
Pre-Delivery Manual

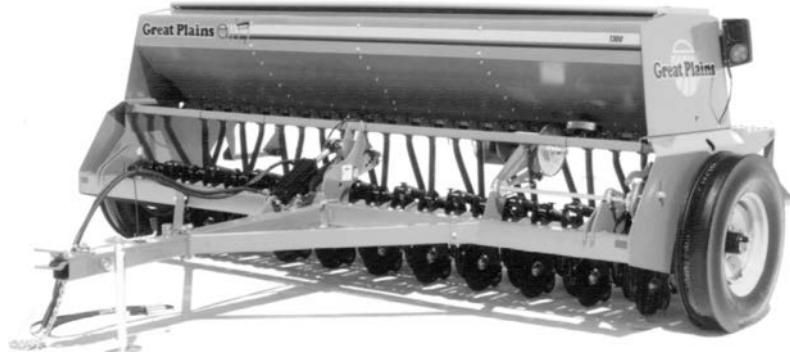
1300

13-Foot, End-Wheel Drill



Read the operator manual entirely. When you see this symbol, the subsequent instructions and warnings are serious - follow without exception. Your life and the lives of others depend on it!

16677



Illustrations may show alternate widths and/or optional equipment not supplied with ordered unit.

ORIGINAL INSTRUCTIONS

EN

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175-179M

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Important Safety Information

Look for Safety Symbol

The SAFETY ALERT SYMBOL indicates there is a potential hazard to personal safety involved and extra safety precaution must be taken. When you see this symbol, be alert and carefully read the message that follows it. In addition to design and configuration of equipment, hazard control and accident prevention are dependent upon the awareness, concern, prudence and proper training of personnel involved in the operation, transport, maintenance and storage of equipment.



Be Aware of Signal Words

Signal words designate a degree or level of hazard seriousness.

DANGER indicates an imminently hazardous situation which, if not avoided, will result in death or serious injury. This signal word is limited to the most extreme situations, typically for machine components that, for functional purposes, cannot be guarded.



WARNING indicates a potentially hazardous situation which, if not avoided, could result in death or serious injury, and includes hazards that are exposed when guards are removed. It may also be used to alert against unsafe practices.



CAUTION indicates a potentially hazardous situation which, if not avoided, may result in minor or moderate injury. It may also be used to alert against unsafe practices.



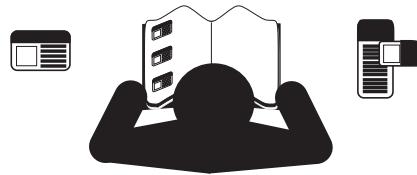
Prepare for Emergencies

- ▲ Be prepared if a fire starts.
- ▲ Keep a first aid kit and fire extinguisher handy.
- ▲ Keep emergency numbers for doctor, ambulance, hospital and fire department near phone.



Be Familiar with Safety Decals

- ▲ Read and understand the “Safety Decals” topic in the Operator manual.
- ▲ Read all instructions noted on the decals.
- ▲ Keep decals clean. Replace damaged, faded and illegible decals.



Wear Protective Equipment

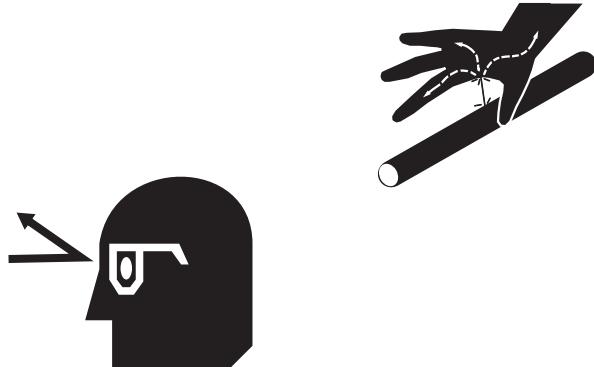
- ▲ Wear clothing and equipment appropriate for the job.
- ▲ Prolonged exposure to loud noise can cause hearing impairment or loss. Wear suitable hearing protection such as earmuffs or earplugs.
- ▲ Avoid wearing entertainment headphones while operating machinery. Operating equipment safely requires the full attention of the operator.



Avoid High Pressure Fluids

Escaping fluid under pressure can penetrate the skin, causing serious injury.

- ▲ Avoid the hazard by relieving pressure before disconnecting hydraulic lines.
- ▲ Use a piece of paper or cardboard, NOT BODY PARTS, to check for suspected leaks.
- ▲ Wear protective gloves and safety glasses or goggles when working with hydraulic systems.
- ▲ If an accident occurs, seek immediate medical assistance from a physician familiar with this type of injury.

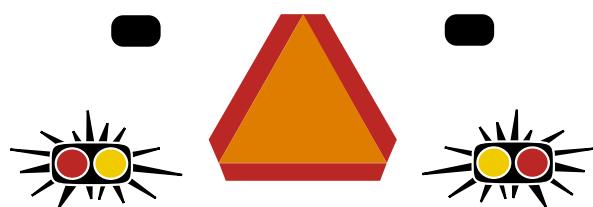


Use Safety Lights and Devices

Slow-moving tractors and towed implements can create a hazard when driven on public roads. They are difficult to see, especially at night.

- ▲ Use flashing warning lights and turn signals whenever driving on public roads.

Use lights and devices provided with implement.



Keep Riders Off Machinery

Riders obstruct the operator's view. Riders could be struck by foreign objects or thrown from the machine.

- ▲ Never allow children to operate equipment.
- ▲ Keep all bystanders away from machine during operation.



Check for Overhead Lines

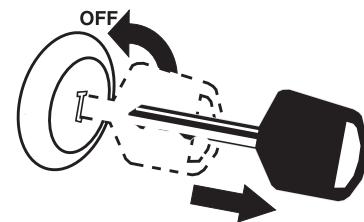
If the optional markers are in the transport position, at least 8 feet 7 inches (262 cm) vertical clearance is required. Contacting overhead electrical lines can introduce lethal voltage levels on machine and tractor frames. A person touching almost any metal part can complete the circuit to ground, resulting in serious injury or death. At higher voltages, electrocution can occur without direct line or body contact.



- ▲ Avoid overhead lines during folding, unfolding, transport and parking.

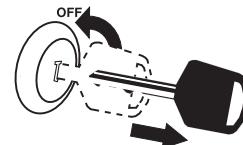
Shutdown and Storage

- ▲ Lower the drill, put tractor in park, turn off engine, and remove the key.
- ▲ Secure drill using blocks and supports provided.
- ▲ Detach and store drill in an area where children normally do not play.



Practice Safe Maintenance

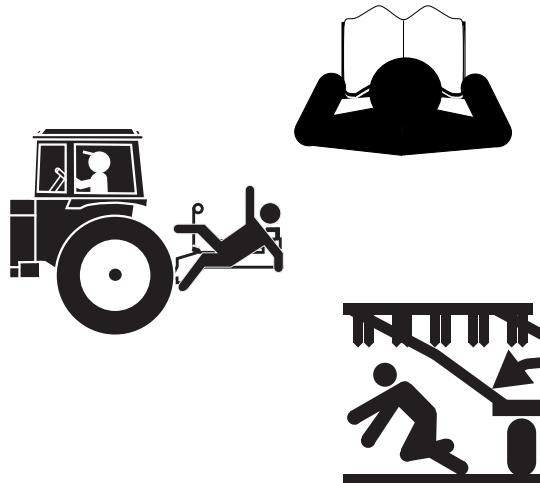
- ▲ Understand procedure before doing work. Use proper tools and equipment. Refer to this manual for additional information.
- ▲ Work in a clean, dry area.
- ▲ Lower the machine, put tractor in park, turn off engine, and remove key before performing maintenance.
- ▲ Make sure all system pressure is relieved.
- ▲ Disconnect battery ground cable (-) before servicing or adjusting electrical systems or before welding on the machine.
- ▲ Inspect all parts. Make sure parts are in good condition and installed properly.
- ▲ Remove buildup of grease, oil or debris.
- ▲ Remove all tools and unused parts from the machine before operation.



Safety At All Times

Thoroughly read and understand the instructions in this manual before operation. Read all instructions noted on the safety decals.

- ▲ Be familiar with all functions of the drill.
- ▲ Operate machinery from the driver's seat only.
- ▲ Do not leave the drill unattended with tractor engine running.
- ▲ Do not dismount a moving tractor. Dismounting a moving tractor could cause serious injury or death.
- ▲ Do not stand between the tractor and the drill during hitching.
- ▲ Keep hands, feet and clothing away from moving parts.
- ▲ Watch out for wires, trees, etc., when the optional markers are raised. Make sure all persons are clear of working area.





Introduction

Great Plains welcomes you to its growing family of new product owners. The 1300 has been designed with care and built by skilled workers using quality materials. Proper setup, maintenance, and safe operating practices will help you get years of satisfactory use from the machine.

Description of Unit

The 1300 is a towed seeding implement. Working width is 13 feet. Double disks open a seed furrow. Press wheels follow the disks to control seeding depth and close the furrow. Opener down pressure and press-wheel height are adjustable. Seeding is driven through the left end wheel. A sprocket drive allows you to adjust the seeding rate. An optional fertilizer divider and drive allow you to plant seed and apply dry fertilizer in the same field pass. An optional small-seeds attachment allows you to plant very small seeds evenly.

Intended Usage

Use this drill in conventional- and some minimum-tillage applications.

Models Covered

1300

Tools Required

- Basic hand tools, including torque wrench
- Mobile lifter or overhead hoist with 5,000 pound (2260 kg capacity)
- Hydraulic oil to fill the tractor hydraulic reservoir after initial bleeding and cycling of the hydraulic system.
- Tractor with one remote valve or other suitable hydraulic power source

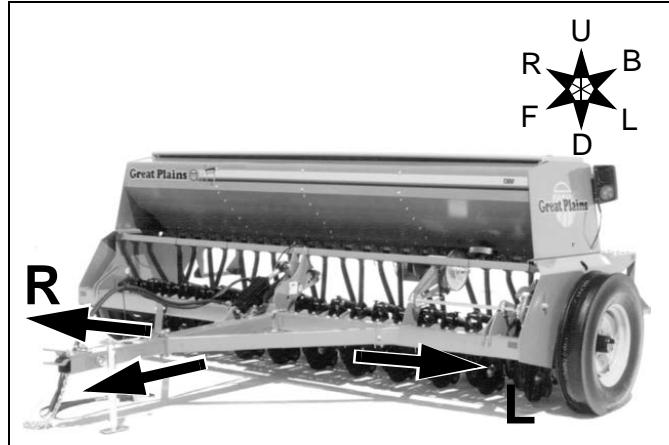


Figure 1
Short Disk™

16677

Using This Manual

This manual was written to help you assemble and prepare the new machine for the customer. The manual includes instructions for assembly and setup. Read this manual and follow the recommendations for safe, efficient and proper assembly and setup.

An Operator and Parts manual are also provided with the new machine. Read and understand “**Important Safety Information**” and “**Operating Instructions**” in the Operator manual before assembling the machine. Refer to the Parts manual for proper part identification. As a reference, keep the Operator and Parts manual on hand while assembling.

The information in this manual is current at printing. Some parts may change to assure top performance.

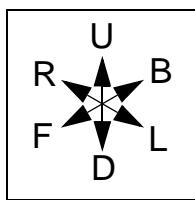
Document Family

- | | |
|----------|-----------------------------------|
| 175-175M | Pre-Delivery Manual (this manual) |
| 175-157M | Operator Manual |
| 175-157P | Parts Manual |

Definitions

The following terms are used throughout this manual.

Right-hand and left-hand as used in this manual are determined by facing the direction the machine will travel while in use unless otherwise stated. An orientation rose in some line art illustrations shows the directions of: Up, Back, Left, Down, Front, Right.



Call-Outs

① to ⑨

Single-character callouts in the ranges 1-9, a-z or A-Z identify elements from only the most recently referenced Figure or Figures. These numbers and letters may be re-used for other elements on other pages.

⑩ and on

Two-digit callouts in the range 11 and on reference the same Great Plains part numbers throughout this manual.

Definition of a Notice

NOTICE

A notice is a crucial point of information related to the current topic. Read and follow the directions to remain safe, avoid serious damage to equipment and ensure desired field results.

Definition of a Note

Note: A note is useful information related to the preceding topic.



Shipment

What's On The Truck

Items that are individually unloaded include:

- 1300 Drill
- Markers (optional)

Shipment Inventory

Verify the implement serial number of your order confirmation documents with the markings on major sub-assemblies and crates.

Note: The truck may contain shipments other than yours.
Confirm items to be unloaded with driver.



Figure 2
Great Plains Truck

29995

Assembly and Setup Assistance

Pre-Delivery, Operator and Parts manuals are available on the Great Plains web site, in PDF form, at no charge.

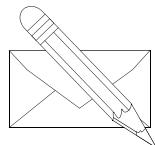
To order additional printed copies of Pre-Delivery, Operator or Parts manuals, write to the following address. Include model numbers or manual part numbers (see page 6) in all correspondence.

If you do not understand any part of this manual or have assembly or setup questions, assistance is available.

Contact:

Product Support

Great Plains Mfg. Inc., Service Department
PO Box 5060
Salina, KS 67402-5060



gp_web_cs@greatplainsmfg.com
(800)255-9215



Unloading

Location Requirements

1. Determine a location for machine assembly. There must be ample space for mobile lifters to deliver and position the drill. There must be space to attach a towing vehicle for lift test as well as tow-away on completion.

Drill width with markers up: 15 ft 7 in (4.74 m).

Drill width with markers down: 26 ft 10 in (8.19 m).

Drill length: 12 ft 7 in (3.81 m)

2. Plan the unload based on the lifters available and any optional assemblies on the truck.

It is usually easiest to unload from trailer back to front.

If lifters are not mobile, plan to have the driver pull the trailer out from under each lifted load. Lift for 12 inches (300 mm) clearance.

Unloading the Truck

WARNING

Overhead Crushing Hazard:

Use adequate lifting equipment. The machine can weigh as much as 4600 pounds (2090 kg). If using multiple lines, make sure that each is rated for the full load.

Place lines where they take an equal share of the load and cannot slip. Attach at frame tubes or weldments, and not at bolted-on components.

Keep all non-essential personnel clear of the truck, lift and movement path. A swinging load can cause crushing injuries. A falling load could cause serious injury or death.

1. Use forklift or a hoist remove the tongue and the pull bars from truck.
2. If optional markers were shipped with drill, use forklift or a hoist remove markers from truck.

NOTICE

Do not install accessories while the machine is on the truck.

3. Secure lifting lines to the lugs above the lift cylinder eyebolts. Prior to tongue installation, these lugs permit nearly level lifting of the drill.
4. Lift drill from truck and position the drill in the center of the assembly area.

NOTICE

Hoist drill from above.

Do not fork-lift from beneath drill There are no suitable lift points.

Do not hoist via lugs after tongue is installed in the working position. Drill is not balanced at lugs with tongue installed.

Releasing the Truck

Verify that no other crates or palettes still on the track are intended for the unload machine (check serial numbers).

 **Assembly**

The following headings are step-by-step instructions for assembling the drill. Begin with *Tools Required* and *Pre-Assembly Checklist* to make sure you have all necessary parts and equipment. Then proceed with *Drill Assembly*. Follow each step to make the job as quick and safe as possible and produce a properly working machine.

The drill is shipped via flat bed truck. It is the dealer's responsibility to unload the new machine. Unload all equipment before beginning assembly. Do not attempt any assembly work while the drill is on the truck.

Tools Required

- Forklift, overhead hoist or loader with 5000 pound (2268 kg) capacity
- General hand tools
- Lifting chain

Pre-Assembly Checklist

1. Read and understand "**Important Safety Information**" on page 1 before assembling.
2. Have at least two people on hand while assembling.
3. Make sure the assembly area is level and free of obstructions (preferably an open, concrete area).
4. Have all major components.
5. Have all fasteners and pins shipped with the drill.

NOTICE

If a pre-assembled part or fastener is temporarily removed, remember where it goes. Keep the parts separated.

6. Have a copy of the parts manual on hand. If unsure of proper placement or use of any part or fastener, refer to the parts manual.
7. Check that all working parts are moving freely, bolts are tight, and cotter pins are spread.
8. Check for proper tension and alignment on all drive chains.
9. Check that all safety labels and reflectors are correctly located and legible. Replace if improperly located or damaged. Refer to *Safety Labels*, "**Important Safety Information**" in the operator's manual.
10. Inflate tires to recommended pressure as listed on the *Tire Inflation Chart*, "**Appendix**," page 20. Tighten wheel bolts as specified on *Torque Values Chart*, "**Appendix**," page 20.

Drill Assembly

1. Bolt the tongue **⑩** to the mainframe **①** using 3/4-10x2 in bolts **⑪**, 3/4 lock washers **⑫**, and 3/4-10 nuts **⑬**.
2. Pin the jack **⑭** to the side of the tongue. Extend the jack until the tongue is level with the ground.

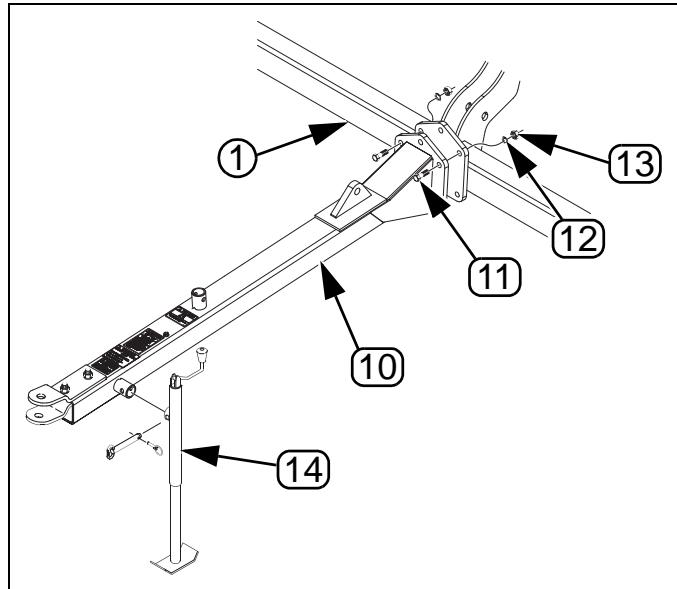


Figure 3
Center Brace Bar

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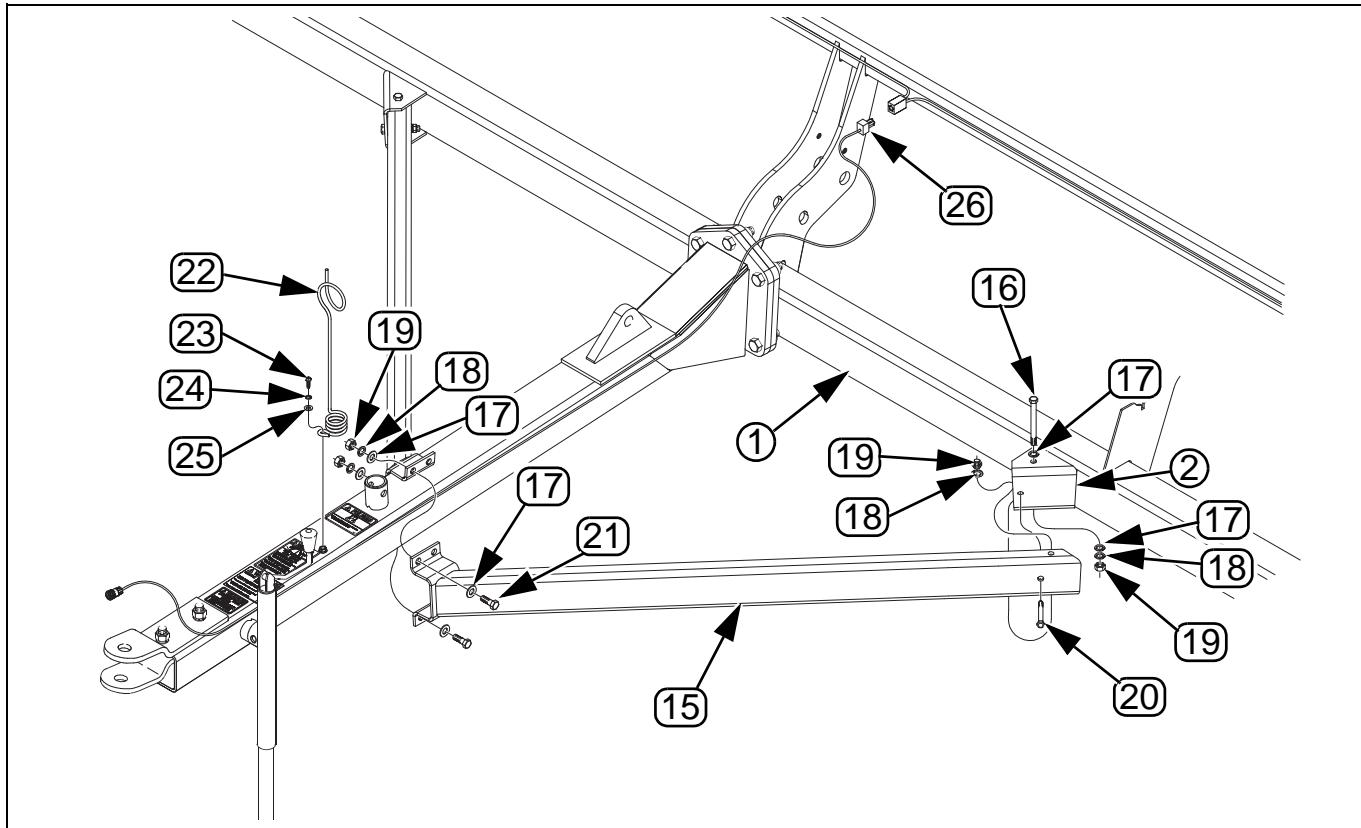


Figure 4
Center Brace Bar

16692

3. Install a pull bar **15** on the left-hand side of the mainframe **①**. Slide the pull bar into the brace **②** on the mainframe. Loosely install a 1/2-13x5 in bolt **16**, two 1/2 flat washers **17**, 1/2 lock washer **18**, and a 1/2-13 nut **19**.
4. Loosely install the 1/2-13x3-1/4 in bolt **20**, 1/2 lock washer **18**, and 1/2-13 nut **19**.
5. Loosely install a pull bar on the right-hand side of the mainframe.
6. Loosely clamp the pull bars around tongue by installing the 1/2-13x1-3/4-inch bolts **21**, 1/2 flat washers **17**, 1/2 lock washers **18**, and 1/2-13 nuts **19**.
7. Tighten all of the hardware for the pull bars.
8. Install hydraulic-hose holder **22** with 3/8-16x1 in bolt **23**, 3/8 in lock washer **24**, and 3/8 flat washer **25**.
9. Plug the tongue portion of lighting harness **26** into the connector on the drill frame. Route the lighting harness over tongue. Secure lighting harness to avoid damage.

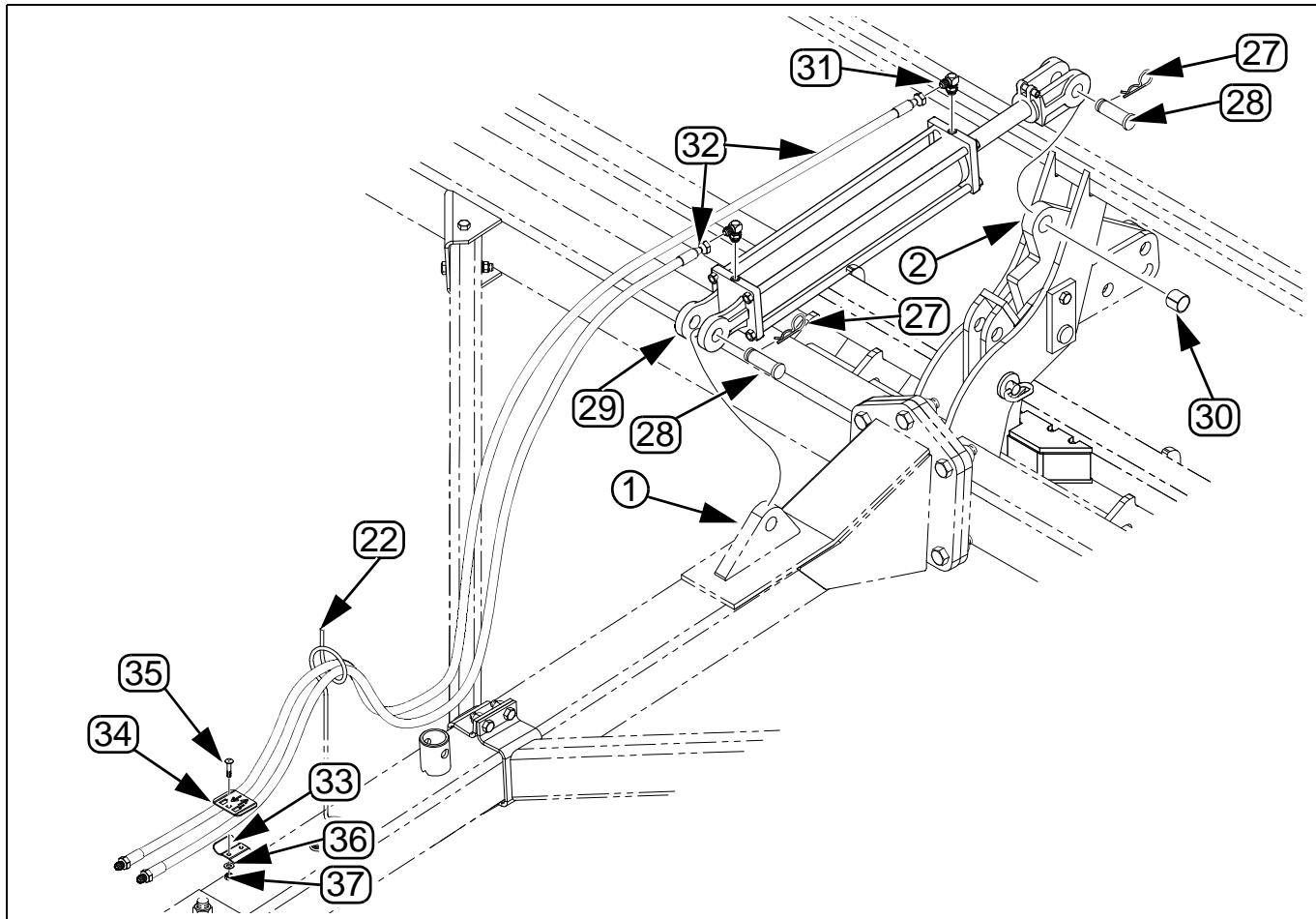


Figure 5
Machine Lift Hydraulics

16588

10. Remove the hairpin pin **27** and the clevis pin **28** from the base end of the 3.5x8x1.25 lift cylinder **29**.
11. Install the base end of the lift cylinder on the mounting bracket **1** on the tongue. Install the clevis pin and the hairpin.
12. Install a 1-1/4x1x1 bushing **30** in the mounting lug **3**.
13. Remove the hairpin **27** and the clevis pin **28** from the rod end of the lift cylinder.
14. Install the rod end of the lift cylinder on the mounting lug and install the clevis pin and the hairpin.
15. Install a 3/4MJIC 3/4MORB elbow **31** in both ends of the lift cylinder.

Note: If markers are being installed, the elbows will be replaced by tees.

16. Connect the two 120 in (305 cm) hoses **32** to the elbows.

- Note: If markers are being installed, do not tighten the hoses on the elbows.
17. Route the hoses forward along the top of the tongue and through the hose holder **22**.
 18. Put the plain clamp bracket **33** under the two hoses. Place the labeled clamp bracket **34** on top of the two hoses. Make sure the labels are oriented correctly.
 19. Fasten the two clamps together with the 5/16-18x1-1/4 bolt **35**, 5/16 flat washer **36**, and 5/6-18 hex flanged nut **37**.
 20. If marker assemblies are not being installed, bleed the hydraulics. See the instructions on page 19.

If marker assemblies are being installed, see the installation instruction on the next page. Install the markers before bleeding the hydraulic system.

Installing the Optional Markers

Marker Assembly Installation

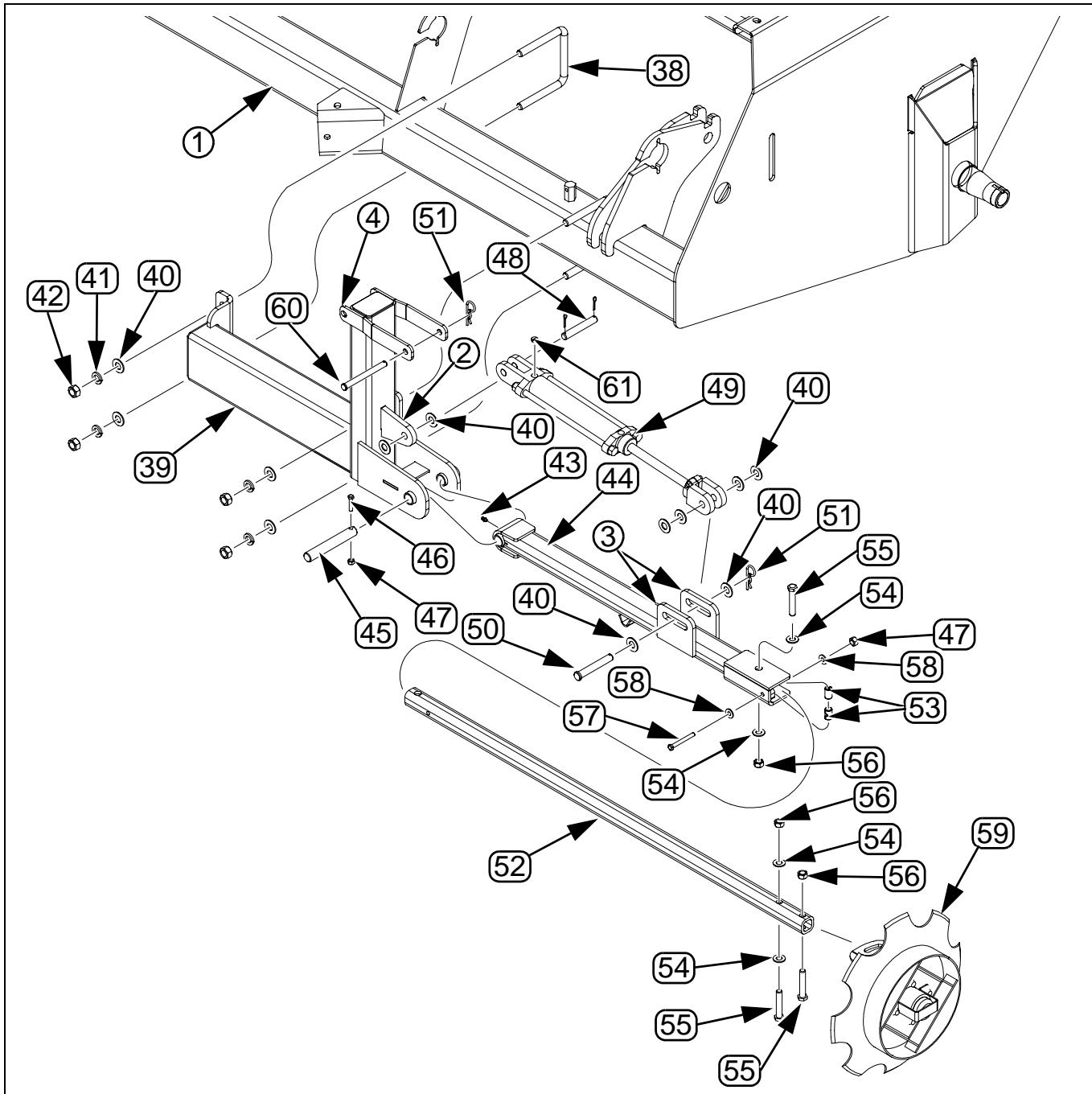


Figure 6
Left-Hand Marker Assembly

36842

1. Make sure there is room on both sides of the machine to install the marker assemblies. The machine will be 26 ft 10 in (8.19 m) wide when both markers are in the working position.
2. Remove the U-bolts 38 from the left-hand marker base 39.

3. Use lifting equipment to put the left-hand marker base in position on the left-hand end of the mainframe **(1)**.
4. Install the U-bolts.
5. Install and tighten the 5/8 flat washers **(40)**, lock washers **(41)**, and nuts **(42)** on the U-bolts.
6. Remove the lifting equipment.
7. Install the grease fitting **(43)** in the end of the left-hand inner marker arm **(44)**.
8. Install the left-hand inner marker arm in the left-hand marker base and install the 7/8x5-1/2 headless clevis pin **(45)**.

NOTICE

The mounting channel on outer end of the left-hand inner marker arm must open toward the rear of the machine

9. Align the holes in the headless clevis pin and the mounting flange. Install the 5/16-18x1-1/2 bolt **(46)** and 5/16-18 lock nut **(47)**.
10. Remove the clevis pin **(48)** from the base end of the left-hand 1.5x8x.75 marker cylinder **(49)**. Put the base end of the lift cylinder on the mounting bracket **(2)**. Install 5/8 flat washers **(40)** to fill the gap on either side of the mounting flange. Install and lock the clevis pin.
11. Put the rod end of the marker cylinder between the mounting brackets **(3)** on the outer marker arm. Install 5/8 flat washers **(40)** to fill the gap on either side of the cylinder rod end. Install a 5/8 flat washer **(40)** on the 5/8x3-3/4 clevis pin **(50)**. Install the clevis pin and install a 5/8 washer **(40)** and hairpin **(51)** on the clevis pin.

12. Inspect the mounting holes in both ends of the outer marker arm **(52)**. Determine which end of the outer marker arm installs into the channel on the inner marker arm. Install the outer marker arm and align the mounting holes.
13. Install the two bushings **(53)** into the vertical mounting hole.
14. Install a 1/2 in flat washer **(54)** on a 1/2-13x2-3/4 cap screw **(55)**. Install the bolt through the bushings.
15. Loosely install a 1/2 flat washer **(54)** and a 1/2-13 nut **(56)** on the bolt.
16. Install the 5/1618x2-3/4 in bolt **(57)**, two 5/16 flat washers **(58)**, and a 5/16-18 nut **(47)** in the outer hole in the channel.
17. Tighten the 1/2-13 nut and the 5/16-18 nut.
18. Install the left-hand marker disc assembly **(59)** on the end of the outer marker arm.

NOTICE

The leading edge of marker disc must be able to pivot outward.

19. Install a 1/2-13x2-3/4 cap screw **(55)** up through the outer hole and install a 1/2-13 nut **(56)**.
20. Install a 1/2 in flat washer **(54)** on a 1/2-13x2-3/4 cap screw **(55)**. Install the cap screw up through the inner hole and install a 1/2 in flat washer **(54)** and a 1/2-13 nut **(55)**.
21. Install the 1/2x4 3/4 in clevis pin **(60)** in the storage bracket **(4)** and install the hairpin **(51)**.
22. Install the ORPL 1/16 9/16MORB orifice **(61)** in the port at the base end of the lift cylinder.
23. Repeat the procedure to install the right-hand marker assembly.

Reflector Installation

Install an amber reflector on the front ① of both marker bases.

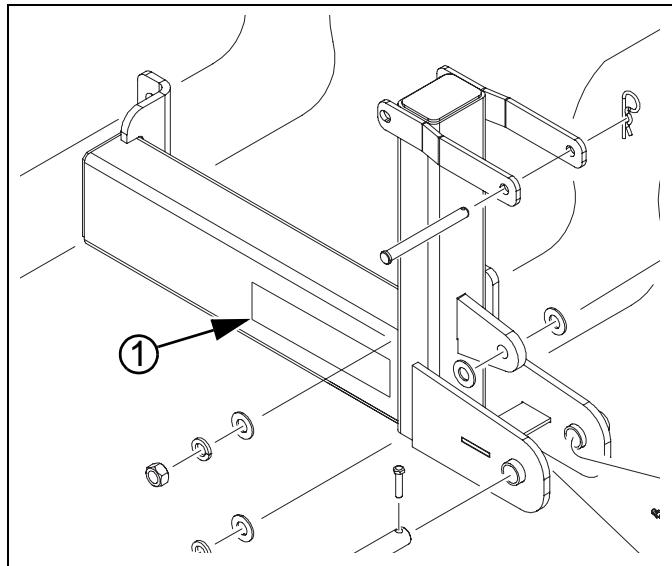


Figure 7
Reflector Installation

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Sequence Valve Installation

1. Put the sequence valve assembly ⑥2 on the mainframe ① between the tongue mount ② and the brace ③ for the left-hand pull bar. Ports 1 and 2 ④ on the sequence valve must be toward the center of the mainframe.
2. Install the 3/8-16x5 cap screw ⑥3, 3/8 lock washer ⑥4, and 3/8-16 nut ⑥5. Do not tighten the nut.

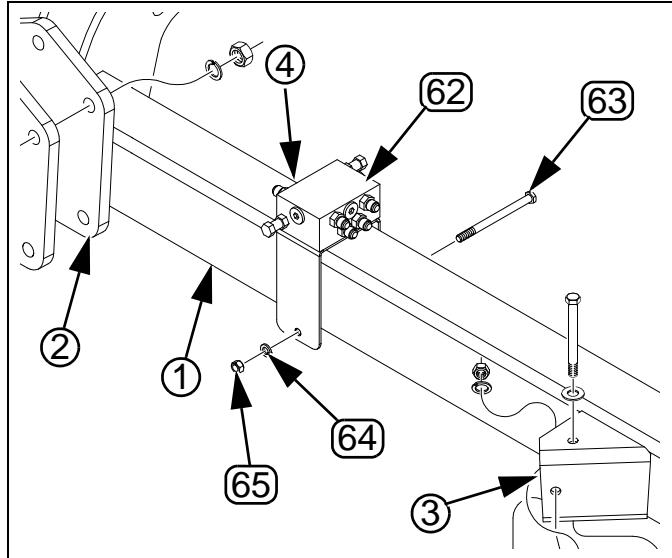
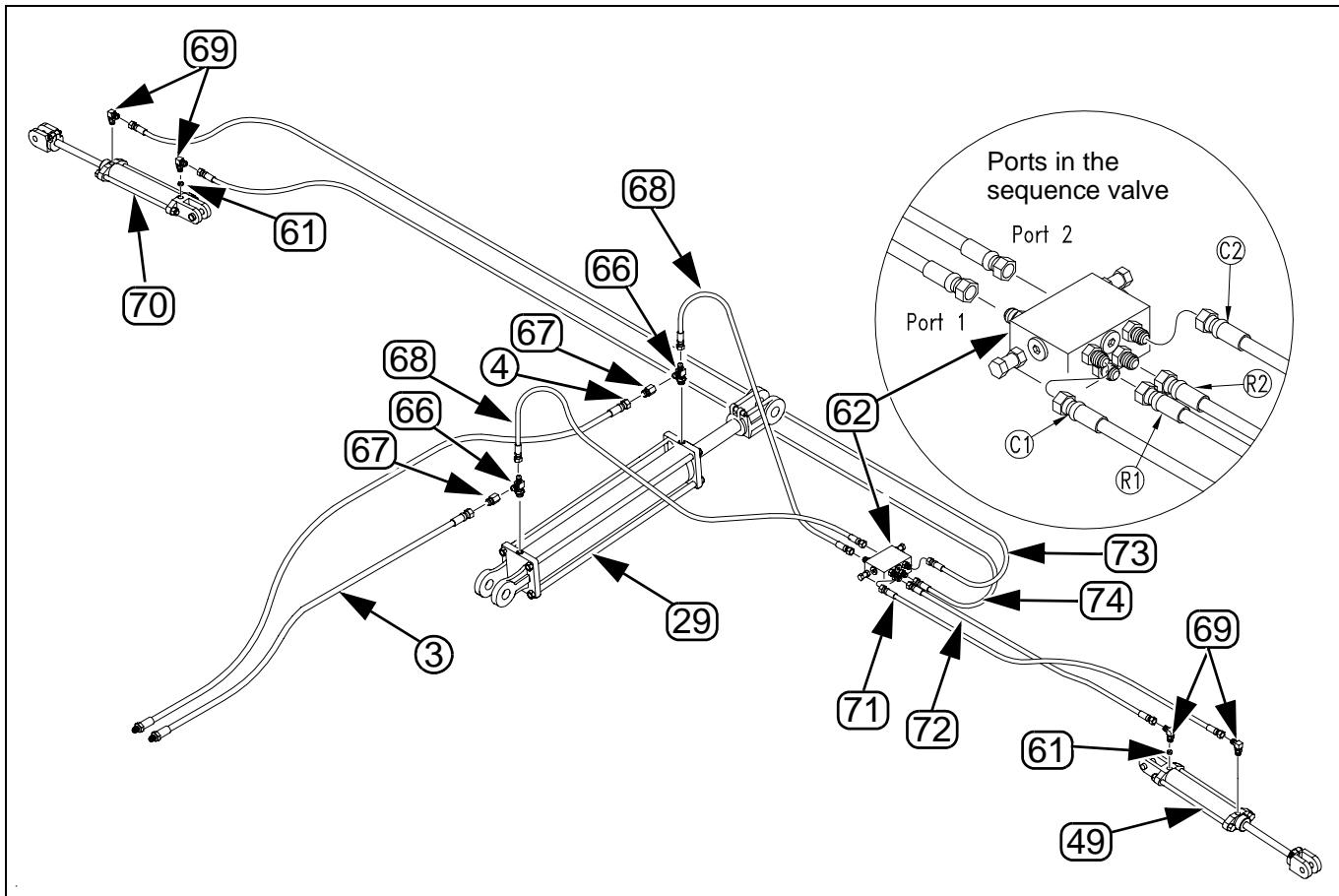


Figure 8
Sequence Valve Assembly

36842

Marker Hydraulics Installation

Figure 9
Center Brace Bar

36847

1. Relieve any pressure in the hydraulic circuit.
2. Disconnect the existing hose ③ from the elbow in the base end of the 3.5x8x1.25 lift cylinder ⑨.
3. Remove and discard the existing elbow from the base end of the lift cylinder.
4. Install an TE 9/16MJIC 9/16MJIC 3/4MORB tee ⑥ in the base end of the lift cylinder as shown.
5. Connect an AD 3/4MJIC 9/16FJIC adapter ⑦ to the center leg of the tee.
6. Connect the existing hose ③ to the adapter.
7. Connect one end of a 23 in (58 cm) hose ⑧ to the top leg of the tee.
8. Route the 23 in (58 cm) hose to the sequence valve ⑫ and connect to the fitting in Port 2.
9. Disconnect the existing hose ④ from the elbow in the rod end of the lift cylinder.
10. Remove and discard the existing elbow from the rod end of the lift cylinder.
11. Install an TE 9/16MJIC 9/16MJIC 3/4MORB tee ⑥ in the rod end of the lift cylinder.
12. Connect an AD 3/4MJIC 9/16FJIC adapter ⑦ to the center leg of the tee.
13. Connect the existing hose ④ to the adapter.
14. Connect the other 23 in (58 cm) hose ⑧ to the top leg of the tee.
15. Route the 23 in (58 cm) hose to the sequence valve and connect to the fitting in Port 1.
16. Make sure the orifices ⑪ installed earlier in the base end ports of the marker cylinders are in place.
17. Install an EL 9/16MJIC 9/16MORB elbow ⑩ in each end of the left-hand 1.5x8x.75 marker cylinder ⑨.

-
18. Install an EL 9/16MJIC 9/16MORB elbow **⑥⁹** in both ends of the right-hand 1.5x8x.75 marker cylinder **⑦⁰**.
 19. Connect one end of the 74 in hose **⑦²** to Port R1 of the sequence valve.
 20. Connect the other end of the 74 in (58 cm) hose to the elbow in the base end of the left-hand marker cylinder.
 21. Connect one end of the 86 in (218 cm) hose **⑦¹** to the fitting the port C1 of the sequence valve.
 22. Connect the other end of the 86 in (218 cm) hose to the elbow in the rod end of the left-hand marker cylinder.
 23. Connect one end of the 142 in (361 cm) hose **⑦³** to the fitting the port C2 of the sequence valve.
 24. Connect the other end of the 142 in (361 cm) hose to the elbow in the rod end of the right-hand marker cylinder.
 25. Connect one end of the 130 in (330 cm) hose **⑦⁴** to the fitting the port R2 of the sequence valve.
 26. Connect the other end of the 130 in (330 cm) hose to the elbow in the base end of the right-hand marker cylinder.
 27. Make sure all of the hydraulic connections are tight.
 28. Adjust the position of the sequence valve so none of the hoses are crimped. Tighten the bolt in the mounting bracket.
 29. Refer to the instructions on the next page and bleed the hydraulic system.
 30. Refer to the Operator Manual for setup and operating instructions for the markers.

Bleeding the Hydraulics, Machines without Markers

1. Make sure the tractor hydraulic reservoir is filled to the proper level.
2. Loosen a fitting at the base end of the lift cylinder.
3. Start the tractor and operate the engine at idle. Slowly work the tractor remote lever to feed oil to the base end of the lift cylinder. Stop the tractor when oil is seen coming from around the fitting. Do not attempt to extend the lift cylinder when bleeding base end. Tighten the fitting.
4. Loosen a fitting at the rod end of the lift cylinder.
5. Start the tractor and operate the engine at idle. Slowly work the tractor remote lever to feed oil to the rod end of the lift cylinder. Stop the tractor when oil is seen coming from around the fitting. Do not attempt to retract the lift cylinders when bleeding rod end. Tighten the fitting.
6. Start the tractor. Retract and extend the cylinders several times to remove remaining air from this system. Any residual air will gradually be pushed to the tractor during day-to-day operations.
7. Recheck the tractor hydraulic reservoir level and add clean fluid as necessary.

Bleeding the Hydraulics, Machines with Markers

1. Make sure the tractor hydraulic reservoir is filled to the proper level.
2. Loosen a fitting at the base end of the lift cylinder and at the base ends of bolt marker lift cylinders.
3. Start the tractor and operate the engine at idle. Slowly work the tractor remote lever to feed oil to the base end of the lift cylinder. Stop the tractor when oil is seen coming from around the fitting. Do not attempt to extend the cylinders when bleeding base end. Tighten the fitting.
4. Start the tractor and operate the engine at idle. Slowly work the tractor remote lever to feed oil to the base end of the marker lift cylinders. Stop the tractor when oil is seen coming from around the fitting at the base end of one of the marker lift cylinder. Tighten the fitting.
5. Start the tractor. Momentarily move the tractor remote to the retract position to shuttle the sequence valve to the opposite marker.
6. Operate the engine at idle. Slowly work the tractor remote lever to feed oil to the base end of the marker lift cylinders. Stop the tractor when oil is seen coming from around the fitting at the base end of the other marker lift cylinder. Tighten the fitting.
7. Loosen a fitting at the rod end of the lift cylinder and at the rod ends of both marker lift cylinders.
8. Repeat the procedure above to bleed air from the rod ends of the three cylinders.
9. Start the tractor. Retract and extend the cylinders several times to remove remaining air from this system. Any residual air will gradually be pushed to the tractor during day-to-day operations.
10. Check the tractor hydraulic reservoir level and add clean fluid as necessary.



Appendix - Reference Information

Torque Values Chart

Bolt Size in-tpi ^a	Bolt Head Identification					
	Grade 2		Grade 5		Grade 8	
	N-m ^b	ft-lb ^d	N-m	ft-lb	N-m	ft-lb
1/4-20	7.4	5.6	11	8	16	12
1/4-28	8.5	6	13	10	18	14
5/16-18	15	11	24	17	33	25
5/16-24	17	13	26	19	37	27
3/8-16	27	20	42	31	59	44
3/8-24	31	22	47	35	67	49
7/16-14	43	32	67	49	95	70
7/16-20	49	36	75	55	105	78
1/2-13	66	49	105	76	145	105
1/2-20	75	55	115	85	165	120
9/16-12	95	70	150	110	210	155
9/16-18	105	79	165	120	235	170
5/8-11	130	97	205	150	285	210
5/8-18	150	110	230	170	325	240
3/4-10	235	170	360	265	510	375
3/4-16	260	190	405	295	570	420
7/8-9	225	165	585	430	820	605
7/8-14	250	185	640	475	905	670
1-8	340	250	875	645	1230	910
1-12	370	275	955	705	1350	995
1 1/8-7	480	355	1080	795	1750	1290
1 1/8-12	540	395	1210	890	1960	1440
1 1/4-7	680	500	1520	1120	2460	1820
1 1/4-12	750	555	1680	1240	2730	2010
1 3/8-6	890	655	1990	1470	3230	2380
1 3/8-12	1010	745	2270	1670	3680	2710
1 1/2-6	1180	870	2640	1950	4290	3160
1 1/2-12	1330	980	2970	2190	4820	3560

Bolt Size mm x pitch ^c	Bolt Head Identification					
	Class 5.8		Class 8.8		Class 10.9	
	N-m	ft-lb	N-m	ft-lb	N-m	ft-lb
M 5 X 0.8	4	3	6	5	9	7
M 6 X 1	7	5	11	8	15	11
M 8 X 1.25	17	12	26	19	36	27
M 8 X 1	18	13	28	21	39	29
M10 X 1.5	33	24	52	39	72	53
M10 X 0.75	39	29	61	45	85	62
M12 X 1.75	58	42	91	67	125	93
M12 X 1.5	60	44	95	70	130	97
M12 X 1	90	66	105	77	145	105
M14 X 2	92	68	145	105	200	150
M14 X 1.5	99	73	155	115	215	160
M16 X 2	145	105	225	165	315	230
M16 X 1.5	155	115	240	180	335	245
M18 X 2.5	195	145	310	230	405	300
M18 X 1.5	220	165	350	260	485	355
M20 X 2.5	280	205	440	325	610	450
M20 X 1.5	310	230	650	480	900	665
M24 X 3	480	355	760	560	1050	780
M24 X 2	525	390	830	610	1150	845
M30 X 3.5	960	705	1510	1120	2100	1550
M30 X 2	1060	785	1680	1240	2320	1710
M36 X 3.5	1730	1270	2650	1950	3660	2700
M36 X 2	1880	1380	2960	2190	4100	3220

a. in-tpi = nominal thread diameter in inches-threads per inch

b. N·m = newton-meters

c. mm x pitch = nominal thread diameter in mm x thread pitch

d. ft-lb = foot pounds

Torque tolerance + 0%, -15% of torquing values. Unless otherwise specified use torque values listed above.

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