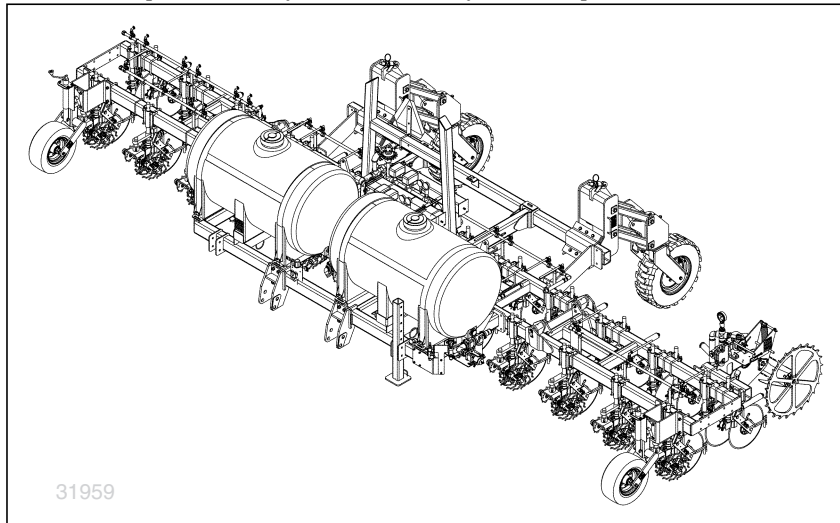


Pre-Delivery Manual

Nutri-Pro® NP3000
30-Foot Fertilizer Applicators



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



Illustrations may show optional equipment not supplied with standard unit, or may show NP30 or NP40 models where the topic procedure is identical.





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Important Safety Information

Look for Safety Symbol

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



Be Aware of Signal Words

Signal words designate a degree or level of hazard seriousness.

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



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



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



Prepare for Emergencies

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



Be Familiar with Safety Decals

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



Avoid High Pressure Fluids

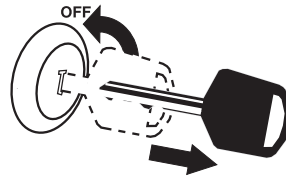
Escaping fluid under pressure can penetrate the skin, causing serious injury. This applicator requires a Power-Beyond port, which is always under pressure when the tractor is running.

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



Shutdown and Storage

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



Tire Safety

Tire changing can be dangerous. Employ trained personnel using correct tools and equipment.

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



Introduction

The 30-Footer Fertilizer Applicator (NP3000) has been designed with care and built by skilled workers using quality materials. Proper setup, maintenance, and safe operating practices will help the customer get years of satisfactory use from the machine.

This manual will familiarize you with planning, unloading, and assembly of this applicator. Most operating information is contained in the Operator manual.

Models Covered

NP3000-1230 30-Footer, 11-Row, 30 inch

Description of Unit

The Nutri-Pro® NP3000 Applicator is a precision implement for sub-soil application of conventional liquid fertilizer from optional on-board tanks or user-provisioned tanks. The NP3000 has lift-assist 2-point hitching

Intended Usage

Use the NP3000 to apply conventional liquid fertilizer. Do not modify Great Plains-provisioned components, or install aftermarket components, except as authorized or recommended by Great Plains.

Document Family

The documents delivered with the implement vary by model and options installed.

NP3000 Documents

407-613M	NP3000 Operator Manual
407-613P	NP3000 Parts manual
407-613Q	NP3000 Pre-Delivery manual
12-M-43	CDS-John Blue NGP Pump Parts and Instructional manual
016-0159-831	Raven SCS-450 Installation, Operation and Service manual

NOTICE

Deliver All Documents:

Do not discard any documents, including any not listed on this page. Implement operation and customer safety rely on having ALL documents. If any are damaged or appear to be missing, contact Great Plains for replacement copies.

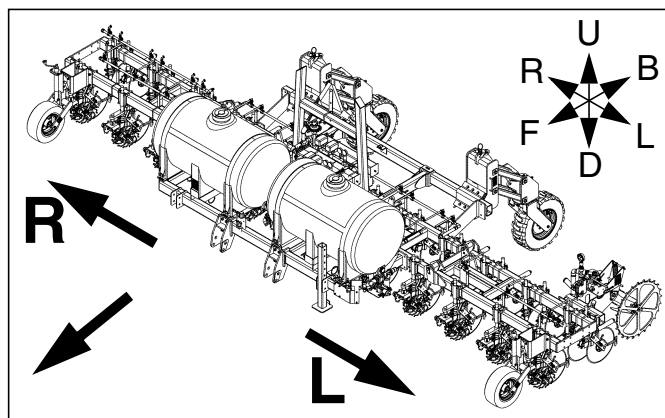
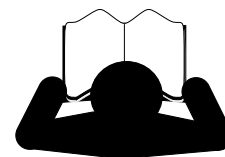


Figure 1
NP3000 Applicator

31959

Using This Manual

This manual will familiarize you with unloading, assembly and initial setup of the implement. Read this manual and follow the recommendations to help ensure safe and efficient delivery preparation.



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

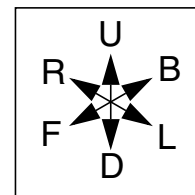
The following terms are used throughout this manual.

NOTICE

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

Note: Useful information related to the preceding topic.

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



Call-Outs

① to ⑨

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

11 to 65

Two-digit callouts in the range 11 to 65 reference the same Great Plains part numbers throughout this manual.

Figures

NOTICE

Photo Advisory:

None of the photographs in this manual were taken during an pre-delivery. They may include parts, assemblies, and other artifacts that will not be present at the same point in an actual pre-delivery. Rely on the text narrative. Rely on the Figures only insofar as they support the text narrative.

About Parts

Fasteners

Fasteners called out are often loosely installed in one of the two parts to be joined, and must be removed before the parts are mated. To avoid mix-ups and misplaced parts, do not remove fasteners from shipping locations until the “Select” instruction that calls for those parts.

Tags

Some parts have engraved metal tags attached. These tags are for parts ID and may be removed and discarded as the part is installed. In some cases, the tag must be removed or it will interfere with part installation. Parts may alternatively be marked with grease pencil. These marks may be left on and removed at close-out.

NOTICE

Great Plains not Responsible for Aftermarket Integration:
Great Plains disclaims all liability for applicators whose final assembly (other than “Pre-Delivery” items and installation of supported accessories) includes subsystems not provided by Great Plains. Warranty claims may be disallowed if, in the opinion of Great Plains, damage resulted from installation or use of third-party components not supplied or supported by Great Plains.

Assembly and Setup Assistance

To order additional copies of pre-delivery instructions, operator or parts manuals, write to the following address. Include model numbers in all correspondence. If you do not understand any part of this manual or have other assembly or setup questions, assistance is available. For further assistance, contact:

Product Support

Great Plains Mfg. Inc., Service Department
PO Box 5060

Salina, KS 67402-5060

gp_web_cs@greatplainsmfg.com

785-823-3276



Pre-Delivery Planning

To meet highway clearance requirements, Nutri-Pro® implements are shipped with a few components and/or sub-assemblies uninstalled.

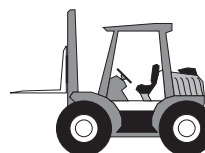
The exact list and status of uninstalled components varies with implement model, implement width, hitch type and options ordered. Shipping configuration may change over time.

This manual assumes a hypothetical extreme case of disassembly. Inspect the delivered implement, and skip steps that are already completed.



Tools Required

- One or more lifters with a combined capacity of 12,000 to 15,000 pounds (5450-6800 kg)
- Adjustable stands or supports.
- Hydraulic oil (3 to 5 gallons, 11 to 19 liters)
- Pipe sealant
- Basic hand tools



Work Space Requirements

Final assembly of the applicator requires a well-lit, flat surface space large enough to accommodate the fully unfolded implement, any wing extensions, any pull-type tongue, any rear casters, and lifter access from all sides.

Delivery Cycle

Standard Great Plains deliveries do not include time for implement assembly while still on the trailer bed. If you are reviewing this manual prior to delivery, and you anticipate that you might have a problem implementing the unload instructions, notify Great Plains prior to shipment.

Unload Trailer

Plan the Unload

Refer to Figure 2

Inspect the load. Plan the unload.

How to conduct the unload depends on:

- what type of dock is available (side dock or pit dock provides the greatest options), and
- what type of power equipment is available, the lifting capacity, and if only fork-lifts, the number available.

Unfolded Delivery

In some cases, applicators are shipped unfolded. Unload is similar to folded unload, but requires more space and more care.

Fold Configurations

NP3000 (30-foot) applicators are shipped folded against the transport rest ①. 12- and 13-row applicators are shipped with any outer wing extensions removed.

Forward Tool Bar Support

2-point NP3000 applicators may be shipped resting on their own parking stands in front. These adjustable height stands remain with the applicator.

Lift-Assist Caster Yokes

NP3000 applicators may be shipped with the rear caster yokes ② removed.

The parallel arms are always floating. They do not support any implement weight, do not have lock channels or spacers installed, and the cylinders may not be charged with hydraulic oil.

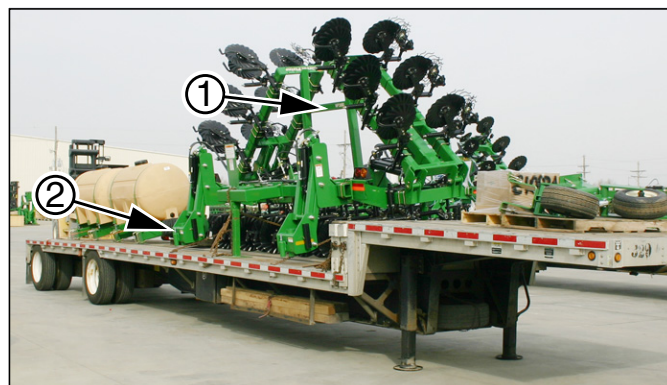


Figure 2
Applicator on Trailer (Folded)

32107

NOTICE

Equipment Damage Risk:

*Do not **fold** the implement on the trailer. The hydraulic system may not be charged, and the wings could fall suddenly. Folded wings could obstruct hoist lines, making unload more difficult.*

NOTICE

Equipment Damage Risk:

*Do not **unfold** the implement on the trailer. The wings will droop, making unload more difficult. The wings may strike and damage truck components. The hydraulic system may not be charged, and the wings could fall suddenly.*

NOTICE

Equipment Damage Risk:

*Plan to relocate temporary shipping stands early in the implement move. Temporary shipping stands under the front tool bars are **NOT** attached to the tool bars. Unfolded and pull-type implements, that have no optional coulters, require front support until gauge wheels are installed.*

NOTICE

Equipment Damage Risk:

Install lift-assist cylinder lock channels or spacers if lifting at the caster pivots. Without a stop on the cylinder rod, the arms are likely to swing up during lift.

Unload Miscellaneous Components

Refer to Figure 3

Use hoists or fork lifts to remove all pallets, crates and loose sub-assemblies from the trailer bed.

Check serial numbers ③ on components and crates against the serial number plate of the implement. If the shipment included multiple implements, particularly for multiple destinations, it is critical to unload all (but only) the extra components for the implement.

WARNING

Falling Implement Hazard:

Do not release any chains or straps securing the applicator itself to the trailer bed until the applicator is fully supported by the lifter(s). Some applicator configurations could tip to one side or the other if not tied down or fully supported. This could result in equipment damage, serious injury or death.



Figure 3
Crate and Gauge Wheels

32108

Pre-Lift Inspection

Any Model Shipped Unfolded

Refer to Figure 4

If the implement was shipped unfolded, verify that there are wing pivot blocks ④ at both wing pivots. If a block is missing at either wing, contact the factory. If the wings are not blocked, they will droop at lift, and coulter damage is possible when the implement is set down.

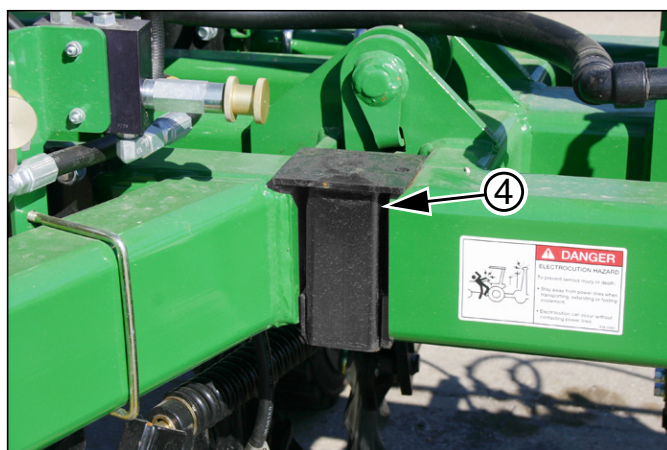


Figure 4
Wing Pivot Shipping Block

31681

Execute the Unload

Hoist Unload

Refer to Figure 5 and Figure 6

Recommended line attachment points vary with implement configuration. Key objectives are:

- Use four attach points for safety.
- Use attach points inboard of the wing pivots.
- Use implement structures designed for the implement weight (such as main frame joints or stand mounts).
- Keep the implement center of gravity inside the four lines.
- Attach so that lines cannot slip toward center.
- Use lines that are individually rated for at least half the load.
- Secure lines to implement to avoid implement damage.

Hoist Unload Steps:

1. Support the implement with the hoist.
2. Release the straps or chains securing the implement to the trailer bed. Remove loose stands.
3. To avoid hazards associated with swinging loads, lift the implement, and have the truck driven out from under it.
4. Lower the implement to the ground.

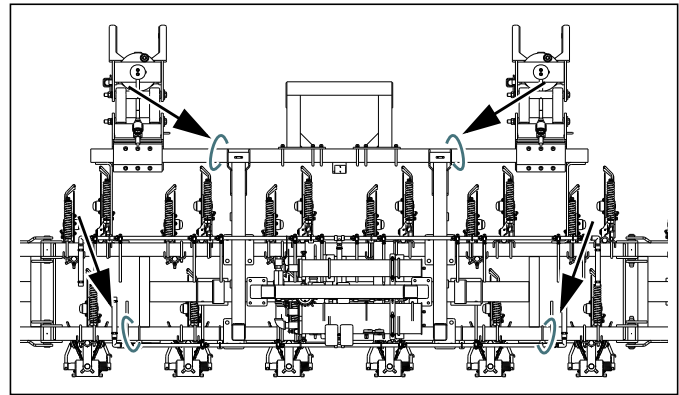


Figure 5: Hoist Points:
w/o Sub-Frame (Center Section)

32031

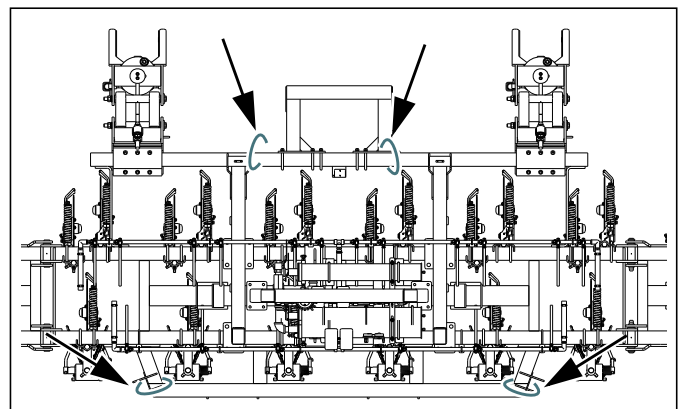


Figure 6: Hoist Points:
Tankless (Center Section)

32032

Two Forklift Unload

Refer to Figure 7, Figure 8 and Figure 9

Recommended lift points vary with implement configuration. Key objectives are:

- Use two lifters for safety.
- Spread the forks as wide as possible without striking implement components.
- Strap the implement frame, at the fork contact point, to the fork, to prevent tilting and shifting.
- Use implement structures designed for the implement weight.
- Keep the implement center of gravity inside the four forks.
- Use lifters that are individually rated for the entire load.

Forklift Unload Steps:

1. Support the implement with the lifters.
2. Release the straps or chains securing the implement to the trailer bed. Remove loose stands.
3. Lift the implement, and have the truck driven out from under it.
4. Lower the implement to the ground. Do not attempt to drive both fork lifts while supporting the implement.

⚠ CAUTION

Tip-Over Hazard:

Use two lifters. Unloading with a single fork lift is not recommended. Even if the lifter is rated for the implement weight, the width of the trailer bed, plus the front-to-back width of the implement, places the center of gravity well out on the forks, and is a tip-over hazard.

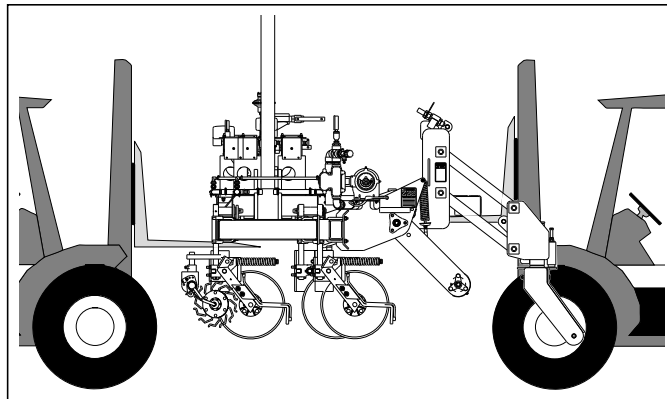


Figure 7
Two Fork Lift

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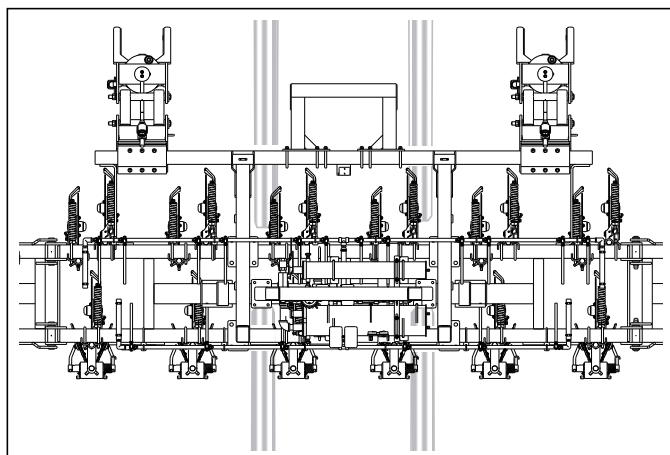


Figure 8: Fork Lift Points:
w/o Tanks (Center Section)

32031

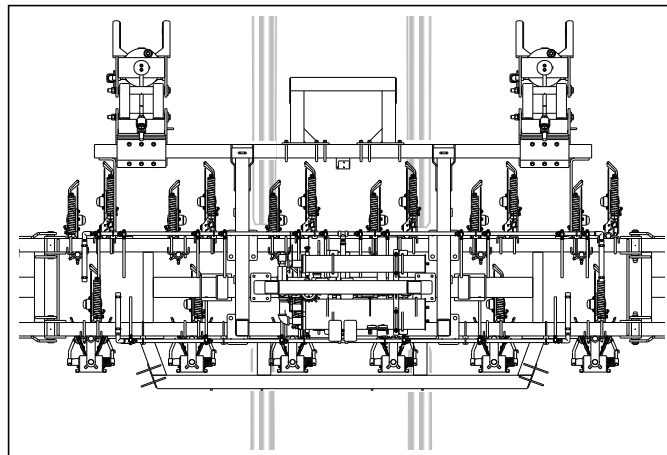


Figure 9: Fork Lift Points:
Tankless (Center Section)

32032



Install Sub-Frame

If the implement was ordered without on-board fertilizer tanks, the smaller tankless sub-frame is already installed. Continue at “**Prepare Hydraulics**” on page 14.

NOTICE

Loss of Time Risk:

Install in order. To ensure safety and reduce effort, the topics must be completed in the order presented. Later topics rely on earlier topics having been completed. Some steps cannot be performed at all if required prior steps are not yet completed.

The tank sub-frame must be attached prior to hydraulic work, because the weight-transfer controls must be disconnected from hoses and reconnected to route them through the tank sub-frame.

Prepare Frames

1. Support the main frame so that it cannot tip backward while having the sub-frame pushed against it. Clear the front tool bar of any hoses or harnesses that might be pinched during frame attachment.

Refer to Figure 10 (which, for clarity, omits tanks and other hardware already installed on both frames)

2. Select eight:
 (51) 806-128C U-BOLT 3/4-10 X 6 1/32 X 5 5/8
 and 16 sets:
 (45) 804-023C WASHER LOCK SPRING 3/4 PLT
 (39) 803-027C NUT HEX 3/4-10 PLT

These may be on the mainframe, or loosely installed in the sub-frame mounting plate holes. Remove the nuts (39) and washers (45). Place the U-bolts (51) on the mainframe at the approximate mounting locations.

Refer to Figure 11

3. Use a hoist or fork lift to move the sub-frame to the main frame. If using a fork lift, as shown, approach the sub-frame from the front (hitch) side. Keep lifting tines clear of plumbing. Make sure the sub-frame is completely level, and centered on the main frame.

Attach Sub-Frame

Refer to Figure 12

4. Carefully bring the sub-frame into alignment with the U-bolts (51).
5. Check that the sub-frame is centered on the main frame (left to right).
6. Secure the sub-frame on the U-bolts with lock washers (45) and nuts (39). Tighten to Grade 5 torque specification.

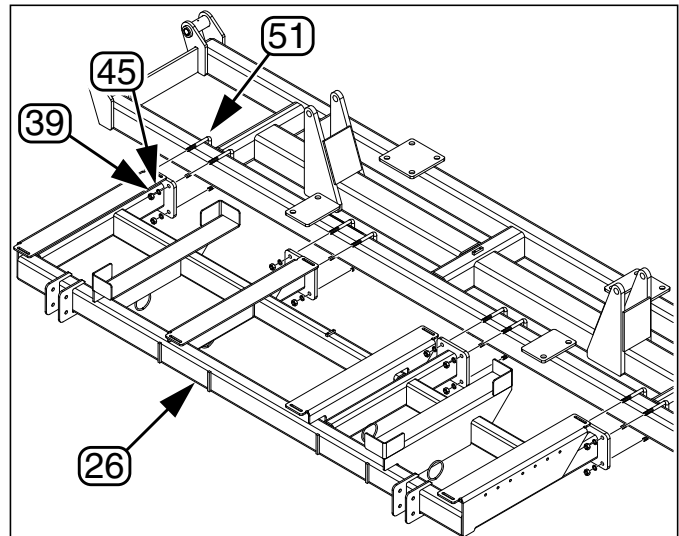


Figure 10
Tank Sub-Frame Mounting

32034



Figure 11
Approaching Sub-Frame

32035



Figure 12
Aligning Sub-Frame

32036

Install Quickfill Assembly

Refer to Figure 13 and Figure 14

1. Select one:
 - ②⑦ 407-587S QUICKFILL ASSY
 - and three sets:
 - ③① 802-034C HHCS 1/2-13X1 1/4 GR5
 - ④③ 804-015C WASHER LOCK SPRING 1/2 PLT
 - ③⑦ 803-020C NUT HEX 1/2-13 PLT
2. At the left end of the tank sub-frame, install the quickfill assembly ②⑦ at the 2nd, 3rd and 4th mounting holes (from the front).

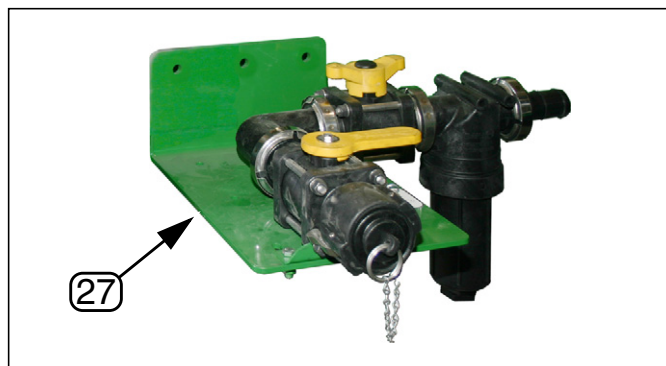


Figure 13
407-587S Quickfill Assembly

32037

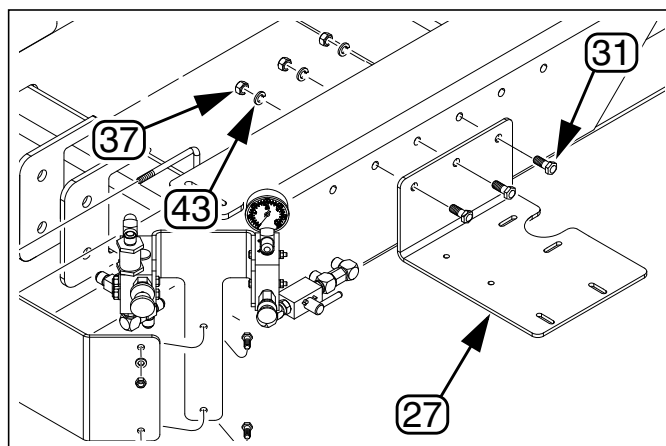


Figure 14
Quickfill Mounting

31931

Connect Quickfill Assembly

Refer to Figure 15

3. Locate the hose to the pump ⑤ and its clamp:
 - ②⑨ 800-259C CLAMP WRM DRV#36SS (1.81-2.75)

Route the hose to the outlet of the strainer. Secure with clamp. Do not over-tighten. This is a low-pressure line.

4. Reconnect the line ② between the supply tee and the selector valve. The line is open at only one or two connections, but is shown exploded, as the break location may vary between shipments.

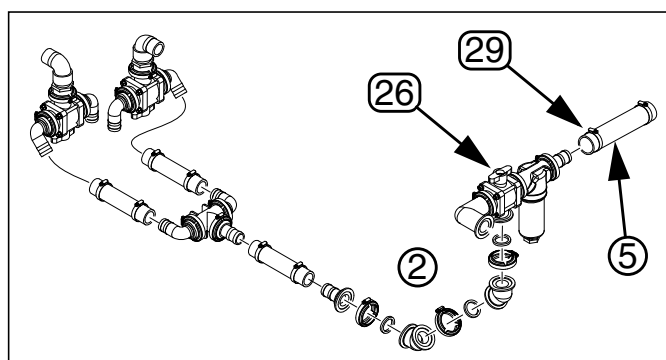


Figure 15
Quickfill Connections

32038

Install Weight Transfer Controls

Prepare Valve Assembly

Refer to Figure 16 and Figure 17

The hydraulic valve assembly (28) is shipped attached to its hoses, and folded up on the main frame. Because the hoses need to be routed under the left tank, the assembly must be temporarily detached from the hoses.

1. Locate the hydraulic valve assembly:
 (28) 407-637S DOWN PRESSURE VALVE ASSY-TANK
 which is attached to two hoses:
 (57) 811-830C HH1/2R2 084 3/4FJIC
 and one each hoses:
 (55) 811-551C HH3/8R2 075 3/4FJIC 3/4MORB
 (56) 811-785C HH1/2R2 168 3/4FJIC
 These two hoses may also be attached:
 (54) 811-485C HH1/2R2 100 3/4FJIC 3/4FJIC

If the hose and assembly fittings are not marked on both sides of the JIC connection, mark each side of each connection 1 through 4 (or 6).

Disconnect hoses (57), (55) and (56) from the valve assembly at the hose JIC fittings. Hitch hoses (54) may be left attached, but the next step, and hose re-connection, are easier if all hoses are detached.

Mount Valve Assembly

2. Select two:
 (48) 806-022C U-BOLT 3/8-16 X 6 1/32 X 5 PLT
 and four sets:
 (42) 804-013C WASHER LOCK SPRING 3/8 PLT
 (36) 803-014C NUT HEX 3/8-16 PLT

Attach the valve assembly to the left front of the tank sub-frame.

Hose Connection Reference

Hose	Part Number	Valve Connection	Function
54a	811-485C	Retract Handle to Bypass Port "IN"	Lift and Fold
54b	811-485C	Extend Handle to Bypass Port "R"	Lower and Unfold
55	811-551C	Bypass Port "IN" to Restrictor Valve	Lift
56	811-785C	Bypass Port "R" to Lift Cylinder Rod Ends	Lower
57a	811-830C	Reducing Port "R" to Fold Cylinder Base Ends	Unfold and Down-Pressure
57b	811-830C	Shut-Off Valve to Fold Cylinder Rod Ends	Fold

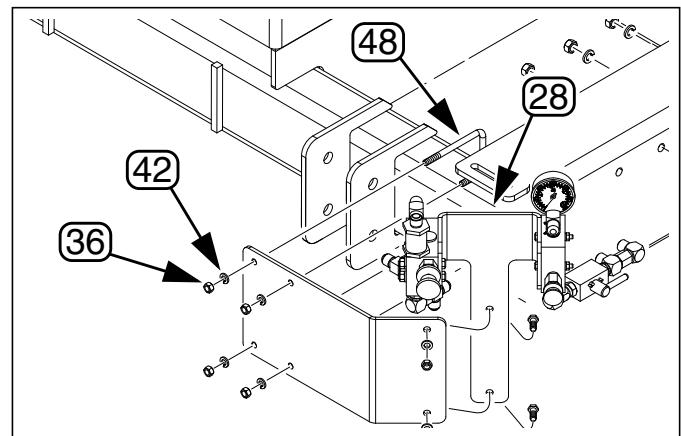


Figure 16
Hydraulic Valve Mounting

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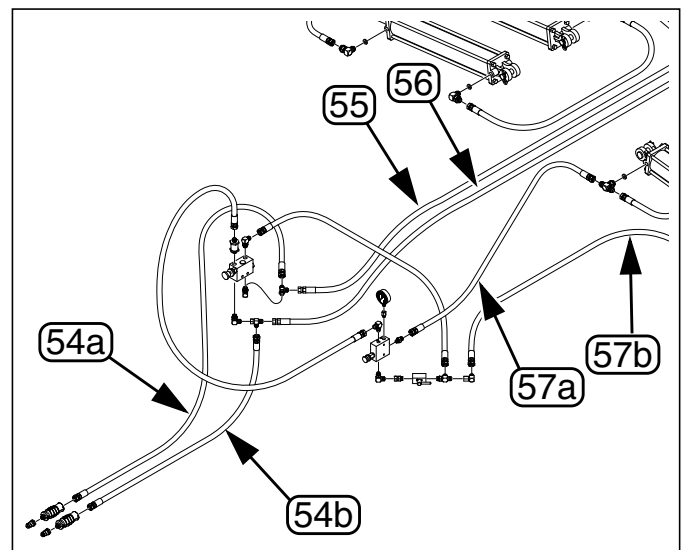


Figure 17
Hose Connections at Valves

31944

Route Lift/Fold Hoses

Refer to Figure 18, which, for clarity, depicts the sub-frame without tanks. It also depicts the hoses ① to the hitch, installed at step 6.

3. Route the valve hose bundle ② from the main frame clamp ③ along the left-most tank support ④. Keep all of the hose bundle at or below the surface level of all tank supports.
4. Re-connect each marked lift/fold hose to its corresponding marked JIC fitting at the valve assembly.
5. Select two hose protectors:
 ⑤8 816-480C HOSE WRAP 3.0-4.5 X 24LG VELCR
 Wrap the hoses at the locations shown.

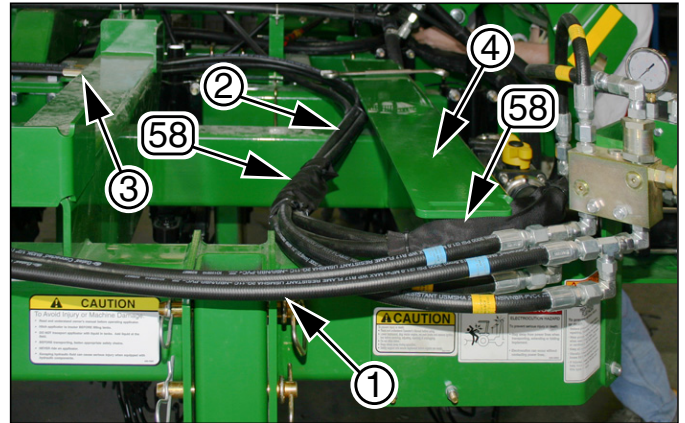


Figure 18
Tank Sub-Frame Hose Routing

32039

Install Hitch Hoses

Refer to Figure 18 and Figure 19

6. Reconnect each marked hitch hose ① to its corresponding marked JIC fitting at the valve assembly. If the hoses weren't marked, consult the table on page 12 for hose-to-port assignments.
7. Route the hoses to the right along the front of the tank sub-frame, and under the clamps ⑤.
8. Set the clamp angles so that the hoses are not pushed against the tank hold-down bolt threads ⑦.

Note: If the implement has one or two hydraulic pumps, do not route the pump hoses under either of the front clamps.

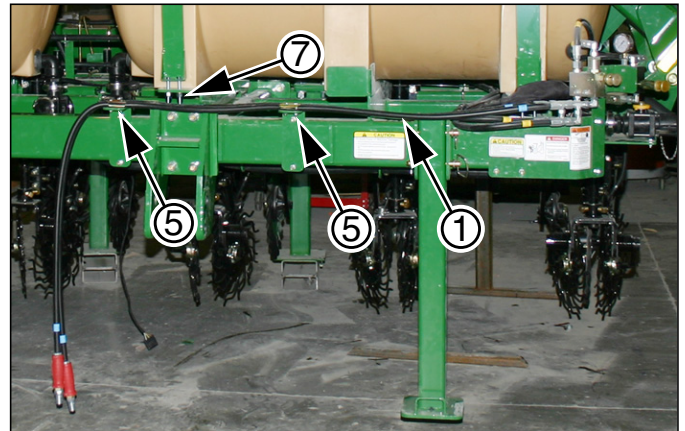


Figure 19
Hitch Hoses

32040

Install Pump Breather Line (Option)

If the implement has no optional hydraulic pump(s), continue at "Prepare Hydraulics" on page 14.

Refer to Figure 20

1. Remove the top center plug from the Ace pump:
 ⑥5 BAC-53 ACE PIPE PLUG
 There are several of these plugs installed in the pump. Remove only the upper-most one.
2. Select one:
 ⑥2 841-229C AD 1/8MNPT 3/16 HOSE BARB
 Apply some pipe sealant. Install the adaptor ⑥1 in the open top hole of the Ace pump.
3. Select all of:
 ⑥4 990-226R HOSE 1/4 OD 3/16 ID - EVA
 Route this tubing from the adaptor ⑥1 into the vent gap of a tank cap ⑧.

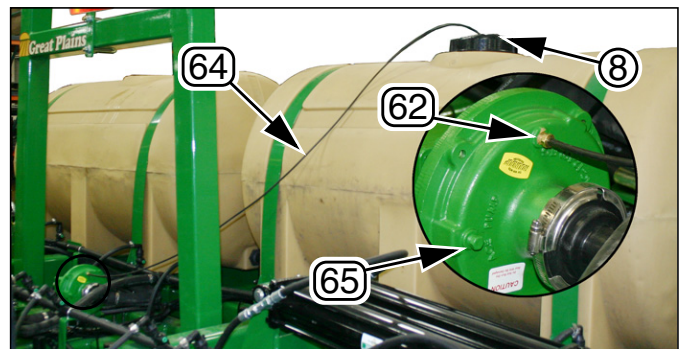


Figure 20
Hydraulic Pump Breather Line

32042

NOTICE

Pump No-Flow Risk:

If using a hydraulic pump, and tanks **not** supplied by Great Plains, be sure to provide a breather line or the pump will not prime.

Prepare Hydraulics

WARNING

Crushing Hazards / Equipment Damage Risk:

Do not operate the hydraulic systems until charged. If there is air in any part of the systems, wings could fall suddenly, and sections could lift unevenly, or fall suddenly. Anyone in the path of movement could be seriously injured or killed. Major equipment damage is possible.

WARNING

High Pressure Fluid Hazard:

Relieve pressure before disconnecting hydraulic lines. Wear protective gloves and safety glasses or goggles when working with hydraulic systems. Use a piece of paper or cardboard, **NOT BODY PARTS**, to check for suspected leaks. Escaping fluid under pressure can penetrate the skin, causing serious injury. If an accident occurs, seek immediate medical assistance from a physician familiar with this type of injury.

Bleed only at JIC and NPT fittings.

Never try to bleed a QD (Quick Disconnect) fitting. Avoid bleeding at ORB fittings. The O-ring is likely to be torn if any pressure remains in the circuit.

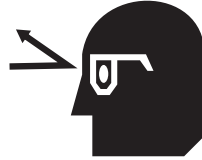
Hydraulics

Disable Weight Transfer

Refer to Figure 21 (which depicts the shut-off valve closed)

1. Release the locking discs (①, ②) on both valves.
2. Close the bypass valve ③ (the valve without the pressure gauge ④) by turning the control knob ⑤ fully clockwise.
3. Open the pressure reducing valve ⑥ by turning the control knob ⑦ fully counter-clockwise.
4. Open the shut-off valve ⑧. Set the handle to in-line with the valve.

These settings are for hydraulic charge only. Initial field values are set later at “Set Rough Weight Transfer” on page 25.



JIC Torque Chart

Size	Foot-Pounds	N-m
$\frac{7}{16}$ -20	11-12	15-16
$\frac{1}{2}$ -20	15-16	20-22
$\frac{5}{16}$ -18	18-20	24-28
$\frac{3}{4}$ -16	38-42	52-58
$\frac{7}{8}$ -14	57-62	77-85
$\frac{11}{16}$ -12	79-87	108-119

NOTICE

Over-Torque and Leak Risks:

JIC (Joint Industry Conference 37° Flare) fittings do not require high torque. Excess torque causes leaks. JIC and ORB (O-Ring Boss) fittings do not require sealant.

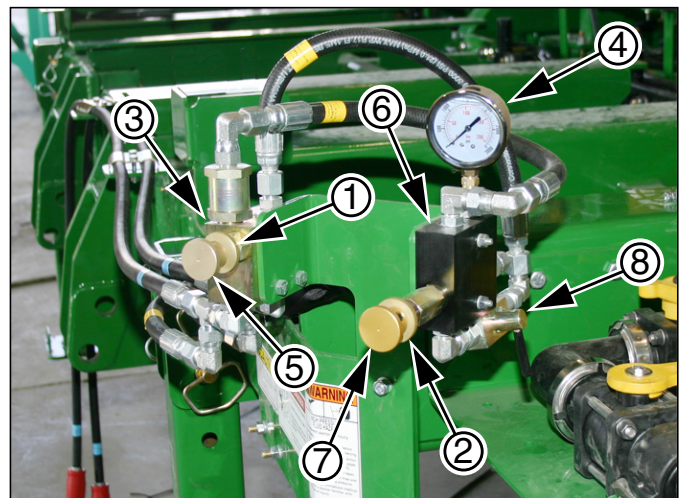


Figure 21
Weight Transfer Adjustment

32041

NP3000 2-Point Hydraulics

2-point implements have a combined lift and fold system, with weight transfer controls. The lift and fold circuits operate in opposite directions.

NP3000: Charge 2P Lift / Fold System

Refer to Figure 22

1. Disconnect the rod ends ① of the lift and fold cylinders (six rods).

Orient lift rods so that they are lower than the cylinder base ends.

Orient fold rods so that they are higher than cylinder base ends.

Make sure no rods can strike implement parts during extension.

2. Operate the circuit to fully retract the lift cylinders (this causes the fold cylinders to extend). Set circuit to Float.

Note: This may be a slow operation. There are flow restricting orifice plates at each fold cylinder port.

3. Slightly loosen (crack) the JIC fittings ② at the base end of the lift cylinders (two places).
4. Slowly extend cylinders. As oil appears at a cracked fitting, set the circuit to Neutral and secure the fitting.
5. When the last lift fitting has been secured, operate circuit to fully extend the fold cylinders.
6. Slightly loosen (crack) the JIC fittings ③ at the base end of the lift cylinders (four places).
7. Slowly extend cylinders. As oil appears at a cracked fitting, set the circuit to Neutral and secure the fitting.
8. When the last lift fitting has been secured, operate circuit to position lift-assist rods for re-attachment.
9. If this implement is:
 - unfolded, or
 - folded to transport rest,
 operate circuit to position wing rods for re-attachment. *Do not attempt, at this time, to connect rod ends on cross-folded wings.*

Continue at section “Install Components” on page 16.

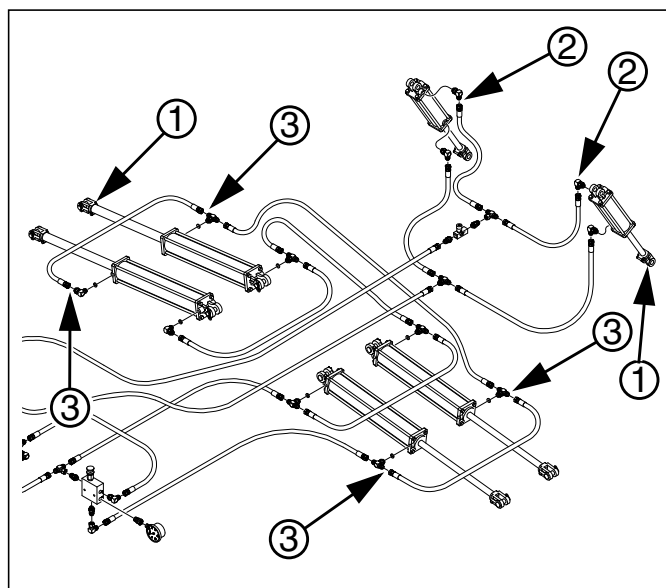


Figure 22
NP3000 2-Point Lift/Fold

31578



Install Components

WARNING

Crushing and Machine Damage Hazards:

“Prepare Hydraulics” beginning on page 14, must be completed prior to most topics in this section. Hydraulic lines may not be charged prior to shipment. Operating systems with air in the lines could result in jerky movements and sudden falls of frame or wings. Anyone nearby could be seriously injured or killed. Machine damage is likely.

Not all topics of this manual section will apply to the implement at hand. Each topic includes a continue-at instruction if the topic does not apply, and may end with a further continue-at instruction if the next topic would not apply, based on the current topic.

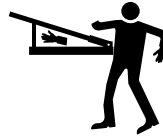
NOTICE

Loss of Time Risk:

Install in order. To ensure safety and reduce effort, the topics must be completed in the order presented. Later topics rely on earlier topics having been completed. Some steps cannot be performed at all if required prior steps are not yet completed.

Before beginning installation steps:

- the implement is presumed to be unloaded from the trailer,
- the hydraulic systems are presumed to be charged and safe to operate, but
- the implement is not presumed to be folded or unfolded.



Install Lift-Assist Casters

If the rear lift-assist casters are already installed, continue at “Install Transport Rest” on page 18.

For this component, two lifters, or a single lifter and a set of tall supports are required. Plan the installation based on the available tools. These instructions assume a single lifter and supports. The caster yoke (18) can be lifted by strapping a lifter fork under the yoke.

1. Disconnect the rod ends of both lift-assist cylinders.

Refer to Figure 24

2. Loosen caster stabilizer jam nuts (41). Back the adjuster bolts (33) most of the way out. Secure with jam nut finger-tight.
3. Locate two sets of the caster stabilizer internal components:
 - (13) 266-012D PLATE RND 3/16" THK 1 7/8" DIA
 - (52) 807-143C SPRING COMP 1.88OD x .362W
 - (14) 266-020D UHMW RND 2.0 DIA X 2.0 LONG
4. Hoist one of the caster weldments (16) high enough that the caster yoke assembly (18) 407-317L CASTER LOCKUP ASSEMBLY can be positioned under it.

Install supports at the parallel arms or secure the hoist.

5. On one of the caster yokes, remove and save two sets of:
 - (31) 802-034C HHCS 1/2-13X1 1/4 GR5
 - (43) 804-015C WASHER LOCK SPRING 1/2 PLT and one:
 - (12) 161-231D NTA CASTER RETAINER CAP

Do *not* remove the:

(46) 804-102C PIVOT THRUST WASHER

6. Lift the yoke (18). Align the vertical shaft (21) with the pivot. Raise the yoke one or two inches into the pivot.
7. Insert into the stabilizer tube, in this order, one each:
 - (13) 266-012D PLATE RND 3/16" THK 1 7/8" DIA
 - (52) 807-143C SPRING COMP 1.88OD x .362W
 - (14) 266-020D UHMW RND 2.0 DIA X 2.0 LONG
8. Fully raise the yoke into the caster weldment. Secure with one cap (12), and two sets of lock washers (43) and bolts (31).
9. Loosen the stabilizer jam nut (41). Turn the adjuster bolt (33) until it contacts the plate (13) and spring (52). Tighten one more inch. Secure jam nut.
10. Repeat step 4 through step 9 for the other caster.
11. Re-connect the lift-assist cylinders.



Figure 23
Caster Yokes on Trailer

31703

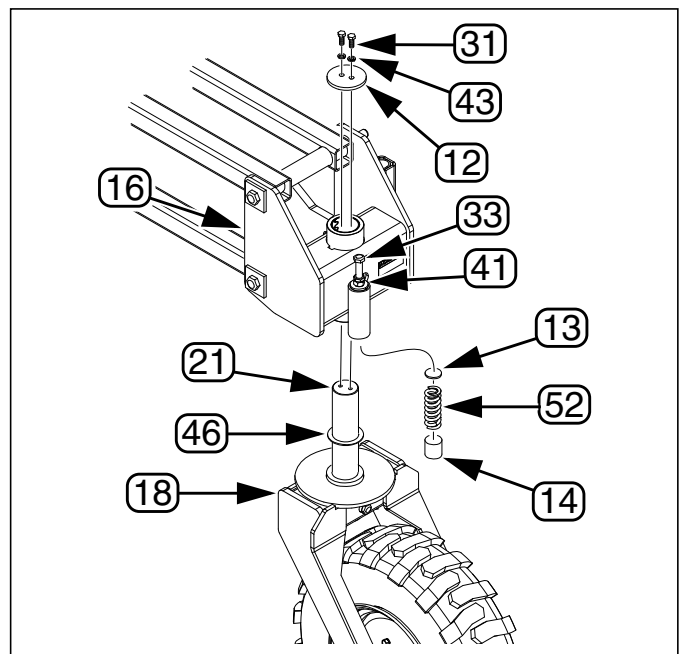


Figure 24
Lift-Assist Caster

31701

Install Transport Rest

This topic is only for shipments with over-folded wings (transport rest not installed). If the implement was shipped unfolded, or has the transport rests already installed, continue at “Install Nurse Tank Hitch” on page 22.

Unfold Over-Folded Wings

Fully raise the implement. Set the parking stands to maximum height. Install lift cylinder lock channels on rear casters.

If only a simple stationary hoist is available, use the following procedure:

Refer to Figure 25 (which depicts an NP40A - the procedure is that same for NP3000)

1. Orient the fold cylinders ① of the left hand (lower) under-folded wing so that their rods can extend without striking implement parts.
2. Connect the hoist to the top end ② of the right hand (upper) over-folded wing.
3. Support some of the RH wing weight with the hoist.
4. Loosen the nuts on the U-bolts securing the right shipping stand ③ to the wing.
5. Increase tension in the hoist until the stand ③ provides no support. Remove the upper and lower U-bolts, and the RH stand itself. The stand and the fasteners are returned to Great Plains.

Note: If an overhead moving crane is available, you can use it to completely unfold the wings and then connect cylinder rod ends. Lower carefully nearing full unfold, as the wing end coulters or knives will contact the ground (since the wing gauge wheels are not yet installed).

6. Lift the wing until the fold cylinder rod ends may be aligned with the wing lugs.
7. Connect the top wing cylinder rod ends.
8. Operate the fold circuit to unfold the wings. Only the RH wing unfolds. Reduce the unfolding rate as the wing end nears the ground. The wing end will be supported by the outside coulters or knife until the wing gauge wheels are installed.
9. Disconnect the cylinder rod ends of the RH (unfolded) wing, to prevent refolding of the RH wing. Orient the fold cylinders of the unfolded wing so that their rods can extend without striking implement parts.

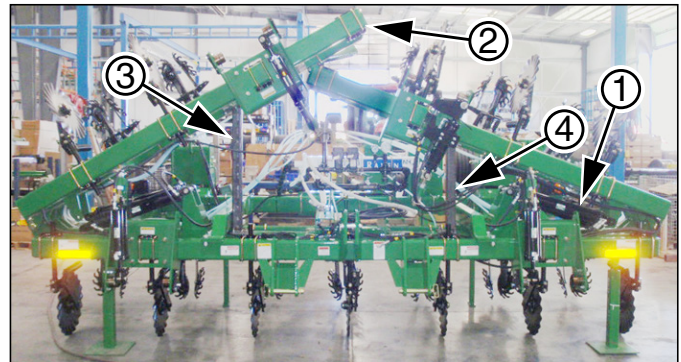


Figure 25
Over-Fold Shipping Supports

31710

Note: The lift-assist cylinders attempt to retract during unfold, but are restrained by the lock channels. They do extend to full length during fold.

10. Connect the hoist to the top end of the LH (folded) wing.
11. Support some of the LH wing weight with the hoist.
12. Loosen the nuts on the U-bolts securing the left shipping stand ④ to the wing.
13. Increase tension in the hoist until the stand ④ provides no support. Remove the upper and lower U-bolts, and the LH stand itself. The stand and the fasteners are returned to Great Plains.
14. Lift the wing until the fold cylinder rod ends may be aligned with the wing lugs. Retract the fold circuit as needed to achieve alignment.
15. Connect the cylinder rod ends at the LH wing.
16. Operate the fold circuit to unfold the LH wing. Reduce the unfolding rate as the wing end nears the ground. The wing end will be supported by the coulters or knife until the wing gauge wheels are installed.
17. Connect the cylinder rod ends at the other (RH) unfolded wing.

Dismount Transport Rest

Refer to Figure 26 and Figure 27 (depicting wings still folded)

18. With the wings unfolded, attach hoist lines at each end of the cross plate of the:
 - (24) 407-478H NP40 WING REST
 Loop them around both the riser tubes below and the plate to keep them from slipping.

CAUTION

Sharp Object Hazards:

Keep feet and legs clear of discs. This dismount requires working in between row implements. Discs are sharp and can cause injury.

19. Loosen the nuts on the shipping U-bolts (5). Check that the hoist is supporting the full weight of the free end of the rest.
20. Have workers support the base ends of the rest while removing the U-bolts completely.

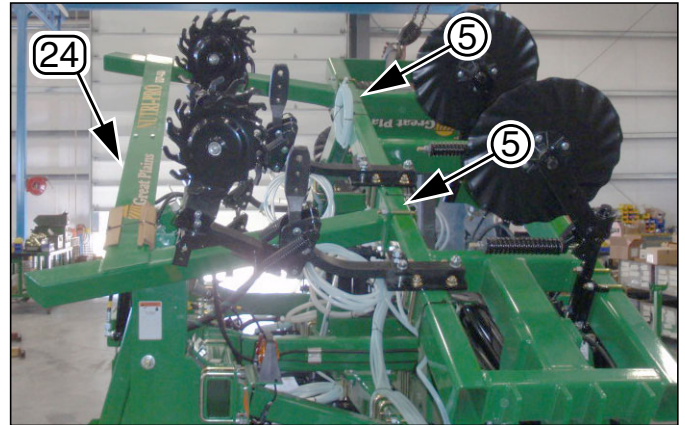


Figure 26
Transport Rest in Over-Fold

31709

Note: The removed U-bolts are used only for shipping, and are returned to Great Plains. The transport rest is installed with different U-bolts.

Install Transport Rest

Refer to Figure 27

21. Select two:
 - (49) 806-039C U-BOLT 5/8-11 X 6 1/32 X 7 3/4
 and eight sets:
 - (38) 803-021C NUT HEX 5/8-11 PLT
 - (44) 804-022C WASHER LOCK SPRING 5/8 PLT
22. With the cross plate to the rear, hoist the rest (24) to implement center, over the middle tool bars (6) of the mainframe.
23. Check that the rest's base plates are equal distances from implement center-line. Secure with U-bolts (49), lock washers (44) and nuts (38).

Do not install the SMV reflector until "Install SMV Reflector" on page 22.

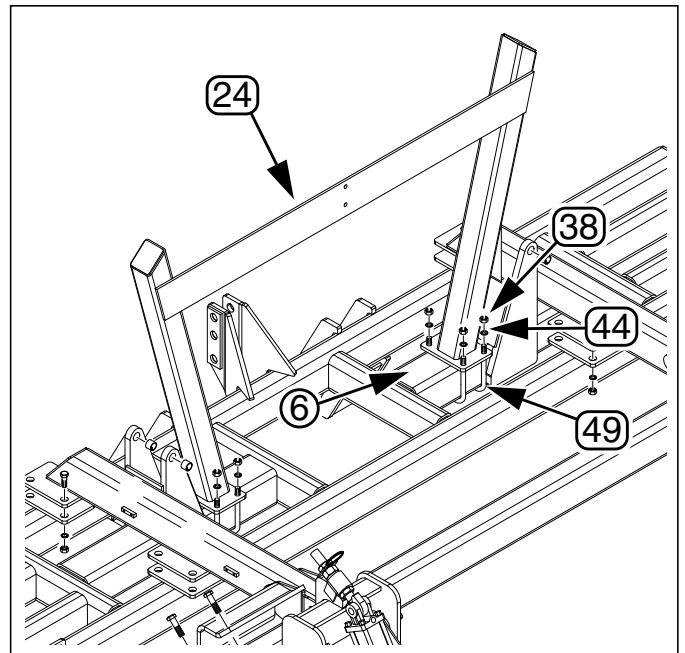


Figure 27
Transport Rest

31025

Unfold Implement

If the implement is already unfolded, continue at “**Install Wing Gauge Wheels**” on page 21.

1. Fully raise implement.
2. Fully extend parking stands.
3. Install lift cylinder lock channels.
4. Lower implement onto stands and/or locks.
5. If stands are available, set one beyond, but not in the path of each wing. Adjust the height to match the raised center section.
6. Slowly extend the fold circuit to begin wing unfolding.
7. When wings are just above level, position the stands to support the wings.
8. Continue unfold. When wing-ends rest on stands, wing gauge wheels (if factory-installed), or rest on wing-end coulters, stop extension. Set circuit to Float.

Note: Wing locks engage during unfold.

Note: Wing-end coulters are likely to contact the ground. Slow the unfold as this point nears.

Install Wing Gauge Wheels

If all the gauge wheels are already installed, continue at topic “Install Nurse Tank Hitch” on page 22.

Install Manual Gauge Wheels

If not installed for shipment, these assemblies may be fully dismantled at the tool bar, or may have only the wheels removed. If only the wheels need to be installed, continue at topic “Install 2P Wheels” on page 21.

2P Gauge Wheel Stations

Before installing, determine the location for each gauge wheel, which varies by row count.

Implement Model	Gauge Wheel Station	
	RH	LH
NP3000-1230	Row 12	Row 1
NP3000-1230SD	Row 2 ^a	Row 13 ^a

a. Note that if the wing extension was not installed for shipment (the usual case), the first row is not present (illustrated in gray). The first present row on the LH wing is Row 2 and not Row 1.

Gauge wheels mount at row center-lines.

Install 2P Gauge Wheel Mounts

Refer to Figure 29

- Select two:
 - ② 407-321S 3PT GW ASSEMBLY and four:
 - ④ 806-016C U-BOLT 5/8-11 X 6 1/32 X 5 3/4 and eight sets:
 - ③ 803-021C NUT HEX 5/8-11 PLT
 - ④ 804-022C WASHER LOCK SPRING 5/8 PLT
- Secure the mounts at the gauge wheel stations from the table above.

Install 2P Wheels

Refer to Figure 30

- Locate two:
 - ② 596-065K TIRE 20.5 X 8 10 PLY 6 BOLT with hub assemblies installed.
- Remove and save at each wheel, two sets:
 - ③ 802-064C HHCS 3/4-10X2 GR5
 - ④ 804-023C WASHER LOCK SPRING 3/4 PLT
- Install the wheel assemblies at each gauge wheel arm ①.

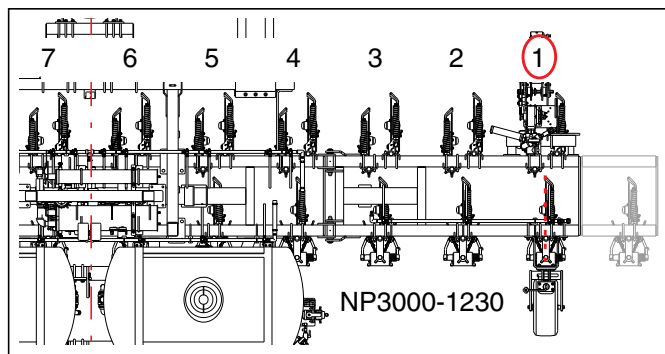


Figure 28
Gauge Wheel Stations

32043

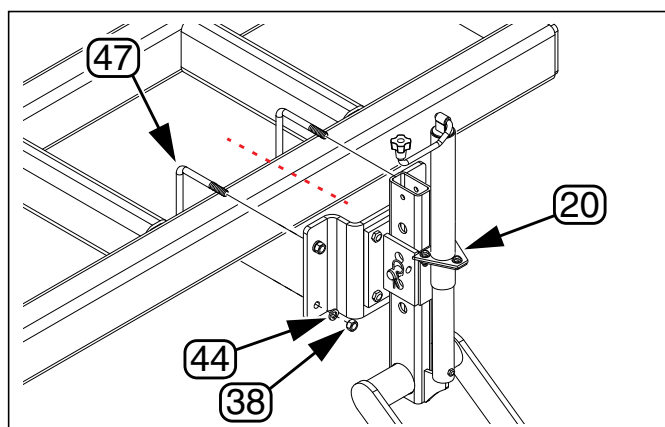


Figure 29
Gauge Wheel Assembly

31706

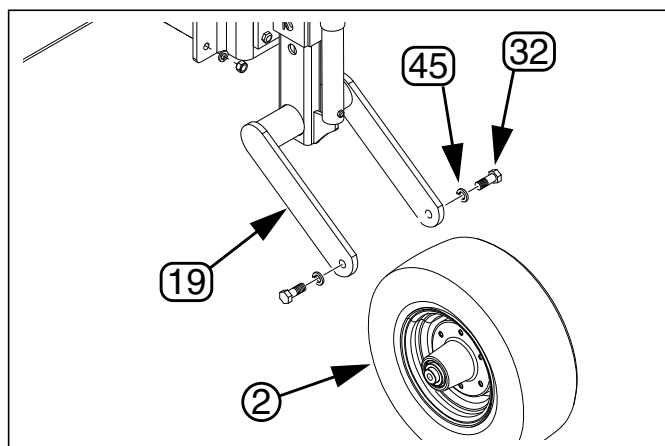


Figure 30
2P Gauge Wheel

31706

Install Nurse Tank Hitch

If the implement was ordered without a rear hitch, continue at “Install SMV Reflector” on page 22.

Refer to Figure 31

For shipping, the hitch mount (17) is removed.

Install Hitch

4. Select one:
(17) 407-304H MOUNT HITCH SHUCK
which should already have the Schuck hitch installed within it.
5. Select six:
(47) 806-016C U-BOLT 5/8-11 X 6 1/32 X 5 3/4
and twelve sets:
(44) 804-022C WASHER LOCK SPRING 5/8 PLT
(38) 803-021C NUT HEX 5/8-11 PLT
6. Orient the hitch assembly (17) with the red handle (1) down, and centered on the hitch extension (15) (or if no hitch extension, on the rear tool bar). Secure with six U-bolts (47), lock washers (44) and nuts (38).

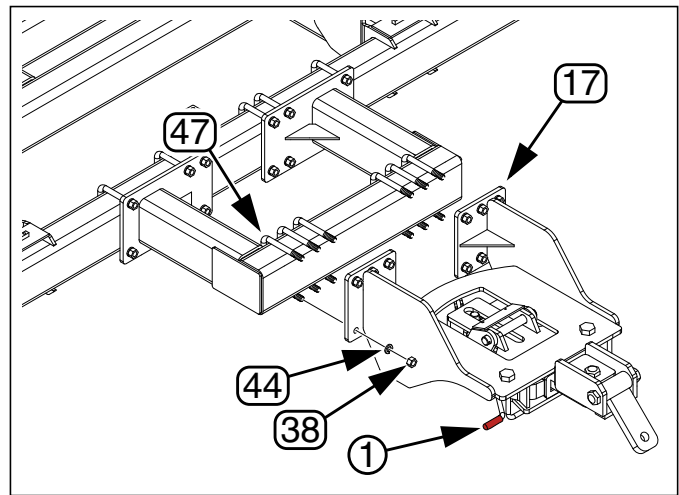


Figure 31
Hitch Components

32044

Install SMV Reflector

Refer to Figure 32

1. Select one:
(25) 407-512D SMV POST 2 1/2 U-BOLT
and two sets:
(34) 802-091C HHCS 1/2-13X1 1/2 GR5
(43) 804-015C WASHER LOCK SPRING 1/2 PLT
(37) 803-020C NUT HEX 1/2-13 PLT
2. With the SMV reflector (97) up and facing rear, mount the SMV post (25) on the rear face of the wing rest (24).

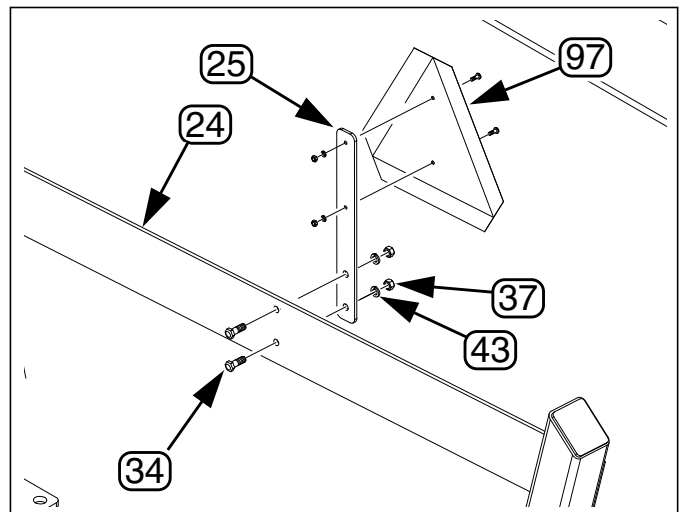


Figure 32
Install SMV Reflector

31024

Mount Ground Drive Wheel

If the implement was ordered without a ground drive pump, continue at section “**Final Setup**” on page 25.

CAUTION

Sharp Object Hazard:

Use a hoist or two people. Wear gloves. The wheel is heavy and the tines are sharp.

Refer to Figure 33

- Select one:
 - 23 407-473D GROUND DRIVE WHEEL
 - and three sets:
 - 35 802-331C RHSNB 1/2-13X1 3/4 GR5
 - 43 804-015C WASHER LOCK SPRING 1/2 PLT
 - 37 803-020C NUT HEX 1/2-13 PLT
- At the ground drive hub 70, orient the wheel so that at the top, the vertical face of the top tooth is to the rear, and the longer angled face is to the front.
- Secure the wheel 23 to the hub with bolts 35, lock washers 43 and nuts 37.

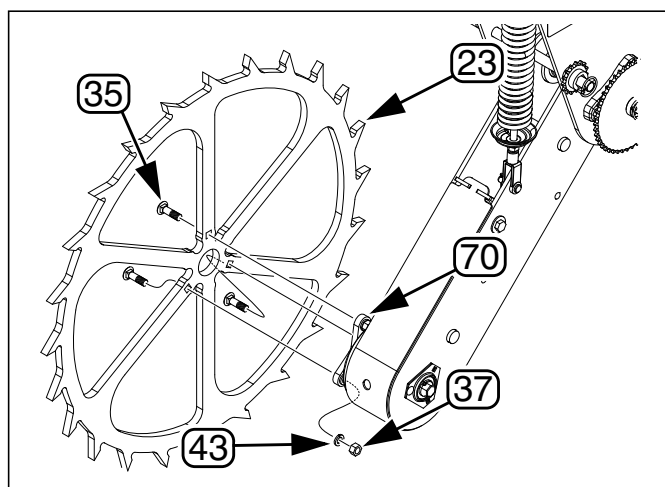


Figure 33
Install Ground Drive Wheel

31719

Install Decal Mount

Refer to Figure 34

If the decal mount 22 is already installed, continue at “**Install Manual Pak**”.

- Select one each:
 - 22 407-468D DECAL MOUNT
 - 50 806-069C U-BOLT 1/2-13 X 4 1/32 X 7 1/4
 - and two sets:
 - 43 804-015C WASHER LOCK SPRING 1/2 PLT
 - 37 803-020C NUT HEX 1/2-13 PLT

Install the mount on the left side of the rear hitch extension. If no extension is present, install the mount on the lift-assist cross-tube left of center.

Install the mount with decals facing to the rear.

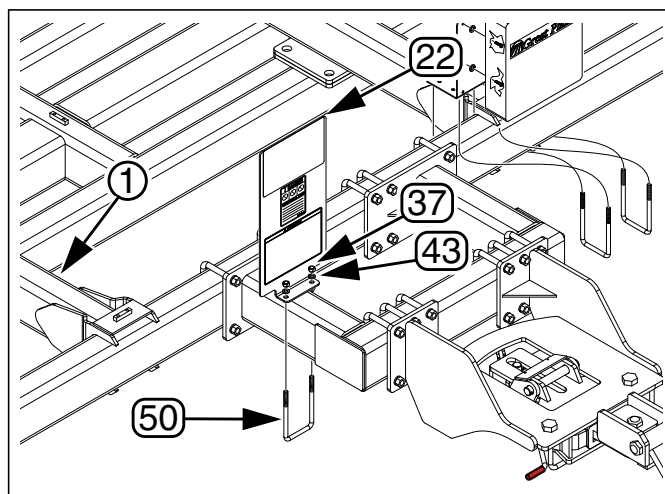


Figure 34
Decal Mount

32049

Install Manual Pak

Refer to Figure 35

If the manual pak (60) is already installed on the implement, continue at “**Final Setup**” on page 25.

1. Select one:
 - (11) 118-652D MANUAL PAK MOUNT
 and two:
 - (50) 806-069C U-BOLT 1/2-13 X 4 1/32 X 7 1/4
 and four sets:
 - (43) 804-015C WASHER LOCK SPRING 1/2 PLT
 - (37) 803-020C NUT HEX 1/2-13 PLT

Install the mount (11), with the break up to the rear, on the lift-assist main cross-tube, just right of the rear hitch. If there is no rear hitch, install the mount near implement center-line.

If the manual pak enclosure (60) is already installed on the mount (11), continue at “**Final Setup**” on page 25.

2. Select one:
 - (60) 817-853C MANUAL PAK 2 1/4 THK
 and four sets:
 - (30) 802-005C HHCS 1/4-20X1 GR5
 - (59) 817-042C MINI END WHEEL PRESS WHEEL
 - (40) 803-255C NUT HEX NYLOCK 1/4-20

Insert the bolts (30) from inside the pak enclosure. Add the elastomer washer/stand-off (59) and mate to the mount (11). Secure with lock nuts (40).

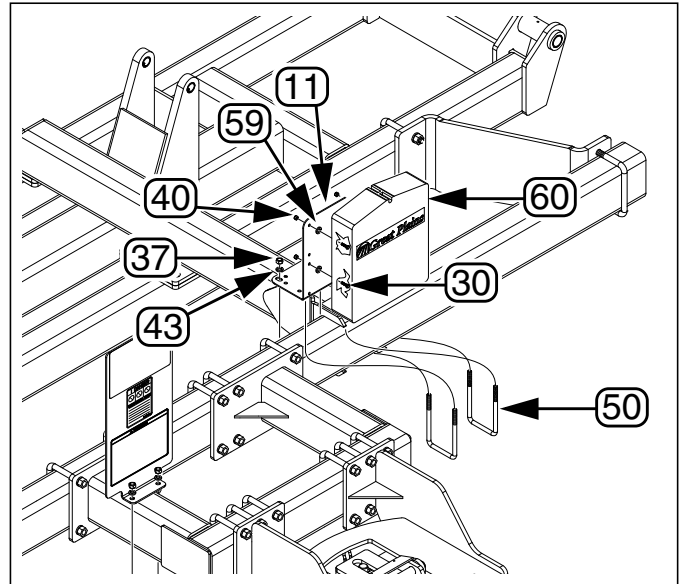


Figure 35
Manual Pak

32049

Final Setup

Set Rough Weight Transfer

⚠ DANGER

Crushing and High Pressure Fluid Hazards:

This adjustment requires working near the unfolded and lowered implement with the hydraulic system active. Assign two people to this task, one in the tractor, ready to shut down on hand signal from adjuster or any unplanned event.

⚠ WARNING

High Pressure Fluid Hazard:

Escaping fluid under pressure can penetrate the skin causing serious injury. Use a piece of paper or cardboard, NOT BODY PARTS, to check for suspected leaks. Wear protective gloves and safety glasses or goggles when working with hydraulic systems. If an accident occurs, seek immediate medical attention from a physician familiar with this type of injury.

Refer to Figure 36 and Figure 37

1. Close the lift-assist valve ⑨ by turning the knob fully clockwise.
2. Open the shut-off valve ⑧.
3. In field conditions, unfold and lower implement.
4. Put tractor in Park and set parking brake.
5. At the bypass valve ③, release the bypass valve lock disc ①. Turn the bypass valve knob ⑤ fully clockwise to shut-off all bypass oil flow. Tighten lock disc.
6. Set tractor to half throttle. Adjust tractor flow control valve so that wings fold/unfold at a reasonable speed. Keep tractor running for step 7 through step 10.
7. Set tractor remote circuit for unfold. Lock lever for continuous operation.
8. At the pressure reducing valve ⑥, release the lock disc ②.
9. Adjust the knob ⑦ for 800 psi on the gauge ④. Tighten the lock disc ②.
10. At the bypass valve ③, release the lock disc ①. Adjust the bypass valve knob until the pressure reading just begins to fall from 800 psi. Tighten the lock disc.

⚠ WARNING

Crushing Hazard:

Keep body parts clear of wings, row cleaners and coulters while adjusting. Keep all bystanders well away. You will be seriously injured or killed if you are caught between lowering row implements and ground.

⚠ CAUTION

Falling Hazard - Tires Not a Step:

Do not use tires as steps or platforms. At some transfer settings, cylinders can lift wheels sufficiently for them to spin.

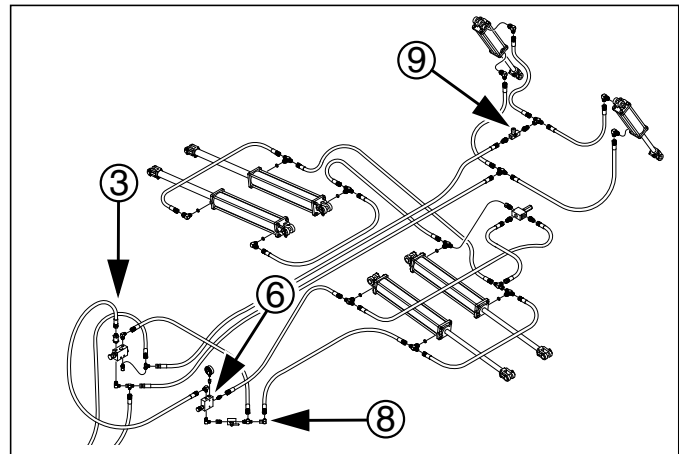


Figure 36
Weight Transfer

31944

Note: Fold and unfold are followed by lift and lower operations.

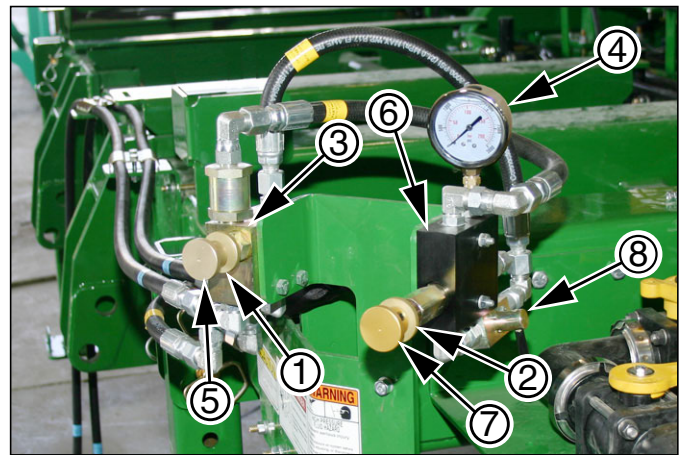


Figure 37
Weight Transfer Valves

32041

Lift-Assist Valve Setup

NP3000 Lift-Assist Valve

1. The implement is presumed to be unfolded. Hitch the implement to a tractor. Raise the implement (as for parking).
2. Locate the one-way restrictor valve ① at the tee that supplies the rear cylinder base ends.
3. Turn the knob fully counterclockwise, then clockwise one turn.
4. Start a lift/fold operation. Initially, the lift occurs before the fold. Stop. Lower.
5. Turn the valve clockwise one turn.
6. Start a lift/fold. Stop. Lower.

If the lift occurred before the fold, repeat step 5.

If the fold occurred before the lift, back the valve off (counterclockwise) a partial turn, and re-test lift/fold.

7. Find the point at which the wings fold to the wing locks prior to lift commencing.

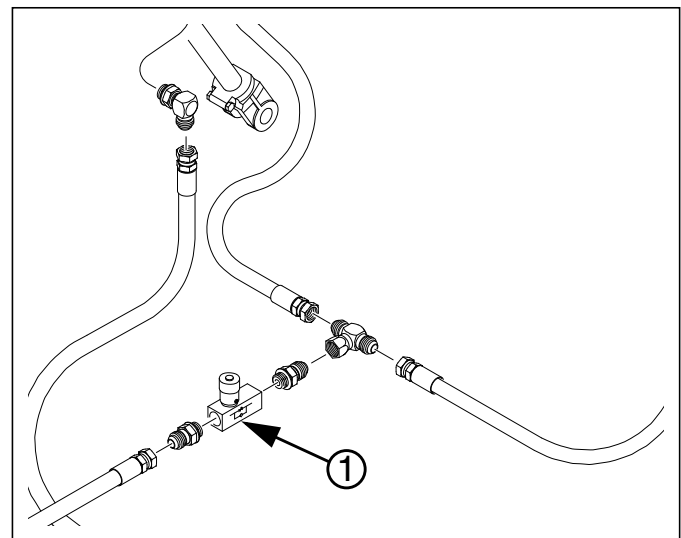


Figure 38
Lift-Assist Valve

31612

Install Lift Cylinder Locks

⚠ CAUTION

Falling Hazard:

Do not climb or stand on tires or wheels. Even at full extension on level ground, tires may not be in firm ground contact. They could spin without warning. A fall could result in serious injury.

Refer to Figure 39

Transport locks are present on all wheel assemblies with hydraulic cylinders. To install cylinder stops:

1. Fully raise implement. Set lift circuit to Neutral.
2. At each rear lift-assist cylinder, remove cotter pin and lock pin. Remove lock channel ① from storage location ③.

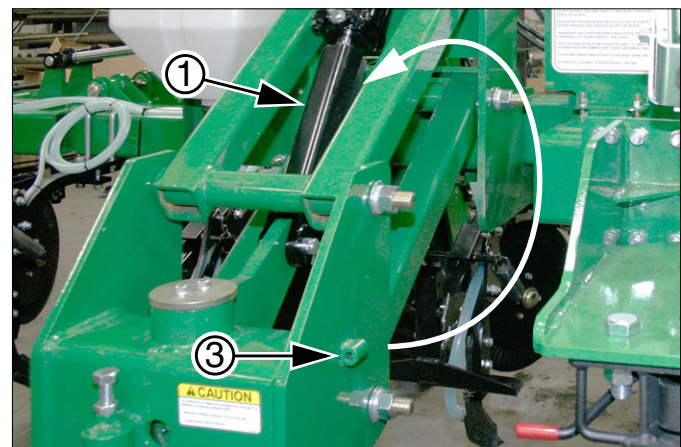


Figure 39
Rear Lift Cylinder Lock Channel

31619



Pre-Delivery Closeout

Stow Spacers

1. Select two sets:
53 810-242C STROKE CONTROL SPACERS 1 1/8
2. Clip each set around the wire loop ② on each of the two lift-assist mounts.

Stow Documents

Place all documents in the Manual-Pak™¹.

Remove Pre-Assembly Markings

Remove all part tags. Wipe off all grease pencil part numbers.

Final Inspection

1. Check that all working parts are moving freely, bolts are tight, and cotter pins are spread.
2. Check that all grease fittings are in place and lubricated. See “**Lubrication and Scheduled Maintenance**” in the Operator manual.
3. Check that all safety decals and reflectors are correctly located and legible. Replace if damaged. See “**Safety Decals**” in the Operator manual.

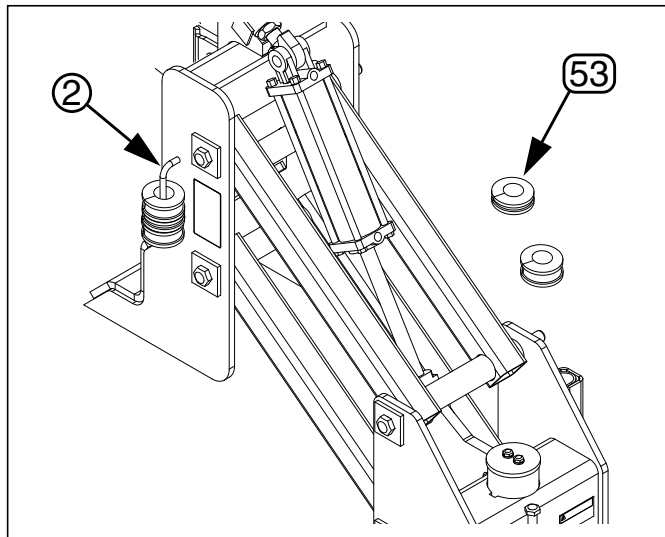


Figure 40
Lift-Assist Spacers

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1. Manual-Pak™ is a trademark of Custom-Pak, Inc.



Appendix A - Reference Information

Specifications and Capacities

NP3000-1230	With On-Board Tanks		Tankless	
	Standard	Side Dress	Standard	Side Dress
Row Count	12	13	12	13
Row Spacing	30 in			
Working Width	29ft. 7in.	31ft. 11in.	29ft. 7in.	31ft. 11in.
Transport Width	17ft. 2in.			
Swath	30ft. 0in.	32ft. 6in.	30ft. 0in.	32ft. 6in.
Metering System	Option: Raven Control/Section Valves, Pressure Sensor & RFM60P Flow meter			
Controller Console	Option: Raven SCS 450 (Optional)			
Length, Transport	13ft. 4in.	13ft. 4in.	11ft. 1in.	11ft. 1in.
Length, Field	14ft. 0in.	14ft. 0in.	11ft. 9in.	11ft. 9in.
Working Height	9ft. 7in.			
Transport Height (Folded)	11ft. 1in.	12ft. 7in.	11ft. 1in.	12ft. 7in.
Transport Clearance	16in. nominal, depends on tractor hitch			
Min. Tractor HP Req. ¹	145 - 180 hp	145 - 180 hp	145 - 180 hp	145 - 180 hp
Hydraulic Circuits Req.	1, 2 or 3 Circuits, 2250 psi, 4 to 17 gal/min			
Weight, Maximum, Empty	15800.0 lbs	16100.0 lbs	14800.0 lbs	15100.0 lbs
Weight, Maximum, Full	18900.0 lbs	19200.0 lbs	N/A	N/A
Transport Tire Size	265/70B16.5 (10-16.5) (NHS 8-Ply Skid Loader 4140 lbs @ 5 mph)			
Wing Gauge Wheel Tire	20.5X8.0-10 (Load Rating E, 1520 Pounds)			
Operating Depth	0 to 6in. Do not exceed 6.5in. (release depth is 4.5in above coulter depth.)			
Rear Hitch (Optional)	Option: Schuck Model 850			
Nurse Tank Capability	2000 Gallons			

1. Power requirements vary significantly with conditions and practices.

Tire Inflation Chart




Wheel	Tire Size	Inflation
2-Point Lift	265/70B16.5	60 psi (415 kPa)
2-Point Gauge	20.5X8.0-10	90 psi (620 kPa)




Tire Warranty Information

All tires are warranted by the original manufacturer of the tire. Tire warranty information is found in the brochures included with your Operator's and Parts Manuals or online at the manufacturer's web sites listed below. For assistance or information, contact your nearest Authorized Farm Tire Retailer.

Manufacturer	Web site
Firestone	www.firestoneag.com
Gleason	www.gleasonwheel.com
Titan	www.titan-intl.com

Torque Values Chart

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

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

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

2. N·m = newton-meters

3. ft-lb = foot pounds

4. mm x pitch = nominal thread diameter in millimeters x thread pitch

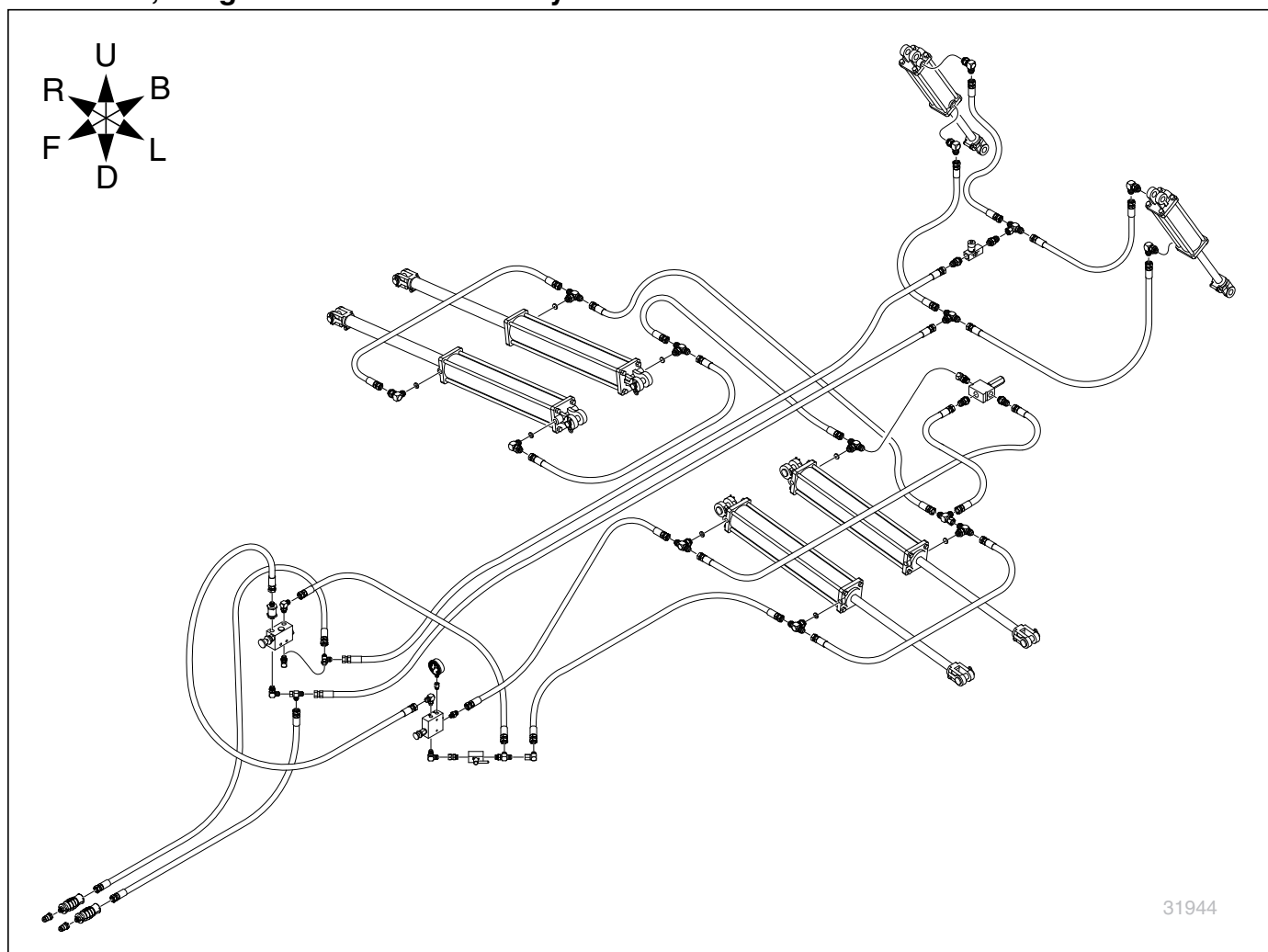
Torque tolerance + 0%, -15% of torquing values. Unless otherwise specified use torque values listed above.

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1. in-tpi = nominal thread diameter in inches-threads per inch
2. N·m = newton-meters
3. ft-lb = foot pounds
4. mm x pitch = nominal thread diameter in millimeters x thread pitch

Hydraulic Diagrams

Lift-Assist, Weight-Transfer and Fold Hydraulics





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