Fertilizer Applicator

NutriMax® Liquid Applicator
1800 & 2600 Models

Serial Number B46260100 & Higher

Operator's Manual

Part No. 417267

Refer to Part No. 417268 for Parts Catalog

Foreword

This symbol identifies important safety messages. When you see it, read the message that follows and be alert to the possibility of personal injury.

Remember, safety instructions stated in this manual are for your protection. Read them carefully and follow them closely when working around or using this machine.

Read and study this manual completely before attempting to operate this implement. Take this manual to the field for handy reference when operating, adjusting, or servicing your machine.

When referenced, “Right-Hand” (RH) and “Left-Hand” (LH) side of the machine are determined by standing behind the machine and facing in the direction of travel.

Product Information

When ordering parts or when requesting further information or assistance, always give the following information:

- Machine name
- Model
- Serial number

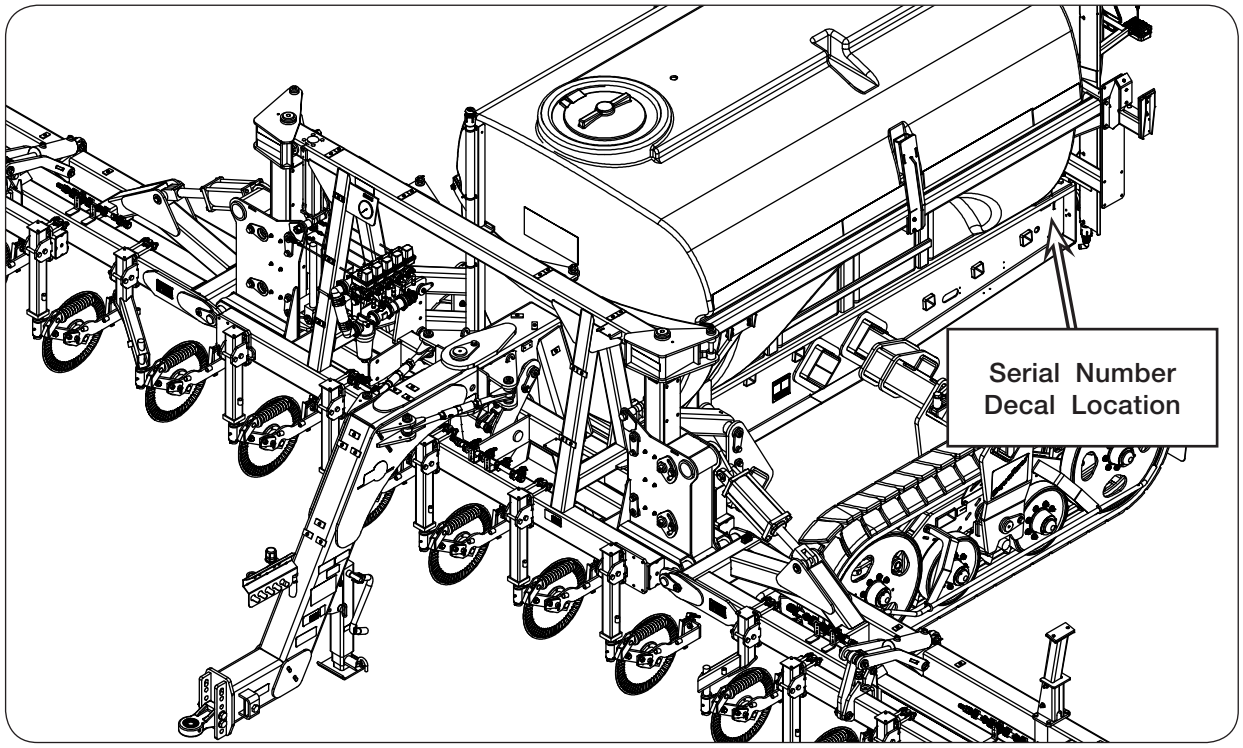
All products manufactured by Unverferth Mfg. Co., Inc. are warranted to be free from material and workmanship defects for one full year from time of consumer delivery. Your local dealer will gladly assist you with any warranty questions.

Please fill out and retain this portion for your records.

Purchase Date _____Model _____Serial Number _____

Dealer _____ City _____

Dealer Contact _____ Phone _____



IMPORTANT

- *The information, specifications, and illustrations in the manual are based on information available at the time it was written. Due to continuing improvements in the design and manufacture of Unverferth products, all specifications and information contained herein are subject to change without notice.*

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FOR INDUCTOR INFORMATION, PLEASE REFER TO YOUR INDUCTOR MANUAL.

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Section I
Safety

General Hazard Information

No accident-prevention program can be successful without the wholehearted cooperation of the person who is directly responsible for the operation of the equipment.

A large number of accidents can be prevented only by the operator anticipating the result before the accident is caused and doing something about it. No power-driven equipment, whether it be transportation or processing, whether it be on the highway, in the field, or in the industrial plant, can be safer than the person who is at the controls. If accidents are to be prevented--and they can be prevented-it will be done by the operators who accept the full measure of their responsibility.

It is true that the designer, the manufacturer, and the safety engineer can help; and they will help, but their combined efforts can be wiped out by a single careless act of the operator.

It is said that, “the best kind of a safety device is a careful operator.” We, at Unverferth Mfg. Co., Inc. ask that you be that kind of operator.

REMEMBER:

THINK SAFETY

A CAREFUL OPERATOR IS THE BEST INSURANCE AGAINST AN ACCIDENT!

SIGNAL WORDS

INDICATES AN EXTREMELY HAZARDOUS SITUATION OR ACTION THAT WILL RESULT IN SERIOUS INJURY OR DEATH.

INDICATES A HAZARDOUS SITUATION OR ACTION THAT COULD RESULT IN SERIOUS INJURY OR DEATH.

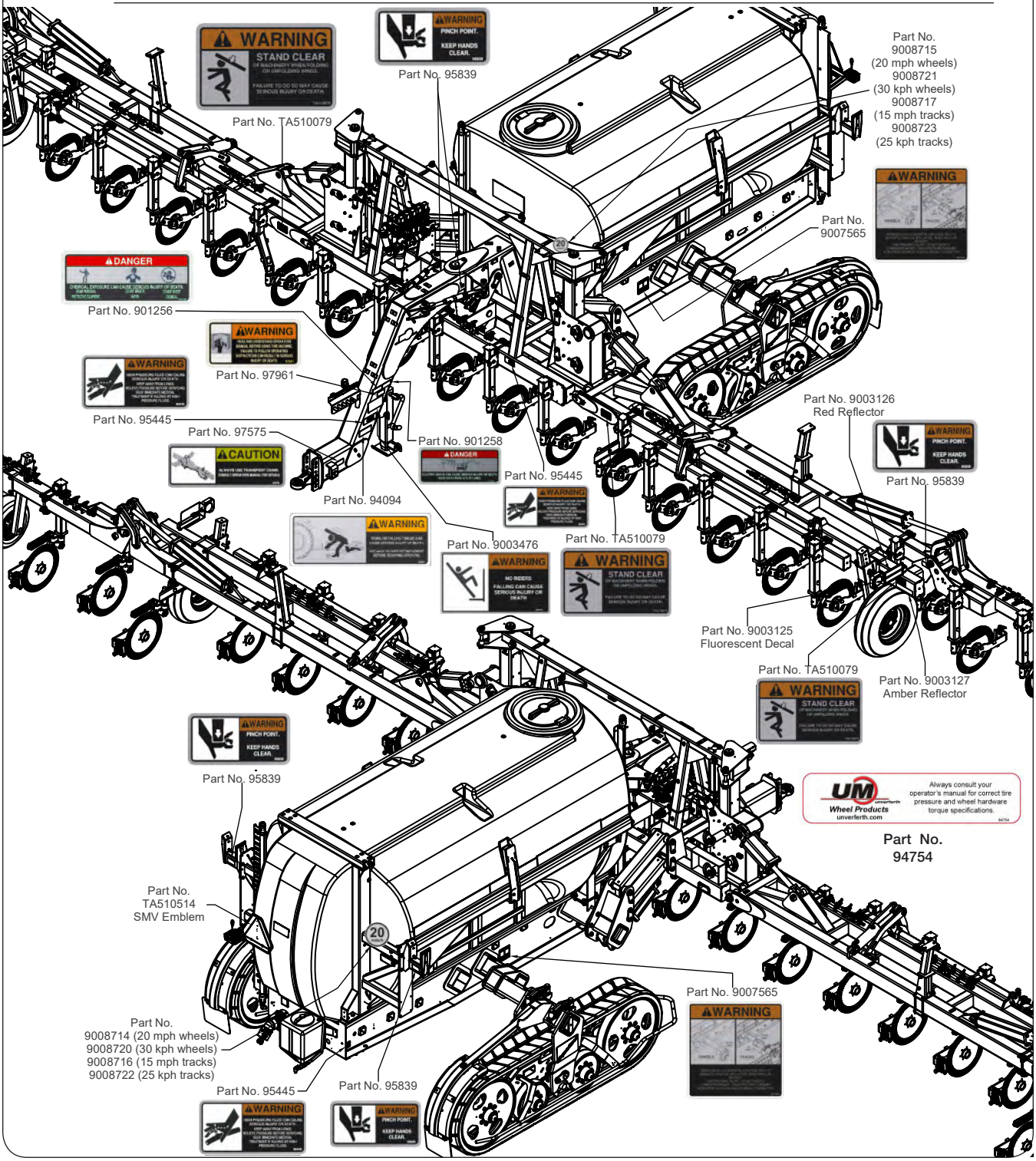
INDICATES AN UNSAFE SITUATION OR ACTION THAT MAY RESULT IN PERSONAL INJURY.

Is used for instruction on operating, adjusting, or servicing a machine.

Safety Decals

WARNING

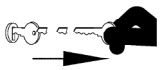
- **REPLACE LOST, DAMAGED, PAINTED, OR UNREADABLE DECALS IMMEDIATELY. IF PARTS THAT HAVE DECALS ARE REPLACED, ALSO MAKE SURE TO INSTALL NEW DECALS. THESE DECALS INFORM AND REMIND THE OPERATOR WITH OPERATIONAL INFORMATION AND SAFETY MESSAGES.**



Following Safety Instructions

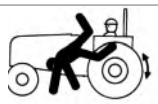
- Read and understand this operator's manual before operating.

- All machinery should be operated only by trained and authorized personnel.
- To prevent machine damage, use only attachments and service parts approved by the manufacturer.
- Always shut tractor engine off and remove key before servicing.



- Avoid personal attire such as loose fitting clothing, shoestrings, drawstrings, pants cuffs, long hair, etc., that may become entangled in moving parts.
- Do not allow anyone to ride on the implement. Make sure everyone is clear before operating machine or towing vehicle.

- Never attempt to operate implement unless you are in driver's seat.



Before Servicing or Operating

- Do not stand between towing vehicle and implement during hitching.

- Always make certain everyone and everything is clear of the machine before beginning operation.
- Ensure that all applicable safety decals are installed and legible.
- Sharp edges on the machine can cause injury. Be careful when working around the machine.
- This applicator is intended to apply only agricultural fertilizers. Attempting to apply other liquids may cause equipment damage and introduce unexpected personal hazards.
- When operating applicators on sidehill conditions, it is recommended that the wheel spacing be set as wide as possible for stability.
- Hitch applicator to towing vehicle and clear all personnel from the surrounding area before folding and unfolding wings.
- Ensure tank access covers are fully closed before beginning or resuming operation.
- Residual pressure may exist in applicator plumbing even when unit is not in use. Remove pressure before servicing any plumbing.
- Avoid working under an implement; however, if it becomes absolutely unavoidable, make sure the implement is safely blocked.

- To prevent personal injury or death, always ensure that there are people who remain outside the applicator to assist the person working inside, and that all safe workplace practices are followed. There are restricted mobility and limited exit paths when working inside the implement.
- Secure drawbar pin with safety lock and lock tractor drawbar in fixed position.
- Ensure that the towing vehicle drawbar has sufficient strength to support the draft and vertical tongue load of a fully-loaded applicator.
- Explosive separation of a tire and rim can cause serious injury or death. Only properly trained personnel should attempt to service a tire and wheel assembly.
- Add sufficient ballast to tractor to maintain steering and braking control at all times. Do not exceed tractor's lift capacity or ballast capacity.
- Check equipment for leaks. Repair any leaks before beginning or resuming operation.
- Hot parts can cause severe burns. Use caution when working around power system/ground engaging components. Allow parts to cool before servicing.

During Operation

- Comply with all laws and product label directions governing safe product application.
- Regulate speed to working conditions. Maintain complete control at all times.
- Never service or lubricate equipment when in operation.
- Keep away from overhead power lines. Electrical shock can cause serious injury or death.

- Use extreme care when operating close to ditches, waterways, fences, or on hillsides.
- Do not leave towing vehicle unattended with engine running.

Before Transporting

- Secure transport chain to towing vehicle before transporting. DO NOT transport without chain.
- Check for proper function of all available transport lights. Make sure that all reflectors are clean and in place on machine. Make sure the SMV emblem and SIS decals are visible to approaching traffic.
- This applicator is not equipped with brakes. Ensure that the towing vehicle has adequate weight and braking capacity to tow this unit.

During Transport

- Comply with all laws governing highway safety when moving machinery.
- Use transport lights as required by all laws to adequately warn operators of other vehicles.
- Regulate speed to road conditions and maintain complete control.
- Maximum on road speed of applicator should never exceed 20 m.p.h. with wheels or 15 m.p.h. with tracks as indicated on the machine. Maximum transport speed of any combination of implements must not exceed the lowest specified speed of the implements in combination. Do not exceed 10 m.p.h. during off-highway travel.
- Slow down before making sharp turns to avoid tipping. Drive slowly over rough ground and side slopes.
- It is probable that this implement is taller, wider and longer than the towing vehicle. Become aware of and avoid all obstacles and hazards in the travel path of the equipment, such as power lines, ditches, etc.

Pressurized Oil

- Relieve pressure before disconnecting hydraulic lines from tractor, loosening any hydraulic fittings or servicing hydraulic system. See hydraulic power unit manual for procedure to relieve pressure.

- High-pressure fluids can penetrate the skin and cause serious injury or death. Leaks of high-pressure fluids may not be visible. Use cardboard or wood to detect leaks in the hydraulic system. Seek medical treatment immediately if injured by high-pressure fluids.

- Hydraulic system must be purged of air before operating to prevent serious injury or death.

- Do not bend or strike high-pressure lines. Do not install bent or damaged tubes or hoses.

- Repair all oil leaks. Leaks can cause fires, personal injury, and environmental damage.

- Route hoses and lines carefully to prevent premature failure due to kinking and rubbing against other parts. Make sure that all clamps, guards and shields are installed correctly.

- Check hydraulic hoses and tubes carefully. Replace components as necessary if any of the following conditions are found:
  - End fittings damaged, displaced, or leaking.
  - Outer covering chafed/cut or wire reinforcing exposed.
  - Outer covering ballooning locally.
  - Evidence of kinking or crushing of the flexible part of a hose.

Chemical Hazards

- 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.
- Applicator tanks may contain residual toxic chemicals. DO NOT ENTER APPLICATOR TANK FOR ANY REASON WITHOUT WEARING PROPER VENTILATION EQUIPMENT. Failure to do so may result in asphyxiation and death.
- Seek and receive chemical product training prior to using agricultural chemicals.
- Read and understand the entire label of every chemical being applied with this applicator.
- Avoid breathing spray mist or vapor.
- Wash hands before eating, drinking, chewing gum, or using the toilet.
- Remove clothing immediately if chemicals penetrate clothing and contact skin. Wash thoroughly and put on clean clothing.
- Dispose of unused chemical in accordance with chemical label directions and local/ national regulations.

Clean Water Tank

- A clean water tank is provided as standard equipment. It is equipped with a spigot for general washing and a hose for emergency eye washing.
- Always keep clean water in tank. Water in clean water tank is not suitable for human consumption.
- For emergency eyewash, pull hose off of the top fitting and flush affected area.

Preparing for Emergencies

- Keep a first aid kit and properly rated fire extinguisher nearby.

- Keep emergency numbers for fire, rescue, and poison control personnel near the phone.

Wearing Protective Equipment

- Wear clothing and personal protective equipment appropriate for the job.

- Wear steel-toed shoes when operating.

- Wear hearing protection when exposed to loud noises.

- Do not wear additional hearing impairing devices such as radio headphones, etc.

Notes

Section II
Set Up

FOR INDUCTOR INFORMATION, PLEASE REFER TO YOUR INDUCTOR MANUAL.

Pre-Delivery Checklist

- ☐ Power wash any road salt off this unit to help prevent corrosion.
- ☐ For units equipped with single wheels, ensure wheel offset is outward.
- ☐ Torque wheel nuts as as specified in MAINTENANCE section.
- ☐ Check tire pressure and inflate tires as needed to specific air pressure. See “Tire Pressure” in MAINTENANCE section.
- ☐ Check track alignment. Refer to 16” Wide x 80” Long Equalizer® Track manual (416327) for adjustment and alignment procedure.
- ☐ Axles are adjusted from shipping position to desired operating width.
- ☐ Lubricate all grease fittings as specified in MAINTENANCE section.
- ☐ Verify all safety decals are correctly located and legible. Replace if damaged.
- ☐ Verify all reflective decals are correctly located.
- ☐ Verify SMV emblem and SIS decals are in place, clean, visible and shipping film is removed.
- ☐ Verify transport lights are working properly.
- ☐ Transport chains are properly installed and hardware is torqued to specification. See “Transport Chain Connection” in OPERATION section.
- ☐ Check hydraulic components for leaks and check hose routing.
- ☐ Check all plumbing components for leaks.
- ☐ Paint all parts scratched during shipment and dealer set up.

Dealer Set Up

⚠ WARNING

- **AFTER INITIAL SET-UP OR REPLACEMENT OF ANY HYDRAULIC COMPONENT ON THE APPLICATOR, AIR MUST BE REMOVED FROM THE WING-FOLD HYDRAULIC SYSTEM PRIOR TO ITS FIRST USE. FAILURE TO DO SO MAY RESULT IN DAMAGE TO TOOLBAR COMPONENTS DUE TO RAPID MOVEMENT.**
- **EYE PROTECTION AND OTHER APPROPRIATE PERSONAL PROTECTIVE EQUIPMENT MUST BE WORN WHILE SERVICING IMPLEMENT.**
- **KEEP HANDS CLEAR OF PINCH POINT AREAS.**
- **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 30,000 LBS. SPECIFIC LOAD RATINGS FOR INDIVIDUAL LOADS WILL BE GIVEN AT THE APPROPRIATE TIME IN THE INSTRUCTIONS.**
- **FALLING COULTERS CAN CAUSE SERIOUS INJURY OR DEATH. DO NOT REMOVE PIVOTING COULTER TUBE SHIPPING RETAINERS UNTIL INSTRUCTED.**

There are 4 hydraulic circuits on this unit and an optional steerable hitch circuit if equipped.

- 3/4” hydraulic hose (Red Hose Grips) – main lift and main wing tilt
- 3/4” hydraulic hose (Orange Hose Grips) – outer wing fold and unfold
- 3/4” hydraulic hose (Green Hose Grips) – wings fold and unfold
- 3/4” hydraulic hose (Blue Hose Grips) – Hydraulically Driven Centrifugal Pump
- Optional – 3/8” hydraulic hose (Purple Hose Grips) – steerable hitch

1. Attach empty applicator to tractor. Refer to “Hitching to the Tractor” in OPERATION section.

2. Applicators with tracks, continue on with step 4.
   Applicators with wheels, adjust transport brackets to working height. Engage the toolbar lift hydraulic circuit to fully raise the toolbar up out of the wing transport brackets. Unfold the wings and rest them on the ground. Raise the transport brackets into the recommended transport position (see FIG. 2-2) reusing the existing hardware.

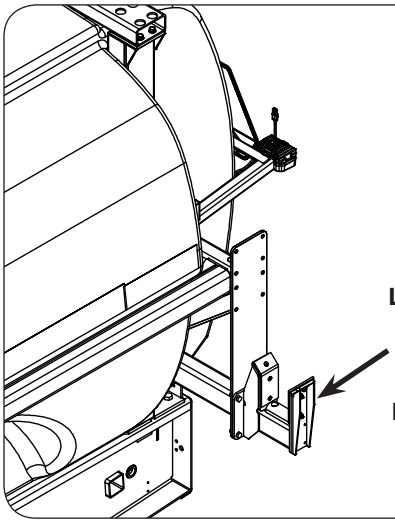


FIG. 2-1

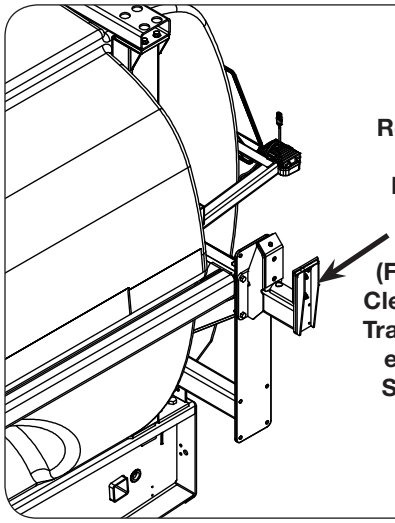


FIG. 2-2

Dealer Set Up (continued)

3. After the transport brackets have been relocated, remove the safe lifting device and lower the toolbar into the wing transport brackets.

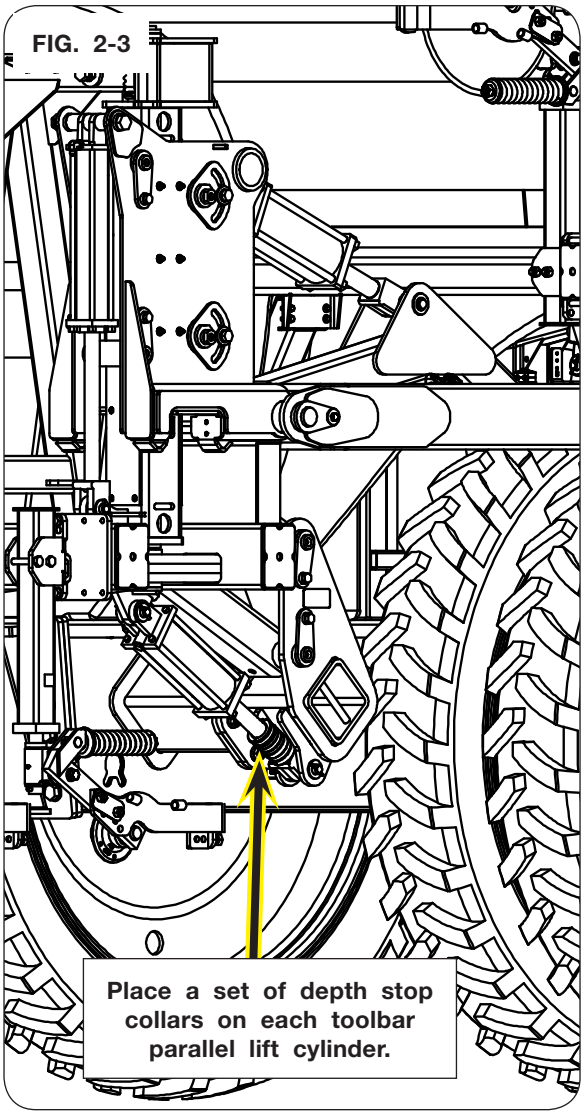
4. **UNITS WITH TRACKS**
   The tracks are shipped in the narrowest setting. Refer to "Axle Tread Setting" in this section for proper spacing. Refer to "Belt Conditioning" in this section for conditioning procedures.

   UNITS WITH WHEELS
   The wheels are shipped less duals and in the narrowest setting. Using a safe lifting device rated at a minimum of 30,000 lbs., support the applicator. Attach the dual wheels and torque nuts according to the "Wheel Torque Requirements" in the MAINTENANCE section. Refer to "Axle Tread Setting" in this section for proper spacing.

5. Remove the safe lifting device.

6. Place a set of depth stop collars on each toolbar parallel lift cylinder. (FIG. 2-3)

FIG. 2-3



Dealer Set Up (continued)

7. Unfold the applicator to access the toolbar.

8. **80'/88'/90' TOOLBARS ONLY**
Attach the front wing hook plates (411390G or 411390R) as shown in FIG. 2-4 with 3/4"-10UNC x 3 1/4" grade 8 capscrews (91299-150), 3/4" SAE flat washers (9405-104), and 3/4"-10UNC flange locknuts (9003399). Torque hardware to 290 ft.-lbs.

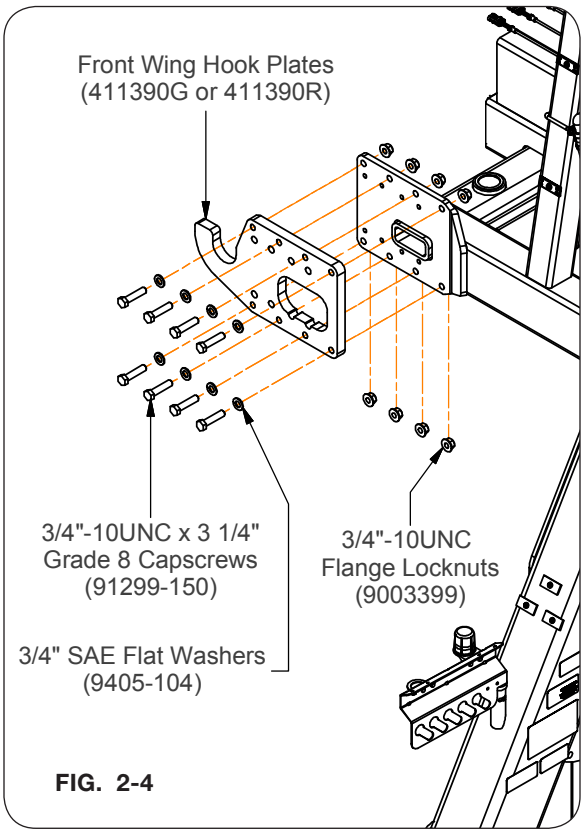
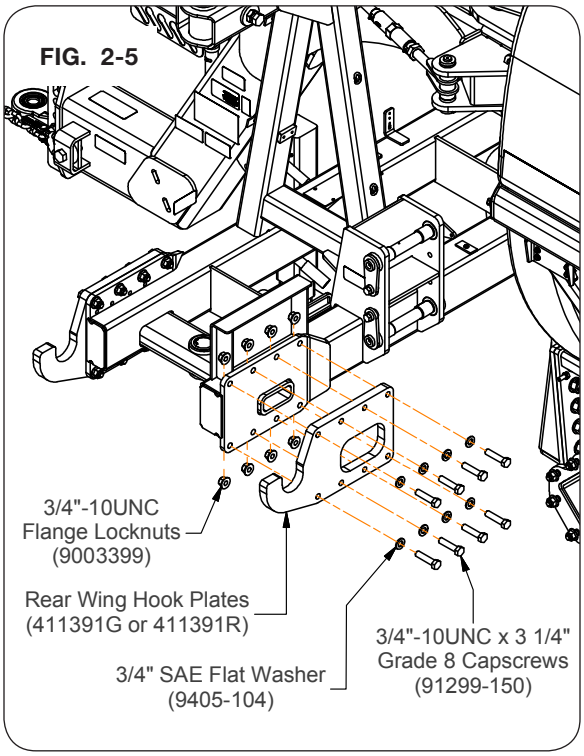


FIG. 2-4

9. **80'/88'/90' TOOLBARS ONLY**
Attach the rear wing hook plates (411391G or 411391R) as shown in FIG. 2-5 with 3/4"-10UNC x 3 1/4" grade 8 capscrews (91299-150), 3/4" SAE flat washers (9405-104), and 3/4"-10UNC flange locknuts (9003399). Torque hardware to 290 ft.-lbs.

FIG. 2-5



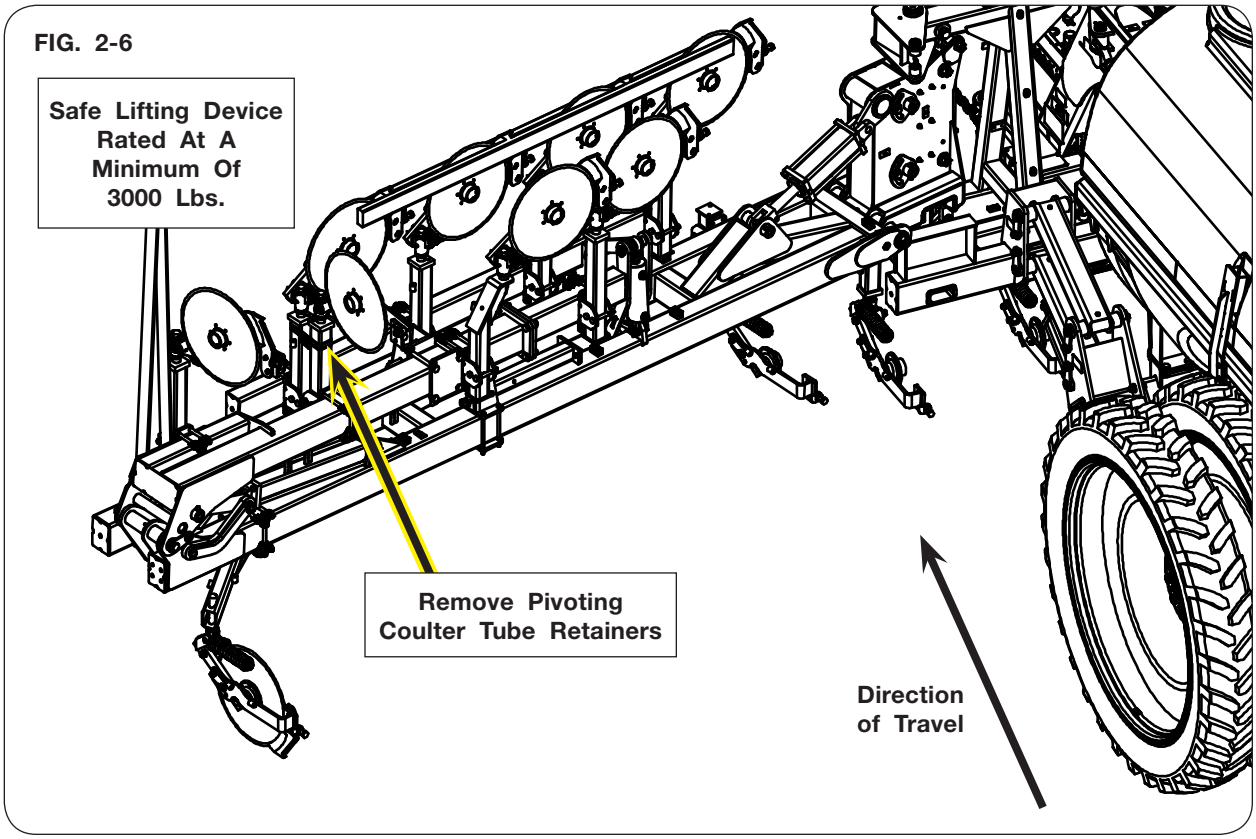
Dealer Set Up (continued)

10. Engage toolbar main lift circuit to raise center section and main wings fully out of the transport rest.

11. Engage the main wing unfold circuit. The toolbar transport latch will unlatch and then swing the main wings forward. Stop the wings before they become fully unfolded. (FIG. 2-6)

12. Using a safe lifting device rated at a minimum of 3,000 lbs., support each wing at the end of the main wing. (FIG. 2-6)

FIG. 2-6



13. Remove and discard the pivoting coulter tube retainers located behind the main wing. (FIG. 2-6)

14. Remove the safe lifting devices.

Dealer Set Up (continued)

15. Re-engage the main wing unfold circuit. Finish unfolding the wings. Then the pivoting coulter tube will rotate down and the outer wings will unfold.

16. Using safe stands rated at a minimum of 3,000 lbs. per side, position safe stands at the ends of the main wings. Ensure transport stands are in shipping position on both sides as shown in (FIG. 2-7). Then lower the main wing masts into the saddle area of the center toolbar. If the wings do not sequence properly, the unfold sequence valve on the hydraulic manifold will need to be adjusted, refer to MAINTENANCE section.

17. With wings unfolded and toolbar in cradle, remove and discard the shipping boards from the pivoting coulter blades. Repeat the process on the opposite side of the applicator. (FIG. 2-7)

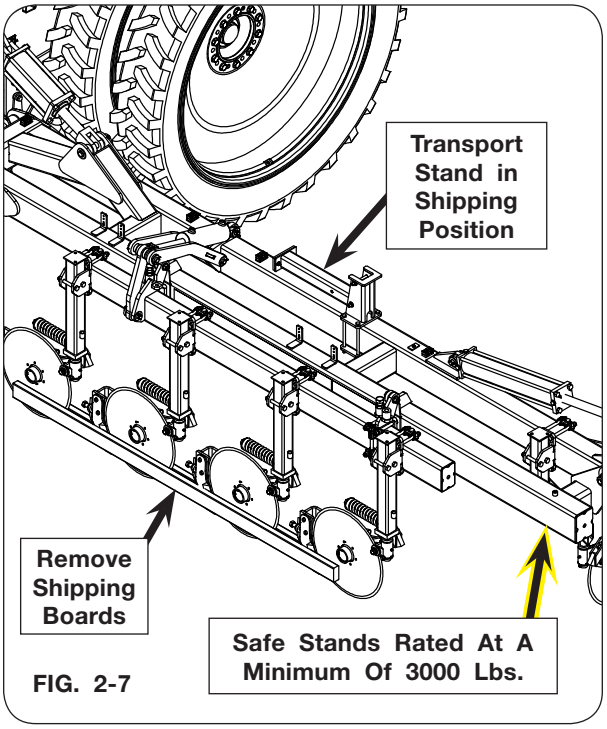


FIG. 2-7

NOTE: Offset coulter bracket (414902B) positions the straight post coulter 6" forward. (FIG. 2-8)

18. Mount the straight post coulter with offset bracket (414902B) onto the first row on the main wing as shown in (Figure 2-8). Using 5/8"-11UNC x 7 1/2" capscrews (9501438-139) and 5/8"-11UNC locknuts (9501438-036), attach the straight post coulter. Be sure to mount the straight post coulter assembly to provide the most amount of clearance to the unit when folded. Repeat this step for the other main wing.

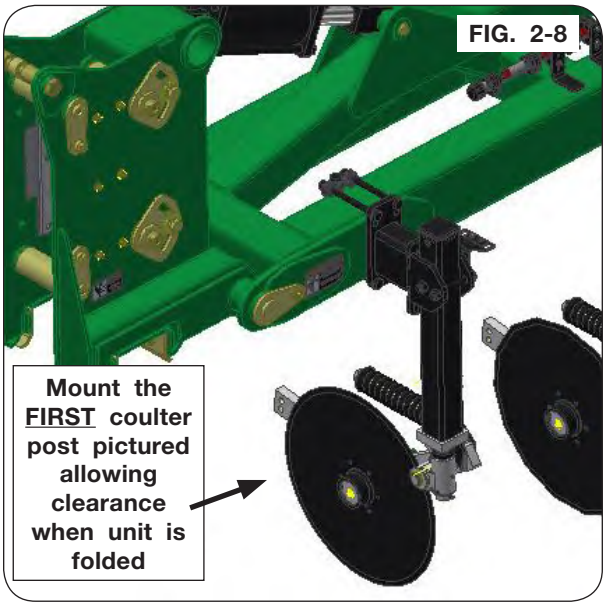


FIG. 2-8

IMPORTANT

- *When installing the coulter mount weldments, ensure the double set of holes are at the top and single set of holes are located at the bottom, see (Figure 2-9).*

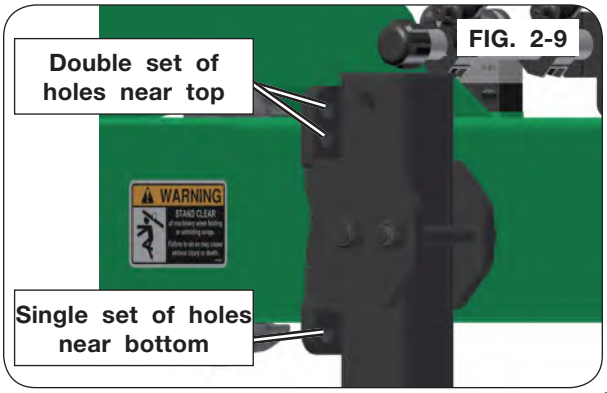


FIG. 2-9

Dealer Set Up (continued)

19. Pivot the coulter arms into working position. Secure into position by placing the roll pin (9501441-210) into the retaining hole. Then install the spiral pin (9501442-209) inside the roll pin. Refer to the "Overhead Layouts" in this section to determine the proper positioning of the coulters. Use a safe lifting device rated at a minimum of 100 lbs., to support coulter post assembly while repositioning.

NOTE: All but the center coulter post allows for four height settings, all of the mounted coulter posts are in the shortest position from the factory. The center coulter post allows for three height settings. The height difference between each position is 1 3/4". (FIG. 2-10)

NOTE: Coulter post hole 3 and 4 also requires 480/80R50 R-1W (159A8) tires. (FIG. 2-10)

NOTE: It is recommended to start in Hole 1 when setting the machine depth. The desired depth can be achieved by adjusting the hole setting and the number of depth stop collars on the toolbar lift cylinders.

20. Pivot the transport stand up to the working position by removing the upper capscrew and reinstalling it in the upper set of holes. See (FIG. 2-11). Repeat for opposite side. Refer to "Overhead Layouts" for proper positioning.

21. Attach the outer wing gauge wheel/tire assembly (FIG. 2-12). Using safe lifting device rated at a minimum of 50 lbs., position the outer wing gauge wheel assembly with the gauge wheel tire in-line with the coulter blade. Refer to the "Overhead Layouts" in this section for proper positioning. Torque nuts according to the "Wheel Torque Requirements" in the MAINTENANCE section.

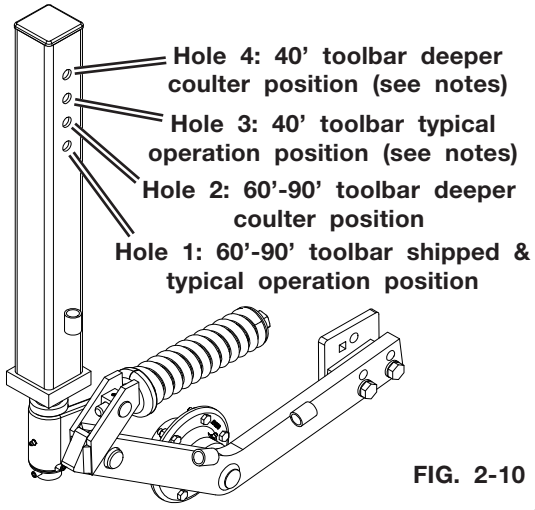


FIG. 2-10

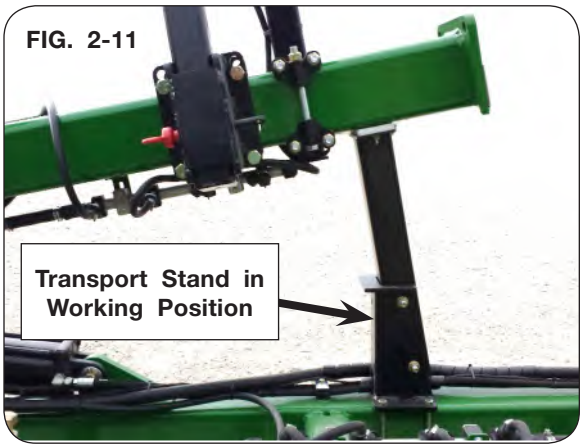


FIG. 2-11

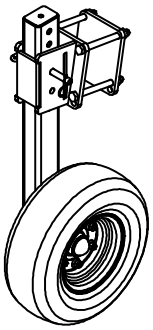


FIG. 2-12

Dealer Set Up (continued)

22. Using a safe lifting device rated at a minimum of 125 lbs., install the main wing gauge wheel assembly with the pin handle to the outside of the post (FIG. 2-13 and 2-14). Verify the gauge wheel tire is directly in-line with the coulter blade. Refer to "Overhead Layouts" in this section for proper positioning.

23. Rotate amber flasher bracket to be perpendicular to the front toolbar tube (FIG. 2-14). The amber light should be visible to the front and rear of the unit and the amber reflector should face forward when the wings are folded in the transport position.

24. After transport lights have been adjusted, coulter post assemblies have been relocated and gauge wheels installed, remove the safe lifting devices.

(Continued on next page.)

FIG. 2-13

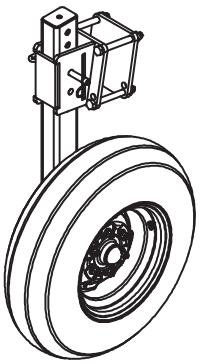


FIG. 2-14

Dealer Set Up (continued)

25. Remove the protective film from SMV and ensure it is visible from the rear of the unit. (FIG. 2-15)

NOTE: Ensure front and rear SIS decals are clean and visible after shipping.

NOTE: For front and rear M.P.H. SIS decals, order 9008715 and 9008714.

For front and rear K.P.H SIS decals order, 9008721 and 9008720.

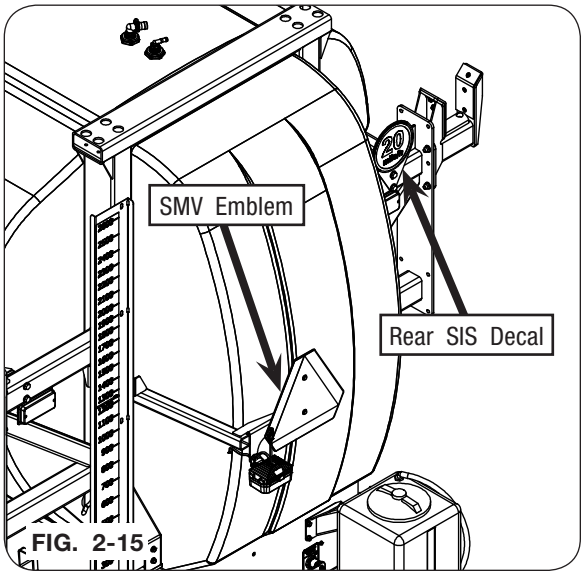


FIG. 2-15

26. To set toolbar working depth for the center section adjust the number of depth stop collars on each parallel lift cylinder. Adjust each gauge wheel position for adjustment of each wing section. (FIG. 2-16)

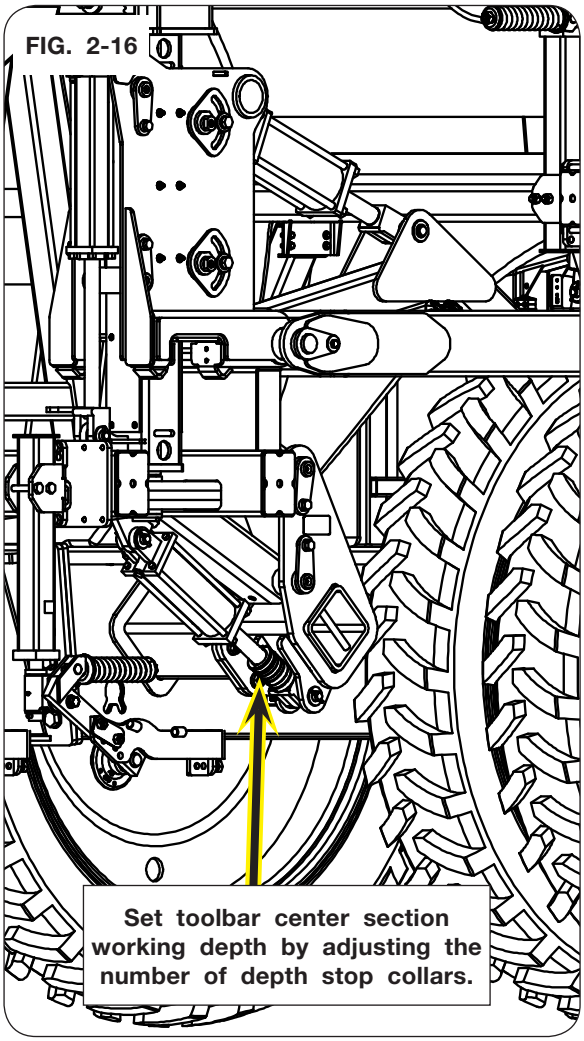


FIG. 2-16

Steerable Hitch Node & Side Hill Compensation Installation (Opt)
For 60' & Larger Toolbars

⚠ WARNING

- **WHEN WORKING AROUND THE MACHINE, BE SURE IT IS SECURELY BLOCKED; FAILURE TO DO SO COULD RESULT IN TIPPING OR MOVEMENT OF MACHINE, CAUSING SEVERE BODILY HARM.**
- **EYE PROTECTION AND OTHER APPROPRIATE PERSONAL PROTECTIVE EQUIPMENT MUST BE WORN WHILE SERVICING IMPLEMENT.**
- **KEEP HANDS CLEAR OF PINCH POINT AREAS.**

1. Attach empty applicator to tractor. Refer to "Hitching to the Tractor" in OPERATION section.

2. Before installing steerable hitch node and side hill compensation parts, follow instructions provided in your Raven steerable hitch manual (9008012). Then continue with step 3.

3. Connect side hill compensation sensor (9009381) to the bottom of steerable hitch node mount plate (410927B) using two 1/4"-20UNC x 1" capscrews (9390-005) and two 1/4"-20UNC locknuts (9398-007). (FIG. 2-17)

NOTE: Ensure the compass on the side hill compensation sensor points forward and the wiring harness points rearward.

4. Hand tighten 1/4" hardware.

(Continued on next page)

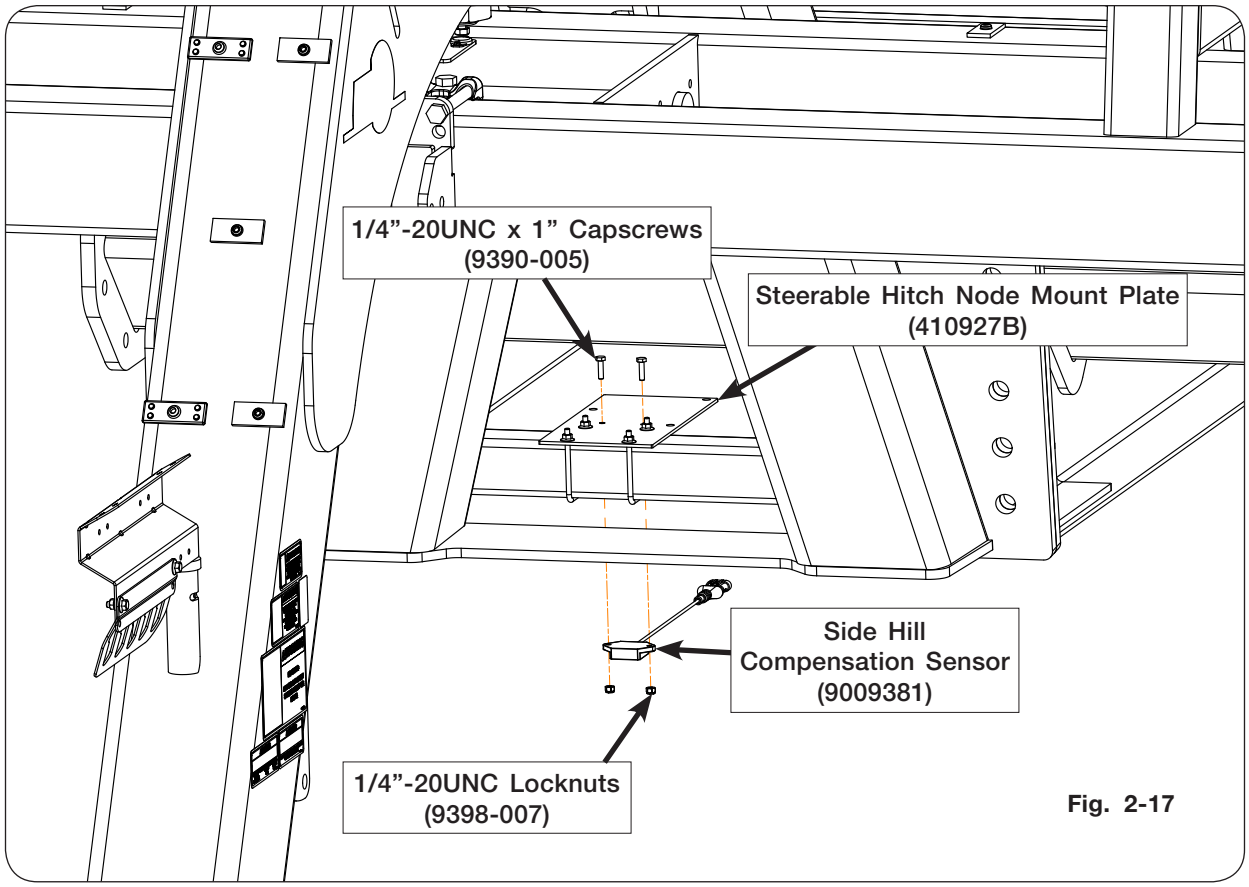


Fig. 2-17

Steerable Hitch Node & Side Hill Compensation Installation (Opt)
For 60' & Larger Toolbars (continued)

5. Connect steerable hitch node (9006470) to the bottom of steerable hitch node mount plate (410927B) using three 3/8"-16UNC x 1 1/2" capscrews (9390-057), nine 3/8" flat washers (9405-076), and three 3/8"-16UNC locknuts (9398-012). The side hill sensor is under the steerable hitch node. (FIG. 2-18)

NOTE: On the steerable hitch node, ensure #2 arrow points forward and #5 arrow points down. (FIG. 2-19)

6. Hand tighten 3/8" hardware.

Fig. 2-18

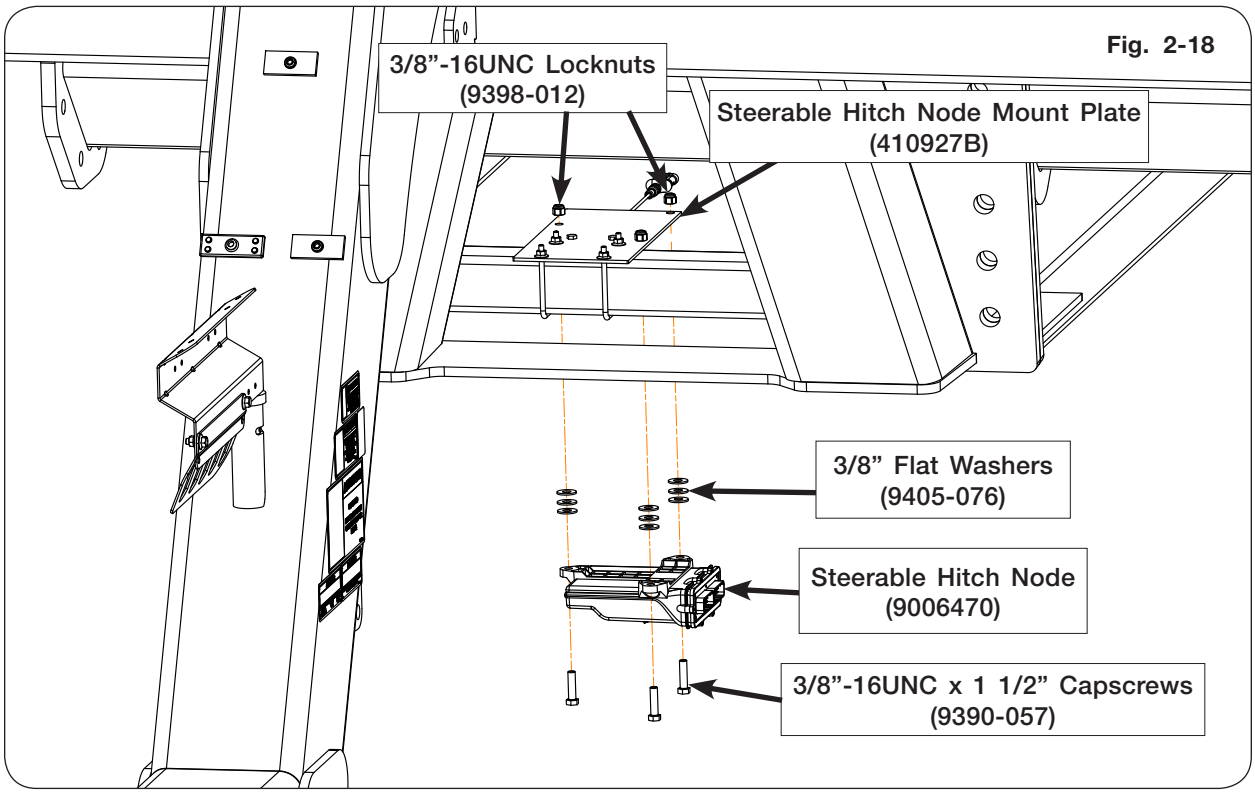
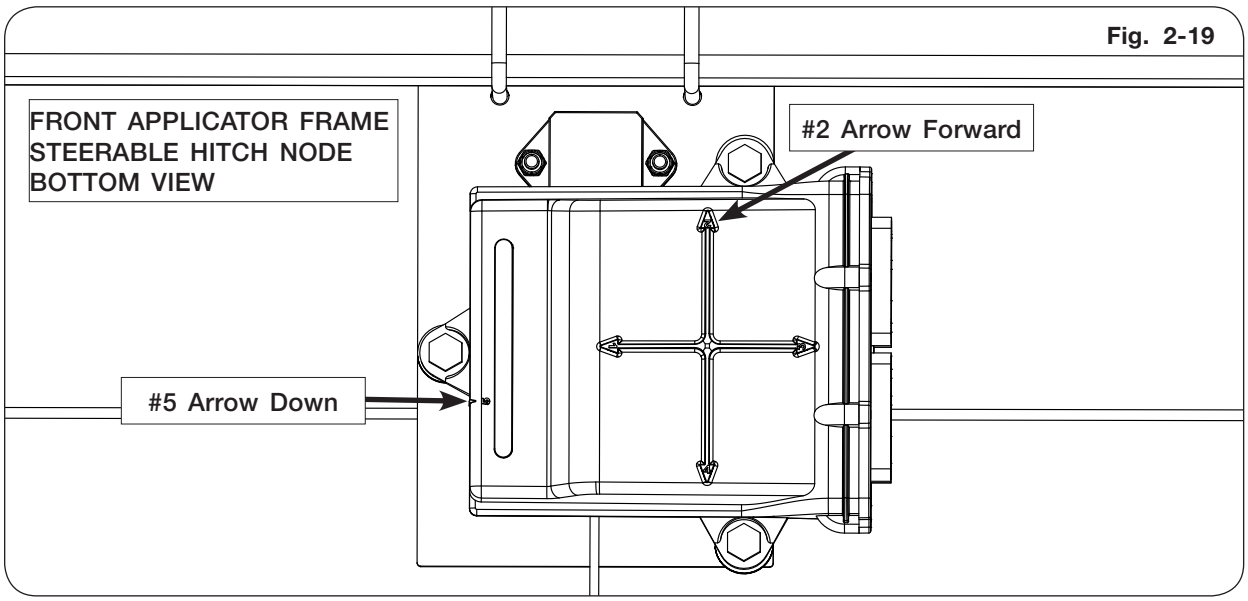


Fig. 2-19



Steerable Hitch Node & Side Hill Compensation Installation (Opt)
For 60' & Larger Toolbars (continued)

7. Cut out a section of the 1 3/8" diameter sight gauge hose as shown. (FIG. 2-20)
8. Insert two hose clamps (TA800912) to the sight gauge hose as shown. (FIG. 2-20)
9. Insert 1" hose barb x 3/4"-14MPT tee (TA810496) into the sight gauge hose. (FIG. 2-20)
10. Tighten both hose clamps.
11. Attach 3/4"-14MPT x 1/4"-18NPT pipe cap (407503) to the tee. (FIG. 2-20)
12. Connect pressure transducer (9009382) to end of the pipe cap. (FIG. 2-20)

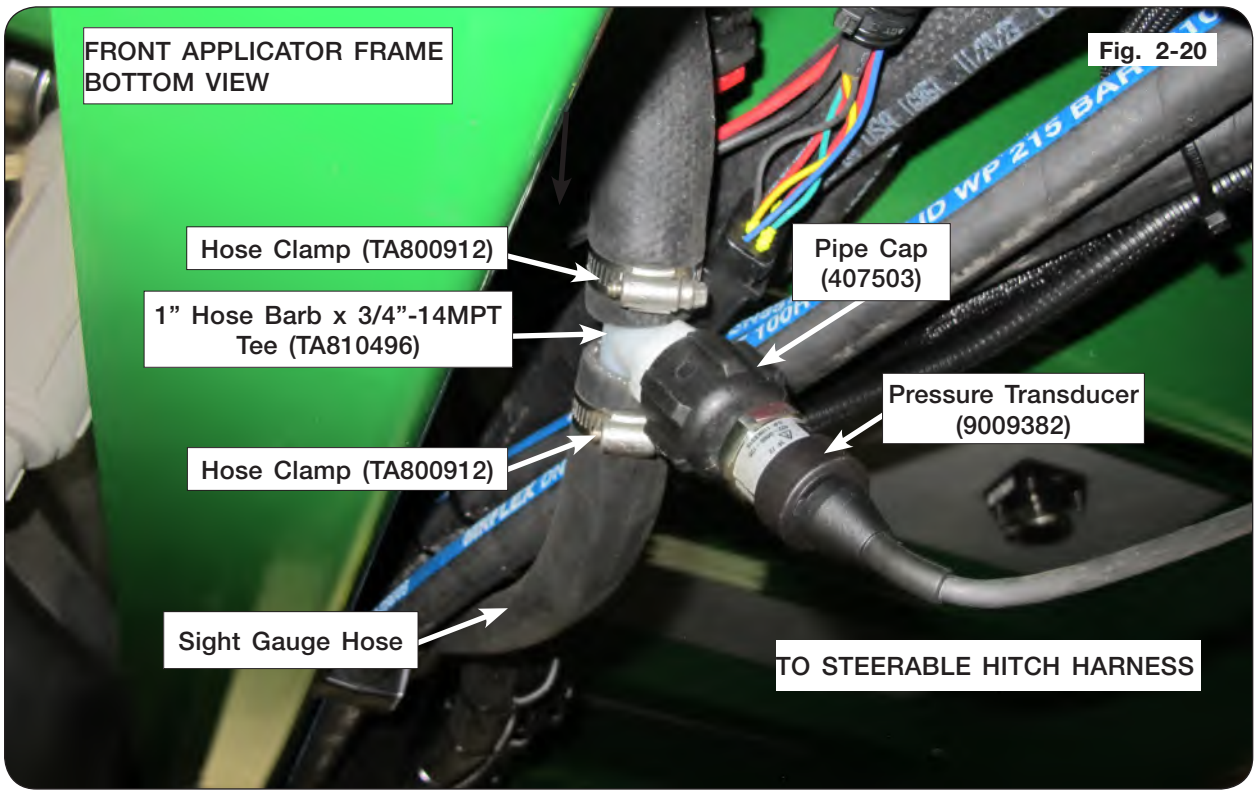


Fig. 2-20

13. Attach pressure transducer with 3-pin connector to steerable hitch harness (9009029) tank PSI connector by the steerable hitch node. (FIG. 2-21)

NOTE: Refer to "Schematics - Rate Control Module (RCM) W/Steerable Hitch" in MAINTENANCE section and Parts Manual 417268 for additional information on steerable hitch harness, RCM wiring harnesses, and components.

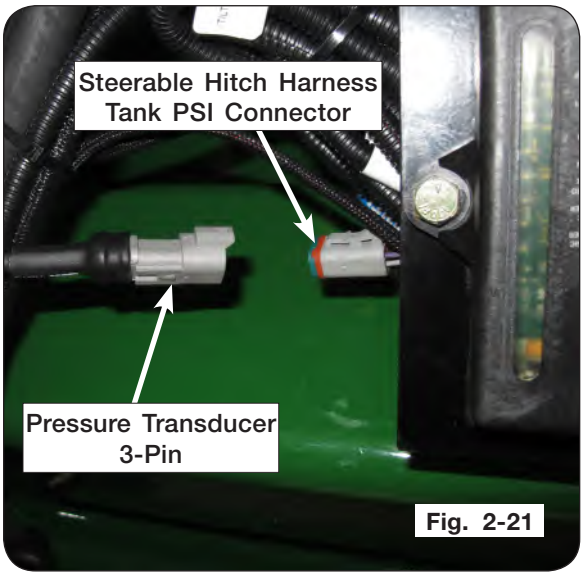


Fig. 2-21

Steerable Hitch Switch Box Connection (Opt.)
For 60' & Larger Toolbars

1. Connect the steerable hitch "ON/OFF" switch box (9007594) to the wire harness with six-pin deutsch connector (9007607) located just behind applicator 7-pin male receptacle. (Fig. 2-22)

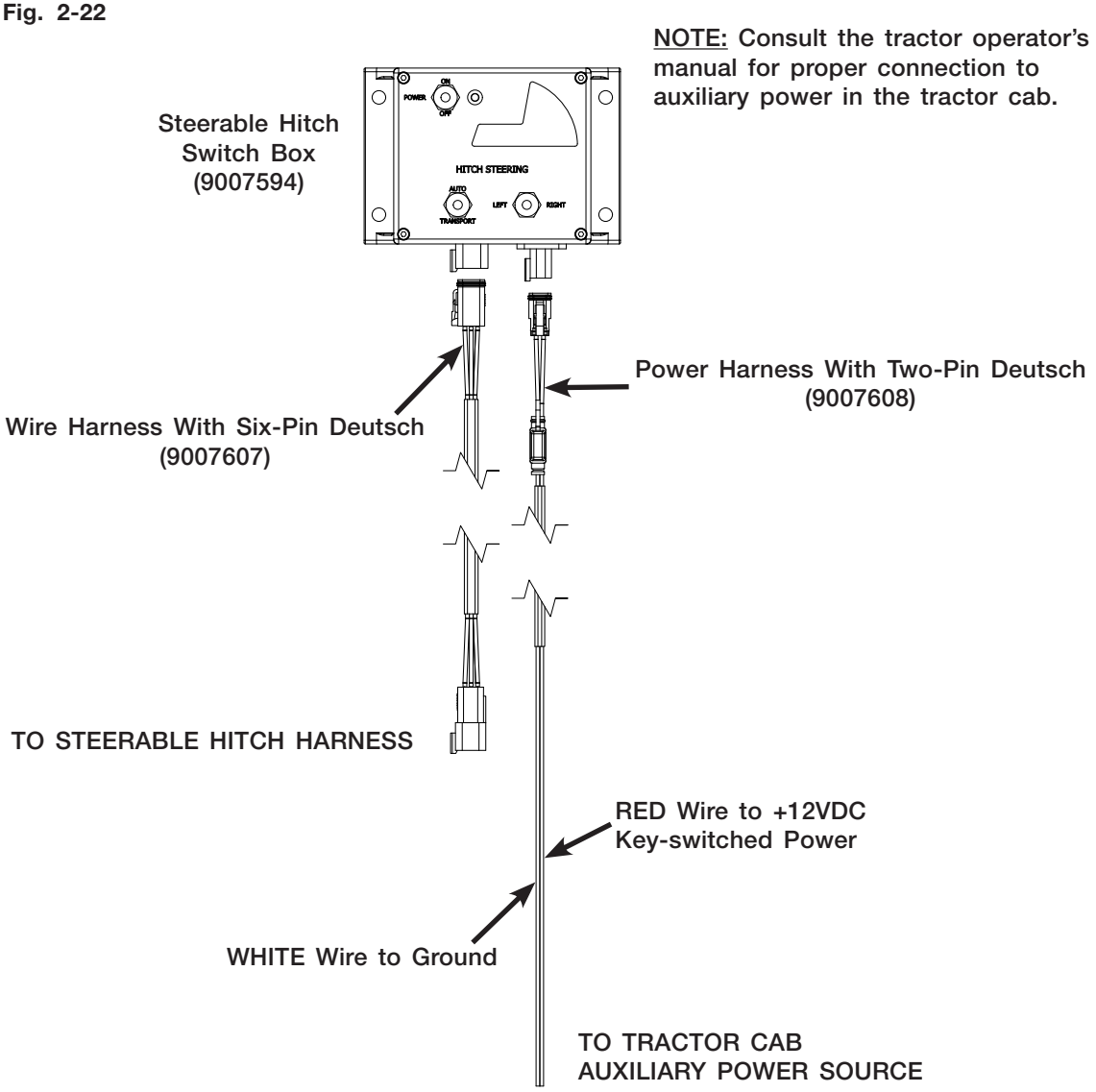
NOTE: For additional steerable hitch wiring harnesses, see "Electrical Components" in the PARTS section of manual.

2. Route switch and harness with six-pin deutsch into tractor cab.

3. Attach the switch box to the steerable hitch power harness with two-pin deutsch (9007608) to the bottom of the switch box. (Fig. 2-22)

4. From the steerable hitch power harness, connect the WHITE wire to ground and RED wire to +12VDC key-switched power source inside the tractor cab. Ensure "ON/OFF switch is "ON". (Fig. 2-22)

Fig. 2-22



Closer Wheel Installation (Opt.)

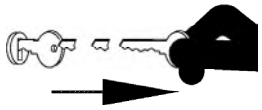
⚠ WARNING

- **WHEN WORKING AROUND THE MACHINE, BE SURE IT IS SECURELY BLOCKED; FAILURE TO DO SO COULD RESULT IN TIPPING OR MOVEMENT OF MACHINE, CAUSING SEVERE BODILY HARM.**
- **EYE PROTECTION AND OTHER APPROPRIATE PERSONAL PROTECTIVE EQUIPMENT MUST BE WORN WHILE SERVICING IMPLEMENT.**
- **KEEP HANDS CLEAR OF PINCH POINT AREAS.**
- **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 7,500 LBS. SPECIFIC LOAD RATINGS FOR INDIVIDUAL LOADS WILL BE GIVEN AT THE APPROPRIATE TIME IN THE INSTRUCTIONS.**

⚠ CAUTION

- **SHARP EDGES ON THE MACHINE CAN CAUSE INJURY. BE CAREFUL WHEN WORKING AROUND THE MACHINE.**

1. Park the empty unit on a firm, level surface. Block the machine to keep it from moving. Unfold the main wings and wing extensions. With the boom still raised, use safe lifting device and supports rated for 7,500 lbs each under each side of the main wings to support the boom. Set the vehicle parking brake, shut off the engine and remove the ignition key.



2. Loosen hose clamp and remove hose from injector tube and the rear hose guide. (FIG. 2-23)

3. Remove and discard the two cap screws and lock washers and remove injector from coulter arm.

4. Use a safe lifting device rated for 100 lbs and install the closer wheel assembly onto the coulter arm by sliding the U-bolt (9812) over the coulter arm. Shims (69799B) and (69800B) should be located between the closer wheel assembly and the coulter arm. (FIG. 2-24)

NOTE: Stop weldment (69783B) installed in standard position as shown. (FIG. 2-24)

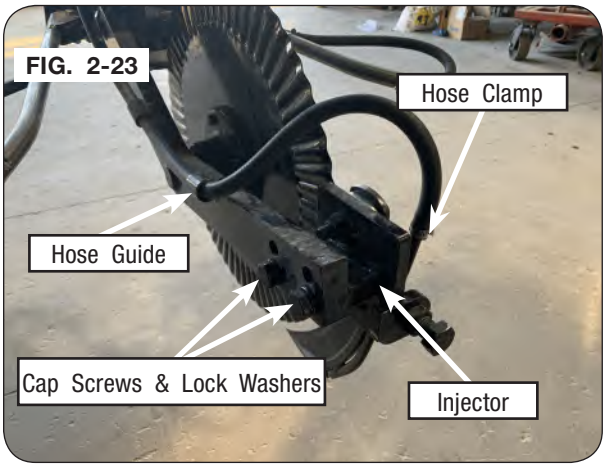


FIG. 2-23

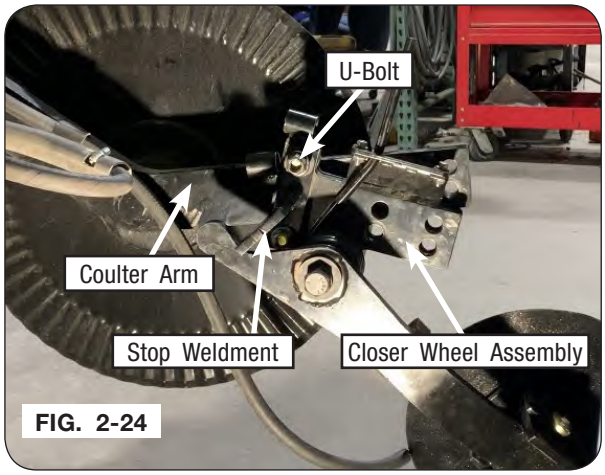


FIG. 2-24

Closer Wheel Installation (Opt.) (continued)

5. Install cap screws (9501438-128) and lock washers (9501440-029) through the closer assembly, shims, and coulter arm.

6. Install the injector to the cap screws and tighten. (FIG. 2-25)

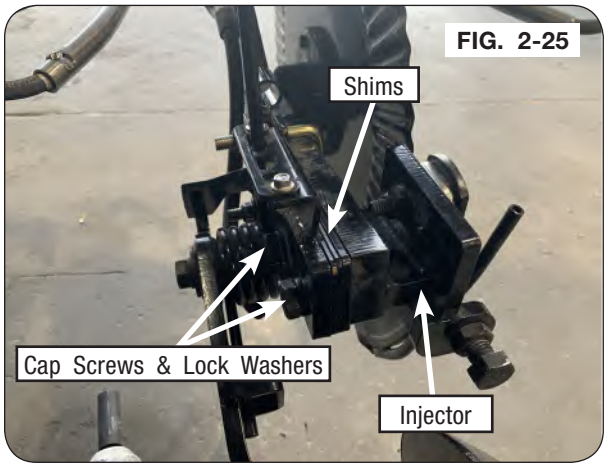


FIG. 2-25

7. Tighten U-bolt lock nuts. Route hose through closer wheel hose guide and install onto injector tube. Install and tighten hose clamp. (FIG. 2-26)

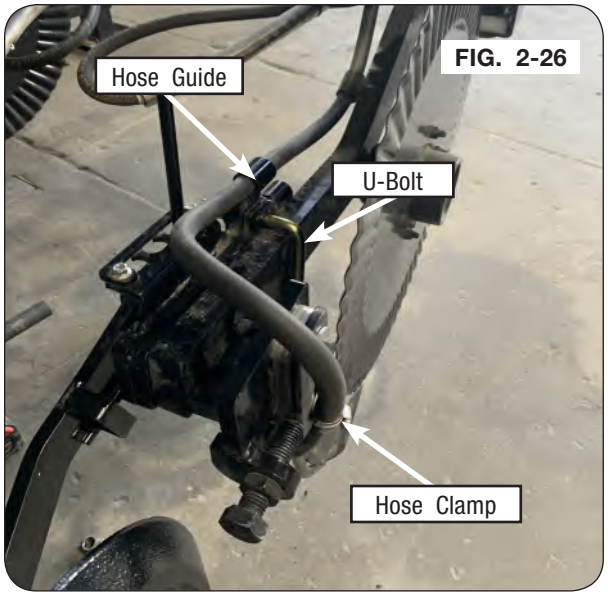


FIG. 2-26

8. After installation, ensure the closer wheel is centered with the coulter blade. If adjustment is needed, add or remove shims from between the closer wheel arm and coulter arm. (FIG. 2-27)

FIG. 2-27

Closer Wheel Installation (Opt.) (continued)

NOTE: Steps 9 through 11 are for applicators with 60'/66'/80'/88'/90' toolbars.

9. Remove the four 1/2" cap screws and lock nuts and remove wing rest bracket from the lower rest position. (FIG. 2-28)

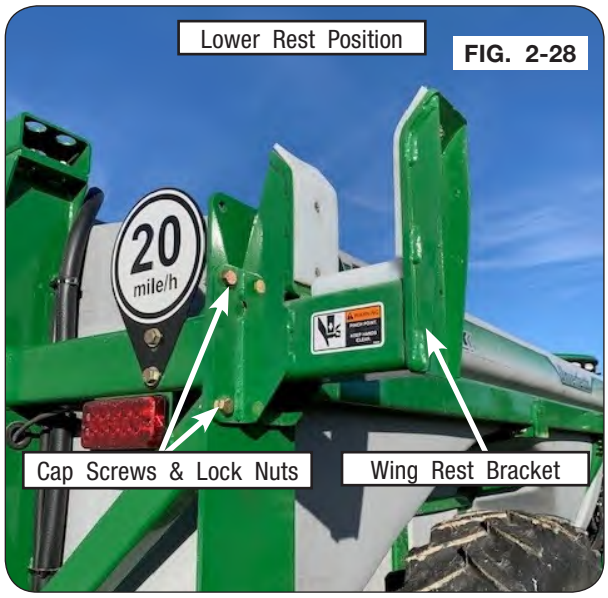


FIG. 2-28

10. Install the wing rest bracket in the top rest position to allow for maximum clearance of the closer wheels. Install the four 1/2" cap screws and lock nuts. (FIG. 2-29)

11. Repeat steps 9 and 10 on the opposite side rest bracket.

FIG. 2-29

NOTE: Refer to "Closer Wheel Adjustments & Replacement (Opt.)" in the MAINTENANCE section for details. Also refer to closer wheel instruction sheet (415411) for more adjustment details.

NOTE: Continued on next page for 60'/66'/80'/88'/90' toolbars.

Closer Wheel Installation (Opt.) (continued)

Closer Wheel Tank Guard Installation - For 60' & Larger Toolbars

12. Remove 3/8" hardware retaining the bottom of the rear sight gauge bracket. Keep flange nuts and discard capscrews. (FIG. 2-30)

NOTE: For steps 2 through 8, loosely attach all hardware.

13. Attach bottom of left-hand tank guard (415412G/R) to the bottom of left-hand wing mast and retain the rear sight gauge bracket reusing 3/8"-16UNC flange nuts (91263) and provided 3/8"-16UNC x 1 1/4" capscrews (9390-056). (FIG. 2-30)

14. Install top of left-hand tank guard to the mount bracket using 5/16"-18UNC x 2 3/4" u-bolts (9002713), 5/16" flat washers (9405-070) and 5/16"-18UNC lock nuts (9807). (FIG. 2-31)

FIG. 2-30

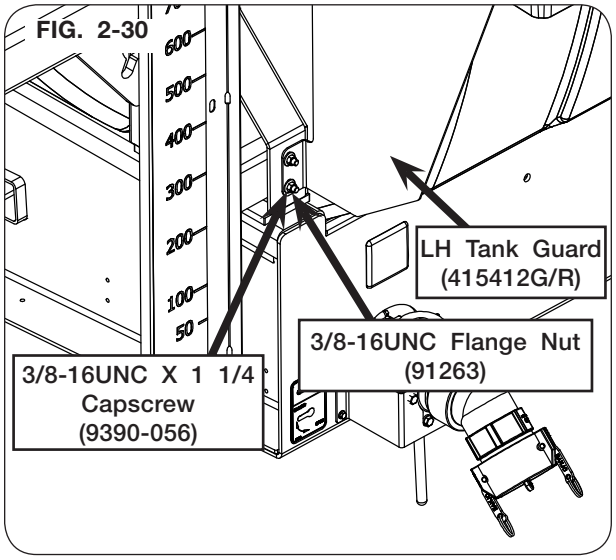
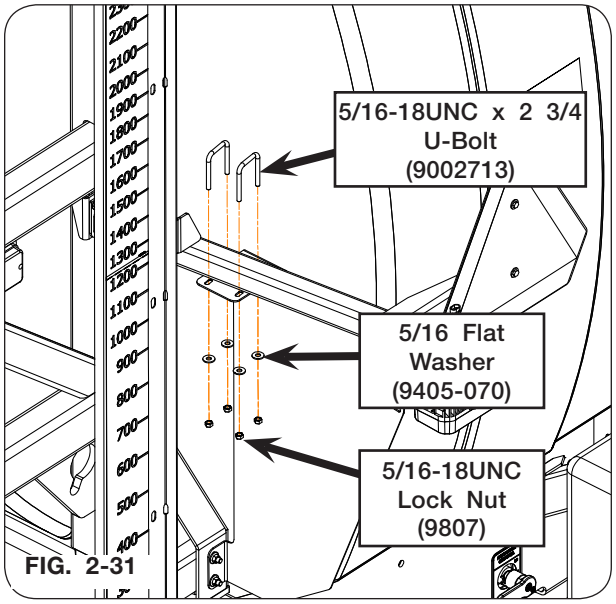


FIG. 2-31

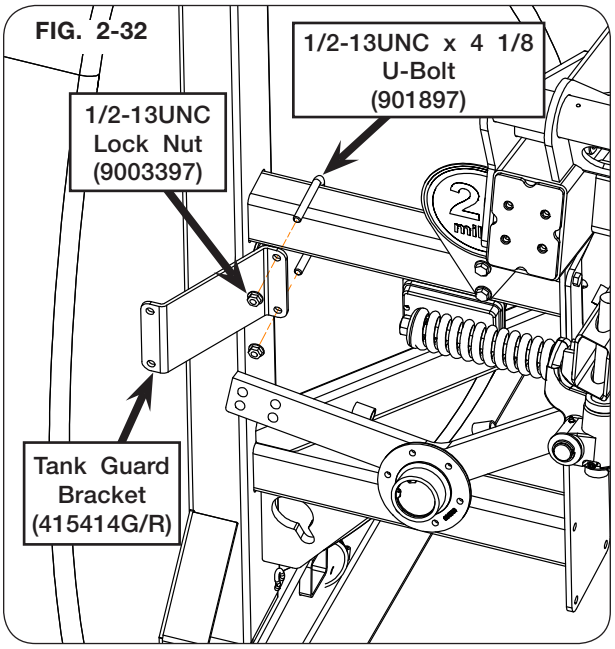


Closer Wheel Installation (Opt.) (continued)

NOTE: Closer wheel assembly (69386B) removed from coulter assembly for clarity. (FIG. 2-32)

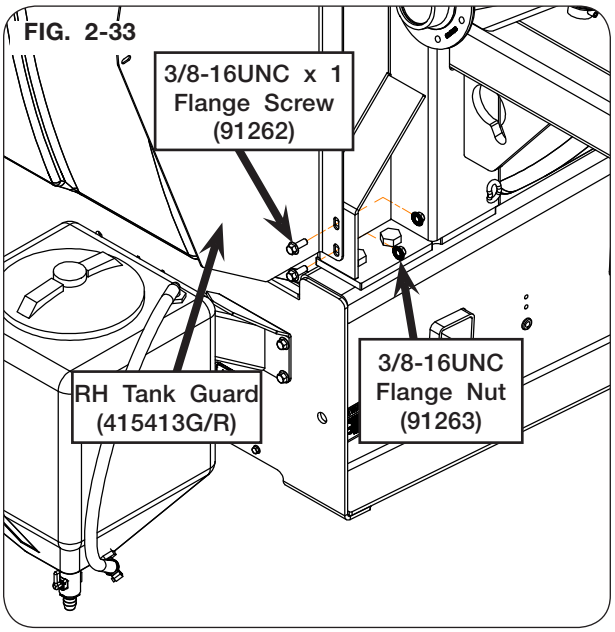
15. Attach the tank guard bracket (415414G/R) to the right-hand wing mast using 1/2"-13UNC x 4 1/8" u-bolt (901897) and two 1/2"-13UNC lock nuts (9003397). (FIG. 2-32)

FIG. 2-32



16. Install the right-hand tank guard (415413G/R) to the bottom of right-hand wing mast using 3/8"-16UNC flange nuts (91263) and 3/8"-16UNC x 1" flange screw (91263). (FIG. 2-33)

FIG. 2-33



Closer Wheel Installation (Opt.) (continued)

17. Secure the top of the right-hand tank guard using two 1/2”-13UNC lock nuts (9003397) and two 1/2”-13UNC x 1” capscrews (9390-099). (FIG. 2-34)

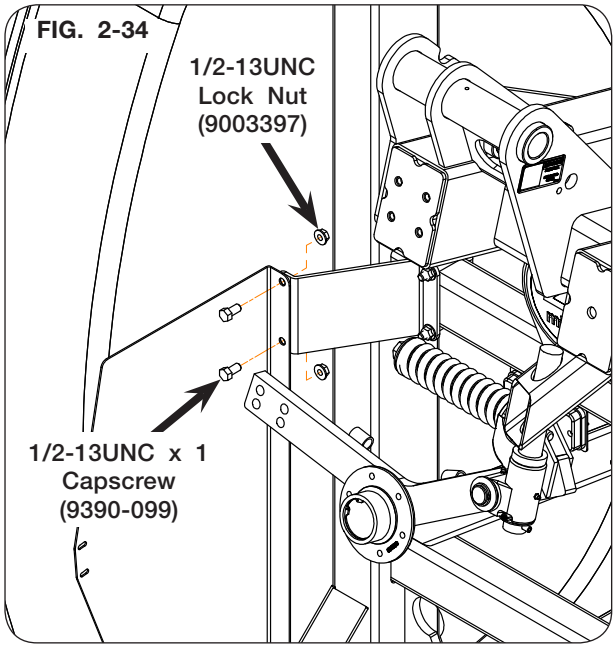


FIG. 2-34

18. Attach brace plate (415415G/R) between left-hand and right-hand tank guard using 5/16”-18UNC flange nuts (91257), 5/16” flat washers (9405-070) and 5/16”-18UNC x 1 button head screws (901563). (FIG. 2-35)

19. Tighten all hardware.

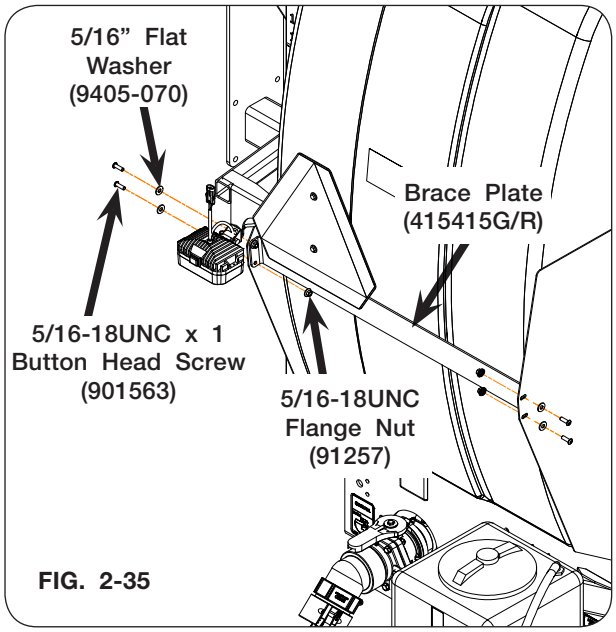


FIG. 2-35

Depth Wheel Installation (Opt.)

⚠ WARNING

- **WHEN WORKING AROUND THE MACHINE, BE SURE IT IS SECURELY BLOCKED; FAILURE TO DO SO COULD RESULT IN TIPPING OR MOVEMENT OF MACHINE, CAUSING SEVERE BODILY HARM.**
- **EYE PROTECTION AND OTHER APPROPRIATE PERSONAL PROTECTIVE EQUIPMENT MUST BE WORN WHILE SERVICING IMPLEMENT.**
- **KEEP HANDS CLEAR OF PINCH POINT AREAS.**
- **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 7,500 LBS. SPECIFIC LOAD RATINGS FOR INDIVIDUAL LOADS WILL BE GIVEN AT THE APPROPRIATE TIME IN THE INSTRUCTIONS.**

⚠ CAUTION

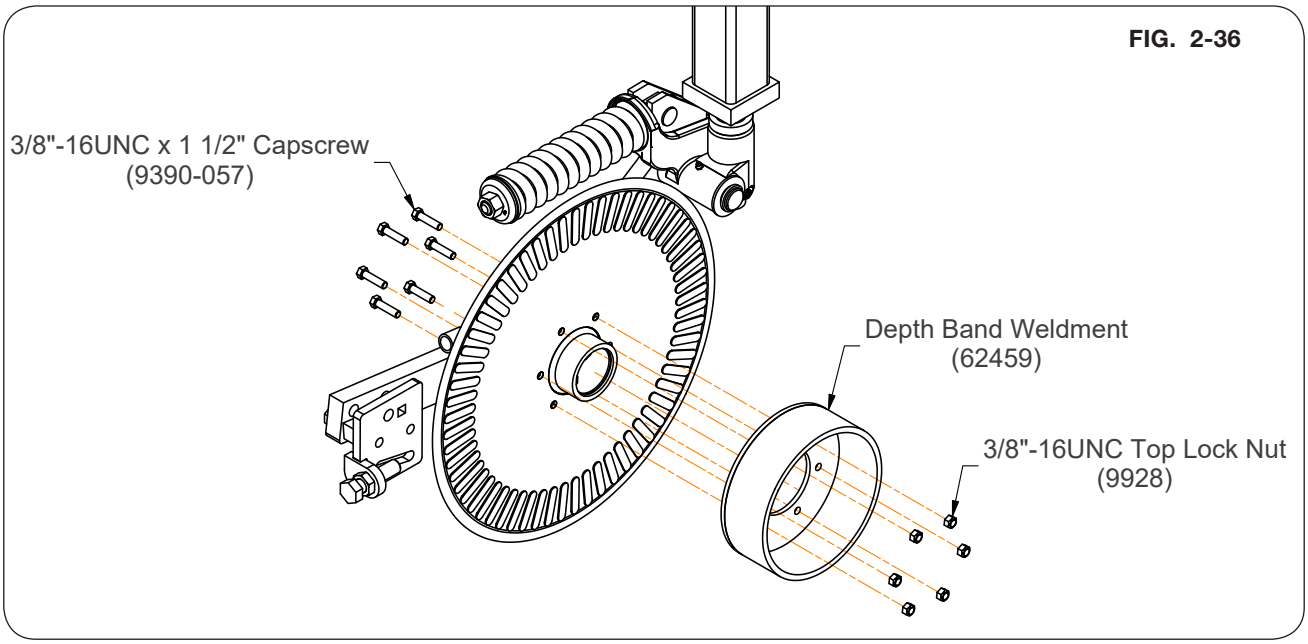
- **SHARP EDGES ON THE MACHINE CAN CAUSE INJURY. BE CAREFUL WHEN WORKING AROUND THE MACHINE.**

1. Park the empty unit on a firm, level surface. Block the machine to keep it from moving. Unfold the main wings and wing extensions. With the boom still raised, use safe lifting device and supports rated for 7,500 lbs each under each side of the main wings to support the boom. Set the vehicle parking brake, shut off the engine and remove the ignition key.

2. Attach depth band weldment (62459) to blade and coulter hub using six 3/8”-16UNC x 1 1/2” capscrews (9390-057) and six 3/8”-16UNC top lock nuts (9928). (FIG. 2-36)

3. Torque 3/8” hardware to 30 ft.-lbs.

FIG. 2-36

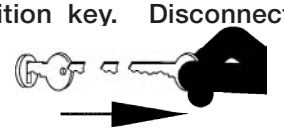


GPS Globe Mount Installation (Opt.) - For 60' & Larger Toolbars

⚠ WARNING

- **WHEN WORKING AROUND THE MACHINE, BE SURE IT IS SECURELY BLOCKED; FAILURE TO DO SO COULD RESULT IN TIPPING OR MOVEMENT OF MACHINE, CAUSING SEVERE BODILY HARM.**
- **EYE PROTECTION AND OTHER APPROPRIATE PERSONAL PROTECTIVE EQUIPMENT MUST BE WORN WHILE SERVICING IMPLEMENT.**
- **KEEP HANDS CLEAR OF PINCH POINT AREAS.**

1. Park the empty unit on a firm, level surface. Block the machine to keep it from moving. Unfold the main wings and wing extensions. Set the vehicle parking brake. Shut off the engine and remove the ignition key. Disconnect the unit from the towing vehicle.



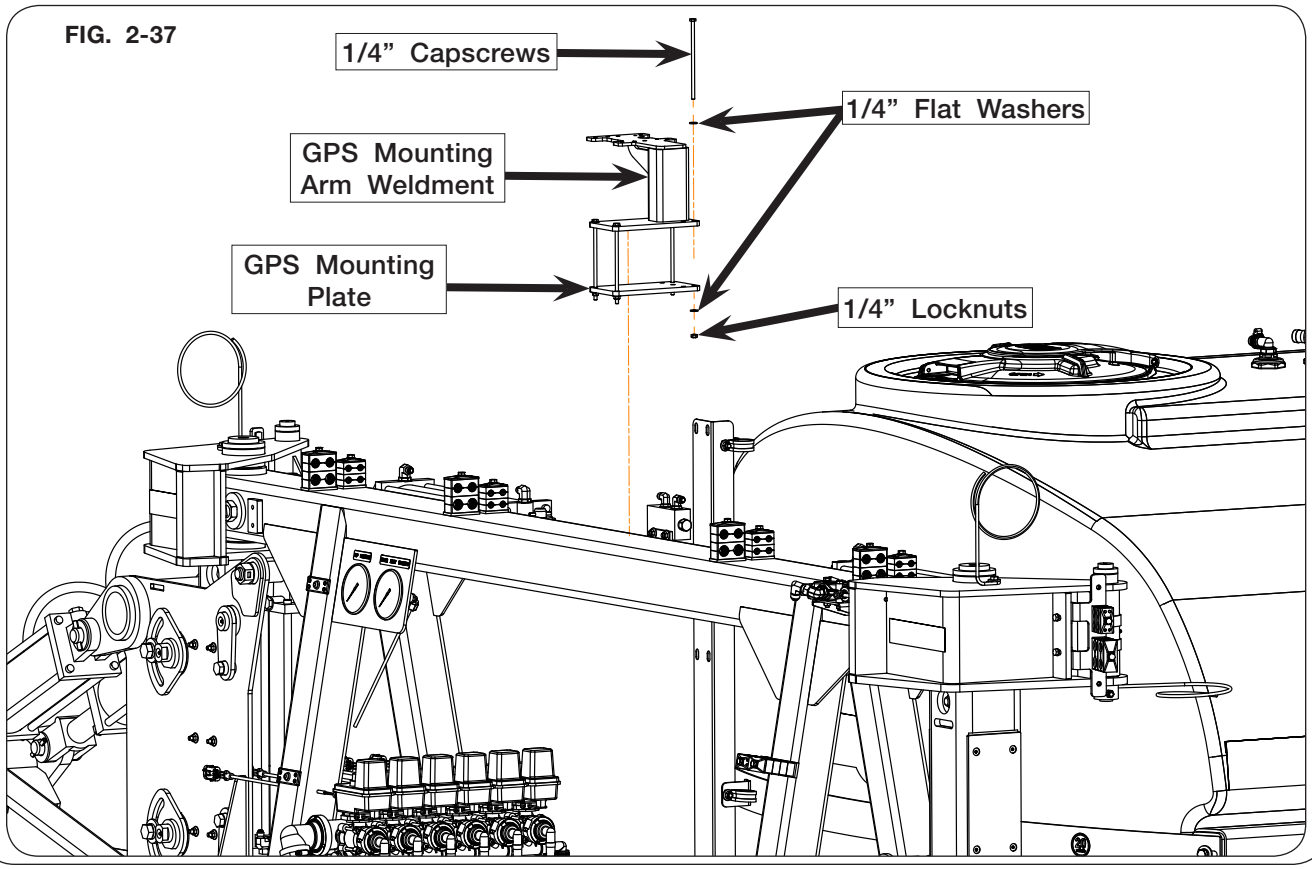
2. Center the GPS mounting arm weldment (416282B) on top of the toolbar weldment (FIG. 2-37)

NOTE: For 60' and 66' toolbars, use four 1/4"-20UNC x 5 1/2" capscrews (9390-020). For 80' and larger toolbars, use four 1/4"-20UNC x 6 1/2" capscrews (9390-022).

3. Using four capscrews, eight 1/4" flat washers (9405-062) and four 1/4"-20UNC locknuts (9936), attach 1/4" hardware to GPS mounting arm and GPS mounting plate (416280B). (FIG. 2-37)

4. Hand tighten 1/4" hardware.

FIG. 2-37

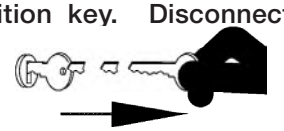


GPS Globe Mount Installation (Opt.) - For 40' & 44' Toolbars

⚠ WARNING

- **WHEN WORKING AROUND THE MACHINE, BE SURE IT IS SECURELY BLOCKED; FAILURE TO DO SO COULD RESULT IN TIPPING OR MOVEMENT OF MACHINE, CAUSING SEVERE BODILY HARM.**
- **EYE PROTECTION AND OTHER APPROPRIATE PERSONAL PROTECTIVE EQUIPMENT MUST BE WORN WHILE SERVICING IMPLEMENT.**
- **KEEP HANDS CLEAR OF PINCH POINT AREAS.**

1. Park the empty unit on a firm, level surface. Block the machine to keep it from moving. Unfold the main wings and wing extensions. Set the vehicle parking brake. Shut off the engine and remove the ignition key. Disconnect the unit from the towing vehicle.

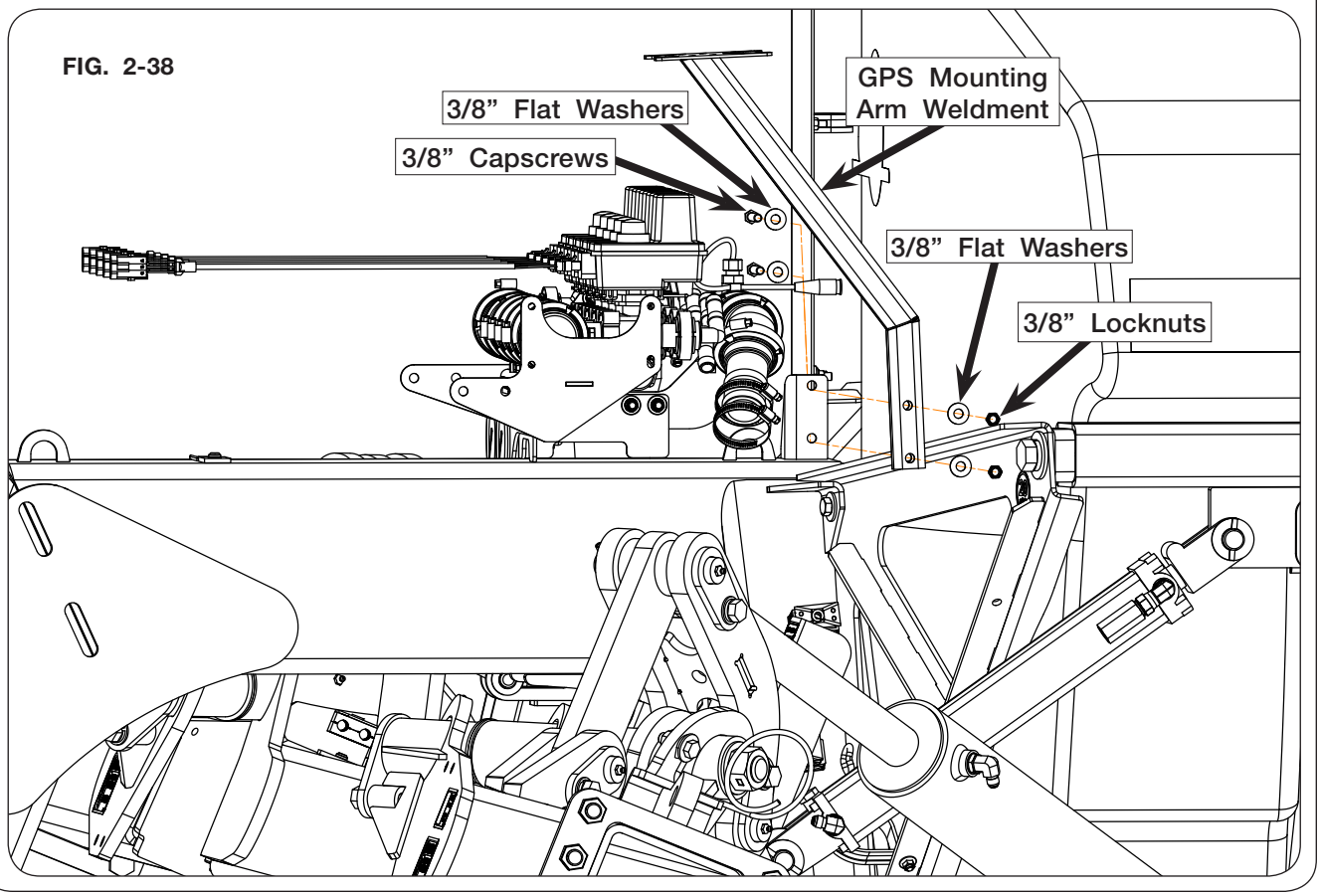


2. Align the GPS mounting arm weldment (416278B) with the mount plate on top of the tongue weldment. (FIG. 2-38)

3. Using two 3/8"-16UNC x 2 3/4" capscrews (9390-062), four 3/8" flat washers (9405-076) and two 3/8"-16UNC locknuts (9398-012), attach 3/8" hardware to GPS mounting arm. (FIG. 2-38)

4. Torque 3/8"-16UNC hardware to 25 ft.-lbs.

FIG. 2-38



Axle Tread Setting

Wheel Spacing Combinations

WARNING

- **USE EXCEPTIONAL CARE WHEN OPERATING APPLICATOR EQUIPPED WITH SINGLE TIRES AND SET AT NARROW WHEEL SPACING. THE POSSIBILITY OF TIPPING OVER DURING TURNS OR TRAVEL ON ROUGH ROADS IS INCREASED UNDER THESE CONDITIONS.**

The axle spacing is infinitely adjustable between minimum and maximum settings. Through a combination of wheel offset, axle adjustment, and hub spacers, a wide variety of track, single wheel, and dual wheel combinations are possible. A summary of the available wheel spacings for each tire and wheel combination is as follows:

WHEEL OFFSET TO INSIDE				
TIRE & WHEEL	1800 GALLON		2600 GALLON	
	MIN. SPACING (inches)	MAX. SPACING (inches)	MIN. SPACING (inches)	MAX. SPACING (inches)
380/90 x 46 Single 5" Offset	70	101	-	-
380/90 x 46 Duals	60 Inner Dual	101 Inner Dual	-	-
320/90 x 50 Duals	63 Inner Dual	104 Inner Dual	-	-
480/80 x 50 Single	70	105	-	-
320/90 x 54 Duals	-	-	62 Inner Dual	103 Inner Dual
380/90 x 54 Duals	-	-	62 Inner Dual	103 Inner Dual

WHEEL OFFSET TO OUTSIDE				
TIRE & WHEEL	1800		2600	
	MIN. SPACING (inches)	MAX. SPACING (inches)	MIN. SPACING (inches)	MAX. SPACING (inches)
380/90 x 46 Single (30" Rows)	84	132*	-	-
380/90 x 46 Duals (30" Rows)	120 Outer Dual	160 Outer Dual	-	-
480/80 x 50 Single (30" Rows)	70	132*		
320/90 x 50 Duals (20" Rows)	100 Outer Dual	140 Outer Dual	-	-
320/90 x 50 Duals (22" Rows)	104 Outer Dual	144 Outer Dual	104 Outer Dual	144 Outer Dual
320/90 x 54 Duals (20" Rows)	-	-	100 Outer Dual	140 Outer Dual
320/90 x 54 Duals (22" Rows)	-	-	104 Outer Dual	144 Outer Dual
380/90 x 54 Duals (30" Rows)	-	-	120 Outer Dual	160 Outer Dual
Tracks	88	144	88 (60'/66' Toolbars) 88 (80'/88'/90' Toolbars)	144 (60'/66' Toolbars) 132 (80'/88'/90' Toolbars)

* 380/90 x 46 and 480/80 x 50 single tires need to be set at a tread width of 120"

Axle Tread Setting (continued)

Adjustment

⚠ WARNING

- **IMPROPER AXLE ADJUSTMENT CAN CAUSE AXLE TO SEPARATE FROM APPLICATOR, RESULTING IN PERSONAL INJURY OR DEATH DUE TO APPLICATOR OR AXLE FALLING.**
- **USE CARE THAT APPLICATOR DOES NOT FALL FROM SUPPORT STANDS DURING ADJUSTMENT. DO NOT ALLOW AXLE TO SLIDE OUT FROM APPLICATOR DURING ADJUSTMENT PROCEDURE.**
- **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 30,000 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, MACHINE DAMAGE, BODILY INJURY, AND DAMAGE TO EQUIPMENT / ENVIRONMENT. 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.**

Axle Tread Setting (continued)

IMPORTANT

- *Always adjust axles equally.*

1. Hitch applicator to tractor to help stabilize unit. Refer to "Hitching to the Tractor" in OPERATION section.

2. Using a safe lifting device and supports rated at 30,000 lbs., raise one side of the empty applicator and place on stands. Stands should be securely positioned under both frame rails, as far toward the rear of the applicator as practical. (FIG. 2-39)

3. **Units with tracks,** skip to step 4.

   Unit with wheels, if necessary for desired wheel spacing, change wheel dish direction by unbolting wheels and swap between left and right sides on applicator. Refer to information in wheel spacing chart to see if wheel dish needs to be reversed. Tighten 7/8" wheel lug bolts to 500 ft-lbs. torque.

NOTE: If equipped with 480/80 x 50 singles, swap the tires between left and right sides on the applicator to have the wheel offset to the outside and achieve 120" tread width.

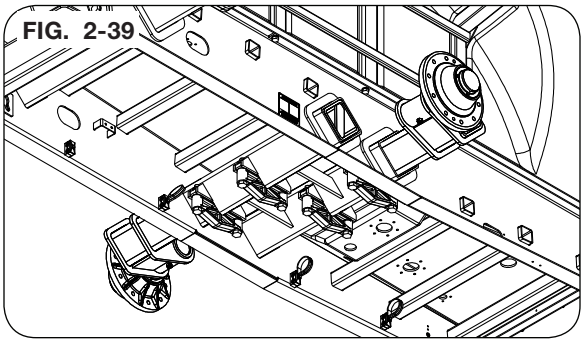


FIG. 2-39

4. Remove 3/8" hardware and four 3 5/16" bolt retainer plates (413570B) from 2 axle clamps (404785B). (FIG. 2-39)

5. Loosen four 1" clamp bolts that hold one axle. Using a safe lifting device rated for 3,000 lbs., lift the axle slightly and slide it out until desired adjustment is reached.

NOTE: Do not extend axle beyond the clamps.

6. Verify the inner axle clamp fully contacts the axle.

7. After adjustment, torque 1" clamp bolts to 525 ft-lbs.

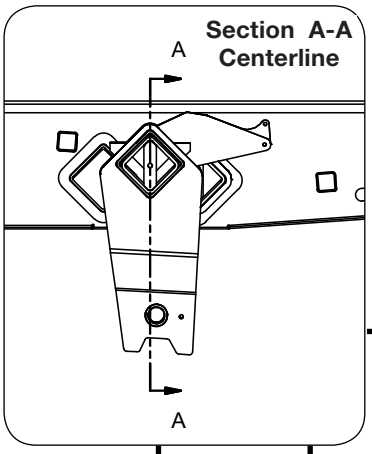
8. Reattach 3/8" hardware and four 3 5/16" bolt retainer plates to axle clamps. (FIG. 2-39)

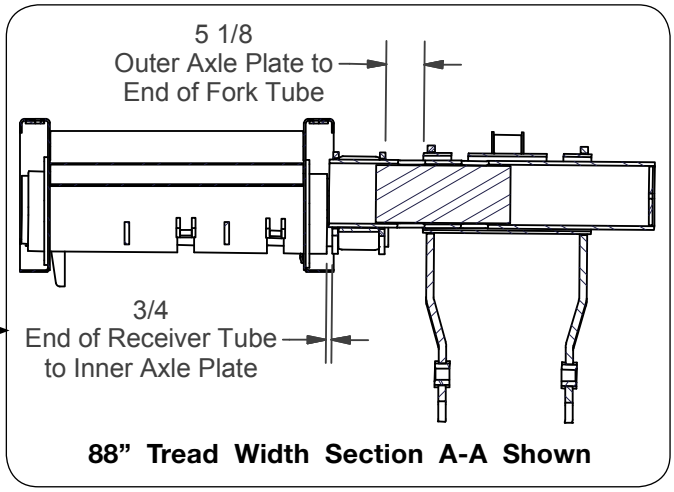
9. Torque 3/8" hardware to 35 ft.-lbs.

10. Repeat steps 2 through 9 for other axle. Remove safe lifting devices and supports.

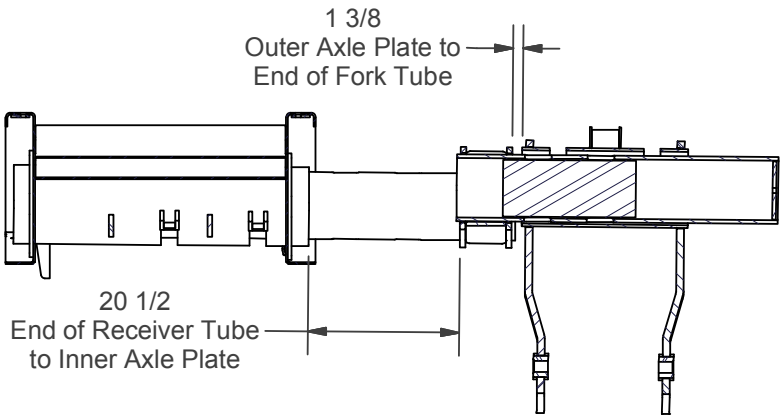
Axle Tread Setting (continued)

Track Tread Toolbar Widths

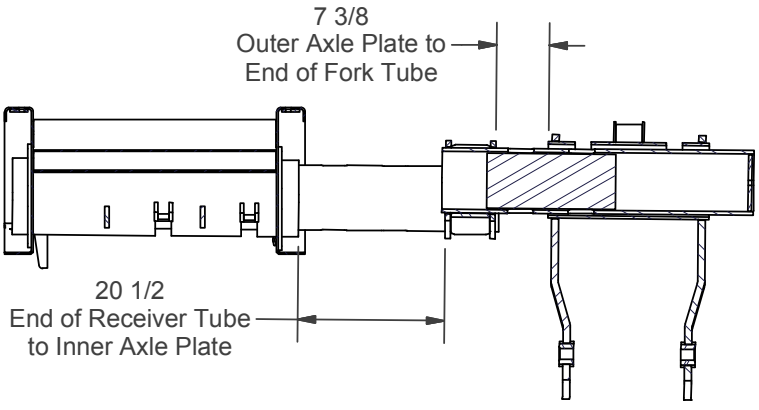




88” Tread Width Section A-A Shown



120” Tread Width Section A-A Shown



132” Tread Width Section A-A Shown

Axle Tread Setting (continued)

Tracks Toe In Adjustment

⚠ WARNING

- **IMPROPER AXLE ADJUSTMENT CAN CAUSE AXLE TO SEPARATE FROM APPLICATOR, RESULTING IN PERSONAL INJURY OR DEATH DUE TO APPLICATOR OR AXLE FALLING.**
- **USE CARE THAT APPLICATOR DOES NOT FALL FROM SUPPORT STANDS DURING ADJUSTMENT. DO NOT ALLOW AXLE TO SEPARATE FROM APPLICATOR DURING ADJUSTMENT PROCEDURE.**
- **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 30,000 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.**

Axle Tread Setting (continued)

Tracks Toe In Adjustment (continued)

IMPORTANT

- *Always adjust axles equally.*

1. Hitch applicator to tractor to help stabilize unit. Refer to "Hitching to the Tractor" in OPERATION section. Ensure tractor is in park and remove key.

2. Using a safe lifting device and supports rated at 30,000 lbs., raise one side of the empty applicator and place on stands. Stands should be securely positioned under both frame rails, as far toward the rear of the applicator as practical. (FIG. 2-40)

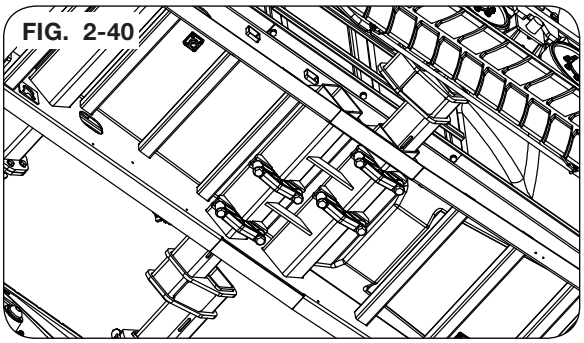


FIG. 2-40

NOTE: Measure from one track to the other to determine if the track axle requires a shim.

3. Measure from front idler to front idler on opposite side and from rear idler to rear idler on opposite side.

4. Next, measure from front left idler to rear right idler and then the opposite dimension.

NOTE: For a toe in adjustment, the front idler measurement will be slightly less than the rear idler measurement. However, the "X" measurement from step 4 will be equal.

5. Using a safe lifting device rated for 3,000 lbs., loosen four 1" clamp bolts that hold one axle. Slide in shim for desired toe in adjustment.

6. To establish toe in, install 14 gauge, 12 gauge or 10 gauge shim (411103B, 411098B or 411105B) on the upper rear side of the track diamond axle between the axle and applicator frame. (FIG. 2-41)

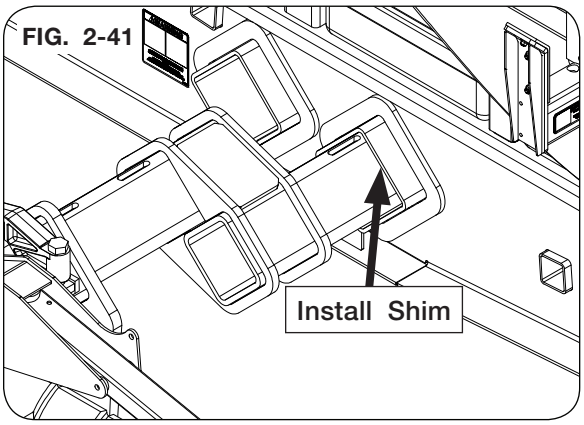


FIG. 2-41

NOTE: Do not extend axle beyond the clamps.

7. After adjustment, tighten 1" clamp bolts to a torque of 500 ft-lbs.

8. Repeat steps 2 through 6 for other axle. Remove safe lifting devices and supports.

Belt Conditioning

Condition Track Prior to Initial Usage

A new rubber track, fresh from the mold, will be slightly "tacky". This is a standard consequence of the vulcanization (curing) process. The rubber track will perform better if this tackiness is removed, and thus it is recommended that all new rubber tracks be "conditioned" with talc, dirt, granular floor dry, or some other non-caustic particulate material. This is done by simply spreading a thin layer of the material over the undercarriage-engaging surface of the track, and then running the system for a brief period. This will serve to remove the tackiness of the rubber, and will promote optimum track-undercarriage engagement.

Belt Conditioning Procedures

IMPORTANT

- *Road transport weight, distance and speed will affect the belt life.*

Before loading the unit with product or solution, use the following recommendations to maximize the belt life:

1. Prior to transporting, apply generous amounts of clean dry dirt to the inside face, between the idler and bogie wheels, of the track.

NOTE: Clean dry dirt and dust are the most effective dry lubricants. For best results, it is recommended to perform the conditioning procedure for new belts in the field. Talc or floor dry are alternate dry lubricants when clean dry dirt is not an option.

2. Once in the field, reapply generous amounts of clean dry dirt to the inside of the track belt and operate for 20 minutes.

3. Using a temperature gun, measure the guide lug face including the radii between the guide lug and inside face of the track belt and record the highest temperature. Check multiple guide lugs. Repeat for the opposite side of track belt.

4. If the temperature difference of the sides of the guide lugs is greater than 30°, adjust the alignment. Refer to Alignment procedures in the Equalizer® Track manual.

5. Continue the alignment procedures until tracks are aligned applying clean dry dirt periodically.

6. Once the temperature difference between the sides of the guide lugs is below 30°, continue to run the track in the field stopping once every hour of run time to reapply clean dry dirt.

7. When 20 hours of total field run time has been achieved, then the guide lug temperatures should be checked after a couple miles of unloaded road transport. If guide lug temperatures are within the previous mentioned parameters, the unit is ready for use.

8. Check guide lug temperatures daily during road transport AND field operation to assure long track belt life. If the temperature difference of the sides of the guide lugs is greater than 30°, refer to Step 4.

Toolbar Functions

Refer to OPERATION section "Toolbar Operation".

Controller Calibration Settings

Refer to the appropriate Raven manual or OEM rate controller manual if applicable.

"BOOM CAL" Monitor Settings

TOOLBAR SIZE	SPACING	SECTION 1	SECTION 2	SECTION 3	SECTION 4	SECTION 5	SECTION 6
40'	20"	90"	100"	100"	100"	90"	-
40'	30"	75"	120"	90"	120"	75"	-
40' Folded Down to 30'	30"	-	135"	90"	135"	-	-
44'	22"	99"	110"	110"	110"	99"	-
60'	20"	120"	170"	140"	170"	120"	-
60'	30"	120"	165"	150"	165"	120"	-
66'	22"	132"	187"	154"	187"	132"	-
80'	30"	135"	180"	180"	150"	180"	135"
88'	22"	231"	154"	154"	132"	154"	231"
90'	30"	195"	180"	180"	150"	180"	195"

Pump Hydraulic System Set Up

For set up of a PWM (Pulse Width Modulated) or non-PWM pump, refer to your Rate controller manual for details. For specific details related to your product pump, please refer to your pump manual.

NOTE: Foot switch must be installed and connected to ISO harness behind the ISO plug at the rear of the tractor for PWM pump to function properly. Extension harness (9503390) may also be required.

FIG. 2-42

IMPORTANT

- *Do not run pump for extended periods with outlet flow fully blocked. Overheating and pump damage can result.*
- *Liquid must be in the Solution Tank. Refer to Filling Applicator in the OPERATION section.*
- *Toolbar should be unfolded when setting the pump pressure. Refer to toolbar operation in the OPERATION section.*
- *The Pump Inlet valve should be open.*
- *Do not run pump without solution. Running a dry pump will shorten its life.*

Setting the Pump Pressure (PWM Pump)

1. Rate controller must be calibrated. See pump calibration in section “RCM Set Up.”
2. Select manual control on the console and turn the master switch on. Press and hold the Inc. button for 5 seconds to verify cartridge valve is fully open.
3. Turn off section valves and agitation valve if equipped.
4. Turn the hydraulic flow dial to 40-50%. The PWM cartridge valve is sized to divert a maximum of 11 GPM to the pump. Increase the tractor’s hydraulic flow until Nutrimax system pressure starts to rise, approximately around 100 PSI.

NOTE: If agitation is needed, go to step 5. If agitation is not needed, go to step 6.

5. Open the agitation valve until the pump pressure drops by 5 PSI. The gauge should now read 95 PSI.
6. Keep the agitation valve closed.

Rate Control Module (RCM) Set Up

When turning on the RCM for the first time or if number of sections, valve type, etc. needs to be changed, the following steps will have to be performed in order for the RCM to function properly right away.

NOTE: Before programming the RCM, ensure the RCM monitor is connected to the battery.

1. Initial start-up screen. At "Profile Name" box, name as "Nutrimax". Click "Machine Type" and select "Liquid Fert. Tool". Next, enter 480 in., 720 in. or 1080 in. for "Application Width" depending on machine size and configuration. Click next arrow. (FIG 2-43)

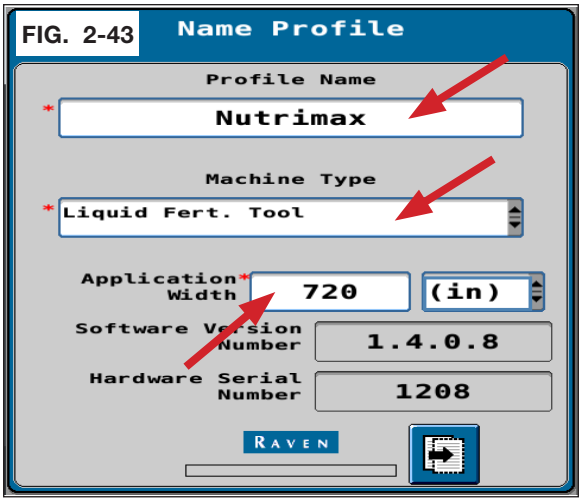


FIG. 2-43

NOTE: Highest value for "Application Width" is 1080 in.

2. Default for "ECU" box is 1. Click "Number of Products" box and enter 1. Click next. (FIG 2-44)

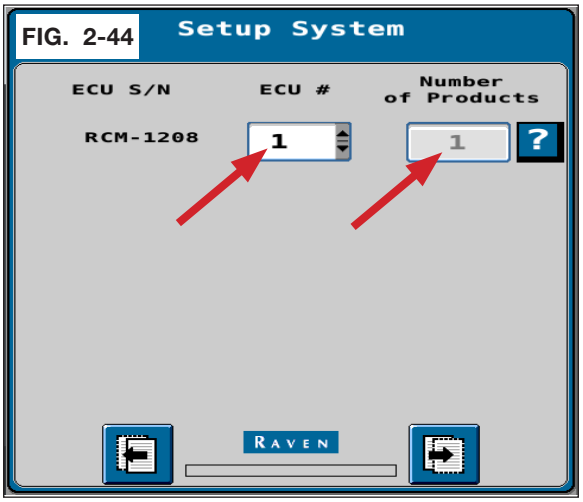


FIG. 2-44

3. Under "Application Type", select "Liquid". Click next. (FIG 2-45)

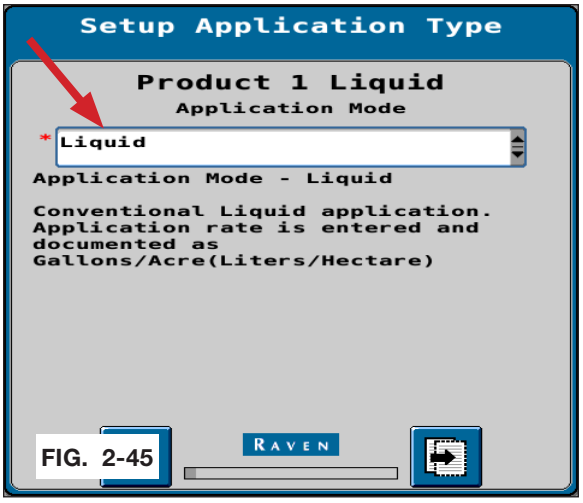


FIG. 2-45

RCM Set Up (continued)

NOTE: 40 FT. - 66 FT. units will have 5 sections. 80 FT. - 90 FT. units will have 6 sections.

4. Under “Number of Sections”, select 5 for 40 FT. - 66 FT. units or 6 for 80 FT. - 90 FT. units. Default for “Section Valve Type” is 3-Wire. Uncheck “Equal Width Sections” box. Click next. (FIG 2-46)

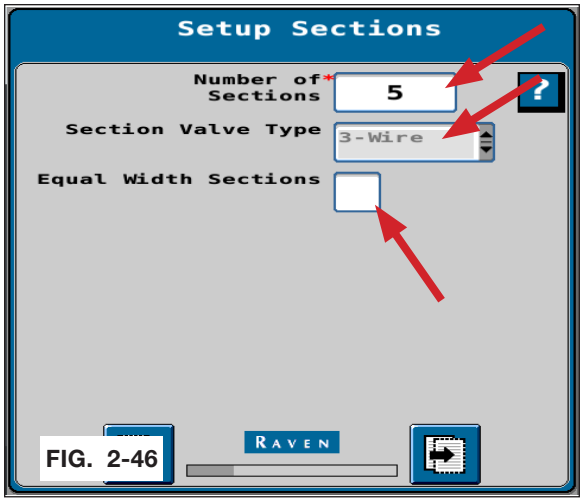


FIG. 2-46

NOTE: Each section is listed in inches and will equal total application width.

NOTE: See “Controller Calibration Settings” in the SET UP section for specific toolbar lengths.

5. Enter values for each section. Click next. (FIG 2-47).

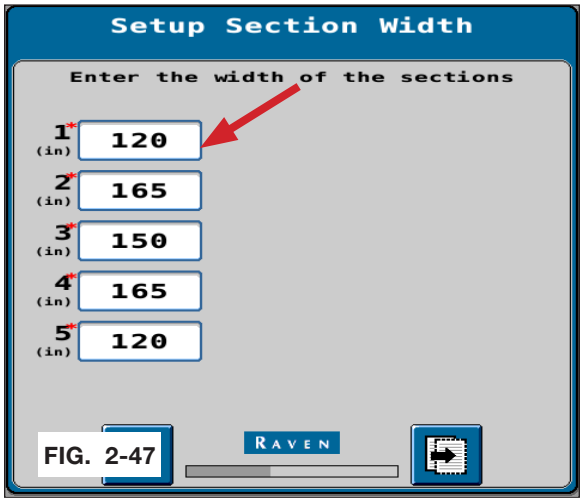


FIG. 2-47

6. Ensure all the appropriate boxes are selected as “None”. (FIG 2-48)

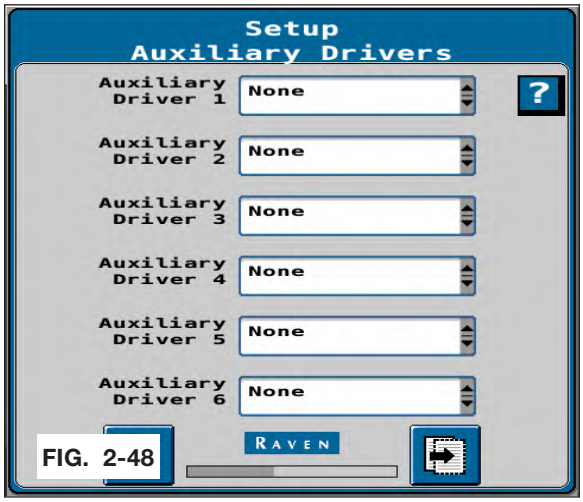


FIG. 2-48

RCM Set Up (continued)

7. No action required on this screen. Make sure this matches toolbar size and section widths. Continue to next page. (FIG 2-49)

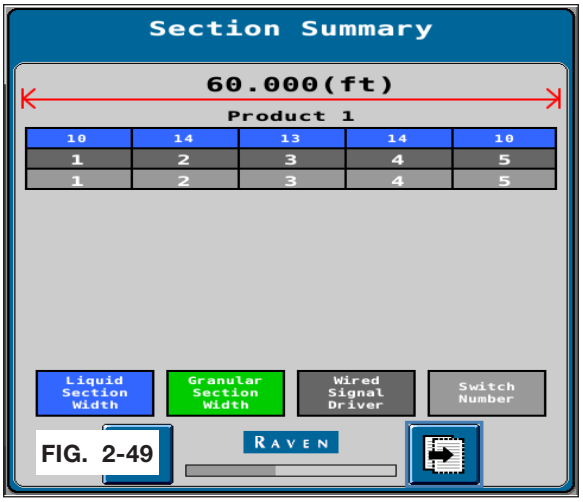


FIG. 2-49

8. Under “Pressure Sensor 1”, select “0-250 psi (1-5V)”. Under “Pressure Sensor 2”, select “None”. Click next. (FIG 2-50)

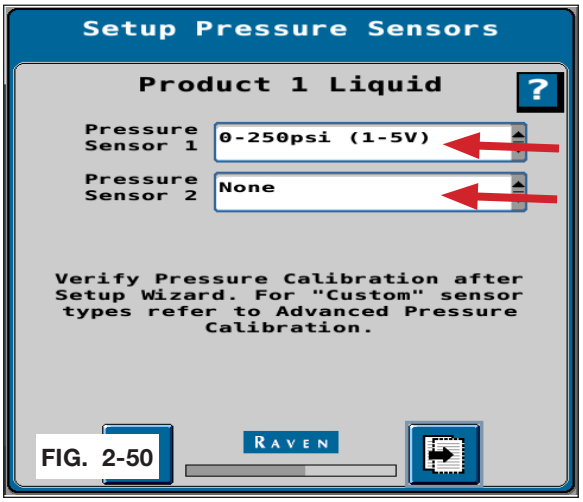


FIG. 2-50

9. Under “Pressure 1”, set minimum and maximum pressures. Recommend starting at 15 psi and 150 psi. Check box if alarm is desired when above max or below min. Click next. (FIG 2-51)

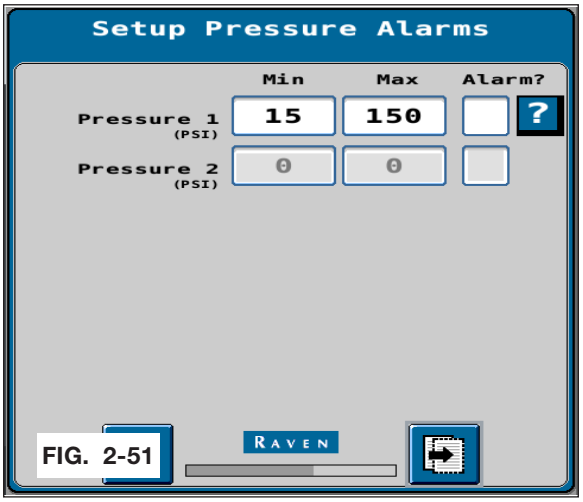


FIG. 2-51

RCM Set Up (continued)

10. For the auxilary functions: uncheck both boxes. Click next page. (FIG. 2-52)

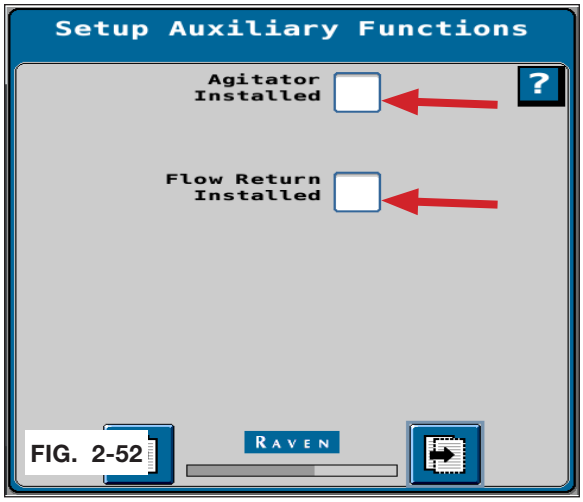


FIG. 2-52

11. "Product 1" is the set up for the liquid. For "Control Valve Type", always select "PWM". (FIG. 2-53)

12. For "Valve Response Rate", enter 40. This is how fast the valve responds.

13. Default for "Control Deadband %" box is 3 and "Valve Delay" box is 0.

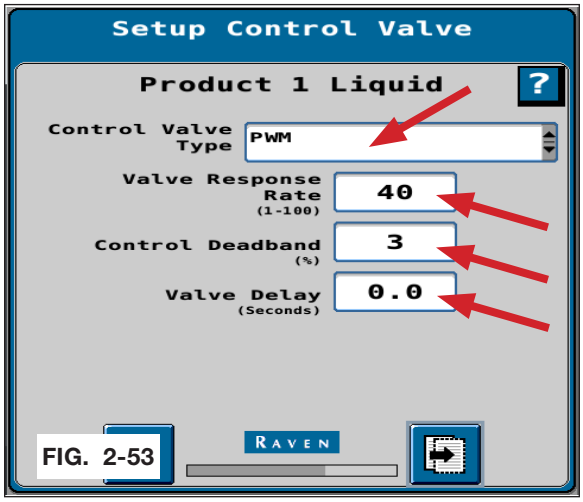


FIG. 2-53

14. For the PWM valve "Coil Frequency", ensure the value is set at 122. (FIG. 2-54)

NOTE: Inputting "PWM Standby" at 20, for example, can resolve "Solution Pump Dry" error.

15. Set the "PWM High Limit" at 100, "PWM Low Limit" at 35 and "PWM Standby" at 0. Click next page. (FIG. 2-54)

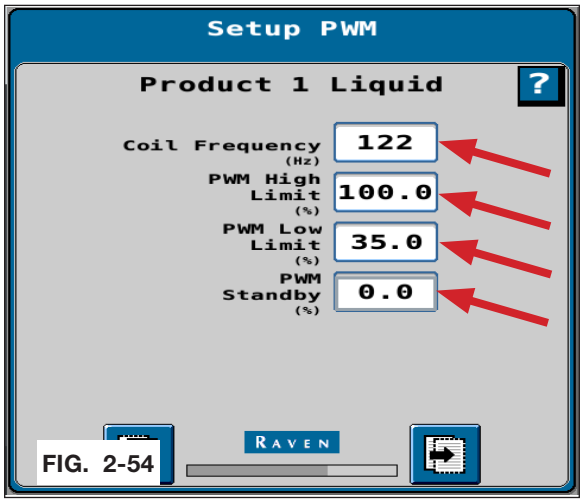


FIG. 2-54

RCM Set Up (continued)

16. For “Flowmeter Calibration”, check the tag on the flowmeter and enter the value. (FIG. 2-55)

17. Under “Flowmeter Pulse/Units” enter 10 gal. Click next page. (FIG. 2-55)

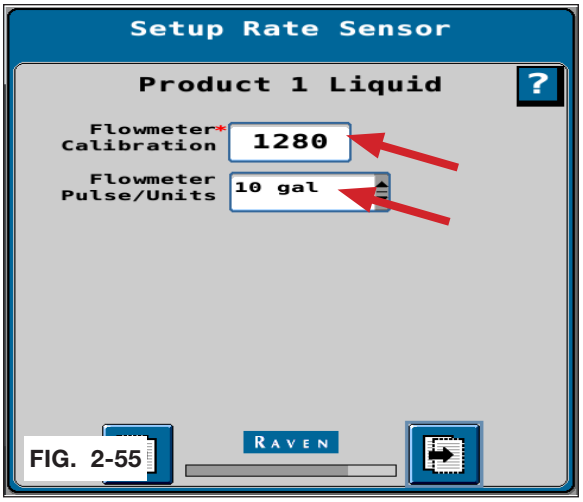


FIG. 2-55

18. For “Tank Fill/Level Sensor”, select “None”. (FIG. 2-56)

19. Enter gallon capacity of unit for “Tank Capacity”.

20. Enter current gallons in unit for “Current Tank Level”.

21. “Low Tank Level” is the value an alarm is set off for a low bin level. Recommended setting is 250 and ensure the “Alarm” box is checked.

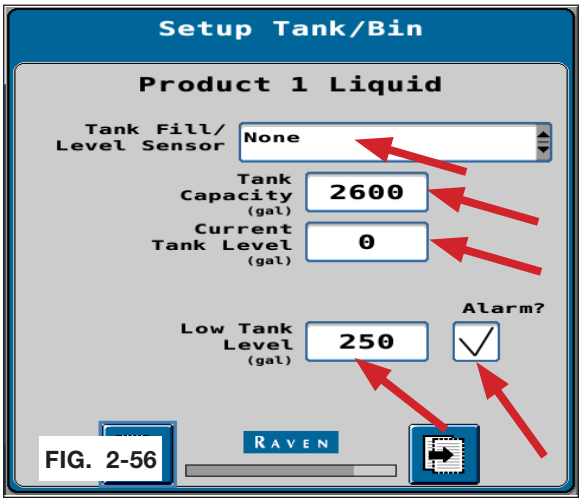


FIG. 2-56

22. “Set Up Rates” page controls the application rates for speed and determines how much product is being applied for “Product 1”. Enter three “Preset Rate Values”, as desired, which can be clicked between on the homescreen. On the homescreen, target rates can be entered as well. (FIG. 2-57)

23. Enter “Rate Bump” value in an increment as desired.

24. For “Rate Selection”, manually input a selection or import an “Rx”.

25. “Display Smoothing” needs to be checked and “Decimal Shift” remains at 0.

26. “Standby Pressure” remains at 0. Standby PWM valve is used instead. Click next page. (FIG. 2-57)

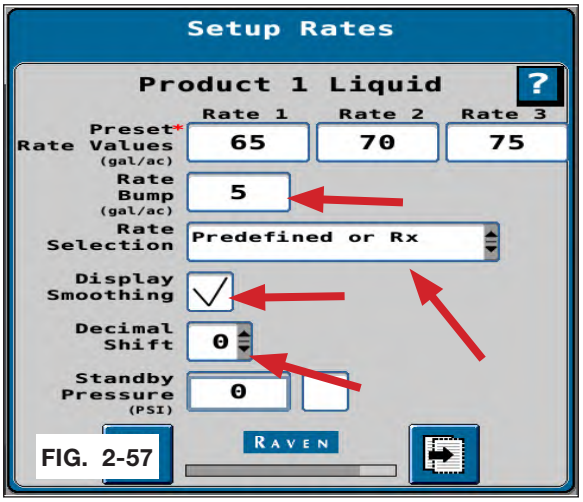


FIG. 2-57

RCM Set Up (continued)

27. Enter 20 for “Off Rate Alarm” and check box. Click next page. (FIG. 2-58)

    NOTE: Alarm prompts when over 20% off target rate.

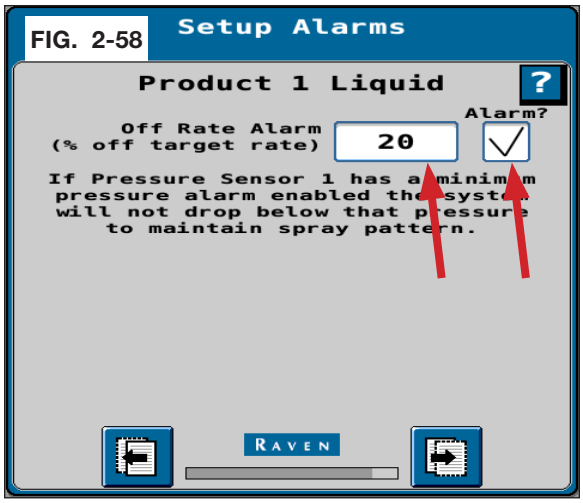


FIG. 2-58

    NOTE: “Number of Products” corresponds to liquid application. (FIG. 2-59)

28. No action required on this screen. Shows the set up summary. Make sure all values are correct. Continue to next page. (FIG. 2-59)

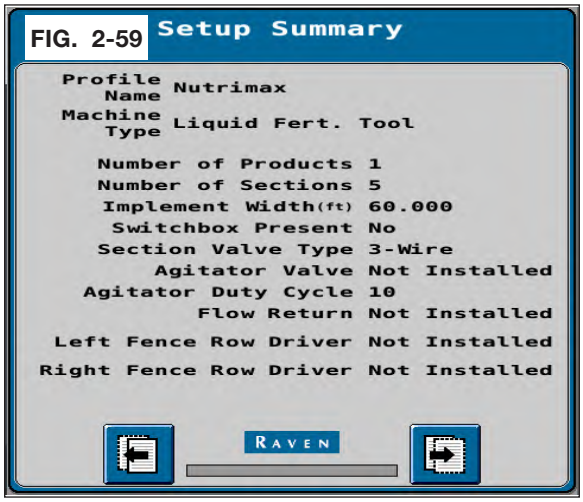


FIG. 2-59

RCM Set Up (continued)

PWM Pump Start Up Procedure (Rate Control Module)

1. Fill solution tank with desired product and reduce the flow on the SCV to lowest setting for the PWM pump before engaging.

   Initial start-up screen (FIG. 2-60).

2. Switch the system from Auto to Manual (FIG. 2-60).

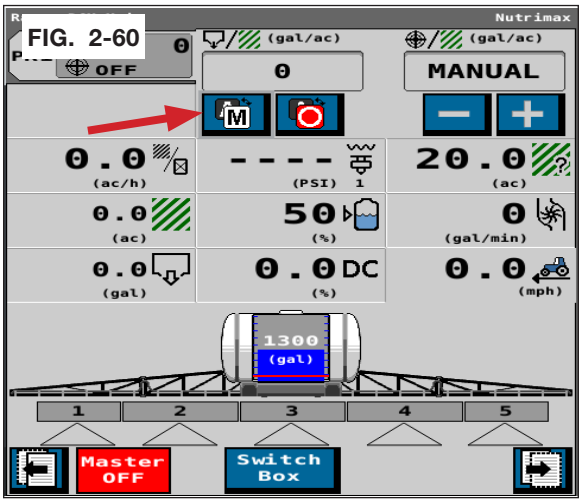


FIG. 2-60

3. Cycle the system from Off to On. (FIG. 2-61)

4. Increase tractor engine throttle to the RPM expected to operate the applicator. Engage the SCV in continuous flow for the pump on the tractor.

5. Click the manual "+" button to increase the DC value to 100%. (FIG. 2-62)

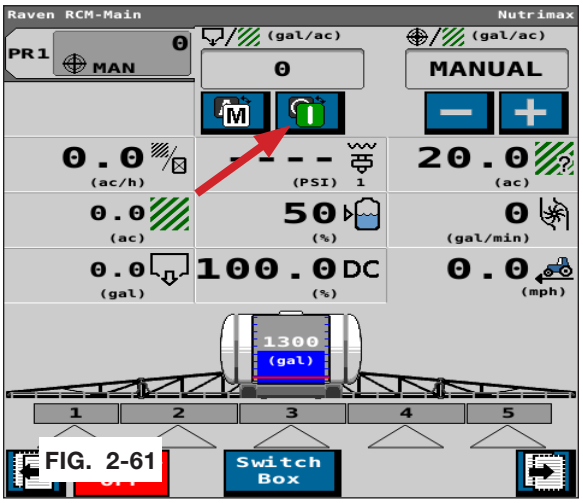


FIG. 2-61

6. Increase the hydraulic flow on the tractor until the pressure reaches 110 PSI for an ACE 205 pump or 130 PSI for an ACE 750 pump.

7. Click the manual "-" button to decrease the DC value. Continue until the filter inlet pressure reaches 18-20 PSI. Note the DC value. Change the PWM low limit to this value. (FIG. 2-62)

   NOTE: If the DC value reaches the low limit before the applicator reaches 20 PSI, reduce the low limit by 5% and repeat step 7.

8. Switch the system from Manual back to Auto. The pump will go into Standby mode, and the pressure should drop.

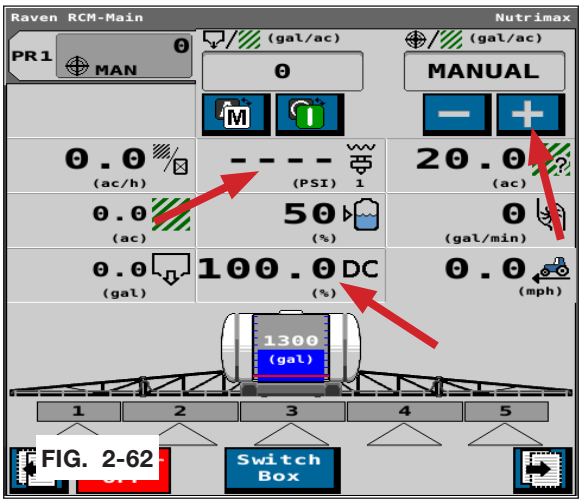


FIG. 2-62

Applicator Calibration

Determine Required Nozzle Size

Use the following procedure to assist with sizing the nozzle and calibrating the applicator. Additional information can be found in the rate controller owner's manual and also obtained from nozzle manufacturers.

The following procedure assumes that an electronic rate controller is being used.

1. Determine the typical operating speed (in MPH) and coverage rate (in GPA) that will be used.
2. Calculate nozzle flow:

$$\text{Nozzle GPM} = \frac{\text{MPH x GPA x Nozzle Spacing x DCF*}}{5940}$$

*DCF = Density Conversion Factor

Weight of Solution	Density Conversion Factor (DCF)
8.34 lb./gal. (Water)	1.00
10.65 lb./gal. (28% Nitrogen)	1.13
11.05 lb./gal. (32% Nitrogen)	1.15

Example:

Speed = 8 miles per hour
Rate = 25 gallons per acre
Nozzle Spacing = 30 inches
Liquid = 32% Nitrogen

$$\text{Nozzle GPM} = \frac{\text{8 MPH x 25 GPA x 30 Nozzle Spacing x 1.15 DCF*}}{5940} = 1.16 \text{ GPM}$$

3. Choose a nozzle or orifice that will provide the calculated GPM within the nozzle's or orifice's operating pressure range. See "Injector Nozzle & Orifice Guide", "Nozzles", and "Orifices" charts. Choose a type of nozzle or orifice for the given application.

INJECTOR NOZZLE & ORIFICE GUIDE			
Nozzle Size	Knife Orifice Size	P.S.I.	Approx. G.P.A. at 30" Rows at 10 M.P.H.
#0004	#57	30 P.S.I.	7
#0006	#70		10
#0008	#80		14
#0010	#89		17
#0015	#107		26
#0020	#125		34
#0030	#151		51
#0040	#177		69

Applicator Calibration (continued)

Nozzles

UM PN		PSI	CAPACITY ONE NOZZLE IN GPM
9007403	H1/4U-SS0002 TP0002-SS	10	0.10
		20	0.14
		30	0.17
		40	0.20
93959	H1/4U-SS0003 TP0003-SS	10	0.15
		20	0.21
		30	0.26
		40	0.30
TA852145	H1/4U-SS0004 TP0004-SS	10	0.20
		20	0.28
		30	0.35
		40	0.40
9007404	H1/4U-SS0006 TP0006-SS	10	0.30
		20	0.42
		30	0.52
		40	0.60
9007405	H1/4U-SS0008 TP0008-SS	10	0.40
		20	0.57
		30	0.69
		40	0.80
93961	H1/4U-SS0010 TP0010-SS	10	0.50
		20	0.71
		30	0.87
		40	1.00
93962	H1/4U-SS0015 TP0015-SS	10	0.75
		20	1.06
		30	1.30
		40	1.50
93963	H1/4U-SS0020 TP0020-SS	10	1.00
		20	1.41
		30	1.73
		40	2.00
93964	H1/4U-SS0030 TP0030-SS	10	1.50
		20	2.12
		30	2.60
		40	3.00
93965	H1/4U-SS0040 TP0040-SS	10	2.00
		20	2.83
		30	3.46
		40	4.00
95379	H1/4U-SS0050	10	2.50
		20	3.54
		30	4.33
		40	5.00
9007647	H1/4U-SS0060	10	3.00
		20	4.24
		30	5.20
		40	6.00

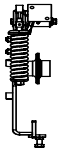
Orifice Plate I.D. Size

UM PN		Orifices GPM						
		5 PSI	10 PSI	20 PSI	30 PSI	40 PSI	50 PSI	60 PSI
TA862017	CP4916-40	0.072	0.102	0.144	0.177	0.204	0.228	0.250
TA862024	CP4916-49	0.104	0.148	0.209	0.255	0.295	0.330	0.361
TA862029	CP4916-57	0.141	0.200	0.283	0.346	0.400	0.447	0.490
TA862032	CP4916-63	0.174	0.246	0.347	0.425	0.491	0.549	0.601
TA862036	CP4916-70	0.216	0.306	0.433	0.530	0.612	0.684	0.750
TA862041	CP4916-80	0.280	0.397	0.561	0.687	0.793	0.887	0.971
TA862043	CP4916-83	0.317	0.449	0.634	0.777	0.897	1.00	1.10
TA862045	CP4916-89	0.346	0.490	0.693	0.849	0.980	1.10	1.20
TA862049	CP4916-98	0.442	0.625	0.884	1.08	1.25	1.40	1.53
TA862051	CP4916-107	0.518	0.733	1.04	1.27	1.47	1.64	1.79
TA862055	CP4916-125	0.693	0.980	1.39	1.70	1.96	2.19	2.40
TA862057	CP4916-132	0.774	1.10	1.55	1.90	2.19	2.45	2.68
TA862062	CP4916-151	1.04	1.47	2.08	2.55	2.94	3.29	3.60
TA862068	CP4916-177	1.41	2.00	2.83	3.46	4.00	4.47	4.90
TA862070	CP4916-187	1.56	2.21	3.12	3.82	4.41	4.93	5.40
TA862073	CP4916-218	2.11	2.98	4.21	5.16	5.96	6.66	7.30

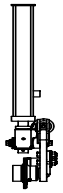
Overhead Layout - Legend

415752B
Coulter Post Assembly
(Straight Post)

Overhead View

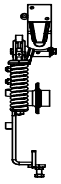


Front View

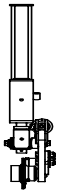


415754B
Coulter Post Assembly
(Offset Post)

Overhead View

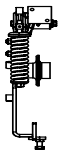


Front View

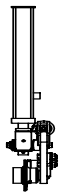


415753B
Center Coulter Post
Assembly (Straight Post)

Overhead View

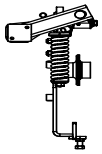


Front View

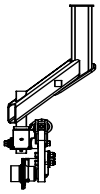


416601B - Coulter Post
Assembly (Double Offset
Left-Hand, Front)

Overhead View

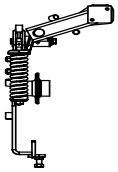


Front View

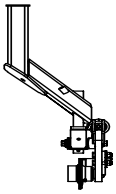


415756B - Coulter Post
Assembly (Double Offset
Left-Hand, Rear)

Overhead View

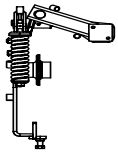


Front View

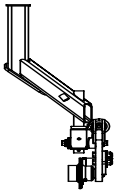


416602B - Coulter Post
Assembly (Double Offset
Right-Hand, Front)

Overhead View

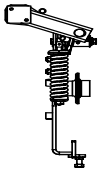


Front View

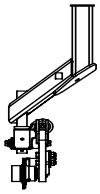


415758B - Coulter Post
Assembly (Double Offset
Right-Hand, Rear)

Overhead View

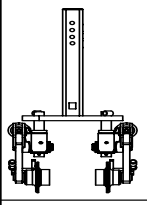


Front View

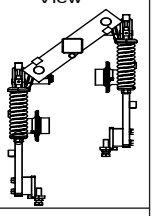


415757B - Double Coulter Post
Assembly Right-Hand

Front View



Overhead View



414887B
Coulter Mount
Weldment

Overhead View

Front View

414898B
Coulter Mount
Offset RH

Overhead View

Front View

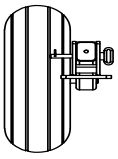
414899B
Coulter Mount
Offset LH

Overhead View

Front View

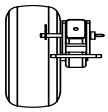
410014B - Gauge Wheel
Assembly
60911 - Mounted Tire &
Wheel (W815-6-08)

Overhead View



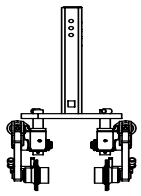
411261B - Gauge Wheel
Assembly
95567 - Mounted Tire &
Wheel (W610-6)

Overhead View

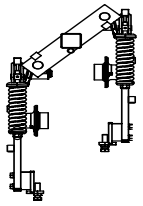


415763B - Center Double Coulter
Post Assembly Right-Hand

Front View



Overhead View



414894B
Coulter Mount
Offset LH

Overhead View

Front View

414895B
Coulter Mount
Offset RH

Overhead View

Front View

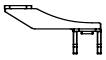
414902B
Coulter Mount
Weldment

Overhead View

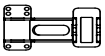
Front View

414896B
Coulter Mount
Offset LH

Overhead View

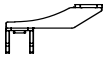


Front View

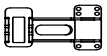


414897B
Coulter Mount
Offset LH

Overhead View

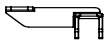


Front View

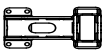


414902B
Coulter Mount
Offset Weldment

Overhead View

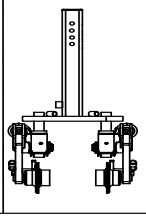


Front View

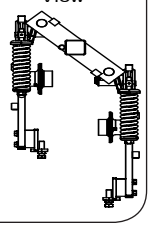


415755B
Double Coulter Post
Assembly Left-Hand

Front View

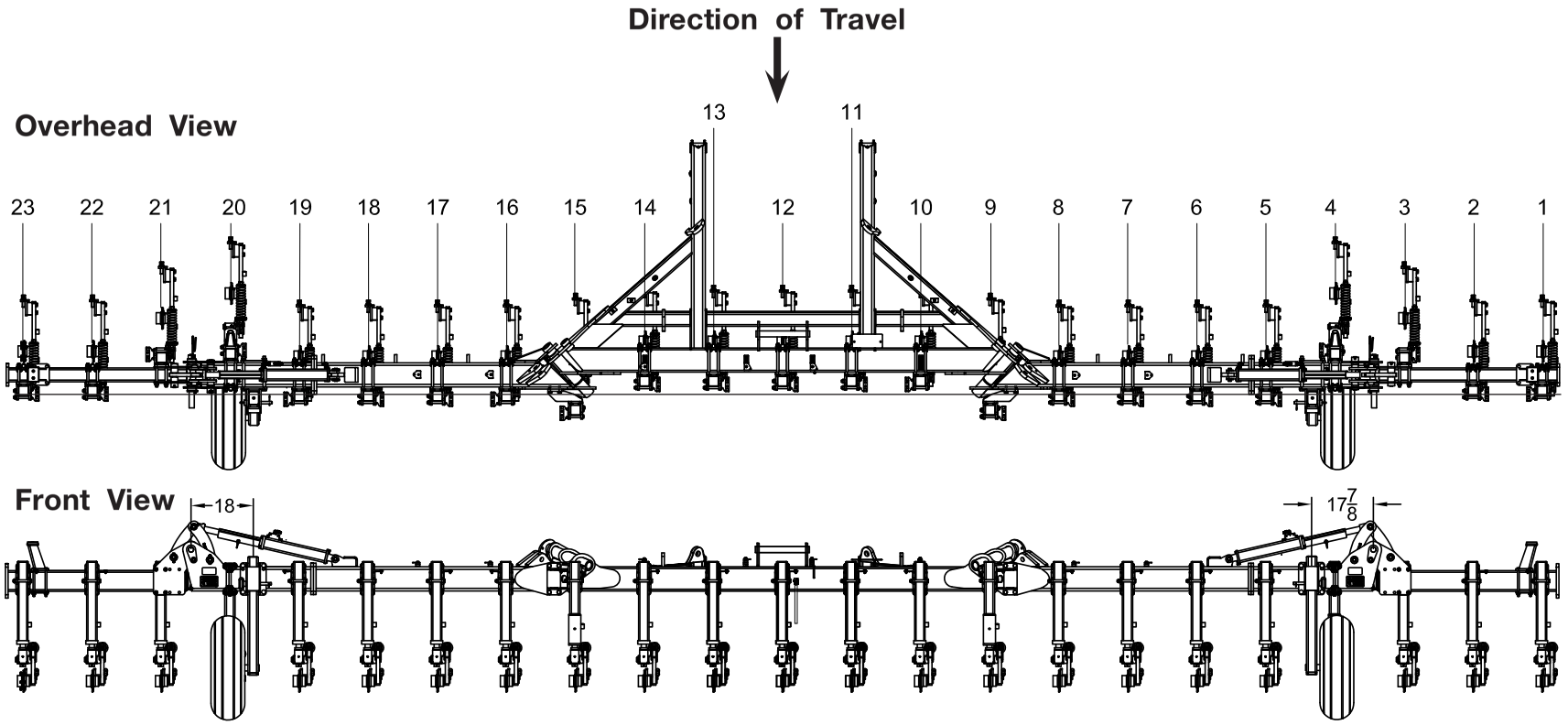


Overhead View



Overhead Layout - 40' Toolbar - 20" Row Spacing
For 1800 NutriMax

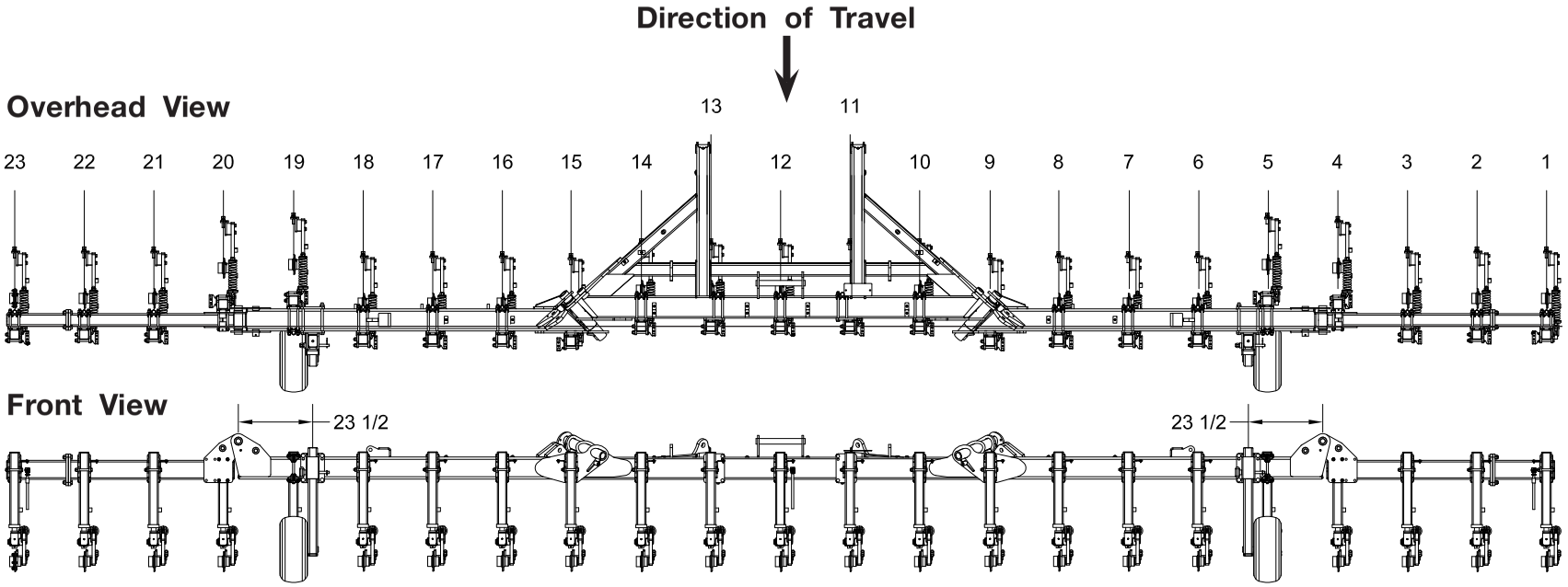
COULTER ROW	COULTER POST ASSEMBLY	COULTER MOUNT WELDMENT
1, 2, 3, 5, 6, 7, 8, 10, 11, 13, 14, 16, 17, 18, 19, 21, 22, 23	415752B - Straight Post	414887B - Coulter Mount Weldment
12	415753B - Center Straight Post	414887B - Coulter Mount Weldment
4, 20	415754B - Offset Post	414887B - Coulter Mount Weldment
9		414895B - Coulter Mount Weldment Offset Right-Hand
15		414894B - Coulter Mount Weldment Offset Left-Hand



"BOOM CAL" Monitor Settings						
TOOLBAR SIZE	SPACING	SECTION 1	SECTION 2	SECTION 3	SECTION 4	SECTION 5
40'	20"	90"	100"	100"	100"	90"

Overhead Layout - 44' Toolbar - 22" Row Spacing For 1800 Nutrimax

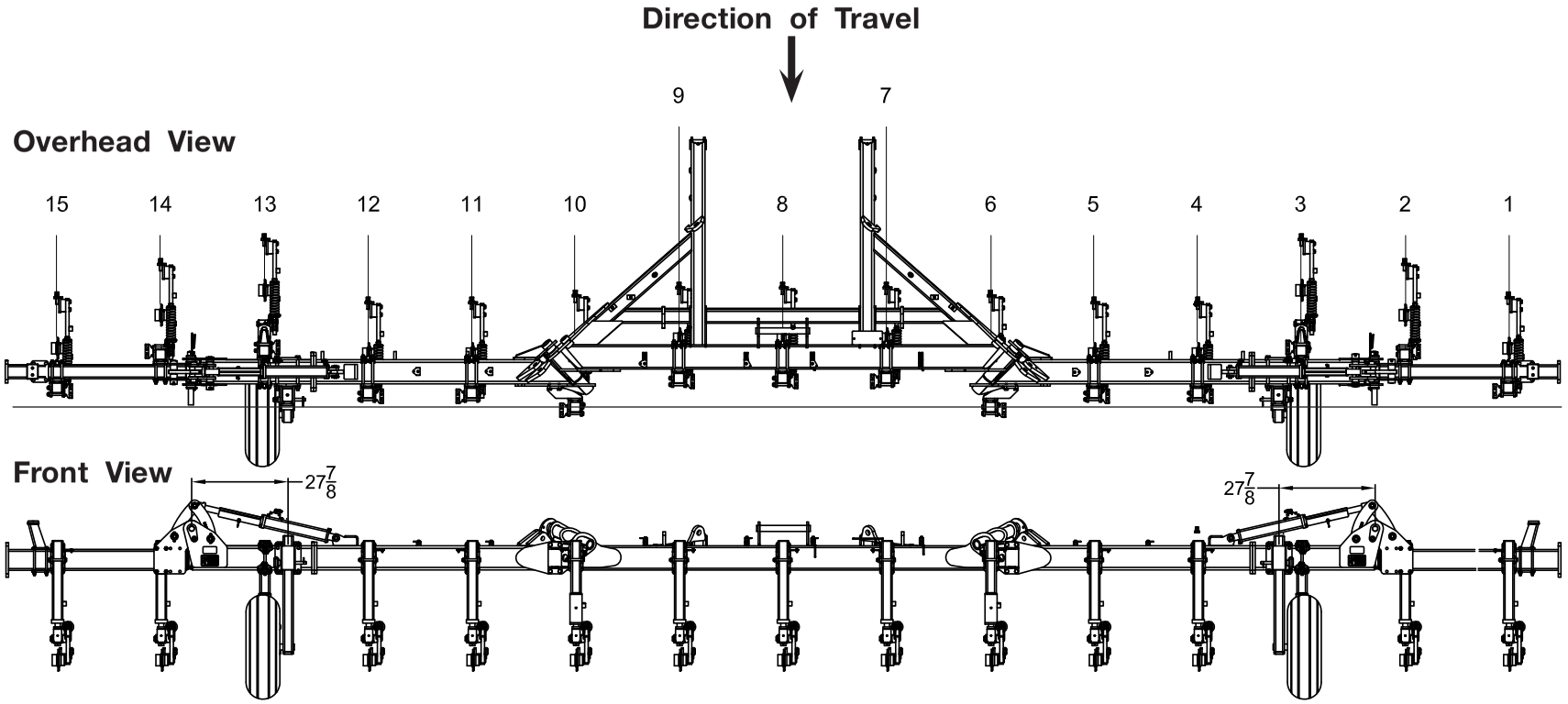
COULTER ROW	COULTER POST ASSEMBLY	COULTER MOUNT WELDMENT
4, 20	415752B - Straight Post	414902B - Coulter Mount Weldment
1, 2, 3, 6, 7, 8, 9, 10, 14, 15, 16, 17, 18, 21, 22, 23		414887B - Coulter Mount Weldment
11		414899B - Coulter Mount Weldment Offset Right-Hand
13		414898B - Coulter Mount Weldment Offset Left-Hand
12	415753B - Center Straight Post	414887B - Coulter Mount Weldment
5, 19	415754B - Offset Post	414887B - Coulter Mount Weldment



"BOOM CAL" Monitor Settings						
TOOLBAR SIZE	SPACING	SECTION 1	SECTION 2	SECTION 3	SECTION 4	SECTION 5
44'	22"	99"	110"	110"	110"	99"

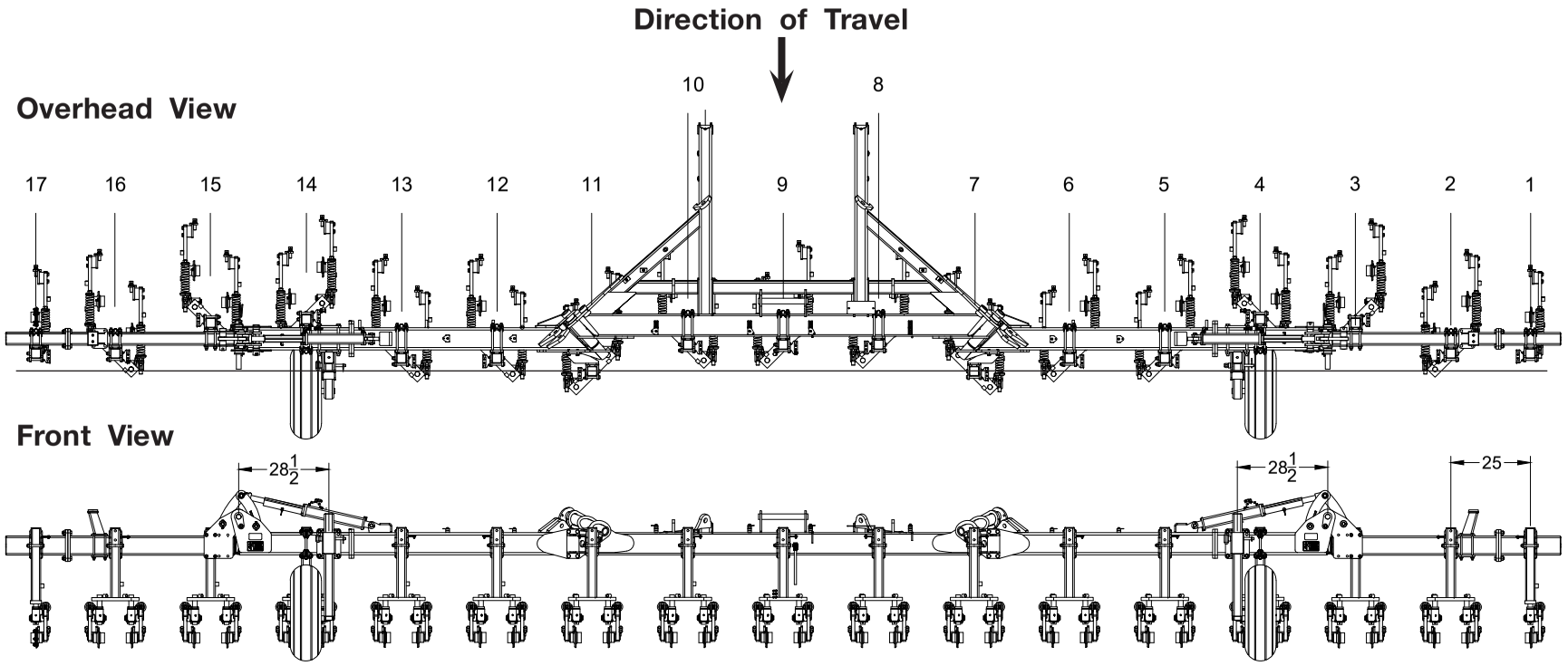
Overhead Layout - 40' Toolbar - 30" Row Spacing
For 1800 NutriMax

COULTER ROW	COULTER POST ASSEMBLY	COULTER MOUNT WELDMENT
1, 2, 4, 5, 7, 9, 11, 12, 14, 15	415752B - Straight Post	414887B - Coulter Mount Weldment
8	415753B - Center Straight Post	414887B - Coulter Mount Weldment
3, 13	415754B - Offset Post	414887B - Coulter Mount Weldment
6		414895B - Coulter Mount Weldment Offset Right-Hand
10		414894B - Coulter Mount Weldment Offset Left-Hand



"BOOM CAL" Monitor Settings						
TOOLBAR SIZE	SPACING	SECTION 1	SECTION 2	SECTION 3	SECTION 4	SECTION 5
40'	30"	75"	120"	90"	120"	75"

COULTER ROW	COULTER POST ASSEMBLY	COULTER MOUNT WELDMENT
1, 17	415752B - Straight Post	414887B - Coulter Mount Weldment
9	415763B - Center Double Coulter Assembly RH	414887B - Coulter Mount Weldment
4, 10, 12, 13, 15, 16	415755B - Double Coulter Assembly LH	414887B - Coulter Mount Weldment
7		414895B - Coulter Mount Weldment Offset Right-Hand
2, 3, 5, 6, 8, 14	415757B - Double Coulter Assembly RH	414887B - Coulter Mount Weldment
11		414894B - Coulter Mount Weldment Offset Left-Hand



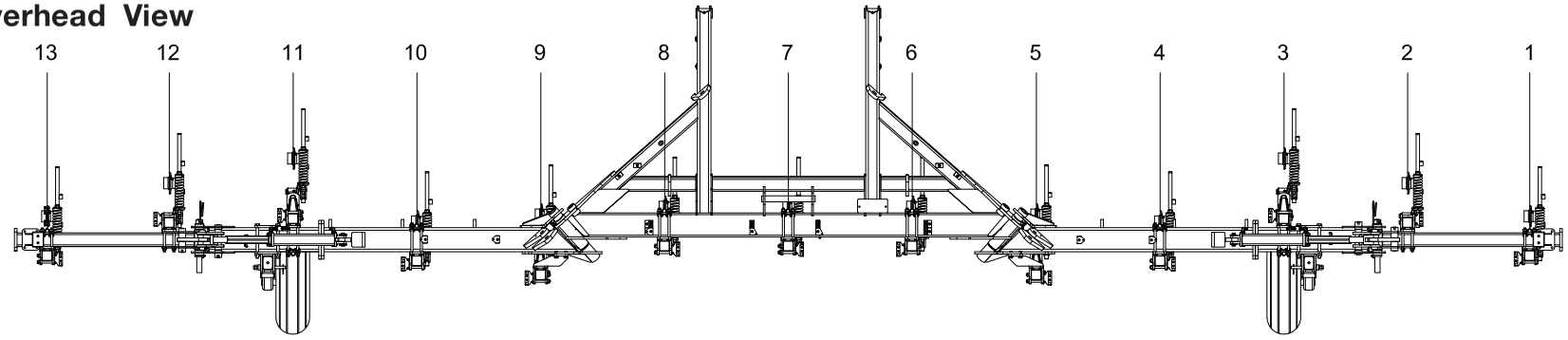
"BOOM CAL" Monitor Settings						
TOOLBAR SIZE	SPACING	SECTION 1	SECTION 2	SECTION 3	SECTION 4	SECTION 5
40'	30"	75"	120"	90"	120"	75"

Overhead Layout - 40' Toolbar - 36" Row Spacing
For 1800 NutriMax

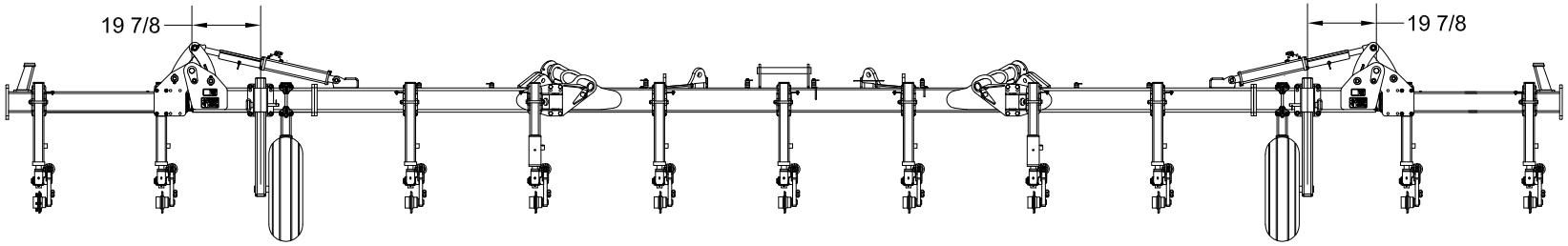
COULTER ROW	COULTER POST ASSEMBLY	COULTER MOUNT WELDMENT
1, 2, 4, 6, 8, 10, 12, 13	415752B - Straight Post	414887B - Coulter Mount Weldment
7	415753B - Center Straight Post	414887B - Coulter Mount Weldment
3, 11	415754B - Offset Post	414887B - Coulter Mount Weldment
9		414895B - Coulter Mount Weldment Offset Right-Hand
5		414894B - Coulter Mount Weldment Offset Left-Hand

Direction of Travel

Overhead View



Front View



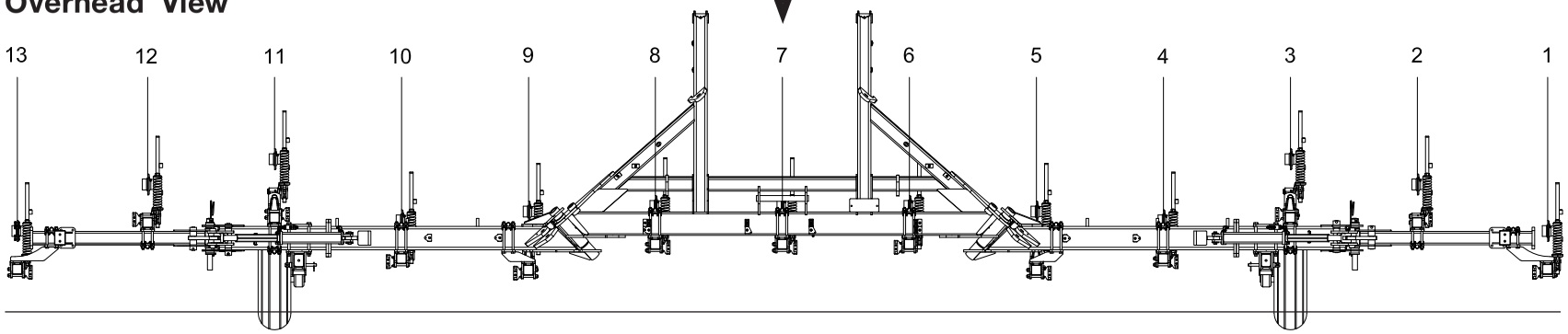
"BOOM CAL" Monitor Settings						
TOOLBAR SIZE	SPACING	SECTION 1	SECTION 2	SECTION 3	SECTION 4	SECTION 5
40'	36"	72"	90"	108"	90"	72"

Overhead Layout - 40' Toolbar - 38" Row Spacing For 1800 NutriMax

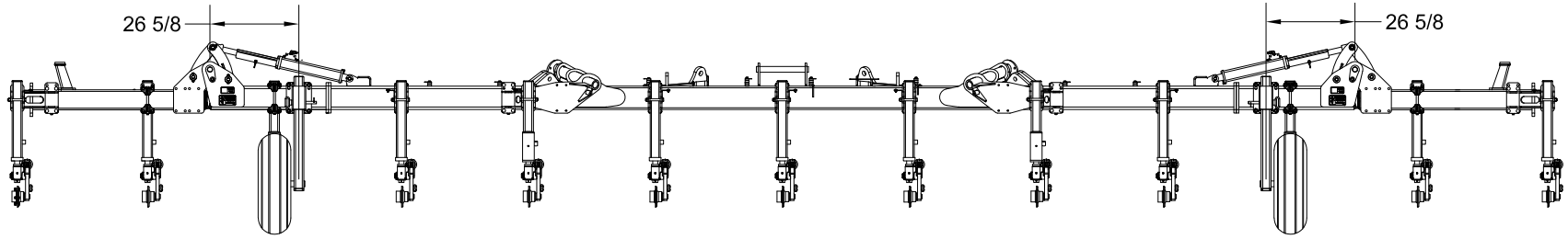
COULTER ROW	COULTER POST ASSEMBLY	COULTER MOUNT WELDMENT
2, 4, 6, 8, 10, 12	415752B - Straight Post	414887B - Coulter Mount Weldment
1		414896B - Coulter Mount Weldment Offset Left-Hand
13		414897B - Coulter Mount Weldment Offset Right-Hand
7	415753B - Center Straight Post	414887B - Coulter Mount Weldment
3, 11	415754B - Offset Post	414887B - Coulter Mount Weldment
5		414895B - Coulter Mount Weldment Offset Right-Hand
9		414894B - Coulter Mount Weldment Offset Left-Hand

Direction of Travel

Overhead View



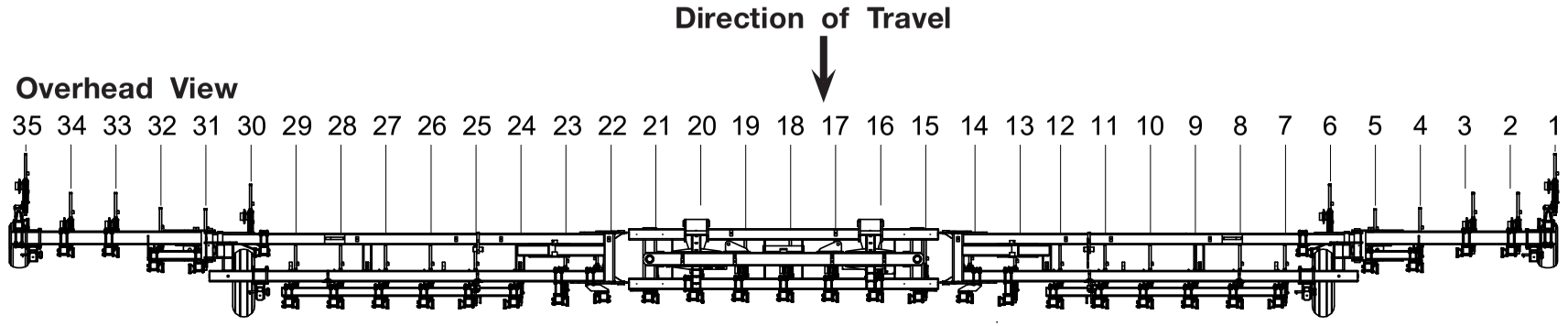
Front View

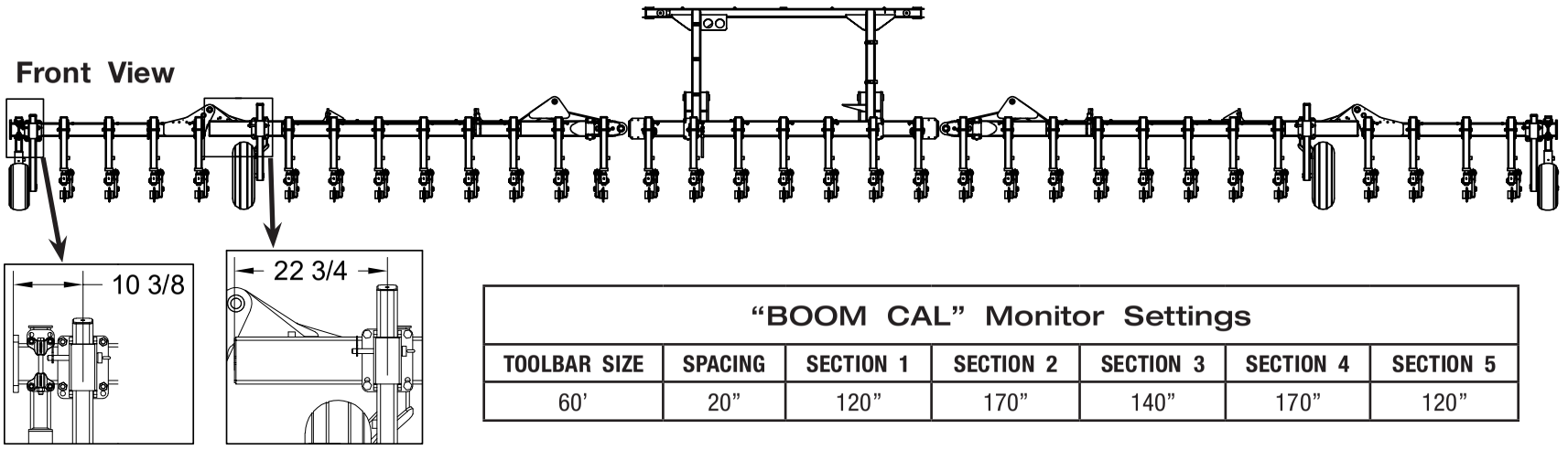


"BOOM CAL" Monitor Settings						
TOOLBAR SIZE	SPACING	SECTION 1	SECTION 2	SECTION 3	SECTION 4	SECTION 5
40'	38"	76"	95"	114"	95"	76"

Overhead Layout - 60' Toolbar - 20" Row Spacing
Offset Coulter Post

COULTER ROW	COULTER POST ASSEMBLY	COULTER MOUNT WELDMENT
1, 35	415754B - Offset Post	414887B - Coulter Mount Weldment
6	415756B - Double Offset Left-Hand, Rear	
30	415758B - Double Offset Right-Hand, Rear	





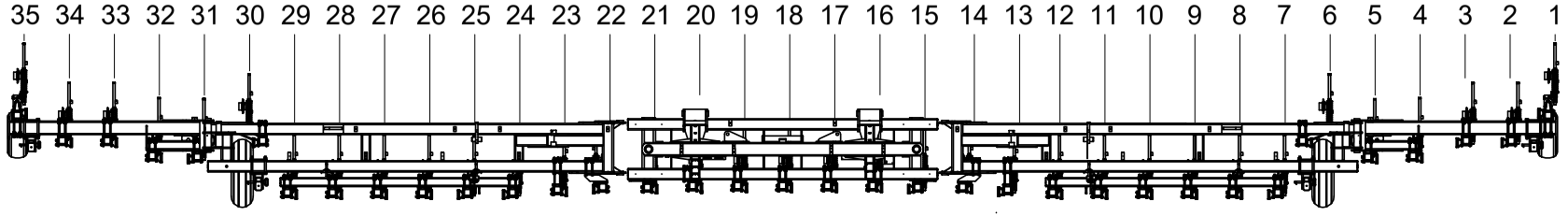
"BOOM CAL" Monitor Settings						
TOOLBAR SIZE	SPACING	SECTION 1	SECTION 2	SECTION 3	SECTION 4	SECTION 5
60'	20"	120"	170"	140"	170"	120"

Overhead Layout - 60' Toolbar - 20" Row Spacing
Straight Coulter Post

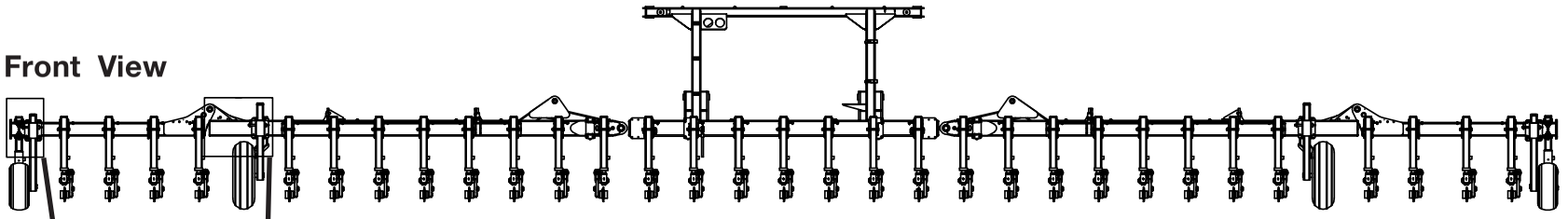
COULTER ROW	COULTER POST ASSEMBLY	COULTER MOUNT WELDMENT
18	415753B - Center Coulter Straight Post	414887B - Coulter Mount Weldment
2, 3, 4, 5, 7, 8, 9, 10, 11, 12, 15, 17, 19, 21, 24, 25, 26, 27, 28, 29, 31, 32, 33, 34	415752B - Straight Post	
16		414898B - Coulter Mount Weldment Offset Right-Hand
20		414899B - Coulter Mount Weldment Offset Left-Hand
13, 23		414902B - Coulter Mount Weldment
14		414895B - Coulter Mount Offset Right-Hand
22		414894B - Coulter Mount Offset Left-Hand

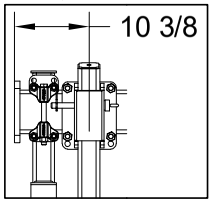
Direction of Travel

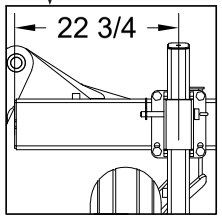
Overhead View



Front View



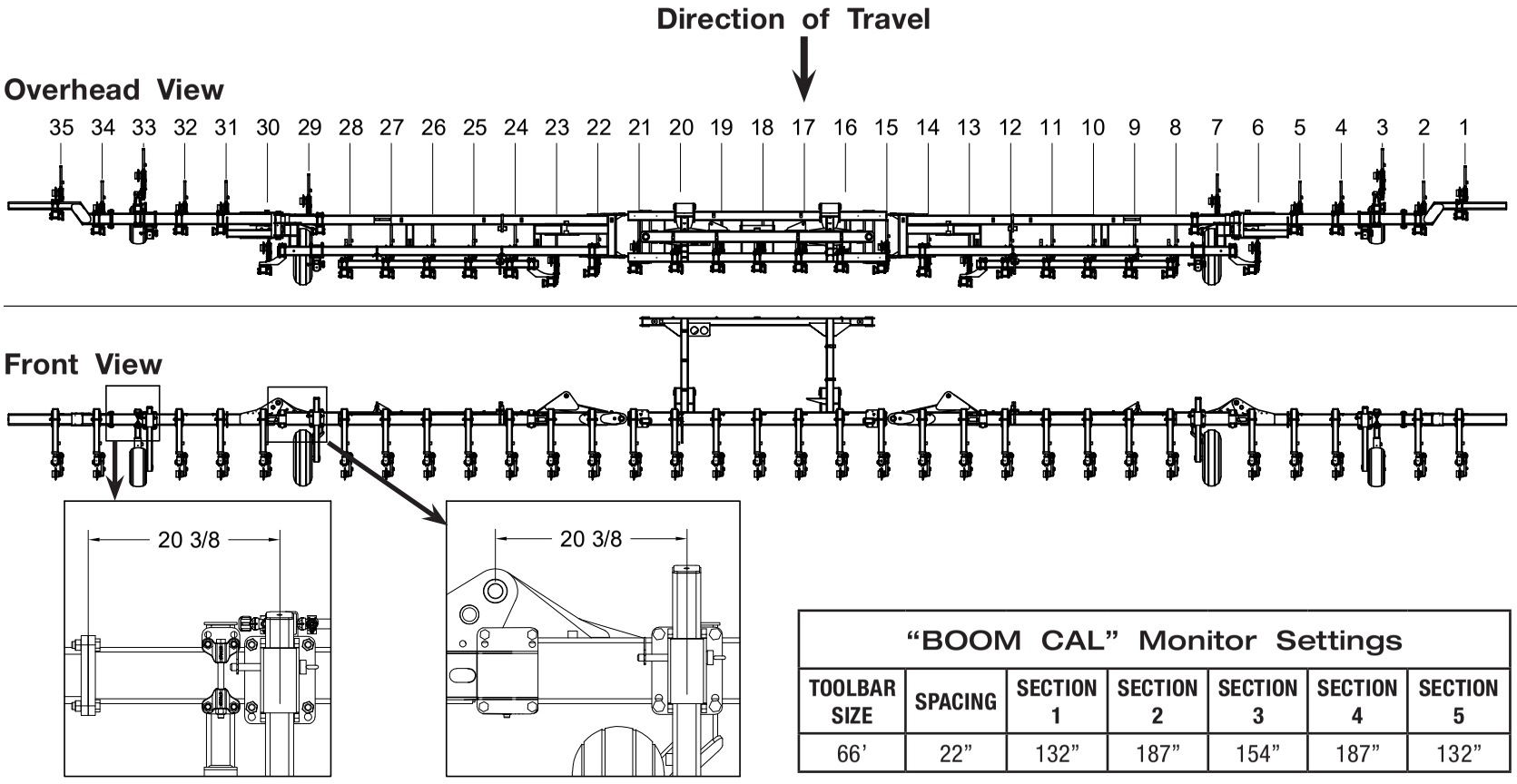




"BOOM CAL" Monitor Settings						
TOOLBAR SIZE	SPACING	SECTION 1	SECTION 2	SECTION 3	SECTION 4	SECTION 5
60'	20"	120"	170"	140"	170"	120"

Overhead Layout - 66' Toolbar - 22" Row Spacing
Offset Coulter Post

COULTER ROW	COULTER POST ASSEMBLY	COULTER MOUNT WELDMENT
3, 33	415754B - Offset Post	414887B - Coulter Mount Weldment
7	415756B - Double Offset Left-Hand, Rear	
29	415758B - Double Offset Right-Hand, Rear	



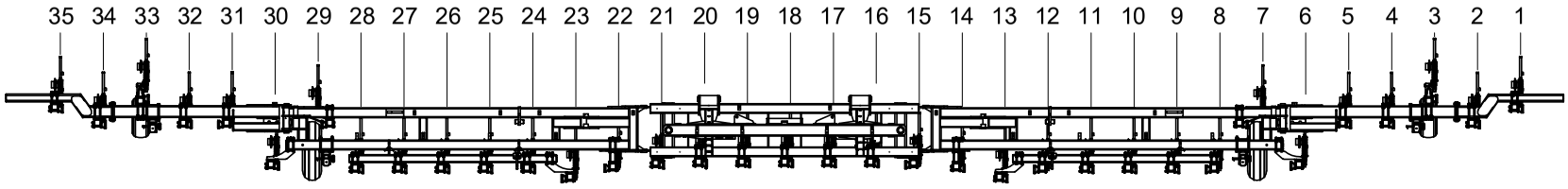
"BOOM CAL" Monitor Settings						
TOOLBAR SIZE	SPACING	SECTION 1	SECTION 2	SECTION 3	SECTION 4	SECTION 5
66'	22"	132"	187"	154"	187"	132"

Overhead Layout - 66' Toolbar - 22" Row Spacing
Straight Coulter Post

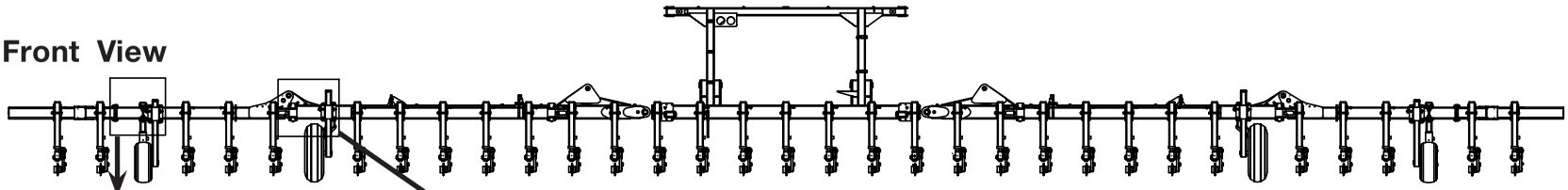
COULTER ROW	COULTER POST ASSEMBLY	COULTER MOUNT WELDMENT
18	415753B - Center Coulter Straight Post	414887B - Coulter Mount Weldment
1, 2, 4, 5, 8, 9, 10, 11, 12, 15, 16, 17, 19, 20, 21, 24, 25, 26, 27, 28, 31, 32, 34, 35	415752B - Straight Post	
6		414896B - Coulter Mount Offset Left-Hand
14, 22		414902B - Coulter Mount Weldment
30		414897B - Coulter Mount Weldment Offset Right-Hand
13, 23		416944B - Coulter Mount Offset Weldment

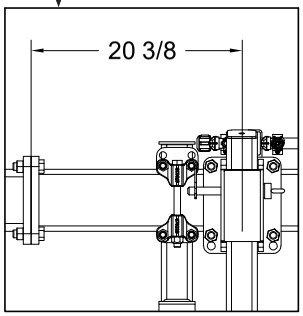
Direction of Travel

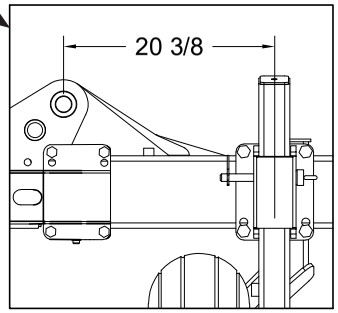
Overhead View



Front View



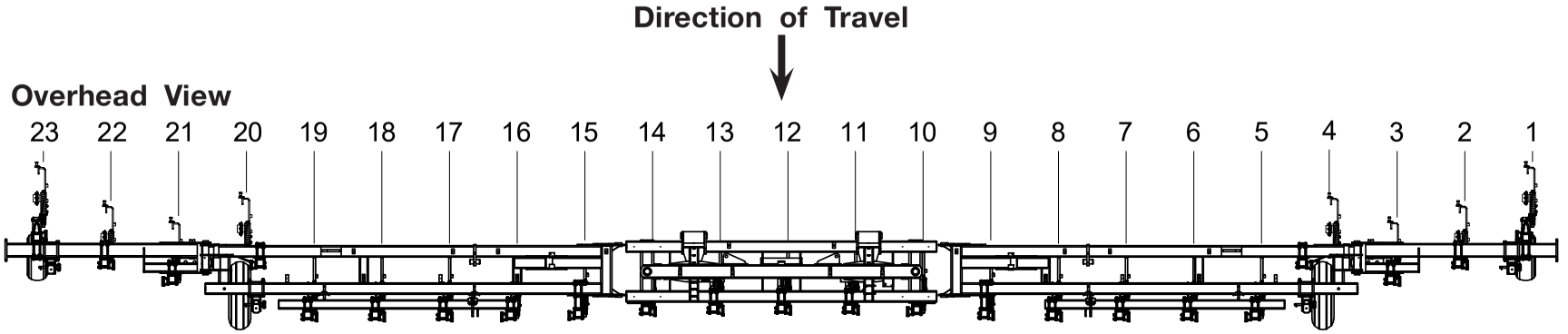


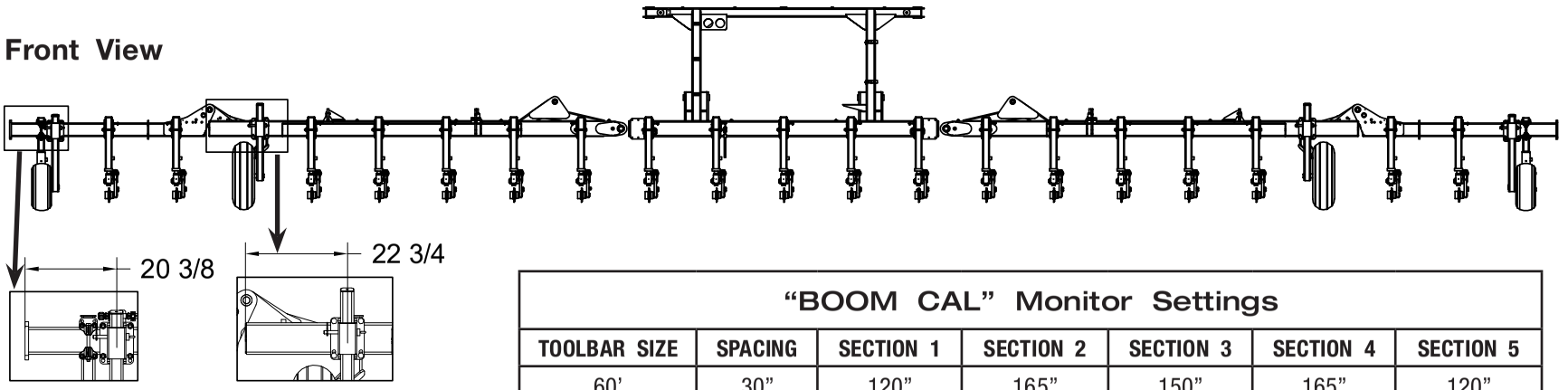


"BOOM CAL" Monitor Settings						
TOOLBAR SIZE	SPACING	SECTION 1	SECTION 2	SECTION 3	SECTION 4	SECTION 5
66'	22"	132"	187"	154"	187"	132"

Overhead Layout - 60' Toolbar - 30" Row Spacing
Offset Coulter Post

COULTER ROW	COULTER POST ASSEMBLY	COULTER MOUNT WELDMENT
1, 23	415754B - Offset Post	414887B - Coulter Mount Weldment
4	415756B - Double Offset Left-Hand, Rear	
20	415758B - Double Offset Right-Hand, Rear	

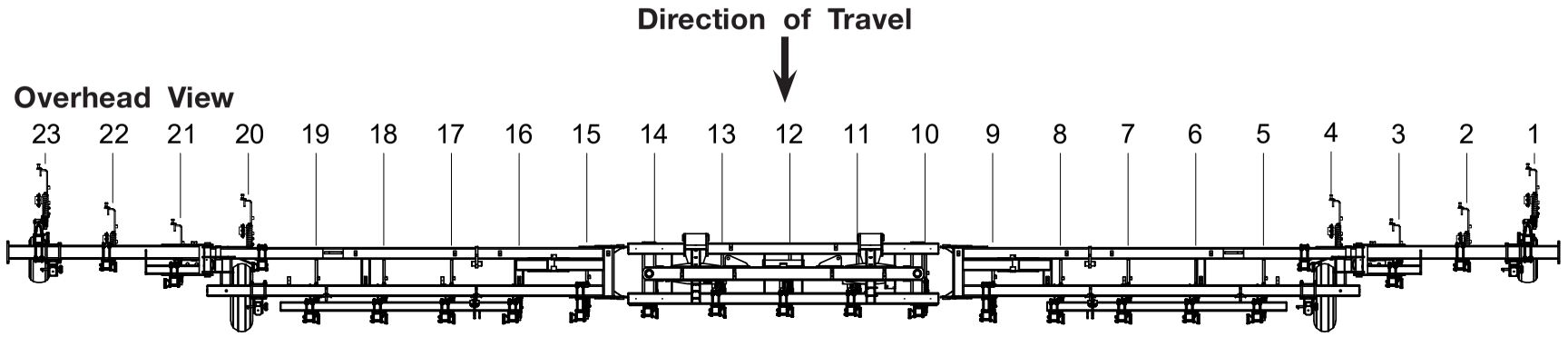


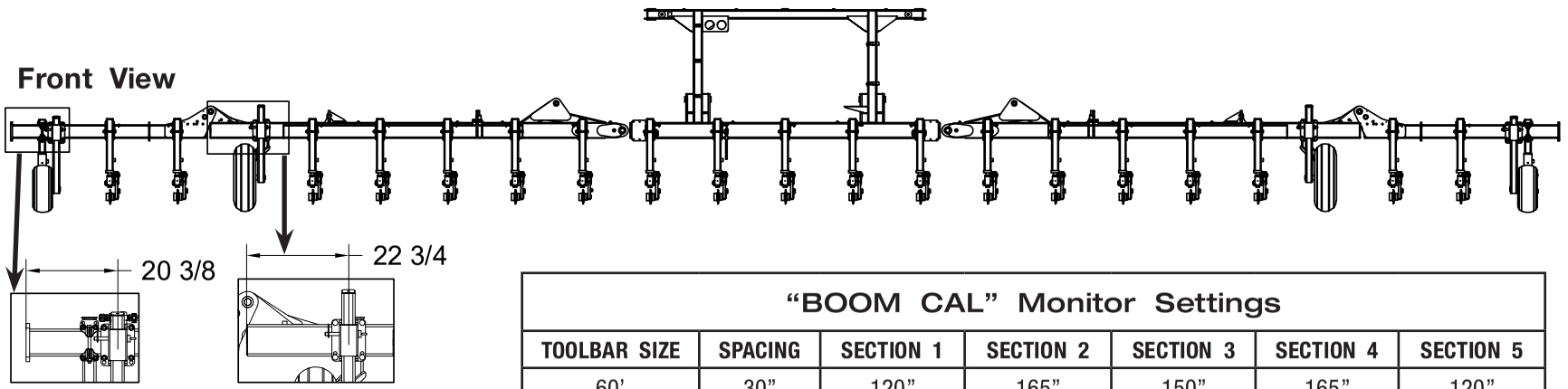


"BOOM CAL" Monitor Settings						
TOOLBAR SIZE	SPACING	SECTION 1	SECTION 2	SECTION 3	SECTION 4	SECTION 5
60'	30"	120"	165"	150"	165"	120"

Overhead Layout - 60' Toolbar - 30" Row Spacing
Straight Coulter Post

COULTER ROW	COULTER POST ASSEMBLY	COULTER MOUNT WELDMENT
12	415753B - Center Coulter Straight Post	414887B - Coulter Mount Weldment
2, 3, 5, 6, 7, 8, 10, 11, 13, 14, 16, 17, 18, 19, 21, 22	415752B - Straight Post	
9, 15		414902B - Coulter Mount Weldment





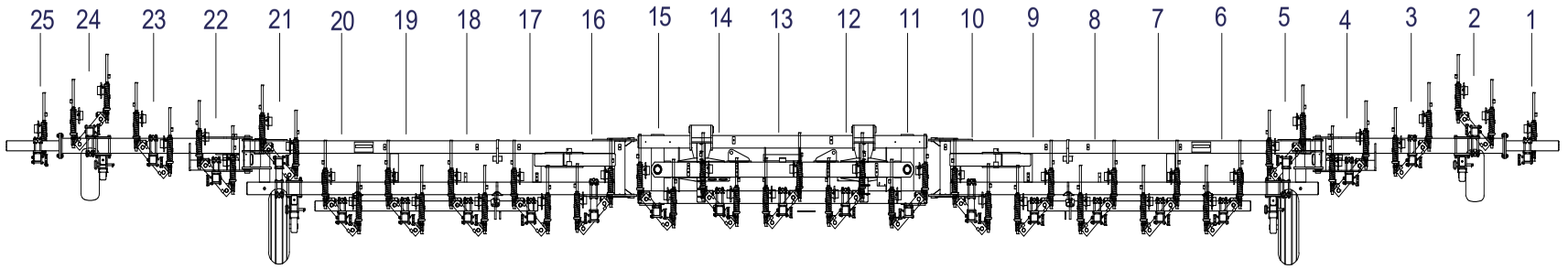
"BOOM CAL" Monitor Settings						
TOOLBAR SIZE	SPACING	SECTION 1	SECTION 2	SECTION 3	SECTION 4	SECTION 5
60'	30"	120"	165"	150"	165"	120"

Overhead Layout - 60' Toolbar - 30" Row Spacing
Double Coulter Post

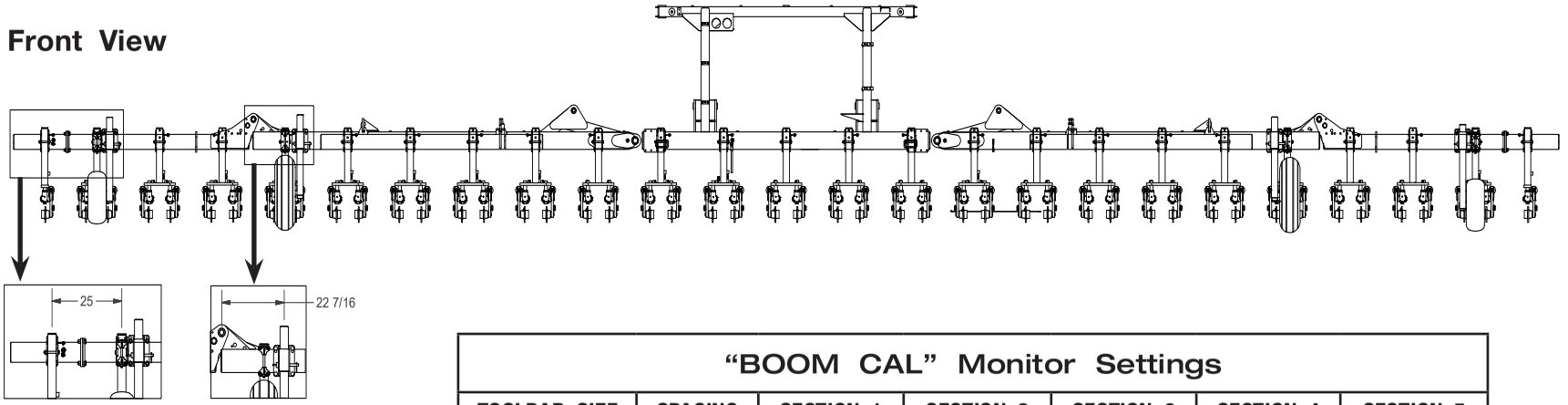
COULTER ROW	COULTER POST ASSEMBLY	COULTER MOUNT WELDMENT
2, 14, 15, 17, 18, 19, 20, 22, 23	415755B - Double Coulter Post Left-Hand Lead	414887B - Coulter Mount Weldment
3, 4, 6, 7, 8, 9, 11, 12, 24	415757B - Double Coulter Post Right-Hand Lead	
13	415763B - Center Double Coulter Post Right-Hand Lead	
10, 21	415755B - Double Coulter Post Left-Hand Lead	414902B - Coulter Mount Weldment
5, 16	415757B - Double Coulter Post Right-Hand Lead	
1, 25	415752B - Straight Post	414887B - Coulter Mount Weldment

Direction of Travel

Overhead View



Front View



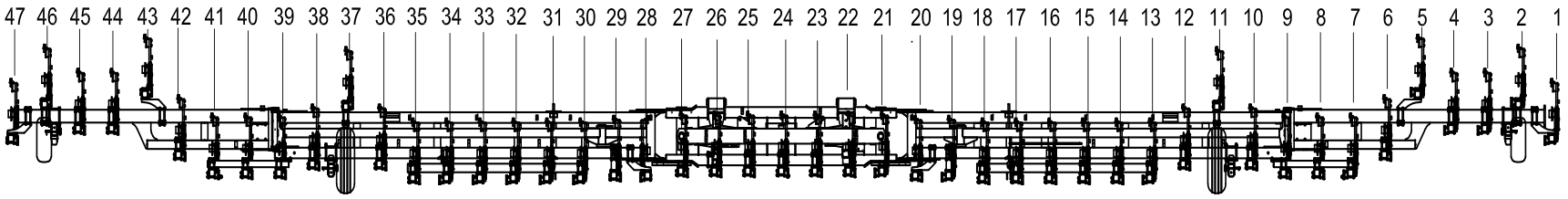
"BOOM CAL" Monitor Settings						
TOOLBAR SIZE	SPACING	SECTION 1	SECTION 2	SECTION 3	SECTION 4	SECTION 5
60'	30"	120"	165"	150"	165"	120"

Overhead Layout - 80' Toolbar - 20" Row Spacing
Straight Coulter Post

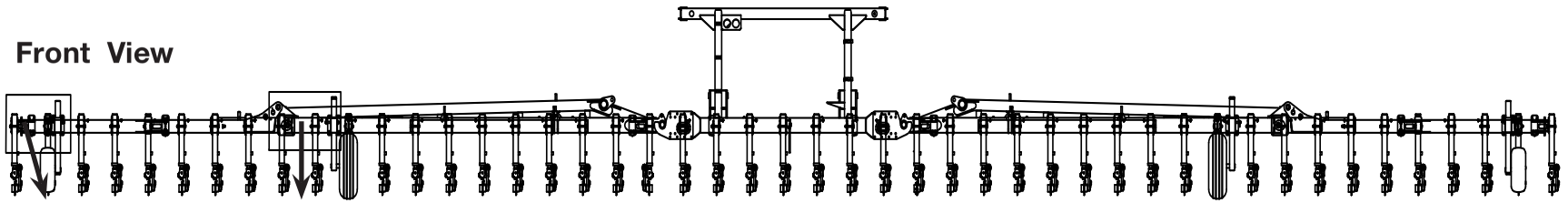
COULTER ROW	COULTER POST ASSEMBLY	COULTER MOUNT WELDMENT
24	415753B - Center Coulter Straight Post	414887B - Coulter Mount Weldment
2, 3, 4, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 23, 25, 30, 31, 32, 33, 34, 35, 36, 37, 38, 39, 40, 41, 42, 44, 45, 46	415752B - Straight Post	
22		414898B - Coulter Mount Weldment Offset Right-Hand
26		414899B - Coulter Mount Weldment Offset Left-Hand
1, 43		414896B - Coulter Mount Offset Left-Hand
5, 20, 47		414897B - Coulter Mount Weldment Offset Right-Hand
19, 21, 27, 29		414902B - Coulter Mount Weldment
28	415759B - Straight Post Right-Hand	414896B - Coulter Mount Offset Left-Hand

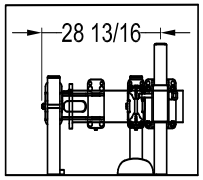
Direction of Travel

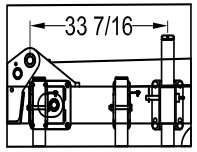
Overhead View



Front View



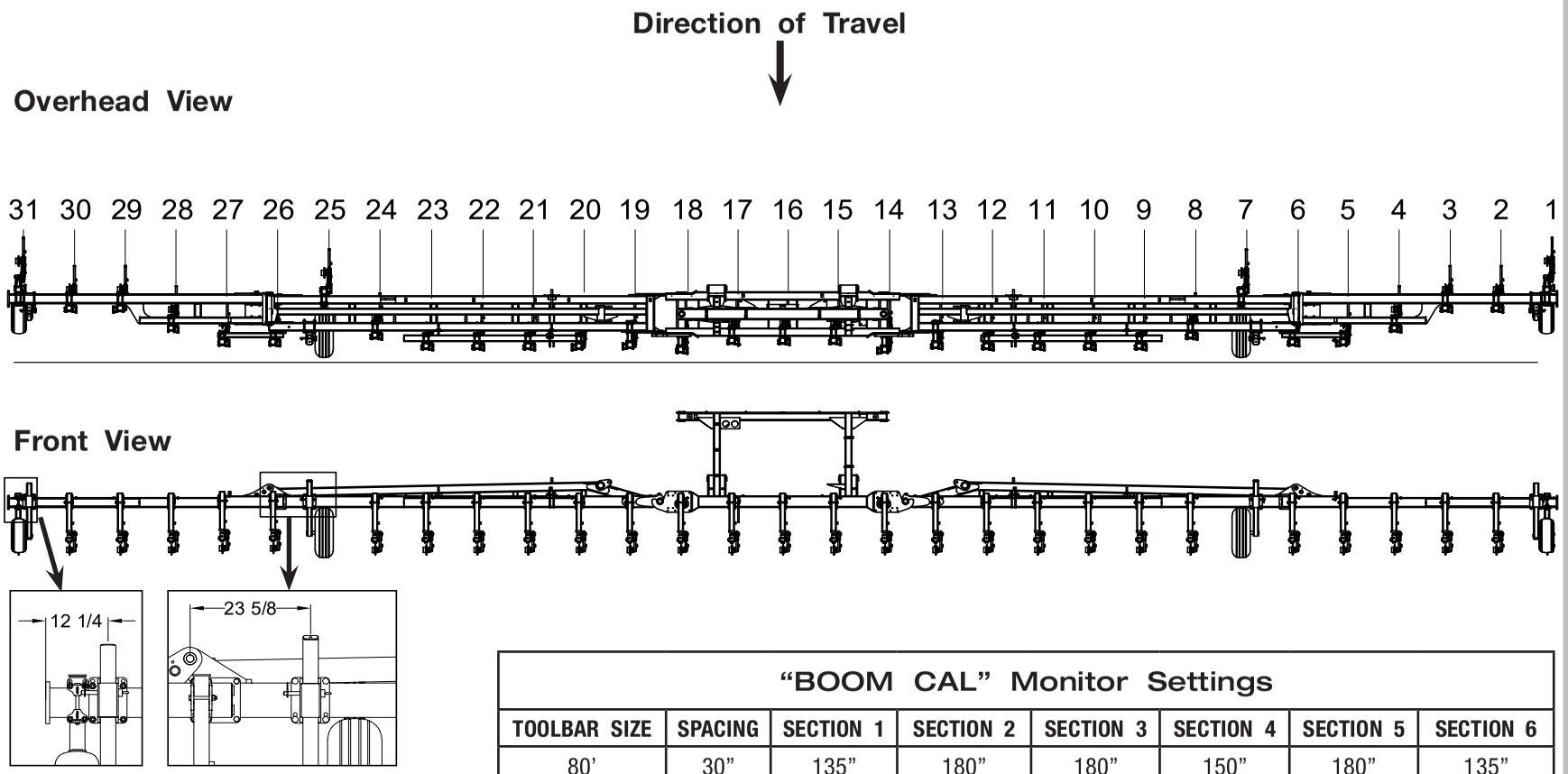




"BOOM CAL" Monitor Settings							
TOOLBAR SIZE	SPACING	SECTION 1	SECTION 2	SECTION 3	SECTION 4	SECTION 5	SECTION 6
80'	20"	130"	160"	200"	180"	160"	130"

Overhead Layout - 80' Toolbar - 30" Row Spacing
Offset Coulter Post

COULTER ROW	COULTER POST ASSEMBLY	COULTER MOUNT WELDMENT
1, 31	415754B - Offset Post	414887B - Coulter Mount Weldment



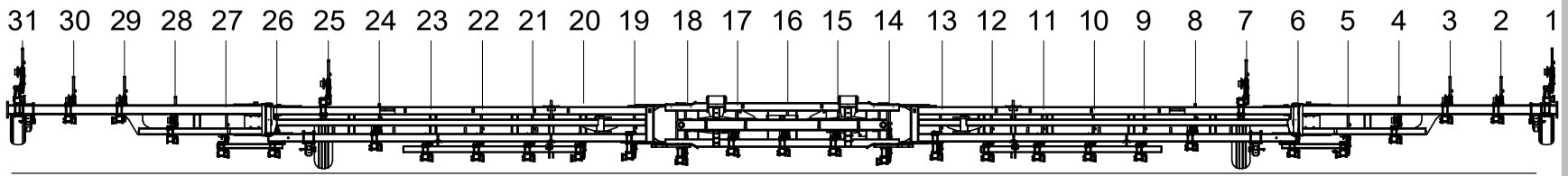
"BOOM CAL" Monitor Settings							
TOOLBAR SIZE	SPACING	SECTION 1	SECTION 2	SECTION 3	SECTION 4	SECTION 5	SECTION 6
80'	30"	135"	180"	180"	150"	180"	135"

Overhead Layout - 80' Toolbar - 30" Row Spacing
Straight Coulter Post

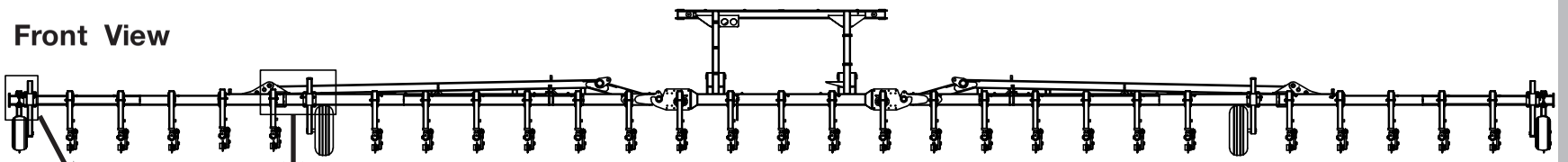
COULTER ROW	COULTER POST ASSEMBLY	COULTER MOUNT WELDMENT
16	415753B - Center Coulter Straight Post	414887B - Coulter Mount Weldment
2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 15, 17, 20, 21, 22, 23, 24, 25, 26, 27, 28, 29, 30	415752B - Straight Post	
13, 14, 18, 19		414902B - Coulter Mount Weldment

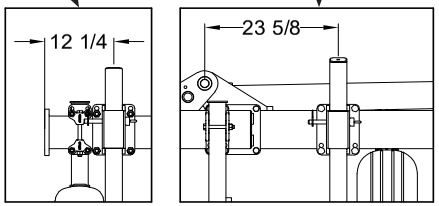
Direction of Travel

Overhead View



Front View

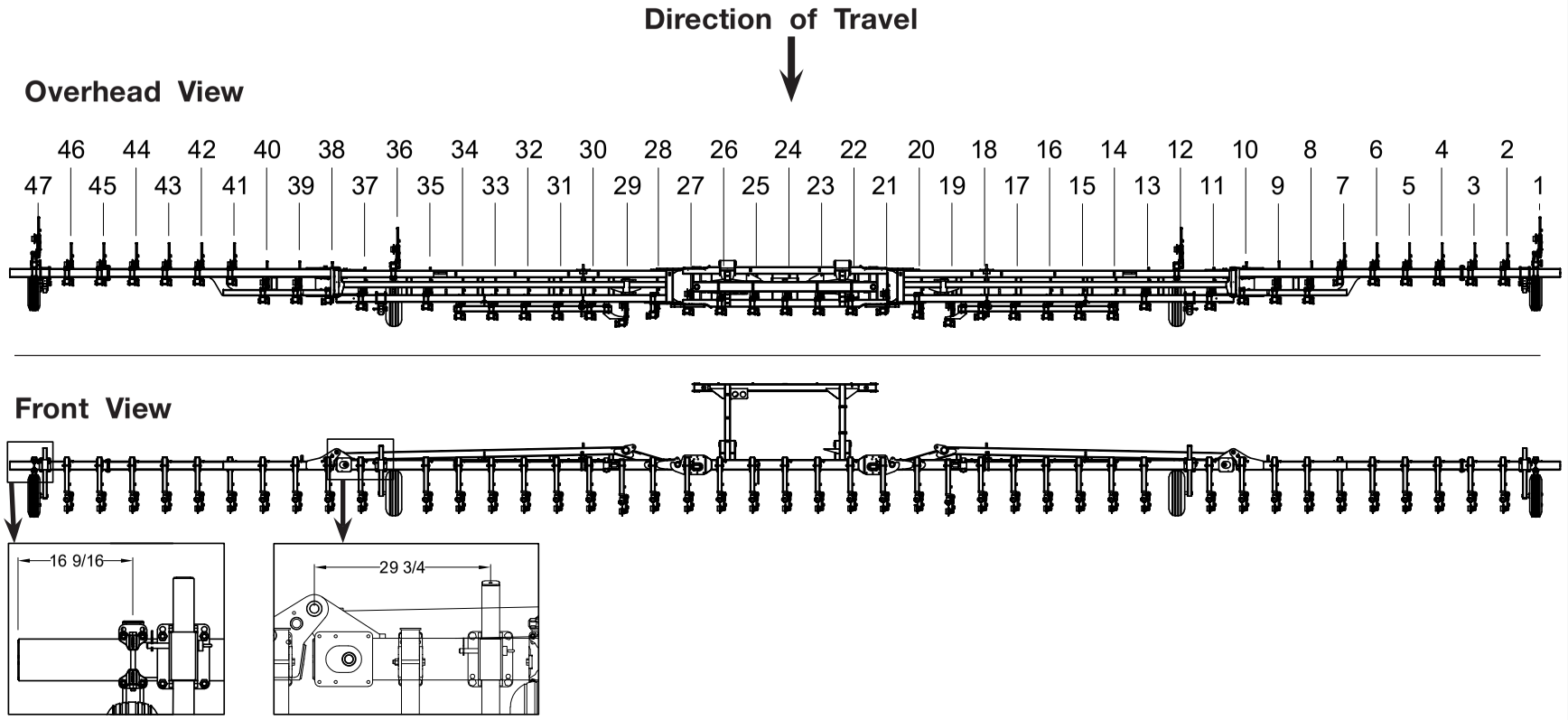




"BOOM CAL" Monitor Settings							
TOOLBAR SIZE	SPACING	SECTION 1	SECTION 2	SECTION 3	SECTION 4	SECTION 5	SECTION 6
80'	30"	135"	180"	180"	150"	180"	135"

Overhead Layout - 88' Toolbar - 22" Row Spacing
Offset Coulter Post

COULTER ROW	COULTER POST ASSEMBLY	COULTER MOUNT WELDMENT
1, 47	415754B - Offset Post	414887B - Coulter Mount Weldment



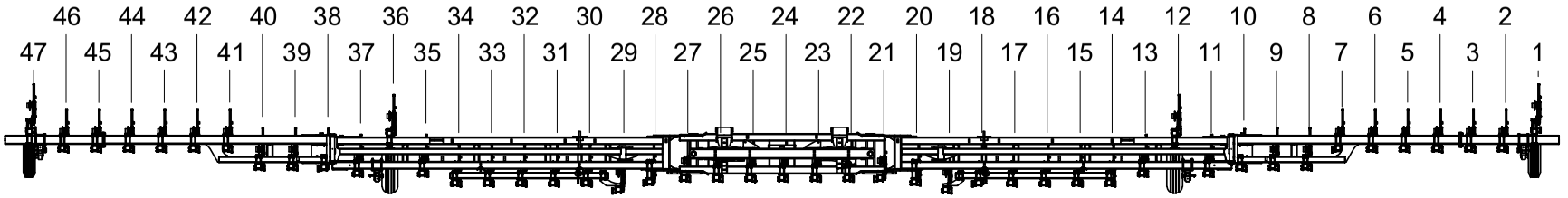
"BOOM CAL" Monitor Settings							
TOOLBAR SIZE	SPACING	SECTION 1	SECTION 2	SECTION 3	SECTION 4	SECTION 5	SECTION 6
88'	22"	231"	154"	154"	132"	154"	231"

Overhead Layout - 88' Toolbar - 22" Row Spacing
Straight Coulter Post

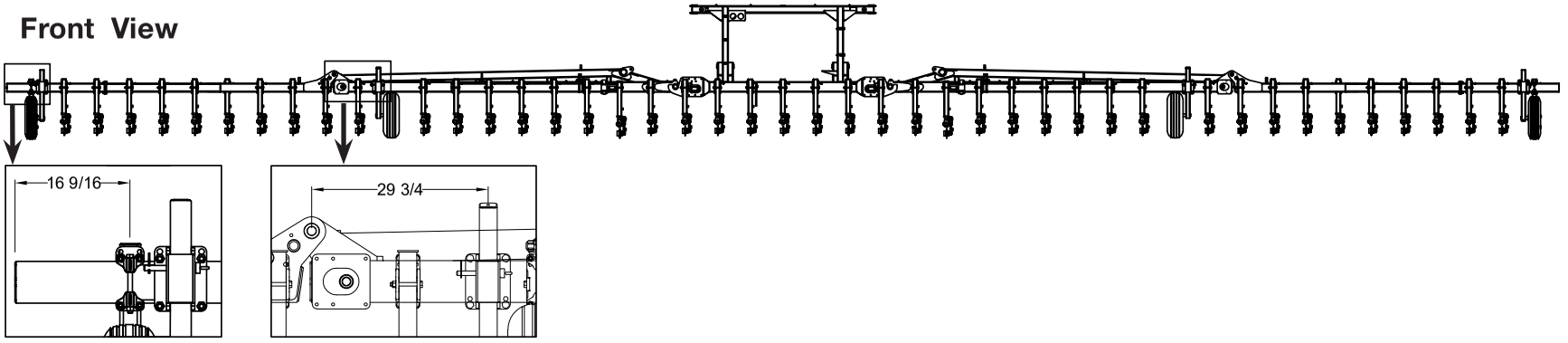
COULTER ROW	COULTER POST ASSEMBLY	COULTER MOUNT WELDMENT
19	415753B - Center Coulter Straight Post	414896B - Coulter Mount Offset Left-Hand
29		414897B - Coulter Mount Weldment Offset Right-Hand
24		414887B - Coulter Mount Weldment
2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 22, 23, 25, 26, 30, 31, 32, 33, 34, 35, 36, 37, 38, 39, 40, 41, 42, 43, 44, 45, 46	415752B - Straight Post	
20, 21, 27, 28		414902B - Coulter Mount Weldment

Direction of Travel

Overhead View



Front View

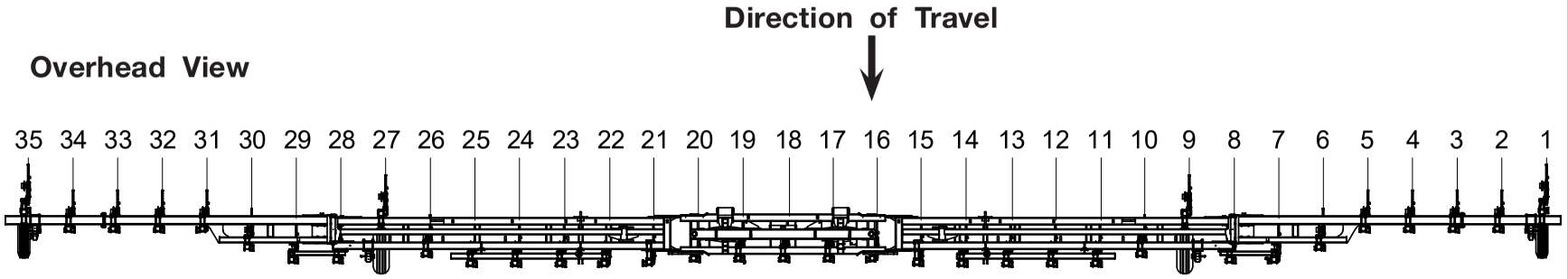


"BOOM CAL" Monitor Settings							
TOOLBAR SIZE	SPACING	SECTION 1	SECTION 2	SECTION 3	SECTION 4	SECTION 5	SECTION 6
88'	22"	231"	154"	154"	132"	154"	231"

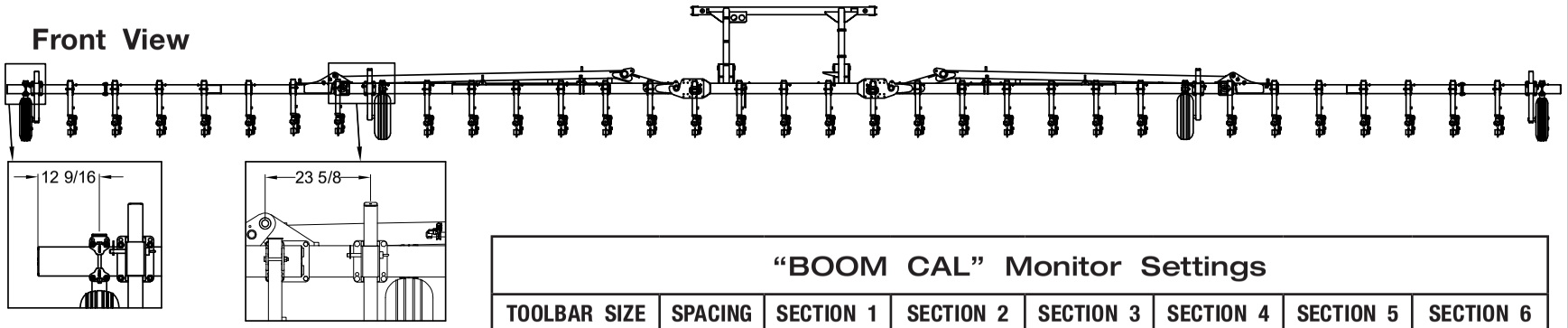
Overhead Layout - 90' Toolbar - 30" Row Spacing
Offset Coulter Post

COULTER ROW	COULTER POST ASSEMBLY	COULTER MOUNT WELDMENT
1, 35	415754B - Offset Post	414887B - Coulter Mount Weldment

Overhead View



Front View

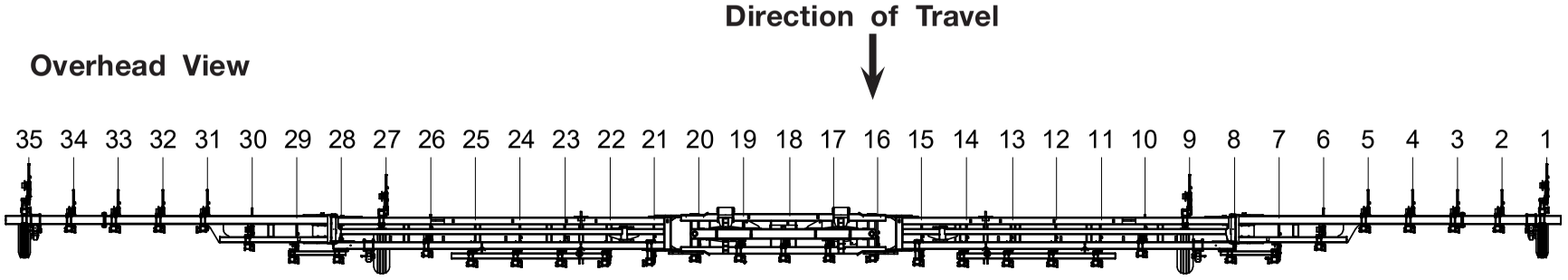


"BOOM CAL" Monitor Settings							
TOOLBAR SIZE	SPACING	SECTION 1	SECTION 2	SECTION 3	SECTION 4	SECTION 5	SECTION 6
90'	30"	195"	180"	180"	150"	180"	195"

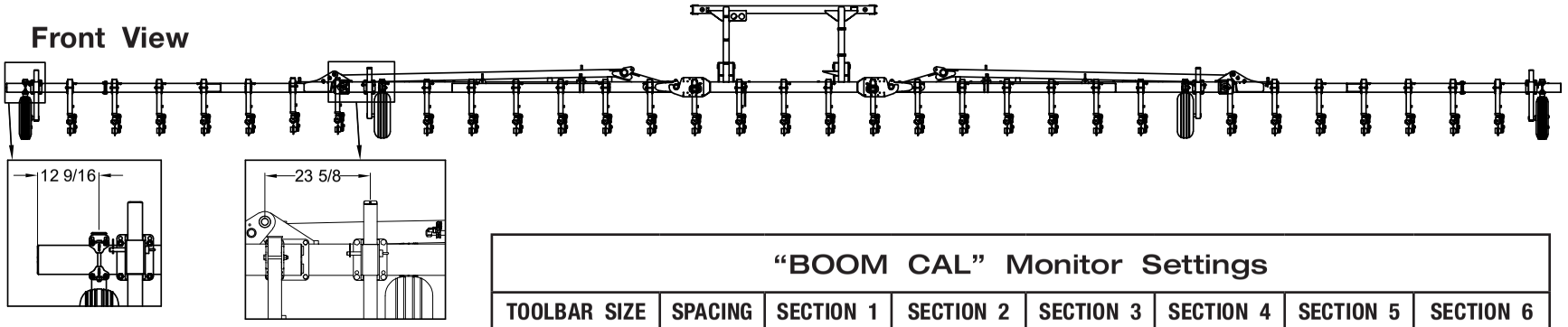
Overhead Layout - 90' Toolbar - 30" Row Spacing
Straight Coulter Post

COULTER ROW	COULTER POST ASSEMBLY	COULTER MOUNT WELDMENT
18	415753B - Center Coulter Straight Post	414887B - Coulter Mount Weldment
2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 17, 19, 22, 23, 24, 25, 26, 27, 28, 29, 30	415752B - Straight Post	
15, 16, 20, 21		414902B - Coulter Mount Weldment

Overhead View



Front View



"BOOM CAL" Monitor Settings							
TOOLBAR SIZE	SPACING	SECTION 1	SECTION 2	SECTION 3	SECTION 4	SECTION 5	SECTION 6
90'	30"	195"	180"	180"	150"	180"	195"

Section III
Operation

Preparing Tractor

- Before operating applicator, read the tractor operator's manual and gain an understanding of its safe methods of operation.
- Check the tractor brakes and transport lights. Make sure they are in proper working order.
- Check the tractor hydraulic oil reservoir and add oil if needed.
- Verify that the tractor is adequately ballasted for drawbar operation at the anticipated draft and vertical tongue load. Ensure that the tractor's drawbar has sufficient strength to support this load:
  - ☐ For 1800 applicators with 60'/66' toolbars & 2600 applicators with 60'/66'/80'/88'/90' toolbars, vertical tongue load of a loaded applicator is approximately 8,500 lbs. unfolded (4,800 lbs. with an empty tank and toolbars folded to transport position).
  - ☐ For 1800 applicators with 40'/44' toolbars, vertical tongue load of a loaded applicator is approximately 4,025 lbs. unfolded (1,450 lbs. with an empty tank and toolbars folded to transport position).
- Verify that the tractor is adequately ballasted for drawbar operation at the anticipated draft and vertical tongue load. Ensure that the tractor's drawbar has sufficient strength to support this load.
- If possible, adjust the tractor drawbar vertically so the top side of the drawbar is at least 18 inches from the ground. Alternately, the applicator hitch may be adjusted vertically by choosing other mounting holes provided.
- Raise and secure all tractor 3-point hitch linkage to prevent interference with the implement tongue and hydraulic hoses during turning.

Preparing Applicator

Perform the service checks as outlined. Repair or replace any damaged or worn parts before operating.

Hardware

Check for loose bolts and nuts, and tighten as needed. Check again after the first half-day of operation.

Pivot Pins

Check that all pins are in place and in good condition. Replace any worn, damaged or missing pins.

Hitch

Check hitch and hitch retention hardware for damage and wear.

Hydraulic System

Check all hoses and cylinders for signs of leakage. Hoses should not be kinked, twisted or rubbing against sharp edges. Re-route or repair hoses as necessary. Refer to SAFETY section for additional information on safe repair and inspection of hydraulic components.

Preparing Applicator (continued)

Tires/Wheels

Check tire pressures and maintain at recommended values listed in the MAINTENANCE section.

⚠ CAUTION

- **IMPROPERLY TORQUED WHEEL NUTS/BOLTS CAN CAUSE A LOSS OF IMPLEMENT CONTROL AND MACHINE DAMAGE. WHEEL NUTS/BOLTS MUST BE CHECKED REGULARLY. SEE TORQUE PAGE IN THE MAINTENANCE SECTION FOR PROPER WHEEL NUT/BOLT SPECIFICATIONS. WARRANTY DOES NOT COVER FAILURES CAUSED BY IMPROPERLY TORQUED WHEEL NUTS/BOLTS.**

IMPORTANT

- *Install wheels with tires in the narrowest position. Installing wheels without the proper inset/offset could result in hub or spindle failure. This will cause substantial damage to the applicator and is not covered by warranty. Inset/offset will vary depending on tire size. Consult dealer for proper inset/offset.*

For questions regarding new tire warranty, please contact your local original equipment tire dealer. Used tires carry no warranty. Tire manufacturers' phone numbers and web sites are listed in the MAINTENANCE section for your convenience.

Mount wheel dish with valve stems out for easy access.

Hitching to the Tractor

Drawbar Hitching (60', 66', 80', 88', 90' Toolbars)

⚠ WARNING

- **DO NOT STAND BETWEEN THE APPLICATOR AND TRACTOR WHEN HITCHING. ALWAYS ENGAGE PARKING BRAKE AND STOP ENGINE BEFORE INSERTING HITCH PIN.**

Connect the hitch to the tractor drawbar. Do not attempt to hitch to any other location on the tractor. (FIG. 3-1)

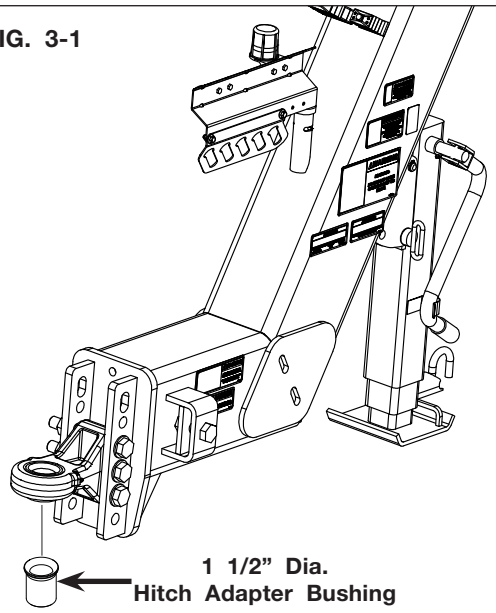
NOTE: Only use the centered position on the hitch and tractor drawbar and lock in place.

The applicator comes equipped with a single tang ball swivel hitch (JAP3228) with a 2" hitch ball which requires a 2" diameter drawbar pin. If a 1 1/2" diameter drawbar pin is used, a corresponding hitch adapter bushing (9009655) must be inserted into the hitch tang.

NOTE: Use of the proper hitch pin/bushing will prevent excessive wear and tear on both the applicator and tractor.

The applicator must be relatively level in order for the tank volume indicator to read accurately.

FIG. 3-1



The holes in the hitch and vertical holes in the tongue allow for adjustment so the tank sits level.

NOTE:
Empty/Transport Tongue Weight is 4,800 lbs.
Loaded/Operating Tongue Weight is 8,500 lbs.

IMPORTANT

- *The use of a smaller-diameter hitch pin will result in additional clearance between the implement hitch and pin. This additional clearance may cause accelerated pin and hitch wear, along with more pronounced jolting from the applicator during operation.*
- *Verify and/or adjust the applicator hitch height before coupling to the tractor. The applicator hitch is adjusted by unbolting the hitch and reinstalling in a different set of holes provided.*
- *After inserting drawbar pin, secure with locking device to help prevent uncoupling during use.*

Hitching to the Tractor (continued)

Drawbar Hitching (1800 - 40'/44' Toolbars)

⚠ WARNING

- **DO NOT STAND BETWEEN THE APPLICATOR AND TRACTOR WHEN HITCHING. ALWAYS ENGAGE PARKING BRAKE AND STOP ENGINE BEFORE INSERTING HITCH PIN.**

IMPORTANT

- *Tractors with rear duals must use the bolt-on hitch extension (410887G or 410887R) and associated hardware (FIG. 3-2). When repositioning hitch, torque 1"-8UNC hardware to 525 ft-lbs. See "Dealer Set Up" in SET UP section.*

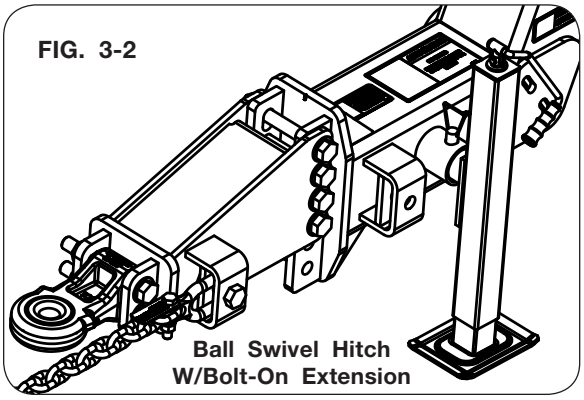
Connect the hitch only to the tractor drawbar. Do not attempt to hitch to any other location on the tractor. (FIG. 3-2)

Lock the tractor drawbar in the centered position.

The applicator comes with a CAT III single tang ball swivel hitch (JAP3231) with a 1 1/2" hitch ball which requires a 1 1/2" diameter drawbar pin. (FIG. 3-2)

NOTE: 1 1/2" pin is for a CAT III drawbar.

FIG. 3-2



Ball Swivel Hitch W/Bolt-On Extension

The applicator must be relatively level in order for the tank volume indicator to read accurately.

The holes in the hitch and vertical holes in the tongue allow for adjustment so the tank sits level.

NOTE:
Empty/Transport Tongue Weight is 1,450 lbs.
Loaded/Operating Tongue Weight is 4,025 lbs.

IMPORTANT

- *The use of a smaller-diameter hitch pin will result in additional clearance between the implement hitch and pin. This additional clearance may cause accelerated pin and hitch wear, along with more pronounced jolting from the applicator during operation.*
- *Verify and/or adjust the applicator hitch height before coupling to the tractor. The applicator hitch is adjusted by unbolting the hitch and reinstalling in a different set of holes provided.*
- *After inserting drawbar pin, secure with locking device to help prevent uncoupling during use.*

Hitching to the Tractor (continued)

Transport Chain

⚠ CAUTION

- **ALWAYS USE TRANSPORT CHAIN WHEN TRANSPORTING IMPLEMENTS. FAILURE TO USE A TRANSPORT CHAIN COULD CAUSE PERSONAL INJURY IF IMPLEMENT BECOMES DISENGAGED.**
- **REPLACE TRANSPORT CHAIN IF ANY LINK OR END FITTING IS BROKEN, STRETCHED OR DAMAGED. DO NOT WELD TRANSPORT CHAIN.**
- **USE ONLY AN UNVERFERTH ASABE TRANSPORT CHAIN WITH A WEIGHT RATING EXCEEDING THE GROSS COMBINED WEIGHT OF ALL TOWED IMPLEMENTS. CONTACT YOUR UNVERFERTH DEALER FOR ADDITIONAL INFORMATION.**

Tractor must be equipped with a transport chain support. Always use intermediate chain support when connecting the applicator directly to a tractor. DO NOT use the intermediate chain support as the chain attaching point. See tractor operator's manual for proper chain attachment. FIG. 3-3 shows how the transport chain must be installed between the tractor and applicator.

Transport chain connection shown for illustration purposes only. Refer to tractor manufacturer for proper attachment.

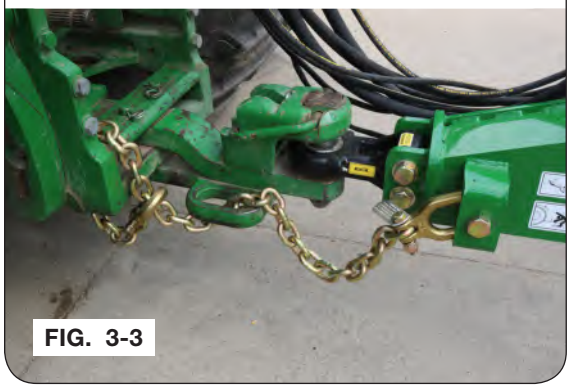


FIG. 3-3

Hitching to the Tractor (continued)

Hydraulic Connections

After cleaning hydraulic hose couplers, connect to tractor hydraulic circuits as follows:

Applicator Solution Pump Hydraulics

IMPORTANT

- *The applicator pump is hydraulically driven, and needs to be configured correctly to match the type of hydraulic system on the tractor (closed center, open center, load-sensing, etc.). Failure to configure the pump correctly may permanently damage the pump through over-speeding and over-pressurizing. Refer to the SET UP section of this manual for guidelines on configuring the applicator pump.*

Connect hoses from the applicator pump to a tractor selective control valve (SCV) circuit. The pump inlet, marked BLUE (+), should be connected to the RETRACT port and the pump outlet, marked BLUE (-), to a low-pressure return port at the tractor (recommended) or to the EXTEND port. If connected to the EXTEND port, it is recommended to shut the pump down in float to preserve pump life. (FIG. 3-4)

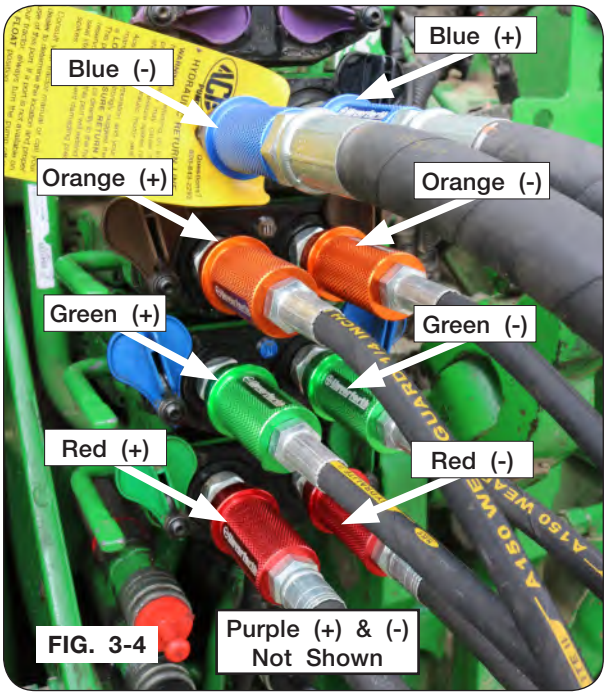


FIG. 3-4

NOTE: It is recommended to pressurize all hydraulic circuits using the retract outlets on the SCVs. This allows all circuits to be shut-off by engaging the hydraulic float feature of the tractor hydraulic system.

Hose Connenctions					Function Settings For Tractors	
Color	**Hose Indentification**	**SCV**	**Extend (+)**	**Retract (-)**	**Flow**	**Detent (Time)**
Red	Main Lift Up / Down	1	Up	Down	30 GPM Maximum	Constant
Green	Wing Fold / Unfold	2	Fold	Out	5 GPM Maximum	60 seconds or as required for full extend and retract
Orange	Outer Wing Fold In / Out	3	In	Out	5 GPM	Constant
Blue	Pump Pressure / Return					
	ACE 205/HYPRO 930C PWM	4	Return (Blue -)	Pressure (Blue +)	11 GPM	Constant
	or ACE HYD 750	4	Return (Blue -)	Pressure (Blue +)	17 GPM	Constant
Purple	Steerable Hitch Pressure / Return (If Equipped)	5	Return	Pressure	5 GPM	Constant

To protect the applicator pump from damage due to excessive speed, adjust circuit flow to minimum setting prior to operating circuit for the first time.

IMPORTANT

- *Never operate applicator pump dry, or with pump inlet selector valve closed. Pump damage may result.*

Hitching to the Tractor (continued)

Toolbar Hydraulics

⚠ WARNING

- **AFTER INITIAL SET-UP OR REPLACEMENT OF ANY HYDRAULIC COMPONENT ON THE APPLICATOR, AIR MUST BE REMOVED FROM THE WING-FOLD HYDRAULIC SYSTEM PRIOR TO ITS FIRST USE. FAILURE TO DO SO MAY RESULT IN DAMAGE TO TOOLBAR COMPONENTS DUE TO RAPID MOVEMENT. SEE AIR PURGING INSTRUCTIONS IN MAINTENANCE SECTION.**

⚠ CAUTION

- **DO NOT UNFOLD OR FOLD TOOLBAR WITHOUT HITCHING TO THE TRACTOR.**

The applicator has 4 sets of hydraulic hoses (5 if equipped with steerable hitch).

NOTE: It is recommended to pressurize all hydraulic circuits using the retract outlets on the SCV's. This allows all circuits to be shut-off by engaging the hydraulic float feature of the tractor hydraulic system.

IMPORTANT

- *If the SCV control lever kicks out, the most likely reason is excessive hydraulic pressure. Try reducing the tractor's flow control setting.*

Refer to the MAINTENANCE section for diverter valve and sequence valve setup information.

Before disconnecting hoses from the tractor, place tractor in Park and apply parking brake. See tractor's operators manual for proper procedure to relieve pressure. After SCV pressures have been relieved and tractor engine is off, disconnect hoses from tractor. Install couplers into storage slots provided. (FIG. 3-5)

FIG. 3-5

Hitching to the Tractor (continued)

Electrical Connection

The main harness has a 7-pin (round) plug conforming to SAE standards that connects to tractor. If your tractor does not have the mating socket connector, contact your tractor dealer. (FIG. 3-6)

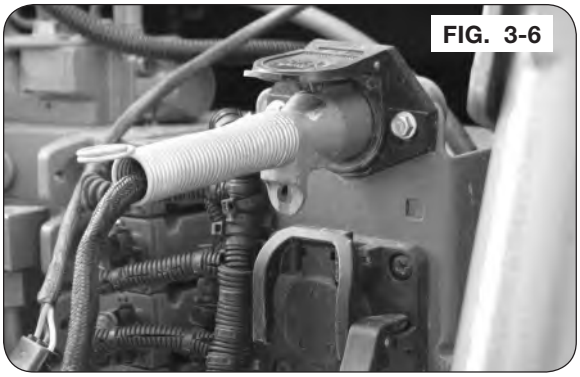


FIG. 3-6

The wiring schematic for this applicator as shown in the MAINTENANCE section complies with current ASABE standards. Always verify correct electrical function before using this applicator.

Compliance with all lighting and marking laws is the responsibility of the operator at the time of travel.

See federal regulation 49 CFR 562; available at www.govinfo.gov for US federal law requirements.

See your Unverferth dealer for additional brackets, reflectors, or lights to meet your requirements.

Jack Usage

WARNING

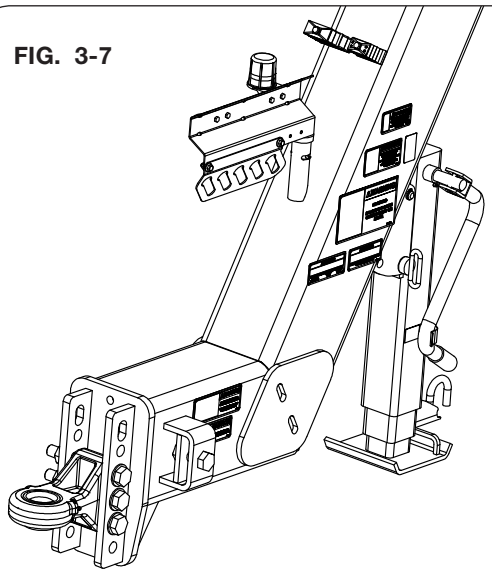
- **UNHITCHING A LOADED APPLICATOR CAN CAUSE SERIOUS INJURY OR DEATH DUE TO TONGUE RISING OR FALLING. ALWAYS HAVE A LOADED APPLICATOR ATTACHED TO A TRACTOR.**

Use jack to support an empty applicator, never a loaded applicator. Always have a loaded applicator hooked to tractor.

Parked Position (60', 66', 80', 88', 90' Toolbars)

Remove keeper and pin while supporting bottom of jack. Move the jack to vertical position and reinstall hitch pin and keeper. Lower drop leg to contact the ground. Crank jack leg downward to completely remove the hitch weight from tractor drawbar. (FIG. 3-7)

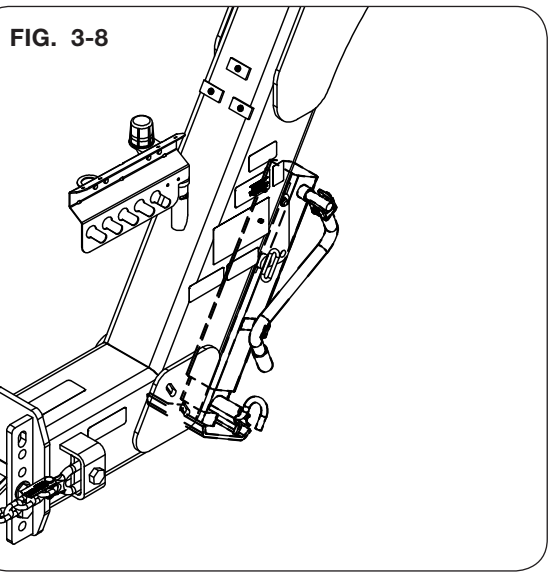
FIG. 3-7



Transport Position (60', 66', 80', 88', 90' Toolbars)

After tractor connection is established, raise jack leg of the jack to highest position to maximize ground clearance. Remove keeper and pin. Pivot bottom of jack toward the applicator tongue so generally parallel to the slanted portion of the applicator tongue. Reinstall the pin and keeper. (FIG. 3-8)

FIG. 3-8

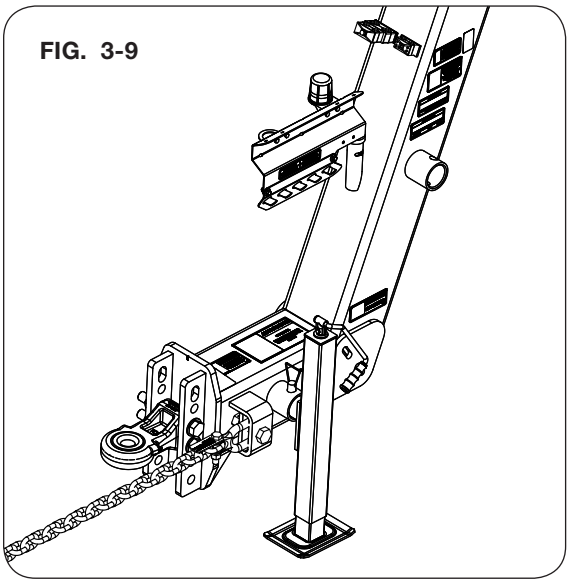


Jack Usage (continued)

Parked Position (1800 - 40'/44' Toolbars)

Remove jack retaining pin while supporting bottom of jack. Move the jack from storage bushing to lower jack bushing and reinstall pin. Crank jack leg downward to completely remove the hitch weight from tractor drawbar. (FIG. 3-9)

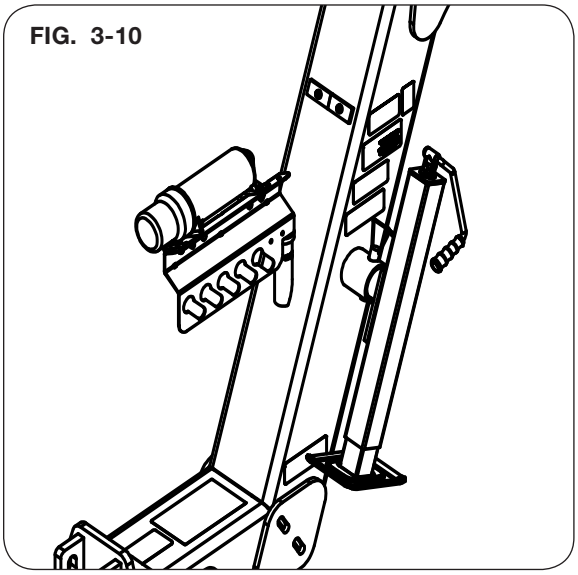
FIG. 3-9



Transport Position (1800 - 40'/44' Toolbars)

After tractor connection is established, raise jack leg of the jack to highest position to maximize ground clearance. Remove jack pin. Remove jack and move to transport mount location on the side of the tongue. Reinstall the jack pin. (FIG. 3-10)

FIG. 3-10



Transporting

Drawbar Connection

⚠ WARNING

- **USE EXCEPTIONAL CARE WHEN OPERATING APPLICATOR EQUIPPED WITH SINGLE TIRES AND SET AT NARROW WHEEL SPACING. THE POSSIBILITY OF TIPPING OVER DURING TURNS OR TRAVEL ON ROUGH ROADS IS INCREASED UNDER THESE CONDITIONS.**

⚠ CAUTION

- **THIS IMPLEMENT IS NOT EQUIPPED WITH BRAKES. ENSURE THAT THE TOWING VEHICLE HAS ADEQUATE WEIGHT AND BRAKING CAPACITY TO TOW THIS IMPLEMENT.**


FIG. 3-11

- **IMMEDIATELY PRIOR TO ROAD TRANSPORT, RUN THE FULL FOLD SEQUENCE FOR PROPER SYSTEM PRESSURES AND TO AVOID INADVERTENT MOVEMENT.**

See towing vehicle manual for towing and braking capacity. Regulate speed to road conditions. Maximum speed of applicator with wheels should never exceed 20 m.p.h. Maximum speed of applicator with tracks should never exceed 15 m.p.h.

Secure drawbar pin with a locking device and lock tractor drawbar in centered position.

Secure transport chain to tractor before transporting, see FIG. 3-11. Regulate speed to road conditions and maintain complete control.

It is probable that this implement is taller, wider, and longer than the towing tractor. Become aware of and avoid all obstacles and hazards in the travel path of the equipment, such as power lines, ditches, etc.

Slow down before making sharp turns to avoid tipping. Drive slowly over rough ground and side slopes.

Always fold wings into transport position when applicator is not in use.

Toolbar Operation (60', 66', 80', 88', 90' Toolbars)

DANGER

- **ELECTROCUTION WILL CAUSE SERIOUS INJURY OR DEATH. PERFORM BOOM UNFOLDING AND FOLDING OPERATIONS ONLY IN AREAS WITH ADEQUATE HEIGHT, WIDTH AND LENGTH CLEARANCE. IN PARTICULAR, BE MINDFUL OF LOCATION OF OVERHEAD POWER LINES.**

WARNING

- **KEEP ALL PERSONNEL A SAFE DISTANCE AWAY FROM THE APPLICATOR WHEN UNFOLDING OR FOLDING THE TOOLBAR. PERSONAL INJURY CAN RESULT FROM IMPACT WITH TOOLBAR.**
- **DO NOT EXCEED 10 MPH DURING OFF-HIGHWAY TRAVEL.**

Unfolding (60', 66', 80', 88', 90' Toolbars)

IMPORTANT

- *Never fold or unfold the unit without attaching to tractor first. Refer to "Hitching to the Tractor" and "Jack Usage" in this section.*

1. Engage the toolbar lift circuit to fully raise the toolbar up out of the main wing rests.
2. Engage the main wing unfold circuit to unfold the main wings. The toolbar transport latch will unlatch and the main wing will swing out, then the pivoting coulter tube will rotate down and the main wing masts will lower. If the wings do not sequence properly, the unfold sequence valve on the hydraulic manifold will need to be adjusted. (Refer to MAINTENANCE section "Toolbar & Wing Adjustments - Sequence Valve Adjustments".)
3. Engage the outer wing unfold circuit to unfold the outer wing. (With the wing stops removed, the wings can flex down 8 degrees horizontal—there is no limit for the flex upwards.)
4. Engage the toolbar lift and lower circuit to lower toolbar to desired working depth. Once the toolbar is in the ground, the lower circuit should be locked in continuous detent to engage the hydraulic down pressure feature of the toolbar. (The outer wings also have a down pressure function and the outer wing extend can be locked in detent to engage the outer wing down pressure feature.) (Refer to MAINTENANCE section "Toolbar & Wing Adjustments - Down Pressure".)

Folding (60', 66', 80', 88', 90' Toolbars)

1. Engage the toolbar lift circuit to raise the toolbar and fully tilt the wings up.
2. Engage the outer wing fold circuit to fold the outer wings.
3. Engage the main wing fold circuit to fold the main wings. The pivoting coulter tube will rotate up and main wing masts will raise first, then the main wings will swing in. If the wings do not sequence properly, the fold sequence valve on the hydraulic manifold will need to be adjusted. (Refer to MAINTENANCE section "Toolbar & Wing Adjustments - Sequence Valve Adjustments".)
4. Engage the toolbar lower circuit to lower the wings into the main wing rests and to lower the toolbar into the transport latch.

Toolbar Operation (60', 66', 80', 88', 90' Toolbars) (continued)

Raising/Lowering Toolbar In The Field

IMPORTANT

- *If unit is equipped with injection knives, the tractor must be moving forward when lowering toolbar into the ground.*

1. Engage the toolbar lift circuit to raise the toolbar and fully tilt the wings up.

2. When you are ready to lower the toolbar, engage the toolbar lower circuit to lower toolbar to desired working depth. Once the toolbar is in the ground, the lower circuit should be locked in continuous detent to engage the active hydraulic down pressure feature of the toolbar. (The outer wings also have a down pressure function and the outer wing extend can be locked in detent to engage the outer wing down pressure feature.) (Refer to MAINTENANCE section "Toolbar & Wing Adjustments - Down Pressure".)

Wing Tilt Stops

Cylinder stops can be added, before operating, to the wing tilt cylinders. This limits how far the wing pivots up when turning on the headlands reducing amount of time it takes to fully raise the toolbar. Cylinder stops **MUST** be removed from the wing tilt cylinders before transporting. See FIG. 3-12.

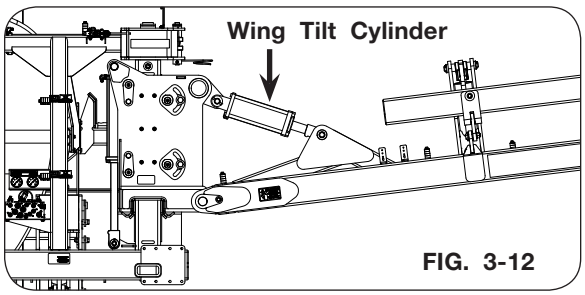


FIG. 3-12

Toolbar Operation (1800 - 40'/44' Toolbars)

DANGER

- **ELECTROCUTION WILL CAUSE SERIOUS INJURY OR DEATH. PERFORM BOOM UNFOLDING AND FOLDING OPERATIONS ONLY IN AREAS WITH ADEQUATE HEIGHT, WIDTH AND LENGTH CLEARANCE. IN PARTICULAR, BE MINDFUL OF LOCATION OF OVERHEAD POWER LINES.**

WARNING

- **KEEP ALL PERSONNEL A SAFE DISTANCE AWAY FROM THE APPLICATOR WHEN UNFOLDING OR FOLDING THE TOOLBAR. PERSONAL INJURY CAN RESULT FROM IMPACT WITH TOOLBAR.**
- **DO NOT EXCEED 10 MPH DURING OFF-HIGHWAY TRAVEL.**

Unfolding

IMPORTANT

- *Never fold or unfold the unit without attaching to tractor first. Refer to "Hitching to the Tractor" and "Jack Usage" in this section.*

1. Engage the main wing unfold circuit to unfold the main wings. The toolbar transport latch will unlatch and the main wing unfold.

   NOTE: If the wings do not sequence properly, the unfold sequence valve on the hydraulic manifold will need to be adjusted. (Refer to MAINTENANCE section "Toolbar & Wing Adjustments - Sequence Valve Adjustments".)

2. Engage the toolbar lower circuit to lower toolbar to desired working depth. Once the toolbar is in the ground, the lower circuit should be locked in continuous detent to engage the hydraulic down pressure feature of the toolbar. (Refer to MAINTENANCE section "Toolbar & Wing Adjustments - Down Pressure".)

Folding

1. Engage the toolbar lift circuit to raise the toolbar and fully tilt the wings up.
2. Engage the main wing fold circuit to fold the main wings. The transport latch will engage and then the main wings will fold back. If the wings do not sequence properly, the fold sequence valve on the hydraulic manifold will need to be adjusted. (Refer to MAINTENANCE section "Toolbar & Wing Adjustments - Sequence Valve Adjustments".)

Raise/Lower Toolbar In The Field

NOTE: The tractor SCV 2 main wing fold/unfold circuit must be running in float at all times.

NOTE: If unit is equipped with injection knives, the tractor must be moving forward when lowering toolbar into the ground.

1. Engage the toolbar lift circuit to raise the toolbar and fully tilt the wings up.
2. When you are ready to lower the toolbar, engage the toolbar lower circuit to lower toolbar to desired working depth. Once the toolbar is in the ground, the lower circuit should be locked in detent to engage the hydraulic down pressure feature of the toolbar. (Refer to MAINTENANCE section "Toolbar & Wing Adjustments - Down Pressure".)

Toolbar Operation (1800 - 40'/44' Toolbars) (continued)

Dual Width Toolbar

1. Fold the toolbar to 30' for the dual width application. (FIG. 3-13)

2. Turn off sections 1 and 5 on the flow controller, and turn on the chemsaver valves to the outside coulters on each main wing. (FIG. 3-13)

3. In the controller calibration settings, change each section widths for sections 2 and 4 from 110" to 135". Refer to "Controller Calibration Settings" in the SET UP section.

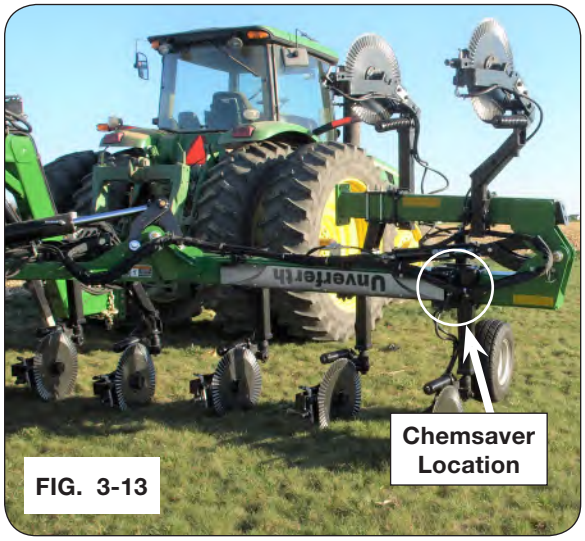


FIG. 3-13

Depth Stop Collars / Gauge Wheels

WARNING

- **KEEP ALL PERSONNEL A SAFE DISTANCE AWAY FROM THE APPLICATOR WHEN UNFOLDING OR FOLDING THE TOOLBAR. PERSONAL INJURY CAN RESULT FROM IMPACT WITH TOOLBAR.**
- **KEEP HANDS CLEAR OF PINCH POINT AREAS.**
- **DO NOT EXCEED 10 MPH DURING OFF-HIGHWAY TRAVEL.**

NOTE: The depth stop collar is to adjust the depth of the center section and partially the main wings. The depth stop collar contacts the bottom of the center section toolbar main tubes when it is lowered down. To adjust the depth, adjust the number of depth stop collars on each lift cylinder and adjust each gauge wheel position for adjustment of each wing section. (FIG. 3-14 & 3-15)

IMPORTANT

- *Toolbar needs to be raised and secured in latch before changing the depth stop collars.*

1. Depths can be changed in 1” increments by using the next size larger/smaller bushing.
2. Adjust each gauge wheel position on all of the wing sections. (FIG. 3-15)

NOTE: See “Dealer Set Up” in SET UP section for more details on depth stop collars.

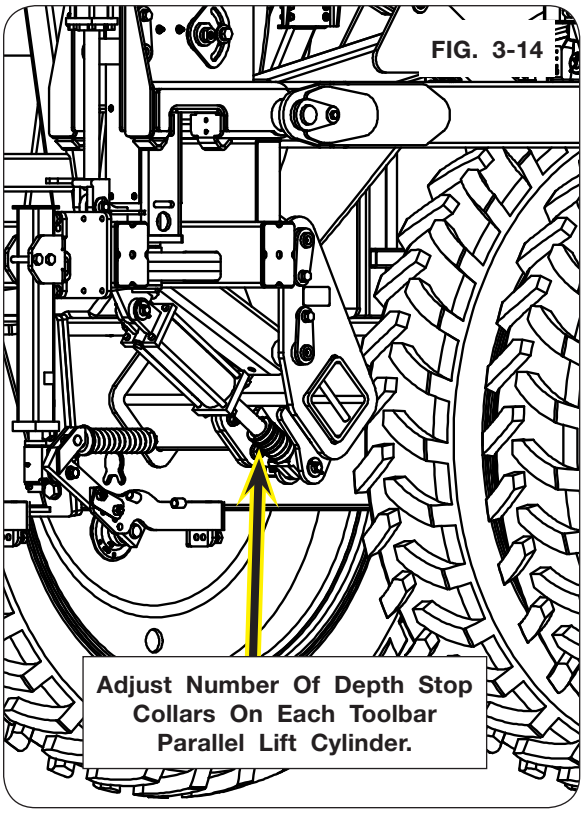


FIG. 3-14

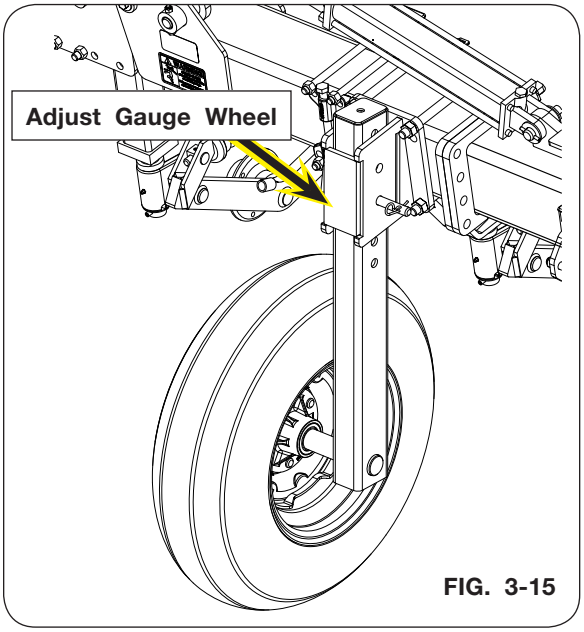


FIG. 3-15

Steerable Hitch

Steerable Hitch Operation (60' & Larger Toolbars)

The steerable hitch has three different settings: Auto, Transport, and Left / Right (Manual). (FIG. 3-16)

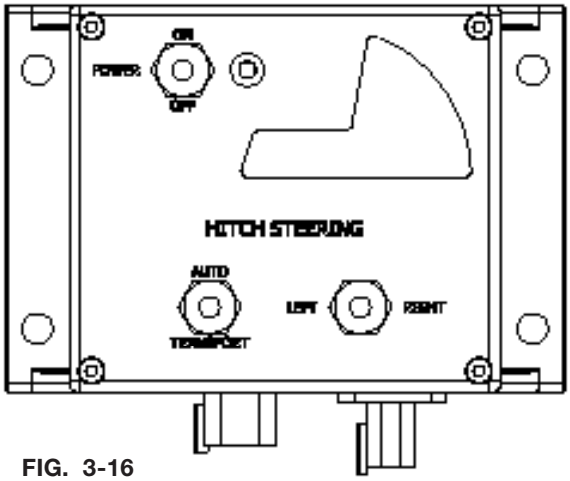


FIG. 3-16

1. To calibrate, follow all instructions provided in your Raven steerable hitch manual (9008012).

2. Toolbar must be unfolded for hitch to operate. A proximity switch located on the toolbar disables the unit when toolbar is folded and in transport position. This will be displayed on the Raven console as "prox".

3. After the steerable hitch is calibrated, the steerable hitch switch box (9007594) will become the primary connection and the Raven console will become the secondary connection.

4. **ON / OFF:** This switch must be in the "ON" position for the hitch to operate. When the hitch is centered by engaging the TRANSPORT function, the ON / OFF switch must be cycled by switching to "OFF" then back to "ON" again.

5. **AUTO / TRANSPORT:** By tapping the switch up to the "AUTO" mode, the hitch will automatically follow the tractor. The Raven console will display "AUTO". When the switch is tapped to "TRANSPORT", the hitch will center. The Raven console will display "CENTER". When the TRANSPORT function is engaged, the ON / OFF switch must be cycled by switching to "OFF" then back to "ON" again to return to "AUTO".

6. **LEFT / RIGHT (MANUAL):** This switch allows for "MANUAL" steering left or right. Each time the switch is tapped (pushed and released, it is not necessary to hold the switch) the hitch moves a pre-set # of degrees to the right or left depending on the direction the switch is moved. The amount the hitch moves when using the "MANUAL" switch is pre-set to 5 degrees. The pre-set can be changed by referring to the Raven steerable hitch manual. After the "MANUAL" steer is engaged, the Raven console will display "BUMP". To return to "AUTO" operation, tap the "AUTO / TRANSPORT" switch up to "AUTO".

Filling Applicator

Quick Fill

⚠ WARNING

- **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.**

⚠ CAUTION

- **NEVER LEAVE APPLICATOR UNATTENDED WHILE FILLING. TANK CONTENTS MAY SPILL OUT OF AIR VENTS IF OVERFILLED.**

IMPORTANT

- *The tank is designed with additional air expansion space in excess of the rated capacity. The full capacity can be reached with the level approximately 6”- 8” below the top surface of the tank access hatch (lid opened).*
- *Sight gauge accuracy depends on the unit being on a level surface and a short delay can be experienced so user should anticipate shutoff for accurate volume*

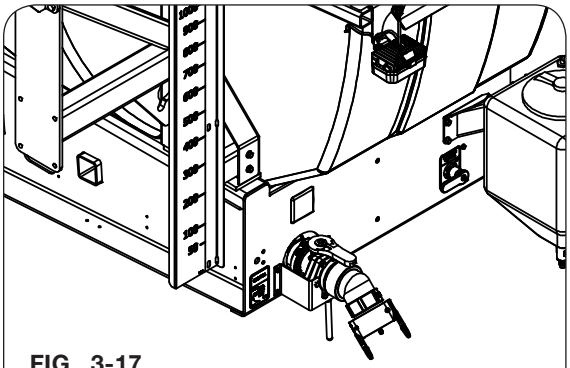


FIG. 3-17

The QUICK-FILL VALVE and indicator level are shown in FIG. 3-17 for reference.

1. Assure that QUICK-FILL VALVE is <OFF>.
2. To fill the tank, remove the cap and attach the hose to the 3” quick fill coupler. Turn quick-fill valve on the tank <ON>.
3. Fill applicator solution tank to desired level.
4. Return valve to <OFF> when desired fill level is reached.
5. Reinstall the cap when finished.

Inductor (Optional)

Basic Operation

WARNING

- **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.**
- **WHEN USING JUG RINSER, BE CAREFUL NOT TO SPRAY SOLUTION INTO EYES OR FACE.**

IMPORTANT

- *The main solution tank should contain at least 50 gallons of liquid.*


FIG. 3-18

The INDUCTION VALVE, INDUCTOR MIX VALVE, and tank are shown in FIG. 3-18 and 3-19 for reference.

1. Assure INDUCTION VALVE on the bottom of the inductor tank is in the <OFF> position.
2. Push the tank lever and lower it to the “fill” position.
3. Set valves: VALVE SETTINGS

PUMP INLET VALVE	OPEN
INDUCTOR MIX VALVE (OPT.)	OFF
AGITATION CONTROL (100 PSI)	PARTIALLY OPEN 1/4
INDUCTION VALVE	OFF

4. Start pump.
5. Open lid and pour chemical into inductor tank. (If using dry chemical, open INDUCTOR MIX valve to mix chemical, using care not to overfill inductor tank.)
6. Close the lid.
7. Open INDUCTION VALVE on the bottom of the inductor tank to evacuate the inductor tank.
8. Close INDUCTION VALVE when the inductor tank is empty and rinse.
   See “Jug and Inductor Tank Rinsing” in this secton.
9. Raise the tank to storage position.


FIG. 3-19

Tank Mixing

Fertilizer additives can be added to the solution tank through the use of the optional inductor. Before adding fertilizer additives, ensure that the tank contains at least 50 gallons of liquid.

Inductor (Optional) (continued)

Jug and Inductor Tank Rinsing

WARNING

- **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.**
- **WHEN USING JUG RINSER, BE CAREFUL NOT TO SPRAY SOLUTION INTO EYES OR FACE.**

IMPORTANT

- *Do not allow pump to run dry. Pump damage will result.*
- *Rinse the jug, nozzle, or tank with the product in the main solution tank.*

The INDUCTION VALVE, INDUCTOR MIX VALVE, and tank are shown in FIG. 3-20 and 3-21 for reference.

1. To rinse a chemical container, place container upside down on rinse nozzle and squeeze handle on rinse wand.
2. To rinse inductor tank, close lid, open INDUCTOR MIX valve and squeeze rinse wand handle for approximately 10 seconds.
3. To rinse out container nozzle, close lid, and activate jug rinser for approximately 10 seconds.
4. Repeat steps 2 and 3 for additional rinsing, if desired.
5. Close INDUCTOR MIX valve and release rinse wand when rinsing is complete.
6. When inductor tank is empty, close INDUCTOR DRAIN valve.
7. Close INDUCTOR FLOW valve then set AGITATION CONTROL to proper settings.
8. Raise tank to storage position.

FIG. 3-20

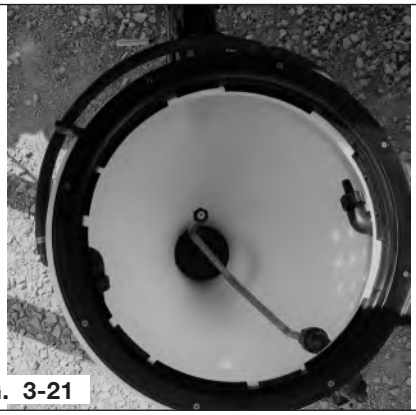


FIG. 3-21

Orifice and Nozzle Installation

⚠ WARNING

- **KEEP HANDS CLEAR OF PINCH POINT AREAS.**

1. Attach the nozzle body to the nozzle mount plates at the top of the coulter post using two 1/4” flange nuts (9004720) and two 1/4” x 3/4” capscrews (900900-003) (FIG. 3-22)

2. Install the desired orifice plate into each hose quick connect cap prior to attaching the hose to the nozzle body tee.

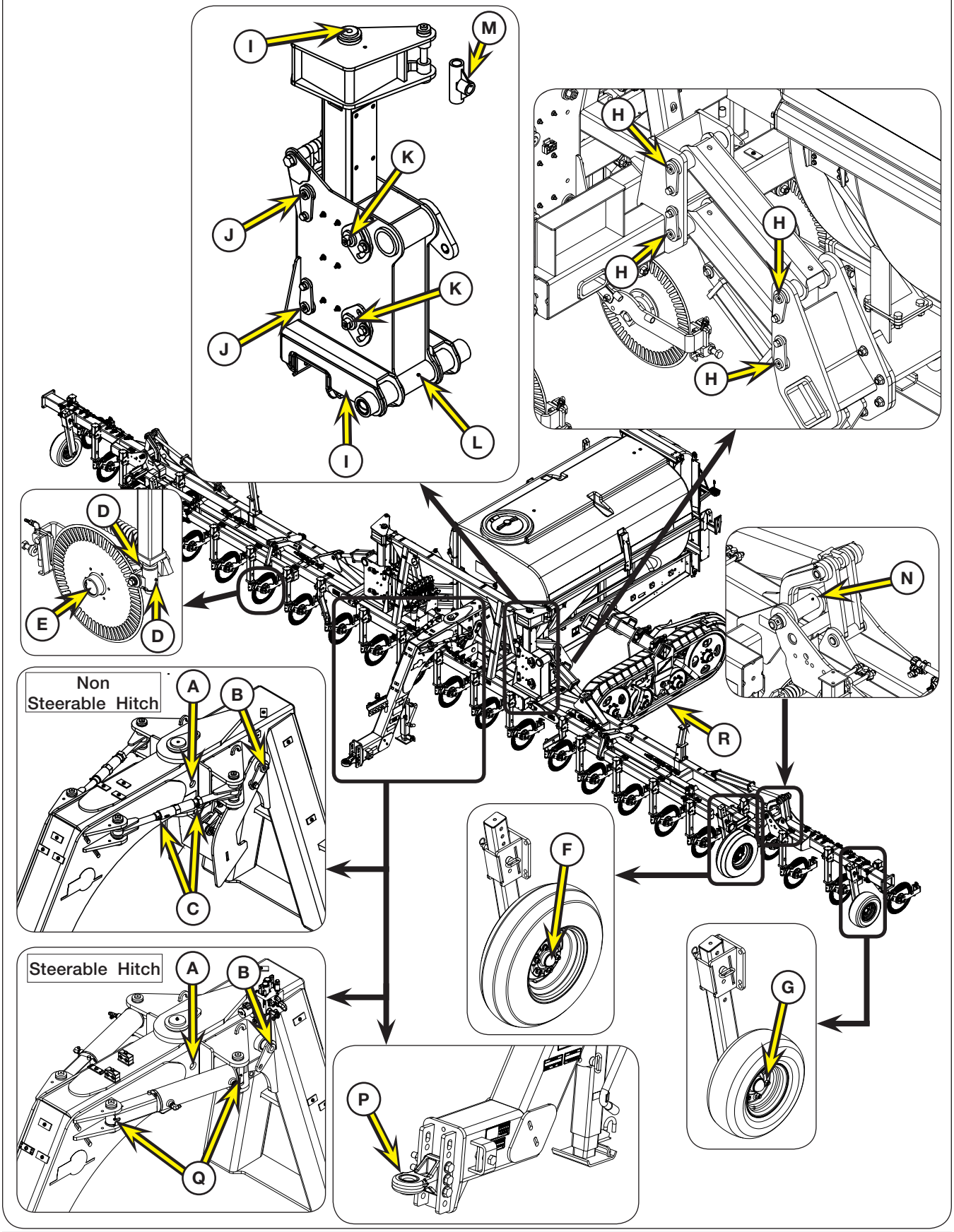
3. Route the 3/8” EPDM hose along the front of the vertical coulter post and attach each hose to the nozzle body tee (FIG. 3-22). Secure with hose clamps.

NOTE: Rotate the coulter assembly clockwise and counterclockwise on the vertical shaft to assure proper hose slack in the hose below the nozzle body to allow for oscillation of the coulter assembly.

FIG. 3-22

Section IV
Maintenance

Lubrication (For 60', 66', 80', 88', 90' Toolbars)



Lubrication (For 60', 66', 80', 88', 90' Toolbars) (continued)

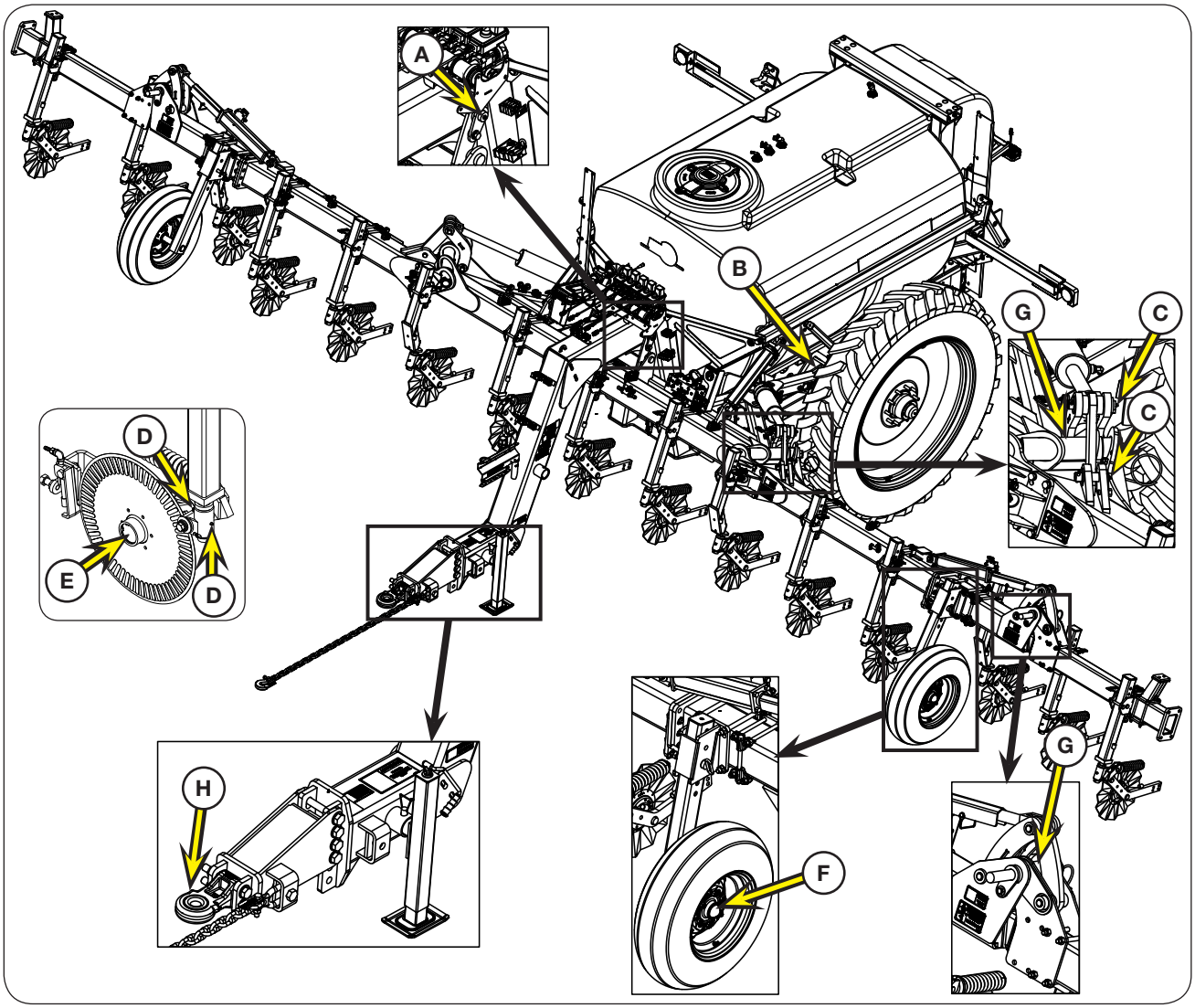
To keep your applicator in top operating condition and to assure its proper performance and reliability for a long period of time, periodic inspection and lubrication is a must.

Use EP-2 lubricant at the locations described in the chart.

The lubrication locations and recommended schedule are as follows:

ITEM	DESCRIPTION	POINT	QTY.	HOURS
A	Hitch Pivot	1	10 Shots	Weekly
B	Latch Pivot Pin	1	5 Shots	Weekly
C	Tongue Brace Assembly/Turnbuckle - 80' / 88' / 90' Non Steerable Hitch Units Only	4	1 Shot	Once Every Season
D	Coulter Swivel	2	2 Shots	Weekly
E	Coulter Hub	-	10 Shots	Once Every Season
F	Main Wing Gauge Wheel Hub	2	Repack	Once Every Season
G	Outer Wing Gauge Wheel Hub	2	Repack	Once Every Season
H	Parallel Lift Arm Pivot Pin	8	5 Shots	Weekly
I	Wing Mast Hinge Pivot Pin	4	5 Shots	Weekly
J	Wing Mast Roller Pin	4	3 Shots	Weekly
K	Wing Mast Adjustment Roller Pin	4	3 Shots	Weekly
L	Wing Mast/Main Wing Hinge Area	2	10 Shots	Weekly
M	Wing Mast/Cylinder Pin Weldment - 80' / 88' / 90' Units Only	2	3 Shots	Weekly
N	Outer Wing Hinge Area	2	10 Shots	Weekly
O	Applicator Frame Hub (NOT SHOWN)	2	Repack	Once Every Season
P	Ball Hitch	2	2 Shots	Weekly
Q	Steerable Hitch Cylinder Pin Weldment	4	3 Shots	Weekly
R	Track Lubrication (Refer to your 16" Wide x 80" Long Equalizer™ track manual.)	-	-	-

Lubrication (For 1800 40'/44' Toolbars)



To keep your applicator 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.

Unverferth Mfg. recommends use of NLGI #2 Extreme Pressure grease.

The lubrication locations and recommended schedule are as follows:

ITEM	DESCRIPTION	POINT	LUBRICANT	QTY.	HOURS
A	Latch Pivot Pin	1	EP-2	5 Shots	Weekly
B	Main Toolbar Pivot Hinge	1	EP-2	5 Shots	Weekly
C	Main Wing Linkage Pins	6	EP-2	3 Shots	Weekly
D	Coulter Swivel	2	EP-2	2 Shots	Weekly
E	Coulter Hub	-	EP-2	10 Shots	Once Every Season
F	Main Wing Gauge Wheel Hub	2	EP-2	Repack	Once Every Season
G	Main Wing/Outer Wing Hinge Area	2	EP-2	10 Shots	Weekly
H	Ball Hitch	2	EP-2	2 Shots	Weekly
I	Applicator Frame Hub (NOT SHOWN)	2	EP-2	Repack	Once Every Season

Hydraulic System

Purging Hydraulic System

⚠ WARNING

- **HYDRAULIC SYSTEM MUST BE PURGED OF AIR BEFORE OPERATING TO PREVENT SERIOUS INJURY OR DEATH.**
- **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. LEAKS OF HIGH-PRESSURE FLUIDS MAY NOT BE VISIBLE. USE CARDBOARD OR WOOD TO DETECT LEAKS IN THE HYDRAULIC SYSTEM. SEEK MEDICAL TREATMENT IMMEDIATELY IF INJURED BY HIGH-PRESSURE FLUIDS.**

- **KEEP CLEAR OF PINCH POINT AREAS.**

- **FALLING OR LOWERING EQUIPMENT CAN CAUSE SERIOUS INJURY OR DEATH. KEEP EVERYONE AWAY FROM EQUIPMENT WHEN SUSPENDED, RASING, OR LOWERING.**

1. Purge air from system as follows:

   A. Clear all personnel and objects from the area, including where the machine will have full range of motion during the hydraulic movement. Remove transport locks from the machine.
   B. Block up all rod ends of each hydraulic cylinder in each circuit so the rods can completely extend and retract without contacting any other component.
   C. Pressurize the system and maintain system at full pressure for at least 5 seconds after cylinder rods stop moving. Check that all cylinders have fully extended or retracted.
   D. Check oil reservoir in hydraulic power source and re-fill as needed.
   E. Pressurize system again to reverse the motion of step B. Maintain pressure on system for at least 5 seconds after cylinder rods stop moving. Check that cylinders have fully extended or retracted.
   F. Check for hydraulic leaks using cardboard or wood. Tighten connections according to directions in Torque Specifications in MAINTENANCE section.
   G. Repeat steps B, C, D, and E 10-12 times.
   H. De-pressurize hydraulic system and connect cylinder rod clevises to their mating lugs.

IMPORTANT

- *Machine damage will occur if the cylinder is incorrectly installed.*

Check for and correct any leaks. Make sure hoses are not kinked, stretched, or twisted. Secure hoses to prevent cuts or chafing during operation.

Hydraulic System (continued)

Relieving Hydraulic Pressure

To relieve hydraulic pressure in the system, be sure hydraulic motor is disengaged and/or hydraulic cylinder is not exerting force on the system. Next, consult tractor operators manual for procedure to relieve pressure.

Hydraulically Driven Centrifugal Pump

ACE HYD 750 Barrier Fluid

IMPORTANT

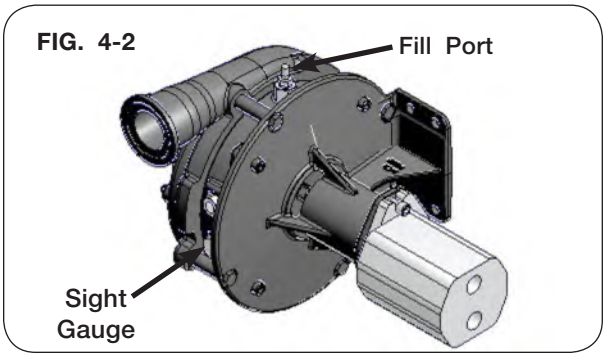
- *Inflation valve must be assembled in the "IN" port of the regulating valve.*

NOTE: During application, periodically check the regulating valve pressure gauge. (FIG. 4-1)


FIG. 4-1

1. Turn regulating valve adjusting knob counterclockwise until it is at the minimum pressure setting. (FIG. 4-1)
2. Attach air chuck to air valve.
3. Turn adjusting knob on regulating valve clockwise until gauge reads 30 psi. (FIG. 4-1)

NOTE: Check the barrier fluid level on the side of the pump. Add barrier fluid if fluid level is below half on the sight gauge. (FIG. 4-2)



4. Remove the air pressure before disconnecting the hose. To add barrier fluid to the fluid chamber, disconnect the hose from the fitting on top of the hydraulically driven centrifugal pump. Remove the fitting on top of the pump. (FIG. 4-2)
5. Fill the fluid chamber by attaching a 1/8" hose to the barrier fluid and using the hose to fill the fluid chamber where the fitting was removed. (FIG. 4-3)
6. Add fluid until level is half-way up the sight gauge on the side of the pump.

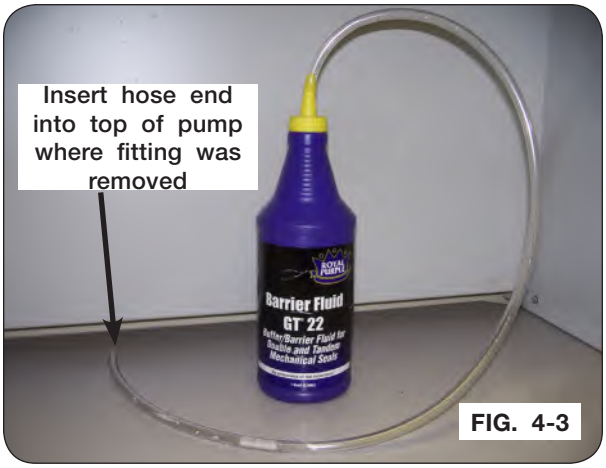


FIG. 4-3

NOTE: Any 1/8" hose will attach to the nipple of the barrier fluid bottle (9005518) to ease filling of the sight gauge. (FIG. 4-3)

At the end of each season, it is recommended to change/check the barrier fluid and seal. Follow the guidlines below.

- The pump requires pressure and/or fluid more frequently. Change barrier fluid and seal.
- The barrier fluid becomes cloudy, discolored, or water mixes with barrier fluid. Change barrier fluid and seal.
- The barrier fluid is clear. No service needed. Refill and store for the winter.

Refer to ACE pump manual and operating instructions.

Toolbar & Wing Adjustments

DANGER

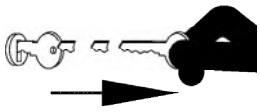
- **ELECTROCUTION WILL CAUSE SERIOUS INJURY OR DEATH. PERFORM BOOM UNFOLDING AND FOLDING OPERATIONS ONLY IN AREAS WITH ADEQUATE HEIGHT, WIDTH AND LENGTH CLEARANCE. IN PARTICULAR, BE MINDFUL OF LOCATION OF OVERHEAD POWER LINES.**

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.**
- **FALLING OR LOWERING EQUIPMENT CAN CAUSE SERIOUS INJURY OR DEATH. KEEP EVERYONE AWAY FROM EQUIPMENT WHEN SUSPENDED, RAISING, OR LOWERING.**
- **MOVING WINGS CAN CAUSE SERIOUS INJURY OR DEATH. KEEP AWAY FROM FOLDING AND UNFOLDING WINGS.**
- **KEEP AWAY FROM OVERHEAD POWER LINES. ELECTRICAL SHOCK CAN CAUSE SERIOUS INJURY OR DEATH.**
- **TIPPING OR MOVEMENT OF APPLICATOR CAN CAUSE SERIOUS INJURY OR DEATH. APPLICATOR MUST BE HITCHED TO THE TRACTOR BEFORE OPERATING BOOM.**
- **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.**
- **RESIDUAL PRESSURE MAY EXIST IN APPLICATOR PLUMBING EVEN WHEN UNIT IS NOT IN USE. RELIEVE PRESSURE BEFORE SERVICING ANY PLUMBING.**

Several areas of adjustment have been designed into the toolbar to maintain proper wing folding operation throughout the life of the toolbar.

Park the empty unit on a firm, level surface. Block the tires or tracks to keep the machine from moving. Unfold the wings into the field working position, and lower the machine to the ground. Set the vehicle parking brake. Relieve hydraulic system pressure, see “Purging Hydraulic System” in this section. Shut off the engine and remove the ignition key. Completely disconnect the unit from the towing vehicle.



Toolbar & Wing Adjustments (continued)

Main Wing & Wing Mast Adjustment

Stop Bolts

The stop bolts on the upper, front side of the center toolbar align wing mast assemblies so they can lower into the saddle area on the toolbar. (FIG. 4-4)

If the toolbar will not slide down into the saddle, the stop bolt on the side that does not lower properly needs to be adjusted.

The stop bolts on the upper back side of the center toolbar align the wing mast assemblies for transporting. (FIG. 4-4)

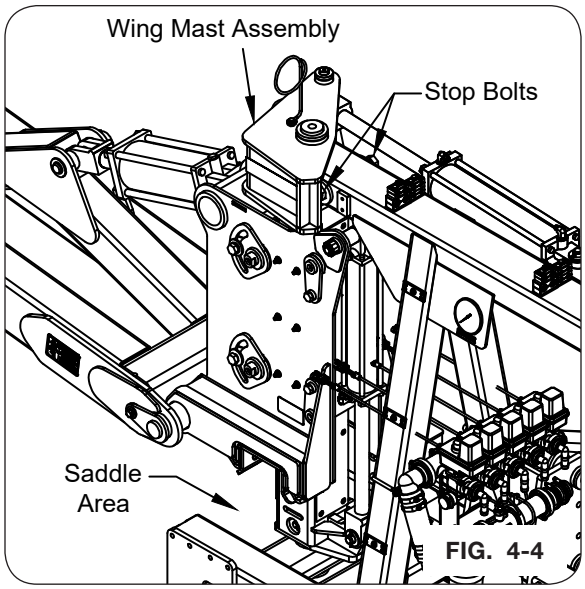


FIG. 4-4

Adjusting Stop Bolts

1. Place the wings in transport position. (FIG. 4-4)
2. Adjust stop bolts 1/2 turn.
3. Unfold the wings and lower the toolbar into the saddle area. If the toolbar will not slide down into the saddle, repeat steps 1 and 2.

Slider Adjustment

Tighten the roller adjustment pin hardware to maintain the toolbar alignment. (FIG. 4-5)

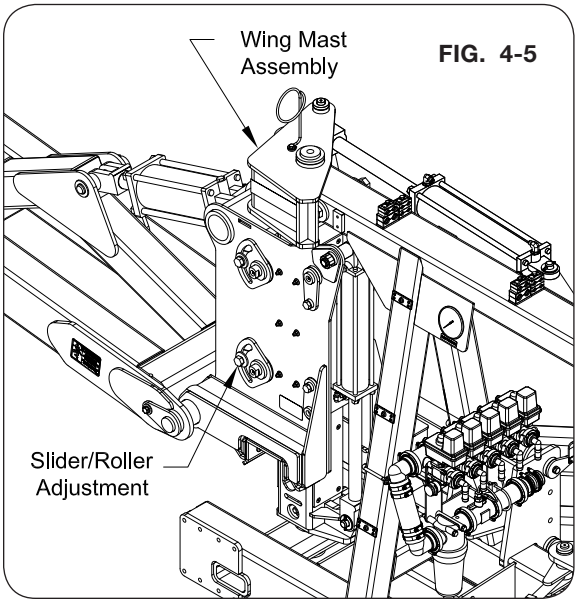


FIG. 4-5

Toolbar & Wing Adjustments (continued)

Diverter Valve (60', 66', 80', 88', 90' Toolbars)

The diverter valve relieves the down pressure on the main wing tilt cylinders so that full pressure is not applied to the wing tilt cylinders when the wings are lowered in to the wing rests.

If the valve does not engage, adjust the handle. (FIG. 4-6)

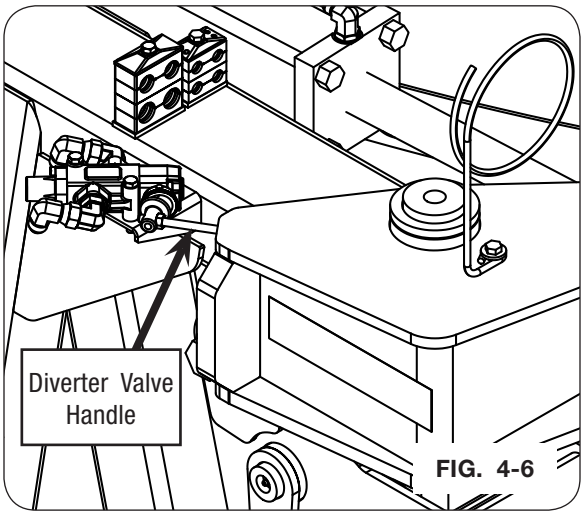


FIG. 4-6

Diverter Valve (40' Toolbars / 1800 Models)

The diverter valve relieves the down pressure on the outer wing fold cylinders so that full pressure is not applied to the outer wing fold cylinders when the wings are lowered in to the wing rests.

If the valve does not engage, adjust the diverter valve forward to be activated when the wings are in the transport position. (FIG. 4-7)

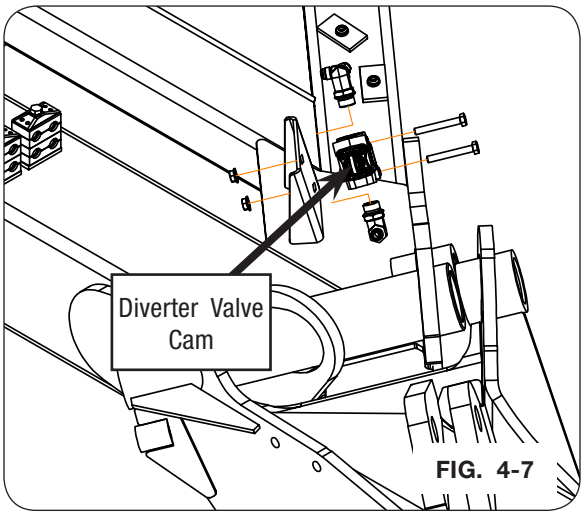


FIG. 4-7

Toolbar & Wing Adjustments (continued)

Center Toolbar & Main Wing Down Pressure (60', 66', 80', 88', 90' Toolbars)

Proper down pressure is achieved when the gauge wheels contact the ground and maintain the coulter depth. Excessive down pressure can cause unnecessary stress on the toolbar gauge wheel components.

NOTE: There is an external relief valve installed on the unit. The main wing down pressure is changed using the adjustment screw on the external valve block instead of Port 7A on the main valve block. (FIG. 4-8)

Cartridge adjustment requires the following tools: (FIG. 4-8)
- The jam nut needs an 11/16" wrench
- The set knob for the cartridge uses a 3/16" hex

1. The main valve block relief valve Port 7A must be turned clockwise all the way in (factory setting) for the wing down pressure to work properly. Adjustments are made through the external relief valve.

NOTE: Adjusting the existing relief valve is critical. The center toolbar and main wing hydraulics will not function properly if not performed.

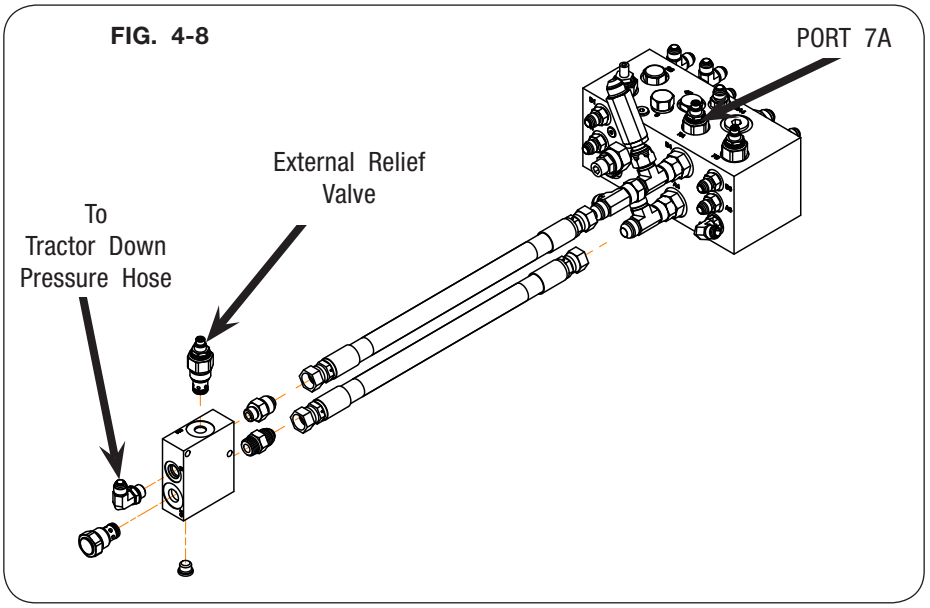
2. Loosen the jam nut on the external relief valve.

3. Turn set knob clockwise to increase pressure/counter clockwise to decrease pressure.

NOTE: Down pressure setting should be between 750 and 1500 PSI. DO NOT EXCEED 1500 PSI.

4. Tighten the jam nut.

FIG. 4-8



Toolbar & Wing Adjustments (continued)

Pivoting Coulter Tube Adjustment

The pivoting coulter tubes and main wings are parallel to each other when in the working position. The pivoting coulter tubes can be adjusted if the pivoting coulter tubes and main wings are not parallel by adding or removing the shims. (FIG. 4-9)

The pivoting coulter tubes and main wings are straight up and down when in the transport position. The pivoting coulter tubes can be adjusted if the pivoting coulter tubes and main wings are not straight up and down by adjusting the stop bolts.

Shim Adjustment

1. Place pivoting coulter tube in the transport position.
2. Add or remove shims accordingly.
3. Lower the pivoting coulter tubes in the working position. If the pivoting coulter tubes and main wings are not parallel, repeat steps 1 and 2.

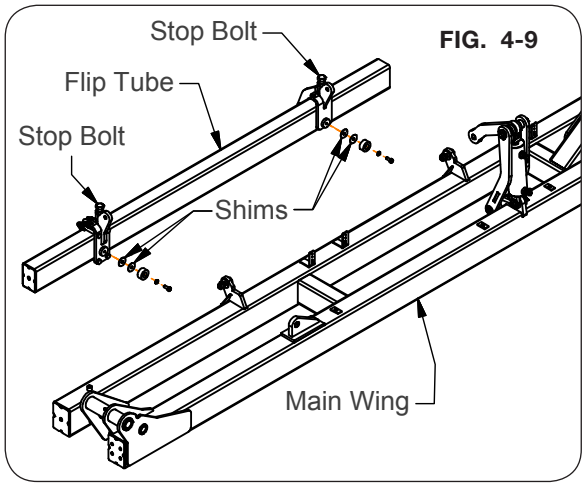


FIG. 4-9

Stop Bolt Adjustment

1. Place pivoting coulter tubes in the working position.
2. Adjust stop bolts 1/2 turn.
3. Raise the pivoting coulter tube in the transport position. If the pivoting coulter tubes and main wings are not straight up and down, repeat steps 1 and 2.

Outer Wing Adjustment

Rigid Setting - no adjustment.

Float Setting - The outer wings can be adjusted to allow the wings to flex down 8 degrees and no limit for the flex up.

NOTE: When wings are in the float setting, wings will not be parallel with the center toolbar.

Wing Stop & Shim Adjustment

1. Place the wings in transport position.
2. Remove shim plates or shim plates and wing stop weldment to allow the wings to flex. (FIG. 4-10)
3. Unfold the wings. If additional adjustment is required, repeat steps 1 and 2.

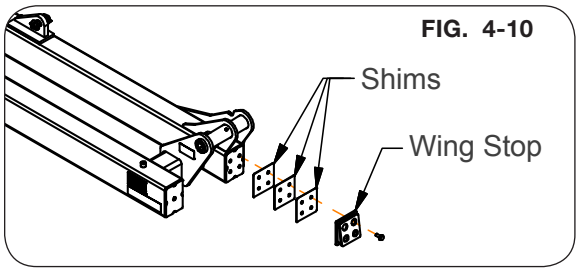


FIG. 4-10

Toolbar & Wing Adjustments (continued)

Outer Wing Adjustment (continued)

Outer Wing Down Pressure

Outer wing down pressure is determined by how much pressure it takes to fold the outer wings into the operating position.

Cartridge adjustment requires the following tools:
(FIG. 4-11)

- The jam nut needs an 11/16" wrench
- The set knob for the cartridge uses a 3/16" hex

1. Loosen the jam nut.

2. Turn set knob clockwise to increase pressure/counter clockwise to decrease pressure. DO NOT EXCEED 2000 PSI.

NOTE: Outer wing down pressure will be higher than 1500 PSI due to folding pressure requirements. Alleviate potential issues during operation by reducing outer wing fold flow to a minimum.

3. Tighten the jam nut.

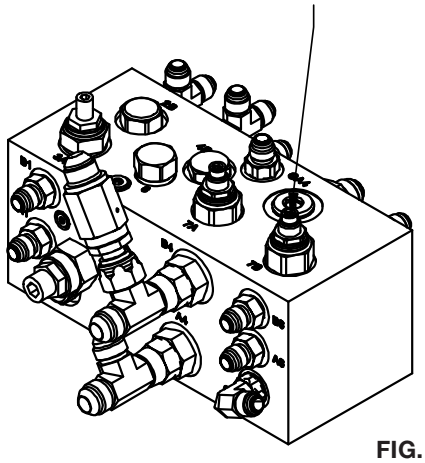


FIG. 4-11

Toolbar & Wing Adjustments (continued)

Sequence Valve Adjustments (40' Toolbars / 1800 Models)

During sequence valve adjustment, disengage hydraulics, use ¼ turn adjustment, and then engage to check. Smaller increments may be used for fine tuning if needed.

Cartridge adjustment requires the following tools (FIG. 4-12 and 4-13):

- The jam nut needs an 11/16" wrench
- The set knob for the cartridge uses a 3/16" hex

Unfolding to Working Position

If the main wings are fully unfolded and the toolbar latch is not disengaged, adjust sequence valve SEQ2. Turn the adjustment screw counterclockwise until the toolbar latch actuates. (FIG. 4-12)

Sequence Valve Adjustment
Unfolding to Working Position
Port SEQ2

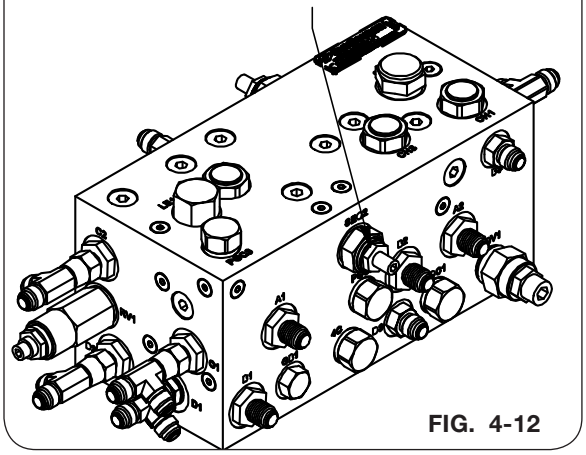


FIG. 4-12

Folding to Transport Position

If the main wings begin to fold before the latch engages adjust sequence valve SEQ1. Rotate the adjustment screw clockwise 1/4 of a turn and then cycle the fold circuit. (FIG. 4-13)

Sequence Valve Adjustment
Folding to Transport Position
Port SEQ1

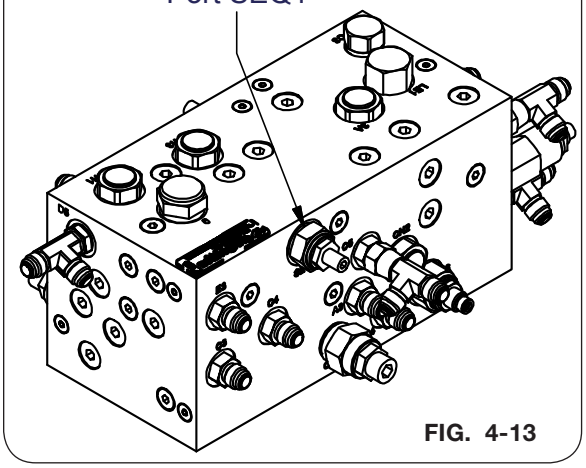


FIG. 4-13

Toolbar & Wing Adjustments (continued)

Sequence Valve Adjustments (60', 66', 80', 88', 90' Toolbars)

During sequence valve adjustment, disengage hydraulics, use ¼ turn adjustment, and then engage to check. Smaller increments may be used for fine tuning if needed.

Cartridge adjustment requires the following tools (FIG. 4-14 and 4-15):

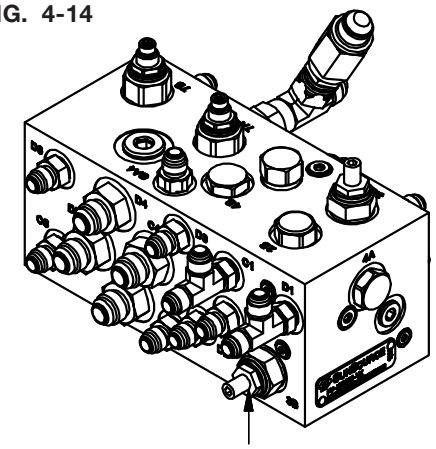
- The jam nut needs an 11/16" wrench
- The set knob for the cartridge uses a 3/16" hex

Unfolding to Working Position

The transport latch will unlatch and the wings will swing out. If the mast lift cylinder or pivoting coulter tube cylinder begin to move before the wings have completely swung outward, the sequence valve 3B needs to be adjusted. Turn the cartridge clockwise 1/4 of a revolution at a time until no movement of these cylinders can been seen until the wings are fully outward. (FIG. 4-14)

If the mast and pivoting coulter tube cylinders do not move at all, the sequence valve is set too high. Turn counter-clockwise until these cylinders start to move.

FIG. 4-14



Sequence Valve Adjustment
Unfolding to Working Position
Port 3B

Folding to Transport Position

The pivoting coulter tube will rotate up and the mast lift will raise. If the main wing starts to fold back before this action is complete, the sequence valve 3A needs to be adjusted. Turn the cartridge clockwise 1/4 of a revolution at a time until no movement of the main fold cylinders can be seen until the mast and pivoting coulter tube are fully raised. (FIG. 4-15)

If the main wing does not fold at all, the sequence valve is set too high. Turn counter clockwise until the cylinder starts to move.

Sequence Valve Adjustment
Folding to Transport Position
Port 3A

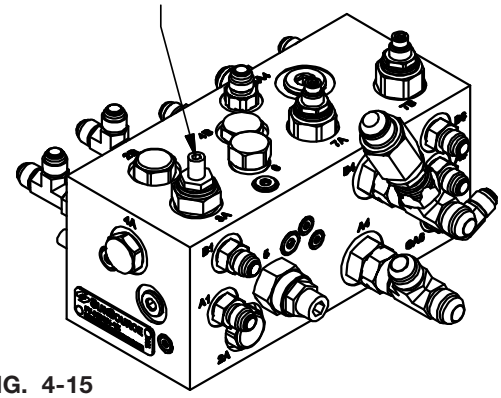


FIG. 4-15

Tongue Adjustment

Units with Non-Steerable Hitch (80' / 88' / 90' Units)

1. Pull applicator in a straight line for a few hundred feet and note how applicator is trailing directly behind the tractor.

2. If unit is trailing to the left, lengthen the RH tongue turnbuckle and shorten the LH tongue turnbuckle. Use 1/2 turn increments for both. (FIG. 4-16)

3. If unit is trailing to the right, lengthen the LH tongue turnbuckle and shorten the RH tongue turnbuckle. Use 1/2 turn increments for both. (FIG. 4-16)

4. Tighten both turnbuckle locking-nuts.

5 Re-check by repeating Step #1.

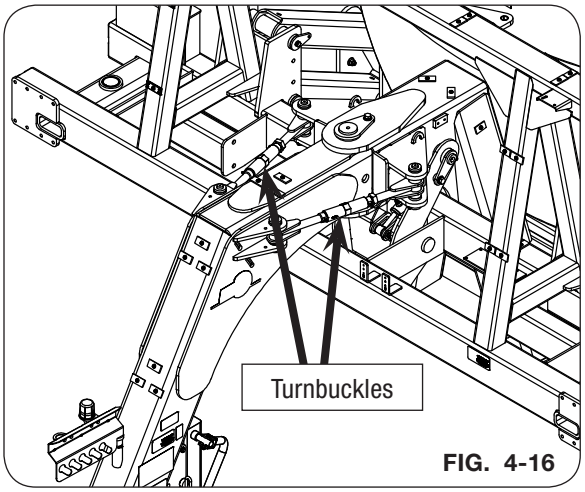


FIG. 4-16

Units Equipped with Steerable Hitch

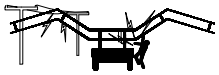
Refer to your Raven Steerable Hitch Manual (9008012) for initial set up.

For side hill compensation set up, refer to "Steerable Hitch Node & Side Hill Compensation Installation (Opt.) - For 60' & Larger Toolbars" in the SET UP section.

Center Toolbar & Wing Mast Cylinder End Replacement
(80', 88', 90' Toolbars)

DANGER

- **ELECTROCUTION WILL CAUSE SERIOUS INJURY OR DEATH. PERFORM BOOM UNFOLDING AND FOLDING OPERATIONS ONLY IN AREAS WITH ADEQUATE HEIGHT, WIDTH AND LENGTH CLEARANCE. IN PARTICULAR, BE MINDFUL OF LOCATION OF OVERHEAD POWER LINES.**

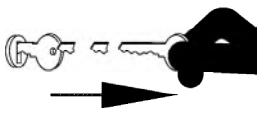


WARNING

- **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.**
- **FALLING OR LOWERING EQUIPMENT CAN CAUSE SERIOUS INJURY OR DEATH. KEEP EVERYONE AWAY FROM EQUIPMENT WHEN SUSPENDED, RAISING, OR LOWERING.**
- **MOVING WINGS CAN CAUSE SERIOUS INJURY OR DEATH. KEEP AWAY FROM FOLDING AND UNFOLDING WINGS.**
- **KEEP AWAY FROM OVERHEAD POWER LINES. ELECTRICAL SHOCK CAN CAUSE SERIOUS INJURY OR DEATH.**
- **TIPPING OR MOVEMENT OF APPLICATOR CAN CAUSE SERIOUS INJURY OR DEATH. APPLICATOR MUST BE HITCHED TO THE TRACTOR BEFORE OPERATING BOOM.**
- **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.**
- **RESIDUAL PRESSURE MAY EXIST IN APPLICATOR PLUMBING EVEN WHEN UNIT IS NOT IN USE. RELIEVE PRESSURE BEFORE SERVICING ANY PLUMBING.**

The following instructions are for replacing the center toolbar cylinder end weldments and cylinder pins.

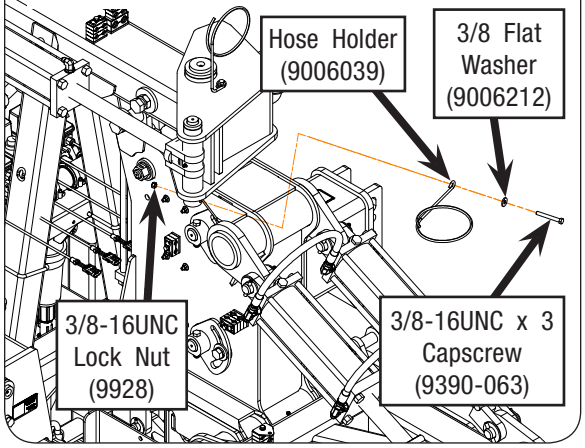
1. Park the empty unit on a firm, level surface. Block the tires or tracks to keep the machine from moving. Unfold the wings into the field working position, and lower the machine to the ground. Set the vehicle parking brake. Relieve hydraulic system pressure, see "Purging A Hydraulic System" in this section. Shut off the engine and remove the ignition key. Completely disconnect the unit from the towing vehicle.



Center Toolbar & Wing Mast Cylinder End Replacement
(80', 88', 90' Toolbars) (Continued)

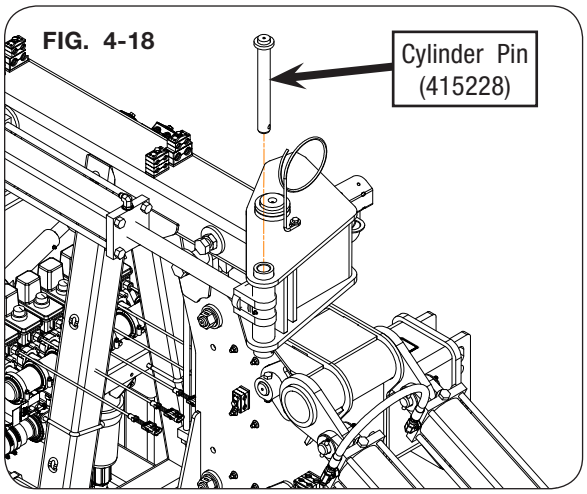
2. Unscrew the 3/8-16UNC lock nut (9928) and remove hose holder (9006039), 3/8 flat washer (9006212) and 3/8-16UNC x 3 capscrew (9390-063). Keep hose holder and hardware. (FIG. 4-17)

FIG. 4-17



3. Remove original cylinder pin (415228) and discard. (FIG. 4-18)

FIG. 4-18

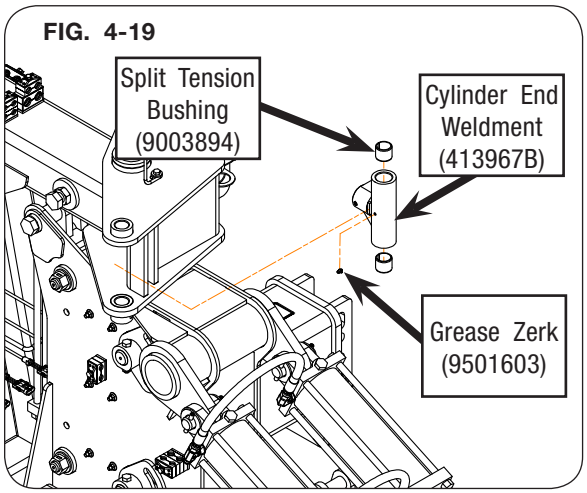


NOTE: Hydraulic cylinder is removed for clarity. (FIG. 4-19)

4. Loosen set screw on original cylinder end weldment (413967B).

5. Unscrew from hydraulic cylinder the original cylinder end weldment. Discard cylinder end weldment and two split tension bushings (9003894) and grease zerk (9501603), as shown. (FIG. 4-19)

FIG. 4-19



Center Toolbar & Wing Mast Cylinder End Replacement
(80', 88', 90' Toolbars) (Continued)

NOTE: Only replace cylinder end weldment from hydraulic cylinder rod end. (FIG. 4-20)

6. Ensure cylinder end weldment grease zerk hole is rearward and split tension bushings slots face the hydraulic cylinder. (FIG. 4-20)
7. Completely tighten new cylinder end weldment to hydraulic cylinder rod end.
8. Insert two split tension bushings and grease zerk into cylinder end weldment. (FIG. 4-20)
9. Tighten set screw to new cylinder end weldment.
10. Insert new cylinder pin into wing mast and cylinder end weldment. (FIG. 4-21)
11. Reusing hose holder and hardware from step 2, reattach parts to the unit.
12. Tighten hardware.
13. Repeat steps 2 through 12 for left-hand side.
14. Grease the cylinder end weldments to prevent seizing. Refer to "Lubrication" in this section.
15. Fold wings to transport position. Check for smooth wing operation.

FIG. 4-20

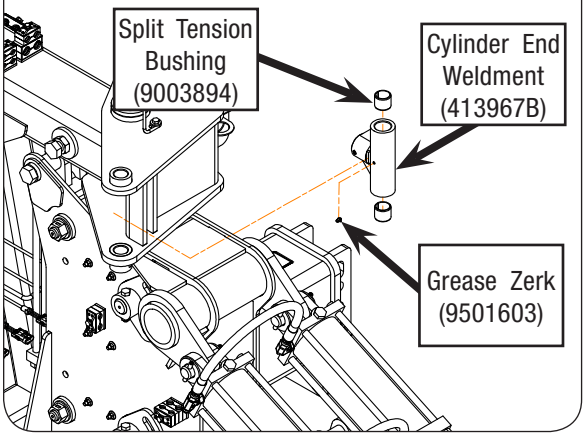
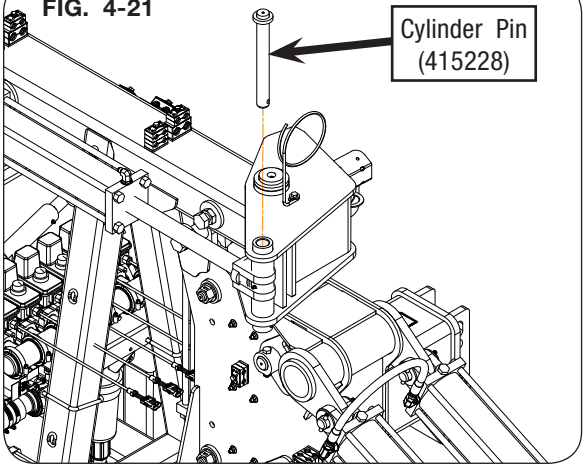


FIG. 4-21



Coulter Hub Adjustment and Replacement

WARNING

- **BE SURE THAT THE IMPLEMENT IS SECURELY BLOCKED TO PREVENT FALLING. FAILURE TO DO SO COULD RESULT IN INJURY OR DEATH.**
- **EYE PROTECTION AND OTHER APPROPRIATE PERSONAL PROTECTIVE EQUIPMENT MUST BE WORN WHILE SERVICING IMPLEMENT**

CAUTION

- **SHARP EDGES ON COULTER BLADES CAN CAUSE SERIOUS INJURY. BE CAREFUL WHEN WORKING AROUND COULTER BLADES.**

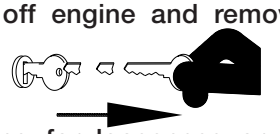
IMPORTANT

- *Do not allow dirt and debris to contaminate the hub and its internal components. Neglecting to do so could result in failure of the hub and its components due to excessive wear.*
- *Removal of cotter pin is best accomplished by using needle-nose pliers or similar tools and prying on the ends to straighten pin. If cotter pin is damaged, discard and replace.*

The following instructions are for adjusting and lubricating the hub and replacing the "O"-ring and triple lip seal.

After the first 100 acres, the hubs should be checked for tightness and wear.

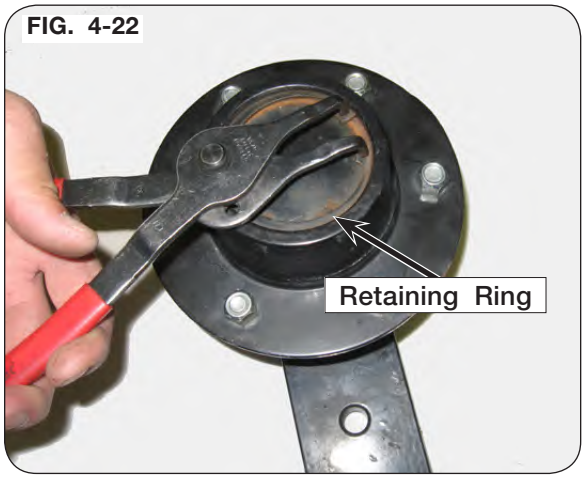
1. Park the empty applicator on a firm, level surface. Block the machine to keep it from moving. Unfold the wings to field working position and lower machine to the ground. Set the tractor's parking brake, shut off engine and remove key.



2. Check the coulter hub and bearing for looseness or wobble by gripping the ends of the blade. Rotate and laterally push and pull on the coulter blade. A tight hub will have no wobble and will rotate smoothly with slight resistance.

3. If the hub wobbles, the hub must be tightened to the spindle. To do this, remove 3/8" hardware, blade, retaining ring (93985), hub cap (60735B), 2 1/2" I.D. O-ring (902158), and bent cotter pin (605465) securing the slotted nut (94795). (FIG. 4-22)

FIG. 4-22



4. While rotating hub, tighten slotted nut (94795) to 40 ft-lbs. (FIG. 4-23)

5. Unscrew nut until it becomes loose without rotating hub.

6. Hand tighten nut without rotating hub.

7. Tighten nut to align the next notch with hole in the spindle.

8. Check for looseness in hub. If the hub is loose, tighten the nut one more slot and repeat step, as needed. If wobble still exists, continue with the following guidelines.

Coulter Hub Adjustment and Replacement (continued)

9. Unscrew the nut and carefully remove the hub from the spindle.

10. Remove the components, clean, and inspect for any damage or wear. If even the slightest imperfection exists, replace the component(s). Once the hub is dismantled, always replace the bearing and seal assembly, o-ring, and triple lip seal.

NOTE: Bearing and seal assembly may not be assembled together. Snap the seal onto the bearing inner race to create a bearing and seal assembly.

IMPORTANT

- *Always replace the "O"-rings and seals if dismantling the hub. Failure to do so could result in premature failure of hub and its components.*

11. Replace any damaged parts before reassembling the components. Be sure to remove any debris or dirt.

12. Pack bearings with moly scent 2 grease.

13. Assemble "O"-ring onto spindle first. Assemble seal and bearings into hub and position onto spindle.

(Continued on next page)

Coulter Hub Adjustment and Replacement (continued)

14. Use grease to lubricate the seal. (FIG. 4-23)

15. While rotating hub, slide the hub, seal and bearing onto spindle. Make sure not to damage seal. Be sure outer bearing and washer slide on the spindle and bearing seats in the cup. (FIG. 4-23)

16. Assemble nut to spindle. While rotating hub, tighten nut to 40 ft-lbs. Do not rotate hub again until step 20. (FIG. 4-23)

IMPORTANT

- *Rotate coulter hub when torquing slotted nut. Doing this will prevent flats from forming on bearings.*

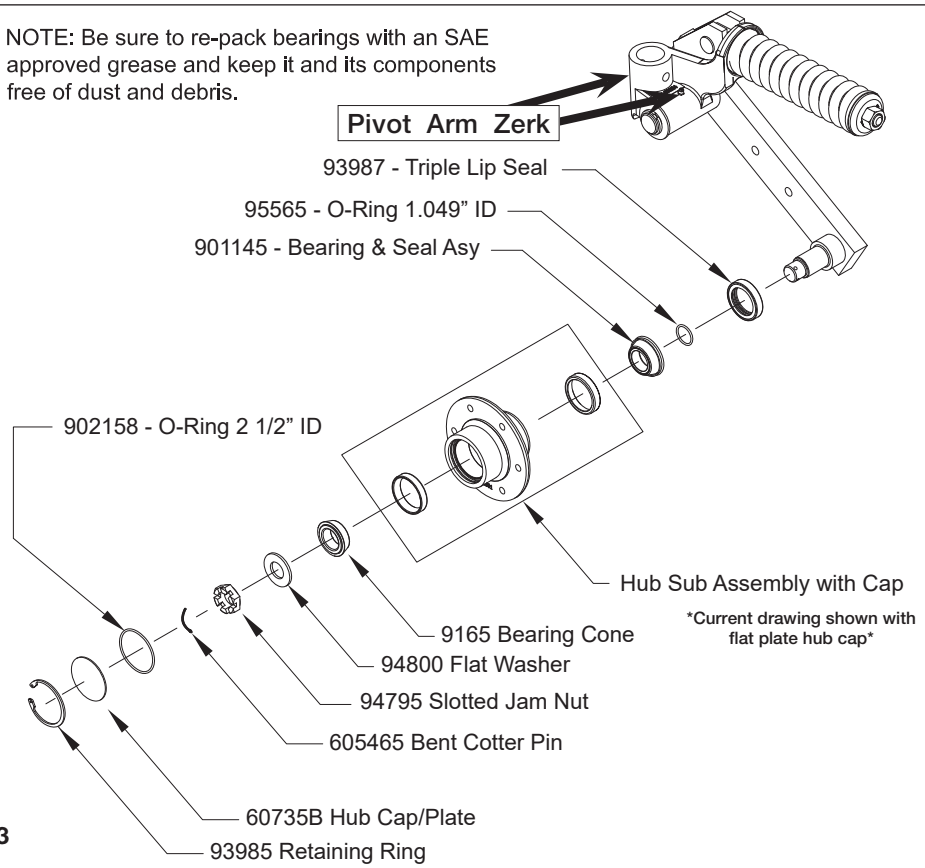


FIG. 4-23

Coulter Hub Adjustment and Replacement (continued)

17. Back off nut until it becomes loose without rotating hub.

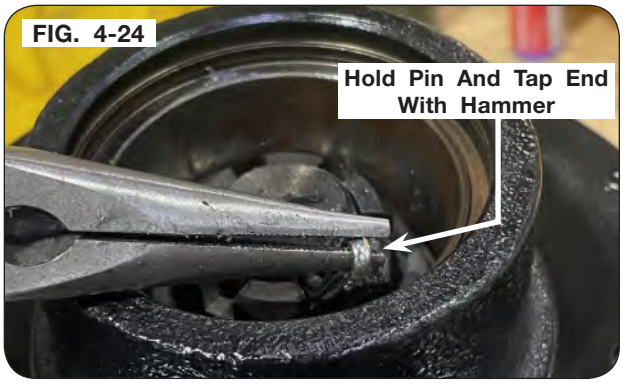
18. Hand tighten nut without rotating hub.

19. Tighten nut to align the next notch with hole in the spindle.

20. Check for looseness in the hub. It should not wiggle. If it does, tighten the nut one more slot and repeat step 20.

21. Check hub rotation for excessive drag. There should be slight resistance. If there is excessive drag, repeat procedure starting at step 16.

22. Install bent cotter pin. Hold the pin with a needle-nose pliers through the ring of the pin. (FIG. 4-24) Tap the ring end with a hammer to install through the hole in the spindle.



23. Secure the cotter pin as shown in figure 4-25.

24. Add moly scent 2 grease through hub zerk until grease extends above the washer (94800) all around cavity. Also add grease to pivot arm zerks. (FIG. 4-23)

25. Reinstall O-ring, hub cap, retaining ring, 3/8' hardware, and blade to the hub.

26. Torque 3/8" hardware to 30 ft.-lbs.

27. Paint hub cap and retaining ring.

Coulter Spring Replacement

⚠ WARNING

- **BE SURE THAT THE IMPLEMENT IS SECURELY BLOCKED TO PREVENT FALLING. FAILURE TO DO SO COULD RESULT IN INJURY OR DEATH.**
- **EYE PROTECTION AND OTHER APPROPRIATE PERSONAL PROTECTIVE EQUIPMENT MUST BE WORN WHILE SERVICING IMPLEMENT**
- **KEEP HANDS CLEAR OF PINCH POINT AREAS.**

⚠ CAUTION

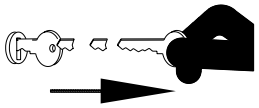
- **SHARP EDGES ON COULTER BLADES CAN CAUSE SERIOUS INJURY. BE CAREFUL WHEN WORKING AROUND COULTER BLADES.**

IMPORTANT

- *The spring should only be adjusted when repairs are being made. The springs have been preset before leaving the factory.*

The following guidelines are for replacing the spring on the coulters.

1. Park the empty applicator on a firm, level surface. Block the machine to keep it from moving. Unfold the wings to field working position and lower machine to the ground. Set the tractor's parking brake, shut off engine and remove key.



2. Loosen the set screw retaining the spring bolt on the coulter arm (FIG. 4-26).
3. Slowly unscrew the spring bolt which will relieve spring pressure (FIG. 4-26).
4. Once the bolt is removed, inspect bolt for wear and replace bolt if necessary. Replace with new spring and re-insert bolt.
5. Tighten bolt until a compression of 1" is obtained on spring (FIG. 4-27).

The coulter springs are preset at the factory to 9 3/8". This measurement is the total amount of exposed spring.

NOTE: Adjusting the spring below 9 3/8" could cause premature part failure and void any warranty considerations.

6. Tighten set screw to secure bolt.

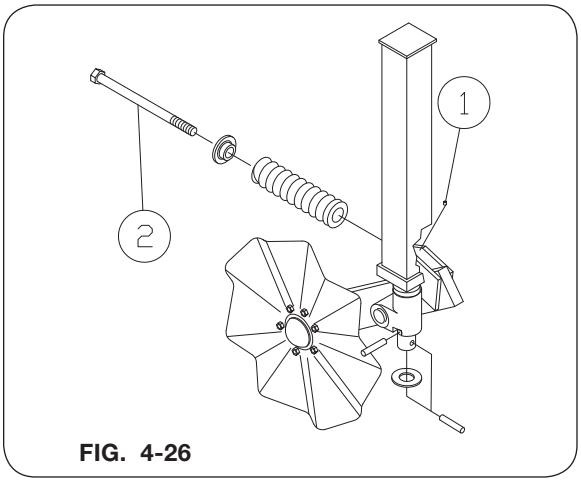


FIG. 4-26

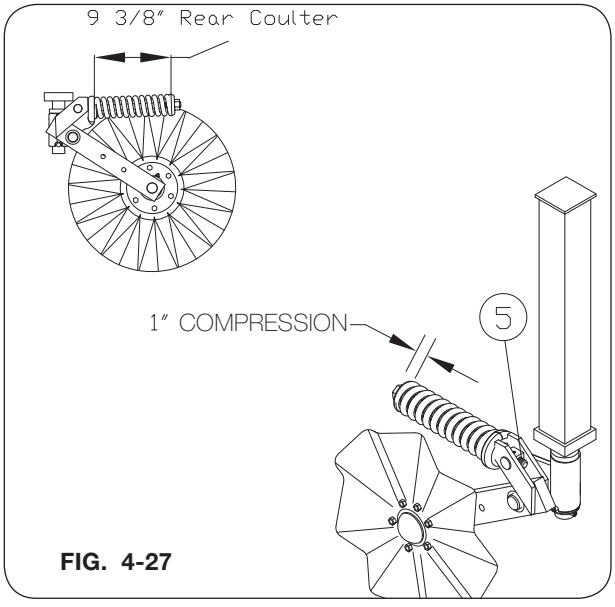


FIG. 4-27

Coulter Post Mount Bracket Adjustment

⚠ WARNING

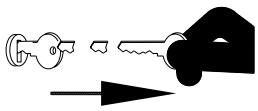
- **BE SURE THAT THE IMPLEMENT IS SECURELY BLOCKED TO PREVENT FALLING. FAILURE TO DO SO COULD RESULT IN INJURY OR DEATH.**
- **EYE PROTECTION AND OTHER APPROPRIATE PERSONAL PROTECTIVE EQUIPMENT MUST BE WORN WHILE SERVICING IMPLEMENT**
- **KEEP HANDS CLEAR OF PINCH POINT AREAS.**
- **FALLING OBJECTS CAN 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 7,500 LBS. SPECIFIC LOAD RATINGS FOR INDIVIDUAL LOADS WILL BE GIVEN AT THE APPROPRIATE TIME IN THE INSTRUCTIONS.**

⚠ CAUTION

- **SHARP EDGES ON COULTER BLADES CAN CAUSE SERIOUS INJURY. BE CAREFUL WHEN WORKING AROUND COULTER BLADES.**

The following instructions are for installing a bolt-on coulter post shim kit (414905B) for original style coulter post mounts. This kit is not for current style coulter post mounts.

1. Park the empty applicator on a firm, level surface. Block the machine to keep it from moving. Unfold the wings to field working position. With the boom still raised, use safe lifting device and supports rated for 7,500 lbs each under each side of the main wings to support the boom and lower machine to the ground. Set the tractor's parking brake, shut off engine and remove key.



2. Slide the shim plate (413991B) between the coulter post and the bottom of the original coulter post mount as shown. (FIG. 4-28)
3. Using 3/8"-16UNC x 3 15/16" U-bolt (9004679) and two 3/8"-16 THD serrated flange nuts (9005640), attach the shim plate to the coulter post. (FIG. 4-28)
4. Tighten the serrated flange nuts.

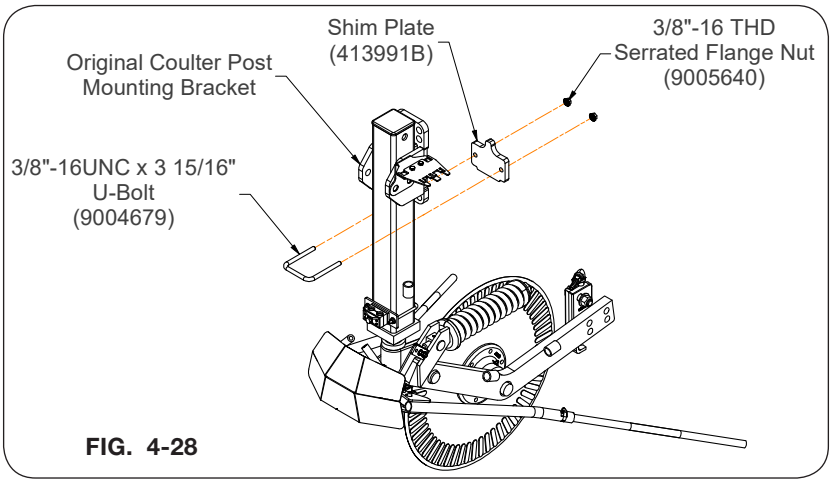


FIG. 4-28

Filters (For 1800 - 40' & 44' Toolbars)

⚠ WARNING

- **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.**
- **RESIDUAL PRESSURE MAY EXIST IN APPLICATOR PLUMBING EVEN WHEN UNIT IS NOT IN USE. RELIEVE PRESSURE BEFORE SERVICING ANY PLUMBING.**

This applicator uses two filters to help ensure proper operation. These filters will need to be cleaned periodically during use and prior to applicator storage.

Primary Filter

To clean the filter located towards the front of the frame underneath the tongue, (FIG. 4-29):

1. Rotate the pump inlet valve to <OFF>.
2. Drain the strainer.
3. Unscrew the filter housing by turning counter-clockwise and remove the filter screen.
4. Clean filter by flushing strainer element with water.
5. Reassemble filter, open pump inlet valve, and check for leaks.

(Continued on next page)

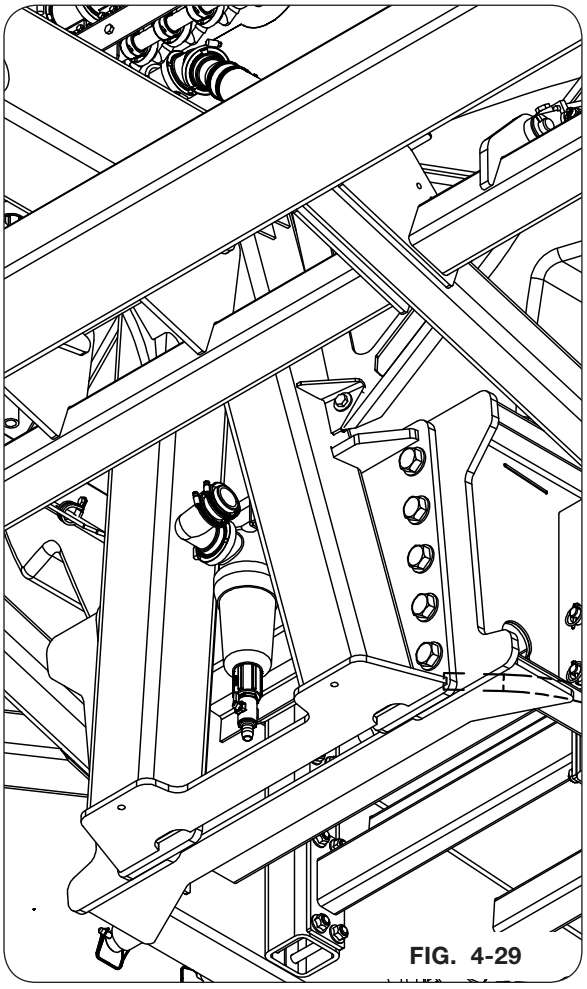


FIG. 4-29

Filters (For 1800 - 40' & 44' Toolbars) (continued)

Secondary Filter

A secondary filter is located on the tongue near the toolbar electric valves. This filter, similar in construction to the primary filter, is used to eliminate the need for strainers at the tips. To clean this filter, first drain the filter housing. Then unscrew the filter housing and remove the screen. Flush the strainer element with water. After cleaning, reassemble filter and check for leaks. (FIG. 4-30)

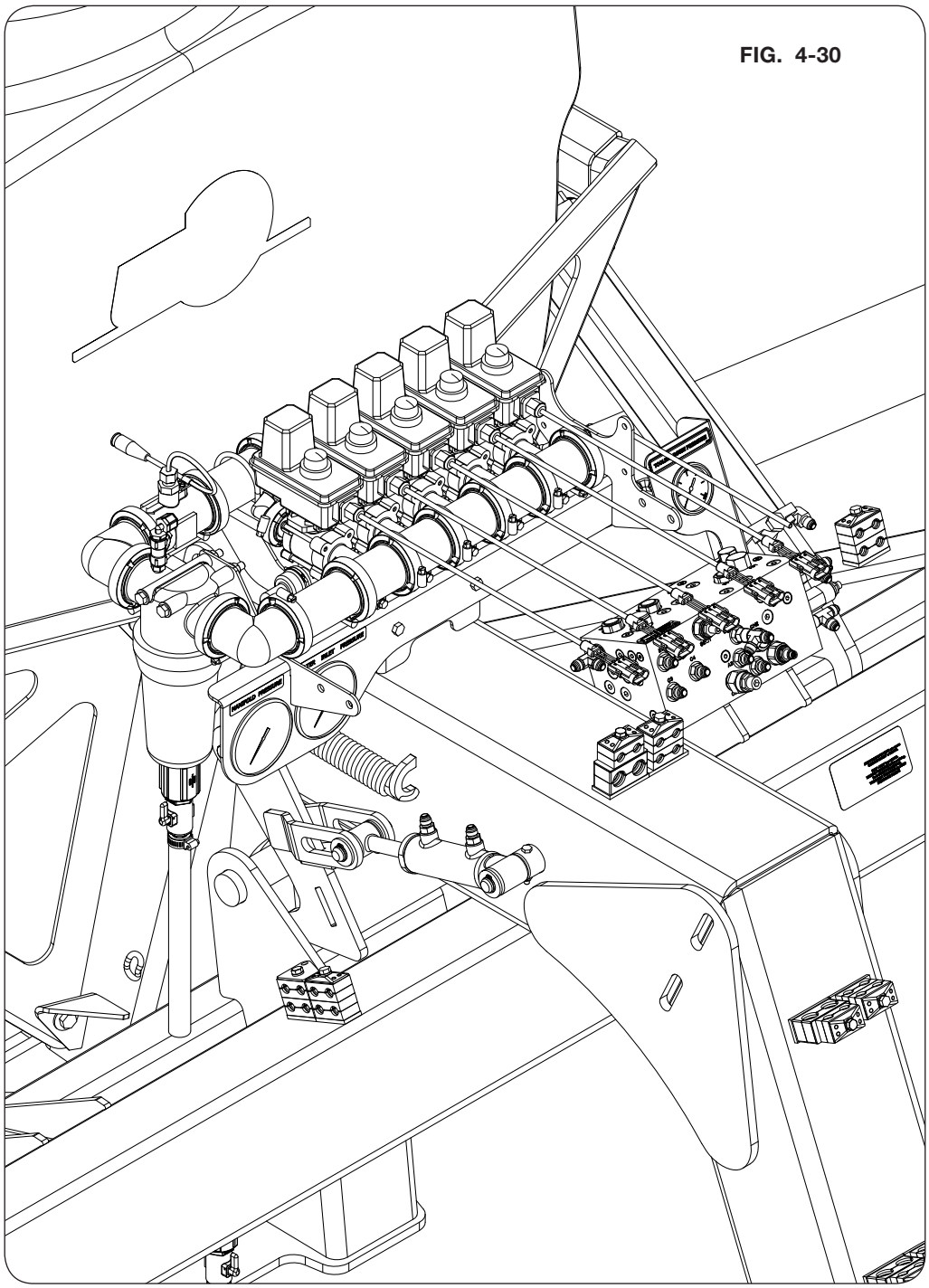


FIG. 4-30

Filters (60', 66', 80', 88', 90' Toolbars)

WARNING

- **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.**
- **RESIDUAL PRESSURE MAY EXIST IN APPLICATOR PLUMBING EVEN WHEN UNIT IS NOT IN USE. RELIEVE PRESSURE BEFORE SERVICING ANY PLUMBING.**

This applicator uses two filters to help ensure proper operation. These filters will need to be cleaned periodically during use and prior to applicator storage.

Primary Filter

To clean the filter located at the rear of the toolbar parallel lift on the right side of the applicator (FIG 4-31):

1. Rotate the pump inlet valve to <OFF>.
2. Unscrew the filter housing by turning counter-clockwise and remove the filter screen.
3. Clean filter by flushing strainer element with water.
4. Reassemble filter, open pump inlet valve, and check for leaks.

(Continued on next page)

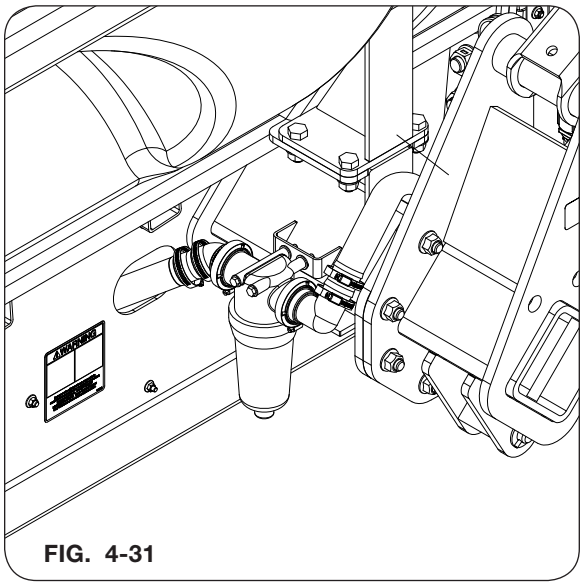


FIG. 4-31

Filters (60', 66', 80', 88', 90' Toolbars) (continued)

Secondary Filter

A secondary filter is located on the toolbar center section, just in front of the toolbar electric valves (FIG. 4-32). This filter, similar in construction to the primary filter, is used to eliminate the need for strainers at the tips. To clean this filter, unscrew the filter housing and remove the screen. Flush the strainer element with water. After cleaning, reassemble filter and check for leaks.

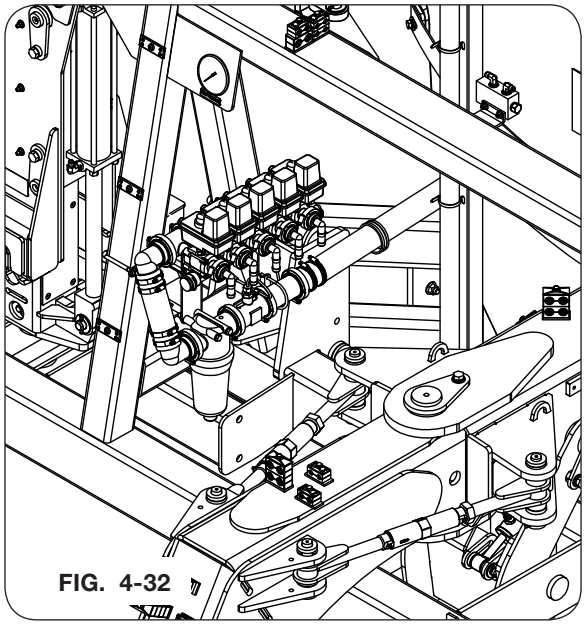


FIG. 4-32

Applicator Maintenance

DANGER

- **ELECTROCUTION WILL CAUSE SERIOUS INJURY OR DEATH. ELECTROCUTION CAN OCCUR WITHOUT DIRECT CONTACT. KEEP AWAY FROM ALL ELECTRICAL LINES AND DEVICES.**

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 SPRAY MIST OR VAPOR.**
- **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 THE MACHINE CAN CAUSE INJURY. BE CAREFUL WHEN WORKING AROUND THE MACHINE.**

Seasonal Storage

Always open all product valves to remove any fluids and to allow moisture to dry.

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

Repaint all areas where paint has been removed to keep rust from developing. Coat areas of coulter blades and knives, if equipped, and coulter posts with rust prohibitive material.

For 60’ toolbars, lower the toolbar to working position and check for a gap between the slide and the mainframe cross it rests on. If a shim can be placed between the slide and the cross piece, add the shim. This check should be done once after 10 hours of use and then seasonally.

Applicator Maintenance (continued)

Seasonal Storage (continued)

Coat exposed cylinder piston rods with rust preventative material.

Inspect machine for parts that may need to be replaced so they may be ordered in the off season.

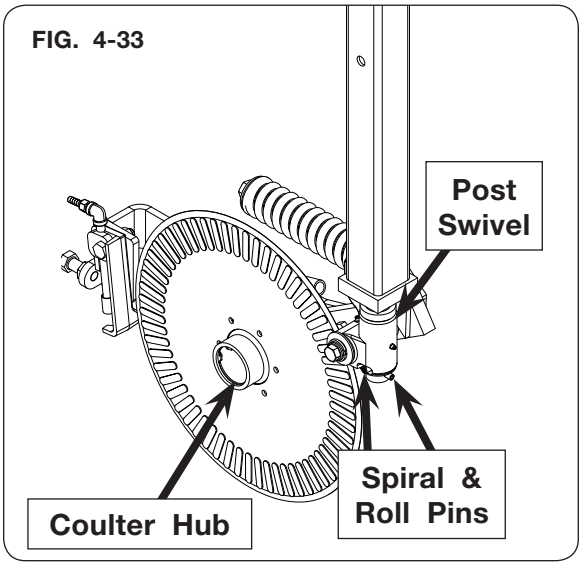
Lubricate machine at all points outlined.

Check coulter blade post swivel limit spiral and roll pins. Replace as needed. (FIG. 4-33)

Check coulter post blade hubs for free rotation. If blade hubs do not rotate, replace and/or pack bearings with grease. Replace coulter arm if spindle is damaged. (FIG. 4-33)

Check coulter post swivel for free movement. If post swivel does not move, free the swivels and grease. Grease the coulter post swivel until fresh grease purges top or bottom of swivel casting to prevent the coulter pivot seizing on post. (FIG. 4-33) Refer to "Lubrication" in this section.

FIG. 4-33



After any period of unused time, unit should be unfolded and refolded to check function of hydraulic system.

Steerable Hitch Maintenance

Remove trash and/or dirt that may have accumulated and possibly interfere with steering performance.

Grease the 4 steerable hitch cylinder pins. For grease zerk locations, see "Lubrication" in this section.

Refer to your Raven Steerable Hitch Manual (9008012) for more details on Maintenance, Troubleshooting, and for initial set up.

For side hill compensation set up, refer to "Steerable Hitch Node & Side Hill Compensation Installation (Opt.) - For 60' & Larger Toolbars" in SET UP section.

Winterizing

⚠ WARNING

- **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.**

IMPORTANT

- *Do not allow pump to run dry. Pump damage will result.*

Before storing the applicator in freezing climates, perform the following winterizing procedure:

1. Perform a complete system rinse using procedure in the "OPERATION SECTION, INDUCTOR - Chemical Container and Inductor Tank Rinsing" of this manual.

2. Wash the applicator thoroughly inside and out with a high-pressure washer.

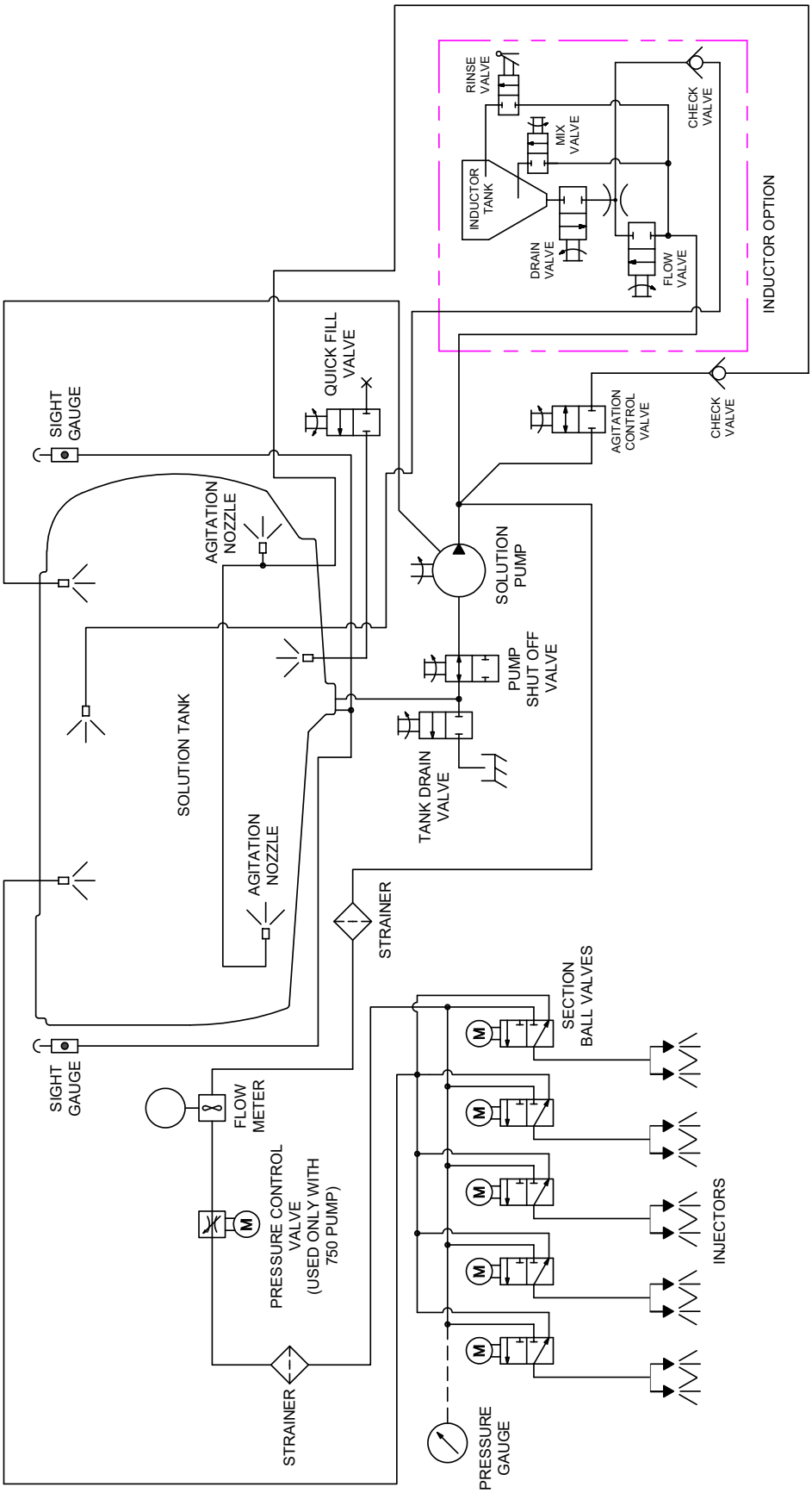
3. Remove as much water from the main tank as possible. Close drain valve on main tank after draining.

4. Pour approximately 50 gallons of R.V. antifreeze into main tank.

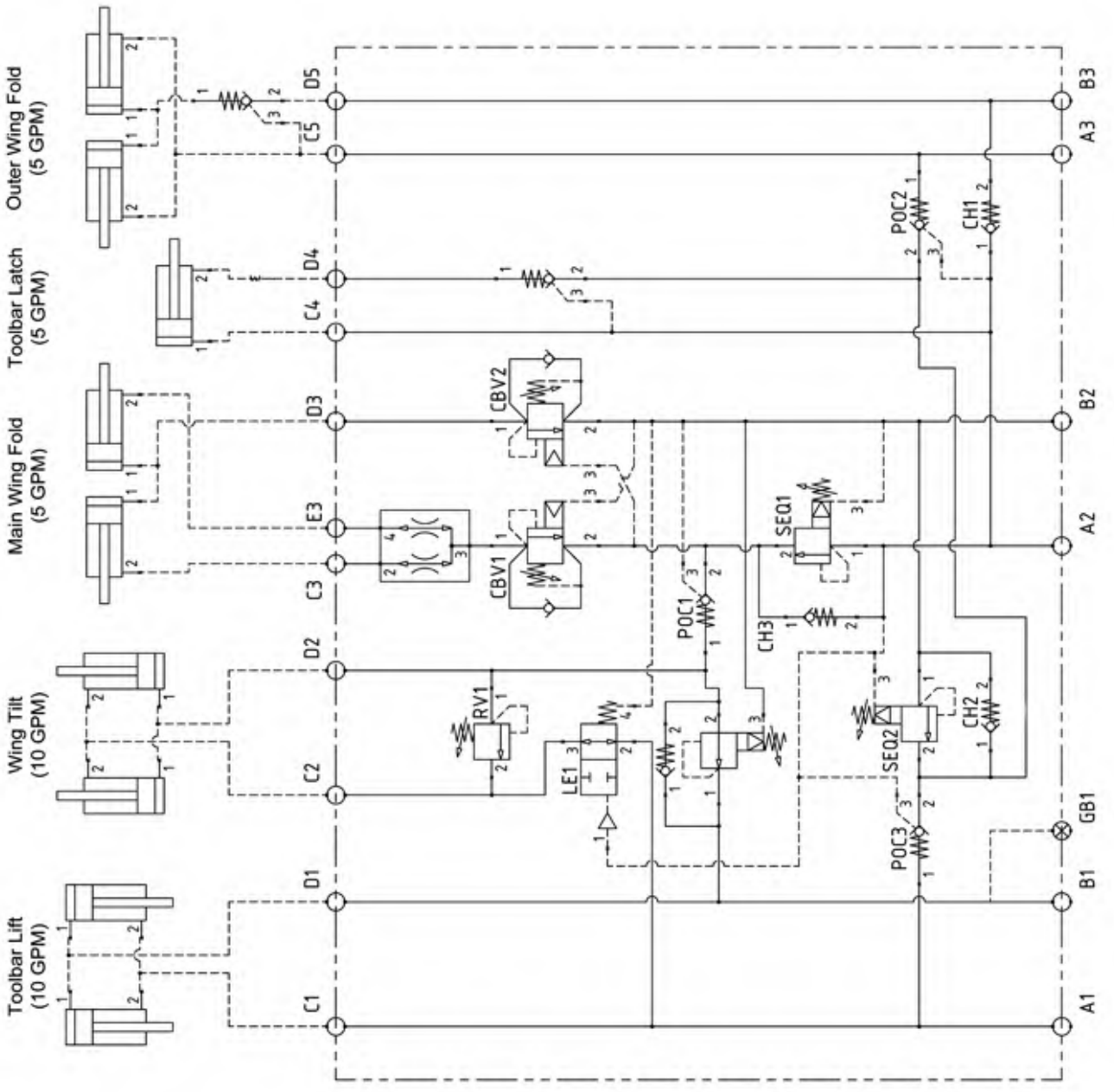
NOTE: If equipped with an inductor, the applicator can circulate the R.V. antifreeze.

5. Loosen diaphragm caps on nozzle bodies to relieve pressure and allow excess antifreeze to drain from wings.

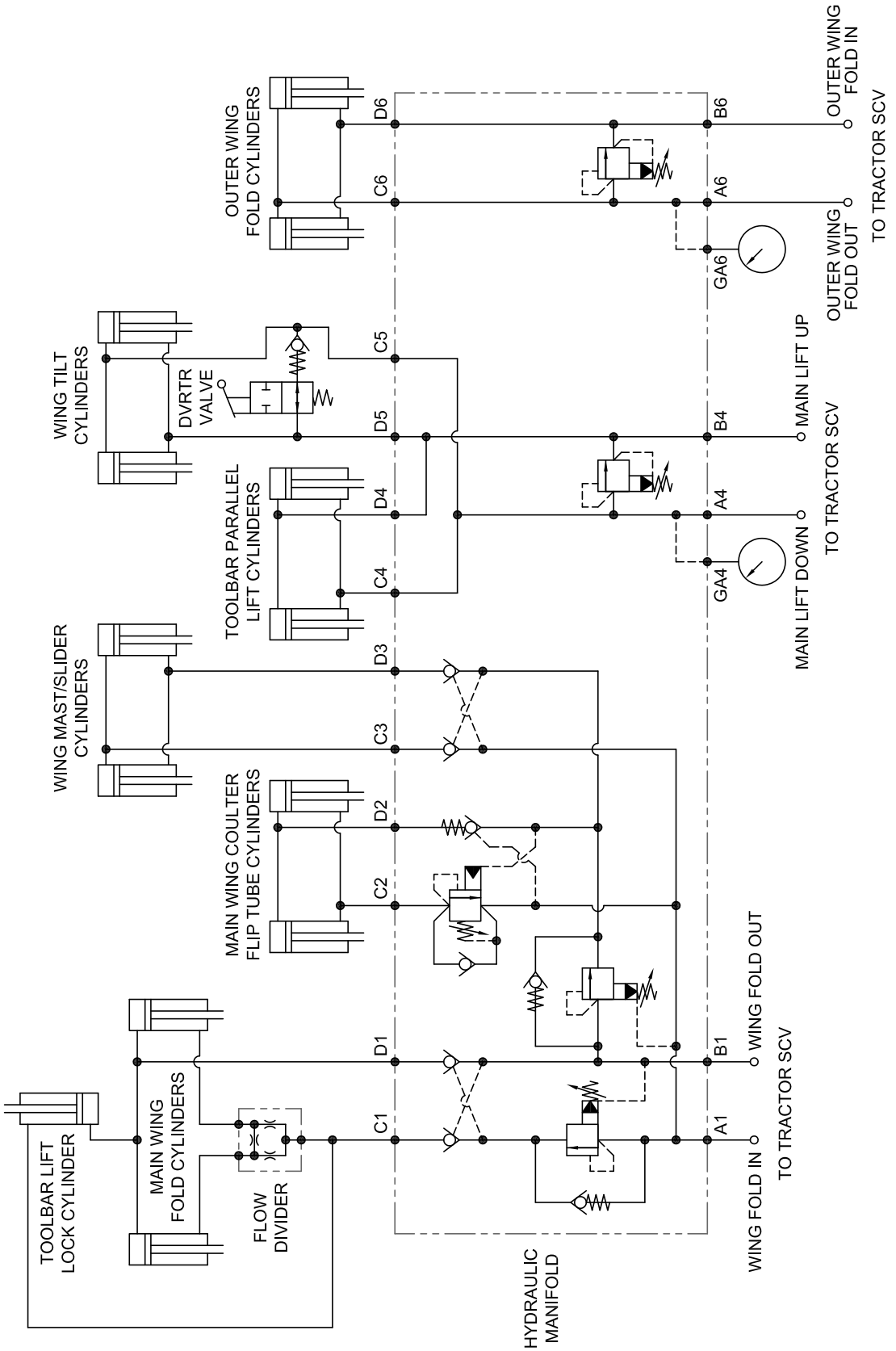
Schematics - Plumbing



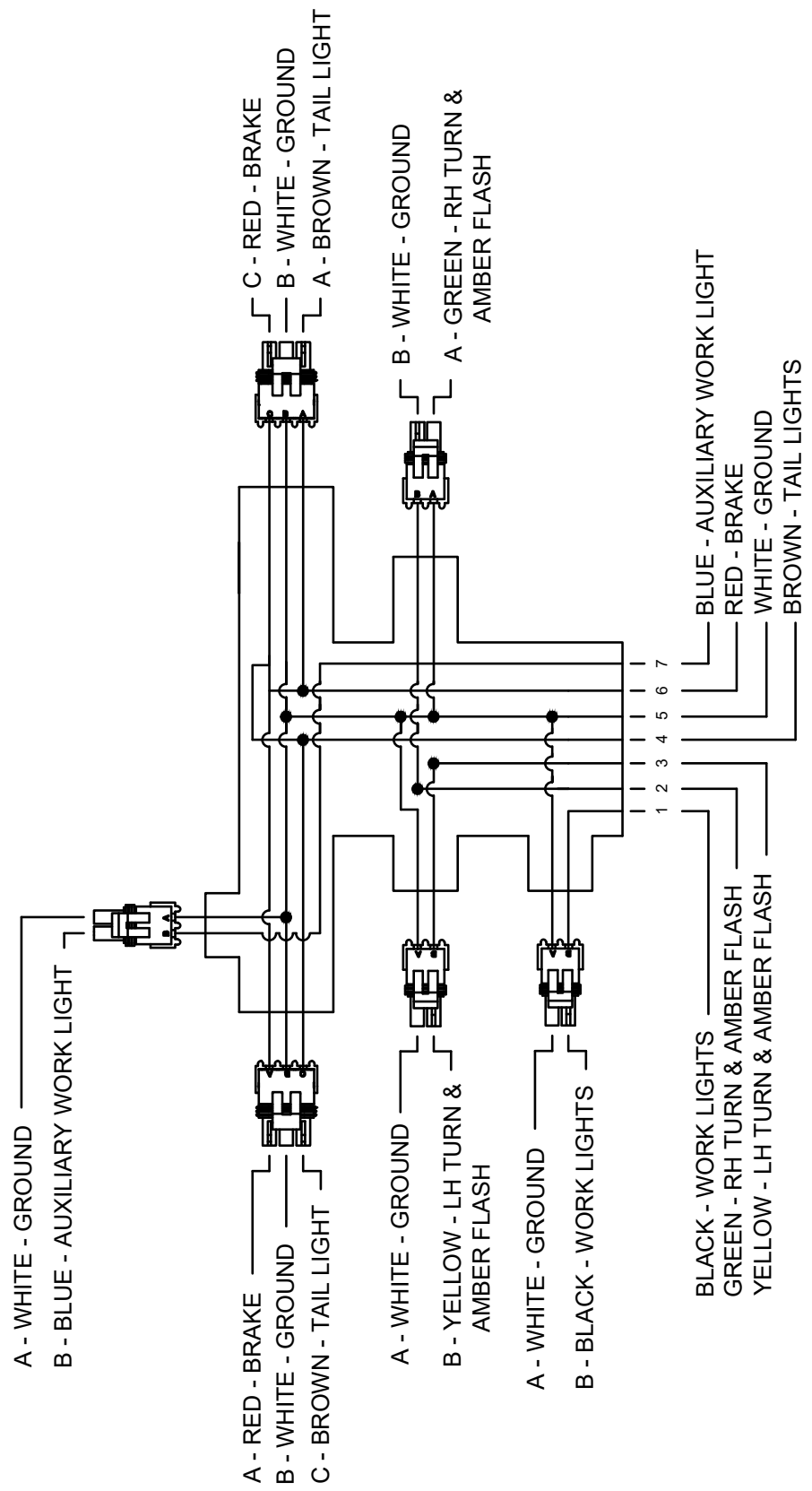
Schematics - Hydraulic (40’ Toolbars)



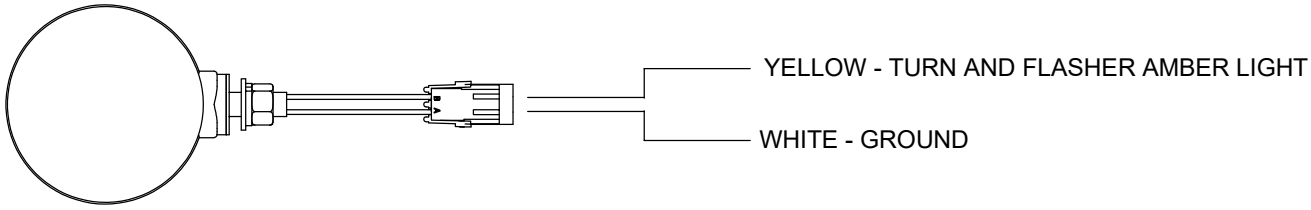
Schematics - Hydraulic (60', 66', 80', 88', 90' Toolbars)



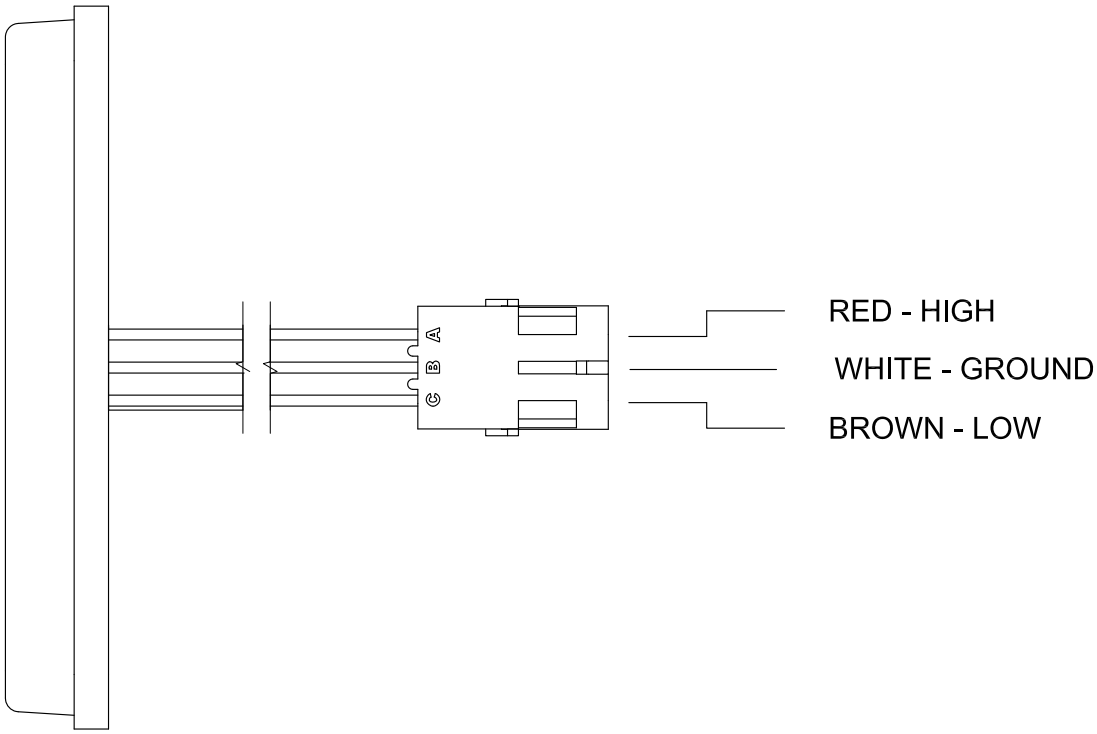
Schematic — Electrical — Main Light Harness (9007224)



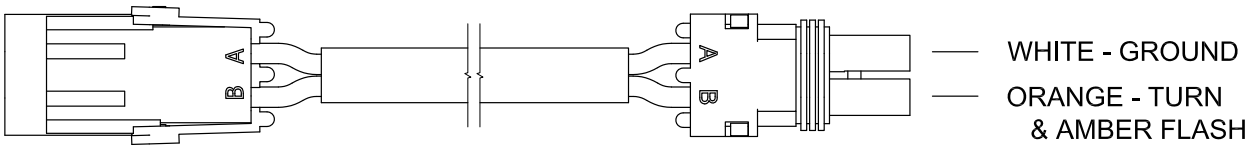
Schematic — Electrical — Amber LED Lamp (9005142)



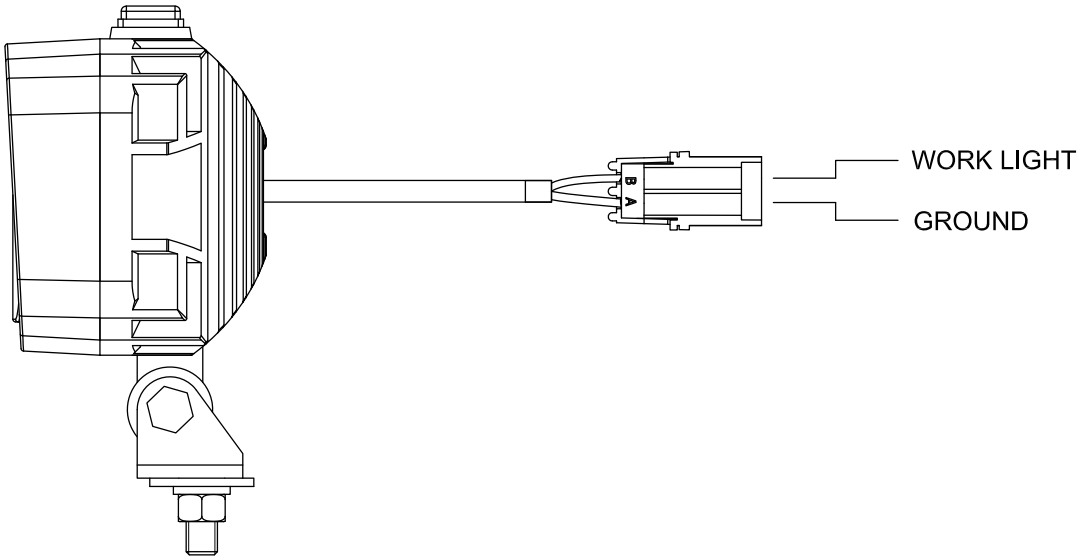
Schematic — Electrical — Red LED Tail/Turn Light (9006282)



Schematic — Wiring Harness (9007310)

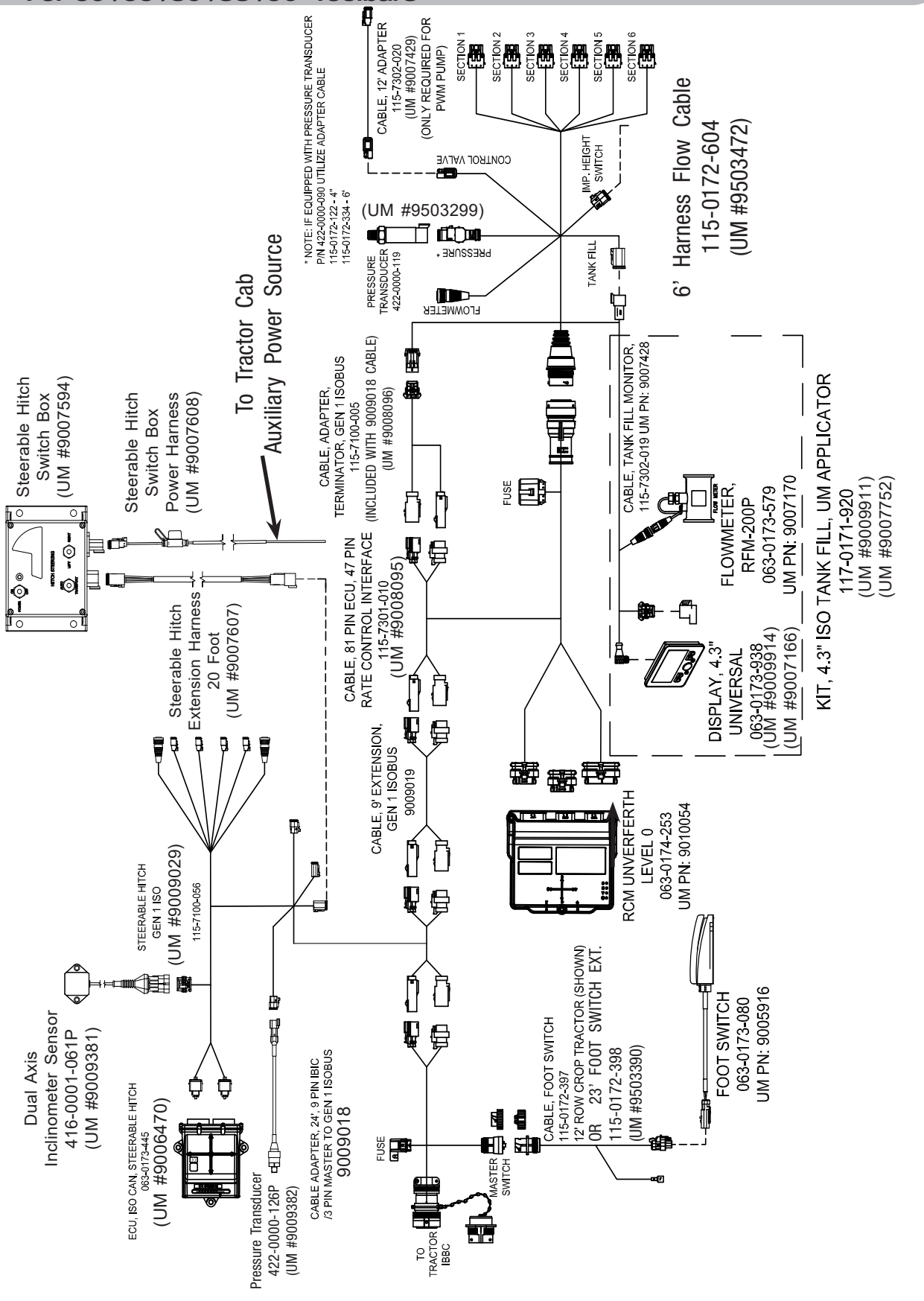


Schematic — Electrical — Work Light (9500801)

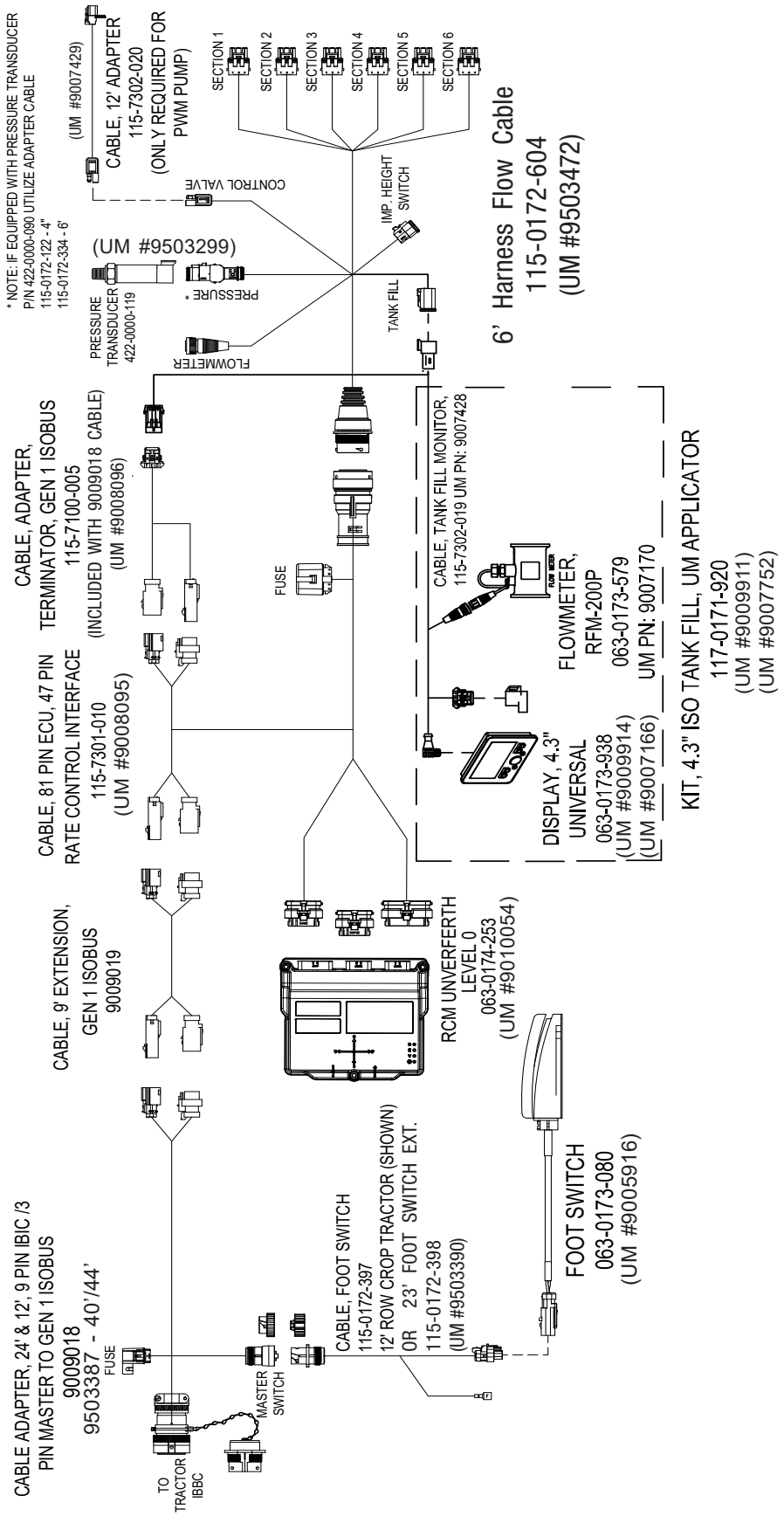


Schematics - Rate Contol Module (RCM) W/Steerable Hitch

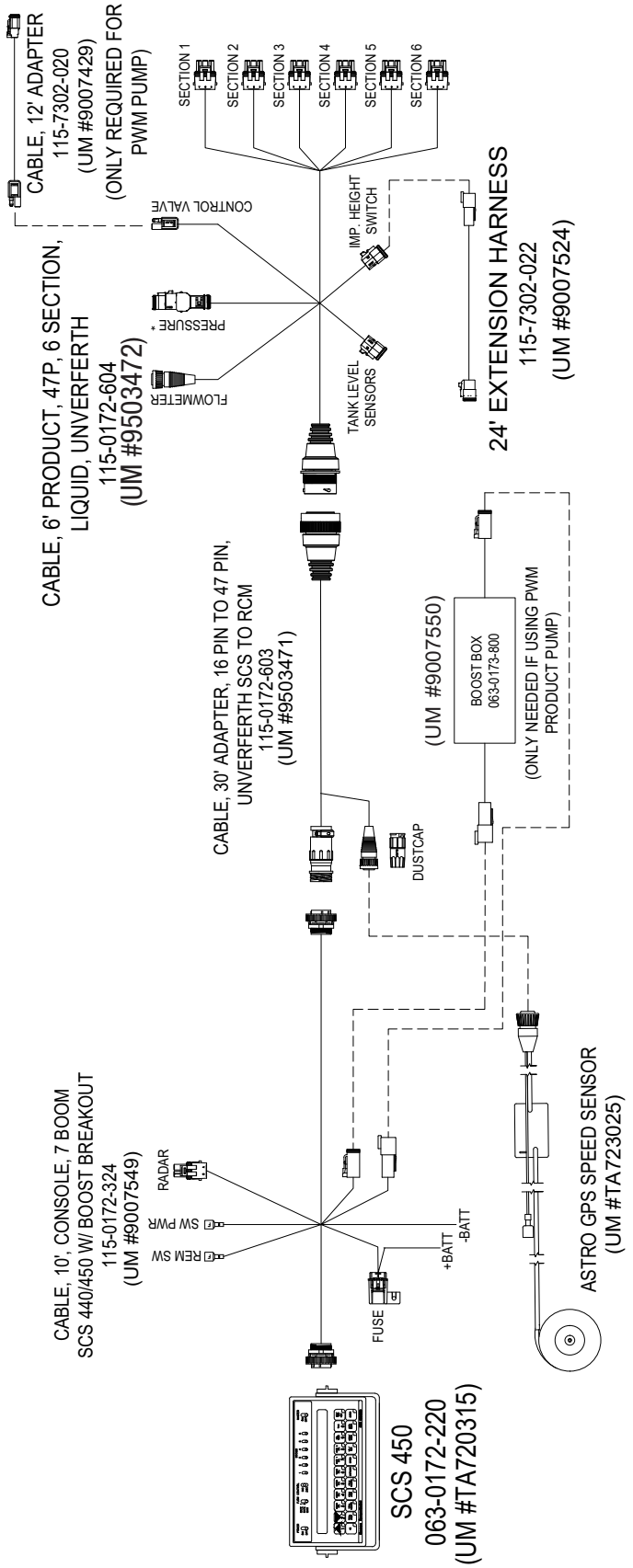
For 60'/66'/80'/88'/90' Toolbars



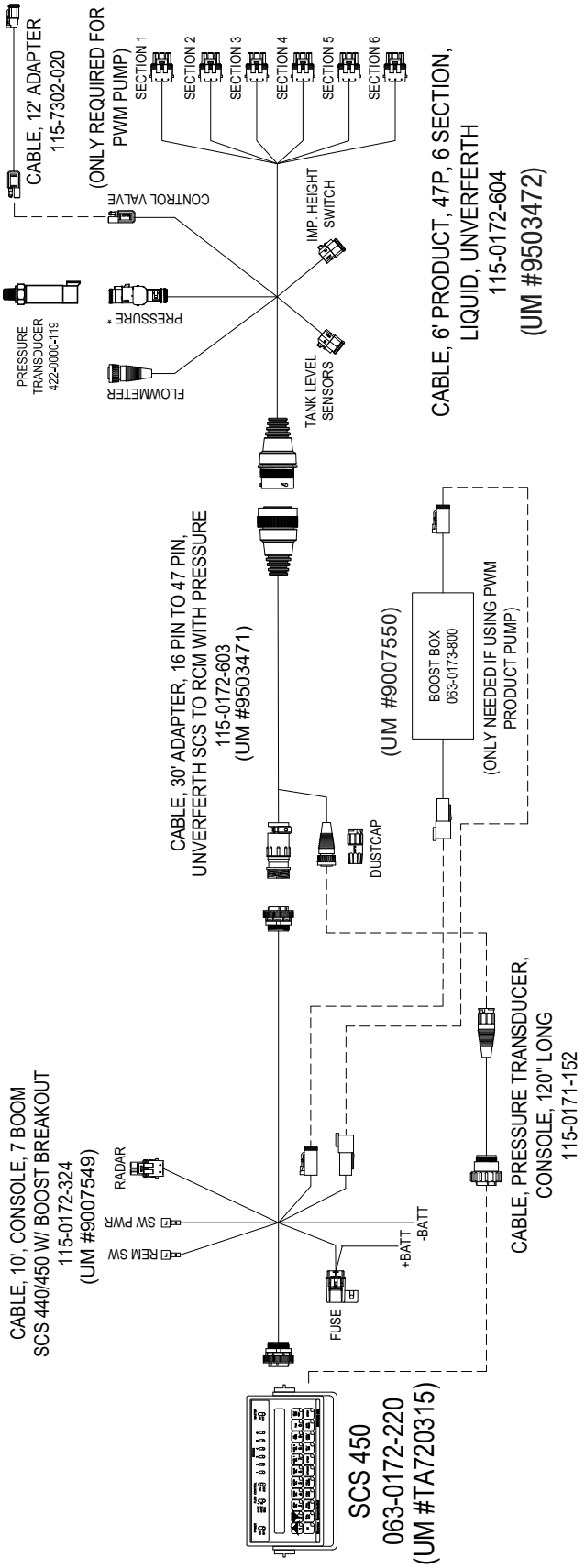
Schematics - Rate Contol Module (RCM) Without Steerable Hitch



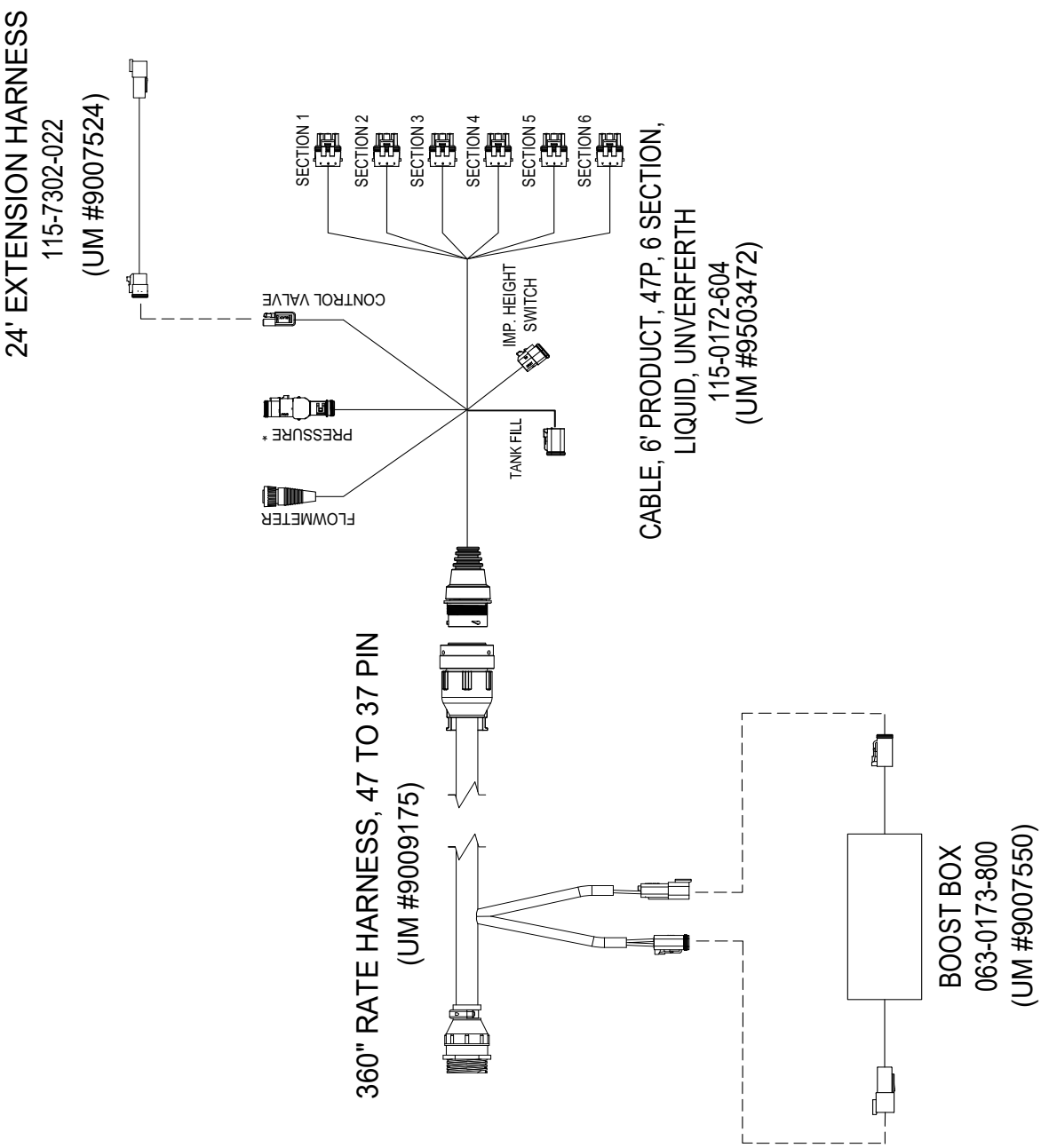
Schematics - SCS 450 Console



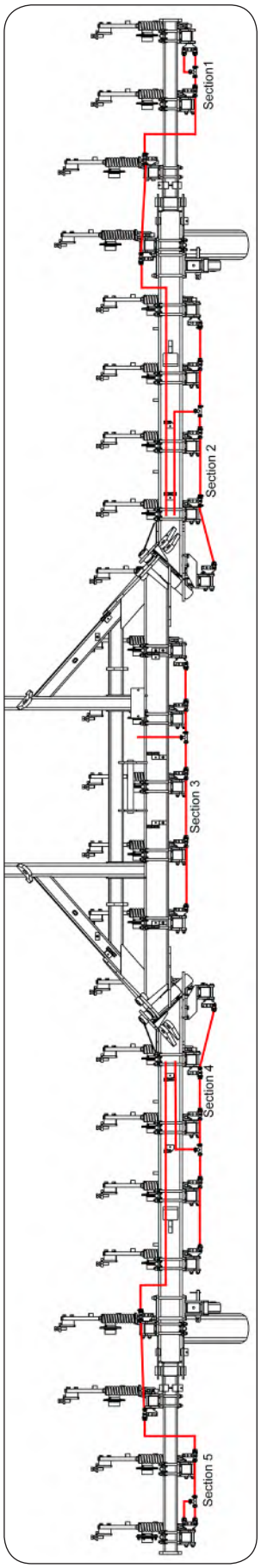
Schematics - SCS 450 Console



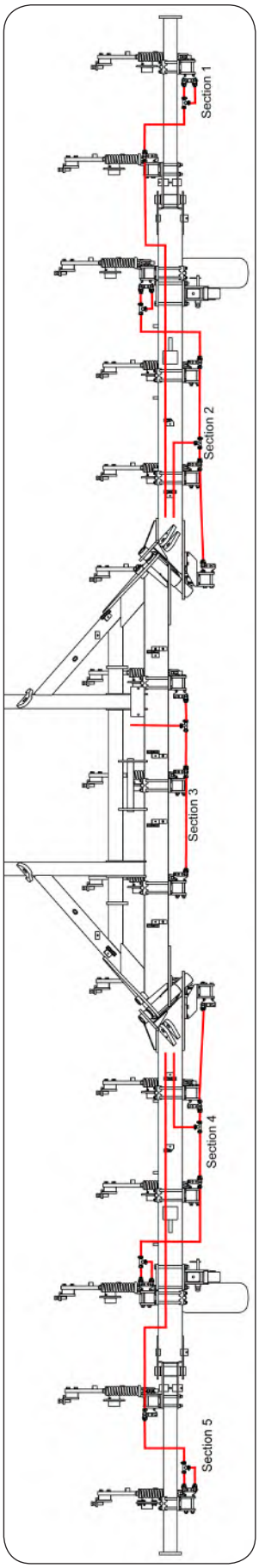
Schematics - Less ISO Rate Contol Module (RCM)



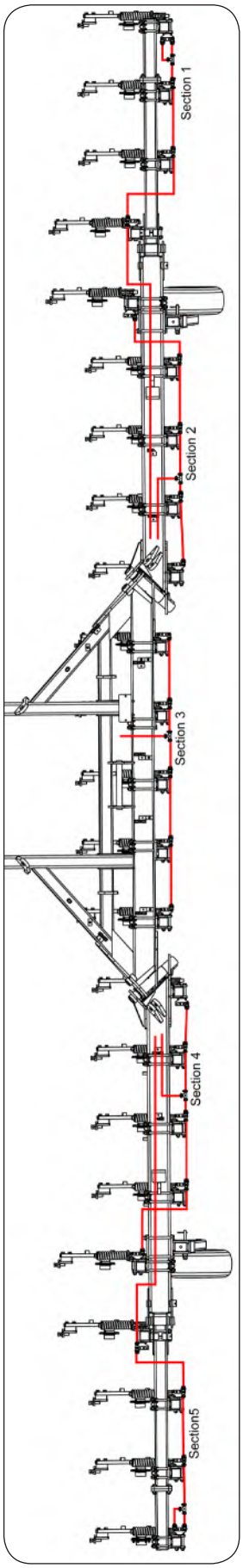
40’ Toolbar Plumbing for 20” Spacing and Orifice Options



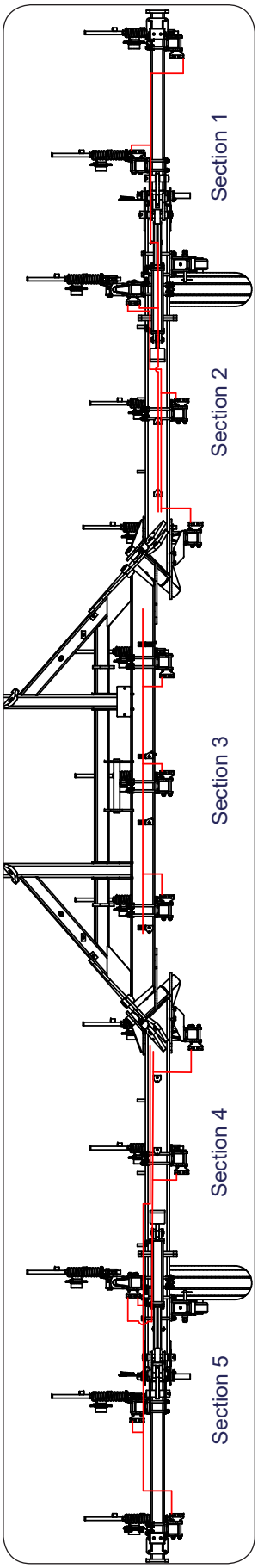
40’ Toolbar Plumbing for 30” Spacing and Orifice Options



44’ Toolbar Plumbing for 22” Spacing and Orifice Options

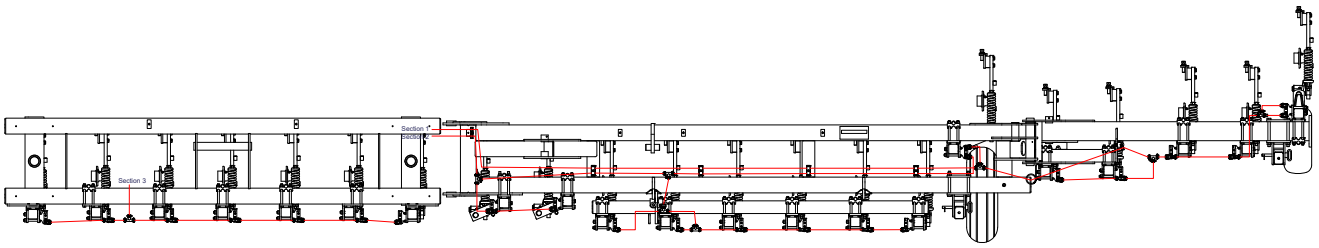


40’ Toolbar Plumbing for 36” & 38” Spacing and Orifice Options

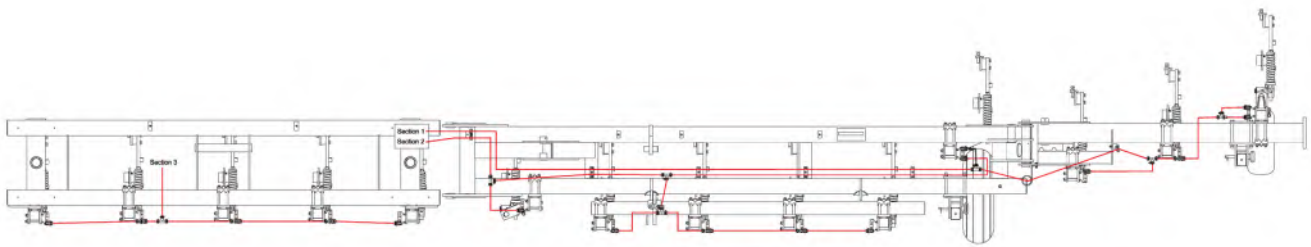


60’ Toolbar Plumbing for 20” Spacing and Orifice Options

Section 5 Routing is Identical to Section 1

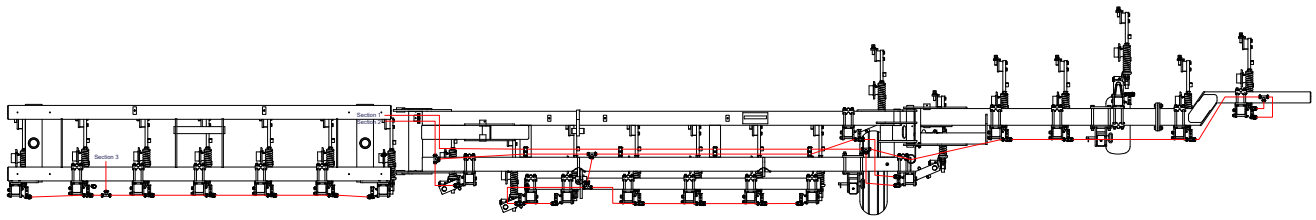


60’ Toolbar Plumbing for 30” Spacing and Orifice Options

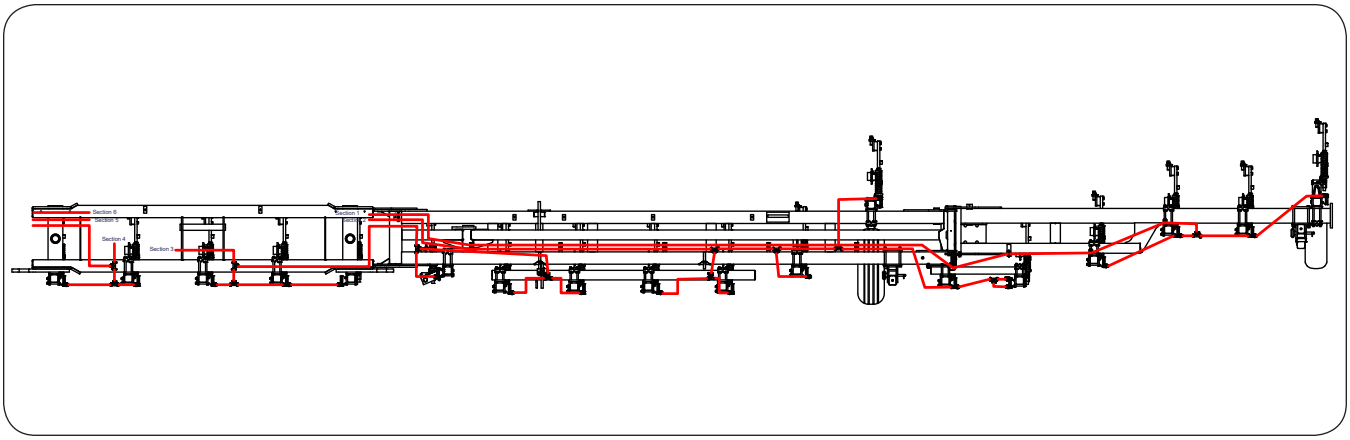


66’ Toolbar Plumbing for 22” Spacing and Orifice Options

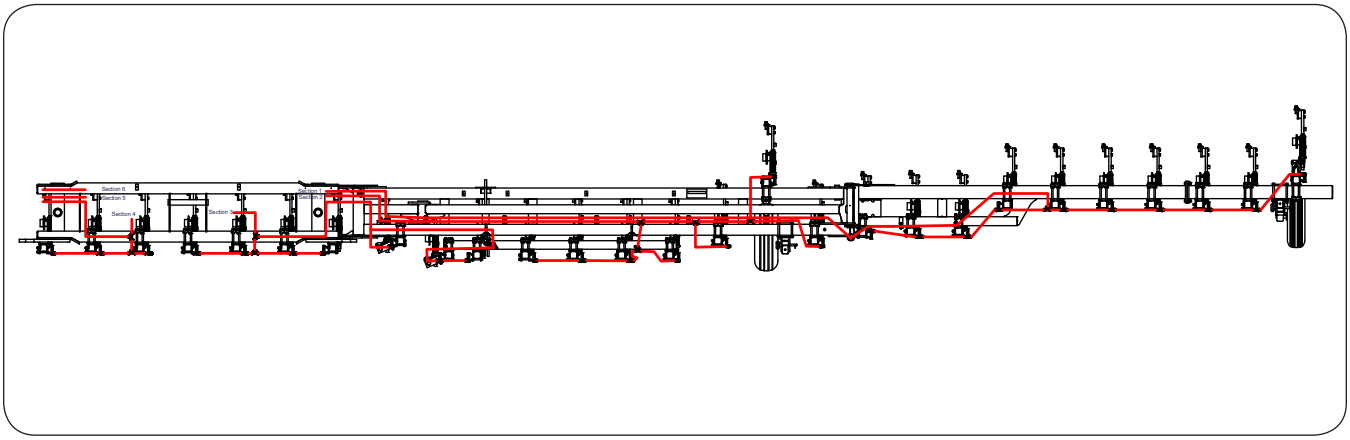
Section 4 Routing is Identical to Section 2



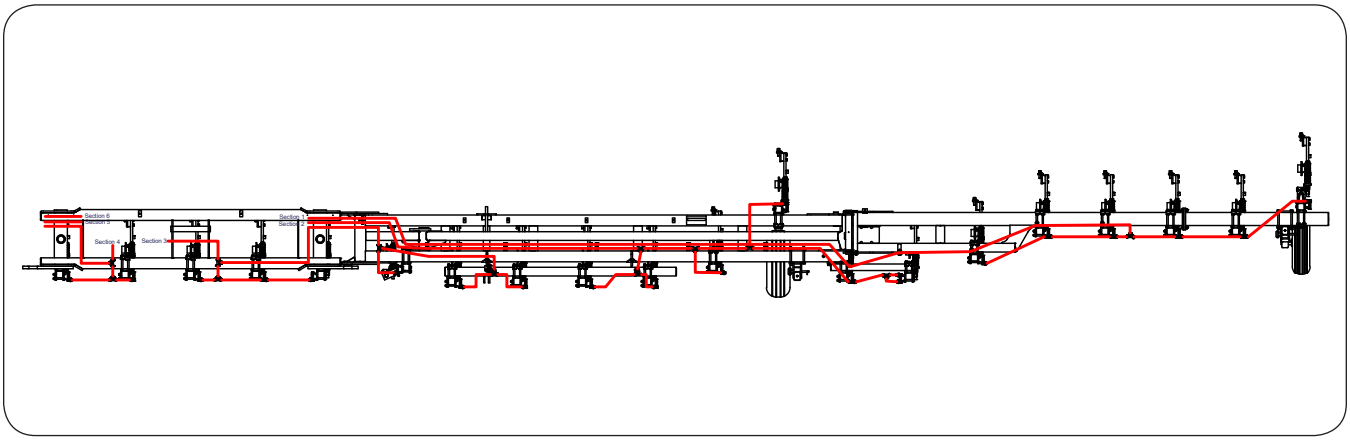
80’ Toolbar Plumbing for 30” Spacing and Orifice Options



88’ Toolbar Plumbing for 22” Spacing and Orifice Options



90’ Toolbar Plumbing for 30” Spacing and Orifice Options



Troubleshooting

Problem	Possible Cause	Corrective Action
No toolbar functions work	Inadequate oil flow	Check tractor SCV flow setting. Check hydraulic oil level in tractor.
	Valve sticking	Remove the valves from the block. Lubricate the valve and re-check for easy movement. If still not getting any movement, replace the valve.
	Debris in block	Remove debris from block.
	Debris in SCV hose tips	Remove hose tips and clean.
Toolbar is slow or some functions work and others do not.	Valve sticking	Remove the valves from the block. Lubricate the valve and re-check for easy movement. If still not getting any movement, replace the valve.
	Defective or missing o-ring on valve	Inspect valve for missing or damaged o-rings. Replace any suspect o-rings.
	Debris in block	Remove debris from block.
Pressure too Low	Valve has an obstruction	Open all valves to pump and check for obstruction.
	Air lock in water tank	Check for air lock in tank.
	Hydraulic flow on tractor set too low	Increase hydraulic flow on tractor.
	Agitation is not set properly	Close agitation completely and slightly open the valve so the pump pressure decreases by 5 psi.
	Impeller has obstruction	Separate pump housing. Remove and clean the impeller.
	Impeller is not turning	Separate pump housing. Verify that shaft and impeller turn together.
Pressure too High	Hydraulic flow on tractor set too high	Decrease hydraulic flow on tractor.
	Improper nozzle size	Verify Nozzle Size.
Rate control console will not turn on	No power coming to the console	Check power source connections.
	Bad console	Check for 12 volts of power on Pin #16 with Pin #1 being ground on the cable coming into the console if equipped with 450 controller.
Do not have a rate	Not getting a speed	Press the speed button on the console to see if there is a speed.
	Not getting a flow	Press the vol/min button on the console to see if there is a flow.
Do not have a speed	Orange wire is unplugged	Verify the orange wire is plugged in to the speed sensor.
	Defective cable or sensor	Program a self test into the console and then check for a rate.
Speed is inaccurate	Loosen cable connection	Wiggle the connections for the speed cable. If accurate speed is displayed tighten connection.
	Cut in cable	Check speed cable for cuts in the cable. Fix the cable or replace the cable.
Do not have a flow	Regulating valve is not operating or PWM cartridge is not functioning	Check and remove debris from valve or PWM cartridge.
	Defective cable	Unplug the flow meter. With the plug keyway at the 12 o'clock position, check voltage between pins at the 2 o'clock and 6 o'clock positions (2 o'clock is ground). Should have 5 volts. Also check voltage between pins at the 2 o'clock and 10 o'clock positions (2 o'clock is ground). Should have 5 volts.
	Defective flow meter	Unplug the flow meter. Check for 5 volts across the 2 wires and getting voltage.
Rate is Unstable	Console is in manual	Put console into either rate 1 or rate 2 and check to see if rate becomes stable.
	Speed is inaccurate	Refer to "Speed is Inaccurate Section".
	Console is not programmed	Verify all numbers programed into console are correct.
Cannot adjust pressure when console is in manual	Defective cable or console	Unplug regulating valve or PWM cartridge. Check for 12 volts across the two wires.
	Defective Valve	Unplug regulating valve or PWM cartridge. Check for 12 volts across the two wires.

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 30,000 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.**

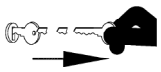
⚠ CAUTION

- **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.**

IMPORTANT

- *Remove only one wheel and tire from a side at any given time in the following procedure.*

1. Hitch applicator to tractor. Unfold the wings to field working position and lower machine to the ground. Park the empty applicator on a firm, level surface. Set the tractor's parking brake, shut off engine and remove key.



2. With applicator empty, use a safe lifting and holding devices rated at 30,000 lbs. to support the weight of your applicator. Place safe lifting device under the axle closest to the tire.
3. Use a 3,000 lbs. safe lifting device to support the wheel and tire during removal.
4. Remove the wheel and tire from the hub.

NOTE: For straddle duals, first remove the outer wheel and tire.

⚠ WARNING

- **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.**

Wheel, Hub and Spindle Disassembly and Assembly (continued)

5. If only removing wheel and tire, skip to Step 9; otherwise continue with Step 5.

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

6. Inspect the spindle and replace if necessary. If spindle does not need to be replaced, skip to Step 7; otherwise continue with Step 6.

   Remove the bolt and lock nut that retain the spindle to the axle. Using a lifting device rated for 150 lbs., remove the old spindle. Coat spindle shaft with anti-seize lubricant prior to installation. Reuse bolt and lock nut to retain spindle to axle. Torque as outlined in MAINTENANCE section.

7. Remove seal and inspect bearings, spindle washer, castle nut and cotter pin. Replace if necessary. Pack both bearings with Extreme Pressure NLGI #2 grease and reinstall inner bearing. Install new seal in hub with garter spring facing inward to the hub by tapping on flat plate that completely covers seal while driving it square to hub. (FIG. 4-34) 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.

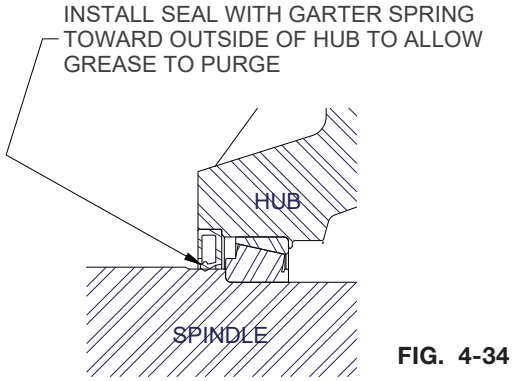


FIG. 4-34

IMPORTANT

- *Do not use an impact wrench!*

8. 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 minimal 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. Spin and check again. Install cotter pin. Clean face for hub cap gasket and install gasket, grease- filled hub cap and retain hubcap with hardware removed. Tighten hubcap hardware in alternating pattern.

9. 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 Wheels and Tires section of this manual.

10. Raise applicator, remove lifting device attached to wheel(s) and tire(s) and lower tire to the ground.

11. Remove safe lifting device from applicator.

Wheels and Tires

Wheel Nut Torque Requirements

⚠ CAUTION

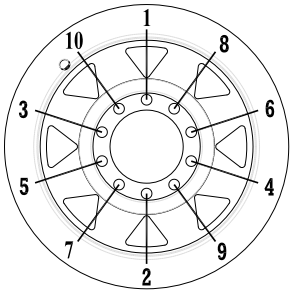
- **IMPROPERLY TORQUED WHEEL NUTS/BOLTS CAN CAUSE A LOSS OF IMPLEMENT CONTROL AND MACHINE DAMAGE. TORQUE WHEEL NUTS/BOLTS TO VALUES IN TABLE. CHECK TORQUE BEFORE USE, AFTER ONE HOUR OF UNLOADED USE OR AFTER FIRST LOAD, AND EACH LOAD UNTIL WHEEL NUTS/BOLTS MAINTAIN TORQUE VALUE. CHECK TORQUE EVERY 10 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 Diagrams 1 and 2.

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

WHEEL HARDWARE	
SIZE	FOOT-POUNDS
7/8”-14 (UNF) For Wheel & Tire	500 Ft.-Lbs.
1/2”-20 (UNF) For Gauge Wheel	75 Ft.-Lbs.

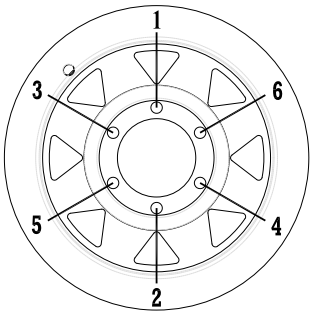
For Wheel & Tire



10 Bolt

DIAGRAM 1

For Gauge Wheel



6 Bolt

DIAGRAM 2

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.** Start with minimum pressure. 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.** Each tire must be inflated to 35 PSI max to seat the beads, deflated to 5-10 PSI, then reinflated to recommended minimum pressure.

Tire Pressure for Unverferth Liquid Applicators

Tire Make	Tire Size	Load Index / Ply Rating	Max PSI
Mitas	380/85R34 R-1W	146A8	44
	380/90R46 R-1	173 D	64
	380/90R46 R-1W	159 A8	58
	320/90R50 R-1W	150 A8	52
	480/80R50 R-1W	159 A8	35
	320/90R54 R-1W	151 A8	52
	380/90R54 R-1W	152 A8	35
Goodyear	12.4x38 R-1	14-Ply	56
	320/90R46 R-1	159 D	64

Wheels and Tires (continued)

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
Carlstar Group LLC	www.carlstargroup.com Phone 800-260-7959 Fax 800-352-0075

Tracks

Equalizer® Track System

Refer to the Equalizer® Track System manual 416327 for information regarding the tracks.

Track Warranty

For questions regarding new track warranty, please contact your local original equipment track dealer. Used tracks carry no warranty. Following is the phone number and website for your convenience:

Contitech	www.contitech.us Phone USA: 888-899-6354 Canada: 888-275-4397

Closer Wheel Adjustment and Replacement (Opt.)

⚠ WARNING

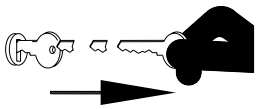
- **KEEP HANDS CLEAR OF PINCH POINT AREAS.**
- **TIPPING OR MOVEMENT OF THE MACHINE CAN CAUSE SERIOUS INJURY OR DEATH. BE SURE MACHINE IS SECURELY BLOCKED.**
- **EYE PROTECTION AND OTHER APPROPRIATE PERSONAL PROTECTIVE EQUIPMENT MUST BE WORN WHILE SERVICING IMPLEMENT.**

⚠ CAUTION

- **SHARP EDGES ON THE MACHINE CAN CAUSE INJURY. BE CAREFUL WHEN WORKING AROUND THE MACHINE.**

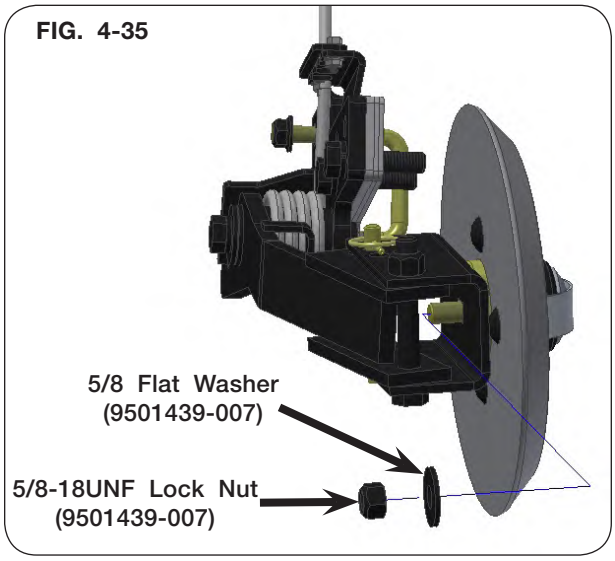
The following guidelines are for adjusting and replacing the closer wheel on the coulters

1. Park the empty applicator on a firm, level surface. Block the machine to keep it from moving. Unfold the wings to field working position and lower machine to the ground. Set the tractor's parking brake, shut off engine and remove key.



2. Remove 5/8"-18UNF lock nut (9501439-007) and 5/8" flat washer retaining the closer wheel and hub assembly. Keep hardware. (FIG. 4-35).

FIG. 4-35



3. Detach the closer wheel and hub assembly from adjustable hub mount (69152B). (FIG. 4-36).

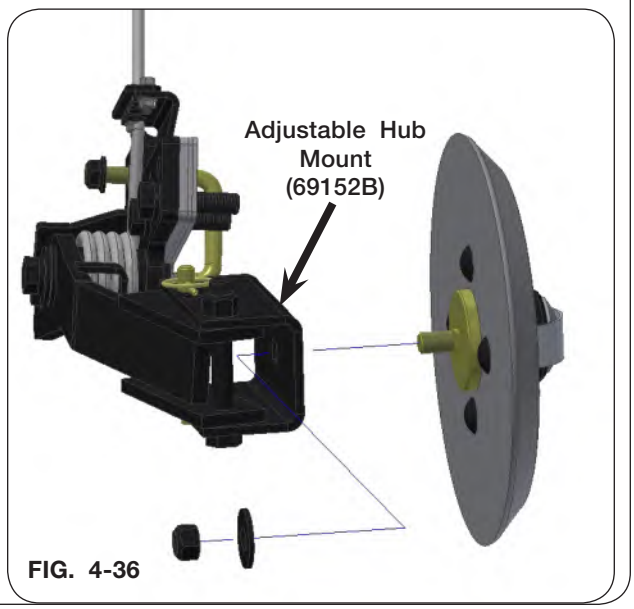


FIG. 4-36

Closer Wheel Adjustment and Replacement (Opt.) (continued)

4. Remove four 1/2”-13UNC x 1 1/2” carriage bolts (9501993-104) and four 1/2”-13UNC lock nuts (9501443-034) retaining the hub assembly (69161B) on the closer wheel (69142B), and hub strap (68315) on the hub. Keep hardware. (FIG. 4-37).

5. Replace closer wheel. (FIG. 4-37).

6. Once closer wheel is replaced, inspect 1/2”-13UNC x 1 1/2” carriage bolts, 1/2”-13UNC lock nuts, 5/8”-18UNF lock nut, and 5/8” flat washer for wear and replace, if necessary.

7. Re-install and loosely tighten 1/2” hardware to closer wheel and hub strap.

8. Reattach and loosely tighten 5/8” hardware to adjustable hub mount.

9. Tighten all hardware.

10. Grease hub assembly zerk before operation.

11. Check closer wheel for smooth rotation.

NOTE: Adjustable hub mount has two toe settings. The right-hand setting positions the closer wheel to toe out and left-hand setting to toe in. (FIG. 4-38)

12. Remove kilk pin (9093) from closer wheel retainer pin (415156). (FIG. 4-38).

13. Insert closer wheel retainer pin in desired position and lock with kilk pin. (FIG. 4-38).

14. Tighten screw to secure adjustable hub mount to the closer assembly (69217B).

FIG. 4-37

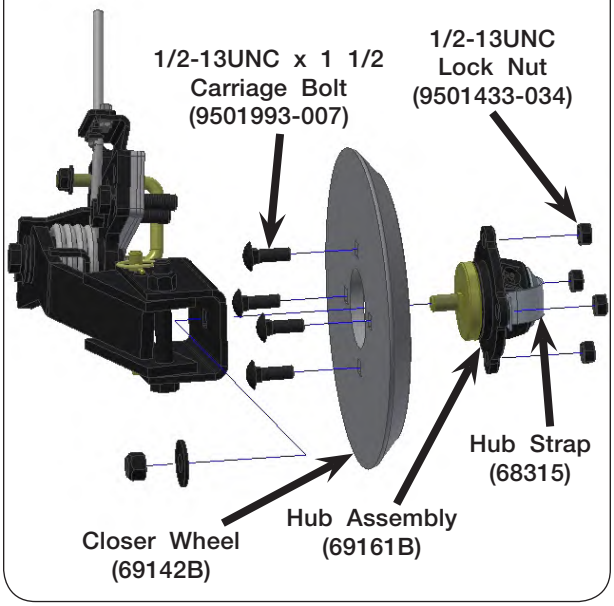
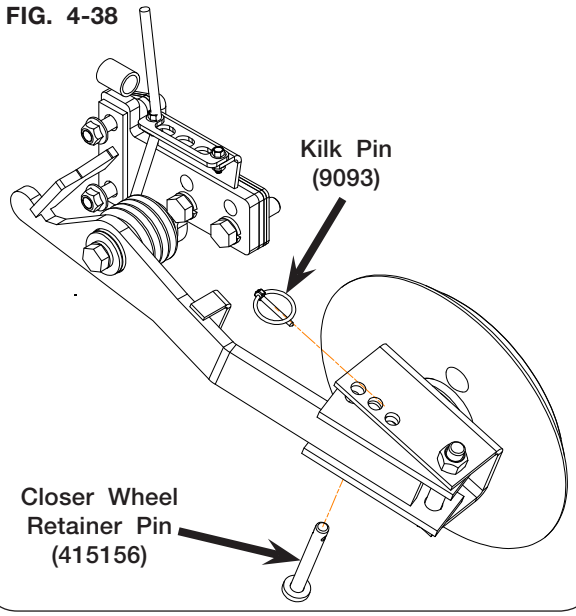


FIG. 4-38



Complete Torque Chart

Capscrews - Grade 5

NOTE:

- Grade 5 capscrews can be identified by three radial dashes on the head.
- For wheel torque requirements, refer to Wheels and Tires.
- Tighten U-bolts evenly and equally to have the same number of threads exposed on each end.

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

Capscrews - Grade 8

NOTE:

- Grade 8 capscrews can be identified by six radial dashes on the head.
- For track wheel torque requirements, refer to Equalizer® Track System manual 416327.
- Tighten U-bolts evenly and equally to have the same number of threads exposed on each end.

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.*

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, ensure 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

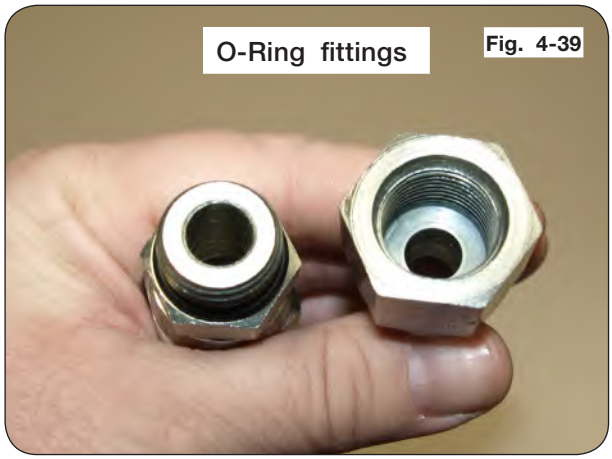


Fig. 4-39

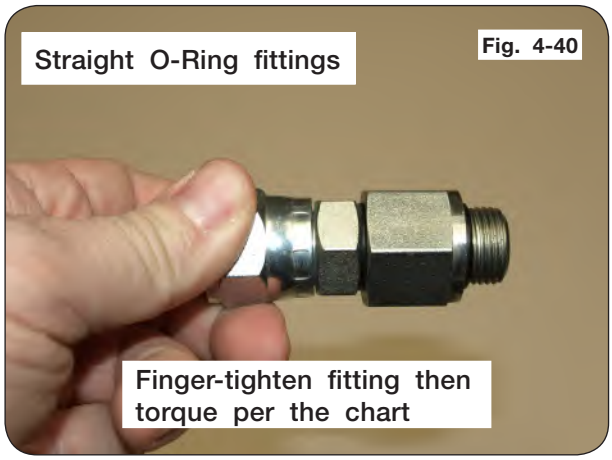


Fig. 4-40

Hydraulic Fittings – Torque and Installation (continued)

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. 4-41

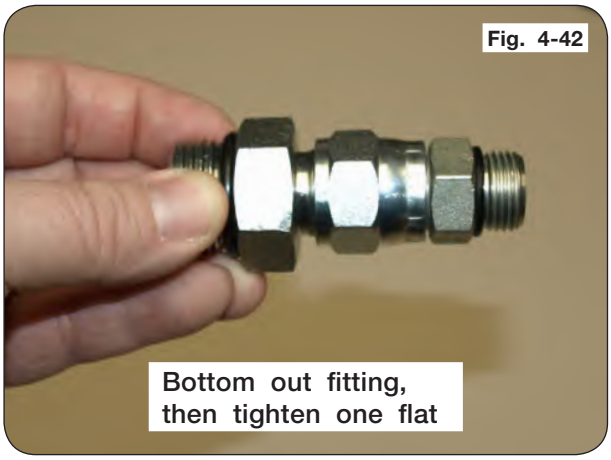


Fig. 4-42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