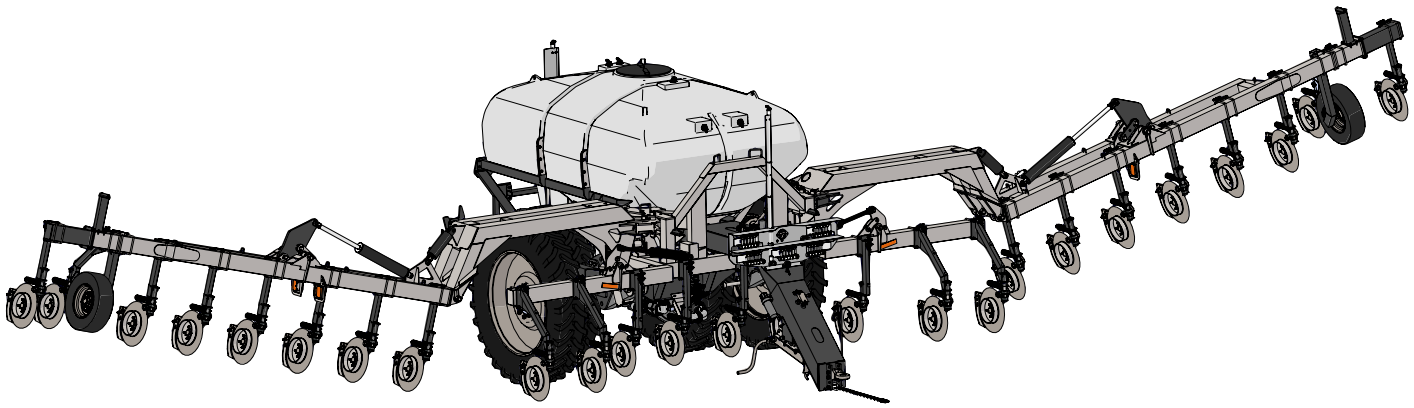
Manual

nitro gro

OPERATOR'S MANUAL

MODEL 6026



Rev. 9.21.2021

J&M Manufacturing Co, Inc
284 Railroad Street - P.O. Box 547 | Fort Recovery, OH 45846 | Ph: (419) 375-2376 | Fax: (419) 375-2708
www.jm-inc.com

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To The Dealer

TO THE DEALER

Read manual instructions and safety rules. Make sure all items on the Dealer's Pre-Delivery and Delivery Check Lists are completed before releasing equipment to the owner.
The dealer must complete the Warranty Registration found on the Dealer Portal website located at dealer.jm-inc.com and return it to J&M Mfg. Co., Inc. at the address indicated on the form. Warranty claims will be denied if the Warranty Registration has not been submitted.

EXPRESS WARRANTY:

J&M Mfg. Co., Inc. warrants against defects in construction or materials for a period of ONE year. We reserve the right to inspect and decide whether material or construction was faulty or whether abuse or accident voids our guarantee.

Warranty service must be performed by a dealer or service center authorized by J&M Mfg. Co., Inc. to sell and/or service the type of product involved, which will use only new or remanufactured parts or components furnished by J&M Mfg. Co., Inc. Warranty service will be performed without charge to the purchaser for parts or labor based on the Warranty Labor Times schedule. Under no circumstance will allowable labor times extend beyond the maximum hours indicated in the Warranty Labor Times schedule for each warranty procedure. The purchaser will be responsible, however, for any service call and/or transportation of the product to and from the dealer or service center's place of business, for any premium charged for overtime labor requested by the purchaser, and for any service and/or maintenance not directly related to any defect covered under the warranty. Costs associated with equipment rental, product down time, or product disposal are not warrantable and will not be accepted under any circumstance.

Each warranty term begins on the date of product delivery to the purchaser. Under no circumstance will warranty be approved unless (i) the product warranty registration card has been properly completed and submitted to the equipment manufacturer, and (ii) a warranty authorization number has been issued by the equipment manufacturer. This Warranty is effective only if the warranty registration card is returned within 30 days of purchase.

This warranty does not cover a component which fails, malfunctions or is damaged as a result of (i) improper modification or repair, (ii) accident, abuse or improper use, (iii) improper or insufficient maintenance, or (iv) normal wear or tear. This warranty does not cover products that are previously owned and extends solely to the original purchaser of the product. Should the original purchaser sell or otherwise transfer this product to a third party, this warranty does not transfer to the third party purchaser in any way. J&M Mfg. Co., Inc. makes no Warranty, express or implied, with respect to tires or other parts or accessories not manufactured by J&M Mfg. Co., Inc. Warranties for these items, if any, are provided separately by their respective manufacturers.

THIS WARRANTY IS EXPRESSLY IN LIEU OF ALL OTHER WARRANTIES OR CONDITIONS, EXPRESS, IMPLIED OR STATUTORY, INCLUDING ANY IMPLIED WARRANTY OF MERCHANTABILITY OR FITNESS FOR PARTICULAR PURPOSE.

In no event shall J&M Mfg. Co., Inc. be liable for special, direct, incidental or consequential damages of any kind. The exclusive remedy under this Warranty shall be repair or replacement of the defective component at J&M Mfg. Co., Inc's. option. This is the entire agreement between J&M Mfg. Co., Inc. and the Owner about warranty and no J&M Mfg. Co., Inc. employee or dealer is authorized to make any additional warranty on behalf of J&M Mfg. Co., Inc.

The manufacturer reserves the right to make product design and material changes at any time without notice. They shall not incur any obligation or liability to incorporate such changes and improvements in products previously sold to any customer, nor shall they be obligated or liable for the replacement of previously sold products with products or parts incorporating such changes.

SERVICE:

The equipment you have purchased has been carefully manufactured to provide dependable and satisfactory use. Like all mechanical products, it will require cleaning and maintenance. Lubricate the unit as specified. Observe all safety information in this manual and safety signs on the equipment.

For service, your authorized J&M dealer has trained mechanics, genuine J&M service parts, and the necessary tools and equipment to handle all your needs.

Use only genuine J&M service parts. Substitute parts may void warranty and may not meet standards required for safety and satisfactory operation. Record the model number and serial number of your equipment in the spaces provided:

Model No: 6026 NitroGro Applicator **Serial No:** _____ **Date of Purchase:** _____

Purchased From: _____

Provide this information to your dealer to obtain correct repair parts.

Serial Number

Serial Number_____
Model Number_____6026_____

Standard practice when ordering parts or obtaining information from your dealer requires the serial number and model number. Have numbers available before making contact.

General Information

TO THE OWNER:
The purpose of this manual is to assist you in operating and maintaining your applicator in a safe manner. Read it carefully. It furnishes information and instructions that will help you achieve years of dependable performance and help maintain safe operating conditions. If this machine is used by an employee or is loaned or rented, make certain that the operator(s), prior to operating:
1. Is instructed in safe and proper use.
2. Reviews and understands the manual(s) pertaining to this machine.
Throughout this manual, the term IMPORTANT is used to indicate that failure to observe can cause damage to equipment. The terms CAUTION, WARNING and DANGER are used in conjunction with the Safety-Alert Symbol, (a triangle with an exclamation mark), to indicate the degree of hazard for items of personal safety. When you see this symbol, carefully read the message that follows and be alert to the possibility of personal injury or death.

⚠	This Safety-Alert symbol indicates a hazard and means ATTENTION! BECOME ALERT! YOUR SAFETY IS INVOLVED!
⚠ **DANGER**	Indicates an imminently hazardous situation that, if not avoided, will result in death or serious injury.
⚠ **WARNING**	Indicates a potentially hazardous situation that, if not avoided, could result in death or serious injury, and includes hazards that are exposed when guards are removed.
⚠ **CAUTION**	Indicates a potentially hazardous situation that, if not avoided, may result in minor or moderate injury.
IMPORTANT	Indicates that failure to observe can cause damage to equipment.
NOTE	Indicates helpful information.

Safety Rules

⚠ ATTENTION! BECOME ALERT! YOUR SAFETY IS INVOLVED! ⚠

Safety is a primary concern in the design and manufacture of our products. Unfortunately, our efforts to provide safe equipment can be erased by an operator's single careless act. In addition, hazard control and accident prevention are dependent upon the awareness, concern, judgment, and proper training of personnel involved in the operation, transport, maintenance and storage of equipment.

Make certain that the operator(s), prior to operating is instructed in safe and proper use and reviews and understands the manual(s) pertaining to this machine. Also make certain that the operator(s) reviews and understands the operator's manual of the tow vehicle prior to hooking up or operating the NitroGro Applicator.

Read this manual before you operate this machine. If you do not understand any part of this manual, or need more information, contact the manufacturer or your authorized dealer.

Note: The right and the left hand sides of the implement are determined by facing the same direction that the applicator will travel when moving forward.

⚠ SAFETY ⚠

Understand that your safety and the safety of other persons is measured by how you service, and operate this machine. Know the positions and functions of all controls before you try to operate them. Make sure to check all controls in a safe area before starting your work.

The safety information given in this manual does not replace safety codes, federal, state or local laws. Make certain your machine has the proper equipment as designated by local laws and regulations.

A frequent cause of personal injury or death is from persons falling off equipment and being run over. Do not permit persons to ride on this machine.

Travel speeds should be such that complete control and machine stability is maintained at all times. Where possible, avoid operating near ditches, embankments and holes. Reduce speed when turning, crossing slopes and rough, slick or muddy surfaces.

Collision of high speed road traffic and slow moving machines can cause personal injury or death. On roads, use flasher lights according to local laws. Keep slow-moving-vehicle emblem visible. Pull over to let faster traffic pass.

Keep all safety shields in place.

Keep hands, feet, hair and clothing away from moving parts while unit is in operation.

Ensure that everyone is clear of equipment before applying power or moving the machine.

Fasten the implement securely to the tractor by using the proper hitch pin, clip and safety chains.

Do NOT exceed speeds in excess of 20 MPH. Also be sure slow moving vehicle emblem is attached to rear of transport.

Do not transport applicator with contents in the tank.

Before unhooking the implement from the towing unit, be sure to properly block the wheels to prevent the implement from moving. Be sure the jack assembly is positioned in the park position and the weight has been transferred to the jack assembly before unhooking the implement. **Do not unhook with conents in tank or toolbar in operating position.**

Avoid high pressure fluids. Escaping fluid under pressure can penetrate the skin causing serious injury. Always relieve pressure before disconnecting hydraulic lines. Wear proper hand and eye protection when searching for leaks. Use wood or cardboard instead of hands. Keep all components in good repair.

Bolt Torque Chart

Always tighten hardware to these values unless a different torque or tightening procedure is listed for specific application. Fasteners must always be replaced with the same grade as specified in the manual parts list. Always use the proper tool for tightening hardware. Make sure fastener threads are clean and you start thread engagement properly. **Use these values when tightening all bolts and nuts with the exception of wheel nuts.**

SAE Fasteners

Coarse Thread Series				
	Grade 5		Grade 8	
Diameter and Pitch (Inches)	*Dry*	*Oiled*	*Dry*	*Oiled*
1/4"-20	8 ft-lbs	6 ft-lbs	12 ft-lbs	9 ft-lbs
5/16"-18	17	13	25	18
3/8"-16	31	23	44	33
7/16"-14	49	37	70	52
1/2"-13	75	57	106	80
9/16"-12	109	82	154	115
5/8"-11	150	113	212	159
3/4"-10	267	200	376	282
7/8"-9	429	322	606	455
1"-8	644	483	909	681
Fine Thread Series				
Diameter and Pitch (Inches)	*Dry*	*Oiled*	*Dry*	*Oiled*
1/4"-28	10 ft-lbs	7 ft-lbs	14 ft-lbs	10 ft-lbs
5/16"-24	19	15	27	20
3/8"-24	35	26	49	37
7/16"-20	55	41	78	58
1/2"-20	85	64	120	90
9/16"-18	121	91	171	128
5/8"-18	170	127	240	180
3/4"-16	297	223	420	315
7/8"-14	474	355	669	502

Stud and Wheel Nut Torque Specifications

Always tighten hardware to these values unless a different torque or tightening procedure is listed for specific application. Fasteners must always be replaced with the same grade as specified in the manual parts list. Always use the proper tool for tightening hardware. Make sure fastener threads are clean and you start thread engagement properly. **Use these values when tightening all studs and wheel nuts.**

Stud	Tightening Torque
1/2"-20	120 ft-lbs
9/16"-18	170 ft-lbs
5/8"-18	300 ft-lbs
3/4"-16	400 ft-lbs
20mm	475 ft-lbs
22mm	640 ft-lbs

TIGHTENING WHEEL NUTS: During initial operation of the NitroGro applicator, **tighten standard 3/4" wheel studs and nuts to torque 400 ft-lbs and tighten 1/2"-20 gauge wheel studs and nuts to torque 80 ft-lbs**. Check for proper torque after every 10 hours of use. Failure to do so may damage wheel nut seats. Once seats are damaged, it will become impossible to keep nuts tight.

Specifications

SPECIFICATIONS 6000 Series Applicators	6026
Tank Size	2,600 Gallon
Base Width	60′
Ground Clearance	40″
Row Spacing*	20″, 22″, 30″
Number of Coulters	23, 25, 35, 37
Coulter Style	Grove Engineered Products (GEP) or J&M Para-Linkage
Fertilizer Delivery	Knife or Injection
Wing Flex	Standard 15° Flex Up - 10° Flex Down Can be operated rigidly
Wing Kick	Standard
Coulter Frame Tubing	5″ x 7″ Double Toolbar
Hydraulic Down Pressure	Standard
Standard PWM Hydraulic Driven Pump	Ace 150 or 750 Pump
Tires	VF320/105R46 Alliance, VF 380/90R46 Alliance, or VF480/80R50 Alliance
Transport Width	11′-9″
Transport Height	12′-6″
Transport Length	25′-0″
Pin To Axle	14′-0″
Flow Monitors	Standard - Wilger
Depth Control Spools	Optional
Quick Fill	3″ Fill Standard
Wash Tank	Standard 9 Gallon Wash Tank
Empty Weight	18,000 lbs.

* Other Row Spacing Available Upon Request

With toolbar folded:

	Total Weight	Weight on Axle	Tongue Weight
Tank Empty	18,000 lbs	17,300 lbs	700 lbs
Tank Full	47,000 lbs	44,200 lbs	2,800 lbs

With toolbar unfolded and raised (knives not in ground):

	Total Weight	Weight on Axle	Tongue Weight
Tank Empty	18,000 lbs	13,436 lbs	4,563 lbs
Tank Full	47,000 lbs	40,773 lbs	6,226 lbs

With toolbar unfolded and down (knives in ground):

	Total Weight	Weight on Axle*	Tongue Weight*
Tank Empty	18,000 lbs	8,422 lbs	827 lbs
Tank Full	47,000 lbs	35,759 lbs	2,490 lbs

*These values are estimates assuming moderate soil hardness and 25 coulters.

Tires	Ground Compaction
VF320/105R46 (Alliance) (172D) - Dual Wheels	29 psi
VF380/90R46 (Alliance) (173D) - Dual Wheels	25 psi
VF480/80R50 (Alliance) (179D) - Dual Wheels	16 psi

Pre-Operation Checklist

Preparing the NitroGro Applicator:

IMPORTANT - Before putting the applicator into operation, check the machine for damaged or worn parts and replace as necessary.

Only use a tractor with sufficient power and weight to operate the applicator. For 24 rows, use a minimum of 275 hp tractor and for 36 rows use a minimum of 410 hp tractor. Be sure the applicator is properly attached to the tractor, the pin is properly secured, and the safety chain is properly installed. Inspect all safety decals for visibility and remove any debris.

Lights and SMV:
Position the SMV emblem with one point of the triangle upward and as near to the rear and centered or as near to the left of center of the unit as practicable. Secure the SMV emblem two to ten feet above the ground measured from the lower edge of the emblem. Before transporting, ensure that all lights, reflectors, and the SMV emblem are clean and visible.

Hardware:
Ensure all hardware is properly fastened according "Bolt Torque Chart" on page 7. Recheck all hardware for tightness after the unit has been operated for several hours. Check that all pins and retaining rings are in good condition. Replace any pins or retaining rings that are worn, damaged or missing.

Hydraulic Hoses:
Ensure hydraulic hoses are not kinked, twisted, or rubbing against sharp edges. Secure hoses to the applicator with nylon tie straps. Check hoses and fittings for hydraulic leaks. Tighten or replace hoses or fittings as necessary.

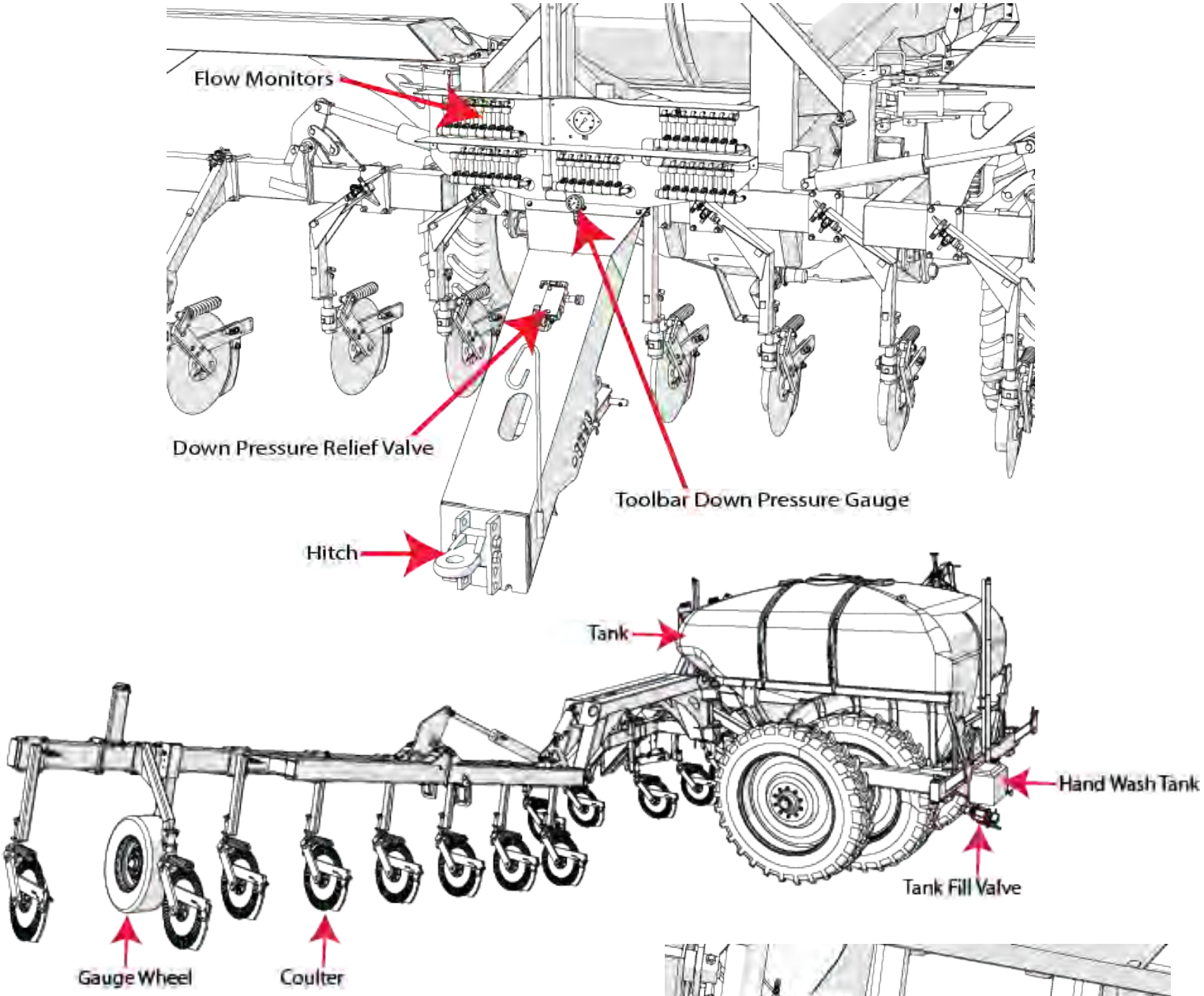
Lubrication:
Lubricate the NitroGro applicator according to the Lubrication Schedule outlined in "Service" on page 33
Tires and Wheels:
Check the tire pressure in the transport and gauge wheel tires and make sure the tire pressure is equal for each tire. Refer to "Operation" on page 16 for tire pressure reccomendations. Tighten standard 3/4" wheel studs and nuts on transport tires to torque 400 ft-lbs and tighten 1/2"-20 studs and nuts on gauge wheels to torque 80 ft-lbs. Check the wheel lug nuts before initial operation and after the unit has been operated for several hours to ensure the lug nuts remain tight.

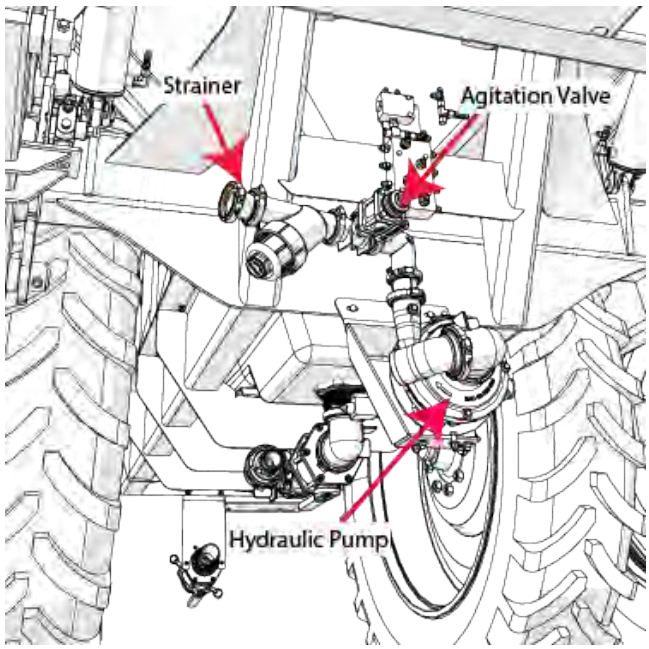
Filling the tank:
⚠ ***Warning: Ensure the applicator is pinned to the tractor before filling tank. The applicator must be pinned to a tractor when any fluid is present in the tank.***
Make sure the area is clear of bystanders when filling the tank. Always wear protective clothing, gloves, and masks when handling fertilizer/chemicals. Follow the fertilizer/chemical manufacturer's instructions when filling the tank. Keep the tank lid on at all times to keep out debris.

Fertilizer Pump:
Raise the toolbar with wings unfolded and turn on the fertilizer pump. Check if liquid is coming out of each knife/injector. Clean or replace knives/injectors if necessary.

Unfolding the Wings:
It is recommended to unfold the side wings in the field. Keep all bystanders away while unfolding the wings. See "Folding & Unfolding" on page 15.

NitroGro Components





Flow Monitors

Flow monitors allow the operator to check for blockages at each coulter with a floating ball inside the transparent inspection tube. Each coulter is connected with a separate supply hose.

Adjusting the Field Depth

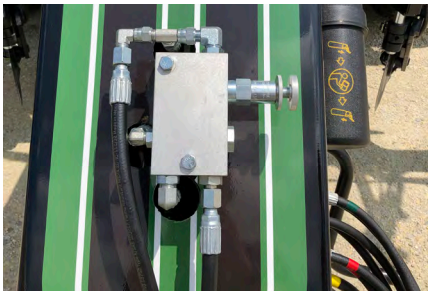
- Set the center section of coulters first. Spacers are included with the toolbar cylinders. Add or remove spacers until the center section is positioned at the appropriate depth. Lower the unit until the lift cylinders bottom out on the stroke control spacers. Add or remove stroke control spacers until the center toolbar section reaches desired application depth. For best results, move forward while lowering the toolbar.
- After the center toolbar is set with the cylinder spacers, adjust the wing gauge wheel setting until the wings are level with the base section and the entire toolbar is flat and even. Once the toolbar is set and leveled, further adjustment is typically not necessary.

Down Pressure Relief Valve and Gauge

The down pressure relief valve provides adjustable hydraulic pressure to force the coulters on the wings into the ground while allowing the wing to flex up and down as needed to follow the contour of the ground.

- Turn clockwise to increase down pressure.
- Turn counter clockwise to decrease down pressure.

⚠ **IMPORTANT -** It is **VERY IMPORTANT NOT TO EXCEED 1,350 psi** of pressure on the down pressure gauge. Doing so may cause damage to the inner wing fold cylinders.



Strainer

The NitroGro applicator is equipped with a strainer designed to remove dirt and debris from the fertilizer to prevent downstream clogs. **Should be cleaned daily.**

Hydraulic PWM Pump

The standard pump for your NitroGro applicator is the Ace FMC-155-HYD-206 with PWM control. The maximum hydraulic fluid input for this pump is 7 gallons per minute. The optional, larger pump available for your applicator is the Ace FMC-750-HYD pump with PWM control. The maximum hydraulic fluid input pump for this pump is 18 gallons per minute.

IMPORTANT - Do not exceed 7 gallons per minute hydraulic fluid input when using the Ace FMC-155-HYD-206 pump or 18 gallons per minute when using the Ace FMC-750-HYD pump. Refer to the pump's operating manual to regulate the hydraulic flow to the pump.

⚠ **WARNING- Failure to regulate oil flow will cause motor failure.**

The hydraulic pump is located below the tank and near the tank outlet to prevent cavitation and provide faster pump priming.

Attach the pump hydraulic hoses to the tractor so the pump operates in the lower/retract position. The pump can then be turned off in the forward "float" position. Turning the pump off in "float" instead of "neutral" allows the hydraulic system pressure to equalize and prevents the occurrence of damaging pressure spikes.

Connect the return line to a low pressure return port, if available. The low pressure return port routes oil directly to the reservoir, minimizing return line pressure. Low return line pressure extends the motor seal life and increases operating efficiency.

Turn the hydraulic flow of the tractor all the way down before you put the hydraulic fertilizer pump into use. The applicator pump only requires 7 GPM of hydraulic flow to make 120 GPM of fertilizer flow. If you don't turn down the tractor hydraulic flow to the pump, damage will occur. (See Set-Up Instructions in the pump manual.)

The PWM valve controls the hydraulic flow to the pump, which creates a variable rate pump. With the PWM valve, the pump controls the rate of fertilizer flow.

⚠ **WARNING - Not a suitable pump for flammable liquids.**

Hand Wash Tank

Nine gallon capacity hand wash tank, which includes built in toolbox, makes cleaning hands after chemical spills quick and easy.

Agitation Valve

If priming becomes an issue, the agitation valve may be opened to allow air to escape from the pump so it can easily primed.

The agitation valve can also be used to evenly mix additives by running the pump with the electronic control valves closed.

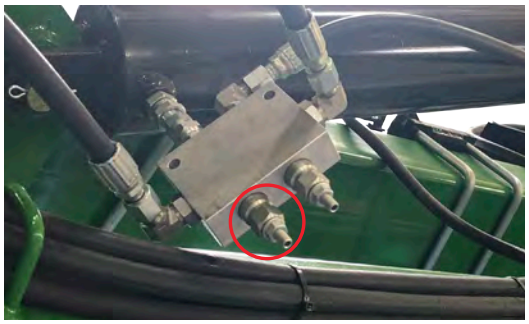
With PWM, the agitation valve may be closed during operation for full pump efficiency.

Coulter

The number of coulters is determined by the number of rows (usually one less or one more). So the number of rows will be even, and the number of coulters will be odd, since you are placing the nitrogen between the rows. For example, a 24 row unit will have either 23 or 25 coulters. A 24 row applicator with 23 coulters is considered a "one-down" unit. Similarly, a 24 row applicator with 25 coulters is considered a "one-up" unit.

Counterbalance Valve

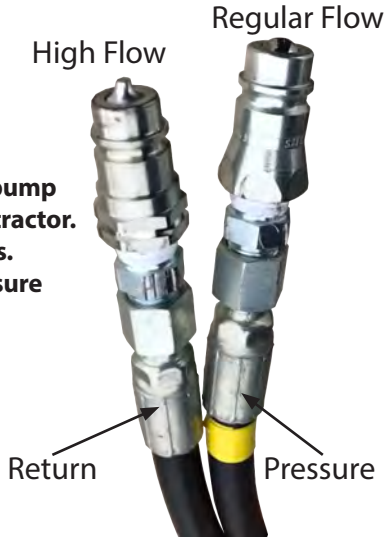
The counterbalance valve keeps the outside wings from creeping up. To tighten the counterbalance valve, turn the allen-head on the counter balance valve closest to the bottom end of the hydraulic cylinder (as shown in the picture to the right) counter-clockwise in 1/2 turn increments until the wings remain locked in place during operation.



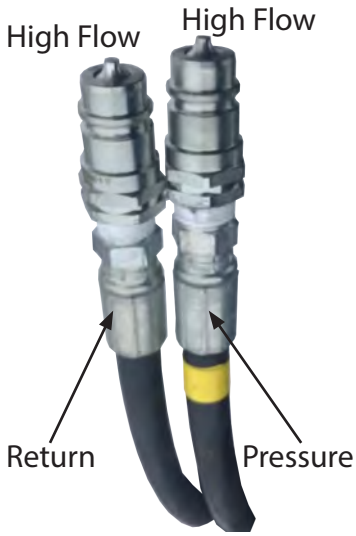
Connecting the Hydraulic Hoses

Connect the hoses so the toolbar raises when the tractor control lever is pulled back and lowered when the control is pushed forward.

Hook up hydraulic lines as follows:
Set #1 - Green Hoses - *Raise & Lower/ Wing Kick/ Down-pressure*
Set #2 - Black Hoses (No Tape) - *Main Fold*
Set #3 - Red Hoses - *Outside Wing and Stub Wing Fold*
Set #4 - Yellow Hoses - *Hydraulic Pump*
IMPORTANT - For the yellow hoses, hook the 1/2" return hose (pump hose without yellow tape) to a low pressure return port on the tractor. If you have a 750 pump, hoses with have high flow pioneer ends. Be sure to use the hose without the yellow tape to the low pressure return port on the tractor.

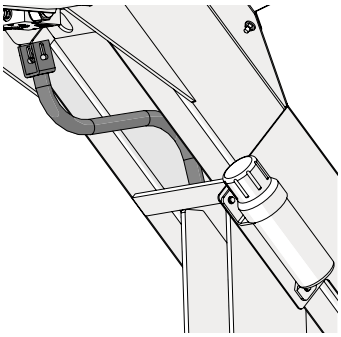


150 Pump Setup



750 Pump Setup

Hitching and Unhitching the Applicator



Connect the applicator to the tow vehicle using a hitch pin and make sure a retaining pin is secured in the hitch pin. Always attach the safety chains to the applicator and the tow vehicle.

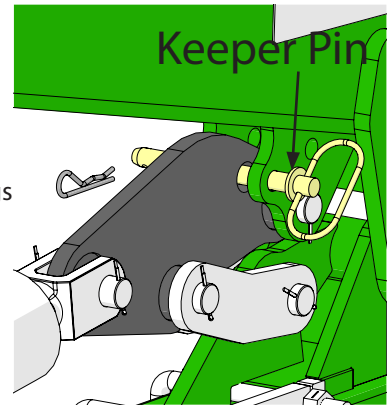
⚠ **WARNING – Before unhooking the applicator, empty contents from tank, block wheels, unpin the jack from storage position, and lock it in the usage position. Lower the jack stand to the ground until the weight of the applicator is transferred to the jack. Keep hands and feet away from the jack stand when lowering.**

Remove the hitch pin and unhook the safety chains.

⚠ **WARNING – Always relieve hydraulic system pressure before disconnecting hoses from tractor or servicing hydraulic system. See the tractor's operating manual for proper procedures. Disconnect the hydraulic hoses. Install dust covers over the hose plugs and outlets.**

When not in use, the jack handle is stored under the tongue, as pictured to the right.

When not in use, lock the stub wing in place with the keeper pin provided. This will keep the stub wings from unfolding when temperatures fluctuate and cause thermal expansion in the hydraulic system.



Initial Operation

Follow these maintenance guidelines during the intial operation of your NitroGro applicator.

First 30 minutes of operation:
1. Ensure all coulters and nozzles are clean and working properly. Clean and adjust accordingly.
2. Check all hydraulic and chemical lines. Be sure none of them are kinked, pinched or leaking. Adjust lines accordingly.
3. Re-torque all of the wheel bolts.
4. Check all other fasteners and hardware. Adjust accordingly.
5. Lubricate all grease fittings.
6. Ensure that outside wings are not creeping up. If needed, adjust the counterbalance valves. Refer to "Counterbalance Valve" on page 13 for instructions.

After 4 hours of operation:
1. Ensure all coulters and nozzles are clean and working properly. Clean and adjust accordingly.
2. Check all hydraulic and chemical lines. Be sure none of them are kinked, pinched or leaking. Adjust lines accordingly.
3. Re-torque all of the wheel bolts.
4. Check all other fasteners and hardware. Adjust accordingly.

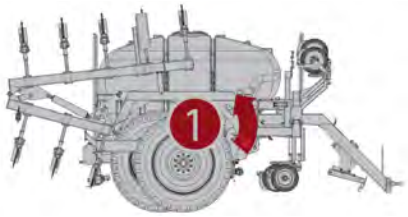
After 10 hours of operation:
1. Ensure all coulters and nozzles are clean and working properly. Clean and adjust accordingly.
2. Check all hydraulic and chemical lines. Be sure none of them are kinked, pinched or leaking. Adjust lines accordingly.
3. Re-torque all of the wheel bolts.
4. Check all other fasteners and hardware, especially the u-bolts that secure the coulters to the toolbar. Tighten if needed.

Upon completing the initial break-in period, begin the standard maintenance schedule as described in "Service" on page 33.

Folding & Unfolding

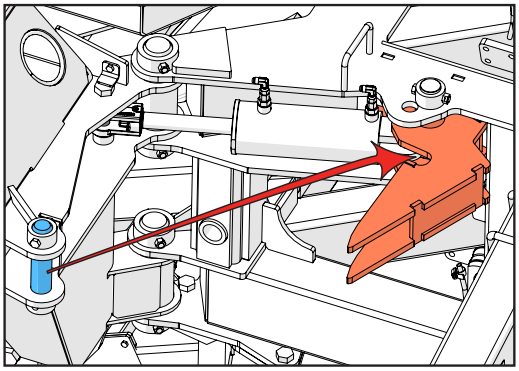
Unfolding

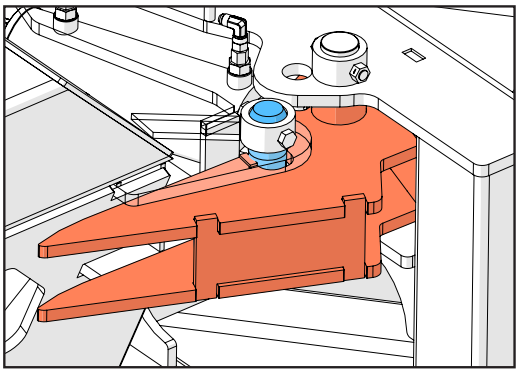
1. Toolbar Completely Up
(Down Pressure Circuit - Green Taped Hoses)



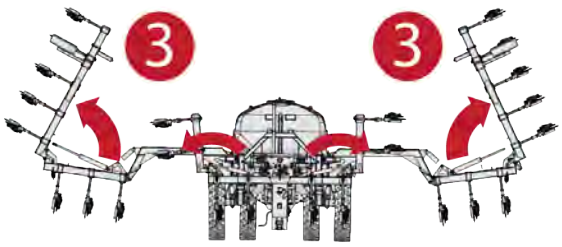
2. Main Toolbar Forward and **Allow Locks to Fully Engage.** Hold hydraulics for 5 seconds once wings fold completely forward. (Toolbar Fold Circuit - Non-Taped Hoses) To be sure locks are fully engaged, and make sure the arrow are aligned for the latches on both sides before field use.

WARNING: Failure to allow locks to fully engage, as pictured below, can cause severe damage to the applicator. Look at the align arrows decal before field use.





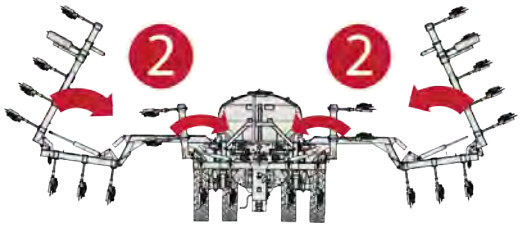
3. Flip Toolbars Out
(Toolbar Flip Circuit - Red Taped Hoses)



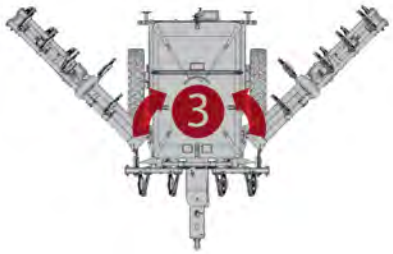
Folding

1. Toolbar Completely Up
(Down Pressure Circuit - Green Taped Hoses)

2. Flip Toolbar In
(Toolbar Flip Circuit - Red Taped Hoses)

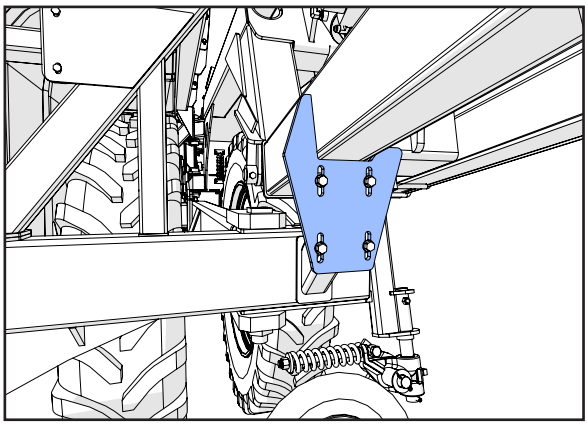


3. Main Toolbar Backwards
(Main Toolbar Fold Circuit - Non-Taped Hoses)



4. Main Toolbar Down
(Down Pressure Circuit - Green Taped Hoses)

WARNING: Ensure wings are resting in wing saddles before transport (as pictured below).



Operation

1. Hook tractor to NitroGro and adjust hitch so that frame on applicator is level or tilting forward slightly.

2. Connect hydraulic lines. See "Connecting the Hydraulic Hoses" on page 13.

3. Unfold the unit. See "Folding & Unfolding" on page 15.

4. Lower the unit until the lift cylinders bottom out on the stroke control spacers. Add or remove stroke control spacers until the center toolbar section reaches desired application depth. For best results, move forward while lowering the toolbar.

5. Adjust the wing gauge wheels so the coulters on the wings are the same depth and the toolbar is level when lowered.

6. Using the desired rate of application (GPA) and speed of application (MPH), reference the supplied sizing charts beginning on page 18 of this manual to determine which orifices or injectors will provide optimal application pressure. Install the orifices or injectors in the check valve unit above each row unit that is mounted on the coulter shaft.
   NOTE – The unit will be either be set up to skip a row ("1 Down"), or re-apply the outside row ("1 Up").
   - **If the unit is set up as "1 Down" (23 or 35 coulters), then the outside coulters on each end of the unit will be 1.5x the rate of the other coulters.**
   - **If the unit is set up as "1 Up" (25 or 37 coutlers), then the outside coulters on each end of the unit will be 0.5x the rate of the other coulters.**

7. Check to make sure tank is clean of all debris inside (shavings from assembly).

8. Put water in the tank and check for leaks.
   IMPORTANT - Before proceeding to the next step, ensure that both the maintenance valve under the tank and the agitation valve is open to allow the pump to prime. NEVER run the pump dry.

9. With the maintenance valve open, perform initial setup of the pump as outlined in the pump operator's manual. After pump set up, recheck the applicator for leaks. For pump setup see "Hydraulic PWM Pump" on page 12.

10. In-field adjustment of hydraulic down-pressure: Adjust so that the coulters stay at desired depth with the least amount of hydraulic pressure necessary.
    IMPORTANT - DO NOT exceed 1,350 psi.

11. Adjust hydraulic flow on the raise and lower/wing kick/down-pressure circuit with the least amount of hydraulic pressure necessary while maintaining a reasonable speed to raise and lower the toolbar. This will prevent excess heat in the hydraulic system as this circuit provides continuous toolbar down-pressure.

12. Fold the wings up for transport. See "Folding & Unfolding" on page 15.
    IMPORTANT - Be sure to fully raise the toolbar before folding the wings up! Failure to do so will result in damage to the unit.

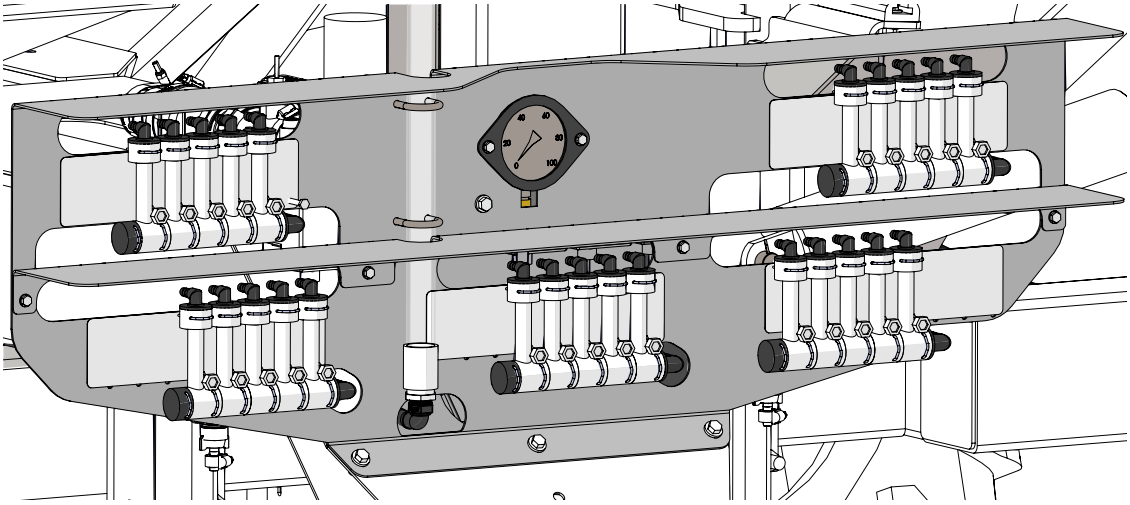
13. TIRE PRESSURE: The following is to be used as a **general guide** for tire inflation for cyclic use. Figures can vary depending on specific brand of tire used. **It is important that tires are inspected before and after operation. The tire should stand up with no side wall buckling or distress as the tire rolls. Do not exceed the tire pressure indicated below:**

Tires for Walking Tandem Dual Wheel Applicators	psi
VF320/105R46 (Alliance) (172D)	29
VF380/90R46 (Alliance) (173D)	25

Tires for Gauge Wheels	psi
ST215-75D14 Carlisle Sport Trail Tire	45

Flow Monitor Set Up

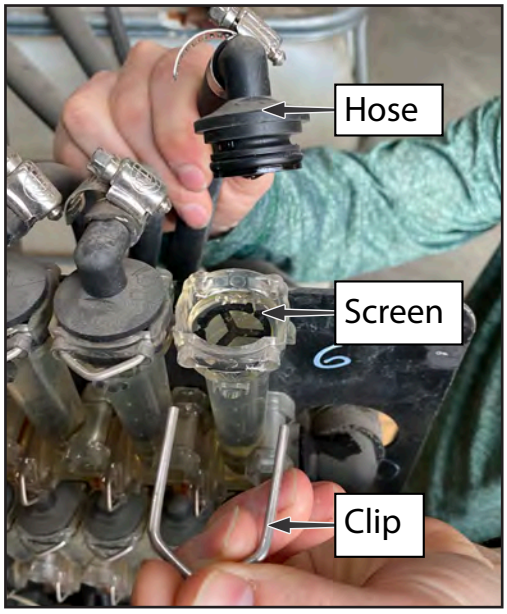
The NitroGro applicator offers row spacing options of 20", 22", or 30". The unit will be either be set up to or re-apply the outside row ("1 Up"), or skip a row ("1 Down"). Using your row spacing and whether your aplicator is "1 Up" or "1 Down", refer to the chart below to determine the location and quantity of flow monitors for your applicator.



Row Spacing	Flow Monitor Manifold Set Up (1 Up)			Flow Monitor Manifold Set Up (1 Down)		
20"/22"	37 Coulters			35 Coulters		
	8		8	7		7
	7	7	7	7	7	7
30"	25 Coulters			23 Coulters		
	5		5	4		4
	5	5	5	5	5	5

Using the charts on pages 18-29, decide which ball is best suited for your desired GPA and Speed. Only choose one ball for all flow monitors. Remove the balls that are not being used. The easiest way to remove the balls is to remove the flow monitors and dump the balls into a box. During this process, keep the hoses organized to ensure they are returned to their original locations when you reassemble the flow monitors.

To install a ball in the flow monitor, remove the clip and pop off the hose on top of the flow monitor. Remove the screen, insert the ball, and return the screen to its original position. **To prevent the ball from entering the hose, ensure the screen is above the ball.** Clip the hose back onto the flow monitor.



Injectors - 20" Row Spacing

	20 Gallons Per Acre									25 Gallons Per Acre								
Speed (MPH)	4	5	6	7	8	9	10	11	12	4	5	6	7	8	9	10	11	12
#10 Injector (psi)		1	7	10	15	19	24	29	33	2	6	13	18	24	29	36	41	47
#15 Injector (psi)					3	6	9	12	16			2	5	9	13	17	20	25
#20 Injector (psi)							2	4	7					2	4	8	10	13
#30 Injector (psi)																		2
#40 Injector (psi)																		
GPM (per nozzle)	0.34	0.43	0.52	0.60	0.69	0.77	0.86	0.95	1.03	0.43	0.54	0.64	0.75	0.86	0.97	1.07	1.18	1.29
Flow Indicator 1/2" SS Ball Level	0.6	0.9	1.2	1.5	1.8	2.1	2.4	2.7	3.0	0.9	1.3	1.7	2.0	2.4	2.8	3.1	3.5	3.9
Flow Indicator 7/16" SS Ball Level						0.1	0.3	0.5	0.7					0.3	0.6	0.9	1.1	1.4

	30 Gallons Per Acre									35 Gallons Per Acre								
Speed (MPH)	4	5	6	7	8	9	10	11	12	4	5	6	7	8	9	10	11	12
#10 Injector (psi)	6	12	20	26	33	39	47	53	61	11	17	27	33	42	49	58	66	74
#15 Injector (psi)		1	6.3	10	15	19	24	29	34	1	5	11	15	21	26	32	37	43
#20 Injector (psi)				2	6	9	13	16	20			3	6	11	14	19	22	27
#30 Injector (psi)							1	4	6					1	3	5	8	11
#40 Injector (psi)																	1	3
GPM (per nozzle)	0.52	0.64	0.77	0.90	1.03	1.16	1.29	1.42	1.55	0.60	0.75	0.90	1.05	1.20	1.35	1.50	1.66	1.81
Flow Indicator 1/2" SS Ball Level	1.2	1.7	2.1	2.5	3.0	3.4	3.9	4.3	4.7	1.5	2.0	2.5	3.0	3.6	4.1	4.6	5.1	5.6
Flow Indicator 7/16" SS Ball Level			0.1	0.4	0.7	1.1	1.4	1.8	2.1			0.4	0.8	1.2	1.6	2.0	2.4	2.8

	40 Gallons Per Acre									45 Gallons Per Acre								
Speed (MPH)	4	5	6	7	8	9	10	11	12	4	5	6	7	8	9	10	11	12
#10 Injector (psi)	15	23	33	41	50	59	70	78	88	20	28	40	48	59	69	81	90	102
#15 Injector (psi)	4	8	15	20	28	33	39	45	52	7	12	20	26	34	40	47	53	61
#20 Injector (psi)		1	6	10	15	19	25	29	33		3	10	14	20	24	30	35	40
#30 Injector (psi)					4	6	9	12	15				2	7	9	13	16	20
#40 Injector (psi)							2	4	6						2	4	7	10
GPM (per nozzle)	0.69	0.86	1.03	1.20	1.38	1.55	1.72	1.89	2.06	0.77	0.97	1.16	1.35	1.55	1.74	1.93	2.13	2.32
Flow Indicator 1/2" SS Ball Level	1.8	2.4	3.0	3.6	4.1	4.7	5.3	5.9	6.5	2.1	2.8	3.4	4.1	4.7	5.4	6.1	6.7	
Flow Indicator 7/16" SS Ball Level		0.3	0.7	1.2	1.6	2.1	2.5	3.0	3.4	0.1	0.6	1.1	1.6	2.1	2.6	3.1	3.6	4.1

NOTES:

- The values highlighted in green indicate pressures that are in the optimal pressure range of 20 - 50 psi. The row spacing is 20 inches.
- Density or viscosity of the liquid can effect operating range.
- A displayed pressure higher than the calculated pressure may be due to a pressure drop in the fertilizer hoses.
- With #10 on the center, use #15 for one and a half rate outside, (35 knife).
- With #15 on the center, use #8 for half rate outside, (37 knife), and #20 for one and a half rate outside, (35 knife).
- With #20 on the center, use #10 for half rate outside, (37 knife), and #30 for one and a half rate outside, (35 knife).
- With #30 on the center, use #15 for half rate outside, (37 knife), and #40 for **one and a third** rate outside, (35 knife).
- With #40 on the center, use #20 for half rate outside, (37 knife), and #60 for one and a half rate outside, (35 knife).

For replacement injectors, see "Coulter Injector Assembly" on page 56.

Injectors - 20" Row Spacing

	50 Gallons Per Acre									55 Gallons Per Acre								
Speed (MPH)	4	5	6	7	8	9	10	11	12	4	5	6	7	8	9	10	11	12
#10 Injector (psi)	24	33	47	56	68	79	93	103	115	29	39	54	64	77	89	104	115	129
#15 Injector (psi)	10	16	24	31	40	46	54	61	70	13	19	29	36	46	53	61	69	79
#20 Injector (psi)	2	6	13	18	24	29	36	41	47	4	9	17	22	29	34	41	47	54
#30 Injector (psi)			2	5	10	13	17	20	24			4	8	13	16	21	25	29
#40 Injector (psi)					2	4	7	10	13					4	7	10	13	17
GPM (per nozzle)	0.86	1.07	1.29	1.50	1.72	1.93	2.15	2.36	2.58	0.95	1.18	1.42	1.66	1.89	2.13	2.36	2.60	2.84
Flow Indicator 1/2" SS Ball Level	2.4	3.1	3.9	4.6	5.3	6.1	6.8			2.7	3.5	4.3	5.1	5.9	6.7			
Flow Indicator 7/16" SS Ball Level	0.3	0.9	1.4	2.0	2.5	3.1	3.7	4.2	4.8	0.5	1.1	1.8	2.4	3.0	3.6	4.2	4.8	5.5

	60 Gallons Per Acre									65 Gallons Per Acre								
Speed (MPH)	4	5	6	7	8	9	10	11	12	4	5	6	7	8	9	10	11	12
#10 Injector (psi)	33	44	60	71	86	99	115	128	143	38	50	67	79	94	109	127	140	156
#15 Injector (psi)	16	23	33	41	53	60	69	78	88	19	26	38	47	59	67	76	86	97
#20 Injector (psi)	6	12	20	26	33	39	47	53	60	8	14	23	30	38	44	53	59	67
#30 Injector (psi)		1	6	10	16	20	25	29	33		3	8	13	19	23	29	33	38
#40 Injector (psi)				2	6	9	13	16	20			1	4	8	12	16	19	23
GPM (per nozzle)	1.03	1.29	1.55	1.81	2.06	2.32	2.58	2.84	3.10	1.12	1.40	1.68	1.96	2.24	2.52	2.79	3.07	3.35
Flow Indicator 1/2" SS Ball Level	3.0	3.9	4.7	5.6	6.5					3.3	4.2	5.2	6.1					
Flow Indicator 7/16" SS Ball Level	0.7	1.4	2.1	2.8	3.4	4.1	4.8	5.5	6.1	1.0	1.7	2.4	3.2	3.9	4.6	5.3	6.1	6.8

	70 Gallons Per Acre									75 Gallons Per Acre								
Speed (MPH)	4	5	6	7	8	9	10	11	12	4	5	6	7	8	9	10	11	12
#10 Injector (psi)	42	55	74	87	103	118	138	152	170	47	60	80	94	112	128	149	165	184
#15 Injector (psi)	22	30	42	52	65	74	84	94	106	25	34	47	57	71	80	91	102	115
#20 Injector (psi)	11	17	27	33	42	49	58	65	74	13	20	30	37	47	54	64	71	80
#30 Injector (psi)	1	5	11	15	22	26	32	37	42	2	6	13	18	25	30	36	41	47
#40 Injector (psi)			3	6	11	14	19	22	27			5	8	13	17	22	26	30
GPM (per nozzle)	1.20	1.50	1.81	2.11	2.41	2.71	3.01	3.31	3.61	1.29	1.61	1.93	2.26	2.58	2.90	3.22	3.55	3.87
Flow Indicator 1/2" SS Ball Level	3.6	4.6	5.6	6.6						3.9	5.0	6.1						
Flow Indicator 7/16" SS Ball Level	1.2	2.0	2.8	3.5	4.3	5.1	5.9	6.7		1.4	2.3	3.1	3.9	4.8	5.6	6.5		

NOTE - The values highlighted in green indicate pressures that are in the optimal pressure range of 20 - 50 psi. The row spacing is 20 inches.

Injectors - 22" Row Spacing

	15 Gallons Per Acre								
Speed (MPH)	4	5	6	7	8	9	10	11	12
#10 Injector (psi)			2	5	9	12	17	20	24
#15 Injector (psi)						1	4	7	9
#20 Injector (psi)									2
#30 Injector (psi)									
#40 Injector (psi)									
GPM (per nozzle)	0.25	0.31	0.38	0.44	0.50	0.57	0.63	0.69	0.75
Flow Indicator Red Glass Ball Level	1.1	1.7	2.2	2.8	3.3	3.8	4.4	4.9	5.5
Flow Indicator 1/2" SS Level	0.3	0.5	0.7	1.0	1.2	1.4	1.6	1.8	2.0

	20 Gallons Per Acre									25 Gallons Per Acre								
Speed (MPH)	4	5	6	7	8	9	10	11	12	4	5	6	7	8	9	10	11	12
#10 Injector (psi)		3	9	13	19	23	29	34	39	4	9	17	22	28	34	41	47	54
#15 Injector (psi)				2	5	8	12	15	19			4	7	12	16	21	24	29
#20 Injector (psi)						1	4	7	9					4	7	10	13	17
#30 Injector (psi)																	2	4
#40 Injector (psi)																		
GPM (per nozzle)	0.38	0.47	0.57	0.66	0.76	0.85	0.95	1.04	1.14	0.47	0.59	0.71	0.83	0.95	1.06	1.18	1.30	1.42
Flow Indicator 1/2" SS Ball Level	0.8	1.1	1.4	1.7	2.0	2.4	2.7	3.0	3.3	1.1	1.5	1.9	2.3	2.7	3.1	3.5	3.9	4.3
Flow Indicator 7/16" SS Ball Level					0.0	0.3	0.5	0.8	1.0				0.2	0.5	0.8	1.1	1.4	1.8

	30 Gallons Per Acre									35 Gallons Per Acre								
Speed (MPH)	4	5	6	7	8	9	10	11	12	4	5	6	7	8	9	10	11	12
#10 Injector (psi)	9	15	24	30	38	45	54	61	69	14	21	31	39	48	56	66	74	84
#15 Injector (psi)		3	9	13	19	23	29	33	39	3	7	14	19	26	31	37	42	49
#20 Injector (psi)			2	5	9	12	17	20	24			5	9	14	18	23	27	31
#30 Injector (psi)						1	4	6	9					3	5	8	11	14
#40 Injector (psi)									2							1	3	5
GPM (per nozzle)	0.57	0.71	0.85	0.99	1.14	1.28	1.42	1.56	1.70	0.66	0.83	0.99	1.16	1.32	1.49	1.66	1.82	1.99
Flow Indicator 1/2" SS Ball Level	1.4	1.9	2.4	2.8	3.3	3.8	4.3	4.8	5.3	1.7	2.3	2.8	3.4	4.0	4.5	5.1	5.7	6.2
Flow Indicator 7/16" SS Ball Level			0.3	0.6	1.0	1.4	1.8	2.1	2.5		0.2	0.6	1.1	1.5	1.9	2.4	2.8	3.2

NOTES:

- The values highlighted in green indicate pressures that are in the optimal pressure range of 20 - 50 psi. The row spacing is 22 inches.
- Density or viscosity of the liquid can effect operating range.
- A displayed pressure higher than the calculated pressure may be due to a pressure drop in the fertilizer hoses.
- With #10 on the center, use #15 for one and a half rate outside, (35 knife).
- With #15 on the center, use #8 for half rate outside, (37 knife), and #20 for one and a half rate outside, (35 knife).
- With #20 on the center, use #10 for half rate outside, (37 knife), and #30 for one and a half rate outside, (35 knife).
- With #30 on the center, use #15 for half rate outside, (37 knife), and #40 for **one and a third** rate outside, (35 knife).
- With #40 on the center, use #20 for half rate outside, (37 knife), and #60 for one and a half rate outside, (35 knife).

For replacement injectors, see "Coulter Injector Assembly" on page 56.

Injectors - 22" Row Spacing

	40 Gallons Per Acre									45 Gallons Per Acre								
Speed (MPH)	4	5	6	7	8	9	10	11	12	4	5	6	7	8	9	10	11	12
#10 Injector (psi)	19	27	39	47	57	67	79	88	99	24	33	46	55	67	78	91	102	114
#15 Injector (psi)	6	11	19	25	33	38	45	51	59	9	15	24	30	40	46	53	60	69
#20 Injector (psi)		3	9	13	19	23	29	34	39	1	6	13	18	24	29	35	40	46
#30 Injector (psi)				2	6	9	12	15	19			1	5	9	12	17	20	24
#40 Injector (psi)						1	4	6	9					1	4	7	10	13
GPM (per nozzle)	0.76	0.95	1.14	1.32	1.51	1.70	1.89	2.08	2.27	0.85	1.06	1.28	1.49	1.70	1.92	2.13	2.34	2.55
Flow Indicator 1/2" SS Ball Level	2.0	2.7	3.3	4.0	4.6	5.3	5.9	6.6		2.4	3.1	3.8	4.5	5.3	6.0	6.7		
Flow Indicator 7/16" SS Ball Level		0.5	1.0	1.5	2.0	2.5	3.0	3.5	4.0	0.3	0.8	1.4	1.9	2.5	3.0	3.6	4.2	4.7

	50 Gallons Per Acre									55 Gallons Per Acre								
Speed (MPH)	4	5	6	7	8	9	10	11	12	4	5	6	7	8	9	10	11	12
#10 Injector (psi)	29	39	54	64	77	89	104	115	129	34	45	61	72	87	100	116	129	144
#15 Injector (psi)	13	19	29	36	46	53	61	69	79	16	23	34	42	53	61	70	78	89
#20 Injector (psi)	4	9	17	22	29	34	41	47	54	6	12	20	26	34	40	48	54	61
#30 Injector (psi)			4	8	13	16	21	25	29		1	6	10	16	20	25	29	34
#40 Injector (psi)					4	7	10	13	17				3	6	9	13	16	20
GPM (per nozzle)	0.95	1.18	1.42	1.66	1.89	2.13	2.36	2.60	2.84	1.04	1.30	1.56	1.82	2.08	2.34	2.60	2.86	3.12
Flow Indicator 1/2" SS Ball Level	2.7	3.5	4.3	5.1	5.9	6.7				3.0	3.9	4.8	5.7	6.6				
Flow Indicator 7/16" SS Ball Level	0.5	1.1	1.8	2.4	3.0	3.6	4.2	4.8	5.5	0.8	1.4	2.1	2.8	3.5	4.2	4.8	5.5	6.2

	60 Gallons Per Acre									65 Gallons Per Acre								
Speed (MPH)	4	5	6	7	8	9	10	11	12	4	5	6	7	8	9	10	11	12
#10 Injector (psi)	39	51	68	80	96	110	129	143	159	44	57	76	89	106	121	141	156	174
#15 Injector (psi)	19	27	39	48	60	68	78	87	99	23	31	44	53	67	76	86	96	109
#20 Injector (psi)	9	15	24	30	39	45	54	60	68	11	18	28	35	44	51	60	67	76
#30 Injector (psi)		3	9	13	19	24	29	34	39	1	5	11	16	23	27	34	38	44
#40 Injector (psi)			2	5	9	12	16	20	24			4	7	11	15	20	23	28
GPM (per nozzle)	1.14	1.42	1.70	1.99	2.27	2.55	2.84	3.12	3.41	1.23	1.54	1.84	2.15	2.46	2.77	3.07	3.38	3.69
Flow Indicator 1/2" SS Ball Level	3.3	4.3	5.3	6.2						3.7	4.7	5.7	6.8					
Flow Indicator 7/16" SS Ball Level	1.0	1.8	2.5	3.2	4.0	4.7	5.5	6.2	6.9	1.3	2.1	2.9	3.7	4.5	5.3	6.1	6.9	

	70 Gallons Per Acre									75 Gallons Per Acre								
Speed (MPH)	4	5	6	7	8	9	10	11	12	4	5	6	7	8	9	10	11	12
#10 Injector (psi)	49	63	83	97	116	132	154	170	189	54	68	91	106	125	143	166	183	204
#15 Injector (psi)	26	35	49	59	74	83	94	105	119	29	39	54	65	81	91	102	114	129
#20 Injector (psi)	14	21	32	39	49	56	66	74	83	16	24	35	43	54	62	72	81	91
#30 Injector (psi)	3	7	14	19	26	31	38	43	49	4	9	16	22	29	35	42	47	54
#40 Injector (psi)			5	9	14	18	23	27	32		2	7	11	16	21	26	30	35
GPM (per nozzle)	1.32	1.66	1.99	2.32	2.65	2.98	3.31	3.64	3.97	1.42	1.77	2.13	2.48	2.84	3.19	3.55	3.90	4.26
Flow Indicator 1/2" SS Ball Level	4.0	5.1	6.2							4.3	5.5	6.7						
Flow Indicator 7/16" SS Ball Level	1.5	2.4	3.2	4.1	5.0	5.8	6.7			1.8	2.7	3.6	4.5	5.5	6.4			

NOTE - The values highlighted in green indicate pressures that are in the optimal pressure range of 20 - 50 psi. The row spacing is 22 inches.

Injectors - 30" Row Spacing

	15 Gallons Per Acre								
Speed (MPH)	4	5	6	7	8	9	10	11	12
#10 Injector (psi)		4	10	14	20	24	30	35	40
#15 Injector (psi)				2	6	9	13	16	20
#20 Injector (psi)						2	5	7	10
#30 Injector (psi)									
#40 Injector (psi)									
GPM (per nozzle)	0.34	0.43	0.51	0.60	0.68	0.77	0.86	0.94	1.03
Flow Indicator Red Glass Ball Level	1.9	2.7	3.4	4.1	4.9	5.6	6.4		
Flow Indicator 1/2" SS Ball Level	0.6	0.9	1.2	1.5	1.8	2.1	2.4	2.7	3.0
Flow Indicator 7/16" SS Ball Level						0.1	0.3	0.5	0.7

	20 Gallons Per Acre									25 Gallons Per Acre								
Speed (MPH)	4	5	6	7	8	9	10	11	12	4	5	6	7	8	9	10	11	12
#10 Injector (psi)	6	12	20	26	33	39	47	53	61	13	20	30	37	46	54	64	72	81
#15 Injector (psi)		1	6	10	15	19	24	29	34	2	6	13	18	25	30	35	41	47
#20 Injector (psi)				2	6	9	13	16	20			5	8	13	17	22	26	30
#30 Injector (psi)							1	4	6					2	4	7	10	13
#40 Injector (psi)																	2	5
GPM (per nozzle)	0.52	0.64	0.77	0.90	1.03	1.16	1.29	1.42	1.55	0.64	0.81	0.97	1.13	1.29	1.45	1.61	1.77	1.93
Flow Indicator 1/2" SS Ball Level	1.2	1.7	2.1	2.5	3.0	3.4	3.9	4.3	4.7	1.7	2.2	2.8	3.3	3.9	4.4	5.0	5.5	6.1
Flow Indicator 7/16" SS Ball Level			0.1	0.4	0.7	1.1	1.4	1.8	2.1		0.2	0.6	1.0	1.4	1.8	2.3	2.7	3.1

	30 Gallons Per Acre									35 Gallons Per Acre								
Speed (MPH)	4	5	6	7	8	9	10	11	12	4	5	6	7	8	9	10	11	12
#10 Injector (psi)	20	28	40	48	59	69	81	90	102	27	36	50	60	72	84	98	109	122
#15 Injector (psi)	7	12	20	26	36	40	47	53	61	11	17	27	34	43	50	58	65	75
#20 Injector (psi)		3	10	14	20	24	30	35	40	3	8	15	20	27	32	39	44	50
#30 Injector (psi)				2	7	9	13	16	20			3	6	11	15	19	22	27
#40 Injector (psi)						2	4	7	10					3	5	9	11	15
GPM (per nozzle)	0.77	0.97	1.16	1.35	1.55	1.74	1.93	2.13	2.32	0.90	1.13	1.35	1.58	1.81	2.03	2.26	2.48	2.71
Flow Indicator 1/2" SS Ball Level	2.1	2.8	3.4	4.1	4.7	5.4	6.1	6.7		2.5	3.3	4.1	4.8	5.6	6.4			
Flow Indicator 7/16" SS Ball Level	0.1	0.6	1.1	1.6	2.1	2.6	3.1	3.6	4.1	0.4	1.0	1.6	2.2	2.8	3.4	3.9	4.5	5.1

NOTES:

- The values highlighted in green indicate pressures that are in the optimal pressure range of 20 - 50 psi. The row spacing is 30 inches.
- Density or viscosity of the liquid can effect operating range.
- A displayed pressure higher than the calculated pressure may be due to a pressure drop in the fertilizer hoses.
- With #10 on the center, use #15 for one and a half rate outside, (23 knife).
- With #15 on the center, use #8 for half rate outside, (25 knife), and #20 for one and a half rate outside, (23 knife).
- With #20 on the center, use #10 for half rate outside, (25 knife), and #30 for one and a half rate outside, (23 knife).
- With #30 on the center, use #15 for half rate outside, (25 knife), and #40 for **one and a third** rate outside, (23 knife).
- With #40 on the center, use #20 for half rate outside, (25 knife), and #60 for one and a half rate outside, (23 knife).

For replacement injectors, see "Coulter Injector Assembly" on page 56.

Injectors - 30" Row Spacing

	40 Gallons Per Acre									45 Gallons Per Acre								
Speed (MPH)	4	5	6	7	8	9	10	11	12	4	5	6	7	8	9	10	11	12
#10 Injector (psi)	33	44	60	71	86	99	115	128	143	40	52	70	83	99	113	132	146	163
#15 Injector (psi)	16	23	33	41	53	60	69	78	88	20	28	40	49	62	70	80	90	102
#20 Injector (psi)	6	12	20	26	33	39	47	53	60	10	16	25	32	40	47	55	62	70
#30 Injector (psi)		1	6	10	16	20	25	29	33		4	10	14	20	25	31	35	40
#40 Injector (psi)				2	6	9	13	16	20			2	5	10	13	17	21	25
GPM (per nozzle)	1.03	1.29	1.55	1.81	2.06	2.32	2.58	2.84	3.10	1.16	1.45	1.74	2.03	2.32	2.61	2.90	3.19	3.48
Flow Indicator 1/2" SS Ball Level	3.0	3.9	4.7	5.6	6.5					3.4	4.4	5.4	6.4					
Flow Indicator 7/16" SS Ball Level	0.7	1.4	2.1	2.8	3.4	4.1	4.8	5.5	6.1	1.1	1.8	2.6	3.4	4.1	4.9	5.6	6.4	

	50 Gallons Per Acre									55 Gallons Per Acre								
Speed (MPH)	4	5	6	7	8	9	10	11	12	4	5	6	7	8	9	10	11	12
#10 Injector (psi)	47	60	80	94	112	128	149	165	184	54	68	91	106	125	143	166	183	204
#15 Injector (psi)	25	34	47	57	71	80	91	102	115	29	39	54	65	81	91	102	114	129
#20 Injector (psi)	13	20	30	37	47	54	64	71	80	16	24	35	43	54	62	72	81	91
#30 Injector (psi)	2	6	13	18	25	30	36	41	47	4	9	16	22	29	35	42	47	54
#40 Injector (psi)			5	8	13	17	22	26	30		2	7	11	16	21	26	30	35
GPM (per nozzle)	1.29	1.61	1.93	2.26	2.58	2.90	3.22	3.55	3.87	1.42	1.77	2.13	2.48	2.84	3.19	3.55	3.90	4.26
Flow Indicator 1/2" SS Ball Level	3.9	5.0	6.1							4.3	5.5	6.7						
Flow Indicator 7/16" SS Ball Level	1.4	2.3	3.1	3.9	4.8	5.6	6.5			1.8	2.7	3.6	4.5	5.5	6.4			

	60 Gallons Per Acre									65 Gallons Per Acre								
Speed (MPH)	4	5	6	7	8	9	10	11	12	4	5	6	7	8	9	10	11	12
#10 Injector (psi)	60	77	101	117	138	158	183	202	224	67	85	111	128	152	173	200	221	245
#15 Injector (psi)	34	45	60	73	90	101	113	127	142	38	50	67	81	100	111	124	139	156
#20 Injector (psi)	20	28	40	49	60	69	81	90	101	23	32	46	55	67	77	89	99	111
#30 Injector (psi)	7	12	20	26	34	40	48	54	60	9	15	23	30	38	45	54	60	67
#40 Injector (psi)		4	10	14	20	24	30	35	40	1	6	12	17	23	28	34	40	46
GPM (per nozzle)	1.55	1.93	2.32	2.71	3.10	3.48	3.87	4.26	4.64	1.68	2.10	2.52	2.93	3.35	3.77	4.19	4.61	5.03
Flow Indicator 1/2" SS Ball Level	4.7	6.1																
Flow Indicator 7/16" SS Ball Level	2.1	3.1	4.1	5.1	6.1					2.4	3.5	4.6	5.7	6.8				

	70 Gallons Per Acre									75 Gallons Per Acre								
Speed (MPH)	4	5	6	7	8	9	10	11	12	4	5	6	7	8	9	10	11	12
#10 Injector (psi)	74	93	121	140	165	188	217	239	265	81	101	131	151	178	203	234	258	286
#15 Injector (psi)	43	55	74	89	109	121	136	151	170	48	61	81	96	118	131	147	163	183
#20 Injector (psi)	27	36	51	61	74	84	98	108	121	30	40	56	67	81	92	106	117	131
#30 Injector (psi)	11	17	27	34	43	50	60	66	74	13	20	30	38	48	55	66	73	81
#40 Injector (psi)	3	8	15	20	27	32	39	44	51	5	10	18	23	30	36	43	49	56
GPM (per nozzle)	1.81	2.26	2.71	3.16	3.61	4.06	4.51	4.97	5.42	1.93	2.42	2.90	3.39	3.87	4.35	4.84	5.32	5.80
Flow Indicator 7/16" SS Ball Level	2.8	3.9	5.1	6.3						3.1	4.4	5.6	6.9					

NOTE - The values highlighted in green indicate pressures that are in the optimal pressure range of 20 - 50 psi. The row spacing is 30 inches.

Knife - 20" Row Spacing

	10 Gallons Per Acre									15 Gallons Per Acre								
Speed (MPH)	4	5	6	7	8	9	10	11	12	4	5	6	7	8	9	10	11	12
0.075 Orifice Pressure (psi)				3	6	10	13	17	20		5	10	15	20	25	31	36	41
0.107 Orifice Pressure (psi)																2	4	7
0.132 Orifice Pressure (psi)																		
0.161 Orifice Pressure (psi)																		
GPM (per nozzle)	0.15	0.19	0.23	0.27	0.30	0.34	0.38	0.42	0.46	0.23	0.29	0.34	0.40	0.46	0.51	0.57	0.63	0.68
Flow Indicator Red Glass Ball Level	0.3	0.6	0.9	1.3	1.6	1.9	2.2	2.6	2.9	0.9	1.4	1.9	2.4	2.9	3.4	3.9	4.4	4.9
Flow Indicator 1/2" SS Level		0.1	0.2	0.4	0.5	0.6	0.8	0.9	1.0	0.2	0.4	0.6	0.8	1.0	1.2	1.4	1.6	1.8

	20 Gallons Per Acre									25 Gallons Per Acre								
Speed (MPH)	4	5	6	7	8	9	10	11	12	4	5	6	7	8	9	10	11	12
0.075 Orifice Pressure (psi)	6	13	20	27	34	41	48	55	62	13	22	31	39	48	57	65	74	82
0.107 Orifice Pressure (psi)					4	7	10	14	17				6	10	15	19	23	27
0.132 Orifice Pressure (psi)									5						3	6	9	12
0.161 Orifice Pressure (psi)																		
GPM (per nozzle)	0.30	0.38	0.46	0.53	0.61	0.68	0.76	0.84	0.91	0.38	0.48	0.57	0.67	0.76	0.86	0.95	1.05	1.14
Flow Indicator Red Glass Ball Level	1.6	2.2	2.9	3.6	4.2	4.9	5.5	6.2	6.9	2.2	3.1	3.9	4.7	5.5	6.4			
Flow Indicator 1/2" SS Ball Level	0.5	0.8	1.0	1.3	1.5	1.8	2.1	2.3	2.6	0.8	1.1	1.4	1.7	2.1	2.4	2.7	3.0	3.3
Flow Indicator 7/16" SS Ball Level								0.2	0.4						0.3	0.5	0.8	1.0

	30 Gallons Per Acre									35 Gallons Per Acre								
Speed (MPH)	4	5	6	7	8	9	10	11	12	4	5	6	7	8	9	10	11	12
0.075 Orifice Pressure (psi)	20	31	41	51	62	72	82	93	103	27	39	51	63	76	88	100	112	124
0.107 Orifice Pressure (psi)		2	7	12	17	22	27	32	37		6	12	18	24	30	36	42	48
0.132 Orifice Pressure (psi)					5	8	12	15	18				6	9	13	17	21	25
0.161 Orifice Pressure (psi)								3	5							5	7	10
GPM (per nozzle)	0.46	0.57	0.68	0.80	0.91	1.03	1.14	1.26	1.37	0.53	0.67	0.80	0.93	1.07	1.20	1.33	1.46	1.60
Flow Indicator Red Glass Ball Level	2.9	3.9	4.9	5.9	6.9													
Flow Indicator 1/2" SS Ball Level	1.0	1.4	1.8	2.2	2.6	3.0	3.3	3.7	4.1	1.3	1.7	2.2	2.6	3.1	3.5	4.0	4.5	4.9
Flow Indicator 7/16" SS Ball Level				0.1	0.4	0.7	1.0	1.3	1.6			0.1	0.5	0.8	1.2	1.5	1.9	2.2

NOTES:

- Values highlighted in green indicate pressures that are within the optimal range of 20 - 50 psi. The row spacing is 20 inches.
- Density or viscosity of the liquid can effect operating range.
- A displayed pressure higher than the calculated pressure may be due to a pressure drop in the fertilizer hoses.
- With .075 on the center, use .054 for half rate outside (37 knife) and .093 for one and a half rate outside (35 knife).
- With .107 on the center, use .075 for half rate outside (37 knife) and .132 for one and a half rate outside (35 knife).
- With .132 on the center, use .093 for half rate outside (37 knife) and .161 for one and a half rate outside (35 knife).
- With .161 on the center, use .107 for half rate outside (37 knife) and .196 for one and a half rate outside (35 knife).

For replacement orifices, see "Check Valve" on page 53.

Kit	**0.075**	**0.093**	**0.107**	**0.132**	**0.161**	**0.196**
35 Knife	0	0	33	33	33	2
37 Knife	2	2	35	35	35	0

Knife - 20" Row Spacing

	40 Gallons Per Acre									45 Gallons Per Acre								
Speed (MPH)	4	5	6	7	8	9	10	11	12	4	5	6	7	8	9	10	11	12
0.075 Orifice Pressure (psi)	34	48	62	76	89	103	117	131	145	41	57	72	88	103	119	134	150	165
0.107 Orifice Pressure (psi)	4	10	17	24	31	37	44	51	58	7	15	22	30	37	45	53	60	68
0.132 Orifice Pressure (psi)			5	9	14	18	23	27	31		3	8	13	18	23	28	33	38
0.161 Orifice Pressure (psi)						5	8	11	14					5	9	12	15	18
GPM (per nozzle)	0.61	0.76	0.91	1.07	1.22	1.37	1.52	1.67	1.83	0.68	0.86	1.03	1.20	1.37	1.54	1.71	1.88	2.05
Flow Indicator 1/2" SS Ball Level	1.5	2.1	2.6	3.1	3.6	4.1	4.6	5.2	5.7	1.8	2.4	3.0	3.5	4.1	4.7	5.3	5.9	6.5
Flow Indicator 7/16" SS Ball Level			0.4	0.8	1.2	1.6	2.0	2.4	2.8		0.3	0.7	1.2	1.6	2.1	2.5	3.0	3.4

	50 Gallons Per Acre									55 Gallons Per Acre								
Speed (MPH)	4	5	6	7	8	9	10	11	12	4	5	6	7	8	9	10	11	12
0.075 Orifice Pressure (psi)	48	65	82	100	117	134	152	169	186	55	74	93	112	131	150	169	188	207
0.107 Orifice Pressure (psi)	10	19	27	36	44	53	61	70	78	14	23	32	42	51	60	70	79	88
0.132 Orifice Pressure (psi)		6	12	17	23	28	33	39	44		9	15	21	27	33	39	45	51
0.161 Orifice Pressure (psi)				5	8	12	16	19	23			3	7	11	15	19	23	27
GPM (per nozzle)	0.76	0.95	1.14	1.33	1.52	1.71	1.90	2.09	2.28	0.84	1.05	1.26	1.46	1.67	1.88	2.09	2.30	2.51
Flow Indicator 1/2" SS Ball Level	2.1	2.7	3.3	4.0	4.6	5.3	5.9	6.6		2.3	3.0	3.7	4.5	5.2	5.9	6.6		
Flow Indicator 7/16" SS Ball Level	0.0	0.5	1.0	1.5	2.0	2.5	3.0	3.5	4.0	0.2	0.8	1.3	1.9	2.4	3.0	3.5	4.1	4.6

	60 Gallons Per Acre									65 Gallons Per Acre								
Speed (MPH)	4	5	6	7	8	9	10	11	12	4	5	6	7	8	9	10	11	12
0.075 Orifice Pressure (psi)	62	82	103	124	145	165	186	207	228	69	91	114	136	158	181	203	226	248
0.107 Orifice Pressure (psi)	17	27	37	48	58	68	78	88	99	21	32	43	54	65	76	87	98	109
0.132 Orifice Pressure (psi)	5	12	18	25	31	38	44	51	58	7	14	21	29	36	43	50	57	64
0.161 Orifice Pressure (psi)			5	10	14	18	23	27	32			7	12	17	22	27	31	36
GPM (per nozzle)	0.91	1.14	1.37	1.60	1.83	2.05	2.28	2.51	2.74	0.99	1.24	1.48	1.73	1.98	2.23	2.47	2.72	2.97
Flow Indicator 1/2" SS Ball Level	2.6	3.3	4.1	4.9	5.7	6.5				2.8	3.7	4.5	5.4	6.2				
Flow Indicator 7/16" SS Ball Level	0.4	1.0	1.6	2.2	2.8	3.4	4.0	4.6	5.2	0.6	1.3	1.9	2.6	3.2	3.9	4.5	5.1	5.8

	70 Gallons Per Acre									75 Gallons Per Acre								
Speed (MPH)	4	5	6	7	8	9	10	11	12	4	5	6	7	8	9	10	11	12
0.075 Orifice Pressure (psi)	76	100	124	148	172	196	221	245	269	82	108	134	160	186	212	238	264	290
0.107 Orifice Pressure (psi)	24	36	48	60	71	83	95	107	119	27	40	53	66	78	91	104	116	129
0.132 Orifice Pressure (psi)	9	17	25	32	40	48	55	63	71	12	20	28	36	44	53	61	69	77
0.161 Orifice Pressure (psi)		5	10	15	20	25	30	35	40		6	12	17	23	28	34	39	45
GPM (per nozzle)	1.07	1.33	1.60	1.86	2.13	2.40	2.66	2.93	3.20	1.14	1.43	1.71	2.00	2.28	2.57	2.85	3.14	3.42
Flow Indicator 1/2" SS Ball Level	3.1	4.0	4.9	5.8	6.7					3.3	4.3	5.3	5.3	6.3				
Flow Indicator 7/16" SS Ball Level	0.8	1.5	2.2	2.9	3.6	4.3	5.0	5.7	6.4	1.0	1.8	2.5	3.3	4.0	4.7	5.5	6.2	7.0

NOTE - The values highlighted in green indicate pressures that are in the optimal pressure range of 20 - 50 psi. The row spacing is 20 inches.

Knife - 22" Row Spacing

	10 Gallons Per Acre									15 Gallons Per Acre								
Speed (MPH)	4	5	6	7	8	9	10	11	12	4	5	6	7	8	9	10	11	12
0.075 Orifice Pressure (psi)			2	5	9	13	17	21	24	2	7	13	19	24	30	36	41	47
0.107 Orifice Pressure (psi)															2	4	7	10
0.132 Orifice Pressure (psi)																		
0.161 Orifice Pressure (psi)																		
GPM (per nozzle)	0.17	0.21	0.25	0.29	0.33	0.38	0.42	0.46	0.50	0.25	0.31	0.38	0.44	0.50	0.57	0.63	0.69	0.75
Flow Indicator Red Glass Ball Level	0.4	0.8	1.1	1.5	1.8	2.2	2.6	2.9	3.3	1.1	1.7	2.2	2.8	3.3	3.8	4.4	4.9	5.5
Flow Indicator 1/2" SS Level		0.2	0.3	0.5	0.6	0.7	0.9	1.0	1.2	0.3	0.5	0.7	1.0	1.2	1.4	1.6	1.8	2.0

	20 Gallons Per Acre									25 Gallons Per Acre								
Speed (MPH)	4	5	6	7	8	9	10	11	12	4	5	6	7	8	9	10	11	12
0.075 Orifice Pressure (psi)	9	17	24	32	40	47	55	62	70	17	26	36	45	55	64	74	83	93
0.107 Orifice Pressure (psi)					6	10	14	17	21			4	9	14	18	23	28	32
0.132 Orifice Pressure (psi)								5	8					3	6	9	12	15
0.161 Orifice Pressure (psi)																		3
GPM (per nozzle)	0.33	0.42	0.50	0.59	0.67	0.75	0.84	0.92	1.00	0.42	0.52	0.63	0.73	0.84	0.94	1.05	1.15	1.26
Flow Indicator Red Glass Ball Level	1.8	2.6	3.3	4.0	4.8	5.5	6.2	6.9	7.7	2.6	3.5	4.4	5.3	6.2				
Flow Indicator 1/2" SS Ball Level	0.6	0.9	1.2	1.5	1.7	2.0	2.3	2.6	2.9	0.9	1.2	1.6	2.0	2.3	2.7	3.0	3.4	3.7
Flow Indicator 7/16" SS Ball Level							0.2	0.5	0.7					0.2	0.5	0.8	1.1	1.3

	30 Gallons Per Acre									35 Gallons Per Acre								
Speed (MPH)	4	5	6	7	8	9	10	11	12	4	5	6	7	8	9	10	11	12
0.075 Orifice Pressure (psi)	24	36	47	59	70	81	93	104	116	32	45	59	72	85	98	112	125	138
0.107 Orifice Pressure (psi)		4	10	16	21	27	32	38	44		9	16	22	29	35	42	48	55
0.132 Orifice Pressure (psi)				4	8	11	15	18	22			4	8	12	17	21	25	29
0.161 Orifice Pressure (psi)							3	5	8						4	7	10	13
GPM (per nozzle)	0.50	0.63	0.75	0.88	1.00	1.13	1.26	1.38	1.51	0.59	0.73	0.88	1.03	1.17	1.32	1.46	1.61	1.76
Flow Indicator Red Glass Ball Level	3.3	4.4	5.5	6.6														
Flow Indicator 1/2" SS Ball Level	1.2	1.6	2.0	2.5	2.9	3.3	3.7	4.2	4.6	1.5	2.0	2.5	3.0	3.5	4.0	4.5	5.0	5.4
Flow Indicator 7/16" SS Ball Level				0.3	0.7	1.0	1.3	1.7	2.0			0.3	0.7	1.1	1.5	1.9	2.3	2.6

NOTES:

- Values highlighted in green indicate pressures that are within the optimal range of 20 - 50 psi. The row spacing is 22 inches.
- Density or viscosity of the liquid can effect operating range.
- A displayed pressure higher than the calculated pressure may be due to a pressure drop in the fertilizer hoses.
- With .075 on the center, use .054 for half rate outside (37 knife) and .093 for one and a half rate outside (35 knife).
- With .107 on the center, use .075 for half rate outside (37 knife) and .132 for one and a half rate outside (35 knife).
- With .132 on the center, use .093 for half rate outside (37 knife) and .161 for one and a half rate outside (35 knife).
- With .161 on the center, use .107 for half rate outside (37 knife) and .196 for one and a half rate outside (35 knife).

For replacement orifices, see "Check Valve" on page 53.

Kit	**0.075**	**0.093**	**0.107**	**0.132**	**0.161**	**0.196**
35 Knife	0	0	33	33	33	2
37 Knife	2	2	35	35	35	0

Knife - 22" Row Spacing

	40 Gallons Per Acre									45 Gallons Per Acre								
Speed (MPH)	4	5	6	7	8	9	10	11	12	4	5	6	7	8	9	10	11	12
0.075 Orifice Pressure (psi)	40	55	70	85	100	116	131	146	161	47	64	81	98	116	133	150	167	184
0.107 Orifice Pressure (psi)	6	14	21	29	36	44	51	59	66	10	18	27	35	44	52	60	69	77
0.132 Orifice Pressure (psi)			8	12	17	22	27	32	37		6	11	17	22	28	33	38	44
0.161 Orifice Pressure (psi)					5	8	11	14	18				4	8	12	15	19	22
GPM (per nozzle)	0.67	0.84	1.00	1.17	1.34	1.51	1.67	1.84	2.01	0.75	0.94	1.13	1.32	1.51	1.70	1.88	2.07	2.26
Flow Indicator 1/2" SS Ball Level	1.7	2.3	2.9	3.5	4.0	4.6	5.2	5.7	6.3	2.0	2.7	3.3	4.0	4.6	5.2	5.9	6.5	
Flow Indicator 7/16" SS Ball Level		0.2	0.7	1.1	1.5	2.0	2.4	2.9	3.3		0.5	1.0	1.5	2.0	2.5	3.0	3.5	3.9

	50 Gallons Per Acre									55 Gallons Per Acre								
Speed (MPH)	4	5	6	7	8	9	10	11	12	4	5	6	7	8	9	10	11	12
0.075 Orifice Pressure (psi)	55	74	93	112	131	150	169	188	207	62	83	104	125	146	167	188	209	230
0.107 Orifice Pressure (psi)	14	23	32	42	51	60	70	79	88	17	28	38	48	59	69	79	89	100
0.132 Orifice Pressure (psi)		9	15	21	27	33	39	45	51	5	12	18	25	32	38	45	52	58
0.161 Orifice Pressure (psi)			3	7	11	15	19	23	27			5	10	14	19	23	28	32
GPM (per nozzle)	0.84	1.05	1.26	1.46	1.67	1.88	2.09	2.30	2.51	0.92	1.15	1.38	1.61	1.84	2.07	2.30	2.53	2.76
Flow Indicator 1/2" SS Ball Level	2.3	3.0	3.7	4.5	5.2	5.9	6.6			2.6	3.4	4.2	5.0	5.7	6.5			
Flow Indicator 7/16" SS Ball Level	0.2	0.8	1.3	1.9	2.4	3.0	3.5	4.1	4.6	0.5	1.1	1.7	2.3	2.9	3.5	4.1	4.7	5.3

	60 Gallons Per Acre									65 Gallons Per Acre								
Speed (MPH)	4	5	6	7	8	9	10	11	12	4	5	6	7	8	9	10	11	12
0.075 Orifice Pressure (psi)	70	93	116	138	161	184	207	230	252	78	102	127	152	176	201	226	250	275
0.107 Orifice Pressure (psi)	21	32	44	55	66	77	88	100	111	25	37	49	61	73	86	98	110	122
0.132 Orifice Pressure (psi)	8	15	22	29	37	44	51	58	66	10	18	26	34	41	49	57	65	73
0.161 Orifice Pressure (psi)		3	8	13	18	22	27	32	37		5	10	16	21	26	31	37	42
GPM (per nozzle)	1.00	1.26	1.51	1.76	2.01	2.26	2.51	2.76	3.01	1.09	1.36	1.63	1.90	2.18	2.45	2.72	2.99	3.26
Flow Indicator 1/2" SS Ball Level	2.9	3.7	4.6	5.4	6.3					3.2	4.1	5.0	5.9	6.9				
Flow Indicator 7/16" SS Ball Level	0.7	1.3	2.0	2.6	3.3	3.9	4.6	5.3	5.9	0.9	1.6	2.3	3.0	3.7	4.4	5.1	5.9	6.6

	70 Gallons Per Acre									75 Gallons Per Acre								
Speed (MPH)	4	5	6	7	8	9	10	11	12	4	5	6	7	8	9	10	11	12
0.075 Orifice Pressure (psi)	85	112	138	165	192	218	245	271	298	93	121	150	178	207	235	264	292	321
0.107 Orifice Pressure (psi)	29	42	55	68	81	94	107	120	133	32	46	60	74	88	102	116	130	144
0.132 Orifice Pressure (psi)	12	21	29	38	46	55	63	72	80	15	24	33	42	51	60	69	78	87
0.161 Orifice Pressure (psi)		7	13	18	24	30	35	41	47	3	9	15	21	27	33	39	45	51
GPM (per nozzle)	1.17	1.46	1.76	2.05	2.34	2.64	2.93	3.22	3.52	1.26	1.57	1.88	2.20	2.51	2.83	3.14	3.45	3.77
Flow Indicator 1/2" SS Ball Level	3.5	4.5	5.4	6.4						3.7	4.8	5.9	6.9					
Flow Indicator 7/16" SS Ball Level	1.1	1.9	2.6	3.4	4.2	4.9	5.7	6.5		1.3	2.1	3.0	3.8	4.6	5.4	6.2		

NOTE - The values highlighted in green indicate pressures that are in the optimal pressure range of 20 - 50 psi. The row spacing is 22 inches.

Knife - 30" Row Spacing

	10 Gallons Per Acre									15 Gallons Per Acre								
Speed (MPH)	4	5	6	7	8	9	10	11	12	4	5	6	7	8	9	10	11	12
0.075 Orifice Pressure (psi)		5	10	15	20	25	31	36	41	10	18	25	33	41	49	57	64	72
0.107 Orifice Pressure (psi)							2	4	7				3	7	11	15	18	22
0.132 Orifice Pressure (psi)															1	3	6	8
0.161 Orifice Pressure (psi)																		
GPM (per nozzle)	0.23	0.29	0.34	0.40	0.46	0.51	0.57	0.63	0.68	0.34	0.43	0.51	0.60	0.68	0.77	0.86	0.94	1.03
Flow Indicator Red Glass Ball Level	0.9	1.4	1.9	2.4	2.9	3.4	3.9	4.4	4.9	1.9	2.7	3.4	4.1	4.9	5.6	6.4		
Flow Indicator 1/2" SS Ball Level	0.2	0.4	0.6	0.8	1.0	1.2	1.4	1.6	1.8	0.6	0.9	1.2	1.5	1.8	2.1	2.4	2.7	3.0
Flow Indicator 7/16" SS Ball Level															0.1	0.3	0.5	0.7

	20 Gallons Per Acre									25 Gallons Per Acre								
Speed (MPH)	4	5	6	7	8	9	10	11	12	4	5	6	7	8	9	10	11	12
0.075 Orifice Pressure (psi)	20	31	41	51	62	72	82	93	103	31	44	57	69	82	95	108	121	134
0.107 Orifice Pressure (psi)			7	12	17	22	27	32	37		8	15	21	27	34	40	46	53
0.132 Orifice Pressure (psi)					5	8	12	15	18			3	7	12	16	20	24	28
0.161 Orifice Pressure (psi)								3	5						4	6	9	12
GPM (per nozzle)	0.46	0.57	0.68	0.80	0.91	1.03	1.14	1.26	1.37	0.57	0.71	0.86	1.00	1.14	1.28	1.43	1.57	1.71
Flow Indicator Red Glass Ball Level	2.9	3.9	4.9	5.9	6.9					3.9	5.1	6.4						
Flow Indicator 1/2" SS Ball Level	1.0	1.4	1.8	2.2	2.6	3.0	3.3	3.7	4.1	1.4	1.9	2.4	2.9	3.3	3.8	4.3	4.8	5.3
Flow Indicator 7/16" SS Ball Level				0.1	0.4	0.7	1.0	1.3	1.6			0.3	0.7	1.0	1.4	1.8	2.1	2.5

	30 Gallons Per Acre									35 Gallons Per Acre								
Speed (MPH)	4	5	6	7	8	9	10	11	12	4	5	6	7	8	9	10	11	12
0.075 Orifice Pressure (psi)	41	57	72	88	103	119	134	150	165	51	69	88	106	124	142	160	178	196
0.107 Orifice Pressure (psi)	7	15	22	30	37	45	53	60	68	12	21	30	39	48	57	66	74	83
0.132 Orifice Pressure (psi)		3	8	13	18	23	28	33	38		7	13	19	25	30	36	42	48
0.161 Orifice Pressure (psi)					5	9	12	15	18				6	10	13	17	21	25
GPM (per nozzle)	0.68	0.86	1.03	1.20	1.37	1.54	1.71	1.88	2.05	0.80	1.00	1.20	1.40	1.60	1.80	2.00	2.20	2.40
Flow Indicator Red Glass Ball Level	4.9	6.4																
Flow Indicator 1/2" SS Ball Level	1.8	2.4	3.0	3.5	4.1	4.7	5.3	5.9	6.5	2.2	2.9	3.5	4.2	4.9	5.6	6.3	6.9	
Flow Indicator 7/16" SS Ball Level		0.3	0.7	1.2	1.6	2.1	2.5	3.0	3.4	0.1	0.7	1.2	1.7	2.2	2.7	3.3	3.8	4.3

NOTES:

- Values highlighted in green indicate pressures that are within the optimal range of 20 - 50 psi. The row spacing is 30 inches.
- Density or viscosity of the liquid can effect operating range.
- A displayed pressure higher than the calculated pressure may be due to a pressure drop in the fertilizer hoses.
- With .075 on the center, use .054 for half rate outside (25 knife) and .093 for one and a half rate outside (23 knife).
- With .107 on the center, use .075 for half rate outside (25 knife) and .132 for one and a half rate outside (23 knife).
- With .132 on the center, use .093 for half rate outside (25 knife) and .161 for one and a half rate outside (23 knife).
- With .161 on the center, use .107 for half rate outside (25 knife) and .196 for one and a half rate outside (23 knife).

For replacement orifices, see "Check Valve" on page 53.

Kit	**0.075**	**0.093**	**0.107**	**0.132**	**0.161**	**0.196**
23 Knife	0	0	21	21	21	2
25 Knife	2	2	23	23	23	0

Knife - 30" Row Spacing

	40 Gallons Per Acre									45 Gallons Per Acre								
Speed (MPH)	4	5	6	7	8	9	10	11	12	4	5	6	7	8	9	10	11	12
0.075 Orifice Pressure (psi)	62	82	103	124	145	165	186	207	228	72	95	119	142	165	189	212	235	259
0.107 Orifice Pressure (psi)	17	27	37	48	58	68	78	88	99	22	34	45	57	68	80	91	102	114
0.132 Orifice Pressure (psi)	5	12	18	25	31	38	44	51	58	8	16	23	30	38	45	53	60	67
0.161 Orifice Pressure (psi)			5	10	14	18	23	27	32		4	9	13	18	23	28	33	38
GPM (per nozzle)	0.91	1.14	1.37	1.60	1.83	2.05	2.28	2.51	2.74	1.03	1.28	1.54	1.80	2.05	2.31	2.57	2.83	3.08
Flow Indicator 1/2" SS Ball Level	2.6	3.3	4.1	4.9	5.7	6.5				3.0	3.8	4.7	5.6	6.5				
Flow Indicator 7/16" SS Ball Level	0.4	1.0	1.6	2.2	2.8	3.4	4.0	4.6	5.2	0.7	1.4	2.1	2.7	3.4	4.1	4.7	5.4	6.1

	50 Gallons Per Acre									55 Gallons Per Acre								
Speed (MPH)	4	5	6	7	8	9	10	11	12	4	5	6	7	8	9	10	11	12
0.075 Orifice Pressure (psi)	82	108	134	160	186	212	238	264	290	93	121	150	178	207	235	264	292	321
0.107 Orifice Pressure (psi)	27	40	53	66	78	91	104	116	129	32	46	60	74	88	102	116	130	144
0.132 Orifice Pressure (psi)	12	20	28	36	44	53	61	69	77	15	24	33	42	51	60	69	78	87
0.161 Orifice Pressure (psi)		6	12	17	23	28	34	39	45	3	9	15	21	27	33	39	45	51
GPM (per nozzle)	1.14	1.43	1.71	2.00	2.28	2.57	2.85	3.14	3.42	1.26	1.57	1.88	2.20	2.51	2.83	3.14	3.45	3.77
Flow Indicator 1/2" SS Ball Level	3.3	4.3	5.3	6.3						3.7	4.8	5.9	6.9					
Flow Indicator 7/16" SS Ball Level	1.0	1.8	2.5	3.3	4.0	4.7	5.5	6.2	7.0	1.3	2.1	3.0	3.8	4.6	5.4	6.2		

	60 Gallons Per Acre									65 Gallons Per Acre								
Speed (MPH)	4	5	6	7	8	9	10	11	12	4	5	6	7	8	9	10	11	12
0.075 Orifice Pressure (psi)	103	134	165	196	228	259	290	321	352	114	147	181	215	248	282	316	349	383
0.107 Orifice Pressure (psi)	37	53	68	83	99	114	129	144	160	43	59	76	92	109	125	142	158	175
0.132 Orifice Pressure (psi)	18	28	38	48	58	67	77	87	97	21	32	43	53	64	75	86	96	107
0.161 Orifice Pressure (psi)	5	12	18	25	32	38	45	51	58	7	15	22	29	36	43	50	57	65
GPM (per nozzle)	1.37	1.71	2.05	2.40	2.74	3.08	3.42	3.77	4.11	1.48	1.85	2.23	2.60	2.97	3.34	3.71	4.08	4.45
Flow Indicator 1/2" SS Ball Level	4.1	5.3	6.5															
Flow Indicator 7/16" SS Ball Level	1.6	2.5	3.4	4.3	5.2	6.1	7.0			1.9	2.9	3.9	4.8	5.8	6.8			

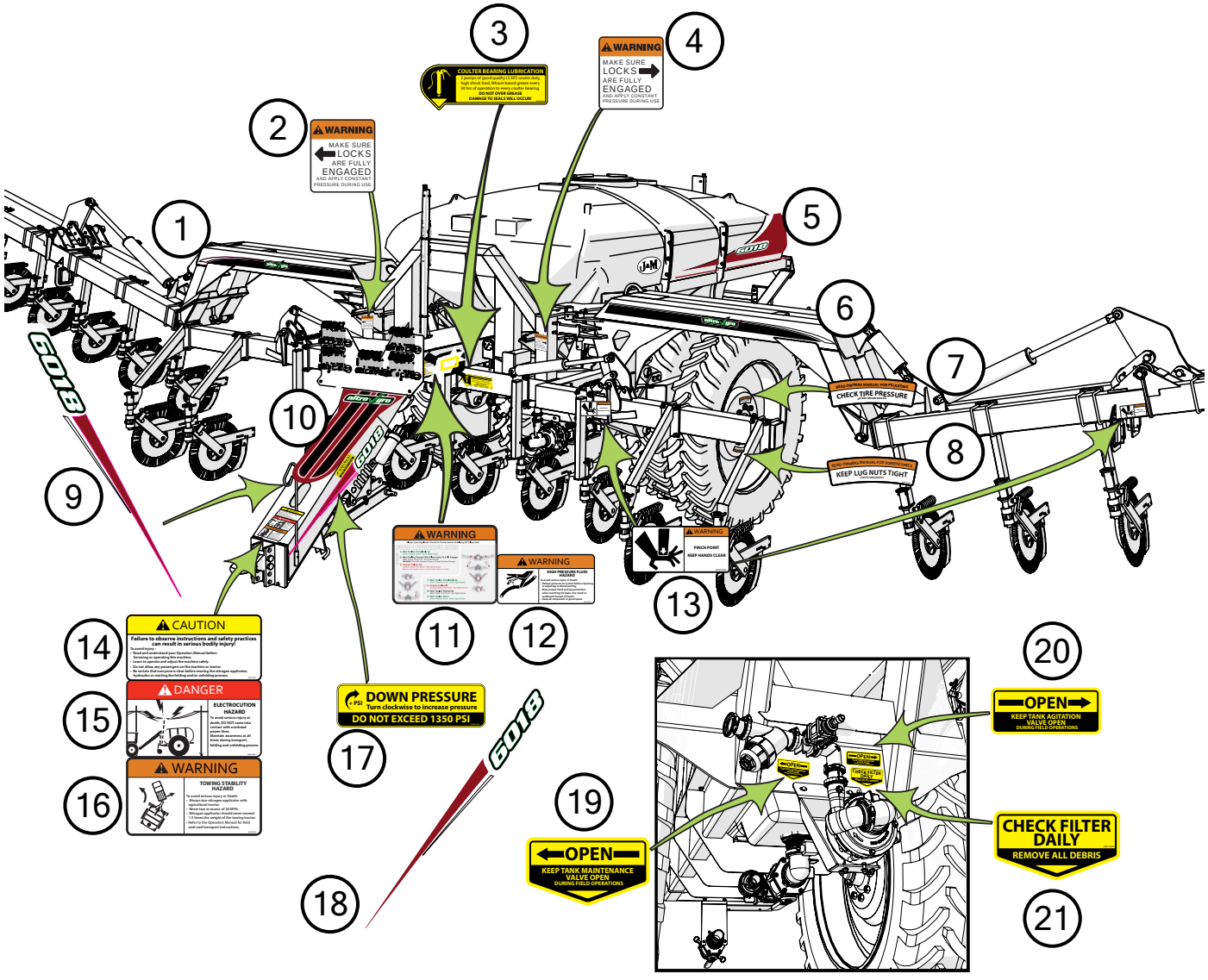
	70 Gallons Per Acre									75 Gallons Per Acre								
Speed (MPH)	4	5	6	7	8	9	10	11	12	4	5	6	7	8	9	10	11	12
0.075 Orifice Pressure (psi)	124	160	196	233	269	305	342	378	414	134	173	212	251	290	329	367	406	445
0.107 Orifice Pressure (psi)	48	66	83	101	119	137	155	172	190	53	72	91	110	129	148	167	186	206
0.132 Orifice Pressure (psi)	25	36	48	59	71	82	94	105	117	28	40	53	65	77	90	102	114	127
0.161 Orifice Pressure (psi)	10	17	25	33	40	48	56	64	71	12	20	28	37	45	53	61	70	78
GPM (per nozzle)	1.60	2.00	2.40	2.80	3.20	3.60	3.99	4.39	4.79	1.71	2.14	2.57	3.00	3.42	3.85	4.28	4.71	5.14
Flow Indicator 7/16" SS Ball Level	2.2	3.3	4.3	5.3	6.4					2.5	3.6	4.7	5.9	7.0				

NOTE - The values highlighted in green indicate pressures that are in the optimal pressure range of 20 - 50 psi. The row spacing is 30 inches.

Decals

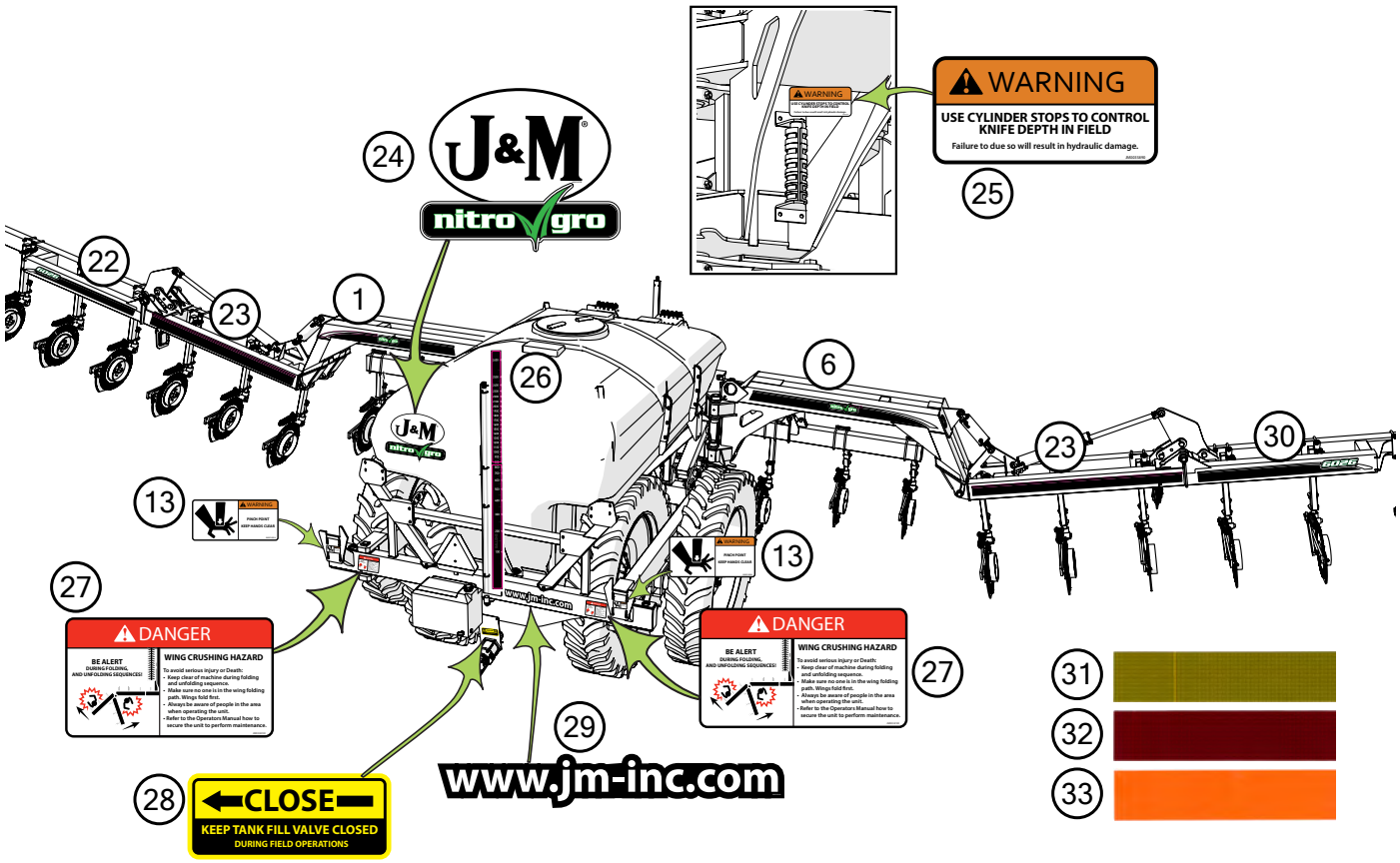
⚠ATTENTION! BECOME ALERT! YOUR SAFETY IS INVOLVED!⚠

Replace Immediately If Damaged or Missing



	Description	Part No.
1	NitroGro Wing Decal (Front Right, Rear Left)	JM0055012
2	Make Sure Locks are Fully Engaged Decal (Right)	JM0055013
3	Coulter Bearing Lubrication Decal	JM0038099
4	Make Sure Locks are Fully Engaged Decal (Left)	JM0055018
5	6018 Tank Stripes Red (Left)	JM0055208
5	6018 Tank Stripes Green (Left)	JM0055209
5	6018 Tank Stripes Red (Right)	JM0055210
5	6018 Tank Stripes Green (Right)	JM0055211
6	NitroGro Wing Decal (Front Left, Rear Right)	JM0055023
7	Check Tire Pressure Decal (NitroGro)	JM0038097
8	Keep Lug Nuts Tight Decal (NitroGro)	JM0035885
9	6018 Tongue Stripe Red (Right)	JM0055212
9	6018 Tongue Stripe Green (Right)	JM0055213
10	Top Red NitroGro Tongue Decal	JM0055027
10	Top Green NitroGro Tongue Decal	JM0055028

Decals



	Description	Part No.
11	Fold Instructions Decal (NitroGro)	JM0055029
12	Warning, High Pressure Fluid Hazard Decal	JM0035880
13	Warning, Pinch Point Decal	JM0014994
14	Caution, Failure to Observe Instructions Decal (NitroGro)	JM0035881
15	Danger, Electrocution Hazard Decal (NitroGro)	JM0035887
16	Warning, Towing Stability Hazard Decal (NitroGro)	JM0035882
17	Down Pressure Decal (NitroGro)	JM0035892
18	6018 Tongue Stripe Red (Left)	JM0055214
18	6018 Tongue Stripe Green (Left)	JM0055215
19	Open (Left) Keep Tank Maintenance Valve Open Decal	JM0039478
20	Open (Right) Keep Tank Agitation Valve Open Decal	JM0039479
21	Check Filter Daily Decal (NitroGro)	JM0035884
22	6018 Back Wing Stripe (Left)	JM0055216
23	Back Wing Solid Stripe	JM0055033
24	NitroGro Logo Decal 14-3/8" x 12-1/8"	JM0055034
25	Warning, Use Cylinder Stops Decal (NitroGro)	JM0035890
26	Gallon Marker Decal (NitroGro)	JM0055035
27	Danger, Wing Crushing Hazard Decal	JM0038100
28	Close (Left) Keep Tank Fill Valve Closed Decal	JM0035891
29	www.jm-inc.com Decal (NitroGro)	JM0038108
30	6018 Back Wing Stripe (Right)	JM0055217
31	Amber Reflective Decal 2" x 9"	JM0009946
32	Red Reflective Decal 2" x 9"	JM0009945
33	Orange Reflective Decal 2" x 9"	JM0009944

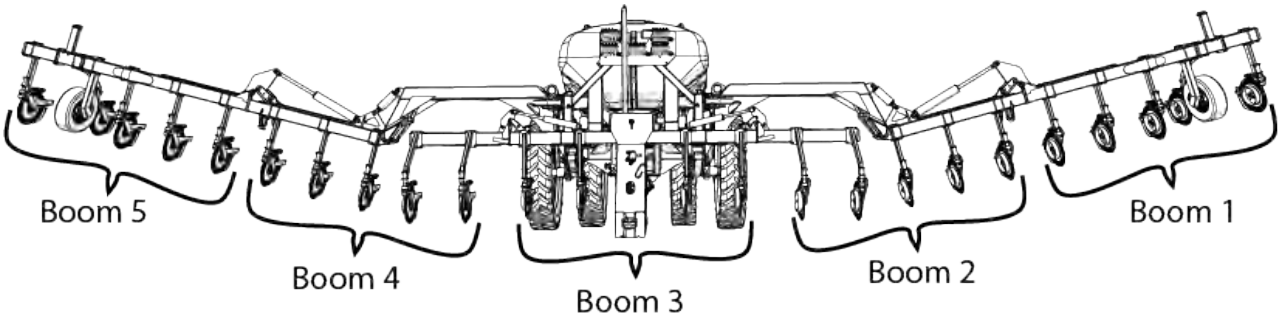
Quick Start for Raven 450 Controller

Initial Console Programming

HINT: If you enter the wrong value when entering your data press "ENTER" then press "ENTER" again and re-enter your value again.

- Select the unit of measurement by pressing the CE button until the desired selection appears in the display and press "ENTER"
  NOTE - The unit of measurement for the United States is Volume per Acre.
- Select the type of sensor by pressing the CE button until the desired sensor type appears in the display and press "ENTER".
  For Phoenix 10, select SP2.
  For wheel drive sensor, select SP1.
- The message "CAL C-SD STANDARD VALVE" will appear in the console's display.
  For PWM pump, press CE until C-PC (PWM Close Valve) appears. If tank agitation is desired, select C-P (PWM Open Valve) to perform agitation. Make sure the agitation valve is partially open. Press "ENTER".
- The message "CAL SELF TEST 00" will appear in the console's display. Press the "BOOM CAL 1" button and enter the value shown in the table below. To store the values, press "ENTER" (the enter button will light up), input the value and then press "ENTER" to store your value. Repeat for Boom 2 through 5. Press the arrow keys to advance to the remaining booms.

Boom #	Value
Boom 1	135
Boom 2	150
Boom 3	150
Boom 4	150
Boom 5	135



- Press the "SPEED CAL" button and input the appropriate speed calibration value for the type of sensor being used and press "ENTER".
  For Phoenix 10, the speed calibration is 785.
  For wheel drive sensor, refer to the speed calibration steps in the Raven SCS 450 operator's manual.
- Press the "METER CAL" button and enter the meter calibration value stamped on the flow meter's identification tag.
  The meter calibration value is approximately 1,340 gallons. Check the stamped valve to be sure.
- Press the "VALVE CAL" button and input the calibration number that corresponds with the control valve being used and press "ENTER".
  For PWM Pump, the valve calibration is 0043 or 43.
- Press the "RATE 1 CAL" button and "ENTER" the Rate 1 value. Refer to the "Calculate the Rate 1 and Rate 2 Cal Values" section of the Raven SCS 450 manual and press "ENTER".
- Press the "RATE 2 CAL" button and "ENTER" the Rate 2 value. Refer to the "Calculate the Rate 1 and Rate 2 Cal Values" section of the Raven SCS 450 manual and press "ENTER".
- The initial console programming is now complete, and the flashing "CAL" in the console's display should turn off. If it does not, repeat the procedure starting from the first step above.
- These settings will be stored and the previous steps do not need to be repeated after powering off or on.

RESET: If an entry or selection error is made during any steps of this procedure, turn the POWER switch to the OFF position, press and hold CE while turning the POWER switch to the ON position to reset the console.

Setting Reaction Time for PWM Pump

- To adjust rate reaction time in a PWM pump, navigate to "Data Menu" and set high PWM to 253 and low PWM to 1.
- To adjust high PWM setting, adjust rate #1 to 50 GPA and rate #2 to 30 GPA. Run a self-test with hydraulics pumping out fluid at 8 mph. To perform self-test, set 8.0 as speed using the "ENTER" button and turn on the master while stationary. Start on rate #1. Once the rate reaches 50 GPA, switch to rate #2. If it takes longer than desired to adjust to 30 GPA, adjust high PWM from 253 to 225 and try again. Continue lowering by 25 and repeat until the rate adjusts as desired. (If needed, fine tuning by less than 25 is allowed).
- To adjust low PWM setting, adjust rate #1 to 50 GPA and rate #2 to 30 GPA. Run a self-test with hydraulics pumping out fluid at 8 MPH. To perform self-test, set 8.0 as speed using the "ENTER" button and turn on the master while stationary. Start on rate #2. Once the rate reaches 30 GPA, switch to rate #1. If it takes longer than you desire to adjust to 50 GPA, adjust low PWM from 1 to 25 and try again. Continue raising by 25 and repeat until the rate adjusts as desired. (If needed, fine tuning by less than 25 is allowed).
- In "Data Menu", set PWM Frequency to 122 Hz.

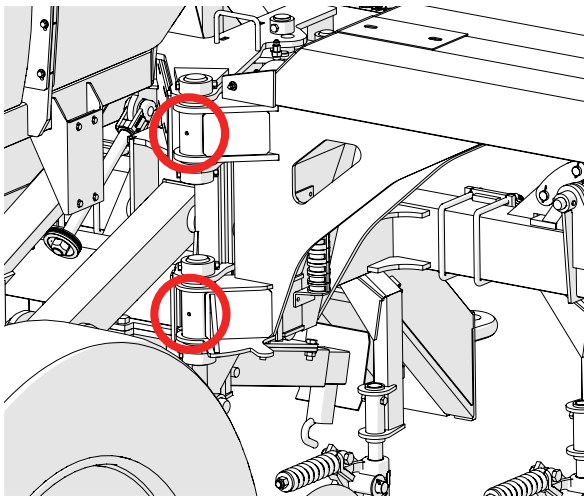
Transporting

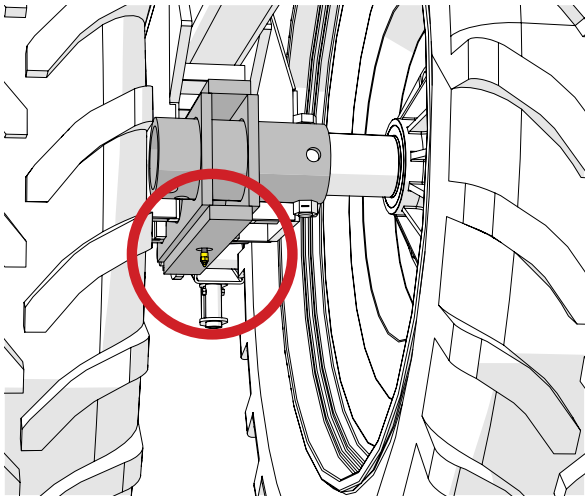
- Comply with ALL state and local laws governing highway safety and regulations when moving machinery on public roads.
- Be sure an SMV (Slow Moving Vehicle) emblem is in place and clearly visible on the rear of the applicator. Position the SMV emblem with one point of the triangle upward and as near to the rear and centered or as near to the left of center of the unit as practicable. Secure the SMV emblem two to ten feet above the ground measured from the lower edge of the emblem. Before transporting, ensure that all lights, reflectors, and the SMV emblem are clean and visible. Ensure the amber, red, and orange reflective tape on the implement is in place and clearly visible. Before transporting, ensure all lights, reflectors, and the SMV emblem are clean and visible.
- When transporting applicator, do not exceed 10 MPH in the field or over rough terrain. For highway transportation, do not exceed 20 MPH. Reduce transport speed when necessary to maintain full control. **Never transport the applicator with contents in the tank.**
- Tongue weight when NitroGro is folded and empty for road transport is 600-1,000 lbs depending on the configuration. Negative tongue weight (even intermittent) may cause instability when transporting. Add ballast to tractor as required. Never tow this implement with a motor vehicle. Tow only with a properly ballasted tractor.
- Be aware of overhead wires when transporting.
- Ensure the safety chain has a rating greater than the empty weight of the machine.
- Ensure wings are seated in the transport saddles before transporting.

Service

To prolong the life of your NitroGro applicator, perform the following on a regular basis:

1. Grease coulter hubs with two pumps every 50 hours.
2. Grease main wing fold pivots and walker pivots every 50 hours as shown in the picture below. There are two grease points on each side of the main wing fold (4 total). If duals are equipped, there are 1 on each side of the unit for the walking pivots.





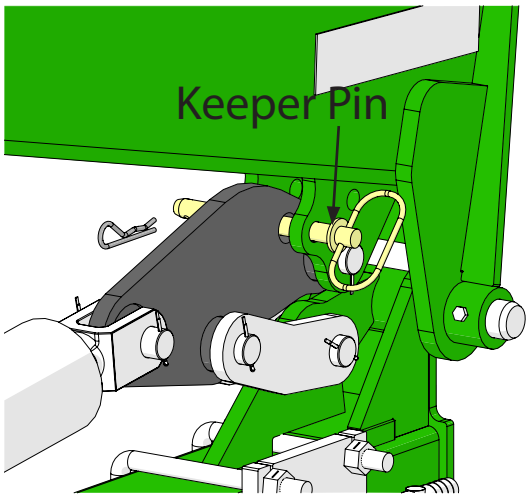
3. Check lighting before over the road transport. Make sure lights and SMV emblem are clean from dirt and field debris.
4. Check implement for damage, cracked welds, loosened hardware, etc. After the unit is repaired promptly repaint to prevent further damage.
5. Check hydraulic system for leaks and hose damage, twists or kinks and repair as needed.
6. Check fertilizer handling system for leaks and hose damage, twists or kinks and repair as needed.
7. Check tire pressures and lug nuts periodically and adjust as required.
8. Grease wheel hubs.
9. Grease jack every 50 hours.
10. Clean strainer daily.
11. Repack bearings for both the gauge wheel hubs and main wheel hubs each season.

Storage

To prolong the life of your NitroGro applicator, hook the applicator to a tractor, unfold it, and perform the following before placing the implement in storage:

1. Pressure wash the NitroGro applicator to remove dirt and debris that may cause rusting.
2. Repaint any areas where the paint has been chipped, scratched or worn away.
3. Coat all earth-moving surfaces with a suitable rust preventative.
4. Inspect for damaged or worn parts and replace before next use. Examine all hydraulic hoses and fittings for wear and replace or tighten as necessary.
5. Grease coulter hubs.
6. Replace all worn, torn, or faded decals and reflectors.
7. Flush all fertilizer from the system and winterize the applicator if kept in cold storage.
   IMPORTANT - To winterize your NitroGro drain the tank and all fertilizer hoses. Once the system is drained add approximately 50 gallons of RV antifreeze. Run the antifreeze thru the strainer, valves, check valves, and orifices until antifreeze comes out of all knives/orifices.
8. Cover flow monitors from the sunlight. If flow monitors are exposed to the sun for a long period of time they will turn cloudy and become difficult to see through.
9. Store the implement inside and sheltered from inclement weather on an area that is dry, level, and clear of debris.
10. Fold up applicator and unhook from tractor.
11. When not in use, lock the stub wing in place with the keeper pin provided. This will keep the stub wings from unfolding when temperatures fluctuate and cause thermal expansion in the hydraulic system.

Do NOT use anything except RV antifreeze to winterize. Using anything else can cause severe damage to fertilizer distribution components and will VOID warranty.



Troubleshooting

⚠ WARNING - MAKE SURE THAT ALL POWER IS SHUT OFF BEFORE SERVICING THE APPLICATOR. MAINTENANCE AND REPAIR SERVICE WORK TO BE PERFORMED BY QUALIFIED SERVICEMEN ONLY.

Trouble	Possible Cause	Possible Remedy
Outside tool bar wing creeps up over time	Counterbalance valve is too loose	Tighten counterbalance valve. See "Counterbalance Valve" on page 13 for instructions.
Toolbar will not raise or lower/ Wings will not fold out or unfold	Faulty hydraulic coupler	Replace with new coupler.
Center toolbar section too deep or too shallow	Lift cylinders have improper combination of cylinder spacers	Add or remove spacers as necessary.
Wings are tilted up from center toolbar section	Gauge wheels set too low	Move gauge wheels up.
	Hydraulic down pressure not set high enough	Increase pressure by turning adjustment knob clockwise. IMPORTANT: Do not exceed 1,350 psi.
	Center toolbar section set too deep	Add cylinder spacers to lift cylinders.
Wings are tilted down from center toolbar section	Gauge wheels set too high	Move gauge wheels down.
	Center toolbar section set too shallow	Remove cylinder spacers from lift cylinders.
Fertilizer pressure gauge showing high pressure when applying fertilizer	Orifices too small	Install larger orifices.
	Plugged knives	Clear debris.
	Kinked hoses	Adjust hoses as necessary.
	Speed too fast	Slow down.
	Flow monitor balls installed incorrectly	Intall flow monitor balls below plasitc grate under flow monitor cap.
Unable to maintain set application rate	Clogged strainer	Clean strainer.
	Orifices too small	Install larger orifices.
	Agitation valve too far open	Adjust valve as necessary.
Hydraulic pump will not prime	Tank valve closed	Open valve.
	Agitation valve closed	Open valve.

Troubleshooting

HIGH BACK PRESSURE IN THE RETURN LINE:
This is the most common cause of shortened motor seal life. the hydraulic motor seal is rated for 250 pssi of back pressure. However, a continuous return pressure of 100 psi or less is recommended for efficient operation and optimum seal life. The high return pressre is caused by restrictions in hoses, fittings, and tractor plumbing.

***LOOK FOR*:**
Seal lips pressed tight against the outer seal housing and shaft. There may also be grooves in the shaft where the seal ips touch.

***PREVENTION*:**
The best way to minimize return pressure is to return oil directly back to the tractor reservoir. Most tractor manufacturees now offer a Low Pressure Return Port option for this purpose. Contact your dealer for the specific options available for your tractor model. Preper hydraulic hose sizing in also important to minimize restriction. A open hose coupling may also be used to reduce restrictions in the return line. Ace recommends 1/2" hose for 200 Series motors and 3/4" hose for 300 series motors. The hoses should be sized larger if individual lengths exceed 15 feet.

PRESSURE SPIKE:
System pressure spikes may also damage the shaft seal and cause leakage. Spikes in the 3000-5000 psi range may result from imporperly synchronized hydraulic valves or quick couplers coming unplugged during operation.

***LOOK FOR*:**
The seal lips are pressed tight against the outer seal housing and form a right angle between the seal housing and the shaft. In severe cases, the seal lip material may be extruded between the front seal casing and the shaft.

***PREVENTION*:**
Using a Low Pressure Return Port prevents spikes by keeping the return line open back to the reservoir at all times. If not using a low pressure return, the pump should always be turned off by moving the lever to the Float position. When moved to Float, the oil supply valve is shut but the return valve stays open.

*Refer to the ACE hydraulic pump manual or Raven controller manual for additional troubleshooting information.

Repair Parts List and Diagrams

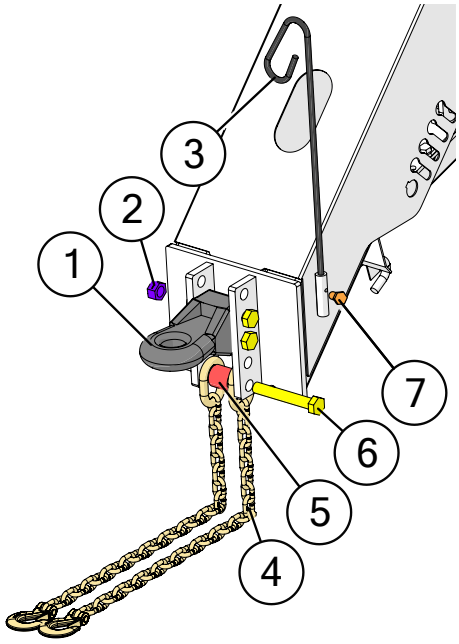
When performing maintenance work, wear sturdy, rough-soled work shoes and protective equipment for eyes, hair, hands, hearing and head. Follow the Operator's Manual instructions to ensure safe and proper maintenance and repair.

Your local, authorized dealer can supply genuine replacement parts. Substitute parts may not meet original equipment specifications and may be dangerous.

⚠ WARNING

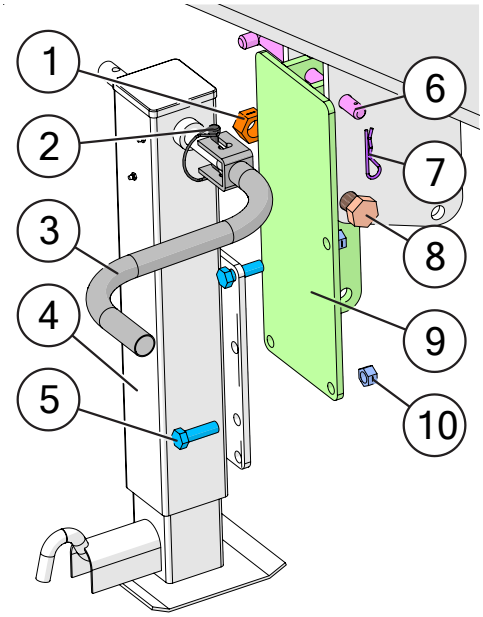
MAKE SURE ALL POWER IS SHUT OFF BEFORE PERFORMING ANY MAINTENANCE OR REPAIR WORK.

Hitch



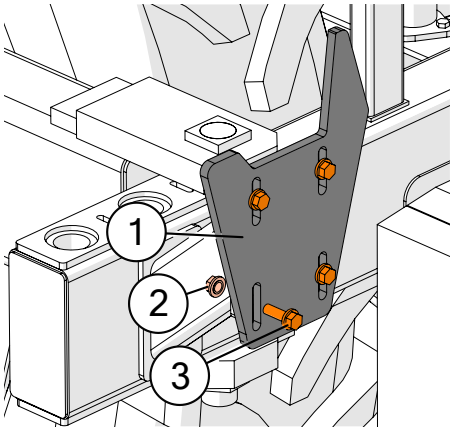
	Description	Part No.
1	CTD Perfect Hitch (Circular Hole)	JM0038515
2	1"-8 Gr2 Z Centerlock Hex Nut	JM0002149
3	1/2" Hose Holder Rod (12HHR)	JM0027120
4	40k Lb Safety Chain	JM0029261
5	NitroGro Applicator Safety Chain Spacer	JM0059128
6	1"-8 x 6-1/2" Gr5 Z Hex Bolt	JM0014192
7	3/8"-16 x 3/4" Gr5 Z Hex Bolt	JM0001663

Jack Assembly



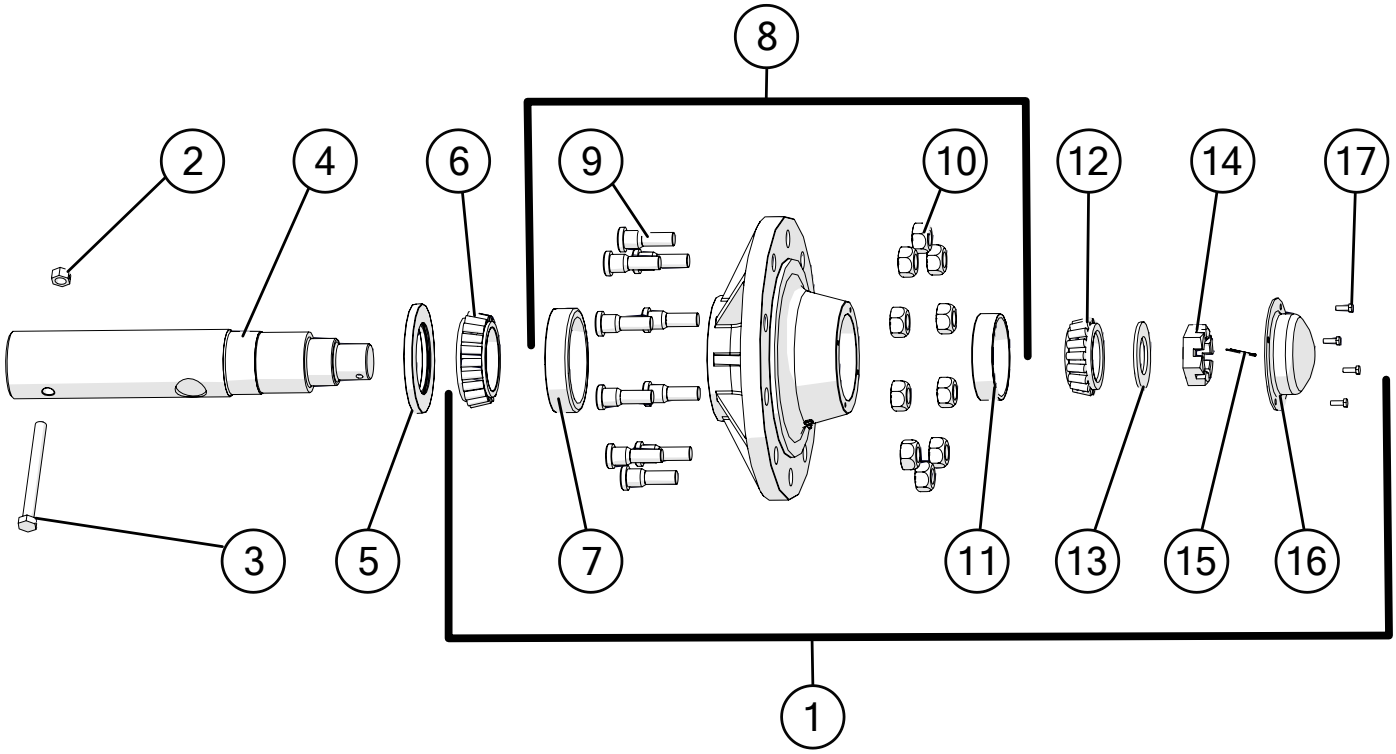
	Description	Part No.
1	1"-8 Gr2 Z Centerlock Hex Nut	JM0002149
2	3/8" x 2-1/2" Wire Lock Pin (38212WLP)	JM0014929
3	Jack Handle for 10,000 lb and Up	JM0037953
4	Jack Assembly (NitroGro & 510ST)	JM0030054
5	5/8"-11 x 2" Gr8 Z Hex Bolt	JM0001771
6	3/4" L Pin (10-9/32" Length)	JM0003076
7	3/16" x 2-1/2" Hair Clip Pin (316HP)	JM0001657
8	1"-8 x 6" Gr5 Z Hex Bolt	JM0002111
9	Jack Mounting Bracket (NitroGro)	JM0031545
10	5/8"-11 Gr2 Z Centerlock Hex Nut	JM0002146

Wing Rest



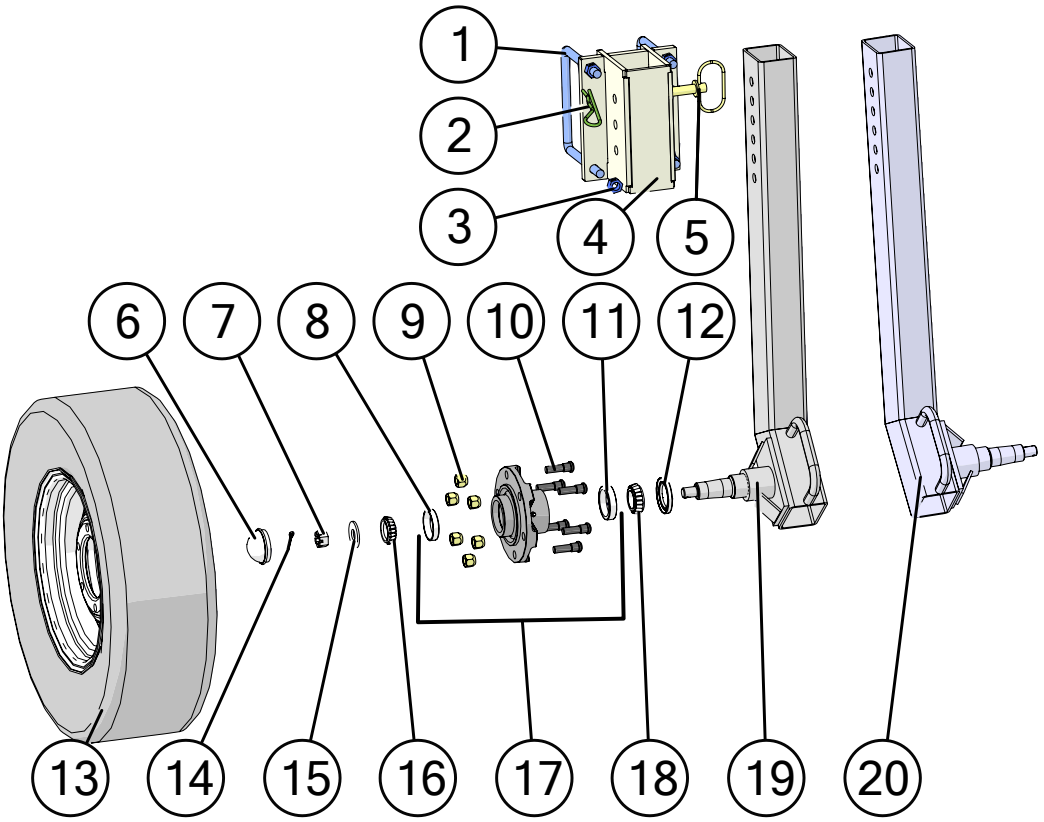
	Description	Part No.
1	Wing Rest Plate (NitroGro)	JM0047598
2	1/2"-13 Gr5 Z SF Hex Nut	JM0002153
3	1/2"-13 x 1-1/2" Gr5 Z SF Hex Bolt	JM0051480

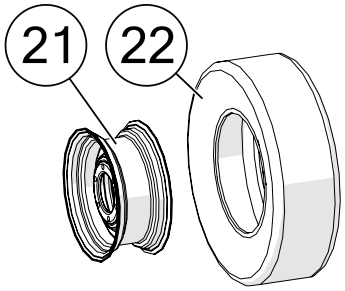
Hub and Spindle Assembly



	Description	Part No.
1	W-881 Hub Assembly Complete with 3/4" Studs and Nuts (Less Seal and Spindle)	JM0050402
2	1"-8 Gr2 Z Centerlock Hex Nut	JM0002149
3	1"-8 x 7" Gr5 Z Hex Bolt	JM0016689
4	Spindle, 4-1/2" x 22-3/4" - Applicator 6000	JM0048051
5	Seal (4-1/4" ID, 6" OD) for Hub (CR-43771)	JM0018955
6	Large Bearing (HM218248)	JM0018849
7	Large Race (HM218210)	JM0018848
8	W-881 Hub with Large and Small Races, 3/4" Studs & Nuts (11.13 Pilot)	JM0020510
9	Wheel Stud (3/4"-16 x 1-3/4") 913564	JM0018957
10	Wheel Nut 3/4"-16	JM0018958
11	Small Race (HM212011)	JM0018854
12	Small Bearing (HM212049)	JM0018852
13	2-1/8" ID, 3-3/4" OD Flat Washer (3/16")	JM0015900
14	2"-12 Gr5 Z Castle Hex Nut (912973)	JM0015899
15	3/8" x 2-3/4" Z Roll Pin (905945)	JM0018956
16	Dust Cap 6-1/4" OD (for W-881 & W-891 Hub) (909921)	JM0018954
17	1/4"-20 x 1" Gr5 Z Hex Bolt	JM0002095

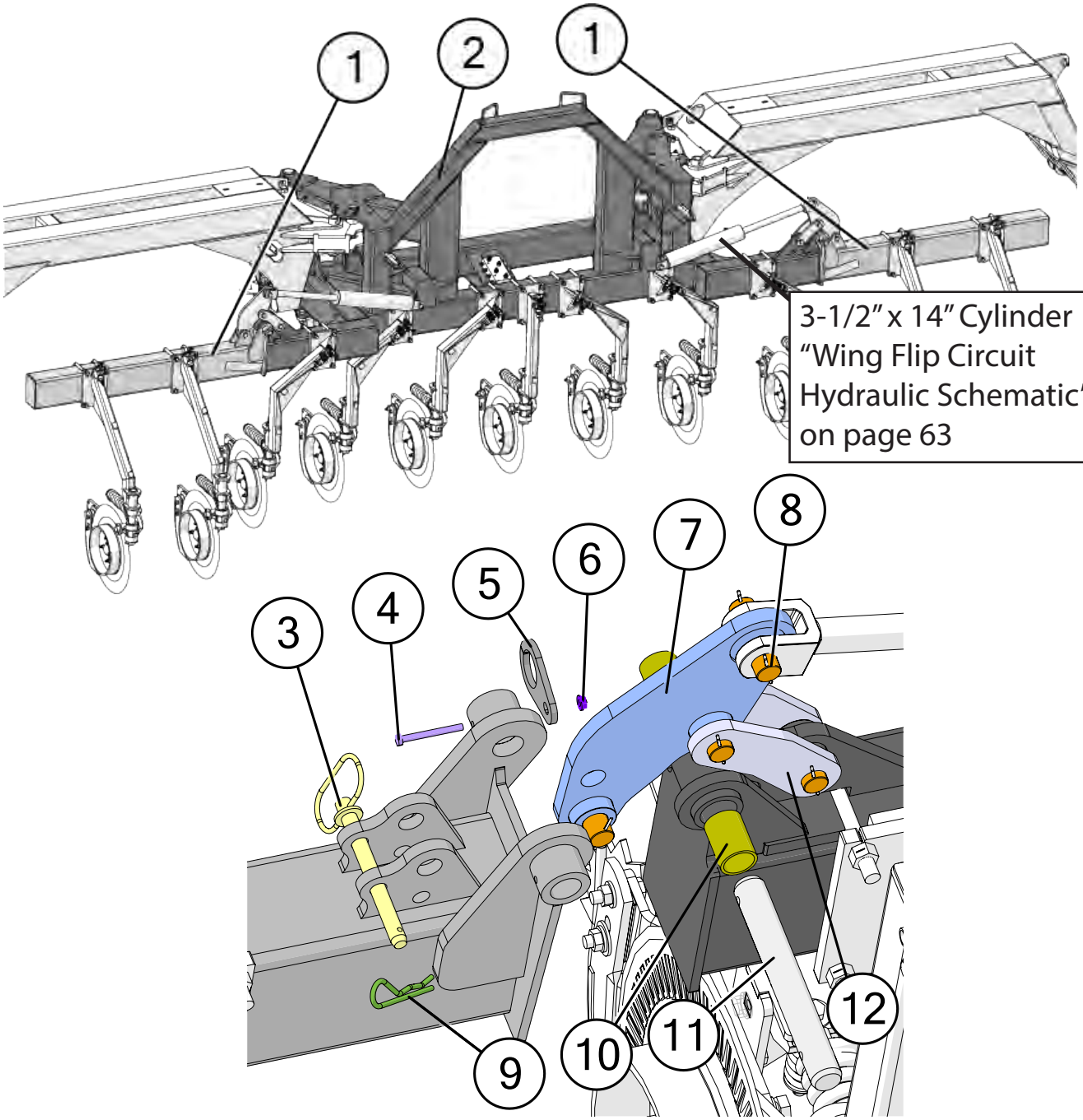
Gauge Wheel Assembly





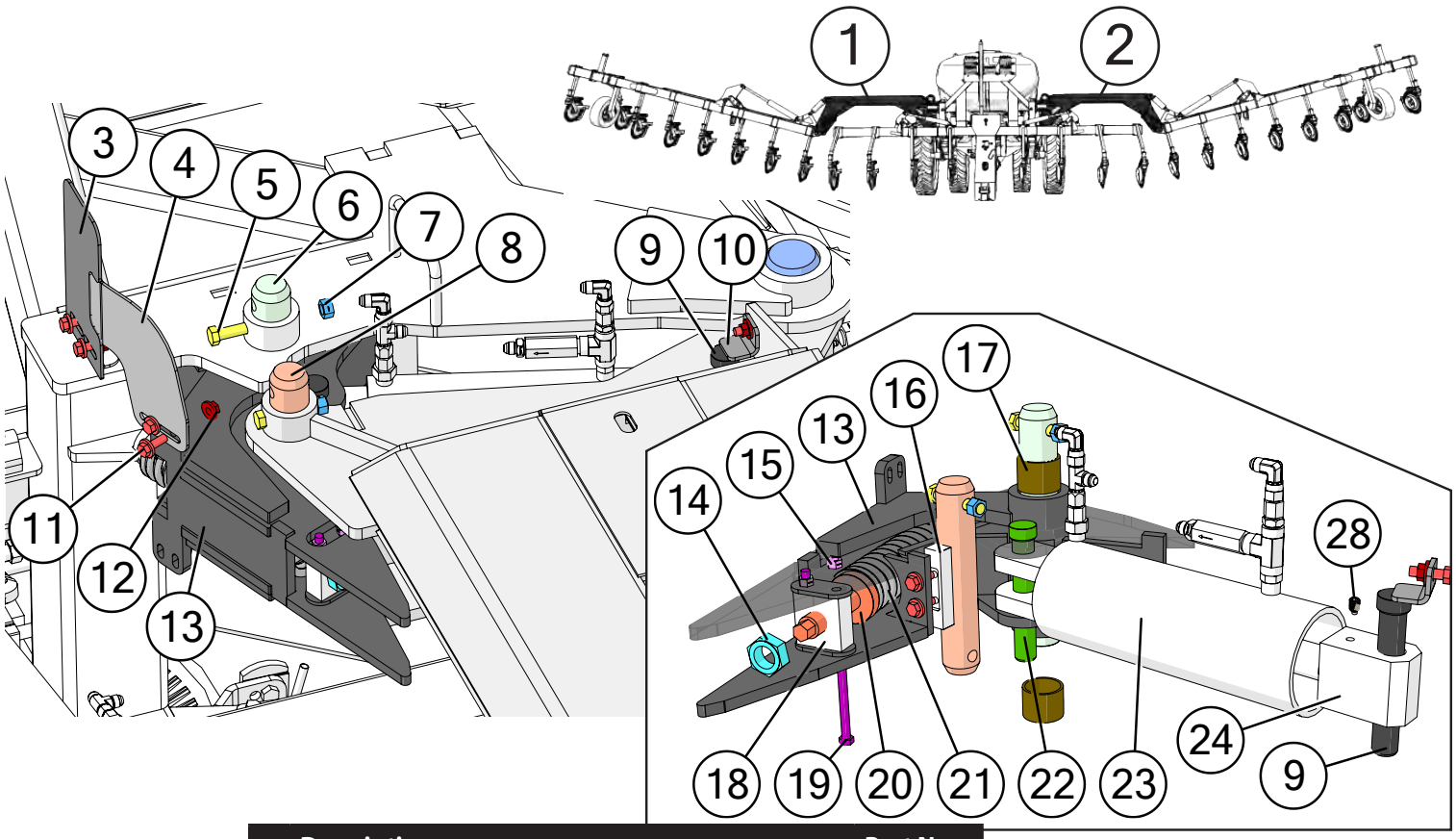
	Description	Part No.
1	5/8"-11 x 7-1/8" x 8-11/16" Square U-Bolt	JM0020901
2	3/16" x 2-1/2" Hair Clip Pin (316HP)	JM0001657
3	5/8"-11 Gr2 Z Centerlock Hex Nut	JM0002146
4	Gauge Wheel U-Bolt Mount Weldment (6000 Series)	JM0047347
5	Hitch Pin (5/8" x 6-1/2") (HP-586)	JM0003079
6	Dust Cap, 6-10 Ton (103969)	JM0026567
7	3/4"-16 Gr2 Castle Hex Nut	JM0002130
8	Small Outer Cone for 6-10 Ton (LM67048)	JM0019564
9	1/2"-20 Lug Nut, 6-8 Ton (5552)	JM0003062
10	Wheel Stud for Hub, 6-8 Ton (1/2"-20 x 1-7/8")(4187)	JM0019559
11	Large Cup for 6-8 Ton (LM48510) (104580)	JM0026565
12	Grease Seal, 6-8 Ton (103953)	JM0026572
13	ST215-75D14 Carlisle Sport Trail Tire and 14x6 - 6 Hole Wheel Rim	JM0019536
14	Cotter Pin 3/16" x 1-3/8" Long	JM0038286
15	3/4" USS Z Flat Washer	JM0010006
16	Small Outer Cone for 6-10 Ton (LM67048)	JM0019564
17	Hub with Races, Studs and Nuts, 7-8 Ton (105218)	JM0026566
18	Large Inner Bearing for 6-8 Ton (LM48548) (104579)	JM0019563
19	Gauge Wheel Assembly (Passenger Side)	JM0047918
20	Gauge Wheel Assembly (Driver Side)	JM0043199
21	14x6 - 6 Hole Wheel Rim	JM0019535
22	ST215-75D14 Carlisle Sport Trail Tire	JM0019529

Toolbar

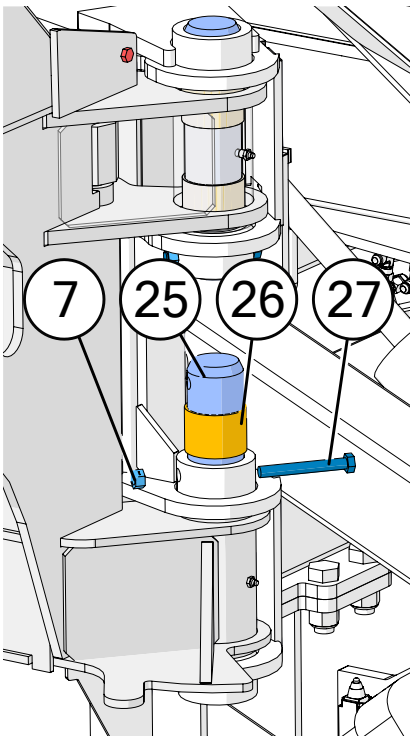


	Description	Part No.
1	Stub Wing Weldment	JM0046687
2	Toolbar Center Section NitroGro 6000	JM0047104
3	Hitch Pin (5/8" x 6-1/2") (HP-586)	JM0003079
4	1/4"-20 x 2-1/2" Gr5 Z Hex Bolt	JM0001506
5	1-1/2" Pin Keeper Plate (NitroGro 6000)	JM0041482
6	1/4"-20 Gr5 Z SF Hex Nut	JM0001630
7	Stub Wing Main Link Weldment	JM0047263
8	1" x 3-1/2" Clevis Pin with Cotter Pins	JM0001817
9	3/16" x 2-1/2" Hair Clip Pin (316HP)	JM0001657
10	1-1/4" ID x 1-1/2" OD x 2" Long Sleeve Composite Bushing	JM0021957
11	Applicator Stub Wing Pin	JM0047296
12	Stub Wing Small Linkage	JM0047264

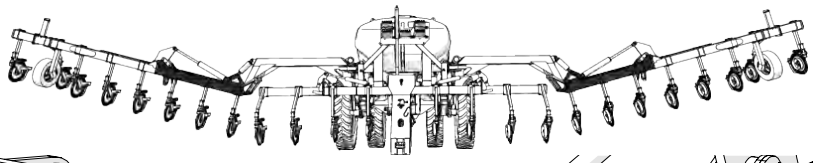
Inside Wing and Connections

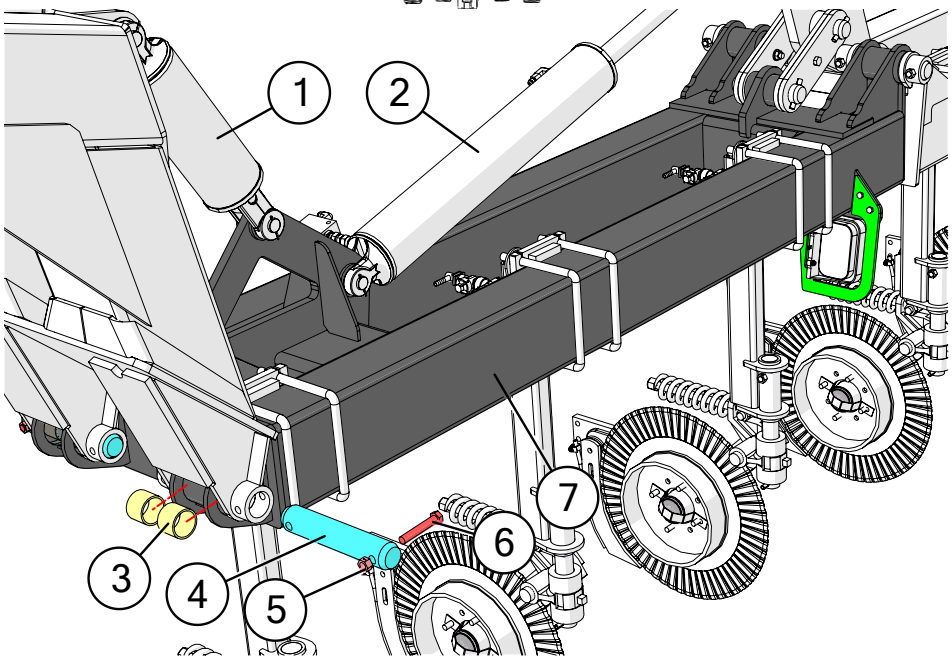


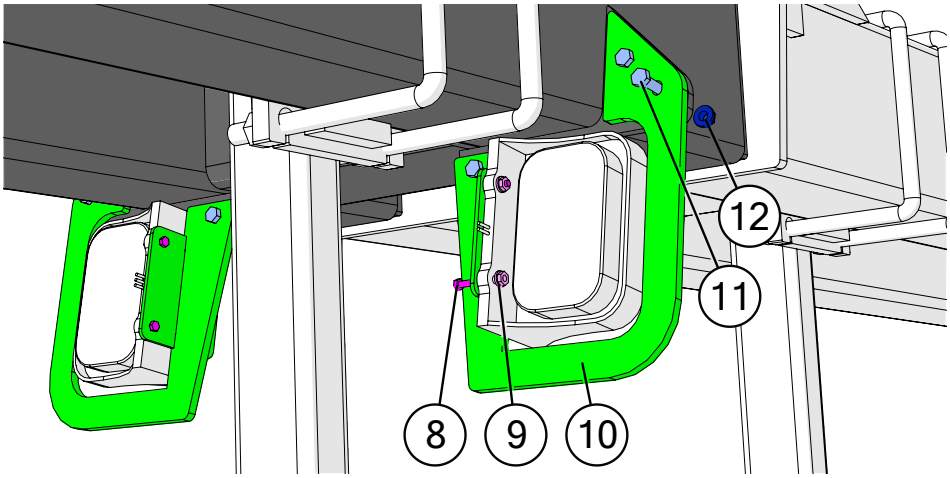
	Description	Part No.
1	Inside Wing Weldment (Passenger's Side) (6018, 6026)	JM0045028
2	Inside Wing Weldment (Driver's Side) (6018, 6026)	JM0047901
3	6000 Series Latch Sign - Stationary	JM0068709
4	6000 Applicator Latch Sign - Moving (Driver Side)	JM0062740
4	6000 Applicator Latch Sign - Moving (Passenger Side)	JM0068715
5	1/2"-13 x 3" Gr5 Z Hex Bolt	JM0016678
6	11-1/4" Clevis Pin (1-3/4" Diameter) - Latch Pin	JM0053933
7	1/2"-13 Gr2 Z Centerlock Hex Nut	JM0001511
8	9-1/4" Clevis Pin (1-3/4" Diameter)	JM0046030
9	1" Pin for 4" x 8-1/2" Latch Cylinder - Clevis End	JM0061801
10	Bolt Pin Keeper (NitroGro 6000 Series)	JM0045972
11	3/8"-16 x 1" Gr5 Z SF Hex Bolt	JM0002092
12	3/8"-16 Gr5 Z SF Hex Nut	JM0002152
13	Spring Latch Weldment (NitroGro 6000 Series)	JM0062110
14	1"-8 Gr2 Z Hex Jam Nut	JM0001705
15	3/8"-16 Gr2 Z Centerlock Hex Nut	JM0001512
16	6000 Applicator Latch Wear Shoe	JM0061649
17	1-3/4" ID x 2" OD x 1-1/2" Sleeve Composite Bushing	JM0030328
18	6000 Applicator Spring Latch Compression Plate - Zinced	JM0060661
19	3/8"-16 x 3-1/2" Gr5 Z Hex Bolt	JM0001986
20	Press-Fit Latch Screw Spring Plunger	JM0074374
21	3/8" x 2-7/16" OD x 10" Long Wire Compression Spring	JM0068707
22	1" Pin for 4x8.5 Latch Cylinder - Butt End	JM0073959
23	4" Bore, 8-1/2" Stroke Cylinder Assembly	JM0062922
24	Solid Clevis for 4" x 8-1/2" Cylinder	JM0074197
25	11-1/4" Clevis Pin (2-1/2" Diameter)	JM0046032
26	2-1/2" ID x 2-3/4" OD x 2" Long Sleeve Composite Bushing	JM0062417
27	1/2"-13 x 4" Gr5 Z Hex Bolt	JM0048014
28	3/8"-16 x 1/2" Socket Set Screw Nylon Tip	JM0037255



Middle Wing and Connections

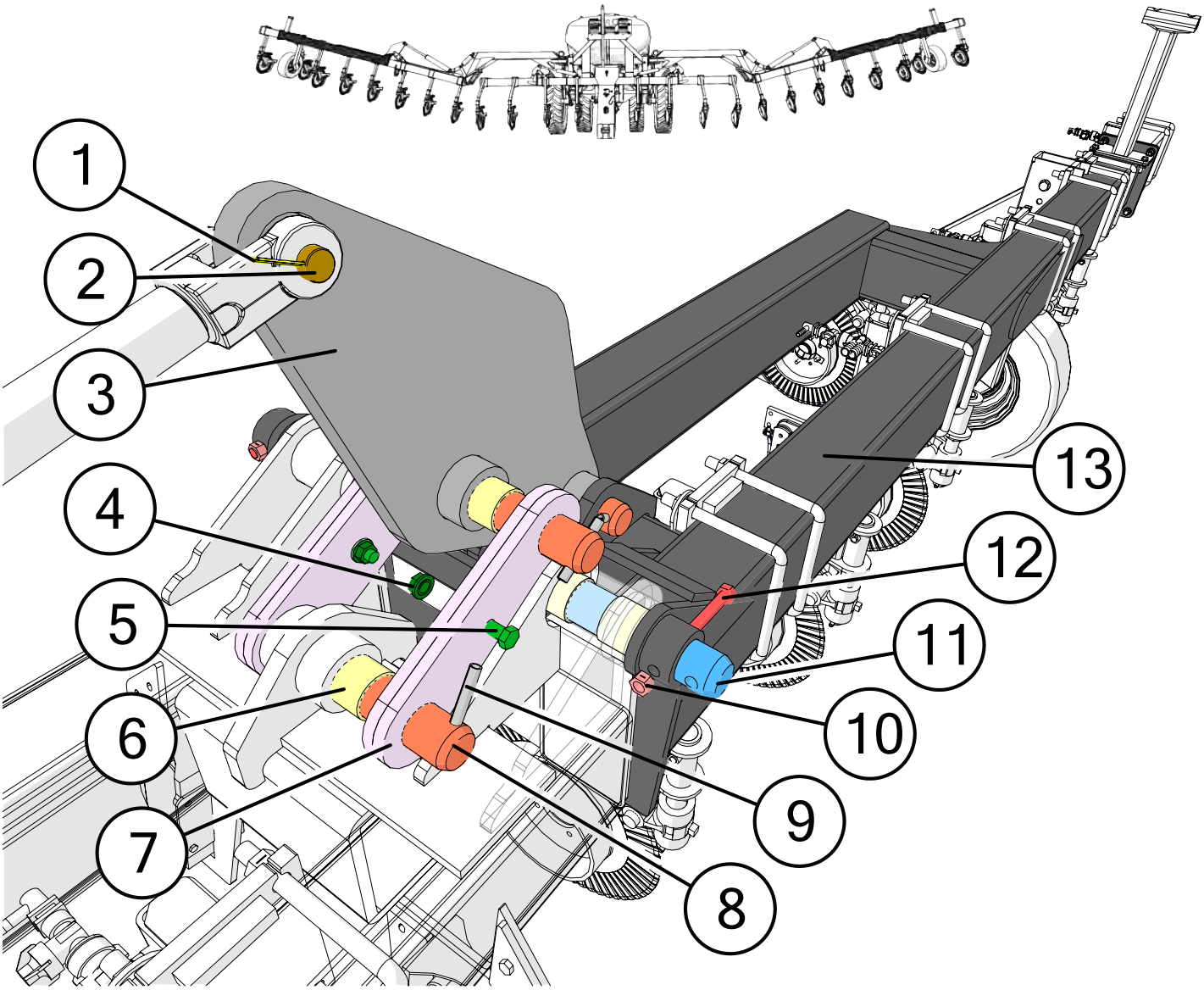






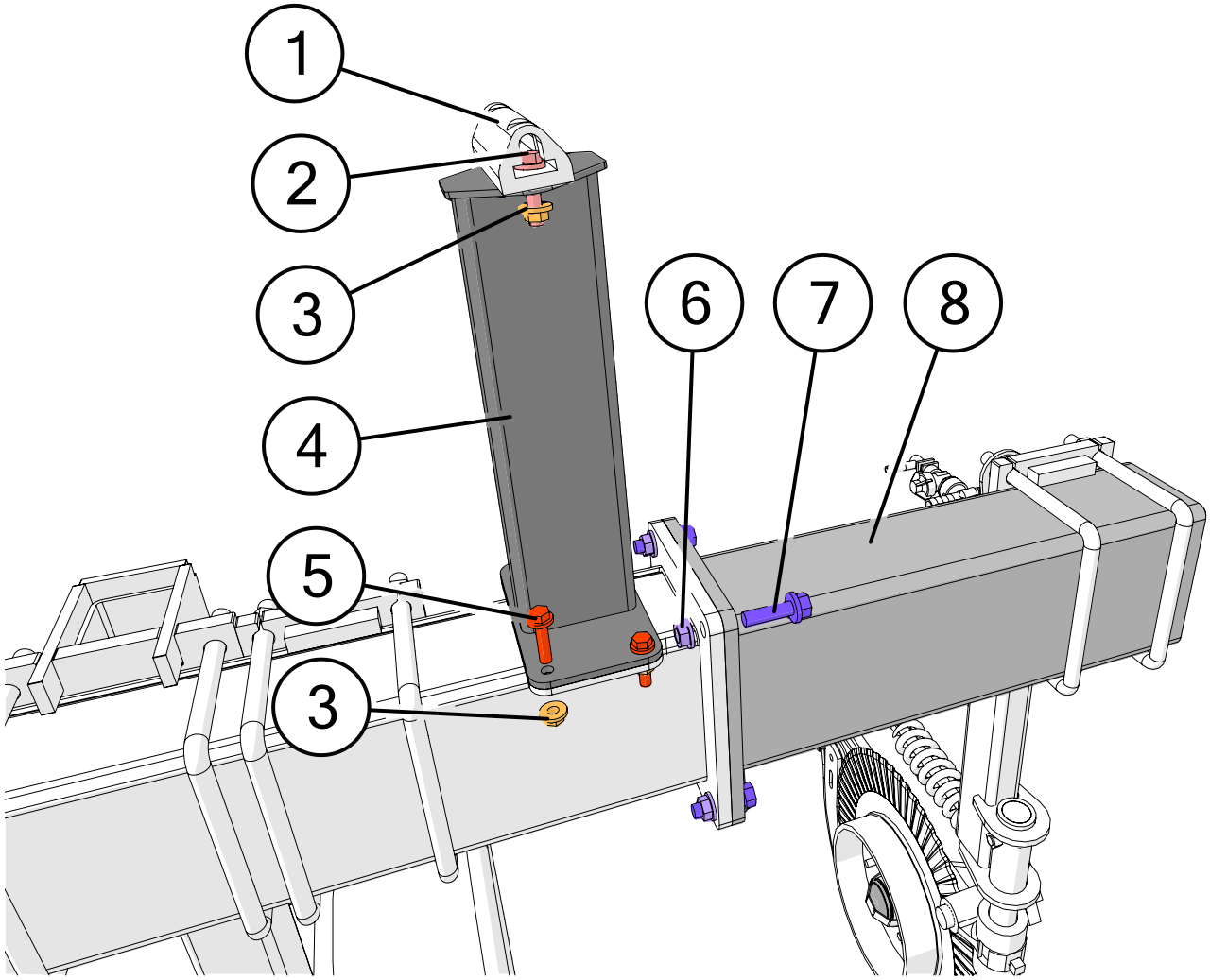
	Description	Part No.
1	4" Bore, 8" Stroke Welded Hydraulic Cylinder - Heavier Clevises	JM0030757
1	Seal Kit for 4" x 8" Hydraulic Cylinder (JD-608)	JM0039241
2	4" Bore, 24" Stroke Welded Hydraulic Cylinder - Heavier Clevises	JM0030730
2	Seal Kit for 4" x 24" Hydraulic Cylinder (JD-609)	JM0039242
3	1-3/4" ID x 2" OD x 1-1/2" Sleeve Composite Bearing	JM0030328
4	9-1/4" Clevis Pin (1-3/4" Diameter)	JM0046030
5	1/2"-13 Gr2 Z Centerlock Hex Nut	JM0001511
6	1/2"-13 x 3" Gr5 Z Hex Bolt	JM0016678
7	Middle Wing Weldment	JM0045238
8	#10-24 x 13/16" Gr5 Z Hex Bolt	JM0048013
9	#10-24 Gr5 Z SF Hex Nut	JM0009983
10	Tail Light Bracket Weldment	JM0047850
11	5/16"-18 x 1" Gr5 Z Hex Bolt	JM0001743
12	5/16"-18 Gr5 Z SF Hex Nut	JM0014049

Outside Wing and Connections



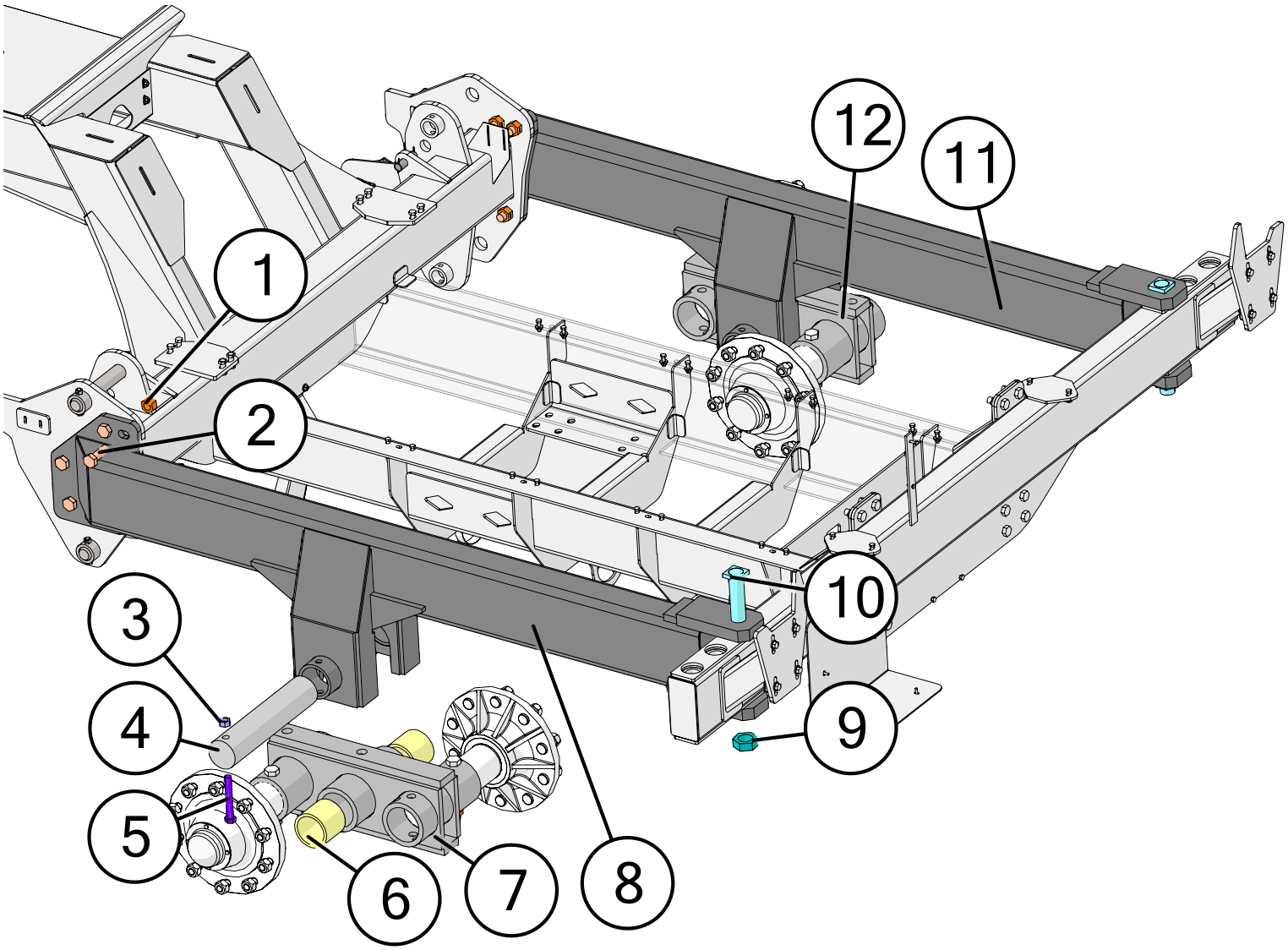
	Description	Part No.
1	Cotter Pin (for 1" x 3-2/5" Clevis Pin)	JM0003064
2	1" x 3-2/5" Clevis Pin	JM0001816
3	Long Fold Straight Auger Master Link Weldment	JM0046033
4	1/2"-13 Gr5 Z SF Hex Nut	JM0002153
5	1/2"-11 x 1-3/4" Gr5 Z SF Hex Bolt	JM0047937
6	1-3/4" ID x 2" OD x 1-1/2" Sleeve Composite Bearing	JM0030328
7	Outside Wing Slave Link	JM0047457
8	7-1/8" Clevis Pin (1-3/4" Diameter)	JM0047458
9	7/16" x 2-3/4" Z Roll Pin	JM0009895
10	1/2"-13 Gr2 Z Centerlock Hex Nut	JM0001511
11	9-1/4" Clevis Pin (1-3/4" Diameter)	JM0046030
12	1/2"-13 x 3" Gr5 Z Hex Bolt	JM0016678
13	Outside Wing Weldment (Driver Side)	JM0047908
13	Outside Wing Weldment (Passenger Side)	JM0045296

Wing End and Wing Prop



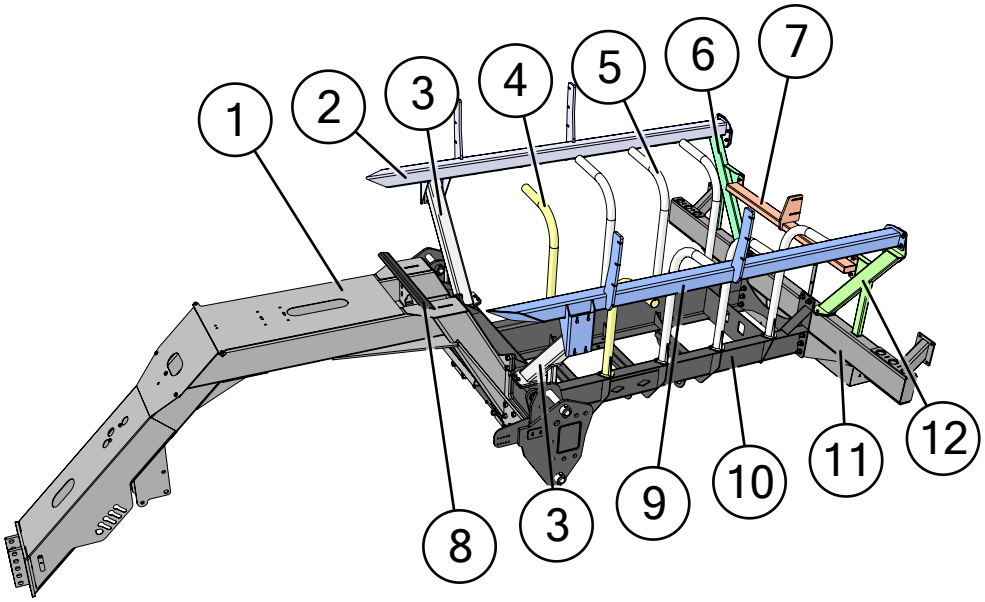
	Description	Part No.
1	6" x 1-7/8" Auger Rest Triangle Pad	JM0037644
2	3/8"-16 x 1" Gr5 Z SF Hex Bolt	JM0002092
3	3/8"-16 Gr5 Z SF Hex Nut	JM0002152
4	2600 Gallon Tank Wing Prop	JM0047490
5	3/8"-16 x 1-1/2" Gr5 Z SF Hex Bolt	JM0001633
6	1/2"-13 Gr5 Z SF Hex Nut	JM0002153
7	1/2"-11 x 1-3/4" Gr5 Z SF Hex Bolt	JM0047937
8	25 Row Wing Extension	JM0047462

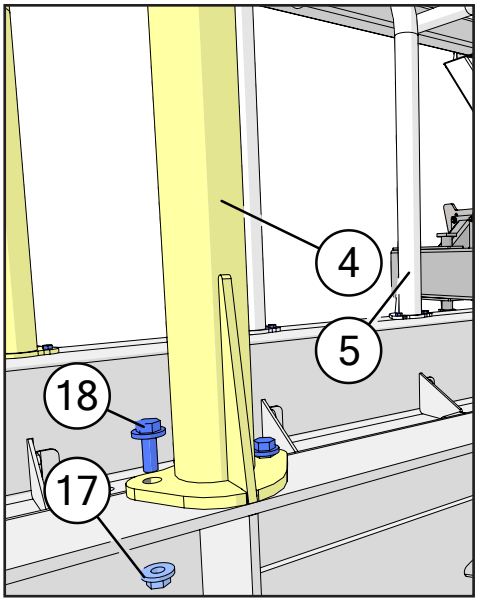
Walking Dual Wheel Assembly

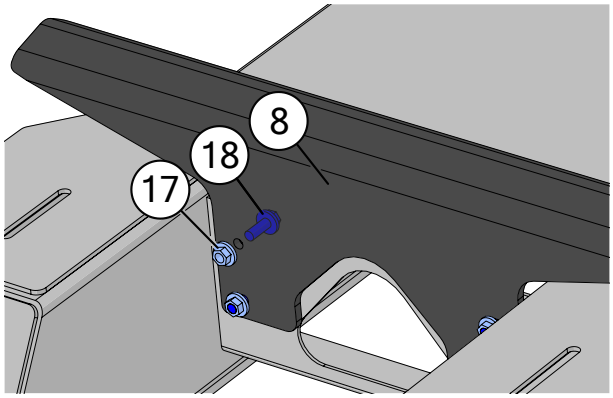


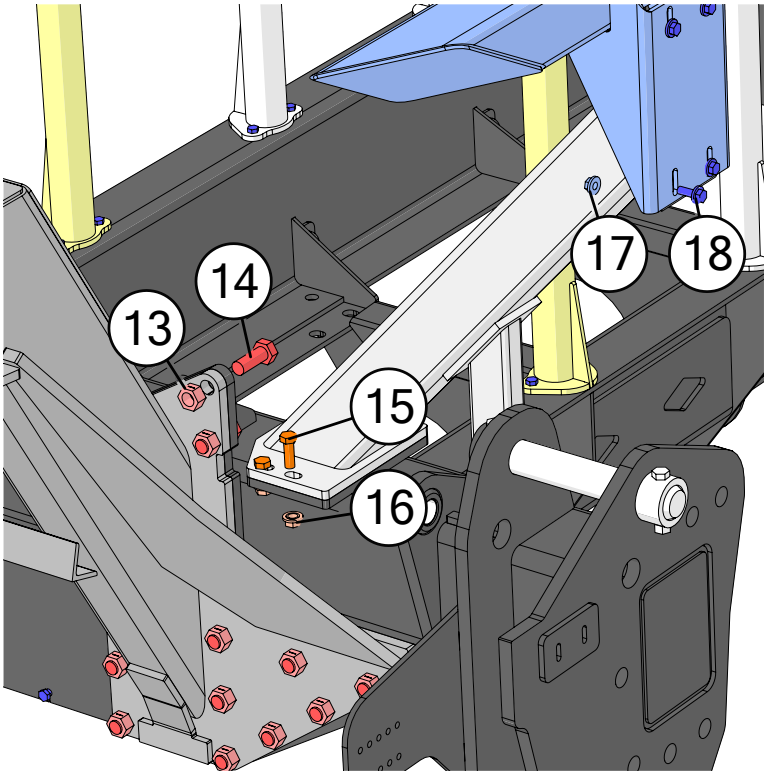
	Description	Part No.
1	1"-8 Gr2 Z Centerlock Hex Nut	JM0002149
2	1"-8 x 3" Gr5 Z Hex Bolt	JM0016686
3	3/4"-10 Gr2 Z Centerlock Hex Nut	JM0002147
4	3-3/4" x 17-1/2" Pivot Pin (334PP)	JM0019928
5	3/4"-10 x 5-1/2" Gr5 Z Hex Bolt	JM0015522
6	3-3/4" ID, 4-1/2" OD Bronze Bushing (4" Lg) (BB-334)	JM0010570
7	Triple Pivot Weldment - Close Coupled Walker (Driver's Side)	JM0046012
8	Walking Axle Assembly (Driver's Side) - NitroGro (7,000 lbs.)	JM0045919
9	1-3/4"-12 Z Gr5 Hex Jam Nut	JM0009752
10	1-3/4" x 13" Gr5 Bolt	JM0020328
11	Walking Axle Assembly (Passenger's Side) - NitroGro (7,000 lbs.)	JM0045526
12	Triple Pivot Weldment - Close Coupled Walker (Passenger's Side)	JM0037521

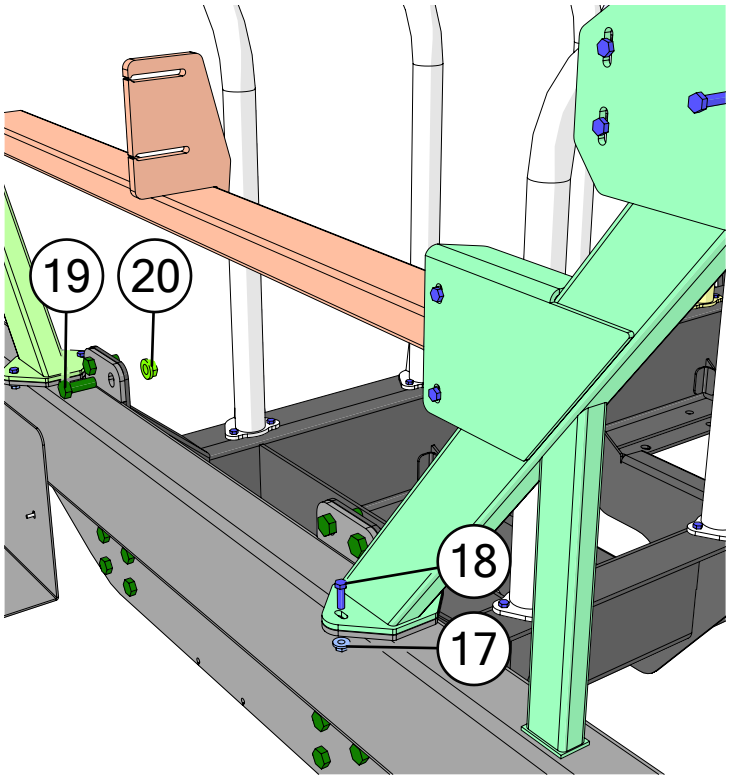
Tank Supports







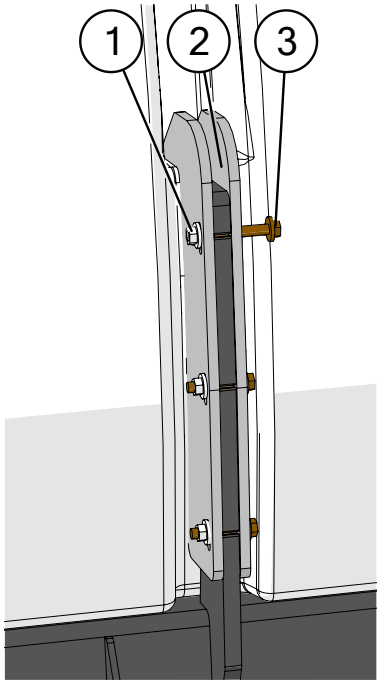


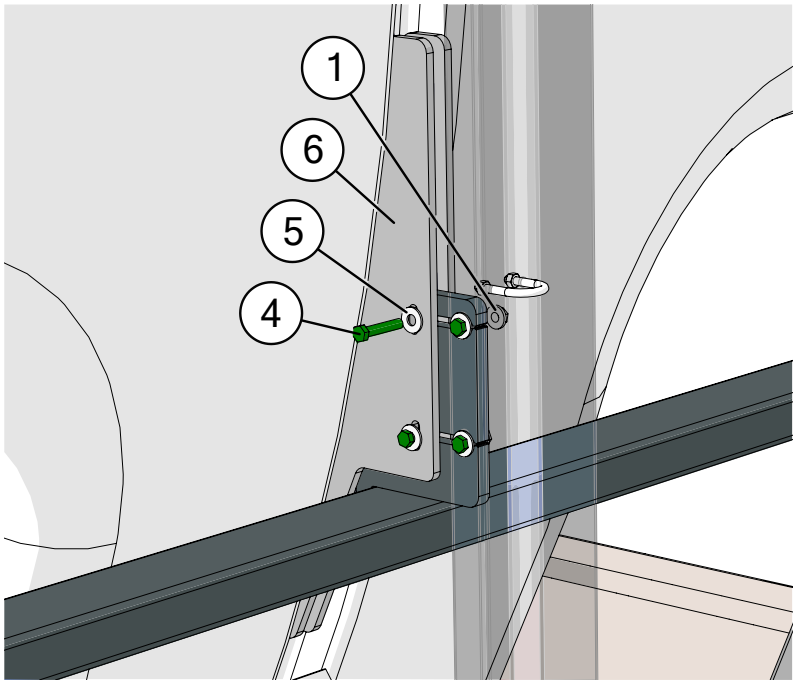


Tank Supports

	Description	Part No.
1	Base Frame Weldment - NitroGro	JM0058146
2	Side Tank Support Tube Weldment	JM0046878
3	Front Tank Support Tube Weldment	JM0046875
4	Tank Support Rib Weldment (33-5/32" Height)	JM0046591
5	Tank Support Rib Weldment (37-7/8" Height)	JM0046594
6	Tank Support Rear Tube Weldment (Passenger's Side)	JM0046880
7	Tank Rear Support Tube Weldment	JM0047584
8	Front Tank Support	JM0046600
9	Tank Support Tube Weldment	JM0047816
10	Base Frame Weldment - NitroGro	JM0058152
11	Uni-Frame Rear - Tandems Tube	JM0053810
12	Tank Support Rear Tube Weldment (Driver's Side)	JM0047819
13	3/4"-10 Gr2 Z Centerlock Hex Nut	JM0002147
14	3/4"-10 x 2" Gr8 YZ Hex Bolt	JM0041923
15	1/2"-13 x 1-1/2" Gr5 Z Hex Bolt	JM0002100
16	1/2"-13 Gr5 Z SF Hex Nut	JM0002153
17	3/8"-16 Gr5 Z SF Hex Nut	JM0002152
18	3/8"-16 x 1" Gr5 Z SF Hex Bolt	JM0002092
19	3/4"-10 x 2" Gr5 Z Hex Bolt	JM0002106
20	3/4"-10 Gr5 Z SF Hex Nut	JM0009921

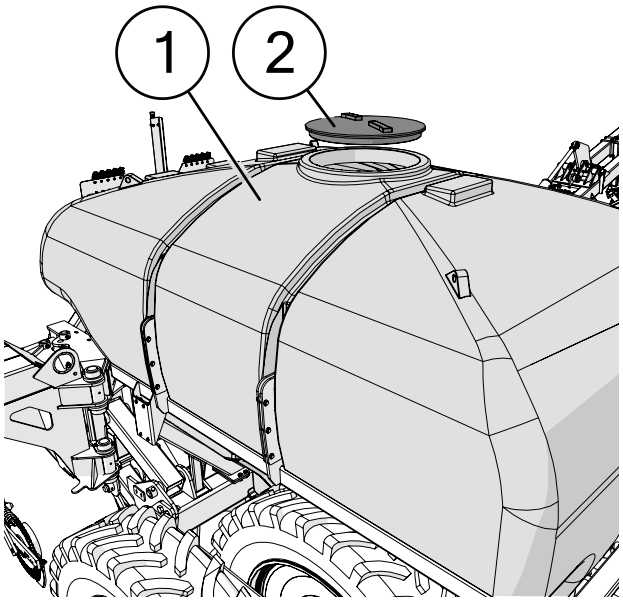
Tank Strap Down

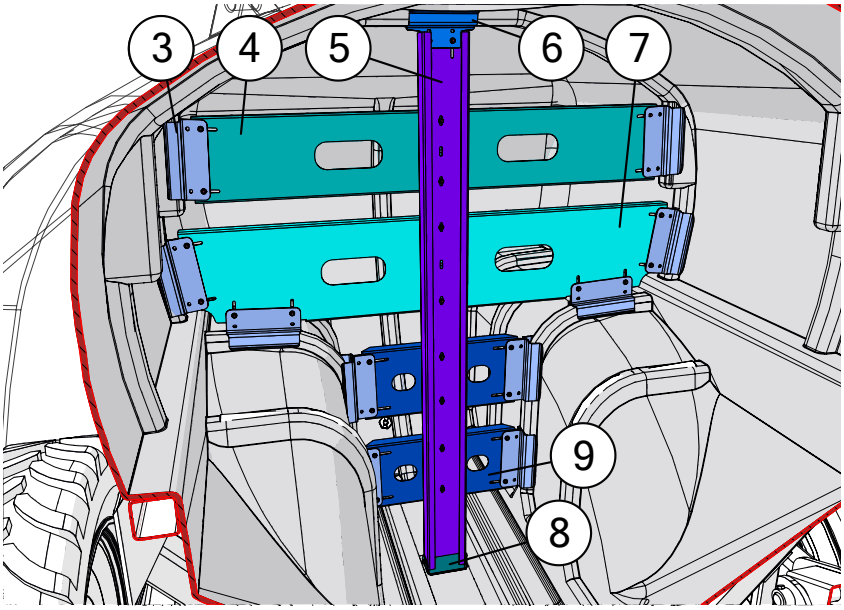


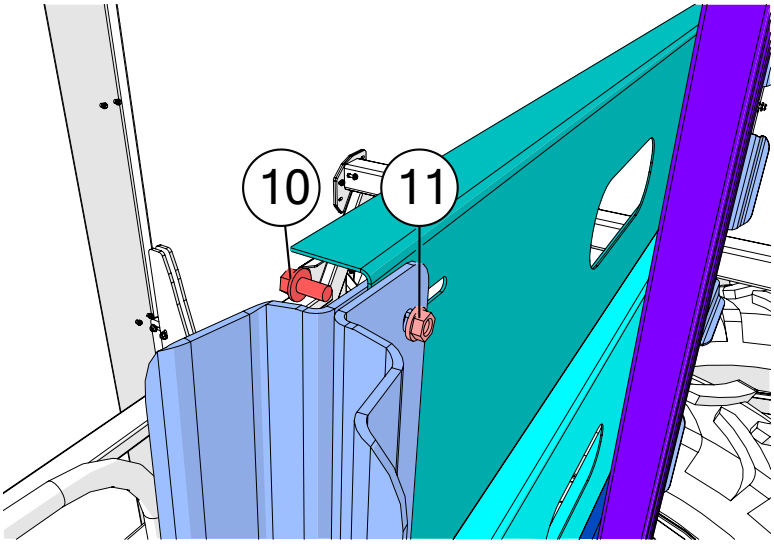


	Description	Part No.
1	3/8"-16 Gr5 Z SF Hex Nut	JM0002152
2	Vertical Bolt-on Tank Support	JM0047572
3	3/8"-16 x 2" Gr5 Z SF Hex Bolt	JM0016070
4	3/8"-16 x 2" Gr5 Z Hex Bolt	JM0001510
5	3/8" ID, 1" OD Z Flat Washer	JM0003061
6	Rear Vertical Tank Support Plate	JM0047583

Tank

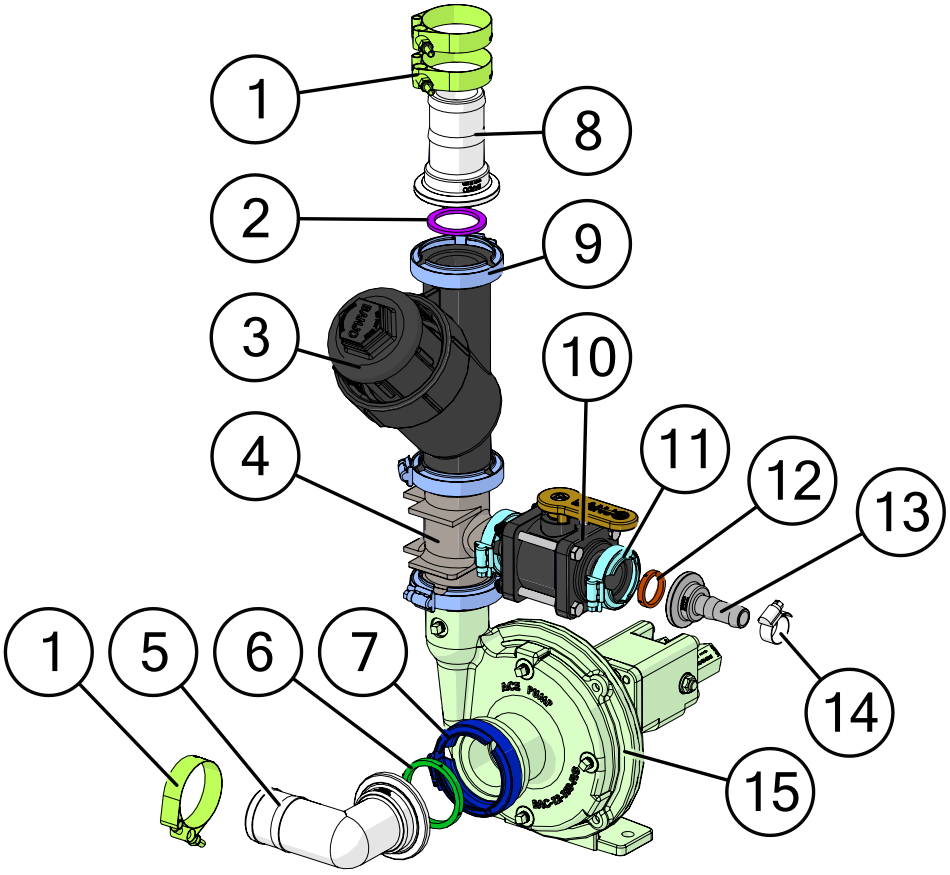


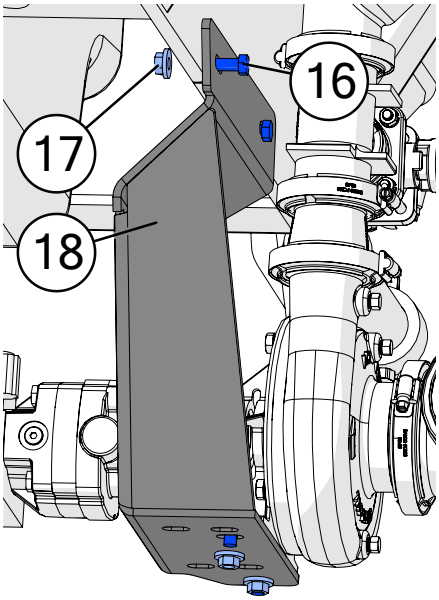




	Description	Part No.
1	2600 Gallon Rounded Tank	JM0046439
2	Norwesco 22in Ventless Lid Assembly - 63863	JM0047873
3	Applicator Poly Tank Baffle - Clamp for Baffle	JM0047722
4	Applicator Poly Tank Baffle - 2600 Gallon Specific Tank Baffle	JM0047728
5	Applicator Poly Tank Baffle - Center Pillar (2600)	JM0046872
6	Applicator Poly Tank Baffle - Clamp for Center Pillar	JM0047726
7	Applicator Poly Tank Baffle - Middle Baffle	JM0046874
8	Applicator Poly Tank Baffle - Foot	JM0047712
9	Applicator Poly Tank Baffle - Lower Baffle	JM0046873
10	3/8”-16 x 3/4” SS SF Hex Bolt	JM0048129
11	3/8”-16 SS SF Hex Nut	JM0048132

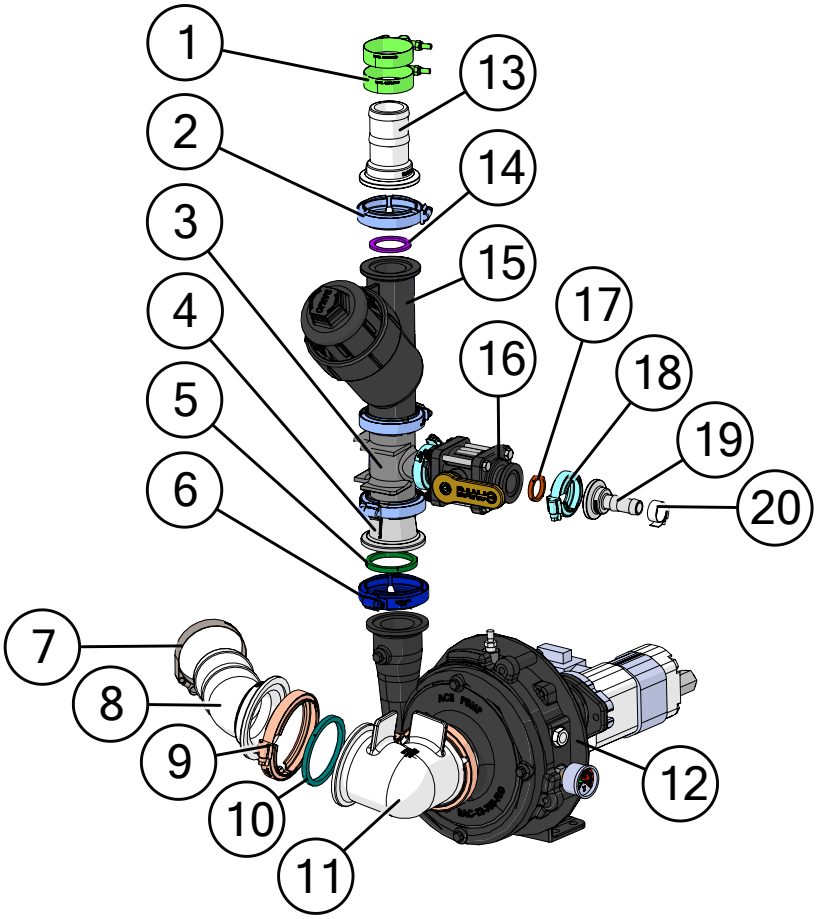
Hydraulic 155 ACE Pump and Manifold

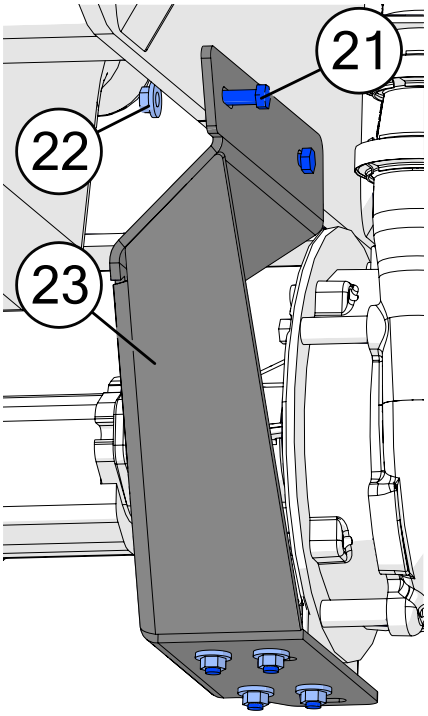




	Description	Part No.
1	T-Bolt Hose Clamp 2" Hose, 2-5/16" Min OD	JM0035247
2	Manifold Gasket for M200 Fittings	JM0021145
3	Manifold Y Strainer - M200 Manifold Flange, 30 Mesh	JM0033803
4	M200 Manifold Flange x M200 Manifold Flange x M100 Manifold Flange; Tee	JM0035116
5	2" Hose Barb x M220 Manifold Flange; 90 Degree	JM0033807
6	Manifold Gasket for M220 Fittings	JM0035278
7	Manifold Flange Clamp for M220	JM0035238
8	M200 Manifold Flange x 2" Hose Barb; Straight	JM0035137
9	Manifold Flange Clamp for M200 Fittings	JM0035251
10	Ball Valve with M100 Manifold Flange	JM0033824
11	Manifold Flange Clamp for M100 Fittings	JM0032496
12	Manifold Gasket for M100 Fittings with Rib	JM0035239
13	M100 Manifold Flange x 3/4" Hose Barb; Straight	JM0021401
14	3/4" Hose Clamp SS	JM0039205
15	FMSC-155F-HYD-206 Ace Pump	JM0038662
16	3/8"-16 x 1-1/4" Gr5 Z Hex Bolt	JM0016675
17	3/8"-16 Gr5 Z SF Hex Nut	JM0002152
18	Applicator Pump Mounting Bracket	JM0050799
19	Ace 150 Pump Hydraulic Side Replacement Seal Kit - RK-BAC-75-HYD-L	JM0061310
20	Ace 150 Pump Water Side Replacement Seal Kit - RK-FMCSC-150	JM0061308

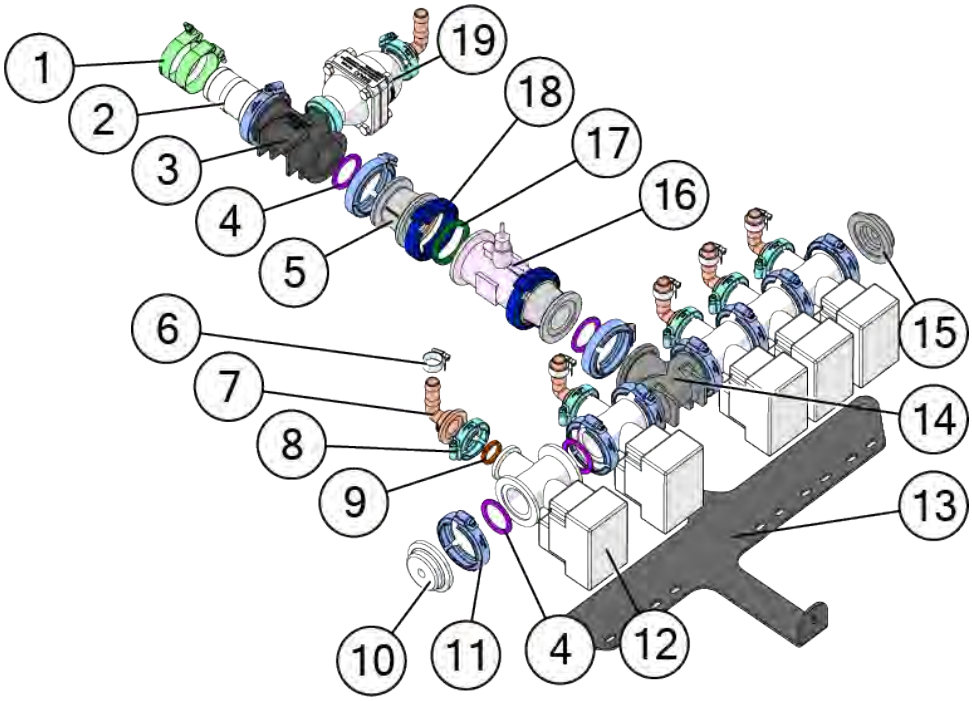
Hydraulic 750 ACE Pump and Manifold

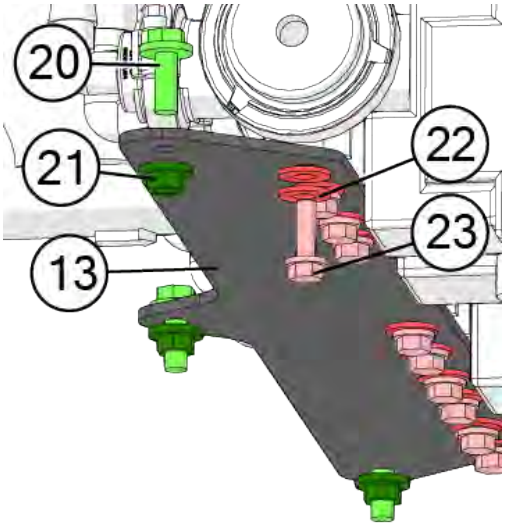




	Description	Part No.
1	T-Bolt Hose Clamp 2" Hose, 2-5/16" Min OD	JM0035247
2	Manifold Flange Clamp for M200 Fittings	JM0035251
3	M200 Manifold Flange x M200 Manifold Flange x M100 Manifold Flange; Tee	JM0035116
4	2" Full Port Manifold x 2" Manifold Flange Reducer Coupling	JM0035131
5	Manifold Gasket for M220 Fittings	JM0035278
6	Manifold Flange Clamp for M220	JM0035238
7	T-Bolt Hose Clamp 3" Hose, 3-5/16" Min OD	JM0035248
8	3" Hose Barb x M300 Manifold Flange; 45°	JM0033989
9	Manifold Flange Clamp for M300 Fittings	JM0035237
10	Manifold Gasket for M300 Fittings with Rib	JM0021239
11	M300 Manifold Flange x M300 Manifold Flange; 90 Degree	JM0033979
12	FMC-750F-HYD-M22 Ace Pump	JM0050785
13	M200 Manifold Flange x 2" Hose Barb; Straight	JM0035137
14	Manifold Gasket for M200 Fittings	JM0021145
15	Manifold Y Strainer - M200 Manifold Flange, 30 Mesh	JM0033803
16	Ball Valve with M100 Manifold Flange	JM0033824
17	Manifold Gasket for M100 Fittings with Rib	JM0035239
18	Manifold Flange Clamp for M100 Fittings	JM0032496
19	M100 Manifold Flange x 3/4" Hose Barb; Straight	JM0021401
20	3/4" Hose Clamp SS	JM0039205
21	3/8"-16 x 1-1/4" Gr5 Z Hex Bolt	JM0016675
22	3/8"-16 Gr5 Z SF Hex Nut	JM0002152
23	Applicator Pump Mounting Bracket	JM0050799
24	Ace 750 Pump Hydraulic Side Replacement Seal Kit - RK-BAC-75-M	JM0061314
25	Ace 750 Pump Water Side Replacement Seal Kit - RK-FMC-750	JM0061312

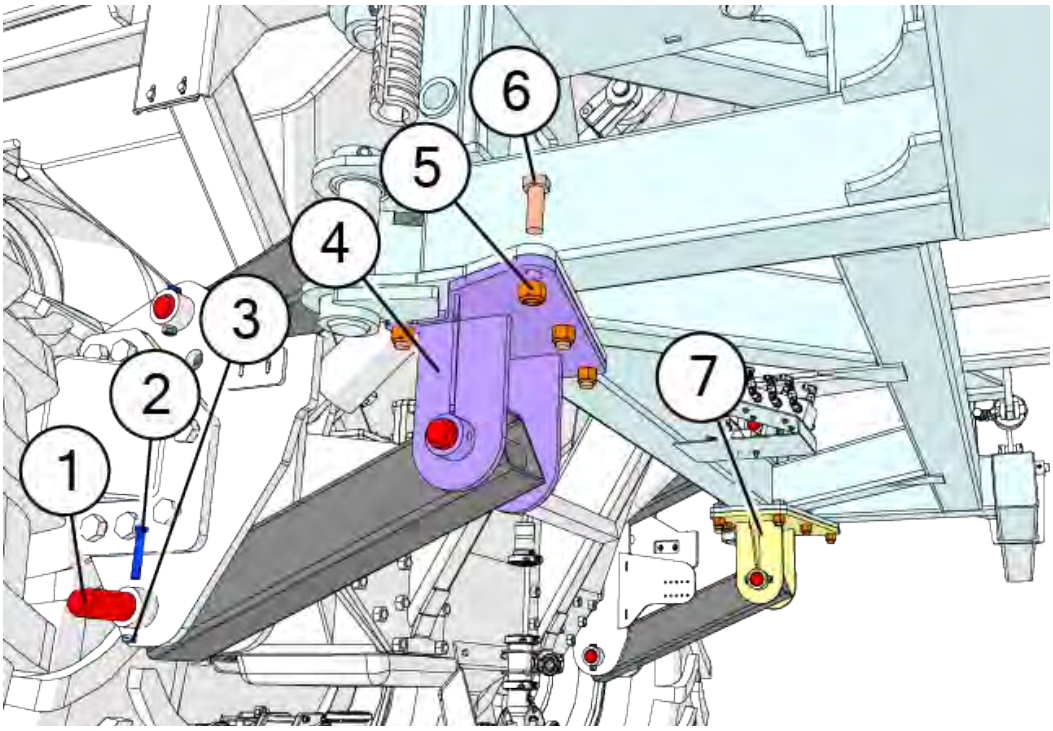
Raven Manifold

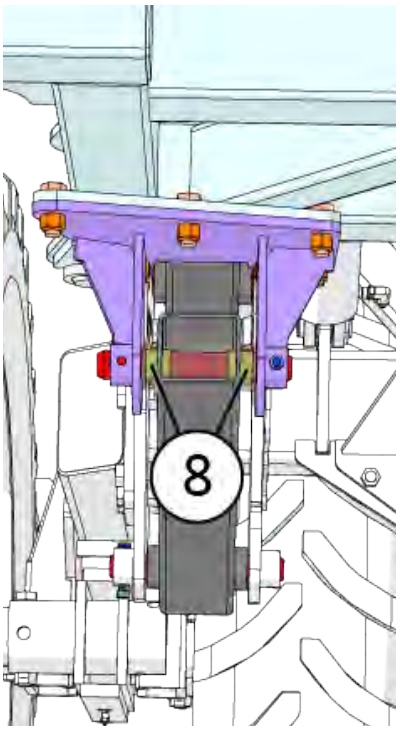


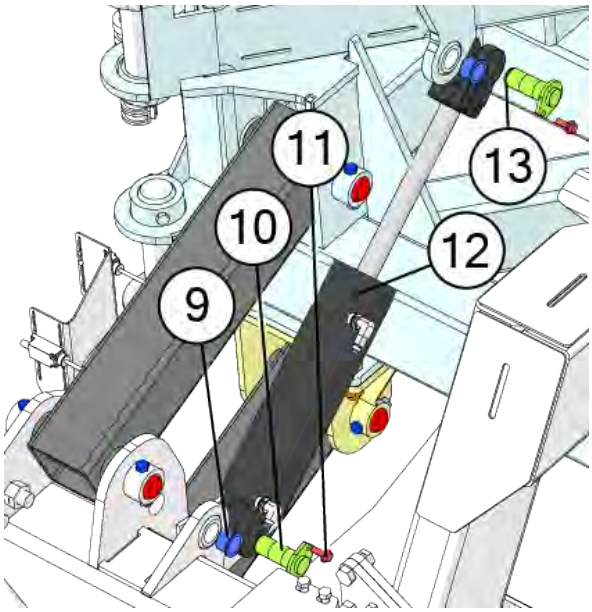


	Description	Part No.
1	T-Bolt Hose Clamp 2" Hose, 2-5/16" Min OD	JM0035247
2	2" Hose Barb x M220 Manifold Flange; Straight	JM0033796
3	M200 Manifold Flange x M200 Manifold Flange x M100 Manifold Flange; Tee	JM0035116
4	Manifold Gasket for M200 Fittings	JM0021145
5	2" Full Port Manifold x 2" Manifold Flange Reducer Coupling	JM0035131
6	3/4" Hose Clamp SS	JM0039205
7	M100 Manifold Flange x 3/4" Hose Barb; 90 Degree	JM0032501
8	Manifold Flange Clamp for M100 Fittings	JM0032496
9	Manifold Gasket for M100 Fittings with Rib	JM0035239
10	Manifold Plug for M200 Fittings with 1/4" NPT for Gauge	JM0021147
11	Manifold Flange Clamp for M200 Fittings	JM0035251
12	Raven Boom Valve	JM0032478
13	Top Tongue Raven Mounting Bracket	JM0054334
14	M200 Manifold Flange x M200 Manifold Flange x M200 Manifold Flange; Tee	JM0021140
15	Manifold Plug for M200 Fittings	JM0021146
16	Raven Flow Meter M220 Manifold Flange (RFM100P)	JM0038727
17	Manifold Gasket for M220 Fittings	JM0035278
18	Manifold Flange Clamp for M220	JM0035238
19	100psi Spike Valve with M100 Manifold Flanges	JM0032499
20	3/8"-16 x 1" Gr5 Z SF Hex Bolt	JM0002092
21	3/8"-16 Gr5 Z SF Hex Nut	JM0002152
22	1/4" ID, 3/4" OD Z Flat Washer	JM0003090
23	1/4"-20 x 3/4" Gr5 Z Hex Bolt	JM0001507

Parallel Linkage for Toolbar Height Adjustment

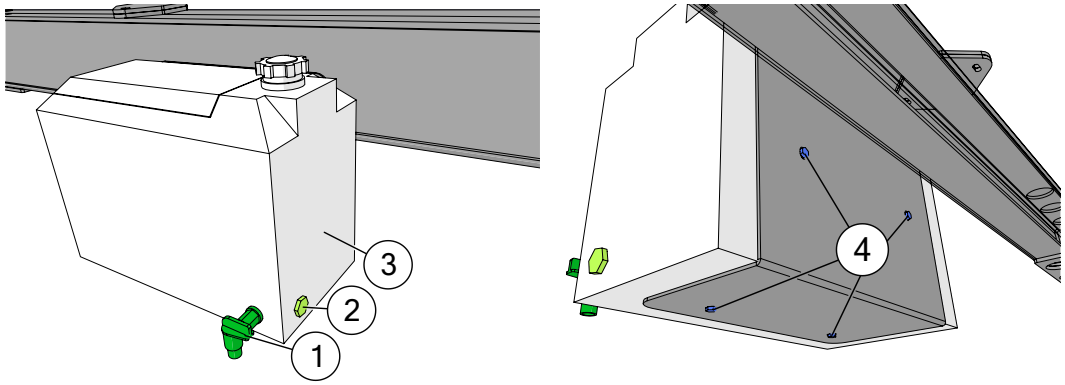






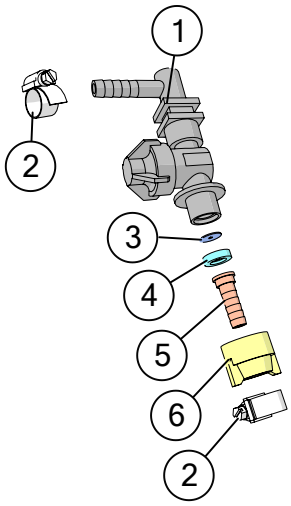
	Description	Part No.
1	11-1/4" Clevis Pin (1-3/4" Diameter)	JM0045307
2	1/2"-13 x 3" Gr5 Z Hex Bolt	JM0016678
3	1/2"-13 Gr2 Z Centerlock Hex Nut	JM0001511
4	Toolbar to Frame Connection Weldment (Passenger Side)	JM0050119
5	7/8"-14 GrC Z Distorted Thread Hex Nut	JM0075662
6	7/8"-14 x 2-1/2" Gr8 YZ Hex Bolt	JM0059217
7	Toolbar to Frame Connection Weldment (Driver Side)	JM0050665
8	1-3/4" ID x 2" OD x 1-1/2" Sleeve Composite Bushing	JM0030328
9	1-1/4" ID x 1-13/32" OD x 1" LG Flange Composite Bearing	JM0063121
10	1-1/4" x 3-3/16" Pin for 4" x 12" Cylinder (NitroGro 6000 Series)	JM0062485
11	3/8"-16 x 1" Gr5 Z SF Hex Bolt	JM0002092
12	4" Bore, 12" Stroke Welded Hydraulic Cylinder	JM0045585
13	External Retaining Ring - 1-1/4" Shaft	JM0074457

Hand Wash Tank



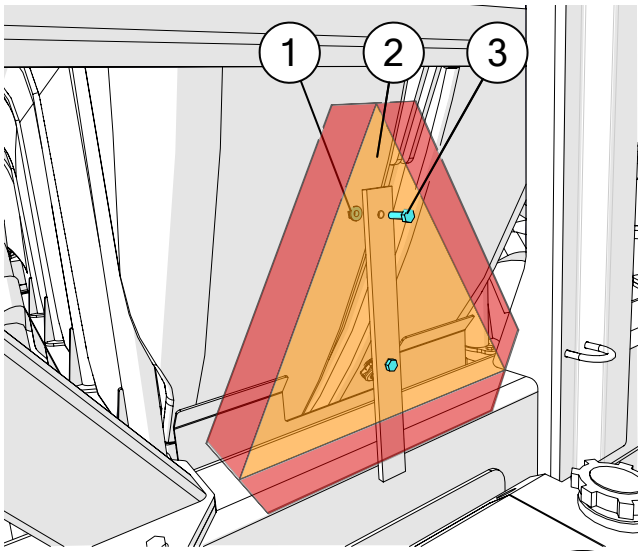
	Description	Part No.
1	9 Gallon Safety/Fresh Water Tank	JM0030587
2	3/4" NPT PVC Threaded Plug Schedule 40 (NitroGro)	JM0037251
3	Drum Faucet - 3/4" NPT	JM0039066
4	1/4"-20 x 3/4" Gr5 Z Hex Bolt	JM0001507

Check Valve



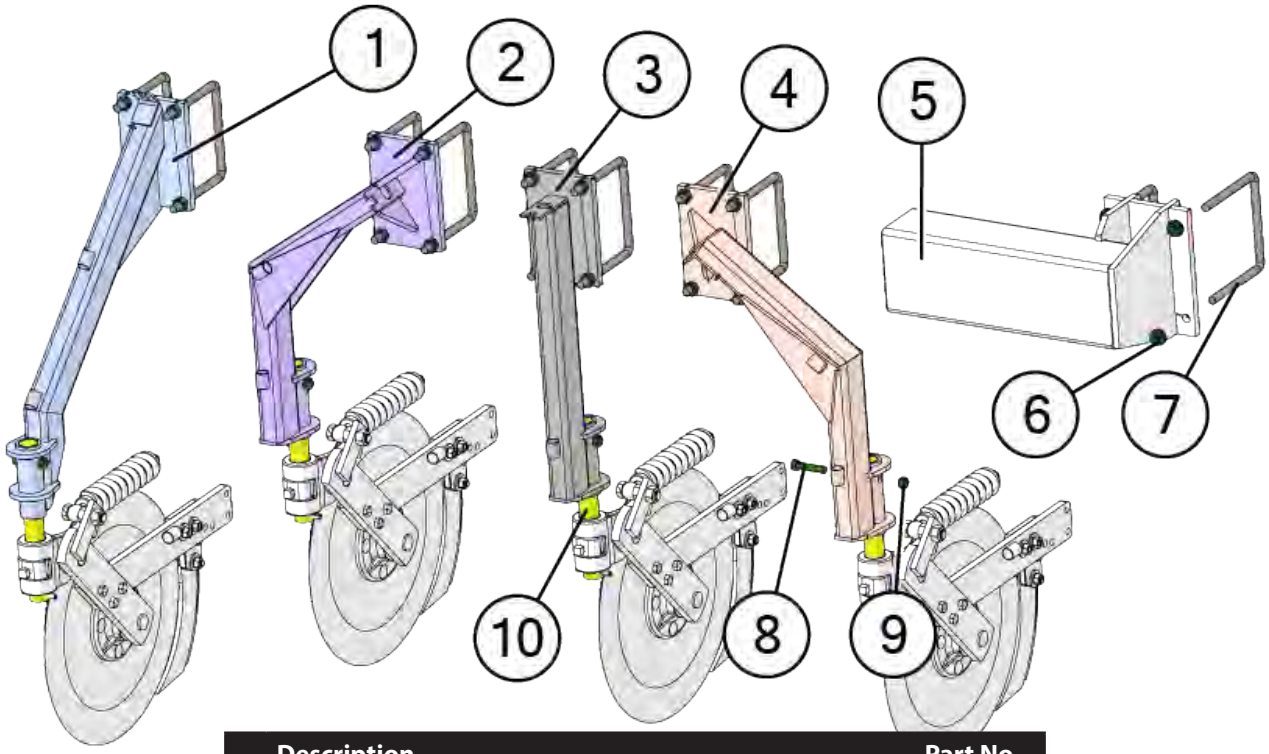
	Description	Part No.
1	Diaphragm Check Valve 3/8" Hose Single	JM0036383
2	3/8" Hose Clamp SS	JM0039206
3	.054 NitroGro Orifice	JM0036373
3	.075 NitroGro Orifice	JM0036374
3	.093 NitroGro Orifice	JM0036375
3	.107 NitroGro Orifice	JM0036376
3	.132 NitroGro Orifice	JM0036377
3	.162 NitroGro Orifice	JM0036378
3	.196 NitroGro Orifice	JM0051020
4	NitroGro Check Valve Seat Gasket	JM0036372
5	3/8" Hose Barb, Poly	JM0036368
6	Quickjet Cap, Black	JM0036371

Slow Moving Vehicle Sign



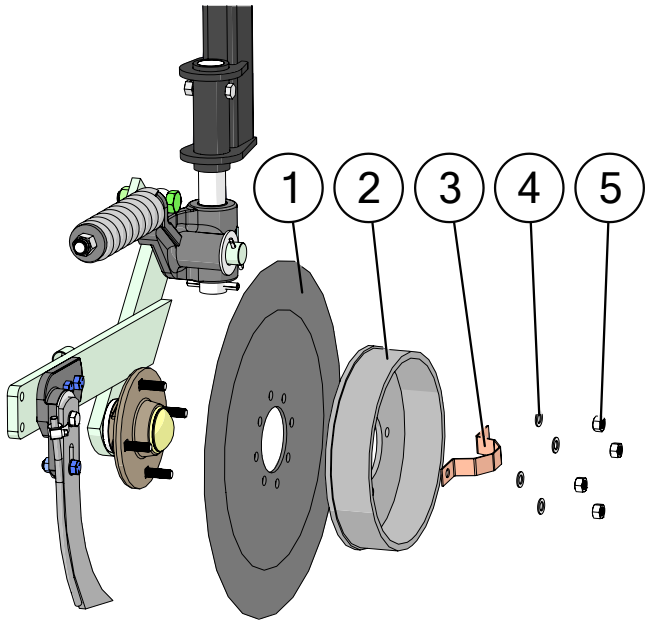
	Description	Part No.
1	1/4"-20 Gr5 Z SF Hex Nut	JM0001630
2	Slow Moving Vehicle Sign	JM0001616
3	1/4"-20 x 3/4" Gr5 Z Hex Bolt	JM0001507

Coulter Mounts



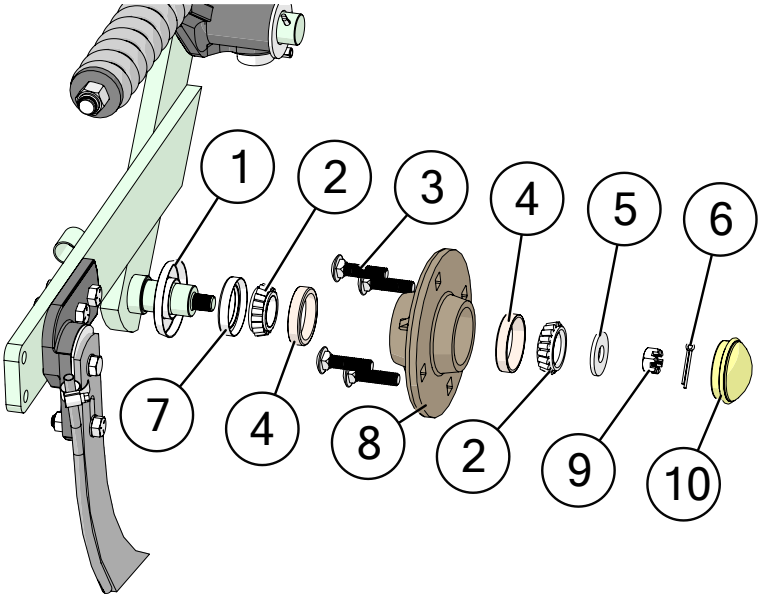
	Description	Part No.
1	Forward Offset Coulter Mount Weldment (NitroGro 6000 Series)	JM0047336
2	Right Offset Coulter Mount Weldment (NitroGro 6000 Series)	JM0047869
3	Standard Coulter Mount Weldment (NitroGro 6000 Series)	JM0036909
4	Left Offset Coulter Mount Weldment (NitroGro 6000 Series)	JM0047867
5	Offset Mount Weldment for Coulters (NitroGro 6000 Series)	JM0047874
6	5/8"-11 Gr5 Z SF Hex Nut	JM0002151
7	5/8"-11 x 7-1/8" x 7" Square U-Bolt	JM0043200
8	1/2"-13 x 2-1/2" Gr5 Z Hex Bolt	JM0001648
9	1/2"-13 Gr2 Z Centerlock Hex Nut	JM0001511
10	Shaft 13" - Coulter Mount	JM0043034
10	13" Shaft - Para-Linkage Coulter Mount	JM0049094

Coulter Depth Control



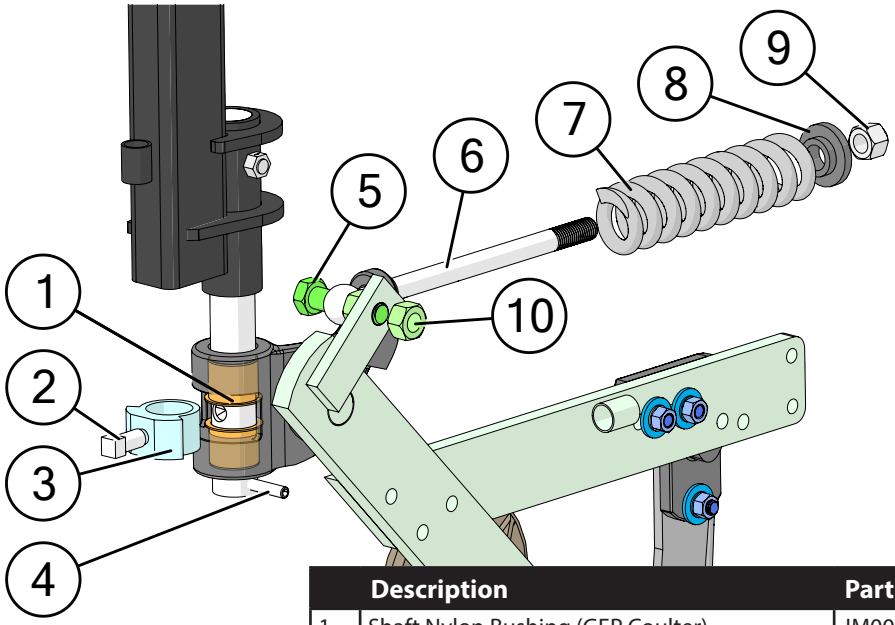
	Description	Part No.
1	20" Straight Coulter Blade with Ripple	JM0031269
1	20" Wavy Coulter Blade (5/8" Wave)	JM0038506
2	GC5000 Depth Control Spool	JM0031281
3	Dust Cap Keeper for GEP Coulter	JM0038391
4	1/2" Gr2 Z Lock Washer	JM0019021
5	1/2"-13 Gr2 Z Hex Nut	JM0002124

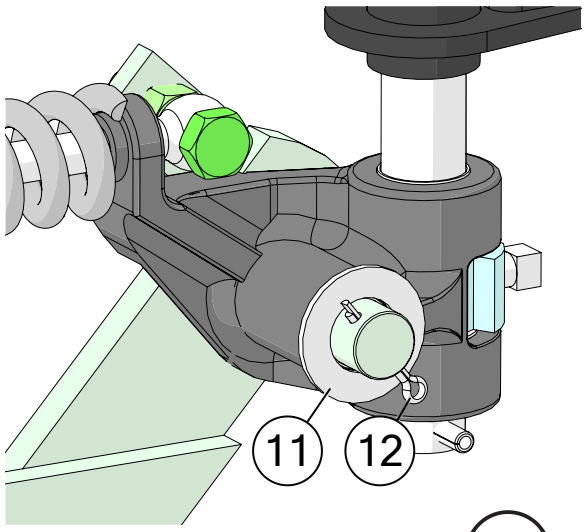
Coulter Hub Assembly

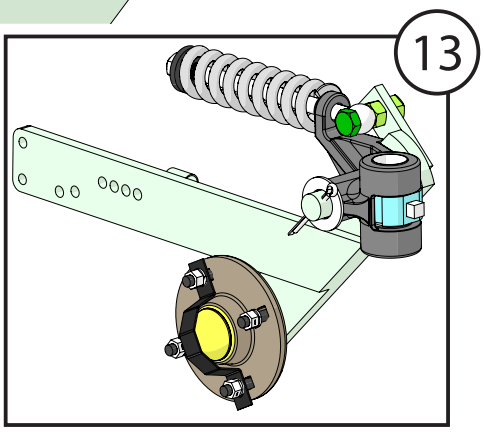


	Description	Part No.
1	Seal Protector for GEP Coulter	JM0038267
2	Small Outer Cone for 6-10 Ton (LM67048)	JM0019564
3	1/2"-13 x 2" Gr2 Z Carriage Bolt	JM0038410
4	LM67010 Cup (Small Race for 6-10 ton)(200500)	JM0026564
5	Hub Washer for GEP Coulter	JM0038278
6	Cotter Pin 1/8" Diameter x 1-1/2" Length	JM0004177
7	Grease Seal for GEP Coulter Hub	JM0038287
8	Hub for GEP Coulter	JM0038285
9	5/8"-18 Castle Nut	JM0049457
10	Dust Cap for GEP Coulter	JM0038288

GEP Coulter Assembly

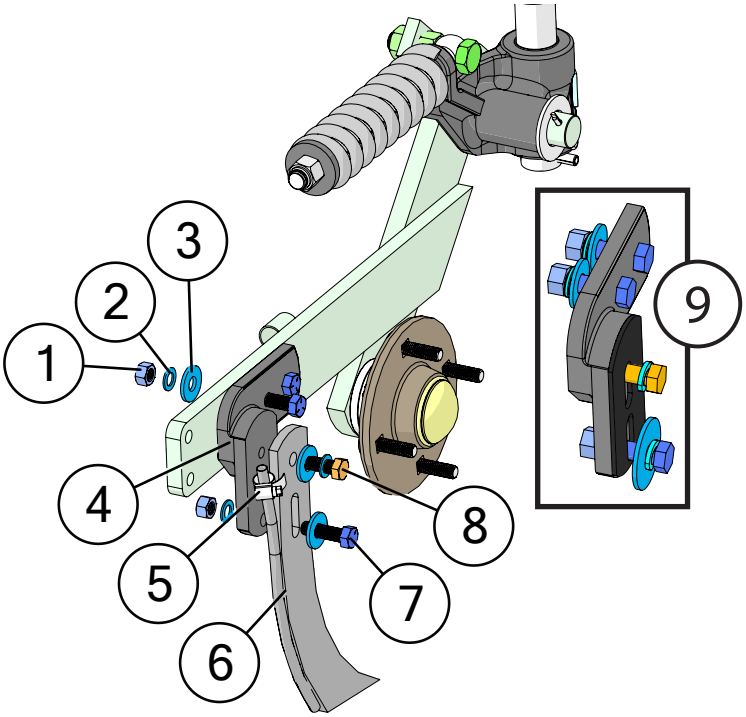






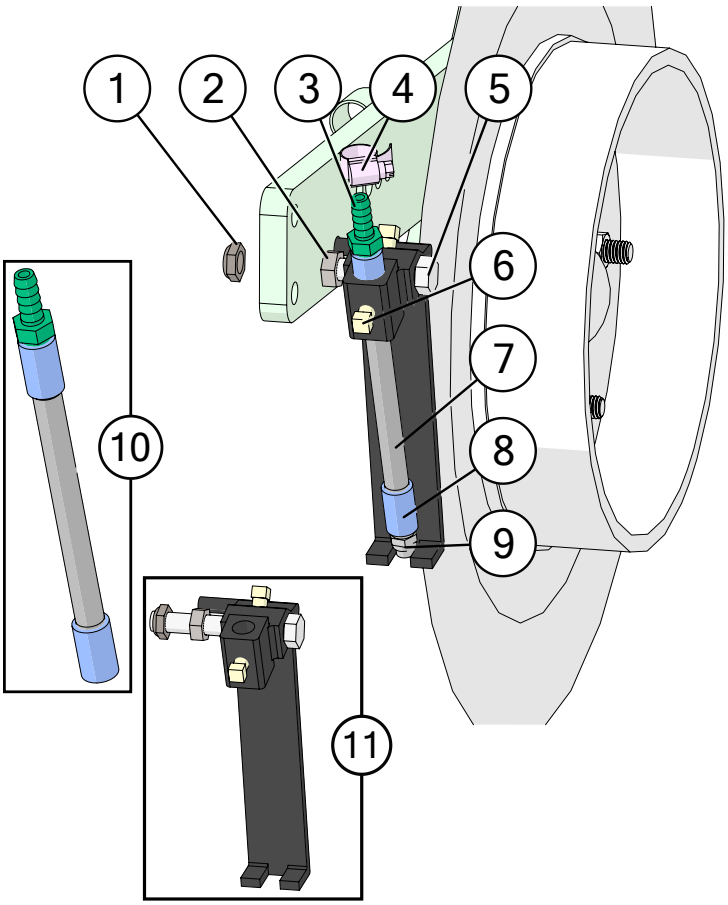
	Description	Part No.
1	Shaft Nylon Bushing (GEP Coulter)	JM0038258
2	5/8"-11 x 1" Square Head Bolt	JM0037259
3	Lock Collar for NitroGro	JM0038280
4	3/8" x 3" SS Roll Pin	JM0037162
5	3/4"-10 x 3" Gr5 Z Hex Bolt	JM0019201
6	Spring Rod for GEP Coulter	JM0038265
7	Spring for GEP Coulter	JM0038269
8	Spring Alignment Cast Washer for GEP Coulter	JM0038270
9	3/4"-10 Gr2 Z Nylon Locking Hex Nut	JM0026756
10	3/4"-10 Gr2 Z Hex Nut	JM0002125
11	1-3/8" ID, 2-1/2" OD Washer	JM0038272
12	Cotter Pin 3/16" Diameter x 2" Long	JM0038266
13	GEP Coulter Knuckle, Arm, and Hub Assembly	JM0031265

GEP Coulter Knife Assembly



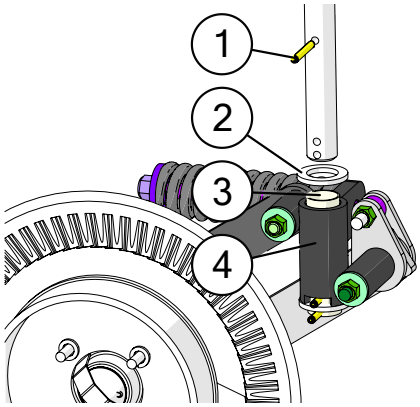
	Description	Part No.
1	1/2"-13 Gr2 Z Hex Nut	JM0002124
2	1/2" Gr2 Z Lock Washer	JM0019021
3	1/2" ID, 1-3/8" OD Z Flat Washer	JM0003082
4	Grove Knife Bracket Weldment	JM0059364
5	3/8" Hose Clamp SS	JM0039206
6	C050 Wiese Knife	JM0031273
7	1/2"-13 x 1-3/4" Gr5 Z Hex Bolt	JM0002101
8	1/2"-13 x 1-1/4" Gr5 Z Hex Bolt	JM0001513
9	Coulter Knife Bracket Package	JM0041705

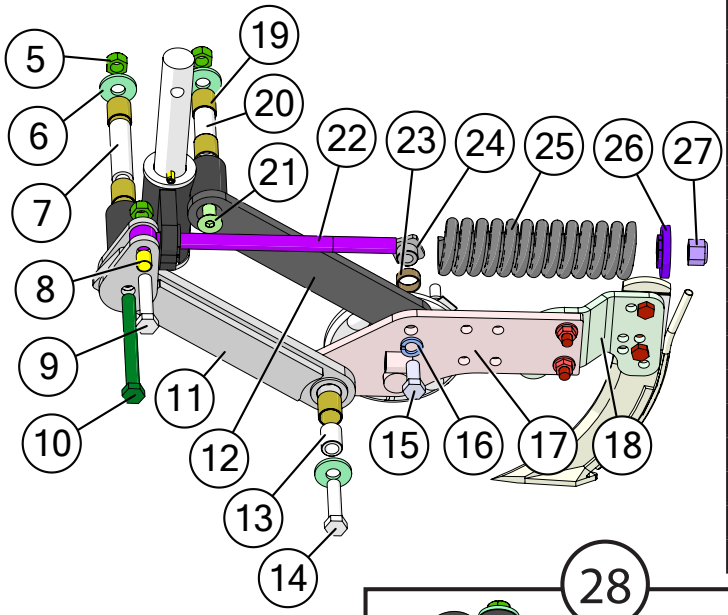
Coulter Injector Assembly

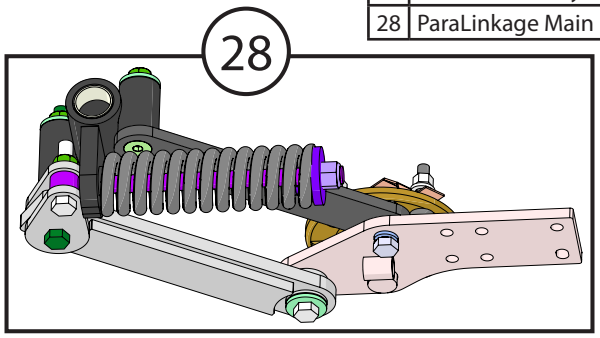


	Description	Part No.
1	1/2"-13 SS Nylon Locking Hex Jam Nut	JM0041792
2	1/2"-13 SS Hex Jam Nut	JM0041791
3	3/8" Hose Barb x 1/4" Male NPT SS	JM0036419
4	3/8" Hose Clamp SS	JM0039206
5	1/2"-13 x 3-1/2" SS Hex Bolt	JM0041790
6	3/8"-16 x 1/2" Square Head SS Bolt	JM0041793
7	6" SS Pipe with 1/4" Male NPT Fittings	JM0036445
8	1/4" NPT Merchant Coupling SS	JM0036441
9	#8 NitroGro Injector	JM0036457
9	#10 NitroGro Injector	JM0036459
9	#15 NitroGro Injector	JM0036460
9	#20 NitroGro Injector	JM0036462
9	#30 NitroGro Injector	JM0036463
9	#40 NitroGro Injector	JM0036464
9	#60 NitroGro Injector	JM0051069
10	Fertilizer Injector With Fittings	JM0041788
11	Injector Mount and Bolt Kit	JM0074341

J&M Para-Linkage Coulter

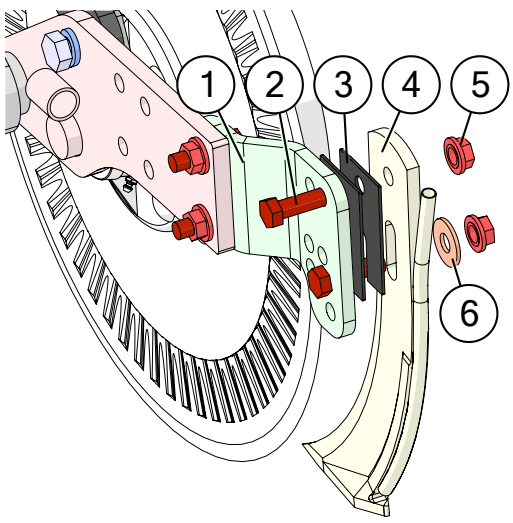






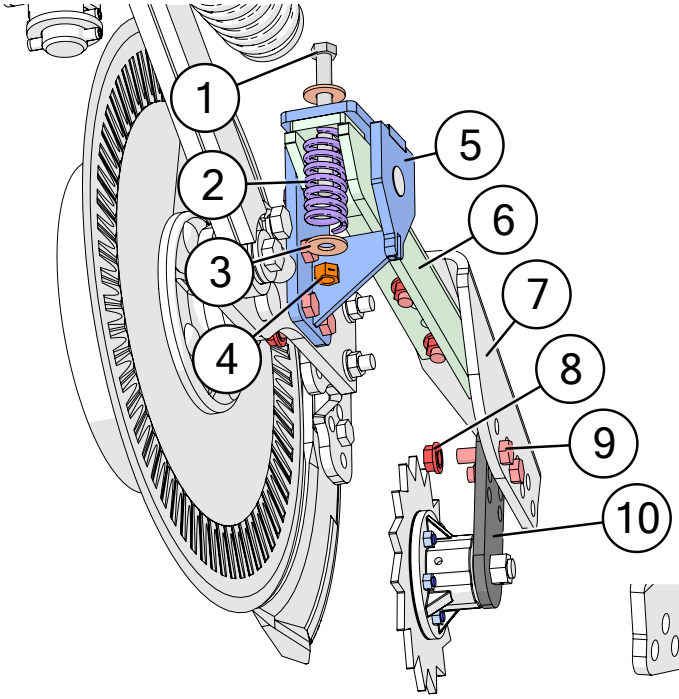
	Description	Part No.
1	3/8" x 2-1/2" SS Spirol Coiled Spring Pin 420SS HD	JM0061533
2	Para-Linkage Coulter Mount Washer	JM0049034
3	1-1/2" ID x 1-5/8 OD x 1" Length Sleeve Composite Bearing	JM0048949
4	Para-Linkage - Main Tube Mount Weldment	JM0048936
5	5/8"-11 GrC Z Distorted Thread Hex Nut	JM0054594
6	5/8" USS Hardened YZ Thick Flat Washer	JM0062183
7	Para-Linkage Lower Arm Bushing Pivot	JM0051220
8	5/8" ID x 23/32" OD x 3/4" Length Sleeve Composite Bearing	JM0048955
9	5/8"-11 x 3" Gr5 Z Hex Bolt	JM0002105
10	5/8"-11 x 6-1/2" Gr8 YZ Hex Bolt	JM0050351
11	Para-Linkage - Main Arm Weldment	JM0048944
12	Para-Linkage Top Arm	JM0048940
13	Bottom Arm Para-Linkage Pivot	JM0051160
14	5/8"-11 x 2-3/4" Gr8 YZ Hex Bolt	JM0061683
15	5/8"-11 x 1-1/2" Gr5 Z Hex Bolt	JM0002103
16	5/8" Gr2 Z Lock Washer	JM0051157
17	Para-Linkage Spindle Mount Weldment	JM0048970
18	Para-Linkage Coulter Knife/Injector Mount	JM0049010
19	1" ID x 1-1/4" OD x 1-1/4" Length Sleeve Composite Bearing	JM0051195
20	Para-Linkage Top Arm Bushing Pivot	JM0051219
21	5/8"-11 x 4" Flat Head Socket Cap Screw	JM0048980
22	Para-Linkage Coulter Spring Rod	JM0049484
23	1" ID x 1-1/8" OD x 1/2" Length Sleeve Composite Bearing	JM0051196
24	Top Arm Para-Linkage Pivot	JM0051159
25	0.562" Wire x 2-3/4" OD x 9-1/4" Length Compression Spring	JM0048712
26	Para-Linkage Coulter Spring Washer Weldment	JM0048967
27	3/4"-10 Gr2 Z Nylon Locking Hex Nut	JM0026756
28	ParaLinkage Main Unit Assembly	JM0077547

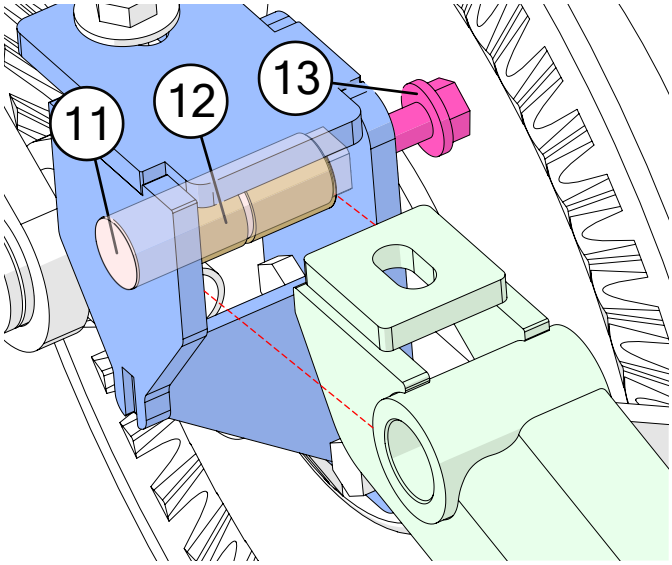
J&M Para-Linkage Coulter Rod Assembly

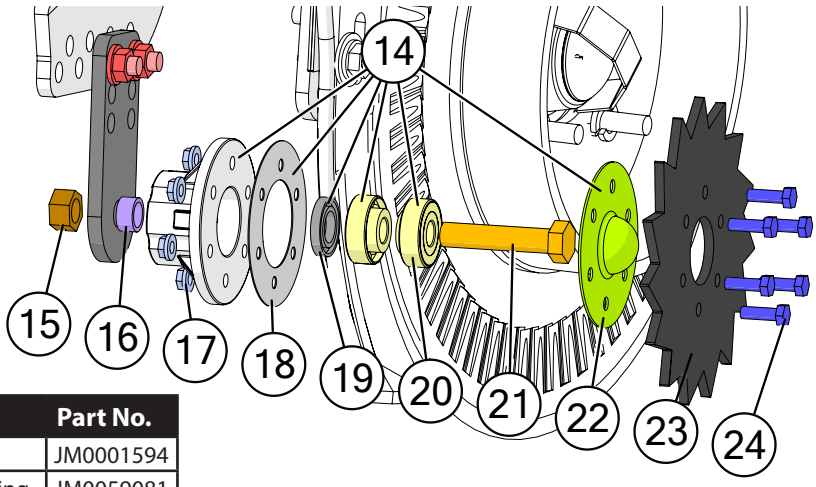


	Description	Part No.
1	Para-Linkage Coulter Knife/Injector Mount	JM0049010
2	1/2"-13 x 1-3/4" Gr5 Z Hex Bolt	JM0002101
3	Knife Mount Spacer SS - .08"	JM0049033
4	C050 Wiese Knife	JM0031273
5	1/2"-13 Gr5 Z SF Hex Nut	JM0002153
6	1/2" ID, 1-3/8" OD Z Flat Washer	JM0003082

J&M Para-Linkage Row Closers

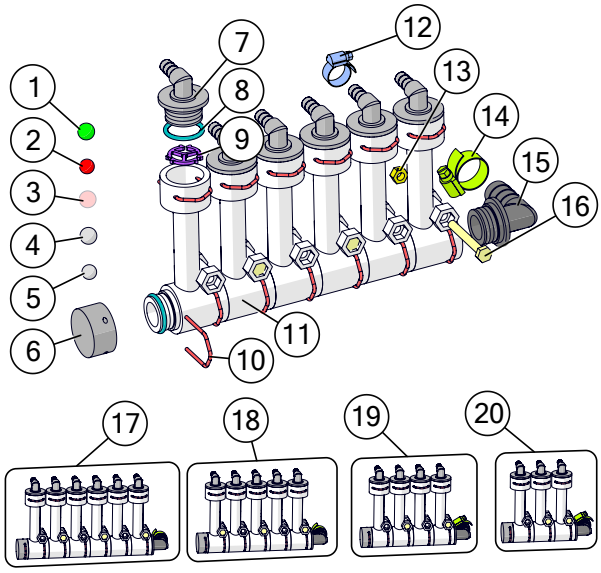






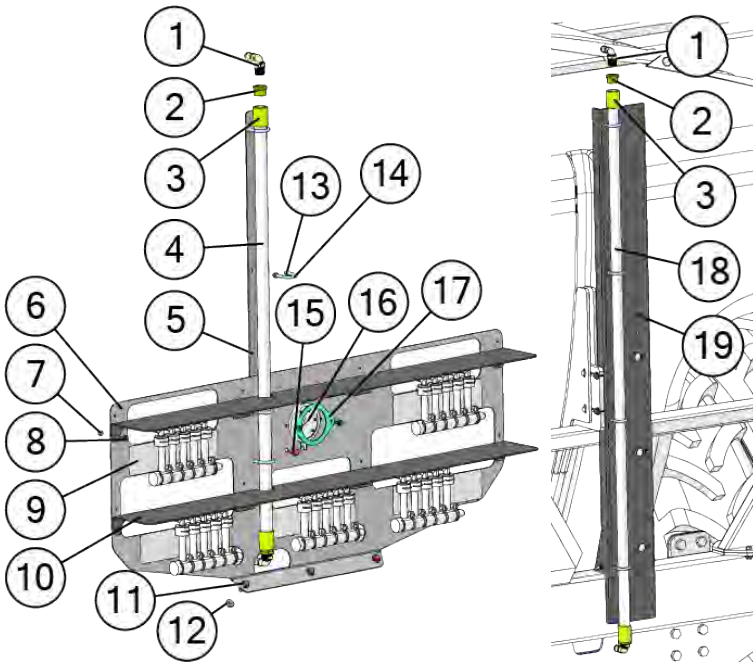
	Description	Part No.
1	1/2"-13 x 5" Gr5 Z Hex Bolt	JM0001594
2	0.256" Wire x 1-1/2" OD x 3-1/4" Length Compression Spring	JM0059081
3	1/2" ID, 1-3/8" OD Z Flat Washer	JM0003082
4	1/2"-13 Gr2 Z Centerlock Hex Nut	JM0001511
5	Gooseneck Spring Loaded Closer Base Weldment	JM0062117
6	Gooseneck Spring Loaded Closer Arm	JM0062118
7	Spring Loaded Closer Adjustable Pitch Plate	JM0062275
8	1/2"-13 Gr5 Z SF Hex Nut	JM0002153
9	1/2"-13 x 1-1/2" Gr5 Z Hex Bolt	JM0002100
10	Spring Lever Arm - Coulter Mount	JM0062277
11	Gooseneck Closer Mounting Pin	JM0062721
12	1" ID x 1-1/4" OD x 1-1/4" Length Sleeve Composite Bearing	JM0051195
13	1/2"-13 x 1-1/4" Gr5 Z SF Hex Bolt	JM0010002
14	G63204 Hub, 6 Hole on 3" Center	JM0049394
15	5/8"-11 Gr2 Z Centerlock Hex Nut	JM0002146
16	Row Closer Hub Spacer	JM0049396
17	5/16"-18 Gr5 Z SF Hex Nut	JM0014049
18	Gasket for G63204 Hub	JM0049390
19	Seal for G63204 Hub	JM0049388
20	G63204 Hub Bushing - Radial Ball Bearing	JM0049389
21	5/8"-11 x 3" Gr5 Z Hex Bolt	JM0002105
22	Hub Cap for G63204 Hub	JM0049391
23	Spike Closing Wheel	JM0062391
24	5/16"-18 x 1" Gr5 Z Hex Bolt	JM0001743

Flow Monitor



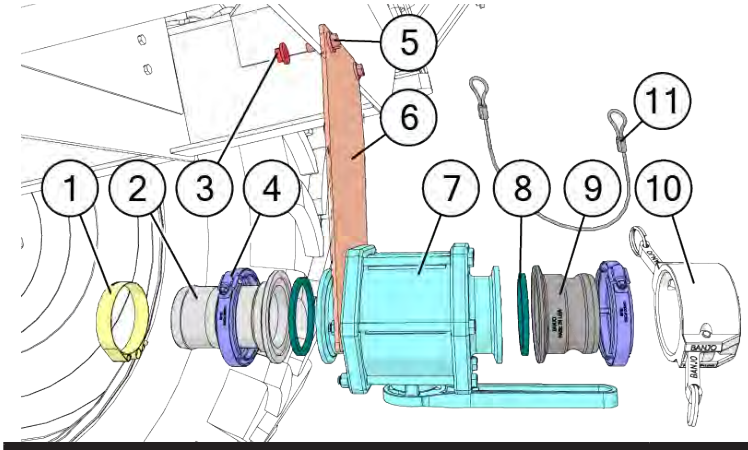
	Description	Part No.
1	Green Polyurethane Ball for Wilger Flow Indicator	JM0055003
2	Red Polyurethane Ball for Wilger Flow Indicator	JM0055004
3	Red Glass Ball for Wilger Flow Indicator	JM0055005
4	1/2" SS Ball for Wilger Flow Indicator	JM0055006
5	7/16" Stainless Steel Ball for Wilger Flow Indicator	JM0061580
6	Cap with O-Ring - Wilger Flow Indicator	JM0021579
7	3/8" Hose Barb with O-Ring; 90 Degree	JM0024469
8	O-Ring Seal for Wilger Flow Monitor	JM0055001
9	Ball Retainer for Wilger Flow Monitor	JM0055002
10	U-Clip for Wilger Flow Monitor	JM0055000
11	Wilger Flow Indicator	JM0021569
12	3/8" Hose Clamp SS	JM0039206
13	1/4"-20 Gr2 Z Centerlock Hex Nut	JM0001505
14	3/4" Hose Clamp SS	JM0039205
15	3/4" Hose Barb with O-Ring; 90 Degree	JM0024468
16	1/4"-20 x 2" Gr5 Z Hex Bolt	JM0001591
17	Wilger Flow Indicator Manifold - 6 Row with 3/4" Inlet and 3/8" Outlets	JM0024470
18	Wilger Flow Indicator Manifold - 5 Row with 3/4" Inlet and 3/8" Outlets	JM0021591
19	Wilger Flow Indicator Manifold - 4 Row with 3/4" Inlet and 3/8" Outlets	JM0039279
20	Wilger Flow Indicator Manifold - 3 Row with 3/4" Inlet and 3/8" Outlets	JM0039280

Flow Monitor Mount and Sight Glasses

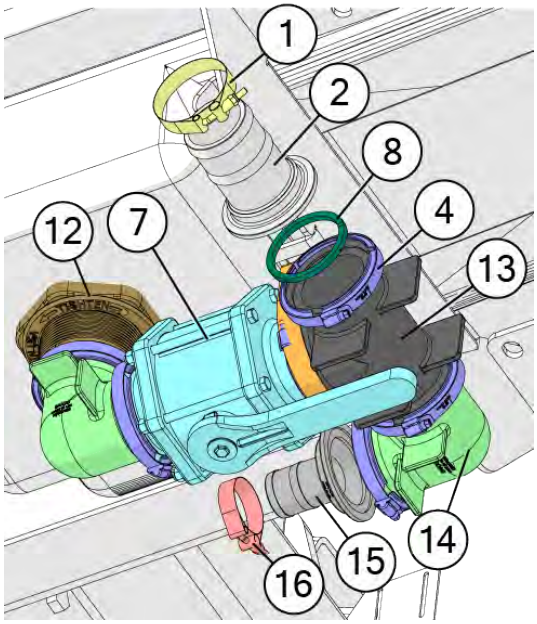


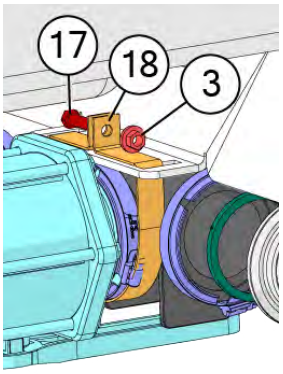
	Description	Part No.
1	3/4" Hose Barb x 3/4" Male NPT; 90 Deg	JM0035226
2	1" Male x 3/4" Female PVC Hex Bushing - Black	JM0047864
3	1" Slip x 1" FIPT PVC - Black	JM0047865
4	1" Clear PVC Pipe - Front Sight Glass - 6026 - 65-5/8"	JM0047604
5	2600 Gallon Tank Front Sight Glass Bracket	JM0054252
6	6000 Applicator Flow Monitor Mounting Plate	JM0058929
7	1/4"-20 Gr5 Z SF Hex Nut	JM0001630
8	1/4"-20 x 3/4" Gr5 Z SF Hex Bolt	JM0001642
9	Flow Monitor Ball Decal - WHITE	JM0054966
10	6000 Applicator Flow Monitor Mounting Plate - Hood	JM0054506
11	3/8"-16 x 1" Gr5 Z SF Hex Bolt	JM0002092
12	3/8"-16 Gr5 Z SF Hex Nut	JM0002152
13	5/16"-18 Gr2 Z Centerlock Hex Nut	JM0002143
14	5/16" Round U-Bolt 1" Pipe Size	JM0047616
15	3/8"-16 x 3/4" Gr5 Z SF Hex Bolt	JM0001750
16	Pressure Gauge Stainless Steel 0-100psi, 1/4" NPT	JM0036636
17	6000 Nitrogro Flow Monitor Pressure Gauge Holder	JM0051516
18	1" Clear PVC Pipe - Rear Sight Glass - 6026 - 86-1/2"	JM0047618
19	2600 Gallon Rear Sight Glass Bracket	JM0047605

Fill Valves



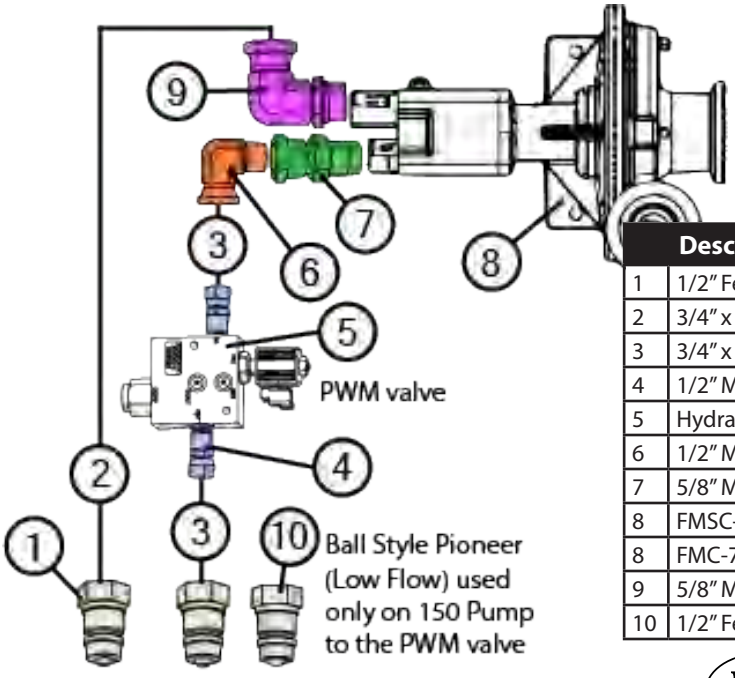
	Description	Part No.
1	T-Bolt Hose Clamp 3" Hose, 3-5/16" Min OD	JM0035248
2	3" Manifold Flange x 3" Hose Barb	JM0021244
3	3/8"-16 Gr5 Z SF Hex Nut	JM0002152
4	Manifold Flange Clamp for M300 Fittings	JM0035237
5	3/8"-16 x 1" Gr5 Z SF Hex Bolt	JM0002092
6	Ball Valve Mount Plate 3" Banjo (NitroGro)	JM0034894
7	Ball Valve - 3" Full Port Flange Manifold	JM0021230
8	Manifold Gasket for M300 Fittings with Rib	JM0021239
9	3" Manifold Flange x 3" QDC Male	JM0035205
10	3" Poly Cam Lever Cap	JM0035206
11	Cable Lanyard (NitroGro)	JM0039282
12	3" MNF x 3" FNPT Tank Fitting BTM DRN	JM0035114
13	3" Manifold Tee	JM0021232
14	M300 Manifold Flange x M300 Manifold Flange; 90 Degree	JM0033979
15	3" Manifold Flange x 2" Hose Barb	JM0034333
16	T-Bolt Hose Clamp 2" Hose, 2-5/16" Min OD	JM0035247
17	3/8"-16 x 1-1/2" Gr5 Z Hex Bolt	JM0001659
18	Auger Band	JM0016185





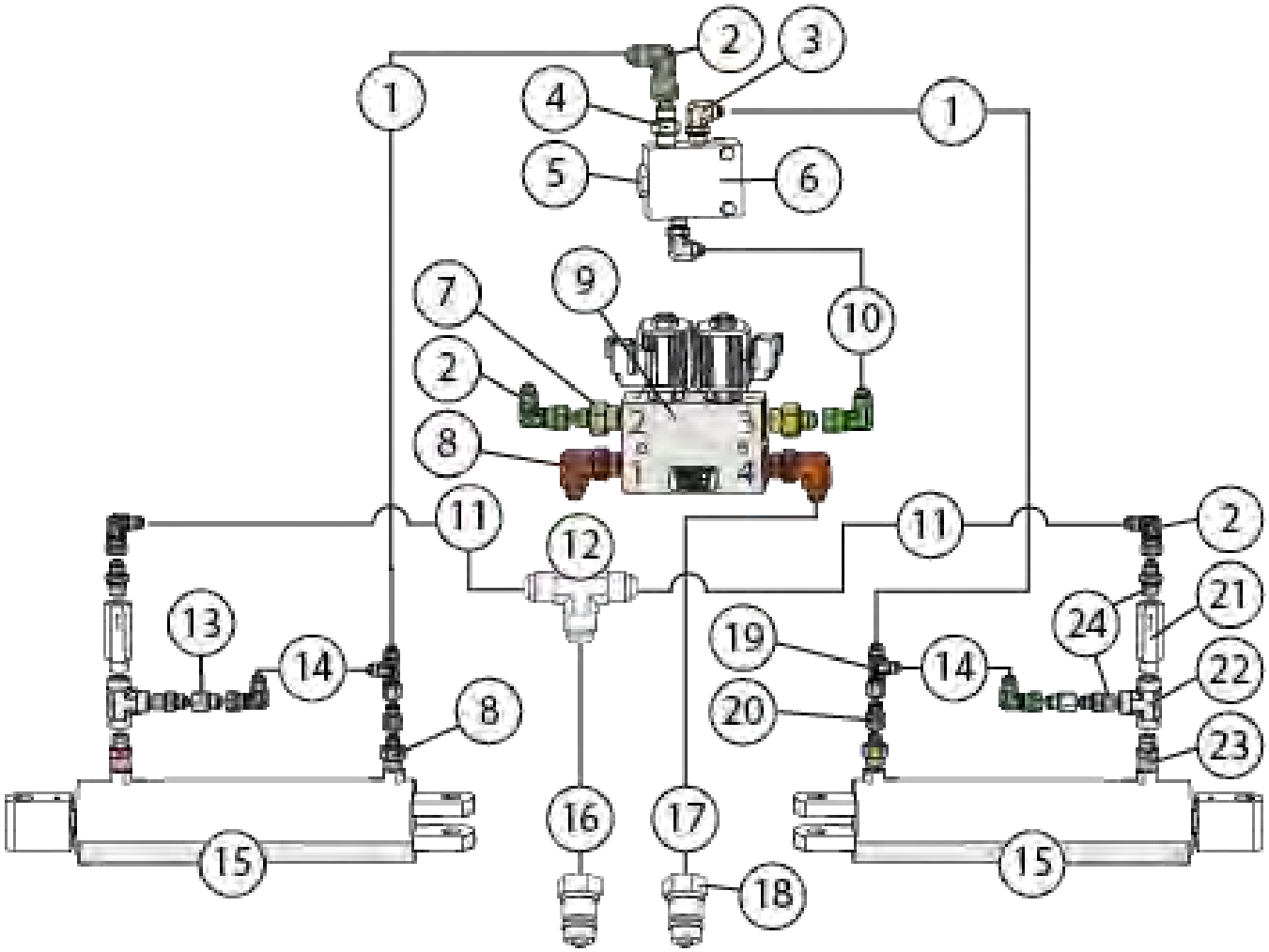
*If you have a 750 Pump use parts 1 and 2 in place of parts 15 and 16.

Hydraulic Pump Circuit Hydraulic Schematic



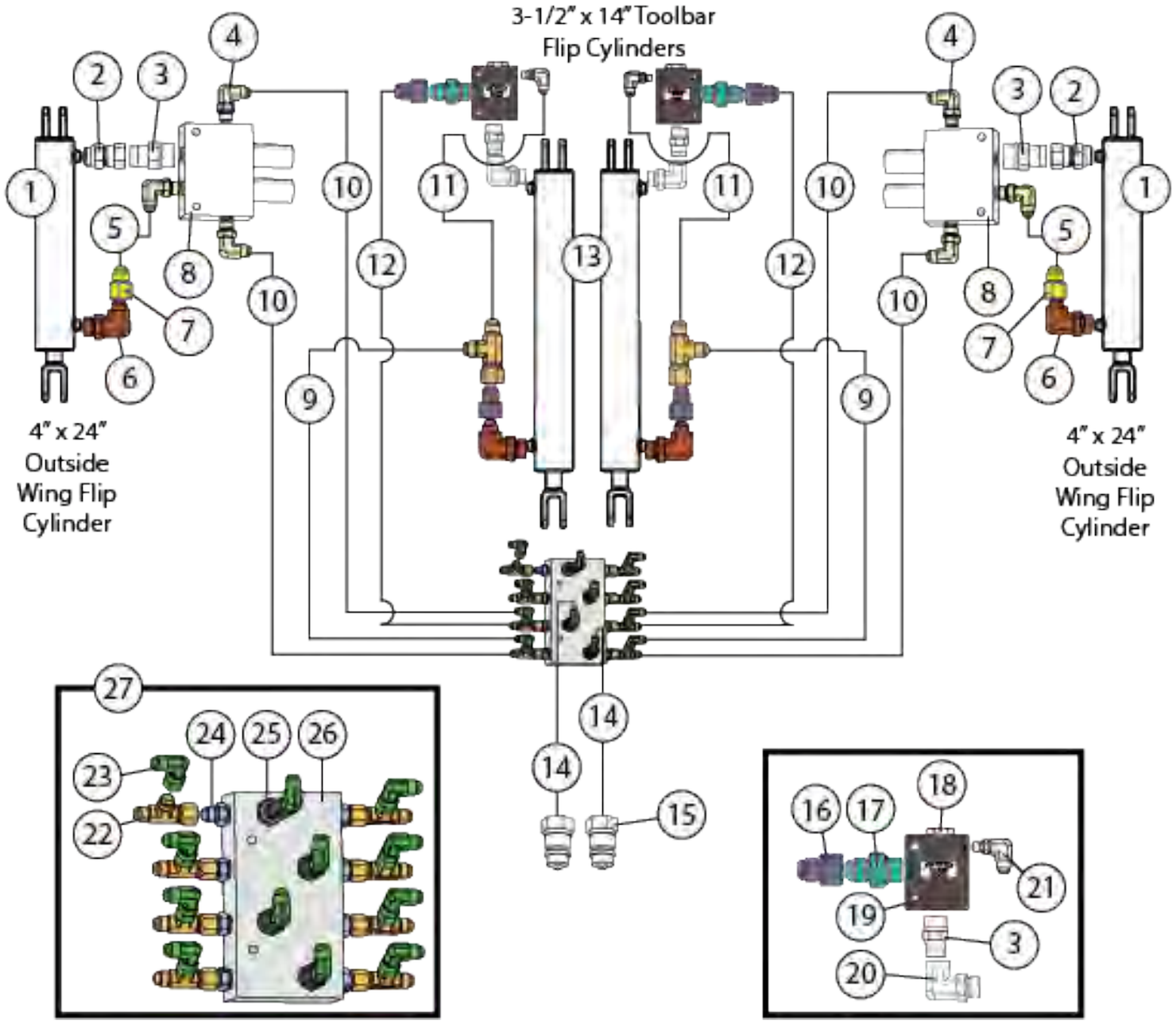
	Description	Part No.
1	1/2" Female NPT x Male Pioneer - High Flow, Cone Style	JM0018254
2	3/4" x 240" Hydraulic Hose 240inch12M3k-12G-8MP-12G-8MP	JM0061554
3	3/4" x 120" Hydraulic Hose 120inch12M3K-12G-8MP-12G-8MP	JM0078622
4	1/2" Male ORB x 1/2" Female NPT Swivel; Straight	JM0026804
5	Hydraulic PWM Control Valve for Nitrogen Fertilizer Pump (F14264A1)	JM0059223
6	1/2" Male Pipe x 1/2" Female Pipe Swivel; 90° Elbow	JM0074224
7	5/8" Male O-Ring x 1/2" Female NPT Swivel; Straight	JM0074223
8	FMSC-155F-HYD-206 Ace Pump	JM0038662
8	FMC-750F-HYD-M22 Ace Pump	JM0050785
9	5/8" Male O-Ring x 1/2" Female NPT Swivel; 90 Degree Elbow	JM0061539
10	1/2" Female NPT x Male Pioneer - Low Flow, Ball Style	JM0039220

Main Wing Fold Circuit Hydraulic Schematic



	Description	Part No.
1	3/8" x 72" Hydraulic Hose 72inch6M3K-6G-6FJX-6G-6FJX	JM0049157
2	3/8" Male JIC x 3/8" Female JIC Swivel; 90 Degree Elbow	JM0010295
3	3/8" Male JIC x 3/8" Male ORB; 90 Degree Elbow	JM0026121
4	3/8" Male JIC x 3/8" Male ORB; Straight	JM0043614
5	3/8" Male NPT Plug	JM0018261
6	50 by 50 Flow Divider Valve	JM0047737
7	3/8" Male JIC x 1/2" Male ORB; Straight	JM0010302
8	3/8" Male JIC x 1/2" Male ORB; 90 Degree Elbow	JM0037159
9	F14424A1 Dual Solenoid Valve Assembly	JM0068890
10	3/8" x 60" Hydraulic Hose 60inch6M3K-6G-6FJX-6G-6FJX	JM0068916
11	3/8" x 85" Hydraulic Hose 85inch6M3K-6G-6FJX-6G-6FJX	JM0049158
12	3/8" Male JIC x 3/8" Male JIC x 3/8" Male JIC; Tee	JM0055046
13	3/8" Male JIC x 3/8" Female JIC with .062 Orifice	JM0047738
14	3/8" x 12" Hydraulic Hose 12inch4M3K-4G-6FPX-4G-6FJX	JM0054984
15	4" Bore, 8-1/2" Stroke Cylinder Assembly	JM0062922
16	3/8" x 192" Hydraulic Hose 192inch6M3K-6G-8MP-6G-6FJX	JM0053803
17	3/8" x 120" Hydraulic Hose 120inch6M3K-6G-8MP-6G-6FJX	JM0054982
18	1/2" Female NPT x Male Pioneer - Low Flow, Ball Style	JM0039220
19	3/8" Male JIC x 3/8" Female JIC Swivel x 3/8" Male JIC; Tee	JM0037163
20	3/8" Male JIC x 3/8" Female JIC with .047 Orifice	JM0054918
21	Vonberg 2100 PSI Blowoff Valve	JM0037492
22	3/8" Female NPT x 3/8" Female NPT x 3/8" Female NPT; Street T	JM0046965
23	3/8" Male NPT x 1/2" Male O-Ring Hex Nipple	JM0030064
24	3/8" Male JIC x 3/8" Male NPT; Straight	JM0037167

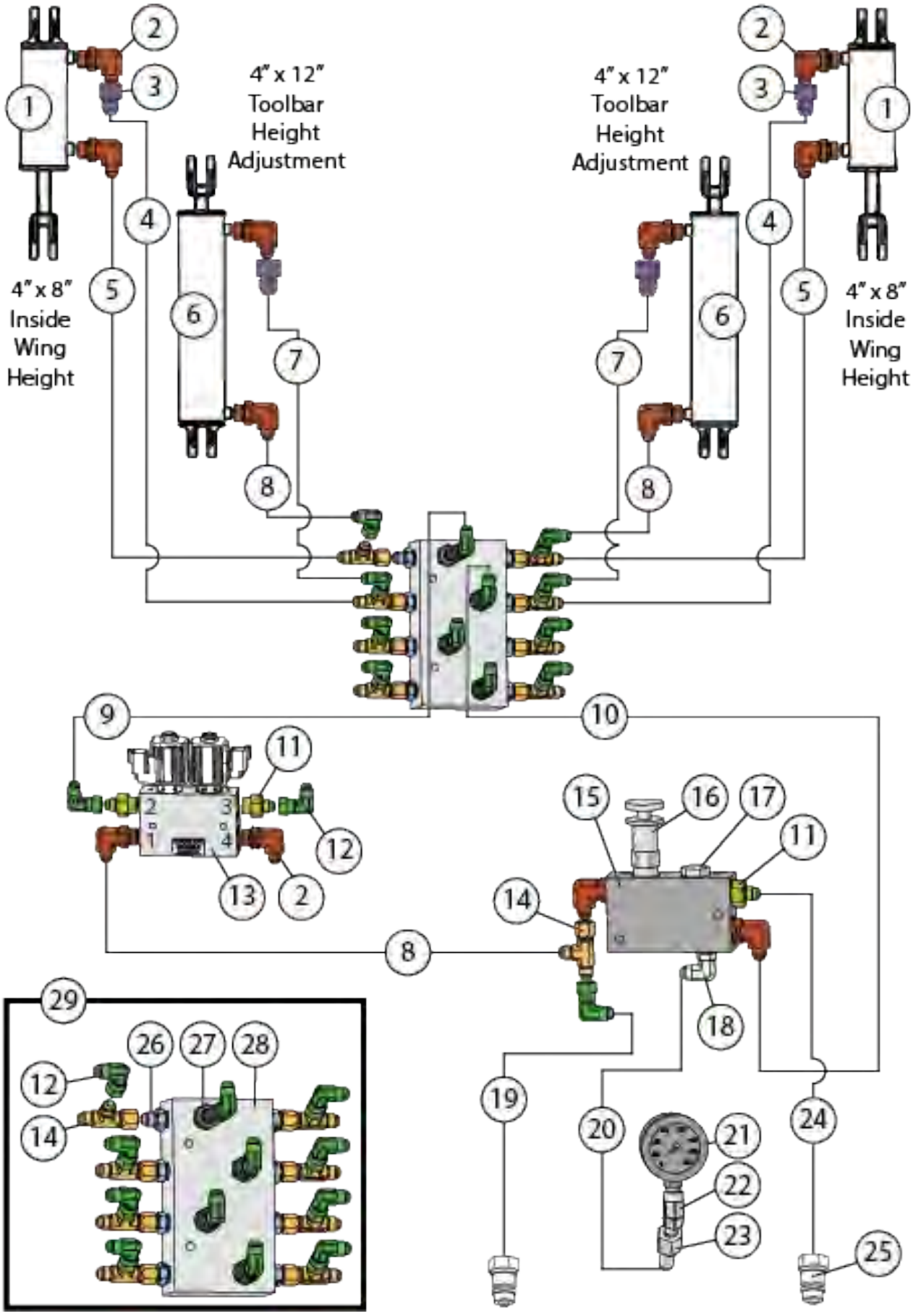
Wing Flip Circuit Hydraulic Schematic



Wing Flip Circuit Hydraulic Schematic

	Description	Part No.
1	4" Bore, 24" Stroke Welded Hydraulic Cylinder - Heavier Clevises	JM0030730
1	Seal Kit for 4" x 24" Hydraulic Cylinder (JD-609)	JM0039242
2	1/2" Male ORB x 1/2" Female NPT Swivel; Straight	JM0026804
3	1/2" Male NPT x 1/2" Male O-Ring Hex Nipple	JM0048977
4	3/8" Male JIC x 3/8" Male ORB; 90 Degree Elbow	JM0026121
5	3/8" x 25" Hydraulic Hose 25inch6M3K-6G-6FJX-6G-6FJX	JM0049167
6	3/8" Male JIC x 1/2" Male ORB; 90 Degree Elbow	JM0037159
7	3/8" Male JIC x 3/8" Female JIC with .094 Orifice	JM0047735
8	Dual Counter Balance Valve	JM0047740
9	3/8" x 53" Hydraulic Hose 53inch6M3K-6G-6FJX-6G-6FJX	JM0049155
10	3/8" x 195" Hydraulic Hose 195inch6M3K-6G-6FJX-6G-6FJX	JM0049164
11	3/8" x 12" Hydraulic Hose 12inch4M3K-4G-6FPX-4G-6FJX	JM0054984
12	3/8" x 36" Hydraulic Hose 36inch6M3K-6G-6FJX-6G-6FJX	JM0049163
13	3-1/2" x 14" Welded Non-Cushion JD Cylinder	JM0055022
13	Seal Kit for 3-1/2" x 14" Hydraulic Cylinder (JD-629)	JM0074483
14	3/8" x 192" Hydraulic Hose 192inch6M3K-6G-8MP-6G-6FJX	JM0053803
15	1/2" Female NPT x Male Pioneer - Low Flow, Ball Style	JM0039220
16	3/8" Male JIC x 3/8" Female JIC with .062 Orifice	JM0047738
17	3/8" Male JIC x 1/2" Male ORB; Straight	JM0010302
18	Pilot Check Valve Hyd (FA/VBBA-5) (FA/LNL)	JM0050870
19	Pilot Operated Check Valve Body, Single Cavity, SAE Ports	JM0054912
20	1/2" Male ORB x 1/2" Female NPT Swivel; 90 Degree Elbow	JM0047392
21	3/8" Male JIC x 1/4" Male ORB; 90 Degree Elbow	JM0054921
22	3/8" Male JIC x 3/8" Female JIC Swivel x 3/8" Male JIC; Tee	JM0037163
23	3/8" Male JIC x 3/8" Female JIC Swivel; 90 Degree Elbow	JM0010295
24	3/8" Male JIC x 3/8" Male NPT; Straight	JM0037167
25	3/8" Male JIC x 1/2" Male NPT; Straight	JM0037172
26	Main Manifold Block (NitroGro)	JM0028902
27	Main 6000 Series Manifold Block with Fittings	JM0054931

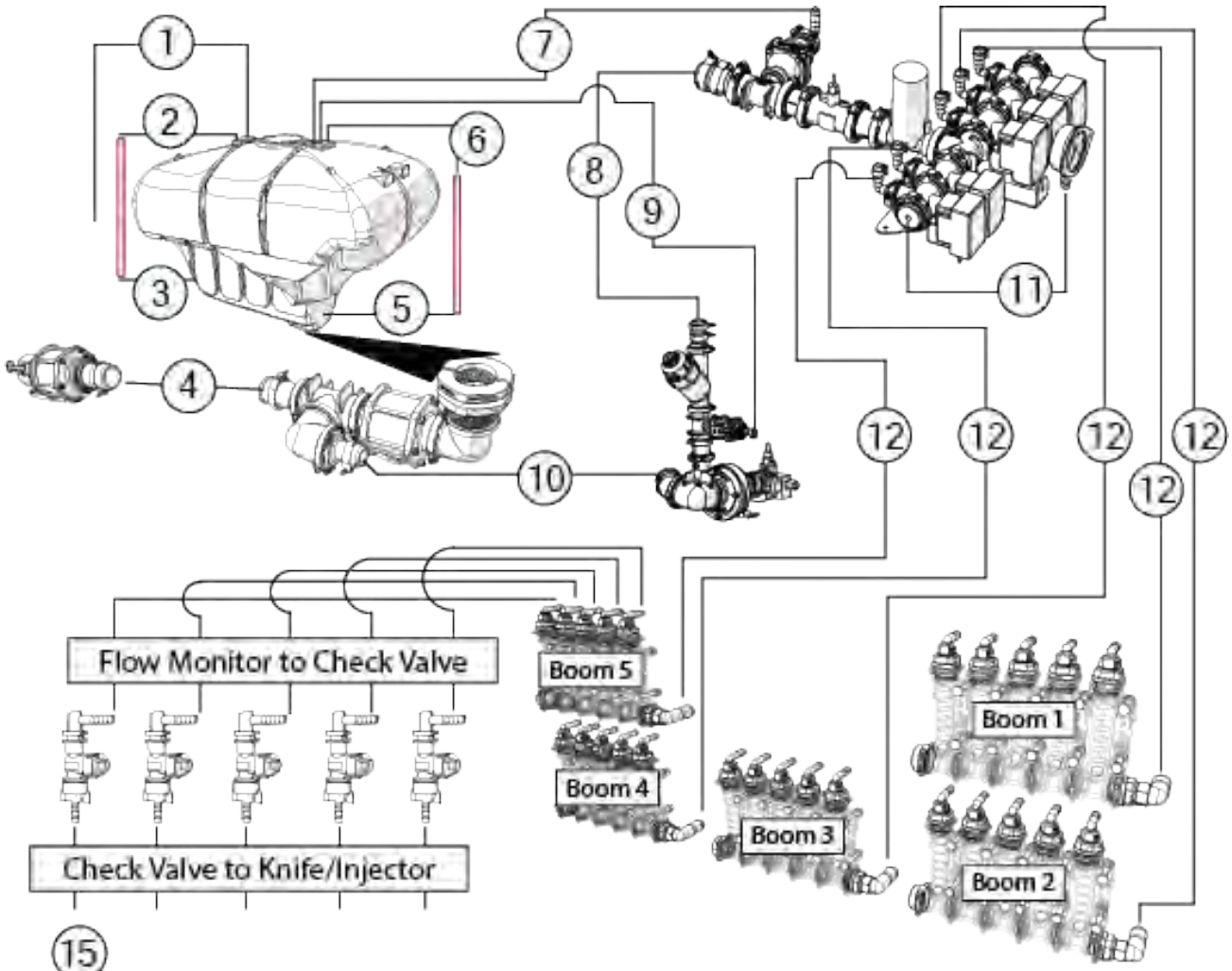
Down Pressure Circuit Hydraulic Schematic



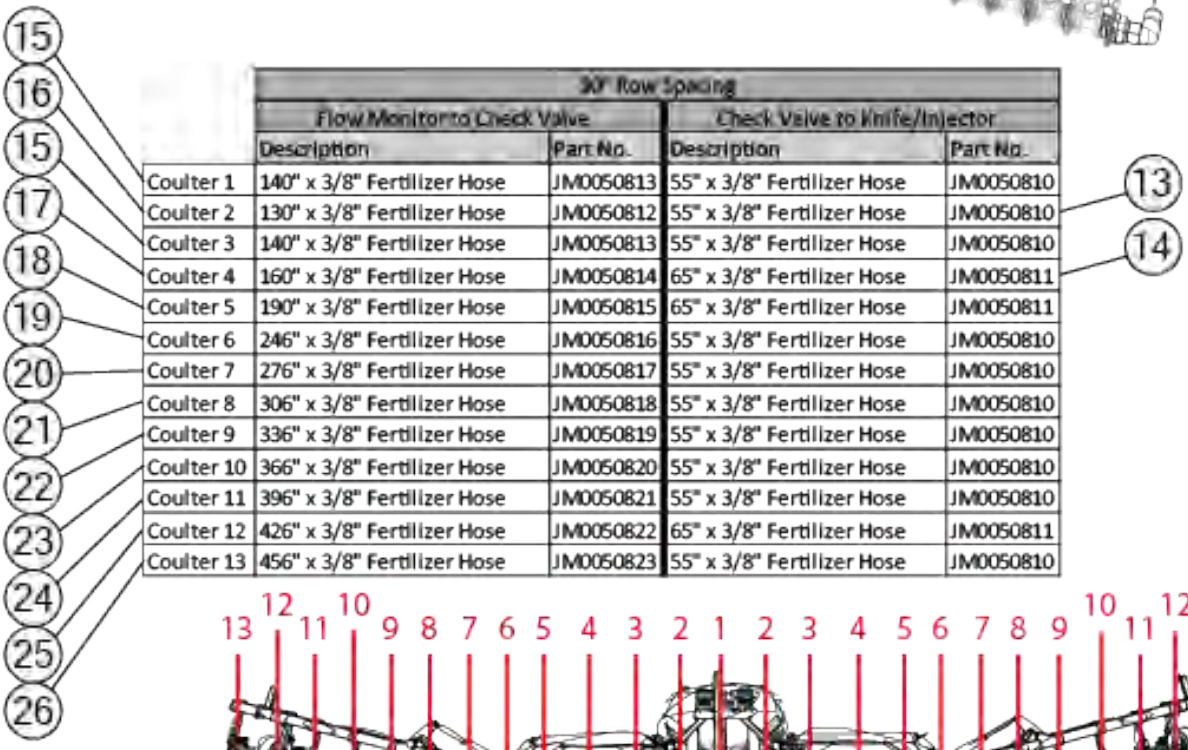
Down Pressure Circuit Hydraulic Schematic

	Description	Part No.
1	4" Bore, 8" Stroke Welded Hydraulic Cylinder - Heavier Clevises	JM0030757
1	Seal Kit for 4" x 8" Hydraulic Cylinder (JD-608)	JM0039241
2	3/8" Male JIC x 1/2" Male ORB; 90 Degree Elbow	JM0037159
3	3/8" Male JIC x 3/8" Female JIC with .094 Orifice	JM0047735
4	3/8" x 165" Hydraulic Hose 165inch6M3K-6G-6FJX-6G-6FJX	JM0049161
5	3/8" x 180" Hydraulic Hose 180inch6M3K-6G-6FJX-6G-6FJX	JM0049160
6	4" Bore, 12" Stroke Welded Hydraulic Cylinder	JM0045585
7	3/8" x 36" Hydraulic Hose 36inch6M3K-6G-6FJX-6G-6FJX	JM0049163
8	3/8" x 53" Hydraulic Hose 53inch6M3K-6G-6FJX-6G-6FJX	JM0049155
9	3/8" x 60" Hydraulic Hose 60inch6M3K-6G-6FJX-6G-6FJX	JM0068916
10	3/8" x 115" Hydraulic Hose 115inch6M3K-6G-6FJX-6G-6FJX	JM0049169
11	3/8" Male JIC x 1/2" Male ORB; Straight	JM0010302
12	3/8" Male JIC x 3/8" Female JIC Swivel; 90 Degree Elbow	JM0010295
13	F14424A1 Dual Solenoid Valve Assembly	JM0068890
14	3/8" Male JIC x 3/8" Female JIC Swivel x 3/8" Male JIC; Tee	JM0037163
15	Manifold with 1/2" ORB Ports for PRV and CV (SFP26157)	JM0034773
16	Hydraforce Pressure Reducing/Relieving Valve	JM0034800
17	Hydraforce Check Valve 5psi Bias Spring	JM0034805
18	3/8" Male JIC x 3/8" Male ORB; 90 Degree Elbow	JM0026121
19	3/8" x 87" Hydraulic Hose 87inch6M3K-6G-8MP-6G-6FJX	JM0053806
20	3/8" x 25" Hydraulic Hose 25inch6M3K-6G-6FJX-6G-6FJX	JM0049167
21	Pressure Gauge 0-1500psi, 2" Face, 1/4" NPT Bottom Mount Donaldson	JM0037152
22	1/ 4" Male NPT x 1/4" Female NPT Rigid; 45 Degree Elbow	JM0037156
23	1/4" Female NPT x 3/8" Male JIC Compression Bulk Head Fitting	JM0037155
24	3/8" x 81" Hydraulic Hose 81inch6M3K-6G-8MP-6G-6FJX	JM0049168
25	1/2" Female NPT x Male Pioneer - Low Flow, Ball Style	JM0039220
26	3/8"Male JIC x 3/8" Male NPT; Straight	JM0037167
27	3/8" Male JIC x 1/2" Male NPT; Straight	JM0037172
28	Main Manifold Block (NitroGro)	JM0028902
29	Main 6000 Series Manifold Block with Fittings	JM0054931

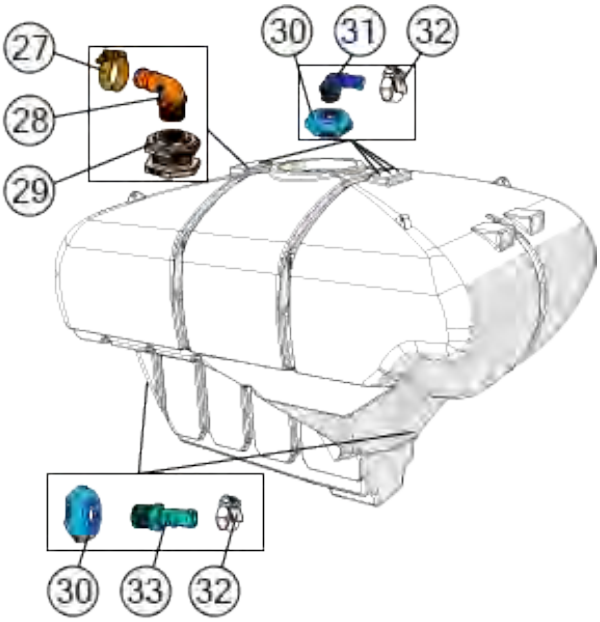
Fertilizer Hose Routing

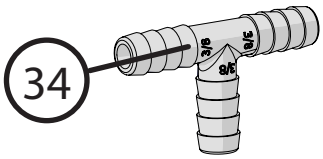


	30" Row Spacing			
	Flow Monitor to Check Valve		Check Valve to Knife/Injector	
	Description	Part No.	Description	Part No.
Coulter 1	140" x 3/8" Fertilizer Hose	JM0050813	55" x 3/8" Fertilizer Hose	JM0050810
Coulter 2	130" x 3/8" Fertilizer Hose	JM0050812	55" x 3/8" Fertilizer Hose	JM0050810
Coulter 3	140" x 3/8" Fertilizer Hose	JM0050813	55" x 3/8" Fertilizer Hose	JM0050810
Coulter 4	160" x 3/8" Fertilizer Hose	JM0050814	65" x 3/8" Fertilizer Hose	JM0050811
Coulter 5	190" x 3/8" Fertilizer Hose	JM0050815	65" x 3/8" Fertilizer Hose	JM0050811
Coulter 6	246" x 3/8" Fertilizer Hose	JM0050816	55" x 3/8" Fertilizer Hose	JM0050810
Coulter 7	276" x 3/8" Fertilizer Hose	JM0050817	55" x 3/8" Fertilizer Hose	JM0050810
Coulter 8	306" x 3/8" Fertilizer Hose	JM0050818	55" x 3/8" Fertilizer Hose	JM0050810
Coulter 9	336" x 3/8" Fertilizer Hose	JM0050819	55" x 3/8" Fertilizer Hose	JM0050810
Coulter 10	366" x 3/8" Fertilizer Hose	JM0050820	55" x 3/8" Fertilizer Hose	JM0050810
Coulter 11	396" x 3/8" Fertilizer Hose	JM0050821	55" x 3/8" Fertilizer Hose	JM0050810
Coulter 12	426" x 3/8" Fertilizer Hose	JM0050822	65" x 3/8" Fertilizer Hose	JM0050811
Coulter 13	456" x 3/8" Fertilizer Hose	JM0050823	55" x 3/8" Fertilizer Hose	JM0050810



Fertilizer Hose Routing

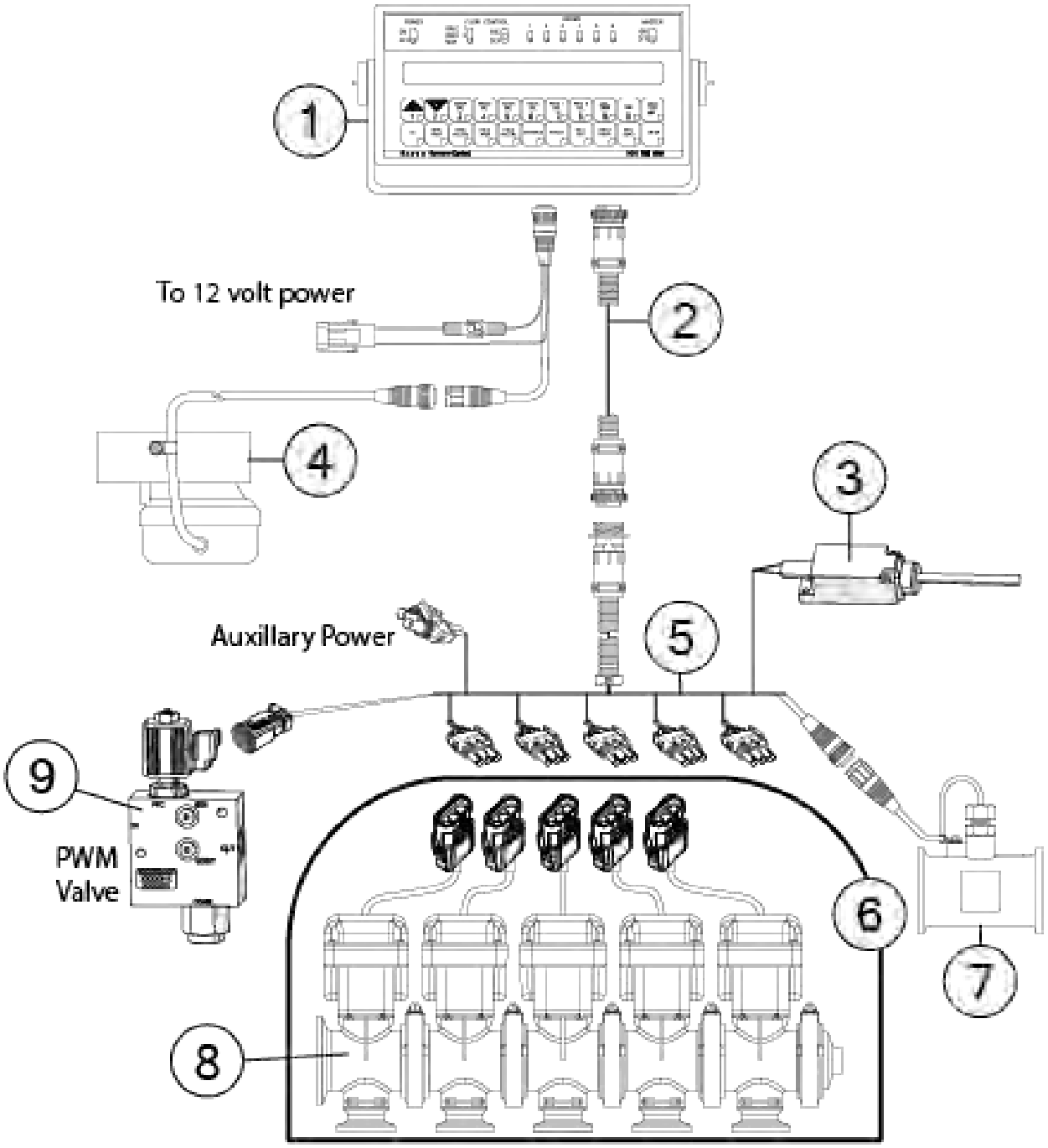




Hose barb "T" will be used if you have too many coulters. Each flow monitor will monitor 2 coulters instead of 1 in that instance.

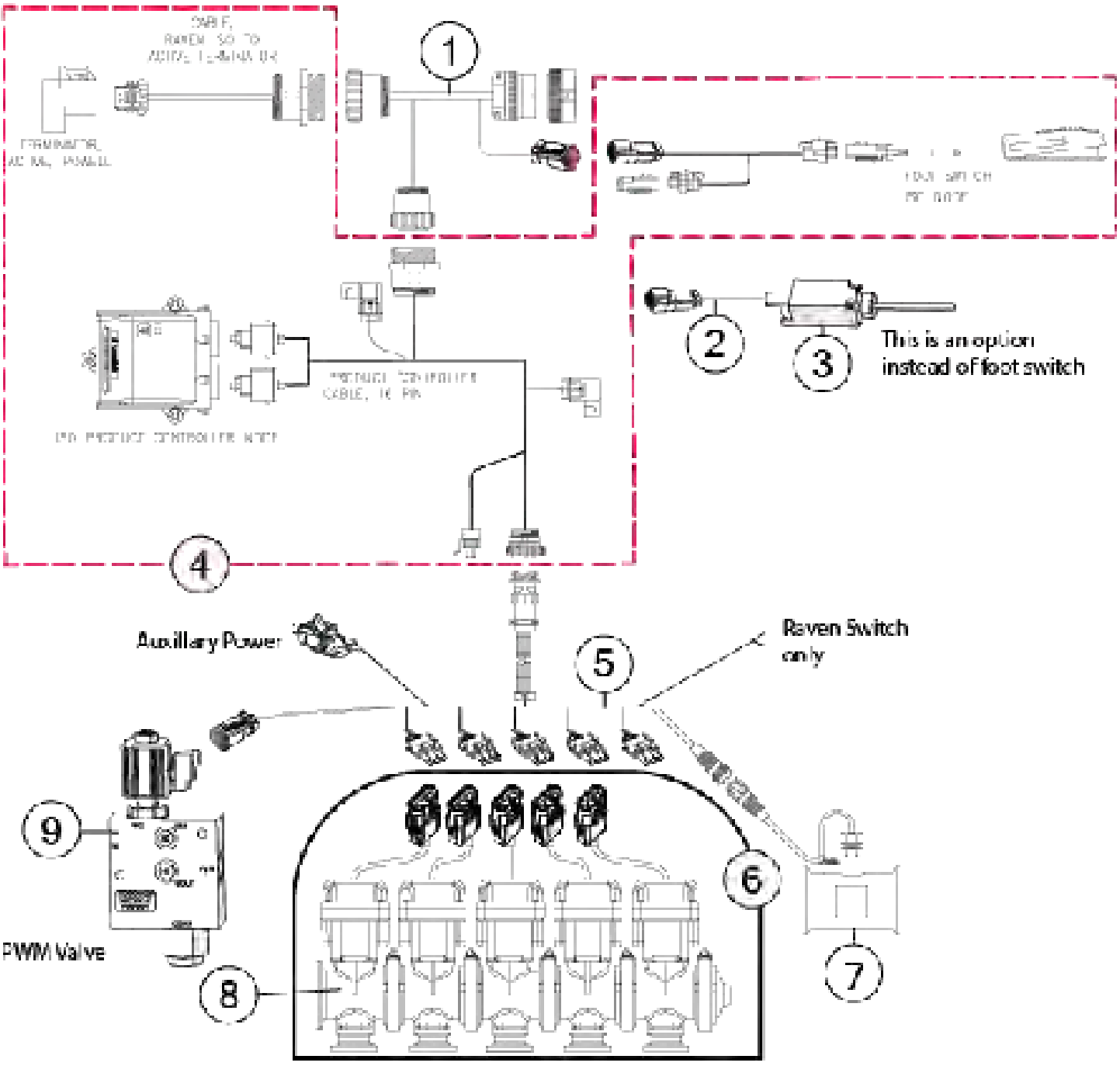
	Description	Part No.
1	120" x 3/4" Fertilizer Hose	JM0050830
2	48" x 3/4" Fertilizer Hose	JM0050825
3	36" x 3/4" Fertilizer Hose	JM0050824
4	3" x 60" Fertilizer Suction Hose - 2600 Tank	JM0050836
5	96" x 3/4" Fertilizer Hose	JM0050826
6	60" x 3/4" Fertilizer Hose	JM0050827
7	53" x 3/4" Fertilizer Hose	JM0050829
8	2" x 96" Pump to Raven Flow Control Line	JM0050834
9	126" x 3/4" Fertilizer Hose	JM0050831
10	2" x 50" Tank to Pump Hose - 150 Pump	JM0050833
10	3" x 42" Tank to Pump Hose - 750 Pump	JM0050835
11	1/4" x 2' Hose - 1/4" Poly Fitting Each End	JM0047863
12	30" x 3/4" Fertilizer Hose	JM0050828
13	55" x 3/8" Fertilizer Hose	JM0050810
14	65" x 3/8" Fertilizer Hose	JM0050811
15	130" x 3/8" Fertilizer Hose	JM0050812
16	140" x 3/8" Fertilizer Hose	JM0050813
17	160" x 3/8" Fertilizer Hose	JM0050814
18	190" x 3/8" Fertilizer Hose	JM0050815
19	246" x 3/8" Fertilizer Hose	JM0050816
20	276" x 3/8" Fertilizer Hose	JM0050817
21	306" x 3/8" Fertilizer Hose	JM0050818
22	336" x 3/8" Fertilizer Hose	JM0050819
23	366" x 3/8" Fertilizer Hose	JM0050820
24	396" x 3/8" Fertilizer Hose	JM0050821
25	426" x 3/8" Fertilizer Hose	JM0050822
26	456" x 3/8" Fertilizer Hose	JM0050823
27	Hose Clamp - 1-13/16" Min, 2-1/16" Max	JM0021189
28	1½" Male Thread X 1½" 90° Hose Barb	JM0061527
29	1½" Poly Bulkhead Tank Fitting with EPDM Gasket	JM0061522
30	3/4" NPT Bulkhead Tank Flange Assembly	JM0035222
31	3/4" Hose Barb x 3/4" Male NPT; 90 Deg	JM0035226
32	3/4" Hose Clamp SS	JM0039205
33	3/4" Male NPT x 3/4" Hose Barb	JM0021163
34	3/8"Hose Barb Tee	JM0073958

Raven SCS 450 Liquid Control System

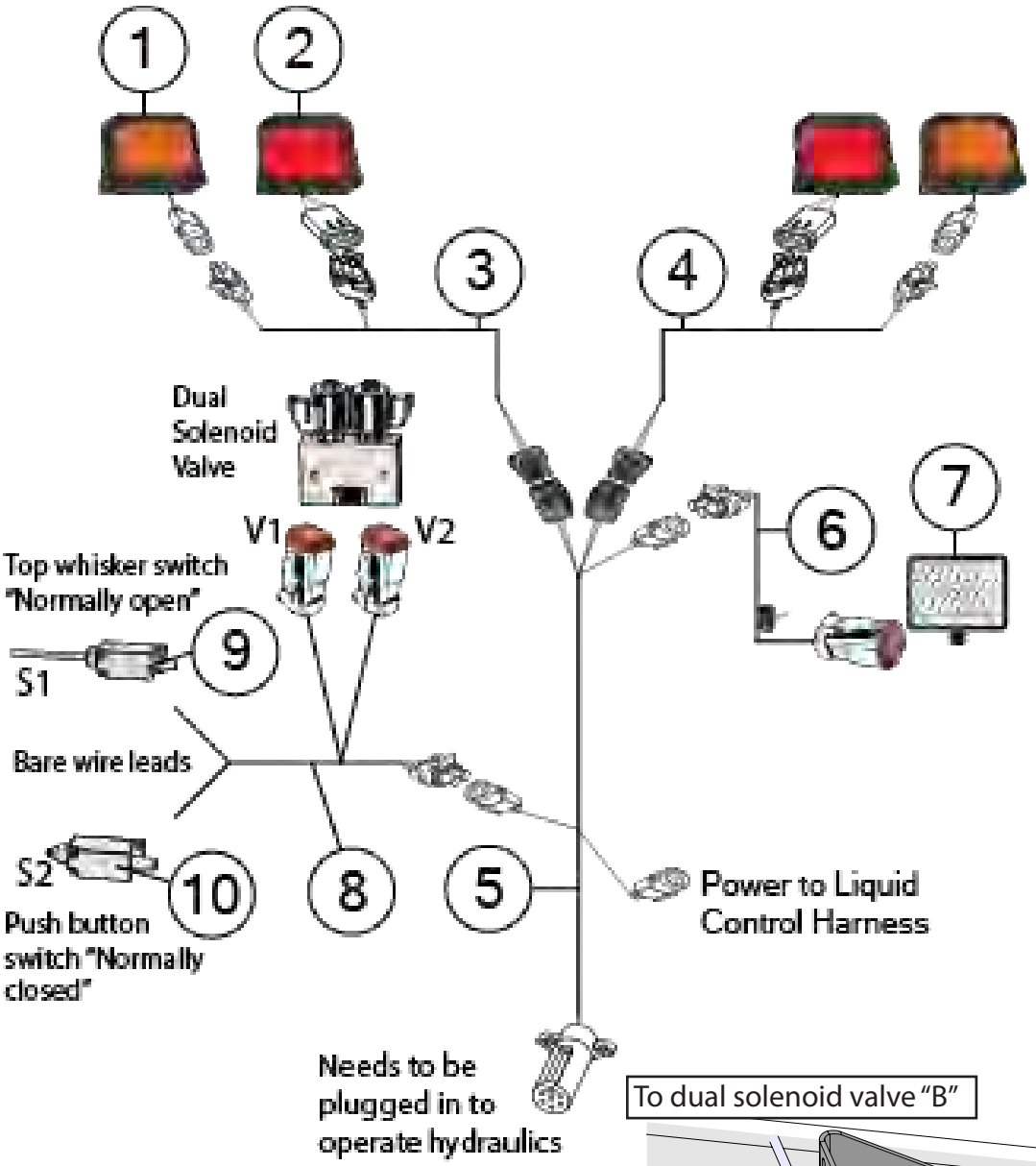


	Description	Part No.
1	Raven SCS450 Control Console	JM0039335
2	NitroGro 5 Section - PWM 30' Extension	JM0055257
3	Mini Wisker Limit Switch (12T962)	JM0050161
4	Phoenix GPS Speed Sensor	JM0039338
5	NitroGro Break Out Harness 4' (5 Boom, Limit Switch, PWM, Flow Meter, Power)	JM0055255
6	Raven 5 Section Manifold	JM0038797
7	Raven Flow Meter RFM100P M220 Manifold Flange (6000 Series)	JM0038727
8	Raven Boom Valve	JM0032478
9	Hydraulic PWM Control Valve for Nitrogen Fertilizer Pump (F14264A1)	JM0059223

ISO Liquid Control System



	Description	Part No.
1	Raven Cable ISOBUS Hitch to Raven ECU (12')	JM0039341
1	Raven Cable ISOBUS Hitch to Raven ECU (17')	JM0051018
2	Remote Switch Cable for Implement Engagement - ISO Control	JM0050677
3	Mini Wisker Limit Switch (12T962)	JM0050161
4	Raven ISO Single Product Kit	JM0039339
5	NitroGro Break Out Harness 4' (5 Boom, Limit Switch, PWM, Flow Meter, Power)	JM0055255
6	Raven 5 Section Manifold	JM0038797
7	Raven Flow Meter RFM100P M220 Manifold Flange (6000 Series)	JM0038727
8	Raven Boom Valve	JM0032478
9	Hydraulic PWM Control Valve for Nitrogen Fertilizer Pump (F14264A1)	JM0059223



	Description	Part No.
1	Amber Light (Soil Conditioner, NitroGro)	JM0009975
2	Red Light (Soil Conditioner, NitroGro)	JM0009976
3	Right Light Harness (NitroGro)	JM0061737
4	Left Light Harness (NitroGro)	JM0061738
5	Front Main Harness with 7 Prong Connector (NitroGro)	JM0061736
6	NitroGro 6000 - Rear Flood Light Harness	JM0074220
7	LED Field Light with Deutsch Connector	JM0074231
8	Dual Solenoid Valve Switch Harness	JM0068895
9	Mini Wisker Limit Switch (12T962)	JM0050161
10	Limit Switch for Field Light (ME-8111)	JM0036040
11	6000 Series Applicator Limit Switch Bracket	JM0061978
12	5/16"-18 Gr5 Z SF Hex Nut	JM0014049
13	M5-0.8 x 12 Gr8.8 Z Hex Bolt	JM0036046
14	5/16"-18 x 1" Gr5 Z Hex Bolt	JM0001743