Manual

nitro gro

OPERATOR'S MANUAL

MODEL 5010
5016

Rev. 6.17.2024

J&M Manufacturing Co, Inc
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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.

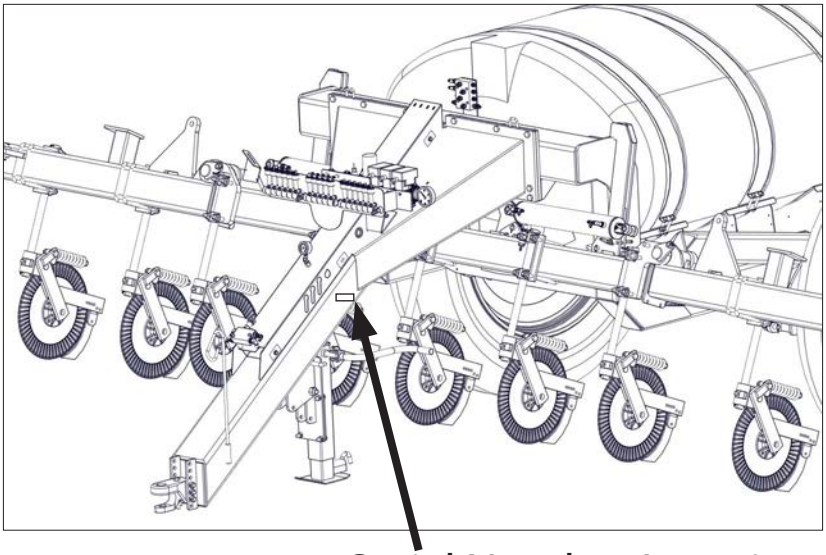
Use only genuine J&M service parts. Substitute parts may void warranty and may not meet standards required for safety and satisfactory operation. Record the model number and serial number of your equipment in the spaces provided:

Model No: 5010-5016 NitroGro Applicator **Serial No:** _____ **Date of Purchase:** _____

Purchased From: _____

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

Serial Number



Serial Number Location

Serial Number_____
Model Number_____5010 or 5016_____

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.

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

Make sure that the implement is fastened 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.

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	80 ft-lbs
9/16"-18	170 ft-lbs
5/8"-18	350 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 5000 Series Applicators	5010	5016
Tank Size	1,000 Gallon	1,600 Gallon
Base Width	30'-0"	40'-0"
Ground Clearance	34"	34"
Row Spacing*	20", 30"	20", 30"
Number of Coulters	11, 13, 15, 17, 23, 25	11, 13, 15, 17, 23, 25
Coulter Style	Grove Engineered Products (GEP) or J&M Para-Linkage Coulters	Grove Engineered Products (GEP) or J&M Para-Linkage Coulters
Fertilizer Delivery	Knife or Injection	Knife or Injection
Wing Flex	Standard 8º Flex Up - 6º Flex Down	Standard 8º Flex Up - 6º Flex Down
Wing Kick	Standard 8° Flex Up	Standard 8° Flex Up
Coulter Frame Tubing	7" x 7" Toolbar	7" x 7" Toolbar
Hydraulic Down Pressure	Standard	Standard
Standard PWM Hydraulic Driven Pump	Ace Pump 155	Ace Pump 155
Optional Ground Driven Pump	John Blue 7055 or 9055	John Blue 7055 or 9055
Wheels - Standard	46" w/IF380/90R46 Firestone Tires	46" w/IF380/90R46 Firestone Tires
Transport Width	15'-0"	15'-0"
Transport Height	12'-6"	12'-6"
Transport Length	16'-8"	20'-8"
Pin To Axle	12'-0"	14'-0"
Flow Monitors	Optional	Optional
Depth Control Spools	Optional	Optional
Quick Fill	2" Fill Standard - 3" Fill Optional	2" Fill Standard - 3" Fill Optional
Wash Tank	Standard 9 Gallon Wash Tank	Standard 9 Gallon Wash Tank

* Other Row Spacing Available Upon Request

Tires and Ground Compaction	5010	5016
VF320/105R46 (Alliance) (172D)	18 psi	35 psi
VF380/90R46 (Alliance) (173D)	16 psi	27 psi
IF520/85R42 (Alliance) (169D)	9 psi	16 psi

5010

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

	Total Weight	Weight on Axle*	Tongue Weight*
Tank Empty	10,500 lbs	8,012 lbs	2,488 lbs
Tank Full	18,800 lbs	16,344 lbs	2,568 lbs

With toolbar folded and down (knives in ground):

	Total Weight	Weight on Axle*	Tongue Weight*
Tank Empty	10,500 lbs	4,467 lbs	83 lbs
Tank Full	18,800 lbs	12,687 lbs	163 lbs

*These values assume moderate soil hardness and 17 coulters.

5016

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

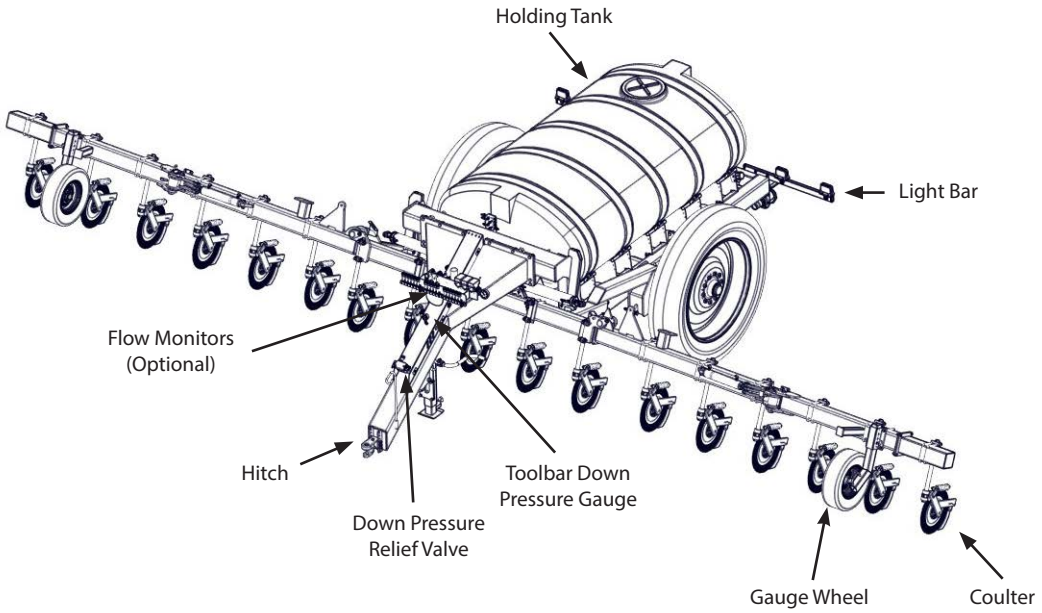
	Total Weight	Weight on Axle*	Tongue Weight*
Tank Empty	10,900 lbs	7,965 lbs	2,935 lbs
Tank Full	24,180 lbs	21,572 lbs	2,608 lbs

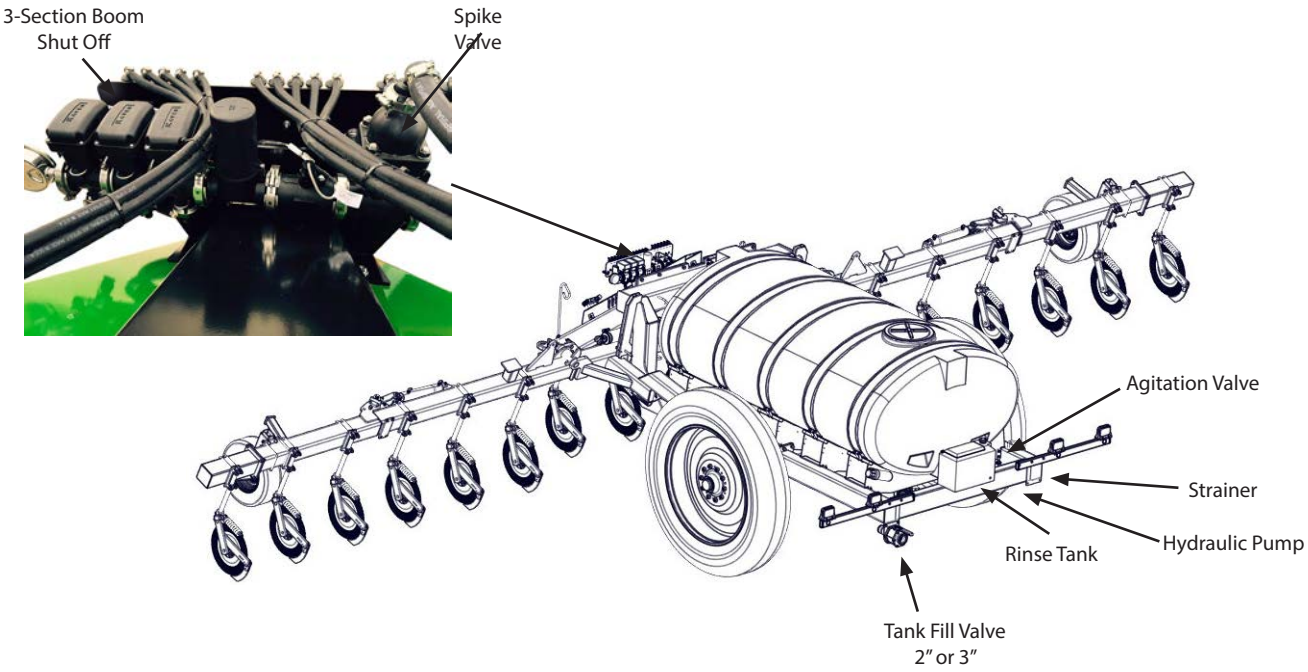
With toolbar folded and down (knives in ground):

	Total Weight	Weight on Axle*	Tongue Weight*
Tank Empty	10,900 lbs	4,837 lbs	113 lbs
Tank Full	24,180 lbs	17,996 lbs	234 lbs

*These values assume moderate soil hardness and 17 coulters.

NitroGro Components





Flow Monitors

Flow monitors allow the operator to see the rate of flow to each coulter through a floating ball inside the transparent inspection tube. Each coulter is connected with a separate supply hose.
Note: The height in each flow monitor is not necessarily an accurate representation of the flow in each row; rather, it serves as an indication of flow.

Toolbar 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 - DO NOT EXCEED 1,350 psi** of pressure on the down pressure gauge. Excessive pressure can cause premature wear on wing pivots and gauge wheels. Exceeding 1,350 psi will void the manufacturer's warranty. It is recommended to use the least amount of pressure necessary to keep the coulters in the ground.

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.

IMPORTANT - Do not exceed 7 gallons per minute hydraulic fluid input when using the Ace FMC-155-HYD-206 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 and will void the manufacturer's warranty.**

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. Failure to do this will void the manufacturer's warranty.

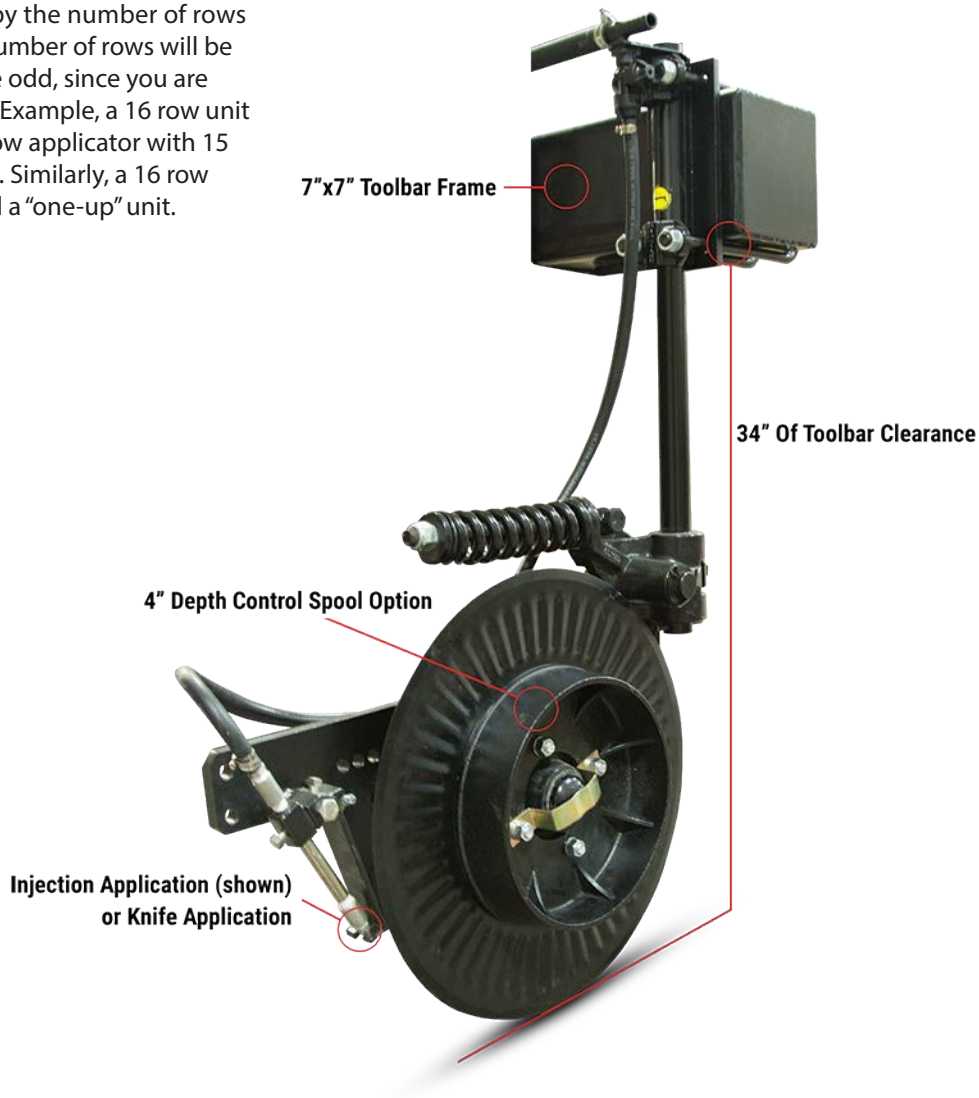
Connect the return line to a low pressure return port, if available. The low pressure return port routes oil directly to the reservoir, minimizing return line pressure. Low return line pressure extends the motor seal life and increases operating efficiency. Pump failure, due to high pressure return lines will void the manufacturer's warranty.

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.**

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. Example, a 16 row unit will have either 15 or 17 coulters. A 16 row applicator with 15 coulters is considered a "one-down" unit. Similarly, a 16 row applicator with 17 coulters is considered a "one-up" unit.



Hand Wash Tank

The 9 gallon hand wash tank makes cleaning hands after chemical spills quick and easy. At the end of the season, winterize the hand wash tank by entirely draining the water.

Strainer

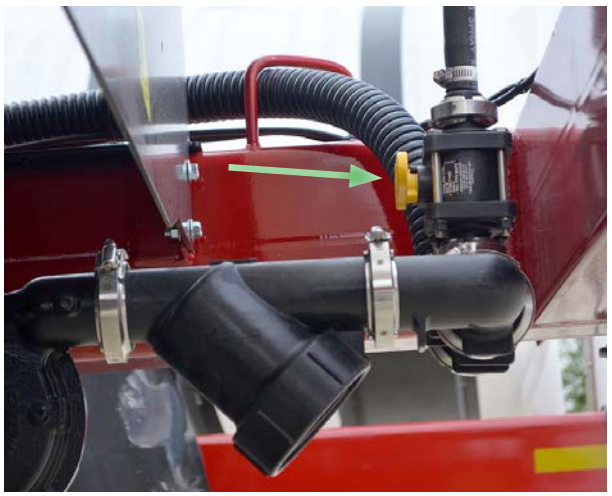
The NitroGro applicator is equipped with a strainer designed to remove dirt and debris from the fertilizer to prevent downstream clogs. The stainer should be cleaned daily during regular operation.

Shut-Off & Fill Valve

The NitroGro applicator is standard equipped with a 2" shut-off and fill valve. There is an upgrade option for a 3" shut-off and fill valve. The 3" valve will allow a quicker fill.

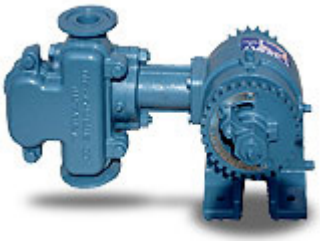
Agitation Valve (Hydraulic Pump Units Only)

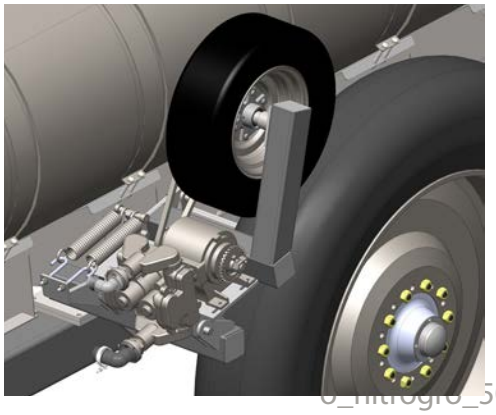
If priming becomes an issue the agitation valve may be opened to allow air to escape from the pump so it can be primed.
The agitation valve can also be used to evenly mix additives by running the pump with the electronic control valves closed.
With PWM, the agitation valve may be closed during operation for full pump efficiency.



Optional Ground Driven Pump

The John-Blue ground drive pump comes in either single or double piston configuration. It does not require any control valves. The rate is controlled by an adjustment on the pump and it naturally compensates for different speeds since it is driven off of the main frame wheel. Refer to "Ground Drive Pump Rates" on page 34.





Pre-Operation Checklist

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

Wheel Nuts Tightened
During initial operation, tighten standard 3/4" wheel studs and nuts to a torque of 400 ft-lbs. Re-check wheel nut torque settings during initial break in period (10, 20, 50 acres), then every 10 hours of use for the first 40 hours. Continue checking wheel nut settings until nuts do not loosen. If wheel nuts loosen, they may damage wheel nut seats. Once seats are damaged, it will become impossible to keep nuts tight.
Failure to keep the wheel nuts tight could cause considerable damage to the applicator and surrounding. It is the dealer's responsibility to torque the wheel nuts to specification before delivery. Damage caused by failure to keep wheel nuts tight is not warrantied.

Tires Inflated
Ensure tires are inflated to the correct pressure, as indicated in "Operation" on page 20.

Hardware
Inspect the unit for loose nuts, bolts, and fasteners. Tighten where necessary.

Grease Points
Check all bearings and grease fittings for proper lubrication, according to the operator's manual.

Hydraulic Leaks
Unfold and fold the applicator according to the fold instructions in the operator's manual "Folding & Unfolding" on page 15. Check for leaks on hydraulic cylinders, fittings, and hose ends (Use cardboard or wood to safely check for leaks) and tighten where necessary.

Clean Tank
Check tank for debris (like plastic shavings from assembly) and clean if necessary. Use a vacuum to remove tank debris.

Indicator Balls
Remove all indicator balls from flow monitors and install the correct indicator ball in each flow monitor for the customer's desired gallons per acre and speed. Refer to "Flow Monitor Set Up" on page 21 to determine which indicator ball to select.

Water Test
Fill tank with 100 gallons of water and test applicator with water before use. Most rate controllers have a "self-test" mode that is for this purpose. Tighten any leaking hoses or fitting connections. **Do not run the fertilizer pump dry. This could cause premature failure to the fertilizer pump and is not warrantied.**

Winterization
If applicator has ever had fluid in the tank, winterize the applicator before the temperature drops below freezing. See "Storage" on page 40 for winterizing instructions. **Failing to winterize applicator can cause severe damage to fertilizer distribution components and is not warrantied.**

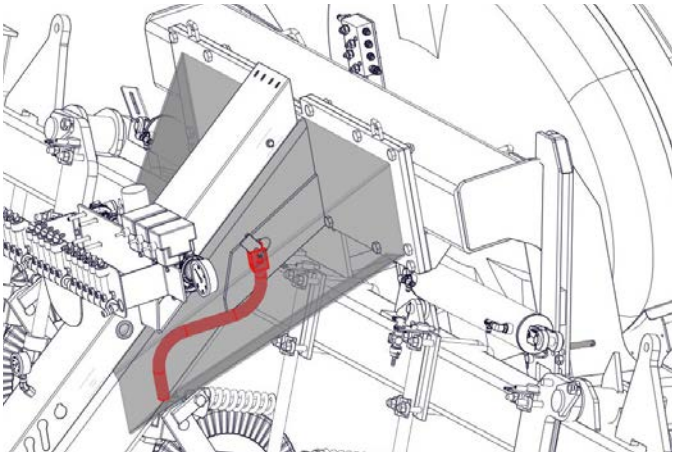
Defects & Scratches
Examine paint and poly tank for scratches, cracks, gouges, and defects.

Safety Decals & Lights
Check that safety decals, reflective decals, and the slow-moving vehicle sign are properly located. Refer to the operator's manual for proper placement of decals. Ensure all lights function properly.

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, 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.**



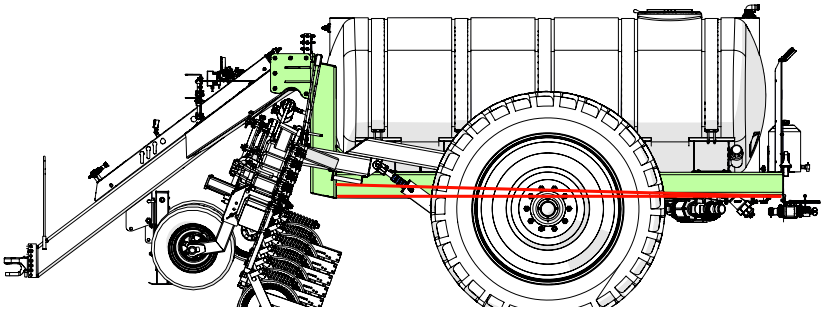
Remove the hitch pin and unhook the safety chains.

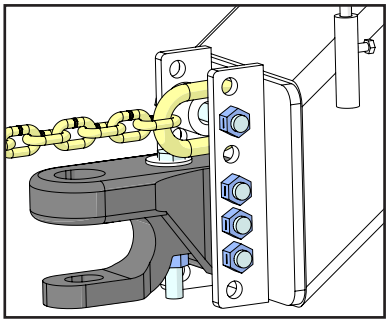
⚠**WARNING – Always relieve hydraulic system pressure before disconnecting hoses from tractor or servicing hydraulic system. See the tractor's operating manual for proper procedures. Disconnect the hydraulic hoses. Install dust covers over the hose plugs and outlets.**

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

Adjusting the Hitch Height

If the front of the chassis is higher than the rear, raise the hitch a set of holes on the front of the tongue. If the rear of the chassis is higher than the front, lower the hitch a set of holes. Shims can be used under the hitch and above the tractor drawbar to adjust the level more if moving the hitch between holes is too big of an adjustment. Shims will raise the front of the chassis up.





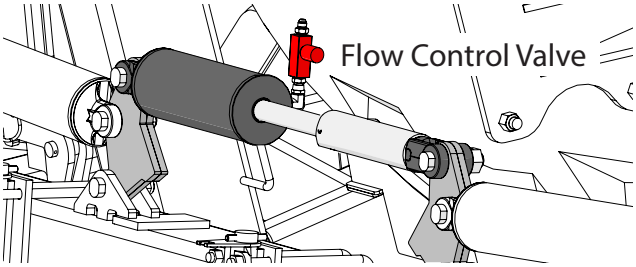
Connecting the Hydraulic Hoses

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/ Ground Drive if Equipped*
Set #2 - Red Hoses -*Wing Fold*
Set #3 - Black Hoses - *Hydraulic Pump (Hook the return hose to low pressure return port at the tractor)*

Folding & Unfolding

- Raise the toolbar to take the weight off of the transport latches and unpin the transport latch/wing
- Unfold the wing assemblies. On 40ft units, one cylinder will unfold the inner wing section and another cylinder will unfold the outer wing section. The inner wing will automatically fold to the wing "kick-up" position, then unfold the outer wing section until it is in alignment with the inner wing section
- After the outside wing is unfolded, lower the toolbar to the ground, adjust the flow control on the down pressure cylinder so the wing coulters come into contact with the ground at the same time as the center coulters.
  - Turn the valve clockwise to slow the wings when lowering.
  - Turn the valve counter-clockwise to accelerate the wings when lowering.
  - This does not affect the lift speed.

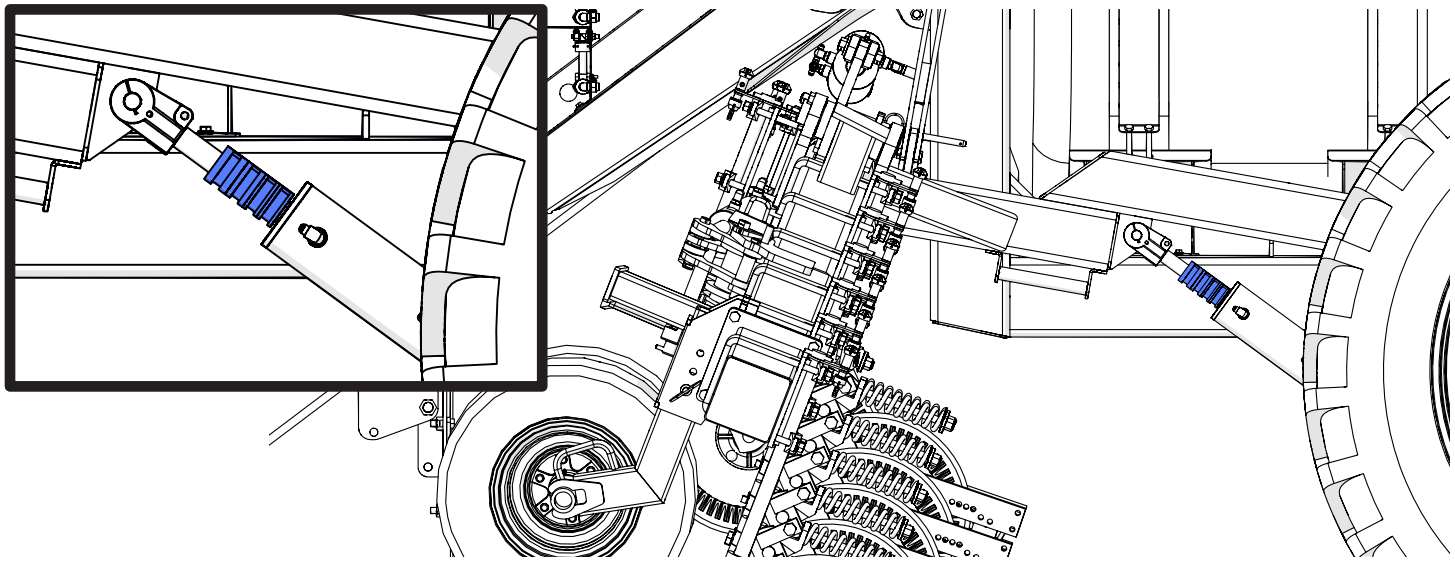


- When you raise the unit up, the entire toolbar raises up until the toolbar raise/lower cylinders are fully extended, then the wings will start to fold to the kick-up wing position.
- Once the wings are in the kick-up position the outside wing section can be folded against the inside wing section. After the inside and outside wing sections are folded together, the wings can continue to be folded until the transport Latch/Wing Rest is engaged against the center base weldment.
- Slightly lower the toolbar to allow some weight to transfer the Transport Latches/ Wing Rest. (Note: If you lower the toolbar too far the wing-kick cylinder will begin to extend and the wings will begin to unfold.)

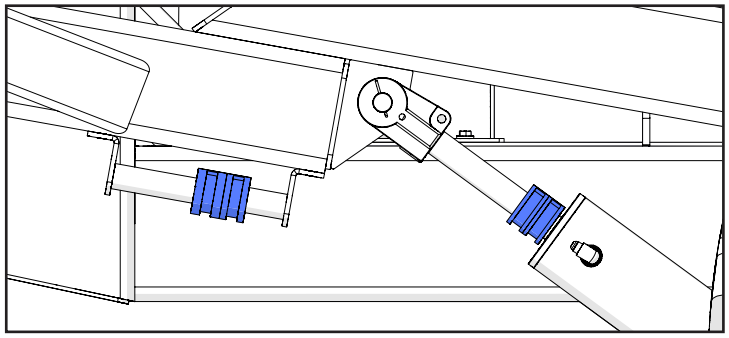
Scan to watch the video

Adjusting the Field Depth

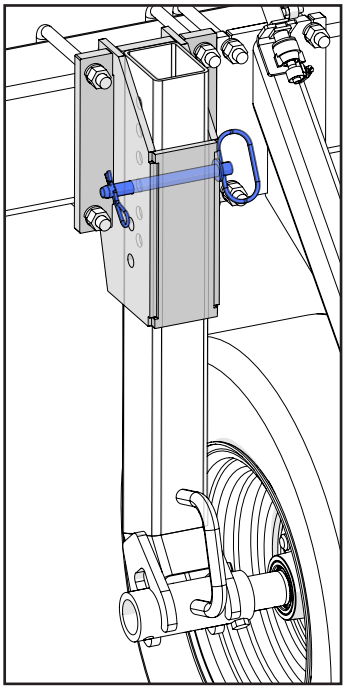
1. All the cylinder rod spacers for setting the coulter soil depth of the enter section should be installed on the 4”x8” lift cylinders on the center toolbar, shown below.



2. With the toolbar unfolded, lower the toolbar and leave in detent, applying constant downward pressure to the 4”x8” cylinders.
3. Pull the applicator forward for 20-30 yards to allow the coulters to reach their maximum soil depth and stop.
4. If more depth is desired for the center section of the toolbar, remove a cylinder spacer the same width from each 4”x8” cylinder. Again, pull forward 20-30 yards before rechecking the depth. Repeat this process until the coulters on the center section of the toolbar are the correct soil depth. The unused spacers can be stored on the underside of the man wings on either side of the applicator, shown below.



5. After the correct depth is set for the coulters on the center toolbar section, both of the gauge wheel assemblies can be adjusted up or down in order to set the coulter depth of the outside wings. This can be done by simply removing the hair pin and depth control pin on each gauge wheel assembly, shown below. After each gauge wheel adjustment, pull the applicator forward 20-30 yards before rechecking the wing coulter depth, until the correct soil depth is achieved. Both gauge wheel assemblies should be set to the same height to ensure the toolbar is level.



NOTE: If at any point the 4”x8” cylinders are not bottomed out on the rod spacers or the gauge wheels are not on the ground while moving, increase the down pressure relief valve pressure by referring to the “Toolbar Down Pressure Relief Valve and Gauge” section.

NOTE: Changing field conditions like soil type and moisture levels can change the down pressure and depth setting requirements. Check the coulter depth when field conditions change and adjust accordingly.

NOTE: Coulter Depths of over 5” are not recommended for 28% or 32% UAN applications. Coulter depths greater than 5” can also cause damage to the applicator and will void the manufacturer’s warranty.

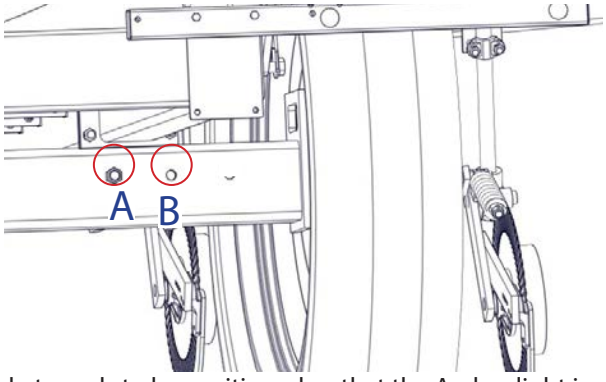
Transporting

- 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 on the transport latches before transporting.

The Transport Latches are designed for safe transport. When the Transport Latches are resting on the Main Frame and the pins are installed, the Nitro Gro Applicator can not lower.

Wheel Spacing

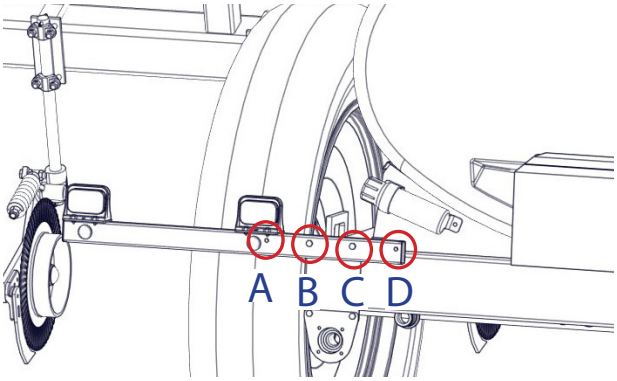
- To set up the Applicator for 20" or 30" rows use the inside hole "A". This will set the wheel spacing at 120".
- To set up the Applicator for 22" rows use the outside hole "B". This will set the wheel spacing at 132".



When shipped, the light bar will be attached using holes "A" and "B". The light bracket needs to be positioned so that the Amber light is out past the wheel.

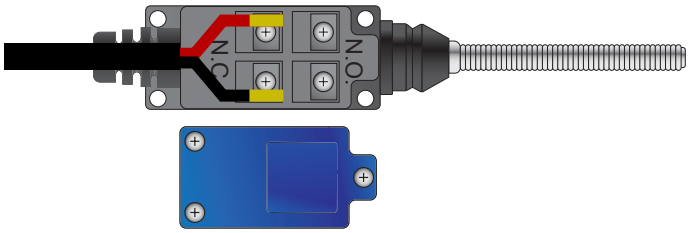
NOTE - When changing the wheel spacing it may be necessary to move the Light Brackets so the Amber Light is out past the wheel.

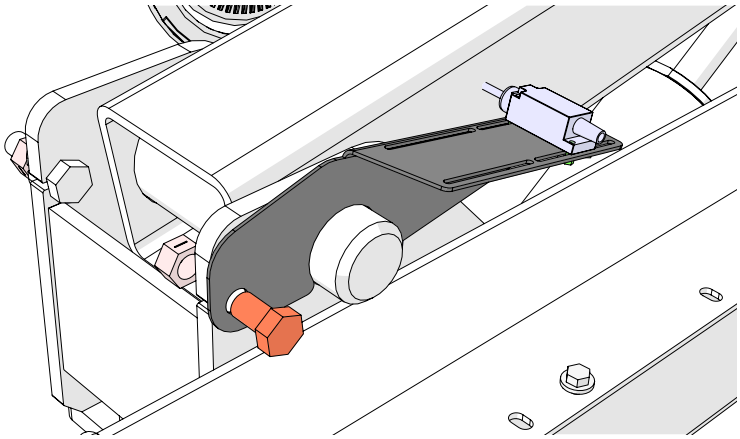
- For 20" and 30" row spacing use holes "B" and "C".
- For 22" rows use holes "C" and "D".



Whisker Switch Installation

- Install Limit Switch Wire on the N.C. Terminals.
- This will cause the pump to shut off when switch is pressed.
- Position the switch on the mount next to the toolbar pivot point on the "drivers" side.
- Adjust the switch's position along the mount's slots in order to disengage the switch when the coulters make contact with the ground while lowering toolbar.
- Secure any loose wire.





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
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 deep	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	Install flow monitor balls below plastic grate under flow monitor cap.
Unable to maintain set application rate	Clogged strainer	Clean strainer.
	Orifices too small	Install larger orifices.
	Agitation valve open	Close valve.
Fertilizer pump will not prime	Tank valve clogged/closed	Unclog/open valve.
	Agitation valve closed	Open valve.

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

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 psi 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 pressure 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 lips touch.

***PREVENTION*:**
The best way to minimize return pressure is to return oil directly back to the tractor reservoir. Most tractor manufactures now offer a Low Pressure Return Port option for this purpose. Contact your dealer for the specific options available for your tractor model. Proper hydraulic hose sizing in also important to minimize restriction. An 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 improperly 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.

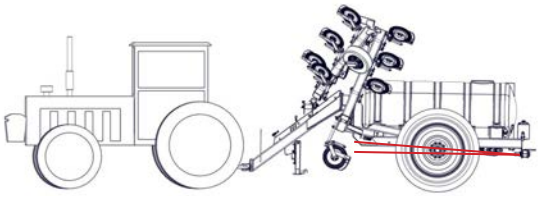
*Refer to the ACE hydraulic pump manual, John Blue Pump manual, or Raven Controller manual for additional troubleshooting information.

Adapter Harnesses for Various Controller Options

If you want to use a different controller for your applicator than Raven you may need to get an adapter harness from these manufacturers below.

Controller	Adapter Harness	Adapter Part #	Source
JD Rate Controller 2000	RC2000 to Raven New Style Flow Harness (16 Pin)	AE2967	Ag Express
JD Rate Controller	JDRC to Raven New Style Flow Harness (16 Pin)	AE3170	Ag Express
Trimble Field-IQ	Field-IQ to Raven New Style Flow Harness (16 Pin)	AE2923	Ag Express
Ag Leader	Raven Adapter Harness	4001266	Ag Leader
TeeJet	Harness, IC18 to Raven Flow Control Implement Harness	45-10122	TeeJet

Operation



1. Hook tractor to NitroGro and adjust hitch so that frame on applicator is level or tilting backward slightly. See "Hitching and Unhitching the Applicator" on page 14.

2. Connect hydraulic lines. See "Connecting the Hydraulic Hoses" on page 15.

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

4. Set the coulter depth. See "Adjusting the Field Depth" on page 16.

5. Using the desired rate of application (GPA) and speed of application (MPH), reference the supplied sizing charts beginning on page 32 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 coulters), then the outside coulters on each end of the unit will be 0.5x the rate of the other coulters.**

6. Put 100 gallons of 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. Doing so will void the manufacturer's warranty.

7. 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.

8. Adjust the hydraulic down pressure. See "Toolbar Down Pressure Relief Valve and Gauge" on page 10.
   IMPORTANT - DO NOT exceed 1,350 psi. Exceeding 1350 psi is not warrantable.

9. 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.

10. 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.

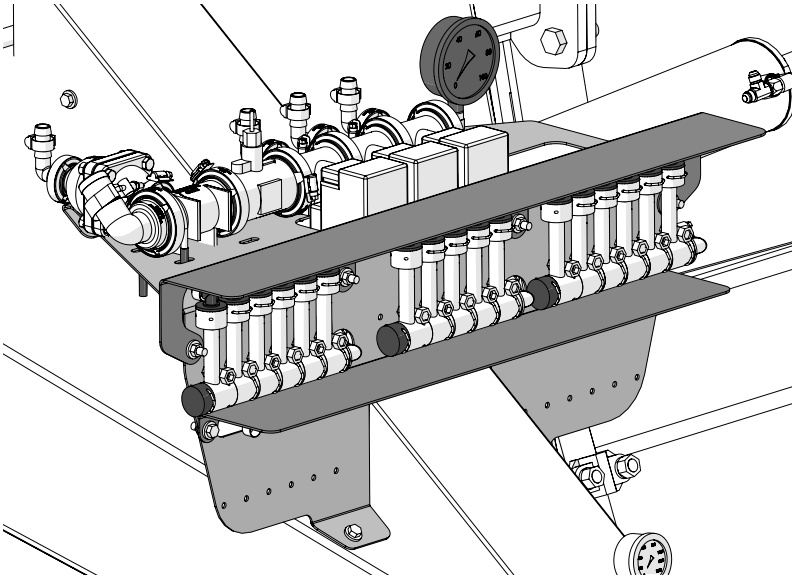
11. TIRE PRESSURE: The following is to be used as a **general guide** for tire inflation for cyclic use. Figures can vary depending on specific brand of tire used. **It is important that tires are inspected before and after operation. The tire should stand up with no side wall buckling or distress as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

Tires for Single Wheel Applicators	5010	5016
VF320/105R46 (Alliance) (172D)	18	35
VF380/90R46 (Alliance) (173D)	16	27
IF520/85R42 (Alliance) (169D)	9	16

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

Flow Monitor Set Up

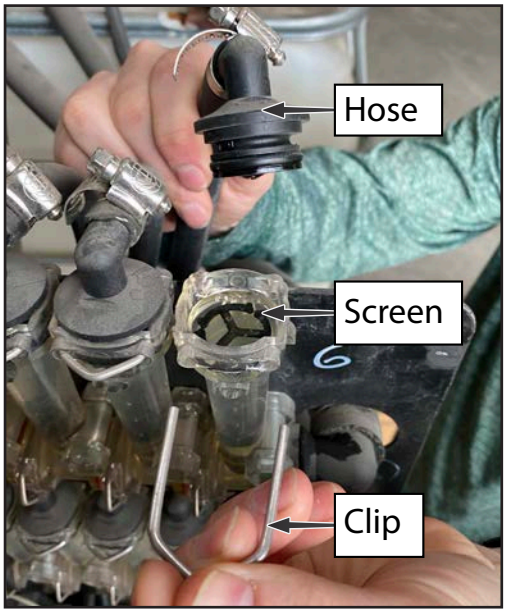
The NitroGro applicator offers row spacing options of 20", 22", or 30". The unit will be either be set up to re-apply the outside row ("1 Up"), or skip a row ("1 Down"). Using your row spacing and whether your applicator is "1 Up" or "1 Down", refer to the chart below to determine the location and quantity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



Row Spacing	Flow Monitor Manifold Set Up (1 Up)			Flow Monitor Manifold Set Up (1 Down)		
20"/22"	25 Coulters			23 Coulters		
	5	5	5	5	5	5
	5		5	3		3
30"	17 Coulters			15 Coulters		
	6	5	6	5	5	5

Using the charts on pages 20-31, 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.



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 (13 or 17 knife) and .093 for one and a half rate outside (11 or 15 knife).
- With .107 on the center, use .075 for half rate outside (13 or 17 knife) and .132 for one and a half rate outside (11 or 15 knife).
- With .132 on the center, use .093 for half rate outside (13 or 17 knife) and .161 for one and a half rate outside (11 or 15 knife).
- With .161 on the center, use .107 for half rate outside (13 or 17 knife) and .196 for one and a half rate outside (11 or 15 knife).

For replacement orifices, see "Check Valve" on page 61.

Kit	**0.075**	**0.093**	**0.107**	**0.132**	**0.161**	**0.196**
11 Knife	0	0	9	9	9	2
13 Knife	2	2	11	11	11	0
15 Knife	0	0	13	13	13	2
17 Knife	2	2	15	15	15	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.

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 Ball 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 (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 61.

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

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 - 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 Ball 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 (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 61.

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 - 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.

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, (15 knife).
- With #15 on the center, use #8 for half rate outside, (13 or 17 knife), and #20 for one and a half rate outside, (11 or 15 knife).
- With #20 on the center, use #10 for half rate outside, (13 or 17 knife), and #30 for one and a half rate outside, (11 or 15 knife).
- With #30 on the center, use #15 for half rate outside, (13 or 17 knife), and #40 for **one and a third** rate outside, (11 or 15 knife).
- With #40 on the center, use #20 for half rate outside, (13 or 17 knife), and #60 for one and a half rate outside, (11 or 15 knife).

For replacement injectors, see "Coulter Injector Assembly" on page 51.

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.

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, (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 51.

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 - 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, (23 knife).
- With #15 on the center, use #8 for half rate outside, (17 knife), and #20 for one and a half rate outside, (15 knife).
- With #20 on the center, use #10 for half rate outside, (17 knife), and #30 for one and a half rate outside, (15 knife).
- With #30 on the center, use #15 for half rate outside, (17 knife), and #40 for **one and a third** rate outside, (15 knife).
- With #40 on the center, use #20 for half rate outside, (17 knife), and #60 for one and a half rate outside, (15 knife).

For replacement injectors, see "Coulter Injector Assembly" on page 51.

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.

Ground Drive Pump Rates

7055 Ground Drive Pump				
Pump Setting	30 ft (GPA)	30 ft (LPHa)	40 ft (GPA)	40 ft (LPHa)
2	11.2	104.4	8.4	78.2
3	16.7	156.6	12.5	117.3
4	22.3	208.8	16.7	156.4
5	27.9	261.0	20.9	195.5
6	33.5	313.2	25.1	234.6
7	39.1	365.4	29.3	273.7
8	44.6	417.6	33.4	312.8
9	50.2	469.8	37.6	351.9
10	55.8	522.0	41.8	391.0

9055 Ground Drive Pump				
Pump Setting	30 ft (GPA)	30 ft (LPHa)	40 ft (GPA)	40 ft (LPHa)
2	22.3	208.8	16.7	156.4
3	33.5	313.2	25.1	234.6
4	44.6	417.6	33.4	312.8
5	55.8	522.0	41.8	391.0
6	67.0	626.3	50.2	469.2
7	78.1	730.7	58.5	547.4
8	89.3	835.1	66.9	625.6
9	100.4	939.5	75.2	703.8
10	111.6	1043.9	83.6	782.0

NOTES:

- The values listed are estimates and can vary based on tire inflation and traction. For the most precise rate, it is best to set the pump at the listed rate and run a known amount on a known area. Then, calculate the actual amount applied and adjust accordingly.
- Rates are calculated using a ST215-75D14 tire with a driving 60-tooth sprocket to an 18-tooth driven sprocket.
- To achieve higher or lower rates, change out the sprockets accordingly.

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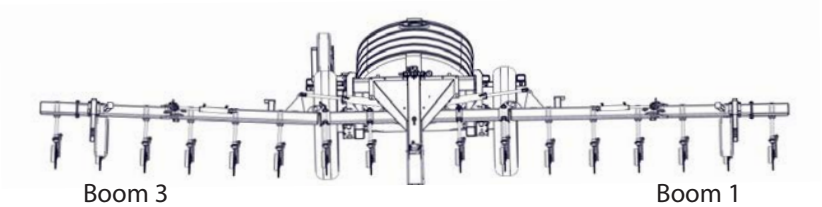
Raven 450 Controller Set Up

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-P-C PWM Valve appears. 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 3. Press the arrow keys to advance to the remaining booms.

Boom #	12 Row	16 Row
Boom 1	105	165
Boom 2	150	150
Boom 3	105	165



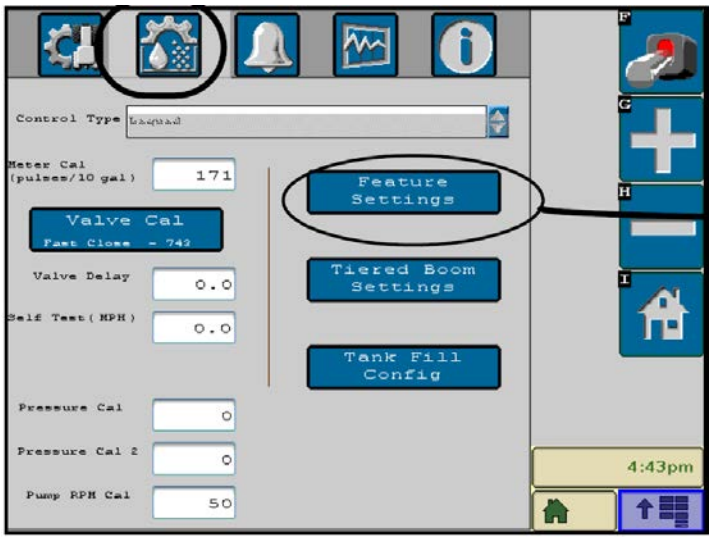
- Press the "SPEED CAL" button and input the appropriate speed calibration value for the type of sensor being used and press "ENTER".
  For Phoenix 10, the speed calibration is 785.
  For wheel drive sensor, refer to the speed calibration steps in the Raven SCS 450 operator's manual.
- Press the "METER CAL" button and enter the meter calibration value stamped on the flow meter's identification tag.
  The meter calibration value is approximately 720 or 1340 check sticker next to flow meter for accurate number.
- 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. If the pump does not react fast enough to the desired rate, 33 can be entered here to speed up the controller's reaction time.
- 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.
- Adjust the PWM offsets by selecting "Data Menu" and use the arrows to find the high PWM and Low PWM offsets. Set the high PWM offset to 220 and the low PWM offset to 50. Next, find the PWM frequency and set it to 122.

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.

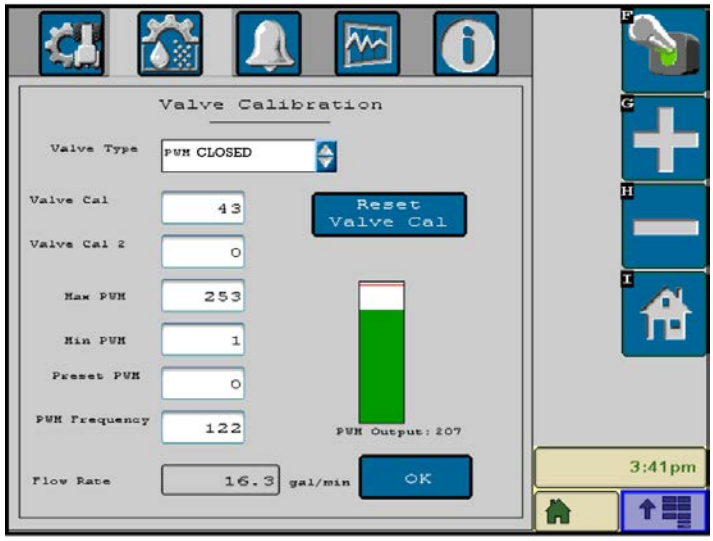
Scan to watch the video

Raven ISOBUS Rate Controller Set Up

- On the second tab from the left, enter the Flowmeter Calibration (Meter Cal approximately 700 or 1340) number which is stamped on the flowmeter on the applicator.
- Next select Valve Cal. Here, a Self Test speed can be entered for water testing and a nozzle flow check.



- For Valve Type, select PWM Closed.
- Enter 43 for the Valve Cal.
  If the pump does not react fast enough to a desired rate, 33 can be entered for the Valve Cal speed up the reaction time.
- Enter 220 for the Max PWM, 50 for the Min PWM and 122 for the PWM Frequency. Select Ok.



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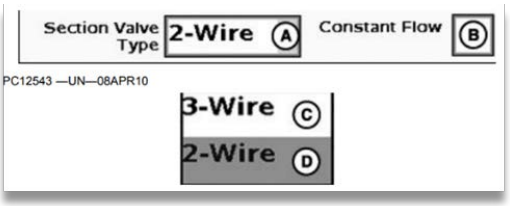
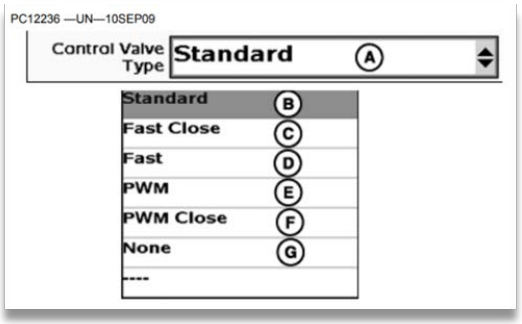
John Deere Greenstar Rate Controller PWM Setup

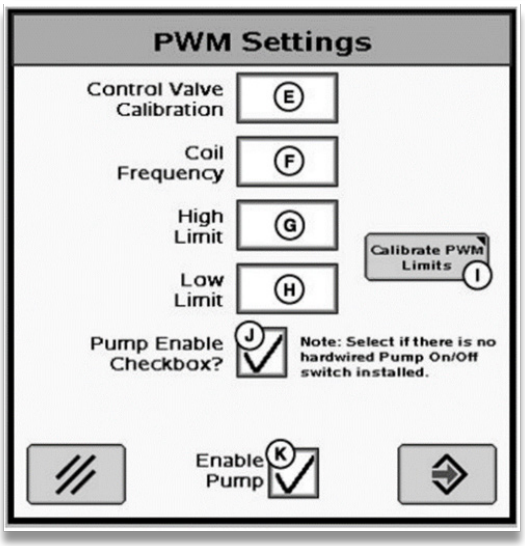
In the System Set-up Tab, select **"3-Wire" (C)** for the Section Valve Type. See your Nitrogro Owners Manual for information on the number of sections and section widths.



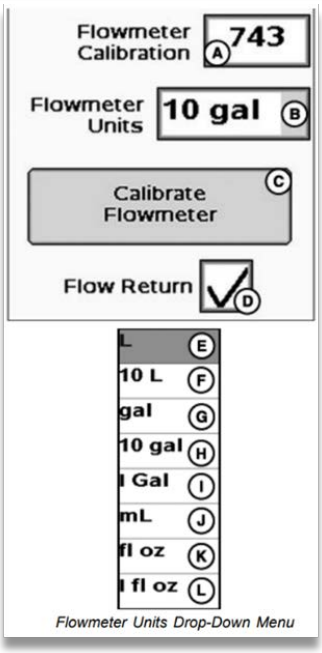
In the System Set-up Tab, select **"PWM Close" (F)** for the Control Valve Type.



Select the PWM Setup Button to enter into the PWM Settings Box. In the PWM Settings Box, enter a Control Valve Calibration of **1533**, a Coil Frequency of **122**, a High Limit of **220** and a Low Limit of **50**. The High and Low Limits can be fine-tuned using the Calibrate PWM Limits button to speed up the response time if necessary.



Enter the Flowmeter Calibration number (approximately 700 or 1340) which is stamped on the flowmeter on the applicator. Also check and make sure the units are the same as stamped on the flowmeter, usually Gallon **"10 gal" (H)**.



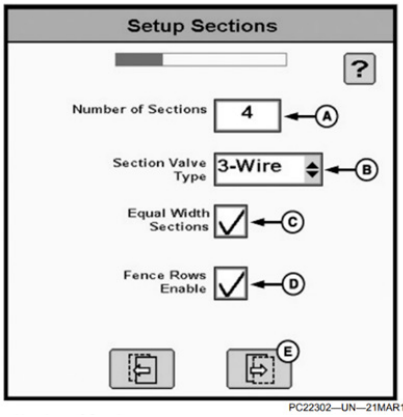
Flowmeter Units Drop-Down Menu

Scan to watch the video

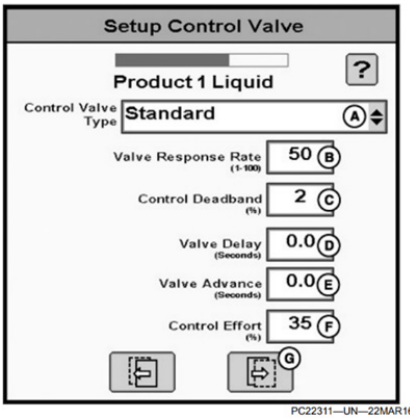
See your Greenstar Rate Controller Manual for more details.

John Deere Rate Controller 2000 PWM Setup

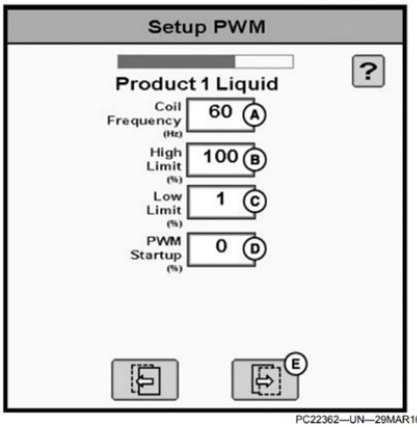
On the Setup Sections page, select **"3-Wire" (C)** for the Section Valve Type. See "Flow Monitor Set Up" on page 30 for information on the number of sections and section widths.



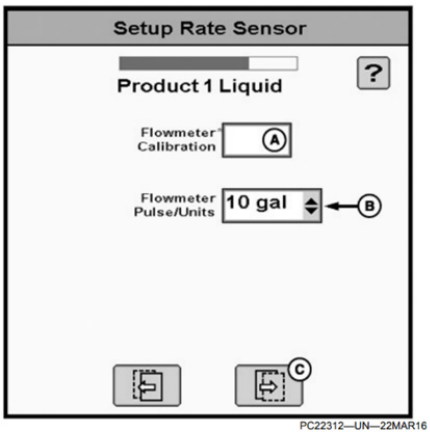
On the Setup Control Valve page, select **"PWM Close" (F)** for the Control Valve Type. Enter **"50"** for the Valve Response Rate and **"2"** for the Control Deadband.



On the Setup PWM page, enter **"122"** for the Coil Frequency, **"85"** for the High Limit %, **"20"** for the Low Limit % and **"0"** for the PWM Startup %.



Enter the Flowmeter Calibration number (approximately 700 or 1340) which is stamped on the flowmeter on the applicator. Also check and make sure the units are the same as stamped on the flowmeter, usually Gallon **"10 gal" (H)**.



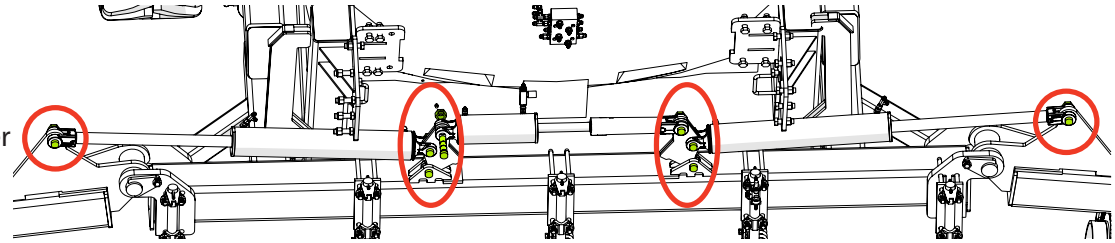
Scan to watch the video

See your Rate Controller 2000 Manual for More Details

Service

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

1. Clean strainer daily.
2. Grease coulter hubs with two pumps every 50 hours.
3. Grease row closers (if equipped) 1 pump of grease per year.
4. Check lighting before over the road transport. Make sure lights and SMV emblem are clean from dirt and field debris.
5. Check implement for damage, cracked welds, loosened hardware, etc. After the unit is repaired promptly repaint to prevent further damage.
6. Check hydraulic system for leaks and hose damage, twists or kinks and repair as needed.
7. Check fertilizer handling system for leaks and hose damage, twists or kinks and repair as needed.
8. Check tire pressures and lug nuts periodically and adjust as required.
9. Grease jack every 50 hours.
10. Repack bearings for both the gauge wheels and main wheels each season.
11. Grease center toolbar cylinder pins (8) every 500 acres.



Storage

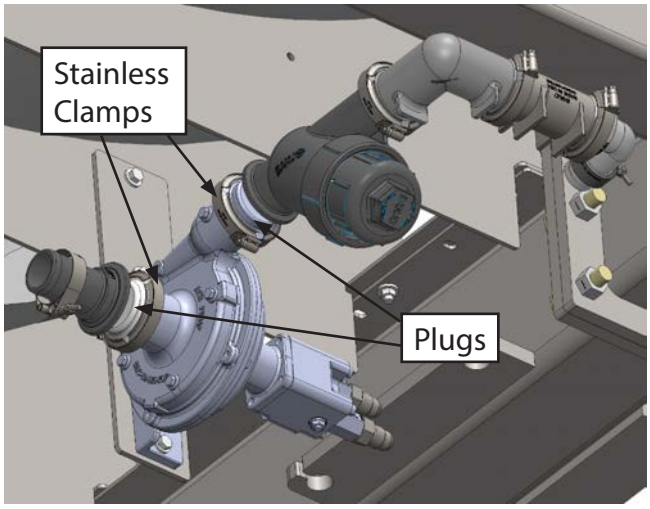
To prolong the life of your NitroGro applicator, hook the applicator to a tractor, unfold it, and perform the following before placing the implement in storage:

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. 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.
8. Store the implement inside and sheltered from inclement weather on an area that is dry, level, and clear of debris.
9. Fold up applicator and unhook from tractor.
10. 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 through the strainer, valves, check valves, and orifices.

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

Removing Pump Safety Plugs

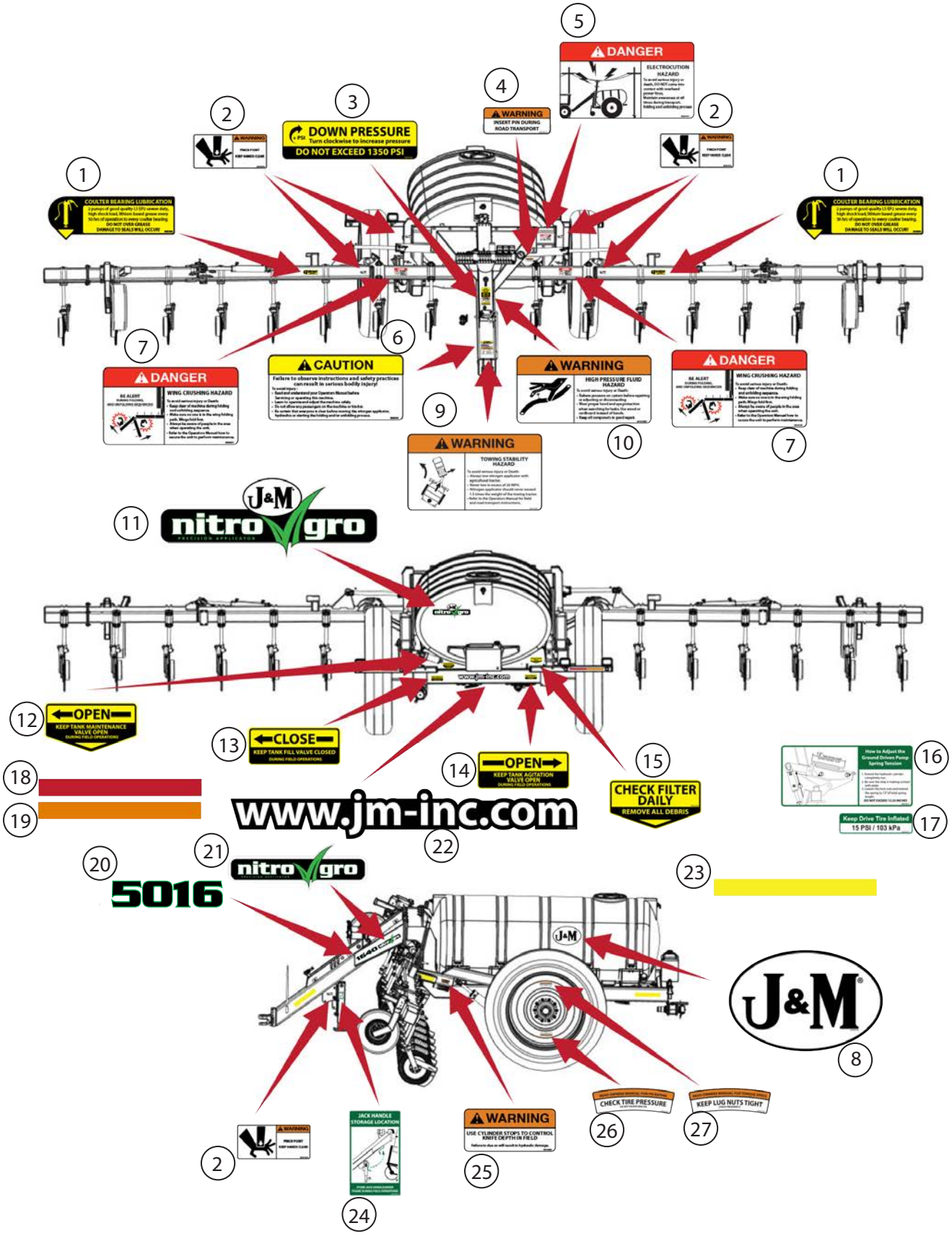
Loosen the stainless clamps shown below and remove the safety plugs. Then, attach the pump fittings using the stainless clamp, ensuring the gasket is seated correctly between the pump and pump fittings. Failing to remove these plugs can cause the pump to run dry and cause damage. Once the pup safety plugs are removed, the applicator will need to be winterized before freezing temperatures occur. See "Storage" on page 40.



Decals

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

Replace Immediately If Damaged or Missing



Decals

	Description	Part No.
1	Grease Point Decal	JM0015104
2	Warning, Pinch Point Decal	JM0014994
3	Down Pressure Decal (NitroGro)	JM0035892
4	Warning, Insert Pin Before Road Transport Decal (NitroGro)	JM0038103
5	Danger, Electrocution Hazard Decal (NitroGro)	JM0035887
6	Caution, Failure to Observe Instructions Decal (NitroGro)	JM0035881
7	Danger, Crushing Hazard Decal (NitroGro)	JM0035883
8	J&M Oval Decal (NitroGro) 10" x 6-9/16"	JM0038110
9	Warning, Towing Stability Hazard Decal (NitroGro)	JM0035882
10	Warning, High Pressure Fluid Hazard Decal	JM0035880
11	NitroGro with J&M Oval Decal	JM0039474
12	Open (Left) Keep Tank Maintenance Valve Open Decal	JM0039478
13	Close (Left) Keep Tank Fill Valve Closed Decal	JM0035891
14	Open (Right) Keep Tank Agitation Valve Open Decal	JM0039479
15	Check Filter Daily Decal (NitroGro)	JM0035884
16	How to Adjust the Ground Driven Pump Decal (NitroGro)	JM0038102
17	Keep Drive Tire Inflated Decal (NitroGro)	JM0038101
18	Red Reflective Decal 2" x 9"	JM0009945
19	Orange Reflective Decal 2" x 9"	JM0009944
20	NitroGro 5010 Logo Decal (Left)	JM0038114
20	NitroGro 5010 Logo Decal (Right)	JM0038116
20	NitroGro 5016 Logo Decal (Left)	JM0038117
20	NitroGro 5016 Logo Decal (Right)	JM0038118
21	NitroGro Logo Decal	JM0039473
22	www.jm-inc.com Decal (NitroGro)	JM0038108
23	Amber Reflective Decal 2" x 9"	JM0009946
24	Jack Handle Storage (NitroGro)	JM0038105
25	Warning, Use Cylinder Stops Decal (NitroGro)	JM0035890
26	Check Tire Pressure Decal (NitroGro)	JM0038097
27	Keep Lug Nuts Tight Decal (NitroGro)	JM0035885

Repair Parts List and Diagrams

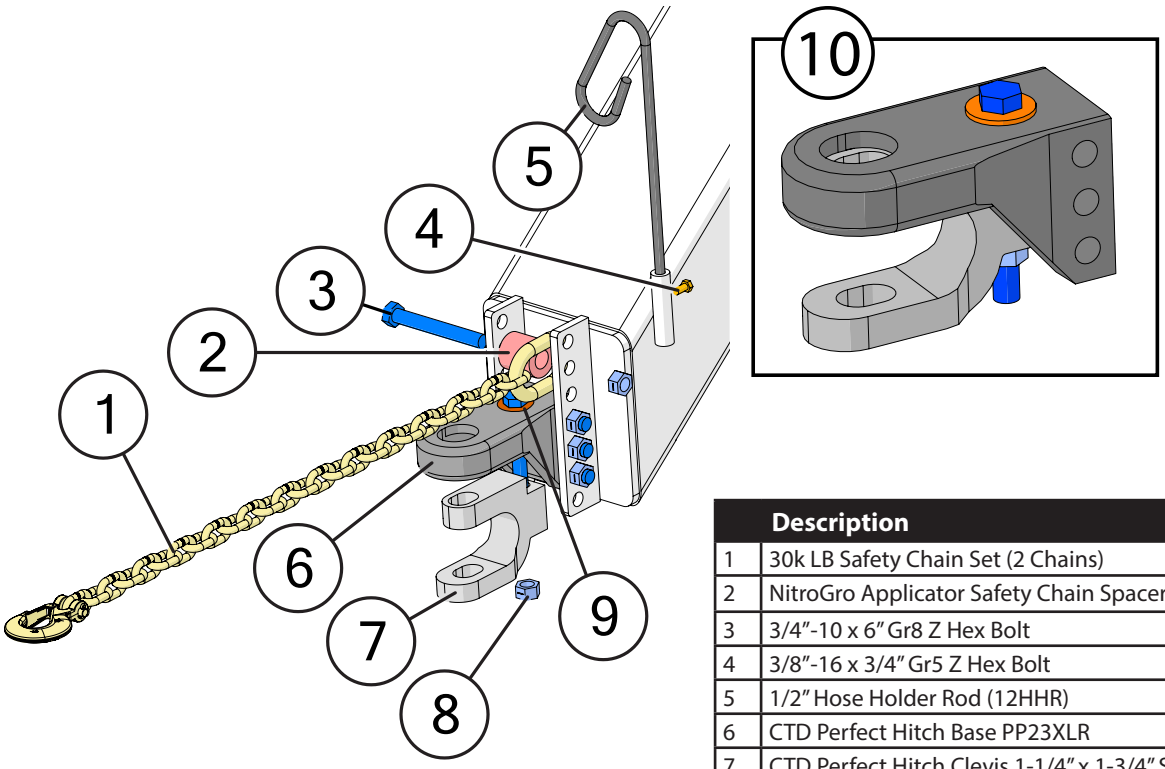
When performing maintenance work, wear sturdy, rough-soled work shoes and protective equipment for eyes, hair, hands, hearing and head. Follow the Operator's Manual instructions to ensure safe and proper maintenance and repair.

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

⚠ WARNING

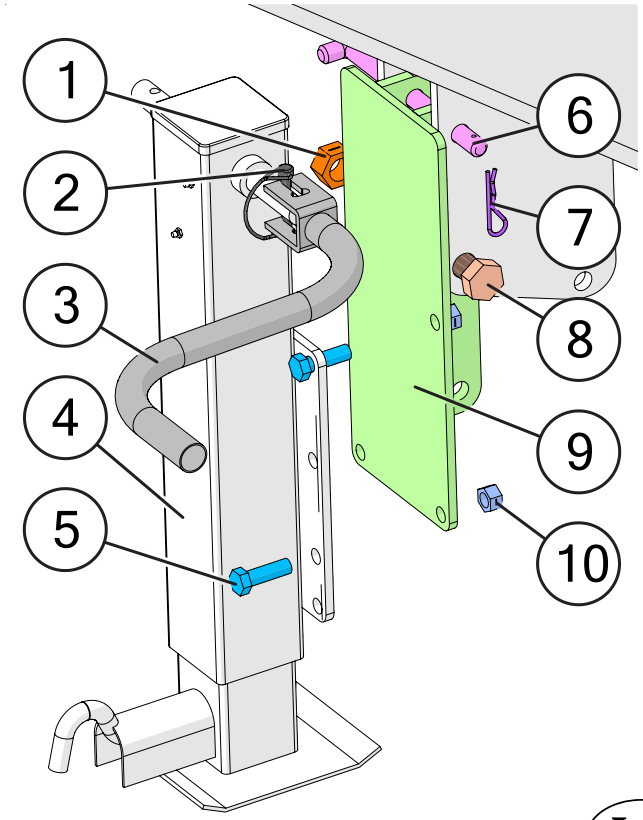
MAKE SURE ALL POWER IS SHUT OFF BEFORE PERFORMING ANY MAINTENANCE OR REPAIR WORK.

Hitch



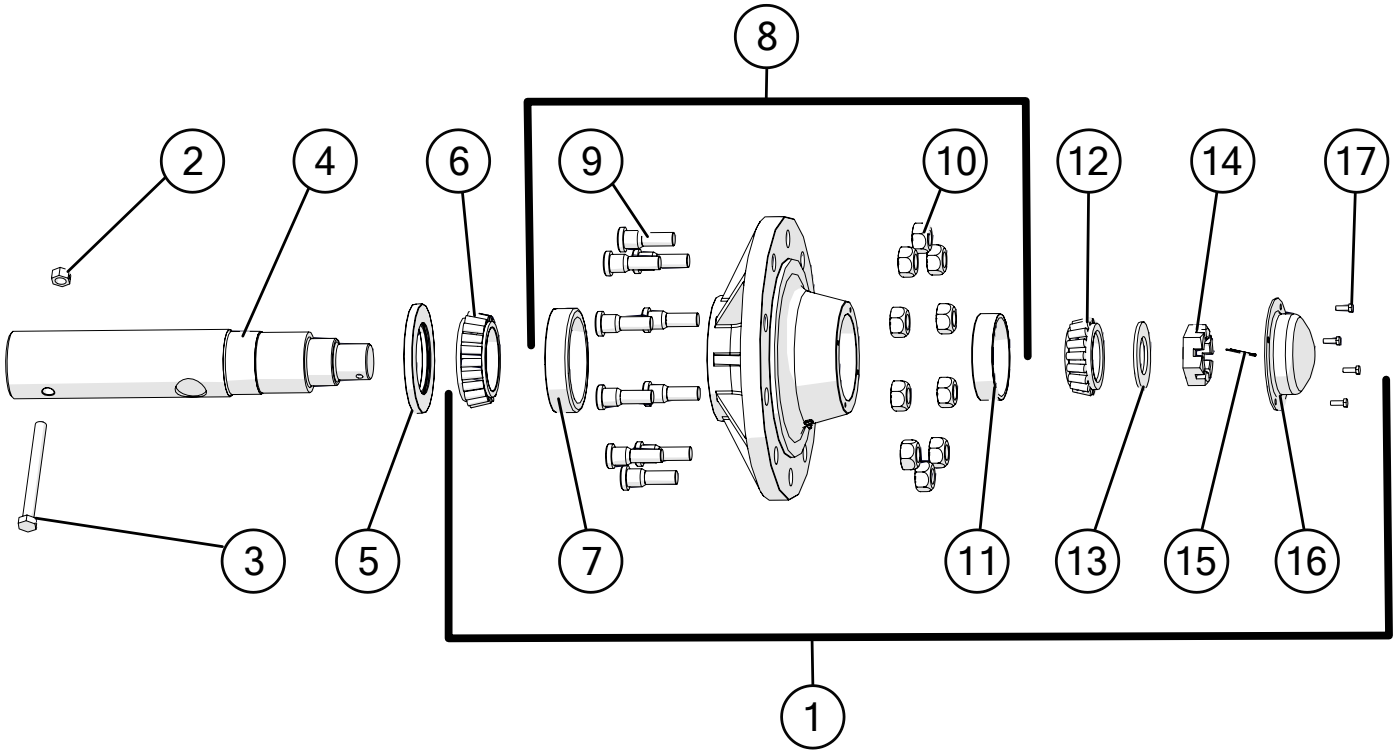
	Description	Part No.
1	30k LB Safety Chain Set (2 Chains)	JM0027440
2	NitroGro Applicator Safety Chain Spacer	JM0059128
3	3/4"-10 x 6" Gr8 Z Hex Bolt	JM0037185
4	3/8"-16 x 3/4" Gr5 Z Hex Bolt	JM0001663
5	1/2" Hose Holder Rod (12HHR)	JM0027120
6	CTD Perfect Hitch Base PP23XLR	JM0037174
7	CTD Perfect Hitch Clevis 1-1/4" x 1-3/4" Slot	JM0037173
8	3/4"-10 Gr2 Z Centerlock Hex Nut	JM0002147
9	3/4" USS Z Flat Washer	JM0010006
10	CTD Perfect Hitch Assembly (NitroGro) (Includes Bolt & Nut)	JM0037177

Jack



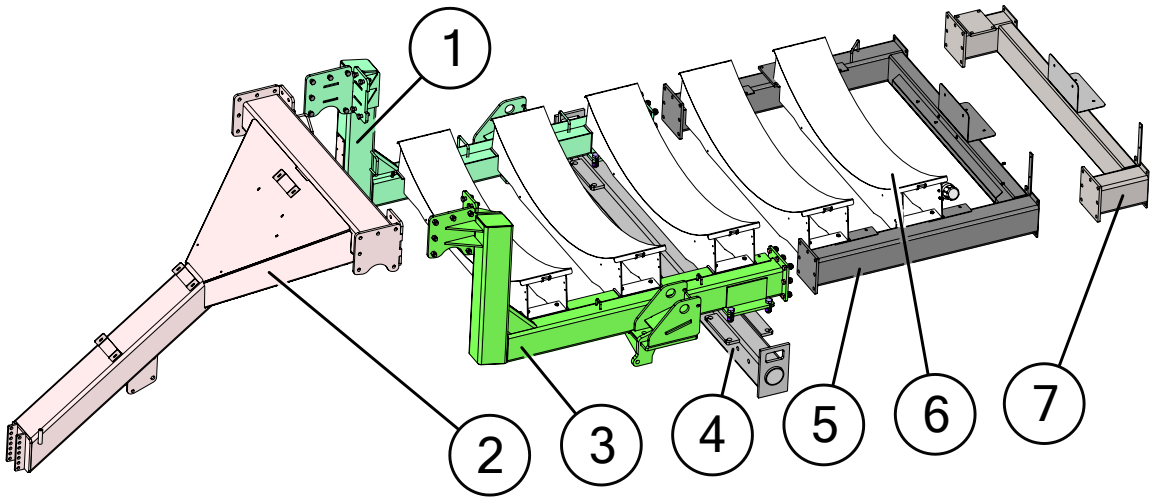
	Description	Part No.
1	1"-8 Gr2 Z Centerlock Hex Nut	JM0002149
2	3/8" x 2-1/2" Wire Lock Pin (38212WLP)	JM0014929
3	Jack Handle for 10,000 lb and Up	JM0037953
4	Jack Assembly (NitroGro & 510ST)	JM0030054
5	5/8"-11 x 2" Gr8 Z Hex Bolt	JM0001771
6	3/4" L Pin (10-9/32" Length)	JM0003076
7	3/16" x 2-1/2"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

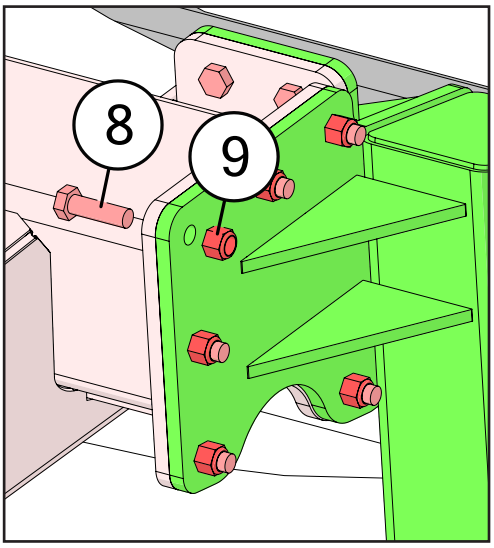
Hub and Spindle

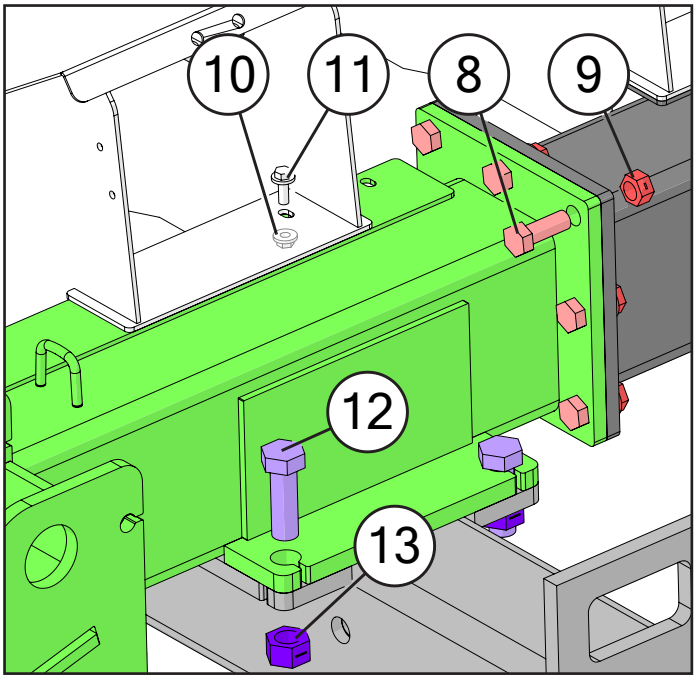


	Description	Part No.
1	W-891 Hub Assembly Complete with 22mm Studs and Nuts (Less Seal and Spindle)	JM0050400
2	1"-8 Gr2 Z Centerlock Hex Nut	JM0002149
3	1"-8 x 7" Gr5 Z Hex Bolt	JM0016689
4	Spindle, 4-1/2" x 30-1/2" - Standard Axle (525-875, 5000)	JM0018794
5	Seal (4-1/4" ID, 6" OD) for Hub (CR-43771)	JM0018955
6	Large Bearing (HM218248)	JM0018849
7	Large Race (HM218210)	JM0018848
8	Hub with Large and Small Races, 22mm Studs & Nuts (11.13 Pilot) (W-891)	JM0034356
9	Stud 22MM 1.5 x 90MM 3.55L 1.005 Knurl (22-MMS)	JM0019178
10	Wheel Nut 22mm with Washer (22-MMNW)	JM0019192
11	Tapered Bearing Cup (HM212011)	JM0018854
12	Tapered Bearing Cone (HM212049)	JM0018852
13	2-1/8" ID, 3-3/4" OD Flat Washer (3/16")	JM0015900
14	2"-12 Gr2 Castle Hex Nut	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

Frame

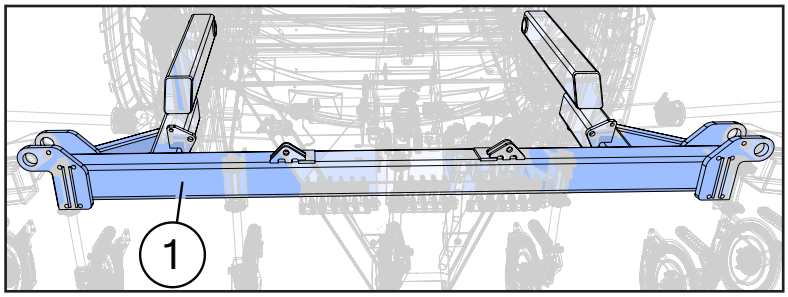


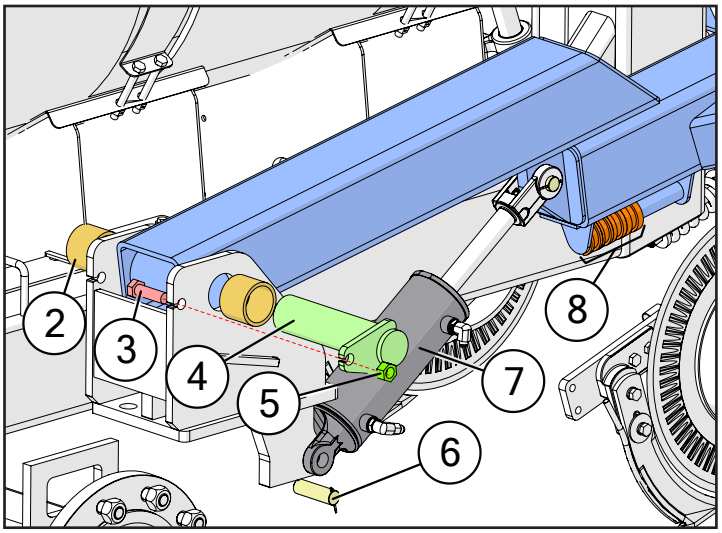


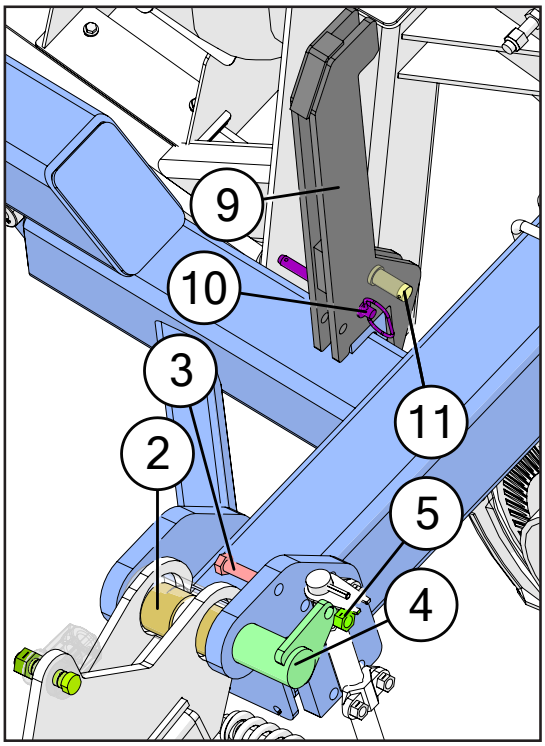


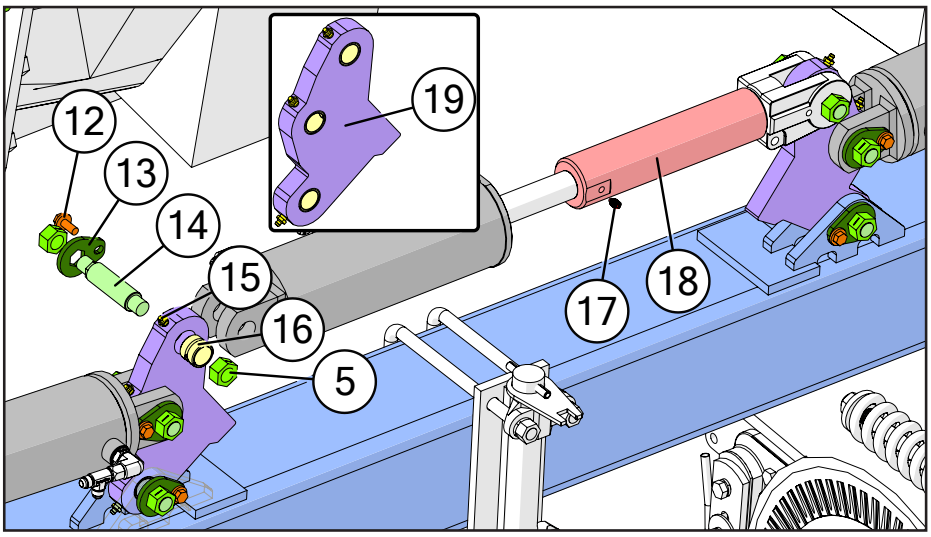
	Description	Part No.
1	Tongue - NitroGro 5000	JM0033656
2	Base Frame - NitroGro 5000	JM0036468
3	6" x 8" Adjustable Axle NitroGro 5000 (Bolt-On)	JM0036561
4	Rear Frame 5016 (NitroGro)	JM0039435
5	Saddle - Tank (NitroGro 5000) (After 2017)	JM0036718
6	Rear Frame 5010 (NitroGro)	JM0033744
7	3/4"-10 x 2-1/2" Gr8 YZ Hex Bolt	JM0027464
8	3/4"-10 Gr2 Z Centerlock Hex Nut	JM0002147
9	3/8"-16 Gr5 Z SF Hex Nut	JM0002152
10	3/8"-16 x 1" Gr5 Z SF Hex Bolt	JM0002092
11	3/4"-10 Gr5 Z SF Hex Nut	JM0009921
12	1"-8 x 3" Gr5 Z Hex Bolt	JM0016686
13	1"-8 Gr2 Z Centerlock Hex Nut	JM0002149

Toolbar



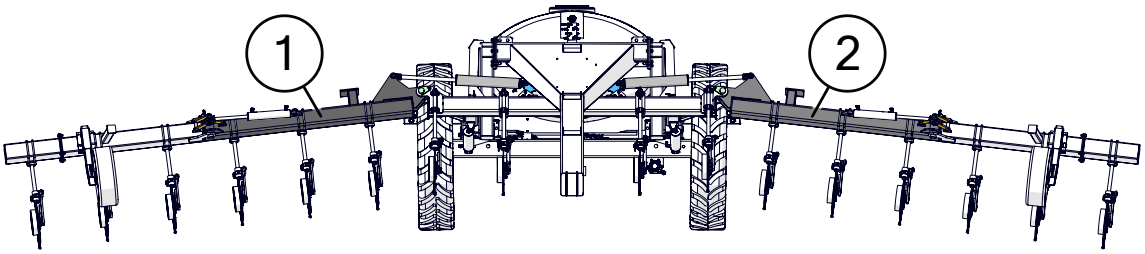


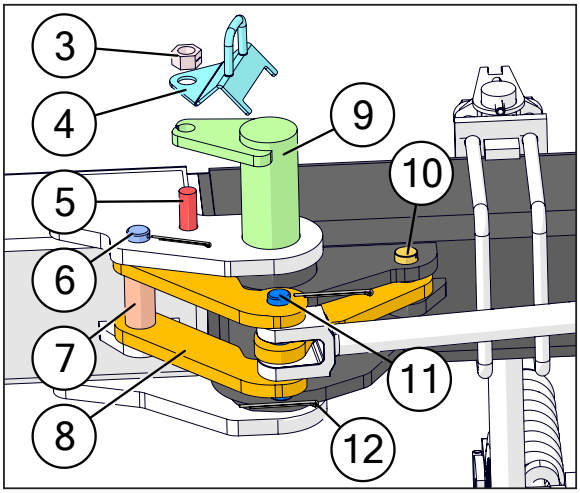




	Description	Part No.
1	Toolbar Base Section (NitroGro) (After 2017)	JM0039525
2	2-1/2" ID x 3" OD x 2-1/4" Sleeve Composite Bearing	JM0020546
3	3/4"-10 x 2-1/2" Gr8 YZ Hex Bolt	JM0027464
4	Pivot Pin - 2-1/2" Dia with Bolt Retainer (NitroGro)	JM0031502
5	3/4"-10 Gr2 Z Centerlock Hex Nut	JM0002147
6	1" x 3-1/2" Clevis Pin with Cotter Pins	JM0001817
7	4" Bore, 8" Stroke Welded Hydraulic Cylinder - Heavier Clevises	JM0030757
7	Seal Kit for 4" x 8" Hydraulic Cylinder (JD-608)	JM0039241
8	1-1/2" Cylinder Stroke Control Kit (NitroGro)	JM0037182
9	Transport Latch (NitroGro 5000)	JM0034167
10	Hitch Pin (5/8" x 6-1/2") (HP-586)	JM0003079
11	1" x 2-1/4" Pin with Head and Cotter Pin	JM0010201
12	3/8"-16 x 7/8" Gr8 Z SF Hex Bolt	JM0080405
13	5000 Seriers Main Lift Pin Retainer	JM0080126
14	5000 Series Main Lift Hardened Pin (4.612" L x 1" Dia)	JM0080393
15	1/8" NPT Male x 11/16" Straight Grease Fitting	JM0009756
16	1" ID x 1-1/4" OD x 1" Hardened Steel Bushing with External Grease Groove	JM0080400
17	3/8"-16 x 1/2" Socket Set Screw Nylon Tip	JM0037255
18	Shaft for Down Pressure Cylinder (NitroGro)	JM0032428
19	Linkage for Down Pressure Cylinder Assembly (5000)	JM0080402

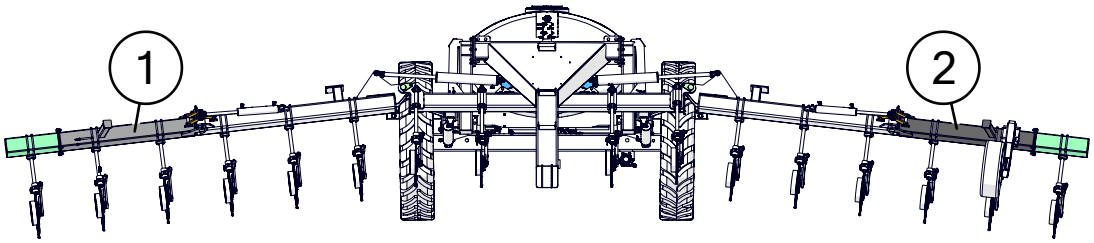
Inside Wing



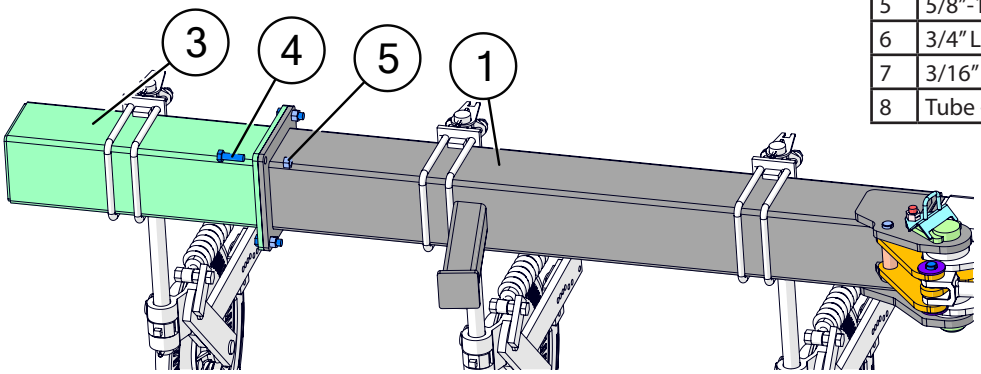


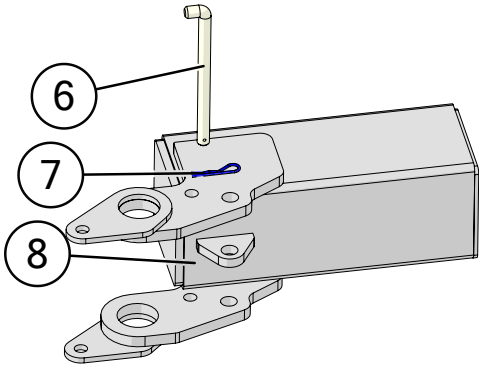
	Description	Part No.
1	Inside Wing - RH - NitroGro 5000	JM0036122
2	Inner Wing - LH - NitroGro 5000	JM0036129
3	3/4"-10 Gr2 Z Centerlock Hex Nut	JM0002147
4	Dee Ring - Bolt Mounted	JM0036703
5	3/4"-10 x 2-1/2" Gr8 YZ Hex Bolt	JM0027464
6	1" x 6" Pin	JM0031495
7	Spacer Linkage 2-9/16" Long (NitroGro)	JM0031494
8	Linkage - Outside Wing (NitroGro 5000 Series)	JM0030333
9	Pivot Pin - 2-1/2" Dia with Bolt Retainer (NitroGro)	JM0031502
10	1" x 3-1/2" Clevis Pin with Cotter Pins	JM0001817
11	5" Clevis Pin (1" Diameter)	JM0031496
12	Cotter Pin (for 1" Diameter Clevis Pin)	JM0003064

Outer Wings

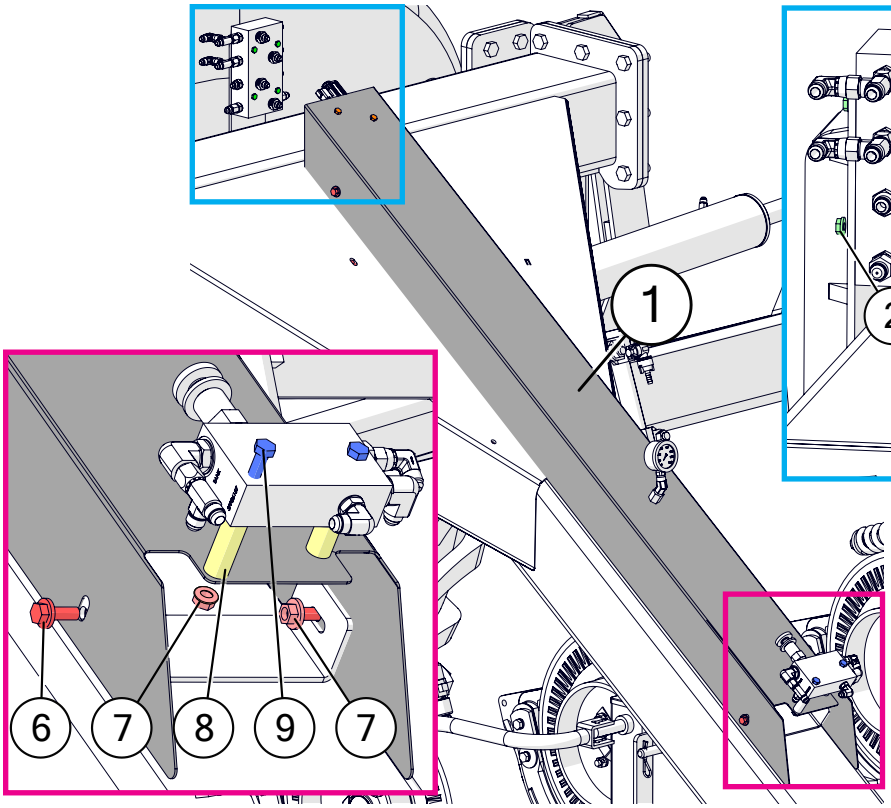


	Description	Part No.
1	Outside Wing (Right Side) (NitroGro)	JM0034129
2	Outside Wing (Left Side) (NitroGro)	JM0034107
3	Outside Wing Extension (NitroGro 5000)	JM0020472
4	5/8"-11 x 2" Gr8 Z Hex Bolt	JM0001771
5	5/8"-11 Gr2 Z Centerlock Hex Nut	JM0002146
6	3/4" L Pin (10-9/32" Length)	JM0003076
7	3/16" x 2-1/2" Hair Clip Pin (316HP)	JM0001657
8	Tube - Wing Extension 30ft Bar	JM0035009



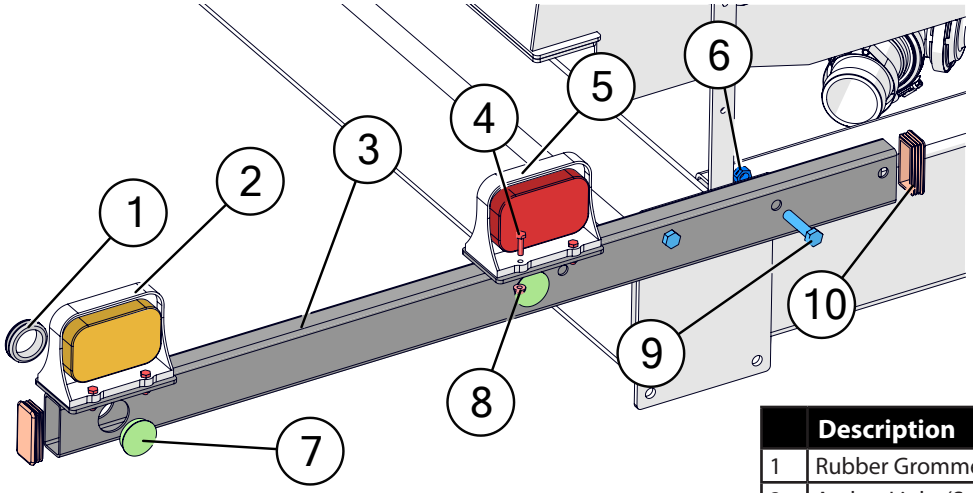


Tongue Shroud



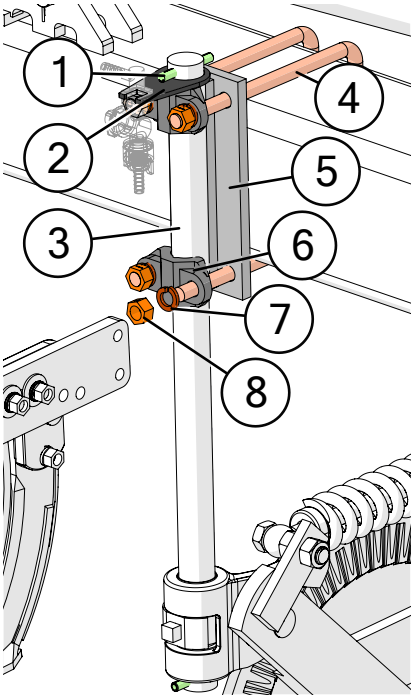
	Description	Part No.
1	Hose Shroud - Tongue (5000)	JM0034836
2	1/4"-20 Gr5 Z SF Hex Nut	JM0001630
3	1/4"-20 x 2-1/2" Gr5 Z Hex Bolt	JM0001506
4	5/16"-18 Gr5 Z SF Hex Nut	JM0014049
5	5/16"-18 x 2-1/2" Gr5 Z Hex Bolt	JM0028310
6	3/8"-16 x 1" Gr5 Z SF Hex Bolt	JM0002092
7	3/8"-16 Gr5 Z SF Hex Nut	JM0002152
8	3/4" x 2" Plastic Spacer	JM0002444
9	3/8"-16 x 4" Gr5 Z Hex Bolt	JM0002098

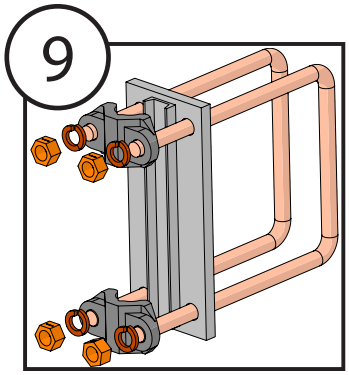
Light Bar

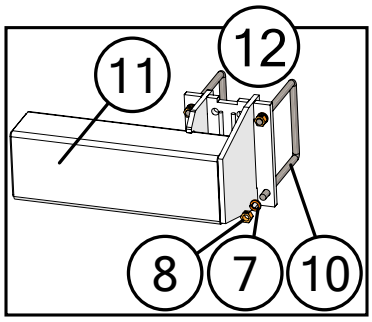


	Description	Part No.
1	Rubber Grommet (1-1/2" ID, 2-1/8" OD, 3/16" Gap)	JM0016924
2	Amber Light (Soil Conditioner, NitroGro)	JM0009975
3	Light Bar Weldment (NitroGro 5000)	JM0036071
4	1/4"-20 x 1" Gr5 Z Hex Bolt	JM0002095
5	Red Light (Soil Conditioner, NitroGro)	JM0009976
6	1/2"-13 Gr2 Z Centerlock Hex Nut	JM0001511
7	Plastic Plug for 1-3/4" Hole (NitroGro)	JM0037250
8	1/4"-20 Gr5 Z SF Hex Nut	JM0001630
9	1/2"-13 x 2 1/4" Gr5 Z Hex Bolt (12214G5B)	JM0016677
10	1-1/2" x 3" Rectangular Tubing Plug (NitroGro)	JM0037249

GEP Coulter Mount



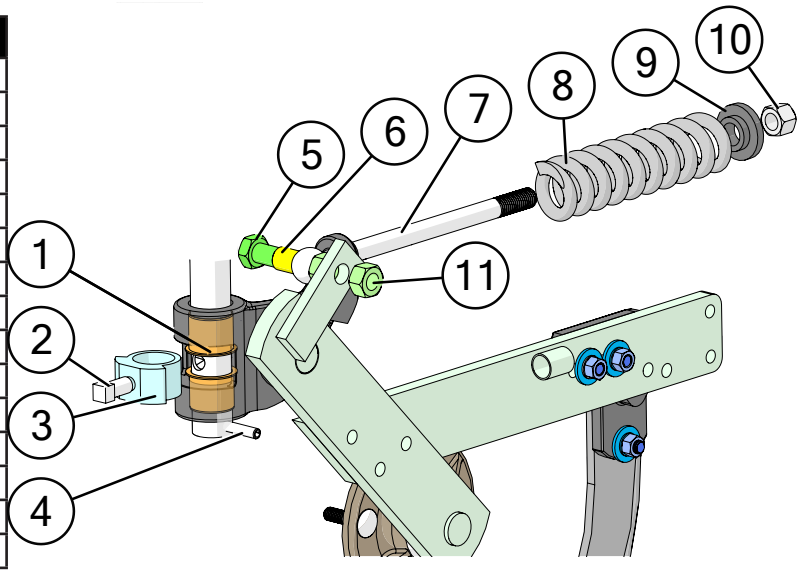


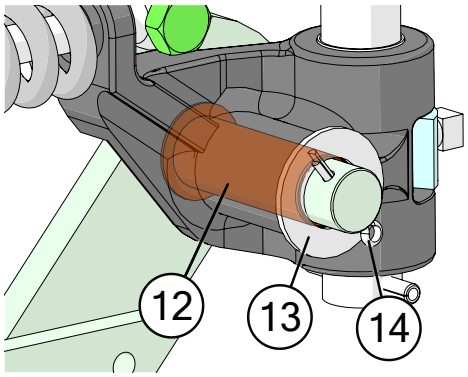


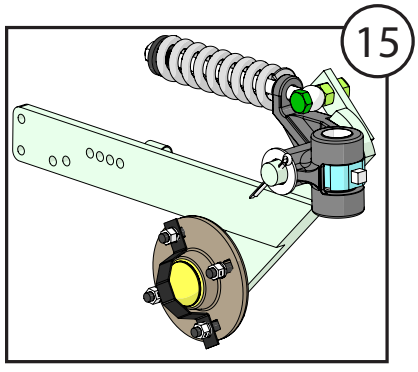
	Description	Part No.
1	3/8" x 3" SS Roll Pin	JM0037162
2	QJ Mounting Tab for 5000 Coulter (NitroGro)	JM0036048
3	28" Shaft for 5000 Coulter (NitroGro)	JM0030959
3	28" Shaft for 5000 Coulter Mount - ParaLinkage	JM0058251
4	5/8"-11 x 7-1/8" x 10-1/4" Square U-Bolt	JM0030958
5	Channel Bracket Plate for 5000 Coulter (NitroGro)	JM0030954
6	Channel Bracket Casting (NitroGro 5000)	JM0030956
7	5/8" Gr2 Z Lock Washer	JM0051157
8	5/8"-11 Gr2 Z Hex Nut	JM0001522
9	Coulter Bracket Package for 5000 GEP Coulter	JM0035053
10	5/8"-11 x 7-1/8" x 7" Square U-Bolt	JM0043200
11	Offset Weldment Mount for Coulters	JM0058654
12	Double Row under 20" Offset Coulter Mount with Hardware (One Side)	JM0058653

GEP Coulter Assembly

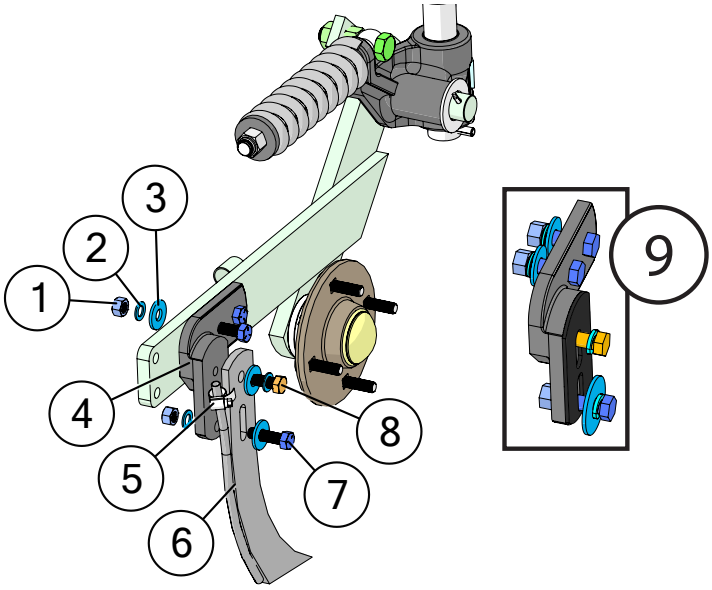
	Description	Part No.
1	Shaft Nylon Bushing (GEP Coulter)	JM0038258
2	5/8"-11 x 1" Square Head Bolt	JM0037259
3	Lock Collar (Coulter, Applicator)	JM0031280
4	3/8" x 3" SS Roll Pin	JM0037162
5	3/4"-10 x 3" Gr5 Z Hex Bolt	JM0019201
6	Nylon Spring Bushing 3/4" ID x 7/8" OD x 1-5/32"	JM0038264
7	Spring Rod for GEP Coulter	JM0038265
8	Spring for GEP Coulter	JM0038269
9	Spring Alignment Cast Washer for GEP Coulter	JM0038270
10	3/4"-10 Gr2 Z Nylon Locking Hex Nut	JM0026756
11	3/4"-10 Gr5 Z Hex Nut	JM0002125
12	Nylon Bushing with Flange 1-1/4" ID x 3-5/8" (GEP)	JM0038259
13	1-3/8" ID, 2-1/2" OD Washer	JM0038272
14	Cotter Pin 3/16" Diameter x 2" Long	JM0038266
15	GEP Coulter Knuckle, Arm, and Hub Assembly	JM0031265





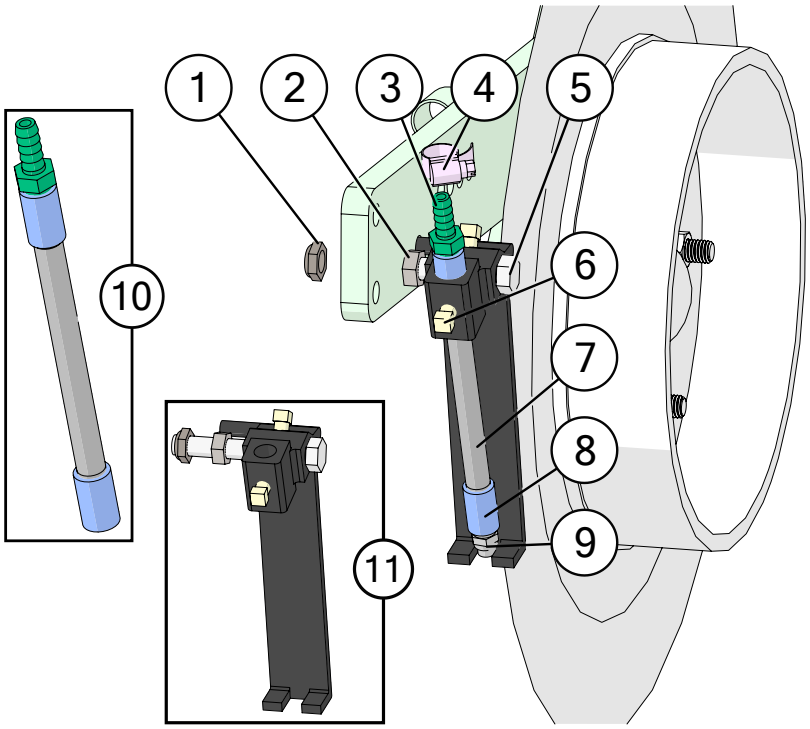


GEP Coulter Knife Assembly

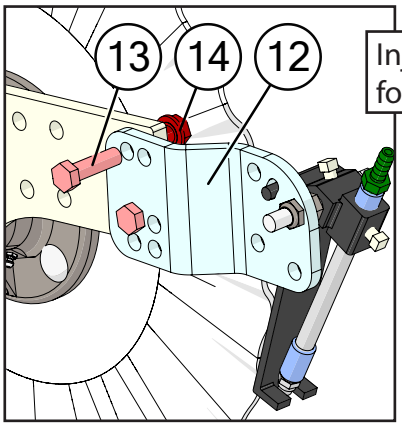


	Description	Part No.
1	1/2"-13 Gr2 Z Hex Nut	JM0002124
2	1/2" Gr2 Z Lock Washer	JM0019021
3	1/2" ID, 1-3/8" OD Z Flat Washer	JM0003082
4	Knife Bracket Weldment	JM0059364
5	3/8" Hose Clamp SS	JM0039206
6	C050 Wiese Knife	JM0031273
7	1/2"-13 x 1-3/4" Gr5 Z Hex Bolt	JM0002101
8	1/2"-13 x 1-1/4" Gr5 Z Hex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

Coulter Injector Assembly

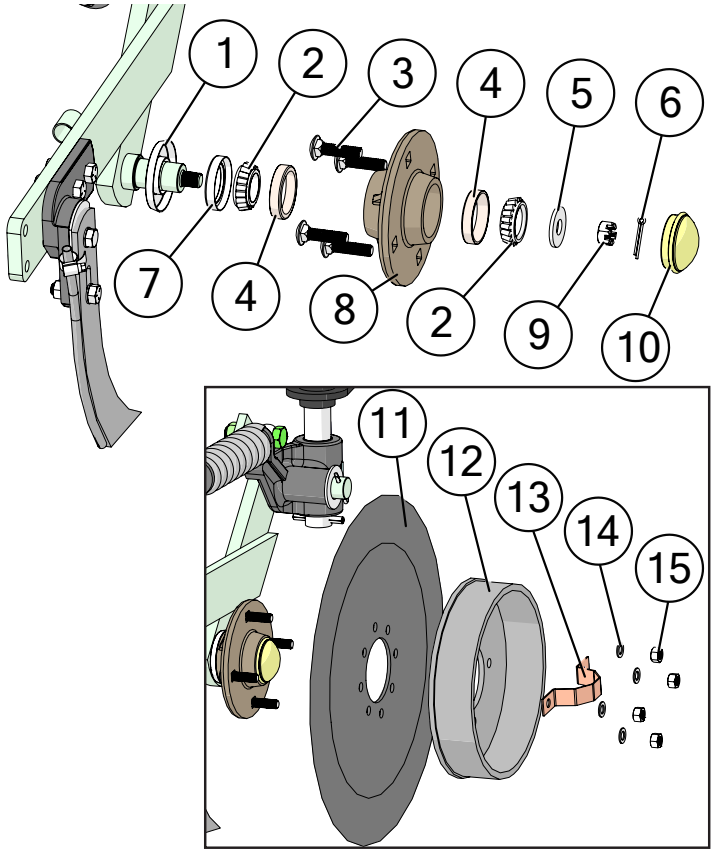


	Description	Part No.
1	1/2"-13 SS Nylon Locking Hex Jam Nut	JM0041792
2	1/2"-13 SS Hex Jam Nut	JM0041791
3	3/8" Hose Barb x 1/4" Male NPT SS	JM0036419
4	3/8" Hose Clamp SS	JM0039206
5	1/2"-13 x 3-1/2" SS Hex Bolt	JM0041790
6	3/8"-16 x 1/2" Square Head SS Bolt	JM0041793
7	6" SS Pipe with 1/4" Male NPT 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
12	Para-Linkage Coulter Knife/Injector Mount	JM0049010
13	1/2"-13 x 1-3/4" Gr5 Z Hex Bolt	JM0002101
14	1/2"-13 Gr5 Z SF Hex Nut	JM0002153



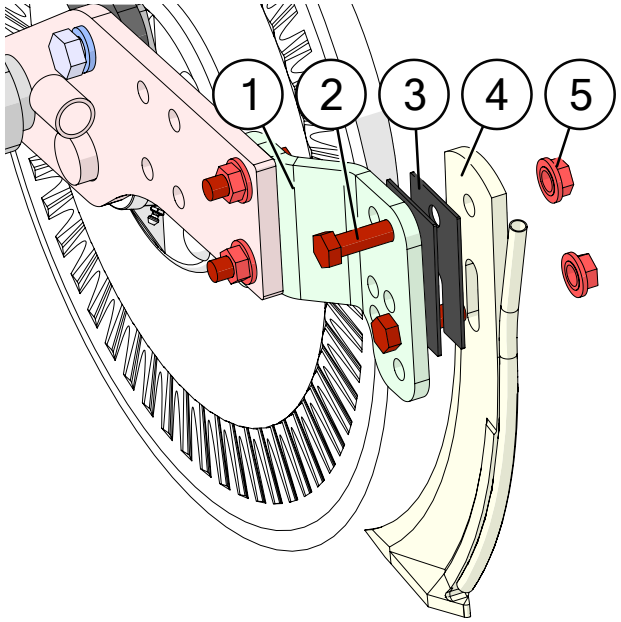
Injector Mount plate for Para-Linkage

Coulter Blade and Hub Assembly



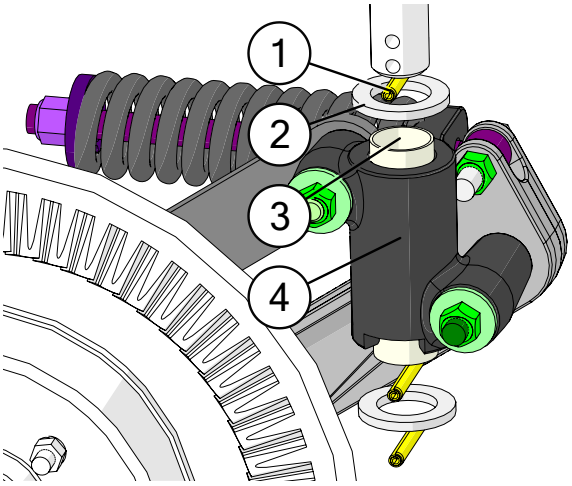
	Description	Part No.
1	Seal Protector for GEP Coulter	JM0038267
2	Small Outer Cone for 6-10 Ton (LM67048)	JM0019564
3	1/2"-13 x 2" Gr2 Z Carriage Bolt	JM0038410
4	Small Cup for 6-10 Ton (LM67010) (200500)	JM0026564
5	Hub Washer for GEP Coulter	JM0038278
6	Cotter Pin 1/8" Diameter x 1-1/2" Length	JM0004177
7	Grease Seal for GEP Coulter Hub	JM0038287
8	Hub for GEP Coulter Includes Races	JM0038285
9	3/4"-16 Gr2 Castle Hex Nut	JM0002130
10	Dust Cap for GEP Coulter	JM0038288
11	20" Straight Coulter Blade with Ripple	JM0031269
11	20" Wavy Coulter Blade (5/8" Wave)	JM0038506
12	GC5000 Depth Control Spool	JM0031281
13	Dust Cap Keeper for GEP Coulter	JM0038391
14	1/2" Gr2 Z Lock Washer	JM0019021
15	1/2"-13 Gr2 Z Hex Nut	JM0002124

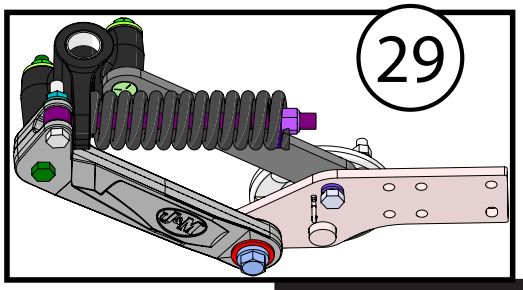
J&M Para-Linkage Knife Assembly

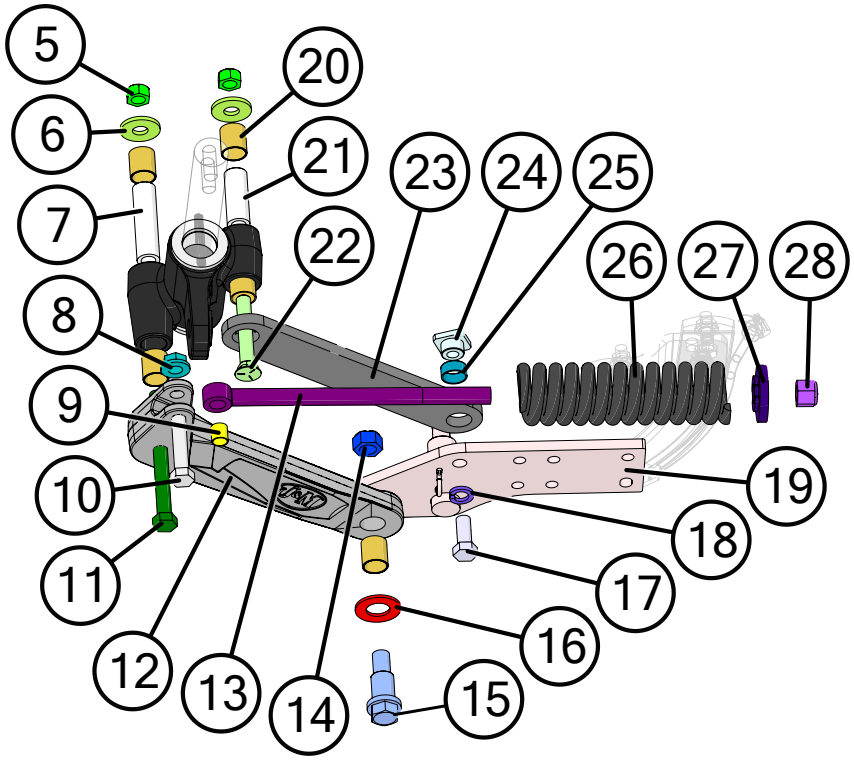


	Description	Part No.
1	Para-Linkage Coulter Knife/Injector Mount	JM0049010
2	1/2"-13 x 1-3/4" Gr5 Z Hex Bolt	JM0002101
3	Knife Mount Spacer - .08"	JM0049033
4	C050 Wiese Knife	JM0031273
5	1/2"-13 Gr5 Z SF Hex Nut	JM0002153

J&M Para-Linkage Coulter

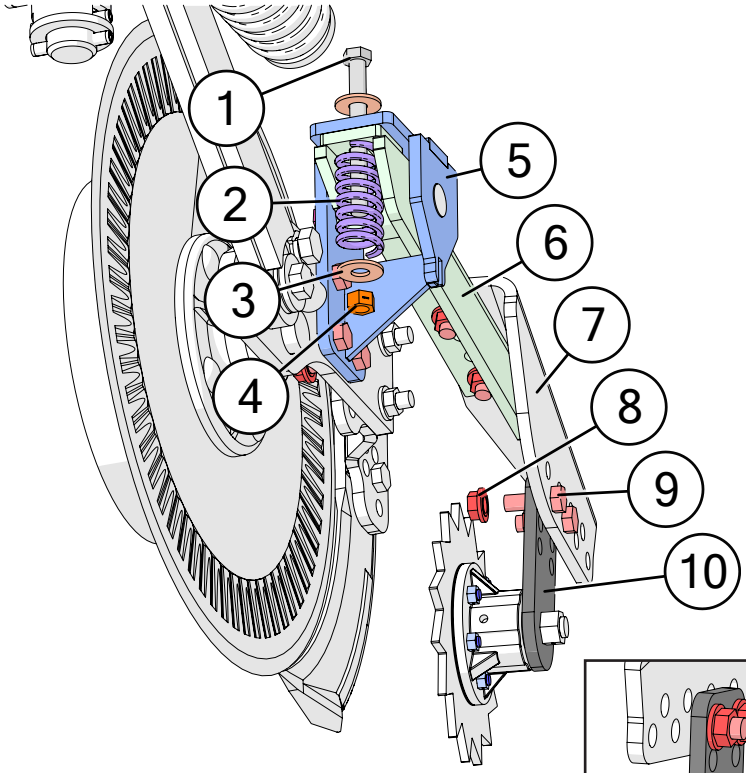


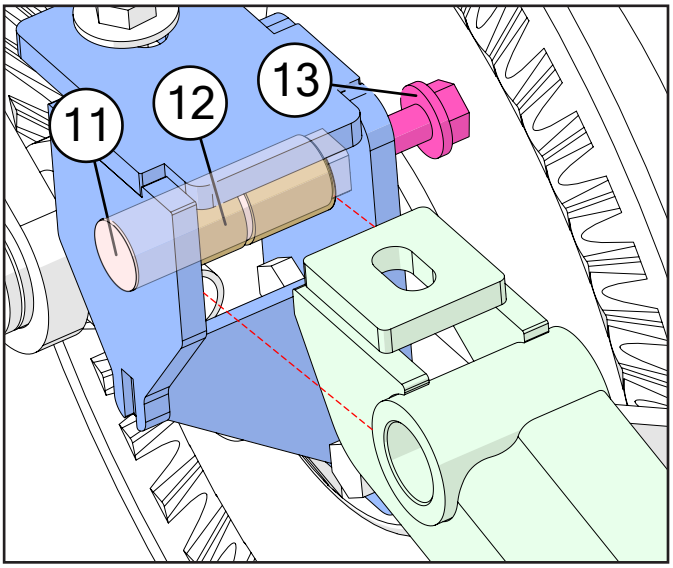


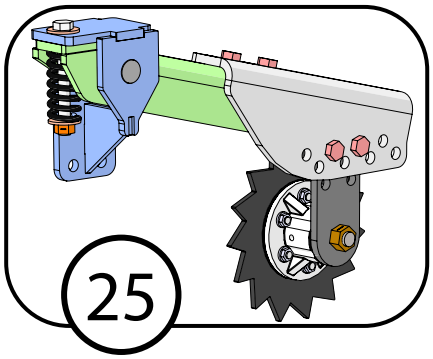


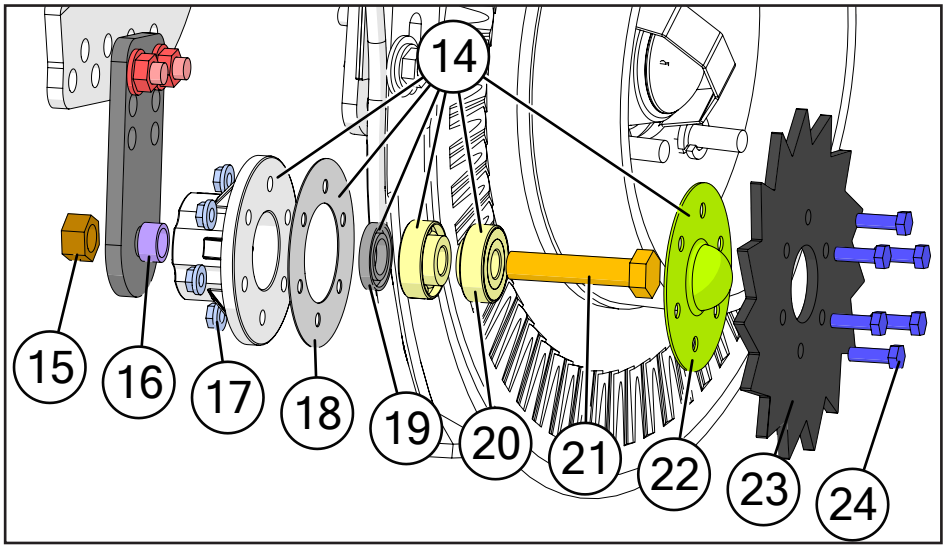
	Description	Part No.
1	3/8" x 2-1/2" SS Spiral Coiled Spring Pin 420SS HD	JM0061533
2	Para-Linkage Coulter Mount Washer	JM0049034
3	1-1/2" ID x 1-5/8 OD x 1" Length Sleeve Composite Bearing	JM0048949
4	ParaLinkage Main body - Cast	JM0051522
5	5/8"-11 GrC Z Distorted Thread Hex Nut	JM0054594
6	5/8" USS Hardened YZ Thick Flat Washer	JM0062183
7	Para-Linkage Lower Arm Bushing Pivot	JM0051220
8	5/8"-11 Gr5 Z SF Hex Nut	JM0002151
9	5/8" ID x 23/32" OD x 3/4" Length Sleeve Composite Bearing	JM0048955
10	5/8"-11 x 3" Gr5 Z Hex Bolt	JM0002105
11	5/8"-11 x 6-1/2" Gr8 YZ Hex Bolt	JM0050351
12	ParaLinkage Cast Arm - Cast	JM0051530
13	Para-Linkage Coulter Spring Rod	JM0049484
14	3/4"-10 GrC YZ Distorted Thread Hex Nut	JM0074456
15	ParaLinkage Bottom Pivot Bolt	JM0085525
16	1" Hardened YZ SAE Flat Washer	JM0080616
17	5/8"-11 x 1-1/2" Gr5 Z Hex Bolt	JM0002103
18	5/8" Gr2 Z Lock Washer	JM0051157
19	Para-Linkage Spindle Mount Weldment - 3/4"	JM0087035
20	1" ID x 1-1/4" OD x 1-1/4" Length Sleeve Composite Bearing	JM0051195
21	Para-Linkage Top Arm Bushing Pivot	JM0051219
22	5/8"-11 x 4 Gr 8 Plow Bolt YZ	JM0086070
23	Para-Linkage Top Arm	JM0048940
24	Top Arm Para-Linkage Pivot	JM0051159
25	1" ID x 1-1/8" OD x 1/2" Length Sleeve Composite Bearing	JM0051196
26	0.562" Wire x 2-3/4" OD x 9-1/4" Length Compression Spring	JM0048712
27	Para-Linkage Coulter Spring Washer Weldment	JM0048967
28	3/4"-10 Gr2 Z Nylon Locking Hex Nut	JM0026756
29	ParaLinkage Main Unit Assembly	JM0077547

J&M Row Closer



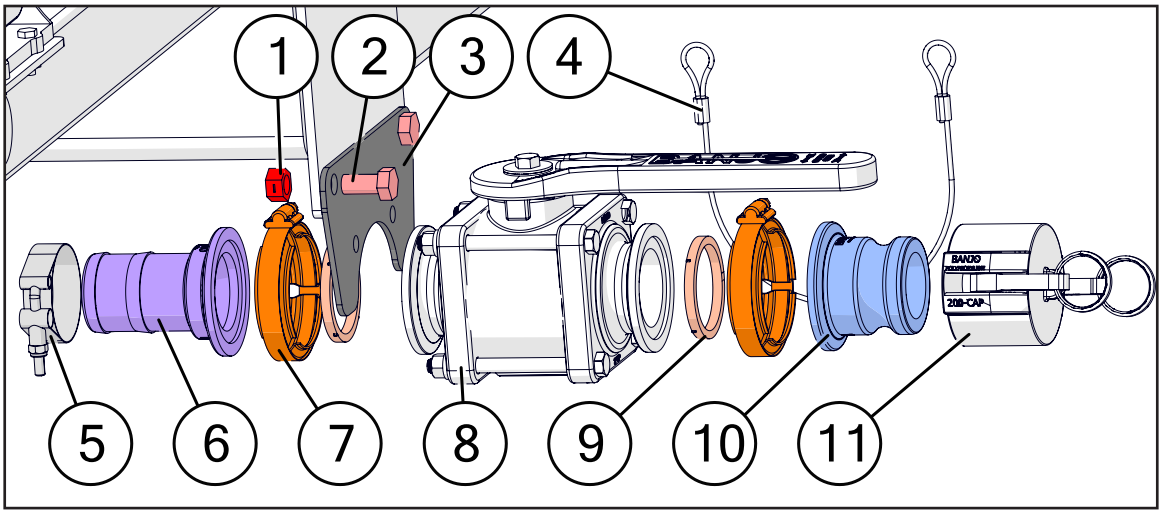


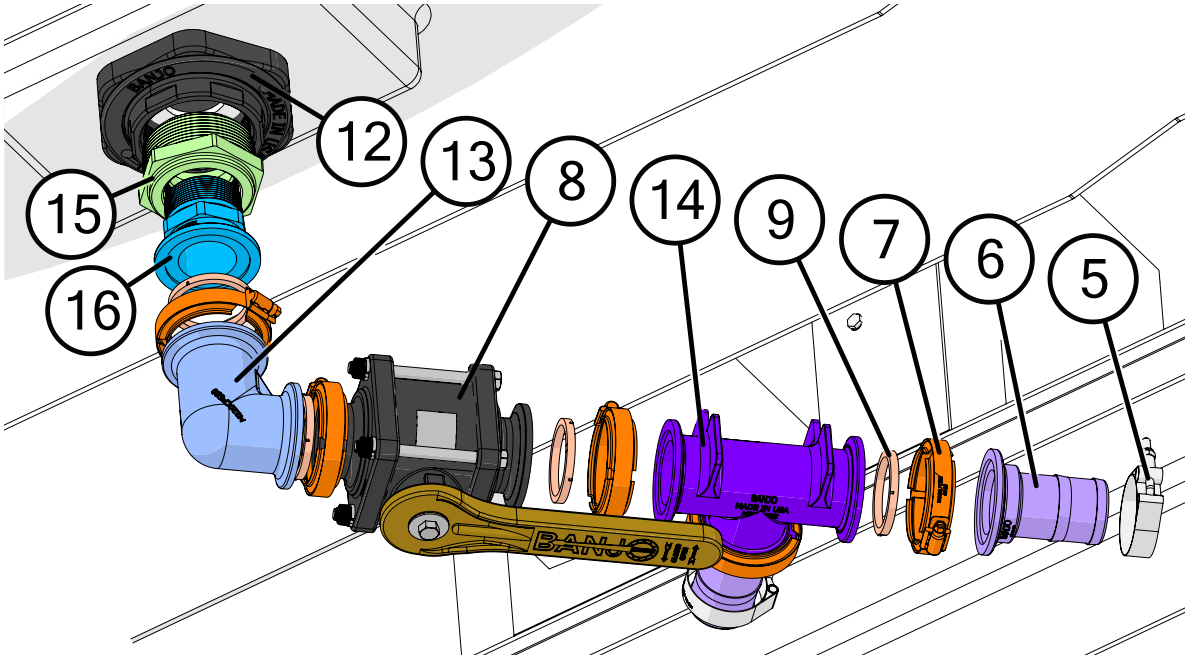




	Description	Part No.
1	1/2"-13 x 5" Gr5 Z Hex Bolt	JM0001594
2	0.256" Wire x 1-1/2" OD x 3-1/4" Length Compression Spring	JM0059081
3	1/2" ID, 1-3/8" OD Z Flat Washer	JM0003082
4	1/2"-13 Gr2 Z Centerlock Hex Nut	JM0001511
5	Gooseneck Spring Loaded Closer Base Weldment	JM0062117
6	Gooseneck Spring Loaded 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 (1" O.D. x 3.4" Long)	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
25	Gooseneck Spring Loaded Closer Assembly	JM0062133

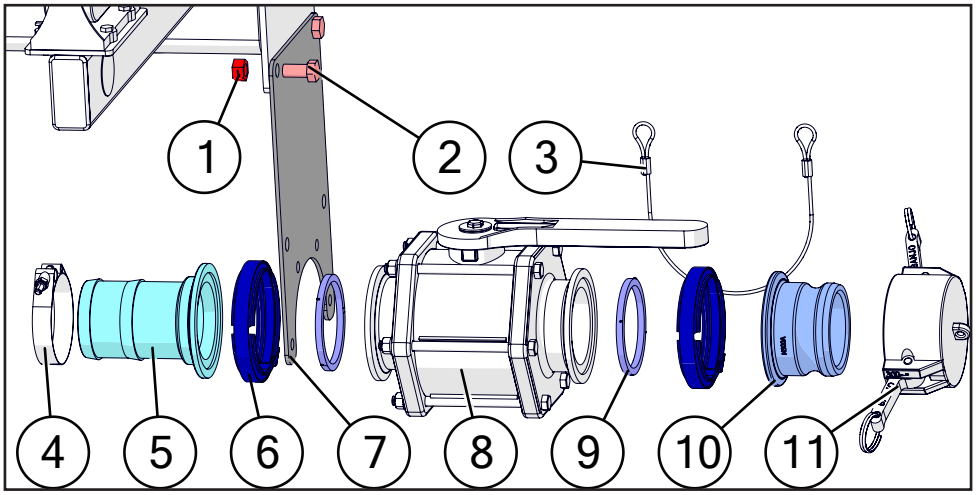
2″ Fill/Tank Fittings

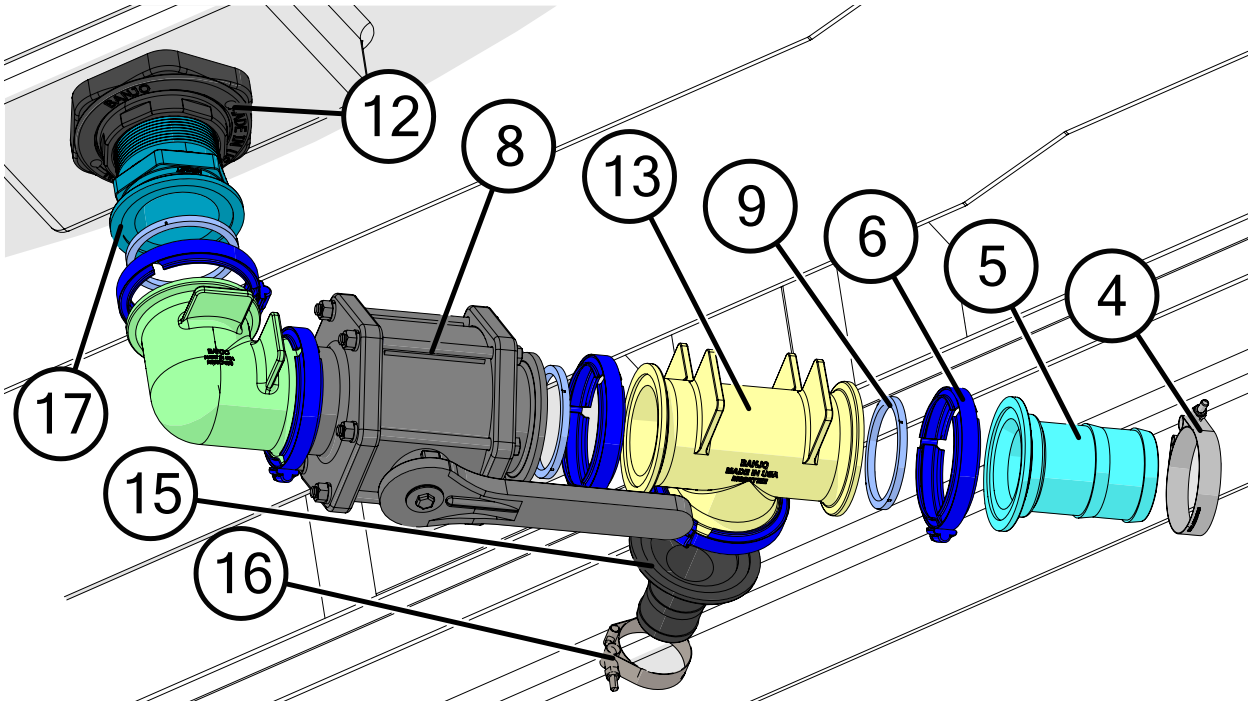




	Description	Part No.
1	1/2″-13 Gr2 Z Centerlock Hex Nut	JM0001511
2	1/2″-13 x 1″ Gr5 Z Hex Bolt	JM0010225
3	Mounting Plate - 2″ Ball Valve (NitroGro)	JM0034889
4	Cable Lanyard (NitroGro)	JM0039282
5	T-Bolt Hose Clamp 2″ Hose, 2-5/16″ Min OD	JM0035247
6	2″ Hose Barb x M220 Manifold Flange; Straight	JM0033796
7	Manifold Flange Clamp for M220	JM0035238
8	2″ Full Port Flange Ball Valve	JM0031370
9	Manifold Gasket for M220 Fittings	JM0035278
10	2″ Full Port Manifold x 2″ Male QDC	JM0035249
11	2″ QD Cap (NitroGro)	JM0035250
12	3″ Poly Bulkhead Tank Fitting with EPDM Gasket	JM0080018
13	90 Degree Coupling - 2″ Full Port Manifold Flange	JM0033795
14	2″ Full Port Manifold Tee - 220 Series	JM0033797
15	3″ MPT X 2″ FPT Reducing Bushing	JM0080013
16	2″ Male MPT X 2″ Full Port Manifold Flange	JM0033793

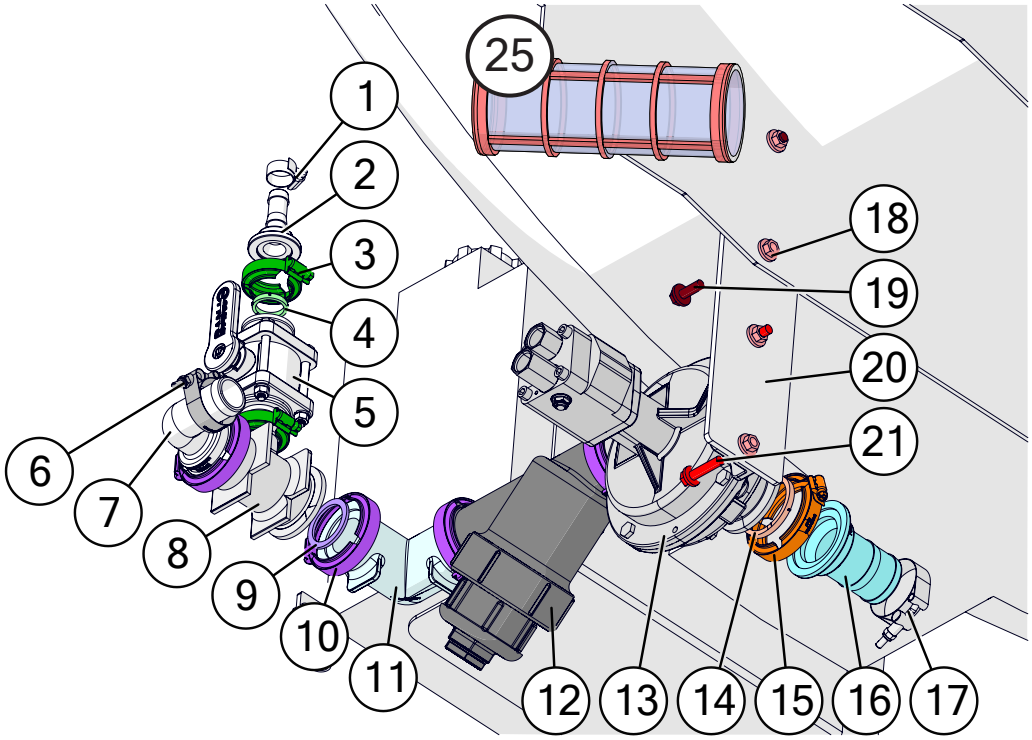
3" Fill/Tank Fittings





	Description	Part No.
1	1/2"-13 Gr2 Z Centerlock Hex Nut	JM0001511
2	1/2"-13 x 1" Gr5 Z Hex Bolt	JM0010225
3	Cable Lanyard (NitroGro)	JM0039282
4	T-Bolt Hose Clamp 3" Hose, 3-5/16" Min OD	JM0035248
5	3" Manifold Flange x 3" Hose Barb	JM0021244
6	Manifold Flange Clamp for M300 Fittings	JM0035237
7	Ball Valve Mount Plate 3" Banjo (NitroGro)	JM0034894
8	Ball Valve - 3" Full Port Flange Manifold	JM0021230
9	Manifold Gasket for M300 Fittings with Rib	JM0021239
10	3" Manifold Flange x 3" QDC Male	JM0035205
11	3" Poly Cam Lever Cap	JM0035206
12	3" Poly Bulkhead Tank Fitting with EPDM Gasket	JM0080018
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" Male MPT x 3" Manifold Flange	JM0033978

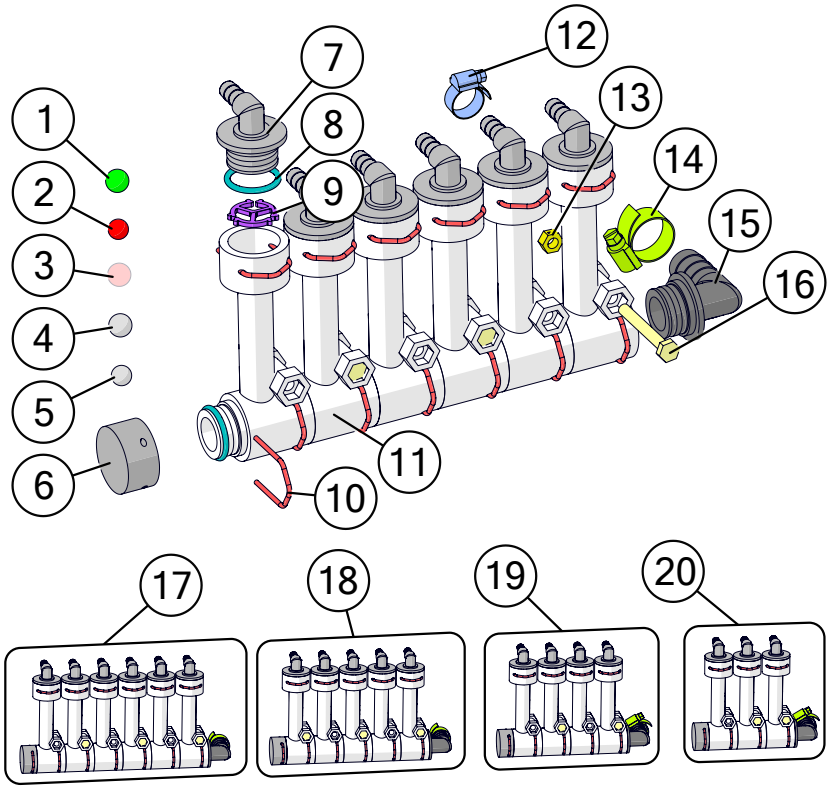
Hydraulic Pump Manifold Setup



	Description	Part No.
1	3/4" Hose Clamp SS	JM0039205
2	M100 Manifold Flange x 3/4" Hose Barb; Straight	JM0021401
3	Manifold Flange Clamp for M100 Fittings	JM0032496
4	Manifold Gasket for M100 Fittings with Rib	JM0035239
5	Ball Valve with M100 Manifold Flange	JM0033824
6	Hose Clamp - 1-13/16" Min, 2-1/16" Max	JM0021189
7	2" Manifold Flange x 90 Deg 1-1/2" Hose Barb	JM0034352
8	M200 Manifold Flange x M200 Manifold Flange x M100 Manifold Flange; Tee	JM0035116
9	Manifold Gasket for M200 Fittings	JM0021145
10	Manifold Flange Clamp for M200 Fittings	JM0035251
11	90 Deg Coupling - 2" Manifold Flange	JM0033991
12	Manifold Y Strainer - M200 Manifold Flange, 30 Mesh	JM0033803
13	FMCSC-155F-HYD-206 - Ace Pump	JM0061538
14	Manifold Gasket for M220 Fittings	JM0035278
15	Manifold Flange Clamp for M220	JM0035238
16	2" Hose Barb x M220 Manifold Flange; Straight	JM0033796
17	T-Bolt Hose Clamp 2" Hose, 2-5/16" Min OD	JM0035247
18	3/8"-16 Gr5 Z SF Hex Nut	JM0002152
19	3/8"-16 x 1" Gr5 Z SF Hex Bolt	JM0002092
20	Plate - Hydraulic Fertilizer Pump Mounting (5000)	JM0034960
21	3/8"-16 x 1-1/2" Gr5 Z SF Hex Bolt	JM0001633
22	Ace 150/155 Pump Hydraulic Side Replacement Seal Kit - RK-BAC-75-HYD-L	JM0061310
23	Ace 150 Pump Water Side Replacement Seal Kit - RK-FMCSC-150	JM0061308
24	Ace 155 Pump Water Side Replacement Seal Kit - RK-FMCSC-PRO5	JM0080001
25	Strainer Screen - 30 Mesh - LS230	JM0079849

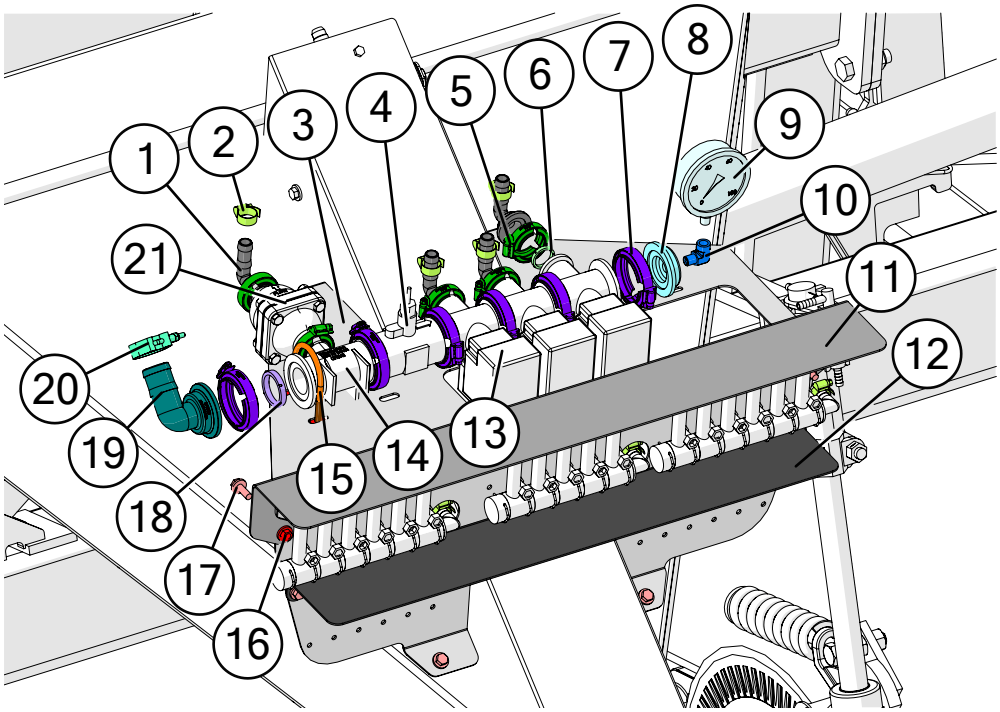
In 2021 the 155 pump replaced the 150 pump. The water side seal kit is different between the 150 and 155 pump. A 150 pump model number is 48874 and a 155 pump model number is FMCSC-155F-HYD-SAE.

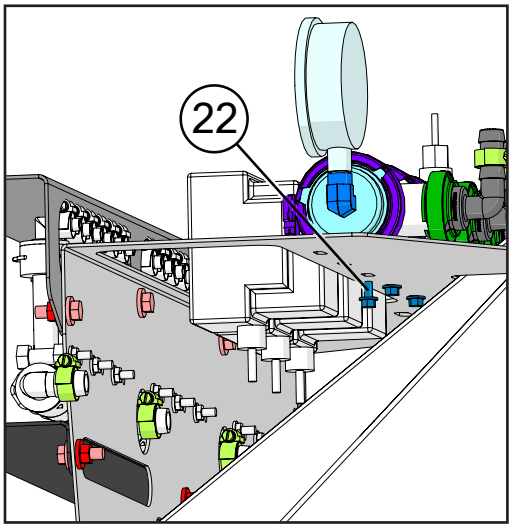
Flow Monitors



	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 Gr5 Z SF Hex Nut	JM0001630
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

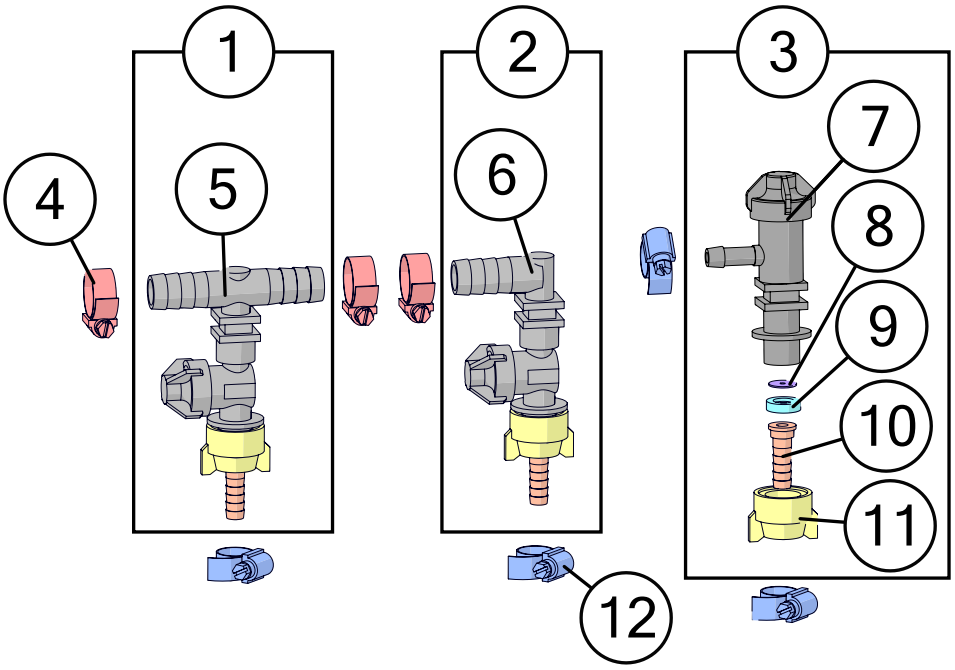
Manifold (Hydraulic Pump Only)





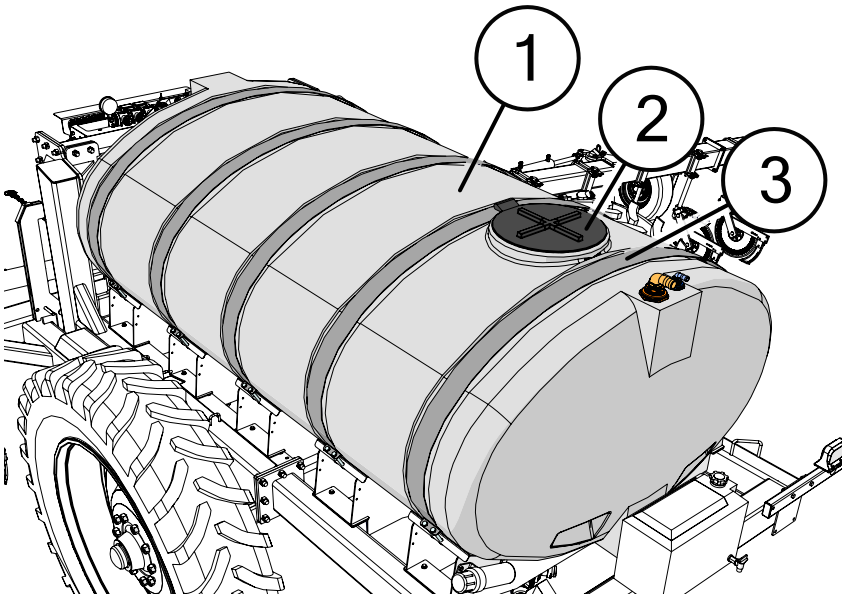
	Description	Part No.
1	M100 Manifold Flange x 3/4" Hose Barb; 90 Degree	JM0032501
2	3/4" Hose Clamp SS	JM0039205
3	Mount For Control Valves and Flow Monitors - 5000 Universal	JM0077615
4	Raven Flow Meter RFM60P	JM0032488
5	Manifold Flange Clamp for M100 Fittings	JM0032496
6	Manifold Gasket for M100 Fittings with Rib	JM0035239
7	Manifold Flange Clamp for M200 Fittings	JM0035251
8	Manifold Plug for M200 Fittings with 1/4" NPT for Gauge	JM0021147
9	Pressure Gauge Stainless Steel 0-100psi, 1/4" NPT	JM0036636
10	1/4" Male NPT x 1/4" Female NPT; 90 Degree Elbow	JM0020115
11	5000 Series Sun Shield	JM0077626
12	5000 Series Lower Sun Shield	JM0077633
13	Raven Boom Valve	JM0032478
14	M200 Manifold Flange x M200 Manifold Flange x M100 Manifold Flange; Tee	JM0035116
15	3/8"-16 x 2-1/2" x 5-1/4" Round U-Bolt	JM0018627
16	3/8"-16 Gr5 Z SF Hex Nut	JM0002152
17	3/8"-16 x 1" Gr5 Z SF Hex Bolt	JM0002092
18	Manifold Gasket for M200 Fittings	JM0021145
19	2" Manifold Flange x 90 Deg 1-1/2" Hose Barb	JM0034352
20	Hose Clamp - 1-13/16" Min, 2-1/16" Max	JM0021189
21	100psi Spike Valve with M100 Manifold Flanges	JM0032499
22	1/4"-20 x 1/2" Gr5 Z Hex Bolt	JM0001481

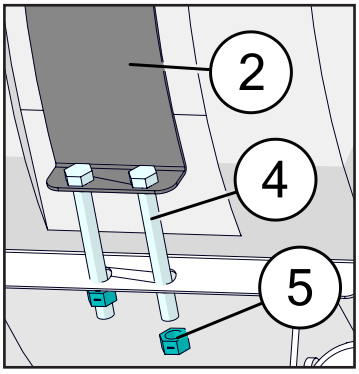
Check Valve

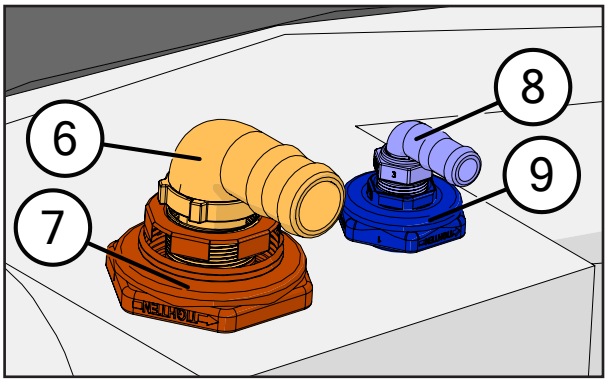


	Description	Part No.
1	Diaphragm Check Valve 3/4" Hose Tee Assembly	JM0041782
2	Diaphragm Check Valve 3/4" Hose Single	JM0041783
3	Diaphragm Check Valve 3/8" Hose Single Assembly	JM0037890
4	3/4" Hose Clamp SS	JM0039205
5	Diaphragm Check Valve 3/4" Hose Tee Only	JM0036379
6	Diaphragm Check Valve 3/4" Hose Single Only	JM0036381
7	Diaphram Check Valve 3/8" Single Hose (22251-311-375-NYB)	JM0084898
8	.054 NitroGro Orifice	JM0036373
8	.075 NitroGro Orifice	JM0036374
8	.093 NitroGro Orifice	JM0036375
8	.107 NitroGro Orifice	JM0036376
8	.132 NitroGro Orifice	JM0036377
8	.162 NitroGro Orifice	JM0036378
8	.196 NitroGro Orifice	JM0051020
9	NitroGro Check Valve Seat Gasket	JM0036372
10	3/8" Hose Barb, Poly	JM0036368
11	Quickjet Cap, Black	JM0036371
12	3/8" Hose Clamp SS	JM0039206

Tank

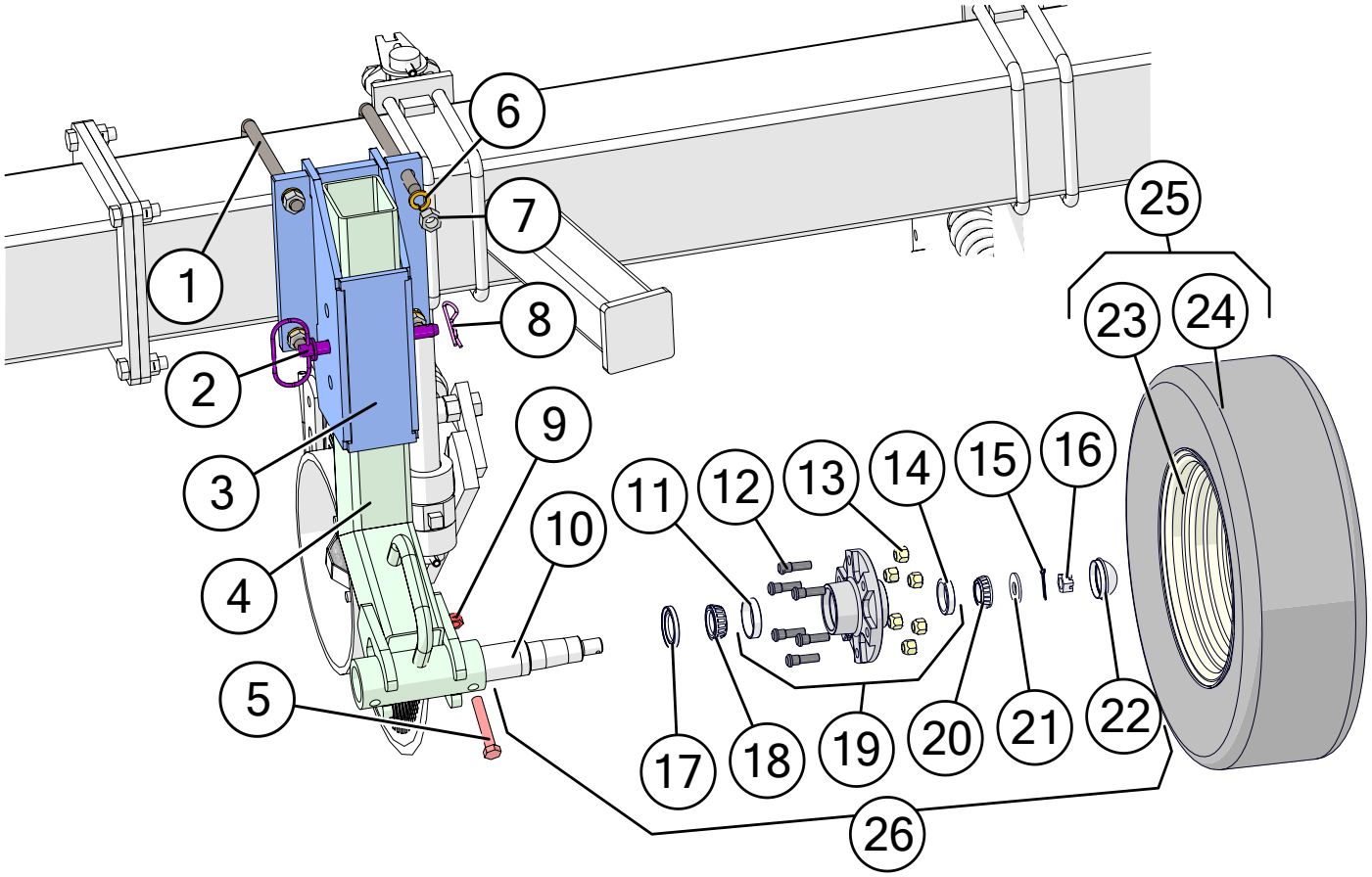






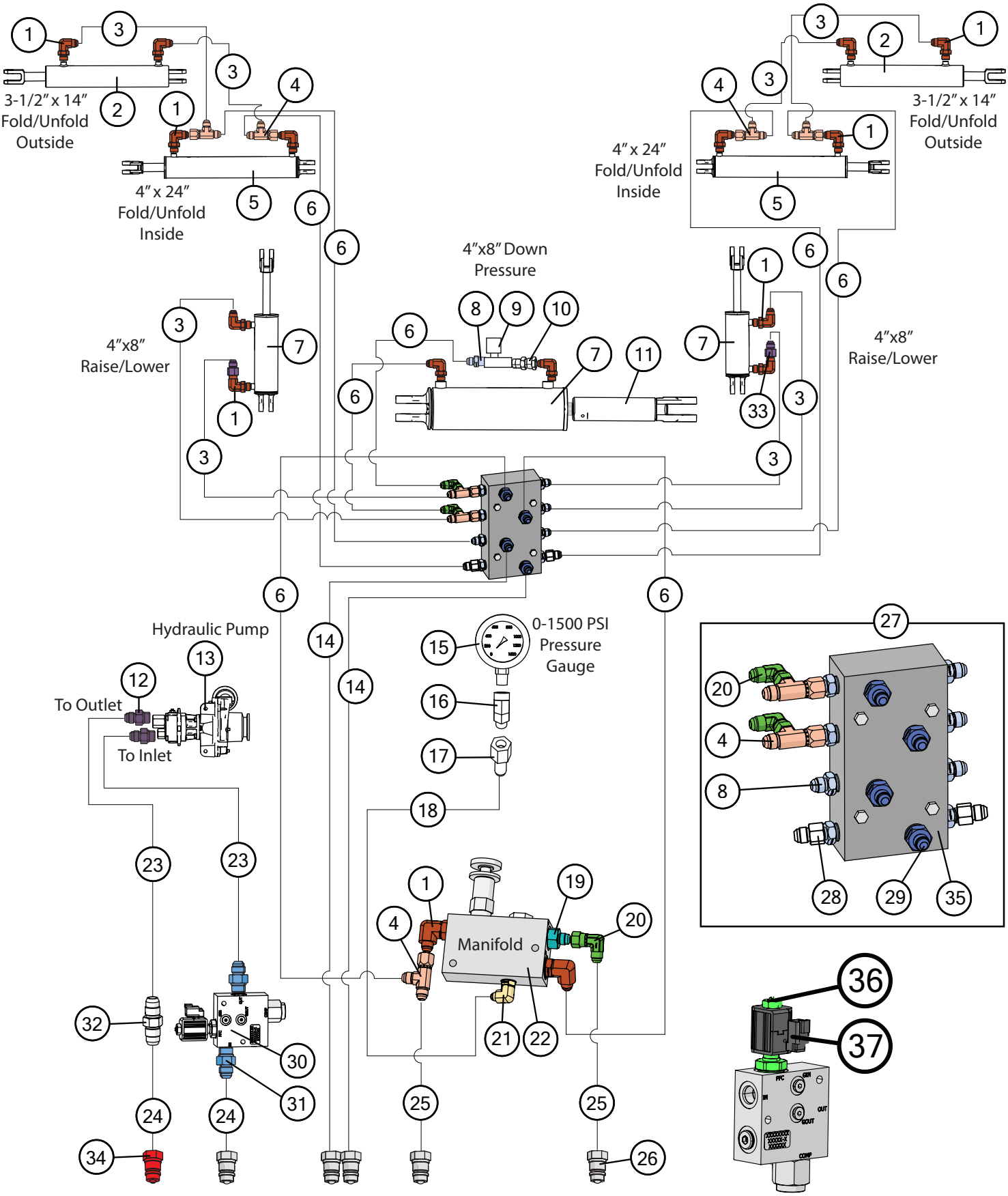
	Description	Part No.
1	1,000 Gallon Elliptical Tank with Sump	JM0027371
1	1,600 Gallon Elliptical Tank with Sump	JM0027372
2	16" Fertilizer Tank Lid With Vent	JM0080584
3	Band for Elliptical NitroGro Tank	JM0030208
4	1/2"-13 x 4-1/2" Gr5 Fully Threaded Z Hex Bolt	JM0078637
5	1/2"-13 Gr2 Z Centerlock Hex Nut	JM0001511
6	1-1/2" Male Thread X 1-1/2" 90 Deg Hose Barb	JM0061527
7	1-1/2" Poly Bulkhead Tank Fitting with EPDM Gasket	JM0061522
8	3/4" Hose Barb x 3/4" Male NPT; 90 Deg	JM0035226
9	3/4" NPT Bulkhead Tank Flange Assembly	JM0035222

Gauge Wheel



	Description	Part No.
1	5/8"-11 x 7-1/8" x 8-11/16" Square U-Bolt	JM0020901
2	Hitch Pin (5/8" x 6-1/2") (HP-586)	JM0003079
3	Gauge Wheel U-Bolt Mount Weldment (6000 Series)	JM0047347
4	5000 Gauge Wheel Ambidextrous Weldment	JM0077668
5	1/2"-13 x 3" Gr5 Z Hex Bolt	JM0016678
6	5/8" Gr2 Z Lock Washer	JM0051157
7	5/8"-11 Gr2 Z Hex Nut	JM0001522
8	3/16" x 2-1/2" Hair Clip Pin (316HP)	JM0001657
9	1/2"-13 Gr2 Z Centerlock Hex Nut	JM0001511
10	1-3/4" Diameter Spindle (SS-134SC)	JM0026569
11	Large Cup for 6-8 Ton (LM48510) (104580)	JM0026565
12	Wheel Stud for Hub, 6-8 Ton (1/2"-20 x 1-7/8") (4187)	JM0019559
13	1/2"-20 Lug Nut, 6-8 Ton (5552)	JM0003062
14	Small Cup for 6-10 Ton (LM67010) (200500)	JM0026564
15	5/32" x 1-1/2" Cotter Pin	JM0014348
16	3/4"-16 Gr2 Castle Hex Nut	JM0002130
17	Grease Seal, 6-8 Ton (103953)	JM0026572
18	Large Inner Bearing for 6-8 Ton (LM48548) (104579)	JM0019563
19	G25 Hub with Races, Studs and Nuts, 7-8 Ton (105218)	JM0026566
20	Small Outer Cone for 6-10 Ton (LM67048)	JM0019564
21	3/4" USS Z Flat Washer	JM0010006
22	Dust Cap, 6-10 Ton (103969)	JM0026567
23	14" x 6"- 6 Hole Wheel Rim	JM0019535
24	ST215-75D14 Carlisle Sport Trail Tire	JM0019529
25	ST215-75D14 Carlisle Sport Trail Tire and 14x6 - 6 Hole Wheel Rim	JM0019536
26	G25-6 Hub, Spindle, and Bearings Assembly	JM0026571

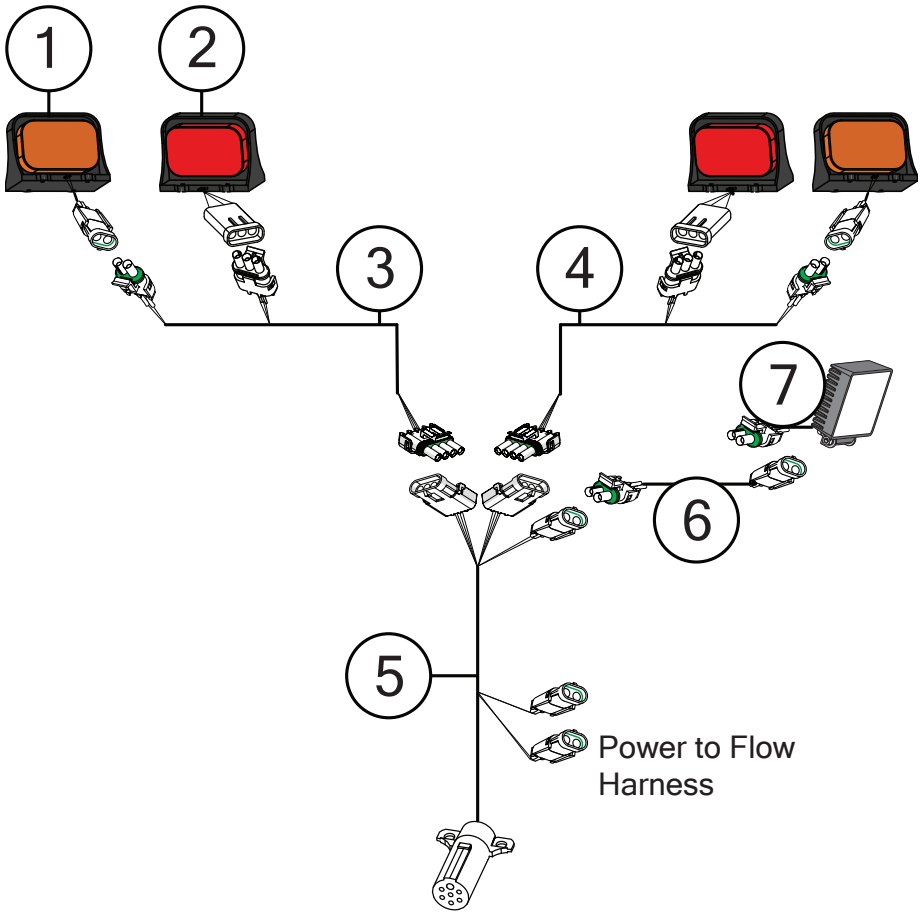
Hydraulic Schematic



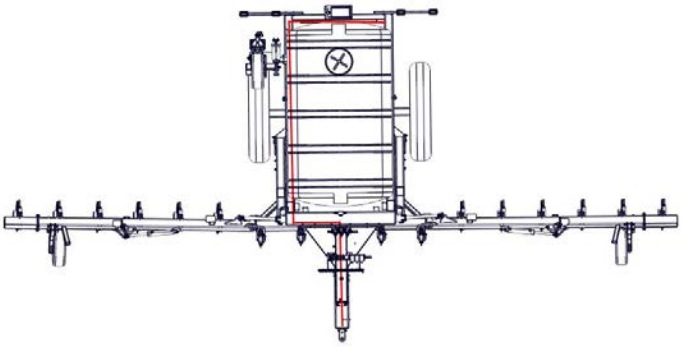
Hydraulic Schematic

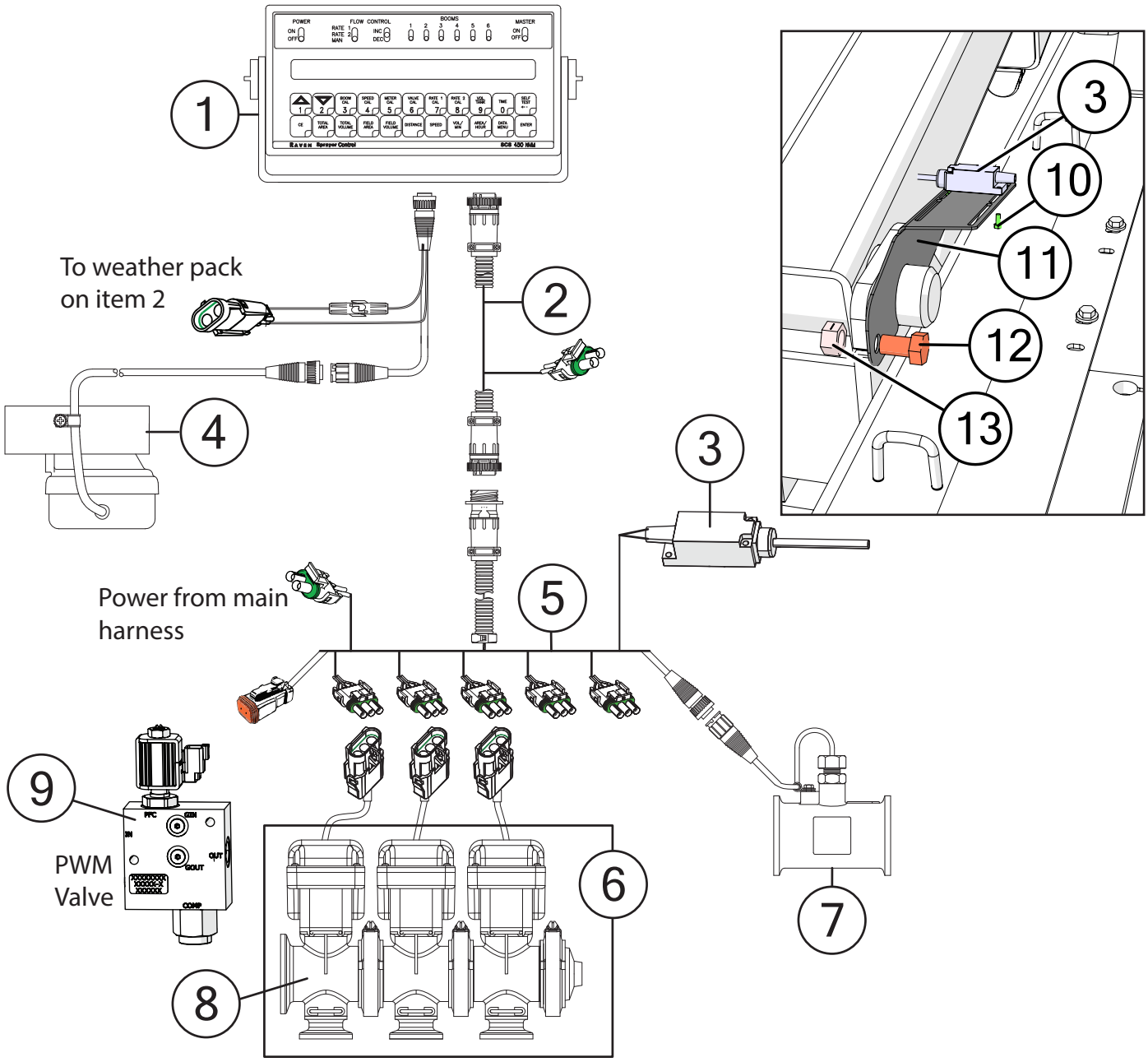
	Description	Part No.
1	3/8" Male JIC x 1/2" Male ORB; 90 Degree Elbow	JM0037159
2	3-1/2" x 14" Welded Non-Cushion JD Cylinder	JM0055022
2	Seal Kit for 3-1/2" x 14" Hydraulic Cylinder (JD-629)	JM0074483
3	3/8" x 108" Hydraulic Hose 104inch6M3K-6G-6FJX-6G-6FJX	JM0041615
4	3/8" Male JIC x 3/8" Female JIC Swivel x 3/8" Male JIC; Tee	JM0037163
5	4" Bore, 24" Stroke Welded Hydraulic Cylinder - Heavier Clevises	JM0030730
5	Seal Kit for 4" x 24" Hydraulic Cylinder (JD-609)	JM0039242
6	3/8" x 84" Hydraulic Hose 80inch6M3K-6G-6FJX-6G-6FJX	JM0041613
7	4" Bore, 8" Stroke Welded Hydraulic Cylinder - Heavier Clevises	JM0030757
7	Seal Kit for 4" x 8" Hydraulic Cylinder (JD-608)	JM0039241
8	3/8" Male JIC x 3/8" Male NPT; Straight	JM0037167
9	Parker Flow Control Valve (NitroGro)	JM0041626
10	3/8" Male NPT x 3/8" Female JIC Swivel	JM0073350
11	Shaft for Down Pressure Cylinder (NitroGro)	JM0032428
12	1/2" Male JIC x 5/8" Male O-Ring; Straight	JM0010294
13	FMCSC-155F-HYD-206 - Ace Pump	JM0061538
13	Ace 150/155 Pump Hydraulic Side Replacement Seal Kit - RK-BAC-75-HYD-L	JM0061310
14	3/8" x 165" Hydraulic Hose 165inch6M3K-6G-6FJX-6G-8MP	JM0041612
15	Pressure Gauge 0-1500psi, 2" Face, 1/4" NPT Bottom Mount Donaldson	JM0037152
16	1/4" Male NPT x 1/4" Female NPT Rigid; 45 Degree Elbow	JM0037156
17	1/4" Female NPT x 3/8" Male JIC Compression Bulk Head Fitting	JM0037155
18	3/8" x 29-1/2" Hydraulic Hose 29.5inch6M3K-6G-6FJX-6G-6FJX90S	JM0041687
19	3/8" Male JIC x 1/2" Male ORB; Straight	JM0010302
20	3/8" Male JIC x 3/8" Female JIC Swivel; 90 Degree Elbow	JM0010295
21	3/8" Male JIC x 3/8" Male ORB; 90 Degree Elbow	JM0026121
22	Down Pressure Relief Valve	JM0034806
23	1/2" x 180" Hydraulic Hose 180inch8M3K-8G-8FJX-8G-8FJX	JM0073123
24	1/2" x 168" Hydraulic Hose 168inch8M3K-8G-8MP-8G-8FJX	JM0073122
25	3/8" x 84" Hydraulic Hose 84inch6M3K-6G-6FJX-6G-8MP	JM0054708
26	1/2" Female NPT x Male Pioneer - Low Flow, Ball Style	JM0039220
27	5000 Applicator Manifold Block ASM	JM0073299
28	3/8" Male JIC x 3/8" Female JIC with .062 Orifice	JM0047738
29	3/8" Male JIC x 1/2" Male NPT; Straight	JM0037172
30	Hydraulic PWM Control Valve for 155 Ace Pump (F14264A1-1)	JM0059223
31	1/2" Male JIC x 1/2" Male O-ring; Straight	JM0010293
32	1/2" Male JIC x 1/2" Male JIC; Straight	JM0041452
33	3/8" Male JIC x 3/8" Female JIC with .094 Orifice	JM0047735
34	1/2" Female NPT x Male Pioneer - High Flow, Cone Style	JM0018254
35	Main Manifold Block (NitroGro)	JM0028902
36	Cartridge, Prop 2W2P NC Poppet	JM0088670
37	Super Coil 5/8" ID 12 VDC Deutsch	JM0055225

Wire Harness



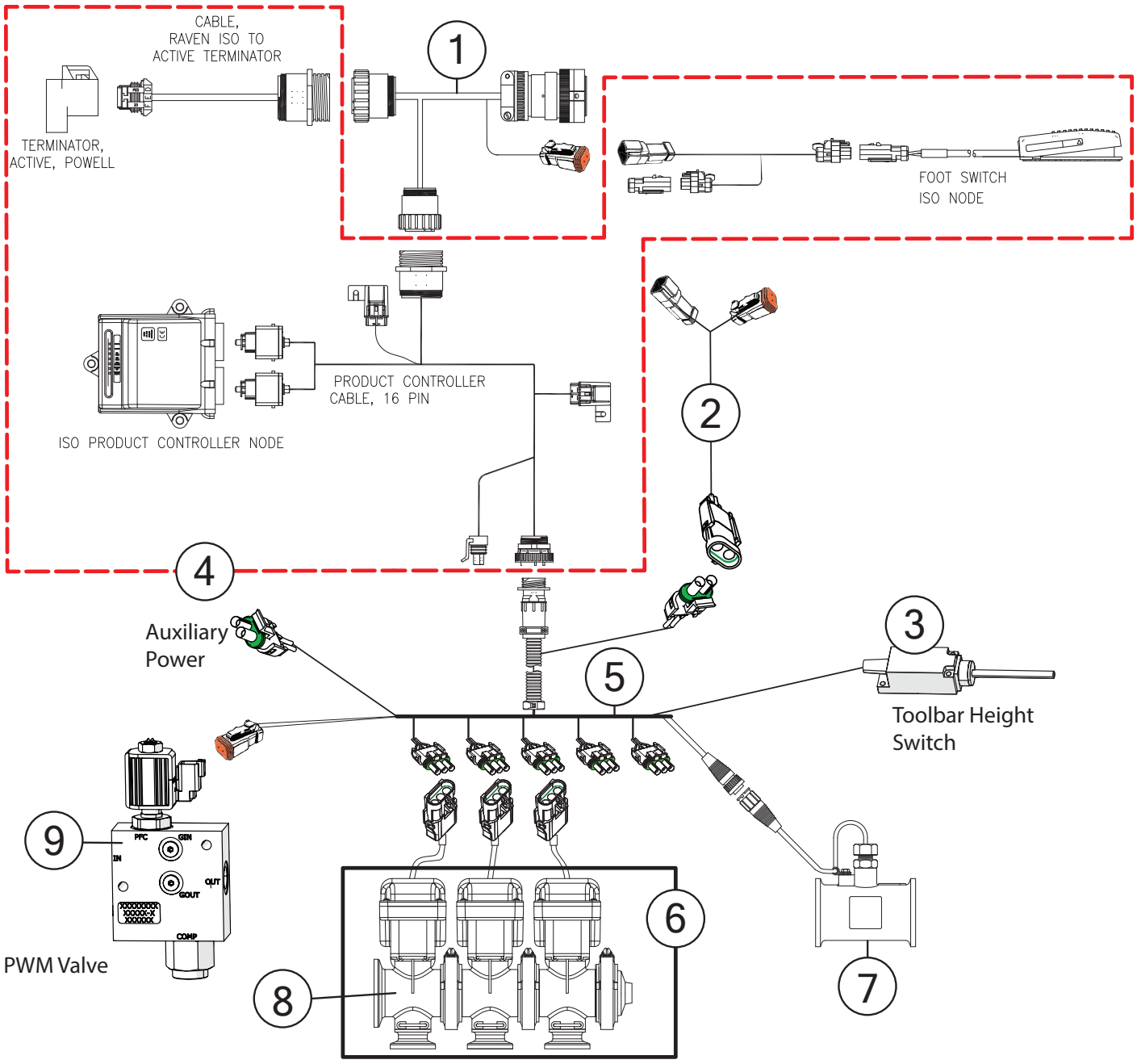
	Description	Part No.
1	Amber Light (Soil Conditioner, NitroGro)	JM0009975
2	Red Light (Soil Conditioner, NitroGro)	JM0009976
3	Right Light Harness (NitroGro)	JM0061737
4	Left Light Harness (NitroGro)	JM0061738
5	Front Main Harness with 7 Prong Connector (NitroGro)	JM0061736
6	NitroGro 6000 - Rear Flood Light Harness	JM0074220
7	LED Field Light with Weather Pack Connectors (SpeedTender, NitroGro)	JM0050942





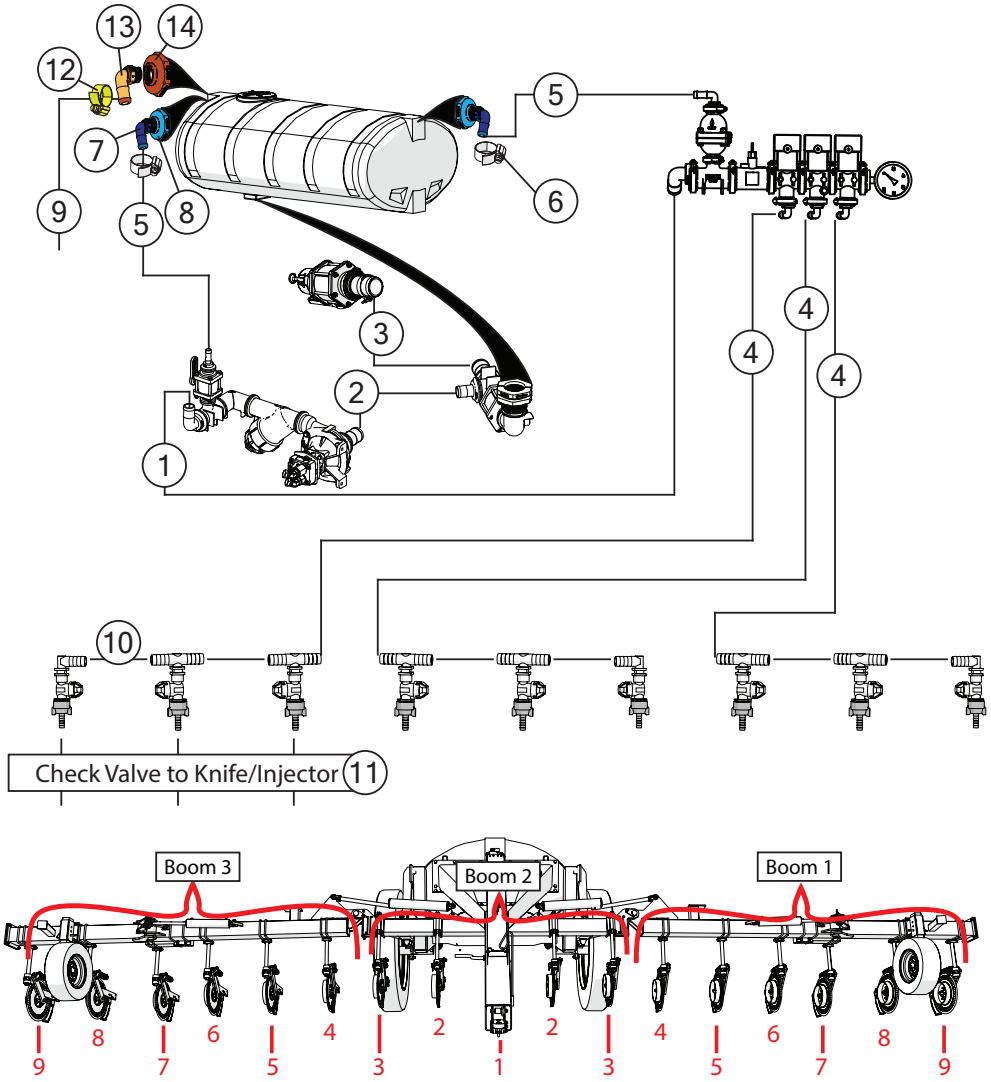
	Description	Part No.
1	Raven SCS450 Control Console	JM0039335
2	NitroGro 5 Section - PWM 30' Extension	JM0055257
3	Mini Whisker Limit Switch	JM0050161
4	Phoenix GPS Speed Sensor	JM0039338
5	NitroGro Break Out Harness 4' (5 Boom, Limit Switch, PWM, Flow Meter, Power)	JM0055255
6	Manifold Valve 3 Section(NitroGro)	JM0032484
7	Raven Flow Meter RFM60P	JM0032488
8	Raven Boom Valve	JM0032478
9	Hydraulic PWM Control Valve for 155 Ace Pump (F14264A1-1)	JM0059223
10	M5-0.8 x 12 Gr8.8 Z Hex Bolt	JM0036046
11	5000 Series Whisker Switch Mount	JM0077651
12	3/4"-10 x 1.25" Gr2 Z Hex Bolt	JM0047207
13	3/4"-10 Gr2 Z Centerlock Hex Nut	JM0002147

ISO Liquid Control System



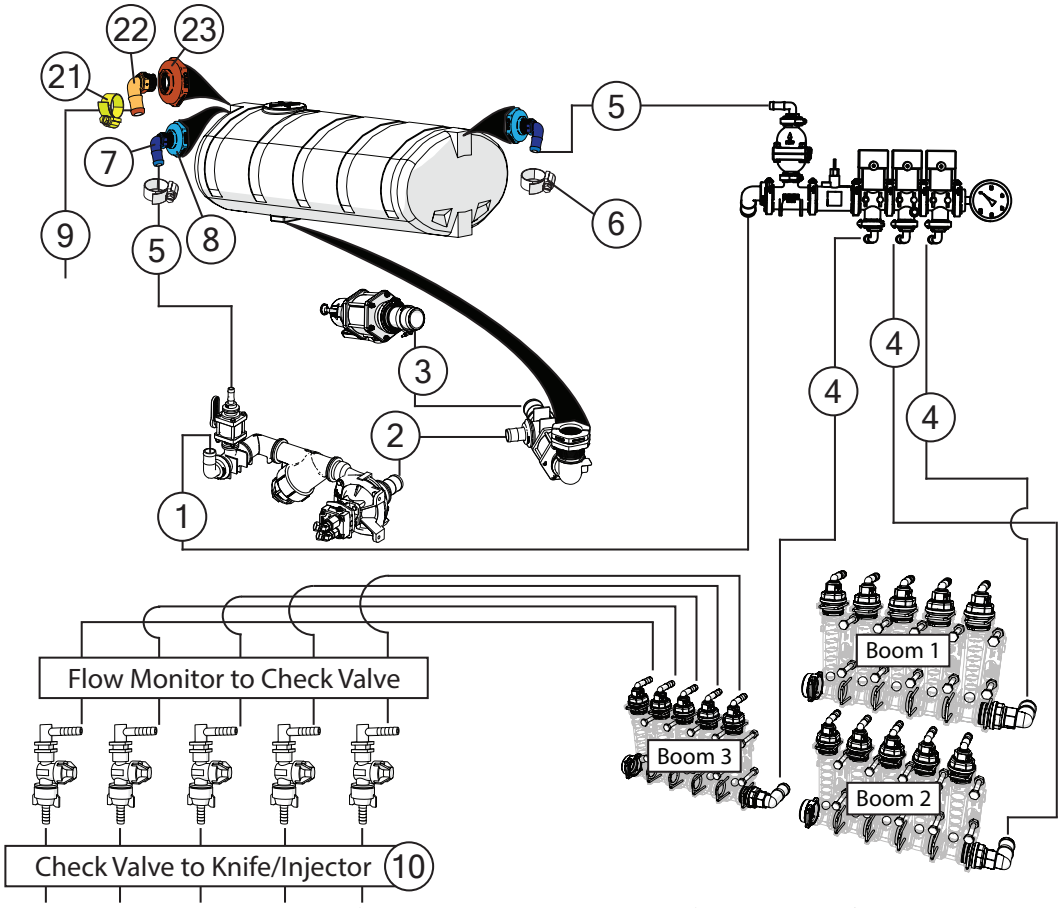
	Description	Part No.
1	Raven Cable ISOBUS Hitch to Raven ECU (17')	JM0051018
2	Remote Switch Cable for Implement Engagement - ISO Control	JM0050677
3	Mini Whisker Limit Switch	JM0050161
4	Raven ISO Single Product Kit	JM0039339
5	NitroGro Break Out Harness 4' (5 Boom, Limit Switch, PWM, Flow Meter, Power)	JM0055255
6	Manifold Valve 3 Section(NitroGro)	JM0032484
7	Raven Flow Meter RFM60P	JM0032488
8	Raven Boom Valve	JM0032478
9	Hydraulic PWM Control Valve for 155 Ace Pump (F14264A1-1)	JM0059223

Fertilizer Hose Routing - Hydraulic Pump without Flow Monitors

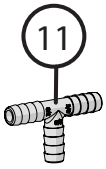


	Description	Part No.
1	1-1/2" x 228" TSD Fertilizer Suction Hose (5016)	JM0040211
1	1-1/2" x 180" TSD Fertilizer Suction Hose (5010)	JM0040330
2	2" x 32" TSD Fertilizer Suction Hose	JM0040224
3	2" x 36" TSD Fertilizer Suction Hose	JM0040215
3	3" x 38" TSD Fertilizer Suction Hose	JM0040216
4	3/4" x 210" EPDM Fertilizer Hose	JM0040217
5	3/4" x 55" EPDM Fertilizer Hose	JM0040332
6	3/4" Hose Clamp SS	JM0039205
7	3/4" Hose Barb x 3/4" Male NPT; 90 Deg	JM0035226
8	3/4" NPT Bulkhead Tank Flange Assembly	JM0035222
9	1-1/2" x 80" EPDM Fertilizer Hose	JM0078557
10	3/4" x 30" EPDM Fertilizer Hose	JM0040218
11	3/8" x 52" EPDM Fertilizer Hose	JM0040219
12	Hose Clamp - 1-13/16" Min, 2-1/16" Max	JM0021189
13	1-1/2" Male Thread X 1-1/2" 90 Deg Hose Barb	JM0061527
14	1-1/2" Poly Bulkhead Tank Fitting with EPDM Gasket	JM0061522

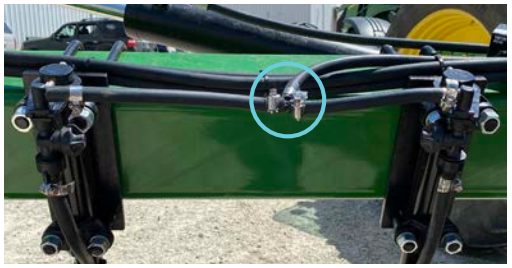
Fertilizer Hose Routing - Hydraulic Pump with Flow Monitors

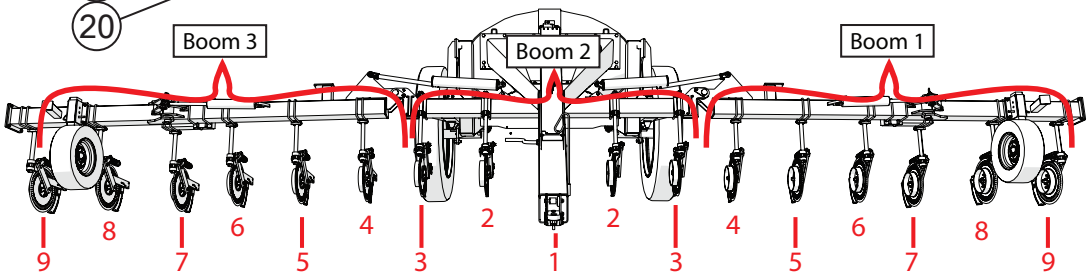


	30" Row Spacing	
	Flow Monitor to Check Valve	
	Description	Part No.
Coulter 1	112" x 3/8" Fertilizer Hose	JM0041658
Coulter 2	142" x 3/8" Fertilizer Hose	JM0041659
Coulter 3	172" x 3/8" Fertilizer Hose	JM0041660
Coulter 4	145" x 3/8" Fertilizer Hose	JM0041661
Coulter 5	175" x 3/8" Fertilizer Hose	JM0041662
Coulter 6	205" x 3/8" Fertilizer Hose	JM0041663
Coulter 7	245" x 3/8" Fertilizer Hose	JM0041664
Coulter 8	275" x 3/8" Fertilizer Hose	JM0041665
Coulter 9	305" x 3/8" Fertilizer Hose	JM0041666



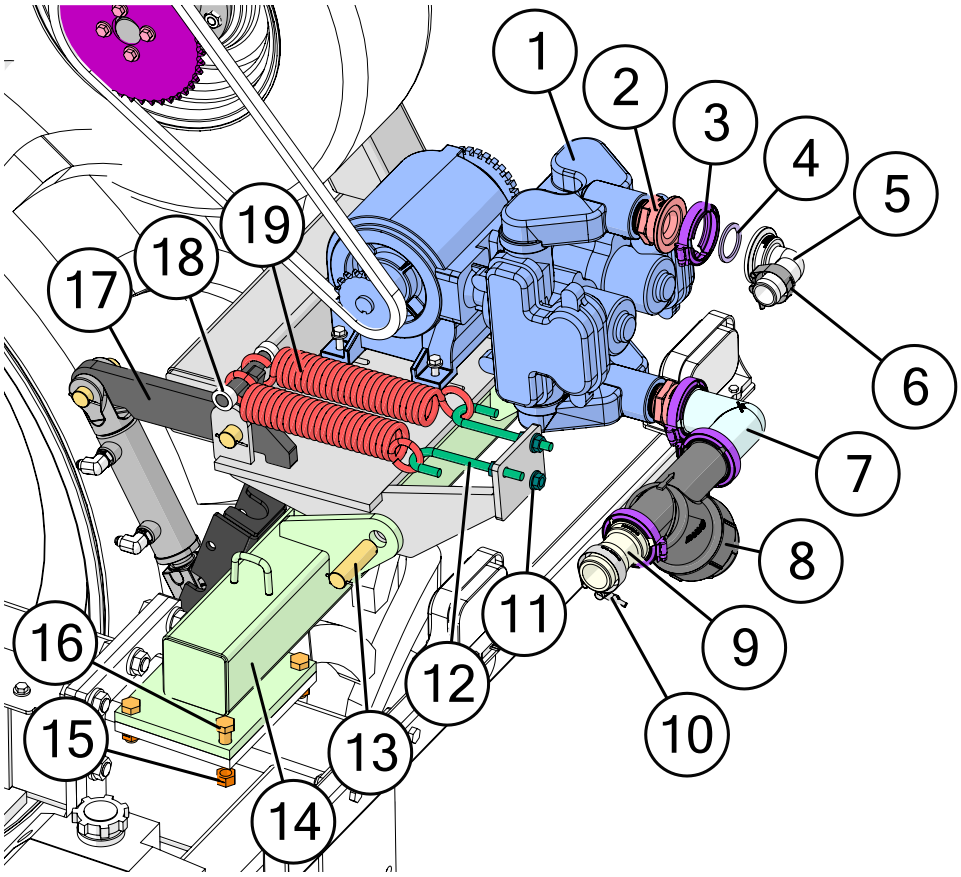
Hose barb "T" will be used if you have too many coulters. Each flow monitor will monitor 2 coulters instead of 1 in that instance.

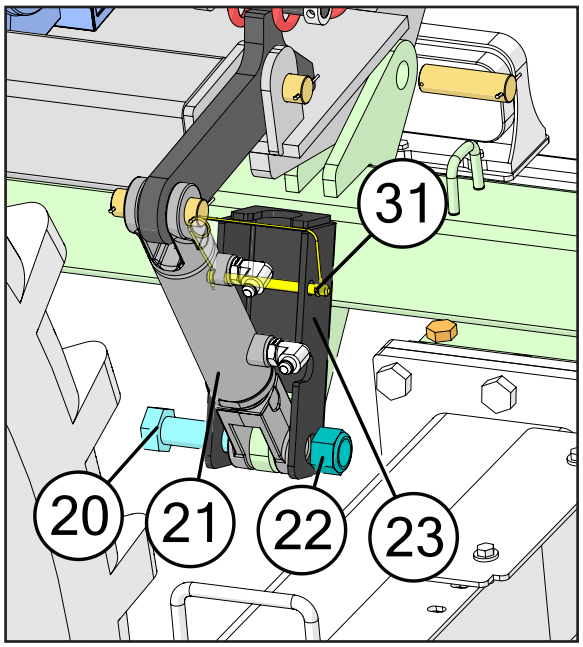


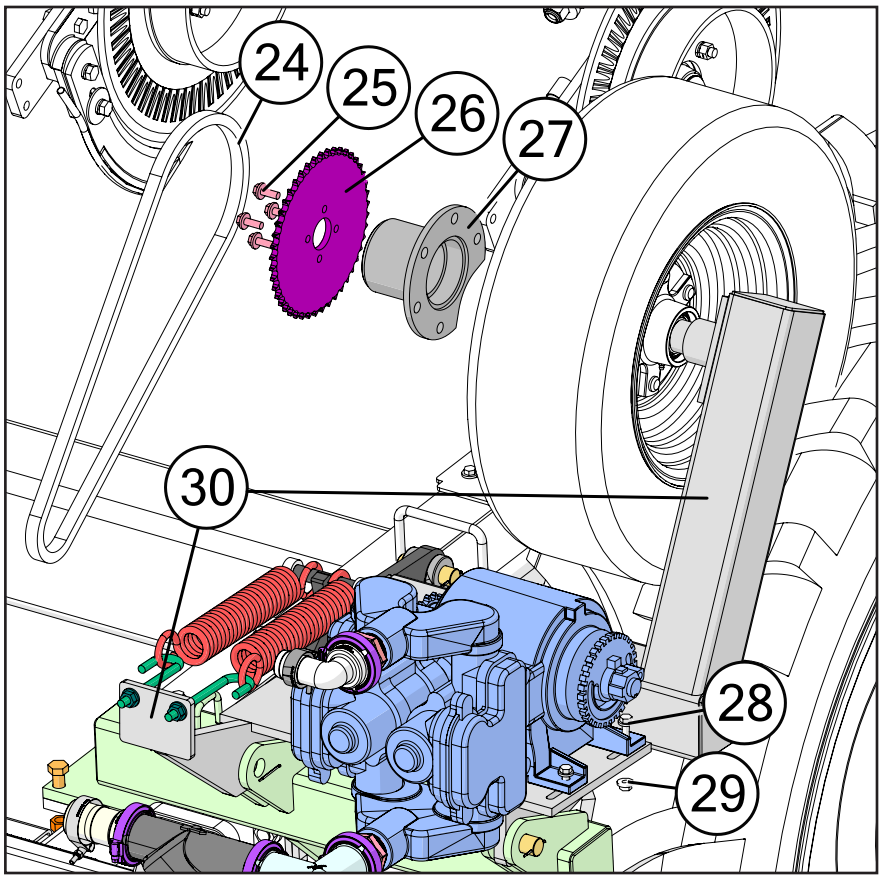


Fertilizer Hose Routing - Hydraulic Pump with Flow Monitors

	Description	Part No.
1	1-1/2″ x 228″ TSD Fertilizer Suction Hose (5016)	JM0040211
1	1-1/2″ x 180″ TSD Fertilizer Suction Hose (5010)	JM0040330
2	2″ x 32″ TSD Fertilizer Suction Hose	JM0040224
3	2″ x 36″ TSD Fertilizer Suction Hose	JM0040215
3	3″ x 38″ TSD Fertilizer Suction Hose	JM0040216
4	3/4″ x 30″ EPDM Fertilizer Hose	JM0040218
5	3/4″ x 55″ EPDM Fertilizer Hose	JM0040332
6	3/4″ Hose Clamp SS	JM0039205
7	3/4″ Hose Barb x 3/4″ Male NPT; 90 Deg	JM0035226
8	3/4″ NPT Bulkhead Tank Flange Assembly	JM0035222
9	1-1/2″ x 80″ EPDM Fertilizer Hose	JM0078557
10	3/8″ x 52″ EPDM Fertilizer Hose	JM0040219
11	3/8″ Hose Barb Tee	JM0073958
12	3/8″ x 112″ EPDM Fertilizer Hose	JM0041658
13	3/8″ x 142″ EPDM Fertilizer Hose	JM0041659
14	3/8″ x 172″ EPDM Fertilizer Hose	JM0041660
15	3/8″ x 145″ EPDM Fertilizer Hose	JM0041661
16	3/8″ x 175″ EPDM Fertilizer Hose	JM0041662
17	3/8″ x 205″ EPDM Fertilizer Hose	JM0041663
18	3/8″ x 245″ EPDM Fertilizer Hose	JM0041664
19	3/8″ x 275″ EPDM Fertilizer Hose	JM0041665
20	3/8″ x 305″ EPDM Fertilizer Hose	JM0041666
21	Hose Clamp - 1-13/16″ Min, 2-1/16″ Max	JM0021189
22	1-1/2″ Male Thread X 1-1/2″ 90 Deg Hose Barb	JM0061527
23	1-1/2″ Poly Bulkhead Tank Fitting with EPDM Gasket	JM0061522





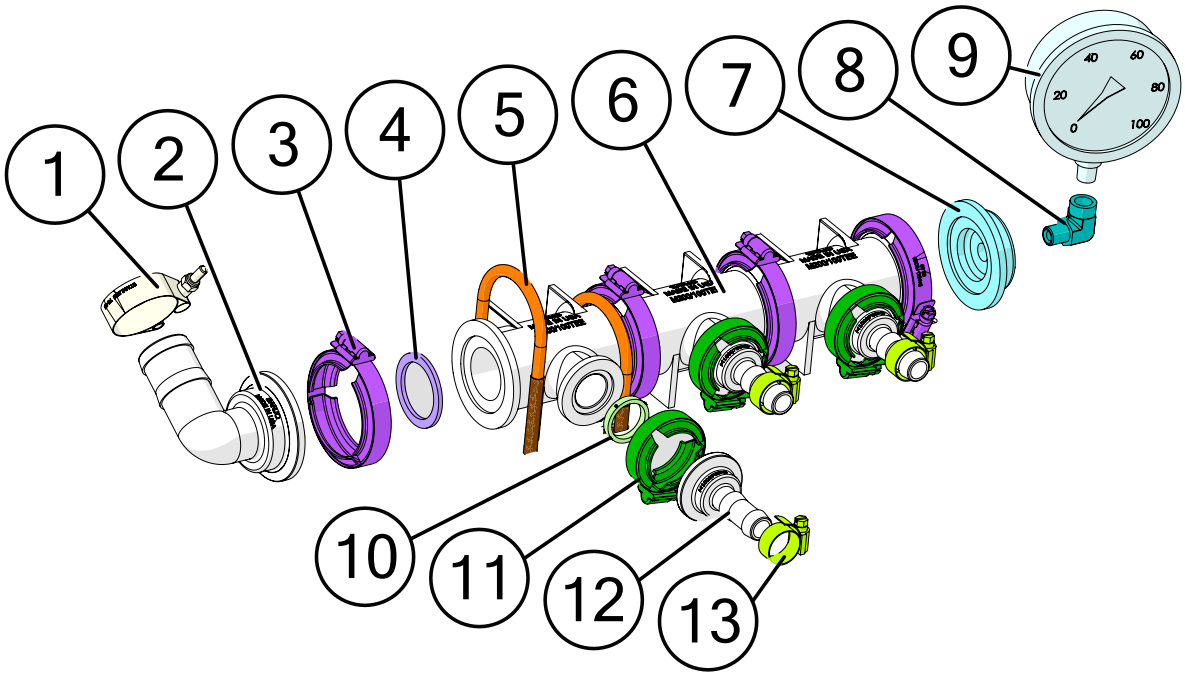


The hub, lugs and tire are the same as the "Gauge Wheel" on page 63.

5000 Ground Driven Pump

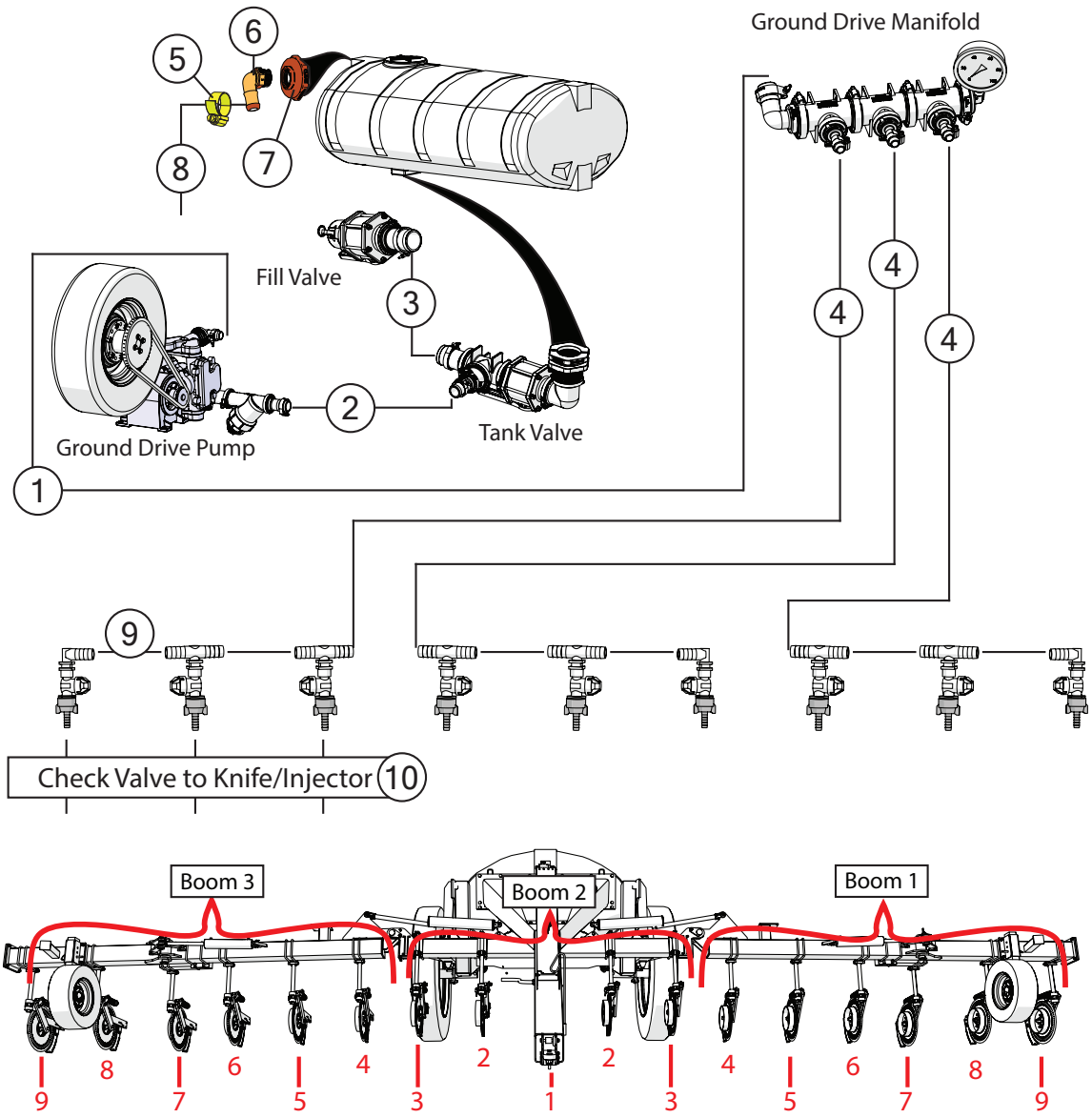
	Description	Part No.
1	John Blue Ground Driven Dual Piston Pump	JM0035142
2	1-1/2" Male MPT x 2" Manifold Flange	JM0035124
3	Manifold Flange Clamp for M200 Fittings	JM0035251
4	Manifold Gasket for M200 Fittings	JM0021145
5	2" Manifold Flange x 90 Deg 1-1/2" Hose Barb	JM0034352
6	Hose Clamp - 1-13/16" Min, 2-1/16" Max	JM0021189
7	90 Deg Coupling - 2" Manifold Flange	JM0033991
8	Manifold Y Strainer - M200 Manifold Flange, 30 Mesh	JM0033803
9	M200 Manifold Flange x 2" Hose Barb	JM0035137
10	T-Bolt Hose Clamp 2" Hose, 2-5/16" Min OD	JM0035247
11	1/2"-13 Gr5 Z F Hex Nut	JM0001624
12	1/2"-13 x 6" Gr5 Z J-Bolt	JM0002168
13	1" x 3-1/2" Clevis Pin with Cotter Pins	JM0001817
14	Ground Drive Pump Mount	JM0036062
15	5/8"-11 Gr2 Z Centerlock Hex Nut	JM0002146
16	5/8"-11 x 2" Gr5 Z Hex Bolt	JM0002104
17	Linkage Weldment for Ground Drive Pump	JM0037580
18	Shaft Collar - Set Screw 3/4"	JM0025216
19	Large Tongue Spring 3/8" x 1-3/4" x 12-1/2" (GDP) TS-615H	JM0014200
20	1"-8 x 5" Gr5 Z Pn Hex Bolt	JM0001558
21	2" x 4" Cylinder (NitroGro)	JM0034861
22	1"-8 Gr5 Z Nylon Locking Hex Nut	JM0002161
23	Cylinder Lock Latch (5000)	JM0036330
24	Roller Chain #50 - 104 Links - 65" Applicator Ground Drive Pump	JM0084895
25	3/8"-16 x 1" Gr5 Z SF Hex Bolt	JM0002092
26	50A60 Sprocket #50 Roller Chain, 60 Teeth Ground Driven Pump	JM0084819
27	Sprocket Mount "Ground Drive Pump"	JM0034442
28	3/8"-16 x 1-1/2" Gr5 Z SF Hex Bolt	JM0001633
29	3/8"-16 Gr5 Z SF Hex Nut	JM0002152
30	Ground Drive Pump Pivot Weldment	JM0036063
31	3/8" x 4" Usable Length Zinc Lynch Pin with Square Retainer	JM0079502

5000 Ground Driven Pump Manifold



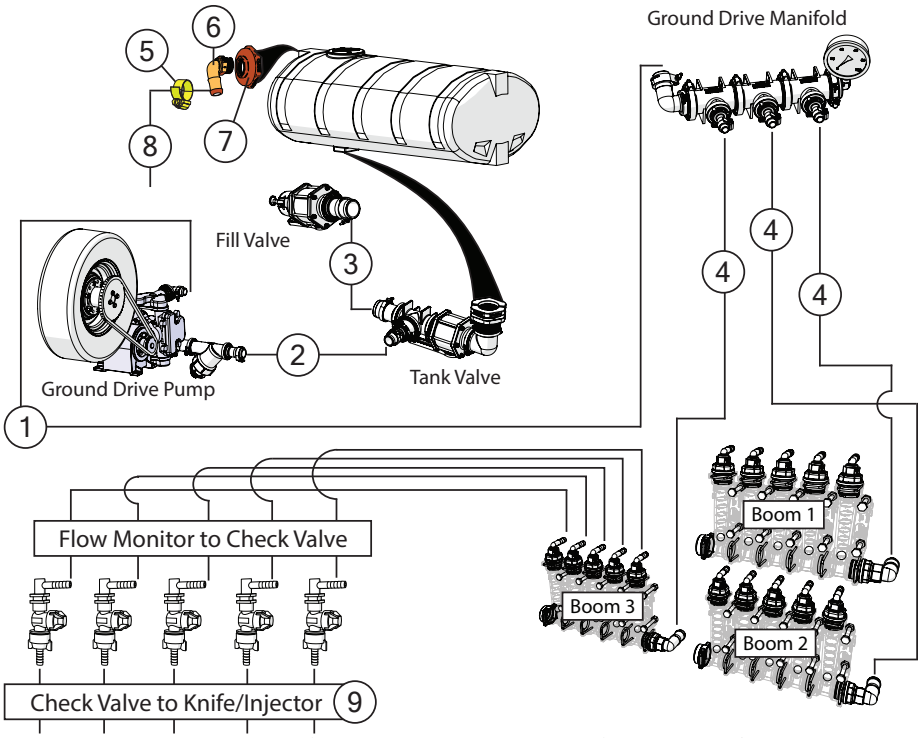
	Description	Part No.
1	Hose Clamp - 1-13/16" Min, 2-1/16" Max	JM0021189
2	2" Manifold Flange x 90 Deg 1-1/2" Hose Barb	JM0034352
3	Manifold Flange Clamp for M200 Fittings	JM0035251
4	Manifold Gasket for M200 Fittings	JM0021145
5	3/8"-16 x 2-1/2" x 5-1/4" Round U-Bolt	JM0018627
6	M200 Manifold Flange x M200 Manifold Flange x M100 Manifold Flange; Tee	JM0035116
7	Manifold Plug for M200 Fittings with 1/4" NPT for Gauge	JM0021147
8	1/4" Male NPT x 1/4" Female NPT; 90 Degree Elbow	JM0020115
9	Pressure Gauge Stainless Steel 0-100psi, 1/4" NPT	JM0036636
10	Manifold Gasket for M100 Fittings with Rib	JM0035239
11	Manifold Flange Clamp for M100 Fittings	JM0032496
12	M100 Manifold Flange x 3/4" Hose Barb; Straight	JM0021401
13	3/4" Hose Clamp SS	JM0039205

Fertilizer Hose Routing - Ground Driven Pump without Flow Monitors

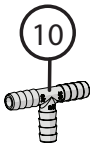


	Description	Part No.
1	1-1/2" x 228" TSD Fertilizer Suction Hose (5016)	JM0040211
1	1-1/2" x 180" TSD Fertilizer Suction Hose (5010)	JM0040330
2	2" x 32" TSD Fertilizer Suction Hose	JM0040224
3	2" x 36" TSD Fertilizer Suction Hose	JM0040215
3	3" x 38" TSD Fertilizer Suction Hose	JM0040216
4	3/4" x 210" EPDM Fertilizer Hose	JM0040217
5	3/4" x 55" EPDM Fertilizer Hose	JM0040332
6	3/4" Hose Clamp SS	JM0039205
7	3/4" Hose Barb x 3/4" Male NPT; 90 Deg	JM0035226
8	3/4" NPT Bulkhead Tank Flange Assembly	JM0035222
9	3/4" x 80" EPDM Fertilizer Hose	JM0073353
10	3/4" x 30" EPDM Fertilizer Hose	JM0040218
11	3/8" x 52" EPDM Fertilizer Hose	JM0040219

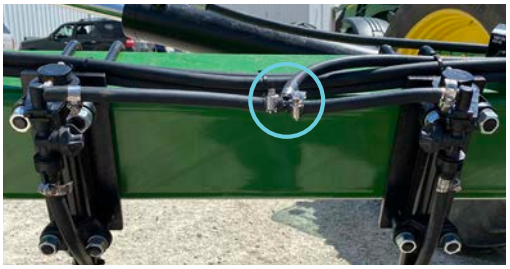
Fertilizer Hose Routing - Ground Driven Pump with Flow Monitors

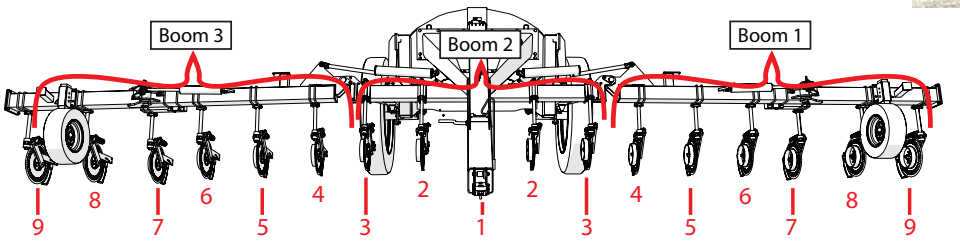


30" Row Spacing		
Flow Monitor to Check Valve		
	Description	Part No.
Coulter 1	112" x 3/8" Fertilizer Hose	JM0041658
Coulter 2	142" x 3/8" Fertilizer Hose	JM0041659
Coulter 3	172" x 3/8" Fertilizer Hose	JM0041660
Coulter 4	145" x 3/8" Fertilizer Hose	JM0041661
Coulter 5	175" x 3/8" Fertilizer Hose	JM0041662
Coulter 6	205" x 3/8" Fertilizer Hose	JM0041663
Coulter 7	245" x 3/8" Fertilizer Hose	JM0041664
Coulter 8	275" x 3/8" Fertilizer Hose	JM0041665
Coulter 9	305" x 3/8" Fertilizer Hose	JM0041666



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.
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1	1-1/2" x 180" TSD Fertilizer Suction Hose (5010)	JM0040330
2	2" x 32" TSD Fertilizer Suction Hose	JM0040224
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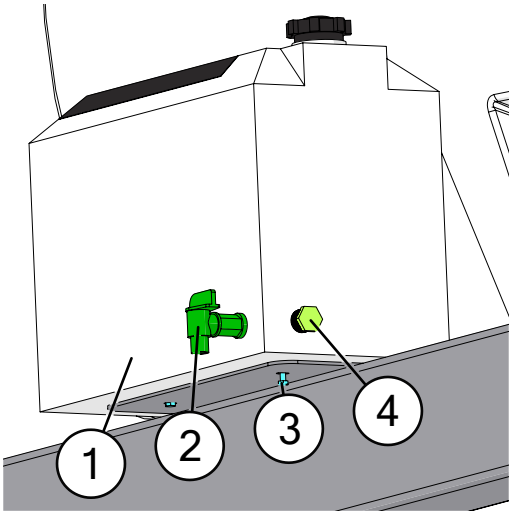
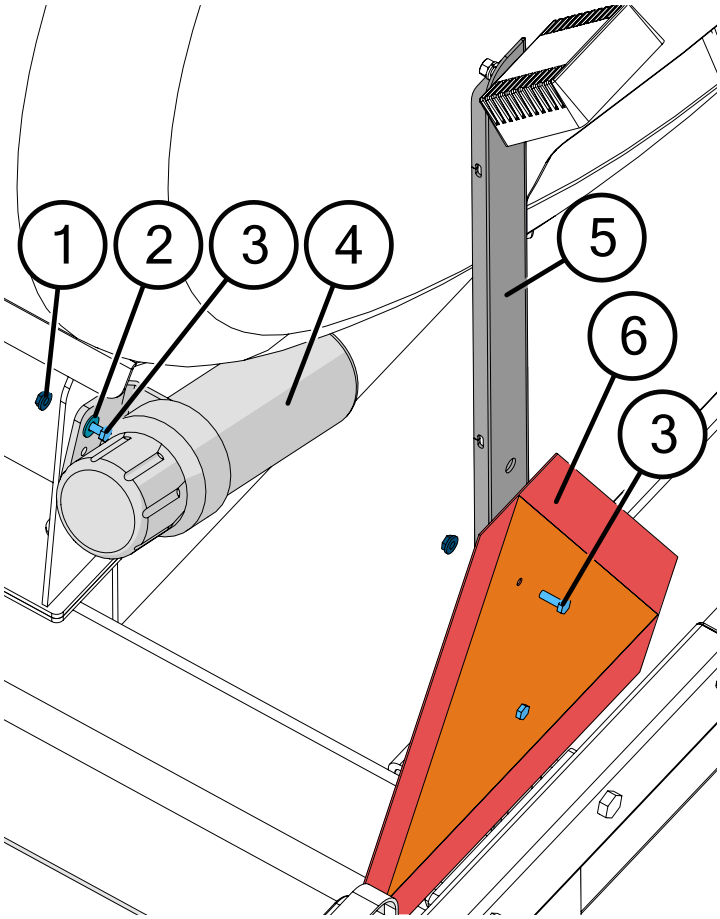
3	3" x 38" TSD Fertilizer Suction Hose	JM0040216
4	3/4" x 30" EPDM Fertilizer Hose	JM0040218
5	3/4" x 55" EPDM Fertilizer Hose	JM0040332
6	3/4" Hose Clamp SS	JM0039205
7	3/4" Hose Barb x 3/4" Male NPT; 90 Deg	JM0035226
8	3/4" NPT Bulkhead Tank Flange Assembly	JM0035222
9	3/4" x 80" EPDM Fertilizer Hose	JM0073353
10	3/8" x 52" EPDM Fertilizer Hose	JM0040219
11	3/8" Hose Barb Tee	JM0073958

Hand Wash Tank



	Description	Part No.
1	9 Gallon Safety/Fresh Water Tank	JM0030587
2	Drum Faucet - 3/4" NPT (NitroGro)	JM0039066
3	5/16"-18 x 1/2" Gr5 Z Hex Bolt	JM0016674
4	3/4" NPT PVC Threaded Plug Schedule 40 (NitroGro)	JM0037251

Manual Canister and SMV



	Description	Part No.
1	1/4"-20 Gr5 Z SF Hex Nut	JM0001630
2	1/4" ID, 3/4" OD Z Flat Washer	JM0003090
3	1/4"-20 x 3/4" Gr5 Z Hex Bolt	JM0001507
4	Operator's Manual Canister	JM0010115
5	5000 Applicator Flood Light Mounting Post	JM0084871
6	Slow Moving Vehicle Sign	JM0001616