PRO-FORCE 50-SERIES

DRY FERTILIZER APPLICATOR

DRY SPREADER
WITH PULL-TYPE UNDERCARRIAGE

PRO-FORCE 50-SERIES PULL-TYPE DRY FERTILIZER SPREADER MAINTENANCE MANUAL

FERTILIZER APPLICATION

INNOVATING
THE FUTURE OF
AGRICULTURE

UNVERFERTH MFG. CO., INC.
P.O. BOX 357 KALIDA, OH 45853 • UNVERFERTH.COM • 419.532.3121

Section IV
Maintenance

FOR SCALE INFORMATION, PLEASE REFER TO YOUR SCALE MANUAL.
FOR TRACK INFORMATION, PLEASE REFER TO YOUR TRACK MANUAL.
FOR MULTI-BIN INFORMATION, PLEASE REFER TO YOUR MULTI-BIN MANUAL.

Pull-Type Undercarriage Maintenance

⚠ WARNING

- **TIPPING OR MOVEMENT OF THE MACHINE CAN CAUSE SERIOUS INJURY OR DEATH. BE SURE MACHINE IS SECURELY BLOCKED.**
- **EYE PROTECTION AND OTHER APPROPRIATE PERSONAL PROTECTIVE EQUIPMENT MUST BE WORN WHILE SERVICING IMPLEMENT.**
- **KEEP HANDS CLEAR OF PINCH POINT AREAS.**
- **ALWAYS WEAR PERSONAL PROTECTIVE EQUIPMENT WHEN WORKING WITH OR NEAR CHEMICALS. THIS EQUIPMENT INCLUDES, BUT IS NOT LIMITED TO: PROTECTIVE EYE WEAR, GLOVES, SHOES, SOCKS, LONG-SLEEVED SHIRT, AND LONG PANTS. ADDITIONAL PROTECTION MAY BE REQUIRED FOR MANY TYPES OF CHEMICALS.**
- **AVOID BREATHING CHEMICALS AND FUMES.**
- **WASH HANDS BEFORE EATING, DRINKING, CHEWING GUM, OR USING TOILET.**
- **NEW HYDRAULIC SYSTEMS OR SYSTEMS THAT HAVE BEEN MAINTAINED MUST BE PURGED OF AIR BEFORE OPERATING OR MOVING MACHINE TO PREVENT SERIOUS INJURY OR DEATH.**

⚠ CAUTION

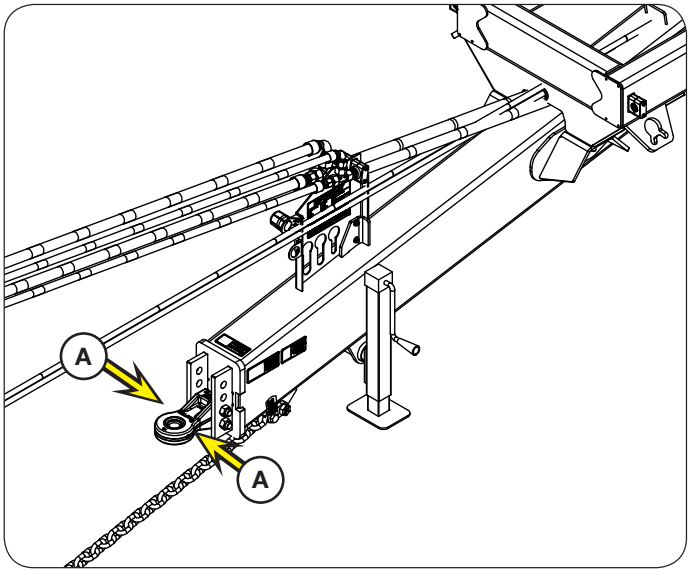
- **SHARP EDGES ON DRY SPREADER CAN CAUSE SERIOUS INJURY. BE CAREFUL WHEN WORKING AROUND DRY SPREADER.**

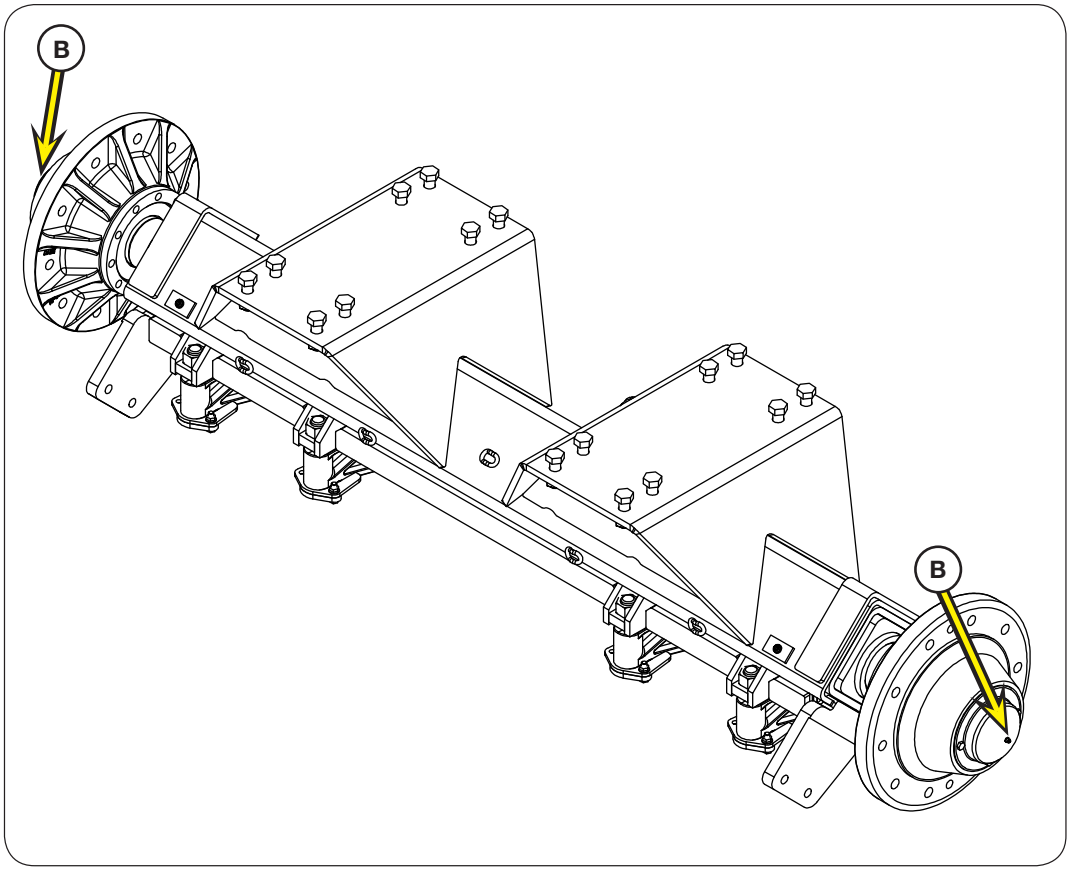
Pull-Type Undercarriage Maintenance (continued)

Lubrication

To keep your dry spreader in top operating condition and to assure its proper performance and reliability for a long period of time, periodic inspection and lubrication is a must. Make sure to use NLGI-2 high quality EP grease.

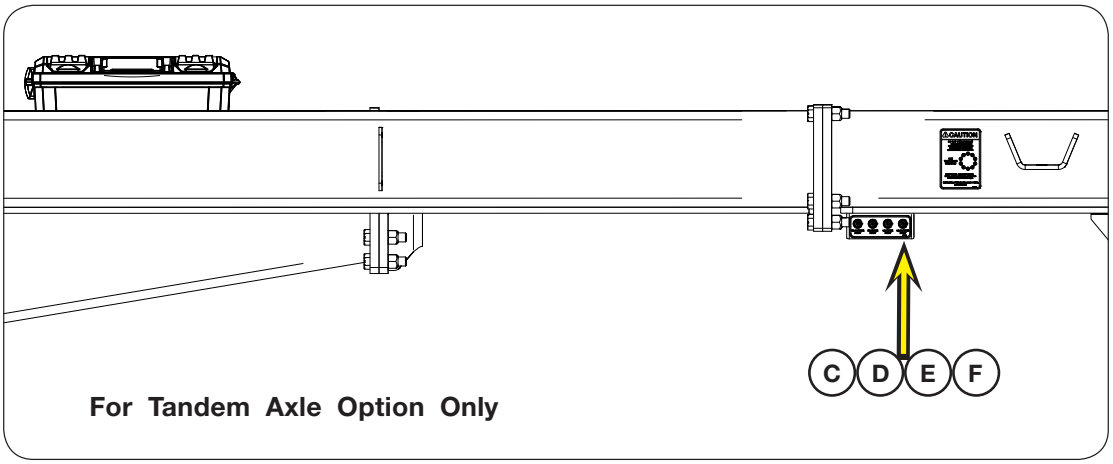
The lubrication locations and recommended schedule are as follows:





(Continued on next page)

Pull-Type Undercarriage Maintenance (continued)



For Tandem Axle Option Only

ITEM	DESCRIPTION	POINT	LUBRICANT	QTY.	HOURS
A	Bull Pull Hitch	2	NLGI No. 2	2 Shots	Weekly
B	Hubs	2	NLGI No. 2	Repack	2 Years
C	RH Outside Axle Pivot	1	NLGI No. 2	2 Shots	Daily
D	RH Inside Axle Pivot	1	NLGI No. 2	2 Shots	Daily
E	LH Inside Axle Pivot	1	NLGI No. 2	2 Shots	Daily
F	LH Outside Axle Pivot	1	NLGI No. 2	2 Shots	Daily
G	Track Lubrication (Refer to track manual.)	-	-	-	-

NOTE: Completely lubricate all locations at the end of the season.

Pull-Type Undercarriage Maintenance (continued)

Seasonal Storage

Immediately after season is finished, completely wash machine to remove corrosive fertilizer/ chemicals inside and out before storing. When using pressure washers, maintain an adequate distance to avoid blasting water into bearings, hydraulic seals or electrical connections.

- After washing empty machine, spray an oil/diesel mixture inside hopper to avoid corrosion.
- Repaint all areas where paint has been removed to keep rust from developing.
- Inspect machine for parts that may need to be replaced so they may be ordered in the off season.
- Lubricate machine at all points outlined in the Lubrication section.
- Inspect for damage or worn parts, replace before next season.
- Replace all worn, torn or faded decals and reflectors.
- If unit is equipped with scale indicator or other electric controllers, store these indoors in a dry location.
- Place ladder in storage position.
- Store the spreader inside, away from animals.
- Keep tarp closed, if equipped.
- Check hydraulic hoses for weather cracks and replace accordingly.
- After any period of unused time, unit should be operated to check function of hydraulic system.

Pull-Type Undercarriage Maintenance (continued)

Purging Hydraulic System

⚠ WARNING

- **EYE PROTECTION AND OTHER APPROPRIATE PERSONAL PROTECTIVE EQUIPMENT MUST BE WORN WHILE SERVICING IMPLEMENT.**
- **RELIEVE HYDRAULIC SYSTEM OF ALL PRESSURE BEFORE ADJUSTING OR SERVICING. SEE TRACTOR OPERATOR'S MANUAL FOR PROPER PROCEDURES.**
- **HIGH-PRESSURE FLUIDS CAN PENETRATE THE SKIN AND CAUSE SERIOUS INJURY OR DEATH. USE CARDBOARD OR WOOD TO DETECT LEAKS IN THE HYDRAULIC SYSTEM. SEEK MEDICAL TREATMENT IMMEDIATELY IF INJURED BY HIGH-PRESSURE FLUIDS.**

1. Purge air from system as follows:

   A. Turn on two SCVs for the BLUE supply lines with engine at low idle. Allow 1 minute for oil to fill the spreader hydraulic system.
   B. Turn on the spinner and conveyor. Check that all hydraulic valves have opened.
   C. Start hydraulic system and run for 1 minute or until hydraulic motor starts turning.
   D. Check oil reservoir in hydraulic power source and re-fill as needed.
   E. Check for hydraulic leaks using cardboard or wood. Tighten connections according to directions in Torque Specifications in MAINTENANCE section.
   F. De-pressurize hydraulic system.

Wheel, Hub and Spindle Disassembly and Assembly

⚠ WARNING

- **TIPPING OR MOVEMENT OF THE MACHINE CAN CAUSE SERIOUS INJURY OR DEATH. BE SURE MACHINE IS SECURELY BLOCKED.**
- **FALLING OBJECTS CAN CAUSE SERIOUS INJURY OR DEATH. DO NOT WORK UNDER THE MACHINE AT ANY TIME WHILE BEING HOISTED. BE SURE ALL LIFTING DEVICES AND SUPPORTS ARE RATED FOR THE LOADS BEING HOISTED. THESE ASSEMBLY INSTRUCTIONS WILL REQUIRE SAFE LIFTING DEVICES UP TO 15,000 LBS. SPECIFIC LOAD RATINGS FOR INDIVIDUAL LOADS WILL BE GIVEN AT THE APPROPRIATE TIME IN THE INSTRUCTIONS.**
- **EYE PROTECTION AND OTHER APPROPRIATE PERSONAL PROTECTIVE EQUIPMENT MUST BE WORN WHILE SERVICING IMPLEMENT.**
- **KEEP HANDS CLEAR OF PINCH POINT AREAS.**

⚠ CAUTION

- **IMPROPERLY TORQUED WHEEL NUTS/BOLTS CAN CAUSE A LOSS OF IMPLEMENT CONTROL AND MACHINE DAMAGE. TORQUE WHEEL NUTS/BOLTS TO VALUES IN TABLE. CHECK TORQUE BEFORE USE, AFTER ONE HOUR OF UNLOADED USE OR AFTER FIRST LOAD, AND EACH LOAD UNTIL WHEEL NUTS/BOLTS MAINTAIN TORQUE VALUE. CHECK TORQUE EVERY 10 HOURS OF USE THERE-AFTER. AFTER EACH WHEEL REMOVAL START TORQUE PROCESS FROM BEGINNING. WARRANTY DOES NOT COVER FAILURES CAUSED BY IMPROPERLY TORQUED WHEEL NUTS/BOLTS.**

1. Hitch undercarriage to tractor. Park the empty undercarriage on a firm, level surface. Block the tires to keep the machine from moving. Set the tractor's parking brake, shut off engine and remove key from tractor.

2. With undercarriage and attached dry spreader empty, use a safe lifting device rated at 15,000 lbs. to support the weight of your undercarriage and dry spreader. Place the safe lifting device under the axle closest to the tire.
3. Use a minimum of 2,000 lbs. safe lifting device to support the wheel and tire during removal.

⚠ WARNING

- **ON UNITS WITH DUAL WHEELS, INNER WHEEL AND TIRE MAY FALL FROM HUB CAUSING SERIOUS INJURY OR DEATH. ALWAYS SUPPORT INNER WHEEL WHEN REMOVING OUTER WHEEL AND/OR THE WHEEL EXTENSION.**

4. If only changing wheel and tire, skip to Step 8; otherwise continue with Step 4.

   Remove the hardware retaining the hubcap. Next, remove the hubcap, gasket, capscrew, castle nut, and spindle washer. Remove hub with bearings from old spindle using a 200 lbs. lifting device.

Wheel, Hub and Spindle Disassembly and Assembly (continued)

5. Inspect the spindle and replace if necessary. If spindle does not need to be replaced, skip to Step 6; otherwise continue with Step 5.

   Remove the bolt and lock nut that retain the spindle to the axle. Using a safe lifting device rated for 150 lbs., replace the old spindle with a new spindle. Coat axle contact length of spindle shaft with anti-seize lubricant prior to installation. Reuse bolt and lock nut to retain spindle to axle. Tighten as outlined in Maintenance Section.

6. Remove seal and inspect bearings, spindle washer, castle nut and cotter pin. Replace if necessary. Pack both bearings with approved grease and reinstall inner bearing. Install new seal in hub with garter spring facing the hub by tapping on flat plate that completely covers seal while driving it square to hub. Install until flush with back face of hub. Using a 200 lb rated lifting device, install hub assembly onto spindle. Install outer bearing, spindle washer and castle nut.

IMPORTANT

- *Do not use an impact wrench!*

7. Slowly tighten castle nut while spinning the hub until drag causes the hub to stop freely spinning. Turn castle nut counterclockwise until the hole in the spindle aligns with the next notch in castle nut. Hub should spin smoothly with little drag and no end play. If play exists, tighten to next notch of castle nut. If drag exists, then back castle nut to next notch of castle nut. Spin and check again. Install bolt and nut. Clean face for hub cap gasket and install gasket, grease filled hub cab and retain hubcap with hardware removed. Tighten hubcap hardware in alternating pattern.

8. Attach the wheel(s) and tire(s) to the hub using the same rated safe lifting device for removal. Tighten wheel nuts to appropriate requirements and recheck as outlined in the Wheel and Tire section of this manual.

9. Using a lifting device rated for 12,000 lbs. lbs, raise the dry spreader, remove the support and lower the dry spreader.

Purging Procedure For Braking System

⚠ WARNING

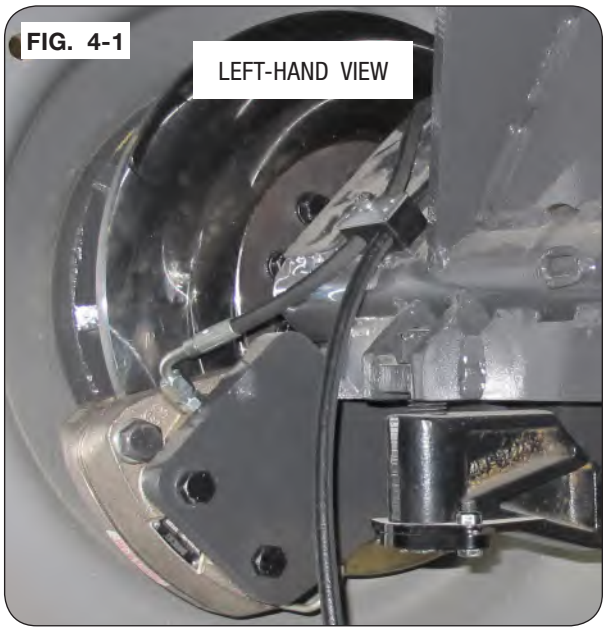
- **RELIEVE THE HYDRAULIC SYSTEM OF ALL PRESSURE BEFORE ADJUSTING OR SERVICING. SEE THE HYDRAULIC POWER UNIT OPERATOR'S MANUAL FOR PROPER PROCEDURES.**
- **HIGH-PRESSURE FLUIDS CAN PENETRATE THE SKIN AND CAUSE SERIOUS INJURY OR DEATH. USE CARDBOARD OR WOOD TO DETECT LEAKS IN THE HYDRAULIC SYSTEM. SEEK MEDICAL TREATMENT IMMEDIATELY IF INJURED BY HIGH-PRESSURE FLUIDS.**
- EYE PROTECTION AND OTHER APPROPRIATE PERSONAL PROTECTIVE EQUIPMENT MUST BE WORN WHILE SERVICING IMPLEMENT.

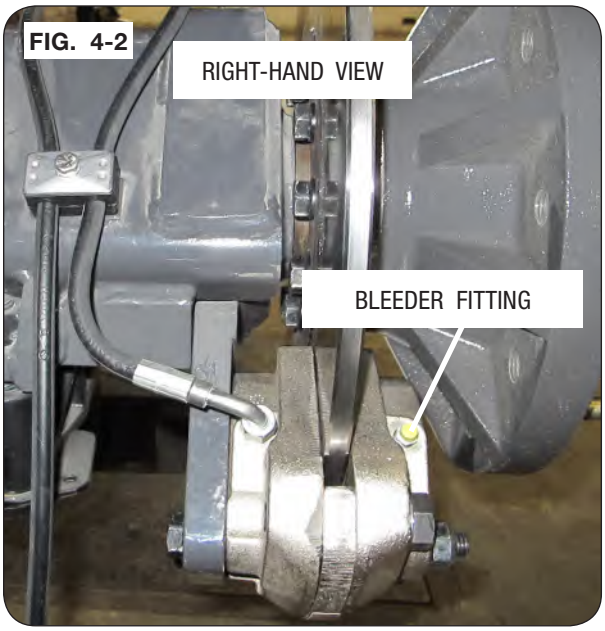
NOTE: Use ONLY quality hydraulic oil. If pressure purging equipment is available, follow manufacturer's instructions in purging the brake system.

NOTE: System is intended for tractors with hydraulic trailer brakes. If your tractor does not have hydraulic trailer brakes, contact your dealer for support.

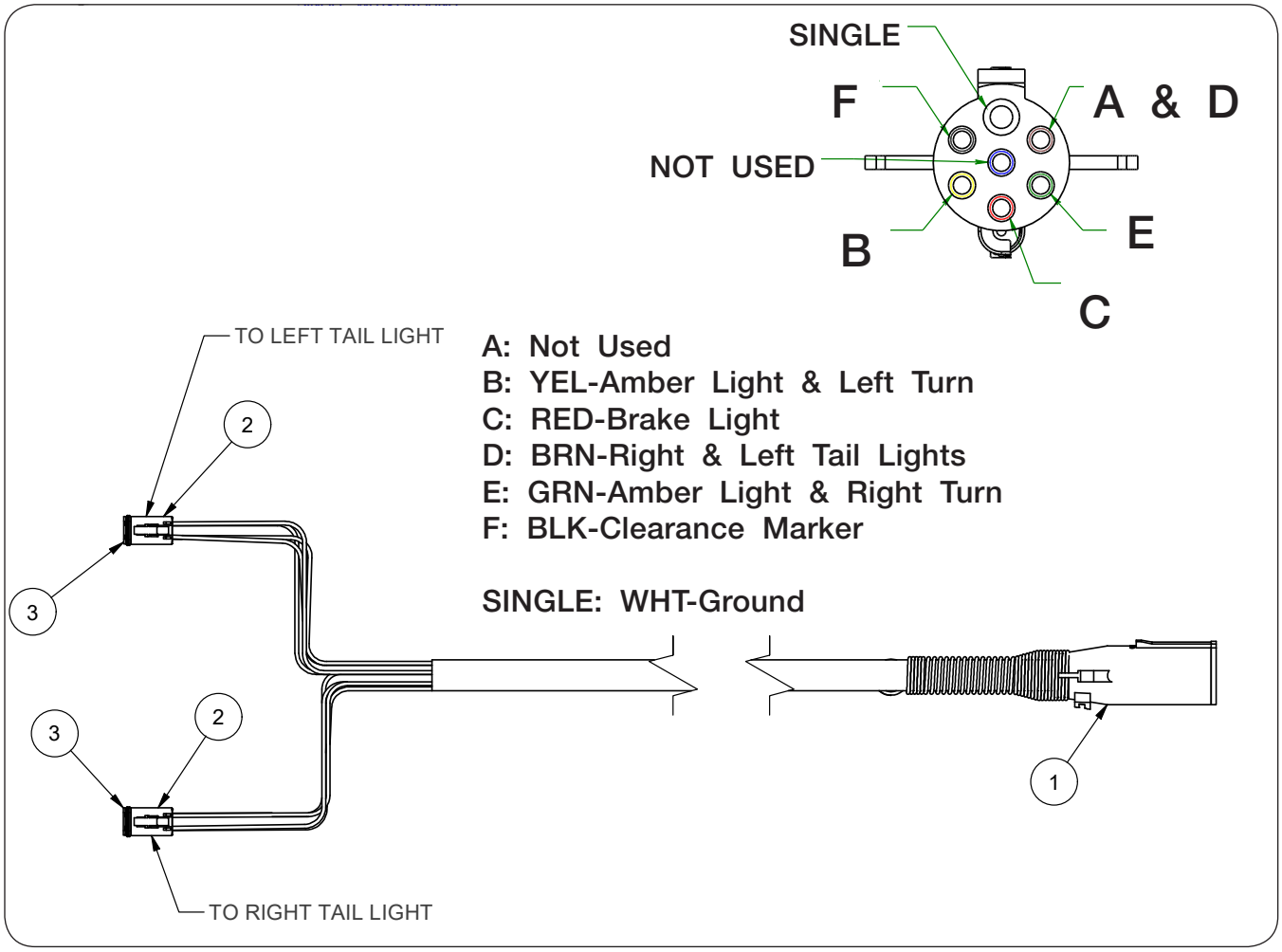
Connector should comply with ISO:5676 standards. Brake hydraulic hose is designated with red color band. See tractor's operators manual for connection location.

1. Block wheels to prevent movement. Set the tractor parking brake, but leave tractor engine on throughout the procedure. Attach hydraulic brake coupler on the undercarriage to the implement brake port at the rear of the tractor.
2. Apply and hold pressure to brake pedal.
3. Attach a hose to the bleeder fitting to drain hydraulic fluid/air. Loosen the bleeder fitting, at the top of the brake caliper and allow air bubbles to escape. Close bleeder fitting when oil flow is free of bubble interruptions and flowing steady. If necessary, pump the brake pedal to build circuit pressure. See Fig. 4-1 & Fig. 4-2.
4. Repeat steps 2 and 3 to the next brake caliper in the brake circuit. Repeat until all brakes are bled.
5. Perform a final tightness check of all caliper bleeder fittings before beginning spreader operation. Check that both brakes actuate and release properly with tractor brake pedal.





Schematic — Electrical — Tail Light Extension Cable 1450 & 1850 (PF1223-754) / 2250 & 2650 (PF1223-75426)



Wheels and Tires

Wheel Nut Torque Requirements

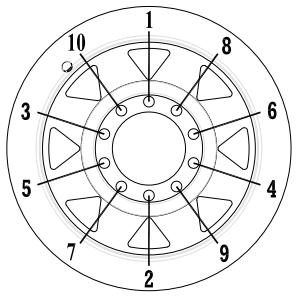
⚠ CAUTION

- **IMPROPERLY TORQUED WHEEL NUTS/BOLTS CAN CAUSE A LOSS OF IMPLEMENT CONTROL AND MACHINE DAMAGE. TORQUE WHEEL NUTS/BOLTS TO VALUES IN TABLE. CHECK TORQUE BEFORE USE, AFTER ONE HOUR OF UNLOADED USE OR AFTER FIRST LOAD, AND EACH LOAD UNTIL WHEEL NUTS/BOLTS MAINTAIN TORQUE VALUE. CHECK TORQUE EVERY 10 HOURS OF USE THEREAFTER. AFTER EACH WHEEL REMOVAL START TORQUE PROCESS FROM BEGINNING. WARRANTY DOES NOT COVER FAILURES CAUSED BY IMPROPERLY TORQUED WHEEL NUTS/BOLTS.**

Failure to check torque before first load may damage wheel nut/bolt seats. Once seats are damaged, it will become impossible to keep nuts/bolts tight. Tighten nuts/bolts to applicable torque value shown in table. Start all nuts/bolts by hand to prevent cross threading. Torque nuts/bolts in the recommended sequence as shown in Diagram 1.

NOTE: Do not use anti-seize on wheel hardware.

WHEEL HARDWARE	
SIZE	FOOT-POUNDS
Axle (M22 x 2.5 10 Bolt)	500 Ft.-Lbs.



10 Bolt

DIAGRAM 1

Wheels and Tires (continued)

Tire Pressure

The following is to be used as a general guide for tire inflation and figures can vary depending on specific brand of tire used. **It is important that tires are inspected after unit is loaded.** The tire should stand up with no side-wall buckling or distress as tire rolls. Record the pressure needed to support the full load and maintain this pressure to achieve proper tire life. **Do not exceed maximum recommended tire pressure.** After beads are seated on the rim, deflate to 5-10 PSI, then reinflate to the tire's recommended PSI when mounting.

Tire Pressure for Unverferth Dry Spreaders

Tire Make	Tire Size	Load Index/ Ply Rating	Max PSI
Firestone	VF380/90R46 R-1	173B	64
	480/80R46 R-1	158AB	35
	VF480/80R46 R-1W	169B	35
	IF900/65R32 CFO R-3	191B	46
MItas	VF320/105R54	169D	58
	710/50R26.5 HF-2	170D	58
	750/60R30.5 HF-2	181D	58

* Based on a field load of 40,000 lbs. on the axle. Base machine weight, 18 tons of material minus tongue weight. Do not transport fully loaded on the road.

Tire Warranty

For questions regarding new tire warranty, please contact your local original equipment tire dealer. Used tires carry no warranty. Following are phone numbers and Websites for your convenience:

Firestone
www.firestoneag.com
Phone 800-847-3364

Titan
or
Goodyear
www.titan-intl.com
Phone 800-USA-BEAR
Fax 515-265-9301

Trelleborg
www.trelleborg.com
Phone 866-633-8473

Continental/Mitas
www.mitas-tires.com
Phone 704-542-3422
Fax 704-542-3474

Complete Torque Chart

Capscrews - Grade 5

NOTE:

- Grade 5 capscrews can be identified by three radial dashes on the head.

SIZE	FOOT POUNDS	NEWTON METERS
1/4-20 1/4-28	8-10 9-11	11-13 12-15
5/16-18 5/16-24	15-17 17-19	20-23 23-26
3/8-16 3/8-24	25-28 28-31	34-38 38-42
7/16-14 7/16-20	40-45 45-50	54-61 61-68
1/2-13 1/2-20	62-68 68-75	84-92 92-102
9/16-12 9/16-18	90-98 100-110	122-133 134-148
5/8-11 5/8-18	120-135 124-137	162-183 168-186
3/4-10 3/4-16	200-220 210-230	270-300 285-310
7/8-9 7/8-14	330-350 360-380	425-475 460-515
1-8 1-14	500-525 540-560	675-710 730-760
1 1/8-7 1 1/8-12	600-635 665-700	815-860 920-950
1 1/4-7 1 1/4-12	850-895 940-990	1150-1215 1275-1340
1 3/8-6 1 3/8-12	1125-1175 1280-1335	1525-1590 1735-1810
1 1/2-6 1 1/2-12	1500-1560 1685-1755	2035-2115 2285-2380

IMPORTANT

- *Follow these torque recommendations except when specified in text.*

Complete Torque Chart (continued)

Capscrews - Grade 8

NOTE:

- Grade 8 capscrews can be identified by six radial dashes on the head.
- For wheel torque requirements, refer to Wheels and Tires.

SIZE	FOOT POUNDS	NEWTON METERS
5/16-18 5/16-24	20-22 21-23	27-30 28-31
3/8-16 3/8-24	35-39 36-41	47-53 49-55
7/16-14 7/16-20	54-58 55-60	73-78 75-80
1/2-13 1/2-20	82-88 94-99	110-120 125-135
9/16-12 9/16-18	127-134 147-155	170-180 199-210
5/8-11 5/8-18	160-170 165-175	215-230 225-235
3/4-10 3/4-16	280-295 330-365	380-400 445-495
7/8-9 7/8-14	410-430 420-440	555-580 570-595
1-8 1-14	630-650 680-700	850-880 920-950
1 1/8-7 1 1/8-12	900-930 930-950	1220-1260 1260-1290
1 1/4-7 1 1/4-12	1250-1300 1280-1320	1695-1760 1735-1790

IMPORTANT

- *Follow these torque recommendations except when specified in text.*

Complete Torque Chart (continued)

Capscrews - Grade 9 EcoGuard Fine Thread

NOTE:

- Grade 8 capscrews can be identified by six radial dashes on the head.
- For wheel torque requirements, refer to Wheels and Tires.

SIZE	FOOT POUNDS	NEWTON METERS
3/8-24	33-38	44-51
7/16-20	54-59	73-79
1/2-20	86-91	116-123
9/16-18	125-130	170-176
5/8-18	178-183	241-248
3/4-16	315-320	427-433
7/8-14	504-509	683-690
1-14	772-777	1046-1053
1 1/4-12	1528-1533	2071-2078
1 3/8-12	2061-2066	2794-2801
1 1/2-12	2705-2710	3667-3674

IMPORTANT

- *Follow these torque recommendations except when specified in text.*

Complete Torque Chart (continued)

Metric Capscrews - Class 10.9

NOTE:

- For wheel torque requirements, refer to Wheels and Tires.

SIZE	FOOT POUNDS	NEWTON METERS
M5 X 0.8	6.5	8.8
M6 X 1	11.1	15.0
M7 X 1	18.6	25.2
M8 X 1.25	26.9	36.5
M10 X 1.5	53.3	72.2
M12 X 1.75	92.9	126
M14 X 2	148	200
M16 X 2	231	313
M18 X 2.5	317	430
M20 X 2.5	450	610
M22 x 1.5	475	644
M22 X 2.5	612	830
M24 X 3	778	1055
M27 X 3	1138	1543
M30 X 3.5	1546	2095
M33 X 3.5	2103	2851
M36 X 4	2701	3662
M39 X 4	3495	4739
M42 X 4.5	4324	5862

IMPORTANT

- *Follow these torque recommendations except when specified in text.*

Complete Torque Chart (continued)

Stainless Steel Capscrews - ASTM F593

IMPORTANT

- *Stainless steel fasteners tend to gall, especially with long run downs, prevailing torque fasteners, impact drivers, and lack of lubrication. It is highly encouraged to use a lubricant such as graphite-based anti-seize or molybdenum disulfide based anti-seize or other commercially available anti-galling compounds and assemble with a slow and continuously applied torque to avoid galling.*

SIZE	INCH POUNDS	NEWTON METERS
1/4-20 1/4-28	62 71	7 8
5/16-18 5/16-24	128 142	15 16

SIZE	FOOT POUNDS	NEWTON METERS
3/8-16 3/8-24	19 21	26 29
7/16-14 7/16-20	30 34	41 46
1/2-13 1/2-20	46 52	63 71
9/16-12 9/16-18	67 74	91 100
5/8-11 5/8-18	92 104	125 141
3/4-10 3/4-16	113 126	153 171
7/8-9 7/8-14	182 201	247 273
1-8 1-14	273 306	370 415
1 1/4-7 1 1/4-12	545 604	739 819
1 3/8-6 1 3/8-12	715 813	970 1102
1 1/2-6 1 1/2-12	949 1067	1287 1447

Hydraulic Fittings – Torque and Installation

Tightening O-Ring Fittings

1. Inspect components for damage or contamination. Do not connect any other type of fitting to an O-ring fitting.
2. For adjustable fittings, insure the jam nut and washer are fully backed up.
3. Lubricate the O-ring and threads on the fitting.
4. Turn the fitting into the port until it is finger tight.
5. For adjustable fittings, set in the desired position.
6. Using a wrench, torque the fitting to the value in the below table. For adjustable fittings the jam nut will be tightened.

Note: Never use a power tool to install a fitting.

Dash Size	Thread Size	Straight Stud Torque (Ft-Lbs)	Adjustable Stud Torque (Ft-Lbs)
-5	1/2-20	14-19	10-14
-6	9/16-18	18-24	12-16
-8	3/4-16	27-43	20-30
-10	7/8-14	36-48	30-36
-12	1-1/16-12	65-75	44-54
-14	1-3/16-12	75-99	53-70
-16	1-5/16-12	85-123	59-80
-20	1-5/8”-12	115-161	75-100
-24	1-7/8”-12	125-170	105-125


FIG. 4-3 O-Ring fittings

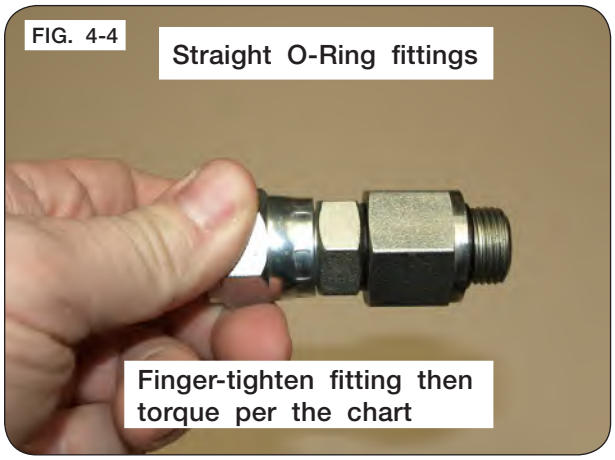


FIG. 4-4 Straight O-Ring fittings

Finger-tighten fitting then torque per the chart

Hydraulic Fittings – Torque and Installation

Tightening JIC Fittings

1. Inspect all components for damage or contamination. Do not connect any other type of fitting to a JIC fitting.

2. Lubricate the threads.

3. Turn the fitting into the port until it bottoms out.

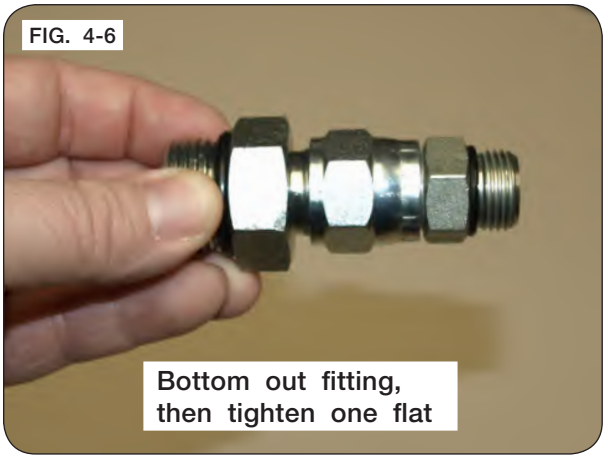
4. Use one wrench on the fixed hex on the hose to prevent twisting and a second on the swivel. Tighten the fitting another 60 degrees (or one flat)

Note: Never use a power tool to install a fitting

FIG. 4-5

JIC fittings

FIG. 4-6



Bottom out fitting, then tighten one flat