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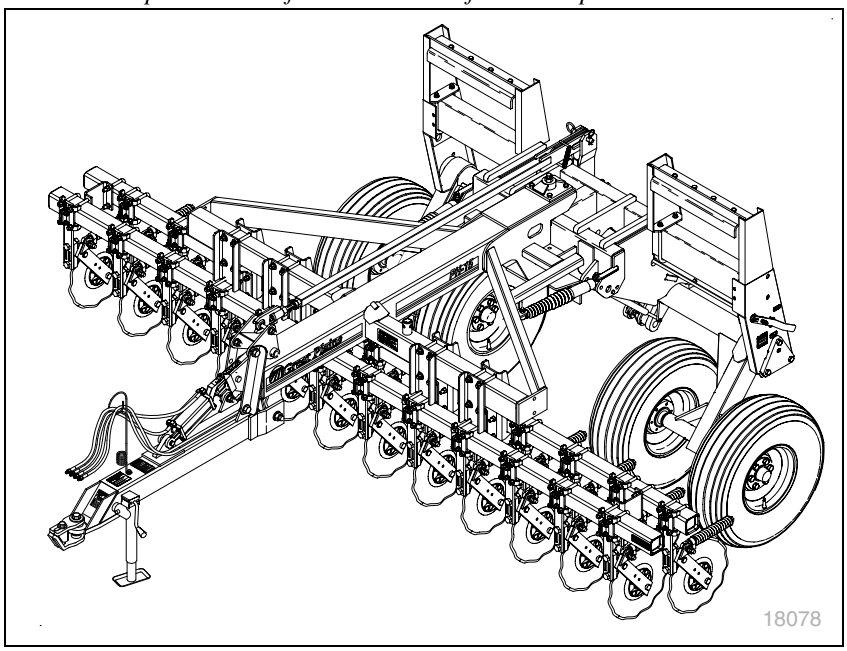
# Pre-Delivery Manual

PH-15, PH-20, PFH-15 and PFH-20
Precision Hitch and Precision Fertilizer Hitch

Great Plains
Manufacturing, Inc.
www.greatplainsmfg.com

*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!*




*Illustrations may show optional equipment not supplied with standard unit*

ORIGINAL INSTRUCTIONS

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# Important Safety Information

## ■ Look for Safety Symbol

The SAFETY ALERT SYMBOL[1] 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. The signal words are:

**DANGER**

DANGER Indicates an imminent hazard 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.

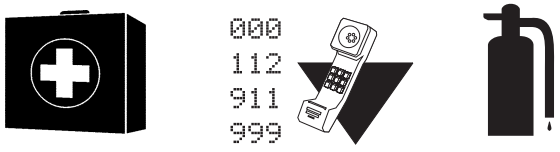
**WARNING**

WARNING Indicates a potential hazard 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**

CAUTION Indicates a potential hazard which, if not avoided, may result in minor or moderate injury. It may also be used to alert against unsafe practices.

## ■ Prepare for Emergencies

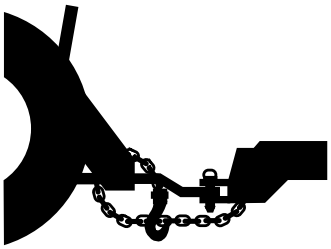



1. Be prepared if a fire starts
2. Keep a first aid kit and fire extinguisher handy.
3. Keep emergency numbers for doctor, ambulance, hospital and fire department near phone.

## ■ Wear Protective Equipment

1. Wear protective clothing and equipment appropriate for the job, such as safety shoes, safety glasses, hard hat, and ear plugs.
2. Clothing must fit snug without fringes and pull strings to avoid entanglement with moving parts.
3. Prolonged exposure to loud noise can cause hearing impairment or hearing loss. Wear suitable hearing protection such as earmuffs or earplugs.
4. Operating equipment safely requires your full attention. Avoid wearing entertainment headphones while operating machinery.

## ■ Use A Safety Chain



1. A safety chain will help control drawn machinery if the machinery separates from tractor drawbar.
2. Use a chain with a strength rating equal to or greater than the gross weight of towed machinery.
3. Attach chain to tractor drawbar support or other specified anchor location. Allow only enough slack in chain to permit turning.
4. Replace chain if any links or end fittings are broken, stretched or damaged.
5. Do not use safety chain for towing.

1. Symbols and color of decals are based on ANSI standard Z535.

## ■ Avoid High Pressure Fluids

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

1. Make sure all hydraulic fluid connections are tight and all hydraulic hoses and lines are in good condition before applying pressure to the system.
2. Avoid the hazard by relieving pressure before disconnecting hydraulic lines or performing any work on the system.
3. Wear protective gloves and safety glasses or goggles when working with hydraulic systems.
4. Use a piece of paper or cardboard, **NOT BODY PARTS**, to check for suspected leaks.
5. **DO NOT DELAY.** If an accident occurs, seek immediate medical assistance from a physician familiar with this type of injury. Any fluid injected into the skin or eyes must be treated within a few hours or gangrene can result.

## ■ Tire Safety

Tire changing can be dangerous and must be performed by trained personnel using correct tools and equipment.

1. When inflating tires, use a clip-on chuck and extension hose long enough for you to stand to one side–not in front of or over tire assembly. Use a safety cage if available.
2. When removing and installing wheels, use wheel-handling equipment adequate for weight involved.

## ■ Use Safety Lights and Devices

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

1. Use flashing warning lights and turn signals whenever driving on public roads.
2. 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.

1. Never allow children to operate equipment.
2. Keep all bystanders away from machine during operation.

## ■ Transport Machinery Safely

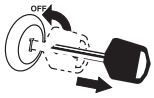
Maximum Transport speed for implement is 30 kph (20 mph). Some rough terrains require a slower speed. Sudden braking can cause a towed load to swerve and upset.

1. Comply with state and local laws.
2. Carry reflectors or flags to mark machinery in case of breakdown on the road.
3. Keep clear of overhead power lines and other obstructions when transporting. Refer to transport dimensions in the operator's manual.
4. Do not tow an implement that, when fully loaded, weighs more than 1.5 times the weight of towing vehicle.
5. Turning tractor too tight can cause implement to tip over.
6. When towing on a trailer, secure implement with tie downs and chains.
7. When towing on a trailer, sudden braking can cause a trailer to swerve and upset. Reduce speed if trailer is not equipped with brakes.

## ■ Shutdown and Storage

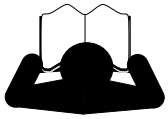
1. Park the tractor and implement on a solid, level surface where children normally do not play.
2. Put tractor in park or set park brake. Turn off engine and remove switch key to prevent unauthorized starting.
3. Wait for all components to come to a complete stop before leaving the leaving the operator's seat.
4. Detach the tractor. Secure the implement using blocks and supports.

## ■ Practice Safe Maintenance



1. Understand procedure before doing work. Use proper tools and equipment. Refer to this manual.
2. Work in a clean, dry area.
3. Lower the implement. Put tractor in Park, turn off engine. To prevent unauthorized starting, remove key before performing maintenance or service work.
4. Make sure all moving parts have stopped and all system pressure is relieved.
5. Disconnect lighting harness from the tractor before servicing or adjusting electrical systems.
6. Allow machine to cool completely.
7. Welding: Disconnect lighting harness from the tractor. Protect hydraulic lines. Avoid fumes from heated paint.
8. Inspect all parts. Make sure parts are in good condition and installed properly.
9. Do not alter this machine in a way which will adversely affect its performance.
10. Remove buildup of grease, oil or debris.
11. Remove all tools and unused parts from implement 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.

Do not allow anyone to operate this equipment who has not fully read and comprehended this manual and who has not been properly trained in the safe operation of the equipment.

1. The operator must not use drugs or alcohol as they can change the alertness or coordination of that person while operating equipment. If over-the-counter drugs are used, seek medical advice on whether you can safely operate equipment.
2. Operator must be familiar with all functions of the tractor and attachments, and be able to handle emergencies quickly.
3. Make sure all guards and shields are in place and secured before operating the implement.
4. Keep all bystanders away from equipment and work area.
5. Operator must start tractor and operate controls from the driver's seat only, never from the ground.
6. Dismounting from a moving tractor can cause serious injury or death.
7. Be familiar with all functions of the implement.
8. Do not leave implement unattended with tractor engine running.
9. Do not stand between the tractor and the implement during hitching.
10. Watch out for wires, trees, etc., when folding and raising the implement.
11. Turning tractor too tight can cause hitched implement to ride up on wheels. This can result in injury or equipment damage.

## Safety Decals

Your implement comes equipped with all safety decals in place. They were designed to help you safely operate your implement.

- ▲ *Read and follow decal directions.*
- ▲ *Keep all safety decals clean and legible.*
- ▲ *Replace all damaged or missing decals. Order new decals from your Great Plains dealer. Refer to this section for proper decal placement.*
- ▲ *When ordering new parts or components, also request corresponding safety decals.*

To install new decals:

1. Clean the area on which the decal is to be placed.
2. Peel backing from decal. Press firmly on surface, being careful not to cause air bubbles under decal.

# Introduction

Great Plains Manufacturing wants you to be satisfied with any new machine delivered by the Great Plains Trucking network. To ease the assembly task and produce a properly working machine, read this entire manual before assembling or setting up new equipment.

## Description of Unit

The Precision Hitch is a pull-type tillage implement designed to tow a Great Plains three-point drill. No-till coulters are mounted on the hitch. Each coulter is aligned with a drill opener. The coulters till strips for the drill openers. The hitch has two hydraulic circuits: one for raising and lowering the coulters and one for raising and lowering the drill.

The hitch can be outfitted with fertilizer coulters, a drive system, a piston pump and tanks for liquid-fertilizer application. With coulters set at various spacings, the hitch can be used to apply fertilizer in the row below the seedbed at rates from 4 to 80 gallons per acre. Total combined tank capacity is 400 gallons.

### Intended Usage

Use this hitch to apply approved liquid fertilizer to production-agriculture crops. Use this hitch in conjunction with Great Plains equipment only. Do not modify the hitch for use with products or attachments other than those specified by Great Plains.

## Models Covered

| | |
|---|---|
| PH-15 | Precision Hitch 15 ft |
| PFH-15 | Precision Fertilizer Hitch 15 ft |
| PH-20 | Precision Hitch 20 ft |
| PFH-20 | Precision Fertilizer Hitch 20 ft |

## Document Family

| | |
|---|---|
| 148-365M | Operators Manual PH/PFH |
| 148-365P | Parts Manual PH/PFH |
| 148-365Q | Pre-Delivery Instructions PH/PFH |

## 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's manual is also provided with the new machine. Read and understand "**Important Safety Information**" and "**Operating Instructions**" in the operator's manual before assembling the machine. As a reference, keep the operator's manual on hand while assembling.

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

### Definitions

The following terms are used throughout this manual.

Right and left as used in this manual are determined by facing the direction the machine will travel while in use unless otherwise stated.

**NOTICE**

***Economic and/or Liability Risks:***
*A crucial point of information related to the current topic. Read and follow the directions to remain safe, avoid serious damage to the equipment and to ensure desired field results.*

**NOTE:**
Useful information about the preceding topic.

## Further Assistance

For additional help with understanding these assembly instructions or for any other assembly or setup related questions, please contact our service department at the following address:

**Great Plains Service Department**
**1525 E. North St.**
**P.O. Box 5060**
**Salina, KS 67402-5060**

Or call us at **(800) 270-9302** to speak over the phone with a service representative.

Copies of this machine's operator manual are available by mail or online. Please visit **www.greatplainsag.com** and follow the product link for information on your machine.

# Preparation

Step-by-step instructions for assembling the hitch begin in the next section of the manual. Review the *Tools Required* and *Pre-Assembly Checklist* to make sure you have all necessary parts and equipment.

The hitch is shipped via flat bed truck. It is the dealer's responsibility to unload the new machine. Unload all equipment before beginning assembly.

**NOTICE**

*Do not attempt any assembly work while the hitch is on the truck.*

## Tools Required

- Forklift or Hoist
- General Hand Tools
- Utility Knife

## Pre-Assembly Checklist

- ❑ Read and understand "**Important Safety Information**" on page 1 before assembling.
- ❑ Have at least two people on hand while assembling.
- ❑ Make sure the assembly area is level and free of obstructions and overhead power lines (preferably an open concrete area).
- ❑ Have all major components.
- ❑ 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.*

- ❑ 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.
- ❑ Check that all working parts are moving freely, bolts are tight, and cotter pins are spread.
- ❑ Check for proper tension and alignment on all drive chains.
- ❑ Check that all safety decals and reflectors are correctly located and legible. Replace if improperly located or damaged. Refer to *Safety Decals* in the operator's manual.
- ❑ Inflate tires to recommended pressure as listed on the *Tire Inflation Chart* in "**Appendix**" on page 27. Tighten wheel bolts as specified on *Torque Values Chart* in the "**Appendix**" on page 27.

# Assembly

Use a hoist or lift to unload the machine from the truck.

Place the machine in the assembly area.

**NOTICE**

*Do not attempt any assembly work while the machine is on the truck.*

***Refer to Figure 1.***

1. Unstrap the transport tire, hub, and spindle assemblies.
2. Slide spindles (1) into outer spindle tubes (2).
3. Secure spindles with 1/2 x 4 3/4-inch bolts (3) and lock nuts (4).

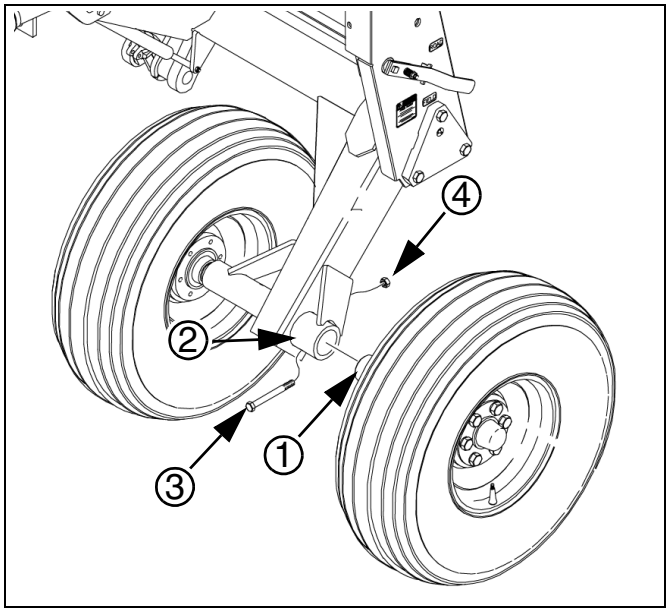



Figure 1
Install Transport Tires

18028A

***Refer to Figure 2***

4. Cut bands holding tongue and tongue cylinder to hitch.
5. Swing tongue (5) into position and pin cylinder (6) onto cylinder lug on hitch.
6. Swing tongue links (7) into position and bolt links to ears (8) on frame.
7. Assemble spring hose loop (9) on nut welded near front of tongue. Use 1/2 x 1-inch bolt, two flat washers, and lock washer (10).

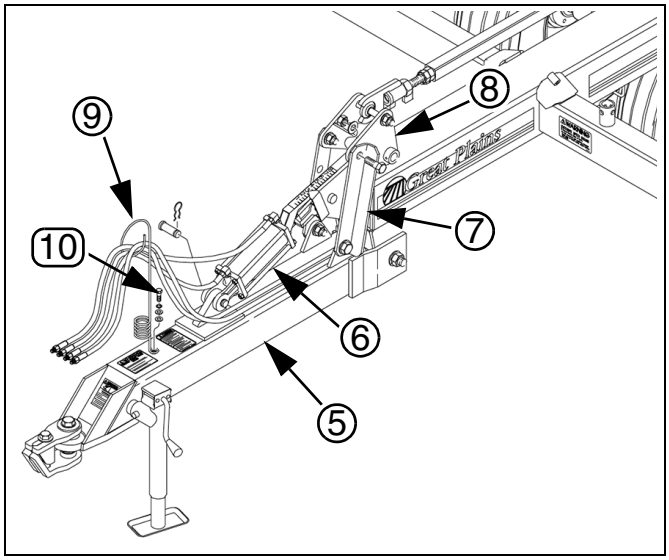



Figure 2
Install Tongue

18028B

***Refer to Figure 3***

8. Hang coulter toolbars (11) under hitch on coulter toolbar support (12), using 5/8 x 6-inch bolts (13), flat washers, lock washers and nuts. Position coulter toolbars so a gap between center coulters (14) is on center line of hitch.

**NOTICE**

*It is critical that the coulters are centered under the hitch to ensure proper tracking with drill openers. Use extra care when assembling coulter toolbar to hitch.*

**NOTE:**
The center of the coulter blade is about 1/4-inch to the right of the coulter mount casting and coulter spring bar.

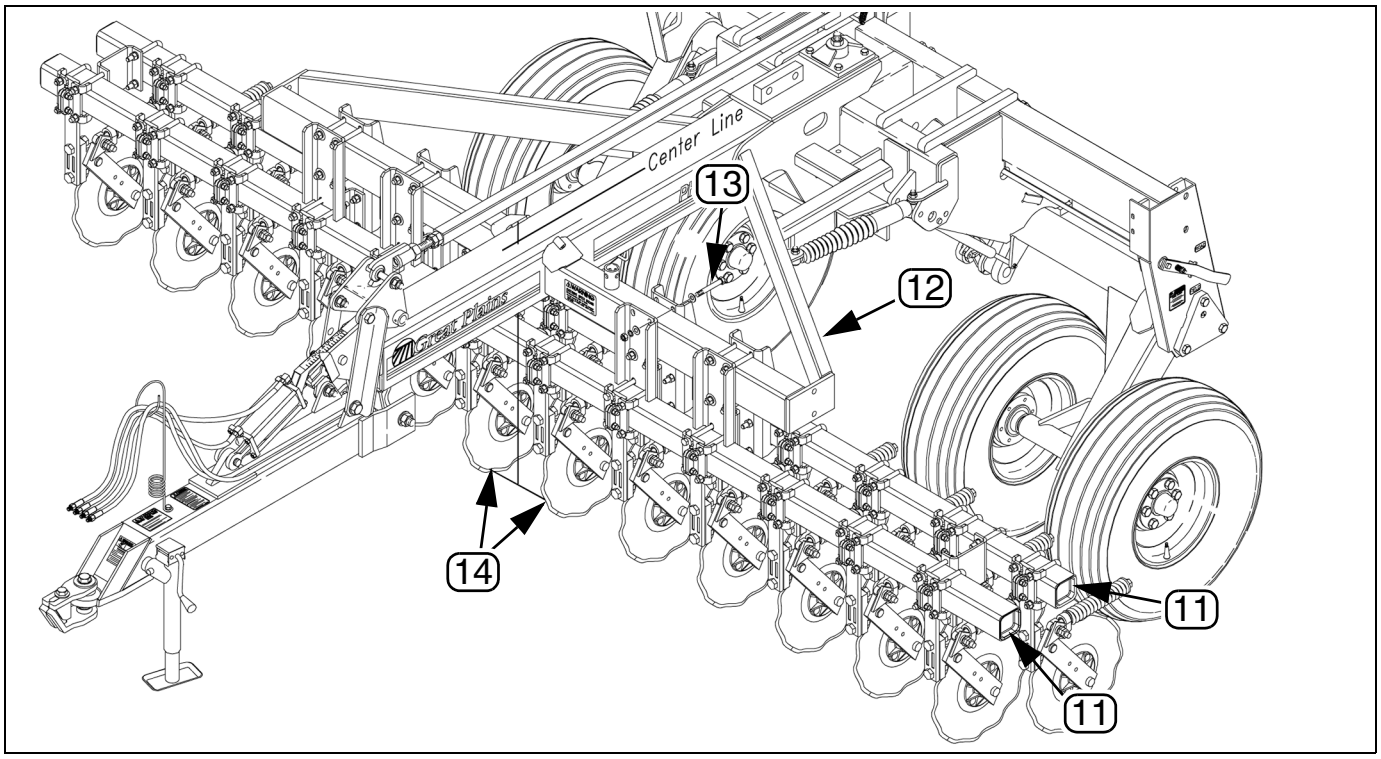



Figure 3 18028C
Install Toolbar and Coulters

***Refer to Figure 4***

9. Install weight rests (15) to weight brackets (16) using 5/8 x 2-inch bolts (17), flat washers, lock washers and nuts.
10. Install weight brackets to frame (18) using u-bolts (19) and nuts.

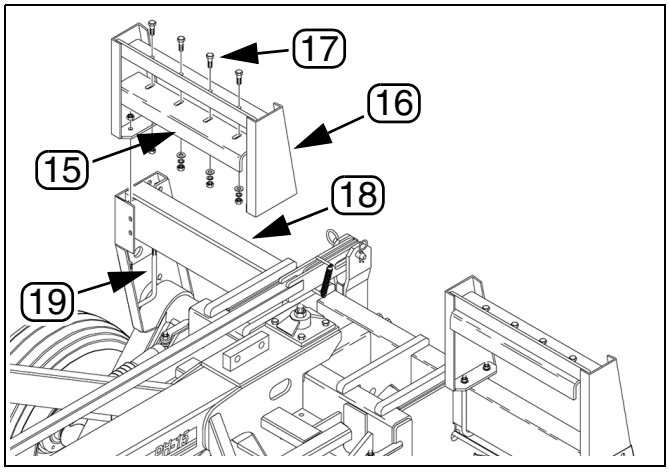



Figure 4 18028D
Install Weight Brackets

# Light Bracket Installation (S/N UU1420+)

## For PH-15 and PFH-15

***Refer to Figure 5***

1. Install light bracket assembly to the rear of the coulter toolbar and secure with 1/2 inch U-bolts (1), lock washers (2), and nuts (3).

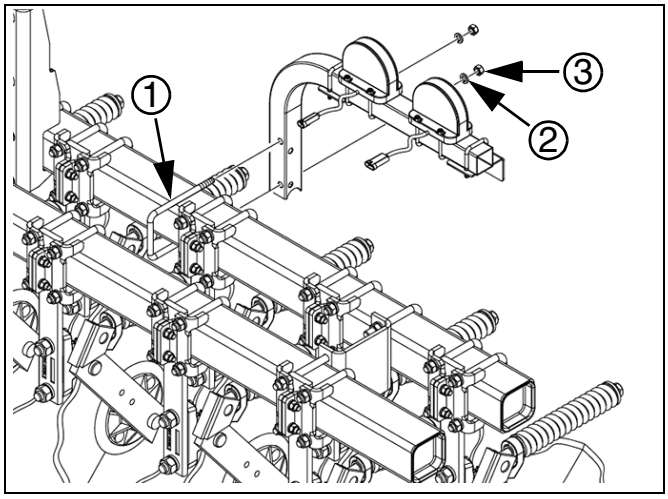



Figure 5 68408A
PH-15 and PFH-15
Install Light Brackets

***Refer to Figure 6***

2. Light brackets must be located as follows:
   (A) Red decals at the ends of the light bracket must be within 25 inches from the edge of the machine.
   (B) Amber lights must be within 16 inches from the edge of the machine.
   (C) Red lights must be within 2 feet to 5 feet of the center of the machine.

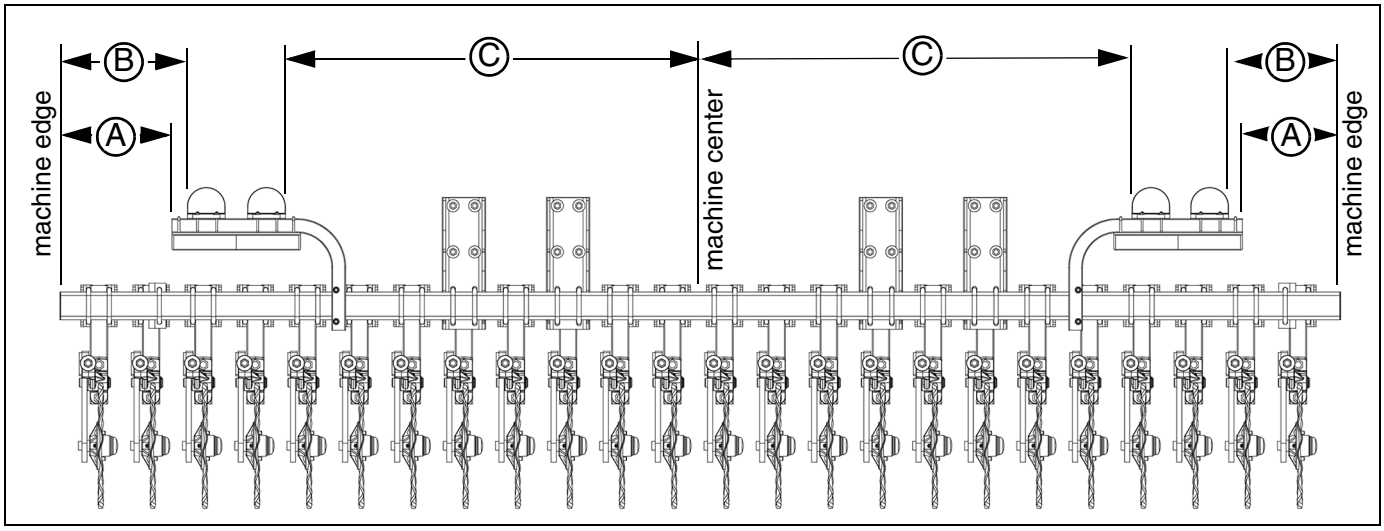



Figure 6 68408
PH-15 and PFH-15
Light Bracket Locations

## For PH-20 and PFH-20

***Refer to Figure 7***

1. Install light bracket assembly to the rear of the coulter toolbar and secure with 1/2 inch U-bolts (1), lock washers (2), and nuts (3).

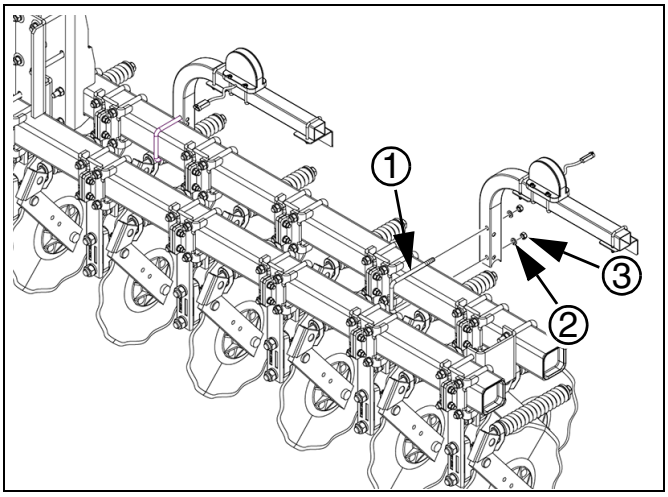



Figure 7 68409A
PH-20 and PFH-20 Install Light Brackets

***Refer to Figure 8***

2. Light brackets must be located as follows:
   (A) Red decals at the ends of the light bracket must be within 25 inches from the edge of the machine.
   (B) Amber lights must be within 16 inches from the edge of the machine.
   (C) Red lights must be within 2 feet to 5 feet of the center of the machine.
   (D) Maximum distance of 5 feet between red decals.

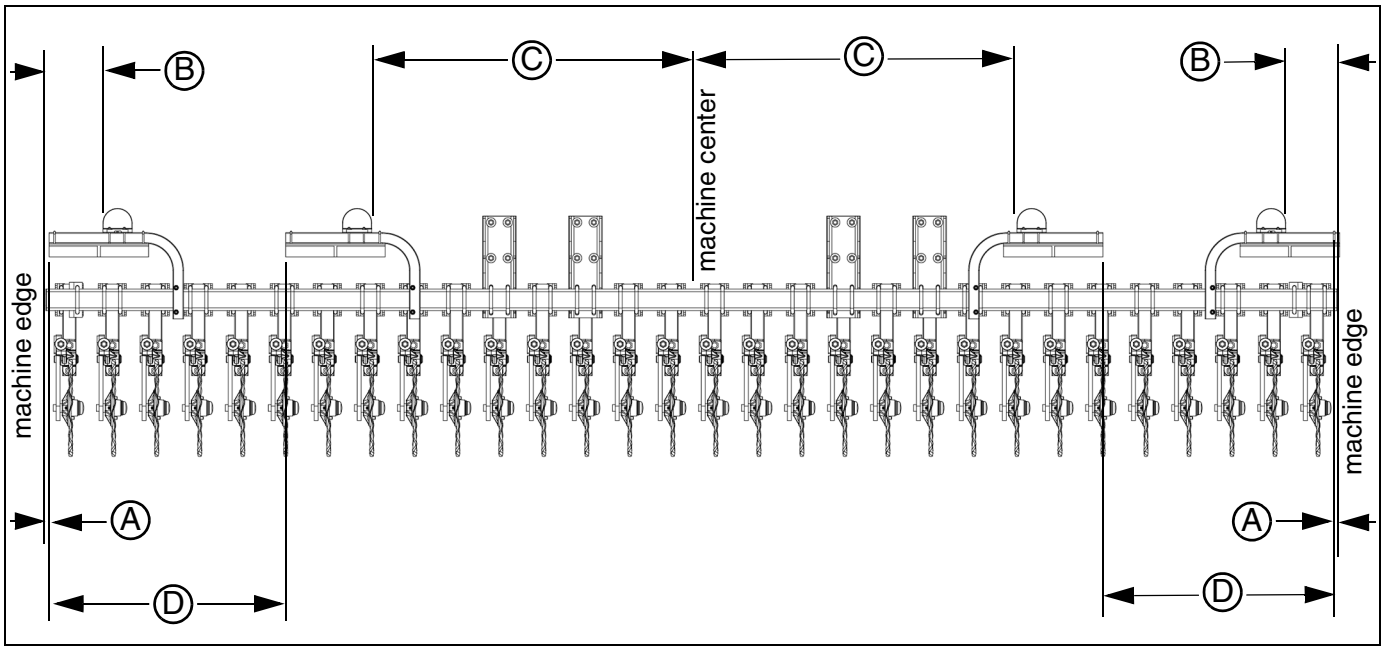



Figure 8 68409
PH-20 and PFH-20 Light Bracket Locations

# Light Harness (S/N UU1420+)

**⚠ CAUTION**

***Harness Damage Hazard:***
*Make sure all wiring harnesses are secured to the machine to prevent damage to the harnesses which can result in injury to the operator or damage to the machine.*

***Refer to Figure 9 and Figure 10.***

1. Connect the wishbone harness (1) to the machine harness (2). Make sure to position the harness so it can be routed as follows:
   - The wire with green tape will be routed to the right-hand side.
   - The wire with yellow tape will be routed to the left-hand side.
2. Route the wishbone harness along the frame to the lights.

📖 **NOTE:**
Coulters and other components are not shown in the illustrations for clarity.

## For PH-15 and PFH-15

a. Connect the three pin connector (3) to the red light.
b. Connect the two pin connector (4) to the amber light.

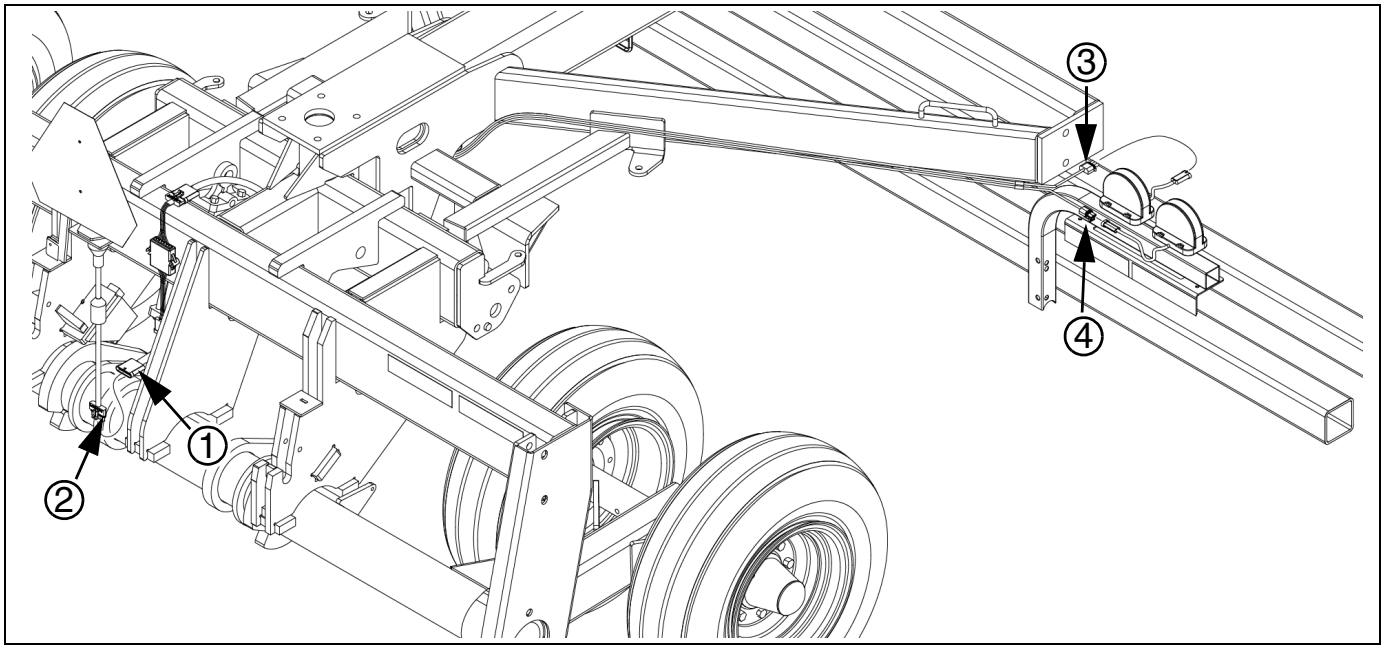



Figure 9 68450A
PH-15 and PFH-15 Light Harness

## For PH-20 and PFH-20

a. Connect the three pin connector (3) to the red light.
b. Connect the two pin connector (4) to the extension harness (5).
c. Route the extension harness to the amber light and connect it to the two pin connector on the light.

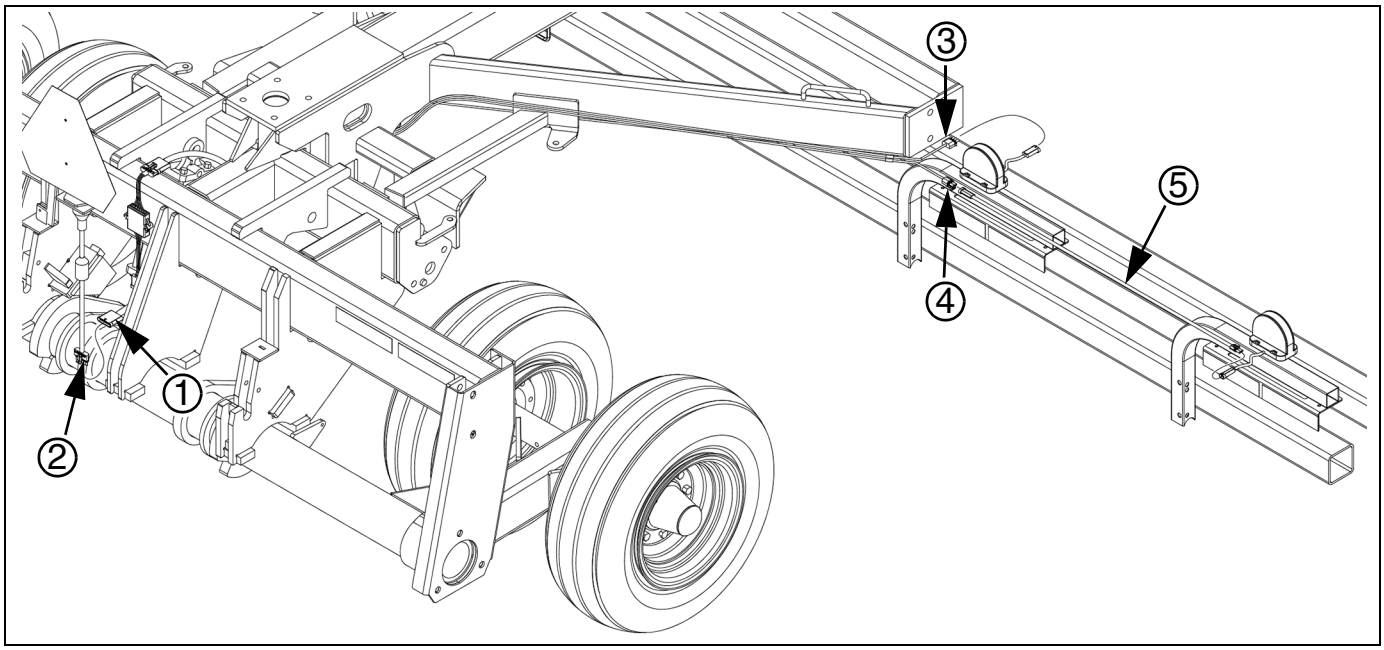



Figure 10 68450
PH-20 and PFH-20 Light Harness

## For PH-15, PFH-15, PH-20, and PFH-20

3. Secure the wiring harness to the machine with adhesive backed cord clips.

**NOTICE**

***Wire Damage Risk:***
*Make sure all harnesses are secured to machine. To prevent damage to harnesses, do not stretch wires and do not let wires drag on the ground.*

## Fertilizer Unit Assembly

Complete page 6 through page 11 assembly, then assemble the fertilizer components.

***Refer to Figure 11***

1. Using mechanical assistance, position tanks on hitch frame (1) as shown.
2. Bolt tank mounts onto hitch frame on outside ends (2) of hitch using 3/4- x 3 3/4-inch bolts, flat washers, lock washers (3) and nuts.
3. Bolt tank mount onto hitch frame from front using 3/4 x 1 1/4-inch bolts (4), lock washers and nuts.
4. On each tank, use three 5/8-inch u-bolts (5) to bolt tanks to rear frame tube (6).

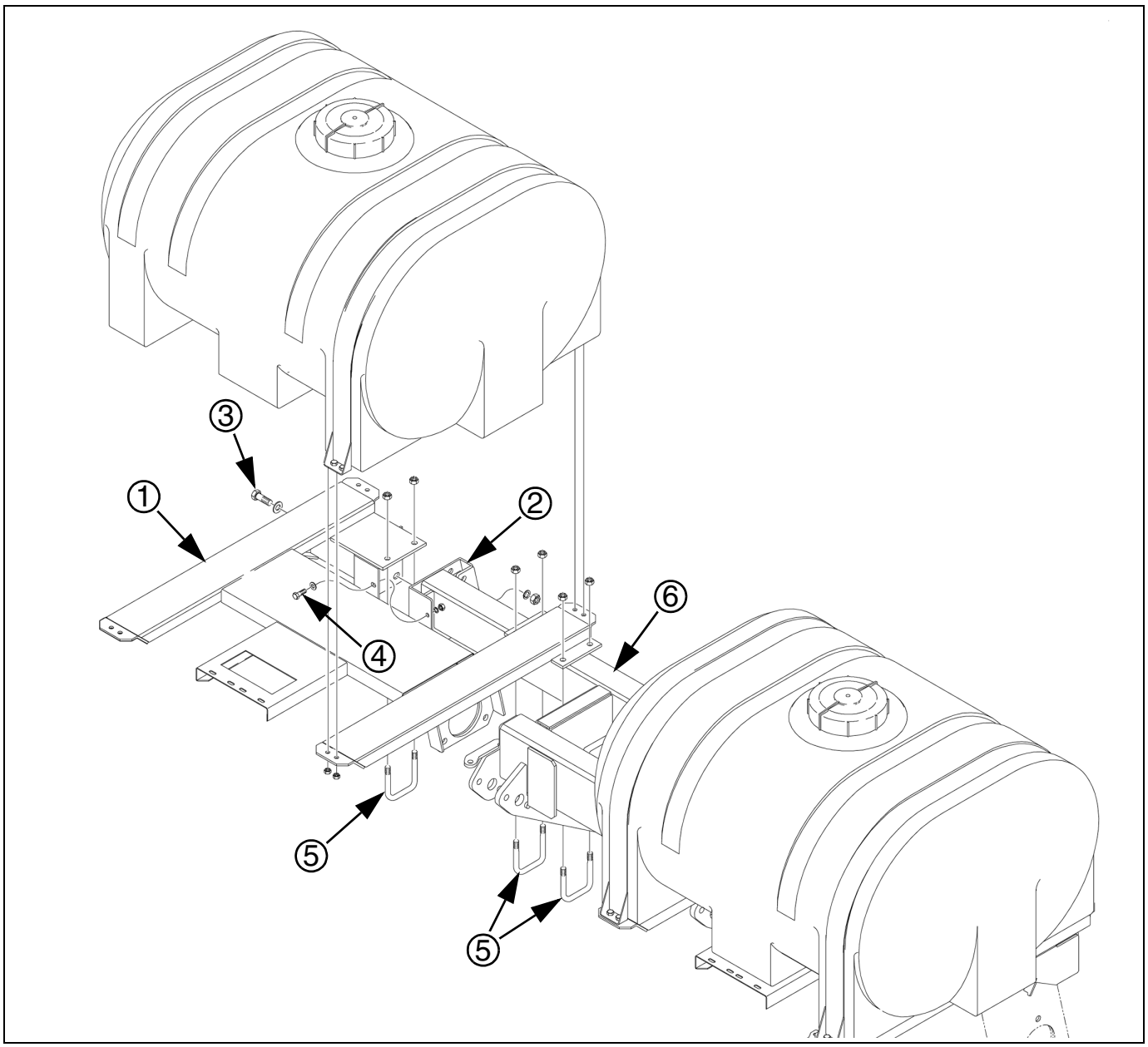



Figure 11
Install Tanks

***Refer to Figure 12***

5. Install a threaded adaptor (1) in each tank outlet.
6. Connect a tank valve (2) to each tank adaptor. Tighten the valves making sure the valves end up facing in the opposite direction. Valves must be orientated as shown.
7. Install a threaded/hose barb elbow (3) in each tank valve. Tighten the elbows so each elbow is facing to the center of the hitch and parallel to the bottom of the tank.
8. Attach mounting plate (4) to the valve (2) on the left tank and fasten plate to the slotted holes as shown.
9. Attach mounting plate (5) to the valve (2) on the right tank and fasten plate to the slotted holes as shown.
10. Mount a quick-fill valve with cam lock (6) onto mounting plate on outside end of left tank. Install a threaded/hose barb adaptor (7) into quick-fill valve.
11. Assemble three threaded/hose barb adaptors (7) onto the four-way cross (8).
12. Install a threaded/hose barb elbow (3) into the open outlet in the four-way cross.
13. Use a roll of 1 1/2-inch-diameter hose to connect valves to four-way cross. Cut hose into four pieces with lengths as shown in the illustration.
    a. Use 34-inch sections to connect 3/4-inch tank valves to four-way cross.
    b. Use 59-inch section to connect quick-fill valve to four-way cross. Route hose through the hole in the mounting plate (4).
    c. Use 42-inch section to connect four-way cross to manifold plumbing.
14. Install each hose over barbed fitting and lock in place with a worm drive hose clamp.

**NOTE:**
Use pipe sealant, Rectorseal 21 Blk Thread Sealant (Great Plains Part Number 890-310C), on all threaded joints.

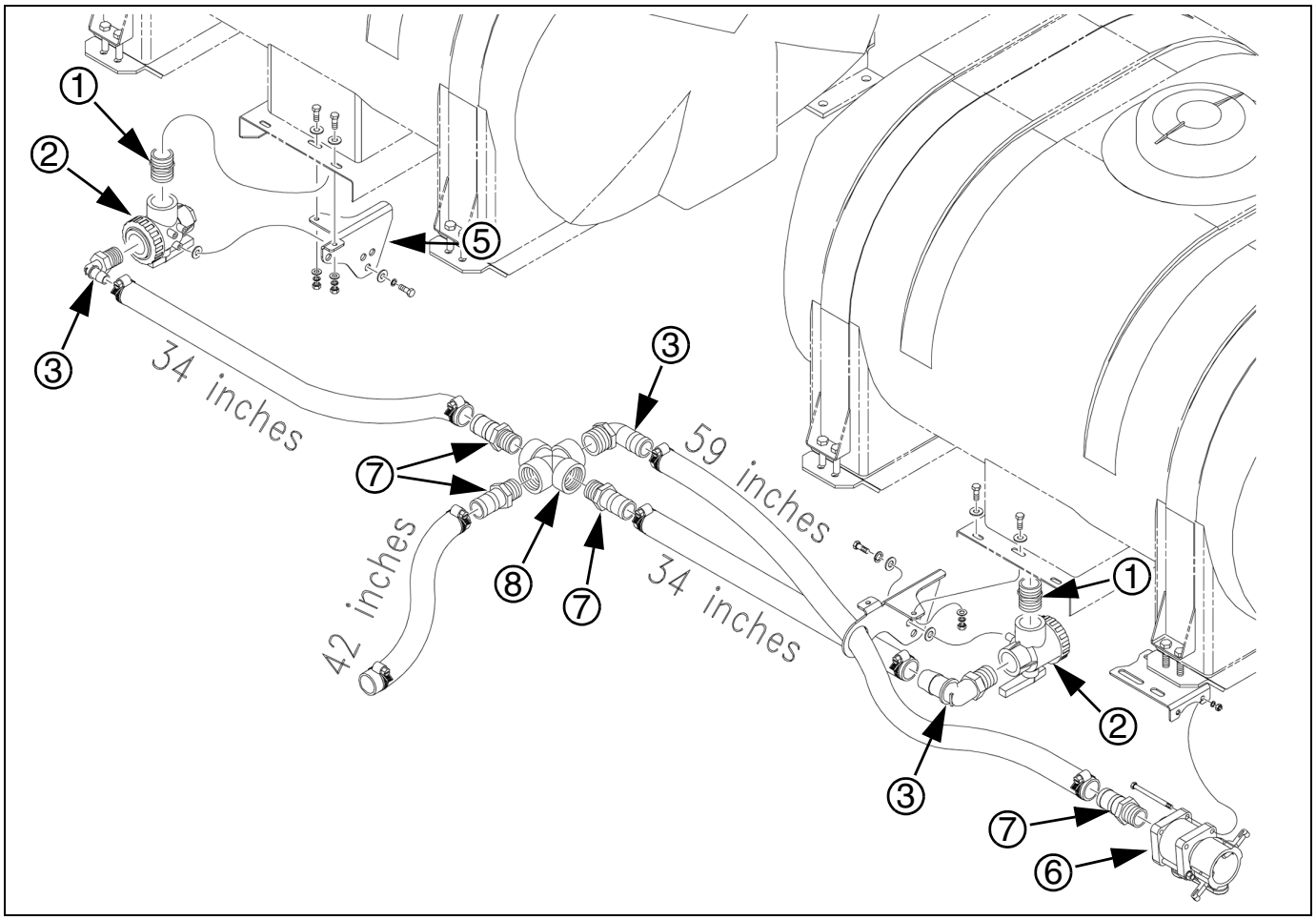



Figure 12 21532A
Install Tank Plumbing

***Refer to Figure 13***

15. Install the drive wheel to the front coulter toolbar under the hitch tongue with 5/8 x 4 1/32-inch u-bolts (9) and nuts. Position drive wheel so inside edge of drive tire is 2 3/4 inches from hitch.

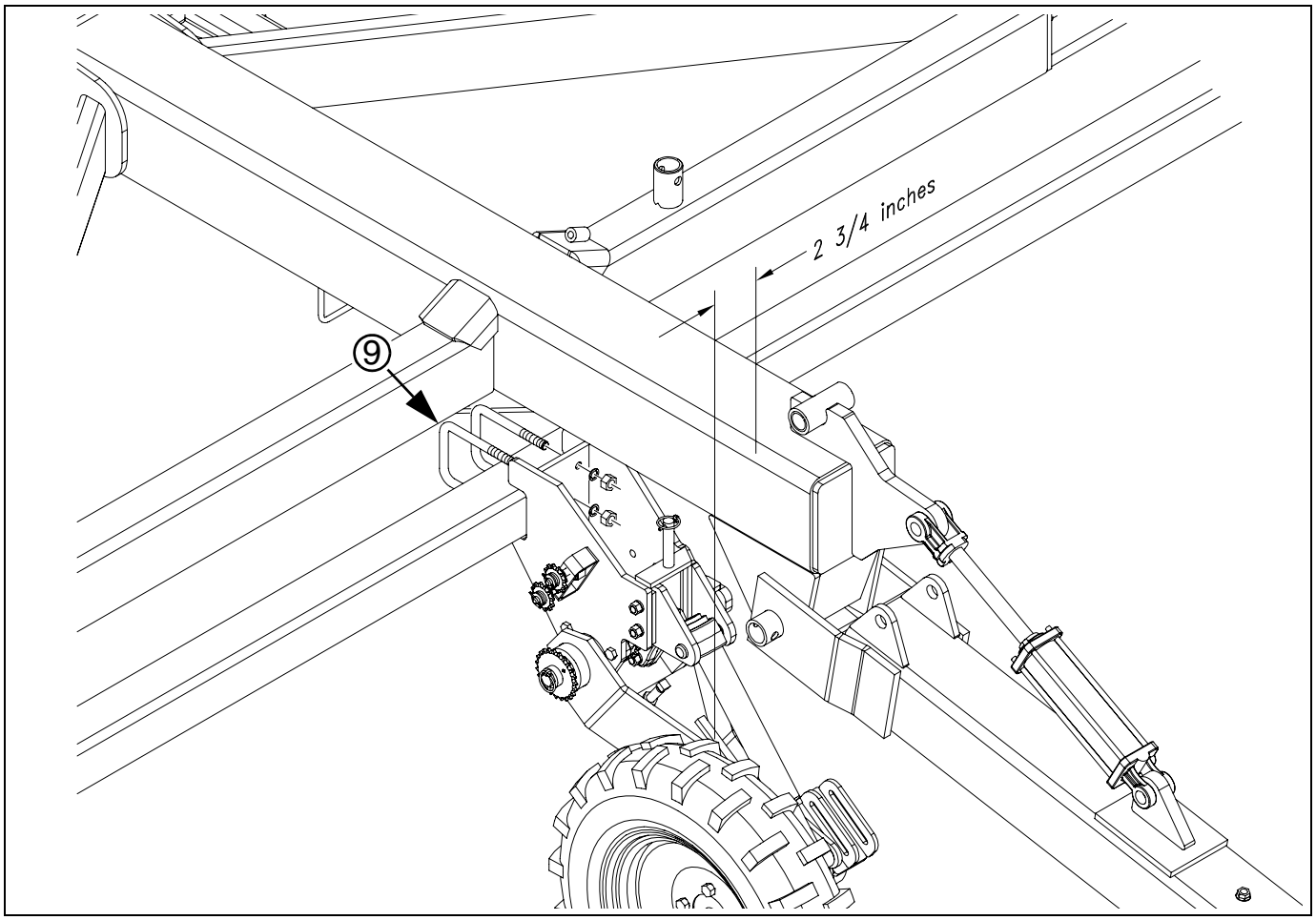



Figure 13
Install Drive Wheel

## Install Pump

***Refer to Figure 14***

1. Assemble pressure gauge and relief valve onto pump as shown using these parts: 1-inch adaptor (1), four-way cross (2), 1 x 1/4-inch adaptor (3), gauge (4), 1-inch threaded/hose barb adaptor (5), 1 x 3/4-inch adaptor (6), relief valve (7), and 3/4 x 3/8-inch elbow (8).
2. Push 3/8-inch hose (9) onto relief valve outlet.
3. Install 1 1/2-inch threaded/hose barb elbow (10) into pump inlet.
4. Install 13-tooth sprocket (11) onto pump shaft.

**NOTE:**
Use pipe sealant, Rectorseal 21 Blk Thread Sealant (Great Plains Part Number 890-310C), on all threaded joints.

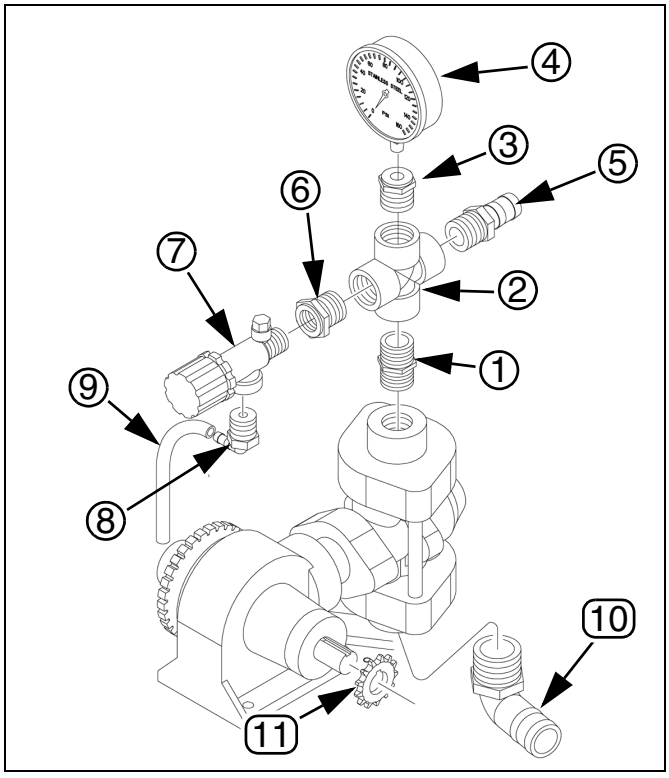



Figure 14 18155A
Assemble Fittings on Pump

***Refer to Figure 15***

5. Install pump mount (12) to hitch frame with u-bolts at location shown. Leave nuts on u-bolts loose for later repositioning.
6. Secure pump (13) on pump mount using 3/8-inch bolts, flat washers, lock washers and nuts.
7. Position pump mount so pump sprocket (14) is aligned with drive wheel sprockets (15). Tighten nuts on pump-mount u-bolts.
8. Route chain (16) over drive wheel and pump sprockets. Use idlers to remove chain slack.

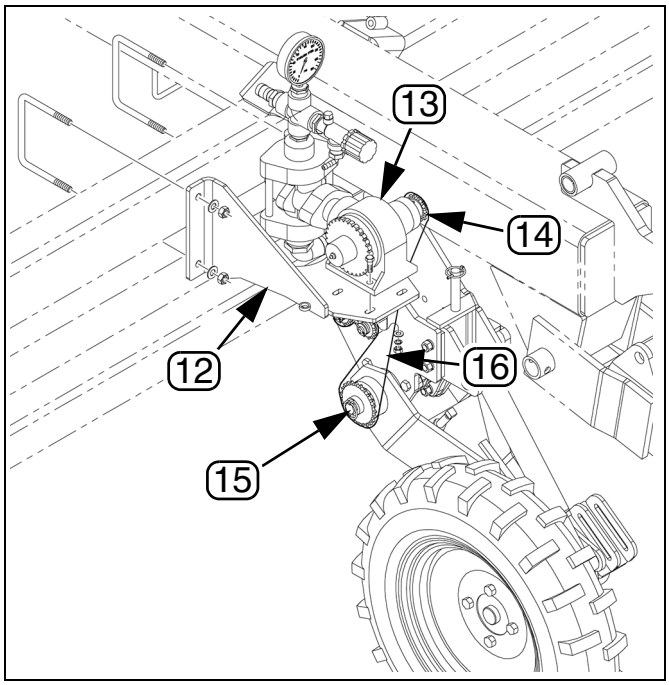



Figure 15 18155A
Assemble Pump on Hitch

## Install Strainer

***Refer to Figure 16***

1. On left side of hitch tongue, clamp valve mount plates (1) around front coulter toolbar using 5/16-inch bolts (2), washers and nylock nuts.
2. Mount 1 1/2-inch valve (3) on valve mount plates.
3. Using 1 1/2-inch threaded adaptor (4), connect strainer (5) to 1 1/2-inch valve.
4. Install 1 1/2-inch elbow (6) in front of strainer.
5. Use hose (7) and worm clamps to connect strainer to pump inlet. (Inlet is on the bottom side of the pump.)
6. Connect 1 1/2-inch valve to tanks using 1 1/2-inch threaded/hose barb adaptor (8).

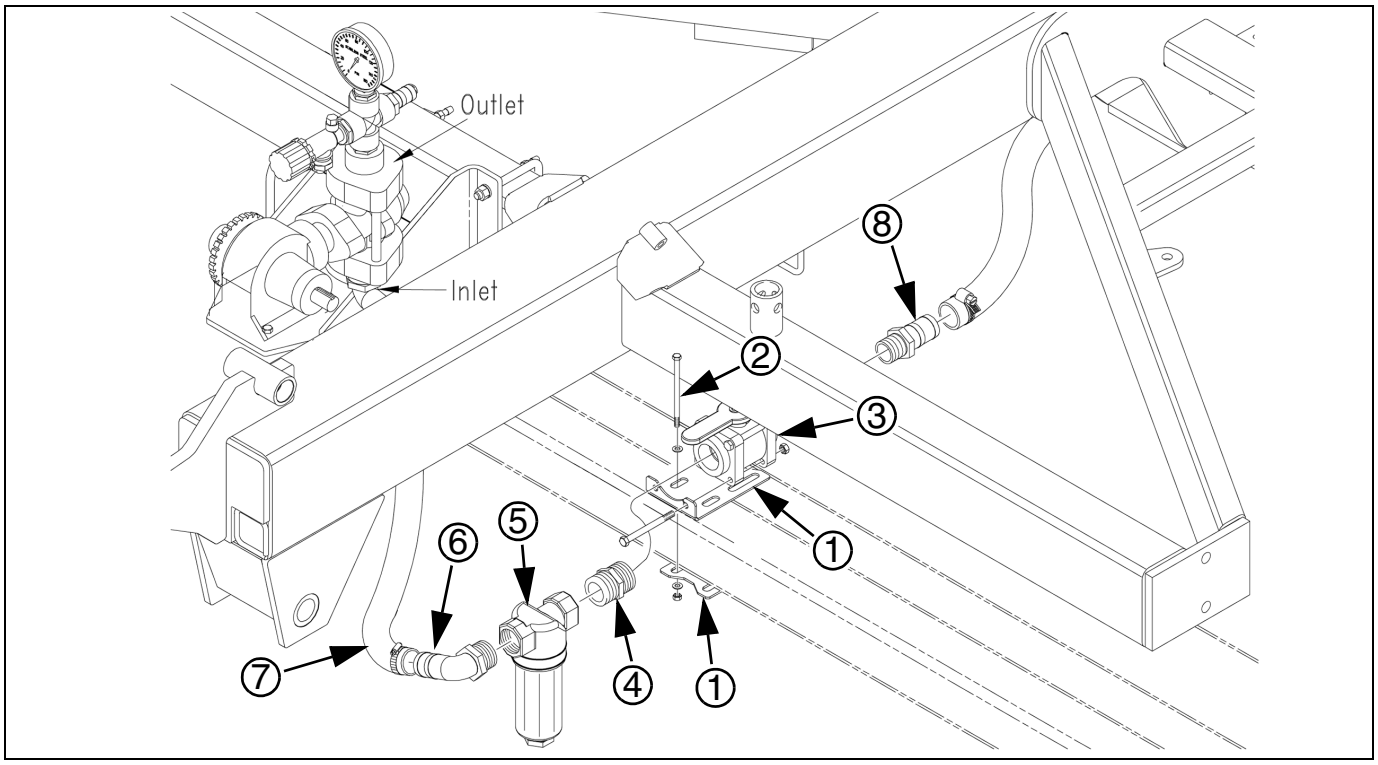



Figure 16
Assemble Strainer

18057A

## Install Manifold

***Refer to Figure 17***

1. From Figure 18 on the next page, determine combination of tubing sections needed for your manifold based on hitch width and tine spacing. Connect sections with threaded tee fittings (1) or pipe couplers (2) as indicated on Figure 18. Cap ends of tubing with caps (3).
2. Install hangers (4) to the coulter bar with u-bolts. Place hangers where necessary. Use at least one hanger per tubing section.
3. Mount manifold on hangers. At each hanger, use a bolt (5) and nut (6) to secure base of nozzle body (7) to hanger. Assemble other half of nozzle body (8) around manifold.
4. Install a nozzle body over all remaining holes in manifold.
5. In each nozzle body, install an orifice plate (9). Place a nozzle cap (10) over nozzle body and turn cap clockwise to secure nozzle cap on nozzle body.

**NOTE:**
On 8-, 10-, and 15-inch nozzle spacings, you must plug some nozzles. Refer to chart to determine where to install nozzle caps (11) instead of quick caps.

6. Install threaded/hose barb adaptors (12) in quick caps.
7. Plumb manifold. Install an elbow (13) in tee fittings. Cut 3/4-inch-diameter hose in half. Connect 3/4-inch hose (14) to elbows on manifold and to hose barb tee fitting (15). Use 1-inch-diameter hose (16) to connect tee fitting to pump outlet fitting.

**NOTE:**
Use pipe sealant, Rectorseal 21 Blk Thread Sealant (Great Plains Part Number 890-310C), on all threaded joints.

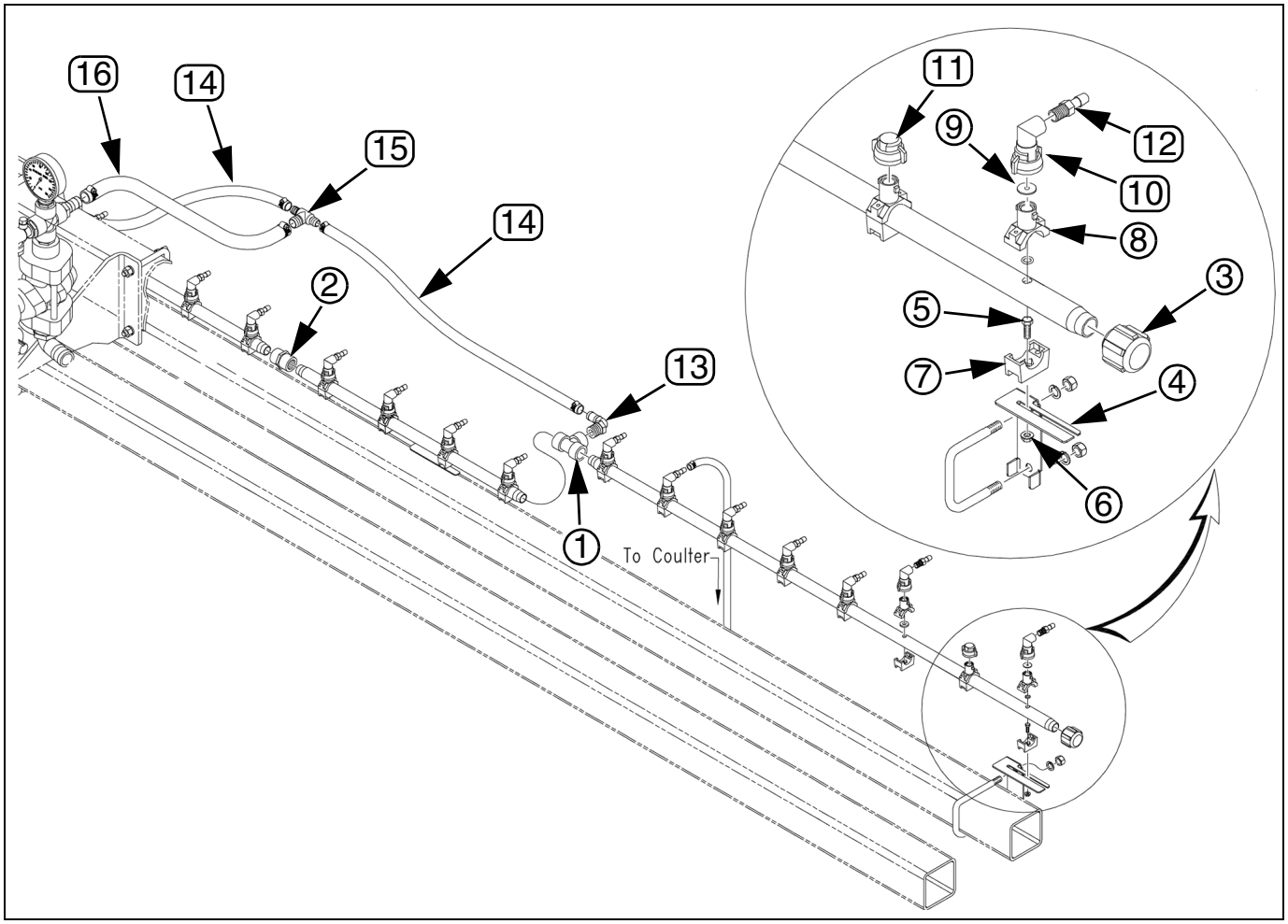



Figure 17 21533A
Manifold Assembly

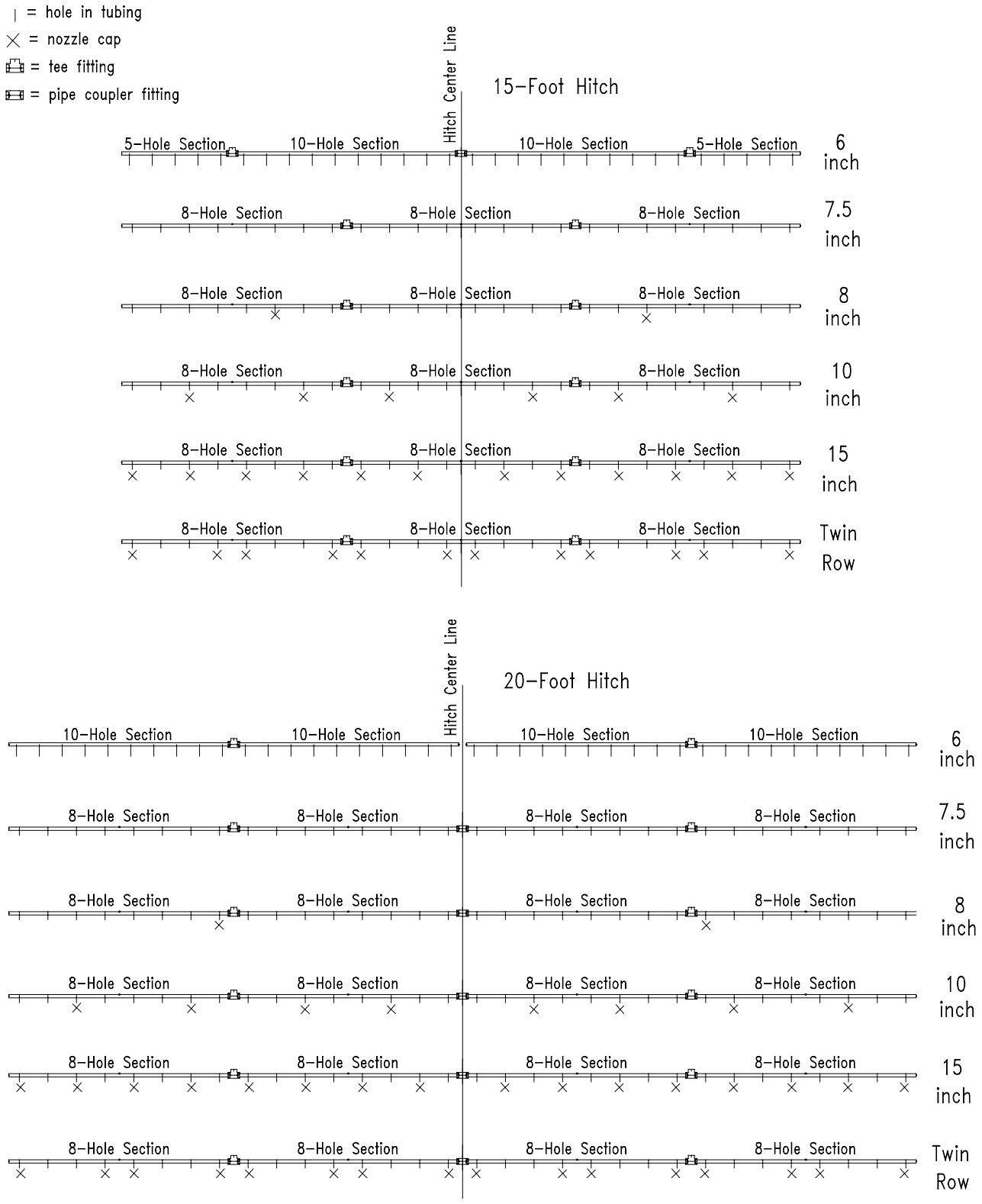



Figure 18 18153
Manifold and Nozzle Layout

## Installing Fertilizer Tines

The fertilizer tine kit (GP part no. 204-242K) contains all parts needed to convert one coulter into a fertilizer injection coulter.

***Refer to Figure 19***

To assemble one tine:

1. Assemble front fertilizer arm (1) to coulter swing arm (2) with two 1/2-by-2-inch flange bolts, flat washers and flange nuts.
2. Fasten back fertilizer arm (3) to front fertilizer arm with two 1/2-by-2-inch flange bolts, six flat washers and two flange nuts. Tighten bolts.
3. Assemble coil tine (4) to back fertilizer arm using 1/2-by- 4 1/2-inch bolt (5), spacer tube (6) spring clip (7), two rectangular spacers (8), flat washer and flange nut (9). Assemble spring clip between hooked end of tine and first spring coil. Hook end of tine assembles in one of top four holes of arm, depending on desired coulter depth.
4. Adjust tine for proper fertilizer placement. Refer to hitch operator's manual for tine adjustment instructions.
5. Once tines are adjusted, assemble nozzle (10) to bottom of tine coupling with extension pipe (11) to top of tine coupling. Screw 3/8-inch hose-barb fitting (12) to top of extension pipe. Use pipe sealant provided in kit on these pipe-thread connections.

   Use roll of 3/8-inch hose from manifold kit to connect each nozzle body to a fertilizer tine. For each nozzle body, insert hose onto nozzle barb at manifold. Route hose down to fertilizer tine, pulling hose straight but not taut. When satisfied with hose length, cut hose. Connect hose (13) to hose-barb fitting (12).

**NOTICE**

*Do not cut hoses longer than 3 feet. You will not have enough hose for all nozzles if hoses are longer than 3 feet.*

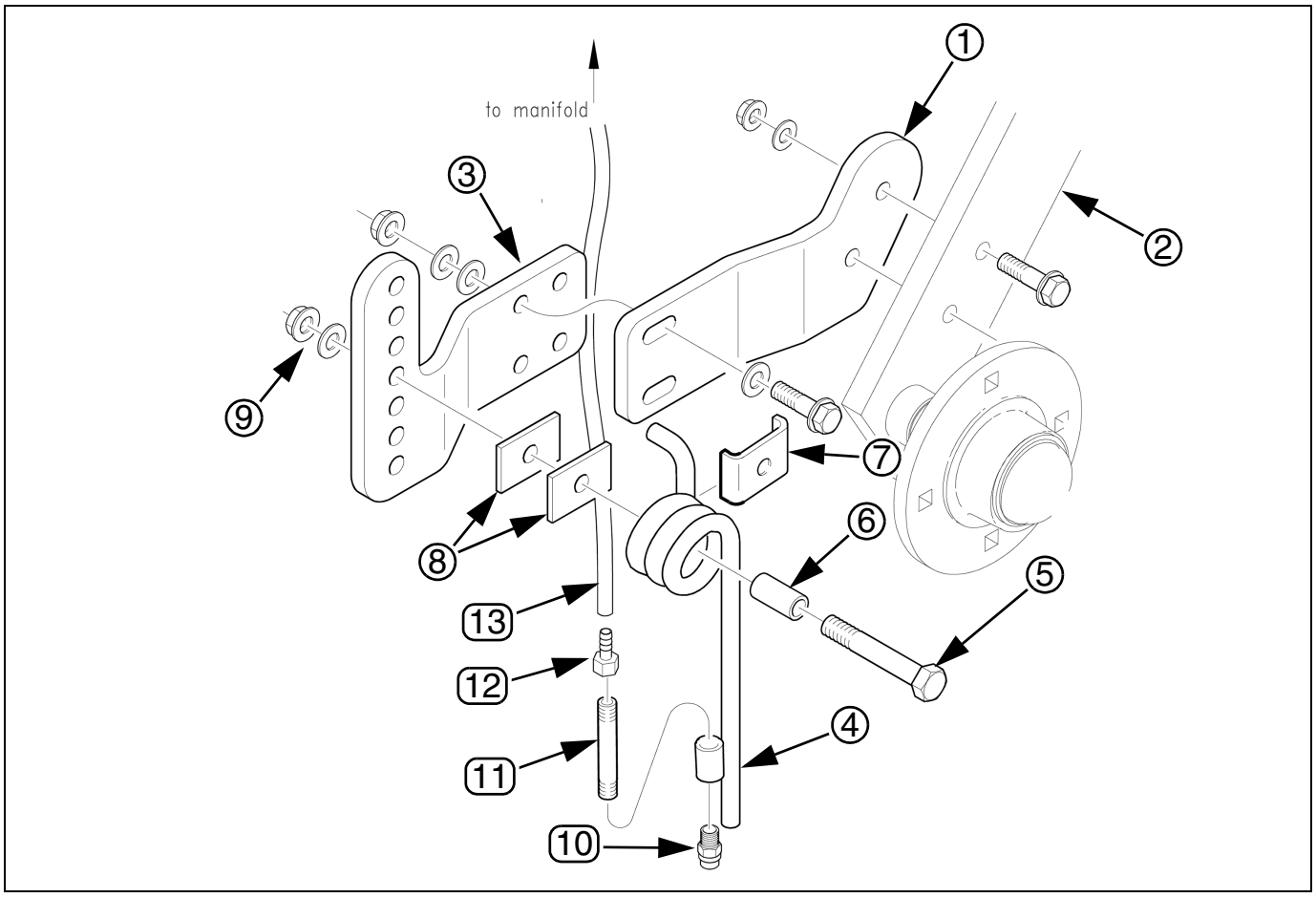



Figure 19 18059A
Assemble Fertilizer Tine

## Installing Fertilizer Arms

The fertilizer arm kit (GP part no. 164-140A) contains all parts needed to convert one coulter into a fertilizer injection coulter.

***Refer to Figure 2-7.***

To assemble one fertilizer arm:

1. Assemble the fertilizer arm (1) to the coulter swing arm (2) with two 1/2 x 1 3/4-inch bolts (3), flat washers (4), lock washers (5) and nuts (6).
2. Slide the fertilizer arm (1) up or down to the desired position and tighten hardware.
3. Install the solid stream nozzle (7) in the lower end of the fertilizer arm (1) and tighten. Install the hose-barb fitting (8) in the upper end of the fertilizer arm (1) and tighten. Use pipe sealant on the pipe-thread connections. Repeat above steps for remaining arms.
4. Use roll of 3/8 inch hose from manifold kit to connect each nozzle body to a fertilizer arm (1). For each nozzle body, insert hose onto nozzle barb at manifold. Route hose down to fertilizer arm (1), pulling hose straight but not taut. When satisfied with hose length, cut hose. Connect hose to hose-barb fitting (8).

**NOTICE**

*Do not cut hoses longer than 3 feet. You will not have enough hose for all nozzles if hoses are longer than 3 feet.*

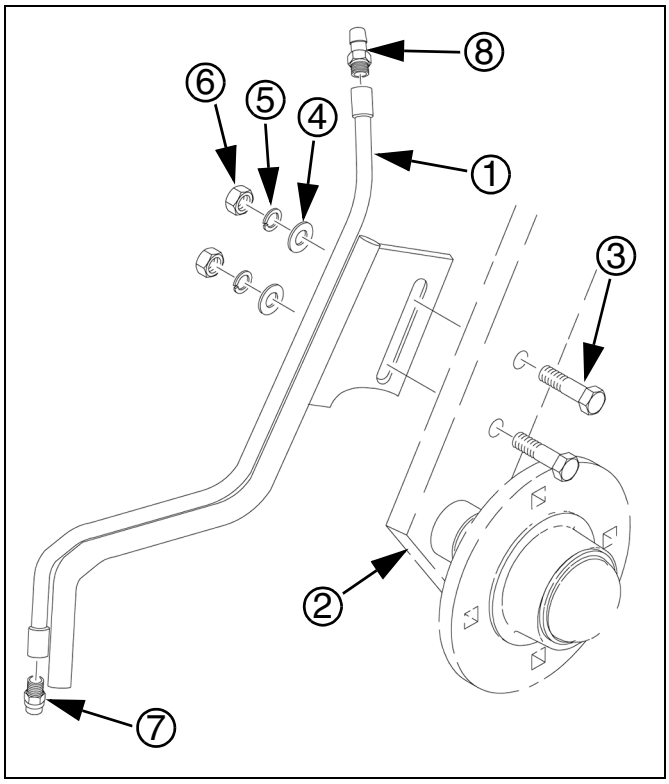



Figure 20
Assemble Fertilizer Arm
21538A

# Setup

This section covers hooking the hitch to the tractor and drill, hooking the hydraulic hoses to the tractor, and bleeding the hitch hydraulics.

## Hooking Hitch to Tractor

**DANGER**

***Crushing Hazard:***

*You may be severely injured or killed by being crushed between the tractor and hitch. Do not stand or place any part of your body between hitch and moving tractor. Stop tractor engine and set park brake before installing the hitch pin.*

***Refer to Figure 21***

1. Place hitch weldment (1) over ball swivel (2) on hitch tongue. Hold hitch weldment in place by inserting spacer tube (3) through hitch clevis and ball swivel.
2. Back tractor up to hitch and bolt hitch weldment to tractor drawbar using 1 x 10-inch bolt (4), large flat washer (5), lock washer (6), and nut (7).
3. Use 3/4 x 9-inch bolt (8) to bolt hitch weldment through its slotted hole and onto secondary hole of tractor drawbar. Install a 3/4-inch flat washer (9) next to top slotted hole and fasten with a lock washer (10) and nut (11). Tighten both bolts.
4. Securely attach safety chain to frame of tractor drawbar.

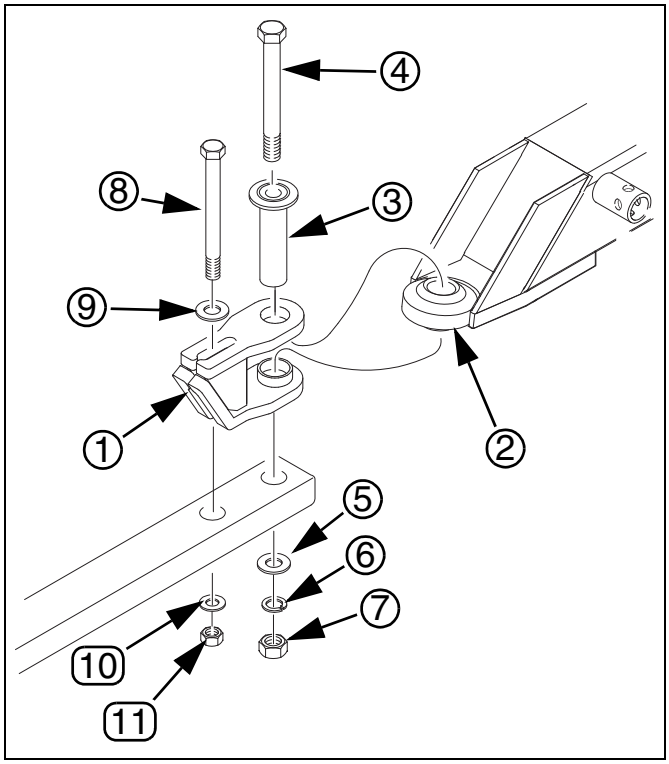



Figure 21 17215
Drawbar Assembly

5. Remove jack from stob on side of hitch tongue and place in transport position on frame brace.

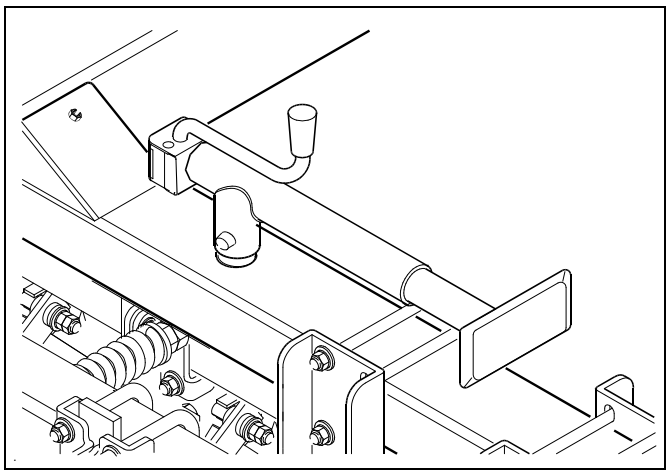


Figure 22 17215
Jack in Transport

# Bleeding Air from Hydraulics

**WARNING**

***High Pressure Fluid Hazard:***
*Escaping fluid under pressure can have sufficient force to penetrate the skin. Check all hydraulic lines and hoses before applying pressure. Fluid escaping from a very small hole can be almost invisible. Use paper or cardboard, not body parts, to check for suspected leaks. If injured, seek medical assistance from a doctor that is familiar with this kind of injury. Foreign fluids in the tissue must be surgically removed within a few hours or gangrene will result.*

The hydraulics must be bled of air before hitch operation. If the hydraulics are not bled, the cylinders will move with jerky, uneven motions.

## Bleeding Tongue Cylinder

1. Check hydraulic fluid in tractor reservoir and fill to proper level. Add fluid to system as needed. Tongue cylinder capacity is one-half gallon (1.89 liters).
2. Raise and safely support hitch, transport frame and front tongue.
3. Unpin rod end of tongue cylinder. Block, wire or otherwise safely support cylinder so when rod end is fully extended it does not contact anything.
4. Cycle cylinder completely in and out at least three times to purge air from cylinder and hoses.
5. Fully extend cylinder and repin rod end.
6. Recheck tractor reservoir and fill to proper level.

## Bleeding Transport Lift Cylinders

1. Check hydraulic fluid in tractor reservoir and fill to proper level. Add fluid to system as needed. Cylinder capacity is about 2 gallons (7.57 liters).
2. Jack up and support hitch frame.
3. Unpin rod ends of cylinders. Block, wire, or otherwise safely support cylinders so when rod ends are fully extended they do not contact anything.
4. Cycle cylinders in and out completely at least three times to purge air from cylinders and hoses.
5. Fully extend cylinders and repin rod ends.
6. Recheck tractor reservoir and fill to proper level.

## Hooking Hitch to Drill

**DANGER**

***Crushing Hazard:***

*You may be severely injured or killed by being crushed between the hitch and drill. Do not stand or place any part of your body between the drill and moving hitch. Stop tractor engine and set park brake before installing hitch pins.*

***Refer to Figure 23***

1. Place hitch extension (1) between top hitch plates on drill. Bolt hitch extension in place as shown using two 1 x 5 1/2-inch bolts (2), lock washers (3) and hex nuts (4).

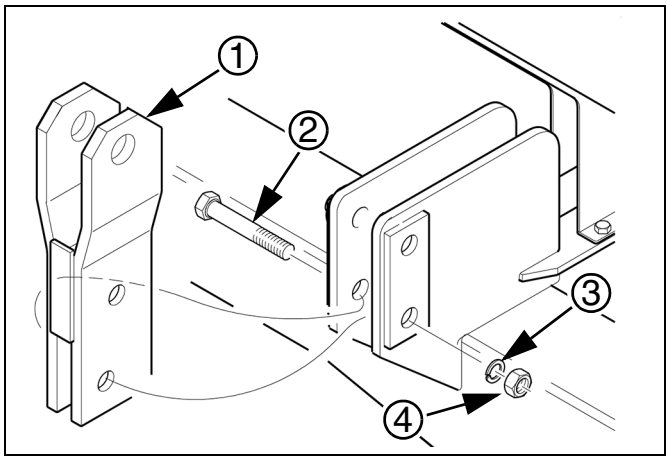



Figure 23
Top Hitch Extension
12085A

***Refer to Figure 24***

2. Move transport-lock handle to field position.

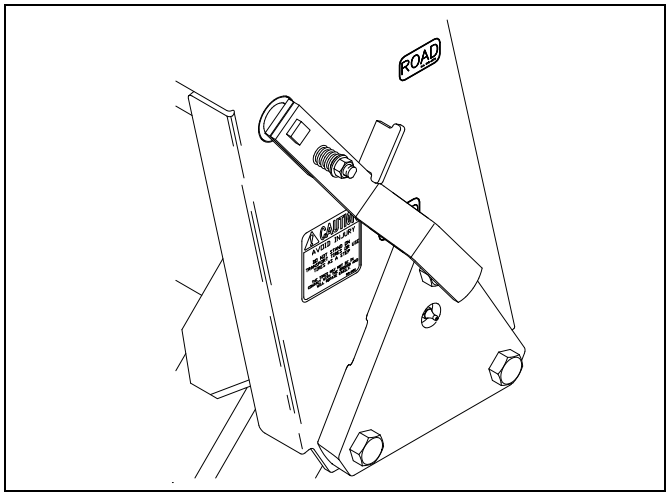



Figure 24
Transport Lock Handle in Field Position
12330

***Refer to Figure 25***

3. Position quick-hitch handles to locking position as shown. This will allow drill hitch pins to snap into quick-hitch links and secure drill to hitch.
4. Position hitch in front of drill so quick-hitch links on hitch are in line with lower hitch pins on drill. Hydraulically retract transport-lift cylinders to position quick-hitch links slightly lower than drill hitch pins.
5. Back hitch up to drill until hitch pins contact quick hitch. Hydraulically raise hitch just until drill hitch pins are secure inside quick-hitch links. Do not raise drill any higher than necessary.
6. Visually confirm that the drill hitch pins have seated and the quick hitch locks have snapped back out.

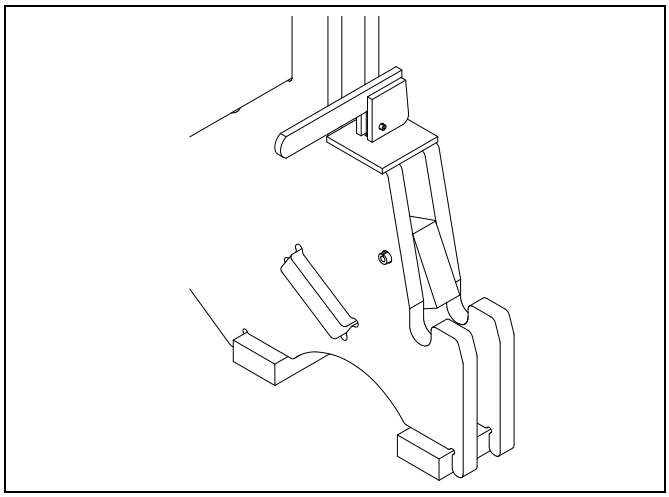


Figure 25 18177
Hitch Links

***Refer to Figure 26***

7. Attach slotted link bar (1) to top hitch extension on drill. Use 1 x 3 3/4-inch pin (2) and bushing (3) to pin level-link bar to drill. Secure pin with clip provided (4).

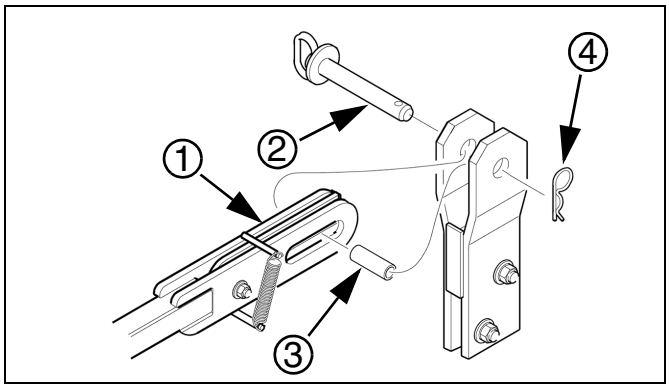



Figure 26 12086A
Top Hitch Link and Drill Extension

## Hooking Up Hydraulic Hoses

Great Plains hydraulic hoses have color coded handle grips to help you hookup hoses to your tractor outlets. Hoses that go to the same remote valve are marked with the same

| Color | Hydraulic Function |
|---|---|
| Red | Tongue Cylinder |
| Blue | Transport Lift Cylinders |
| Orange | Marker Cylinders |

To distinguish hoses on the same hydraulic circuit, refer to the symbol molded into the handle grip. Hoses with an extended-cylinder symbol feed cylinder base ends. Hoses with a retracted-cylinder symbol feed cylinder rod ends.

1. Connect hydraulic hoses from tongue cylinder to one set of tractor outlets.
2. Connect hoses from transport-lift cylinders to another set of tractor outlets.
3. Connect hoses from optional markers to a third set of tractor outlets.

**NOTE:**
If your implement is equipped with the optional Coulter Command system, refer to Coulter Command Hookup for instructions on hydraulic hookup.

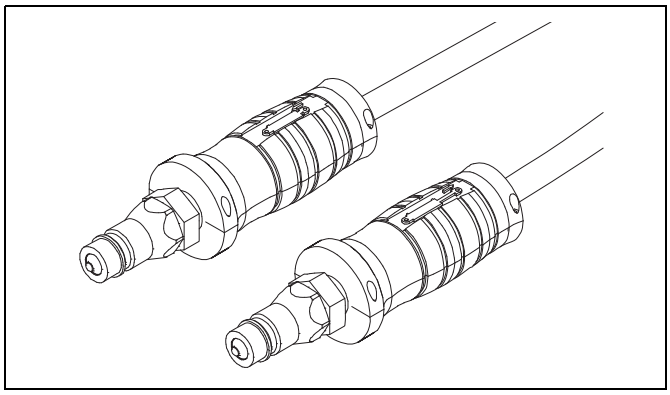


Figure 27 31733
Color Coded Hose Grips

## Coulter Command Hookup

1. Adjust tractor flow-control valve so flow rate is between 8 and 12 gpm.
2. Set Coulter Command to open-center or closed-center mode, depending on your tractor hydraulics. If you are not familiar with your tractor hydraulics, contact your tractor dealer.

- **Closed Center**: Turn knob on Coulter Command valve completely clockwise.
- **Open Center**: Turn knob on Coulter Command valve completely counterclockwise.

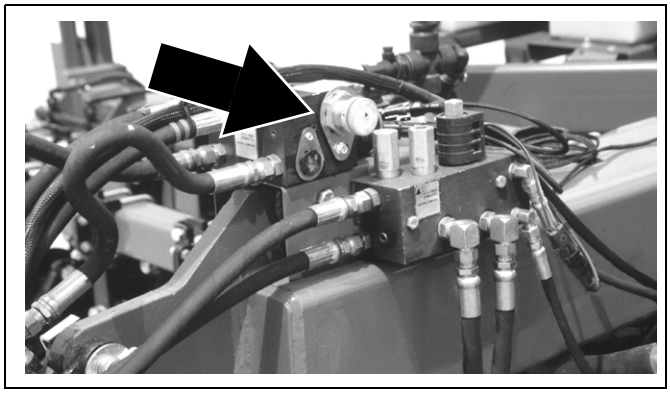


Figure 28 18047
Set Coulter Command Valve

On tractors with open-center hydraulics, use poppet-style couplers on hydraulic hoses to reduce oil heating.

3. Connect transport-lift hoses from valve on side of hitch frame to one set of tractor outlets. If one of your hydraulic circuits is designated priority, connect transport-lift hoses to this circuit.

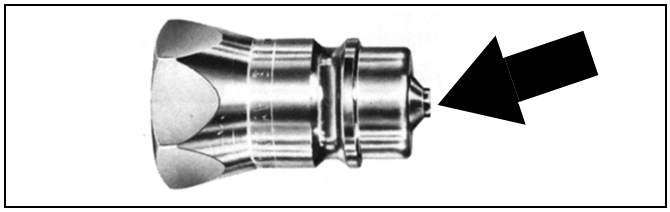


Figure 29 18041
Poppet Style Coupler for Open-Center Systems

4. Connect hoses from tongue-cylinder hoses from valve on top of hitch frame to another set of tractor outlets. Lock hydraulic lever for this circuit for continuous oil flow.

   **John Deere tractors with Sound-Gard ® Body:** Use lever lock clip, John Deere part number R52667, to lock lever forward. See your tractor dealer for clip purchase and installation.

   **John Deere 7000 Series tractors:** Rotate valve detent selector to motor position to lock lever in forward position.

   **John Deere 8000 Series tractors:** Set timer to continuous. Push lever forward until detent clicks.

   **Case-IH Magnum tractors:** Lock lever forward in detent position. You may need to turn up detent pressure to its maximum setting. Do not tie hydraulic lever past detent position with a strap. See your tractor dealer for hydraulic-system details.

   **Other tractors:** Lock lever forward in detent position. You may need to turn up detent pressure to maximum or use a mechanical detent holder to hold lever forward. See your tractor dealer for proper means of providing constant flow to openers.

5. Connect hoses from marker cylinders to another set of tractor outlets.

6. Connect power cord to an uninterrupted, 12-volt power source such as your tractor battery.

**NOTE:**
To prevent circuit damage, connect the white wire to the positive (+) battery terminal and the black wire to the negative (-) battery terminal.

7. Connect control-box cable to back of control box. Route cable out of tractor cab. Connect cable to hitch wiring harness.

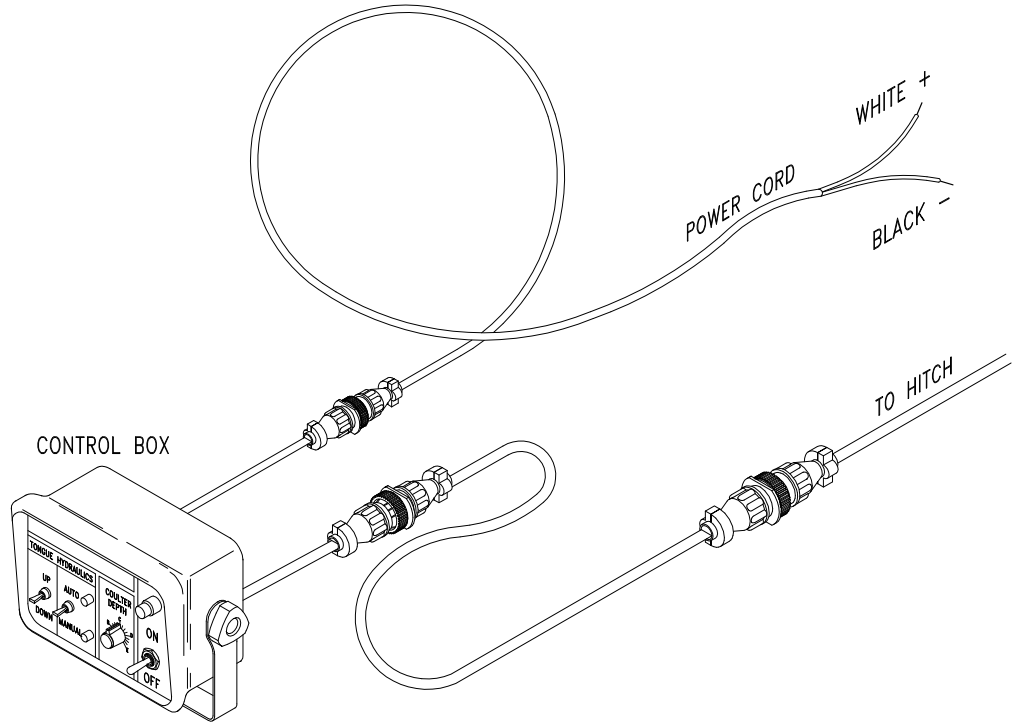



Figure 30 12575
Coulter Command Control Box

# Appendix

## Torque Values Chart

| Bolt Size | Bolt Head Identification | | | | | |
|---|---|---|---|---|---|---|
| | Grade 2 | | Grade 5 | | Grade 8 | |
| in-tpi[a] | 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 | Bolt Head Identification | | | | | |
|---|---|---|---|---|---|---|
| | 5.8 Class 5.8 | | 8.8 Class 8.8 | | 10.9 Class 10.9 | |
| mm x pitch[c] | 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. 25199

# Tire Inflation Chart

| Tire Size | Inflation PSI | | Tire Size | Inflation PSI |
|---|---|---|---|---|
| 7.50 x 20" 4-Ply Drill Rib | 28 | | 11L x 15" 6-Ply Rib Implement | 28 |
| 9.0 x 22.5 10-Ply Highway Service 70 | 70 | | 11L x 15" 12-Ply Rib Implement | 52 |
| 9.0 x 24" 8-Ply Rib Implement | 40 | | 12.5L x 15" 8-Ply Rib Implement | 36 |
| 9.5L x 15" 6-Ply Rib Implement | 32 | | 12.5L x 15" 10-Ply Rib Implement | 44 |
| 9.5L x 15" 8-Ply Rib Implement | 44 | | 16.5L x 16.1" 10-Ply Rib Implement | 36 |
| 9.5L x 15" 12-Ply Rib Implement | 60 | | 21.5 x 16.1” SC 10-Ply Rib Implement | 28 |

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