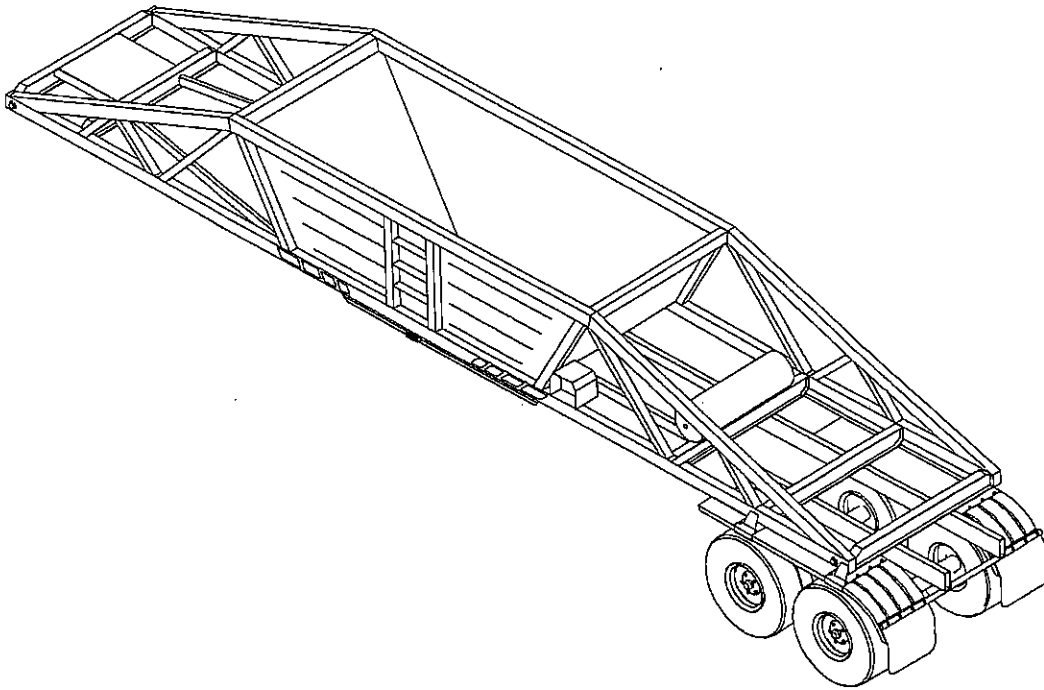




**BOTTOM DUMP
SERIES TRAILER
OPERATOR'S MANUAL**



**1900 North Street
Marysville, KS 66508
(785)562-5381**

WARRANTY

MANUFACTURER'S GUARANTEE POLICY

LANDOLL CORPORATION WARRANTY

LANDOLL warrants each new and unused LANDOLL machine, when properly assembled, adjusted, and operated, to be free of defects in material and workmanship, in normal use and when properly serviced, for a period of twelve (12) months after date of delivery by the Dealer to the original retail purchaser. LANDOLL shall repair or replace, at its option, freight on board (f.o.b.) at its factory or designated DEALER location, any part or parts of such new and unused machine which shall have been reported in writing to LANDOLL within thirty (30) days from date of failure thereof and which LANDOLL inspection shall disclose to have been defective. Defective parts must be returned to the LANDOLL factory, freight prepaid. LANDOLL will not be liable for labor, transportation, or any other charges resulting from replacement of a defective part. This warranty is void if any part not supplied by LANDOLL is used in assembly or repair, or if the machine has been altered, abused, or neglected. LANDOLL repair parts are warranted for ninety (90) days from date of replacement or for the unexpired warranty period of the applicable LANDOLL machine, whichever period is longer. LANDOLL makes no warranty, whatsoever, as to purchased component parts and other trade accessories, except to the extent that such items are warranted by the manufacturer thereof. THIS WARRANTY IS EXCLUSIVE AND IN LIEU OF ALL OTHER WARRANTIES, WHETHER EXPRESSED, IMPLIED, OR STATUTORY (INCLUDING WARRANTIES OF MERCHANTABILITY AND FITNESS FOR PURPOSE), AND LANDOLL SHALL NOT BE LIABLE FOR SPECIAL OR CONSEQUENTIAL DAMAGES OF ANY KIND ON ACCOUNT OF ANY LANDOLL PRODUCT.

NO EMPLOYEE OR REPRESENTATIVE IS AUTHORIZED TO CHANGE THIS WARRANTY, VERBALLY OR IN WRITING, OR GRANT ANY OTHER WARRANTY.

LANDOLL CORPORATION, WHOSE POLICY IS ONE OF CONTINUOUS IMPROVEMENT, RESERVES THE RIGHT TO MAKE CHANGES WITHOUT OBLIGATION TO MODIFY PREVIOUSLY PRODUCED EQUIPMENT.





**BOTTOM DUMP
SERIES TRAILER
OPERATOR'S MANUAL**

PURCHASED FROM: _____ **DATE** ___ / ___ / ___

ADDRESS: _____

PHONE NO.: _____ **SERIAL NO.:** _____

REPORTING SAFETY DEFECTS

If you believe that your vehicle has a defect which could cause a crash or could cause injury or death, you should immediately inform the National Highway Traffic Safety Administration (NHTSA) in addition to notifying Landoll Manufacturing.

If NHTSA receives similar complaints, it may open an investigation, and if it finds that a safety defect exists in a group of vehicles, it may order a recall and remedy campaign. However, NHTSA cannot become involved in individual problems between you, your dealer, or Landoll Manufacturing.

To contact NHTSA, you may either call the Auto Safety Hotline toll-free at 1-800-424-9393 (or 366-0123 in Washington, D.C. area) or write to: NHTSA, U.S. Department of Transportation, Washington, D.C. 20590. You can also obtain other information about motor vehicle safety from the Hotline.

In the event of a defect or problem with your LANDOLL equipment, please notify LANDOLL CORPORATION:

**LANDOLL CORPORATION
SALES AND SERVICE
1900 NORTH STREET
MARYSVILLE, KANSAS 66508**

**OR PHONE:
(785)562-5381
1-800-HAULLOLL
(1-800-428-5655)
FAX NO.: (785) 562-4893**

TABLE OF CONTENTS

SECTION	DESCRIPTION	PAGE NO.
1	INTRODUCTION	1-1
2	STANDARD SPECIFICATIONS	2-1
3	OPERATING INSTRUCTIONS	3-1
3-1	GENERAL	3-1
3-2	PRE-COUPLING OF SEMITRAILER AND TRACTOR	3-1
3-3	COUPLING OF THE TRACTOR TO THE SEMITRAILER	3-2
3-4	CONNECTING TRACTOR SERVICES TO THE SEMITRAILER	3-2
3-5	TRACTOR AND SEMITRAILER HOOK-UP AND CHECK-OUT	3-3
3-6	TOWING THE SEMITRAILER	3-3
3-7	PARKING THE TRAILER	3-4
3-8	UNCOUPLING TOWING VEHICLE FROM SEMITRAILER	3-4
3-9	OVERLOAD OPERATION	3-5
3-10	FREEZING WEATHER CONDITIONS	3-5
3-11	ROCKING TYPE UPPER COUPLER COMPATIBILITY	3-5
3-12	GATE CONTROL VALVE OPERATION	3-6
3-13	GATE OPERATION	3-6
3-14	CLAMSHELL GATE AIR SYSTEM FILTER AND LUBRICATOR	3-7
3-15	OIL RATE DELIVERY ADJUSTMENT	3-7
4	MAINTENANCE AND LUBRICATION	4-1
4-1	GENERAL	4-1
4-2	MAINTENANCE SCHEDULE	4-1
4-3	LUBRICATION	4-3
4-4	WELDING ON THE BOTTOM DUMP STRUCTURE	4-3
4-5	AXLES, WHEELS, AND DRUMS	4-4
4-6	BRAKES	4-5
4-7	AXLES	4-7
4-8	WHEELS	4-8
4-9	TIRES	4-9
4-10	ROCKING UPPER COUPLER MAINTENANCE	4-10
4-11	KINGPIN WEAR	4-11
4-12	AIR BRAKE SYSTEM	4-11
4-13	DOUBLE DIAPHRAGM TYPE SPRING BRAKE	4-12
4-14	GATE CONTROL VALVE SERVICE	4-13
4-15	CLAMSHELL GATE AIR SYSTEM FILTER	4-13
4-16	CLAMSHELL GATE AIR SYSTEM LUBRICATOR	4-14
5	TROUBLESHOOTING	5-1

SAFETY PRECAUTIONS



THIS IS THE INTERNATIONAL SAFETY ALERT SYMBOL. IT ALERTS THE OPERATOR TO IMPORTANT SAFETY MESSAGES ON THE MACHINE AND IN THIS MANUAL. CAREFULLY READ AND STUDY THESE LABELS AND MESSAGES BEFORE MACHINE ASSEMBLY AND OPERATION. THERE ARE THREE TYPES OF SAFETY ALERT MESSAGES:

DANGER

A LIFE THREATENING SITUATION EXISTS. DEATH CAN OCCUR if safety measures or instructions on this label are not properly followed.

WARNING

SERIOUS INJURY OR DEATH CAN OCCUR if safety measures or instructions on this label are not properly followed.

CAUTION

SERIOUS EQUIPMENT OR OTHER PROPERTY DAMAGE CAN OCCUR if instructions on this label are not properly followed.



This manual provides operating, servicing, and maintenance instructions, for a Bottom Dump Series Trailer, manufactured by Landoll Corporation, Marysville, Kansas 66508.

- SECTION 1** gives basic instructions on the use of this manual.
- SECTION 2** gives 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.
- SECTION 3** gives instructions for the proper operation of the equipment.
- SECTION 4** gives general maintenance procedures, a maintenance schedule, and a lubrication schedule. Improper maintenance will void your warranty.

IF YOU HAVE ANY QUESTIONS CONTACT:

**LANDOLL CORPORATION
1900 NORTH STREET
MARYSVILLE, KANSAS 66508
or phone:
(785) 562-5381 or
(800) 428-5655
or FAX:
(785) 562-4893**

- SECTION 5** is a troubleshooting guide to aid in diagnosing and solving problems with the trailer.
- PARTS LIST** is a separate manual showing the various assemblies, subassemblies, and systems. Refer to that manual when ordering Landoll replacement parts. Order parts from your Landoll dealer.
- WARRANTY** The Warranty Registration form is located with the product documents. Fill it out and mail it within 15 days of purchase. The Warranty is printed inside the front cover.

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

- COMMENTS** Address comments or questions regarding this publication to:

**LANDOLL CORPORATION
1900 NORTH STREET
MARYSVILLE, KANSAS 66508
ATTENTION: PUBLICATIONS - DEPT. 55**

STANDARD SPECIFICATIONS

WEIGHT*

MODEL 302C	13,950 LB.
MODEL 302D	11,500 LB.
MODEL 305D	12,945 LB.
MODEL 312D	5,775 LB.
MODEL 313D	7,950 LB.
MODEL 314D	13,115 LB.

*INDIVIDUAL TRAILER LOAD CAPACITIES ARE RATED FOR THE SPECIFIC TIRE AND WHEEL LISTED ON THE VEHICLE IDENTIFICATION PLATE LOCATED ON THE FRONT OF THE TRAILER. USING A TIRE OR WHEEL OTHER THAN THE ONE LISTED MAY RESULT IN A LOWER TRAILER LOAD CAPACITY.

CAPACITY:

MODEL 302C/302D/305D	21 CU. YDS.
MODEL 312D/313D	12 CU. YDS.
MODEL 314D	15 CU. YDS.

LOAD TARGET AREA:

MODEL 302C	15'-7"
MODEL 302D/305D	16'-0"
MODEL 312D/313D	10'-8"
MODEL 314D	12'-4"

PIN TO CENTERLINE REAR AXLE:

MODEL 302C	35'-10 1/2"
MODEL 302D/305D	35'-7" or 31'-7"
MODEL 312D	16'-8"

C/L FRONT AXLE - C/L REAR AXLE:

MODEL 313D	16'-8"
MODEL 314D	24'-3"

OVERALL LENGTH

MODELS 302C	40'-0"
MODEL 302D/305D	39'-1" OR 35'-1"
MODEL 312D	20'-5"
MODEL 313D	20'-4"
MODEL 314D	28'-5"

HEIGHT:

MODEL 302C	9'-4"
MODEL 302D/305D	8'-9"
MODEL 312D/313D/314D	8'-11"

GATE HOPPER OPENING (WIDTH X LENGTH):

MODEL 302C	53" X 112"
MODEL 302D/305D:	58" X 117"
MODEL 312D/313D:	59" X 58-1/2"
MODEL 314D	59" X 75-1/2"

CYLINDER:

MODEL 301E/302C/302D/305D/314D	7" X 30"
MODEL 312D/313D	6" X 30"

FOR AXLES, HUBS, WHEELS & BRAKE, CONTACT YOUR LANDOLL DEALERSHIP FOR REQUIREMENTS FOR VARIOUS EQUIPMENT.

**LANDOLL CORPORATION
GENERAL TORQUE SPECIFICATIONS (REV. 4/97)**

THIS CHART PROVIDES TIGHTENING TORQUES FOR GENERAL PURPOSE APPLICATIONS WHEN SPECIAL TORQUES ARE NOT SPECIFIED ON PROCESS OR DRAWING.

ASSEMBLY TORQUES APPLY TO PLATED NUTS AND CAPSCREWS ASSEMBLED WITHOUT SUPPLEMENTAL LUBRICATION (AS RECEIVED CONDITION). THEY DO NOT APPLY IF SPECIAL GRAPHITE MOLY-DISULFIDE OR OTHER EXTREME PRESSURE LUBRICANTS ARE USED.

WHEN FASTENERS ARE DRY (SOLVENT CLEANED), ADD 33% TO AS RECEIVED CONDITION TORQUE.

BOLT HEAD IDENTIFICATION MARKS INDICATE GRADE AND MAY VARY FROM MANUFACTURER TO MANUFACTURER.

THICK NUTS MUST BE USED ON GRADE 8 CAPSCREWS.

USE VALUE IN [] IF USING PREVAILING TORQUE NUTS.

TORQUE IS SPECIFIED IN FOOT POUNDS

UNC Size	SAE Grade 2		SAE Grade 5		SAE Grade 8		UNF Size	SAE Grade 2		SAE Grade 5		SAE Grade 8	
1/4-20	4	[5]	6	[7]	9	[11]	1/4-28	5	[6]	7	[9]	10	[12]
5/16-18	8	[10]	13	[16]	18	[22]	5/16-24	9	[11]	14	[17]	20	[25]
3/8-16	15	[19]	23	[29]	35	[43]	3/8-24	17	[21]	25	[31]	35	[44]
7/16-14	24	[30]	35	[43]	55	[62]	7/16-20	27	[34]	40	[50]	60	[75]
1/2-13	35	[43]	55	[62]	80	[100]	1/2-20	40	[50]	65	[81]	90	[112]
9/16-12	55	[62]	80	[100]	110	[137]	9/16-18	60	[75]	90	[112]	130	[162]
5/8-11	75	[94]	110	[137]	170	[212]	5/8-18	85	[106]	130	[162]	180	[225]
3/4-10	130	[162]	200	[250]	280	[350]	3/4-16	150	[188]	220	[275]	320	[400]
7/8-9	125	[156]	320	[400]	460	[575]	7/8-14	140	[175]	360	[450]	500	[625]
1-8	190	[237]	408	[506]	680	[850]	1-14	210	[263]	540	[675]	760	[950]
1-1/8-7	270	[337]	600	[750]	960	[1200]	1-1/8-12	300	[375]	660	[825]	1080	[1350]
1-1/4-7	380	[475]	840	[1050]	1426	[1782]	1-1/4-12	420	[525]	920	[1150]	1500	[1875]
1-3/8-6	490	[612]	110	[1375]	1780	[2225]	1-3/8-12	560	[700]	1260	[1575]	2010	[2512]
1/1-2-6	650	[812]	1460	[1825]	2360	[2950]	1/1-2-12	730	[912]	1640	[2050]	2660	[3325]

METRIC

COARSE THREAD METRIC CLASS 10.9 FASTENERS AND CLASS 10.0 NUTS AND THROUGH HARDENED FLAT WASHERS, PHOSPHATE COATED, ROCKWELL "C" 38-45.

USE VALUE IN [] IF USING PREVAILING TORQUE NUTS.

Nominal Thread Diameter mm	Standard Torque				Nominal Thread Diameter mm	Standard Torque			
	Newton-Meters		Foot-Pounds			Newton-Meters		Foot-Pounds	
6	10	[14]	7	[10]	20	385	[450]	290	[335]
7	16	[22]	12	[16]	24	670	[775]	500	[625]
8	23	[32]	17	[24]	27	980	[1105]	730	[825]
10	46	[60]	34	[47]	30	1330	[1470]	990	[1090]
12	80	[101]	60	[75]	33	1790	[1950]	1340	[1450]
14	125	[155]	90	[115]	36	2325	[2515]	1730	[1870]
16	200	[240]	150	[180]	39	3010	[3210]	2240	[2380]
18	275	[330]	205	[245]					

Table 2-1 General Torque Specifications

**LANDOLL CORPORATION
HYDRAULIC FITTING TORQUE SPECIFICATIONS
37° JIC, ORS, & ORB (REV. 10/97)**

THIS CHART PROVIDES TIGHTENING TORQUES FOR HYDRAULIC FITTING APPLICATIONS WHEN SPECIAL TORQUES ARE NOT SPECIFIED ON PROCESS OR DRAWING.

ASSEMBLY TORQUES APPLY TO PLATED CARBON STEEL AND STAINLESS STEEL FITTINGS ASSEMBLED WITHOUT SUPPLEMENTAL LUBRICATION (AS RECEIVED CONDITION). THEY DO NOT APPLY IF SPECIAL GRAPHITE MOLY-DISULFIDE OR OTHER EXTREME PRESSURE LUBRICANTS ARE USED.

BRASS FITTINGS AND ADAPTERS - 65% OF THE TORQUE VALUE FOR STEEL. STAINLESS STEEL, ALUMINUM AND MONEL - THREADS ARE TO BE LUBRICATED.

TORQUE IS SPECIFIED IN FOOT POUNDS

PARKER BRAND FITTINGS

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	57.5-62.5
-12	80-90	134-146	75-85
-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

**LANDOLL CORPORATION
HYDRAULIC FITTING TORQUE SPECIFICATIONS
37° JIC, ORS & ORB (REV. 10/97)**

THIS CHART PROVIDES TIGHTENING TORQUES FOR HYDRAULIC FITTING APPLICATIONS WHEN SPECIAL TORQUES ARE NOT SPECIFIED ON PROCESS OR DRAWING.

ASSEMBLY TORQUES APPLY TO PLATED CARBON STEEL AND STAINLESS STEEL FITTINGS ASSEMBLED WITHOUT SUPPLEMENTAL LUBRICATION (AS RECEIVED CONDITION). THEY DO NOT APPLY IF SPECIAL GRAPHITE MOLY-DISULFIDE OR OTHER EXTREME PRESSURE LUBRICANTS ARE USED.

BRASS FITTINGS AND ADAPTERS - 65% OF THE TORQUE VALUE FOR STEEL.

TORQUE IS SPECIFIED IN FOOT POUNDS.

AEROQUIP BRAND FITTINGS

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	210-280
-24	158-167	150-165	270-360
-32	245-258	—	—

Table 2-2 Hydraulic Fitting Torque Specifications

3-1 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.

⚠ 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.

3-2 PRE-COUPLING OF SEMITRAILER AND TRACTOR

3-2.1 Slowly back the tractor/truck (towing vehicle) up to the front end of the semitrailer so the hitch of the semitrailer is centered with the truck. Stop the towing vehicle just inches ahead of the semitrailer. Set tractor parking brake.

3-2.2 Check the semitrailer king pin plate height. The king pin plate should be the same height, to slightly lower, than the latch area of the fifth wheel plate of the towing vehicle. Drain all air and moisture from the towing vehicle air brake system following towing vehicle manufacturer's instructions.

3-2.3 Connect the service and emergency air hoses of the towing vehicle to their respective gladhand on the front of the semitrailer red emergency line to the gladhand with the "EMERGENCY" tag, and the blue service line to the gladhand with the "SERVICE" tag (See Figure 3-1). Chock the semitrailer wheels before activating the semitrailer air supply valve in the towing vehicle. Set the parking brakes.

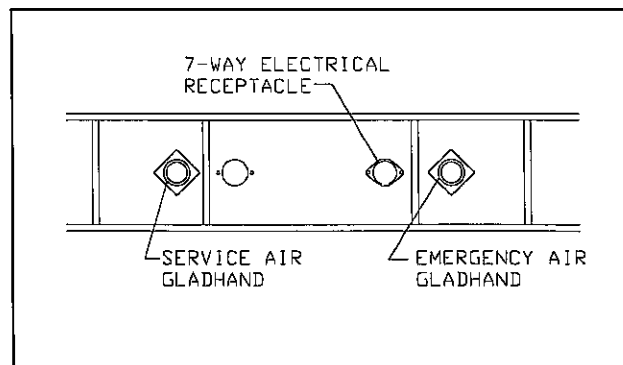


Figure 3-1 Service Hookups

3-2.4 Check the air brake operations of the semitrailer as follows:

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 semitrailer gladhand. Trailer brakes should promptly set.

d. Re-connect the emergency air line to the semitrailer and activate the semitrailer air supply valve. The semitrailer brakes should set.

 **WARNING**

FAILURE TO CHOCK SEMITRAILER WHEELS COULD ALLOW MOVEMENT OF THE SEMITRAILER RESULTING IN SERIOUS PERSONAL INJURY, DEATH, OR DAMAGE TO PROPERTY IN ITS PATH.

3-3 COUPLING OF THE TRACTOR TO THE SEMITRAILER

 **DANGER**

KEEP ALL PERSONNEL CLEAR OF FRONT, REAR, AND SIDES OF TOWING VEHICLE AND SEMITRAILER DURING COUPLING, COMPONENT OPERATIONS, AND UNCOUPLING. FAILURE TO STAY CLEAR CAN RESULT IN SERIOUS PERSONAL INJURY OR DEATH.

3-3.1 Verify the semitrailer wheels are chocked and brakes function properly.

3-3.2 Make certain the coupler of the towing vehicle's fifth wheel is open by pulling the latch handle.

3-3.3 Slowly back the towing vehicle so its fifth wheel contacts the front of the king pin plate on the semitrailer and slips under it. Continue backing until the fifth wheel coupler locks onto the semitrailer kingpin.

 **CAUTION**

PUSHING THE SEMITRAILER BACKWARDS CAN DAMAGE PARKING STANDS.

3-3.4 Verify the vehicle coupling is secure by attempting to pull the tractor forward a few inches. If the tractor disconnects from the semitrailer, locate source of coupling failure; repair before continuing; and repeat Section 3-3.3 and 3-3.4.

3-3.5 Check that the towing vehicle couples securely to the semitrailer before setting towing vehicle and semitrailer parking brakes.

NOTE: Keep brakes engaged for remainder of Hookup, Checkout Procedures and Parking.

3-4 CONNECTING TRACTOR SERVICES TO THE SEMITRAILER

3-4.1 Connect the towing vehicle 7-pole electrical plug to the electrical receptacle on the front of the semitrailer (See Figure 3 -1).

NOTE: The key on the plug and the keyway in the socket must be properly aligned before inserting the plug into the semitrailer socket.

3-4.2 Air Lines: See Section 3-2.

3-5 TRACTOR AND SEMITRAILER HOOK-UP AND CHECK-OUT

 **WARNING**

FAILURE TO PROPERLY SET AND CHECK PARKING BRAKE, AND CHOCK WHEELS WHEN PARKING AND DURING STORAGE, COULD ALLOW MOVEMENT OF THE TRUCK/SEMITRAILER RIG RESULTING IN SERIOUS PERSONAL INJURY, DEATH, OR DAMAGE TO PROPERTY IN ITS PATH.

3-5.1 Raise parking stands. Secure each parking stand with park stand retaining pin in the full “up” position before transporting.

3-5.2 Check the operation of all lights and signals on the semitrailer for proper response to switch positions (stop, right turn, left turn, and clearance).

3-5.3 Check tire inflation, adjust as needed to the pressure listed on the semitrailer VIN plate, located on the front of the semitrailer.

3-5.4 Check tractor/semitrailer rig for air leaks. If air leakage is found, repair the defect before transporting.

3-5.5 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.

3-5.6 Check tractor air pressure. Pressure must not fall below 90 psi, 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 semitrailer wheels must not rotate. If semitrailer brakes do not apply, **DO NOT** transport until defect, or defects, are repaired.

3-6 TOWING THE SEMITRAILER

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

 **WARNING**

ALWAYS CHECK BEHIND AND UNDER THE TRUCK AND SEMITRAILER FOR PERSONS OR OBJECTS BEFORE MOVING. FAILURE TO CHECK CAN LEAD TO SERIOUS PERSONAL INJURY OR DEATH TO OTHERS, OR DAMAGE TO PROPERTY.

3-6.1 Make a moving test of the semitrailer brakes at low, and medium speeds before traveling at highway speed.

3-6.2 Monitor the air pressure gauge on the dash of the towing vehicle. Pressure should not fall below 80 psi at any time.

3-6.3 The semitrailer wheels track to the inside of the towing vehicle during turns. Thus, turning corners requires a wide swing to prevent "curb hopping", and to allow the semitrailer wheels to clear any obstacle on the inside of the corner.

3-6.4 To stop, use a gradual and smooth application of brakes. If grabbing occurs, apply less pressure - grabbing brakes are not efficient.

3-6.5 Backing should be done with care. Tail overhang, semitrailer length, and allowable space must be taken into consideration when backing the semitrailer.

3-7 PARKING THE TRAILER

3-7.1 Position truck/semitrailer rig on a level, solid surface.

3-7.2 Set the **PARKING BRAKE**, not the semitrailer hand brake, and check for proper brake holding.

3-7.3 Chock wheels of semitrailer.

3-7.4 Check for any air leaks in lines, relay valve, brake pods, or any other air system component.

 **WARNING**

WHEN LEAVING THE SEMITRAILER UNATTENDED, CONTROLS SHOULD BE PUT IN THE NEUTRAL OR "OFF" POSITION.

3-8 UNCOUPLING TOWING VEHICLE FROM SEMITRAILER

3-8.1 Park the semitrailer according to instructions in Section 3-7.

3-8.2 Lower the park stands to the ground. Pin through both inner and outer legs of stand. If parking stand not available, place blocks under gate as necessary.

3-8.3 Disconnect the emergency and service air lines and attach them to the tractor gladhand holders.

3-8.4 Disconnect the 7-pole cable and hydraulic lines from the semitrailer and store with the tractor.

3-8.5 Pull the tractor fifth wheel plate latch release lever.

3-8.6 Attempt to pull the tractor forward. If the tractor uncouples, verify all service lines are disconnected and semitrailer wheels are chocked. If tractor does not disconnect, repeat Section 3-8.5 and 3-8.6.

3-8.7 Pull the tractor away from the semitrailer.

 **WARNING**

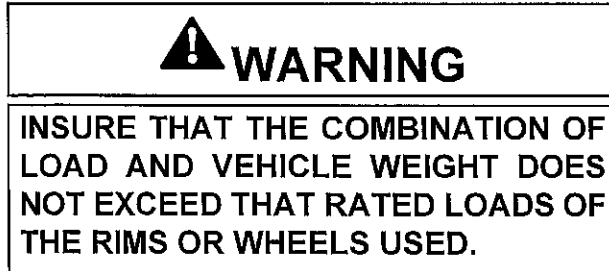
ALWAYS CHECK BEHIND AND UNDER THE TRUCK AND SEMITRAILER FOR PERSONS OR OBJECTS BEFORE MOVING. FAILURE TO CHECK CAN LEAD TO SERIOUS PERSONAL INJURY OR DEATH TO OTHERS, OR DAMAGE TO PROPERTY.

 **WARNING**

IF PARKING STANDS ARE AVAILABLE, SECURE EACH LEG WITH PIN BEFORE LEAVING SEMITRAILER UNATTENDED. IF PARKING STANDS ARE NOT AVAILABLE, PLACE BLOCKS UNDER GATE AS NECESSARY.

3-9 OVERLOAD OPERATION

The Landoll Bottom Dump trailer has proven to be a rugged, reliable, versatile, light weight and low maintenance product. Operation under overload conditions, however, can result in premature and progressive deterioration of the structure and components. It is extremely important that a periodic maintenance program be instituted, which includes the following:



3-9.1 Periodic cleaning and inspection for frame cracks or damage, excessive wear, or operational deterioration. The frequency of required inspection intervals can be determined after reviewing the findings of several weekly inspections.

3-9.2 Removal of and welding of all progressive type cracks in the structure.

3-9.3 Retighten all suspension bolts.

3-9.4 Lubricate all bearings.

3-9.5 Maintain the air gate, air brake system, and related components.

3-10 FREEZING WEATHER CONDITIONS

For maintenance during low temperatures check for frozen, sluggish, or inoperative brakes, sagging light and brake lines, broken connections, increased corrosion, and properly installed of winter equipment. Some preventive steps to take include:

3-10.1 Drain air tanks daily.

3-10.2 The air system should be treated through either tractor equipment or directly into air lines. Be sure to use additives designed for such use. Make sure light and brake lines are adequately supported.

3-10.3 Brake applications on icy and snowpacked roads should be made intermittently by fanning or pumping the brakes. To apply trailer brakes, first, via the hand control valve, pull the tractor-trailer combination into line.

3-10.4 Use mud and snow tires, tire chains and sanders, as needed, in braking on slippery roads. Protect the air brakes and other air systems against the entry of moisture and dirt.

3-11 ROCKING TYPE UPPER COUPLER COMPATIBILITY

3-11.1 The rocking upper coupler on Landoll Bottom Dump Trailer reduces twisting stresses forced upon the tractor and trailer when driven over uneven terrain. It is coupled via a single axis hinged tractor fifth wheel.

3-11.2 If the tractor used to pull the bottom dump trailer has a multi-axis oscillating type fifth wheel, then replace the rocking type coupler on the trailer with a rigid coupler. The rigid type upper coupler is available from the Landoll Parts Distribution Center.

3-12 GATE CONTROL VALVE OPERATION

3-12.1 To operate the gate cylinder valve remotely, energize the solenoid from inside the cab. The energized solenoid provides pilot pressure to operate the spool, and pressurizes the small area bleeder pilot by the ball check. The air in the bleeder pilot acts as a return spring to return the spool to its original position. This air may eventually leak off.

3-12.2 Operate manually only through a de-energized solenoid. The bleeder pilot is used to vent any air which has not leaked off after a remote operation, before the first manual operation. After the solenoid has been de-energized, and the bleeder pilot has been vented, the manual operator can then be moved in either direction to control the cylinder.

3-12.3 Periodically, disassemble the valve for cleaning.

3-13 GATE OPERATION

3-13.1 The gate limiting chains on the bottom dump trailer must be threaded downward through the keyholes on the gates. (If the chains are threaded upward through the keyholes, they may fall out). The chains must be set at the same length (front and rear) on the gates (See CAUTION).

3-13.2 When emptying a load:

a. Control the amount of gate opening by setting the gate limiting chains. Set the gate limiting chains at the same length, front and rear, on the gates. **The gates must open only enough to unload the cargo. They must not be opened so wide that the windrow becomes too high - causing the axles and brake equipment to drag on the windrow(See DANGER).**

b. Do not unload at excessive speeds.

 **CAUTION**

IMPROPERLY THREADED GATE LIMITING CHAINS OR CHAINS SET AT DIFFERENT LENGTHS (FRONT AND REAR) CAN CAUSE THE GATES TO TWIST WHEN UNLOADING. BE SURE THE CHECK THAT THESE CHAINS ARE SET CORRECTLY ON THE GATE.

 **DANGER**

FAILURE TO LIMIT THE WINDROW HEIGHT AS SPECIFIED CAN CAUSE AXLE AND BRAKE EQUIPMENT DAMAGE. THIS CAN LEAD TO A BRAKE MALFUNCTION, WHICH IMPOSES A DANGEROUS SITUATION THAT CAN CAUSE SERIOUS INJURY OR DEATH.

3-14 CLAMSHELL GATE AIR SYSTEM FILTER AND LUBRICATOR

 **CAUTION**

CERTAIN COMPRESSOR OILS, CHEMICALS, HOUSEHOLD CLEANERS, SOLVENTS, PAINTS AND FUMES WILL ATTACK PLASTIC BOWLS AND CAN CAUSE BOWL FAILURE. DO NOT USE NEAR THESE MATERIALS (SEE SECTION 3-14.2 FOR CLEANING INSTRUCTIONS). IMMEDIATELY REPLACE ANY CRAZED, CRACKED, DAMAGED OR DETERIORATED PLASTIC BOWL WITH A NEW PLASTIC BOWL AND METAL BOWL GUARD.

 **CAUTION**

USE ONLY RECOMMENDED AIR SYSTEM LUBRICANTS. NON-SPECIFIED TYPE MAY BE HAZARDOUS TO UNIT. BOWL GUARD MUST BE ON AT ALL TIMES DURING OPERATION TO CONFINE FRAGMENTS IN CASE OF BOWL FAILURE.

3-14.1 Lubrication For Differing Operating Conditions:

a. Under average service conditions, the lubricator bowl should be kept filled above the level of the bottom of the siphon tube with a petroleum based oil. Preference of oil is an SAE-5 or SAE-10 motor oil or hydraulic oil.

NOTE: DO NOT USE A SYNTHETIC BASED OIL.

b. In colder weather or under more severe service conditions, an automobile automatic transmission fluid (ATF Type F or Dexron) often provides better performance than a conventional motor oil.

c. In damp, below freezing conditions, freezing water in the air lines can cause gate air system problems. In such conditions, lubricating oil should be replaced with Kil-frost, available through parts dealers.

d. The unit may be filled (or cleaned) under pressure by first removing the fill plug, then removing the bowl.

 **CAUTION**

DO NOT REPLACE THE FILL PLUG UNTIL THE BOWL AND GUARD ARE IN POSITION AND THE CLAMP RING IS LOCKED INTO PLACE.

3-14.2 **Lubricator Bowl:** Drain and clean the lubricator bowl whenever contaminants collect over 1/4" deep in the bottom of the bowl. The bowl may be removed with the air system pressurized. It should be wiped clean with a clean, dry cloth.

NOTE: DO NOT, UNDER ANY CIRCUMSTANCES, ATTEMPT TO CLEAN THE PLASTIC BOWL WITH A SOLVENT.

3-15 OIL RATE DELIVERY ADJUSTMENT

3-15.1 The rate of oil delivery from the lubricator should be set at three drops for each complete cycle (open and close) of one hopper gate system.

3-15.2 The rate of oil delivery is controlled by turning the adjusting screw counterclockwise (ccw), for increased flow, and clockwise (cw) for decreased flow.

3-15.3 To gain access to the drip rate adjusting screw, the tamper resistant cap must be removed.

4-1 GENERAL

This section contains instructions necessary for proper maintenance of the trailer. The Bottom Dump Series Trailer is designed for years of service with minimal maintenance. However, proper maintenance is important for durability and safe operation and is an owner/user responsibility.



OPERATING THE TRACTOR OR TRAILER WITH DEFECTIVE, BROKEN OR MISSING PARTS MAY RESULT IN SERIOUS INJURY OR DEATH, DAMAGE TO THE TRACTOR/TRAILER, ITS CARGO, OR PROPERTY IN ITS PATH.

4-2 MAINTENANCE SCHEDULE

The following maintenance practices are recommended for your Landoll Bottom Dump Trailer.

4-2.1 Within the first 50 miles of operation and, thereafter, as shown in **Figure 4-1**. Check the suspension and tighten the bolts to the specified torque. See **Tables 2-1 and 2-2** for torque specifications.

4-2.2 Tighten wheel nuts, both inner and outer, properly, one or two trips after trailer delivery. A wheel tightening sequence is shown in **Figure 4-1**.

4-2.3 Cam and brake adjustment is governed by the type and severity of service used. Regular maintenance of grease fittings on cam shafts is recommended within 60 day intervals, or as specified in **Table 4-1**. Bleed the air when greasing. This allows full penetration of grease around cam shafts.

4-2.4 Inspect for malfunctions and correct them early. This will usually lessen the degree of correction necessary, and prevent excessive and costly trailer repair time.

4-2.5 Regular upkeep is very important for keeping your trailer looking new longer. If you have any unusual problems, do not hesitate to call Landoll. Landoll Corporation is ready to help you stay on the road.

NORMAL OPERATING SERVICE INTERVALS ^a								
SERVICE INTERVAL :	TIMES	1st 5 Hrs	Weekly	Monthly	6 Months	Yearly	LUBE #	NOTES
ITEM	MILES	50	500	2,000	12,000	25,000		
ELECTRICAL								+
LIGHTS								
WIRING & CONNECTIONS								
MISCELLANEOUS								
FASTENERS		I, T						b
KING PIN & PLATE				C,I,L			4	c
BRAKE AIR SYSTEM								
RELAY VALVES						I, C		
BRAKE ADJ & WEAR				I, T				d
SLACK ADJUSTERS						L	4	c
CAMSHAFT ASSYS						L	4	c
HUB OIL			I, L			R	6	c
WHEEL BEARINGS					I, T		6	c
TIRE INFLATION & WEAR								e
WHEEL LUG NUTS		I, T		I, T				b
SUSPENSION ALIGNMENT								
CLAMSHELL LUBRICATION						R	1	c
CLAMSHELL AIR FILTER					R			
HOSES						R		
I – Inspect, R – Replace, T– Tighten/ Adjust Torque, L – Lubricate, C – Clean								
NOTES:								
a. Perform at the time shown. Shorten service intervals when operating in severe or dirty conditions.								
b. See Table 2-1 and 2-2 (Bolt Torque Chart) for correct torque.								
c. See Table 4-2 (Lube Specification Chart) for recommended lubricant.								
d. Call Landoll Customer Services for procedures to replace.								
e. See Serial Number Plate on the front of the trailer for proper inflation requirements.								
f. See Figure 4-1, Stud Tightening Sequence.								
g. Inspect prior to and after each use.								

Table 4-1 Maintenance Schedule

LUBE #	SEASON	BRAND AND PRODUCT (WEIGHT AND/OR TYPE)			
		AMOCO	EXXON	PHILLIPS	TEXACO
5th Wheel Plate/Slack Adjusters/Brake Spider Bushing	ALL YEAR	Lit-Multi Purpose Grease	Rondex Multi-Purpose Grease	Phil Lube M.W. Grease	MarFax All Purpose
Clamshell Lubricator	SUMMER & WINTER	SAE 5 or SAE 10 motor oil or hydraulic oil. Colder weather or severe service conditions. ATF Type F or Dexron. Damp sub-freezing temperatures: Replace oil with Kil-Frost. Parker O-Lube on O-rings only.			
Wheel Bearings	ALL YEAR	Gear Lube SAE 80W-90	Gear Oil GTX SAE 80W-90	Superior MP Gear Oil SAE 80W-90	Multi-Gear EP SAE 80W-90

Table 4-2 Lubrication Specifications

4-3 LUBRICATION

Proper lubrication is essential to all types of bearings, gearing, and friction producing mechanical devices. Lack of adequate and proper lubrication results in premature wear of components due to increased abrasion or excessive heat. See Table 4-1, **Maintenance Schedule** and Table 4-2, **Lubrication Specifications** for recommended lubricants and a periodic maintenance schedule.

4-4 WELDING ON THE BOTTOM DUMP STRUCTURE

The Landoll Bottom Dump Trailer is constructed using high-strength, alloyed steel in all critical strength areas. Before performing any welding on the structure, review the following guidelines.


CAUTION

1. DO NOT WELD ACROSS ANY MAIN FRAME MEMBER AT ANY LOCATION.
 2. DO NOT WELD TO THE TOP OR BOTTOM FLANGE OF THE "I-BEAM" CROSS MEMBERS.

4-4.1 All paint, dirt, grease, or moisture must be thoroughly removed from the entire weld and heat affected area before welding.

4-4.2 Use low-hydrogen, low-alloy electrodes for all welding. AWS 7016, AWS 7018, or equivalent, are recommended in wire, if using a MIG welding process.

4-4.3 All cracks should be grooved out before welding. This enables a complete penetration weld to be made from one side. If possible, a second weld should then be made from the opposite side.

4-4.4 For cracks that may occur in the main frame members away from the end points, contact Landoll Customer Services for repair instructions.

4-5 AXLES, WHEELS, AND DRUMS

Axles, wheels, and drums should be inspected at regular intervals, depending on vehicle speeds, loads, and general operating conditions.

WARNING

DO NOT EXCEED THE RIM OR WHEEL MAXIMUM INFLATION PRESSURES. IT IS IMPORTANT TO MAINTAIN UNIFORM INFLATION IN BOTH TIRES OF A DUAL ASSEMBLY SO WEIGHT IS EQUALLY DISTRIBUTED.

WARNING

DO NOT RUN VEHICLE ON ONE TIRE OF A DUAL ASSEMBLY. IF A TIRE HAS LOST A SIGNIFICANT AMOUNT OF PRESSURE, DO NOT REINFLATE THE TIRE WITHOUT FIRST REMOVING AND INSPECTING EACH PART.

CAUTION

INSUFFICIENT MOUNTING TORQUE CAN ALLOW MOVEMENT AND BREAKAGE OF WHEEL STUDS, WHEEL NUTS, AND CAUSE WHEEL DAMAGE OR BREAKAGE. EXCESSIVE MOUNTING TORQUE CAN CAUSE STUD BREAKAGE, BOLT HOLE CHAMFER BURRS, AND STUD HOLE DEFORMATION.

WARNING

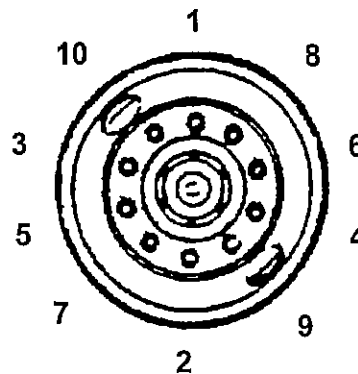
INSPECT RIMS AND WHEELS FOR DAMAGE DURING TIRE CHECKS AND AT PERIODIC MAINTENANCE INTERVALS. REMOVE AND REPLACE DAMAGED OR WORN PARTS.

10 STUD HUBS

Applies to 3/4 to 1-1/8 dia. Studs

INNER CAP NUTS - Torque Cap Nuts to 50 ft.-lb. using procedure shown. Then tighten Cap Nuts to recommended torque - 450 to 500 ft. lb.

OUTER CAP NUTS - Torque Cap Nuts to 50 ft.-lb. using procedure shown. Then tighten Cap Nuts to recommended torque - 450 to 500 ft.-lb.



RECOMMENDED TORQUE DRY: 450 to 500 ft.-lb.

NOTE: In all applications where an Aluminum Disc Wheel is to be installed, a special Inner Cap Nut must be substituted for the Standard Inner Cap Nut.

Figure 4-1 Wheel Nut Tightening Sequence

4-5.1 Check and tighten, as needed, rim clamps and wheel stud nuts at the beginning of each trip. With spoke type wheels, be sure rims are installed so tires do not wobble. Run nuts up uniformly using diagonal opposite tightening pattern (See **Figure 4-1**). Tighten nuts gradually to recommended torque (See **Table 2-1**).

4-5.2 Check for loose wheels at regular intervals to see if there is play between the bearing and bearing race. Check wheel bearing cones and cups for wear or damage. When assembling the hub or wheel on the axle, do not force wheel or hub over bearings, as damage can occur.

4-5.3 Adjust wheel bearings whenever brakes are adjusted.

4-5.4 The wheel bearing must be correctly set before adjusting the brake. Use a torque wrench for adjustment, and follow the manufacturer's specifications.

4-5.5 Replace oil seals every time a wheel is removed to insure leak free operation. If the hub is removed, it can contaminate the lubricant and cause possible bearing damage. Therefore, any time a trailer hub is removed, replace the seal. Also seals should be replaced each time brakes are relined. Do not wait for seals to show signs of leakage.

4-5.6 Overheating causes failure due to heat checking. This frequently happens when the trailer brakes are used independently of the tractor brakes.

4-5.7 Reboring brake drums beyond the manufacturer's maximum diameter is not recommended. Drums are made to allow for a given maximum diameter. Oversized linings are available.

4-6 BRAKES

The operator should establish a schedule for the periodic cleaning, inspection, adjustment, and lubrication of brake equipment based on experience and severity of operation. Inspect brake shoe linings regularly. Weak and unmated springs cause pulling and dragging brakes which can damage the springs, resulting in overheated brake drums.

WARNING

FIELD DISASSEMBLY OF THE SPRING BRAKE UNIT IS NOT RECOMMENDED. FAILURE TO FOLLOW PROCEDURE AS OUTLINED BY THE OEM OF THE BRAKE UNIT CAN CAUSE SUDDEN ACCIDENTAL RELEASE OF THE POWER SPRING CAUSING SPRING BRAKE COMPONENTS TO BE HURLED WITH DANGEROUS FORCE. THESE COMPONENTS COULD STRIKE PERSONS IN THE AREA CAUSING SERIOUS PERSONAL INJURY OR DEATH. IF FIELD DISASSEMBLY IS UNAVOIDABLE, CONTACT LANDOLL CORPORATION FOR PROCEDURES AND SPECIALIZED TOOLS NEEDED TO PERFORM THE SAFE REPAIR OF THE BRAKE UNIT.

4-6.1 Lubrication

a. Lubricate all brake linkages, anchor pins, camshafts, slack adjusters, and all other moving brake parts that need grease.

b. Use a high temperature resistant lubricant. Avoid excessive lubrication to prevent getting any on the lining.

NOTE: Grease soaked linings cannot be salvaged. Lubricate the shoe mechanism for a more responsive application and release of the brake. This requires less air when applied.

4-6.2 Brake Adjustment

Always adjust brakes with the wheels off the floor. This is the only true way of definitely knowing you have a free running brake.

4-6.3 Overhaul

During a major brake overhaul, the following parts should be carefully checked and replaced as required:

a. Spiders - for loose or sheared fasteners, or wear and damage.

b. Anchor pins - for wear and misalignment.

c. Cam shafts and cam shaft bearings or bushings - for wear.

d. Shoe return springs - at each overhaul.

e. Brake shoes - for wear, oversized fastener holes, and any signs of grease on the braking surface.

f. Drums - for cracks, scoring, or other damage.

4-6.4 Relining

When relining brakes, the following procedure is recommended:

a. Check drums with a micrometer to be sure both drums on the axle are the same diameter.

b. Use the same manufacturer's drum design on each axle.

c. Clean brake shoe tables thoroughly after removing old lining.

d. Replace all worn shoe parts. Replace the shoe if anchor pin holes are oversized.

e. Treat axle as a unit - do identical repairs on both brakes.

f. Disconnect slack adjuster lever to check camshaft by hand.

g. Be sure that proper type of lining is used - that is, the same friction rating as original equipment - to get uniform braking, and when applicable, retain compliance with FMVSS-121 - Air Brake System.

h. Be sure "S" cam is clean and free of grease. This allows shoe roller to run free and turn freely on the cam face. All roller surface should be clean and free of any flat spots. Replace rollers with flat spots.

i. Check and replace brake chambers, chamber springs, and chamber diaphragms in pairs.



DO NOT APPLY MORE THAN 50 FT-LBS TORQUE TO THE BRAKE CHAMBER RELEASE BOLT NUT.

j. Rebush and replace camshafts in pairs.

k. Replace slack adjusters if they will not adjust properly.

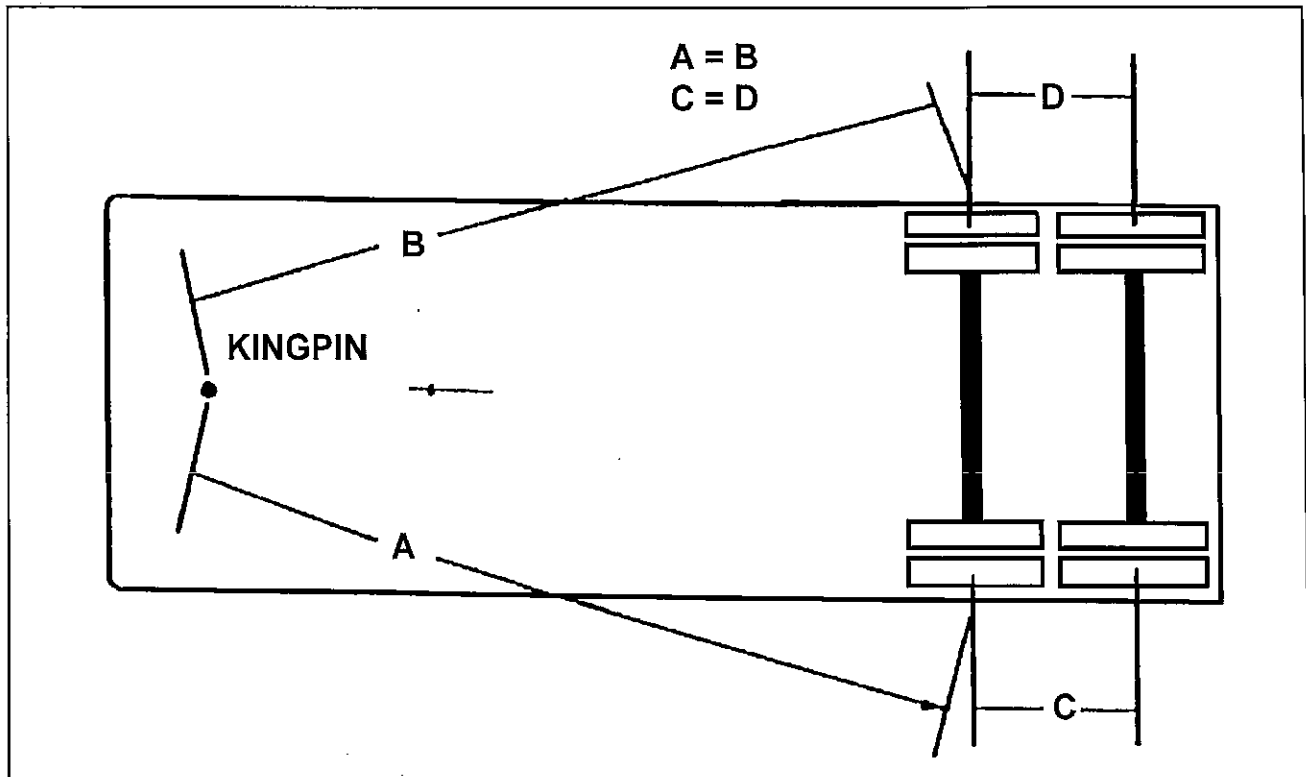


Figure 4-2 Axle Alignment Distances

4-7 AXLES

Poorly aligned axles cause vehicle “dog tracking” and excessive tire wear. Alignment must be done regularly, to prevent these and other related problems.

4-7.1 When aligning axles, suspension should be in a “relaxed” state, and free of “binds”. Before taking measurements, and to achieve this “relaxed” condition, make sure the vehicle is unloaded, then roll it back and forth on a level floor. Avoid brake application. Vehicle must be level from side to side as well as from front to rear.

4-7.2 Use screw-on axle and extenders, or remove outer wheels and anything else that may be in the way of the measuring tape to achieve a straight line from kingpin to the axle ends. Proper tools for axle alignment inspection are:

- a. Spring-loaded kingpin extender with bubble level,
- b. Screw-on axle end with extenders,
- c. 50-foot steel tape,
- d. Adjustable tram
- e. See Figure 4-2 . Measure distances “A” and “B” from the kingpin to the axles. These must be equal within 1/16” of each other.

NOTE:

1. Always measure to the axle ends for accurate alignment.
2. Avoid measuring to rims, suspension brackets, brake drums, etc. This results in improper alignment.
3. If difficulty is encountered in getting true alignment, check and repair - or replace - worn or bent suspension parts.

4-8 WHEELS

Landoll trailers are equipped with wheels or rims consistent with the trailer's gross vehicle weight rating and gross axle weight ratings. They meet or exceed tire and rim association recommendations. However, verify the radial tire rating before mounting on wheels (if radials are not original equipment). Consult your Landoll dealer or your tire distributor about tire and wheel requirements. Use the following procedures to insure safe and dependable service.

4-8.1 Installation

a. Use a wire brush to clean the wheel mounting faces and ball seats. Make sure they are free from dirt and excess paint.

b. Place the inner wheel over the wheel studs. Use care not to damage the threads.

c. Install the inner wheel nuts. Run them down until the ball face of the nut seats squarely in the ball seats of the wheel.

d. Tighten the inner wheel nuts to specified torque. The wheel nuts must be tightened by always tightening opposites. See Figure 4-1 for wheel cap nuts tightening sequence.

e. Mount the outer dual wheel and install the outer cap nuts. Tighten them to the specified torque in the same manner as the inner nuts.

NOTE: After running approximately 50 miles under load, the wheel nuts must be retightened.

f. Inspect or measure the distance from the ball seat of the wheel mounting flange to the first (inside) nut thread. This can be done by counting the number of engaged threads: (1) Tighten all nuts in the regular manner; (2) Loosen one nut to the hand-tight position; and (3) Count the number of turns needed to disengage from the stud as it is backed off. At least seven full turns are required to disengage a 3/4" nut. At least five full turns are required to disengage an 1-1/8" nut.

4-8.2 Care and Maintenance

a. Inspect wheels at frequent intervals for safe operation, including interior surfaces of duals not normally visible. Clean off and look for cracks or other damage.

b. Avoid such driving practices that are known to shorten the life of a wheel. This includes heavy pounding on wheel rim, overloading, or hitting curbs at high speeds or at sharp angles, etc.

c. The wheel cap nuts must be kept tight. When cracking the cap nuts on dual disc wheels, back off the outer nut before attempting to tighten the inner nut. Try all cap nuts after first use or any wheel change. Inspect wheels and check wheel nuts during service stops. Dirt streaks may indicate loose cap nuts.

d. Do not heat wheels or attempts to soften them. The special alloy used in these wheels is heat-treated. Uncontrolled heating from welding changes the properties of the metal.

e. Whenever a tire is removed, closely inspect the complete wheel. Remove all grease and road dirt. Use a wire brush or steel wool to remove the rubber from the bead seat. Remove projections on the side wall of the gutter to prevent uneven seating of the side or lock ring. This leads to chipping of the gutter. Follow the same procedure for mounting areas and fixed flange areas.

4-8.3 Wheel Studs

a. Wheel Stud selection is based on the wheel to be used on the axle. When using aluminum wheels, change stud lengths to increase thread engagement between the inner cap nut and hub stud.

b. If the stud is changed for aluminum wheels, steel wheels cannot be reinstalled. If the "standout" exceeds the above recommended length for the appropriate wheel, the inner cap nut may bottom-out and become tight before the nut is fully seated in the bolt hole chamber in the wheel.

c. Operating with loose cap nuts or improperly seated wheels can break wheel studs.

CAUTION

INSUFFICIENT MOUNTING TORQUE CAN ALLOW MOVEMENT AND BREAKAGE OF WHEEL STUDS, WHEEL NUTS, AND CAUSE WHEEL DAMAGE OR BREAKAGE. EXCESSIVE MOUNTING TORQUE CAN CAUSE STUD BREAKAGE, BOLT HOLE CHAMFER BURRS, AND STUD HOLE DEFORMATION.

d. When a broken stud is replaced, also replace the stud on each side of it (in ten-hole mountings).

NOTE:

Standout distance is the distance the stud extends from the drum surface outward to the end of the stud.

Inner Cap Nut Interior Threads: 3/4" - 16

Inner Cap Nut Exterior Threads: 1-1/8" - 16

Outer Cap Nut Interior Threads: 1-1/8" - 16

It is recommended that the following standout distances be used for the appropriate wheels:

Steel (any size): 1-5/16"

Aluminum (7.5" x 22.5"): 1-5/8"

(8.25" x 22.5"): 1-3/4" & 1-7/8"

(8.25" x 24.5"): 1-7/8"

4-9 TIRES

Tire maintenance after installation is perhaps the most important factor contributing to tire survival. Before each trip, inspect your tires, including the spare, and check air pressure.

WARNING

IMPROPERLY RETREADED OR REPAIRED TIRES ARE DANGEROUS AND CAN CAUSE TIRE DESTRUCTION, PROPERTY DAMAGE, AND PERSONAL INJURY. PROCEDURES FOR THE PROPER RETREADING AND REPAIRING OF TIRES IS PROVIDED BY THE TIRE MANUFACTURER, AND SHOULD BE CARRIED OUT ONLY BY QUALIFIED PERSONNEL WITH PROPER EQUIPMENT.

WARNING

ONLY TIRES WHICH ARE MARKED "REGROOVABLE" ON THE SIDEWALL MAY BE REGROOVED. AFTER REGROOVING, THE DEPTH OF THE NEW GROOVES MUST NOT EXCEED THE LIMITS ESTABLISHED BY THE TIRE MANUFACTURER.

WARNING

AN INFLATED TIRE AND RIM CAN BE VERY DANGEROUS IF MISUSED OR WORN OUT. MANY ACCIDENTS, SOME FATAL, HAVE RESULTED FROM IMPROPER HANDLING AND OPERATION OF TRUCK RIMS AND WHEELS.

4-9.1 Care and Maintenance

- a. If one of the tires has lost four or more pounds of pressure, look for signs of penetrations, valve leakage, or wheel/rim damage.
- b. Inspect the tire at regular intervals during long runs for bulges, cracks, cuts, or penetrations. If any such damage is found, the tire must be inspected fully at once.
- c. Before returning to a normal surface or highway speeds, after use on substandard road surfaces, inspect your tires for any damage, such as cuts or penetrations.
- d. Check tire inflation at least once every five days. Check it daily during the summer months.
- e. Tires should normally be inflated according to the specification on VIN plate. The carrying capacities and inflation pressures specified in these charts are determined with the tire's rated maximum speed in consideration.

 **WARNING**

USING A DAMAGED TIRE, CAN CAUSE TIRE DESTRUCTION, PROPERTY DAMAGE, AND PERSONAL INJURY. UNDERINFLATED TIRES BUILD UP EXCESSIVE HEAT THAT MAY RESULT IN SUDDEN TIRE DESTRUCTION. PRESSURE SHOULD BE CHECKED WHEN TIRES ARE COLD. THAT IS, BEFORE THEY HAVE BEEN DRIVEN. NEVER BLEED AIR FROM HOT TIRES. THIS CAUSES TIRES TO BECOME UNDERINFLATED. MAKE SURE TO CHECK BOTH TIRES IN DUAL OPERATION. PRESSURE SHOULD BE THE SAME IN BOTH TIRES.

4-9.2 Recommendations

a. After the first 50 to 100 miles, recheck torque on wheel nuts. When inner cap nuts are tightened, outer nuts must be backed off several turns. Check inner nut for tightness. Retighten nuts as needed. Tighten the outer nut to appropriate torque. Figure 4-1 provides a proper tightening procedure.

b. It is highly recommended that when using aluminum wheels, the inner cap nut be Grade 8 quality. These are available through your Landoll dealer.

c. Store all tires in a cool dry place, indoors, so there is no danger of water collecting inside them. Water trapped between the tube and the tire after inflation can cause sudden tire failure.

d. Keep tires away from sources of ozone, such as hot pipes and electric generators. Store tires on surfaces that are clean and free from grease, gasoline, or other such substances. Tires exposed to these materials are subject to sudden failure.

e. If irregular wear is noted, have your tire inflation, alignment, and the parallelism of your axles checked immediately.

4-9.3 Failure Causes

a. If wheel cracks running from hand holes occur, note the position of the failed wheel on the vehicle, and check the actual working loads of that axle.

b. If wheel cracks running from stud hole to stud hole on the bolt circle appear, check the wheel assembly for worn hub mounting face, worn stud grooves, and cracked or damaged studs.

c. If mixing tires, note that the tires of all wheels of a single axle must be matched to within 1/8" of the rolling radius (3/4" of the same rolling circumference). The tires of all wheels of a single axle must match in the static loaded radius. The dimension from wheel center to the ground under load is the static loaded radius.

4-10 ROCKING UPPER COUPLER MAINTENANCE

The Rocking Upper Coupler requires very little maintenance. Primary item is to include the coupler in the routine greasing portion of the normal maintenance program. Three grease zerks are located on the roadside of the coupler and require only a slight amount of grease

at each periodic greasing. The only other maintenance is to make sure adequate grease is on the surface between the coupler and the fifth wheel. The grease zerks are designated in Figure 4-3.

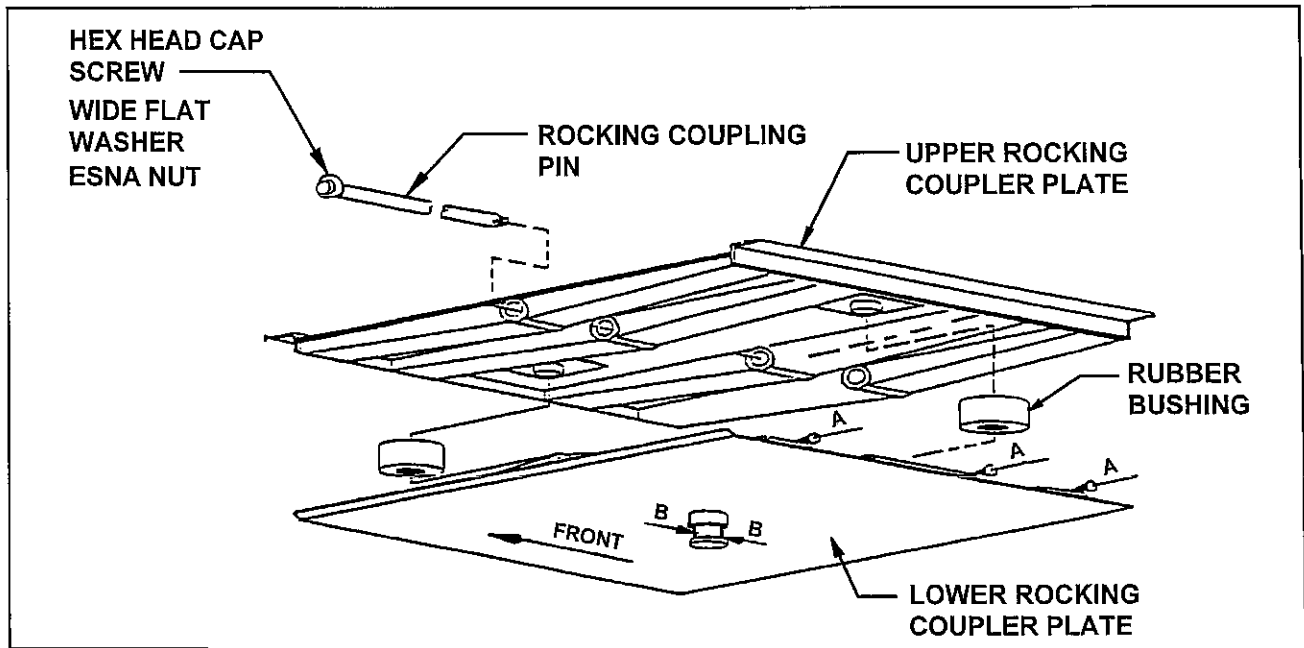


Figure 4-3 Rocking Coupler

4-11 KINGPIN WEAR

4-11.1 It is important to inspect the king pin periodically for wear and to make sure it does not exceed recommendations. This is a simple measurement which can be completed in minutes, as shown in Figure 4-3. Measure the distance of the two arrows noted by letter "B". Measurement is made from front to rear - not side to side. This dimension is 2", when the pin is installed new. If this dimension drops below 1-7/8", the pin must be replaced.

4-11.2 Use a kingpin gauge to simplify the above measurement.

4-12 AIR BRAKE SYSTEM

4-12.1 Emergency Control Valve and Relay Valve: These valves are not generally recommended for field rebuilding. These valves can be ordered through the Landoll Parts Distribution Center.

4-12.2 Brake System Reservoir: This reservoir is a pressure vessel. Weld on the vessel is definitely not recommended.

4-13 DOUBLE DIAPHRAGM TYPE SPRING BRAKE



DANGER

THIS SPRING INSIDE THE HOUSING OF THIS BRAKE CHAMBER IS HIGHLY LOADED. DO NOT ATTEMPT TO OPEN THE HOUSING TO REPLACE PARTS. DOING SO CAN RESULT IN SERIOUS PERSONAL INJURY OR DEATH.

REPLACE THE DECAL ON THE CHAMBER SHOULD IT BECOME WORN.

CAGE THE SPRING BEFORE DISPOSAL.

4-13.1 The double diaphragm type spring brake is not serviceable. The entire chamber must be replaced if the brakes become worn, and the worn brakes disposed of properly.

4-13.2 Contact your Landoll Dealer or Service Representative if you have any questions regarding replacement of these brakes.

4-14 CLAMSHELL GATE AIR SYSTEM FILTER

4-14.1 Remove and clean the Clamshell Gate Air System Filter periodically by tapping on hard surface and blowing it off with an air blow gun.

4-14.2 Flexible Drain: Drain the bowl at least once per work shift.

NOTE:

- 1. Occasionally, dirt must be removed from the inside of the bowl by wiping it with a clean, dry cloth. This requires the air pressure in the line to be completely exhausted and the bowl to be removed from the body.**
- 2. Do not, under any circumstances, attempt to clean the plastic bowl with solvent.**

4-15 GATE CONTROL VALVE SERVICE

To clean, inspect, and lubricate, the valve portion is easily removed from the subplate by removing the three mounting screws. It is not necessary to disconnect the piping or to remove the subplate for most servicing needs.

4-15.1 Disassemble the valve in a clean, well-lit area. Clean all metal parts in a non-flammable solvent and wash all rubber parts in soap and water. Rinse all parts thoroughly and blow dry with a low pressure air jet. Replace those parts which are damaged or worn. Removal of internal plug is not recommended, unless need for replacement is evident.

4-15.2 Worn parts can be quickly replaced by removing the four bleeder pilot housing screws and the

four handle operator housing screws and sliding the spool out of the valve.

4-15.3 Reassemble the valve using the assembly view as reference (Figure 4-4). No special tools are required. When the piston "U" cup is replaced, make sure that the two lip seals face toward the handle operator end of the valve.

4-15.4 As the assembly proceeds, lubricate all metal-to-metal contact surfaces, and all rubber parts, with Dow-Corning Number 55 Pneumatic Grade.

4-15.5 No adjustments are required on the valve after reassembly is complete.

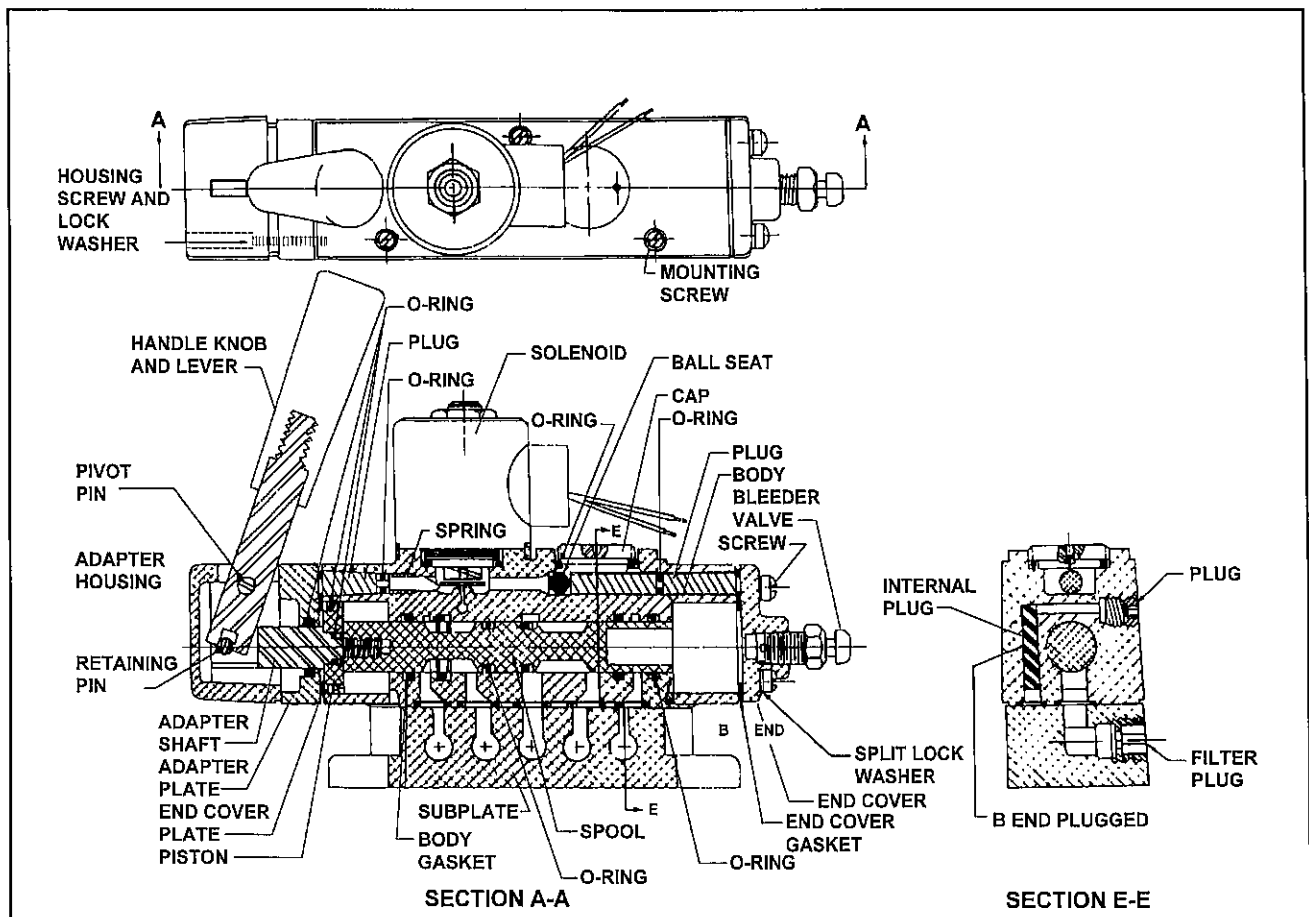


Figure 4-4 Gate Control Valve

4-16 CLAMSHELL GATE AIR SYSTEM LUBRICATOR

4-16.1 Dirty oil contaminants can collect on the siphon tube inlet filter, requiring the filter to be cleaned by tapping it on a hard surface and blowing it off with an air blow gun.

4-16.2 If the oil delivery rate drops, the lubricator should be cleaned. (See Figure 4-5)

a. Remove the variable orifice and clean its air passage with a small wire.

b. Check the bore that the screw fits into for contaminants and clean if needed. Be sure that the passageway from the sight dome cavity into the variable orifice post is open.

c. Remove the oil flow adjusting screw and clean the needle and seat in the body.

d. Inspect and clean the passage from the needle seat down into the adapter.

4-16.3 Drain off any contaminants which collect in the bottom of the bowl.

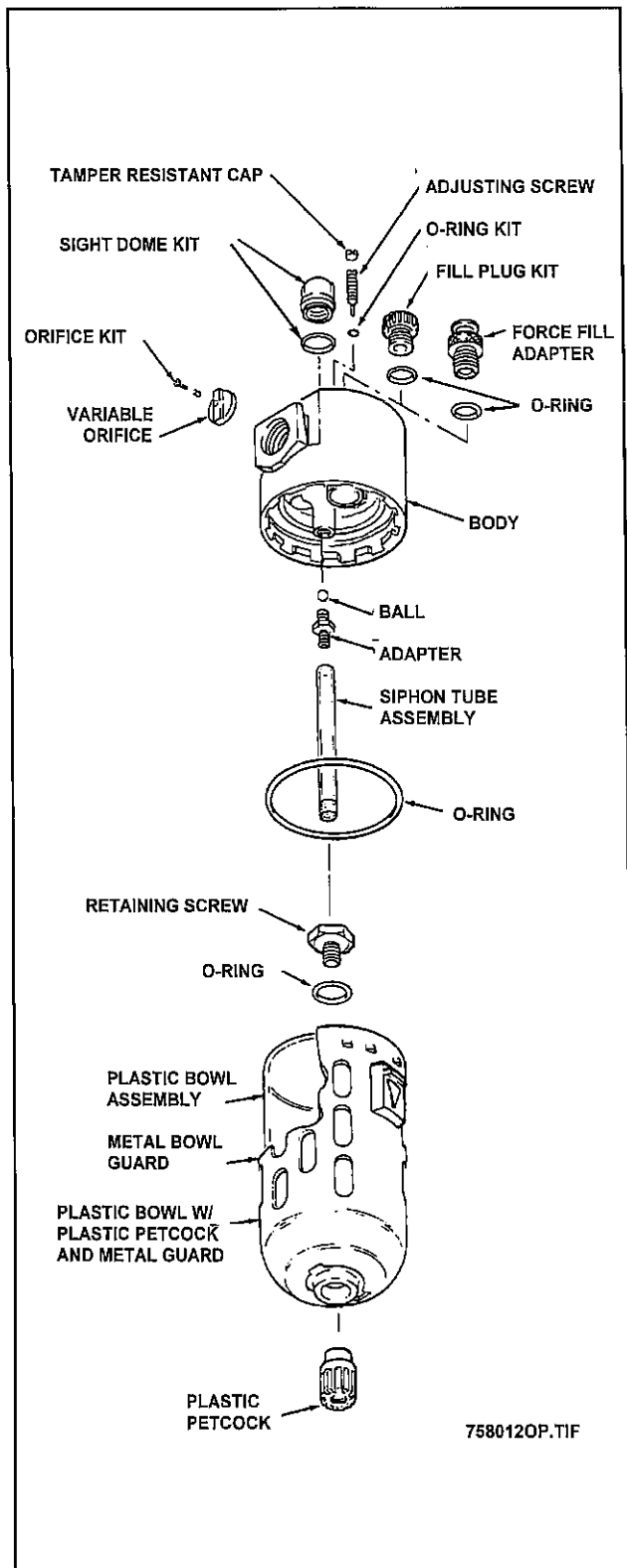


Figure 4-5 Clamshell Gate Air System Lubricator

NOTES:

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

5-1 ELECTRICAL

Most electrical system problems show up as a burned out light or fuse, or inoperative electrical component. Wiring, grounds, or components may be at fault. Locate the symptom in this section that best identifies your electrical problem. Check out each possible problem under that symptom. If the problem cannot be located, see an automotive electrical specialist. For maintenance procedures see **Section 3-4**.

SYMPTOM	PROBLEM: REMEDY
NO LIGHTS	<p>Fuse blown: replace fuse.</p> <p>Connection at plug-in: tighten connection.</p> <p>Broken or corroded wires: replace wire.</p> <p>Ground wire loose: clean and tighten ground.</p>
LIGHTS FLICKERING	<p>Wires shorted or loose: locate, insulate, replace, or tighten.</p>
LIGHTS DIM	<p>Voltage difference between trailer & tractor: Tractor supply wire or circuit components too low capacity -enlarge wire or component, match bulbs with tractor voltage.</p>
LIGHTS BRIGHT & BURN OUT	<p>Ground wire disconnected: reconnect ground wire</p> <p>Voltage difference between trailer & tractor: Tractor supply wire or circuit components too low capacity -enlarge wire or component, match bulbs with tractor voltage.</p>
FUSE BLOW-OUT OR CIRCUIT BREAKER TRIPPING	<p>Vibration: locate source of vibration and repair.</p> <p>Short circuit: replace fuse and try all accessories. If fuse blows right away, locate short and repair.</p>
LAMP BULB BURN OUT	<p>Vibration: locate source of vibration and repair.</p> <p>Short circuit: replace fuse and try all accessories. If fuse blows right away, locate short and repair.</p> <p>Loose connection: check lamp sockets and ground connections.</p> <p>Intermittent short: locate short and repair.</p> <p>Improper voltage: check voltage regulator output.</p>

5-2 TIRES - WHEELS - SUSPENSION

Most tire, wheel, and suspension related problems are due to excessive loads, extreme conditions, and improper maintenance. Tire, wheel, and suspension problems can be easily detected and solved by checking the following guide. For maintenance procedures see **Sections 4-5, 4-7, 4-8, and 4-9.**

SYMPTOM

PROBLEM: REMEDY

VIBRATIONS WHILE DRIVING

Improper tire inflation: inflate to proper pressure.
Tires cupped or have flat spots: replace tires.
Wheels bent or loose: replace or tighten.
Tires incorrectly mounted: remount.
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).

RAPID TIRE WEAR/DETERIORATION:

CENTER TREAD WEAR

Over inflation: deflate to correct inflation.

SHOULDER TREAD WEAR - BOTH SHOULDERS

Under inflation: increase inflation to correct PSI.
check axle alignment.
Overload: Loads are above rated tire capacity. Do not load above rated tire capacity.

SHOULDER TREAD WEAR - ONE SHOULDER

Axle damage: straighten or replace axle.
Axles not parallel: check axle alignment.

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.

TIRE FLAT SPOTS

Quick stops: adjust braking practices.
Grabbing brakes: adjust brakes properly.
Worn or loose wheel bearings: adjust or replace as needed.
Out of balance wheels and tires: balance wheels and tires.

UNEVEN WEAR

Suspension bushings worn: replace bushings.
Worn or loose wheel bearings: adjust or replace as needed.
Out of balance wheels and tires: balance wheels and tires.

RIM FAILURE*:

CRACKING

Overinflated tires: deflate tire to proper PSI.
High speeds: adjust speed according to road and load conditions.
High speed cornering: adjust cornering practices.
Overloading: check rim load rating.

***IN ALL INSTANCES OF RIM FAILURE, REPLACE THE RIM IMMEDIATELY!**

TIRES - WHEELS - SUSPENSION (CONTINUED)

SYMPTOMS

PROBLEM: REMEDY

BENDING OR WARPING

Curb-hopping or potholes: adjust turning practices and adjust speed accordingly with road conditions.
Improper tightening sequence: follow proper tightening sequence. (See Figure 4-1.)

BROKEN STUDS*

Over tightening: use correct torque when mounting.

***REPLACE BROKEN STUDS BEFORE USING THE SEMITRAILER!**

TRAILER TRACKING PROBLEMS:

TRACKS TO ONE SIDE

Axle alignment: re-align axle.

TRACKS TO EITHER SIDE

Broken or bent springs or equalizers: replace defective parts.
Axles not parallel: realign axles

AIR RIDE HEIGHT PROBLEMS:

TOO HIGH

Axle to control valve linkage: readjust linkage.
Height Control Valve internal leak: repair or replace Valve.

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 low (65 PSI minimum required): troubleshoot air supply.

UNEVEN FROM SIDE TO SIDE

Linkage adjustment: readjust linkage so both sides are the same.
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.

5-3 BRAKES

For maintenance procedures see Sections 4-6.

SYMPTOM

PROBLEM: REMEDY

NO BRAKES OR BRAKES ARE INTERMITTENT

Brake air system improperly connected: reconnect gladhand 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.

BRAKES (CONTINUED)

SYMPTOM

PROBLEM: REMEDY

SINGLE BRAKE DRAGGING
OR LOCKED

Broken internal brake component: locate and replace broken part.
Flat spot on cam roller or cam shaft: replace and lubricate.
Improper adjustment: adjust slack adjusters.
Spider bushing or cam bracket bushing binding: lubricate or replace bushing.
Improper lubrication: lubricate per **Figure 4-2**.
Worn brake shoe bushing: replace bushing.
Brake drum distortion: replace drum.
Broken brake chamber spring: replace spring.
Brake chamber pushrod 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.
Call Factory or see qualified Trailer/Brake Technician
Leaking brake chamber diaphragm: replace diaphragm.

BRAKES APPLY TOO SLOWLY

Brakes need adjusting or lubrication: adjust or lubricate as needed.
Low air pressure in brake system (below 90 psi): 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 90 psi min.

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 90 psi min.

BRAKES (CONTINUED)

SYMPTOM

PROBLEM: REMEDY

INSUFFICIENT BRAKES

Brakes need adjusting: adjust brakes.
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 ONLY
APPLIED - NO LEAKAGE WITH
NORMAL BRAKING

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.

BRAKE 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 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.

5-4 BRAKE DRUMS:

For maintenance procedures see **See Section 4-6.**

SYMPTOM	PROBLEM: REMEDY
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.

5-5 TRAILER/GATE OPERATION

SYMPTOM	PROBLEM: REMEDY
TRAILER MOVES ERRATICALLY FROM SIDE TO SIDE DURING TRANSPORT	Air bags too full: reduce air in bags Oscillating 5th wheel plates on both trailer and tractor: one of the plates must be rigid to eliminate excessive movement between trailer and tractor Worn bushings: repair or replace Coupler bent or broken: repair or replace
GATES DO NOT OPEN FROM CAB CONTROLS	Defective solenoid valve: repair or replace Tractor pressure too low: Adjust to provide 90 psi min.
GATES BIND AND WILL NOT CLOSE	Gate limit chains not set properly: check that gate limit chains are equal in length. Gate hinge sticking: grease gate hinges
GATES DO NOT OPEN	Defective solenoid valve: repair or replace Sticking solenoid valve: Spool should be removed, cleaned, and lubricated.
SLOW GATE OPERATION	Gate hinge sticking: grease gate hinges Air pressure low: check for pinched hose. Check air pressure with manual install gauge at inlet port of control valve, outlet port of control valve, and cylinder to verify same air pressures in and out.

TRAILER/GATE OPERATION (CONTINUED)

SYMPTOM

PROBLEM: REMEDY

AIR CYLINDERS STICK

No lubrication oil going to cylinders: check for oil in lubricator bowl. (See Sections 3-14 and 3-15)

Moisture in air system: Check air system.

AIRBAGS TEARING AND/OR
SHOCK ABSORBERS BREAKING

Shock absorber straps needed or missing: Straps needed to prevent overextension of air springs. (Use of limit straps dependent upon use of trailer and loading/unloading conditions.)(2 per shock)

NOTES:
