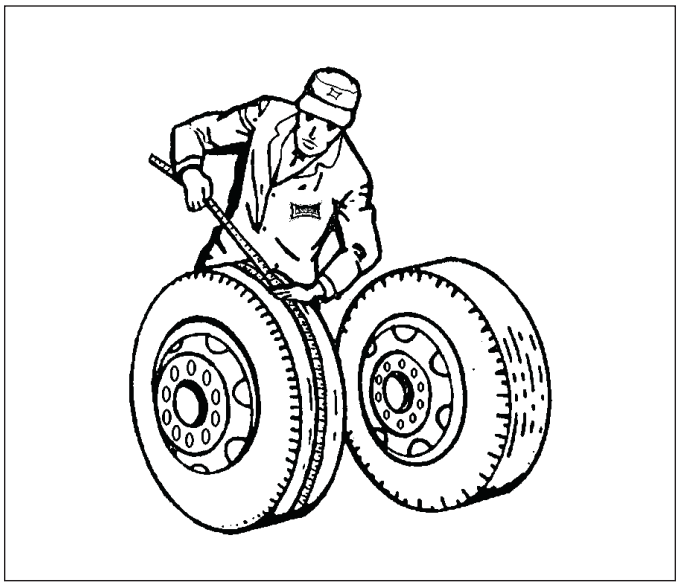


Figure 5-32: Tape Measure Method

Straight Edge or String Method

This method cannot be used if tire and wheel assemblies are not mounted on the axle. Jack trailer up until the wheels are off of the ground. Hold a straight edge against the tires of both ends of an axle. A gap at one tire indicates a smaller tire. A maximum of 1/8 inch (3.175 mm) gap is allowed, ***See Figure 5-33***.

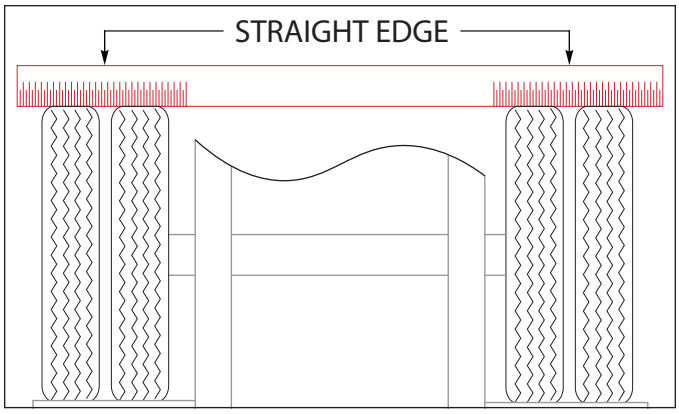


Figure 5-33: Straight Edge Method

Tire and Wheel Mounting

DANGER

Use a torque wrench to assure proper torque. Insufficient torque will cause stud breakage and damage wheel pilots. Over torque will over stress the studs and strip the threads. *See Wheel Fasteners on Page 2-3.*

1. Make sure that all mounting surfaces are clean and free of rust, dirt or paint. A wire brush may be used to clean these surfaces. ***See Figure 5-34***.
2. Position the inner disc wheel over the studs, being careful not to damage the stud threads. Make sure that the disc wheel is flat against the mounting surface and that there is clearance between the disc wheel taper and brake drum.
3. Position the outer disc wheel being careful not to damage the threads. Be sure the valve stems for both the inner and outer tire are accessible.
4. Install the flange nut and tighten to 50 ft-lbs (68 Nm) using the sequence in ***Figure 5-35***. Then tighten to full torque of 450-500 ft-lbs (610-678 Nm). ***See Wheel Fasteners on Page 2-3.***
5. Torque will drop after the first 50-100 miles (80-160 Km) of operation. Check the nuts for proper torque after this interval and re-tighten them.

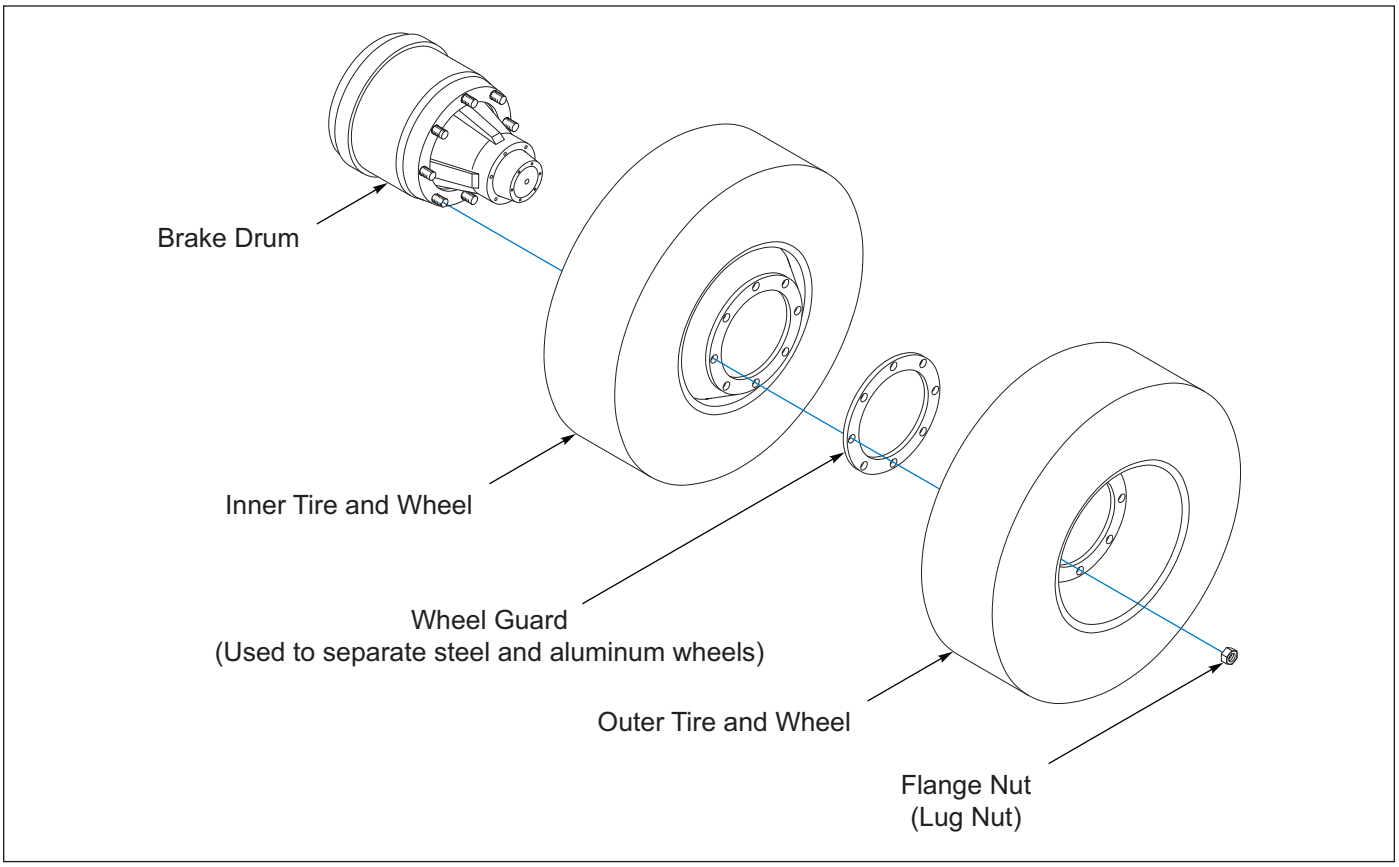


Figure 5-34: Tire and Wheel Mounting

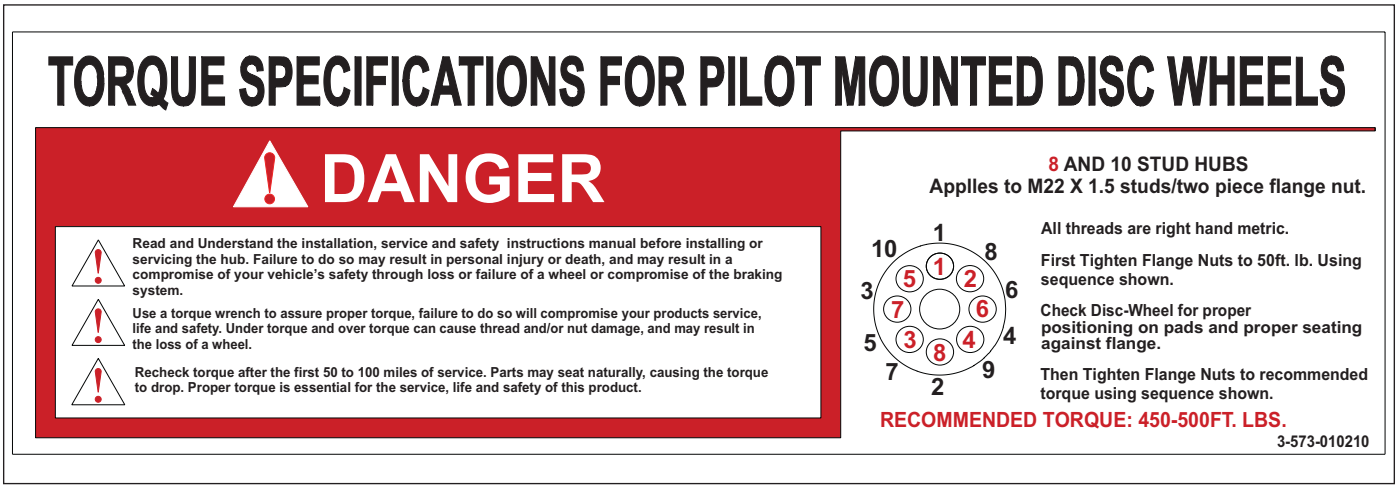


Figure 5-35: Flange Nut Tightening Sequence

Chapter 6

Troubleshooting Guide

General

1. This chapter provides information for identifying and correcting problems that may develop while operating or maintaining the trailer.
2. The Troubleshooting Guide Index lists common problems that may occur and refers you to the proper troubleshooting guide.
3. If you are unsure of an item mentioned or needing an air, electrical or hydraulic diagram, ***Refer to Chapter 7 - Parts Manual on Page 7-1.***
4. Before performing any troubleshooting procedure, read and understand, ***Understanding Safety Statements on Page 1-2***. Also read and understand Chapter 3, ***Trailer Overview on Page 3-1***.
5. This guide cannot list all problems that may occur or all tests, inspections, solutions. It the appropriate problem is not listed, notify your service department.
6. When troubleshooting a problem:
   a. Locate the problem or problems that best describe the fault in the Troubleshooting Guide Index.
   b. The Troubleshooting Guide is organized using the following headings: “Problem,” “Probable Cause,” and “Solution.”

Explanation of the Headings

1. **PROBLEM** - A visual or operational indication that something is wrong with the equipment.
2. **PROBABLE CAUSE** - Equipment defect that may cause the problem.
3. **SOLUTION** - A procedure to possible correct the problem.

Troubleshooting Guide Index

1. ***Brakes Problems - Drum on Page 6-2***
2. ***Electrical Light Problems on Page 6-5***
3. ***Hydraulic System Problems on Page 6-6***
4. ***Ramp, Front Power (Option) Problems on Page 6-8***
5. ***Suspension Problems on Page 6-10***
6. ***Tires and Wheels Problems on Page 6-11***

Brakes Problems - Drum

IMPORTANT

Troubleshooting should be performed by a trained and competent technician. Landoll Company, LLC. is not responsible for equipment that is improperly maintained. Contact an authorized Landoll Service Center for servicing.

PROBLEM	PROBABLE CAUSE	SOLUTION
No brakes or brakes are intermittent	Brake air system improperly connected	Reconnect hand valves properly.
	Relay/Emergency valve plugged	Clean valve.
	Defective tractor protection valve	Repair or replace.
	Restricted tubing or hose line	Locate and eliminate restriction.
	Broken line	Locate break and repair.
	Tractor air system failure	Troubleshoot tractor air system and repair. Check ABS system function.
Single brake dragging or locked up	Broken internal brake component	Locate and replace broken part. ***See Figure on Page 5-25***.
	Flat spot on cam roller or cam shaft	Replace and lubricate.
	Improper adjustment	Adjust slack adjusters ***See Adjust - Slack Adjuster on Page 5-26***.
	Spider bushing or cam bracket bushing binding	Lubricate or replace bushing.
	Improper lubrication	Lubricate per ***Centralized Lubrication Points on Page 5-7***.
	Worn brake shoe bushing	Replace bushing.
	Brake drum distortion	Replace drum.
	Broken brake chamber spring	Replace spring.
	Brake chamber push rod binding	Re-align brake chamber bracket.
	Air brake line loose or broken	Tighten or repair.
Uneven brakes	**See "SINGLE BRAKE DRAGGING OR LOCKED"**	
	Restriction in hose	Locate restriction and remove
	Worn brake linings	Reline brakes.
	Grease on linings	Reline brakes.
	Broken slack adjuster	Replace slack adjuster. ***See Remove - Slack Adjuster on Page 5-26***.
	Leaking brake chamber diaphragm	Replace diaphragm.
Brakes apply too slowly	Brakes need adjusting or lubrication	Adjust or lubricate as needed.
	Air pressure below 105 psi (724 kPa)	Check tractor air system.
	Restricted tubing or hose	Locate restriction and remove.
	Defective relay valve	Clean or replace.
	Call Factory or see qualified Trailer/Brake Technician	
Brakes release too slowly	Brakes need adjusting or lubrication	Adjust or lubricate as needed.
	Brake rigging binding	Align brakes or replace bent parts.
	Exhaust port of relay valve restricted or plugged	Clean valve.
	Tractor pressure too low	Adjust to provide 105 psi (724 kPa) min.

PROBLEM	PROBABLE CAUSE	SOLUTION
All brakes DO NOT release	Air system improperly connected to tractor	Tighten or adjust connections.
	Brake valve on tractor is applied	Release brake
	Relay emergency valve in emergency position	Check line pressure and check valve
	Restricted tubing or line	Locate restriction and remove
	Defective tractor protection valve	Troubleshoot tractor air system.
	Parking brakes locked	Troubleshoot air system
	Moisture in air system	Check air system
	Tractor pressure too low	Adjust to provide 105 psi (724 kPa)min.
Brakes weak	Brakes need adjusting	Adjust brakes. ***See Adjust - Slack Adjuster on Page 5-26***.
	Brakes need lubricating	Lubricate brakes.
	Brakes need relining	Reline brakes.
	Low air pressure	Troubleshoot air system.
	Defective relay emergency valve	Repair or replace.
	Brakes overheated	Stop and allow brakes to cool, locate cause of overheating.
Brakes grabbing	Grease on brake linings	Reline brakes
	Brake rigging binding	Align brakes or replace bent parts.
	Defective brake valve on tractor	Repair or replace valve.
	Defective relay emergency valve	Repair or replace valve.
Excessive leakage with brakes released	Relay emergency valve leaking	Repair or replace valve
	Leaking tubing or hose	Replace defective part.
Excessive leakage with brakes applied	Relay emergency valve leaking	Repair or replace valve.
	Leaking brake chamber diaphragm	Replace diaphragm.
	Call Factory or see qualified Trailer/Brake Technician	
	Leaking tubing or hose	Replace defective part.
Excessive leakage with emergency system applied ONLY	Defective relay emergency valve	Repair or replace valve.
Excessive water present in brake system	Reservoir not drained often enough	Drain reservoir daily.
Excessive oil present in brake system	Compressor on tractor passing excessive oil	Repair compressor.
Brakes will not apply properly	Flat spot on cam roller or camshaft	Replace and lubricate.
Brakes will not apply when emergency line is disconnected	Initial air pressure too low	Allow air system to build up to minimum 90 psi (621 kPa) and stabilize.
	Defective relay valve	Repair or replace valve.
	Air line leak	Locate leak and repair.
	Brake chamber leak	Locate leak and repair or replace.
ABS Warning Light stays on	ABS system failure	Troubleshoot ABS System, ***Refer to Chapter 7 - Wabco on Page 7-1.***

PROBLEM	PROBABLE CAUSE	SOLUTION
Excessive loss of brakes or fading	Overheated brake drums	Check for defective or misadjusted brake linings, distorted or over-machined drums. Also check for operating conditions or loads that create severe or excessive brake applications.
Brakes pull to either side	Drums of different diameters	Replace with drums of same diameter.
	Foreign matter in drums	Clean drums out.
Rough or noisy braking action	Defective drums	Pull drums and inspect for any of the following; Heat spotted drums, grease spotting, blue drums, scored drums, excessive wear at rivet holes or edges, polished drums, out of round drums, unbalanced drums, worn/damaged brake components, foreign matter in drums. Correct situation or replace defective part(s).
Vibration in ride	Defective drums or out-of-round	Replace drums.
	Out-of-balance drums	Balance drums.

NOTES:

Electrical Light Problems

IMPORTANT

Troubleshooting should be performed by a trained and competent technician. Landoll Company, LLC. is not responsible for equipment that is improperly maintained. Contact an authorized Landoll Service Center for servicing.

PROBLEM	PROBABLE CAUSE	SOLUTION
No lights	Fuse blown	Replace fuse
	Connection at plug-in	Tighten connection
	Broken or corroded wires	Replace wire
	Ground wire loose	Clean and tighten ground
Lights flickering	Wires shorted or loose	Locate, insulate, replace, or tighten
	Grounding through fifth wheel	Locate broken ground wire (tractor or semitrailer)
Lights Dim	Voltage difference between semitrailer and tractor	Match bulbs with tractor voltage
	Grounding through fifth wheel	Locate broken ground wire (tractor or semitrailer)
Lights bright and burning out	Voltage difference between semitrailer and tractor	Match bulbs with tractor voltage
Fuse blown or circuit breaker trip	Vibration	Locate source of vibration and repair
	Short circuit	Replace fuse and try all accessories. If fuse blows right away, locate short and repair
Light Bulb burn out	Vibration	Locate source of vibration and repair
	Short circuit	Replace fuse and try all accessories. If fuse blows right away, locate short and repair
	Loose connection	Check lamp sockets and ground connections
	Intermittent short	Locate short and repair
	Improper voltage	Check voltage regulator output

Table provided for general use.

NOTES:

Hydraulic System Problems

IMPORTANT

Troubleshooting should be performed by a trained and competent technician. Landoll Company, LLC. is not responsible for equipment that is improperly maintained. Contact an authorized Landoll Service Center for servicing.

PROBLEM	PROBABLE CAUSE	SOLUTION
System inoperative	Not enough oil in system	Fill, check for leaks.
	Wrong oil in system	Change oil, see specifications. ***See Lubrication Specifications on Page 5-11***.
	Filter dirty or clogged	Drain oil and replace filter.
	Hydraulic lines dirty or collapsed	Clean or replace as necessary.
	Air leaks in pump suction line	Repair or replace as necessary.
	Worn or dirty pump	Clean, repair or replace. Check for contaminated oil. Drain and flush.
	Badly worn components	Examine for internal leakage. Replace faulty components. Check for cause of wear.
	Leakage	Check all components, and relief valve for proper settings.
	Excessive load	Check unit specifications for load limit. ***See Trailer Specifications on Page 2-1***.
	Slipping or broken pump drive	Repair or replace couplings. Check for alignment
	Valve compensator stuck	Clean, repair, or replace.
System operates erratically	Air in the system	Check suction side of system for leaks. Repair leaks.
	Cold oil	Allow ample warm-up time. Use proper weight oil for operating temperature.
	Dirty or damaged components	Clean or repair as needed.
	Restriction in filters or lines	Clean and/or replace filter or lines.
	Not enough oil in system	Fill and check for leaks.
System operates slowly	Oil viscosity too high, or “cold oil”	Allow oil to warm up before operating.
	Low pump drive speed	Increase engine speed (check pump owners manual for specifications).
	Low oil level	Check reservoir and add oil as necessary.
	Air in system	Check suction side for leaks. Repair leaks.
	Badly worn pump, valves, cylinders, etc.	Repair or replace faulty component(s) as necessary.
	Restrictions in lines or filter	Clean and/or replace filter or lines.
	Improper adjustments	Check orifices, relief valves, etc. Adjust as necessary.
	Oil leaks	Tighten fittings. Replace seals, gaskets and damaged lines.
System operates fast	Engine running too fast	Reduce engine speed

PROBLEM	PROBABLE CAUSE	SOLUTION
Hydraulic oil over heating	Oil passing through relief valve for excessive time	Return control valve to neutral when not in use
	Incorrect, low, dirty oil	Use recommended oil, ***See Lubrication Specifications on Page 5-11***. Fill reservoir with clean oil. Replace filter.
	Engine running too fast	Reduce engine speed.
	Excessive component internal leakage	Repair or replace component as necessary.
	Restriction in filters or lines	Clean and/or replace filter or lines.
	Insufficient heat radiation	Clean dirt and mud from reservoir and components.
	Malfunctioning component	Repair or replace
Hydraulic oil foaming	Incorrect, low, or dirty oil	Replace, clean or add oil as needed.
	Water in oil	Replace oil
	Air leaks	Check suction line and component seals for suction leaks. Replace defective parts.
Pump noisy	Low, incorrect, foamy oil	Replace, clean, or add oil as needed.
	Suction line plugged	Clean out obstruction or replace line. Flush system, replace filter.
	Pump damaged	Repair or place
Pump leaking	Damaged or worn shaft seal	Replace seal and/or shaft and check for misalignment.
	Loose or broken parts	Tighten or replace.
Control Valves leaks	Seals damaged or worn	Replace.
Hydraulic components leaking	Seals worn or damaged	Replace.
	Internal parts damaged	Replace.
	Housing damaged	Replace.
Hydraulic components still move with control valve in neutral position	Leaking seals, fittings, or hoses	Replace worn or defective parts.
	Control lever not returning to center	Check linkage for binding and repair.
	Spool valve binding or stuck	Replace Valve Section section.
	Solenoid stuck	Replace defective solenoid.
	Valve damaged	Repair or replace.
Hydraulic components function, or creep with PTO disengaged	Leaking fittings or cylinder seals	Tighten loose fittings. Replace worn seals or fittings.
	Piloted check valve or O-ring leak	Replace defective component.

Table provided for general use.

NOTES:

Ramp, Front Power (Option) Problems

IMPORTANT

Table provided for general use.**Troubleshooting should be performed by a trained and competent technician. Landoll Company, LLC. is not responsible for equipment that is improperly maintained. Contact an authorized Landoll Service Center for servicing.**

PROBLEM	PROBABLE CAUSE	SOLUTION
Hydraulic Power Unit will not turn on For component locations, ***See Figure 3-24 on Page 3-24***. For Parts or Diagrams, ***Refer to Chapter 7 - Parts Manual on Page 7-1.*** For Hydraulic Power Pack Bleed Procedures, ***See on Page 5-47***.	Low or dead battery, Power Unit performs best at 10-12 vdc.Trickle charge harness 20 amp fuse blown or connections loose.	Tighten Loose or clean corroded battery terminals.
		Charge battery, use the battery jumper terminals located on the streetside of the trailer. ***See Loss of Power Operation on Page 3-22***.
		Trickle charge harness 20 amp fuse blown or connections loose.
		Replace battery.
	No power at power unit.	300 amp power fuse blown.
		Loose or corroded positive connections at the fuse block or power unit.
		Loose or corroded negative connections at the grounding point or power unit.
	Bad Power Unit.	Troubleshoot Power Unit, refer to Chapter 7 Manufacturer References. ***Refer to Chapter 7 - KTI Hydraulics Incorporated on Page 7-1.***
Hydraulic Power Unit will not turn off	Bad Power Unit.	Troubleshoot Power Unit, refer to Chapter 7 Manufacturer References. ***Refer to Chapter 7 - KTI Hydraulics Incorporated on Page 7-1.***
Ramp will not operate For component locations ***See Figure 3-24 on Page 3-24***. For Parts or Diagrams, ***Refer to Chapter 7 - Parts Manual on Page 7-1.*** For Hydraulic Power Pack Bleed Procedures, ***See on Page 5-47***.	Hydraulic Power Unit will not turn on	Refer to Problem above: Hydraulic Power Unit will not come on.
	Obstruction in rotation path.	Clear obstruction.
	Hydraulic fluid low	Fill reservoir, ***See Ramp, Front Power (OPTION) on Page 5-10***.
	Manual Override Valve open	Close the Manual Override Valve and ***Perform Bleed Procedures - Front Power Ramp Hydraulic Power Pack (Option) on Page 5-47.***
	Leaking Hydraulic System	Repair or replace defective parts.
	Ramp Drive System binding or broken components	Repair or replace defective parts.
	Hydraulic Power Unit faulty	Troubleshoot Power Unit, refer to Chapter 7 Manufacturer References. ***Refer to Chapter 7 - KTI Hydraulics Incorporated on Page 7-1.***

PROBLEM	PROBABLE CAUSE	SOLUTION
Ramp operates slowly or erratically For component locations, ***See Figure 3-24 on Page 3-24***. For Parts or Diagrams, ***Refer to Chapter 7 - Parts Manual on Page 7-1.*** For Hydraulic Power Pack Bleed Procedures, ***See on Page 5-47***.	Hydraulic fluid low	Fill reservoir, ***See Lubrication Specifications on Page 5-11***.
	Manual Override Valve not fully closed	Close the Manual Override Valve and ***Perform Bleed Procedures - Front Power Ramp Hydraulic Power Pack (Option) on Page 5-47.***
	Ramp Drive System binding or broken components	Repair or replace defective parts.
	Leaking Hydraulic System	Repair or replace defective parts.
	Ramp Lift System binding or broken components	Repair or replace defective parts.
	Hydraulic Power Unit faulty	Troubleshoot Power Unit, refer to Chapter 7 Manufacturer References. ***Refer to Chapter 7 - KTI Hydraulics Incorporated on Page 7-1.***
Power Unit faults For component locations ***See Figure 3-24 on Page 3-24***.	Hydraulic Power Unit faulty	Troubleshoot Power Unit, refer to Chapter 7 Manufacturer References. ***Refer to Chapter 7 - KTI Hydraulics Incorporated on Page 7-1.***

Table provided for general use.

NOTES:

Suspension Problems

IMPORTANT

Table provided for general use.Troubleshooting should be performed by a trained and competent technician. Landoll Company, LLC. is not responsible for equipment that is improperly maintained. Contact an authorized Landoll Service Center for servicing.

PROBLEM	PROBABLE CAUSE	SOLUTION
Air Ride Height too high	Axle to control valve linkage	Readjust linkage.***See Ride Height Adjustment on Page 5-66***
	Height Control Valve internal leak	Repair or replace valve.
Air Ride Height too low	Axle to control valve linkage	Readjust linkage.
	Height Control Valve filter plugged	Clean or replace valve.
	Pressure Protection Valve filter plugged	Clean or replace valve.
	System air pressure is below 65 psi (414 kPa) minimum required	Troubleshoot air supply.
Air Ride Height Uneven from side to side	Linkage adjustment	Readjust linkage
	Exhaust port plugged	Clean or replace valve(s).
	Height control valve internal leak	Repair or replace valve.
	Supply line to one height control valve pinched, restricted, or plugged	Repair or replace line.
Tracking to one side	Axle alignment	Re-align axle. ***See Alignment, Air Ride, 1st Axle on Page 5-17***.
Tracking to either side	Broken or bent springs or equalizers	Replace defective parts.
	Axles not parallel	Re-align axles
Vibrations while driving	Improper tire inflation	Inflate to proper pressure ***See Tire Inflation on Page 5-66***.
		Troubleshoot Tire Inflation System (Option) if installed. ***Refer to Chapter 7 - Meritor on Page 7-1.***
	Tires cupped or have flat spots	Replace tires.
	Wheels bent or loose	Replace or tighten.
	Tires incorrectly mounted	Remount. ***See Tire and Wheel Mounting on Page 5-67***.
	Mud in wheels	Clean wheels.
	Tire(s) out of balance	Balance tires.
	Brakes dragging	Locate cause and repair.
	Object(s) stuck between duals	Remove object(s).

Tires and Wheels Problems

IMPORTANT

Troubleshooting should be performed by a trained and competent technician. Landoll Company, LLC. is not responsible for equipment that is improperly maintained. Contact an authorized Landoll Service Center for servicing.

PROBLEM	PROBABLE CAUSE	SOLUTION
Broken Studs **WARNING:** Replace broken studs before using the trailer!	Over tightening	Use correct torque when mounting. ***See on Page 2-2***.
Tire Center tread wear	Over inflation	Deflate to correct inflation. ***See Tire Inflation on Page 5-66***.
		Adjust Tire Inflation System (Option) if installed. ***Refer to Chapter 7 - Meritor on Page 7-1.***
Tire Shoulder tread wear - One Shoulder	Axle damage	Straighten or replace axle. ***See Alignment, Air Ride, 1st Axle on Page 5-17***.
	Axles not parallel	Check axle alignment.
Tire Shoulder tread wear - Both Shoulders	Under inflation	Increase inflation to correct pressure. Check axle alignment. ***See Tire Inflation on Page 5-66***.
		Adjust Tire Inflation System (Option) if installed. ***Refer to Chapter 7 - Meritor on Page 7-1.***
	Overload	Loads are above rated tire capacity. **DO NOT** load above rated tire capacity.
Tire Overall tread wear	Overloading	Check tire load rating.
	High speeds	Adjust speed according to road and load conditions.
	Incorrect dual matching	Properly match dual tires. ***See Tire Matching & Methods on Page 5-67***.
Tire Flat Spots	Quick stops	Adjust braking practices.
	Grabbing brakes	Adjust brakes properly. ***See Adjust - Slack Adjuster on Page 5-26***.
	Worn or loose wheel bearings	Adjust or replace as needed. ***See Adjust - Wheel Bearings on Page 5-21***.
	Out of balance wheels and tire	Balance wheels and tires. Check ABS system function.
Tire Uneven wear	Suspension bushings worn	Replace bushings
	Worn or loose wheel bearings	Adjust or replace as needed. ***See Adjust - Wheel Bearings on Page 5-21***
	Out of balance wheels and tires	Balance wheels and tires.

PROBLEM	PROBABLE CAUSE	SOLUTION
Wheel Cracking **WARNING:** Replace any defective rim immediately!	Overinflated tires	Deflate tire to proper pressure.
	High speeds	Adjust speed according to road and load conditions.
	High speed cornering	Adjust cornering practices.
	Over loading	Check rim load rating.
Wheel Bending or Warping **WARNING:** Replace any defective rim immediately!	Curb-hopping or potholes	Adjust turning practices and adjust speed accordingly with road conditions.
	Improper tightening sequence	Follow proper tightening sequence. ***See Figure 5-35 on Page 5-68***.

Table provided for general use.

NOTES:

Chapter 7

Manufacturer References

Disclaimer

The documentation provided here has been appended to this Landoll Manual for reference **ONLY** and is subject to change without notice.

The specific contents of the information is not the responsibility of Landoll Company, LLC. or any of it's affiliates.

General

Explanation of the Headings

1. **Manufacturer** - The manufacturer that supplies the product.
2. **Component** - The manufacturer's component covered by the reference.
3. **Reference Title** - The reference title that supports the component.

The Trailer Manual Manufacturer References are available online through the Dealer Portal at **dealer.landoll.com.** For Manufacturer References assistance contact an Authorized Landoll Dealer. ***See Instructions for Ordering Parts on Page 1-2.***

Manufacturer Index

1. ***Dexter on Page 7-1.***
2. ***Kohler on Page 7-1.***
3. ***KTI Hydraulics Incorporated on Page 7-1.***
4. ***Landoll Company, LLC. on Page 7-1.***
5. ***Meritor on Page 7-1.***
6. ***Right Weigh on Page 7-1.***
7. ***Wabco on Page 7-1.***

Manufacturer	Component	Reference Title (subject to change without notice)
Dexter	Drum Brakes & Axles (PQ STYLE) (22,500-27,500 lbs) (10,206-12,474 Kg)	**Operation Maintenance Service Manual - Lit-002-00 Rev 2019.01**
Kohler	Engine, 25Hp (189360)	**KOHLER Command Pro Owner' s Manual - 24 590 49 Rev C (ECH630-ECH749, CH735-CH26, CH745, ECV630-749, CV735, CV745)**
		KOHLER Command Pro EFI Service Manual - 24 690 01 Rev Q (ECH630-ECH749, CH735, CH26, CH745)
KTI Hydraulics Incorporated	12vdc Hydraulic Power Unit (Power Up/Power Down)	**DC Power Unit Troubleshoot Guide**
		Installation Instructions-12vdc Double-Acting - INST0003 Dec 2015
Landoll Company, LLC.	Operators Manual	**F-1122 855F / 860F Detachable Semitrailer Operators Manual**
	Parts Manual	**F-1123 855F / 860F Detachable Semitrailer Parts Manual**
	Remote Control System (Brand)	**Wireless Hydraulic Control System Installation and Operation Manual - Rev 1.8 - 2-2-2022**
Meritor	Tire Inflation System	**Meritor Tire Inflation System Standard MTIS with the ThermALERT System - Maintenance Manual 14P Rev 10-19**
Right Weigh	Scale, Digital Bluetooth Wireless 201-ebt-01(B)	**Right Weigh Load Scales Installation& Operation Manual 201-EBT-01(B) PP-003-0010 Rev I - Jan 2018**
Wabco	Anti-Lock Brakes	**Enhanced Easy-Stop Trailer ABS with PLC Maintenance Manual MM0180 Ver 05-2018**
	Disc Brakes (16-1/2")	**PAN 22 Mechanical Sliding Caliper Disc Brake Assembly & Maintenance Instruction - Ver 01-08-2013**

MANUFACTURER REFERENCES

Table provided for general use.

NOTES:

Document Control Revision Log:

Date	Form #	Improvement(s): Description and Comments
05/09/2022	F-1122-0522	New Release
07/26/2022	F-1122-0722	Suspension Ride Height Adjustment Updated
07/26/2023	F-1122-2307	Updated Maintenance Schedule and Axle Alignment Procedures.
03/04/2024	F-1122-2403	Updated Maintenance & Lubrication General Information, Trailer Maintenance Checklist & Notes, Hydraulic Maintenance Leak Classification, Added Air System Maintenance.
01/20/2025	F-1122-2501	Updated Specific & General Torque Specifications, General Maintenance Information, Suspension Alignment Procedures, Added new Equipment of Low Usage Statement.
02/10/2025	F-1122-2501	Chapter 3, Tie Down Anchor Section Added to Show Approved / Not Approved Anchors.
07/17/2025	F-1122-2507	Updated Chapter 2 Wheel Fastener Specifications & Chapter 4 Wheel Bearing Adjustment, Wheel End Play and Torque Limits.
01/12/2026	F-1122-2601	Updated Suspension 7/8” Pivot Bolt Torque from 425-440 to 500-550 ft lbs. Added New Lubrications Specifications, Maintenance Schedule, and Engine Package Maintenance Schedule.

Equipment from Landoll Company, LLC is built to exacting standards ensured by ISO 9001:2015 registration at all Landoll manufacturing facilities.

855F/860F

Operators Manual

Re-order Part Number F-1122

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