MONOSEM

Precision Vacuum Planters

Narrow Fold Twin-Row

NG plus 4

Operator & Parts Manual

Includes Instructions for:

- Safety
- Operation
- Maintenence

op&parts.09

Congratulations on your purchase of a MONOSEM planter.

This manual has been prepared for use in operation, adjustment, and maintenance of the planter. Read this manual carefully before operating your planter.

The information used in compiling this manual is current, however as production changes do occur on a continual basis, Monosem Inc. reserves the right to change specifications or designs without notice and without the obligation to install the same on previously manufactured machines.

Please take the time now to record your serial number and date of purchase for a reference when ordering replacement parts for your Monosem NG Plus 4 planter.

Serial Number _____

Date _____

The WARRANTY for your NG Plus 4 planter is printed on the back cover.

While reading your manual you will see the symbol  and the words **CAUTION**, **WARNING**, **DANGER**. Pay particular attention to the safety information given. Failure to observe the safety symbols can cause damage to the machine and/or personal injury. A detailed description of the safety symbols and their meaning is found in the safety section of this manual.

***2 precautions for successful planting*:**

1. Choose a reasonable working speed adapted to the field conditions and desired accuracy.

2. Check proper working of the seed metering, seed placement, spacing and density when starting up and from time to time during planting.

… and don't forget – accurate planting is the key to a good stand!

QUICK REFERENCE

Twin-Row PULL-TYPE RIGID Planter

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This is a downloadable version of the manual. A partial download may not contain all pertinent information. Make Sure to read Chapter 1, Safety!
Due to ongoing upgrades specifications may change without notice, contact a Monosem Rep for current information.

This symbol means:
ATTENTION - BECOME ALERT YOUR SAFETY IS INVOLVED.

When you see this symbol on the machine or in this manual, be alert to the potential for personal safety. Follow all recommended precautions. Safety of the operator is one of the main concerns in designing and developing a new piece of equipment. You, the operator, can avoid many accidents by observing the warning signs.

Keep safety warning signs clean and readable. Replace all labels on your machine that are damaged, unreadable, or missing.

The signal words used in this manual and on the machine are **DANGER, WARNING**, and **CAUTION**. Signal words designate a level of hazard:

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, or to alert against unsafe practices.

CAUTION: Indicates a potentially hazardous situation that, if not avoided, may result in minor or moderate injury, or to alert against unsafe practices.

Listed below are safety precautions that should become standard practice before and during operation, transport, and maintenance of the planter.

GENERAL SAFETY

Any alterations to the design of this planter may create safety hazards. In the case of alterations or changes, you MUST follow all appropriate safety standards and practices to protect you and others near this machine from injury.

Agricultural chemicals can be dangerous. Improper use can result in injury to persons, animals and soil. Handle with care and follow instructions of the chemical manufacturer.

BEFORE OPERATION

- Carefully study and understand this manual.
- Learning takes time. Do not hurry the learning process or take the unit for granted. Ease into it and become familiar with your new planter.
- Practice operating your planter and its attachments. Completely familiarize yourself and other operators with its operation before using.
- Do not wear loose fitting clothing that could catch in moving parts.
- Wear suitable protective clothing, shoes, protective hearing and safety glasses. Have necessary safety equipment for handling certain materials you may come in to contact with, such as extremely dusty, molds, fungi, bulk fertilizers, insecticides, etc.

- Inflate the planter tires evenly.
- Inspect the planter for loose bolts, worn parts or cracked welds, and make necessary repairs. Never operate equipment that is not in safe working condition.
- Before applying pressure to the hydraulic system, make sure all connections are tight and that hoses and fittings are not damaged. Hydraulic fluid escaping under pressure can penetrate the skin causing serious injury.
- Before operating the planter for the first time and periodically thereafter, check to be sure the lug nuts on the transport wheel are properly torqued. This is especially important you are going to transport the planter for a long distance.
- Do not allow anyone to stand between the tongue or hitch and the towing vehicle when backing up to the planter.
- Lower the toolbar stands to support the planter. Do not stand between the tractor and the planter when connecting or disconnecting the implement.
- Install lock ups on markers, as provided prior to transporting the planter or working around the unit.
- Stay clear when raising or lowering folding sections. Make sure no one else is near the planter when the folding sections are raising or lowering.
- Remove any tools that are on or in the planter.

DURING OPERATION

- Beware of bystanders, particularly children! Always look around to make sure that it is safe to start the engine of the towing vehicle.

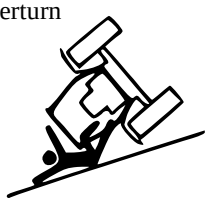
- Use necessary safety lights and devices and observe legal regulations before transporting on public roads. Check to be sure that all warning lights are working properly before transporting machine.

- Do not allow passengers anywhere on or in the planter during operation.

- Be especially observant of the operating area and terrain – watch for holes, rocks or other hidden hazards.

- Always inspect the operating area prior to operation. Do not operate near the edge of drop-offs or banks. Be extra careful when working on inclines.

- Do not operate on steep slopes as overturn may result.



- Avoid sudden uphill turns on steep slopes, as shift of weight could cause a rollover.

- Reduce speed prior to turns to avoid the risk of overturning.

- Keep hands and clothing clear of moving parts.

- Always make sure there are no persons near the planter when the marker assemblies are in operation.

- If a marker cylinder was removed for any reason, do not attach the rod end of the cylinder until the cylinder is cycled several times to remove any air that may be trapped in the system.

- Serious injury or death can result from contact with electric lines. Use care to avoid contact with electric lines when moving or operating this machine.

- This planter is designed to be driven by ground tires only. The use of hydraulic, electric or PTO dives may create serious safety hazards to you and the people nearby. If you install such drives you must follow all appropriate safety standards and practices to protect you and others near this planter from injury.

- Lower the planter when not in use and cycle the hydraulic control lever to relieve pressure in hoses.

FOLLOWING OPERATION

- When you stop operation of the planter, even if periodically, stop the tractor, set the tractor or towing vehicle brakes, disengage the PTO and all power drives, shut off the engine and remove the ignition key.

UNHOOKING THE PLANTER

- Lower the toolbar stands to support the planter. Do not stand between the tractor and the planter when connecting or disconnecting the implement.

- Before unhooking the planter from the tractor, fully extend the jack stands to the point where the toolbar will remain level. Lock the stands securely in place with the locking pins.

- Lower the planter to the ground. Set the tractor or towing vehicle brakes, disengage PTO and all power drives, shut off the engine and remove the ignition key.

- Unhook the tractor lift arms from hitch pockets and remove center link. If a quick attach is used, position levers so that the locking mechanism is in the “unlatched” position and lower.

- When the lift arms or quick attach arms are clear of the tractor, slowly drive the tractor away from the planter.

STORING THE PLANTER

- Store the planter on a dry, level surface. An uneven surface could cause the planter to shift or fall, resulting in injury or death. Store planter in an area away from human activity.

- Do not permit children to play on or around the stored planter.

- The planter should be stored in a dry and dust-free location with the hydraulic cylinders closed.

- Engage all safety devices for storage.

- You may need wheel chocks to prevent the parked planter from rolling.

- Never work under the planter while in raised position without installing safety lockup pin.

PERFORMING MAINTENANCE

- Good maintenance is your responsibility.

- Make repairs in an area with plenty of ventilation. Never operate the engine of the towing vehicle in a closed building. The exhaust fumes may cause asphyxiation.

- As a precaution, always recheck the hardware on equipment following every 100 hours of operation. Correct all problems.

- Before working on the planter, stop the towing vehicle, set the brakes, disengage the PTO and all power drives, shut off the engine and remove the ignition keys.

- Never work under the planter while it is in a raised position.

- Be certain all moving parts have come to a complete stop before attempting to perform maintenance.

- Always use the proper tools or equipment for the job at hand.

- Never use you hands to locate a hydraulic leak. Use a small piece of cardboard or wood. Hydraulic fluid escaping under pressure can penetrate the skin. If injured by escaping hydraulic fluid, see a doctor at once. Gangrene can result. Without immediate medical treatment, serious infection and reactions can occur.

- Replace all shields and guards after servicing and before moving.

- After servicing, remove all tools, parts and service equipment from on or in the planter.

- If the planter has been altered in anyway from the original design, the manufacturer does not accept any liability for injury or warranty.
Any alterations to the design of this planter may create safety hazards. Follow safe practices to avoid injury.

TIRE SAFETY

- Inflating or servicing tires can be dangerous. Do not attempt to mount a tire unless you have the proper equipment and experience to do the job. Whenever possible, call a trained person to service and/or mount tires.
- Failure to follow proper procedures when mounting a tire on a rim can produce an explosion that may result in serious injury or death.
- Check wheels for low pressure, cuts, bubbles, damaged rims or missing lug bolts and nuts.

DRIVE LINE SAFETY

DANGER. Contact with a Rotating drive line can cause death – keep away. Do not operate without all driveline, tractor and equipment shields in place. Make sure driveline is securely attached at both ends, and that driveline shields turn freely on driveline.

HYDRAULIC SYSTEM SAFETY

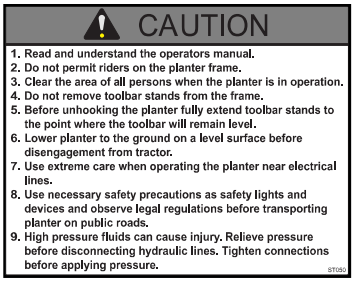
DANGER. Before applying pressure to the hydraulic system, check that all connections are tight and that the hoses and fittings have not been damaged. Hydraulic fluid escaping under pressure can penetrate the skin causing serious injury. If injured by escaping hydraulic fluid see a doctor at once. Gangrene can result.

- **Relieve pressure on system before repairing, adjusting or disconnecting.**

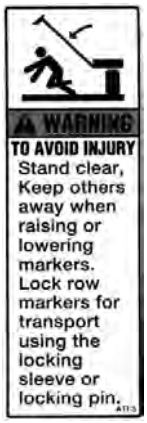
- **Wear proper hand and eye protection when searching for leaks. Use wood or cardboard instead of hands.**

- **Keep all components in good repair.**

Shown below are various safety stickers, their part number and location. Keep the safety warning signs clean and readable. **Replace all damaged, unreadable, or missing warning labels on your machine.**



ST050 On Front Toolbar



ST052 Row Marker

ST053 Front of hopper of inside wing unit of stacker

ST054 Front Toolbar

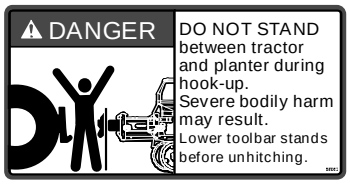
ST055
Inside of Granular hopper lid.

ST056 Front of Pull-Type toolbar.

ST057 PTO Shaft.

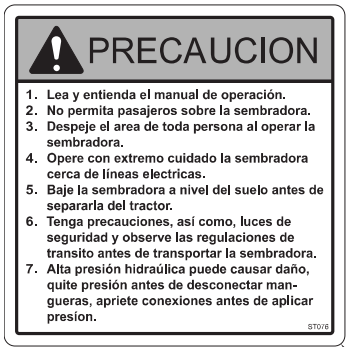
ST058

ST059



ST061 Front Toolbar Near Hitch

ST075 Spanish ver. of ST054



ST076 Spanish ver. of ST050

ST077 Spanish ver. of ST055

ST079 Spanish ver. of ST057

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PREPARING THE PLANTER

Pull-Type Planter

For the initial preparation of the planter, lubricate the planter and row units. Make sure all tires are properly inflated, that all drive chains have the proper tension, alignment and lubrication.

CAUTION Before starting up the planter, check that all main bolts are properly tightened and that planting units are equipped with the proper seed disc. Also check that the shutters inside the metering boxes are adjusted correctly. (See Metering Box.)

CAUTION Except when absolutely necessary, do not leave the turbofan running when the planter is in a raised position.

When planting small seeds (rape, cabbage, uncoated sugarbeet), make sure that the hoppers fit tightly at the bottom. This may be improved if necessary by using a sealant. When planting these small seeds, it is recommended to fill the hopper only one-third full.

LUBRICATION

Proper lubrication of all moving parts will help ensure efficient operation of your Monosem planter and prolong the life of friction producing parts.

All bearings (wheels, disc openers, turbofan, and metering box) are self-lubricated for life and therefore no additional greasing is necessary.

The gauge wheel arms may require daily greasing.

The hub of each drive wheel requires greasing once per season.

A general lubricant each day of the chains for the seed spacing gearbox, drive wheel blocks and metering units is recommended (preferably with a chain lubricant which does not attract dust).

Before starting up the planter, grease the hexagonal shaft where the upper sprocket cluster of the gearbox slides to allow easier alignment of the sprockets. Also lubricate the claws of the safety clutch of each planting unit to allow for disengagement in case of a blockage.

Oil the chain rollers and shafts of the metering unit chain moderately.

All transmission and drive chains should be lubricated daily with a chain lubricant (which does not attract dust). Extreme operating conditions such as dirt, temperature or speed may require more frequent lubrication. If a chain becomes stiff, it should be removed, soaked and washed in solvent to loosen and remove dirt from the joints. Then soak the chain in oil so that the lubricant can penetrate between the rollers and bushings.

LUBRICATE WHEEL BEARINGS

Wheel bearings should be repacked with clean, heavy-duty axle grease once a year or at the beginning of each planting season. This applies to all drive wheels, transport wheels, and marker hubs. Follow the procedure outlined for wheel bearing replacement with the exception that bearings and bearing cups are reused.

Wheel Bearing Lubrication or Replacement

1. Raise the tires clear of the ground and remove wheel.
2. Remove the double jam nuts and slide the hub from the spindle.
3. Remove the bearings and cups and discard if bearings are being replaced. Clean the hub and dry. Remove the bearings only if repacking.
4. Press in new bearing cups with thickest edge facing in. (Bearing replacement procedure only.)
5. Pack bearings with heavy-duty wheel bearing grease thoroughly forcing grease between roller cones and bearing cage. Also fill the space between the bearing cups in the hub with grease.
6. Place inner bearing in place.
7. Clean spindle and install hub.
8. Install outer bearing and nut. Tighten the jam nut while rotating the hub until there is some drag. This assures that all bearing surfaces are in contact. Back off jam nut ¼ turn or until there is only slight drag when rotating the hub. Install second jam nut to lock against first.
9. Install wheel on hub and tighten evenly and securely.

PREPARING THE PLANTER

Pull-Type Planter

LUBRICATE GREASE FITTINGS

Those parts equipped with grease fittings should be lubricated at the frequency indicated with SAE multipurpose type grease. Be sure to clean the fitting thoroughly before using a grease gun. The frequency of lubrication recommended is based on normal operating conditions. Severe or unusual conditions may require more frequent attention.

There are a number of sealed bearings on your planter to provide trouble free operation. These sealed bearings are lubricated for life.

Frequency of lubrication for:

Chain Lubricant

DAILY

- Unit drive chains
- Wheel block drive chains
- Transmission chains & rollers
- Insecticide drive chains
- Liquid fertilizer squeeze pump drive
- Chain rollers and shafts on unit drive chains

Grease

DAILY

- Gauge wheel arms
- Row marker hinge points

WEEKLY

- Row unit closing wheel/disc
- Closing assembly pivot points.

SPRING ADJUST CONTACT DRIVE WHEEL

There are two down pressure springs on each contact drive wheel. The down pressure is factory preset and should need no further adjustment.

The spring tension is set leaving 2 ¼" between the spring plug and the bolt head.

Tire pressure should be checked regularly and maintained.

CHAIN TENSION ADJUSTMENT

The drive chains are spring loaded and therefore self-adjusting. The only adjustment needed is to shorten the chain if wear stretches the chain and reduces spring tension. The pivot point of these idlers should be checked periodically to ensure that they will rotate freely.

TIRE PRESSURE

Tire pressure should be checked regularly and maintained as follows:

Transport Ground Drive – 7.50x20 - 40 PSI
Contact Drive – 4.10x6 - 50 PSI

DANGER Rim and tire servicing can be dangerous. Explosive separation of a tire and rim parts can cause serious injury or death.

Do not attempt to mount a tire unless you have the proper equipment and experience to perform the job. This should only be done by properly trained people who are equipped to do the job.

Maintain the correct tire pressure. Do not inflate the tires above the recommended pressure.

When inflating tires, use a clip-on air chuck and extension hose long enough to allow you to stand to one side, and not in front of or over the tire assembly. Use a safety cage to enclose the tire and assembly when inflating.

Inspect tires and wheels daily. Do not operate with low pressure, cuts, bubbles, damaged rims or missing lug bolts and nuts.

PREPARING THE PLANTER

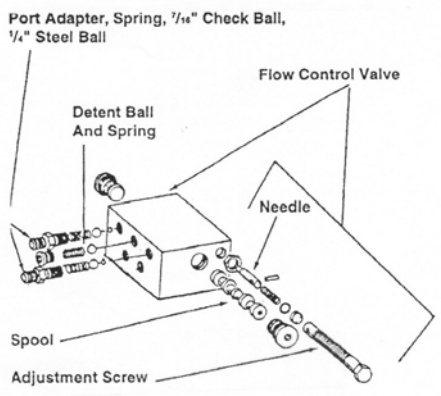
Pull-Type Planter

VALVE BLOCK ASSEMBLY INSPECTION

The valve block assembly consists of the marker sequencing and flow control valves in one assembly. The sequencing valve consists of a chambered body containing a spool and series of check valves to direct hydraulic oil flow. Should the valve malfunction, the components may be removed for inspection as follows.

1. Remove valve block assembly from planter
2. Remove detent assembly and port adapter assemblies from rear of valve block.
3. Remove plug from both sides of valve block and remove spool.
4. Inspect all parts for pitting, contamination or foreign material. Also check seating surfaces inside the valve. Replace any parts found to be defective.
5. Lubricate spool with light oil and reinstall. Check to be sure spool moves freely in valve body.
6. Important: Make sure the correct check ball(s) and spring are installed in each valve bore before reassembly.

A flow control valve is located on each side of the block assembly. The flow control valves should be adjusted for raise and lower speed as part of the assembly procedure or upon initial operation. If the valve fails to function properly or requires frequent adjustment, the needle valve should be removed for inspection. Check for foreign material and contamination. Be sure the needle moves freely in adjustment screw. Replace any components found to be defective.



TRACTOR PREPARATION & HOOKUP

Consult your dealer for information on the minimum tractor horsepower requirements and tractor capability. Tractor requirements will vary with planter options, tillage and terrain.

1. Adjust the tractor drawbar so it is 13 to 17 inches above the ground. Adjust the drawbar so that the hitch pinhole is directly below the centerline of the PTO shaft. Make sure the drawbar is in a stationary position.
2. Back the tractor to the planter and connect them with a hitch pin. Make sure the hitch pin is secured with a locking pin or cotter pin.
3. Connect the PTO drive shaft to the tractor. In addition to a standard 450/540 rpm PTO, a 1000-rpm shaft is available.

CAUTION Make sure that you connect the proper end of the PTO to the tractor. An arrow on the PTO indicates the end of the constant velocity (double clutch) that is attached to the tractor.

A sticker with the following warning is placed on your PTO shaft for your safety:

DANGER Rotating driveline contact can cause death – keep away. Do not operate without all driveline, tractor and equipment shields in place; do not operate without drivelines securely attached at both ends, and without driveline shields that turn freely on driveline.

4. Connect the hydraulic hoses to tractor ports in a sequence that is both familiar and comfortable to the operator.

PREPARING THE PLANTER

Pull-Type Planter

DANGER Before applying pressure to the hydraulic system, make sure all connections are tight and hoses and fittings have not been damaged. Hydraulic fluid escaping under pressure can have sufficient force to penetrate skin, causing injury or infection.

CAUTION Always wipe hose ends to remove any dirt before connecting couplers to tractor parts.

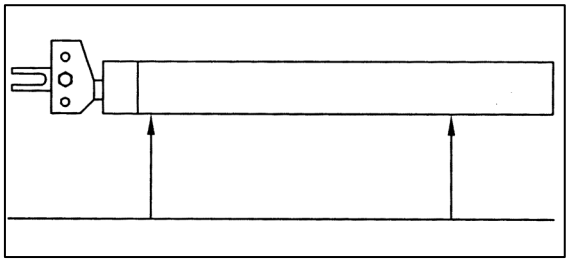
5. Raise the jack stand and remount horizontally on the storage bracket.

6. Lower the planter to the planting position and check that the planter is level (front to back and side to side). If the hitch height is too high or too low, disconnect the planter and adjust the hitch clevis in an up or down position as necessary.

LEVELING THE PLANTER

For proper operation of the planter and row units, it is important that the unit operate level.
Unless the tractor drawbar is adjustable for height, the fore and aft level adjustment must be maintained by the position of the hitch clevis. Holes in the hitch bracket allow the clevis to be raised or lowered. When installing clevis-mounting bolt, tighten hex nut to proper torque setting.
With the planter lowered to proper operating depth, check to be sure the frame is level fore and aft (front to back and side to side). Recheck once the planter is in the field.

It is also important for the planter to operate level laterally. Tire pressure can affect the lateral leveling of the planter. Maintain the tire pressure as mentioned in this section.



TRANSPORTING THE PLANTER

CAUTION Use necessary safety precautions, such as turning on safety lights and devices.

CAUTION Always install all cylinder lockup brackets before transporting the planter.

Observe legal regulations before transporting the planter on public roads.

Always drive at a safe speed relative to local conditions and ensure that your speed is low enough for an emergency stop to be safe and secure.

Do not carry passengers on transported equipment.

Watch for obstructions overhead and to the side while transporting.

Make allowances for increased length and weight of the planter when making turns, stopping, etc.

OPERATING SPEED

The operating speed needs to be selected as a function of:

- The desired consistency in the row
- The ground conditions
- The density of the seed

A high speed is not conducive to accuracy, especially in rough or rocky conditions that causes the unit to bounce.

Likewise, a high seed density may cause the disc to rotate fast, thus burdening the metering.

It should be noted, and especially for corn, that misshapen and angular seeds are difficult to sow regularly, particularly at high working speeds.

A base speed of 3 ½ to 4 ½ mph (5-7 km/h) assures good results for most seeds in the majority of conditions. However when planting corn at lighter population more than 6" (15 cm) between the seed, 5-6 mph (8-10 km/h) is quite possible.

For planting of high seed population such as peanuts, edible beans, and kidney beans, best results can be obtained by not going faster than 3-4 mph (4.5-6 km/h).

PREPARING THE PLANTER

Pull-Type Planter

FIELD TEST

Before the initial operation of the planter, a field test is advised. Check for the following:

- That the planter is level (front to back and side to side)
- That the hydraulics of the 3-point hitch of the tractor is in a float position while planting.
- That all of the row units are running level and remain parallel to the ground when planting.
- That each metering unit is metering properly (see metering unit section).
- That the row markers are adjusted properly.
- That you are using the proper application rates of chemicals on all rows.
- That you have set the desired depth of seed placement and checked your seed population on all rows.

CHECKING SEED POPULATION

1. Only one planting unit is necessary to check you seed population. Tie up the sets of closing wheels on one unit with a heavy cord or light chain. It may be necessary to decrease the tension of the closing wheel arm.
2. Put seed in the seed hopper.
3. Begin planting. At the end of a short distance (for example 100 yards or 90 meters) check to see if seed is visible in the seed trench. Make adjustments in your seed depth if necessary.
4. Measure off 1/200 of an acre of the test row just planted. Use the chart below to find the approximate distance. Mark this distance with flags.
5. Count the seeds within the distance between the flags. Multiply the number of seeds counted in this distance by 200. This will give you the total number of seeds planter per acre.

Length of Row in Feet

Fraction Of Acre	Row Width 22"	30"	36"	40"
1/200	119	87	72 ½	66

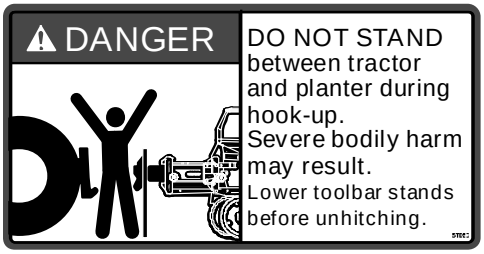
NOTE: When viewing the test row for seed population and placement, remember that the closing wheels were tied up in a raised position. Therefore, the seeds may have rolled or bounced and will affect your seed placement for accuracy.

PREPARING THE PLANTER

Pull-Type Planter

UNHOOKING THE PLANTER

WARNING Before unhooking the planter from the tractor, fully extend the jack stands to the point where the toolbar will remain level. Lock the stands securely in place with the locking pins.



1. Lower the planter to the ground. Set the tractor or towing vehicle brakes, disengage PTO and all power drives, shut off the engine and remove the ignition key.

2. Unhook the tractor lift arms from hitch pockets and remove center link. If a quick attach is used, position levers so that the locking mechanism is in the “unlatched” position and lower.

3. When the lift arms or quick attach arms are clear of the tractor, slowly drive the tractor away from the planter.

STORAGE

After the season, thoroughly clean the machine, especially the metering boxes. The microgranular applicator should be completely emptied and the fertilizer applicator scraped of any fertilizer residue. After emptying the trap doors, turn the shafts manually to remove any residual product from the mechanism.

Except for the microgranular applicator, protect all metal parts against oxidation by applying a coat of oil or diesel fuel.

Grease the exposed areas of cylinder rods. Also grease or paint the disc openers to prevent rust.

Inspect and replace any worn parts at the end of the planting season. New parts are available for replacement from your dealer.

Remove all trash that may be wrapped on sprockets or shafts and remove dirt that can draw and hold moisture.

Clean all drive chains and coat with a rust preventative spray, or remove chains and submerge in oil.

Lubricate planter and row units at all lubrication points.

The planter should be stored in a dry and dust-free location with the hydraulic cylinders closed.

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Pull-Type Narrow Transport Frame

The Monosem Narrow Transport Series features a 3 section forward fold toolbar with telescoping tongue for narrow transport. A hydraulic control box controls the folding and unfolding.

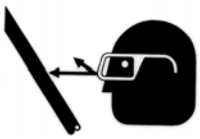
Your planter comes standard with two ¾" hydraulic lines and two ½" hydraulic lines on the hitch. The ¾" lines connect into outlet #1 to run the manifold on the back of the toolbar. The ½" lines connect into outlet #2 to run the front hitch to lock and unlock hitch and draft tubes.

HYDRAULIC SYSTEM SAFETY DANGER

- **Relieve pressure on system before repairing, adjusting or disconnecting.**

- **Before applying pressure to hydraulic system, check that all connections are tight and that the hoses and fittings have not been damaged. Hydraulic fluid escaping under pressure can penetrate the skin causing serious injury. If injured by escaping hydraulic fluid see a doctor at once. Gangrene can result.**

- **Wear proper hand and eye protection when searching for leaks. Use wood or cardboard instead of hands.**



GREASE FITTINGS

Those parts equipped with grease fittings should be lubricated daily with SAE multipurpose type grease. Be sure to clean the fitting thoroughly before using a grease gun.

The Row Markers have:
four greasers at the cylinder
On each wheel block
On the marker hinge point
On each wing flex
On each side of the hinge
Two on each back wing

The hitch has four greasers:
On the top of the hitch
On each wheel hub
At the bottom
Two inside the tongue on the roller
Two in back

TRANSPORTING

Put safety pin in hitch and make sure safety chain is hooked to tractor. Wheel chucks go on the outside wheel blocks of center section for transport. The chucks are stored at back of the toolbar.

CAUTION Use necessary safety precautions, such as turning on safety lights and devices. Always drive at a safe speed

STORAGE

For long term storage, set frame down and block front hitch.

Maintenance

Make sure all wheel chucks are in four cylinder wheel blocks before working on machine

Temporary Free Set

To unhook frame take orange strap use clevis to hook strap to road hook, go under tongue to other road hook, then untuck wheels and lift hitch up and down to remove pin. This is preferred *ONLY* for short term.

Pull-Type Narrow Transport Frame

Dickey-John Intelli-Ag.

DANGER - Pinch points & crush points exist on mechanism. Stay away and keep others away from frame sections when folding and unfolding.

UNFOLDING a Monosem Narrow Transport frame outfitted with Dickey-John Intelli-Ag.

Connect Hydraulic Hoses to remote ports for remote #1 and #2

To remote #1 connect hoses marked with Blue markers labeled “Lift/Fold”

To remote #2 connect hoses marked with Green markers labeled “Marker/Hitch”

Connect the planter ISO connector to tractor ISO connection or install Dickey-John terminal and harness in the tractor cab and connect planter ISO connection.

Install Dickey-John Monosem Frame Fold Module and turn all switches to the off postion. (John Deere green star systems require the use of additional harnessing – Monosem PN: INT1020)

Start Tractor and make sure tractor is in neutral with all brakes released. **Ensure that all the LED indicators above the switches on the frame fold module are off.**

On switch module turn on “**Master**” switch
Turn on “**Field**” switch.
Lift machine using remote #1.

Turn off “**Field**” switch,
Turn on “**Tuck/Hitch**” switch.
Use remote #2 to raise tongue until cylinder is fully extended.

Remove hitch safety pin located on tongue, also remove main lift stops from rear of machine.

Using remote #1 lower the wing wheels to the ground. Do not stop until the wheel cylinders are fully extended.

Turn off “**Tuck/Hitch**” switch.

If equipped with a fold latch,
turn on “**Fold Latch**” switch.
Use Remote #1 to release the fold latch. Do not stop until cylinder is fully extended.

Turn off “**Fold Latch**” switch.

Pull-Type Narrow Transport Frame

Turn on "**Fold/Hitch**" switch.
Use remote #2 to lower the hitch just below the fold hooks on the end of the wings. Use remote #1 to unfold the toolbar. If the planter does not pull the tractor backwards during this process the operator will need to put the tractor in reverse and help it back.

Turn off the "**Fold/Hitch**" switch.

Turn on the "**Draft Tube Lock**" switch.
Use remote #2 to lower the draft tube lock pins.

Turn off the "**Draft Tube Lock**" switch.

Turn on the "**Hitch**" switch.
Use remote #2 to lower the planter tongue until cylinder is fully collapsed and the telescopic lock is fully engaged.

Turn off the "**Hitch**" switch.

Turn on the "**Field**" switch.
Use remote #1 to raise and lower the machine.
Use remote #2 to operate the row markers if planter is equipped.

Note: Fully lower the machine and hold the hydraulic lever in the down position to rephrase lift cylinders.

FOLDING a Monosem Narrow Transport frame outfitted with Dickey-John Intelli-Ag.

Raise the planter to full height

Place the tractor in neutral

Turn off the "**Field**" switch

Turn on the "**Hitch**" switch.
Use remote #2 to raise the planter tongue until cylinder is close to fully extended.

Turn off the "**Hitch**" switch.

Turn on the "**Draft Tube Lock**" switch.
Use remote #2 to raise the draft tube lock pins.

Turn off the "**Draft Tube Lock**" switch.

Turn on "**Fold/Hitch**" switch.
Use remote #1 to fold the toolbar.
If the planter does not push the tractor forwards during this process the operator will need to put the tractor in a low forward gear and help it forward.
Use remote #2 to raise the hitch to just below the fold hooks on the end of the wings.

Turn off the "**Fold/Hitch**" switch.

If equipped with a fold latch,
turn on "**Fold Latch**" switch.
Use Remote #1 to engage the fold latch.

Turn off "**Fold Latch**" switch.

Turn on "**Tuck/Hitch**" switch.
Use remote #2 to lift planter tongue, don't stop until hitch cylinder is fully extended. Then using remote #1 raise the wing wheels off of the ground. Stop when the tires are firmly against the bottom of the planter tongue.

Note: There is a built in bypass that will prevent tires from pressing too hard against the bottom of the tongue.

Turn off "**Tuck/Hitch**" switch.

Turn off "**Master**" switch

Install hitch safety pin and main lift stops.

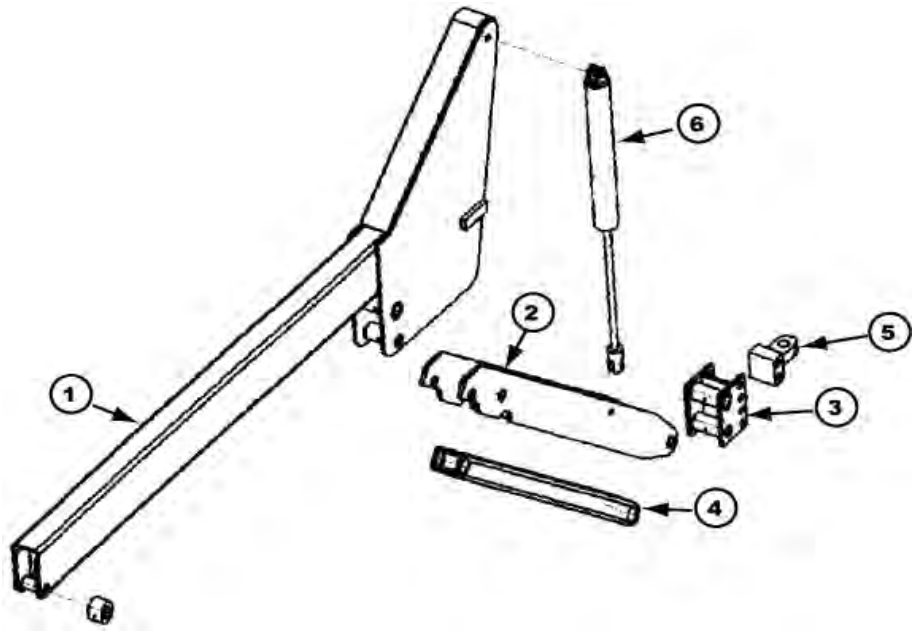
Note: Once tractor has be shut off and restarted the "Master" switch may have to be cycled to regain hydraulic control.

Pull-Type Narrow Transport Planter

ASSEMBLY

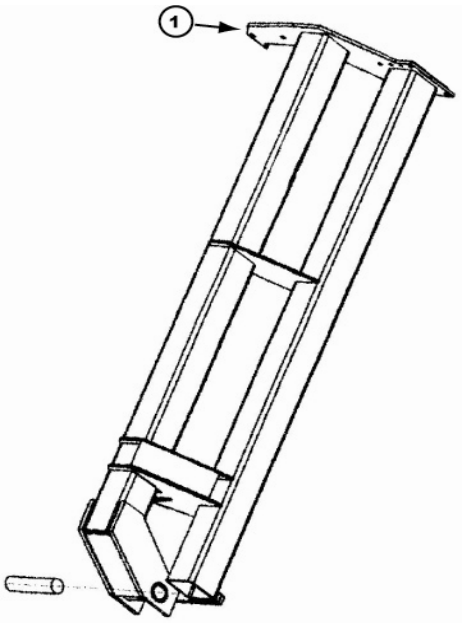
FRONT HITCH

ITEM	PART #	DESCRIPTION
1	40-107000	Front Hitch BOM
2	40-107002	Front Hitch Top Link
3	40-107003	Front Hitch Slide Bracket
4	40-107009	Front Hitch Parallel Link
5	40-301V3	Hitch
6		4 x 24 cylinder



FRONT WING

ITEM	PART #	DESCRIPTION
	40-104000	Right Front Wing
	40-105000	Left Front Wing
1	40-100003	Road Hook

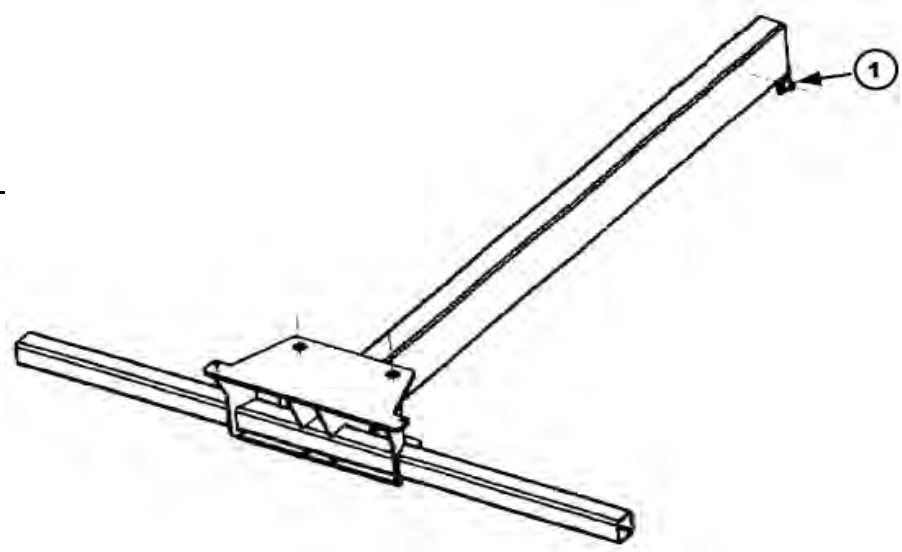


Pull-Type Narrow Transport Planter

ASSEMBLY

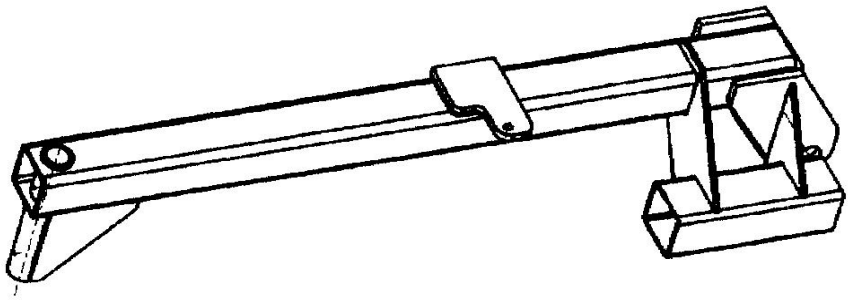
BACK FRAME

ITEM	PART #	DESCRIPTION
	40-101000	Back Frame
	40-100003	Road Hook
1	40-MISW	Safety Latch



BACK WING

ITEM	PART #	DESCRIPTION
1	40-102000	Right Back Wing
2	40-103000	Left Back Wing

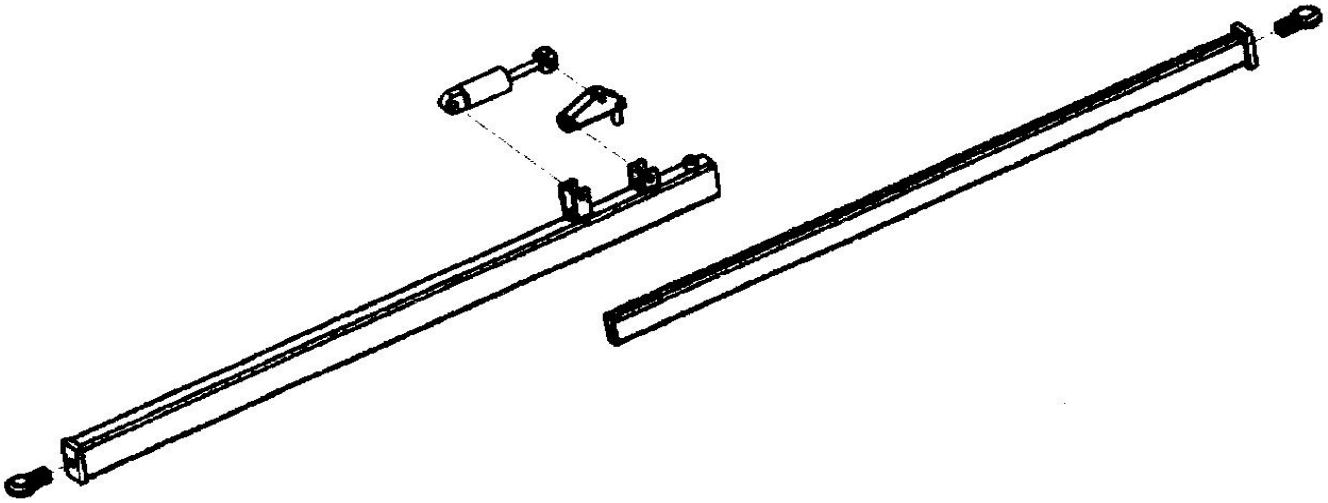


Pull-Type Narrow Transport Planter

ASSEMBLY

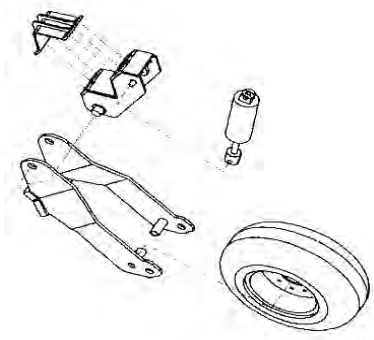
DRAFT

ITEM	PART #	DESCRIPTION
1	40-108000	Telescoping Draft Link
2	40-108003	Outer Draft Link Tubes
	40-1080004	Inner Draft Link Tubes
	E1759-3RH	Forged Replacement Ends (1 1/4" pin 1 3/8 thread)
	F150040CSS	1.5 x 4 cylinder
	344836	1-1/4 x 5 Grn Dspring
		Draft Tube Latch



WHEEL BLOCK

PART #	DESCRIPTION
106030	Top Clamp
106035	Bolt Kit
106040	Top Half Wheel Block
106045	Bottom Wheel Block 14L x 16.1
106050	Bottom Wheel Block 16.5 x 16.1
106060	1 3/4" shaft Axle
106000	Complete Wheel Block 14 x 16.1
106000-L	Complete Wheel Block 16.5 x 16.1
14L x 16.1	14L x 16.1 Tire
16.5 x 16.1	16.5 x 16.1 Tire



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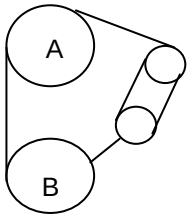
Pull-Type, Rigid Frame

PLANTING RATE CHART

The following planting distances were obtained with standard assembly and sprocket system. Additional settings are possible by using different combinations or special sprockets. Please consult us in case you have such special requirements.

Important: Poor alignment of the sprockets of the seed spacing gearbox and stiffness of the chain will cause premature side wear on the pinions. Make sure the chains are tight and properly lubricated, and the tires are properly inflated.

The indicated spacings are theoretical and may vary from 5-10% depending on soil conditions.



Number of holes in the Seed Disc.

Transmission sprocket selection

Driver-A	**26**	**24**	**28**	**26**	**24**	**28**	**26**	**26**	**24**	**23**	**26**	**23**	**24**	**23**	**19**	**17**	**14**	**14**
Driven-B	**14**	**14**	**17**	**17**	**17**	**23**	**23**	**24**	**23**	**24**	**28**	**26**	**28**	**28**	**28**	**28**	**24**	**26**

Seed Spacing (inches)

9	7.9	8.5	8.9	9.5	10.3	12.0	12.9	13.5	14.0	15.2	15.7	16.5	17.0	17.8	21.5	24.1	25.0	27.1
12	5.9	6.4	6.7	7.2	7.8	9.0	9.7	10.1	10.5	11.4	11.8	12.4	12.8	13.3	16.1	18.0	18.8	20.3
18	3.9	4.3	4.4	4.8	5.2	6.0	6.5	6.7	7.0	7.6	7.9	8.3	8.5	8.9	10.8	12.0	12.5	13.6
24	2.9	3.2	3.3	3.6	3.9	4.5	4.8	5.1	5.2	5.7	5.9	6.2	6.4	6.7	8.1	9.0	9.4	10.2
30	2.4	2.6	2.7	2.9	3.1	3.6	3.9	4.0	4.2	4.6	4.7	5.0	5.1	5.3	6.5	7.2	7.5	8.1
36	2.0	2.1	2.2	2.4	2.6	3.0	3.2	3.4	3.5	3.8	3.9	4.1	4.3	4.4	5.4	6.0	6.3	6.8
40	1.8	1.9	2.0	2.1	2.3	2.7	2.9	3.0	3.1	3.4	3.5	3.7	3.8	4.0	4.8	5.4	5.6	6.1
48	1.5	1.6	1.7	1.8	1.9	2.2	2.4	2.5	2.6	2.9	2.9	3.1	3.2	3.3	4.0	4.5	4.7	5.1
60	1.2	1.3	1.3	1.4	1.6	1.8	1.9	2.0	2.1	2.3	2.4	2.5	2.6	2.7	3.2	3.6	3.8	4.1
72	1.0	1.1	1.1	1.2	1.3	1.5	1.6	1.7	1.7	1.9	2.0	2.1	2.1	2.2	2.7	3.0	3.1	3.4
90	0.8	0.9	0.9	1.0	1.0	1.2	1.3	1.3	1.4	1.5	1.6	1.7	1.7	1.8	2.2	2.4	2.5	2.7
120	0.6	0.6	0.7	0.7	0.8	0.9	1.0	1.0	1.0	1.1	1.2	1.2	1.3	1.3	1.6	1.8	1.9	2.0
180	0.4	0.4	0.4	0.5	0.5	0.6	0.6	0.7	0.7	0.8	0.8	0.8	0.9	0.9	1.1	1.2	1.3	1.4

G3 (3/26/12)

Rev: 03/12

TWIN – ROW
DENSITISES – SEED POPULATION CHART

AVG SEED SPACING ↓	ROW SPACING 30"	36"	38"	40"
1"	418,400	348,800	330,000	313,600
2"	209,200	174,400	165,000	156,800
2 3/4"	152,000	126,800	120,000	114,000
3 1/4"	128,800	107,200	101,600	96,400
3 1/2"	120,200	100,000	94,800	90,000
3 3/4"	111,600	93,000	88,000	83,600
4"	104,600	87,200	82,500	78,400
4 1/4"	98,400	82,000	77,600	73,800
4 1/2"	93,000	77,400	73,400	69,700
5"	83,600	69,700	66,000	62,800
5 1/2"	76,000	63,400	60,000	57,000
6"	69,700	58,000	55,000	52,220
6 1/2"	64,400	53,600	50,800	48,200
7"	60,100	50,000	47,400	45,000
7 1/2"	55,800	46,400	44,000	41,800
8"	52,500	43,700	41,400	39,350
8 1/2"	49,200	41,000	38,800	36,900
9"	46,600	38,850	36,774	34,950
9 1/2"	44,000	36,700	34,750	33,000
10"	41,900	34,950	33,074	31,450
10 1/2"	39,800	33,200	31,400	29,900
11 1/2"	36,400	30,300	30,700	27,300
12"	34,850	29,000	27,500	26,100
13"	32,200	26,800	25,400	24,100
13 1/2"	31,000	25,900	24,550	23,300
14 1/2"	28,976	24,100	22,850	21,700

For Twin-Row planters with Optional Sync-Row® System

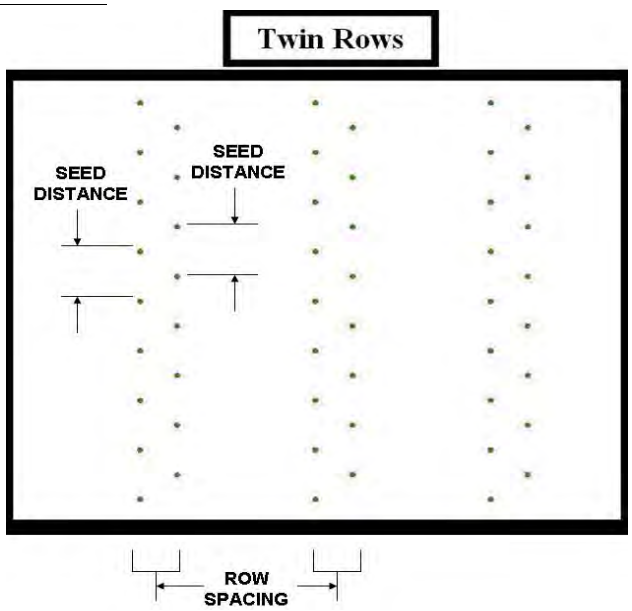
TIMING CHART 30" ROW SPACING

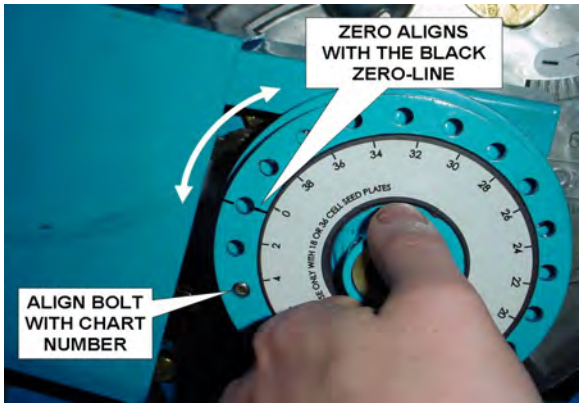
INSURE THESE VALUES ARE CORRECT FOR YOUR TWIN ROW PLANTER

Chart for Adjustable Metering Sprocket

Crop	**Corn**
Number of Seed Disk Cells (holes)	**18**
Row Spacing (inch)	**30**
Left Row Offset (inches)	**18**

Seed Population (Seeds/Acre)	Seed Distance (inches)	**Chart Number**
50,000	8 3/8	**8**
49,000	8 1/2	**8**
48,000	8 3/4	**10**
47,000	8 7/8	**10**
46,000	9 1/8	**10**
45,000	9 1/4	**12**
44,000	9 1/2	**12**
43,000	9 3/4	**14**
42,000	10	**14**
41,000	10 1/4	**16**
40,000	10 1/2	**16**
39,000	10 3/4	**16**
38,000	11	**18**
37,000	11 1/4	**18**
36,000	11 1/2	**0**
35,000	12	**0**
34,000	12 1/4	**2**
33,000	12 3/4	**2**
32,000	13	**2**
31,000	13 1/2	**4**
30,000	14	**4**
29,000	14 1/2	**6**
28,000	15	**6**
27,000	15 1/2	**8**
26,000	16	**8**
25,000	16 3/4	8





DETERMINE SEED POPULATION YOU ARE PLANTING (OR SEED DISTANCE) AND SET THE ADJUSTABLE SPROCKETS TO THE CORRECT CHART NUMBER

For Instructions on how to set the stagger, please refer to the Sync-Row® section in the Options section of this manual, toward the back of the manual.

For Twin-Row planters with Optional Sync-Row® System

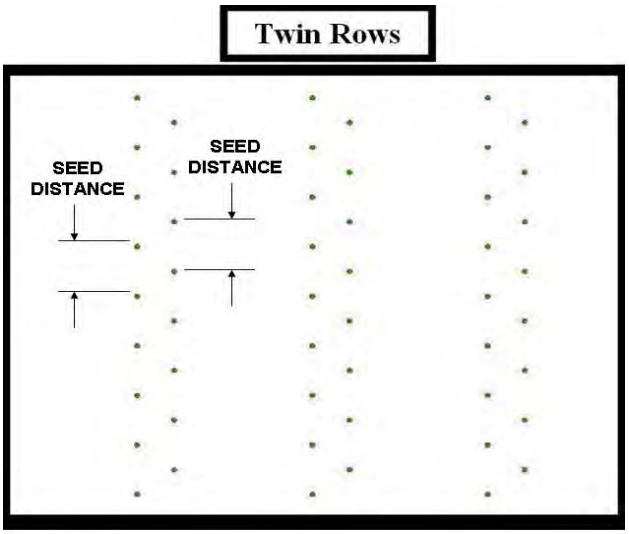
TIMING CHART 36" ROW SPACING

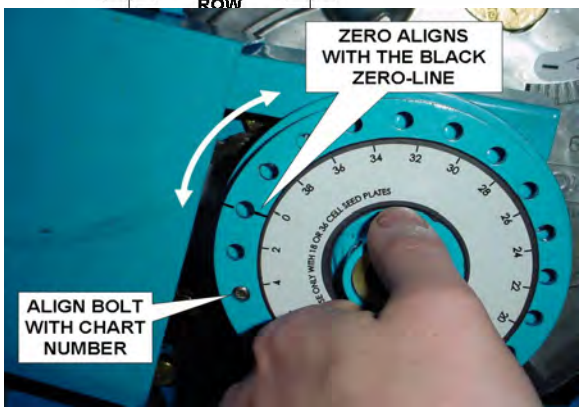
Chart for Adjustable Metering Sprocket

INSURE THESE VALUES ARE CORRECT FOR YOUR TWIN ROW PLANTER

Crop	**Corn**
Number of Seed Disk Cells (holes)	**18**
Row Spacing (inch)	**36**
Left Row Offset (inches)	**18**

Seed Population (Seeds/Acre)	Seed Distance (inches)	Chart Number
40000	**8.75**	**10**
39,000	8 7/8	**10**
38,000	9 1/8	**12**
37,000	9 3/8	**12**
36,000	9 5/8	**14**
35,000	10	**14**
34,000	10 1/4	**16**
33,000	10 1/2	**16**
32,000	11	**18**
31,000	11 1/4	**18**
30,000	11 1/2	**0**
29,000	12	**0**
28,000	12 1/2	**2**
27,000	13	**2**
26,000	13 1/2	**4**
25,000	14	**4**
24,000	14 1/2	**6**
23,000	15 1/4	**6**
22,000	15 3/4	**8**
21,000	16 1/2	**8**
20,000	17 1/2	**10**
19,000	18 1/4	**10**
18,000	19 1/4	**12**
17,000	20 1/2	**12**
16,000	21 3/4	**14**
15,000	23 1/4	**14**





DETERMINE SEED POPULATION YOU ARE PLANTING (OR SEED DISTANCE) AND SET THE ADJUSTABLE SPROCKETS TO THE CORRECT CHART NUMBER

For Instructions on how to set the stagger, please refer to the Sync-Row® section in the Options section of this manual, toward the back of the manual.

For Twin-Row planters with Optional Sync-Row® System

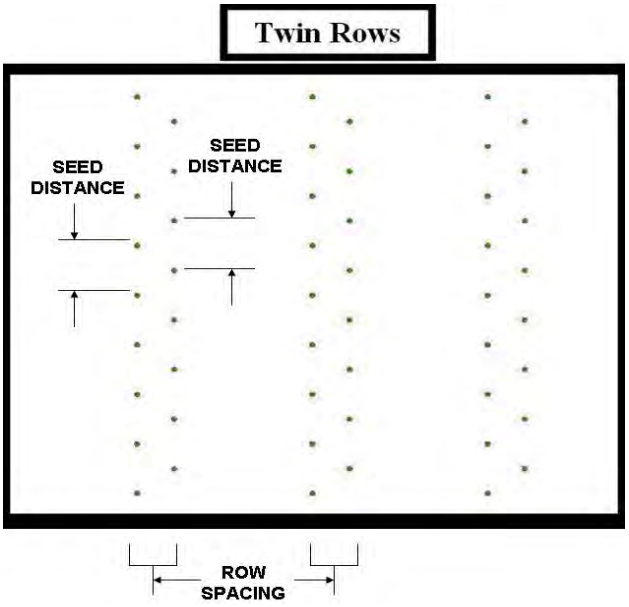
TIMING CHART 38" ROW SPACING

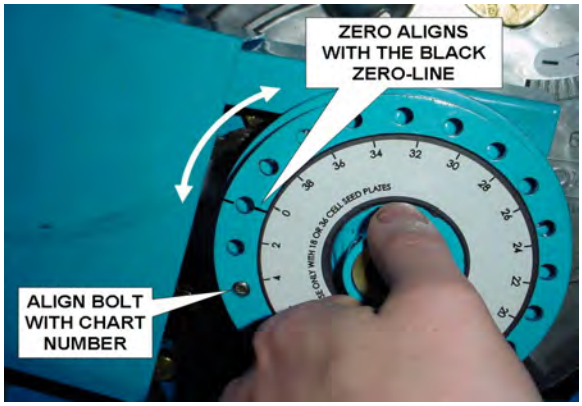
INSURE THESE VALUES ARE CORRECT FOR YOUR TWIN ROW PLANTER

Chart for Adjustable Metering Sprocket

Crop	**Corn**
Number of Seed Disk Cells (holes)	**18**
Row Spacing (inch)	**38**
Left Row Offset (inches)	**18**

Seed Population (Seeds/Acre)	Seed Distance (inches)	Chart Number
50,000	6 5/8	**16**
49,000	6 3/4	**18**
48,000	6 7/8	**18**
47,000	7	**0**
46,000	7 1/8	**0**
45,000	7 3/8	**2**
44,000	7 1/2	**2**
43,000	7 3/4	**4**
42,000	7 3/4	**4**
41,000	8	**6**
40,000	8 1/4	**6**
39,000	8 1/2	**8**
38,000	8 3/4	**10**
37,000	9	**10**
36,000	9 1/4	**12**
35,000	9 1/2	**12**
34,000	9 3/4	**14**
33,000	10	**14**
32,000	10 1/4	**16**
31,000	10 3/4	**16**
30,000	11	**18**
29,000	11 1/2	**18**
28,000	11 3/4	**0**
27,000	12 1/4	**0**
26,000	12 3/4	**2**
25,000	13 1/4	**4**





DETERMINE SEED POPULATION YOU ARE PLANTING (OR SEED DISTANCE) AND SET THE ADJUSTABLE SPROCKETS TO THE CORRECT CHART NUMBER

For Instructions on how to set the stagger, please refer to the Sync-Row® section in the Options section of this manual, toward the back of the manual.

For Twin-Row planters with Optional Sync-Row® System

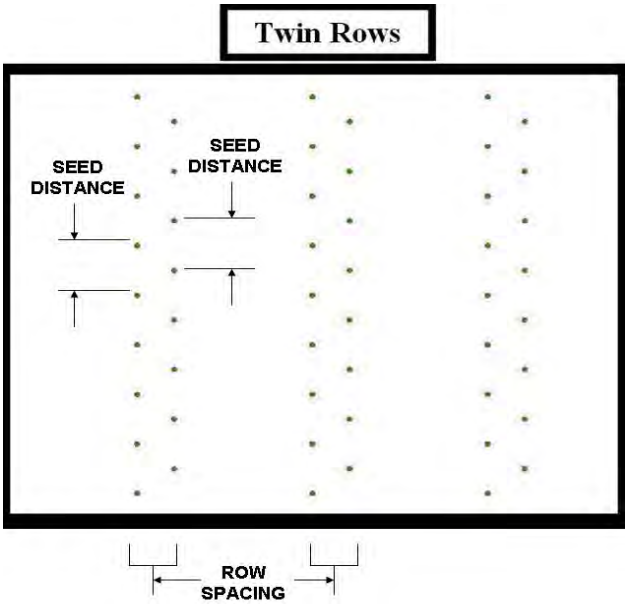
TIMING CHART 40" ROW SPACING

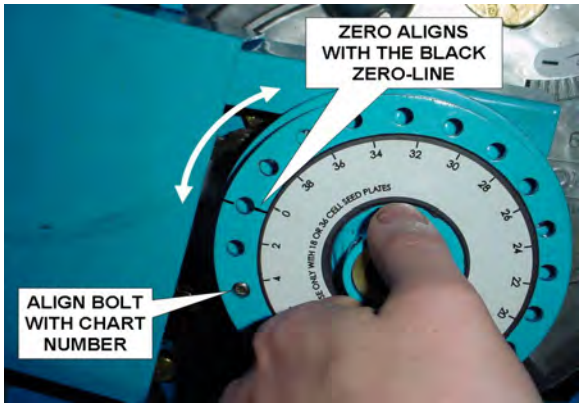
Chart for Adjustable Metering Sprocket

INSURE THESE VALUES ARE CORRECT FOR YOUR TWIN ROW PLANTER

Crop	Corn
Number of Seed Disk Cells (holes)	**18**
Row Spacing (inch)	**40**
Left Row Offset (inches)	**18**

Seed Population (Seeds/Acre)	Seed Distance (inches)	Chart Number
50,000	6 1/4	**14**
49,000	6 3/8	**14**
48,000	6 1/2	**16**
47,000	6 5/8	**16**
46,000	6 7/8	**18**
45,000	7	**0**
44,000	7 1/8	**0**
43,000	7 1/4	**2**
42,000	7 1/2	**2**
41,000	7 3/4	**4**
40,000	7 3/4	**4**
39,000	8	**6**
38,000	8 1/4	**6**
37,000	8 1/2	**8**
36,000	8 3/4	**10**
35,000	9	**10**
34,000	9 1/4	**12**
33,000	9 1/2	**12**
32,000	9 3/4	**14**
31,000	10	**14**
30,000	10 1/2	**16**
29,000	10 3/4	**18**
28,000	11 1/4	**18**
27,000	11 1/2	**0**
26,000	12	**0**
25,000	12 1/2	**2**





DETERMINE SEED POPULATION YOU ARE PLANTING (OR SEED DISTANCE) AND SET THE ADJUSTABLE SPROCKETS TO THE CORRECT CHART NUMBER

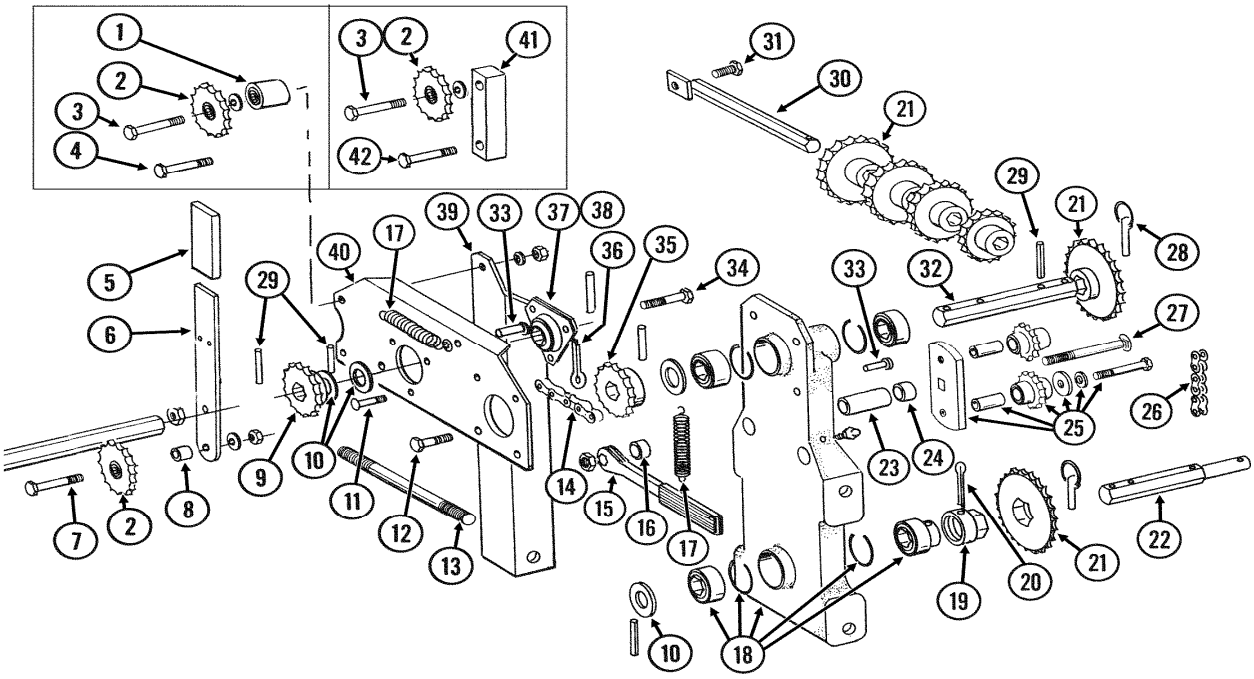
For Instructions on how to set the stagger, please refer to the Sync-Row® section in the Options section of this manual, toward the back of the manual.

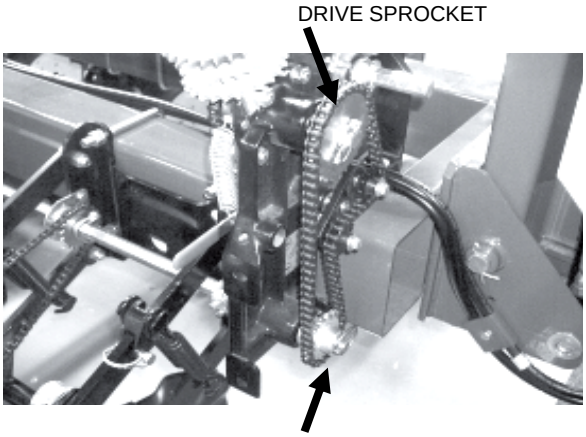
Pull-Type, Rigid Frame

ADJUSTMENT & ASSEMBLY

Planting population rate changes are made at the end mounted transmission. The planter is designed to allow simple, rapid changes in sprockets to obtain the desired population. By removing the lynch pins on the hexagon shafts, sprockets can be interchanged with those from the sprocket storage rod bolted to the transmission. The planting rate chart will aid you in selecting the correct sprocket combinations.

Chain Tension is controlled by a spring loaded dual sprocket idler. The idler assembly is adjusted with a ratchet arm. This arm has a release position to remove spring tension for replacing sprockets. The amount of spring tension on the chain can be controlled by the ratchet arm.





Pull-Type, Rigid Frame

ITEM	PART No.	DESCRIPTION
1	KB0259	Spacer 1"
2	KA7154	Idler sprocket 18 tooth
3	K10033	Hex bolt 1/2-13 x 3 1/2
	K10128	Bushing 1/2 x 14GA
	K10228	Lock washer 1/2
	K10102	Hex nut 1/2-13
4	K10039	Hex bolt 1/2-13 x 1 3/4
	K10228	Lock washer 1/2
	K10102	Hex nut 1/2-13
5	KD5827	Cover
7	K10053	Hex bolt 1/2-13 x 2 1/2
	K10128	Bushing 1/2 x 14GA
	K10228	Lock washer 1/2
	K10102	Hex nut 1/2-13
8	KD4887-01	Sleeve 1/2" I.D. x 5/8" long
9	KA5105	Sprocket 15 tooth
10	K10233	Bushing 1" x 10GA
11	K10303	Carriage bolt 5/16-18 x 1
	K10232	Lock washer 5/16
	K10106	Hex nut 5/16-18
12	K10037	Hex bolt 1/2-13 x 1 1/4
	K10228	Lock washer 1/2
	K10102	Hex nut 1/2-13
13	KD6793	Stud 5/8-11 x 9 1/2
	K10230	Lock washer 5/8
	K10107	Lock nut 5/8-11
14	K3310-92	Chain No.40 x 92 pitches
15	KA4235	Ratchet arm w/sleeve
	K10445	Sleeve only
16	KD10161	Spacer 3/8"
17	KD5857	Spring
18	KA5629	Transmission plate
	KA5116	Bearing 7/8 hex bore cylindrical
	KA5624	Special bearing
	KD6551	Ring
	K10640	Grease fitting 1/4-28
19	KD7127	Shear coupling
20	K10462	Cotter pin 3/16 x 2
21	KA5106	Sprocket, 17 tooth
	KA5107	Sprocket, 19 tooth
	KA5108	Sprocket, 23 tooth

ITEM	PART No.	DESCRIPTION
21	KA5109	Sprocket, 24 tooth
	KA5110	Sprocket, 25 tooth
	KA5111	Sprocket, 26 tooth
	KA5112	Sprocket, 27 tooth
	KA5113	Sprocket, 28 tooth
22	KD7822	Shaft 7/8" x 7"
23	KD3180-16	Sleeve 2 13/16 long
24	KD2734-01	Sleeve 1/2" long
25	KA7336	Idler sprocket assembly
	KD7426	Sprocket only 12 tooth
	KD1026	Sleeve 1 3/16" long
	K10210	Washer 3/8
	K10229	Lock washer 3/8
	K10047	Hex bolt 3/8-16 x 1 3/4
26	K3310-80	Chain No. 40 x 80 pitches
27	K10867	Carriage bolt 1/2-13 x 5
	K10111	Lock nut 1/2-13
28	KD2558	Lynch pin 1/4
29	K10602	Spring pin 1/4 x 1 1/2
30	KA5146	Sprocket storage rod
31	K10017	Hex bolt 1/2-13 x 1 1/2
	K10228	Lock washer 1/2
	K10102	Hex nut 1/2-13
32	KD5835	Shaft 7/8" x 7"
33	K10478	Clevis pin 5/16 x 1
	K10409	Retaining ring 5/16
34	K10001	Hex bolt 3/8-16 x 1
	K10229	Lock washer 3/8
	K10203	Washer 3/8 SAE
	K10210	Washer 3/8 USS
	KD5756	Special nut
35	KA5107	Sprocket 19 tooth
	KA5112	**Sprocket w/ Sync-Row® 27 tooth**
36	K10460	Cotter pin 1/4 x 2
37	K2100-03	Bearing 7/8 hex bore spherical
38	K3400-01	Flangette
39	KD5830	Angle support R.H.
40	KD5824	Plate R.H.
41	KD12571	Spacer 1" x 4"
42	K10053	Hex bolt 1/2-13 x 2 1/2
	K10228	Lock washer 1/2
	K10102	Hex nut 1/2-13

TABLE OF CONTENTS

This is a downloadable version of the manual. A partial download may not contain all pertinent information. Make Sure to read Chapter 1, Safety!
Due to ongoing upgrades specifications may change without notice, contact a Monosem Rep for current information.

STANDARD Turbofan
540, 450 & 1000 RPM with PTO Drive

Your Monosem planter will be equipped with either a 540, 450 or 1000 rpm turbofan. A special pump pulley is available as optional equipment for the 450 and 540 turbofans.
It is recommended to use a 450 rpm turbofan when using a hydraulic drive.

The vacuum hose is attached to the outlets on the back of the turbofan and delivers suction to the metering box of each unit. An arrow decal sticker on the back of the turbofan indicates that the turbofan blade runs in a counter clockwise direction. A protection shield against the rain is located at the top of the turbofan, and when in a raised position, indicates that the turbofan is operating.

Note: Before planting, make sure that the support brackets are tight to eliminate any vibrations of the turbofan. A vacuum gauge may also be mounted to the frame.

PTO (Power Take Off)
The PTO connects the tractor to the turbofan.

Make sure you connect the proper end of the PTO to the tractor. An arrow on the PTO indicates the end that is attached to the tractor.

The following warning is placed on your PTO shaft for your safety.

DANGER Rotating drive line contact can cause death – keep away. Do not operate without all driveline, tractor and equipment shields in place, without drivelines securely attached at both ends, and without driveline shields that turn freely on driveline.

Vacuum gauge

HIGH Output Turbofan
500 & 1000 RPM

The high output turbofan provides more air than the standard turbofan. The high output turbofan is to be used when the planter is 8 rows or more and when planting heavy seed such as beans.

When using a hydraulic drive, a 500-rpm high output turbofan should be used instead of a 1000-rpm high output turbofan.

An extended shaft (#4405.A2) is used for planters with 7" X 7" mounted toolbar frames and PTO drive, to provide more room for the PTO.

The vacuum hose is attached to the outlets on the front of the turbofan and deliver suction to the metering box of each unit. An arrow decal sticker on the turbofan indicates the direction that the turbofan blade runs, which is counter clockwise. A shield to protect the turbofan from the rain is located at the top of the turbofan, and when in a raised position, indicates that the turbofan is operating.

Note: Before planting, make sure that the support straps (1) are tight to eliminate any vibrations of the turbofan.

You can mount a vacuum gauge to the turbofan.

EXTRA HIGH Output Turbofan
540 & 1000 RPM

The extra high output turbofan was designed to provide more volume of air than the standard or high output turbofan. The extra high output turbofan is most often used with planters of 16 rows or more.

The extra high output turbofan can be used with either a PTO or a hydraulic motor. When using a PTO, this turbofan requires a PTO with an overrunning clutch. When using a hydraulic motor, this turbofan requires a larger motor.

The vacuum hose is attached to the outlets on the front of the turbofan and deliver suction to the metering box of each unit. An arrow decal sticker on the turbofan indicates the direction that the turbofan blade runs, which is counter clockwise. A shield to protect the turbofan from the rain is located at the top of the turbofan, and when in a raised position, indicates that the turbofan is operating.

You can mount a vacuum gauge to the turbofan.

PTO Drive

(Power Take Off)
The PTO connects the tractor to the turbofan.

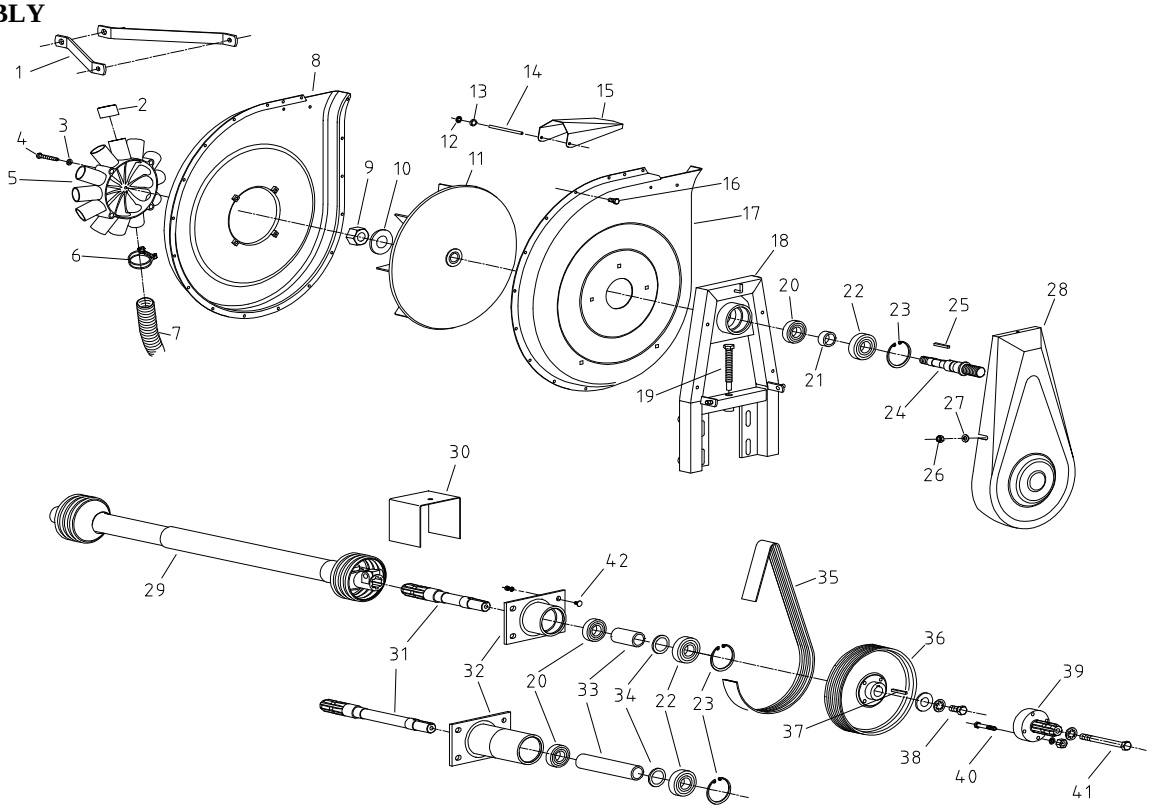
Make sure you connect the proper end of the PTO to the tractor. An arrow on the PTO indicates the end that is attached to the tractor.

The following warning is placed on your PTO shaft for your safety. (part # ST057)

DANGER
Rotating drive line contact can cause death – keep away. Do not operate without all driveline, tractor and equipment shields in place, without drivelines securely attached at both ends, and without driveline shields that turn freely on driveline.

Standard Turbofan 540, 450 and 1000 rpm with PTO drive

ASSEMBLY

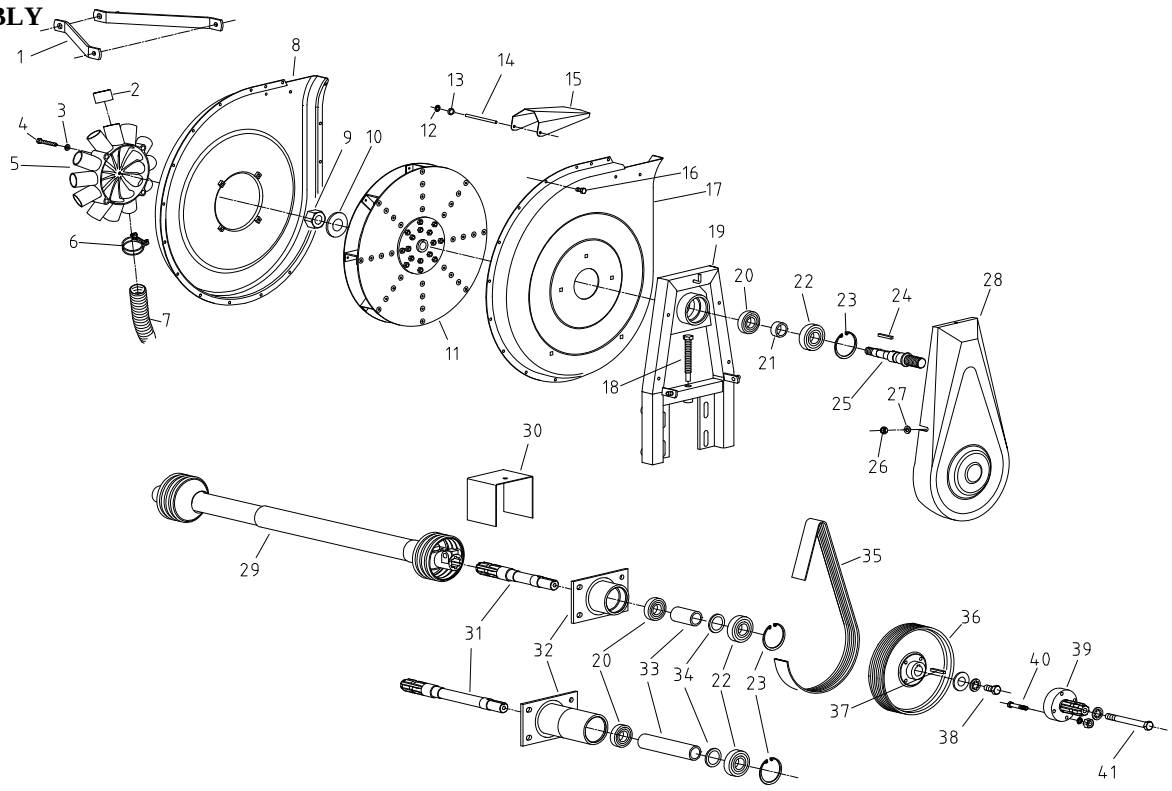


ITEM	PART No.	DESCRIPTION
1	4532	Support strap - 565mm long (22 1/4")
	4532.1	Support strap - 340mm long (13 3/8")
	4532.2	Support strap - 480mm long (18 7/8")
2	4451	Plastic cap
3	10620064	Washer 8.5x16x2mm
4	10511062	Bolt, 8x55mm (to secure manifold)
5	4450	12-Hole manifold
6	4453	Hose clamp
7	4454	Vacuum hose 40mm (specify length req.d)
8	4402.B	Fan housing manifold side
9	NM-72005	Nylon lock nut 20mm (to secure fan blade)
10	10623042	Washer 22.5x48x3mm (on upper shaft)
11	4403.B	Fan blade (plastic, 16 1/8" dia.)
12	6090	Snap ring 6mm
13	6089	Rubber ring
14	4455	Pin for outlet shield
15	4429.A	Outlet shield
16	10500091	Hex bolt 6x12mm
17	4401.B	Fan housing (support frame side)
18	4400.1	Support frame
19	4440	Special bolt tension adjustment
20	4407	Bearing 62mm (62062RS)
21	4410.A	Spacer upper shaft
22	4408	Bearing 72mm (63062RS)
23	4409	Snap ring internal 72mm
24	4452	Upper shaft, 540 & 1000 rpm (1 1/8" dia. pulley)
	4452.1	Upper shaft, 450 rpm (7/8" dia. pulley)
25	4439.A	Key upper shaft (6x6x45mm)
26	NM-21015	Lock nut 10mm
27	10620089	Washer 10.5x20x2mm
28	4414.1	Cover shield for belt

ITEM	PART No.	DESCRIPTION
28	4414.2	Cover shield (with optional pump pulley)
29	4428.B	PTO drive shaft 540rpm 24"
	4428.B21	PTO drive shaft 1000rpm 24"
	4431.B	PTO drive shaft 540rpm 36"
	4431.B21	PTO drive shaft 1000rpm 36"
	4432.B	PTO drive shaft 540rpm 54" - Pull-Type only
	4432.B21	PTO drive shaft 1000rpm 54"- Pull-Type only
	900058	PTO drive shaft pull type with 20 splines 54" - Pull-Type
30	4434.4	Safety shield
31	4405.A	Lower shaft (1 3/8" 6 spline adapter)
	4405.A2	Lower shaft extended 7X7 PTO
32	4404	Shaft housing (lower drive shaft)
	4404.3	Shaft housing extended 7X7 PTO
33	4411	Spacer lower shaft
	4411.2	Spacer extended 7X7 PTO
34	10624018	Washer 31x41x3mm
35	4413	Belt, 450 & 540 rpm (PJ1168/460J or 460J19)
	4413.1	Belt 1000 rpm (PJ955/376J)
36	4412.2	Pulley, 450 & 540rpm (9 13/16" dia.)
	4412.3	Pulley, 1000 rpm (5 5/16" dia.)
37	4437	Key lower shaft (8x7x40mm)
38	HM-61230	Bolt, 12x30mm (to secure pulley)
	10621061	Washer 13x40x4mm (to secure pulley)
39	4426	Pump pulley (6 spline stub shaft)
40	HM-2850	Bolt, 8x50mm
	10629009	Lock washer 8x14mm
41	HM-65110	Bolt, 12x110mm
	10101012	Lock washer 12x20mm
42	CB-3322	Carriage bolt 7/16-14 x 2"
	W-3610	Lock washer 7/16"
	N-3000	Hex nut 7/16-14

High Output Turbofan 500 1000 rpm
With PTO drive

ASSEMBLY

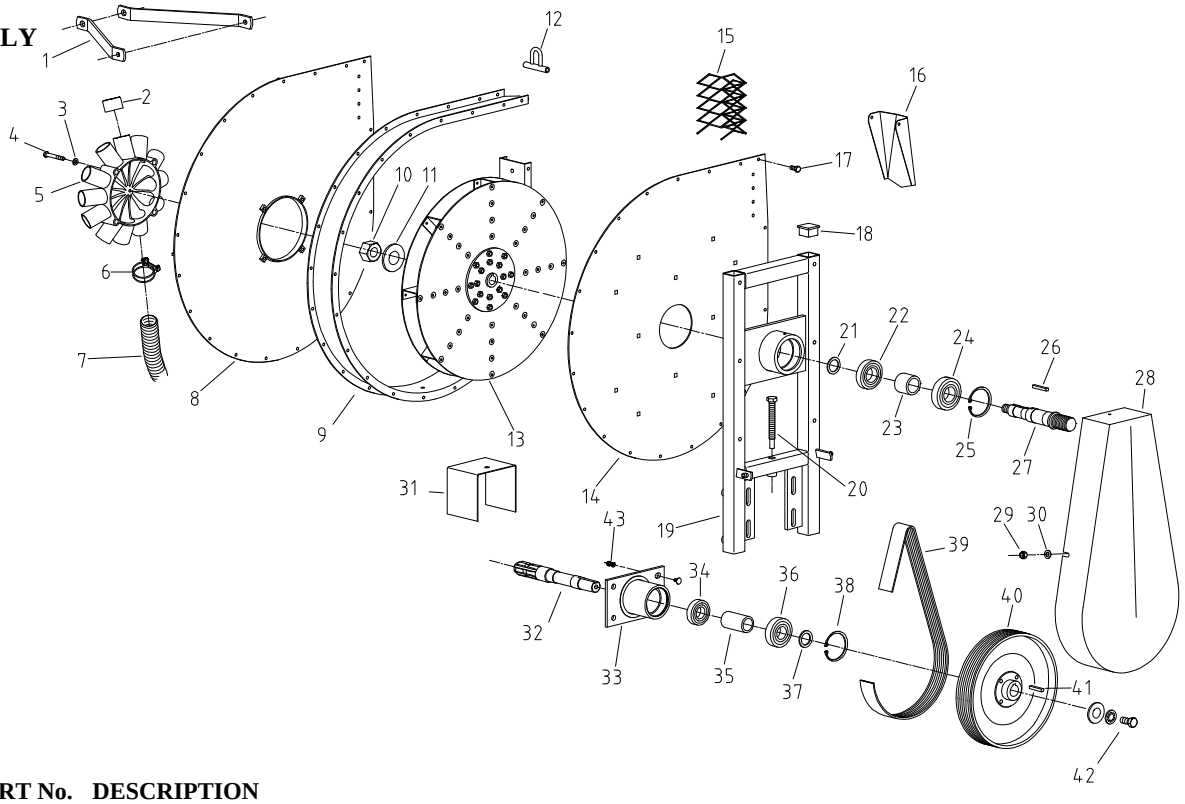


ITEM	PART No.	DESCRIPTION
1	4532	Support strap – 565mm long (22 ¼")
	4532.1	Support strap – 340mm long (13 3/8")
	4532.2	Support strap – 480mm long (18 7/8")
2	4451	Plastic cap
3	10620064	Washer 8.5x16x2mm
4	10511062	Bolt, M8x55 (to secure manifold)
5	4450	12-hole manifold
6	4453	Hose clamp
7	4454	Vacuum hose 40mm ID (specify length)
8	4402.C	Fan Housing, (manifold Side)
9	NM-72005	Lock nut, M20 (to secure fan blade)
10	10623042	Washer, 22.5x48x3mm
11	4403.D	Fan Blade (aluminum, 17 3/4" Dia.)
12	6090	Snap ring (6mm)
13	6089	Rubber ring
14	4455	Pin for outlet shield
15	4429.A	Outlet shield
16	10500091	Hex bolt M6x12
17	4401.B	Fan Housing, (support frame side)
18	4440	Belt tension adjustment bolt
19	4400.1A	Support Frame
20	4407	Bearing 62mm (62062RS)
21	4410.A	Spacer bushing (upper shaft)
22	4408	Bearing 72mm (63062RS)
23	4409	Snap ring, internal (72mm)
24	4439.A	Key stock for upper shaft (6x6x45mm)
25	4452.B	Upper shaft (1 1/8" Dia. Pulley)
26	NM-21015	Lock nut M10
27	10620089	Washer 10.5x20x2mm

ITEM	PART No.	DESCRIPTION
28	4414.1A	Cover shield for belt
29	4428.B	PTO drive shaft 540 rpm, 24" long
	4431.B	PTO drive shaft 540 rpm, 36" long
	900057	PTO drive shaft HD 1000 rpm 20 spline
30	4434.3	Safety shield
31	4405.A	Lower shaft (1 3/8" 6-spline)
	4405.A2	Extended shaft 7X7 toolbar w/PTO
32	4404.A	Shaft Housing (lower drive shaft)
	4404.3	Extended housing 7X7 toolbar w/PTO
33	4411	Spacer bushing (lower shaft)
	4411.2	Long bushing 7X7 toolbar w/PTO
34	10624018	Washer, 31x41x3mm
35	4413.B	Belt, 500 rpm (1244J25)
	4413.1B	Belt, 1000 rpm (991J25)
36	4412.B	Pulley, 500 rpm (11 3/8" Dia.)
	4412.1B	Pulley, 1000 rpm (5 7/8" Dia.)
37	4437	Key stock for lower shaft (8x7x40mm)
38	HM-61230	Bolt, M12x30 (to secure pulley)
	10621061	Washer, 13x40x4mm (to secure pulley)
	10101012	External tooth lock washer (12x20mm)
39	4426	Pump pulley (6 spline stub shaft)
40	HM-2850	Bolt M8x50
	10629009	External tooth lock washer (8x14mm)
41	HM-65110	Bolt, M12x110
	10101012	External tooth lock washer (12x20mm)

Extra High Output Turbofan 540 & 1000 RPM With PTO Drive

ASSEMBLY



ITEM	PART No.	DESCRIPTION
1	4532.2	Turbofan support strap - 480mm long (18 7/8")
2	4451	Plastic cap, 40mm
3	10620064	Washer 8.5x16x2mm
4	10511062	Hex bolt M8x55
5	4450	12 hole manifold
6	4453	Hose clamp
7	4454	Vacuum hose (40mm ID, specify length)
8	4242	Fan housing (manifold side)
9	4243	Fan housing sidewall
10	NM-72005	Nylon locknut, 20mm (to secure fan blade)
11	10623042	Washer 22.5x48x3mm
12	4253	Support eye
13	4244.co	Fan blade, aluminium 19 5/8" dia.
14	4241	Fan housing (support frame side)
15	4254	Screen
16	4429.a	Outlet shield
17	10500091	Hex bolt M6x12
18	9525	End cap
19	4240	Support frame
20	4440	Bolt to adjust belt tension
21	10624016	Washer, 31x41x2mm (on upper shaft)
22	4251	Bearing upper shaft (62072RS1)
23	4247	Spacer bushing (upper shaft)
24	4252	Bearing upper shaft (63072RS1)

ITEM	PART No.	DESCRIPTION
25	4246	Snapring, internal (80mm)
26	4439.A	Key stock for upper shaft (6x6x45mm)
27	4248.1	Upper shaft, 25 grooves (35mm O.D.)
28	4250	Cover shield for belt
29	NM-21015	Lock nut M10
30	1062089	Washer 10.5x20x2mm
31	4434.3	Safety shield
32	4405.a	Lower shaft (w/1 3/8" 6 spline adapter)
33	4404.a	Shaft housing (lower drive shaft)
34	4407	Bearing 62mm (62062RS)
35	4411	Spacer bushing (lower shaft)
36	4408	Bearing 72mm (63062RS)
37	10624018	Washer, 31x41x3mm (on lower shaft)
38	4409	Snapring, internal (72mm)
39	4249.2	Belt, 540 rpm 25 grooves (1335J25)
	4249.3	Belt, 1000 rpm 25 grooves
40	4412.B	Lower pulley, 540 rpm 25 grooves (290mm)
	4412.1B	Lower pulley, 1000 rpm 25 grooves (150mm)
41	4437	Key stock for lower shaft (8x7x40mm)
42	HM-61230	Hex bolt M12x30
	10621061	Washer 13x40x4mm
	10101012	Lock washer 12x20mm

Vacuum Gauge - Standard for Hydraulic Drive, Optional for PTO Drive

VACUUM GAUGE SETTINGS

The hydraulic drive is equipped with a vacuum gauge that allows you to read the vacuum level of the turbofan. The vacuum level should be set depending on the weight and size of the seed to be planted. Vacuum gauge settings for the hydraulic drive are shown below in inches of water column. This is a guideline for small, medium and large seed.

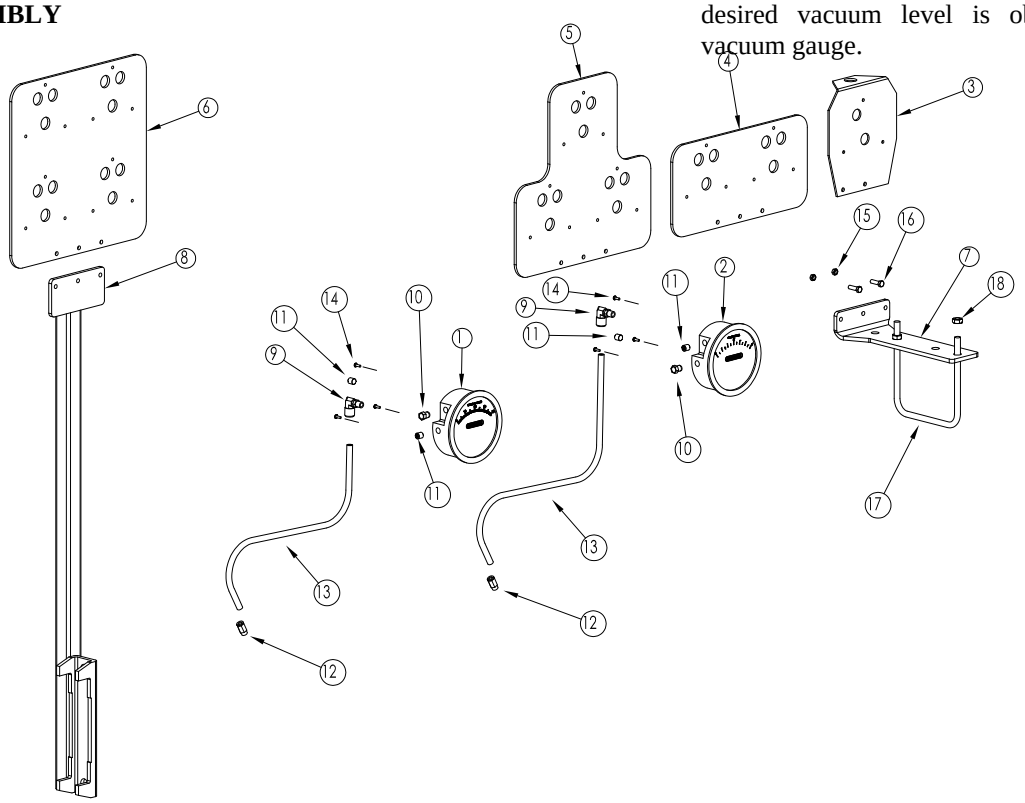
Small (Sugarbeet/Pickle)	15"-20"
Medium (Corn)	20"-25"
Large (Beans/Peanut)	25"-30"

To set the vacuum level:

It is not necessary to have to reset vacuum levels daily. Vacuum levels will be slightly lower during tractor and pump start-up.

1. Use the recommended vacuum settings above, or consult your dealer.
2. Push tractor lever/switch to start oil flow to hydraulically driven turbofan and let oil warm up.
3. With some seed in the hoppers, turn drive wheels by hand or lower planter to engage drive wheels and drive forward a short distance to fill cells on seed discs with seed. This will result in a more accurate setting of the vacuum.
4. Re-adjust the oil flow, if necessary, until the desired vacuum level is obtained on the vacuum gauge.

ASSEMBLY



ITEM No.	PART No.	DESCRIPTION
1	D2040	Vacuum gauge
2	900389	Pressure gauge
3	M30050070	Mounting plate single
4	800187	Mounting plate double
5	800148	Mounting plate triple
6	800149	Mounting plate quadruple
7	800311	Panel mount mounted pltr.
8	80036	Panel mount pull type pltr.
9	J69PPS-4-2	Swivel elbow fitting
10	D200108-00	Filter vent plug

ITEM No.	PART No.	DESCRIPTION
11	A-330	Pipe plug 1/8" NPT
12	J68PP-4-2	Swivel fitting
13	JPT04	Tubing ¼"
14	F27295	Screw 6-32 x 3/8"
15	NM-0605	Nylon lock nut, 6mm
16	HM-0620	Bolt 6 x 20 mm
17	4647.SS	U-bolt 5"x5"x3/8"-16
	4647.S	U-bolt 7"x7"x3/8"-16
	900240	U-bolt 5"x7"x3/8"-16
18	N-2100	Nylon lock nut 3/8 -16

Hydraulic Drive
Optional for 450 Standard, 500 High Output, or 540 Extra High Output Turbofans

The hydraulic drive is optional for the 450 Standard turbofan, the 500 High Output turbofan and the 540 Extra High Output turbofan. The hydraulic drive attaches to the turbofan to produce and maintain the vacuum level.

The desired vacuum is dependent on the correct amount of oil flow to the hydraulic motor.

Starving the motor of oil will cause the vacuum to drop.

An excessive amount of oil flowing into the motor can result in damage to the motor or the fan blade.

When attempting to shut off the turbofan, the blade must be allowed to "wind down" slowly. If the flow of oil stops abruptly, the bypass block on the motor will re-circulate the oil already in the motor helping to prevent damage to the blade and motor. Still, you should not allow the flow of oil to stop suddenly. This is accomplished with the tractor hydraulic controls. Refer to your tractor operator manual for further information.

You can control oil flow to the motor in one of two ways:

1. With a flow control valve that is optional for the hydraulic motor
2. With the tractor hydraulic system controls.

If your tractor has flow control capabilities, then it is recommended that you use this method and remove the in-line flow control valve. Failure to do this will cause the hydraulic oil to overheat, damaging the motor.

Oil requirements are as follows:
Regular & high output turbofans: 6-7 gal/ minute
Extra high output turbofans: 7-8 gal/minute

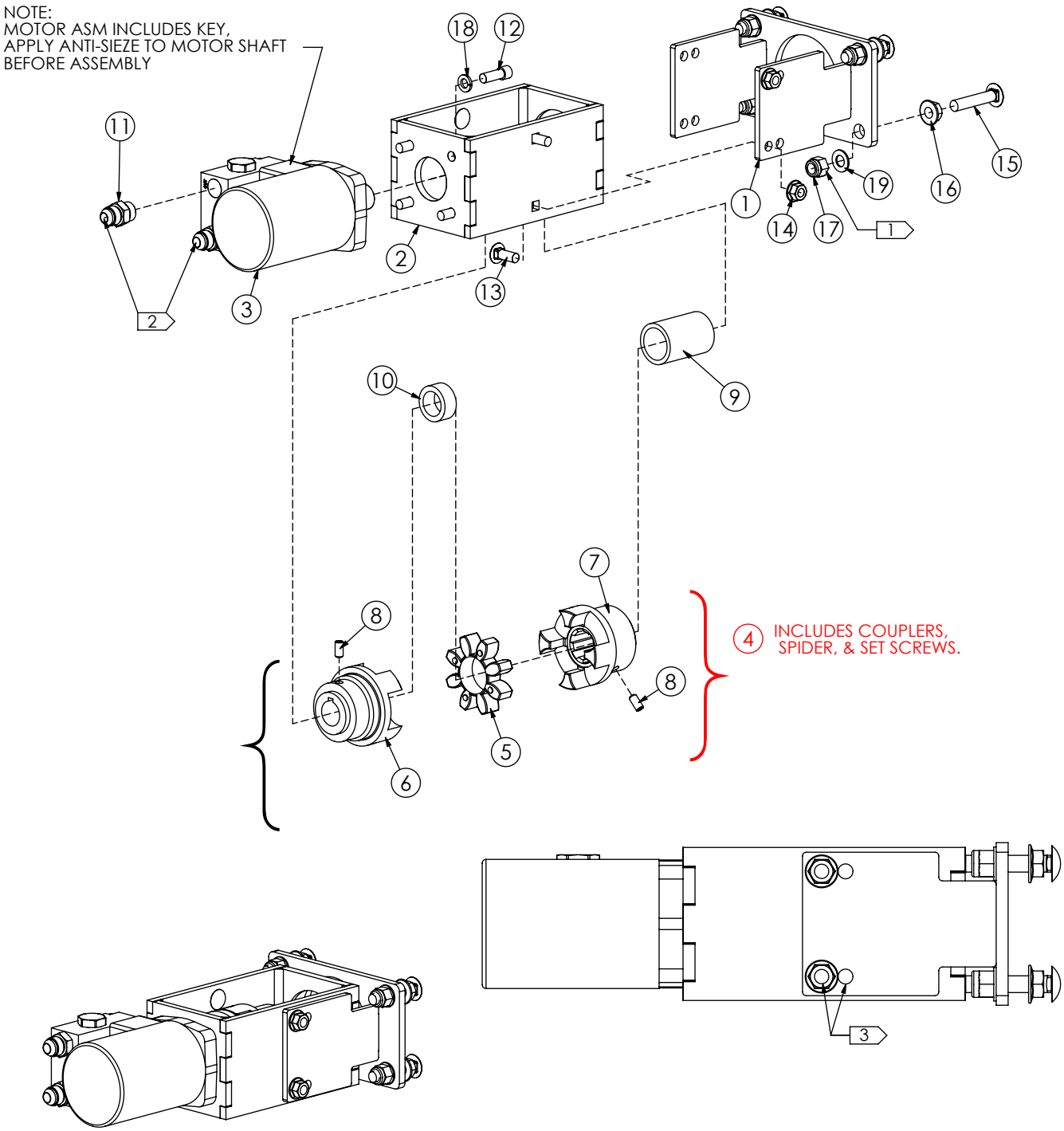
NOTE: Check the labeling on your turbofan to determine if you have a standard, high output or extra high output turbofan. As a general rule, planters with 8-15 rows have a high output turbofan, 16-rows and larger use an extra high output turbofan.

HYDRAULIC SYSTEM SAFETY

DANGER. Before applying pressure to the hydraulic system, check that all connections are tight and that the hoses and fittings have not been damaged. Hydraulic fluid escaping under pressure can penetrate the skin causing serious injury. If injured by escaping hydraulic fluid see a doctor at once. Gangrene can result.

- **Relieve pressure on system before repairing, adjusting or disconnecting.**

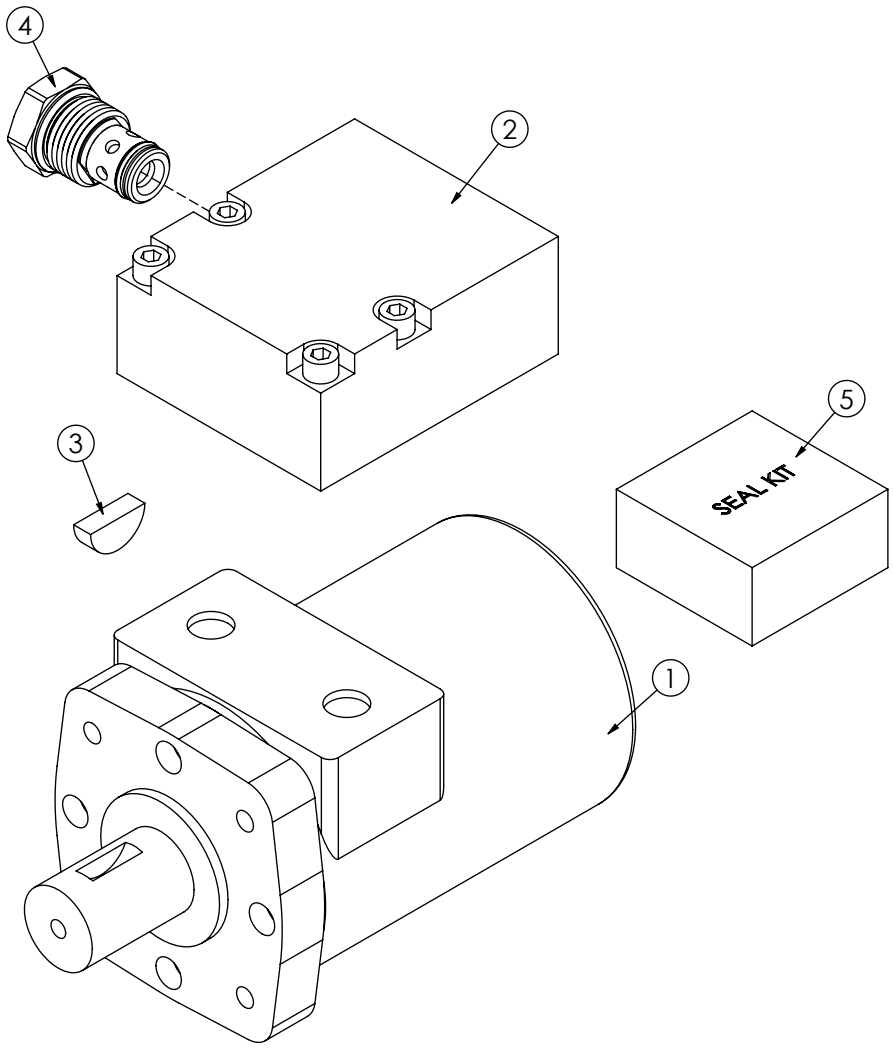
MOTOR BRACKET ASM, STD TURBO



NOTE:
1. TORQUE N-3101 TO 35 FT.-LBS. ± 5 FT.-LBS.
2. 1/2" HYDRAULIC HOSE LINES.
3. USE FRONT HOLE FOR STANDARD TURBO FAN, USE BACK HOLE FOR HIGH OUTPUT TURBO FAN.

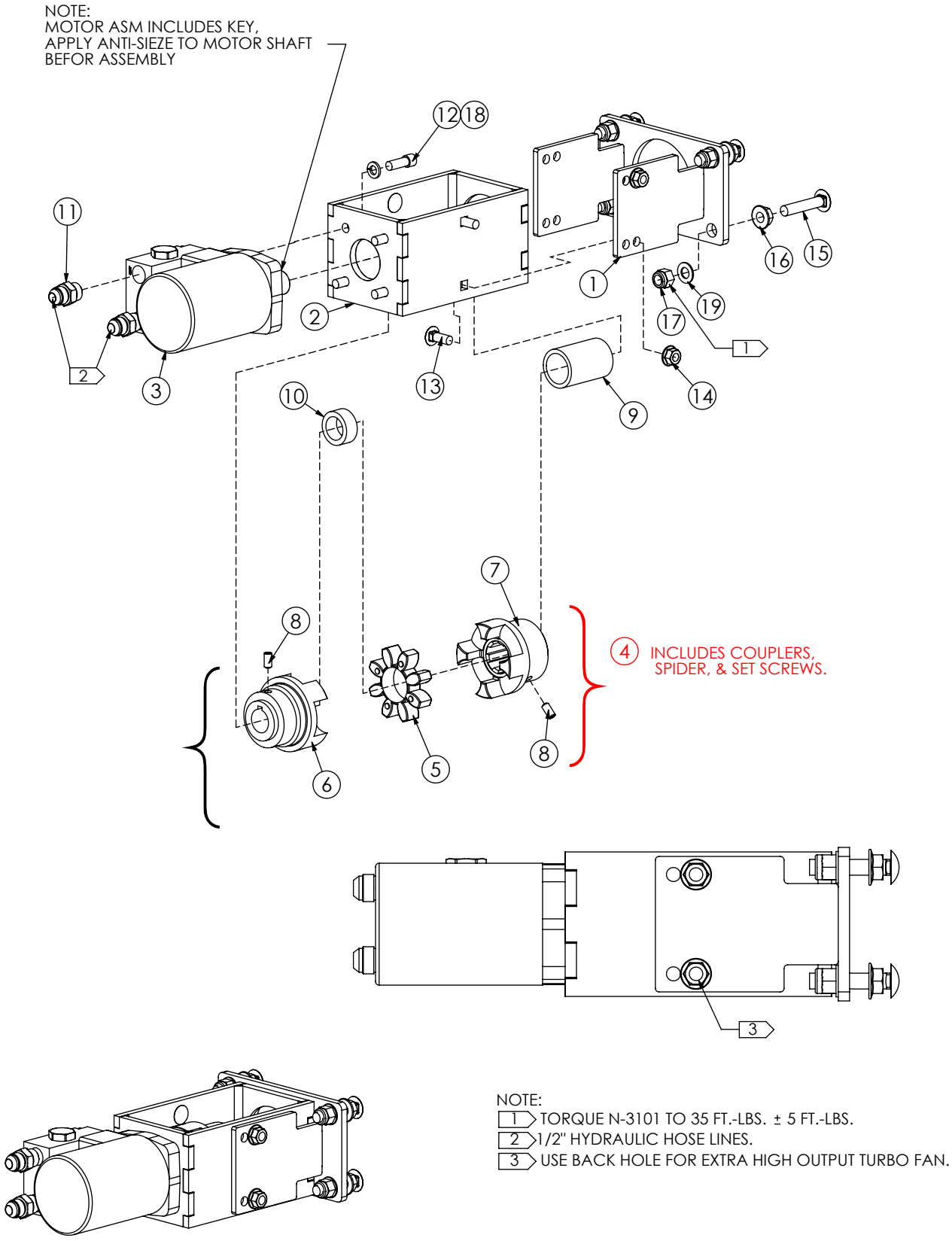
ITEM NO.	QTY.	PART NUMBER	DESCRIPTION
1	1	200266	MOTOR MOUNT END WA
2	1	200161	BRACKET WA
3	1	FTA0232-1	STD & HIGH OUTPUT TURBO MOTOR
4	1	640925	COUPLING
5	1	5041	ELASTIC SHOCK ABSORBER
6	1	5042	COUPLING, MOTOR SIDE, 1" KEYED
7	1	5040	COUPLING, TURBOFAN END, 6 SPLI
8	2	10591915	SCREW, SOCKET SET , M8 x 16
9	1	5039	COUPLING SPACER, 62MM LONG
10	1	800436	SPIDER RING
11	2	TA6400-8-8	1/2 MALE JIC-1/2 MALE O-RING
12	4	F23305	SCREW, SCKT HD CAP , 3/8"-16 X 1"
13	4	CB-2210	BOLT, CARRIAGE, 3/8"-16 X 1" G5
14	4	N-2301	NUT, FLANGE, SERRATED, 3/8"-16
15	4	CB-3323	BOLT, CARRIAGE, 7/16"-14 X 2-1/4" FULL THRD G5
16	4	N-3103	NUT, FLANGE, SERRATED, 7/16"-14
17	4	N-3101	NUT, NYLOCK 7/16"-14 G5
18	4	W-2610	WASHER, SPLIT, 3/8" G8 YZ
19	4	W-3410	WASHER, FLAT, 7/16" SAE G8 YZ

STD & HIGH OUTPUT TURBO MOTOR



ITEM NO.	QTY.	PART NUMBER	DESCRIPTION
1	1	F101-017	HYDRAULIC MOTOR
2	1	FP10270-2	BYPASS BLOCK w/ HARDWARE
3	1	F14193	WOODRUFF KEY
4	1	900022	CHECK VALVE CARTRIDGE
5	1	F60540	SEAL KIT

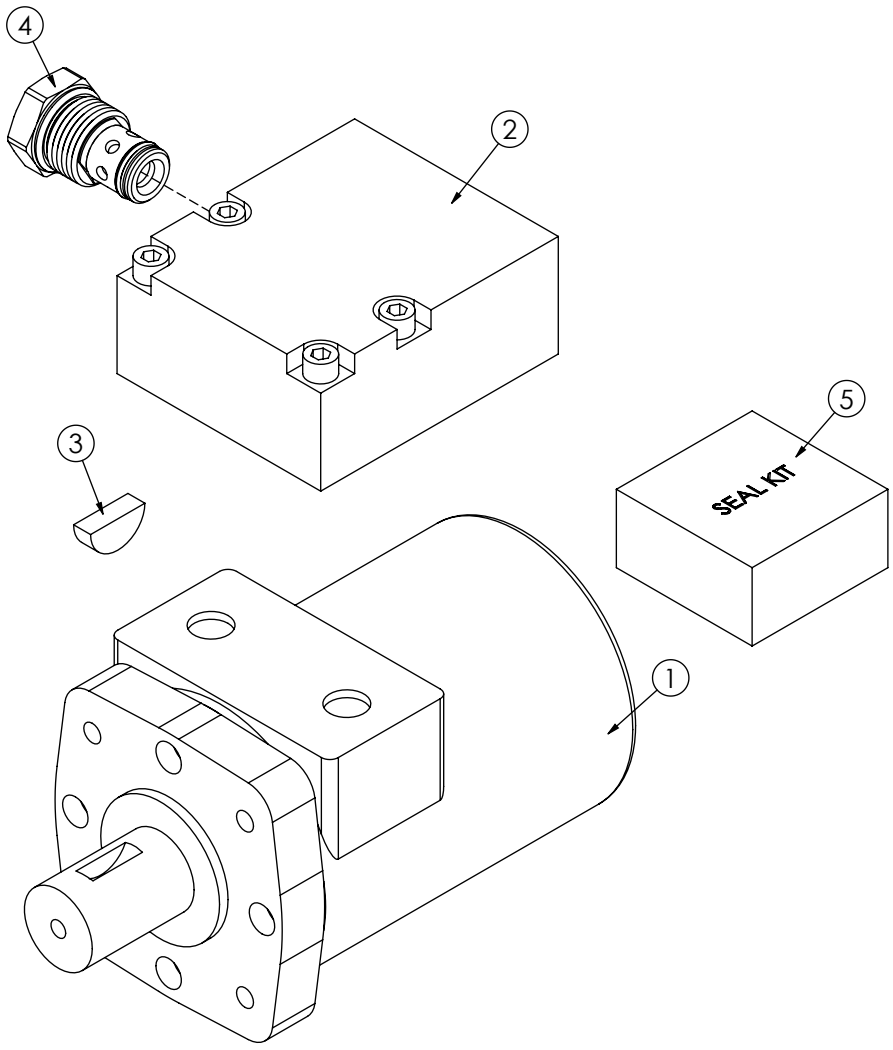
MOTOR BRACKET ASM, EXTRA HIGH OUTPUT TURBO



100092 A

ITEM NO.	QTY.	PART NUMBER	DESCRIPTION
1	1	200266	MOTOR MOUNT END WA
2	1	200161	BRACKET WA
3	1	FTA0425	XHO TURBO MOTOR
4	1	640925	COUPLING
5	1	5041	ELASTIC SHOCK ABSORBER
6	1	5042	COUPLING, MOTOR SIDE, 1" KEYED
7	1	5040	COUPLING, TURBOFAN END, 6 SPLI
8	2	10591915	SCREW, SOCKET SET , M8 x 16
9	1	5039	COUPLING SPACER, 62MM LONG
10	1	800436	SPIDER RING
11	2	TA6400-8-8	1/2 MALE JIC-1/2 MALE O-RING
12	4	F23305	SCREW, SCKT HD CAP , 3/8"-16 X 1"
13	4	CB-2210	BOLT, CARRIAGE, 3/8"-16 X 1" G5
14	4	N-2301	NUT, FLANGE, SERRATED, 3/8"-16
15	4	CB-3323	BOLT, CARRIAGE, 7/16"-14 X 2-1/4" FULL THRD G5
16	4	N-3103	NUT, FLANGE, SERRATED, 7/16"-14
17	4	N-3101	NUT, NYLOCK 7/16"-14 G5
18	4	W-2610	WASHER, SPLIT, 3/8" G8 YZ
19	4	W-3410	WASHER, FLAT, 7/16" SAE G8 YZ

EXTRA HIGH OUTPUT TURBO MOTOR

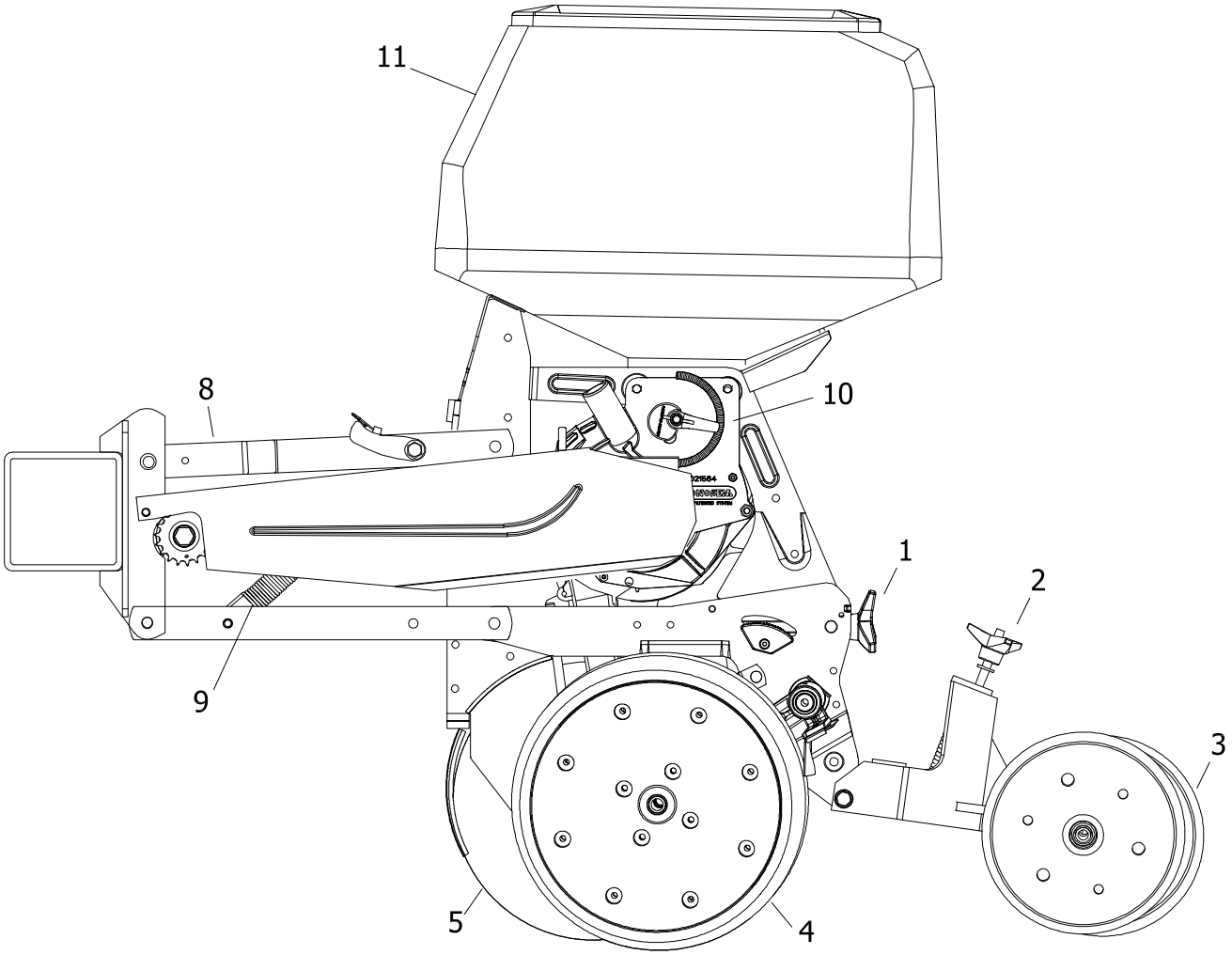


ITEM NO.	QTY.	PART NUMBER	DESCRIPTION
1	1	F101-018	HYDRAULIC MOTOR
2	1	FP10270-2	BYPASS BLOCK w/ HARDWARE
3	1	F14193	WOODRUFF KEY
4	1	900022	CHECK VALVE CARTRIDGE
5	1	F60540	SEAL KIT

TABLE OF CONTENTS

This is a downloadable version of the manual. A partial download may not contain all pertinent information. Make Sure to read Chapter 1, Safety!
Due to ongoing upgrades specifications may change without notice, contact a Monosem Rep for current information.

NG Plus 4, Twin-Row



The NG Plus 4 row unit is shown above with standard features. Other options are available for specific conditions or uses.

(1) – Depth Adjustment Hand wheel

(2) – Hand wheel for Closing Wheel

(3) – Adjustable V Press Wheels

(4) – Independent Gauge Wheels

(5) – Heavy-Duty Disc Openers

(8) – Parallel Linkage

(9) – Stabilizing Springs

(10) – Metering Box

(11) – Heavy-Duty Plastic Hopper

NG Plus 4, Twin-Row

SEED DEPTH

Adjust the seed depth by turning the hand wheel **(1)**. Turning the wheel changes the height of the depth gauge wheels **(4)** in relation to the disc openers **(5).** A marker close to the hand wheel **(6),** indicating a gradual scale, ensures the uniformity of the depth control on all row units of the planter. Be sure that you set all of the row units on the planter at the same adjustment.
The disc openers and ground adjustment system guarantees an accurate and regular seed depth in all types of soil and conditions because the depth wheels are positioned perpendicular to the falling point of seeds.

V PRESS WHEELS

The two adjustable rear press wheels **(3)** affect only the closing of the seed furrow. They float independently and therefore do not have any effect on the ground engaging of the unit. Regulate the soil pressure by turning the hand wheel **(2)**. This adjustment allows for shallow (cotton), medium (bean) or deep (corn) planting. Choose this pressure carefully with relationship to the type and humidity of the soil, in order to assure proper seed to soil contact. Optional disc closing systems with flat or V press wheels are available.

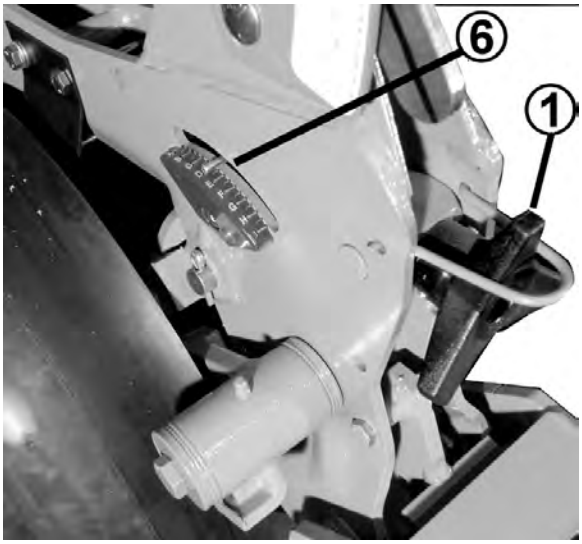
DEPTH GAUGE WHEELS

The depth gauge wheels **(4)** are engineered with an equalizing rocker bar to assure uniform depth control of the disc openers, even in clods or rocky conditions. The gauge wheels are independent of each other for a smoother ride through the field

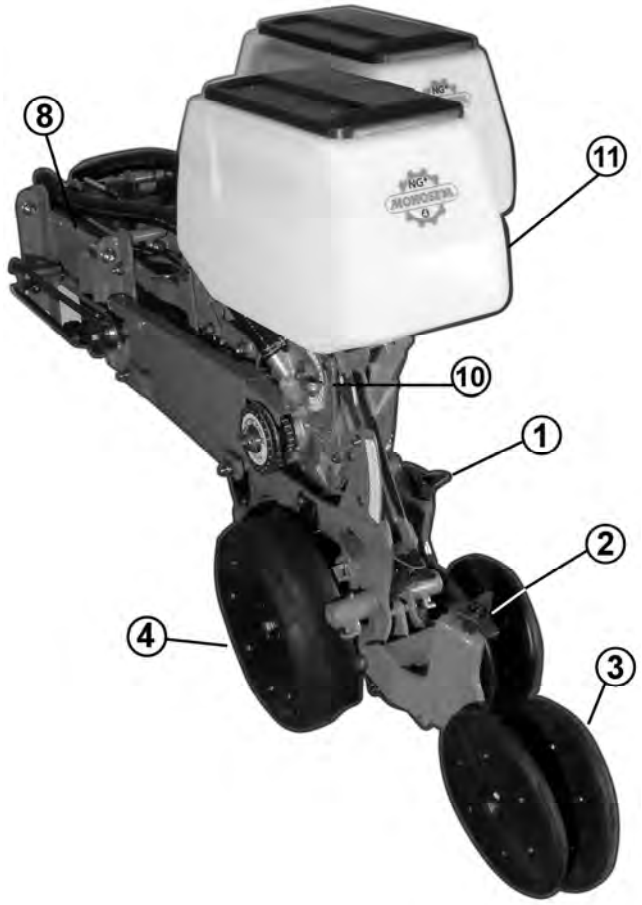
In order for the disc openers to remain properly clean and free of soil build-up, make sure the flange of the gauge wheel is just touching the disc. To double-check this, raise the unit (using the unit lock up) and manually rotate the gauge wheels; the disc openers should also rotate freely without restriction.

After starting up the planter, the factory assembly may need readjustment. Adjust gauge wheel spacing by putting the washers from one side of the articulating arm to the other. Using an SAE multipurpose grease in a clean grease gun, lubricate the gauge wheel arms as needed.

SEED DEPTH ADJUSTMENT



NG PLUS 4 UNIT



NG Plus 4, Twin-Row

DOUBLE DISC OPENERS

The heavy-duty double disc openers **(5)** are very durable and mounted on watertight roller bearings. Their function is to slice the soil, and open a straight seed trench. An interchangeable firming point attached to the frame and positioned ahead of the seed tube also acts as a disc scraper. The flange of the gauge wheel should be just touching the disc openers, without restricting their movement.

A disc scraper is mounted to the side of each disc. You can adjust the pressure of the scrapers by tightening or loosening the bolts.

DRIVE CHAIN

The drive chains are spring loaded and therefore, self tightening. You may need to shorten the chain if wear stretches the chain and reduces spring tension. Periodically check the pivot point of the chain idlers to ensure they rotate freely. Use a chain lubricant spray daily, or as needed. Dry moly is the recommended chain lubricant.

SEED HOPPER

A 60-liter plastic hopper with lid **(11)** is standard on the NG+ 4 unit. On the Twin-Row unit, the hopper comes in a right hand and a left hand.

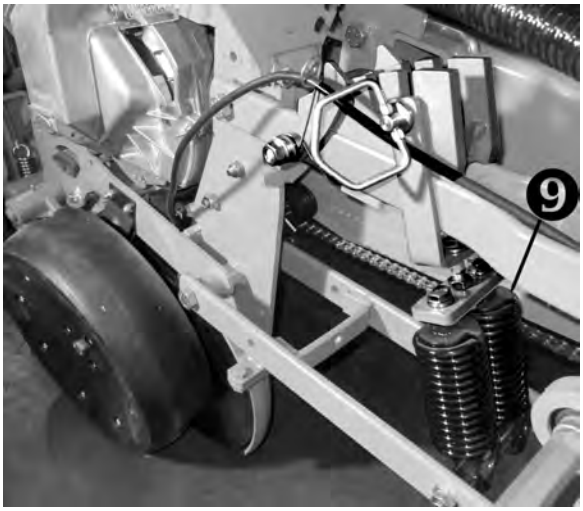
DOWN PRESSURE SPRINGS

The Down Pressure springs **(9)** located within the parallel linkage absorbs shock and helps to stabilize the unit in rough terrain. Optional quick adjust and heavy duty down pressure springs available.

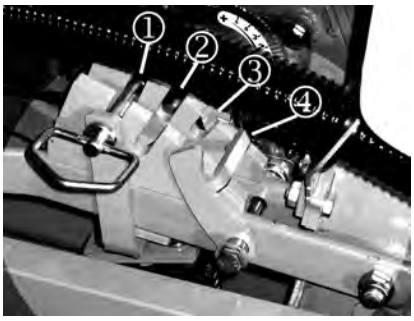
Optional quick adjust for down pressure springs is pictured here.
For normal level field conditions, the apx. down pressure settings are

(1) 100 lb
(2) 190 lb
(3) 280 lb
(4) 375 lb

DOWN PRESSURE SPRINGS



QUICK ADJUST DOWN PRESSURE SETTINGS



Down Pressure Settings:

(1) 100 lb
(2) 190 lb
(3) 280 lb
(4) 375 lb

NG Plus 4, Twin-Row

SEED METERING SYSTEM

The seed metering system **(10)** is made of cast aluminum and consists of two parts, the non-removable **main housing**, and a removable **cover**. The metering box is equipped with a stainless steel seed disc that delivers the seed to a curved seed tube.

The metering box is located below the seed hopper and is engineered for accuracy and long life. The special shape allows for planting even when a minimum of seed remains in the hopper. The metering box contains sealed bearings for durability.

METERBOX MAIN HOUSING

The main housing is mounted in the planter unit frame. Components in the main housing are the plastic wear gasket, cap, seed disc and seed scraper. The seed disc rotates on the plastic wear gasket, so make sure the gasket is smooth and in good condition. Under normal operating conditions, replace the gasket when the wear indicator is less than .5 mm.

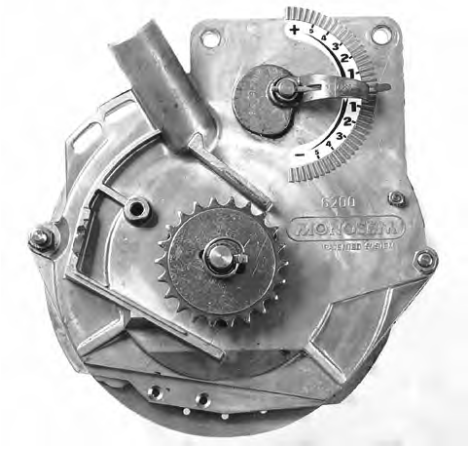
REPLACING THE WEAR GASKET

To replace the gasket, position the metal brace with its tab notched in the hole of the housing. Rotate the outer edge of the plastic wear gasket into the groove. It will lock into place when the stub fits into the hole of the housing; the cap and three bolts hold the gasket in position.

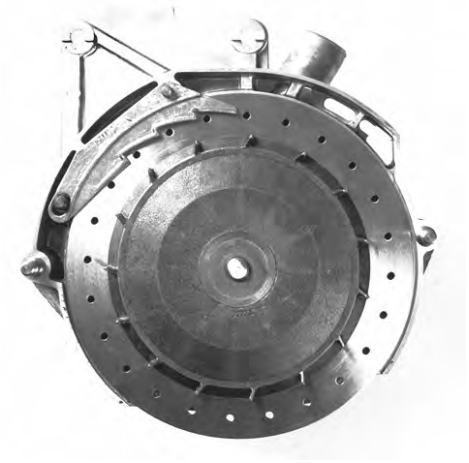
NOTE: Thoroughly clean the metering box housing before installing a new wear gasket. Any residue left from previous use will not allow the gasket to fit in the proper position.

On the outside of the main housing is the lever for adjusting the air suction in relation to the weight of the seed. This lever also sets the height of the seed scraper. See **OUTSIDE LEVER ADJUSTMENT** for specifics on this setting.

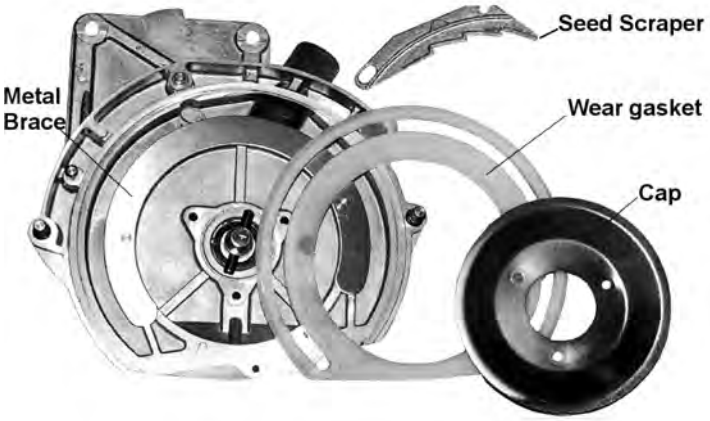
MAIN HOUSING EXTERIOR



MAIN HOUSING INTERIOR



MAIN HOUSING INTERIOR, DISSECTED



NG Plus 4, Twin-Row

OUTSIDE LEVER on Meterbox ❶

The outside lever on the metering box cover is unique. It makes two adjustments at the same time. These two factors influence the degree of singulation of the seed.

By turning the outside lever, ❶, two adjustments are made at the same time.
ADJUSTMENT one
The lever adjusts the height of the scraper in relationship to the holes in the seed disc (h),
ADJUSTMENT two,
at the same time it adjusts the air suction ❷ (from the turbofan) to the weight of the seed.

For LARGER SEED, to INCREASE SUCTION +0 to +5

When the indicator ❶ is positioned toward plus, "**+**" The scraper raises over the holes of the seed disc **(h)** and closes the size of the hole on the meterbox ❷. This increases the suction, and may cause doubles if the indicator is raised too high.

For SMALLER SEED, to DECREASE SUCTION -0 to -5

When the indicator ❶ is positioned toward minus, "**-**" The scraper lowers over the holes of the seed disc **(h)** and opens the hole on the meterbox ❷. This decreases the suction, and may cause skipping if the indicator is too low.

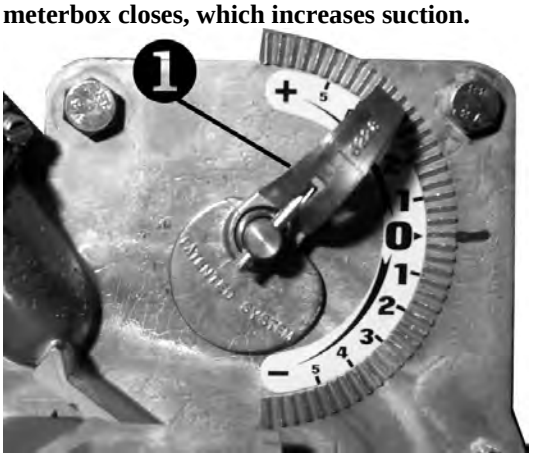
The clear plastic control window on the cover allows you to monitor the results.

See "**5. Drive"** for Turbofan vacuum settings.

Recommended setting for the indicator:	
Corn	**+1 (0 to +2)**
Cotton	**+1**
Beans	**+4 to +5**
Soybeans/Peas	**+2 to +4**
Sorghum/Milo	**+3**
Peanuts	**+4 ½ (+4 to+5)**

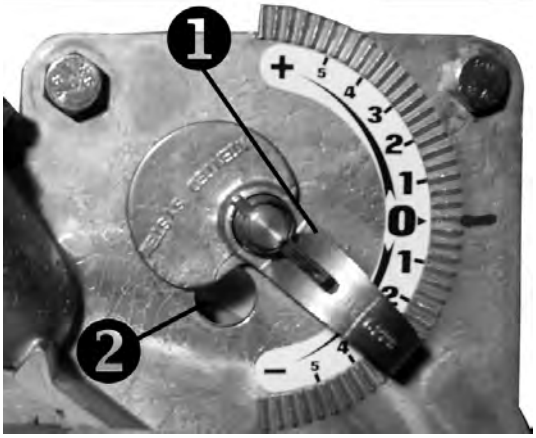
NOTE: The above settings are theoretical, so checking before and during planting is essential.

SETTING FOR LARGER SEED the hole on meterbox closes, which increases suction.

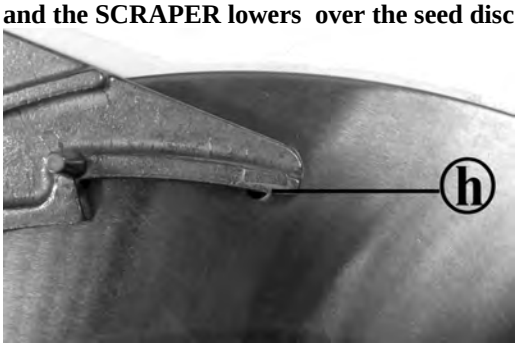


and the SCRAPER RAISES over the seed disc hole.

SETTING FOR SMALLER SEED, the hole on meterbox opens which reduces suction.



and the SCRAPER lowers over the seed disc hole.



NG Plus 4, Twin-Row

METERBOX COVER

The cover is the removable part of the metering box. Two wing nuts secure the cover to the main housing. The components on the outside of the cover are a control window and trap door**.** The components on the inside of the cover are a metal shutter and ejector block. Use a special cover for extra large seed such as peanuts and kidney beans. See **EXTRA LARGE SEED** for more information.

The control window is made of clear plastic and allows you to view the seed against the seed disc. For a closer inspection of the seed against the disc, you can raise the window.

INTERIOR SHUTTER ADJUSTMENT Meterbox

The metal shutter inside the cover regulates the flow of seeds coming from the hopper and provides a constant and sufficient level of seed in front of the disc. According to the seed used, check and adjust the shutter before planting.

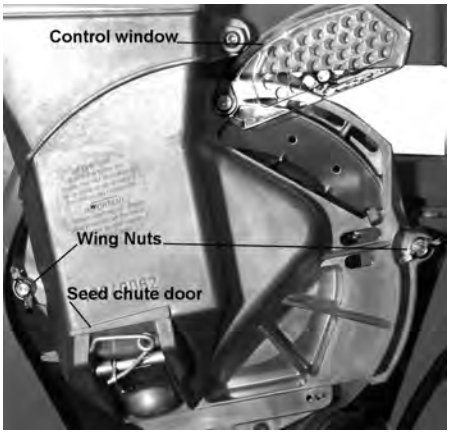
Adjust the interior shutter by loosening two bolts **(13)** and then lowering the shutter **(12).** A small plastic sheet **(14)** is located under the shutter. The shutter limits the level of seeds in front of the disc.

High Position: **For large seeds**, such as corn, soybean, edible beans, cotton, etc. The high position moves the shutter away from the opening.

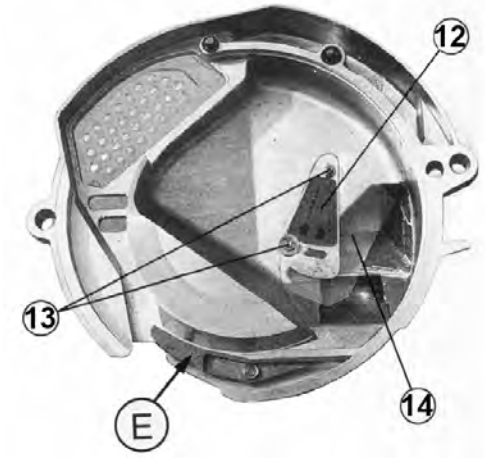
Low Position: For small seeds, such as sorghum and milo. The low position moves the shutter over part of the opening

The brass ejector block **(E)** assures that the seed is dropped at a consistent angle to reduce seed bounce inside the seed tube, for more accurate seed placement. Because of the important function of the ejector block, periodically check that it is in good condition.

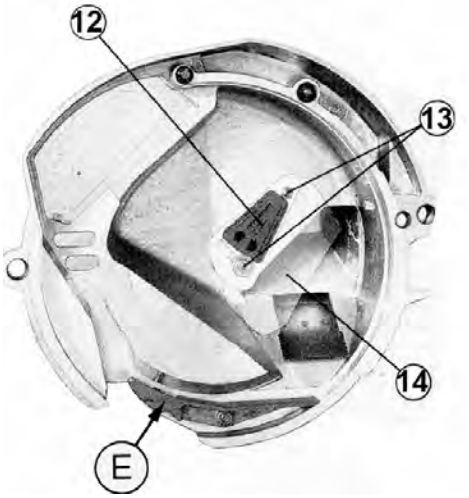
COVER



SETTING FOR SMALLER SEED the restrictor is closer to the opening, in the low position



SETTING FOR LARGER SEED the restrictor is away from the opening, in the high position.



NG Plus 4, Twin-Row

METERING BOX TROUBLESHOOTING

Problem: Excessive Skipping

Possible Reason:

Seed scraper is too low.

The indicator is on the wrong setting.

Seed scraper is bent. (not flat)

The seed disc is bent or worn.

Seed scraper is dirty with chemical product.

Plastic wear surface gasket is warped or used up.

Holes of the seed disc are clogged (sugarbeets, rapeseed, cabbage.) Double-check from time to time.

The planter is working at an excessive speed.

Defective vacuum hoses.

The vacuum suction is insufficient.

Turbofan speed is too low.

Foreign material mixed with seed.

Seed blockage in the hopper, seed treatment product may be too moist.

Fan belt is too loose.

Problem: Excessive Doubling

Possible Reason:

Seed scraper is too high. Incorrect indicator setting

Seed scraper is worn.

The holes of the seed disc are too large for seed.

The planters working speed is excessive.

Seed level too high in the metering box.

Problem: Skipping and Doubles

Possible Reason:

Seed is bridging in the meterbox cover.

The planters working speed is excessive.

Holes of the seed disc are too large. (Cut off seeds.)

Fields are too steep.

The shutter is adjusted incorrectly**.**

Vacuum setting is too high

Problem: Irregular Spacing

Possible Reason:

The planters working speed is excessive.

The soil is sticking to the tires because it is too wet.

Incorrect tire pressure.

Shutter is adjusted incorrectly.

Ejector is damaged.

Toolbar is not level.

NOTE: Toolbar must run level or slightly back.

For 3pt Mounted Planters, make sure tractor is in "float" mode.

NG Plus 4, Twin-Row

EXTRA LARGE SEED
A special metering box cover should be used for seeds such as peanuts, and kidney beans. This special metering box cover is designed with a larger opening (to improve the seed flow into the seed chamber), a larger discharge channel (to avoid blockage), and a special less aggressive seed scraper (to avoid skips). The metal shutter should be in the "**high position**" for these large seeds.

NOTE: If you ordered your planter specifically to plant extra large seed and it has the special metering box cover installed, you can also use this cover for smaller seed as corn or beans. To use the large seed cover with small seed, adjust the metal shutter to a low position and add a special bolt-on plastic restrictor.

DISENGAGING THE METERING BOX
The individual disengaging of a metering unit is possible by removing the lynch pin in the sprocket on the main housing, **(1)** or by disconnecting the vacuum hose from the meterbox.

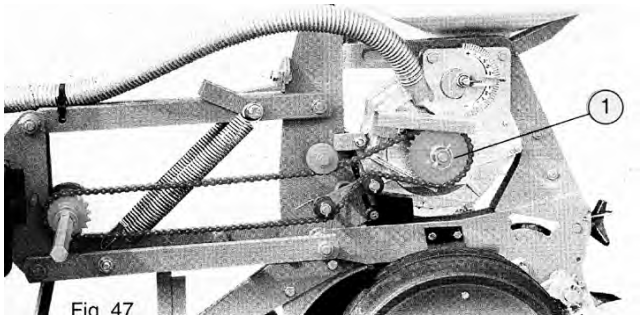


Fig. 47

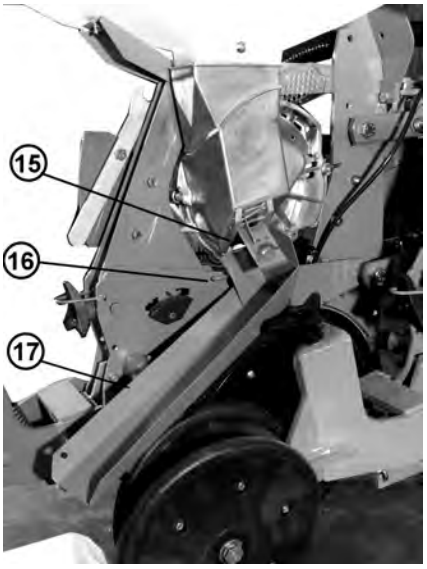
SEED TUBE
The seed tube is the last point of contact the seed has in the metering system. After the seed passes by the brass ejector block, (which ejects the seed at a consistent angle to reduce seed bounce in the seed tube) it is guided through the curved seed tube into the seed trench.

Before and during each new planting season, make sure your seed tubes are in good condition. Your seed tubes must be in good condition to ensure consistent and regular seeding.

To replace the seed tube, remove the metering box cover and seed disc to remove the top pin holding the tube in place OR remove the metering box cover and the seed disc.

Electronic seed monitors are optional. They monitor the flow of seed through the seed tube. For accurate reading of the monitors, periodically clean the inside of the seed tubes by running a brush up through the tube to clean the sensor eye.

SEED CHUTE
The seed chute simplifies the job of emptying the hoppers. Attach the chute **(17)** to the Row Unit at point **(16).** Place a bucket at the bottom of the chute, lift the seed chute door **(15)** and collect the left over seed.



SEED DISC
Use the proper seed disc for different seeds. Check your type of seed, and use the **Seed Disc Recommendations** chart to determine the correct disc for your crop.

It is important to use seed discs that are clean and in good condition. Customized seed discs are not shown, but are available upon special request. It is not recommended to drill out your own seed discs. Any slight burrs or imperfections in drilling will alter your metering. The precision of your seed discs must be maintained to have proper metering.

The brass agitator is set onto the seed disc with 6 special screws.

If you remove your seed discs from the metering box to clean them or to use a different disc, use a permanent marker to identify which seed disc came from which metering box. When you put the discs back into the unit place the seed discs back into their original metering box.

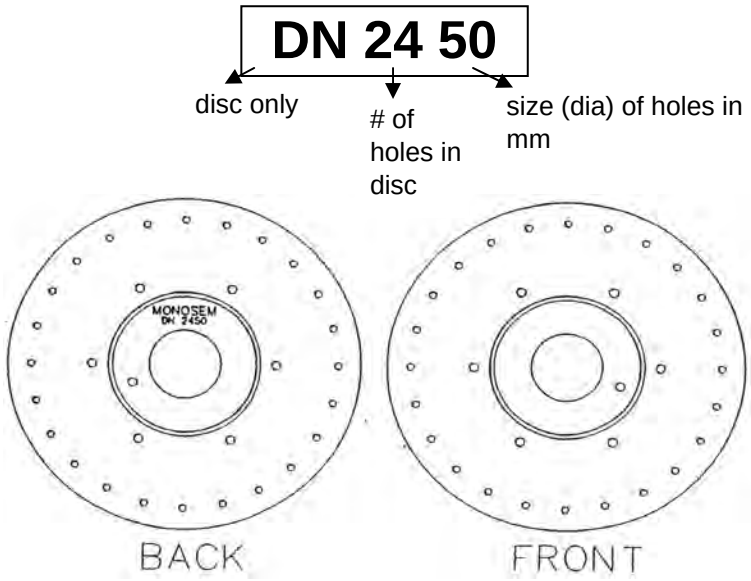
NG Plus 4, Twin-Row

SEED DISC IDENTIFICATION

The size of the seed disc is engraved into the back of the seed disc. When ordering seed discs, the prefix DN indicates the disc only. The prefix DC indicates the complete disc with brass agitator (6212.a). The first 2 numbers of a 4 number series indicates the number of holes in the seed disc. The second two numbers indicates the size (diameter) of the holes.

Example:
Seed Disc # DN 2450
DN indicates disc only (no agitator)
24 indicates 24 holes
50 indicates the holes are diameter 5.0 mm.

HOLE SIZE EXAMPLES
20 = 2.0 mm
30 = 3.0 mm
35 = 3.5 mm
45 = 4.5 mm
50 = 5.0 mm
60 = 6.0 mm
65 = 6.5 mm



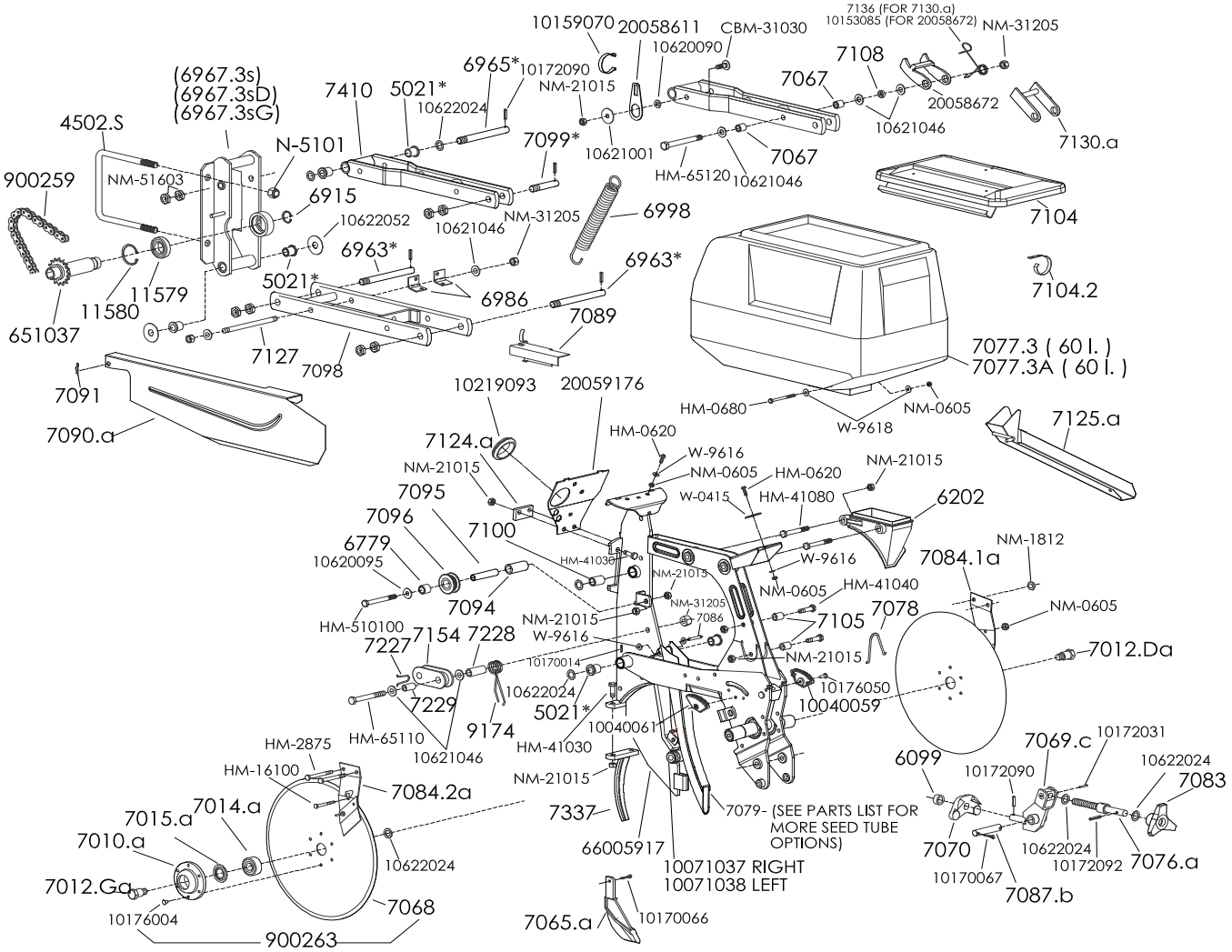
SEED DISC RECOMMENTATIONS

CROP	SEED DISC		SEED SPACING
Beans	DC3665	Large, Kidney	2 3/8 - 7"
	DC4850	Large, Pinto, Romano, Lima, Chicapee	1 3/4 - 5 1/2"
	DC6045	Medium, Snap, Baby Limas, Soybeans	1 3/8 - 4 3/8"
	DC6035	Small, Navy, Peas	1 3/8 - 4 3/8"
Corn	DC0950	Field	9 1/2 - 28"
	DC1250		7 - 21"
	DC1837		4 3/4 - 14"
	DC1850 (low population)		4 3/4 - 14"
	DC2450 (medium population)		3 1/2 - 10 1/2"
	DC3050 (high population)		2 3/4 - 8 1/2"
	DC2437, small, 2700-5000 seeds/lb.	Sweet	3 1/2 - 10 1/2"
	DC2445, large,1700-2700 seeds/lb.		3 1/2 - 10 1/2"
	DC2425	Ornamental	3 1/2 - 10 1/2"
Cotton	DC3635 (low population)	Single seed drop	2 3/8 - 7"
	DC6035 (high population)	Single seed drop	1 3/8 - 4 3/8"
	DC0930D (double seed drop)	Hill drop(seeds 3/4 - 2" apart)	9 1/2 - 28"
	DC0930T (triple seed drop)	Hill drop(seeds 3/4 - 2" apart)	9 1/2 - 28"
	DC1230D (double seed drop)	Hill drop(seeds 3/4 - 2" apart)	7 1/8 - 21"
	DC1230T (triple seed drop)	Hill drop(seeds 3/4 - 2" apart)	7 1/8 - 21"
	DC1830D (double seed drop)	Hill drop(seeds 3/4 - 2" apart)	4 3/4 - 14"
	DC1830T (triple seed drop)	Hill drop(seeds 3/4 - 2" apart)	4 3/4 - 14"
Cucumbers/ Pickles	DC1820	Hand harvest	4 3/4 - 14"
	DC3020	Machine harvest	2 3/4 - 8 1/2"
Peanuts	DC3665	Jumbo seed	2 3/8 - 7"
	DC3060 (twin row)	Small to medium seed	2 3/4 - 8 1/2"
	DC4060	Small to medium seed	2 1/8 - 6 1/2"
	DC4860(not recommended)	Small to medium seed, (High pop.)	1 3/4 - 5 1/2"
Rice	DC9016		15/16 - 2 3/4"
Sorghum	DC3622 (low population)		2 3/8 - 7"
	DC7222 (high population)		1 3/16 - 3 1/2"

NG+ 4 Twin-Row UNIT ASSEMBLY

SELECT CORRECT SERVICE PART NUMBER FROM TABLE:	6963*	6965*	7099*	5021*
PIN STYLE PIVOT PIN:	6963	6965	7099	5021
BOLT STYLE PIVOT PIN (9A & EARLIER S/N):	6963.B	6965.B	7099.B	5021.1
BOLT STYLE PIVOT PIN (10A & LATER S/N):	6963.C	6965.C	7099.C	5021.2

NOTE: CORRECT BUSHING (5021*) SHOULD BE USED WITH CORRESPONDING PIN / BOLT



PART No.	DESCRIPTION
4502.S	U bolt, for 7" x 7" x 5/8-11
5021*	SEE TABLE ABOVE, Bushing
5021.1	Bushing. S/N 9A & EARLIER
5022.2	Bushing. S/N 10A & LATER
6099	Collar with 6x25 roll pin
6202	Collar brace
6779	Bushing, self lubricated

PART No.	DESCRIPTION
6915	Snapring, 30mm
6963 *	SEE TABLE ABOVE, Pivot Pin.
6963.B	Pivot Bolt, Lower Linkage. S/N 9A & EARLIER
6963.C	Pivot Bolt, Lower Linkage. S/N 10A & LATER
6965 *	SEE TABLE ABOVE, Pivot Pin.
6965.B	Pivot Bolt, Upper Linkage Front. S/N 9A & EARLI
6965.C	Pivot Bolt, Upper Linkage Front. S/N 10A & LATE

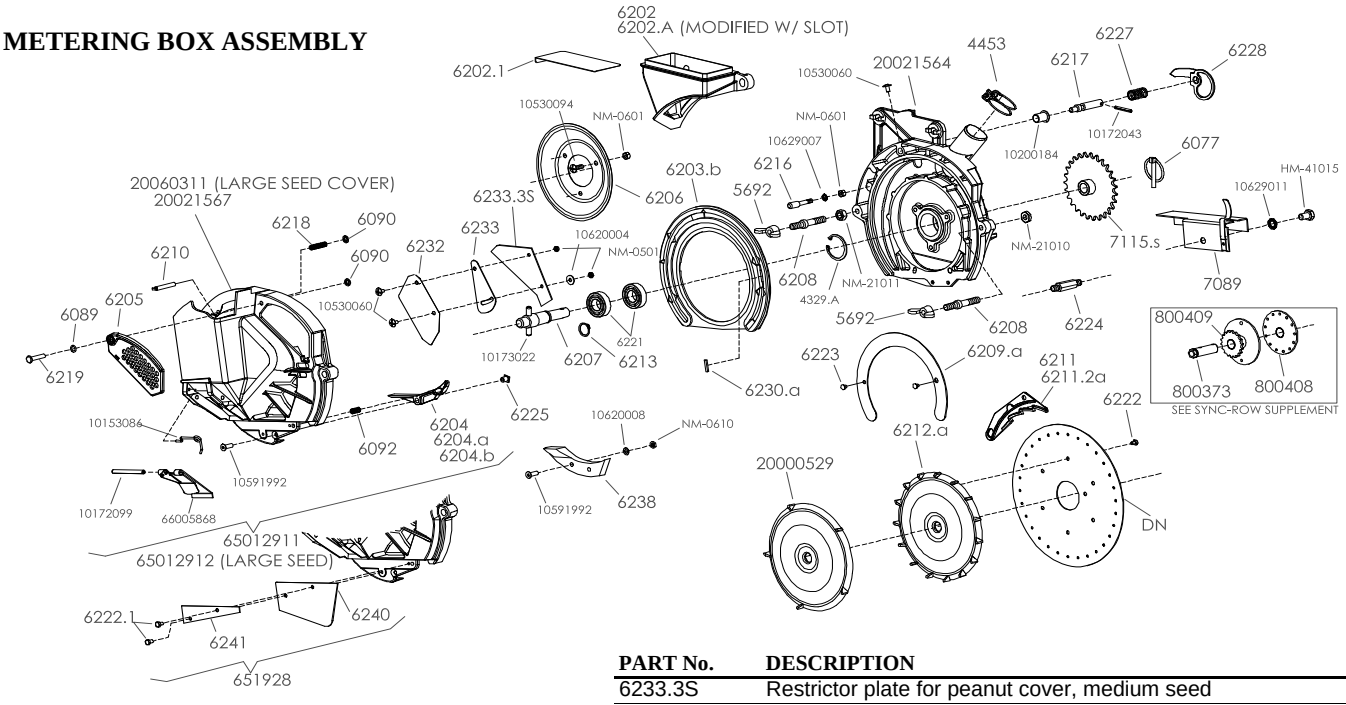
NG+ 4 Twin-Row UNIT ASSEMBLY

PART No.	DESCRIPTION
6779	Bushing, self lubricated
6915	Snapring, 30mm
6963 *	SEE TABLE ABOVE, Pivot Pin.
6963.B	Pivot Bolt, Lower Linkage. S/N 9A & EARLIER
6963.C	Pivot Bolt, Lower Linkage. S/N 10A & LATER
6965 *	SEE TABLE ABOVE, Pivot Pin.
6965.B	Pivot Bolt, Upper Linkage Front. S/N 9A & EARLIER
6965.C	Pivot Bolt, Upper Linkage Front. S/N 10A & LATER
6967.3S	Clamp facing, 7x7 toolbar
6967.3SD	Clamp facing, 7x7 toolbar R.H.
6967.3SG	Clamp facing, 7x7 toolbar L.H.
6986	Spring Clip Stainless
6998	Spring
7010.A	Cast hub, uses 6x22 rivets
7012.DA	Removable spindle, righthand
7012.GA	Removable spingle, lefthand
7014.A	Bearing double disc opener (52042RS)
7015.A	Sealing washer
7065	Cast point
7065.A	Cast V slice insert
7067	Spacers for Unit Lock-up bracket
7068	Opening disc only
7069.C	Bracket for wheel stop/depth control rod, NG+4
7070	Swing bracket
7076.A	Threaded for depth adjustment
7077.3	Seed hopper, Twin row, 60 ltr
7077.3A	Seed hopper, TwinRow/reversed, 60 ltr
7078	Wire stop for depth control rod
7079	Seed tube, blank
7079.1	Seed tube, w/ hole, no sensor
7079.2S	Seed tube, w/ sensitive sensor
7079.3	Seed tube, Peanut, no sensor
7079.3S	Seed tube, Peanut, w/ sensor
7079.4	Seed tube, Beet, no sensor
7086	Seed tube, Pin
VA598003	Seed tube, w/ sensor
VA598503	Seed tube, w/ hole, no sensor
7083	Handwheel for depth control
7084.1A	Right outside scraper
7084.2A	Left outside scraper
7086	Pin for seed tube attachment
7087.B	Pin, uses 2-5x40 cotter pins
7089	Small chain guard
7090.A	Drive chain guard
7091	Clip pin
7094	Spacer bushing
7095	Pivot pin, takes 10x100 bolt
7096	Chain roller (cast iron)
7098	Lower parallel linkage arm
7099 *	SEE TABLE ON PREVIOUS PAGE, Pivot Pin
7099.B	Pivot Bolt, Upper Linkage Rear, S/N 9A & EARLIER
7099.C	Pivot Bolt, Upper Linkage Rear, S/N 10A & LATER
7100	Bushing, self lubricated
7104	Lid w/o spring clip
7104.CO	Lid complete w/spring clip
7104.2	Spring clip
7105	Spacer
7108	Bushing, self lubricated, Unit Lock-up

PART No.	DESCRIPTION
7124.A	Unit Stop
7125.A	Seed Emptying chute
7127	Threaded rod
7130.A	Unit lock up bracket NG+3 & Quick Adjust
7136	Spring for lock-up 7130.A
7154	Idler (7154.CO = Complete assembly)
7227	Spring Stop for Idler
7228	Spacer for Idler
7229	Carrier Bushing for Idler
7337	Protection point, double disc openers
7410	Upper parallel linkage arm
9174	Spring, chain tightener
11579	Bearing, safety clutch (60062RS)
11580	Snapring, 55mm
651037	Sprocket 18T #41 Chain
900259	Drive chain, #41, 124 links w conn. Link
900263	Opening disc complete w/bearing
10040059	Depth Gauge Indicator, Right
10040061	Depth Gauge Indicator, Left
10071037	Threaded weld bushing, Right
10071038	Threaded weld bushing, Left
10159070	Vacuum Hose Spring Clip
10153085	Spring for lock-up 20058672
10170014	Split Pin, 2.5 x 20mm
10170066	Split Pin, 5 x 35mm
10170067	Split Pin, 5 x 40mm
10172031	Roll Pin, 3.5 x 25mm
10172090	Roll Pin, 6 x 25mm
10172092	Roll Pin, 6 x 35mm
10176004	Rivet, 6 x 22mm
10176050	Rivet, 6 x 16mm
10219093	Rubber Grommet
CBM-31030	Carrage Bolt, M10 x 30mm
HM-0620	Bolt, M6 x 20mm
HM-0680	Bolt, M6 x 80mm
HM-16100	Bolt, M6 x 100mm
HM-2875	Bolt, M8 x 75mm
HM-41030	Bolt, M10 x 30mm
HM-41040	Bolt, M10 x 40mm
HM-41080	Bolt, M10 x 80mm
HM-510100	Bolt, M10 x 100mm
HM-65110	Bolt, M12 x 110mm
HM-65120	Bolt, M12 x 120mm
N-5101	Nylock 5/8"
NM-0605	Nylock 6mm
NM-1812	Nylock 8mm
NM-21015	Nylock 10mm
NM-21205	Nylock 12mm
NM-51603	Jam Nut 16mm
W-0415	Washer, 1/4" x 1-1/2" Stainless for Hopper
W-9616	Washer, 6.5 x 16 x 1mm
W-9618	Washer, 6.5 x 18 x 1.5mm
10620090	Washer, 10.5 x 20 x 2.5mm
10620095	Washer, 10.5 x 27 x 2mm
10621001	Washer, 10.5 x 40 x 2mm
10621046	Washer, 13 x 27 x 2mm
10622024	Washer, 16.5 x 26 x 1mm
10622052	Washer, 17 x 50 x 1mm
20058611	Support for Vacuum Hose Spring Clip
20058672	Unit lock up bracket NG+4
20059176	Removable FacePlate NG+4
66005917	NG+4 Unit Frame

NG Plus 4, Twin-Row

METERING BOX ASSEMBLY

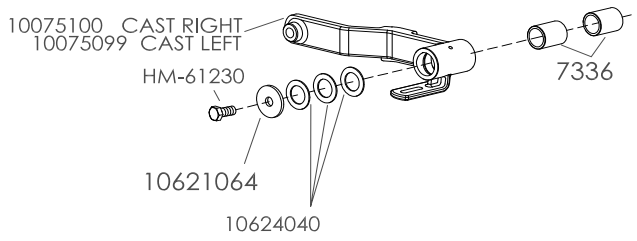


PART No.	DESCRIPTION
4329.a	Snapring, internal, 57mm
4453	Vac Hose Clamp
5692	Wing nut, 10mm
6077	Lynch pin, 6mm dia.
6089	Rubber ring
6090	Snapring, 6mm
6092	Spring
6202	Collar brace
6202.A	Coller Brace with slot
6202.1	Slide Plate for slotted Meter box collar
6203.b	Plastic insert
6204	Plastic Ejector
6204.a	Bronze ejector block assembly
6204.b	Bronze ejector, extended point
6205	Control window
6206	Tightening cap
6207	Shaft, meter box, uses 8x50 roll pin
6208	Threaded tightening rod for cover
6209.a	Brace for plastic insert
6210	Pressure pin scraper
6211	Seed scraper, standard
6211.2a	Seed scraper, extra large seed
6212.a	Agitator, brass
6213	Snapring, external, 20mm
6216	Fixed pin for seed scraper
6217	Adjustable pin for seed scraper, uses 4x35 roll pin
6218	Spring for selector
6219	Pin for control window
6221	Bearing 42mm, (ref. 60042RS)
6222	Screw, used for agitator and wind flap
6222.1	Screw used for wind flap
6223	Screw, 5x6 to secure brace 6209.a
6224	Connector Pin Chainshield
6225	Nut, to secure ejector block
6227	Spring for selector handle
6228	Selector handle
6230.a	Removable Plug
6232	Gasket for inside meter box cover

PART No.	DESCRIPTION
6233.3S	Restrictor plate for peanut cover, medium seed
6233.2	Shutter for medium to small seed, standard cover
6233.2s	Shutter for small seed, large seed cover only (turnip)
6233.3s	Shutter for medium seed, large seed cover only
6238	Aluminum ejector block (for large seed covers)
6240	Rubber shield
6241	Metal tightener plate
7089	Fixed Chain housing
If using Sync-Row System, See Sync-Row Supplement in Back	
7115.s	Sprocket, 26 tooth, standard drive sprocket
800373	Sleeve with Hex with groove for timing plate
800408	Dial selector with weldment
800409	Timing plate with 18 tooth sprocket
10153086	Spring for trap door
10172043	Roll pin, 4x35 for 6217 pin
10172099	Roll pin, 6x70 to secure trap door
10173022	Roll pin, 8x50 for 6207 shaft
10200184	Plastic insert for seed scraper
10530060	Screw, 5x10 Phillips head
10530094	Phillips screw, 6x20
10591992	Screw, 6x16 for ejector block assembly
10620004	Washer, 5.5x16x1mm
10620008	Washer, 6.5x12x.6mm
10629007	Lockwasher, External tooth 6mm
10629011	Lockwasher, External tooth 10mm
20000529	Agitator brass with only 5 fins
20021564	Housing only for meter box
20021567	Meter box cover only
HM-41015	Hex Bolt 10-1.5x16mm
NM-0501	Hex Nut 5mm
NM-0601	Hex Nut 6mm
NM-0610	Jam Nut 6mm
NM-21010	Jam Nut 10mm
NM-21011	Hex Nut 10mm
651928	Protection kit
66005868	Trap door NG+4
65012911	Standard cover complete
65012912	Large seed cover complete
METERING BOX COMPLETE	
641097	Complete meter box, w/26T sprocket & collar
641090	Complete meter box, w/21T sprocket & collar
65032073	Large seed complete meter box assem. w/ 26T sprocket & collar

NG Plus 4, Twin-Row

GAUGE WHEEL ARM ASSEMBLY

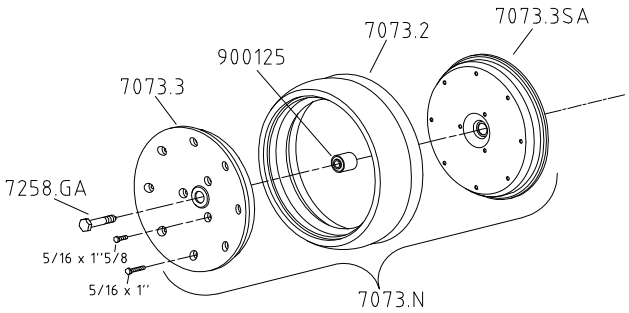


PART No.	DESCRIPTION
7336	Two piece bushing
10075100	Cast Gauge wheel arm RH
10075099	Cast Gauge wheel arm LH

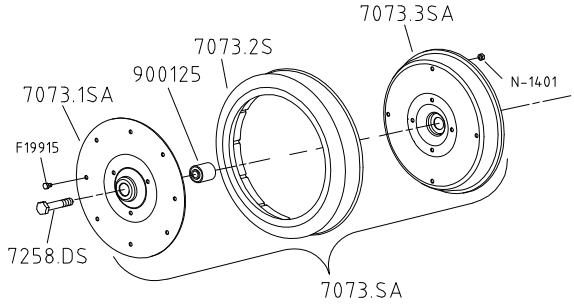
PART No.	DESCRIPTION
10621064	Washer M13 x 45 x 5
10624040	Washer M33 x 45 x 1.5
HM-61230	Hex bolt M12 x 30

GAUGE WHEEL ASSEMBLY

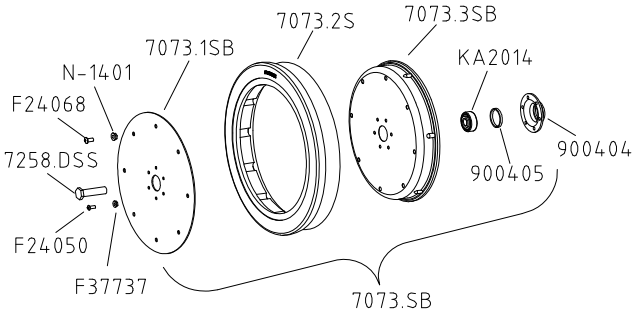
7073.N	Gauge wheel complete (black nylon rim)
900125	Bearing, 40mm (DAC1640442RSL)
7073.2	Tire only, standard
7073.3	Outer rim (black nylon)
7073.3SA	Inner rim (black steel)
7258.DA	RH Hex head bolt 16 x 80
7258.GA	LH Hex head bolt 16 x 80



7073.SA	Narrow gauge wheel, complete
900125	Bearing, 40mm (DAC1640442RSL)
7073.1SA	Outer rim (steel)
7073.2S	Tire only, narrow
7073.3SA	Inner rim (black steel)
7258.DS	RH Hex bolt 16 x 80, W/ 7/32" thick bolt head
7258.GS	LH Hex bolt 16 x 80, W/ 7/32" thick bolt head
F19915	Flange head bolt, 5/16-18 x 5/8"
N-1401	5/16 -18 Flange lock nut



7073.SB	Flat narrow gauge wheel
900404	Bearing housing
900405	Spacer
7073.1SB	Outer rim (steel)
7073.2S	Tire only, narrow
7073.3SB	Inner rim (black steel)
7258.DSS	RH Bolt 16 x 60, W/ 7/32" thick bolt head
7258.GSS	LH Bolt 16 x 60, W/ 7/32" thick bolt head
F24050	1/4" -20 x 5/8 Button head socket screw
F24068	5/16" -18 x 5/8" Button head socket screw
F37337	1/4 -20 Flange lock nut
N-1401	5/16 -18 Flange lock nut
KA2014	Bearing

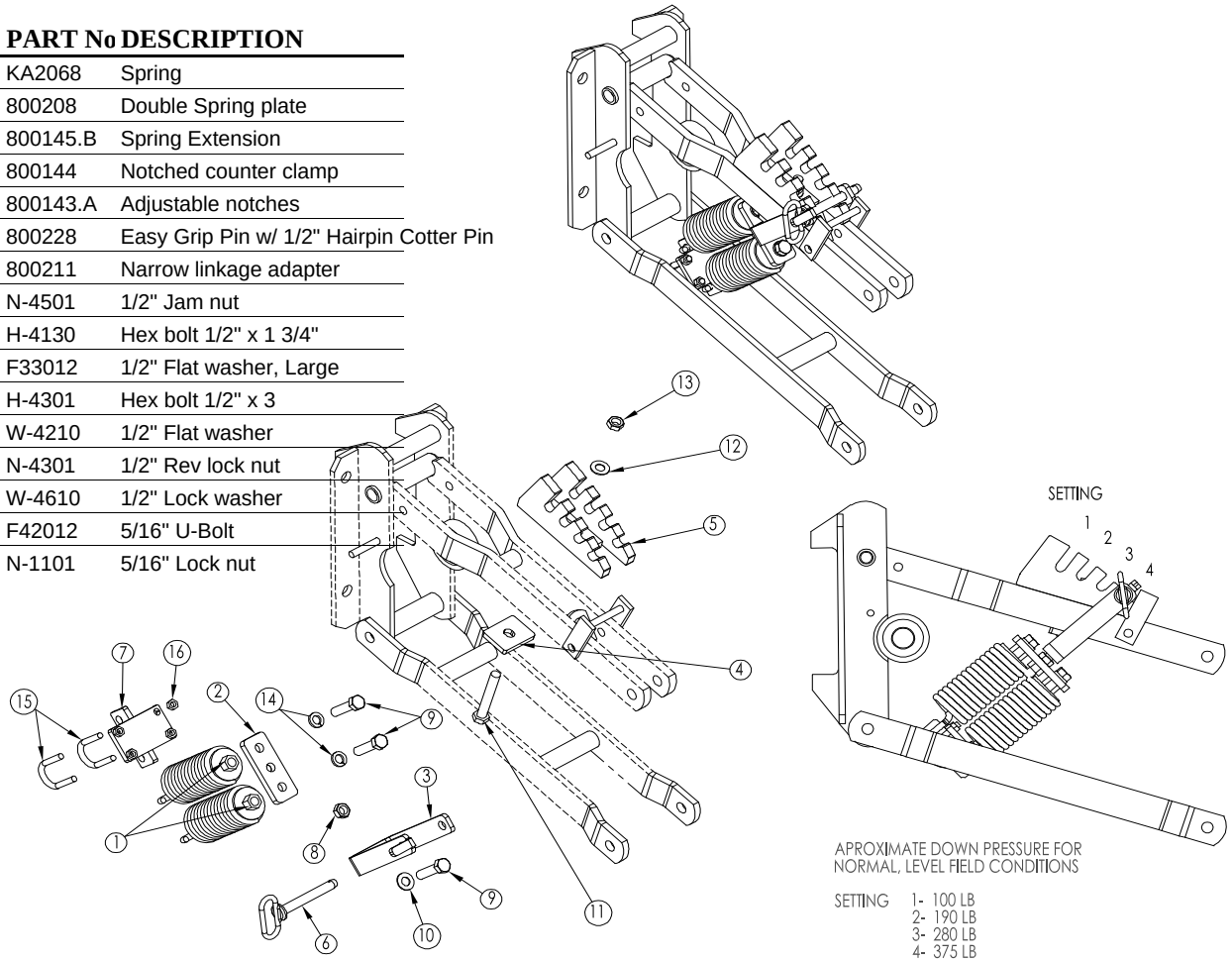


NG Plus 4

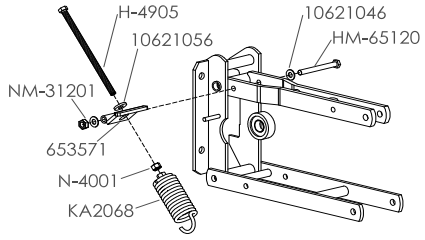
UP / DOWN PRESSURE SPRING

Quick Change Down Pressure, For Use with Narrow Bottom Linkage Sub-Assembly #KA2068QT

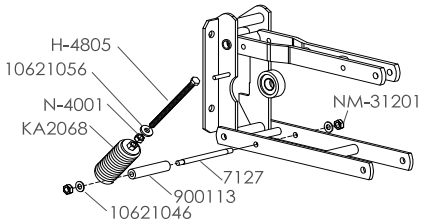
ITEM	PART No	DESCRIPTION
1	KA2068	Spring
2	800208	Double Spring plate
3	800145.B	Spring Extension
4	800144	Notched counter clamp
5	800143.A	Adjustable notches
6	800228	Easy Grip Pin w/ 1/2" Hairpin Cotter Pin
7	800211	Narrow linkage adapter
8	N-4501	1/2" Jam nut
9	H-4130	Hex bolt 1/2" x 1 3/4"
10	F33012	1/2" Flat washer, Large
11	H-4301	Hex bolt 1/2" x 3
12	W-4210	1/2" Flat washer
13	N-4301	1/2" Rev lock nut
14	W-4610	1/2" Lock washer
15	F42012	5/16" U-Bolt
16	N-1101	5/16" Lock nut



Up / Down Pressure Spring Assembly	
H-4805	Bolt, all thread, 1/2-13x8"
H-4905	Bolt, all thread, 1/2-13x10"
HM-65120	Bolt, metric M12-1.75 x120mm
KA2068	Spring
N-4001	Nut, 1/2-13
NM-31201	Nut, Metric M12
653571	Up Pressure Spring plate
7127	Treaded rod M12
900113	Down pressure Spacer bushing
10621046	Washer, 13x27x2
10621056	Washer, 13x30x6



UP PRESSURE SPRING ASSEMBLY



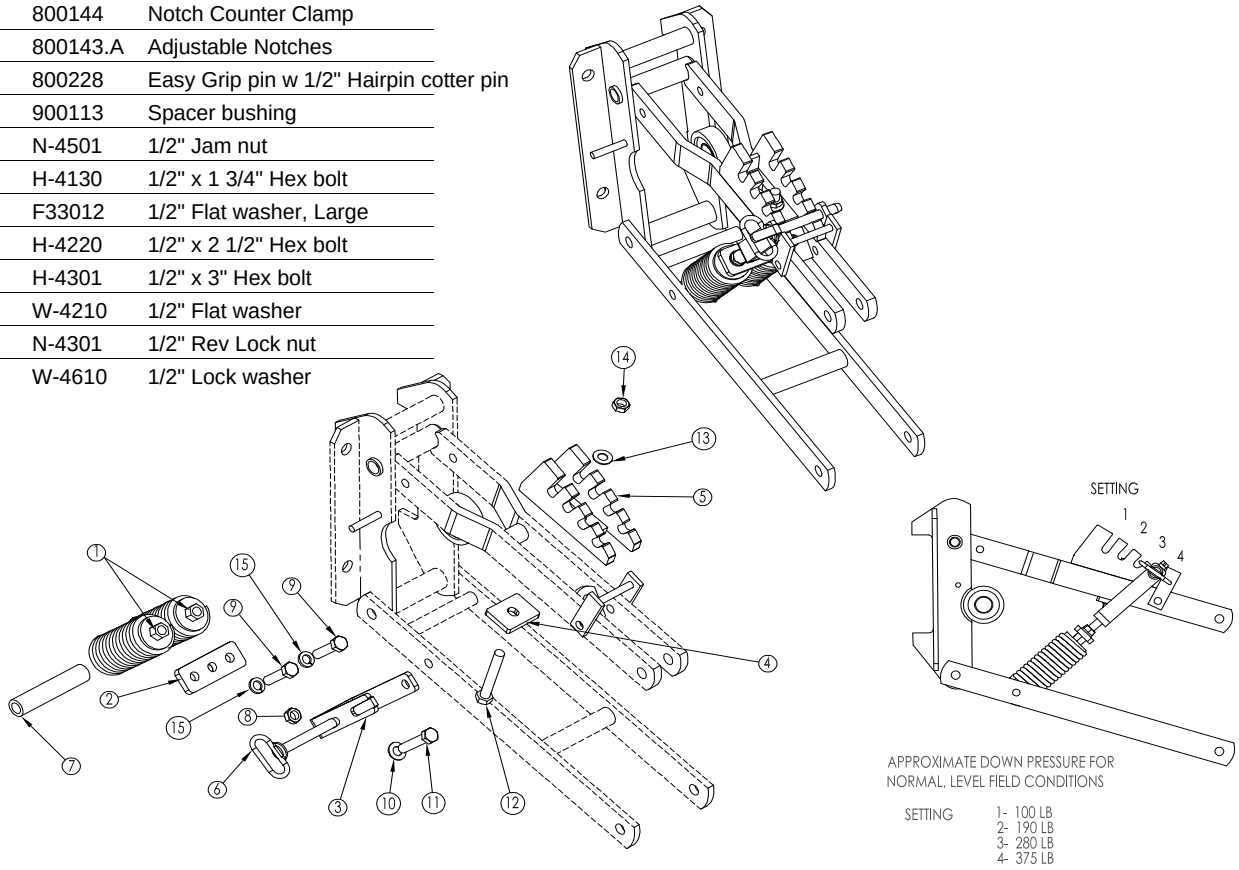
DOWN PRESSURE SPRING ASSEMBLY

NG Plus 4

UP / DOWN PRESSURE SPRING

Quick Change Down Pressure, For Use with Standard Linkage Sub-Assembly #KA2068Q

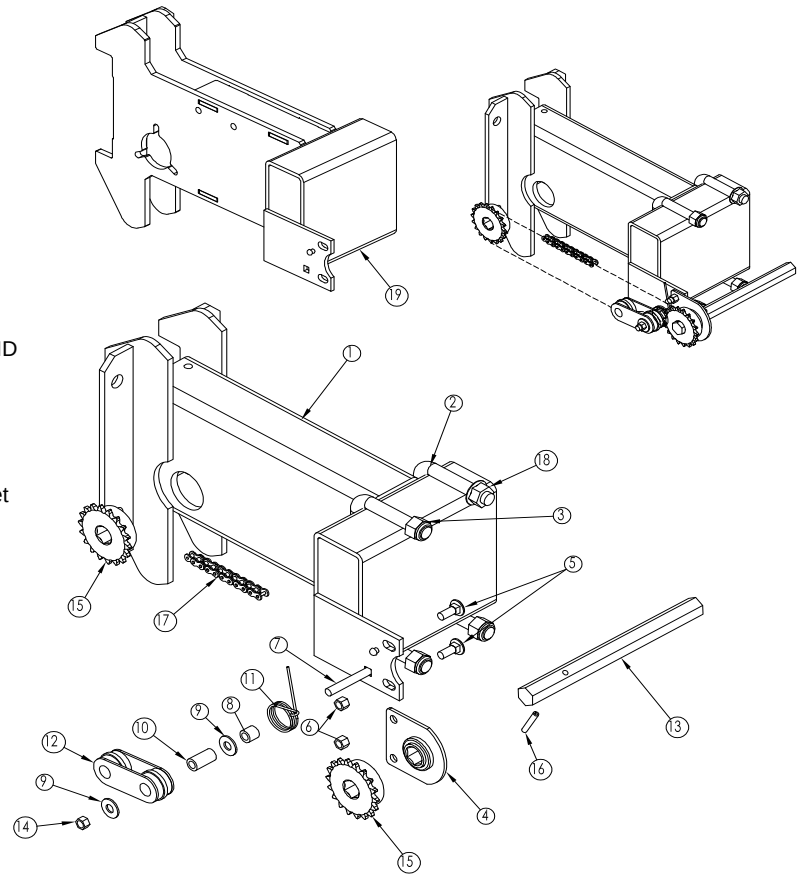
ITEM	PART No	DESCRIPTION
1	KA2068	Spring
2	800208	Double Spring Plate
3	800145.B	Spring Extension
4	800144	Notch Counter Clamp
5	800143.A	Adjustable Notches
6	800228	Easy Grip pin w 1/2" Hairpin cotter pin
7	900113	Spacer bushing
8	N-4501	1/2" Jam nut
9	H-4130	1/2" x 1 3/4" Hex bolt
10	F33012	1/2" Flat washer, Large
11	H-4220	1/2" x 2 1/2" Hex bolt
12	H-4301	1/2" x 3" Hex bolt
13	W-4210	1/2" Flat washer
14	N-4301	1/2" Rev Lock nut
15	W-4610	1/2" Lock washer



Twin-Row

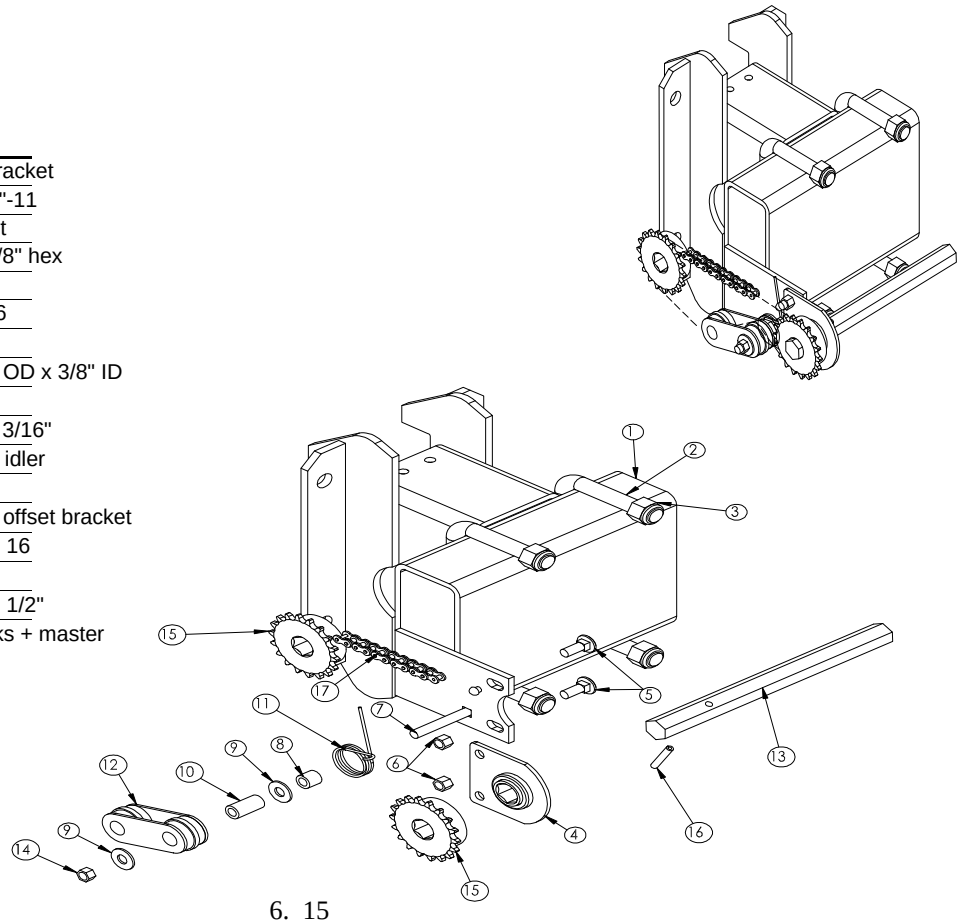
OFFSET ASSEMBLY FOR 8"

ITEM	PART No.	DESCRIPTION
1	E7501.2	Twin-row offset bracket 8"
2	900164	U Bolt 7"x 3"x 5/8"-11
3	N-5101	5/8"-11 Nylock nut
4	KA2180	Bearing hanger 7/8" hex
5	CB-2210	CB 3/8"-16x 1"
6	N-2101	Nylock nut 3/8"-16
7	CB-2231	CB 3/8"-16x 2.5"
8	KD2971-10	Tube marker 5/8" OD x 3/8" ID
9	W-2210	3/8" Flat washer
10	KD1026	Sleeve bushing 1 3/16"
11	KD11219	Spring, US Insect idler
12	KD11962	Idler
13	E7502.1	Hex shaft for 8" offset bracket
		(10" Length)
14	N-2300	Rev lock nut 3/8"- 16
15	G40B18	Sprocket 40-18
16	F64251	Spring pin 1/4"x 1 1/2"
17	900327	Chain #40
18	N-5401	Flange nut 5/8"-11 REG
19	E7501.3	Twin-row offset bracket
		right (Shown)
	E7501.4	Twin-row offset bracket
		left (Not shown)



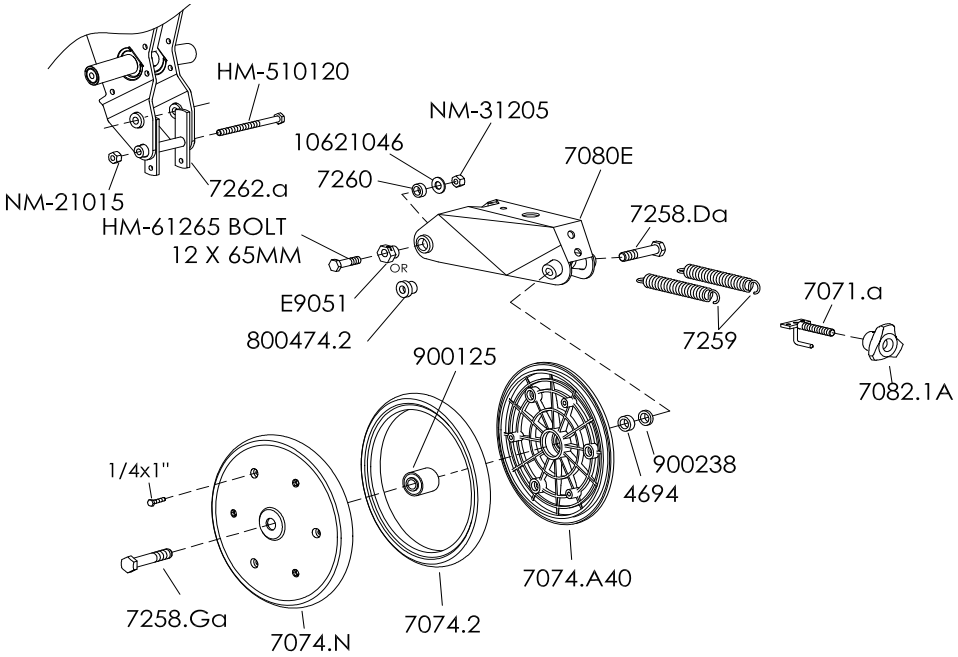
OFFSET ASSEMBLY FOR 9"

ITEM	PART No.	DESCRIPTION
1	E1001.A	Twin-row offset bracket
2	900164	U Bolt 7"x 3"x 5/8"-11
3	N-5101	5/8"-11 Nylock nut
4	KA2180	Bearing hanger 7/8" hex
5	CB-2210	CB 3/8"-16x 1"
6	N-2101	Nylock nut 3/8"-16
7	CB-2231	CB 3/8"-16x 2.5"
8	KD2971	Tube marker 5/8" OD x 3/8" ID
9	W-2210	3/8" Flat washer
10	KD1026	Sleeve bushing 1 3/16"
11	KD11219	Spring, US Insect idler
12	KD11962	Idler
13	E7502.1	Hex shaft for 7.5" offset bracket
14	N-2300	Rev lock nut 3/8"- 16
15	G40B18	Sprocket 40-18
16	F64251	Spring pin 1/4"x 1 1/2"
17	900184.B	Chain #40, 55 links + master



NG Plus 4, Twin-Row

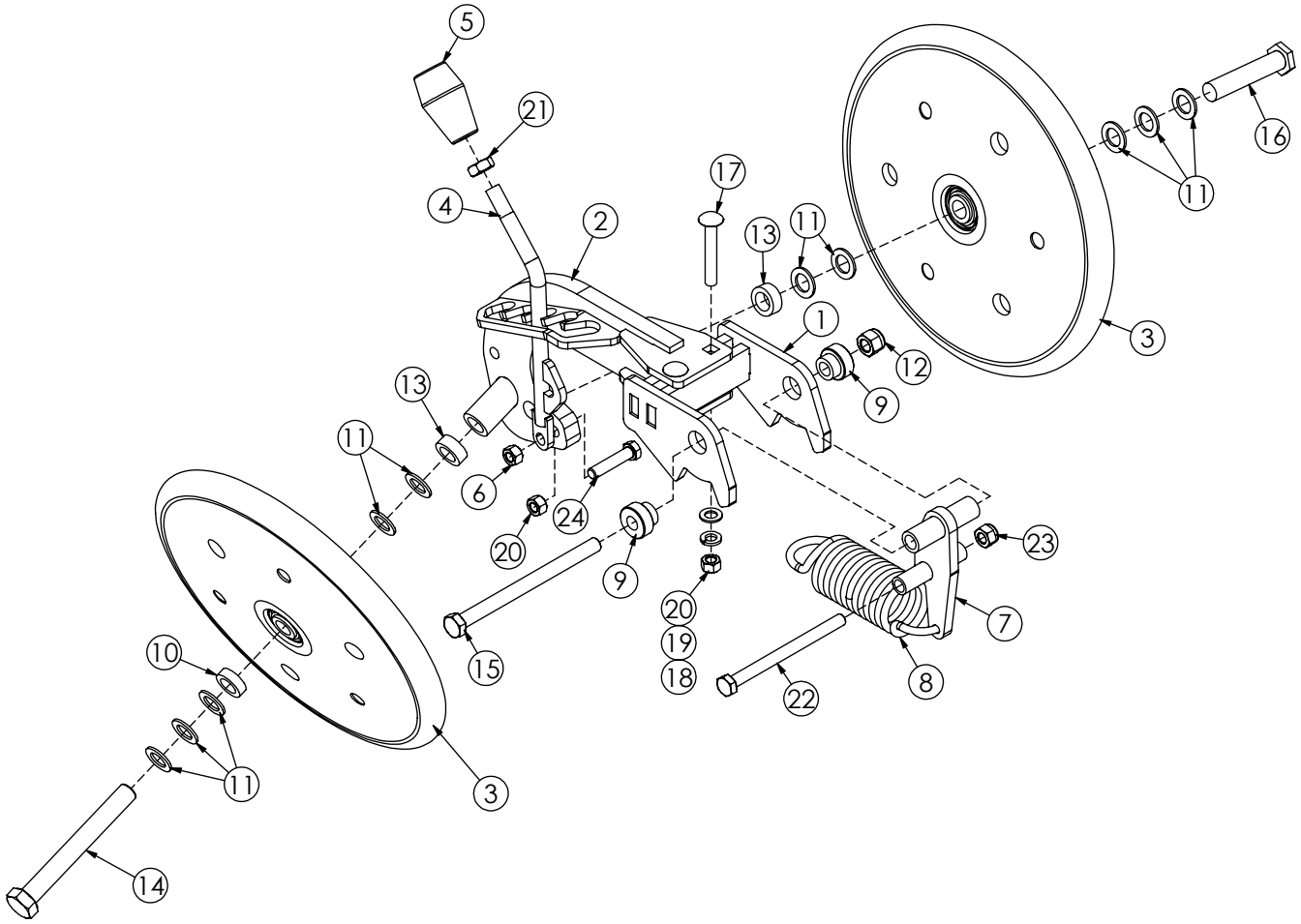
CLOSING WHEEL ASSEMBLY

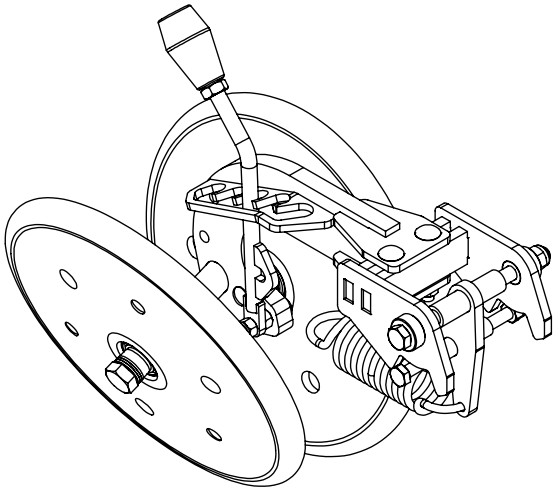


PART No.	DESCRIPTION
4694	Bushing 10mm
7071.A	Adjustment Rod 12mm
7074.A40	Nylon rim half
7074.N	Closing Whl Complete 1" x 12"
7074.2	Tire Only 1" x 12"
7080.E	Bracket for narrow and twin rows
7082.1A	Handwheel Machined
7258.DA	M16 x 80 R.H.
7258.GA	M16 x 80 L.H.
7259	Spring
7260	Spacer bushing

PART No.	DESCRIPTION
7262.A	Spring support
800474.2	Straight bushing
900125	Bearing 40mm
900238	Bushing 8mm
10621046	Washer M13 x 27 x 2
E9051	Eccentric bushing
HM-510120	Bolt M10 x 120
HM-61245	Bolt M12 x 45
HM-61265	Bolt M12 x 65
NM-21015	Nylock 10mm
NM-31205	12mm Nylock

TWIN-ROW CLOSING WHEEL ASM

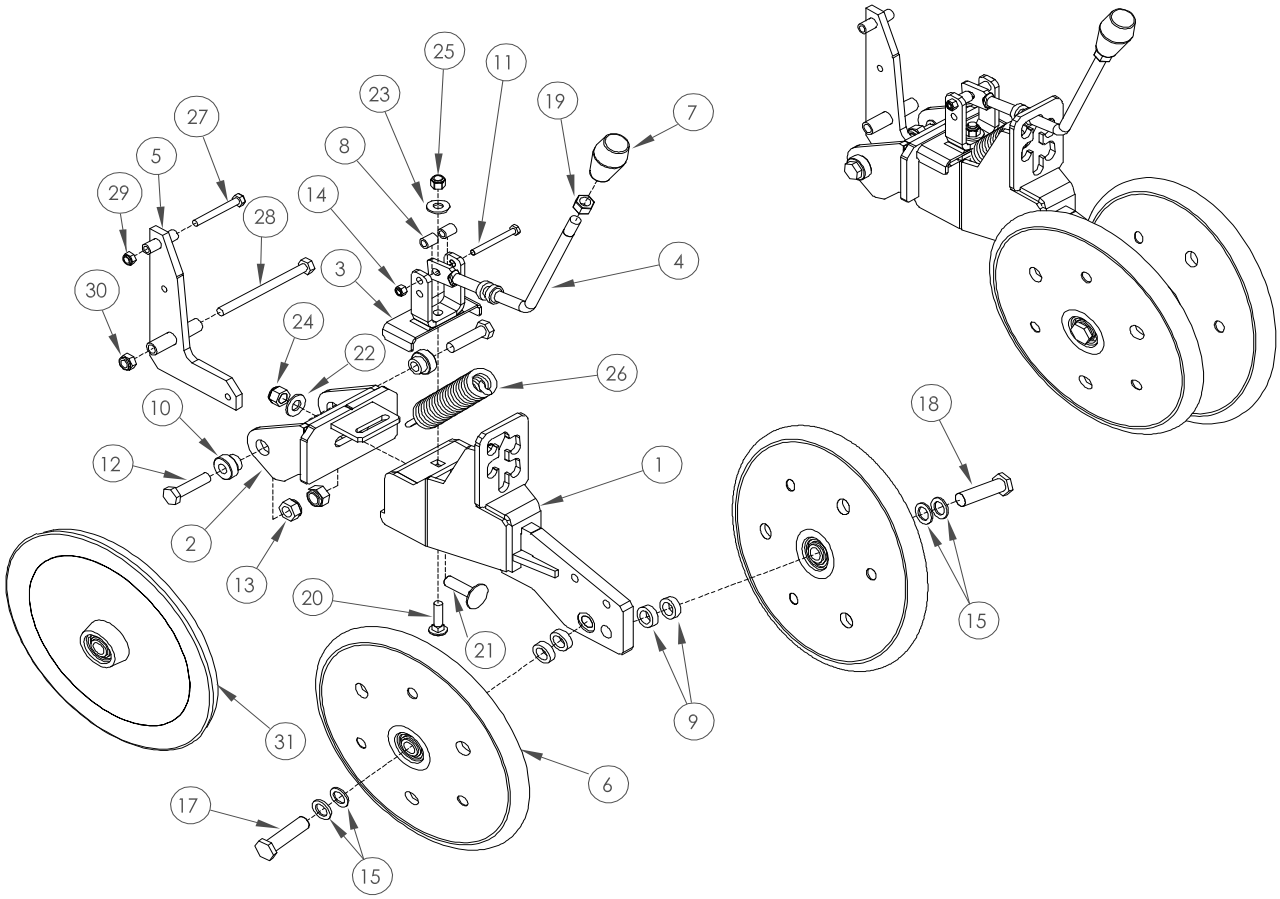




ITEM NO.	QTY.	PART NUMBER	DESCRIPTION
1	1	200469	CLOSING WHEEL FRONT WA
2	1	200417	BRACKET
3	2	7074.N	V-CLOSING WHEEL
4	1	200418	HANDLE WA
5	1	7082.AM	KNOB
6	1	N-2300	NUT, HEX, CNTRLK, 3/8"-16 G5
7	1	200471	BRACKET, SPRING WA
8	1	300432	SPRING, CLOSING WHEEL
9	2	800474.1	BUSHING SHORT
10	1	900238	BUSHING, 25 X 16.5 X 8mm
11	10	10622026	WASHER 16.5 X 26 X 2mm
12	1	NM-31205	NUT, NYLOCK, 12mm G8.8
13	2	900159	BUSHING, 25 X 16.5 X 11mm
14	1	HM-816130	BOLT, HEX, 16-2 X 130mm G8.8
15	1	HM-56160	BOLT, HEX, 12-1.75 X 160mm G8.8
16	1	7258.GS	BOLT, HEX SHORT HEAD LH 16 X 80mm
17	2	CB-2231	BOLT, CARRIAGE, 3/8"-16 X 2-1/2" FULL THRD G5
18	2	W-2410	WASHER, FLAT, 3/8" SAE G8 YZ
19	2	W-2610	WASHER, SPLIT, 3/8" G8 YZ
20	3	N-2001	NUT, HEX, 3/8"-16 Z G5
21	1	N-4501	NUT, HEX JAM 1/2"-13 G8
22	1	HM-510130	BOLT, HEX, 10-1.5 X 130mm G10.9
23	1	NM-21015	NUT, NYLOCK, 10mm G8.8
24	1	H-3130	BOLT, HEX, 3/8"-16 X 1-3/4" G8

Twin-Row

8" V PRESS WHEEL CLOSING ASSEMBLY

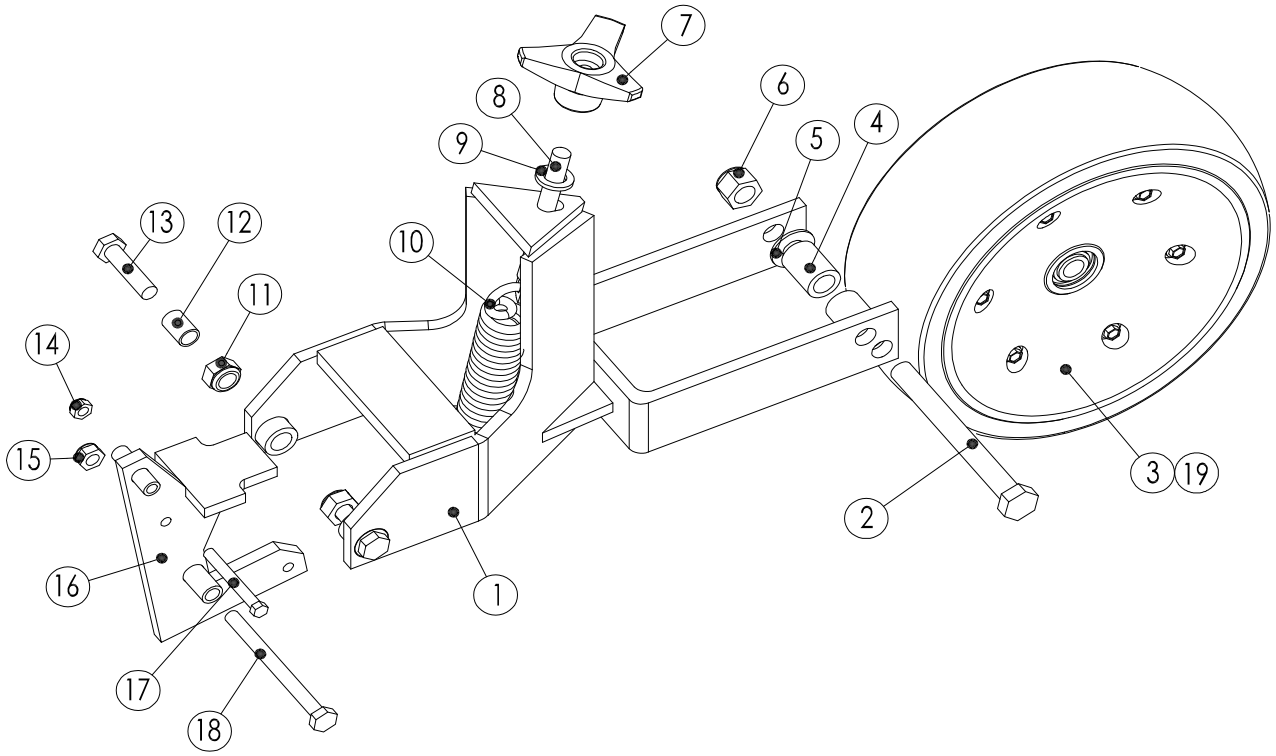


ITEM	PART NO.	DESCRIPTION
1	800583	Body weldment
2	800582	Front weldment
3	800585	Handle support weldment
4	800584	Handle weldment
5	200001	Spring plate weldment
6	7074.N	Closing wheel complete
7	7082.AM	Knob -1/2-13 internal thread
8	800617	Spacer .635" long
9	900238	Bushing 16.5 ID X 25 OD X 8mm
10	800474.1	Bushing
11	H-2275	Bolt, 5/16 x 2-3/4"
12	HM-61250	Bolt, 12 x 50mm
13	NM-31205	Nylon Locknut, 12mm
14	N-1101	Nylon Locknut, 5/16"-18
15	10622026	Flat Washer, 16.5 X 26 X 2mm

ITEM	PART No.	DESCRIPTION
17	7258.GS	Bolt, LH, 16 x 80mm thin head
18	7258.DS	Bolt, RH, 16 x 80mm thin head
19	N-4501	Jam Nut, 1/2-13
20	CB-2221	Carriage Bolt, 3/8" X 1-1/2"
21	CB-4411	Carriage Bolt, 1/2" X 1-1/2"
22	W-4410	Flat Washer, 1/2"
23	W-2210	Flat Washer, 3/8"
24	N-4101	Nylon Locknut, 1/2"-13
25	N-2101	Nylon Locknut, 3/8"-16
26	7075	Spring
27	HM-2865	Bolt, 8 X 65mm
28	HM-510130	Bolt, 10-1.5 X 130mm
29	NM-1812	Nylon Locknut, 8mm
30	NM-21015	Nylon Locknut, 10mm
31	KA6597	Cast iron closing whl, complete

Twin-Row

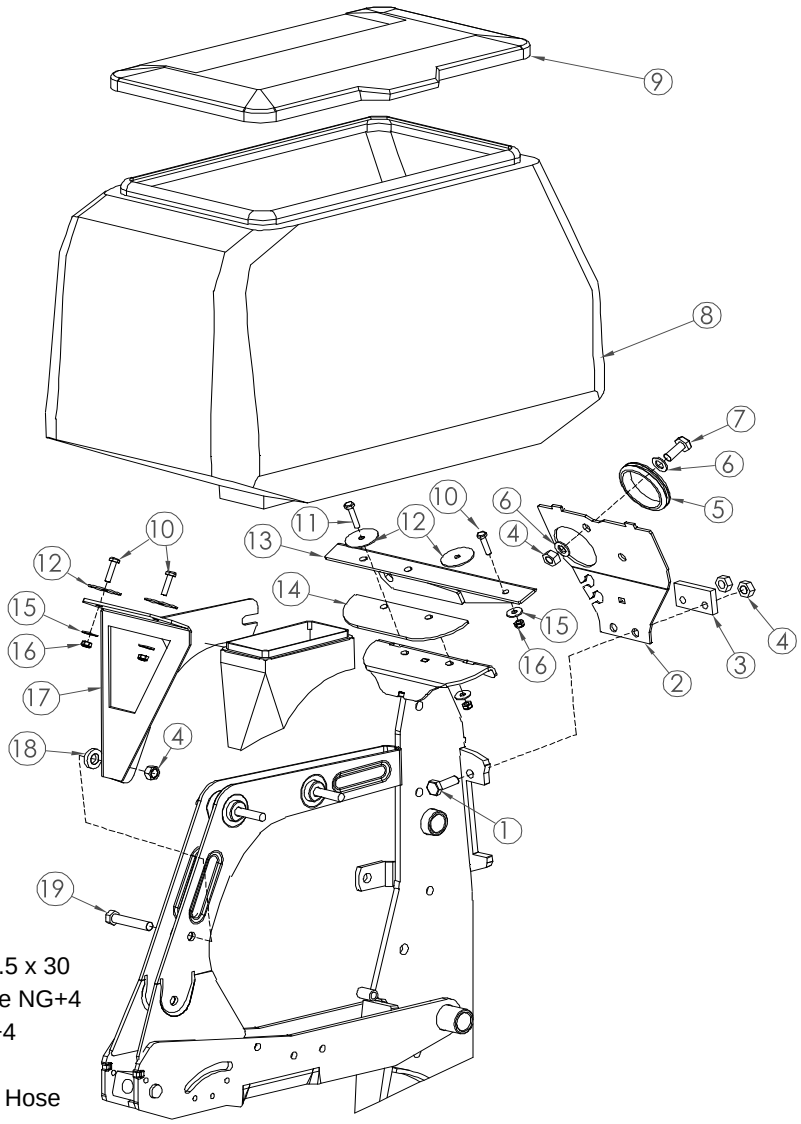
7.5" FLAT PRESS WHEEL CLOSING ASSEMBLY



ITEM	PART No.	DESCRIPTION
1	E7530	Wheel mounting bracket
2	H-5601	Hex bolt 5/8-11 x 6"
3	11540.AM	Flat closing wheel, 4" x 12" crowned
	11540.AMC	Flat closing wheel, 4" x 12" concave
4	900235	Bushing - 32mm
5	W-5410	Flat washer - 5/8" SAE
6	N-5101	Nylock nut 5/8-11
7	7082	Knob 12MM
8	7071.2	Tension rod - 12 x 130mm
9	W-4405	Flat washer - 1/2" SAE
10	7075	Spring
11	NM-31205	Lock nut M12
12	E7522.1	Bushing 23mm
13	HM-61250	Hex bolt M12 x 50mm
14	NM-1812	Lock nut M8
15	NM-21015	Lock nut M10
16	E7524	Spring plate
17	HM-2865	Hex bolt M8 x 65mm
18	HM-510120	Hex bolt M10 x 120mm
19	900125	Wheel bearing 40mm (DAC1640442RSLCS)

Twin-Row

HOPPER ASSEMBLY



ITEM	PART No.	DESCRIPTION
1	HM-41030	Hex Head Bolt M10-1.5 x 30
2	20059176	Removable Face Plate NG+4
3	7124.A	Removable Stop NG+4
4	NM-21015	Nylock M10
5	10219093	Grommet for Vacuum Hose
6	W-2410	Flat Washer 3/8"
7	HM-41025	Hex Head Bolt M10-1.5 x 25
8	7077.3A	Reversed 2 Bushel Hopper
9	7104.CO	Hopper Lid W/ Spring
10	HM-0620	Hex Head Bolt M6-1 x 20
11	HM-0630	Hex Head Bolt M6-1 x 30
12	W-0415	Washer, 1/4" x 1.5" stainless
13	800518	Front Hopper Bracket
14	800517	Front Hopper Bracket Shim
15	10620041	Washer, 16.5 x 18 x 1.5mm
16	NM-0605	Nylock M6
17	800501	Reverse Hopper Bracket, Rear
18	10621056	Flat Washer , 13 x 30 x 6mm
19	HM-41055	Hex Head Bolt M10-1.5 x 55

7. OPTIONAL EQ.

7. 1. TRIPLE FOLD ROW MARKERS

7. 4. MICROSEM INSECTICIDE, Twin-Row

SYNC-ROW® system for Twin-Row

7. 5. DRY FERTILIZER, Pull-Type

7. 7. LIQUID FERTILIZER, Pull-Type

CSS- CENTRAL SEED SYSTEM, Twin-Row

ROW MARKERS

Pull-Type

HYDRAULIC ROW MARKER OPERATION

The planters are equipped with a single valve hydraulic system or an optional dual valve hydraulic system. The single valve system requires the planter to be raised in order to lift the markers. Each time the planter is lowered, the row markers will alternately be lowered. If the planter is raised to cross a waterway, the opposite marker will be lowered when the planter is lowered back into the ground. Therefore, it will be necessary to stop and again raise and lower the planter to restore correct marker operation.

If planting in this type of situation, dual valve hydraulics are highly recommend. The optional dual hydraulic system allows the markers to be operated independently of the planter lift cylinders. Each time a marker is raised, the sequencing valve will direct flow to lower the opposite marker.

Both markers can be used at the same time if desired. To do this, lower the planter and the marker that has been selected. Move the tractor control lever to the raise position and immediately return it to the lower position. This will shift the marker control valve and the remaining marker will be lowered. This is useful in planting contours and terraces.

WARNING Stand clear and keep others away when raising or lowering the row markers. Lock row markers for transport using the locking pin.

MARKER LENGTH ADJUSTMENT

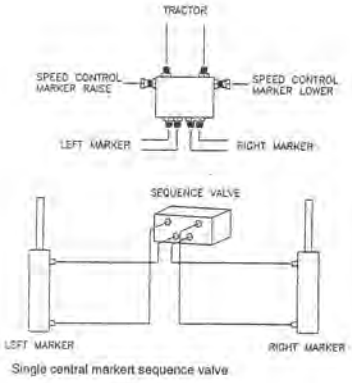
To determine the correct length to set the marker assemblies, multiply the number of rows by the average row spacing in inches. This provides the total planting width. Adjust the marker extension so the distance from the marker shovel to the center line of the planter is equal to the total planting width previously obtained. Both the planter and marker assembly should be lowered to the ground when measurements are taken. The measurement should be taken from the point where the shovel contacts the ground. Adjust right and left marker assemblies equally and securely tighten clamping bolts. An example of marker length adjustments follows:

Number of rows x Row spacing inches = Dimension between planter center line and marker shovel.

IMPORTANT: **A field test is recommended to ensure the markers are properly adjusted. After the field test is made, make any minor adjustments necessary.**

MARKER SPEED ADJUSTMENT

Markers come standard with automatic sequence valves. A flow control valve controls the lowering and raising speed of the markers. To adjust the marker speed, loosen the jam nut and turn the control clockwise or 'in' to slow the travel speed and counter clockwise or 'out' to increase the travel speed. The adjusting bolt determines the amount of oil flow restriction through the flow control valve, therefore determining travel speed of the markers.



Single central markert sequence valve

DANGER The flow controls should be properly adjusted before the marker assembly is first put into use. Excessive travel speed of the markers can be dangerous and/or damage the marker assembly.

NOTE: When oil is cold, hydraulics operate slowly. Make sure all adjustments are made with warm oil.

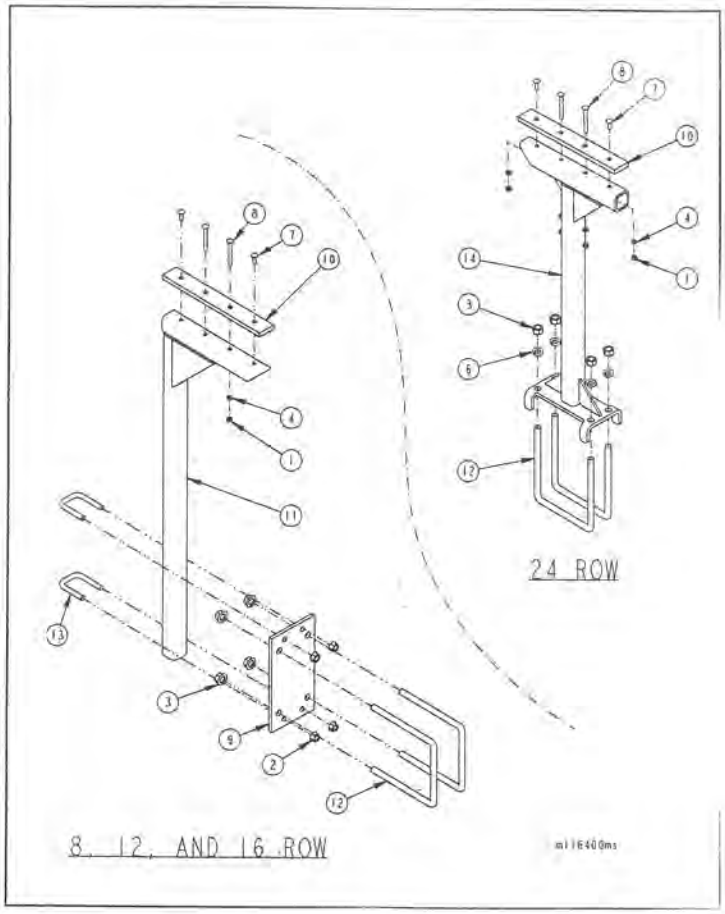
NOTE: On a tractor where the oil flow can not be controlled, the rate of flow of oil from the tractor may be greater than the rate at which the marker cylinder can accept it. The tractor hydraulic control lever will have to be held until the cylinder reaches the end of its stroke. This occurs most often on tractors with an open center hydraulic system.

On tractors with a closed center hydraulic system, the tractor's hydraulic flow control can be set so the tractor's detent will function properly.

ROW MARKERS

Pull-Type

ROW MARKER SUPPORT ASSEMBLY

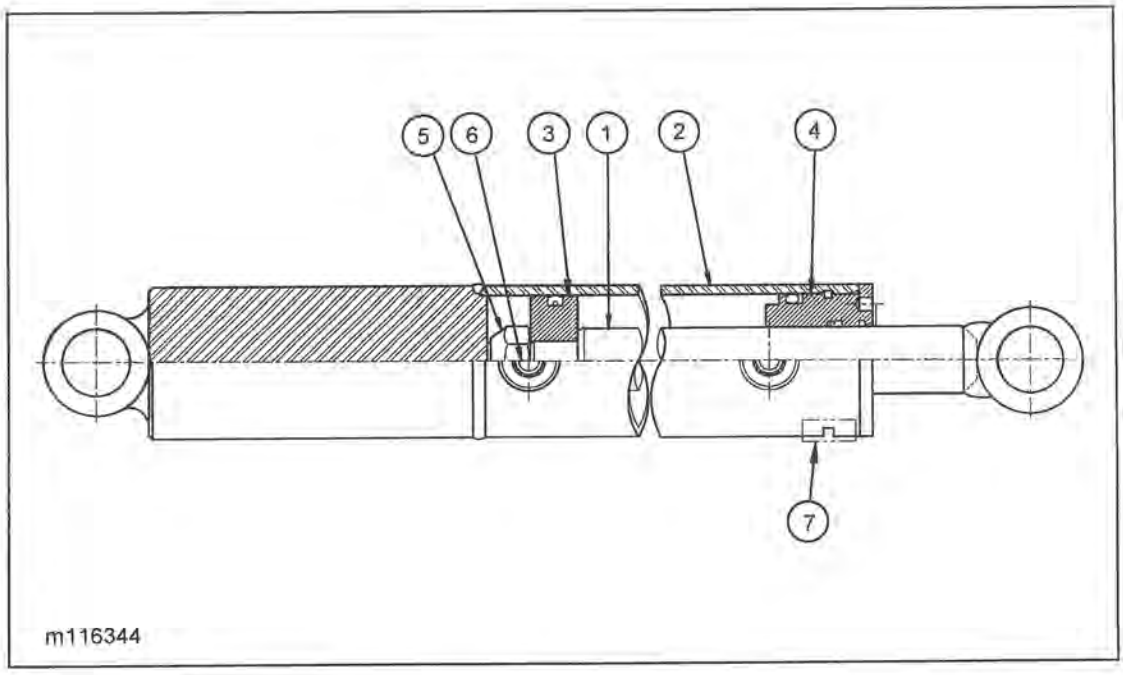


ITEM	PART No.	DESCRIPTION	QTY
1	F36104	Nut, Hex 5/16-18	8
2	F36110	Nut, Hex ½-13 (8row 30 & 16-row)	8
3	F36114	Nut, Hex 5/8-11	8
4	33620	Washer, split lock 5/16	8
5	F33626	Washer, split lock ½ (16-row)	8
6	F33630	Washer, split lock 5/8	8
7	F21811	Screw, rd head sq neck 5/16-18 x 1 GR5	4
8	F21863	Screw, rd head sq neck 5/16-18 x 3 GR5	4
9	L117184	Plate, marker brace (16-row)	2
10	L117186	Rubber block	2
11	L117185	Brace assembly (16-row)	2
12	4502.S	U-bolt	4
13	KD2721	U-bolt scraper (16-row)	4
14	L125952	Bracket weldment, marker rest (24-row)	2

ROW MARKERS

Pull-Type

ROW MARKER CYLINDER ASSEMBLY

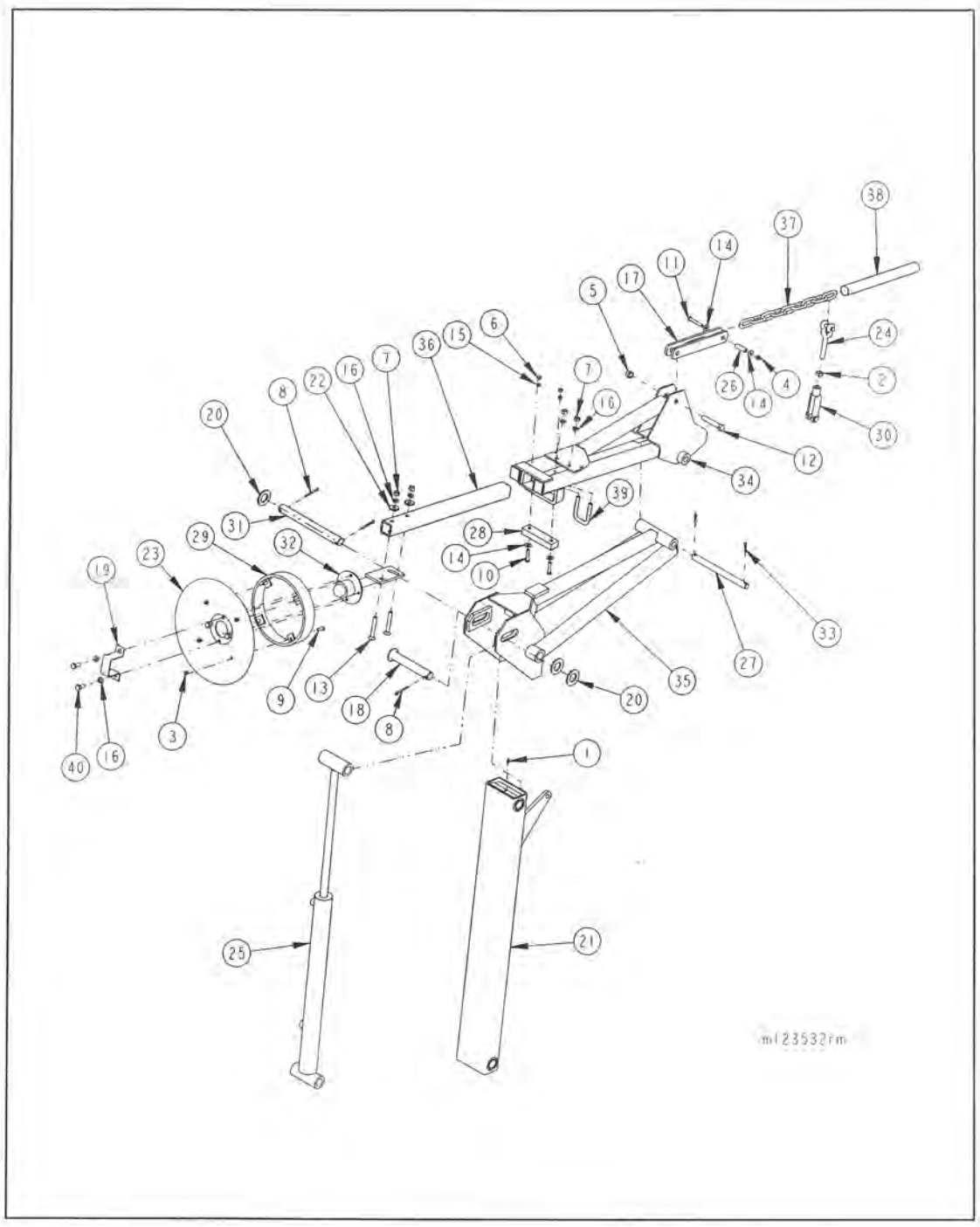


ITEM	PART No.	DESCRIPTION
	L116344	Cylinder, marker 2- ½ x 20
1	L120802	Piston rod
2		Butt and tube assembly
3	L117512	Piston
4	L120803	Gland
5	L220000208	Locknut
6	L200300040	Shipping plug
7	L125563	Square wire tape
	L117514	Seal kit, Includes all O-rings and seals

ROW MARKER

8-Row 30" Pull Type

ASSEMBLY



ROW MARKER

8-Row 30" Pull Type

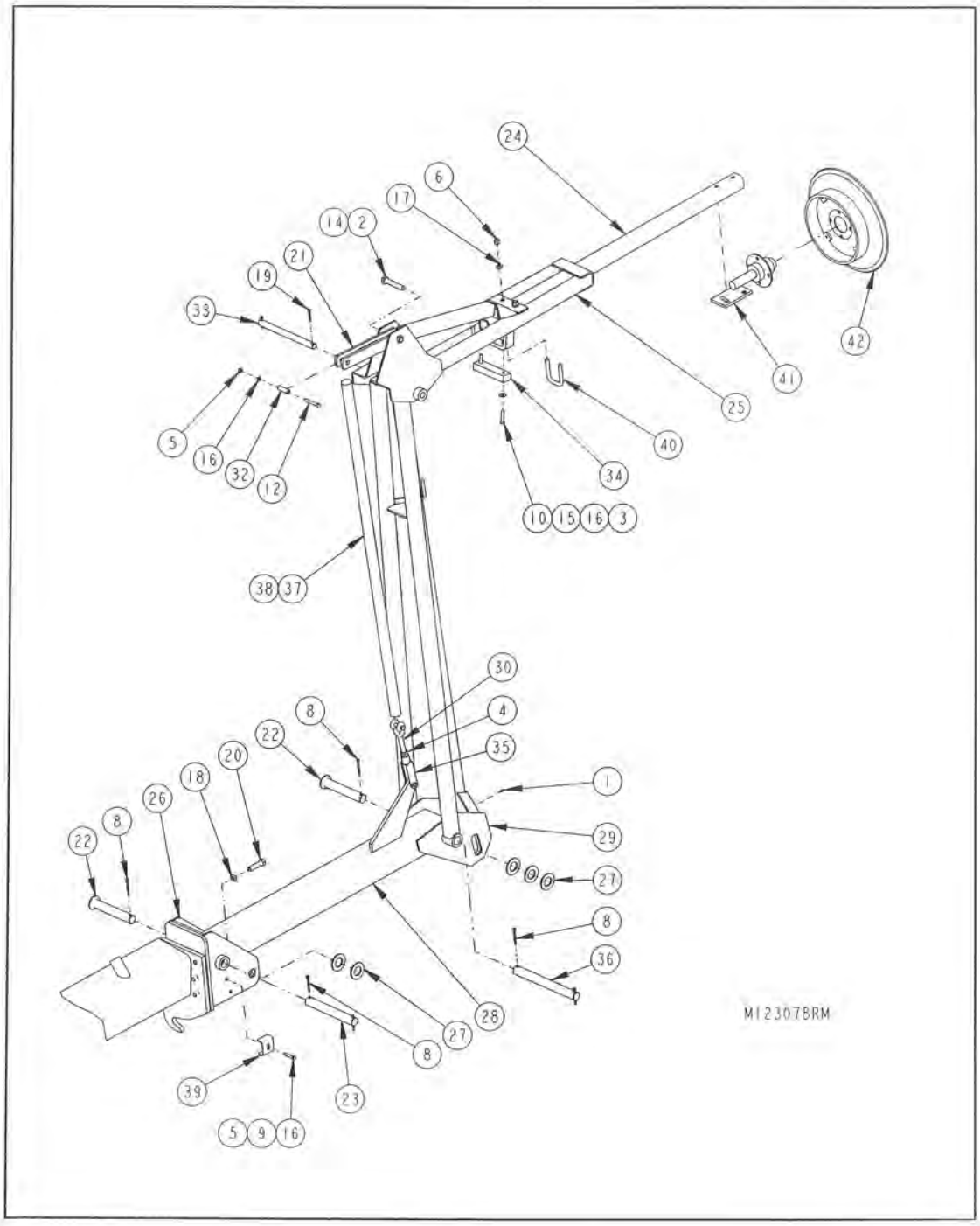
ASSEMBLY

ITEM	PART NO.	DESCRIPTION
1	F58805	GREASE FITTING, 1/4-28
2	F36214	HEX JAM NUT, 5/8-11
3	F37211	REV LOCK NUT, 5/16-18
4	F37212	REV LOCK NUT, 3/8-16
5	F37216	REV LOCK NUT, 5/8-11
6	F36106	HEX NUT, 3/8-16
7	F36110	HEX NUT, 1/2-13
8	F65147	COTTER PIN, 1/4 X 2
9	F13055	SCREW, HEX HEAD CAP, 5-16/18 X 1 GR5
10	F13110	SCREW, HEX HEAD CAP, 3/8-16 X 1-3/4 GR5
11	F13113	SCREW, HEX HEAD CAP, 3/8-16 X 2-1/2 GR5
12	F13317	SCREW, HEX HEAD CAP, 5/8-11 X 3-1/2 GR5
13	F21887	CARRIAGE BOLT, 1/2-13 X 3-1/2 GR5
14	F33008	WASHER, FLAT, 3/8 USS
15	F33622	WASHER, SPLIT LOCK, 3/8
16	F33626	WASHER, SPLIT LOCK, 1/2
17	L116029	LINKAGE WELDMENT
18	L116032	PIN, W/WASHER WELDMENT, 1-1/4 X 7-1/2
19	L116038	RETAINER
20	F33100	WASHER, FLAT, 1-1/4 SAE
21	L116176	ROW MARKER, FIRST ARM WELDMENT
22	L116254	MACHINE BUSHING
23	L116337	BLADE, SMOOTH, 16" DIA.
24	L116339	CLEVIS W/EXTERNAL THREAD, 5/8-11
25	L116344	CYLINDER, 2-1/2 X 20 (NOT SHOWN)
26	L116354	TUBE, 5/8 X 1-7/8
27	L116355	PIN, W/DOUBLE HOLES, 7/8 X 11
28	L116366	RUBBER SPACER, OUTER ARM
29	L116390	DEPTH BAND WELDMENT
30	L116405	CLEVIS W/INTERNAL THREAD 5/8-11
31	L116438	PIN, W/DOUBLE HOLES, 1-1/4 X 12-1/4
32	L116446	LH SPINDLE AND HUB ASSEMBLY
	L116447	RH SPINDLE AND HUB ASSEMBLY
33	F65145	COTTER PIN, 1/4 X 1-1/2
34	L123337	ROW MARKER, OUTER ARM WELDMENT
35	L123338	ROW MARKER, MID ARM WELDMENT
36	L123340	EXTENSTION TUBE, 2" SQ
37	L123342	CHAIN
38	L123343	CHAIN COVER
39	KD2721	U BOLT, 2 X 2, 1/2-13
40	K10722	SCREW, HEX HEAD CAP, 1/2-20 X 1

ROW MARKER

8-Row 38, 12-Row, 16-Row Pull Type

ASSEMBLY



ROW MARKER

8-Row 38, 12-Row, 16-Row Pull Type

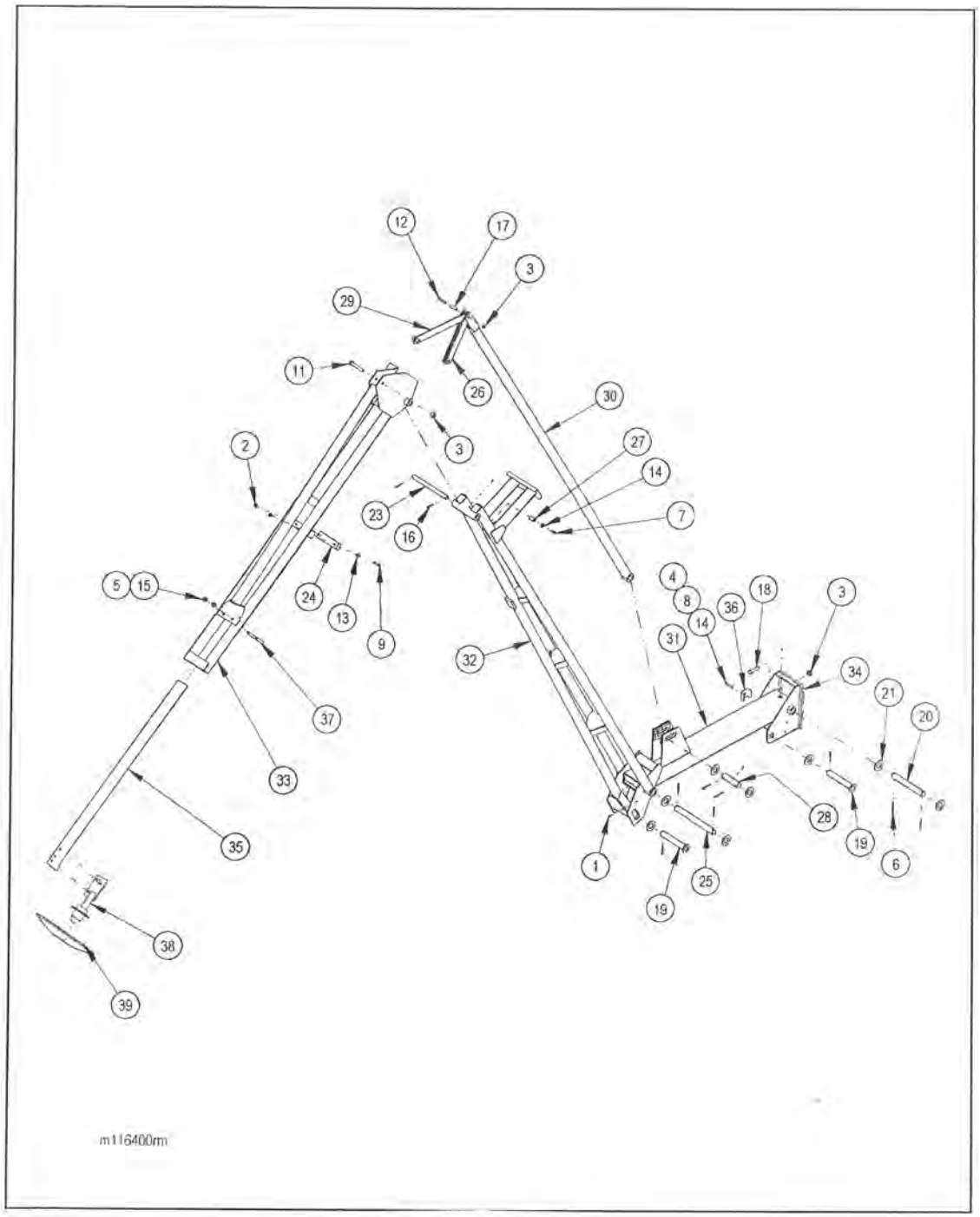
ASSEMBLY

ITEM	PART NO.	DESCRIPTION
1	F58805	GREASE FITTING, 1/4-28
2	F36214	HEX JAM NUT, 5/8-11
3	F37212	REV LOCK NUT, 3/8-16
4	F37216	REV LOCK NUT, 5/8-11
5	F36106	HEX NUT, 3/8-16
6	F36110	HEX NUT, 1/2-13
8	F65147	COTTER PIN, 1/4 X 2
9	F13111	SCREW, HEX HEAD CAP, 3/8-16 X 2 GR5
10	F13110	SCREW, HEX HEAD CAP, 3/8-16 X 1-3/4 GR5
12	F13113	SCREW, HEX HEAD CAP, 3/8-16 X 2-1/2 GR5
14	F13317	SCREW, HEX HEAD CAP, 5/8-11 X 3-1/2 GR5
15	F33008	WASHER, FLAT, 3/8 USS
16	F33622	WASHER, SPLIT LOCK, 3/8
17	F33626	WASHER, SPLIT LOCK, 1/2
18	F33630	WASHER, SPLIT LOCK, 5/8
19	F65145	COTTER PIN, 1/4 X 1-1/2
20	F15312	SCREW, HEX HEAD CAP, 5/8-11 X 2-1/4 GR8
21	L116029	LINKAGE WELDMENT
22	L116032	PIN, W/WASHER WELDMENT, 1-1/4 X 7-1/2
23	L116034	PIN, W/DOUBLE HOLES, 1-1/4 X 9-1/2
24	L116035	EXTENSTION TUBE, 2" SQ X 50"
25	L116045	ROW MARKER, OUTER ARM WELDMENT (8 ROW 38 & 12 ROW)
	L116454	ROW MARKER, OUTER ARM WELDMENT (16 ROW)
26	L116070	ROW MARKER PIVOT WELDMENT
27	F33100	WASHER, FLAT, 1-1/4 SAE
28	L116176	ROW MARKER, FIRST ARM WELDMENT
29	L123329	ROW MARKER, MID ARM WELDMENT (8 ROW 38)
	L116199	ROW MARKER, MID ARM WELDMENT (12 ROW)
	L116452	ROW MARKER, MID ARM WELDMENT (16 ROW)
30	L116339	CLEVIS W/EXTERNAL THREAD, 5/8-11
31	L116344	CYLINDER, 2-1/2 X 20 (NOT SHOWN)
32	L116354	TUBE, 5/8 X 1-7/8
33	L116355	PIN, W/DOUBLE HOLES, 7/8 X 11
34	L116366	RUBBER SPACER, OUTER ARM
35	L116405	CLEVIS W/INTERNAL THREAD 5/8-11
36	L116438	PIN, W/DOUBLE HOLES, 1-1/4 X 12-1/4
37	L124456	CHAIN (8 ROW 38)
	L120368	CHAIN (12 ROW)
	L120369	CHAIN (16 ROW)
38	L124455	CHAIN COVER (8 ROW 38)
	L120399	CHAIN COVER (12 ROW)
	L120400	CHAIN COVER (16 ROW)
39	L2-181-010001	HOSE CLAMP
40	KD2721	U BOLT, 2 X 2, 1/2-13
41	L116446	LH SPINDLE & HUB
	L116447	RH SPINDLE & HUB
42	L116337	BLADE, SMOOTH

ROW MARKER

24-Row Pull Type

ASSEMBLY



ROW MARKER

24-Row Pull Type

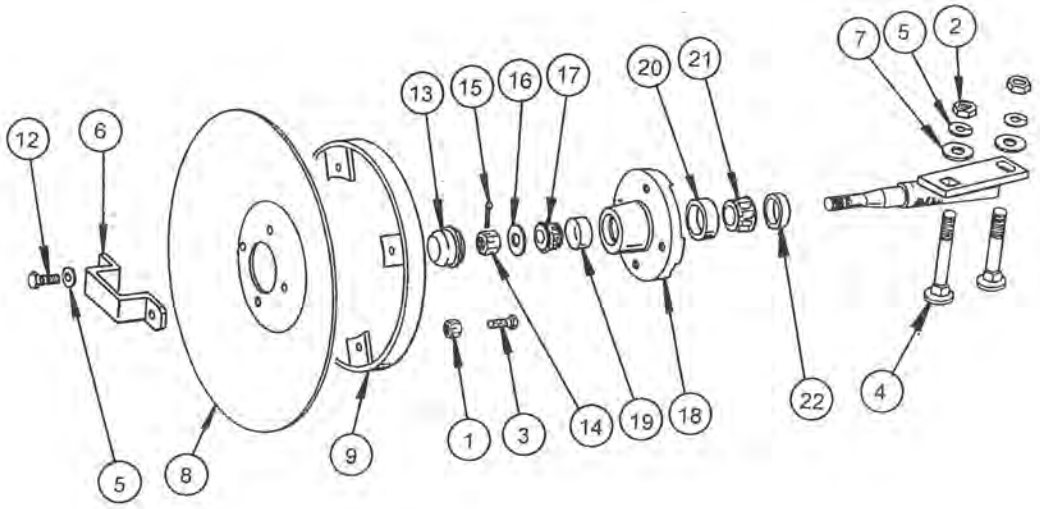
ASSEMBLY

ITEM	PART NO.	DESCRIPTION
1	F58805	GREASE FITTING, 1/4-28
2	F37212	REV LOCK NUT, 3/8-16
3	F37216	REV LOCK NUT, 5/8-11
4	F36106	HEX NUT, 3/8-16
5	F36110	HEX NUT, 1/2-13
6	F65147	COTTER PIN, 1/4 X 2
7	F13103	SCREW, HEX HEAD CAP, 3/8-16 X 3/4 GR5
8	F13111	SCREW, HEX HEAD CAP, 3/8-16 X 2 GR5
9	F13110	SCREW, HEX HEAD CAP, 3/8-16 X 1-3/4 GR5
11	F13315	SCREW, HEX HEAD CAP, 5/8-11 X 3 GR5
12	F13113	SCREW, HEX HEAD CAP, 3/8-16 X 2-1/2 GR5
13	F33008	WASHER, FLAT, 3/8 USS
14	F33622	WASHER, SPLIT LOCK, 3/8
15	F33626	WASHER, SPLIT LOCK, 1/2
16	F65145	COTTER PIN, 1/4 X 1-1/2
17	L107389	TUBE, 5/8 X 1-3/4 X 11GA
18	F15312	SCREW, HEX HEAD CAP, 5/8-11 X 2-1/4 GR8
19	L116032	PIN, W/WASHER WELDMENT, 1-1/4 X 7-1/2
20	L116034	PIN, W/DOUBLE HOLES, 1-1/4 X 9-1/2
21	F33100	WASHER, FLAT, 1-1/4 SAE
22	L116344	CYLINDER, 2-1/2 X 20 (NOT SHOWN)
23	L116355	PIN, W/DOUBLE HOLES, 7/8 X 11
24	L116366	RUBBER SPACER, OUTER ARM
25	L116438	PIN, W/DOUBLE HOLES, 1-1/4 X 12-1/4
26	L117275	BAR, LINKAGE 12-1/2
27	L117278	BUSHING, LINKAGE, THREADED 3/8-16
28	L117289	PIN, W/DOUBLE HOLES, 1-1/4 X 5
29	L117292	LINKAGE WELDMENT
30	L117293	LINKAGE TUBE WELDMENT
31	L117294	ROW MARKER FIRST ARM
32	L117295	ROW MARKER MID ARM WELDMENT
33	L117296	ROW MARKER OUTER ARM WELDMENT
34	L117297	ROW MARKER BASE, PIVOT ASSEMBLY
35	L117298	TUBE EXTENSION, 2" SQ X 50"
36	L2-181-010001	HOSE CLAMP
37	KD2721	U BOLT, 2 X 2, 1/2-13

ROW MARKER

Pull Type

MARKER SPINDLE / HUB / BLADE ASSEMBLY



ITEM	PART NO.	DESCRIPTION
1	F37211	REV LOCK NUT, 5/16-18
2	F36110	HEX NUT, 1/2-13
3	F13055	SCREW, HEX HEAD CAP, 5-16/18 X 1 GR5
4	F21887	CARRIAGE BOLT, 1/2-13 X 3-1/2 GR5
5	F33626	WASHER, SPLIT LOCK, 1/2
6	L116038	RETAINER
7	L116254	MACHINE BUSHING
8	L116337	BLADE, SMOOTH, 16" DIA.
9	L116390	DEPTH BAND WELDMENT
10	L116446	LH SPINDLE AND HUB ASSEMBLY (ITEMS 13-22)
11	L116447	RH SPINDLE AND HUB ASSEMBLY (ITEMS 13-22)
12	K10722	SCREW, HEX HEAD CAP, 1/2-20 X 1
13	L125612	HUB CAP
14	K10725	HEX NUT SLOTTED, 5/8-18
15	F65105	COTTER PIN, 5/32 X 1-1/2
16	L125617	WASHER, FLAT, 5/8
17	L70336915	OUTER CONE (P752231)
18	L125614	HUB WITH CUPS (ITEMS 19-20)
19	L70336914	OUTER CUP (P702218)
20	L70336916	INNER CUP (P702215)
21	L125613	INNER CONE (P752316)
22	L125611	GREASE SEAL (P602123)

ROW MARKERS

TROUBLE SHOOTING

Problem **Possible Cause**

PROBLEM: If both markers are lowering, but only one is raising at a time,

- The hoses from the cylinders to the valve may be connected backwards. Check the hose diagram in manual to correct.

PROBLEM: If the same marker is always operating,

- The spool in sequencing valve may not be shifting. Remove spool and inspect for foreign material to make sure all ports in the spool are open. Clean spool and reinstall.

PROBLEM: If both markers lower and raise at the same time,

- There may be foreign material under the check ball in the sequencing valve. Remove and clean the hose fitting, spring and balls. Remove and clean the spool as well.
- Make sure there is not a ball missing or incorrectly installed I the sequencing valve. Disassemble and correct if this is the case.

PROBLEM: If the marker is setting down while in the raised position,

- The O-ring in the marker cylinder may be damaged or the piston may be cracked. Disassemble the cylinder to inspect for damage, repair any damage.
- The spool in sequencing valve may not be shifting completely because of a defective ball or because the spring is missing. Check the valve assembly and install parts as needed.
- The spool in sequencing valve may be shifting back towards the center position. Restrict the flow of hydraulic oil from the tractor to the sequencing valve.

PROBLEM: If neither marker will move,

- The flow control may be closed too much. Loosen the locking nut and turn the flow control adjustment bolt out, or counterclockwise, until the desired speed is set.

PROBLEM: If the markers are moving too fast,

- The flow control may be open too much. Loosen the locking nut and turn the flow control adjustment bolt in, or clockwise, until the desired speed is set.

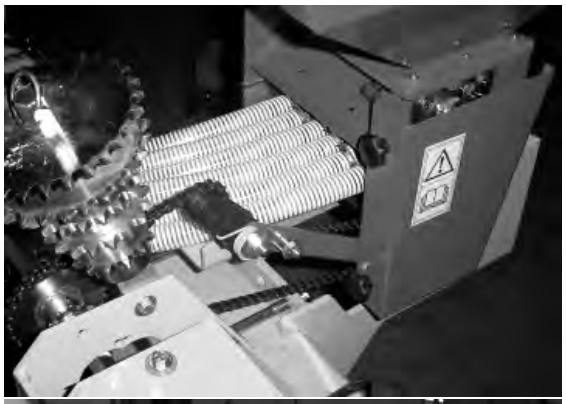
PROBLEM: If the marker operation speed is sporadically changing,

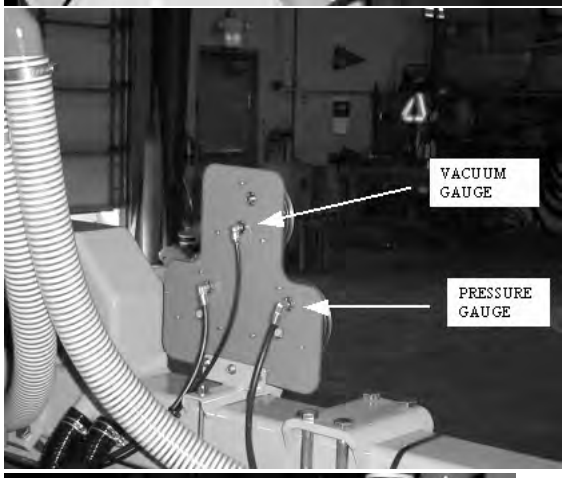
- The needle may be sticking open in the flow control valve. Remove the flow control, inspect and repair or replace.

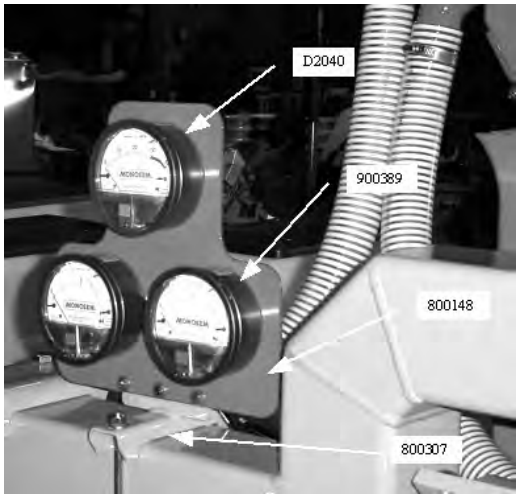
SYSTEM ASSEMBLY

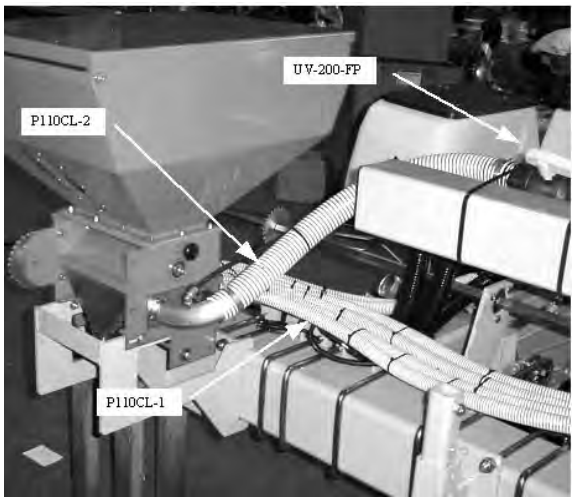
The ¼" vacuum hose connects to the bottom port in the back of the vacuum gauge. The filter is to be used in the top port in back of the vacuum gauge. Use plugs in the side ports.

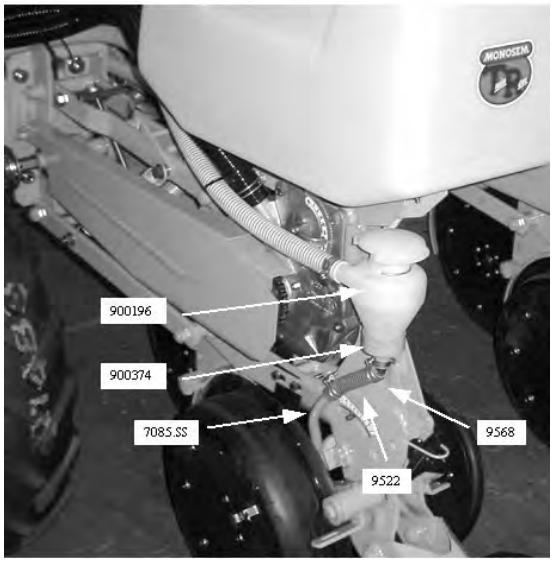
The ¼" pressure hose connects to the top port in the back of the vacuum gauge. Use the filter in the bottom port in back of the vacuum gauge. Use plugs in the side ports.







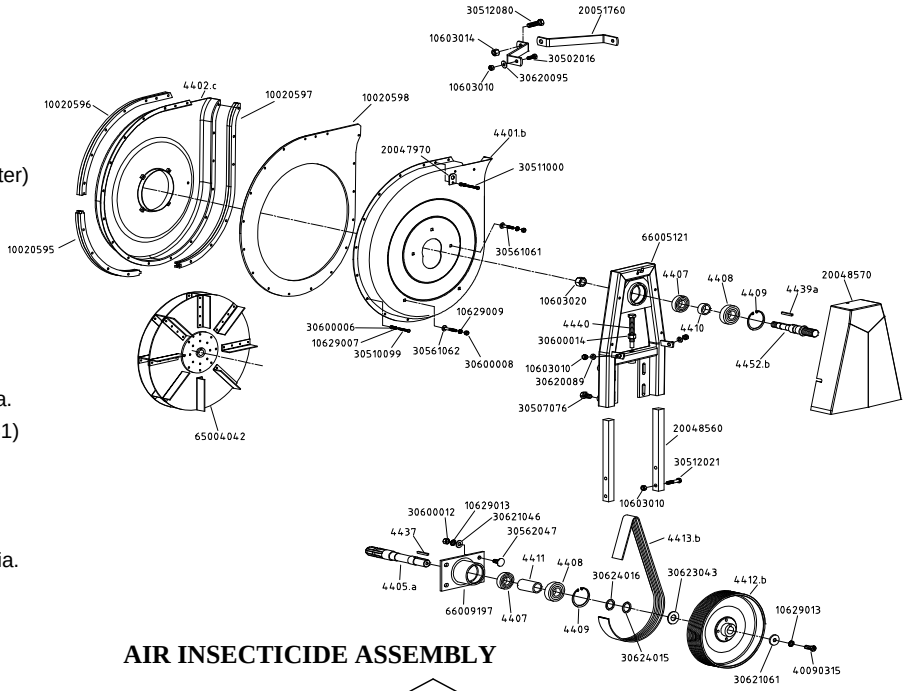




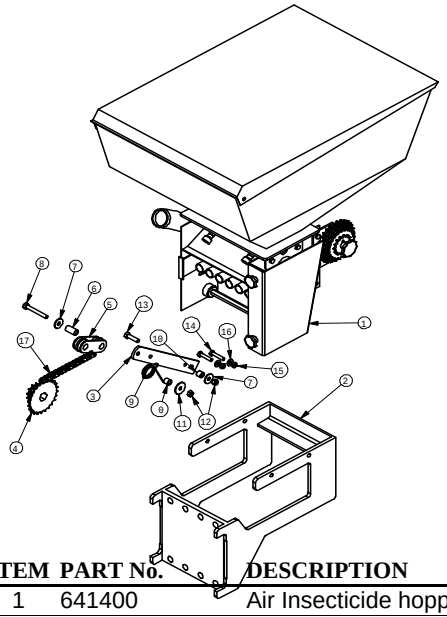
PART NO.	DESCRIPTION
D2040	Vacuum Gauge
90389	Pressure Gauge
800148	Panel Triple Gauge
800307	Bracket Gauge panel
UV-200-FP	2" Ball valve, (requires Fitting TERHB200-200, qty 2)
P110CL-2	2" Hose (Specify Length)
P110CL-1	1" Hose (Specify Length)
UV-200-FP	2" Ball valve, (requires Fitting TERHB200-200, qty 2)
P110CL-2	2" Hose (Specify Length)
P110CL-1	1" Hose (Specify Length)
900196	Cyclone (includes fitting)
900374	Cyclone clamp
7085.SS	Drop tube
9522	Hose (Specify Length
9568	Hose Clamp

DOUBLE TURBOFAN ASSEMBLY

PART No.	DESCRIPTION
4401.B	Fan housing (support frame side)
4402.C	Fan housing manifold side
4405.A	Lower shaft (1 3/8" 6 spline adapter)
4407	Bearing 62mm (62062RS)
4408	Bearing 72mm (63062RS)
4409	Snap ring internal 72mm
4410	Spacer upper shaft
4411	Spacer lower shaft
4412.B	Pulley, 500/540rpm
	Hi-Output 25 grooves 290mm dia.
4413.B	Fan belt, 25 grooves (1244JEJ151)
4437	Key lower shaft (8x7x40mm)
4439.A	Key upper shaft (6x6x45mm)
4440	Special bolt tension adjustment
4452.B	Upper shaft, 25 grooves 29mm dia.
10020595	Lower spacer segment
10020596	Upper spacer segment
10020597	Front spacer segment
10020598	Divider plate
10603010	Nut, 10mm
10603014	Nut, 14mm
10603020	Nut, 20mm
10629007	Washer, 6mm
10629009	Washer, 8mm
10629013	Washer, 12mm
20047970	Lift hook
20048560	Support bar
20048570	Belt guard
20051760	Anti v bration strap
30502016	Bolt, 12 x 25mm
30507076	Bolt, 14 x 25mm
30510099	Bolt, 6 x 40mm
30511000	Bolt, 6 x 45mm
30512021	Bolt, 10 x 50mm
30512080	Bolt, 14 x 45mm
30561061	Carriage bolt, 8 x 50mm
30561062	Carriage bolt, 8 x 55mm
30562047	Carriage bolt, 12 x 30mm
30600006	Nut, 6mm
30600008	Nut, 8mm
30600012	Nut, 12mm
30600014	Nut, 14mm
30620089	Washer, 10.5 x 20 x 2mm
30620095	Washer, 10.5 x 27 x 2mm
30621046	Washer, 13 x 27 x 2mm
30621061	Washer, 13 x 40 x 4mm
30623043	Washer, 22.5 x 48 x 4mm
30624015	Washer, 31 x 41 x 1.5mm
30624016	Washer, 31 x 41 x 2mm
40090315	Screw, 12 x 30mm
65004042	Double fan blade
66005121	Support frame
66009197	Lower bearing housing



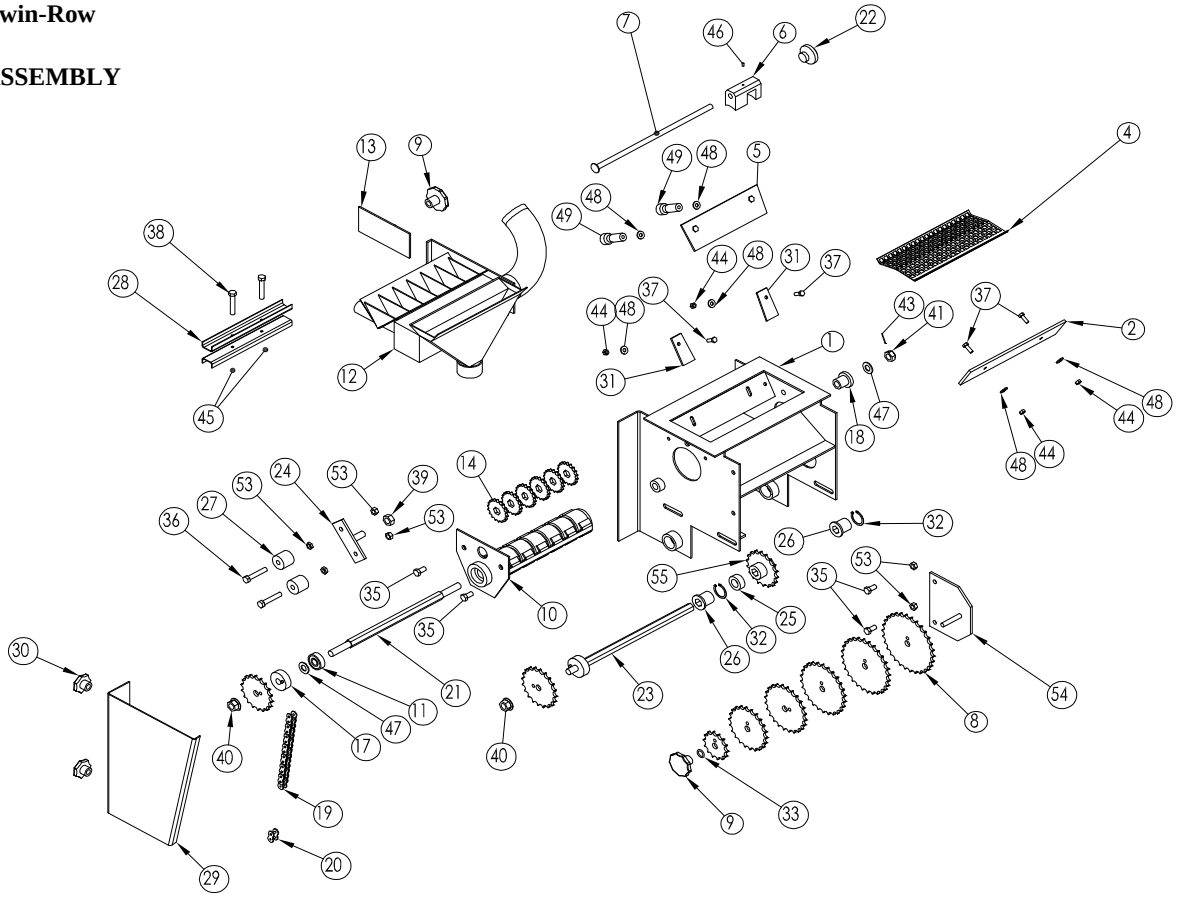
AIR INSECTICIDE ASSEMBLY



ITEM	PART No.	DESCRIPTION
1	641400	Air Insecticide hopper w/ meter
2	800261	Hopper bracket
3	800123	Idler support arm
4	9555.A	Double Sprocket 12-25
5	KD11962	Idler, US Insect
6	KD1026	Long sleeve tube
7	F33008	3/8" Flat washer
8	F15114	3/8" x 2 3/4" Bolt
9	KD9306	Spring, US Insecticide Idler
10	KD2971-10	Short sleeve tube
11	K10210	3/8" Large Flat washer
12	F37212	3/8" Center lock nut
13	F13109	3/8" x 1 1/2" Bolt
14	F13059	5/16" x 1 1/2" Bolt
15	F37211	5/16" Center lock nut
16	F33114	5/16" Flat washer

Twin-Row

ASSEMBLY



ITEM	PART No.	DESCRIPTION
1		Main housing
2		Stainless steel plate
3		Guard
4		Screen
5		Clean out trapdoor
6		Shut off gate to create 4 or 6 outlet
7		Shaft for shut off gate
8	7701.14	Sprocket, 14T, 5R
	7701.16	Sprocket, 16T, 5R
	7701.18	Sprocket, 18T, 5R
	7701.20	Sprocket, 20T, 5R
	7701.22	Sprocket, 22T, 5R
	7701.24	Sprocket, 24T, 5R
	7701.26	Sprocket, 26T, 5R
	7701.28	Sprocket, 28T, 5R
	7701.30	Sprocket, 30T, 5R
27	7714	Plastic chain idler tensioner
28		Support plates for hose
29		Chain guard
30	7715	Threaded knob, 8mm
31		Corner plate for clean out door
32	7716	Snapring, external, 24mm
33	7717	O ring, 12mm ID
35		Hex bolt, 8 x 16mm
36		Hex bolt, 8 x 45mm
37		Hex bolt, 6 x 16mm
38		Hex bolt, 5 x 40mm
39		Hex nut, 12mm
40	7718	Hex nut, 12mm w/ washer

ITEM	PART No.	DESCRIPTION
9	7702	Sprocker carrier w/threaded knob
10	7703	Rotor weldment
11	7704	Bearing, 6201, 12x 32x 10mm wide
12		Venturi manifold w/ 6 outlets
13		Plate with weldment, 8mm stud bolt
14	7705.5	Serrated roller, 5mm
17	7706	Hub w/ locator pin, 12 mm ID
18	7707	Plastic bushing, 12 mm ID
19	10107	Roller chain, 5R
20	10111	Connecting link, 5R
21	7708	Meter shaft, 15mm hex w/ 12mm thread
22	7709	Threaded knob, 10mm
23	7710	Hex shaft, 14mm w/ hub & locator pin
24	7711	Chain tensioner bracket
25	7712	Aluminum lock collar w/ set screw
26	7713	Plastic bushing, w/ 14 mm hex bore
41		Nylon locknut, 12mm w/ hole for roll pin
42		Set screw w/ spring loaded ball end, 6mm
43		Roll pin, 3 x 20mm
44		Hex nut, 6mm
45		Nylon locknut, 5mm
46		Set screw, 6 x 1 mm
47		Flat washer, 12 x 24 x 2mm
48		Flat washer, 6.5 x 15 x 1.5mm
49	7719	Threaded knob, 6mm
53		Hex nut, 8mm
54		Sprocket storage bracket
55	4426.18	Sprocket, 18T, bottom hex shaft

AIR INSECTICIDE SYSTEM

Twin-Row

AIR INSECTICIDE APPLICATION RATES

Double sprocket on hex shaft and changeable sprockets on 6 outlet insecticide metering boxes.

Rates are in pounds per acre

These settings are theoretical and approximate. Actual output may vary.

TEMIK 15G Gypsum

		Double Sprocket: 12							
		Sprockets on insecticide meter box							
Driver		14	14	14	14	28	30	22	26
Driven		30	26	22	16	30	28	18	18
Row Spacing	36"	8.9	10.3	12.2	16.8	17.9	20.5	23.4	27.7
	38"	8.5	9.8	11.5	15.9	16.9	19.4	22.2	26.2
	40"	8	9.3	11	15.1	16.1	18.5	21.1	24.9

TEMIK 15G Grit

		Double Sprocket: 12							
		Sprockets on insecticide meter box							
Driver		14	14	14	14	28	30	22	26
Driven		30	26	22	16	30	28	18	18
Row Spacing	36"	3.6	4.2	4.9	6.8	7.2	8.3	9.4	11.1
	38"	3.4	3.9	4.7	6.4	6.8	7.8	8.9	10.6
	40"	3.2	3.7	4.4	6.1	6.5	7.4	8.5	10

COUNTER 15G

		Double Sprocket: 12							
		Sprockets on insecticide meter box							
Driver		14	14	14	14	28	30	22	26
Driven		30	26	22	16	30	28	18	18
Row Spacing	36"	5.4	6.2	7.4	10.1	10.8	12.4	14.1	16.7
	38"	5.1	5.9	7	9.6	10.2	11.7	13.4	15.8
	40"	4.9	5.6	6.6	9.1	9.7	11.2	12.7	15

THIMET 20G

		Double Sprocket: 12							
		Sprockets on insecticide meter box							
Driver		14	14	14	14	28	30	22	26
Driven		30	26	22	16	30	28	18	18
Row Spacing	36"	5.5	6.3	7.5	10.2	10.9	12.5	14.3	16.9
	38"	5.2	6	7.1	9.7	10.4	11.9	13.6	16
	40"	4.9	5.7	6.7	9.2	9.8	11.3	12.9	15.2

GRANULAR APPLICATION RATES

The US Insecticide System is mounted to the planter unit and has a hand clutch to engage or disengage the metering mechanism for easy removal of the hopper. Be sure no foreign objects get into the hopper when it is being filled with product. Keep hopper lids on when not being filled to prevent accumulation of dirt or moisture in the hoppers.

Many things can affect the rate of delivery of granular chemicals such as temperature, humidity, speed, ground conditions, flow ability of different materials or any obstruction in the meter.

NOTE: Since the chemical meter is driven directly from the seed meter box, changing the seed population after calibrating will change the output of the chemical meter, even if ground speed remains constant.

WARNING! Agricultural chemicals can be dangerous. Improper use can result in injury to persons, animals and soil. Handle with care and follow directions supplied by the chemical manufacturer.

A field check is important to determine the correct application rates. The following method for calibrating is recommended:

1. Attach a plastic bag to each chemical meter outlet tube.
2. Lower the planter and drive 500 feet at the desired seeding population and speed.
3. Weigh (in ounces) the amount of chemical in one bag.
4. Multiply the number of ounces by the factor shown below for your row width.

Row Width	Factor
38"	1.7
36"	1.8
30"	2.2
22"	3

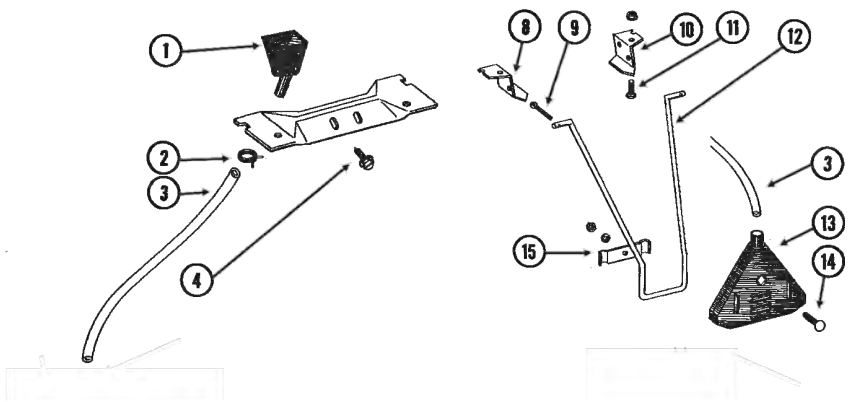
Example: You have driven 500 feet. Your row spacing is 30" and you have collected 4.5 ounces of material in a plastic bag. Multiply 4.5 by the factor 2.2. This would indicate that you are applying 9.9 lbs./acre.

If you do not have the desired amount of chemical per acre, adjust the metering gate accordingly. Zero for minimum output while 45 for maximum output. It is suggested that after a desired rate is achieved through calibration, you record the ground speed and transmission setting used for the calibration along with the chemical used for future reference.

NOTE: It is important to check calibration of all rows.

ATTENTION: Once you have the proper setting do not vary your planting speed as this will affect the output.

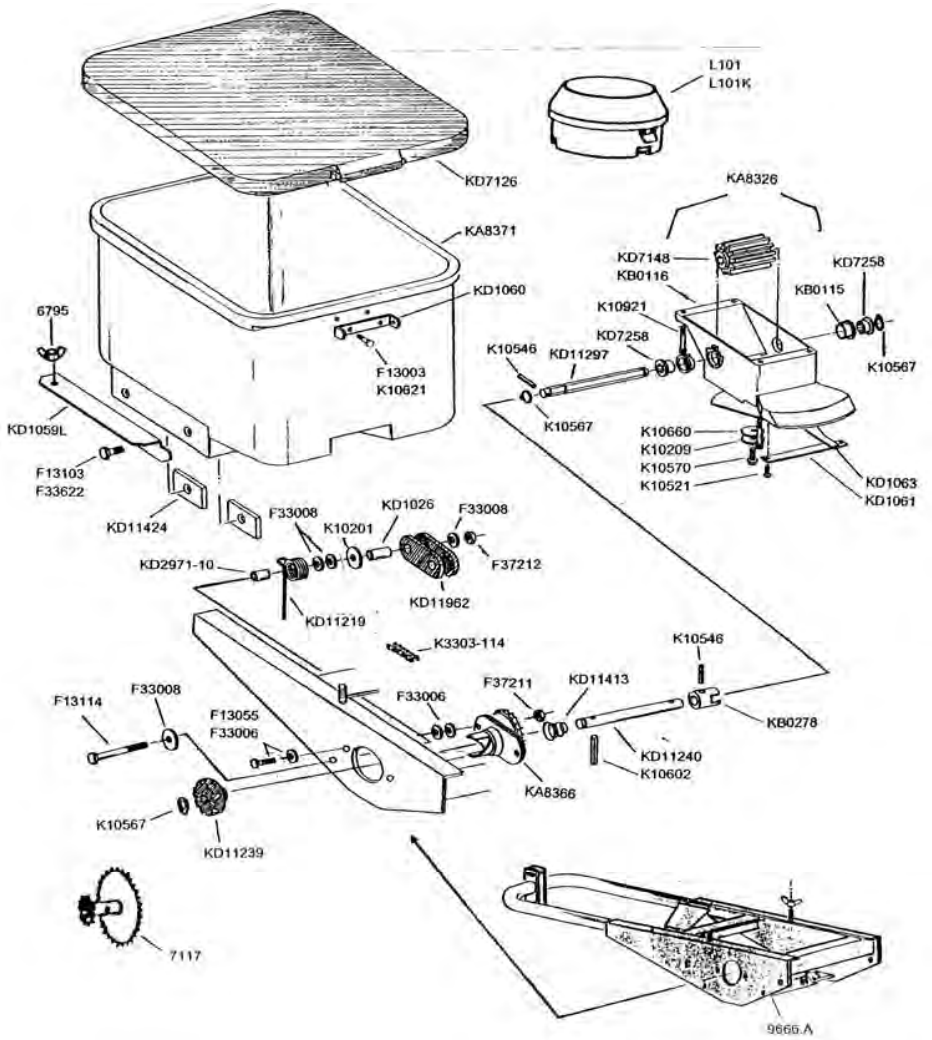
SPREADER TUBE ASSEMBLY



ITEM	PART No.	DESCRIPTION
1	KD2423	Funnel
2	K10680	Hose clamp
3	KD2947	Hose, precut, 7/16" x 28"
4	K10523	Self-tapping screw, 10 -24 x 1/2"
8	KD1115L	Hanger bracket, LH
9	K10452	Cotter pin, 1/8"x 1/2"
10	KD1115R	Hanger bracket, RH
11	K10310	Carriage bolt, 1/4" x 3/4"
	K10227	Lock washer, 1/4"
	K10103	Nut, 1/4"
12	KD8756	Hanger, standard length
13	KA2075	Diffuser, 14" band
14	K10306	Carriage bolt, 3/8" x 2"
	K10229	Lock washer, 3/8"
	K10101	Nut, 3/8"
15	KD118	Clamp plate

ASSEMBLY

Single Outlet
Plastic Hopper



PART NO.	DESCRIPTION
6795	Wing nut, 8mm
7117	Double sprocket, 26-12 (replaces 7115)
9666.A	Frame to mount insecticide box
F13003	Bolt, 1/4-20 x 3/4"
F13055	Bolt, 5/16-18 x 1"
F13103	Bolt, 3/8-16 x 3/4"
F13114	Bolt, 3/8-16 x 2-3/4"
F33006	Flat washer, 5/16" USS
F33008	Flat washer, 3/8" USS
F33622	Lock washer, 3/8
F37211	Lock nut, 5/16-18
F37212	Lock nut, 3/8-16
K10201	Special washer, 3/8" x 1-1/2" OD
K10209	Washer, 1/4" USS
K10521	Self tapping screw, No.10 x 3/8"
K10546	Roll pin, 3/16" x 1-1/4"
K10567	Retaining ring, 5/8"
K10570	Self tapping screw, 1/4" x 3/4"
K10602	Roll pin, 1/4" x 1-1/2"
K10621	Flange nut, 1/4-20
K10660	Wave washer, 1/2"
K10921	Hex socket head bolt, 10-24 x 7/8"
K3303-114	link
K7767X	Complete hopper with meter, clutch

PART NO.	DESCRIPTION
KA8326	Meter box assembly, complete
KA8366	Lock out clutch assembly, complete
KA8371	Hopper
KB0115	Bearing
KB0116	Granular housing
KB0278	Coupler
KD1026	Spacer, 1-3/16" long
KD1059L	Support, left hand(shown)
KD1059R	Support, right hand
KD1060	Hinge
KD1061	Support strap
KD1063	Metering gate
KD11219	Spring
KD11239	Knob
KD11240	Shaft
KD11297	Shaft
KD11413	Spring
KD11424	Block with threaded hole, 3/8-16
KD11962	Idler
KD2971-10	Spacer, 9/16" long
KD7126	Lid
KD7148	Feed roller, hex bore
KD7258	Hex bushing
L101	Lock-n-load valve only
L101K	Lock-n-load valve mntd on lid #KD7126 meter box to drive insect. meter assy

MICROSEM MICROGRANULAR INSECTICIDE SYSTEM

Twin-Row

MICROSEM SYSTEM

The microsem system meters microgranular products such as insecticide and herbicide with precision. The system is ground driven and has a positive displacement. The output is set by a transmission that is unaffected by a change in planting speed. The microsem system is mounted to the toolbar frame with support brackets to reduce weight on the planter unit. The microsem system with auger is equipped with a telescoping outlet, and its output starts from a minimum of 2-3 lbs/acre.

Each microsem hopper has a 33 lb. capacity and can be used with a double outlet for two row units or with a single outlet for one row unit.

The drive sprocket is mounted on the upper hex shaft. The hoses direct the granular product directly between the disc openers via drop tubes, or behind the disc openers via a spreader tube.

TROUBLE SHOOTING

PROBLEM:
Variations between the outlets or metering boxes.

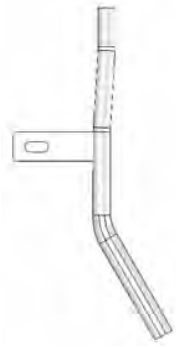
POSSIBLE CAUSE:

- There may be foreign material mixed with the product
- ATTENTION! there may be moisture in the product.
- The metering unit may have been assembled improperly.
- The outlet chute may be warped.
- The hose may be too long or bent, causing the hose to clog.

INSECTICIDE DROP TUBE

7085.SD Mounts on the right hand side of the unit, towards the front with a single bolt. It then curves down thru a notch cut into the shield covering the front of the double disc opener. It deposits material into the seed trench in front of the seed tube. This tube is used on the set back unit on twin-row machines. The top of the tube curves to the left to accept the feeder hose coming down on the left hand side of the parallel linkage.

7085. SU Mounts on the right hand side of the unit, towards the front with a single bolt. It then curves down thru a notch cut into the shield covering the front of the double disc opener. It deposits material into the seed trench in front of the seed tube. This tube is used on the set back unit on twin-row machines. The top of the tube extends straight up to accept the feeder hose coming through the middle of the parallel linkage.



7085.DA Mounts on the right hand side of the unit, with the same bolts that attach the disc scraper. It deposits material down in the seed trench behind the seed tube. The top of the tube points straight up.

7085.GA Mounts on the left hand side of the unit, with the same bolts that attach the disc scraper. It deposits material down in the seed trench behind the seed tube. The top of the tube points straight up.

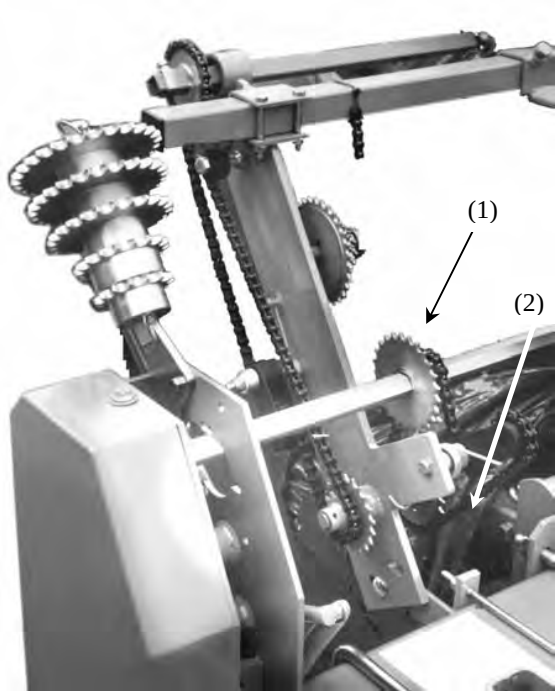
7085.SS Mounts on the left hand side of the unit, with the same bolts that attach the disc scraper. It deposits material down in the seed trench behind the seed tube. The top of the tube curves towards the rear to accept the feeder hose from the Air Insecticide System.

MICROSEM MICROGRANULAR INSECTICIDE SYSTEM

Twin-Row

SETTING THE OUTPUT

The output is a function of the number of rotations of the spindle of the metering boxes, which is set primarily with the double sprocket (1) and the interchangeable sprockets (2). The chart provided will assist with the setting and also indicates the sprockets to be used for the principle commercial products. The furnished information is a recommendation only.



NOTE: Avoid moisture contamination. Moisture in the product will cause hardening and could cause chain breakage. To avoid this problem, empty hoppers and store in a dry place.

NOTE: This unit should be used only with microgranulars and not with powders or granulates. It is possible to meter large granulars provided the inside auger is changed for a special one.

WARNING Agricultural chemicals can be dangerous. Improper use can result in injury to persons, animals and soil. Handle with care and follow instructions of the chemical manufacturer.

HOW TO TEST FOR INSECTICIDE RATES

Measure out a distance of 328 feet (100m).

Set the sprocket combination to: A=12, B=30, C=12. (This ratio = 0.24 or the number of Microsem shaft rotations for 1 drive wheel rotation.)

Remove the hoses from a 2-outlet hopper, placing a bag or other container to catch the product. Put the product into the Microsem hopper. Engage the Microsem and drive forward the pre-measured distance. Weigh the amount of product caught in the container and convert to grams.

Ounces x 31.103481 = grams
Inches x 2.54 = cm

Use the following formula:

$$\text{Output} = \frac{10 \times \text{quantity weighted (g)}}{\text{Inter-rows (cm)} \times 2}$$

Example:

Inter-rows = 60 cm (23.63")
Quantity weighed = 60 grams (1.929 oz)

If you require 8 kg/ha or 8 lb/acre, choose the ratio
$\frac{8}{5} \times 0.24 = 0.384$ A=12, B=18, C=12

If you require 11 kg/ha or 11 lb/acre, choose the ratio
$\frac{11}{5} \times 0.24 = 0528$ A=12, B=22, C=20

$$\text{Output} = \frac{10 \times 60}{60 \times 2} = 5 \text{ kg/ha or } 5 \textbf{ lb/acre}$$

From the following chart, find the closest sprocket combination to achieve appropriate lbs/acre.

Note: Because of the large variety of insecticides and its density and irregularity of granulars, it is impossible to provide an exact chart. This is a close approximation only.

Twin-Row

Possible Sprocket Combinations

Ratios Obtained

A	**B**	**C**	
12	35	12	---------- 0.21
12	32	12	---------- 0.22
12	**30**	12	---------- 0.24
12	**25**	12	---------- 0.29
12	**22**	12	---------- 0.33
12	20	12	---------- 0.36
12	**18**	12	---------- 0.40
12	16	12	---------- 0.45
12	**15**	12	---------- 0.48 or
12	25	20	---------- 0.48
12	23	20	---------- 0.51
12	**22**	20	---------- 0.54
12	21	20	---------- 0.57
12	**12**	12	---------- 0.60
12	24	12	---------- 0.63
12	**18**	21	---------- 0.66
25	**22**	12	---------- 0.68
12	10	12	---------- 0.72
25	20	12	---------- 0.75
12	**15**	20	---------- 0.80
25	**18**	12	---------- 0.83
25	16	12	---------- 0.94
25	**15**	12	---------- 1 or
12	12	20	---------- 1
25	**22**	20	---------- 1.13
12	10	20	---------- 1.20
25	**12**	12	---------- 1.25
25	**18**	20	---------- 1.40
25	10	12	---------- 1.50
25	**15**	20	---------- 1.66
25	**12**	20	---------- 2.08
25	10	20	---------- 2.50

Less Product

Note: The bold sprocket numbers for the interchangeable B sprocket are standard.

The remaining sprockets for the interchangeable B sprocket are available on request. (13-14-16-23-26-35)

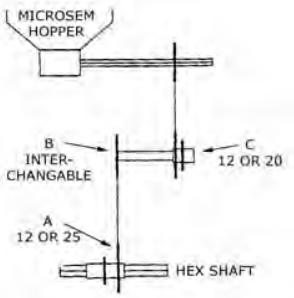
More Product

MICROSEM MICROGRANULAR INSECTICIDE SYSTEM

TWIN-ROW MICROSEM SETTING CHART - Drive sprockets to be used

These settings are theoretical and approximate. Actual output may vary. Other outputs can be obtained by using different sprocket arrangements of the Microsem drive, however travel speed variations will not affect the output.

A = Double sprocket on hex shaft - driven 1
B = Interchangeable sprocket - driven 2
C = 12 or 20 tooth sprocket



NOTE: For Planters with Sync-Row® seed timing system, the following rates need to be adjusted. Multiply these rates by 0.69.

		A / B / C	A / B / C	A / B / C	A / B / C	A / B / C	A / B / C
#'s per acre		**4.8**	**5.4**	**6.2**	**7.2**	**8.1**	**9.0**
THIMET	36"	12 / 25 / 12	12 / 22 / 12	12 / 18 / 12	12 / 16 / 12	12 / 23 / 20	12 / 21 / 20
20G	38"	12 / 22 / 12	12 / 20 / 12	12 / 16 / 12	12 / 25 / 20	12 / 22 / 20	12 / 12 / 12
	40"	12 / 20 / 12	12 / 18 / 12	12 / 15 / 12	12 / 23 / 20	12 / 21 / 20	25 / 24 / 12
#'s per acre		**7.1**	**8.5**	**9.5**	**10.8**	**11.6**	**13.2**
FURADAN	36"	12 / 30 / 12	12 / 25 / 12	12 / 22 / 12	12 / 20 / 12	12 / 18 / 12	12 / 16 / 12
15G	38"	12 / 27 / 12	12 / 22 / 12	12 / 20 / 12	12 / 18 / 12	12 / 16 / 12	12 / 23 / 20
	40"	12 / 25 / 12	12 / 20 / 12	12 / 18 / 12	12 / 16 / 12	12 / 23 / 20	12 / 22 / 20
#'s per acre		**4.7**	**5.5**	**6.3**	**7.3**	**7.8**	**9.0**
COUNTER 15G	36"	12 / 25 / 12	12 / 20 / 12	12 / 18 / 12	12 / 15 / 12	12 / 23 / 20	12 / 12 / 12
LORSBAN 15G	38"	12 / 22 / 12	12 / 18 / 12	12 / 15 / 12	12 / 23 / 20	12 / 22 / 20	25 / 24 / 12
	40"	12 / 20 / 12	12 / 15 / 12	12 / 23 / 20	12 / 22 / 20	12 / 12 / 12	12 / 18 / 20
#'s per acre		**6.5**	**7.8**	**8.9**	**9.7**	**10.8**	
TEMIK	36"	12 / 30 / 12	12 / 25 / 12	12 / 22 / 12	12 / 20 / 12	12 / 18 / 12	
15G	38"	12 / 27 / 12	12 / 22 / 12	12 / 20 / 12	12 / 18 / 12	12 / 16 / 12	
GYPSUM	40"	12 / 25 / 12	12 / 20 / 12	12 / 18 / 12	12 / 16 / 12	12 / 15 / 12	
#'s per acre		**5.2**	**6.3**	**7.1**	**8.6**	**10.3**	
AMEBIN	36"	12 / 30 / 12	12 / 25 / 12	12 / 22 / 12	12 / 18 / 12	12 / 15 / 12	
	38"	12 / 25 / 12	12 / 22 / 12	12 / 18 / 12	12 / 16 / 12	12 / 23 / 20	
	40"	12 / 22 / 12	12 / 18 / 12	12 / 16 / 12	12 / 15 / 12	12 / 22 / 20	

MICROSEM MICROGRANULAR INSECTICIDE SYSTEM

TWIN-ROW MICROSEM SETTING CHART - Drive sprockets to be used

These settings are theoretical and approximate. Actual output may vary. Other outputs can be obtained by using different sprocket arrangements of the Microsem drive, however travel speed variations will not affect the output.

NOTE: For Planters with Sync-Row® seed timing system, the following rates need to be adjusted. Multiply these rates by 0.69.

		A / B / C	A / B / C	A / B / C	A / B / C	A / B / C	A / B / C
#'s per acre		**4.4**	**5.3**	**5.7**	**6.0**	**6.7**	**7.3**
TEMIK 15G	36"	12 / 18 / 12	12 / 15 / 12	12 / 23 / 12	12 / 22 / 20	12 / 12 / 12	12 / 18 / 20
CORNCOB	38"	12 / 15 / 12	12 / 23 / 20	12 / 22 / 20	12 / 12 / 12	12 / 24 / 12	25 / 22 / 12
GRIT	40"	12 / 23 / 20	12 / 22 / 20	12 / 12 / 12	12 / 24 / 12	12 / 18 / 20	12 / 10 / 12

#'s per acre	**7.6**	**8.3**	
	25 / 22 / 12	25 / 20 / 12	
	12 / 10 / 12	12 / 15 / 20	
	25 / 20 / 12	25 / 18 / 12	

#'s per acre		**4.0**	**4.5**	**5.4**	**6.1**	**6.7**	**7.4**
ZENECA FORCE	36"	12 / 20 / 12	12 / 18 / 12	12 / 15 / 12	12 / 12 / 12	12 / 12 / 12	12 / 18 / 20
3G	38"	12 / 18 / 12	12 / 15 / 12	12 / 23 / 20	12 / 12 / 12	25 / 24 / 12	25 / 22 / 12
	40"	12 / 16 / 12	12 / 23 / 20	12 / 22 / 20	24 / 24 / 12	12 / 18 / 20	25 / 20 / 12

#'s per acre	**8.4**
	25 / 20 / 12
	12 / 15 / 20
	12 / 18 / 12

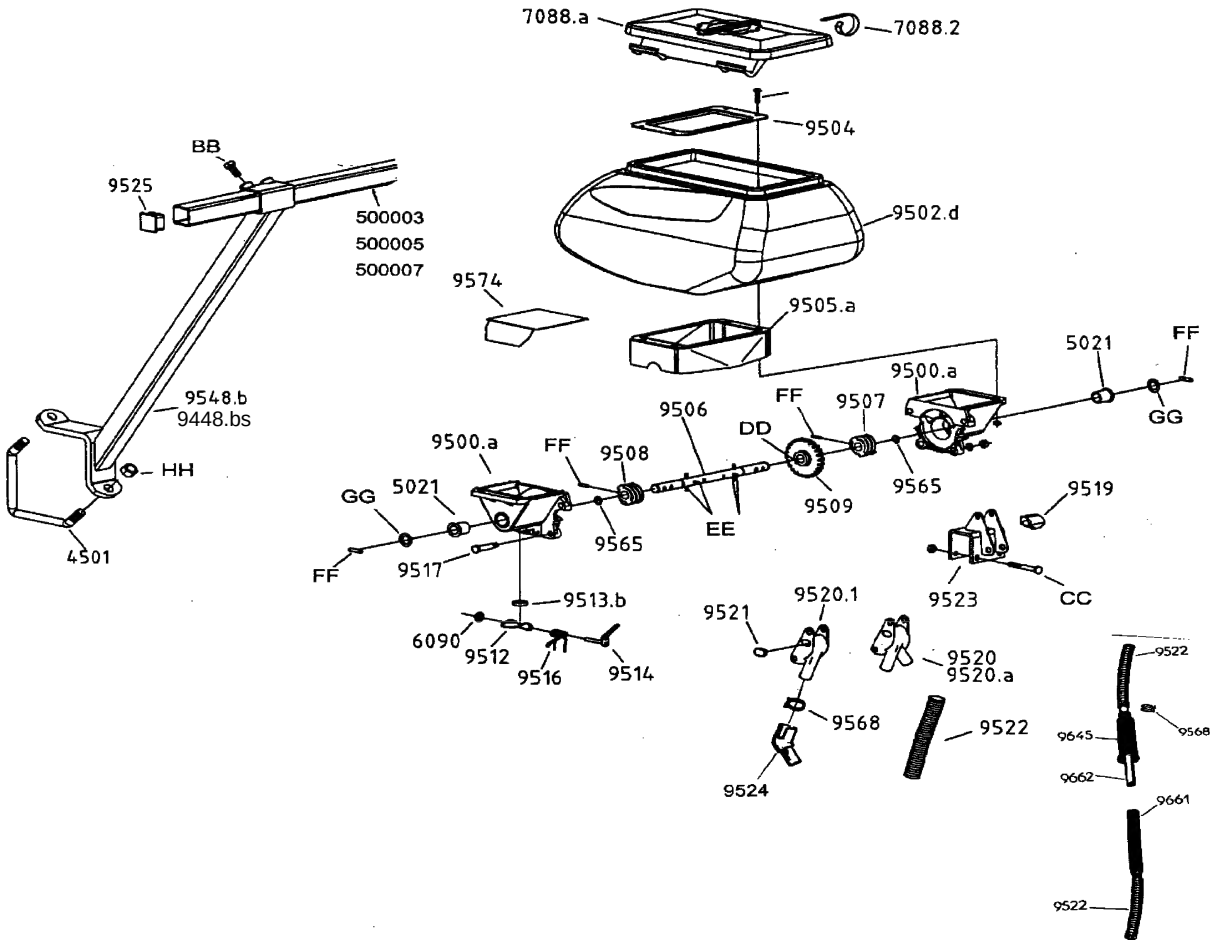
#'s per acre		**4.0**	**4.4**	**4.9**	**5.8**	**6.6**	**7.4**
RIDOMIL	36"	12 / 22 / 12	12 / 20 / 12	12 / 18 / 12	12 / 15 / 12	12 / 22 / 20	12 / 12 / 12
GOLD GR	38"	12 / 20 / 12	12 / 18 / 12	12 / 15 / 12	12 / 23 / 20	12 / 12 / 12	12 / 18 / 20
PC11G	40"	12 / 18 / 12	12 / 15 / 12	12 / 23 / 20	12 / 22 / 20	12 / 18 / 20	25 / 22 / 12

#'s per acre	**8.1**
	12 / 18 / 20
	25 / 22 / 12
	25 / 20 / 12

#'s per acre		**5.1**	**5.8**	**6.4**	**7.1**	**8.5**	**9.5**
GOLD PC	36"	12 / 25 / 12	12 / 22 / 12	12 / 20 / 12	12 / 18 / 12	12 / 15 / 12	12 / 22 / 20
	38"	12 / 22 / 12	12 / 20 / 12	12 / 18 / 12	12 / 15 / 12	12 / 22 / 20	12 / 12 / 12
	40"	12 / 20 / 12	12 / 18 / 12	12 / 15 / 12	12 / 22 / 20	12 / 12 / 12	12 / 18 / 20

MICROSEM INSECTICIDE ASSEMBLY

Microsem Assembly

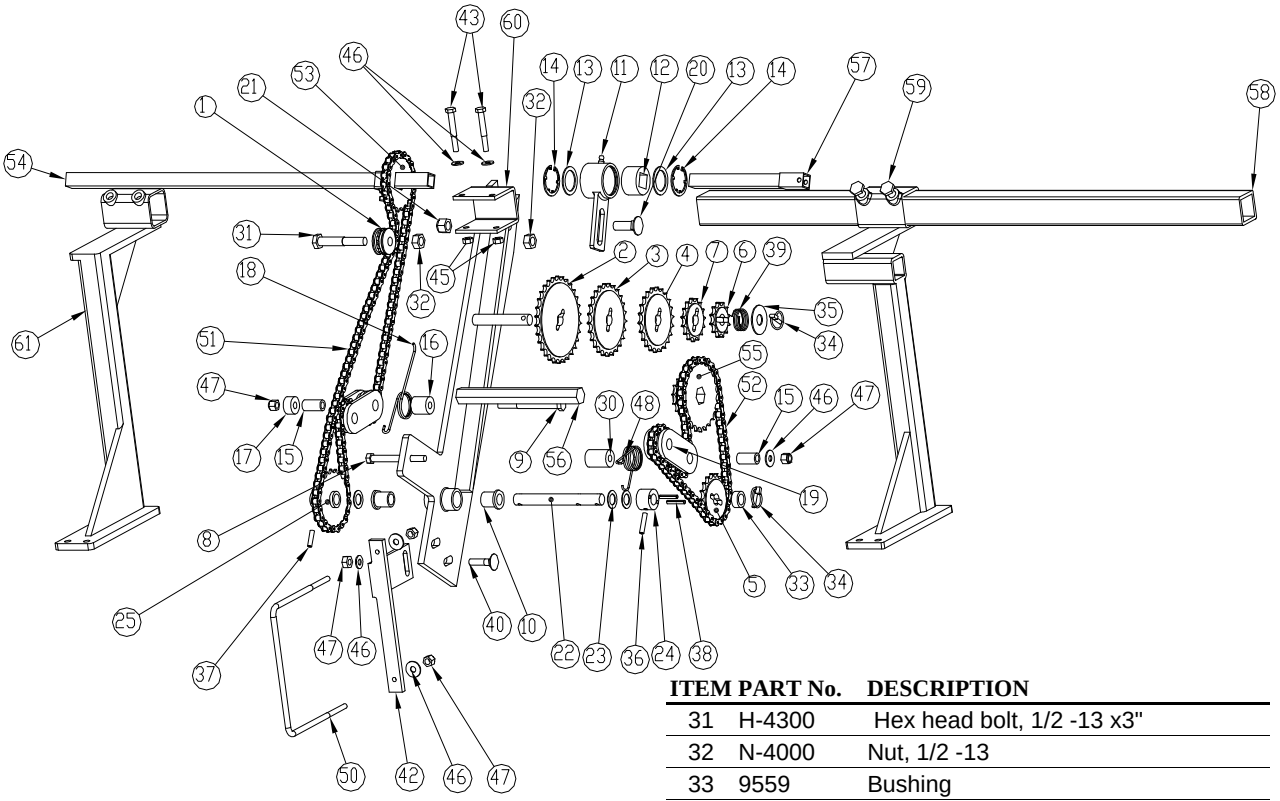


PART No.	DESCRIPTION
4501	V-bolt, 16mm
5021	Self lubricated bushing
6090	Snapring, 6mm
7085.da	Drop tube, right hand
7085.ga	Drop tube, left hand
7088.a	Lid, hopper, with clip (7088.2)
7088.2	Clip, for hopper lid
9500.a	Housing(half), metering unit (replaces old
	9500 & 9501 left & right sides)
9502.d	Plastic hopper only, 25 liter, -'03
9504	Steel base (hopper to meter)
9505.a	Rubber skirt
9506	4x35 roll pins)
9507	Worm gear, lft(reqrs 6x25 roll pin)
9508	Worm gear, rht(reqrs 6x25 roll pin)
9509	4x25 roll pin)
9512	Trap door (to clean out meter unit)
9513.a	Seal for trap door
9514	Lever for trap door
9516	Spring for trap door
9517	Bolt (fastens housings together)
9519	Rubber plug
9520	Two outlet chute (towards the front)
9520.a	Two outlet chute (towards the rear)

PART No.	DESCRIPTION
9520.1	Single outlet
9521	Rubber plug for side of chute
9522	Hose (specify length)
9523	Clamp/mounting bracket
9524	Elbow for single outlet
9525	End cap for bar
9548.b	Support bar(for mounting to a 5x5 bar)
9548.bs	Support bar(for mounting to a 7x7 bar)
9565	Rubber O-ring
9568	Hose clamp (for 9522)
9574	Plate for hopper (to convert to single outlet)
9645	Protective Sleeve
9661	Female half of sliding drop tube assy
9662	Male half of sliding drop tube assy
500003	Carrier bar, 8' 2" long(1-1/2" square)
500005	Carrier bar, 11' 6" long(1-1/2" square)
500007	Carrier bar, 14' 9" long(1-1/2" square)
AA	10530096 - Phillips head bolt, 6 x 25
BB	HM-61225 - Hex bolt, 12 x 25
CC	HM-2860 - Hex bolt, 8 x 60
DD	10172041 - Roll pin, 4 x 25
EE	10172043 - Roll pin, 4 x 35
FF	10172090 - Roll pin, 6 x 25
GG	10622024 - Washer, 16 x 26 x 1
HH	NM-51605 - 16mm nylon locknut

MICROSEM TRANSMISSION

Twin-Row



ITEM	PART No.	DESCRIPTION
1	9562	Chain roller
2	9554.21	Interchangeable sprocket, 30T
3	9554.16	Interchangeable sprocket, 25T
4	9554.13	Interchangeable sprocket, 22T
5	9554.9	Interchangeable sprocket, 18T
6	9554.3	Interchangeable sprocket, 12T
7	9554.6	Interchangeable sprocket, 15T
8	H-3320	Hex head bolt, 3/8" -16 x 3 1/2"
9	H-3410	Hex head bolt, 3/8" -16 x 4"
10	5021	Self lubricated bushing
11	E2002	Housing to hold nylon bushing
12	9280	Nylon support bushing
13	10624014	Flat washer, 31x 41x 1
14	4329.A	Snapring 44mm
15	KD1026	Sleeve, 1 3/16" long
16	E2004	Spacer, 1" long
17	E2005	Spacer, .6" long
18	7157	Spring
19	KD11962	Chain idler, plastic
20	CB-4411	Carriage head bolt, 1/2 -13 x 1 1/2"
21	N-2300	Rev lock nut, 1/2 -13
22	9612	Intermediate shaft
23	10622024	Flat washer, 16.5 x26 x1
24	9552	Spacer/driver for sprocket
25	9654	Double intermediate sprocket, 12- 20T
30	E2003	Spacer, 1.4" long
31	H-4300	Hex head bolt, 1/2 -13 x3"
32	N-4000	Nut, 1/2 -13
33	9559	Bushing
34	9557	Lynch pin
35	W-5410	Flat washer, 5/8 SAE
36	10172091	Roll pin, 6 x 30
37	10172090	Roll pin, 6 x 25
38	10170065	Roll pin, 5 x 30
39	9158	Compression spring
40	CB-2221	Carriage head bolt, 3/8 -16 x 1 1/2"
42	E2007	Mounting strap to 7 x 7 toolbar
43	HM-2865	Hex head bolt, 8 x 60mm
45	NM-1801	Nut, 8mm
46	W-2210	Flat washer, 3/8, USS
47	N-2101	Nylon locknut, 3/8 -16
48	7150	Spring
50	4647.S	U Bolt, 7 x 7, 3/8 -16
51	9553.E	Upper drive chain, 5R, 99 links for 12T driver sprocket, 103 links for 20T
52	9553.F	Lower drive chain, 5R, 60 links for 25T driver spricket, 54 links for 12T
53	9606.A	Sprocket, square drive, 20T
54	9651.085	Female drive conductor tube, 33 1/2"
55	9555.A	Double drive sprocket, hex bore, 12- 25T
56	4520	7/8" Hex shaft
57	9650.085	Male drive connector tube, 33 1/2"
58	9549.125	Carrier bar, 1 1/2" sq., specify length
59	E1011	Support bracket with offset
60	E2001	Transmission main frame
61	E1010	Support bracket

DRY FERTILIZER

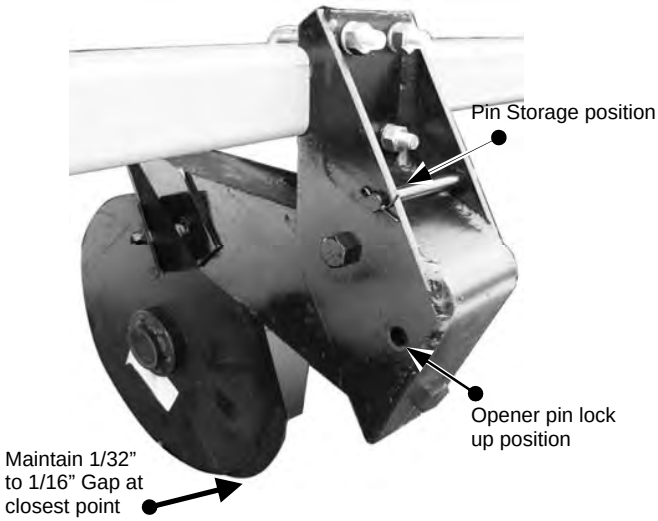
Pull-Type Planters

DOUBLE DISC FERTILIZER OPENER
Position the double disc fertilizer during assembly to place the fertilizer no closer than 2" to either side of the row. If planter frame is level and at proper planting height, fertilizer depth will be approximately 4". Soil conditions can affect depth slightly.

The down pressure spring is factory preset at 250 lbs down pressure but may be adjusted for various soil conditions. To adjust spring tension, loosen the jam nut with a 15/16" wrench and use a 1" wrench to turn the adjustment bolt clockwise to increase tension or counter-clockwise to decrease tension. Securely tighten the jam nut upon completion of tension adjustment. Do not attempt to set opener depth with spring pressure. The opener is designed to operate against depth stop and spring up when encountering a foreign abject or hard ground.

CAUTION: Do not operate the double disc openers at full down pressure tension when planting in rocky ground. Chipping of the blades will occur.

Maintain a gap of 1/32" to 1/16" between the closest points of the opener blades. Adjust the blades by moving the inside spacer washers to the outer side of the blade. After making this adjustment, check to be sure bearing assembly rivets are not hitting shank. The outer scrapers on each blade may also be adjusted to make up for wear that may occur. Adjust the scraper to allow only slight contact with the blade.



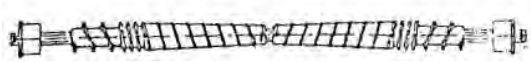
Lock the opener assembly in a raised position when the fertilizer attachment is not in use or during storage. To lock the opener, first raise the planter and place blocks under the openers. Then lower the planter until the hole in the pivot section aligns with the hole in the mounting bracket. Remove the lockup pin from the storage position in the mounting bracket an install it through the lockup hole and secure with cotter pins.

DANGER: Always install all cylinder lockup brackets before working under the unit.

DRY FERTILIZER ADJUSTMENTS
The rate of fertilizer application is determined by
① **the auger position** in the hopper and
② **the drive/ driven sprocket combination** on the fertilizer drive.

① **Adjusting the augers**
Remove ¼" stainless steel cap screws holding augers in place on shaft and reposition augers to change delivery rate. Do not use a high rate position at too low a rate setting; this will cause uneven delivery of fertilizer. Check the rate chart.


Shown with augers at **LOW RATE** delivery.


Shown with augers at **HIGH RATE** delivery.

② **Adjusting the sprockets**
A transmission for the fertilizer is located on the right side of the planter directly ahead of the row unit transmission. This transmission is designed to allow simple, rapid changes in sprockets to obtain the desired fertilizer application rates. By removing the pins on the hexagonal shafts, sprockets can be interchanged with those on the sprocket storage rod bolted to the transmission plate.

DRY FERTILIZER

Pull-Type Planters

Chain tension is controlled by a spring loaded idler. This idler is adjusted with a ratchet arm located to the inside of the transmission. This arm has a release position to remove spring tension for replacing sprockets. The amount of spring tension on the chain can be controlled by the ratchet arm.

Use the fertilizer application chart to select the correct sprocket combinations.

IMPORTANT: After each sprocket combination adjustment, make a field check to be sure you are applying fertilizer at the desired rate.

APPLICATION RATES
The dry fertilizer attachment meters granules by volume rather than weight. For this reason, and given the variances in brands and fertilizer analysis, the weight metered during actual application may vary considerably. Use the Application Rates chart for *reference only*. It is suggested that a container be used to catch and measure application to obtain a closer estimate.

WARNING: Agricultural chemicals can be dangerous. Improper use can result in injury to persons, animals and soil. Handle with care and follow instructions of chemical manufacturer.

The following rates were calculated with a bulk density of 65 lbs/cubic foot. This chart is for planters that are equipped with contact drive. In lbs/ acre

IMPORTANT: Fertilizer application rates can vary from the weights calculated in this chart due to different brands, temperature, humidity, etc. These settings are theoretical and approximate. Actual output may vary. To prevent application miscalculations, make a field test

CLEANING
Since most fertilizers absorb moisture, it is important that you keep fertilizer dry during use and storage. In addition to waste, deposits of fertilizer left in the hopper can cause metal corrosion. Hoppers should be emptied at the end of each day's use.

At the end of the planting season, or when fertilizer attachment is not going to be used for a period of time, the hoppers should be disassembled, cleaned and metal surfaces coated with a rust preventative.

IMPORTANT: If fertilizer is placed too close to the seed, it may cause germination or seedling damage especially if used in amounts in excess of fertilizer manufacturer's recommendations. Check with your fertilizer dealer or manufacturer for the correct amount and placement.

The dry fertilizer hoppers are designed to tip forward for dumping and ease of cleaning. To dump hoppers, first disconnect the drive shaft from the transmission or adjacent hopper. LOOSEN HOES CLAMPS AND REMOVE HOSES FROM EACH HOPPER.

1. Remove the two rear ½" x 1 ¼" cap screws from between hopper support and opener mounting bar. Loosen the two front ½" x 1 ¼" cap screws. Rotate hopper lids to the backside of hopper and carefully tip hopper forward. After dumping contents, flush all loose fertilizer from the hopper and hoses. To disassemble auger assemblies, remove ¼" cotter pin and bearing from one end of the shaft. Pull auger assembly from opposite end of hopper. Remove stainless steel cap screws from auger shaft and remove all auger components for cleaning. Coat all parts with rust preventative before reassembly. Reinstall auger halves in proper low rate or high rate position.

2. To reassemble, slide auger assembly through the outlet housing back into the hopper. Secure in place by reinstalling the bearing and cotter pin.

3. auger installation by rotating shaft in the direction of planter travel to see that the spirals on the auger move toward the ends of the hopper. If not, remove auger assembly, turn 180° and reinstall.

4. Be certain that the augers turn freely. If not, loosen the 5/16" carriage bolts in the outlet housings, rotate the auger several times and retighten the 5/16" carriage bolts.

5. This should allow the housings to realign them selves with the auger.

6. Install auger baffles over the augers and secure in place with two hairpin clips in each hopper. Do not operate fertilizer attachment without auger baffles in place.

IMPORTANT: Frequent lubrication of auger bearings is critical to ensure that the augers will turn freely. Check lubrication section for frequency.

7. NOTE: Be sure to install the auger so the flighting on the augers move material to the outer openings in the hopper when the augers are rotated in the direction they will turn when the planter is in operation.

DRY FERTILIZER

Pull-Type Planters

APPLICATION RATES
The dry fertilizer attachment meters granules by volume rather than weight. For this reason, and given the variances in brands and fertilizer analysis, the weight metered during actual application may vary considerably. Use the Application Rates chart for *reference only*. It is suggested that a container be used to catch and measure application to obtain a closer estimate.

WARNING: Agricultural chemicals can be dangerous. Improper use can result in injury to persons, animals and soil. Handle with care and follow instructions of chemical manufacturer.

The following rates were calculated with a bulk density of 65 lbs/cubic foot. This chart is for planters that are equipped with contact drive. In lbs/ acre

IMPORTANT: Fertilizer application rates can vary from the weights calculated in this chart due to different brands, temperature, humidity, etc. These settings are theoretical and approximate. Actual output may vary. To prevent application miscalculations, make a field test

HOW TO TEST FOR FERTILIZER RATES
To determine lbs/acre for your desired fertilizer at 30" Row spacing, follow these steps.

1. Remove one spout from one of the fertilizer hoppers and attach a container under the opening.

2. Engage the fertilizer attachment and drive forward 174 feet.

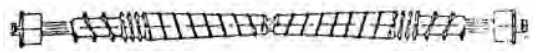
3. Weigh the amount of fertilizer caught in the container (in ounces), and multiply that number by 100.

4. The result will be the pounds of fertilizer delivered per acre when planting in 30" rows. To convert this delivery rate for wider rows, use the following conversion factors.
36" Row spacing, multiply the ounces by 0.83
38" Row spacing, multiply the ounces by 0.79
metered during actual application may vary considerably. Use the Application Rates chart for *reference only*. It is suggested that a container be used to catch and measure application to obtain a closer estimate.

APPLICATION RATES

		LOW RATE SETTINGS			HIGH RATE SETTINGS		
A /	B	30" Rows	36" Rows	38" Rows	30" Rows	36" Rows	38" Rows
15 /	35	32	26	25	94	78	74
15 /	33	36	30	28	109	91	86
15 /	30	39	33	31	120	100	95
19 /	33	45	37	36	135	114	107
19 /	30	50	42	39	153	126	120
15 /	19	58	48	46	174	144	136
30 /	35	61	51	48	188	156	148
30 /	33	67	55	52	200	166	157
33 /	35	69	58	55	206	172	163
35 /	33	76	63	61	214	193	183
33 /	30	81	67	64	241	200	190
19 /	15	93	77	73	278	230	219
30 /	19	116	96	91	347	288	274
33 /	19	127	105	100	382	317	301
35 /	19	133	111	106	402	335	318
30 /	15	146	121	115	440	365	347
33 /	15	161	134	127	482	400	380
35 /	15	168	141	133	510	424	403

DIRECTION OF ROTATION

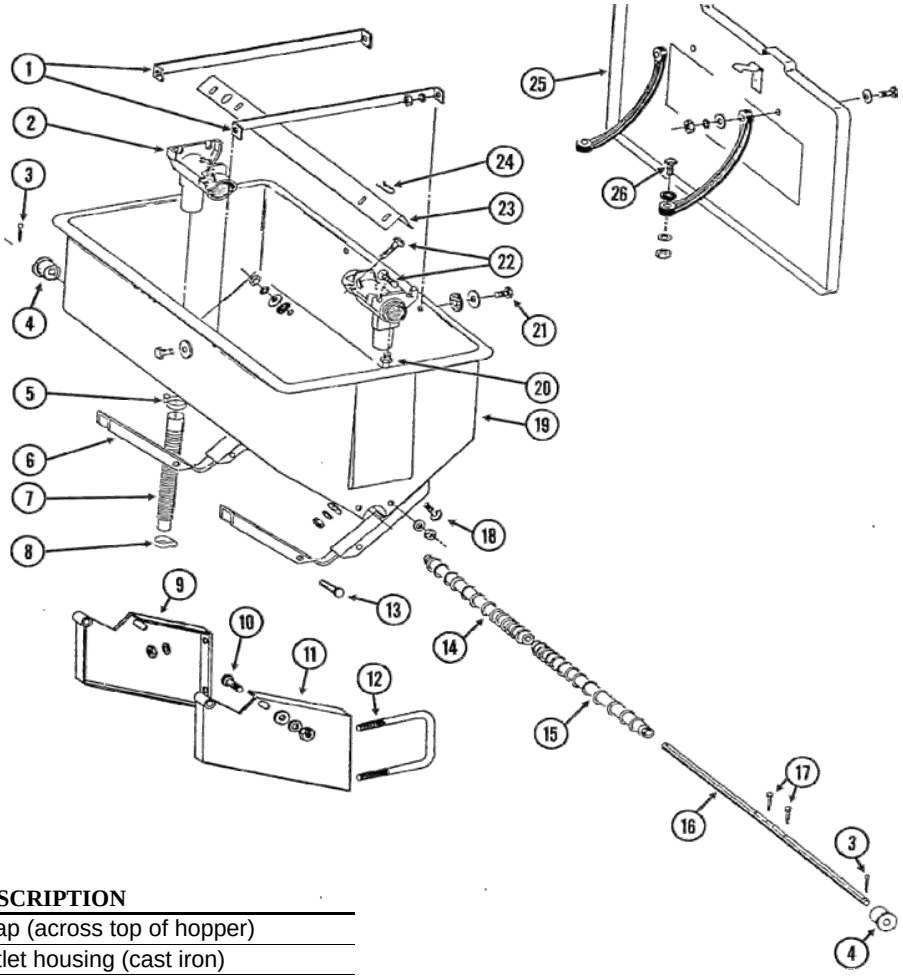


HIGH RATE POSITION

LOW RATE POSITION

Pull-Type Planters

ASSEMBLY



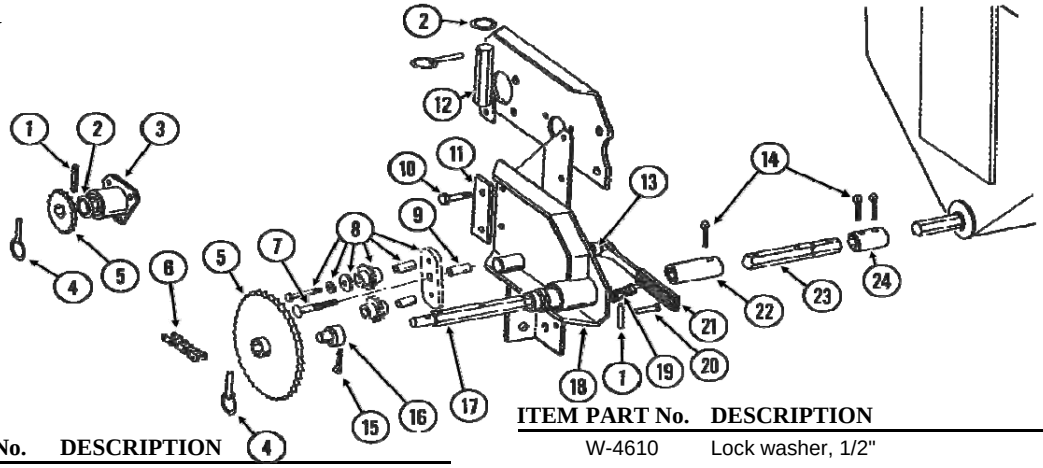
ITEM	PART No.	DESCRIPTION
1	KD1209	Strap (across top of hopper)
2	KD1200	Outlet housing (cast iron)
3	K10460	Cotter pin, 1/4" x 2"
4	KB0200	Auger bearing
5	K10676	Clamp, No. 36
6	KA5652	Saddle (to support hopper)
7	KD3790	Rubber hose, standard(9" to 16")
	KD1925	Rubber hose, extra long(14" to 24")
8	K10672	Clamp, No. 28
9	KA2534	Hopper mounting bracket, RH
10	H-4110	Bolt, 1/2" x 1-1/4"
11	KA2533	Hopper mounting bracket, LH
12	4502.S	U-bolt, 7" x 7" x 5/8"
13	K10561	Pin, 1/2" x 3"
	K10451	Cotter pin, 1/8" x 1"
14	KB0198	Auger, RH (as standing behind planter)
15	KB0199	Auger, LH (as standing behind planter)
16	KD7848	Shaft for auger
17	K10587	Bolt, 1/4" x 2", stainless steel
	K10588	Nut, 1/4"-20, stainless steel
18	CB-1114	Carriage bolt, 5/16" x 1-1/4"
	K10201	Special washer
	KD1213	Rubber washer
	W-1610	Lock washer, 5/16"
	N-1001	Nut, 5/16"-18
19	KD1379	Hopper (bare shell)

ITEM	PART No.	DESCRIPTION
20	K10641	Grease fitting, 1/8" NPT
21	K10171	Bolt, 5/16" x 1-1/4"
	K10201	Special washer
	KD1213	Rubber washer
	W-1610	Lock washer, 5/16"
	N-1001	Nut, 5/16"-18
22	CB-1110	Carriage bolt, 5/16" x 1", grade 2
23	KD1207	Baffle (galvanized steel)
24	K10670	Hair pin clip, No. 3
25	**KA0898**	**Lid assembly complete(clips, rubber straps, and hardware)**
	KD1380	Front clip
	KD1210	Rubber strap
26	H-2120	Bolt, 5/16" x 1-1/2"
	W-1210	Flat washer, 5/16"
	W-1610	Lock washer, 5/16"
	N-1001	Nut, 5/16"-18
	KA5666	**Hopper assembly(items 2,6,18, 19,22, & 24)**
	KA5667	**Auger, baffle & straps(items 1, 3,4,14,15,16,17, & 23)**
	K6796X	**Mounting bracket kit complete (items 9,10,11,12, & 13)**

DRY FERTILIZER

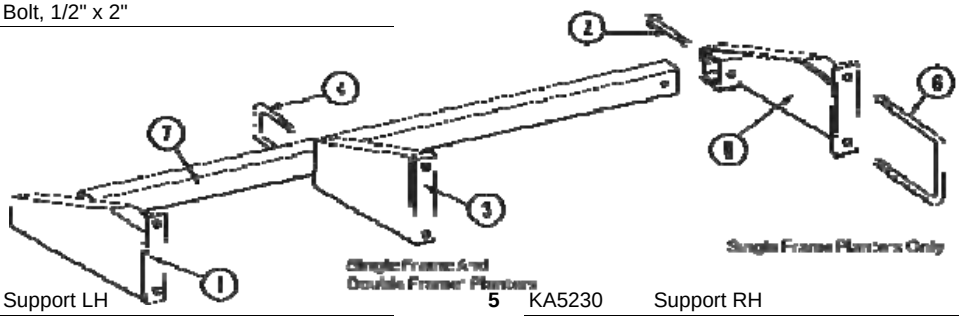
Pull-Type Planters

ASSEMBLY



ITEM	PART No.	DESCRIPTION
1	K10602	Roll pin, 1/4" x 1-1/2"
2	K10233	Machine bushing, 1"ID x 1-1/2"OD, 1/8" thick
3	KA5223	Spacer w/bearing
	KA5116	Bearing, 7/8" hex bore, cylindrical
4	KD2558	Lynch pin, 1/4"
5	KA5105	Sprocket, 15 tooth, #40
	KA5107	Sprocket, 19 tooth, #40
	KA5114	Sprocket, 30 tooth, #40
	KA5115	Sprocket, 33 tooth, #40
	KA6337	Sprocket, 35 tooth, #40
6	K3310-98	Chain, #40, 98 links(w/conn. link)
7	K10419	Carriage bolt, 1/2" x 4-1/2"
	K10111	Lock nut, 1/2"
8	KA7336	Idler w/bolt on sprockets
	KD7426	Plastic sprocket
	KD1026	Spacer, 1-3/16"
	W-2410	Washer, 3/8"
	W-2610	Lock washer, 3/8"
	H-3130	Bolt, 3/8" x 1-3/4"
9	KD31380-17	Sleeve, 2-5/16" wide
10	H-4220	Bolt, 1/2" x 2-1/2"
	H-4320	Bolt, 1/2" x 3-1/2"
	H-4201	Bolt, 1/2" x 2"
	W-4610	Lock washer, 1/2"
	N-4001	Nut, 1/2"
11	KD8246	Overlay
12	KA5229	Sprocket storage rod
13	KD10161	Spacer, 3/8"
14	K10460	Cotter pin, 1/4" x 2"
15	K10462	Cotter pin, 3/16" x 2"
16	KD7127	Shear coupler
17	KD7870	Shaft, 7"
18	KA5678	Plate w/bearings and grease fitting
	KA5116	Bearing, 7/8" hex bore, cylindrical
	KA5624	Bearing, 7/8" hex bore, extended sleeve w/cross drilled hole
	K10640	Grease fitting, 1/4"-28
19	KD5857	Spring
20	K10408	Clevis pin, 5/16" x 3/4"
	K10409	Retaining ring, 5/16"
21	KA4235	Ratchet wrench w/protective covering
	K10445	Protective covering(on handle)
22	KD7867	Coupler, 3"
23	KD7871	Hex shaft, 6"
24	KD5886	Coupler, 1-3/4"

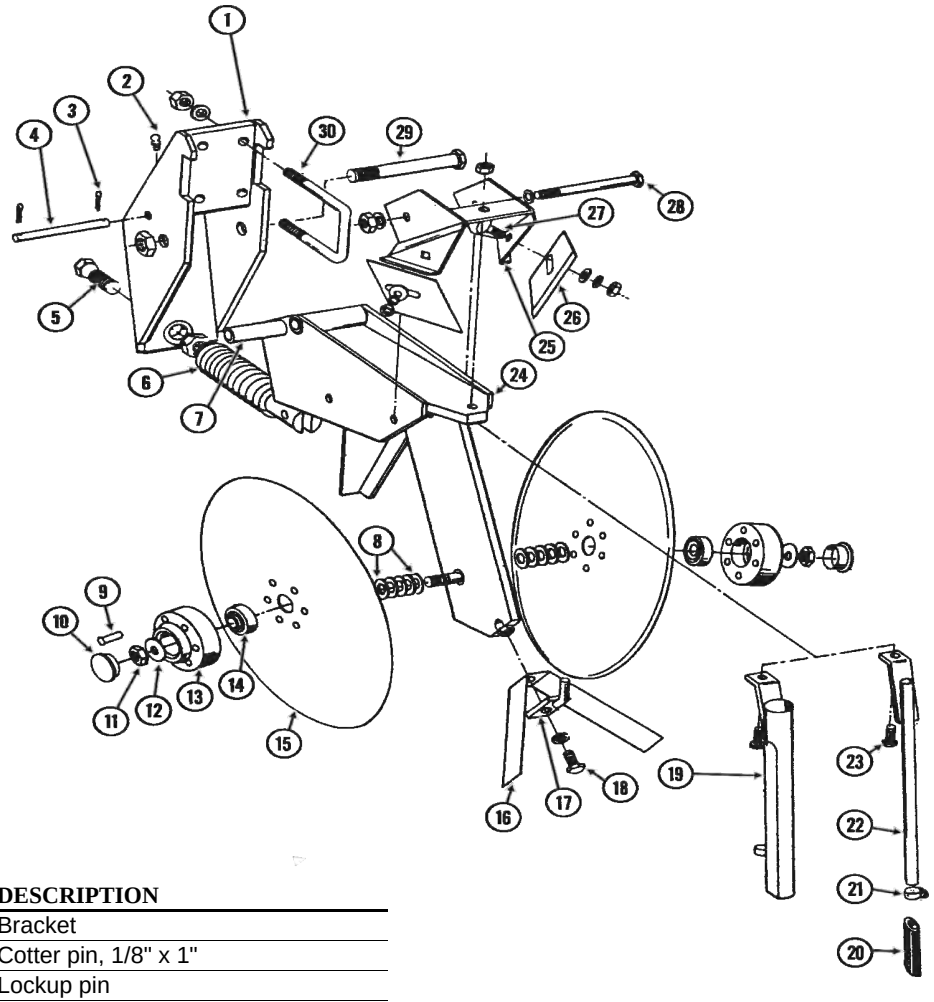
MOUNTING BAR



ITEM	PART No.	DESCRIPTION
1	KA5231	Support LH
2	H-4401	Bolt, 1/2" -13x 4"
	N-4001	Hex nut 1/2" -13
	W-4610	Lock washer, 1/2"
3	KA5236	Support RH 8-row
	KA5237	Suppost LH 8-row
4	KD1138	U-Bolt 2 1/2" x 2 1/2"x 1/2"- 13
	N-4001	Hex nut 1/2" -13
	W-4610	Lock washer, 1/2"
5	KA5230	Support RH
6	KD1114	U-Bolt 7" x 7"x 5/8"- 11
	N-5001	Hex nut 5/8" -11
	W-5610	Lock washer, 5/8"
7	KD1685-12	Bar, 205 6-row 36
	KD1685-13	Bar, 165 6-row 30
	KD1685-14	Bar, 105 4-row 30
	KD1685-15	Bar, 129 4-row 36/38
	KD1685-16	Bar, 225 8-row 30

Pull-Type Planters

DOUBLE DISC FERTILIZER OPENER



ITEM	PART No.	DESCRIPTION
1	KA0785	Bracket
2	K10451	Cotter pin, 1/8" x 1"
3	KD1657	Lockup pin
4	KD1657	
5	KD0962	Hex head adj. bolt, 5/8" -18
5	K10499	Jam Nut, 5/8" -18
6	KA0328	Spring
7	KD0487	Bushing
8	K10213	Machine bushing, 11/16"
9	K10542	Rivet, 1/4" x 1 5/16"
10	KD1132	Cap
11	K10503	Jam Nut, 5/8" -11 RH
11	K10504	Jam Nut, 5/8" -11 LH
12	K10204	Machine bushing, 21/32"
13	KB0134	Hub
14	KA2014	Bearing
15	KD1030	Blade
16	KD2589	Inner Scraper
17	KA0312	Mount
18	K10019	Hex head cap screw, 5/16" - 18 x 1"
18	K10232	Lock washer, 5/16"
19	KA1369	Drop Tube
20	KD1797	Extension
21	K10681	Clamp, No. 6
22	KA0318	Drop Tube, Liquid Fertilizer

ITEM	PART No.	DESCRIPTION
23	K10133	Hex head cap screw, 5/16" -18 x 1 1/2
23	K10109	Lock nut 5/16" -18
24	KA0308	Shank
25	KA0810	Scraper Mount
26	KD1673.	Scraper
27	K10305	Carriage bolt, 3/8" -16x1"
27	K10210	Washer, 3/8" USS
27	K10229	Lock washer, 3/8"
27	K10101	Hex nut 3/8" -16
28	K10045	Hex head cap screw, 1/2" -13x 4 1/2"
28	K10111	Lock nut 1/2" -13
29	K10046	Hex head cap screw, 5/8" - 11x5"
29	K10107	Lock nut 5/8" -11
30	KD1339	U-Bolt 2 1/2" x 2 1/2"x 1/2"- 13
30	K10102	Hex nut 1/2" -13
30	K10228	Lock washer, 1/2"

LIQUID FERTILIZER

Pull-Type Planters

PUMP MOUNTING AND HOSE ARRANGEMENT

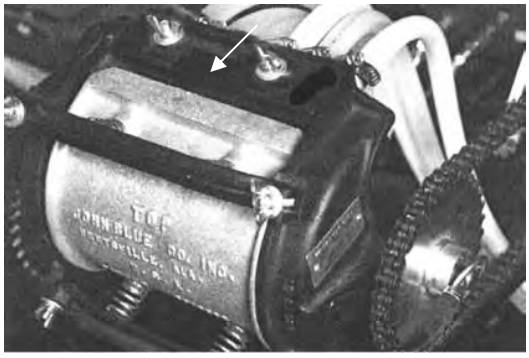
The squeeze pump is shipped with the discharge manifold in the **rearward or non-operating** position. Before operating or mounting the pump, position the discharge manifold in the forward or operating position and secure by tightening the wing nuts.

The pump should always be mounted even with or lower than the fertilizer tank for accurate metering. The rate of liquid fertilizer application is determined by the combination of sprockets on the squeeze pump and the drive shafts (see chart). When changing the sprocket combinations, check that the sprockets are in alignment, that the sprocket retaining collars are tight and that the chain tension is restored.

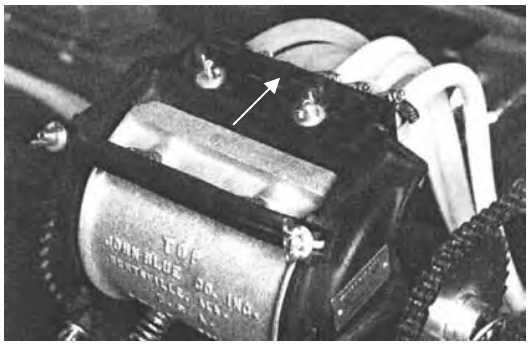
The shut-off valves should be closed to shut off the flow when the pump is not in use, either overnight, or for an extended amount of time. Also close the valves when servicing either the pump or the hoses.

To prolong the life of the hoses, the discharge manifold must be repositioned to the rearward position when not is use to prevent hose distortion.

The discharge pump must be in the forward position when the pump is in operation. To reposition the manifold, loosen the wing nuts and slide the manifold forward and sideways or rearward as required and retighten the nuts.



DISCHARGE MANIFOLD REARWARD



DISCHARGE MANIFOLD FORWARD

WARNING

Agricultural chemicals can be dangerous. Improper use can result in injury to persons, animals, and soil. Handle with care and follow instructions of the chemical manufacturer.

IMPORTANT

Do not place fertilizer too close to seed, it may cause germination or seedling damage. This is even more likely to occur if used in amounts in excess of the fertilizer manufacturer's recommendations. Check with your fertilizer dealer or manufacturer for the correct amount and placement of fertilizer.

LIQUID FERTILIZER

Pull-Type Planters

SQUEEZE PUMP APPLICATION RATES

Drive	Driven	30"	36"	38"
		Gallons per Acre		
15	*62	6.9	5.8	5.5
19	*62	8.8	7.3	6.9
15	46	9.3	7.8	7.4
19	46	11.8	9.8	9.3
15	34	12.6	10.5	9.9
15	32	13.4	11.2	10.6
32	*62	14.7	12.3	11.6
19	34	16.	13.3	12.6
19	32	17.	14.1	13.4
32	46	19.9	16.6	15.7
34	46	21.1	17.6	16.7

Drive	Driven	30"	36"	38"
		Gallons per Acre		
46	*62	21.2	17.7	16.7
15	19	22.5	18.8	17.8
32	34	26.9	22.4	21.2
34	32	30.3	25.3	24
19	15	36.2	30.1	28.6
46	34	38.6	32.2	30.5
46	32	41.	34.2	32.4
32	19	48.1	40.1	38.
34	19	51.1	42.6	40.3
*62	34	52.1	43.4	41.1

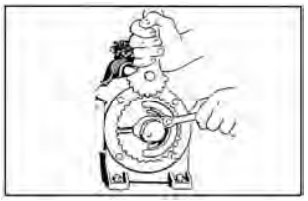
Above chart is for planters equipped with contact drive. See "Tire Pressure" for recommended tire pressures.
This chart was calculated based on a solution weighing ten pounds per gallon.

NOTE: Fertilizer application rates can vary from the above chart. To prevent application miscalculations, make field checks to be sure you are applying fertilizer at the desired rate. Follow the instructions on the following page to make a **FIELD CHECK.**

OPTIONAL PISTON PUMP

If the machine is equipped with the piston pump option, the rate of liquid fertilizer application is determined by the piston pump settings.

To adjust delivery rate, loosen the 3/8" lock nut that secured the arm with the pointer and rotate the scale flange until the pointer is over the desired scale setting. The adjustment wrench will facilitate rotation of the scale flange. Tighten the 3/8" lock nut being careful not to over tighten.



CLEANING

The tanks and all hoses are made of sturdy plastic and rubber to resist corrosion. However, the tanks, hoses and metering pump should be thoroughly cleaned with water at the end of the planting season or prior to an extended period of non-use. Do not allow fertilizer to crystallize due to cold temperature or evaporation.

On machines equipped with the piston pump, the strainer located between the piston pump and ball valve should be taken apart and cleaned daily. Remove the end cap to clean the screen

PISTON PUMP STORAGE

KEEP AIR OUT OF THE PUMP! This is the only way to prevent corrosion. Even for short periods of storage, the entrance of air into the pump will cause RAPID AND SEVERE CORROSION.

Overnight Storage

Suspension Fertilizer must be flushed from the pump for ANY storage period.

Winter Storage

1. Flush pump thoroughly with 5 to 10 gallons of fresh water and circulate until all corrosive salts are dissolved in the pump.
2. With the pump set on 10, draw in a mixture of half diesel fuel and half 10 weight oil until the discharge is clean. Then plug inlet and outlet

LIQUID FERTILIZER

Pull-Type Planters

PISTON PUMP APPLICATION RATES

Pump Setting	1	2	3	4	5	6	7	8	9	10
4-row 30”	8.3	16.5	24.8	32.6	41.3	49.5	57.8	66.0	74.3	83.5
4-row 36”	6.9	13.7	20.6	27.5	34.4	41.3	48.2	55.0	61.9	68.8
4-row 38”	6.5	13.0	19.5	26.0	32.6	39.1	45.6	52.1	58.7	65.2
6-row 30”	5.5	11.0	16.5	22.0	27.5	33.0	38.5	44.0	49.5	55.0
6-row 36”	4.6	9.2	13.7	18.3	22.9	27.5	32.1	36.7	41.3	45.9
6-row 38”	4.4	8.7	13.0	17.4	21.7	26.0	30.4	34.8	39.1	43.4
8-row 30”	4.1	8.3	12.4	16.5	20.6	24.8	28.9	33.0	37.1	41.3

The above chart is for planters equipped with contact drive. This chart is based on average wheel slippage and liquid viscosities.

Measure and weigh one gallon of actual fertilizer solution to determine exact application rates. This chart was calculated based on a solution weighing 10 pounds per gallon.

IMPORTANT: Fertilizer application rates can vary from the above chart. To prevent application miscalculation, make field checks to be sure you are applying fertilizer to all rows at the desired rate.

NOTE: Flow to all rows should be checked periodically. If one or more lines are plugged, the desired rate will be delivered to the remaining rows keeping total application rate at desired rate.

FIELD CHECK

To check the exact number of gallons your fertilizer attachment will actually deliver on 30” row spacing, proceed as follows:

1. Remove the hose from one of the fertilizer openers and insert it into a collection container that has been secured to the planter frame.
2. Engage the fertilizer attachment and drive forward for 174’.
3. Measure the fluid ounces caught in the container and multiply that amount by 100.
4. Divide that amount by 128.
5. The result will be the gallons of fertilizer delivered per acre when planting in 30” rows. Rinse the collection container and repeat test on other rows if necessary. To convert this delivery rate for wider rows, multiply by the following conversion factors:

   For 36” rows, multiply by .83 by result
   For 38” rows, multiply by .79 by result

LIQUID FERTILIZER

Pull-Type Planters

TROUBLE SHOOTING

PROBLEM:
Pump Hard or impossible to Prime.

POSSIBLE CAUSE:	
Valves fouled or in wrong place.	Inspect and clean valves.
Air leak in suction line	Repair Leak
Pump is set too low	Adjust Pump Setting
Packing washers are worn out	Replace.

PROBLEM:
Low Metering.

POSSIBLE CAUSE:	
Valves fouled or in wrong place.	Inspect and clean valves.
Air leak in suction line	Repair Leak
Pump is set too low	Adjust Pump Setting
Broken valve spring	Replace.

PROBLEM:
Over Metering.

POSSIBLE CAUSE:	
Improper rate setting	Adjust Pump Setting
Trash is under valves	Inspect and clean valves
Broken discharge valve spring	Replace.

PROBLEM:
Leaks Through when Stopped.

POSSIBLE CAUSE:	
Trash is under valves	Inspect and clean valves
Broken discharge valve spring	Replace.

PROBLEM:
Fertilizer Solution leaking under stuffing box

POSSIBLE CAUSE:	
Packing washers are worn out	Replace.

PROBLEM:
Pump is using excessive Oil

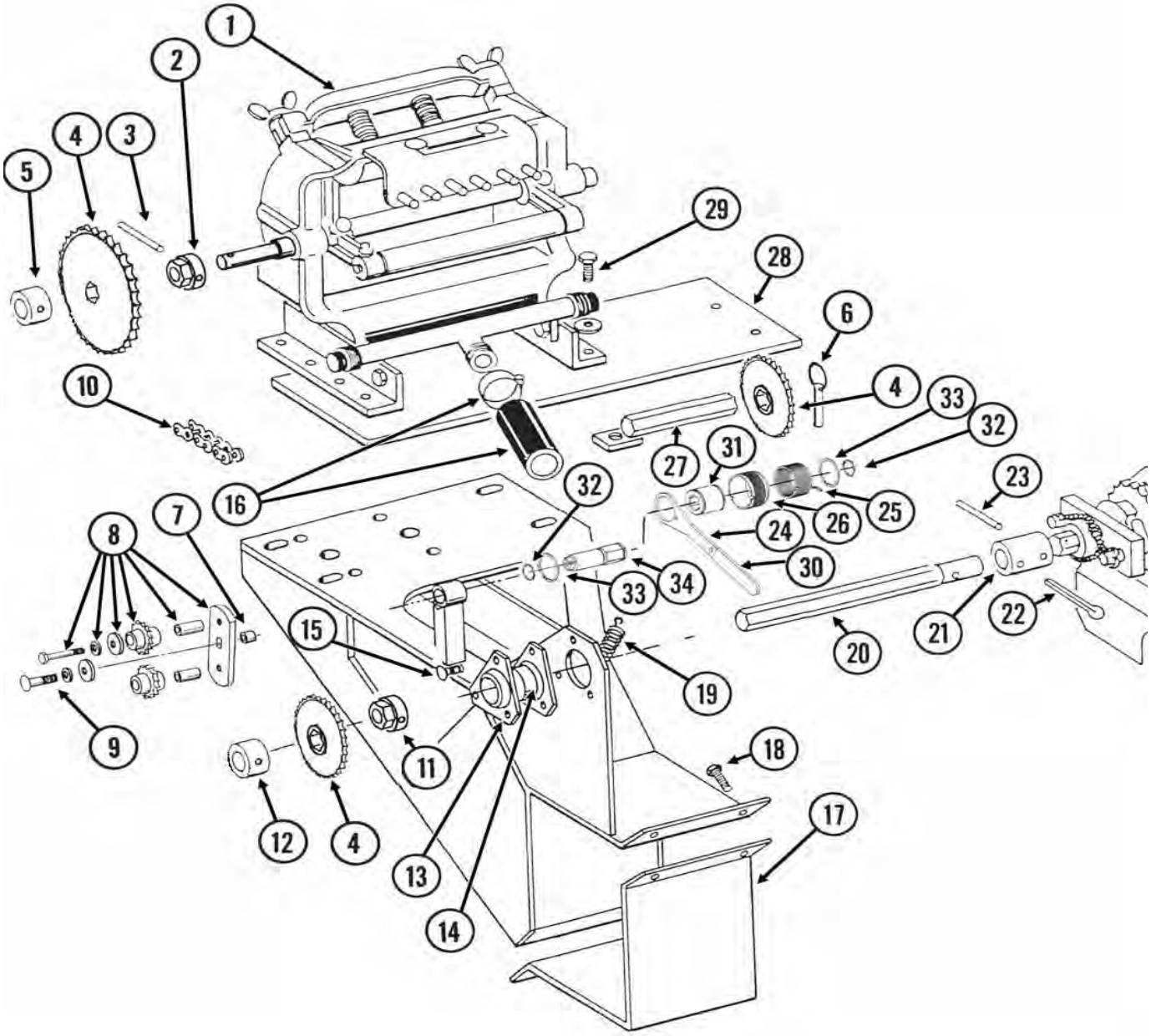
POSSIBLE CAUSE:	
Oil seals or o-ring worn and leaking	Replace.

PROBLEM:
Pump operates noisily

POSSIBLE CAUSE:	
Crankcase components worn excessively	Inspect and replace if necessary.

Pull-Type Frame

SQUEEZE PUMP ASSEMBLY



Pull-Type Frame

SQUEEZE PUMP ASSEMBLY

ITEM	PART No.	DESCRIPTION
1	JBL6C	SQUEEZE PUMP 2 - 6 ROWS
	JBL8LC	SQUEEZE PUMP 8 ROWS
	JBL12C	SQUEEZE PUMP 12 ROWS
2	MPL1414	7/8" SPROCKET ADAPTER
3	F64286	SPRING PIN 5/16 X 2-1/4"
4	MPL1381	SPROCKET, 20 TOOTH
	MPL1383	SPROCKET, 8 TOOTH
	MPL1384	SPROCKET, 9 TOOTH
	MPL1385	SPROCKET, 10 TOOTH
	MPL1386	SPROCKET, 15 TOOTH
	MPL1387	SPROCKET, 22 TOOTH
	MPL1388	SPROCKET, 23 TOOTH
	MPL1389	SPROCKET, 26 TOOTH
5	MPL4414	7/8" SPROCKET RETAINER
6	KD2558	LYNCH PIN, 1/4"
7	KD2734-08	SLEEVE, 1 1/4" X 5/8"
8	KA7336	IDLER W/SPROCKETS
	KD7426	SPROCKET, 12 TOOTH
	KD1026	SLEEVE, 1 3/16"
	K10210	WASHER, 3/8" USS
	K10229	LOCK WASHER, 3/8"
	K10047	HEX BOLT, 3/8-16 X 1 3/4"
9	K11100	SCREW, 1/2-20 X 1/2"
	K10227	LOCK WASHER, 1/4"
	K10209	WASHER, 1/4" USS
10	G169A2040	CHAIN, #A2040
	G171A2040	CONNECTOR LINK, #A2040
	G172A2040	OFFSET LINK, #A2040
11	KA2354	ADAPTER
12	KA2355	LOCK COLLAR
13	K3400-01	FLANGETTE
14	K2100-03	BEARING
15	K10303	CARRIAGE BOLT 5/16-18 X 1
	K10232	LOCK WASHER 5/16"
	K10106	HEX NUT 5/16-18
16	K4200	FERTILIZER HOSE 1 1/4"
	HC-024	HOSE CLAMP
17	KD15685	CLAMP

ITEM	PART No.	DESCRIPTION
18	K10017	HEX BOLT, 1/2-13 X 1 1/2"
	K10228	LOCK WASHER, 1/2"
	K10102	HEX NUT, 1/2-13
19	KD5857	SPRING
20	KD5988	SHAFT, 36" (4 & 6 ROW)
	KD5990	SHAFT, 74" (8 ROW)
21	KD3839	COUPLER, 2"
22	K10460	COTTER PIN, 1/4" X 2"
23	K10602	SPRING PIN, 1/4" X 1 1/2"
24	KD14431	HANDLE
25	KD14413	TORSION SPRING, L.H.
26	KD14430	RELEASE COLLAR, GOLD, R.H.
27	KA5229	SPROCKET STORAGE ROD
28	KD6165	PLATE, 8 ROW PUMP
29	K10004	HEX BOLT, 3/8-16 X 1 1/4"
	K10210	WASHER, 3/8" USS
	K10229	LOCK WASHER, 3/8"
	K10101	HEX NUT, 3/8-16
30	K11078	COVER
31	KD14432	SLEEVE, 1 1/4"
32	K11075	SNAP RING, 7/8"
33	K10496	SNAP RING, 1 1/2"
34	KD14427	SHAFT, 4 7/8"
	K1K378	WRENCH REPLACEMENT KIT
		(#7, 9, 24-26, and 32-36)