



Precision Vacuum Planters

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5" x 5" Mounted

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Operator & Parts Manual

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**Includes Instructions for:**

- **Safety**
- **Operation**
- **Maintenance**

## INTRODUCTION

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### *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**

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**5" x 5" 3pt MOUNTED**

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## SPECIFICATIONS

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### 5" x 5" 3pt MOUNTED

**FRAME-** Three Point Mounted  
Single Rigid Toolbar

**PLANTING UNIT** – NG Plus 4 Monosem  
Vacuum Metering Box  
Double Disc Opener  
Gauge Wheels  
Adjustable Closing Wheels

STANDARD ROW SPACING	WIDTH	WEIGHT*
2-Row – 30-40" Rows Single Rigid Toolbar Frame	8' 2"	972 lbs.
4-Row Narrow - 30" Rows Single Rigid Toolbar Frame	9' 6"	1510 lbs.
4-Row Wide – 36, 38 & 40" Rows Single Rigid Toolbar Frame	11' 6"	1540 lbs.
6-Row Narrow – 22-30" Rows Single Rigid Toolbar Frame	14' 9"	2010 lbs.
6-Row Wide – 36, 38 & 40" Rows Single Rigid Reinforced Toolbar Frame	20'	2080 lbs.
8-Row Narrow – 22-30" Rows Single Rigid Reinforced Toolbar Frame	20'	2960 lbs.

\* Weight of planter frame, drive components, tires and wheels, with NG Plus 4 planter unit with seed hopper and lid. Weight does not include accessories such as double gauge wheels, insecticide or fertilizer applicators.

**DRIVE SYSTEM**  
Ground Drive  
Two Drive Wheels with 5.9x15" Tires

**TURBOFAN**  
540, 450 or 1000 rpm  
500 or 925 rpm High Output

**GEARBOX**  
Central Gearbox

**HITCH**  
Category II and III, Narrow and Wide,  
Bolt on and Adjustable.  
Category I Pins Available

**MARKERS/HYDRAULICS**  
Single Fold Marker  
  
Hydraulic Hoses of the Markers Can Be  
Connected To:  
- A Single Remote with Automatic  
Sequence Valve  
- A Dual Remote

**OPTIONAL EQUIPMENT**  
Hydraulic Drive for Turbofan  
Electronic Seed Monitor  
US Insecticide  
Microsem Insecticide System  
Disc Hiller System, w/Flat or V Press Wheel  
U.S. Insecticide/Herbicide System  
Adjustable Drive Wheels  
Advanced or Double Bar Hitch  
Dry Fertilizer System  
Liquid Fertilizer Squeeze Pump and Disc  
Openers

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.

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## SAFETY PRECAUTIONS



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.

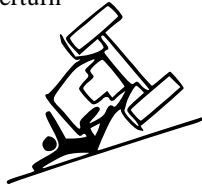


## SAFETY PRECAUTIONS



### 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 drives 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.



## SAFETY PRECAUTIONS



### 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.

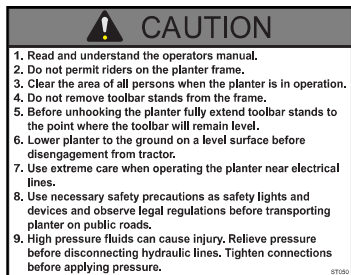
- Wear proper hand and eye protection when searching for leaks. Use wood or cardboard instead of hands.



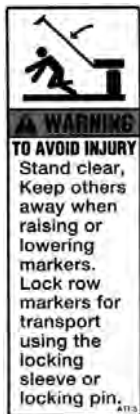
- Keep all components in good repair.

**SAFETY PRECAUTIONS**

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



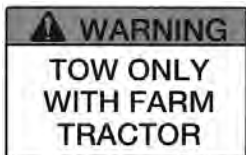
ST053 Front of hopper of inside wing unit of stacker



ST054 Front Toolbar



ST055 Inside of Granular hopper lid.



ST056 Front of Pull-Type toolbar.



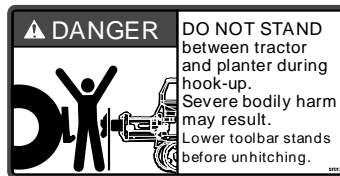
ST057 PTO Shaft.



ST058



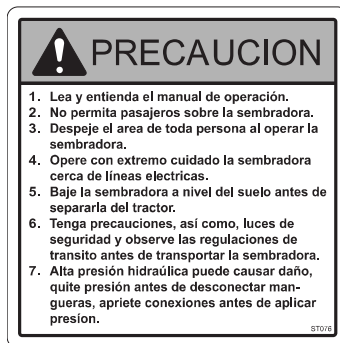
ST059



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

### 3- Point Mounted Planters

For the initial preparation of the planter, lubricate the planter and row units. Make sure all tires are evenly 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.) Check daily to see if the bolts of the hitch are tight as loose bolts can cause the brackets to break.



**WARNING!** The PTO shaft should be at a reduced angle during lifting. If the angle is too steep, reduce the PTO speed at the end of the field. (Normally the seed will remain under suction even at 400 rpm.)



**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).

**NOTE:** For 5 x 5 Mounted machines, 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 excessive 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.

#### 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

#### Grease

##### DAILY

- Gauge wheel arms
- Row marker hinge points

##### WEEKLY

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

## PREPARING THE PLANTER

### 3- Point Mounted Planters

#### 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 they would rotate freely.

#### TIRE PRESSURE

Tire pressure should be checked regularly and maintained as follows:

Transport ground drive: 7.60 x 15 35 PSI (7x7)  
5.90 x 15 36 PSI (5x5)



#### **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. Only properly trained and equipped people should do this job.**

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

**When inflating tires, use a slip-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.**

#### 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.

**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.

## PREPARING THE PLANTER


### 3- Point Mounted Planters

#### 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. Check your tractor manual for specific detailed information regarding the operation of your tractor.

1. Set tractor rear wheel spacing at double the planter row spacing. On wide front-end tractors set the front wheel spacing equal to rear wheel spacing. Check tractor operator's manual for correct front and rear tire pressure.
2. Adjust the lift links on the tractor so the planter will lift level from side to side and raise high enough for planter transport clearance. Set the sway blocks on the tractor in position to prevent side sway. Be sure the individual lift link arms are in the float position.
3. Back the tractor up to the planter. Position the lower hitch pins and spacers for your type of tractor hitch. Line up the holes. Insert the hitch pins that are provided through the hole to lock in place. It may be necessary to change the length of the upper link with the adjusting handle.

Note: If the tractor has an adjustable center link, using the lowest adjustment hole will provide maximum clearance in the raised position and yet allow the planter to remain level during field operation.

 **DANGER** Never transport folding models with lift assist wheels without a quick hitch in place. If a quick hitch is not in place, a sudden stop could allow the toolbar to rotate forward causing serious personal injury or damage to the equipment.

4. 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 that is attached to the tractor.

The following sticker 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, without drivelines securely attached at both ends, and without driveline shields that turn freely on driveline.



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



**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.

NOTE: Double check that the locking sleeves or locking pins on the row markers are in working position.

6. Raise the planter slowly and watch for any interference. Remove pin from each parking stand and raise each to the transport. Secure stands in the raised position with the pin in the lowest hole.
7. Slowly lower the planter so the drive wheels rest on the ground, and check to be sure that the planter is level. Readjust the top link as required to level row units.



**CAUTION** As a general safety practice and to avoid damage to the tractor hydraulic system, always lower the planter when not in use.

## PREPARING THE PLANTER

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### 3- Point Mounted Planters

**IMPORTANT:** Check daily to see if the bolts of the hitch are tight as loose bolts can cause the brackets to break.

#### LEVELING THE PLANTER

For proper operation of the planter and row units, it is important that the unit operate level.

With the planter lowered to proper operating depth, check to be sure that the frame is level fore and aft (front to back and side to side). Recheck once the planter is in the field.

Tire pressure can affect the lateral leveling of the planter. Maintain the tire pressure as mentioned in this section.

On planters equipped with the optional dual lift assist wheels, adjustment holes on the lift assist cylinder mounts allow for adjustment for lift height and adjustment for leveling the planter frame. Depth stops on the lift assist cylinders can be added or removed for additional adjustment.

#### TRANSPORTING THE PLANTER



**CAUTION:** Use necessary safety precautions such as safety lights and devices.

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.

Make sure to clear any obstructions overhead and to the side of the implement 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

#### OPERATING SPEED

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).

#### 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)
- Check 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.
- Check that each metering unit is metering properly (see metering unit section).
- Check that the seed disc you are using has the proper number of holes and proper diameter of holes for the type of seed you will be planting (see Seed Disc section in chapter 6 – Row Unit).
- Check that the row markers are adjusted properly.
- Check that you are using the proper application rates of chemicals on all rows.
- Check that you have set the desired depth of seed placement and checked your seed population on all rows.

## PREPARING THE PLANTER

### 3- Point Mounted Planters

#### CHECKING SEED POPULATION

1. Only one planting unit is necessary to check your 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.

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.

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

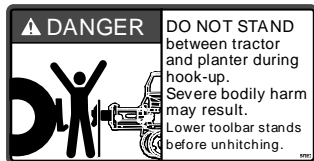
Note: When viewing the test row for seed population and placement, remember that the closing wheels were tied up in a raised position. Therefore, the seeds may have rolled or bounced and will affect your seed placement for accuracy.

#### UNHOOKING THE PLANTER



#### **DANGER:**

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. Do not stand between the tractor and the planter when connecting or disconnecting the implement.



#### TOOLBAR STANDS

One or two toolbar stands are located on the front of the main frame. Do not position the stands directly behind the tractor tire or they will hit when the planter is raised. Planters with front mounted drive wheels do not require toolbar stands.

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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Due to ongoing upgrades specifications may change without notice, contact a Monosem Rep for current information.

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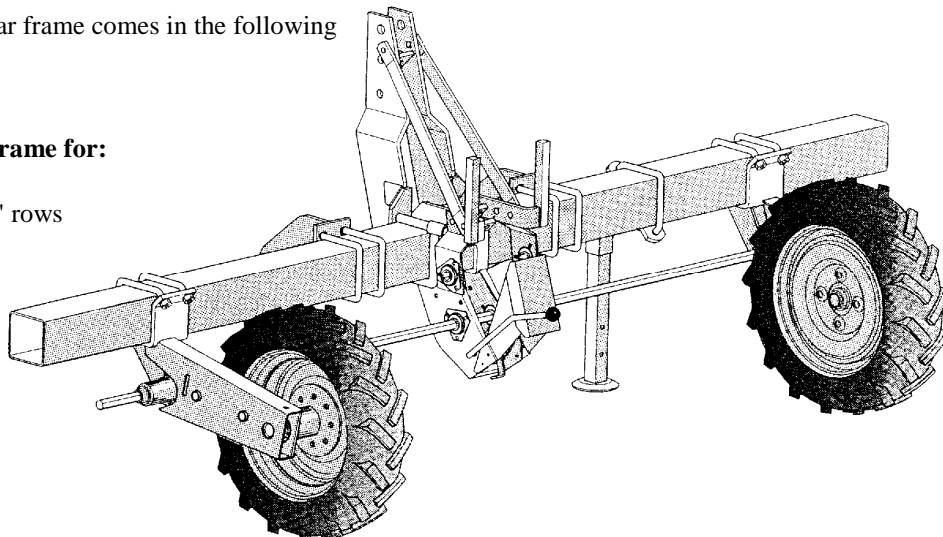
**FRAME**

**5" x 5" Mounted Toolbar**

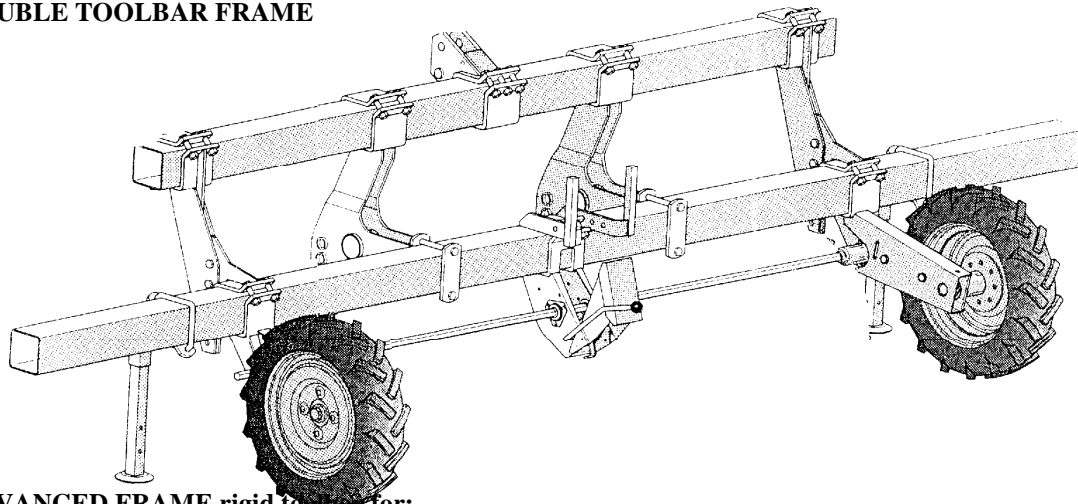
The 5x5 mounted rigid toolbar frame comes in the following configurations:

**SINGLE RIGID Toolbar Frame for:**

- 1-row
- 2 and 4-row 30"-40" rows
- 6-row 22"-30" rows
- 8-row 22" row



**DOUBLE TOOLBAR FRAME**

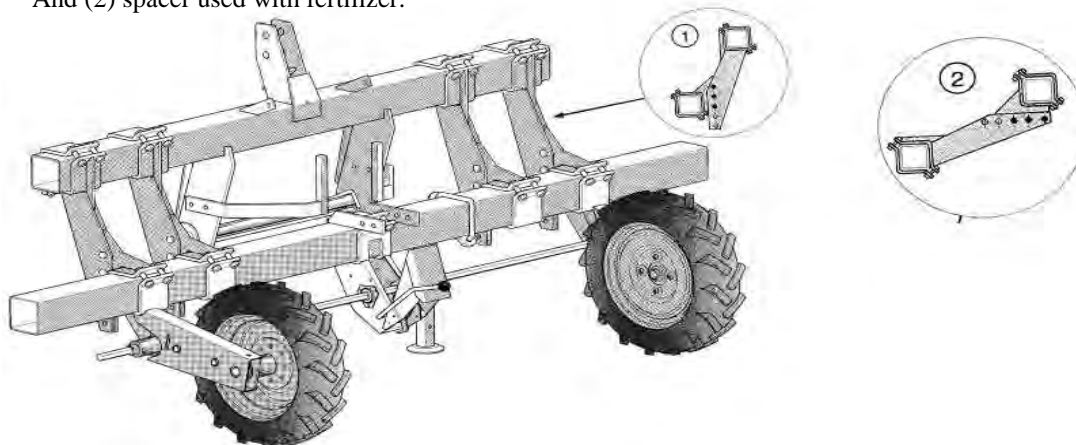


**ADVANCED FRAME rigid toolbar for:**

This frame is used when a unit needs to be placed in the center of the main toolbar. This toolbar gives you the option of a 1, 3, 5, or 9-row planter.

The photo shows spacers

- (1) Used without fertilizer
- And (2) spacer used with fertilizer.



## FRAME

### 5" x 5" Mounted Toolbar

#### TOOLBAR STAND

One or two toolbar stands are located on the front of the main frame. Position the stands so that they are not directly behind the tire of the tractor. Planters with front mounted drive wheels do not require toolbar stands.

#### TOOLBAR

The standard 5"x5" toolbar comes in these sizes:  
8' 2" – 11' 6" – 13' 2" – 14' 9" - 5mm thickness  
20' – reinforced 5mm thickness  
14' 9" – 20' – 23' – 25' – 6mm thickness

#### HEX SHAFT, COUPLERS, BUSHING STOPS

The drive wheels drive the hex shaft; the hex shaft then turns the transmission that drives the planter units. It is important to visually check the hex shaft each season to make sure it is straight. Couplers can be used to extend a shaft. The bushing stops prevent the hex shaft from working or moving from side to side, while in operation.

#### FIXED DRIVE WHEEL

The fixed drive wheel block is mounted on the 5"x5" toolbar frame with (2) 16mm 'V' bolts and (4) 16mm locking nuts.  
Tire size = 5.90" x15"  
PSI = 36

**Check and maintain the tire pressure regularly.** There is a right and left mounting for the wheel blocks. To determine the right and left hand side of the planter, stand behind the planter and face it. The back of the planter is the side that is not hooked up to the tractor.



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



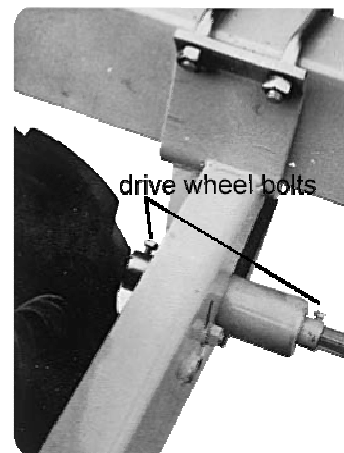
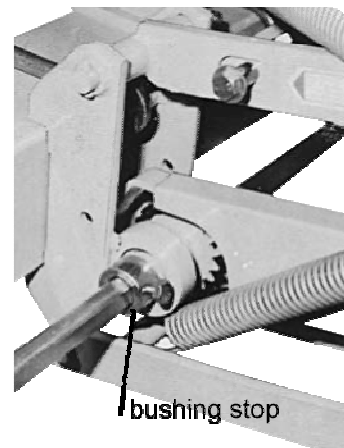
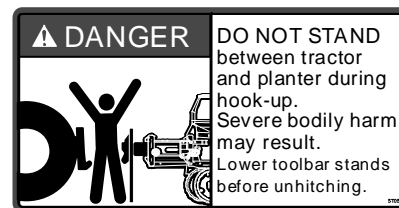
**Do not attempt to mount a tire unless you have the proper equipment and experience to perform the job. Only properly trained and equipped people should do this job. Maintain the correct tire pressure. Do not inflate the tires above the recommended pressure.**

When inflating tires, use a slip-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.



**Important:** Check that the chains for the drive wheel blocks are tight. If not, tighten **adjustment bolt** in an "up" position. Also, check that the **bushing stops** of the upper hex shaft and the **bolts of the drive wheel** blocks are tight. The bolts or the drive wheel blocks secure the lower hex shaft.



**FRAME**

---

**5" x 5" Mounted Toolbar**

**ADJUSTABLE DRIVE WHEEL**

The adjustable drive wheel block is mounted on the 5"x5" toolbar frame with a counter clamp. The adjustable drive wheel block allows you to adjust the level of the toolbar and adjust the height for variances in the seed bed.

Either a screw-type or a newer spring-loaded adjustment regulates the wheel block. They are both interchangeable within the wheel block. The screw-type adjustment is rigid, while the spring-loaded adjustment acts as a 'shock absorber' and allows for a flex up and down of the wheel to ride the contours of the land. The spring-loaded adjustment can also be made rigid by tightening the nylon locknut clockwise on top of the housing. This will compress the spring inside the housing and minimize any upward or downward travel of the wheel block.

**ADJUSTING THE DRIVE WHEEL**

To lower the drive wheel, turn the hand wheel counterclockwise.  
To raise the drive wheel turn the hand wheel clockwise.

There is a right and left mounting for the wheel blocks which is determined by standing behind the planter as it would be hooked up to the tractor.

Tire size = 5.90" x 15" and  
PSI = 36

The tire pressure should be checked and regularly maintained.



**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. Only properly trained and equipped people should do this job. Maintain the correct tire pressure. Do not inflate the tires above the recommended pressure.**

**SINGLE TOOLBAR HITCH**

The single toolbar hitch consists of two lower hitch brackets (right and left) and one main heavy-duty center mast with tie brace and straps. The lower mounting brackets are delivered with a Cat. II pin. A Cat. I pin or a bushing for a Cat. III pin is also available. If necessary, the lower mounting brackets of the standard hitch can be mounted as a counter clamp of the planting unit.

**DOUBLE TOOLBAR HITCH & SPACER**

The planter hitch of the double toolbar consists of two lower hitch brackets (right and left) and one upper mounting bracket. The double toolbar hitch is delivered with a Cat. II hitch pin. This bracket can also be positioned to fit a Cat. III 3-point or quick hitch. The double toolbar hitch is generally used with two spacers for extra support.

**ADVANCED HITCH**

The advanced hitch allows for the placement of a unit in the center of the main toolbar. This feature gives you the option for an odd number of units on the main frame. Included in the advanced hitch are mounting brackets for placement of the gearbox in an advanced position. The hitch bar (4365.a) is semi-automatic.

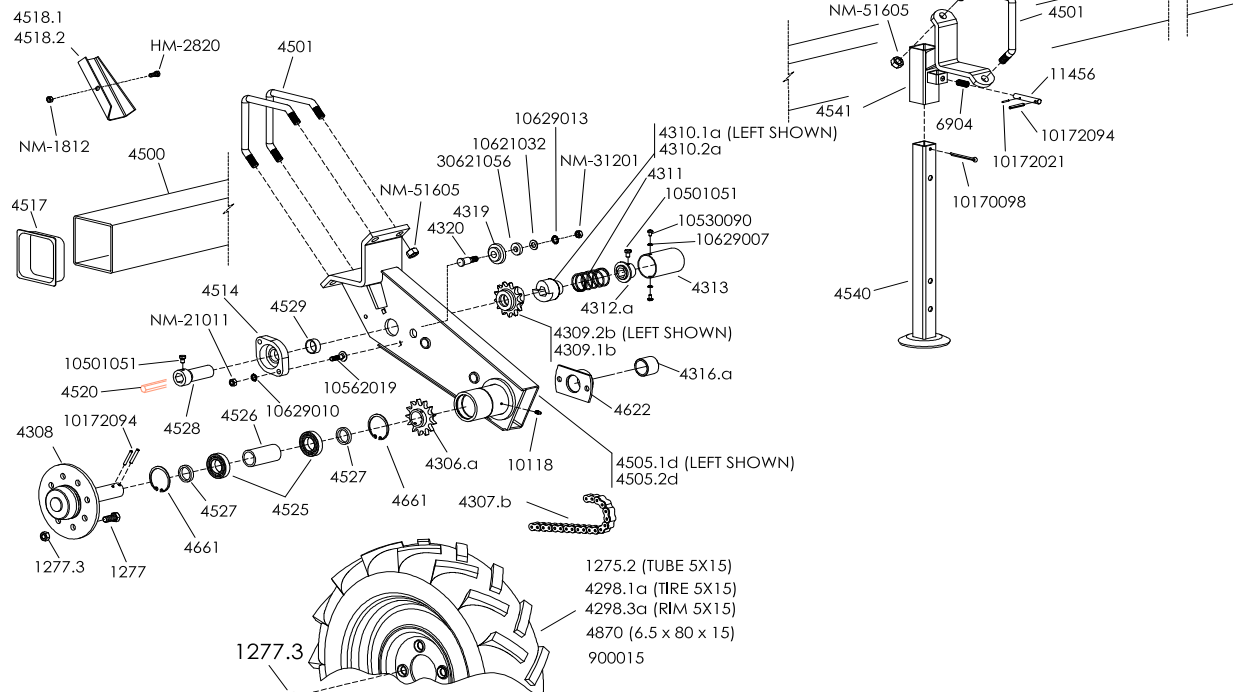


**CAUTION** Make sure that the tractor, when placed in front of the planter, does not interfere with the lock bar of the hitch. This could result in the unlocking of the hitch.

**FRAME**

**5" x 5" Mounted Frame**

**TOOLBAR STAND, HEX SHAFT, COUPLERS, BUSHING STOP, FIXED DRIVE WHEEL**



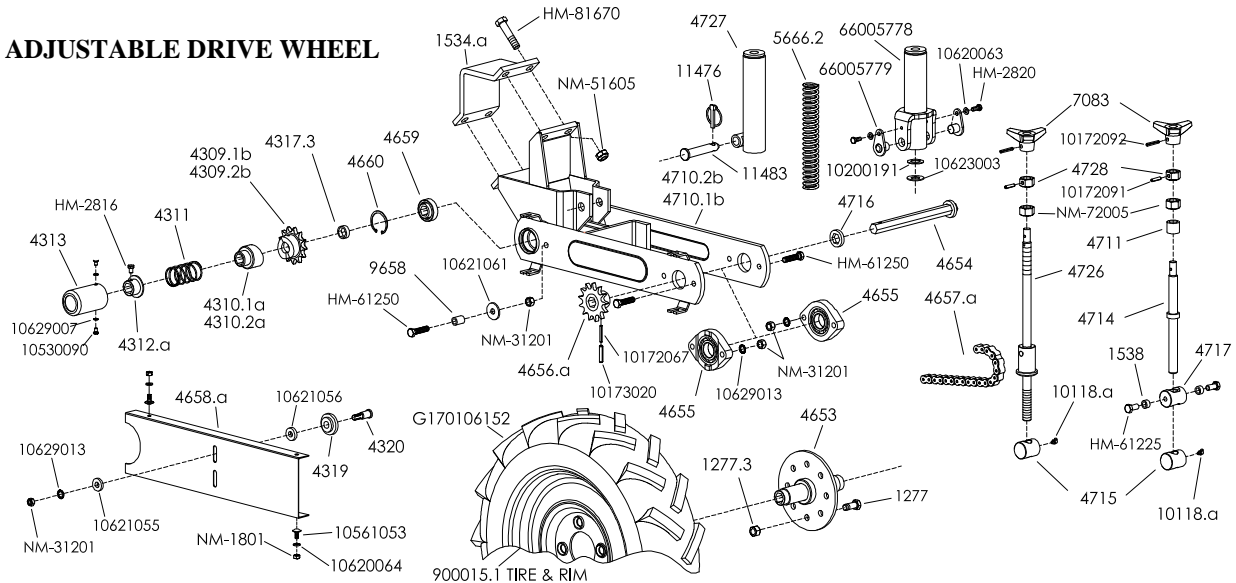
PART	DESCRIPTION
1277	Bolt (14mm x 30mm)
1277.3	Lug nut, 14mm
4306.a	Sprocket Drive Wheel, 13 Tooth, 1 3/8" Bore Uses
4307.b	Chain Drive Wheel, 13N, 52 Links
4308	Hub Spindle Drive Wheel
4309.1b	Sprocket Slip clutch, LH, 13 Tooth
4309.2b	Sprocket Slip clutch, RH, 13 Tooth
4310.1a	Claw Slip clutch, LH
4310.2a	Claw Slip clutch, RH
4311	Spring Slip clutch
4312.a	Bushing Stop for Spring Clutch, uses 8x12 Bolt
4313	Housing Slip clutch, uses 6x10 Phillips Head
4316.a	Sleeve, self lubricated bushing
4319	Chain Tightening Idler
4320	Pin for Chain Tightener w/ 12mm nut
4500	5" x 5" x 1/4" wall Toolbar
4501	V bolt, 16mm
4505.1d	Wheel housing, left hand
4505.2d	Wheel housing, right hand
4514	Pillow Block Complete w/Bearing
4514.1	Bearing Only (GAY 30NPPB)
4514.2	Pillow Block Only
4517	Endcap for 5 x 5 Toolbar
4316.a	Sleeve, 35 id x44 od x35
4518.1	Front Guard Left Drive Wheel
4518.2	Front Guard Right Drive Wheel
4520	<b>Hexagon Drive Shaft</b> , specify length
4521	<b>Coupler</b> , uses 6 x 40 roll pin
4523	<b>Bushing Stop</b> , 1", uses 10 x 15 bolt
4523.1	Bushing Stop, with cross bolt
4525	Bearing 60072RS
4526	Bushing, inside 36 id x42 od x83 long

PART No.	DESCRIPTION
4527	Bushing, outside 36 id x42 od x7 long
4528	Clutch Sleeve
4529	Filler Bushing 30 id x35 od x14.25 long
4540	Support Stand Only, short stnd frame
4540.1	Support stand only, 26 1/4" tall
4541	Bracket for toolbar stand
4622	Pillow block, Special Wheel
4661	Snap ring, Internal 62
6904	Spring (R145)
10118	Grease Zerk, 6mm straight
11456	Locking pin
<b>640838</b>	<b>ASSY: Toolbar stand complete</b>
900015.1	Wheel w/rim & 5.90x15 tire, complete
10170098	Split Pin, 6 x 70
10172021	Roll Pin, 3 x 20
10172094	Roll Pin, 6 x 45
10501051	8 x 12
10530090	Screw, phillips, 6 x 10
10562019	Carriabe Bolt, 10 x 40mm
10621032	Washer 13 x 25 x 2
10629007	Washer, lock, ext tooth 6mm
10629010	Lockwasher, ext tooth 10mm
10629013	Lockwasher, ext tooth 12mm
30621056	13 x 30 x 7
AW51812	Rim Only 5.90x15
G170106152	Tire Only, 5.90 x 15
GTR-415	Stem Only
HM-2820	8 - 1.25 x 20
NM-1812	Nylon Lock Nut, 8mm
NM-21011	Hex Nut, 10 x 1.5
NM-31201	Hex Nut, 12 x 1.75
NM-51605	Nylon Lock Nut, 16mm

**FRAME**

**5" x 5" Mounted Frame**

**ADJUSTABLE DRIVE WHEEL**



**PART No. DESCRIPTION**

1277	Lug nut and bolt (14mm x 30mm)
1277.3	Lug nut 14mm
1534.A	Counter clamp (120mm wide)
1538	Spacer bushing, 12x18x10mm long
4309.1B	Sprocket slipclutch, LH, 13 teeth, mates with 4310.1a
4309.2B	Sprocket slipclutch, RH, 13 teeth, shown above
4310.1A	Claw slipclutch, lefthand (C12A on casting)
4310.2A	Claw slipclutch, righthand (C12B on casting) shown
4311	Spring for slipclutch
4312.A	Bushing & spring stop (uses 8x12 bolt)
4313	Housing for slipclutch (fastens with 10530090)
4317.3	Hex bushing (33mm wide)
4319	Chain tightening idler
4320	Pin for chain tightening idler, w/12mm nut
4467.D	Clutch assembly complete RH (w/4309.2b & 4310.2a)
4467.G	Clutch assembly complete LH (w/4309.1b & 4310.1a)
4653	Hub, drive wheel
4654	Spindle, hex shaped
4655	See #4655.1 & #4655.2
4655.1	Bearing only (S207FF ref. #)
4655.2	Pillow block only (01LC7E 07 marking on cast housing)
4656.A	Rear sprocket, 13T, hex bore, takes a 8x40 roll pin
4657.A	Chain, 13N (66 links w/conn. link)
4658.A	Drive chain shield
4659	Bearing (205KRR2 ref. #)
4660	Snapping, internal (52mm)
4710.1B	Support frame, w/clutch to the right (since 1994)
4710.2B	Support frame, w/clutch to the left (since 1994)
4711	Spacer bushing
4714	Threaded rod, standard adjustment
4715	Threaded pivot pin
4716	Spacer for spindle (hex bore, 8mm wide)
4717	Pivot pin (takes 12x25 bolt)
4726	Threaded rod, spring loaded adjustment
4727	Housing for spring & shaft
4728	Hex nut, 20mm, w/6mm hole
5666.2	Spring

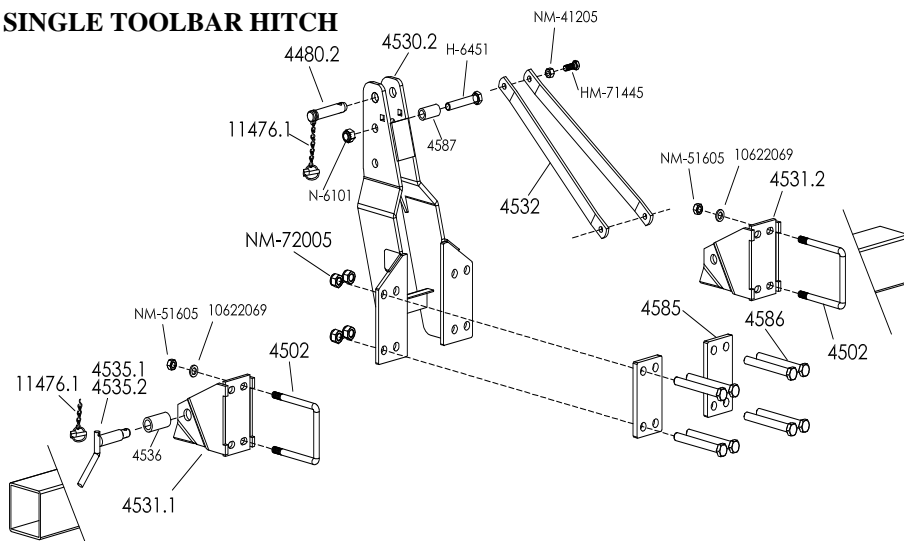
**PART No. DESCRIPTION**

7083	Threaded handwheel
9658	Bushing (7mm ID x 25mm long)
10118.A	Grease zerk, 6mm, 45 degree
11476	Lynch pin, 9mm dia.
11483	Pin, 19mm dia.
900015.1	Tire & rim assembly (5.90x15)
AW51812	Rim only
G170106152	Tire only (5.90x15)
HM-2816	Bolt, 8x16
HM-2820	Bolt, 8x20
HM-61225	Bolt, 12x25
HM-61250	Bolt, 12x50
HM-81670	Bolt, 16x70
NM-1801	8mm nut
NM-31201	12mm nylon locknut
NM-51605	16mm nylon locknut
NM-72005	20mm nylon locknut
10172067	Roll pin, 5x40
10172091	Roll pin, 6x30
10172092	Roll pin, 6x35
10173020	Roll pin, 8x40
10200191	Plastic Washer, Black
10530090	Screw, 6x10 phillips head
10561053	Carriage head bolt, 8x18
10620063	Washer, 8.5X16X1.5
10620064	Washer, 8.5x16x2
10621055	Washer, 13x30x5
10621056	Washer, 13x30x6
10621061	Washer, 13x40x4
10623003	Washer, 20.5x40x2
10629007	External tooth locking washer, 6mm
10629013	External tooth locking washer, 12mm
66005778	Trunnion Asm.
66005779	Trunnion Pin
<b>650610</b>	<b>Complete ASSY:Screw adjust, <b>spring loaded</b></b>
<b>653611</b>	<b>Complete ASSY: Screw adjust</b>

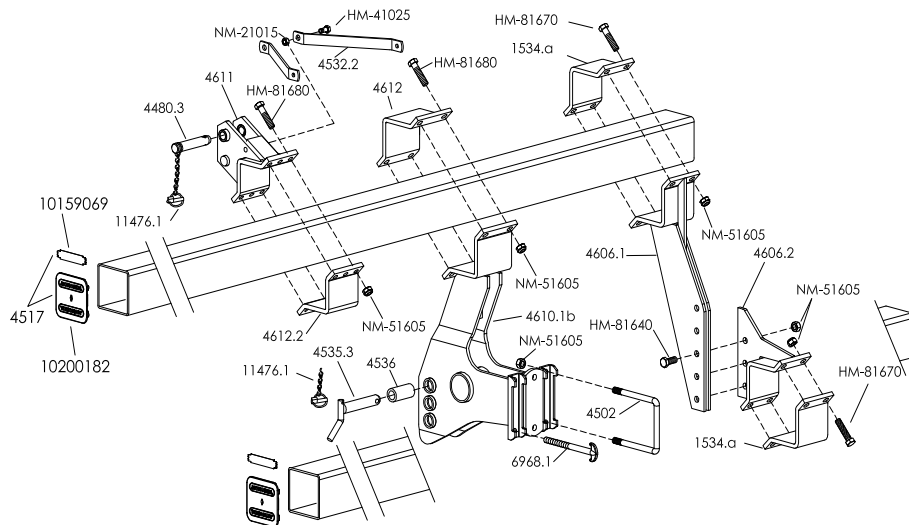
**FRAME**

**5" x 5" Mounted Frame**

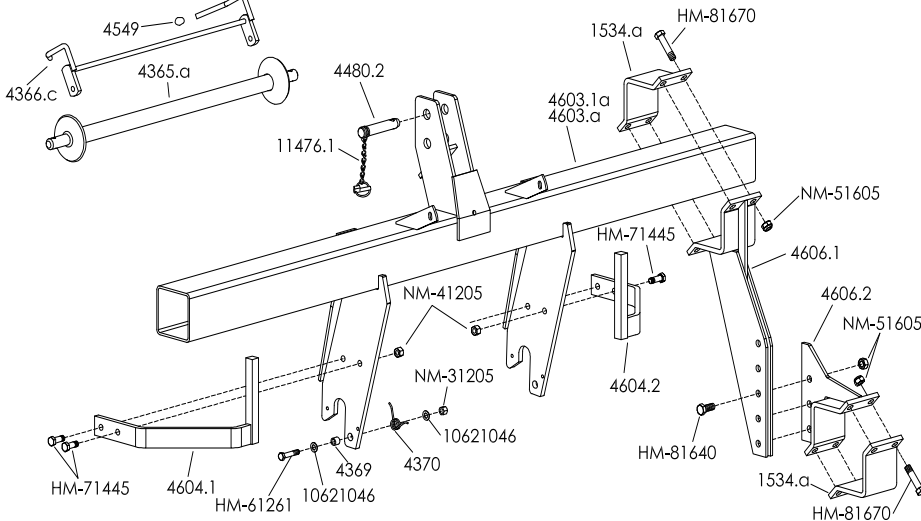
**SINGLE TOOLBAR HITCH**



**DOUBLE TOOLBAR HITCH**



**ADVANCED HITCH**



PART No.	DESCRIPTION
1534.A	Counter Clamp 120mm w/4 holes
4365.a	Hitch Bar, Semi-Automtc Hitch (A12)
4366.c	Locking Rod for Hitch Bar
4369	Sleeve Locking Rod
4370	Locking Spring
4480.2	Upper Hitch Pin, 1" DIA. X 3-3/4"
4480.3	Upper Hitch Pin, 1" DIA. X 5-3/8"
4502	U Bolt, 16mm
4517	5x5 Toolbar Endcap
4530.2	Heavy-duty Mast
4531.1	Lower 3 Pt. Bracket, Left
4531.2	Lower 3 Pt. Bracket, Right
4532	Turbofan support Straps, 3 Pt. Hitch
4535.1	Hitch Pin, Cat. 1
4535.2	Hitch Pin, Cat. 2
4535.3	Hitch Pin, CAT II
4536	Bushing for Cat. 3
4549	Plastic Cap
4585	Reinforced Hitch Plate
4586	Bolt, 20x180mm
4587	Bushing, 20 id x30 od x60mm long
4603.a	Upper Bar Advanced Hitch, 2.20m
4603.1a	Upper Bar Advanced Hitch, 2.60m
4604.1	Support Bracket Turbofan Left
4604.2	Support Bracket Turbofan Right
4606.1	Toolbar Spacer, upper
4606.2	Toolbar Spacer, lower
4610.1B	Hitch/ Spacer bracket
4611	Upper 3-Point Hitch Bracket
4612	Counter Clamp 140 mm w/ 4 holes
6968.1	T-bolt, 16mm
4612.2	Counter Clamp 140mm w/ 6 holes
11476	Lynch Pin
11476.1	Lynch Pin w/ Chain
10159069	Endcap Metal clip
10200182	Endcap, Plastic only
10621046	Washer, 13x27x2
10622069	Washer, 17.5 x 30 x 4mm
H-6451	Bolt, 7/8" x 4-1/2"
HM-41025	Bolt, 10 x 25mm
HM-71445	Bolt, 14 x 45mm
HM-81640	Bolt, 16 x 40mm
HM-81670	Bolt, 16 x 70mm
HM-81680	Bolt, 16 x 80mm
N-6101	Nylock, 3/4-10"
NM-21015	Nylock, 10mm
NM-31205	Nylock, 12mm
NM-41205	Nylock, 14mm
NM-51605	Nylock, 16mm
NM-72005	Nylock, 20mm



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## GEARBOX

### 5" x 5" Mounted Frame

#### SETTINGS

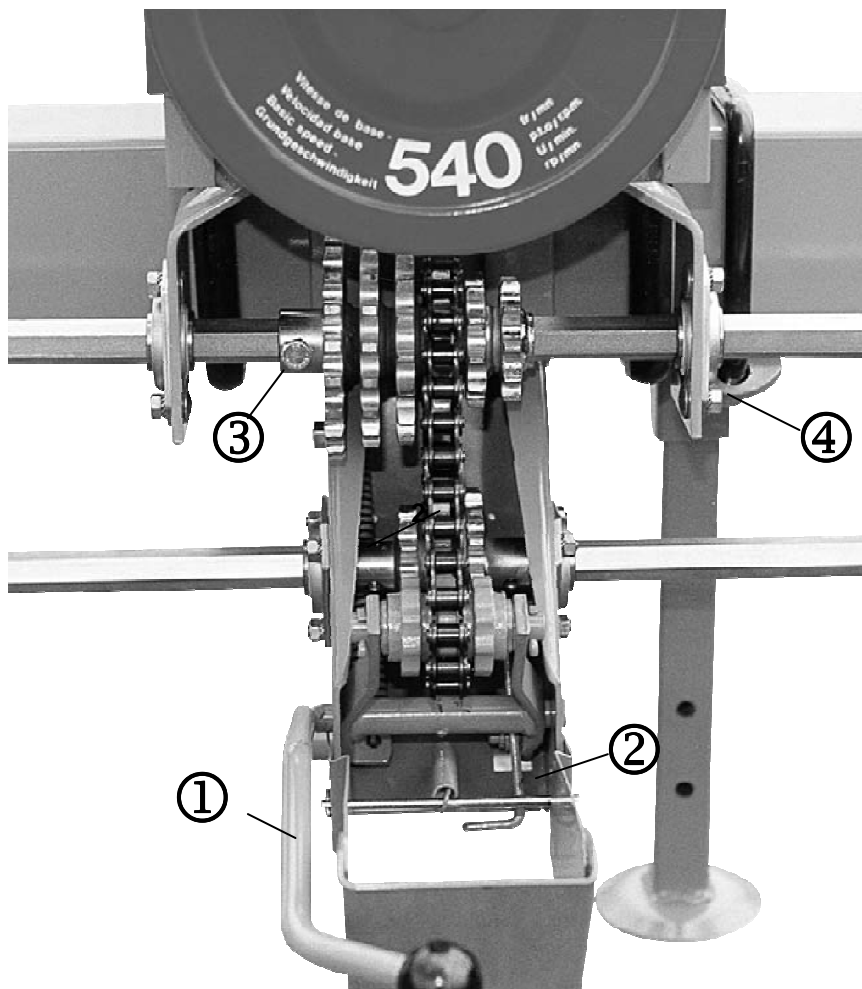
Three different assemblies are possible for the standard gearbox.

1. Normal assembly for planters with an even number of rows and inter-row spacing of 18" or more.
2. Offset assembly, for planters with an odd number of rows and inter-row spacing of less than 18". The gearbox is then mounted on the left and as close as possible to the central metering unit. To do so, remove one of the bearing brackets ④ which support the hexagonal shaft.
3. Assembly for planters with 14"-15" inter-row spacing. Remove the 2 bearing brackets ④. A special gearbox model is supplied for planters with narrow 10"-12" inter-row spacing.

The standard gearbox consists of a changeable upper cluster fitted with six sprockets (two 3-sprocket clusters) and a lower fixed 3-sprocket cluster. This allows for 16 different gear ratios. The following gearbox chart indicates the distances possible for each distribution disc. A decal placed on the planter will provide the same information for on-the-spot reference.

To change the seed spacing, push the idler lever ①, lock its pawl ② then align to the proper sprocket combination. The small upper sprocket cluster is fitted with a bolt, ③ which should be tightened to avoid any sliding of the cluster.

The special narrow gearbox uses one upper 3-sprocket cluster.



**GEARBOX**

**5" x 5" Mounted Frame**

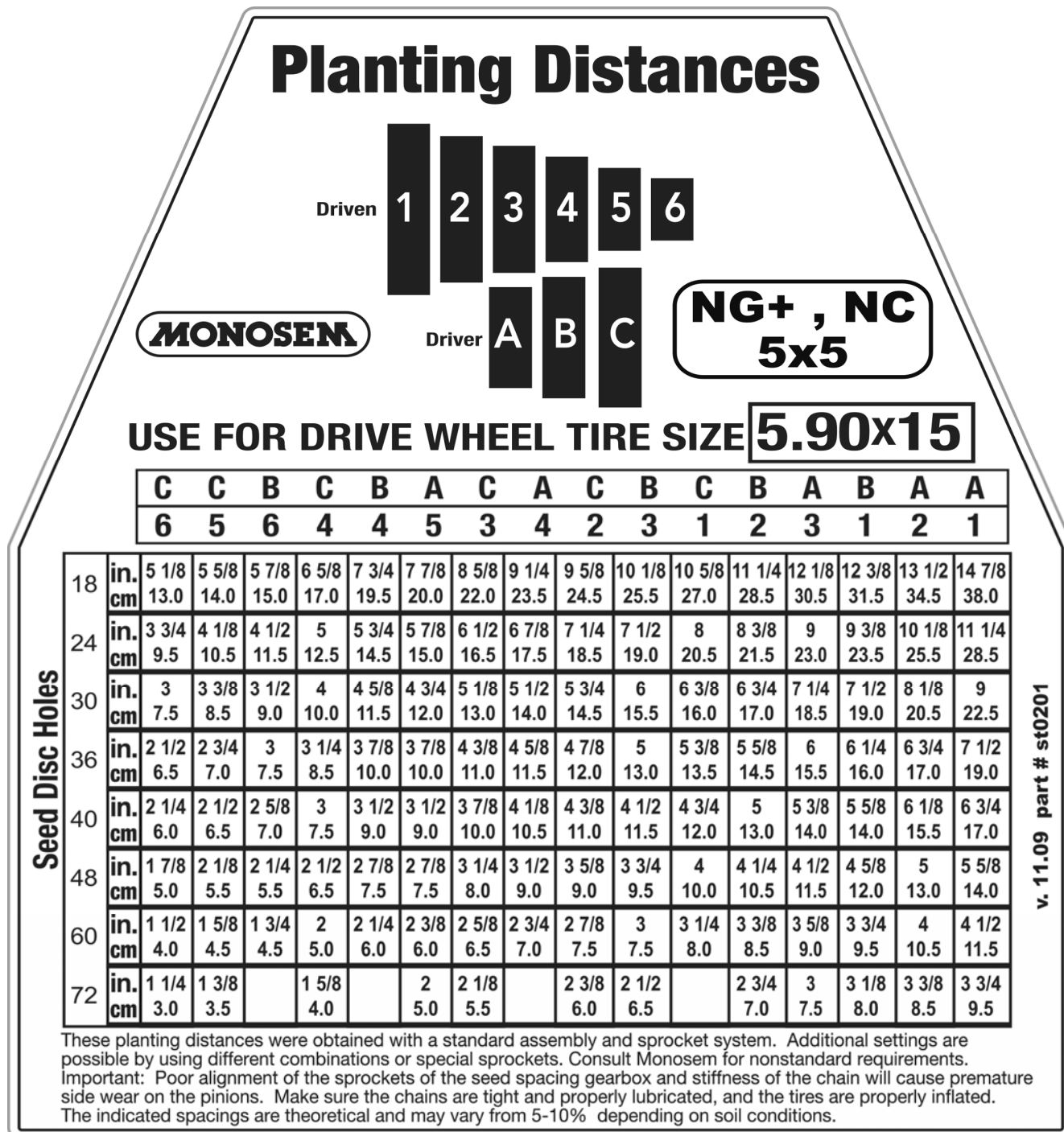
**DENSITIES - SEED POPULATION CHART**

AVERAGE SEED SPACING ↓	← ROW SPACING →							
	10"	22"	26"	30"	34"	36"	38"	40"
1"	627,600	285,200	241,200	309,200	184,400	174,400	165,000	156,800
2"	313,800	142,600	120,600	104,600	92,200	87,200	82,500	78,400
2 3/4"	228,000	103,600	87,800	76,000	67,000	63,400	60,000	57,000
3 1/4"	193,200	87,800	74,200	64,400	56,800	53,600	50,800	48,200
3 1/2"	180,300	81,900	69,300	60,100	53,000	50,000	47,400	45,000
3 3/4"	167,400	76,034	64,300	55,800	49,200	46,500	44,000	41,800
4"	156,900	71,300	60,300	52,300	46,100	43,600	41,250	39,200
4 1/4"	147,600	67,000	56,800	49,200	43,400	41,000	38,800	36,900
4 1/2"	139,500	63,400	53,600	46,500	41,000	38,700	36,700	34,850
5"	125,400	57,000	48,250	41,800	36,900	34,850	33,000	31,400
5 1/2"	114,000	51,800	43,900	38,000	33,500	31,700	30,000	28,500
6"	104,550	47,500	40,200	34,850	30,750	29,000	27,500	26,100
6 1/2"	96,600	43,900	37,100	32,200	28,400	26,800	25,400	24,100
7"	90,150	40,950	34,650	30,050	26,500	25,000	23,700	22,500
7 1/2"	83,700	38,000	32,200	27,900	24,600	23,200	22,000	20,900
8"	78,750	35,750	30,300	26,250	23,150	21,850	20,700	19,675
8 1/2"	73,800	33,500	28,400	24,600	21,700	20,500	19,400	18,450
9"	69,900	31,750	26,900	23,300	20,550	19,425	18,387	17,475
9 1/2"	66,000	30,000	25,400	22,000	19,400	18,350	17,375	16,500
10"	62,850	28,575	24,200	20,950	18,475	17,475	16,537	15,725
10 1/2"	59,700	27,150	23,000	19,900	17,550	16,600	15,700	14,950
11 1/2"	54,600	24,800	21,000	18,200	16,050	15,150	14,350	13,650
12"	52,275	23,750	20,100	17,425	15,375	14,500	13,750	13,050
13"	48,300	21,950	18,550	16,100	14,200	13,400	12,700	12,050
13 1/2"	46,689	21,213	19,163	15,563	13,725	12,950	12,275	11,650
14 1/2"	43,464	20,475	17,938	14,488	12,775	12,050	11,425	10,850

**GEARBOX**

**5" x 5" Mounted Frame**

**PLANTING RATE CHART**



**IMPORTANT!** As of July 2008, The Tire on the Drive Wheel is 5.90 x 15.

Prior to July 2008, The Tire on the Drive Wheel was 5 x 15.

The size of the tire affects the planting distances.

The chart shown above reflects seed distances for the newer wheel, 5.9 x 15. This change is in effect as of July 2008.

Prior to July 2008 the planters had a drive wheel of 5 x 15.

To use the old chart (pre July 2008) with new tire (5.9 x 15), multiply distance on old chart by 1.07

To use the new chart (post July 2008) with old tire (5 x 15), divide distance on new chart (above) by 1.07

**GEARBOX**

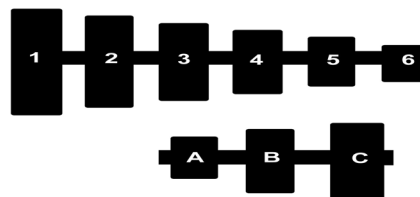
**5" x 5" Planter - 2008 and earlier**

**PLANTING DISTANCES**

ARCHIVE SHEET, FOR USE WITH OLDER PLANTER, pre 2008

# Planters before 2008

Gearbox Selection



**USE FOR DRIVE WHEEL TIRE SIZE 5" x 15"**

Number of Holes in the Seed Disc



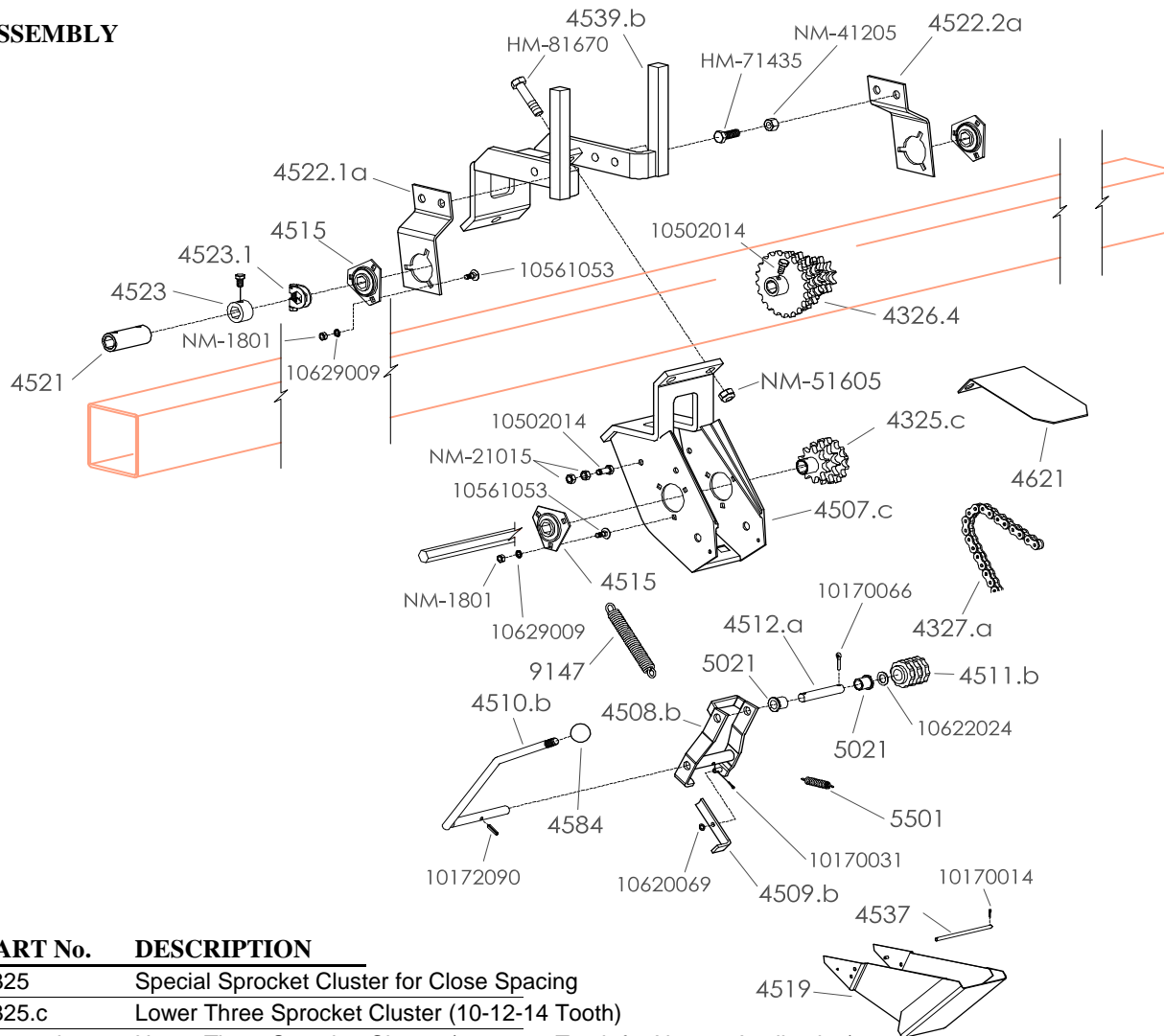
	C	C	B	C	B	A	C	A	C	B	C	B	A	B	A	A
	6	5	6	4	4	5	3	4	2	3	1	2	3	1	2	1
<b>9 in</b>	9 1/2	10 1/4	11	12 5/8	14	14 1/2	16 1/8	17 1/4	18	19	20	21 1/4	22 1/2	23 1/4	25 1/4	28
<b>cm</b>	24	26	28	32	35	37	41	44	46	48	51	54	57	59	64	71
<b>18 in</b>	4 3/4	5 1/8	5 1/2	6 5/16	7	7 1/4	8 1/16	8 5/8	9	9 1/2	10	10 5/8	11 1/4	11 5/8	12 5/8	14
<b>cm</b>	12	13	14	16	17 1/2	18 1/2	20 1/2	22	23	24	25 1/2	27	28 1/2	29 1/2	32	35 1/2
<b>24 in</b>	3 9/16	4	4 1/4	4 1/2	5 1/8	5 1/2	6 1/8	6 1/2	7	7 1/16	7 1/2	8	8 1/2	8 5/8	9 1/2	10 1/2
<b>cm</b>	9	10	10 1/2	11 1/2	13	14	15 1/2	16 1/2	17 1/2	18	19	20	21 1/2	22	24	26 1/2
<b>30 in</b>	2 3/4	3 1/8	3 3/8	3 3/4	4 1/4	4 3/8	4 3/4	5 1/8	5 1/2	5 3/4	6 1/16	6 5/16	6 3/4	7 1/16	7 3/4	8 1/2
<b>cm</b>	7	8	8 1/2	9 1/2	10 1/2	11	12	13	14	14 1/2	15	16	17	18	19 1/2	21 1/2
<b>36 in</b>	2 3/8	2 1/2	2 3/4	3 1/8	3 9/16	3 3/4	4	4 3/8	4 1/2	4 3/4	4 7/8	5 3/8	5 1/2	5 3/4	6 5/16	7 1/16
<b>cm</b>	6	6 1/2	7	8	9	9 1/2	10	11	11 1/2	12	12 1/2	13 1/2	14	14 1/2	16	18
<b>40 in</b>	2 1/8	2 3/8	2 1/2	2 3/4	3 1/8	3 3/8	3 9/16	4	4 1/4	4 3/8	4 1/2	4 3/4	5 1/8	5 3/8	6 1/16	6 1/2
<b>cm</b>	5 1/2	6	6 1/2	7	8	8 1/2	9	10	10 1/2	11	11 1/2	12	13	13 1/2	15	16 1/2
<b>48 in</b>	1 3/4	2	2 1/8	2 1/4	2 1/2	2 3/4	3	3 1/4	3 1/2		3 3/4	4	4 1/4	4 3/8	4 3/4	5 1/2
<b>cm</b>	4 1/2	5	5 1/4	5 3/4	6 1/2	7	7 3/4	8 1/4	8 3/4	9	9 1/2	10	10 3/4	11	12	13 1/4
<b>60 in</b>	1 3/8	1 5/8		1 3/4	2	2 1/8	2 3/8	2 1/2	2 3/4		2 7/8	3 1/8	3 3/8	3 9/16	4	4 3/8
<b>cm</b>	3 1/2	4		4 1/2	5	5 1/2	6	6 1/2	7		7 1/2	8	8 1/2	9	10	11
<b>72 in</b>	1 3/16		1 3/8	1 5/8	1 3/4		2	2 1/8		2 3/8	2 1/2		2 3/4	2 7/8	3 1/8	3 9/16
<b>cm</b>	3		3 1/2	4	4 1/2		5	5 1/2		6	6 1/2		7	7 1/2	8	9
<b>120 in</b>		3/4			1		1 3/16		1 3/8			1 5/8		1 3/4	2	2 1/8
<b>cm</b>		2			2 1/2		3		3 1/2			4		4 1/2	5	5 1/2

The indicated spacings are theoretical and may vary from 5-10% depending on soil conditions and tire pressure. Double check for proper seed population as soon as you start the planter and then at regular intervals. 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.

**GEARBOX**

**5" x 5" Mounted Frame**

**ASSEMBLY**



**PART No. DESCRIPTION**

4325	Special Sprocket Cluster for Close Spacing
4325.c	Lower Three Sprocket Cluster (10-12-14 Tooth)
4326.1d	Upper Three Sprocket Cluster (17-19-21 Tooth for Narrow Application)
4326.2d	Upper Three Sprocket Cluster (10-11-13 Tooth for Narrow Application)
4326	Standard 6-Tooth Upper Sprocket Cluster (10-11-13-17-19-21 Tooth)
4327.a	Drive Chain (13N, 36 links w/conn. Link)
4507	Gearbox Housing (for Narrow Spacing)
4507.c	Gearbox Housing
4508	Lever (for Narrow Spacing)
4508.b	Gearbox Lever
4509.b	Lever Lock
4510.b	Gearbox Handle
4511.b	Chain Tightener Roller (with 5021 Bushing)
4512.a	Pin
4515	Bearing Complete with Flangettes
4515	Bearing Only (205KRRB2, 7/8 Hex Bore)
4515	Flangettes (2)
4519	Gearbox Door
4522.1a	Left Support Bracket (for Hex Shaft)
4522.2a	Right Support Bracket (for Hex Shaft)
4537	Pin for Gearbox Door
4539.1b	Gearbox Mounting Bracket without Turbofan Stand
4539.b	Gearbox Mounting Bracket with Turbofan Stand

**PART No. DESCRIPTION**

4621	Shield, Gearbox
4584	Knob for Handle
5021	Bushing (Self Lubricating, B25)
5501	Spring, Gearbox Door
9147	Spring, for Tightening Drive Chain
10502014	Bolt, 10x20, on gear cluster #4326.4
10622024	Washer, 16.5x26x1
F21253	Carriage Bolt, 5/16-18-3/4
F36104	Hex Nut, 5/16
F33620	Lock Washer, 5/16

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.

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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!  
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**DRIVE**

**5" x 5" Planter**

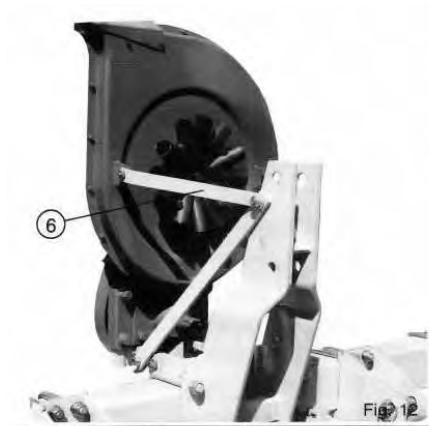
**STANDARD TURBOFAN**

**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 deliver 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, **(6)** for single toolbar, and **(7)** for double toolbar are tight to eliminate any vibrations of the turbofan. A vacuum gauge may also be mounted to the turbofan.



**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.**

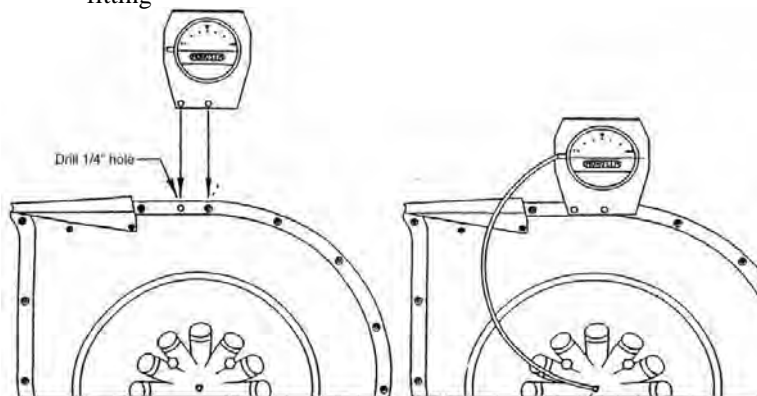


**HOW TO MOUNT THE VACUUM GAUGE**

To mount the vacuum gauge, follow the following steps

1. Remove the second top bolt (10mm) from the turbofan.
2. Position the mounting bracket re-using the second hole, and drilling a new 1/4" hole to accommodate the mounting bracket. Attach the vacuum gauge using hardware provided (1/4" x 3/4" bolts, 1/4" nylock nuts).
3. Drill an 11/32" hole in the center of manifold. Tap the hole using a 1/8" NPT male tap.
4. Screw one of the air fittings into the center of the manifold, the other air fitting into the vacuum gauge.

If not already attached, push the tubing into each fitting



Drill 11/32" hole in center of manifold. Tap with 1/8" NPT. Install air fittings and tubing.

**DRIVE**

**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**

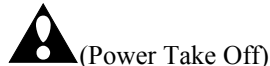
The extra high output turbofan was designed to provide more volume of air than the standard or high output turbofan. The extra high output turbofan is most often used with planters of 16 rows or more.

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)



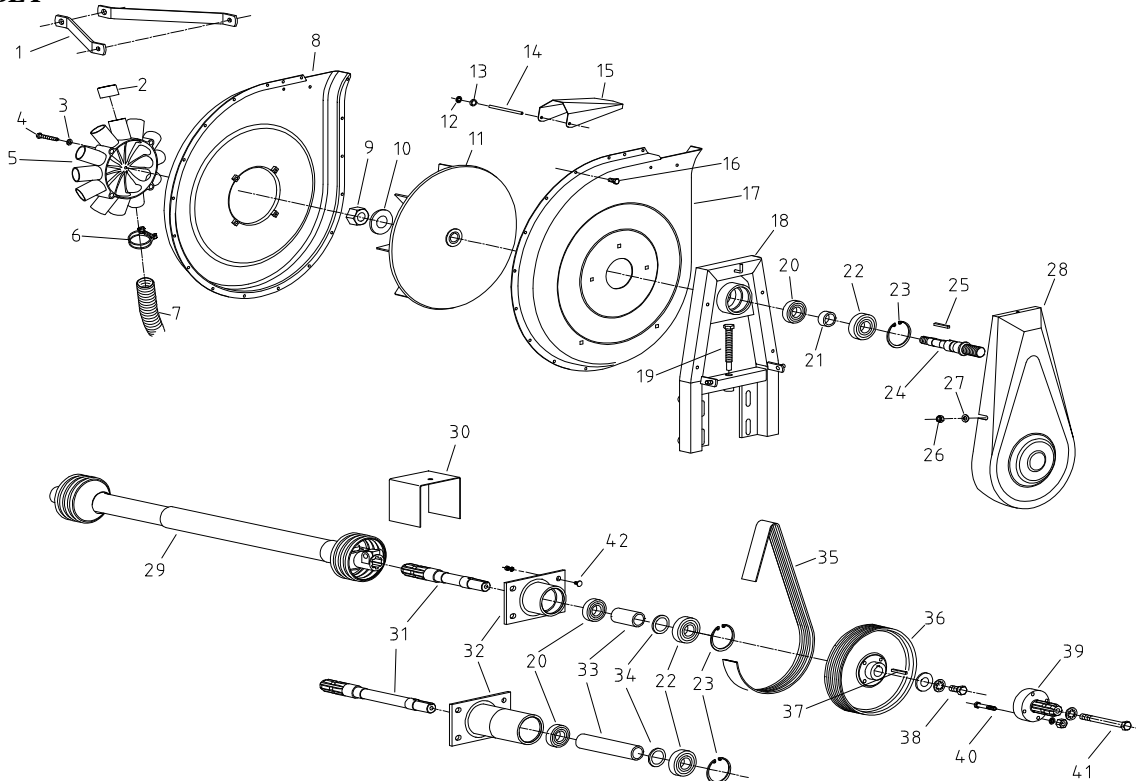
**DANGER**  
Rotating drive line contact can cause death – keep away. Do not operate without all driveline, tractor and equipment shields in place, without drivelines securely attached at both ends, and without driveline shields that turn freely on driveline.



**DRIVE**

**Standard Turbofan 540, 450 and 1000 rpm with PTO drive**

**ASSEMBLY**



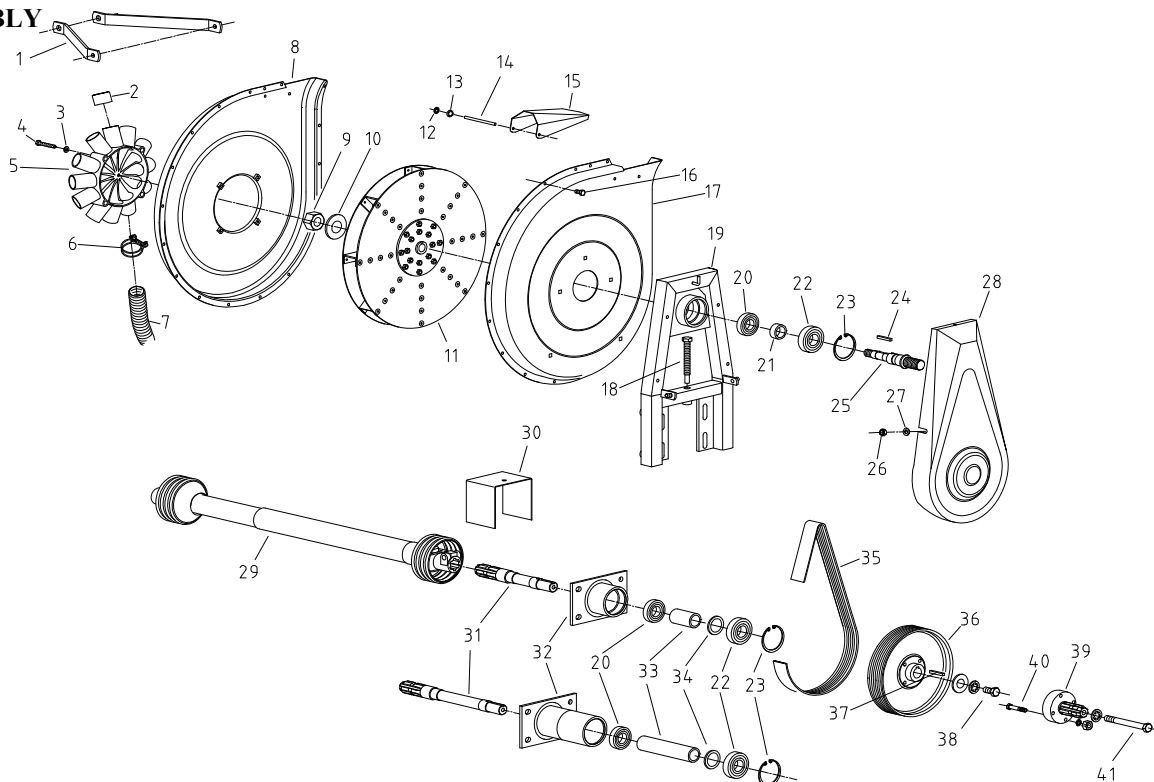
ITEM	PART No.	DESCRIPTION
1	4532	Support strap - 565mm long (22 1/4")
	4532.1	Support strap - 340mm long (13 3/8")
	4532.2	Support strap - 480mm long (18 7/8")
2	4451	Plastic cap
3	10620064	Washer 8.5x16x2mm
4	10511062	Bolt, 8x55mm (to secure manifold)
5	4450	12-Hole manifold
6	4453	Hose clamp
7	4454	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	4414.2	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 only
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"
5. 3	N-3000	Hex nut 7/16-14

**DRIVE**

**High Output Turbofan 500 1000 rpm  
With PTO drive**

**ASSEMBLY**



**ITEM PART No. DESCRIPTION**

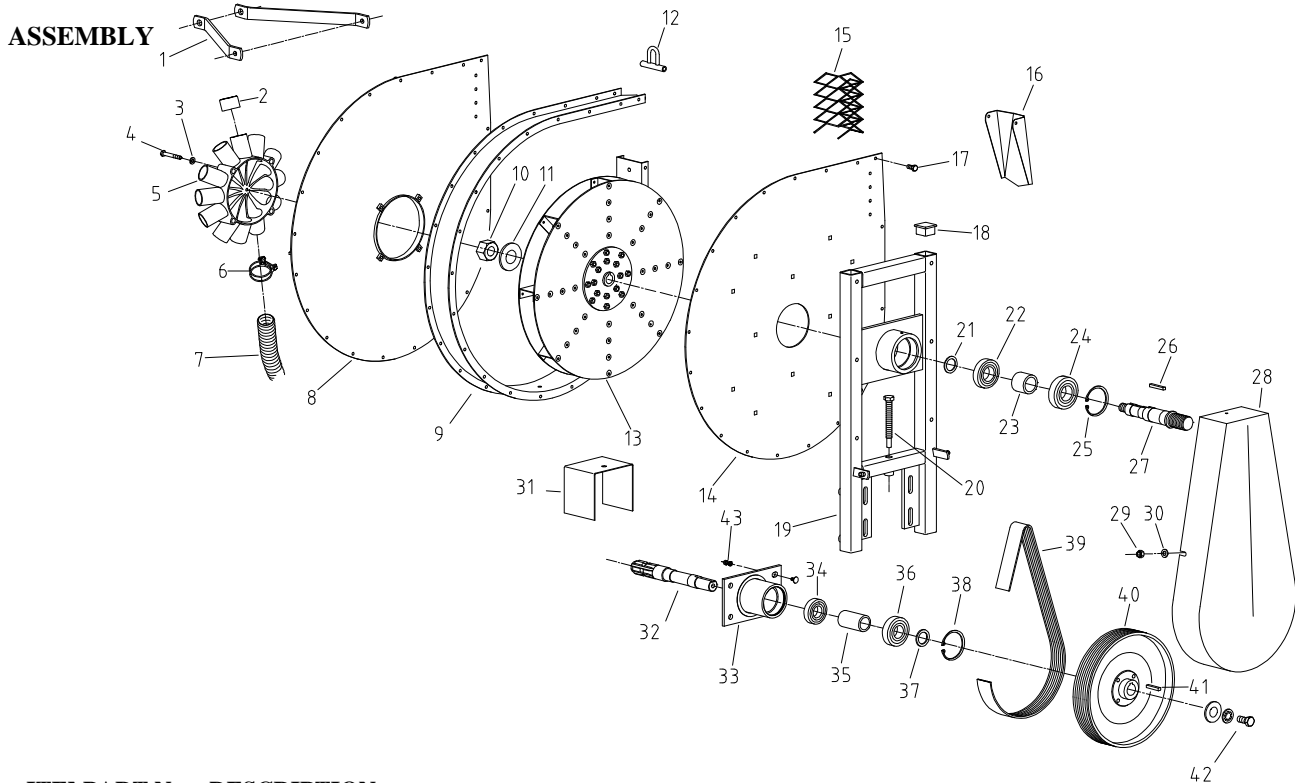
1	4532	Support strap – 565mm long (22 1/4")
	4532.1	Support strap – 340mm long (13 3/8")
	4532.2	Support strap – 480mm long (18 7/8")
2	4451	Plastic cap
3	10620064	Washer 8.5x16x2mm
4	10511062	Bolt, M8x55 (to secure manifold)
5	4450	12-hole manifold
6	4453	Hose clamp
7	4454	Vacuum hose 40mm ID (specify 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)

**DRIVE**

**Extra High Output Turbofan 540 & 1000 RPM  
With PTO Drive**



**ITEMPART 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)

**ITEMPART No. DESCRIPTION**

25	4246	Snapping, 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	Snapping, 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

**DRIVE**

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**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 recirculate 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.**

**DRIVE**

**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.

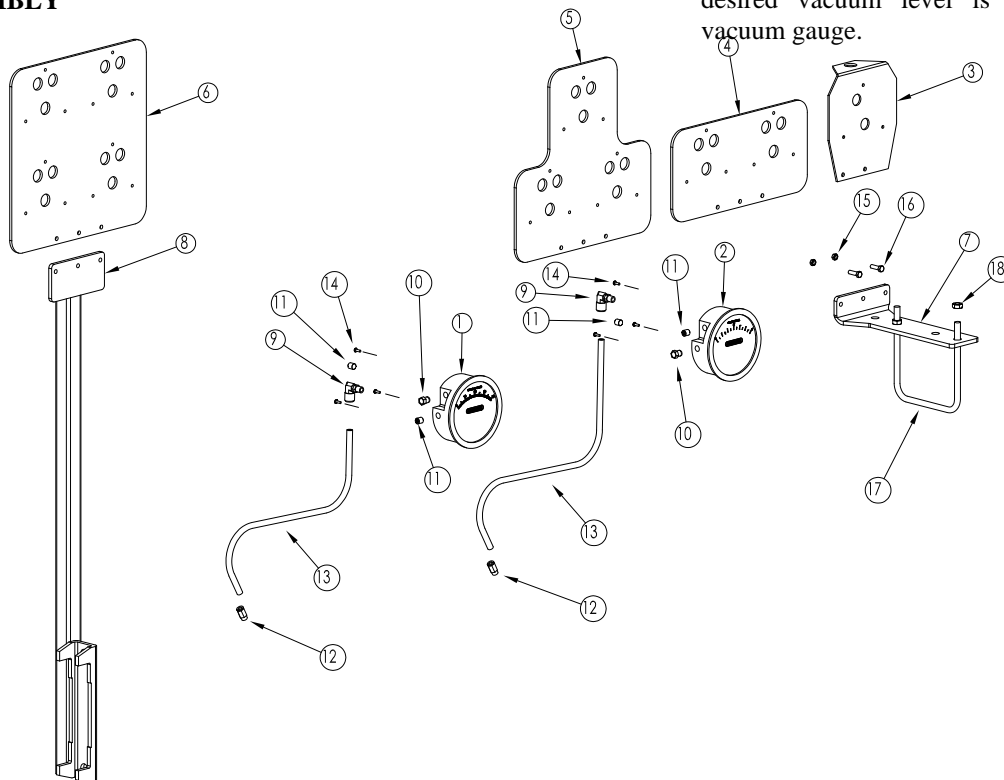
Small (Sugarbeet/Pickle)	15"-20"
Medium (Corn)	20"-25"
Large (Beans/Peanut)	25"-30"

**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**



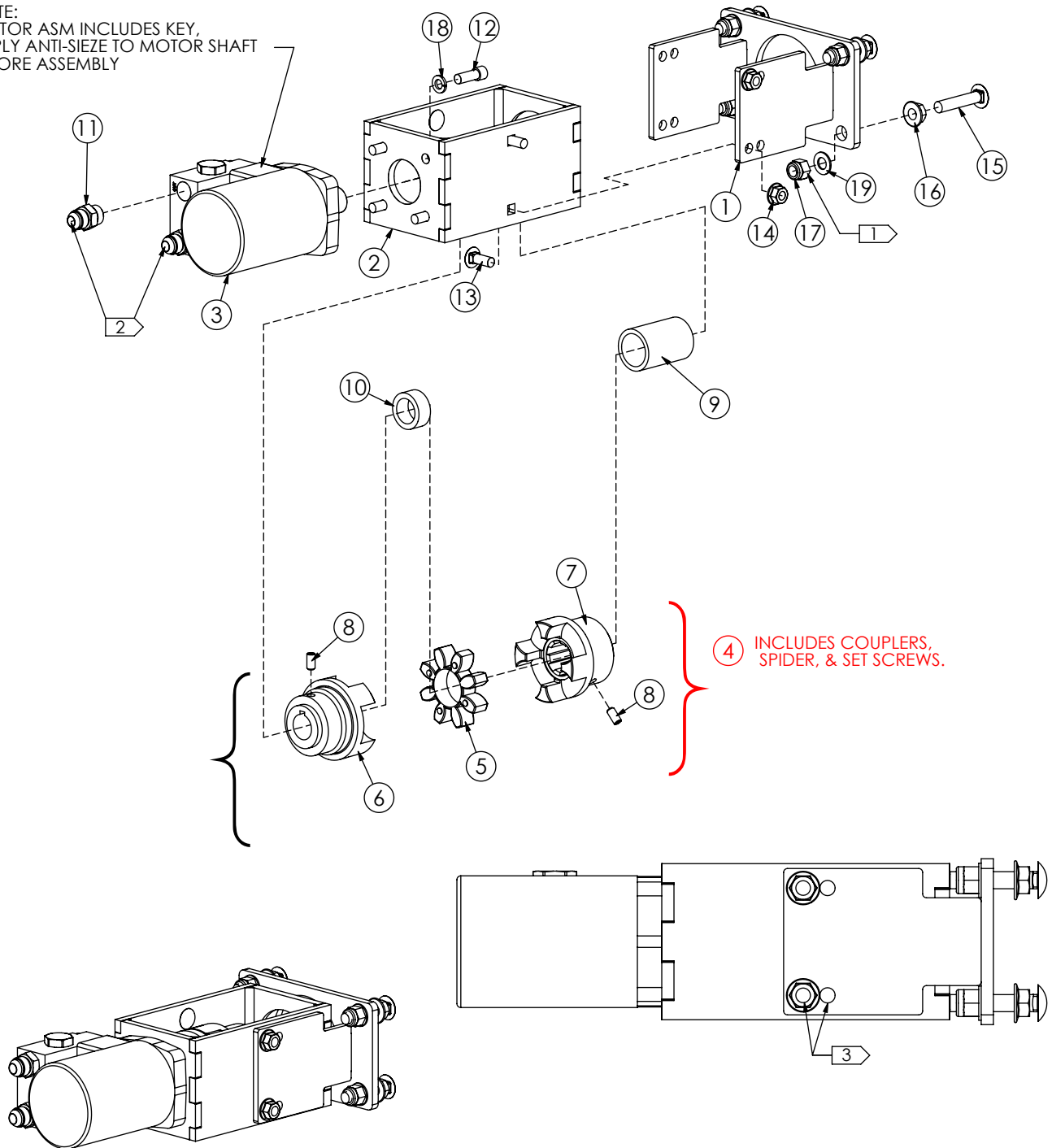
ITEM No.	PART No.	DESCRIPTION
1	D2040	Vacuum gauge
2	900389	Pressure gauge
3	M30050070	Mounting plate single
4	800187	Mounting plate double
5	800148	Mounting plate triple
6	800149	Mounting plate quadruple
7	800311	Panel mount mounted pltr.
8	80036	Panel mount pull type pltr.
9	J69PPS-4-2	Swivel elbow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

# MOTOR BRACKET ASM, STD TURBO

This is a non-patented version of the original product. The original download may 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.

NOTE:  
 MOTOR ASM INCLUDES KEY,  
 APPLY ANTI-SIEZE TO MOTOR SHAFT  
 BEFORE ASSEMBLY



STANDARD

NOTE:

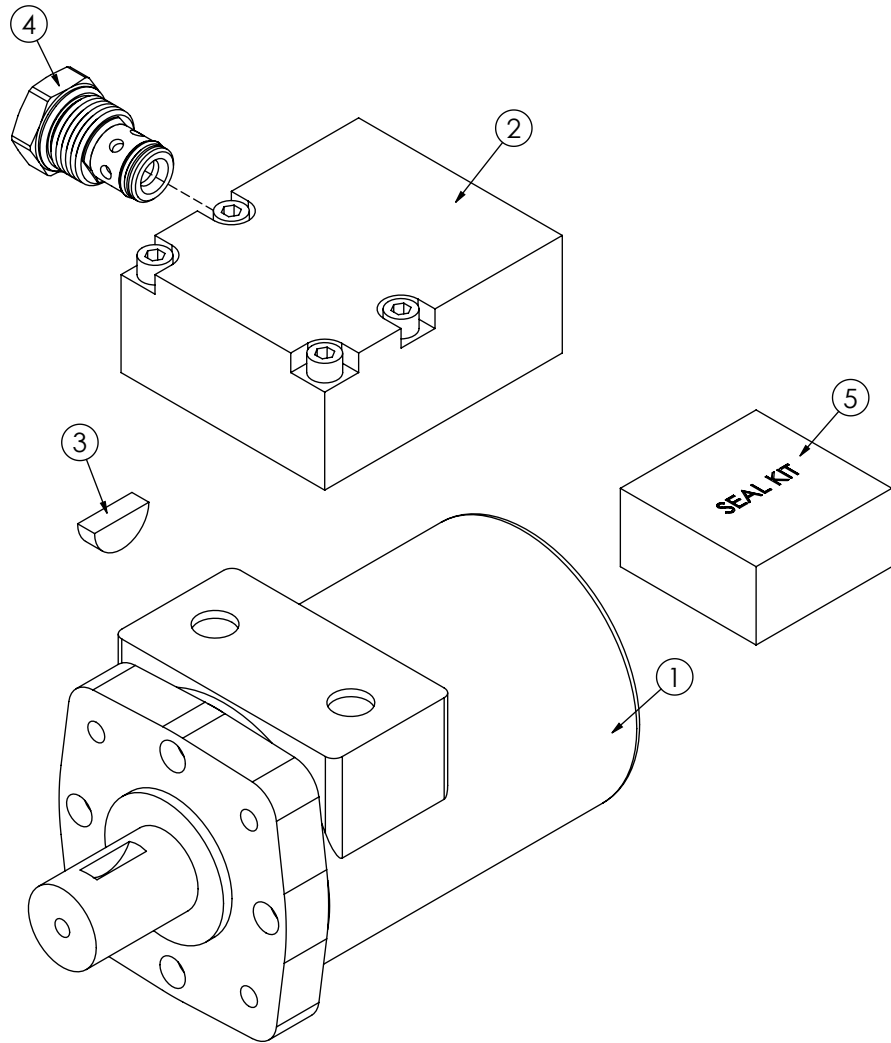
- 1 TORQUE N-3101 TO 35 FT.-LBS. ± 5 FT.-LBS.
- 2 1/2" HYDRAULIC HOSE LINES.
- 3 USE FRONT HOLE FOR STANDARD TURBO FAN,  
 USE BACK HOLE FOR HIGH OUTPUT TURBO FAN.



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

This is not the latest version of the manual. An extra 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.

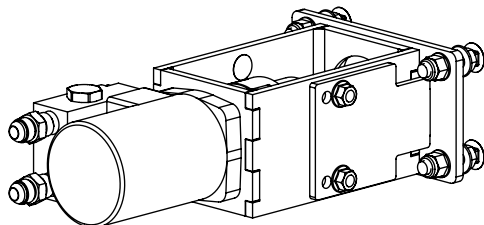
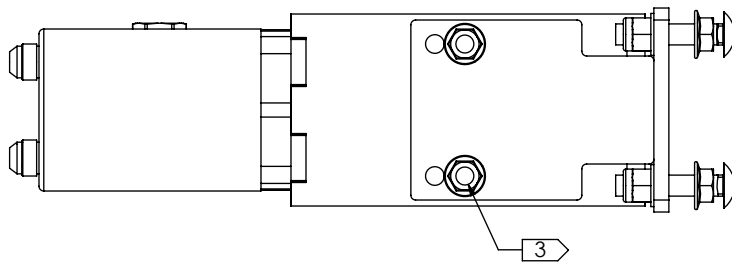
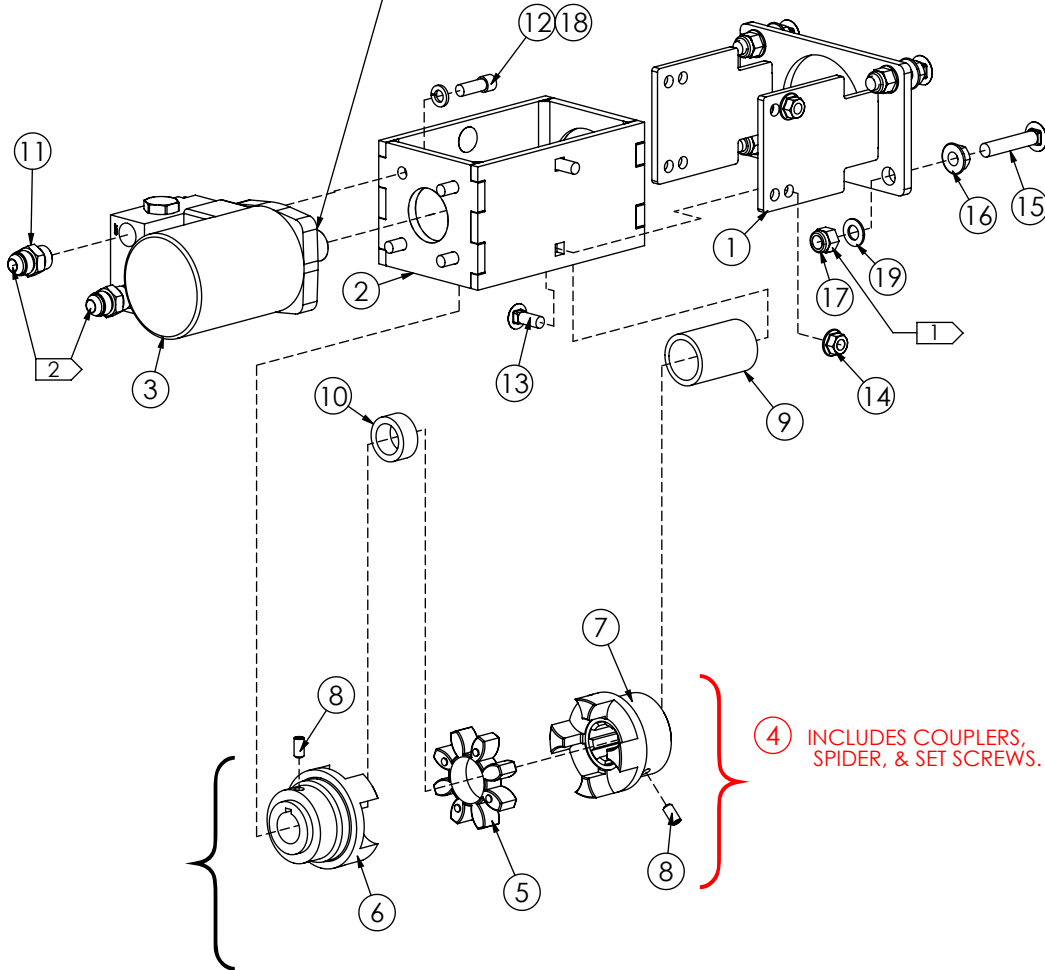


ITEM NO.	QTY.	PART NUMBER	DESCRIPTION
1	1	F101-017	HYDRAULIC MOTOR
2	1	FP10270-2	BYPASS BLOCK w/ HARDWARE
3	1	F14193	WOODRUFF KEY
4	1	900022	CHECK VALVE CARTRIDGE
5	1	F60540	SEAL KIT

# MOTOR BRACKET ASM, EXTRA HIGH OUTPUT TURBO

This is a non-patented version of the motor. A patent is currently pending. 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.

NOTE:  
 MOTOR ASM INCLUDES KEY,  
 APPLY ANTI-SIEZE TO MOTOR SHAFT  
 BEFORE ASSEMBLY



NOTE:

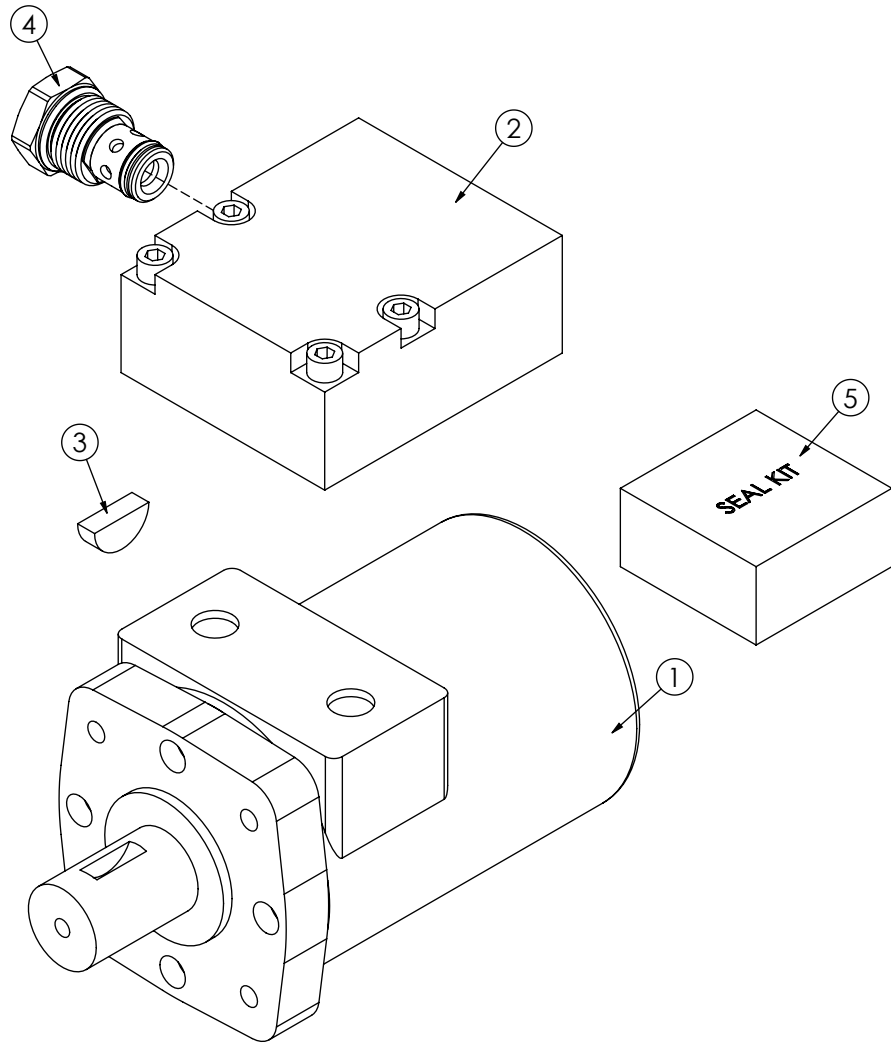
- 1 TORQUE N-3101 TO 35 FT.-LBS. ± 5 FT.-LBS.
- 2 1/2" HYDRAULIC HOSE LINES.
- 3 USE BACK HOLE FOR EXTRA HIGH OUTPUT TURBO FAN.

# MOTOR BRACKET ASM, EXTRA HIGH OUTPUT TURBO

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

This is a download version of the manual. If the 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.



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

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.

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**6. ROW UNIT**

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**7. OPTIONAL EQUIPMENT**

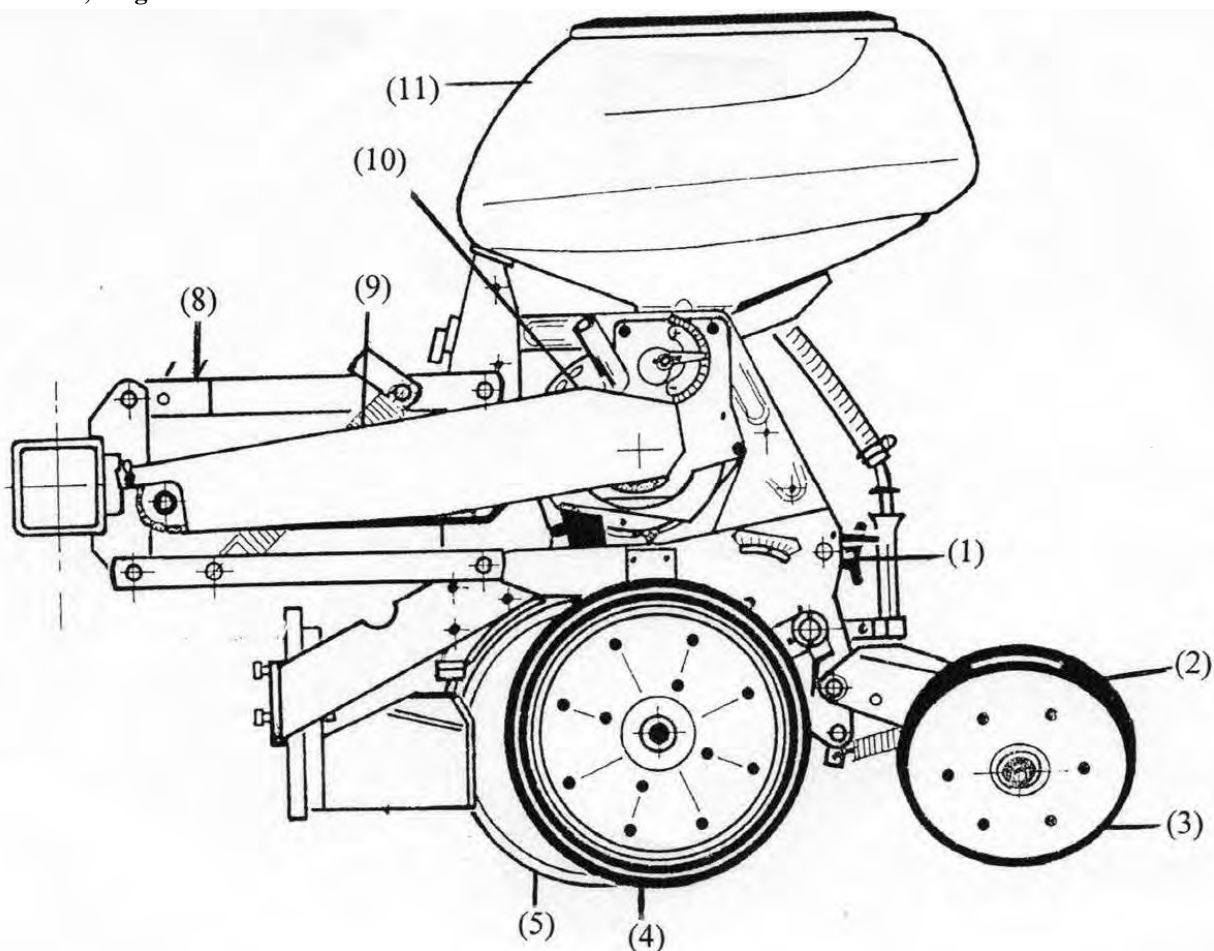
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**ROW UNIT**

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**NG Plus 4, Single 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**

**ROW UNIT**

---

**NG Plus 4, Single 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 (beet), medium (corn) or deep (bean) 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.

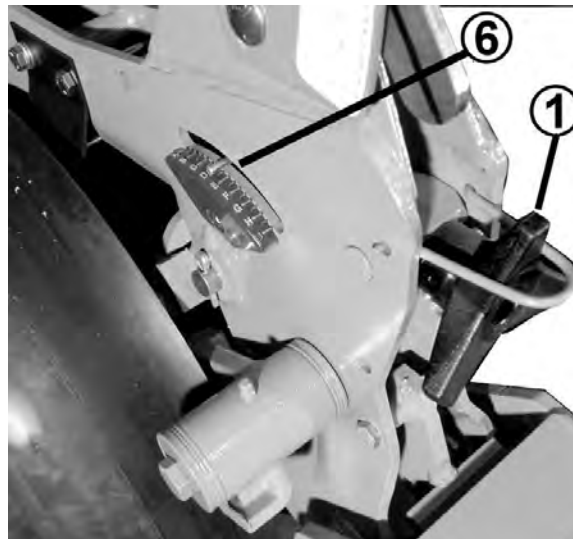
**DEPTH GAUGE WHEELS**

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**



**ROW UNIT**

---

**NG Plus 4, Single 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 52, 60, or 90 liter plastic hopper with lid (11) is standard on the NG+ 4 unit.

**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.

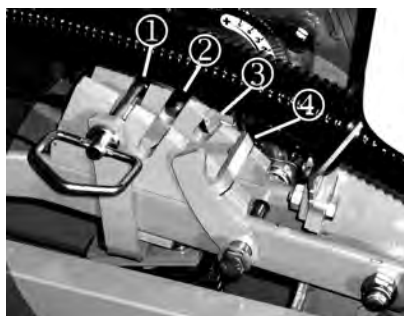
For normal level field conditions, the apx. down pressure settings are

- (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

**ROW UNIT**

---

**NG Plus 4, Single 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.

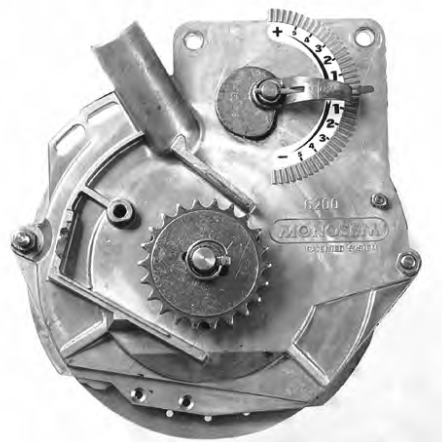
**REPLACING THE WEAR GASKET**

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.

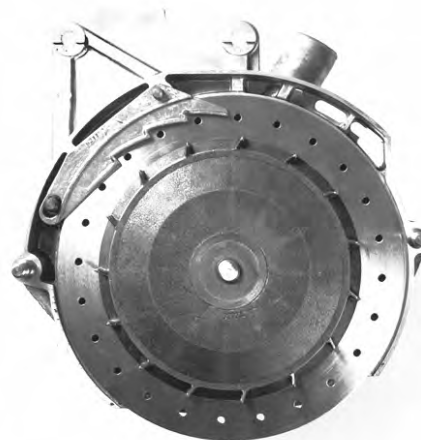
**NOTE:** Thoroughly clean the metering box housing before installing a new wear gasket. Any residue left from previous use will not allow the gasket to fit in the proper position.

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**



**ROW UNIT**

**NG Plus 4, Single Row**

**OUTSIDE LEVER on Meterbox ①**

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, ①, 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 ② (from the turbofan) to the weight of the seed.

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

When the indicator ① 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 ②. 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 ① is positioned toward minus, "-" The scraper lowers over the holes of the seed disc (h) and opens the hole on the meterbox ②. 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.

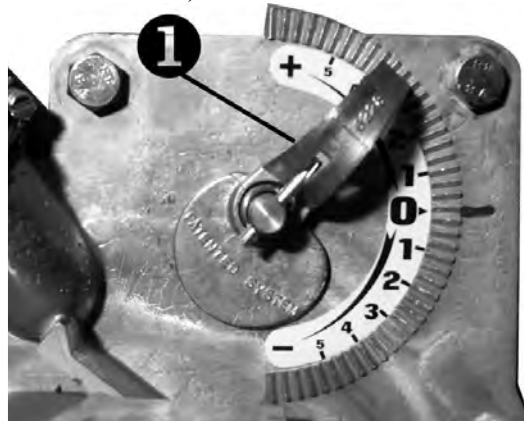
See "5. Drive" for Turbofan vacuum settings.

**Recommended setting for the indicator:**

<b>Kidney Bean</b>	+5
<b>Peanuts</b>	+4 ½ (+4 to+5)
<b>Beans</b>	+4 to +5
<b>Sorghum/Milo</b>	+3
<b>Soybeans/Peas</b>	+2 to +4
<b>Cabbage</b>	+2
<b>Coated Sugarbeet</b>	+2
<b>Corn</b>	+1 (0 to +2)
<b>Sunflowers</b>	+1 (0 to +2)
<b>Cotton</b>	+1
<b>Uncoated Sugarbeet</b>	0 (-2 to +1)
<b>Pickle / Melon</b>	-1 ½ (-1 to-2)

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

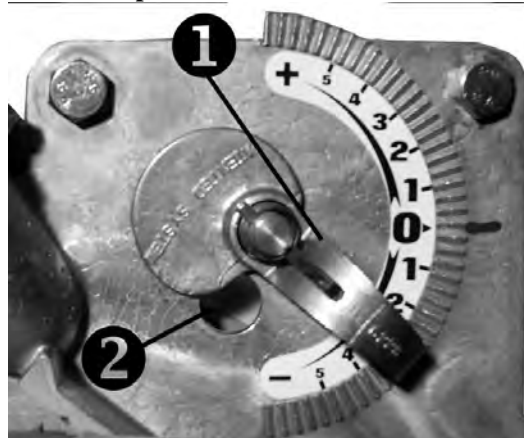
**SETTING FOR LARGER SEED the hole on meterbox closes, which increases suction.**



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.



**ROW UNIT**

**NG Plus 4, Single 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.

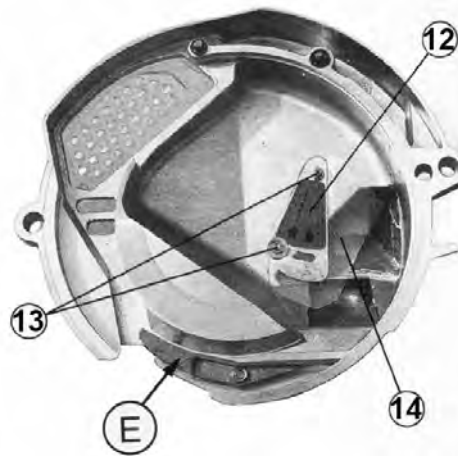
**Low Position: For small seeds**, such as sorghum and milo. The low position moves the shutter over part of the opening

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.

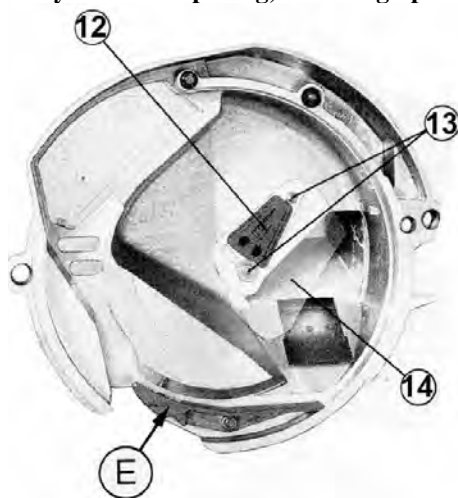
**COVER**



**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.



## ROW UNIT

---

### NG Plus 4, Single 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.

## ROW UNIT

### NG Plus 4, Single Row

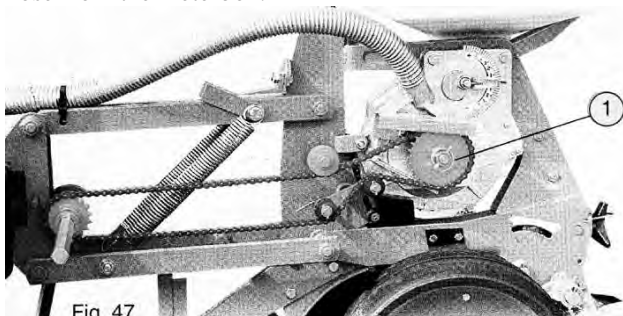
#### EXTRA LARGE SEED

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.



#### 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.

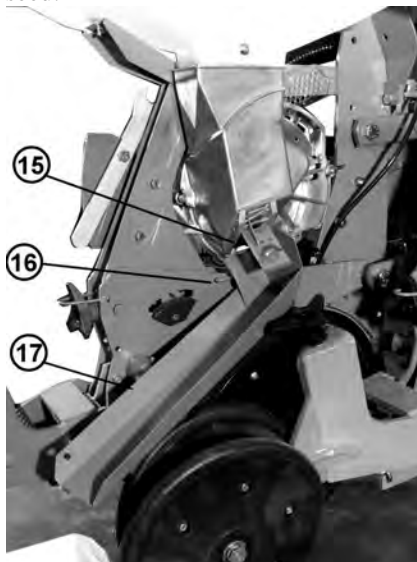
Before and during each new planting season, make sure your seed tubes are in good condition. Your seed tubes must be in good condition to ensure consistent and regular seeding.

**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.



**ROW UNIT**

**NG Plus 4, Single 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.

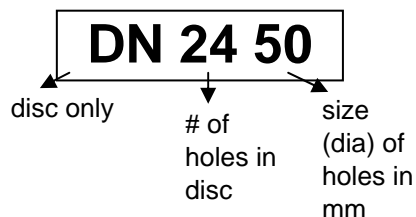
**Example:**

**Seed Disc # DN 2450**

DN indicates disc only (no agitator)

24 indicates 24 holes

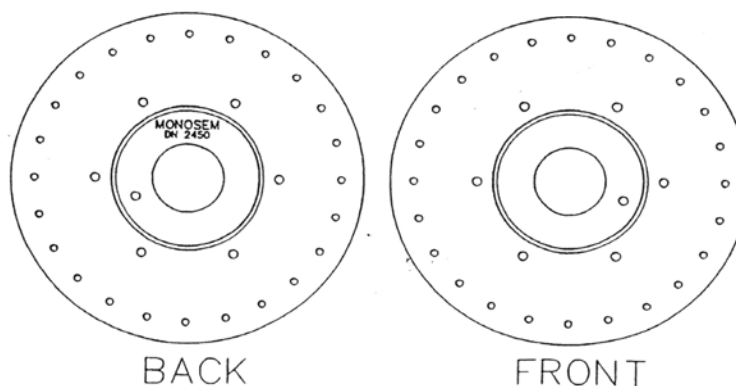
50 indicates the holes are diameter 5.0 mm.



**HOLE SIZE**

**EXAMPLES**

- 08 = .8 mm
- 10 = 1.0 mm
- 12 = 1.2 mm
- 20 = 2.0 mm
- 35 = 3.5 mm
- 45 = 4.5 mm
- 50 = 5.0 mm
- 60 = 6.0 mm
- 65 = 6.5 mm



**SEED DISC RECOMMENDATIONS**

<b>CROP</b>	<b>SEED DISC</b>		<b>SEED SPACING</b>
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"
Broccoli and Cabbage	DC3612 (low population)		2 3/8 - 7"
	DC7212 (high population)		1 3/16 - 3 1/2"
Canola	DC7212		1 3/16 - 3 1/2"
Cauliflower	DC3612 (low population)		2 3/8 - 7"
	DC7212 (high population)		1 3/16 - 3 1/2"
Collard Greens	DC7208, DC7210		1 3/16 - 3 1/2"
Corn	DC0950	Field	9 1/2 - 28"
	DC1250		7 - 21"
	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"

**ROW UNIT**

**NG Plus 4, Single Row**

Cotton	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"
Kale	DC7208		1 3/16 - 3 1/2"
Melons	DC0620 (low population)	Watermelon, small seed, Cantaloupe	14 1/4 - 42"
	DC0920 (medium population)		9 1/2 - 28"
	DC1820 (high population)		4 3/4 - 14"
	DC0325 (low population)	Watermelon, large seed	28 1/2 - 84"
	DC0325D (hill drop )	Drop two seeds, 1-3/8 - 4-3/8" apart	28 1/2 - 84"
	DC0625 (medium population)		14 1/4 - 42"
	DC0625D (hill drop)	Drop two seeds, 1-3/8 - 4-3/8" apart	14 1/4 - 42"
Okra, Artichoke	DC3622		2 3/8 - 7"
	DC7222		1 3/16 - 3 1/2"
Onions	DC3610 (low population)	Raw	2 3/8 - 7"
	DC7210 (high population)		1 3/16 - 3 1/2"
	DC3622 (low population)	Pelleted	2 3/8 - 7"
	DC7222 (high population)		1 3/16 - 3 1/2"
Parsley	DC7208		1 3/16 - 3 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"
Peppers	DC3612 (low population)		2 3/8 - 7"
	DC7212 (high population)		1 3/16 - 3 1/2"
Pumpkins	DC0335 (low population)		28 1/2 - 84"
	DC0335D (hill drop)	Drop two seeds, 1-3/8 - 4-3/8" apart	28 1/2 - 84"
	DC0635 (medium population)		14 1/4 - 42"
	DC0635D (hill drop)	Drop two seeds, 1-3/8 - 4-3/8" apart	14 1/4 - 42"
	DC0935 (high population)		9 1/2 - 28"
Radish	DC6015		1 3/8 - 4 3/8"
Rice	DC9016		15/16 - 2 3/4"
Sesame	DC7208		1 3/16 - 3 1/2"
Sorghum	DC3622 (low population)		2 3/8 - 7"
	DC7222 (high population)		1 3/16 - 3 1/2"
Spinach	DC6015	Small seed	1 3/8 - 4 3/8"
	DC6020	Large seed	1 3/8 - 4 3/8"
	DC12020	Large seed(high populations)	11/16 - 2 1/16"
Squash	DC0625 (medium population)	Summer	14 1/4 - 42"
	DC0925 (high population)		9 1/2 - 28"
	DC0635 (medium population)	Winter	14 1/4 - 42"
	DC0935 (high population)		9 1/2 - 28"
Sugarbeets	DC4016 (medium population)	Small, Medium, Large & Pelleted seed	2 1/8 - 6 1/2"
	DC4020 (medium population)	Medium, Large and Pelleted seed	2 1/8 - 6 1/2"
	DC6020 (high population)	Medium, Large and Pelleted seed	1 3/8 - 4 3/8"
	DC12015 (seed production)	Small, Medium, Large & Pelleted seed	11/16 - 2 1/16"
	DC12020 (seed production)	Medium, Large and Pelleted seed	11/16 - 2 1/16"
Sunflowers	DC1225 (low population)	Oil & Confection	7 1/8 - 21"
	DC1825 (high population)		4 3/4 - 14"
Tomatoes	DC7212		1 3/16 - 3 1/2"
	DC1212T(hill drop 12 x 3 x 1.2)		7 - 21"
Turnips	DC7208		1 3/16 - 3 1/2"

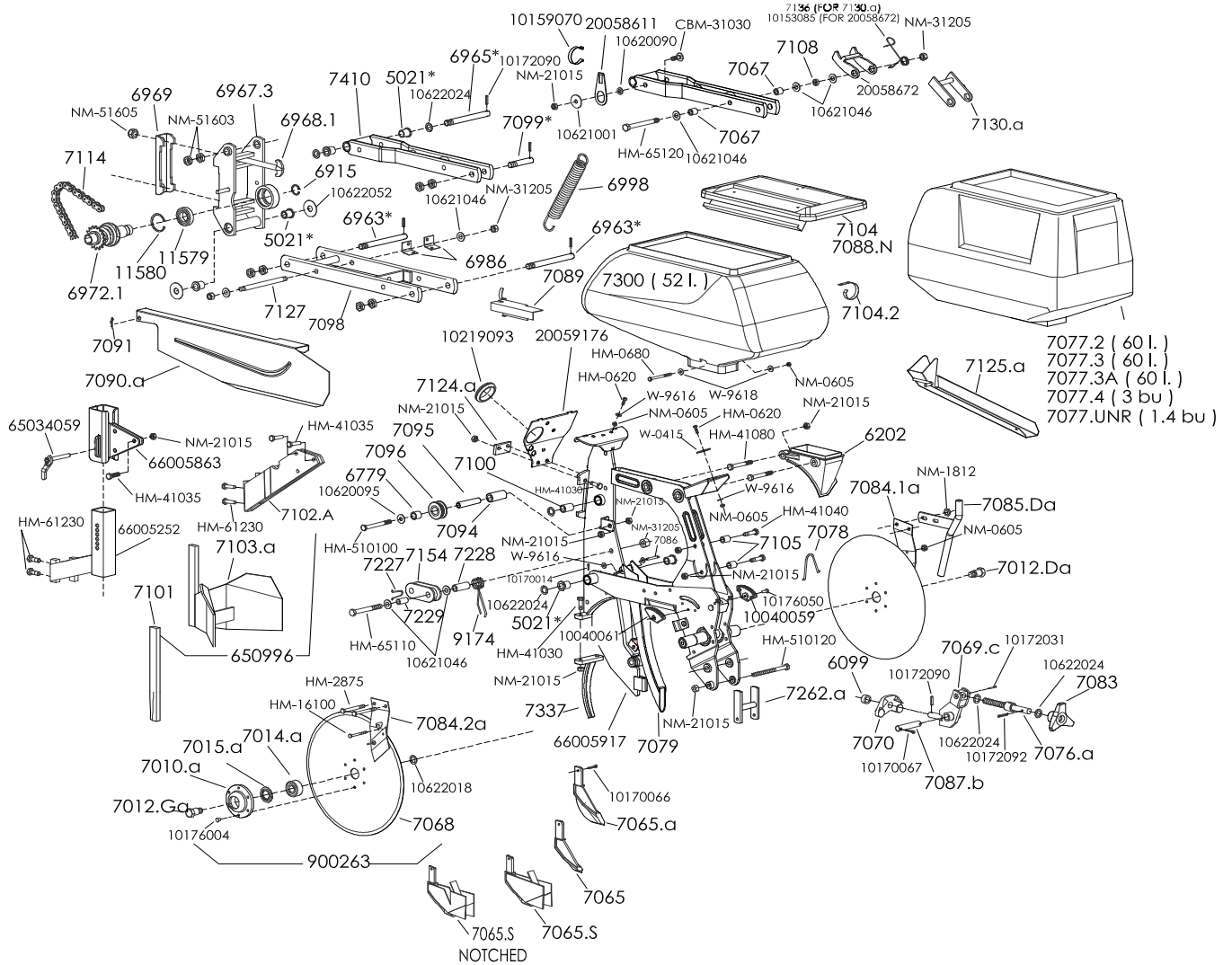
**ROW UNIT**

**NG Plus 4 Assembly**

5" x 5"

<b>SELECT CORRECT SERVICE PART NUMBER FROM TABLE:</b>				
	<b>6963*</b>	<b>6965*</b>	<b>7099*</b>	<b>5021*</b>
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**



<b>PART No.</b>	<b>DESCRIPTION</b>
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
6915	Snapping, 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

<b>PART No.</b>	<b>DESCRIPTION</b>
6967.3	Clamp facing, 5x5 toolbar
6968.1	T-bolt W/ Nut for 5x5 toolbar, 16mm
6969	Clamp Plate 5x5 toolbar
6972.1	Slipclutch
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
7065.S	V shoe insert for small seed

**ROW UNIT**

**NG Plus 4 Assembly**

5" x 5"

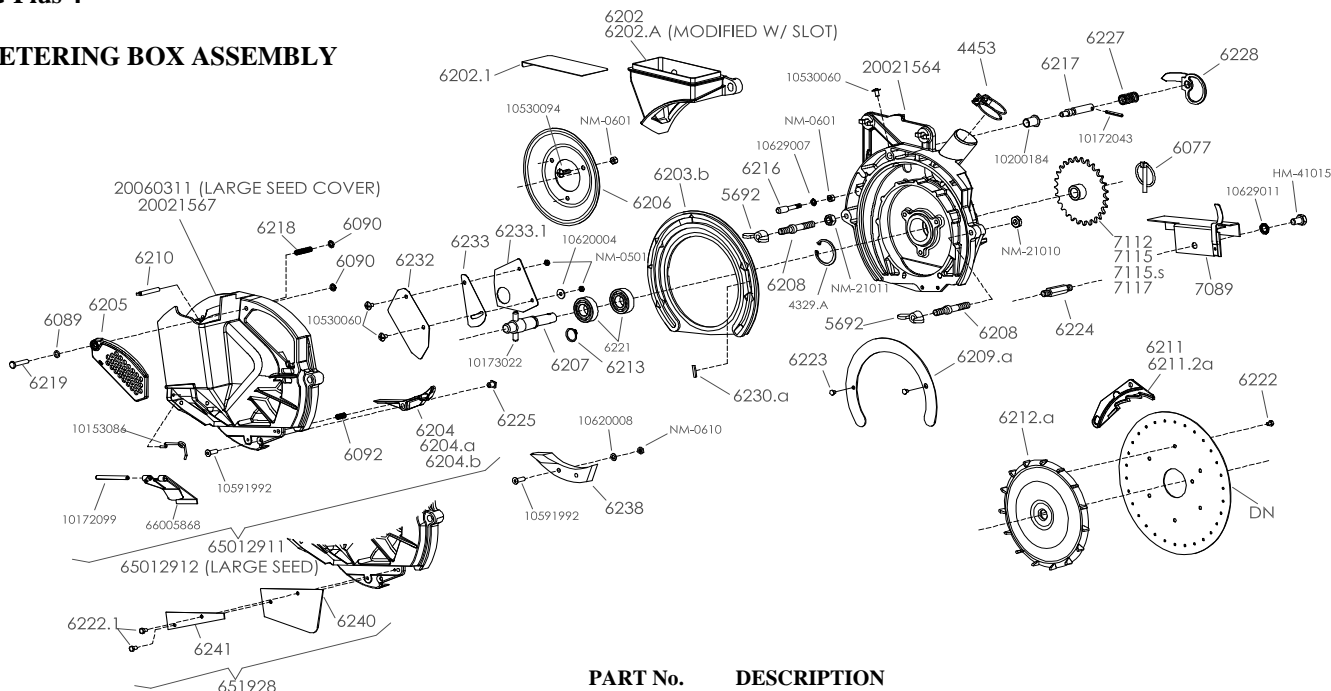
<b>PART No.</b>	<b>DESCRIPTION</b>
7067	Spacers for Unit Lock-up bracket
7068	Opening disc only
7069.C	Bracket for wheel stop/depth control rod, NG+4
7070	Swing bracket
7076.A	Threaded for depth adjustment
7077.2	Seed hopper, standard, 60 ltr
7077.3	Seed hopper, Twin row, 60 ltr
7077.3A	Seed hopper, TwinRow/reversed, 60 ltr
7077.4	Seed hopper, 3 bu.
7077.UNR	Seed hopper, 50 ltr (1.4 bu, uses7088.n lid)
7078	Wire stop for depth control rod
7079	Blank seed tube
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
7085.DA	Insecticide drop tube, right
7085.GA	Insecticide drop tube, left
7086	Pin for seed tube attachment
7087.B	Pin, uses 2-5x40 cotter pins
7088.N	Lid for 7077.UNR hopper
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
7101	Front point, clod remover
7102.A	Mounting bracket, clod remover
7103.A	Clod remover
7104.CO	Lid complete w/spring clip
7104.2	Spring clip
7105	Spacer
7108	Bushing, self lubricated, Unit Lock-up
7114	Drive chain, 5R, 124 links w conn. Link
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
7262.A	Spring support bracket

<b>PART No.</b>	<b>DESCRIPTION</b>
7300	Seed hopper, 52 ltr.
7337	Protection point, double disc openers
7410	Upper parallel linkage arm
9174	Spring, chain tightener
11579	Bearing, safety clutch (60062RS)
11580	Snapping, 55mm
650996	Clod remover, complete
900263	Opening disc complete w/bearing
10040059	Depth Gauge Indicator, Right
10040061	Depth Gauge Indicator, 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-41035	Bolt, M10 x 35mm
HM-41040	Bolt, M10 x 40mm
HM-41080	Bolt, M10 x 80mm
HM-510100	Bolt, M10 x 100mm
HM-510120	Bolt, M10 x 120mm
HM-61230	Bolt, M12 x 30mm
HM-65110	Bolt, M12 x 110mm
HM-65120	Bolt, M12 x 120mm
NM-0605	Nylock 6mm
NM-1812	Nylock 8mm
NM-21015	Nylock 10mm
NM-21205	Nylock 12mm
NM-51603	Jam Nut 16mm
NM-51605	Nylock 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
10622018	Washer, 16.5 x 21 x 1mm
10622024	Washer, 6 x 18 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
65034059	Pin, Clod remover Adjustment
66005252	Clod remover Adj. Bracket
66005863	Clod remover Mtg. Bracket
66005917	NG+4 Unit Frame

**ROW UNIT**

**NG Plus 4**

**METERING BOX ASSEMBLY**



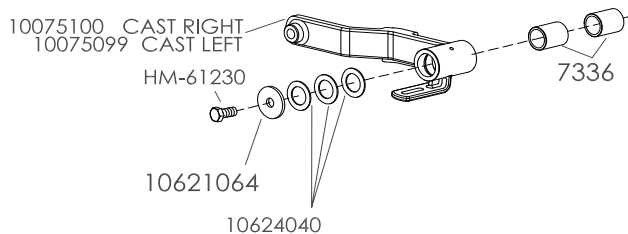
PART No.	DESCRIPTION
4329.a	Snapping, internal, 57mm
4453	Vac Hose Clamp
5692	Wing nut, 10mm
6077	Lynch pin, 6mm dia.
6089	Rubber ring
6090	Snapping, 6mm
6092	Spring
6202	Collar brace
6202.A	Collar Brace with slot
6202.1	Slide Plate for slotted Meter box collar
6203.b	Plastic insert
6204	Plastic Ejector
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	Snapping, 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
<b>If using Sync-Row System, See Sync-Row Supplement in Back</b>	
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 complete meter box assem. w/ 26T sprocket & collar
<b>METERING BOX COMPLETE</b>	
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

**ROW UNIT**

**NG Plus 4**

**GAUGE WHEEL ARM ASSEMBLY**



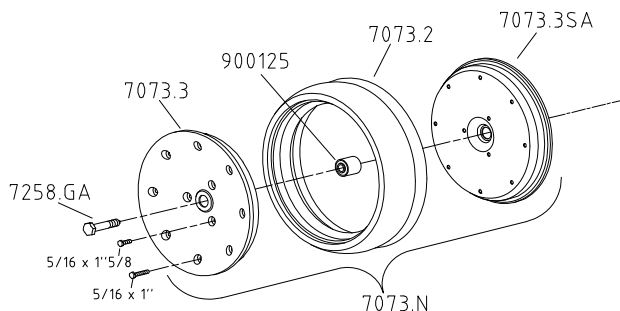
PART No.	DESCRIPTION
7336	Two piece bushing
10075100	Cast Gauge wheel arm RH
10075099	Cast Gauge wheel arm LH

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**

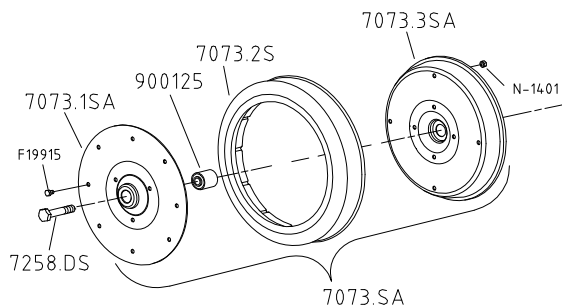
**7073.N Gauge wheel complete (black nylon rim)**

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



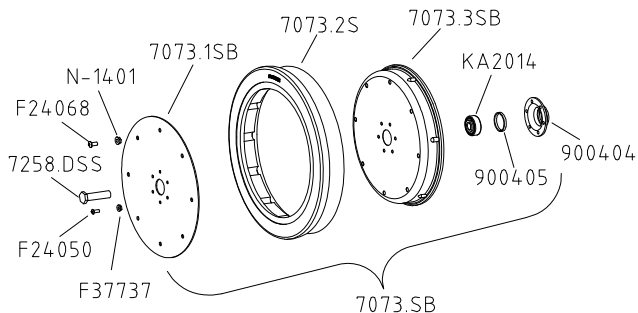
**7073.SA Narrow gauge wheel, complete**

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

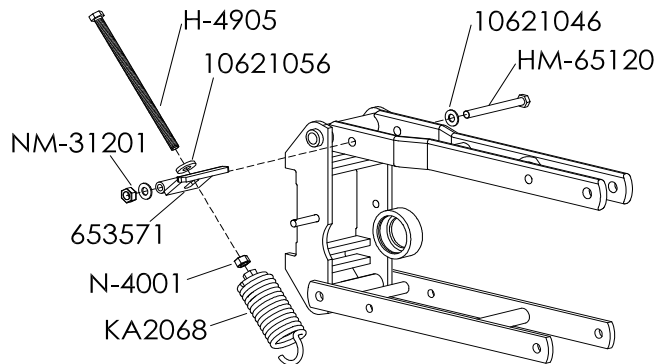


**ROW UNIT**

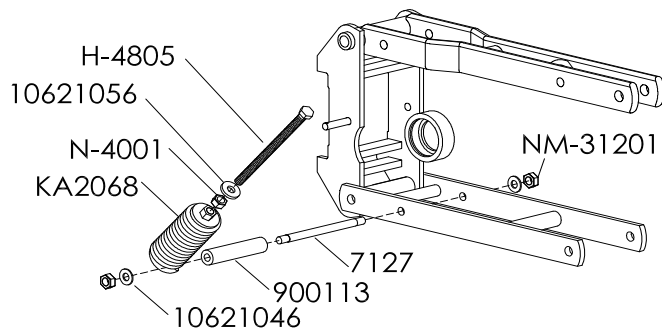
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**NG Plus 4**

**UP / DOWN PRESSURE HD SINGLE SPRING**



**UP PRESSURE SPRING ASSEMBLY**



**DOWN PRESSURE SPRING ASSEMBLY**

**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

**ROW UNIT**

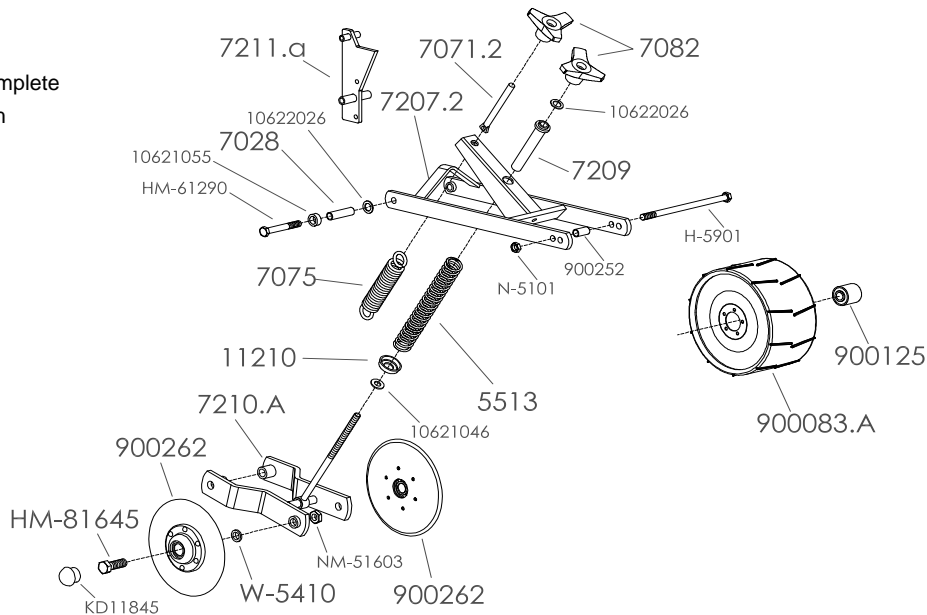
**NG Plus 4**

**900052.A- HILLER DISC w/ FLAT PRESS WHEEL**

The flat press wheel with disc closing system is used for cotton or other shallow planted crops. It has an adjustable down pressure spring and an independent spring for discs.

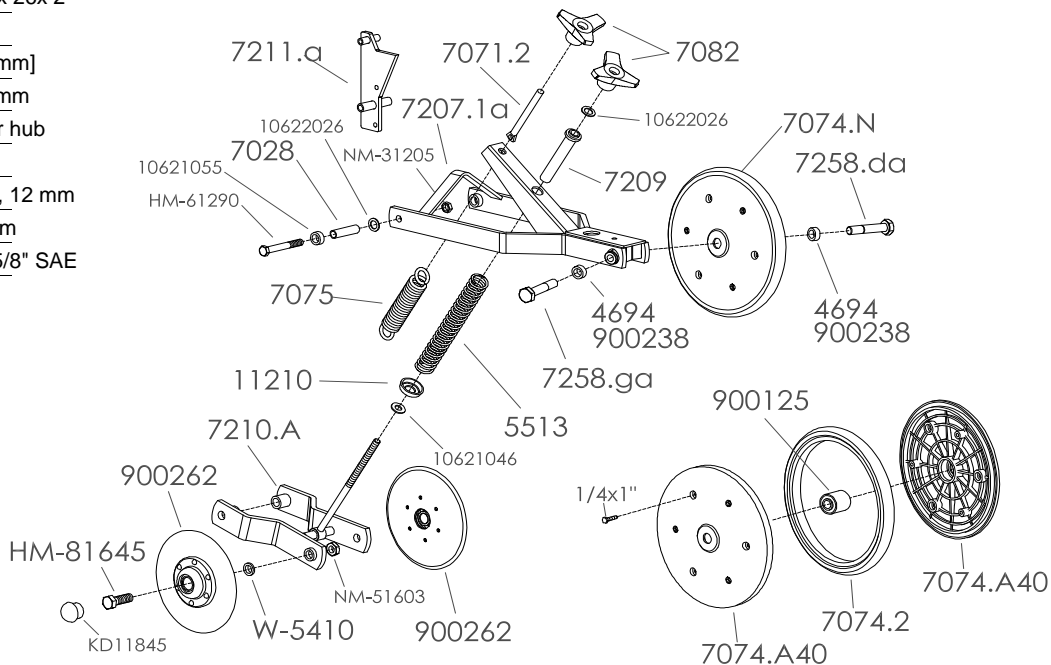
**PART No. DESCRIPTION**

4694	Bushing Closing wheel 10mm
5513	Pressure spring
7028	Bushing spacer, 59mm
7074.A40	Rim Half
7074.N	Adjustable closing wheel complete
7071.2	Adjustment rod 12 x 130 mm
7074.2	Tire only, 1 x 12
7075	Spring
7082	Handwheel knob
7207.1A	Frame for hiller disc
7207.2	Frame for hiller disc
7209	Sleeve for spring
7210.a	Bracket for mounting discs
7211.a	Frame wheel stop
7258.GA	Bolt, 16x 80 RH
7258.DA	Bolt, 16x 80 LH
11210	Cap to support spring
90052.a	Complete v press wheel
900083.1	Rim half flat press wheel
900083.2	Tire only flat press wheel. (6.5" x 12")
900083.a	Complete flat press wheel
900125	Bearing 40mm
900238	Bushing spacer, Narrow, 5/16" wide
900252	Bushing spacer, 2 13/16"
900262	Disc complete w/ hub & bearing
10621046	Washer, 13x 27x 2
10621055	Washer, 13x 30x 5
10622026	Washer, 16.5x 26x 2
H-5901	Bolt, 5/8 x 9
HM-61290	Bolt, 12 x 90 mm]
HM-81645	Bolt, 16 x 45 mm
KD11845	Plastic cap for hub
N-5101	Locknut, 5/8"
NM-31205	Nylon locknut, 12 mm
NM-51603	Jam nut, 16mm
W-5410	Flat washer, 5/8" SAE



**900052.1- HILLER DISC w/ V PRESS WHEEL**

The V press wheel closing system features twin off-set discs and a V press wheel with an adjustable down pressure spring. There is an independent spring-loaded adjustment for discs.

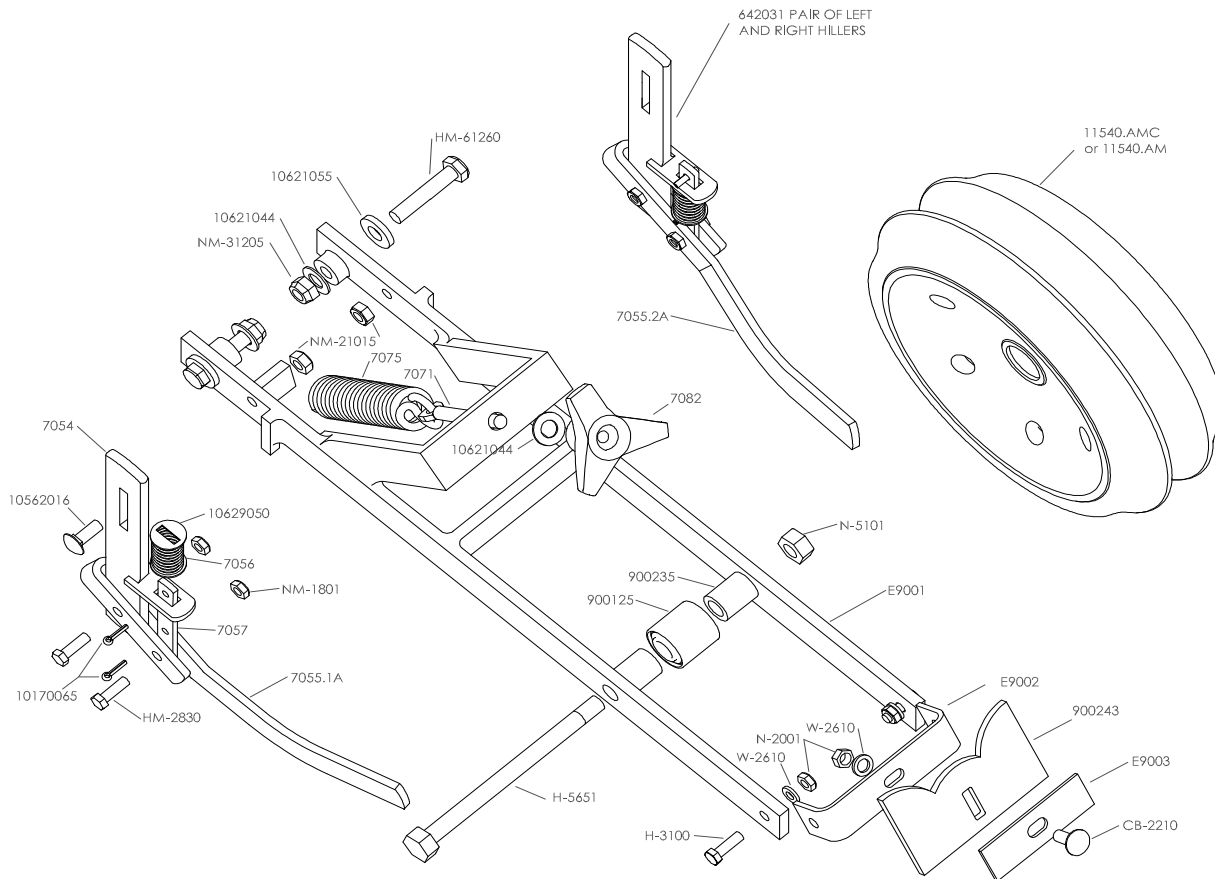




**ROW UNIT**

**NG Plus 4**

**CONCAVE PRESS WHEEL/ HILLER ASSEMBLY**



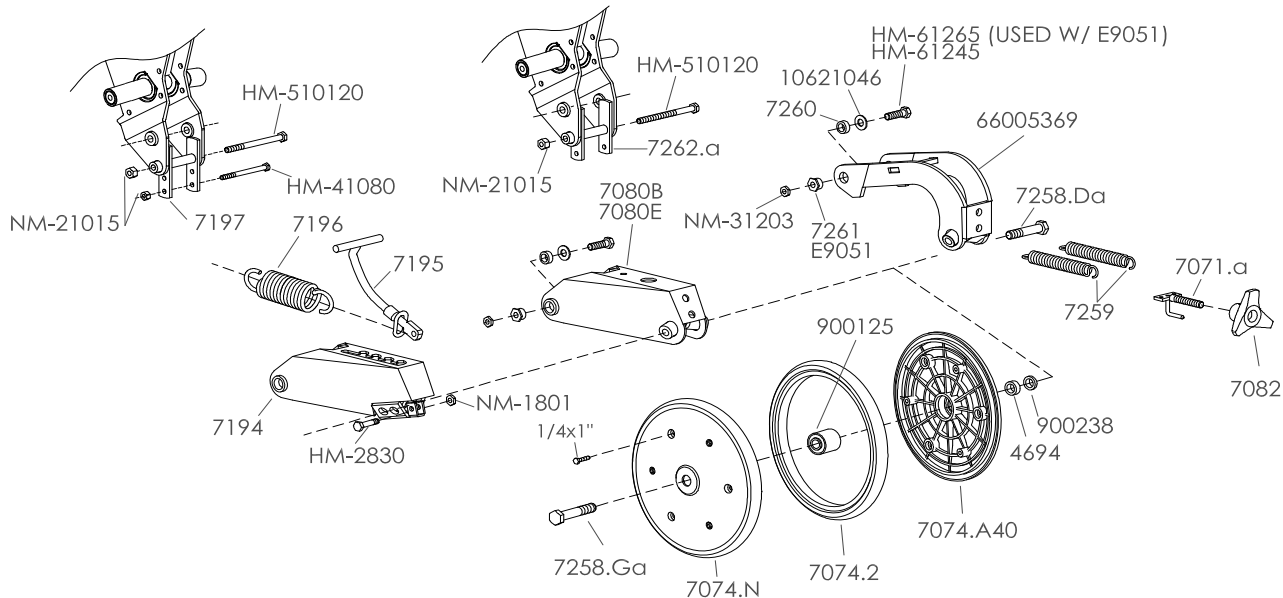
<b>PART No.</b>	<b>DESCRIPTION</b>
642031	Pair of hillers complete
7054	Scraper support bracket
7055.1A	Lefthand scraper
7055.2A	Righthand scraper
7056	Spring
7057	Spring support
7071	Tension rod
7075	Spring closing wheel
7082	Handwheel pressure control
11540.AMC	Wheel complete concave
11540.AM	Wheel complete crowned
900125	Bearing
900235	Bushing
900243	Mud scraper
10170066	Cotter pin, 5x 30

<b>PART No.</b>	<b>DESCRIPTION</b>
10562016	Carriage bolt, 10x 25
10621044	Washer, 13x 27x 1
10621055	Washer, 13x 30x 5
10629050	Washer, 18x 7x 27x 2
CB-2210	Carriage bolt, 3/8 -16x 1
H-3100	Bolt, 3/8 -16x 1
H-5651	Bolt, 5/8 -11x 6 1/2
HM-2830	Bolt, 8x 30 mm
HM-61260	Bolt, 12x 60 mm
N-2001	Nut, 3/8 -16 z
N-5101	Nylock, 5/8 -11
NM-1801	Nut, 8mm
NM-21015	Nylock, 10mm
NM-31205	Nylock, 12mm
W-2610	Lock washer, 3/8 z

**ROW UNIT**

**NG Plus 4, Single Row**

**SINGLE ROW CLOSING WHEEL ASSEMBLY**



PART No.	DESCRIPTION
4694	Bushing 10mm
7071.A	Adjustment Rod 12mm
7074.2	Tire Only 1" x 12"
7074.A40	Nylon rim half
7074.N	Closing Whl Complete 1" x 12"
7080.E	Bracket for narrow and twin rows
7082	Handwheel
7194	Bracket for adj. closing wheel,
7195	T-Handle, Rear Closing Bracket
7196	Rear Unit Spring, T-Handle assy
7197	Spring support, T-Handle spring
7258.DA	M16 x 80 R.H.
7258.GA	M16 x 80 L.H.
7259	Spring
7260	Spacer bushing

PART No.	DESCRIPTION
7261	Threaded pivot bushing
7262.A	Spring support
900125	Bearing 40mm
900238	Bushing 8mm
10621046	Washer M13 x 27 x 2
66005369	Bracket, adj closing wheel, open frame
E9051	Eccentric bushing
HM-2830	Bolt, 8-1.25 x 30 G8.8
HM-41080	Bolt, 10-1.5 x 80 G8.8
HM-510120	Bolt M10 x 120
HM-61245	Bolt M12 x 45
HM-61265	Bolt M12 x 65
NM-1801	Hex Nut, 8 x 1.25 G8.8
NM-21015	Nylock 10mm
NM-31203	Jam nut M12

## **7. OPTIONAL EQ.**

**7. 0. MISC.  
CLOD REMOVERS  
RESIDUE MANAGER**

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**7. 1. ROW MARKERS**

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**7. 3. GRANULAR INSECTICIDE, Single Row**

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**7. 4. MICROSEM INSECTICIDE, Single Row**

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**7. 5. DRY FERTILIZER, 5"x5" Mounted Planters**

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**7. 7. LIQUID FERTILIZER, Mounted Planters**

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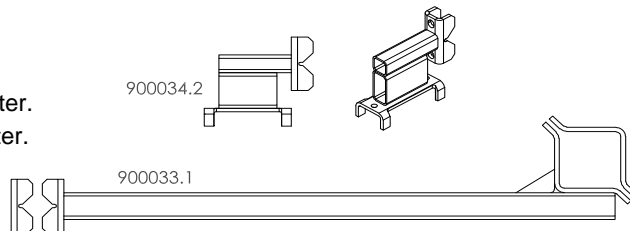
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**OPTIONAL EQUIPMENT**

**SPACERS**

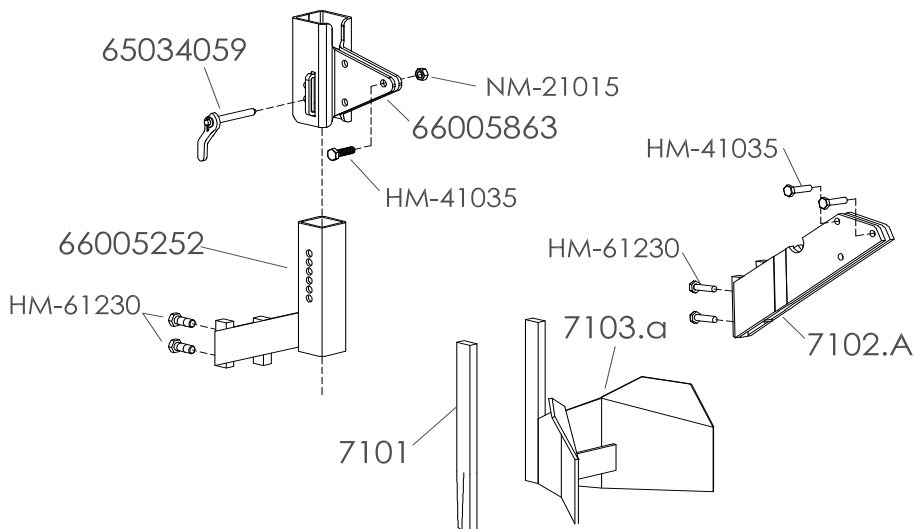
Front and Rear Spacers are used to hang accessories from a 2" x 2" diamond toolbar. The spacers are mounted on the 5" x 5" main frame toolbar.

<b>PART No.</b>	<b>DESCRIPTION</b>
900034.2	Front spacer, 2" x 2" Diamond bar for 7 x 7 planter.
900033.1	Rear spacer, 2" x 2" Diamond bar for 7 x 7 planter.



**CLOD REMOVERS**

The function of the clod remover is to clear the surface of the soil, but not plow a furrow. It is rigid and mounted in front of the disc openers that push clods away in preparation for the seed trench. The front brace of the clod remover is an independent adjustable opening knife that used to slice open hard soil and move stones away from the track of the disc opener. The clod remover should be adjusted according to soil type.

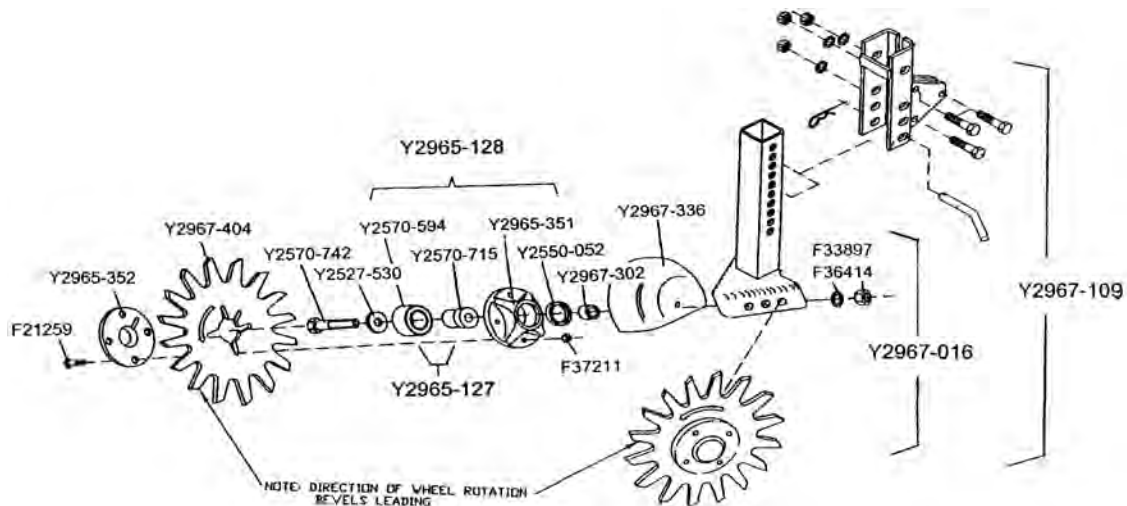


<b>PART No.</b>	<b>DESCRIPTION</b>
7101	Front point, clod remover
7102a	Mounting bracket, clod remover
7103a	Clod remover
HM-41035	Bolt , 10x35mm
HM-61230	Bolt , 12x30mm
NM-21015	Nylock 10mm
65034059	Clod remover brkt. Pin NG+4
66005863	Clod remover Mtg. brkt. NG+4
66005252	Clod remover adj. brace. NG+4
650996	Complete clod remover

**OPTIONAL EQUIPMENT**

**RESIDUE MANAGER**

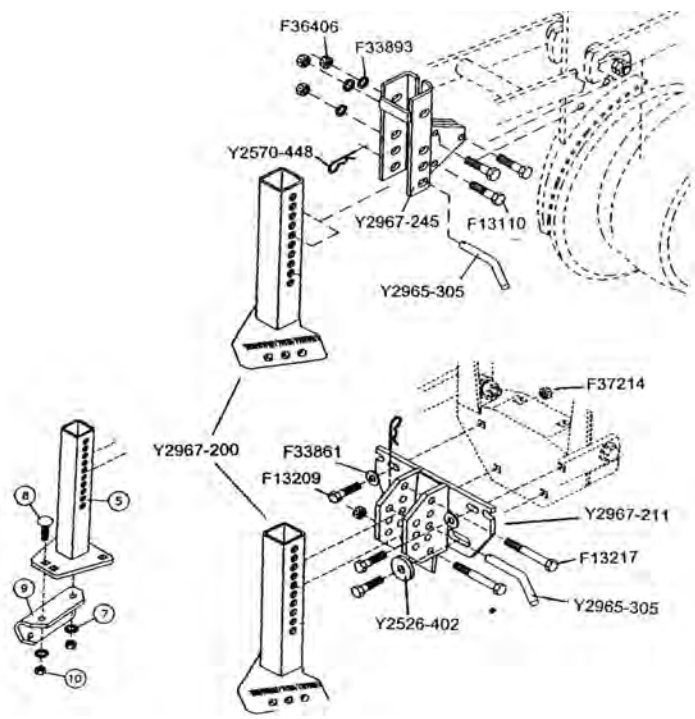
Residue managers are available for minimum and no-till situations.



**PART No. DESCRIPTION**

**Y2967-109 Residue manager assy complete w/ mnt bracket**

H-3130	Bolt, 3/8 -16 x 1 3/4 Gr. 5
H-4120	Bolt, 1/2- 13 x 1 1/2 Gr. 5
H-4320	Bolt, 1/2- 13 x 3 1/2 Gr. 5
CB-1150	Carriage bolt, 5/16 -18 x 1 1/2 Gr. 5
W-4210	Flat washer, 1/2
W-2610	Lockwasher, 3/8
W-5610	Lockwasher, 5/8"
N-2001	Nut 3/8- 16
N-5001	Nut, 5/8- 11
N-1101	Rev lock nut, 5/16- 18
N-4101	Rev lock nut, 1/2- 13
Y2526-402	Machine bushing, 9/16 ID x 1 3/4 OD x 1 1/4
Y2527-530	Machine bushing, 3/16"
Y2550-052	Seal for hub and bearing
Y2570-448	Hairpin, 1/8"
Y2967-404	Spoke wheel, 13" dia
Y2570-594	Bearing
Y2570-715	Insert for bearing
Y2570-742	D bolt, 5/8- 11 x 4" Gr. 5
Y2965-127	Bearing and insert assy
Y2965-128	Hub and bearing assy
Y2965-305	Pin
Y2965-351	Hub
Y2965-352	Hub cap
Y2967-016	Residue manager assu less mounting bracket
Y2967-200	Stem
Y2967-211	Mounting bracket for No-till parallel linkage
Y2967-245	Mounting bracket only
Y2967-302	Spacer, 3/4"
Y2967-336	Bearing shield



PART No.	DESCRIPTION
5	Y2967-234 Single Wheel Arm WA
7	Y2525-352 1/2 Medium Lockwasher ZP
8	Y2505-339 1/2- 13 x 1 1/2 Car. Clt GR 5 ZP
9	Y2967-405 Wheel Mount
10	Y2520-352 1/2- 13 Hex nut ZP

## ROW MARKERS

### 5"x 5" Mounted Frame

The hydraulic row markers are available in three sizes:

**Extra Small: 2-Row – 4-Row**

**Short, Single fold: 4-Row**

**Medium, Single fold: 6-Row – 8-Row**



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



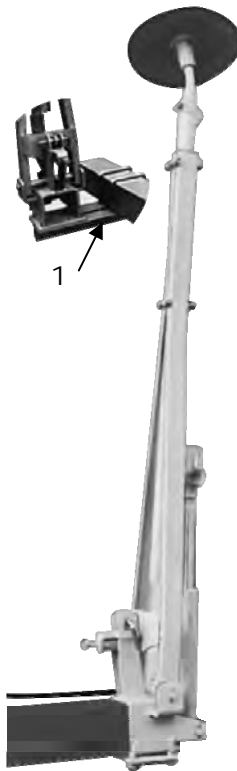
**WARNING** Use extreme care when operating the row markers near electrical lines.



**WARNING** Hydraulic fluid escaping under pressure can penetrate the skin causing serious injury. Relieve pressure before disconnecting hydraulic lines. Tighten connections before applying pressure. 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.



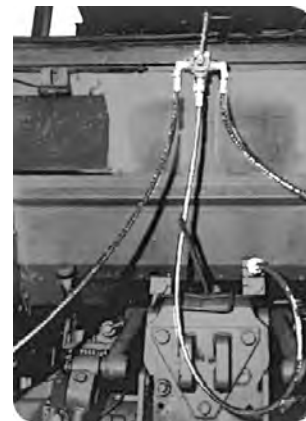
The small marker for frames of 11'6" (3m50) and medium marker for frames of 20' (6m10) are normally mounted at the end of the toolbar. However, you can get an optional mounting bracket (1) for positioning the row marker in front of the toolbar if you have narrow rows.



Use a single remote with either a 3-way directional valve or a sequence valve.

With a double remote, you can raise or lower each row marker independently. Both row markers and controls can be in operation at the same time.

A 3-way directional valve mounted on the tractor directs the hydraulic row markers. This is a single acting hydraulic system.



A sequence valve to alternate automatically the hydraulic row markers is mounted to the toolbar. **NOTE: This valve is sensitive to impurities in the oil.**



**NOTE: Each cylinder has a flow reducer inside the hydraulic fitting. If the hole of the flow reducer is blocked by dirt or impurities the row marker cylinder will malfunction. When removing for cleaning, place the flow reducer in its original position with the internal snap ring up (visible when inserted).**

### ROW MARKER ADJUSTMENTS

The row marker length is determined by multiplying the number of rows by the row spacing (in inches). This figure should be equal to the distance from the end of the marker blade to the centerline of the planter. Adjust the left and right row markers equally to the determined length.

**Example:**

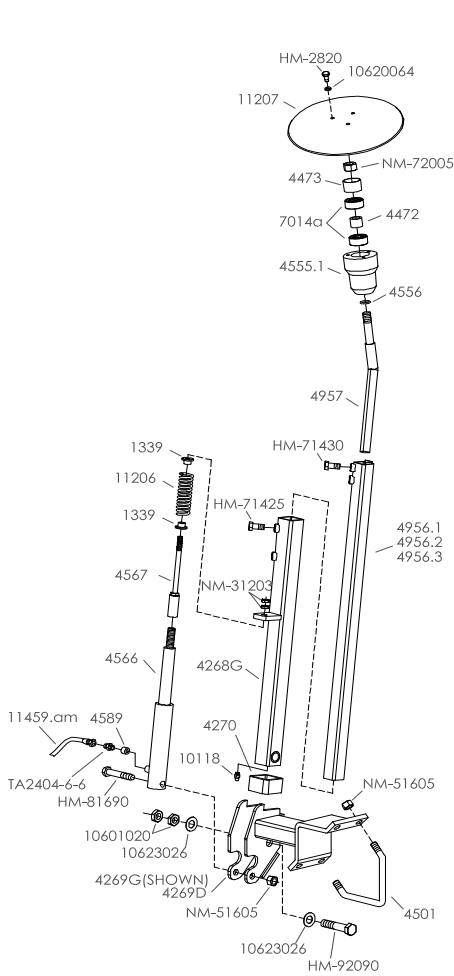
6 rows x 30" row spacing = 180".

Row marker extension from center of planter to end of row marker blade should be 180".

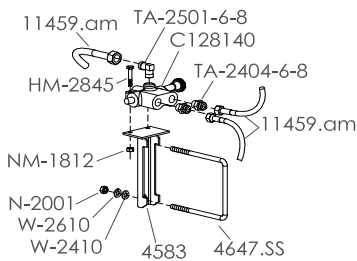
**ROW MARKERS**

**5" x 5" Mounted Planter**

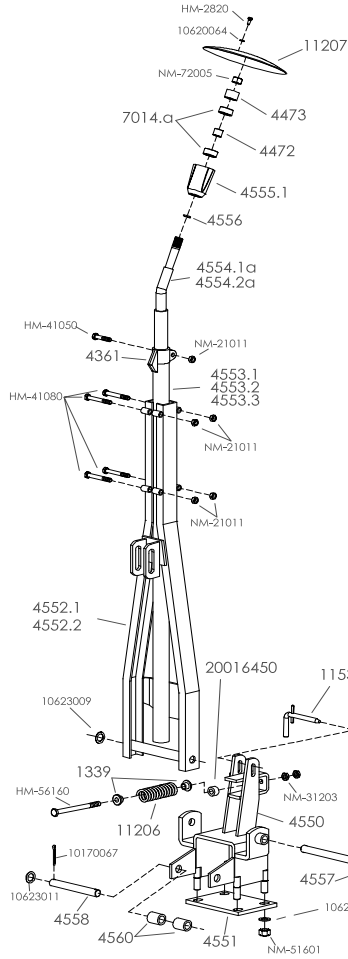
**XTRA-SMALL MARKER**



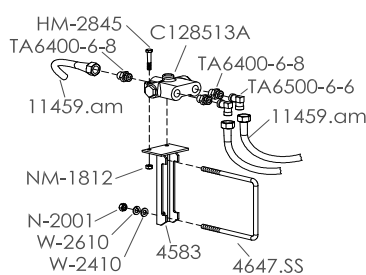
**Manual Valve**



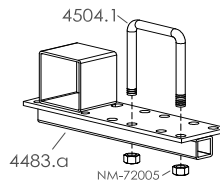
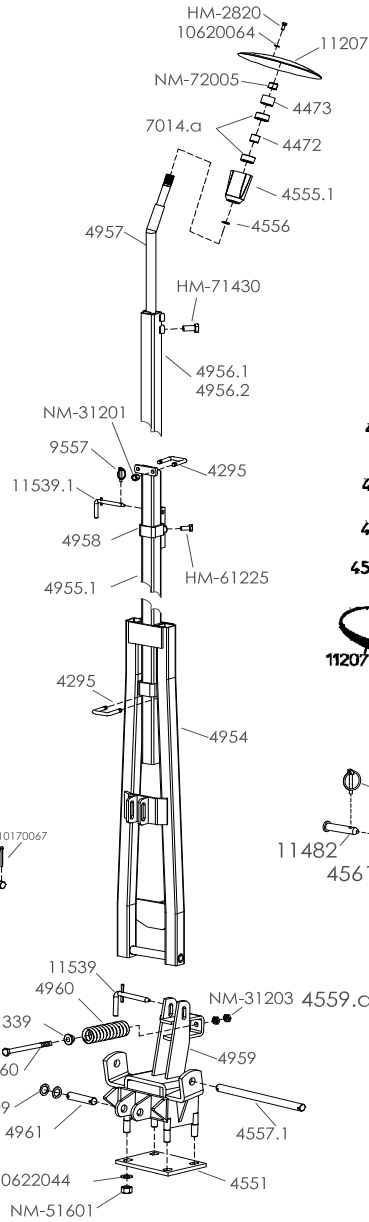
**SHORT MARKER**



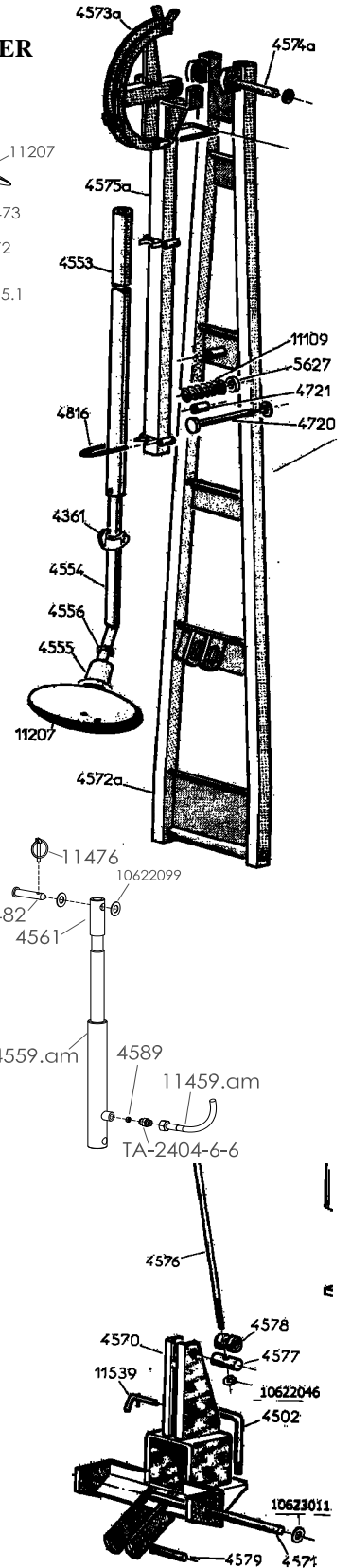
**Sequence Valve**



**MEDIUM MARKER**



**LARGE MARKER**





## ROW MARKERS

### 5" x 5" Mounted Planter

#### PART No. DESCRIPTION

1339	Bushing (B11)
4268.G	Marker arm Left 27.5"
4269.D	Marker arm mount Left (Shown)
4269.G	Marker arm mount Right
4270	Marker Arm Locking Ring
4295	U bolt, 12mm
4361	Adjustable clamp for row marker
4472	Bearing spacer
4473	Stop ring
4483.a	Offset support bracket
4501	V Bolt, 5x5 16mm
4502	U bolt, 16mm
4504.1	U bolt, 20mm
4550	Mounting bracket, single row marker 14' (4m50)
4551	Mounting plate
4552.1	Support frame short 39" (99cm)
4552.2	Support frame long, 55" (140 cm)
4553.1	Female tube 79" (200cm)
4553.2	Female tube 48" (120cm)
4553.3	Female tube 39" (99cm)
4554.1a	Male tube 71" (180cm)
4554.2a	Male tube 39" (99cm)
4555	Hub, row marker
4555.1	Hub, row marker
4556	Washer (rubber O ring)
4557	Pivot pin
4557.1	Pivot pin
4558	Cylinder pin
4559.am	Row marker cylinder 1992 on
C4C0872	Seal kit hydraulic row marker 1992 on
4566	Small Row marker cylinder
4567	Small Row marker cylinder threaded rod
4589	Flow reducer non-adjustable
4560	Bushing (B11)
4561.am	Rod end cylinder row marker
4571	Lower pivot pin
4572.a	Main frame folding row marker
4573.a	Pivot section
4574	Pivot pin
4574.a	Pivot pin
4576	Adjustable rod folding row marker
4577	Tightening nut
4578	Cross tube for nut
4579	Lower cylinder pin
4583	Sequence valve support
4589	Flow reducer, non adjustable
4596.3	Fitting, metric to american, cylinder row marker
4647.ss	U bolt, 5x5 3/8"-16
4720	Stop shock absorber
4721	Slide bushing
4816	Locking clamp row marker tube
4954	Main frame, length 51"
4955.1	Tube, 50x50, length 49"
4955.2	Tube, 50x50 length, 88"
4956.1	Tube, 40x40, length 51"
4956.2	Tube 40x40, length 69"
4956.3	Tube 40x40, length 39.5"

#### PART No. DESCRIPTION

4957	Shaft
4958	Retractable collar
4959	Mounting bracket, row marker
4960	Spring
4961	Lower pin, row marker
5627	Dust cap
7014.a	Bearing
9557	Lynch pin
11109	Spring (R59)
10118	Grease Zerk 6mm
11206	Spring, row marker (R75)
11207	Disc, row marker
11459.am	Hydraulic hose, specify length
11459.15a	59" hydraulic hose, with fitting
11459.35a	138" hydraulic hose with fitting
11459.40a	157" hydraulic hose with fitting
11459.50a	197" hydraulic hose with fitting
11459.6	234" hydraulic hose with fitting
11476	Lynch pin
11482	Pin, 19x65
11539	Row marker pin
11539.1	Row marker pin
C128140	Manual flow valve
C128513A	Sequence valve
TA2404-6-6	3/8 Male JIC- 3/8 Male NPT
TA2404-6-8	3/8 Male JIC- 1/2 Male NPT
TA2501-6-8	3/8 JIC - 1/2 Male NPT 90°
TA6400-6-8	3/8 Male JIC - 1/2 Male O-Ring
TA6500-6-6	3/8 Male JIC- 3/8 FEM 90°
HM-2820	Hex bolt, 8x20mm
HM-2845	Hex bolt, 8x45mm
HM-41050	Hex bolt, 10x50mm
HM-41080	Hex bolt, 10x80mm
HM-61225	Hex bolt, 12x25mm
HM-65160	Hex bolt, 12x160mm
HM-71425	Hex bolt, 14x25mm
HM-71430	Hex bolt, 14x30mm
HM-81690	Hex bolt, 16x90mm
HM-92090	Hex bolt, 20x90mm
N-2001	Hex nut, 3/8"-16
NM-1812	Nylock, 8mm
NM-21011	Hex nut, 10mm
NM-31201	Hex nut, 12mm
NM-31203	Jam nut, 12mm
NM-51601	Hex nut, 16mm
NM-51605	Nylock, 16mm
NM-72005	Hex nut, 20mm
10170067	Split Pin, 5x40mm
10601020	Hex Nut, 20mm
10620064	Washer, 8.5x16x2mm
10622044	Washer, 17x30x2mm
10622046	Washer, 17x30x4mm
10622099	Washer. 20.5x30x2mm
10623009	Washer, 21x32x1mm
10623011	Washer, 21x32x2mm
10623026	Washer, 21x40x1mm
10623028	Washer, 21x40x2mm
20016450	Bushing, 15mm

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**US INSECTICIDE SYSTEM**

**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

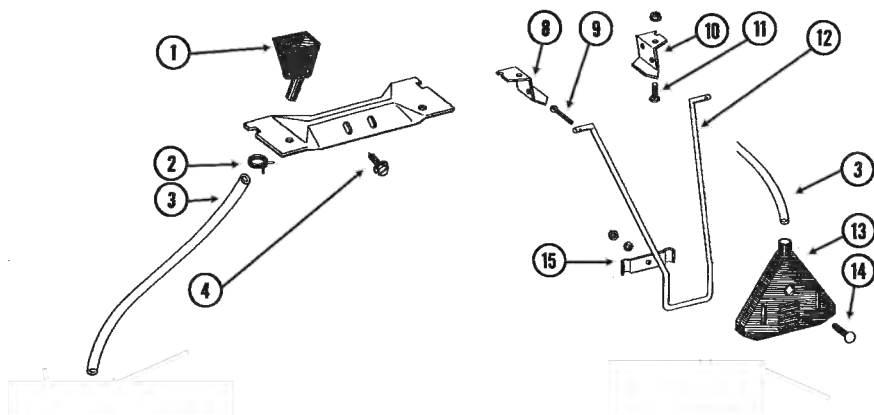
Example: You have driven 500 feet. Your row spacing is 30" and you have collected 4.5 ounces of material in a plastic bag. Multiply 4.5 by the factor 2.2. This would indicate that you are applying 9.9 lbs./acre.

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.

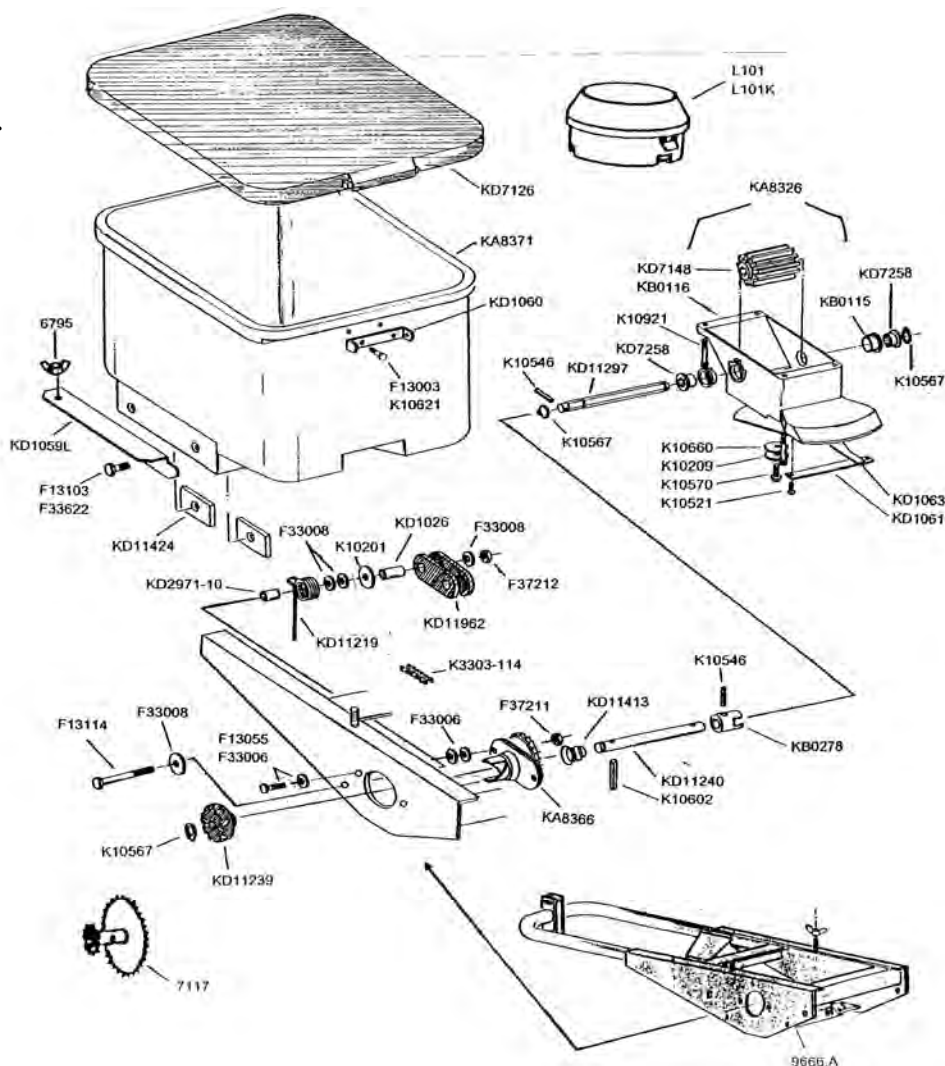
**SPREADER TUBE ASSEMBLY**



ITEM	PART No.	DESCRIPTION
1	KD2423	Funnel
2	K10680	Hose clamp
3	KD2947	Hose, precut, 7/16" x 28"
		Self-tapping screw, 10 -24 x 1/2"
4	K10523	
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

**US INSECTICIDE SYSTEM**

**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

### Single Row Planters



### STANDARD 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 means of 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

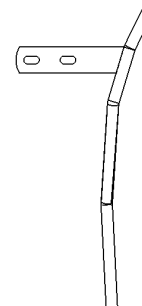
**7085.DA** Mounts on the right hand side of the unit, with the same bolts that attach the disc scraper. It deposits material down in the seed trench behind the seed tube. The top of the tube points straight up.



**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.

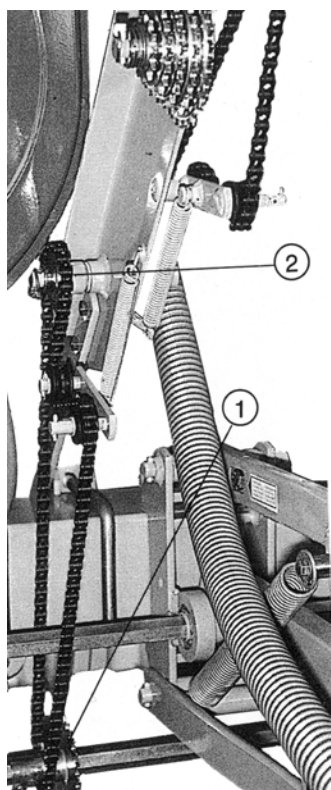


**MICROSEM MICROGRANULAR INSECTICIDE SYSTEM**

**Single Row Planters**

**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  
 $\frac{11}{5} \times 0.24 = 0.528$   
 A=12, B=22, C=20

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

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.

**MICROSEM MICROGRANULAR INSECTICIDE SYSTEM**

**Single Row Planters**

**Possible Sprocket Combinations**

**Ratios Obtained**

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

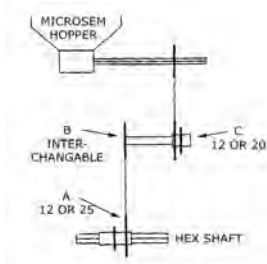


More Product

**MICROSEM MICROGRANULAR INSECTICIDE SYSTEM**

**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

	A / B / C	A / B / C	A / B / C	A / B / C	A / B / C	A / B / C	A / B / C	A / B / C
<b>#'s per acre</b>	<b>5.35</b>	<b>6.42</b>	<b>7.22</b>	<b>8.03</b>	<b>9.82</b>	<b>11.15</b>		
<b>THIMET 22"</b>	12 / 18 / 12	12 / 15 / 12	12 / 22 / 20	12 / 12 / 12	12 / 15 / 20	25 / 18 / 12		
<b>20G 30"</b>	12 / 22 / 20	12 / 18 / 20	25 / 20 / 12	25 / 18 / 12	25 / 15 / 12	25 / 22 / 20		
<b>36"</b>	12 / 18 / 20	12 / 15 / 20	25 / 16 / 12	25 / 15 / 12	25 / 12 / 12			
<b>40"</b>	25 / 22 / 12	25 / 18 / 12	25 / 15 / 12	25 / 22 / 20				

<b>#'s per acre</b>	<b>5.00</b>	<b>6.50</b>	<b>8.10</b>	<b>9.30</b>	<b>10.00</b>	<b>11.40</b>	<b>13.50</b>	
<b>DASANIT 22"</b>		12 / 12 / 12	25 / 22 / 12	12 / 15 / 20	25 / 18 / 12	25 / 15 / 12	25 / 22 / 20	
<b>15G 30"</b>	12 / 18 / 20	25 / 20 / 12	25 / 18 / 12	25 / 15 / 12	25 / 22 / 20	25 / 18 / 20		
<b>36"</b>	25 / 22 / 12	25 / 16 / 12	25 / 22 / 20	25 / 12 / 12	25 / 18 / 20	25 / 15 / 20		
<b>40"</b>	25 / 20 / 12	25 / 15 / 12	25 / 12 / 12	25 / 18 / 20	25 / 15 / 20	25 / 14 / 20		

<b>#'s per acre</b>	<b>5.85</b>	<b>6.50</b>	<b>7.20</b>	<b>8.70</b>	<b>9.70</b>	<b>10.80</b>	<b>12.30</b>	<b>14.50</b>
<b>FURADAN 22"</b>		12 / 25 / 12	12 / 22 / 12	12 / 20 / 12	12 / 18 / 12	12 / 22 / 12	12 / 15 / 12	12 / 12 / 12
<b>15G 30"</b>	12 / 22 / 12	12 / 20 / 12	12 / 18 / 12	12 / 15 / 12	12 / 22 / 20	12 / 12 / 12	25 / 22 / 12	12 / 15 / 20
<b>36"</b>	12 / 18 / 12	12 / 16 / 12	12 / 15 / 12	12 / 12 / 12	12 / 18 / 20	25 / 22 / 12	12 / 15 / 20	25 / 15 / 12
<b>40"</b>	12 / 16 / 12	12 / 15 / 12	12 / 22 / 20	12 / 18 / 20	25 / 22 / 12	12 / 15 / 12	25 / 15 / 12	

<b>#'s per acre</b>	<b>5.40</b>	<b>7.13</b>	<b>8.91</b>	<b>10.70</b>	<b>12.50</b>	<b>14.25</b>	<b>16.04</b>	
<b>COUNTER 15G 22"</b>	12 / 18 / 12	12 / 22 / 20	25 / 22 / 12	25 / 18 / 12	25 / 15 / 12	25 / 22 / 20	25 / 12 / 12	
<b>LORSBAN 15G 30"</b>	12 / 22 / 20	12 / 15 / 20	25 / 15 / 12	25 / 22 / 20	25 / 18 / 20	25 / 16 / 20	25 / 15 / 20	
<b>36"</b>	12 / 18 / 20	25 / 16 / 12	25 / 22 / 20	25 / 18 / 20	25 / 15 / 20	25 / 14 / 20	25 / 12 / 20	
<b>40"</b>	12 / 15 / 20	25 / 15 / 12	25 / 12 / 12	25 / 15 / 20	25 / 14 / 20	25 / 12 / 20		

<b>#'s per acre</b>	<b>17.82</b>	<b>19.60</b>	<b>21.40</b>	<b>23.20</b>				
<b>COUNTER 15G 22"</b>	25 / 18 / 20	25 / 16 / 20	25 / 15 / 20	25 / 14 / 20				
<b>LORSBAN 15G 30"</b>	25 / 14 / 20	25 / 12 / 20						



**MICROSEM MICROGRANULAR INSECTICIDE SYSTEM**

**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 / B / C	A / B / C	A / B / C	A / B / C	A / B / C	A / B / C	A / B / C	A / B / C
#'s per acre	<b>3.56</b>	<b>8.90</b>	<b>10.95</b>	<b>13.35</b>	<b>17.80</b>	<b>22.25</b>	<b>26.70</b>	
<b>TEMIK 15G</b> 22"		12 / 18 / 12	12 / 15 / 12	12 / 22 / 20	12 / 15 / 20	25 / 15 / 12	25 / 22 / 20	
<b>GYPSUM</b> 30"		12 / 22 / 20	12 / 18 / 20	12 / 15 / 20	25 / 12 / 12	25 / 18 / 20	25 / 15 / 20	
36"		12 / 18 / 20	12 / 15 / 20	25 / 12 / 12	25 / 20 / 20	25 / 15 / 20	25 / 12 / 20	
40"	12 / 25 / 12	25 / 22 / 12	25 / 18 / 12	25 / 15 / 12	25 / 18 / 20	25 / 12 / 20	25 / 12 / 20	

#'s per acre	<b>1.78</b>	<b>4.45</b>	<b>8.90</b>					
<b>TEMIK 15 G</b> 22"		12 / 15 / 12	25 / 12 / 12					
<b>CORNCOB</b> 30"	12 / 25 / 12	25 / 22 / 12	25 / 18 / 20					
<b>GRIT</b> 36"	12 / 22 / 12	12 / 15 / 20	25 / 15 / 20					
40"	12 / 18 / 12	25 / 15 / 12	25 / 12 / 20					

#'s per acre	<b>2.70</b>	<b>3.20</b>	<b>3.70</b>	<b>4.50</b>	<b>5.60</b>	<b>6.70</b>	<b>7.80</b>	<b>9.40</b>
<b>ZENECA</b> 22"	12 / 25 / 12	12 / 22 / 12	12 / 18 / 12	12 / 15 / 12	12 / 12 / 12	25 / 22 / 12	25 / 18 / 12	25 / 15 / 12
<b>FORCE</b> 30"	12 / 18 / 12	12 / 15 / 12	12 / 22 / 20	25 / 22 / 12	12 / 15 / 20	25 / 15 / 12	25 / 22 / 20	25 / 18 / 20
<b>3G</b> 36"	12 / 15 / 12	12 / 22 / 20	12 / 18 / 20	12 / 15 / 20	25 / 15 / 12	25 / 22 / 20	25 / 18 / 20	25 / 15 / 20
38"	12 / 23 / 20	12 / 12 / 12	25 / 22 / 12	25 / 18 / 12	25 / 15 / 12	25 / 12 / 12	25 / 10 / 12	

#'s per acre	<b>3.40</b>	<b>4.00</b>	<b>4.60</b>	<b>4.90</b>	<b>5.50</b>	<b>6.70</b>	<b>8.10</b>	<b>10.10</b>
<b>RIDOMIL</b> 22"	12 / 22 / 12	12 / 18 / 12	12 / 16 / 12	12 / 15 / 12	12 / 22 / 20	12 / 18 / 20	12 / 15 / 20	25 / 15 / 12
<b>GOLD GR</b> 30"	12 / 16 / 12	12 / 15 / 12	12 / 22 / 20	12 / 18 / 20	25 / 20 / 12	25 / 18 / 12	25 / 22 / 12	25 / 18 / 20
<b>PC11G</b> 36"	12 / 22 / 20	25 / 24 / 12	12 / 18 / 20	12 / 15 / 20	25 / 18 / 12	25 / 22 / 20	25 / 12 / 12	25 / 15 / 20
38"	12 / 21 / 20	25 / 22 / 12	25 / 22 / 12	25 / 18 / 12	25 / 15 / 12	25 / 22 / 20	25 / 18 / 20	

#'s per acre	<b>3.10</b>	<b>3.50</b>	<b>4.20</b>	<b>5.10</b>	<b>5.70</b>	<b>7.00</b>	<b>8.50</b>	<b>10.60</b>
<b>GOLD PC</b> 22"	12 / 25 / 12	12 / 22 / 12	12 / 18 / 12	12 / 15 / 12	12 / 22 / 20	12 / 18 / 20	12 / 15 / 20	25 / 15 / 12
30"	12 / 18 / 12	12 / 16 / 12	12 / 22 / 20	12 / 18 / 20	25 / 20 / 12	25 / 18 / 12	25 / 22 / 20	25 / 20 / 12
36"	12 / 15 / 12	12 / 22 / 20	12 / 18 / 20	12 / 15 / 20	25 / 18 / 12	25 / 22 / 20	25 / 12 / 12	12 / 12 / 12
38"	12 / 23 / 20	12 / 21 / 20	25 / 22 / 12	25 / 18 / 12	25 / 16 / 12	25 / 22 / 20	25 / 18 / 20	

#'s per acre	<b>13.50</b>	<b>16.00</b>	<b>20.00</b>	<b>22.40</b>				
<b>AMEBIN</b> 22"	25 / 18 / 12	25 / 15 / 12	25 / 12 / 12	25 / 18 / 20				
30"	25 / 22 / 20	25 / 18 / 20	25 / 15 / 20					
36"	25 / 18 / 20	25 / 15 / 20	25 / 12 / 20					
40"	25 / 12 / 12	25 / 13 / 20						



**MICROSEM INSECTICIDE ASSEMBLY**

**MICROSEM ASSEMBLY- for Single Row Planters**

<b>PART No.</b>	<b>DESCRIPTION</b>	<b>PART No.</b>	<b>DESCRIPTION</b>
4329 . a	Snapping	9612	pins)
4501	V BOLT 5 X 5, 16MM	9613 . S	Spring, Chain Tightener H.D.
4502	U BOLT 5 X 5, 16MM	9645	Protective Sleeve
4515	BEARING AND FLANGETTE	9650 . O23	LINKAGE
5021	Self lubricated bushing	<b>9651 . O85</b>	<b>Drive shaft(outer), 33-1/2" long</b>
6090	Snapping, 6mm	9652 . b	Support Bracket
7085 . da	Drop tube, right hand	9653	CHAIN TIGHTENER
7085 . ga	Drop tube, left hand	9654	DOUBLE INTERMEDIATE SPRKT 12-20T
7088 . 2	Clip, for hopper lid	9656	Support arm (for drive frame)
7088 . a	Lid, hopper, with clip (7088.2)	9661	Female half of sliding drop tube assy
9158	Spring (holds on extra sprockets)	9662	Male half of sliding drop tube assy
9172 . a	Chain, 5R(106 links w/conn. link)	9713	
9280	Bushing, nylon w/square hole	9716	Pivot pin weldment
9472	Clamp Mounting Bracket, Bottom (9523 Complete)	9717	Shield for drive chain
9473	Clamp Mounting Bracket, Top (9523 Complete)	9724 . 1	Shield keeper bolts
9474	LEVER LIFT	9730	
9475		10118	Grease zerk, 6mm, straight
9500 . a	HALF HOUSING MICROSEM METER	500003	MICROSEM TOOLBAR 2M50
9502 . d	Plastic hopper only, 25 liter, -'03	500005	MICROSEM TOOLBAR 3M50
9504	Steel base (hopper to meter)	500007	MICROSEM TOOLBAR 4M50
9505 . a	Rubber skirt	900236	BUNGI CORD 5/32 X 10
9506	pins)	10020094	
9507	Worm gear, lft(reqrs 6x25 roll pin)	10170031	Split Pin, 3.5 x 25
9508	Worm gear, rht(reqrs 6x25 roll pin)	10172041	Roll pin, 4 x 25
9509	Central metering gear(requires 4x25 roll pin)	10172043	Roll pin, 4 x 36
9512	TRAP DOOR	10172090	Roll pin, 6 x 25
9513 . a	SEAL TRAP DOOR	10172091	Roll Pin 6 x 30
9516	Spring for trap door	10219099	
9517	Bolt (fastens housings together)	10530096	SCREW 6X25, PHILLIPS HEAD
9519	Rubber plug	10591905	
9520	Two outlet chute (towards the front)	10603016	Jam Nut 16-2.0Metric
9520 . 1	Single outlet	10620064	Washer, 8.5 x 16 x 2
9520 . a	Two outlet chute (towards the rear)	10620069	WASHER 8.5X20X1.5
9521	Rubber plug for side of chute	10621026	Washer, 13 x 18 x 2mm
9522	Hose (specify length)	10622024	Washer, 16 x 26 x 1
9525	END CAP MICROSEM BAR	10622044	Washer, 17 x 30 x 2
9548 . b	SUPPORT BAR INSECTICIDE	10624016	Washer, 31 x 41 x 2mm
9548 . bs	SUPPORT BAR INSECTICIDE 7X7	10629009	Lock Washer, ext tooth 8mm
9552	Bushing, requires 2-4x25 & 1-6x30 roll pin	10629011	Lock Washer, Ext tooth 10mm
9553 . b	Chain microsem drive	20062141	
9554 . 3	Sprocket, 12 tooth, 5R(standard)	64014051	Clean out Chute
9554 . 4	Sprocket, 13 tooth, 5R	66006215	
9554 . 5	Sprocket, 14 tooth, 5R	CB-1214	5/16-18 X 1-1/4 CARRIAGE G5 Z
<b>9554 . 6</b>	<b>Sprocket, 15 tooth, 5R(standard)</b>	HM-2816	Hex Bolt, 8-*1.25 x 16 G8.8
9554 . 7	Sprocket, 16 tooth, 5R	HM-2816	Hex Bolt, 8-1.25 x 16 G8.8
9554 . 9	Sprocket, 18 tooth, 5R(standard)	HM-2830	Hex Bolt, 8-1.25x30 G8.8
9554 . 11	Sprocket, 20 tooth, 5R	HM-41020	HEX BOLT 10-1.5 X 20 G8.8
9554 . 13	Sprocket, 22 tooth, 5R(standard)	HM-61225	Hex bolt, 12 x 25
9554 . 16	Sprocket, 25 tooth, 5R(standard)	HM-61280	HEX BOLT 12-1.75 X 80 G8.8
9554 . 21	Sprocket, 30 tooth, 5R(standard)	N-1001	5/16-18 FIN HEX NUT G5 ZY
9554 . 26	Sprocket, 35 tooth, 5R	NM-0605	Nylon Lock Nut, 6mm G8.8
9555 . a	Double sprocket, 12-25 tooth, 5R(hex bore)	NM-1801	8 X 1.25 HEX NUT G8.8
9557	Lynch pin, small(6mm)	NM-1812	Nylon Lock Nut, 8mm G8.8
9559	Bushing (17mmID x 25mmOD, 10mm long)	NM-21015	10MM NYLON LOCK NUT G8.8
9562	Chain Roller (G12AS)	NM-31205	Nylon Lock Nut, 12mm G8.8
9565	Rubber O-ring	NM-51605	NYLON LOCK NUT 16 MM G8.8
9568	Hose clamp (for 9522)	W-1610	5/16 LOCK WASHER YZ G8
9574	Plate for hopper (to convert to single outlet)		
9606 . a	Sprocket, 20 tooth, 5R, top dr shaft(square)		

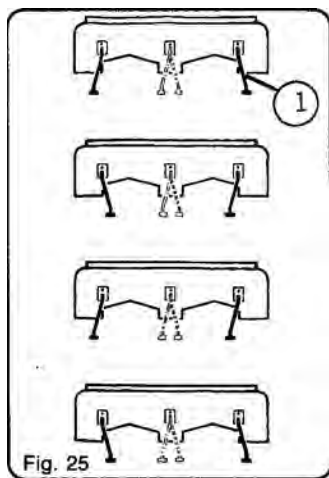
## DRY FERTILIZER

### 5" x 5" Mounted Planter

The Monosem dry fertilizer system is precisely metered by use of an auger. The standard output is adjustable from 80-350 lbs/acre and up to 600 lbs/acre using a high output auger. A non-corrosive plastic hopper with drain plug has a capacity of from 2-row 500 lbs to 12-row 2900 lbs with single, double or ripples outlet hoppers. A flexible knife opener or a double disc opener applies fertilizer from a minimum of 2" to the side of the seed line.

#### ASSEMBLY AND ADJUSTMENT

The supports (1) of the fertilizer can be attached at two different widths on the hoppers, and can be easily attached to available spots on the bar. See diagram as shown below.



The drive is normally mounted in the center of the machine, as close as possible to the left side of the gearbox. For narrow inter-row spacing this drive can be placed on the outside of the toolbar frame. In that case, an optional bearing (#4515) can be used.

It is possible (but not necessary) to counter clamp the fertilizer opener clamps to the planting units. The two inner rows cannot always be mounted in this manner because of the hitch brackets. As half of the fertilizer knives are offset to the left and the other half are offset to the right, they can be adjusted as needed.

Note: When using double disc openers the wheels of the tractor must be perfectly centered on the inter-rows or the spring leaves will come in contact with the tires during lifting.

Note: With row spacing of less than 32" (80 cm) the double disc openers are not compatible with the standard semi-automatic hitch. Semi-automatic hitch with short shaft and pin are required, or manual hitch with pins.

Note: If the connector tubes between the hoppers are too long, they can be cut to size.

As an option, a 2-row hopper can feed 3 or 4 outlets, and a 3-row hopper can feed 4, 5, or 6 outlets. The fertilizers are then delivered with a meter specially equipped and plugs to allow certain outlets to be blocked off as desired.

**The primary adjustment** is set by using the lower double sprocket. **The final adjustment** is made by using one of the sprockets of the upper sprocket cluster. Outputs can thus be obtained between approximately 80 to 350 lbs/acre (80-350 kg/ha).

Different outputs can be obtained by replacing the standard auger painted blue, with a special (optional) high output auger painted red.

Because of the large variety of fertilizers and its density and irregularity of granules, it is impossible to furnish an exact setting chart. To make an initial setting, as a guide only, an output of 80 lbs/acre, approximately between 1.2 lb for each 334 feet (600-650 grams every 100 meters) is obtained with many types of fertilizers using the small lower sprocket cluster and the big upper sprocket cluster.

The placement of the fertilizer should be between 2" and 4" (6 and 10 cm) on the side of the row. A closer placement than what is recommended may cause the plant to burn and curb its growth.

Use the procedure outlined for testing the amount of fertilizer needed.

**DRY FERTILIZER**

**5" x 5" Mounted Planters**

**HOW TO TEST FOR FERTILIZER RATES**

To test your desired fertilizer to determine lbs/acre use the chart below.  
First measure out a distance of 328 feet in a row.

1. Remove one hose from a fertilizer hopper and attach a plastic bag, or other container, under the opening in the hopper.
2. Engage the fertilizer attachment and drive forward the pre-measured distance of 328 feet (100 meters).
3. Weigh the amount of fertilizer caught in the container (in ounces).
4. Find your row spacing on the below chart, locate the approximate ounces and follow the chart up to see the approximate lbs/acre that will be applied at that setting.

**CALIBRATION CHART**

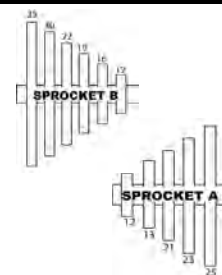
NOTE: Because all fertilizers do not have the same density and the granules can be irregular, it is impossible to furnish an exact setting chart.

Row Spacing	lbs per acre														
	80	90	100	110	120	130	140	150	160	170	180	190	200	210	220
22"	14	16	18	20	22	23	25	27	29	31	32	34	36	38	40
30"	20	22	24	27	29	32	34	37	39	42	44	47	49	51	54
36"	24	26	29	32	35	38	41	44	47	50	53	56	59	62	65

**APPLICATION RATES**

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.

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



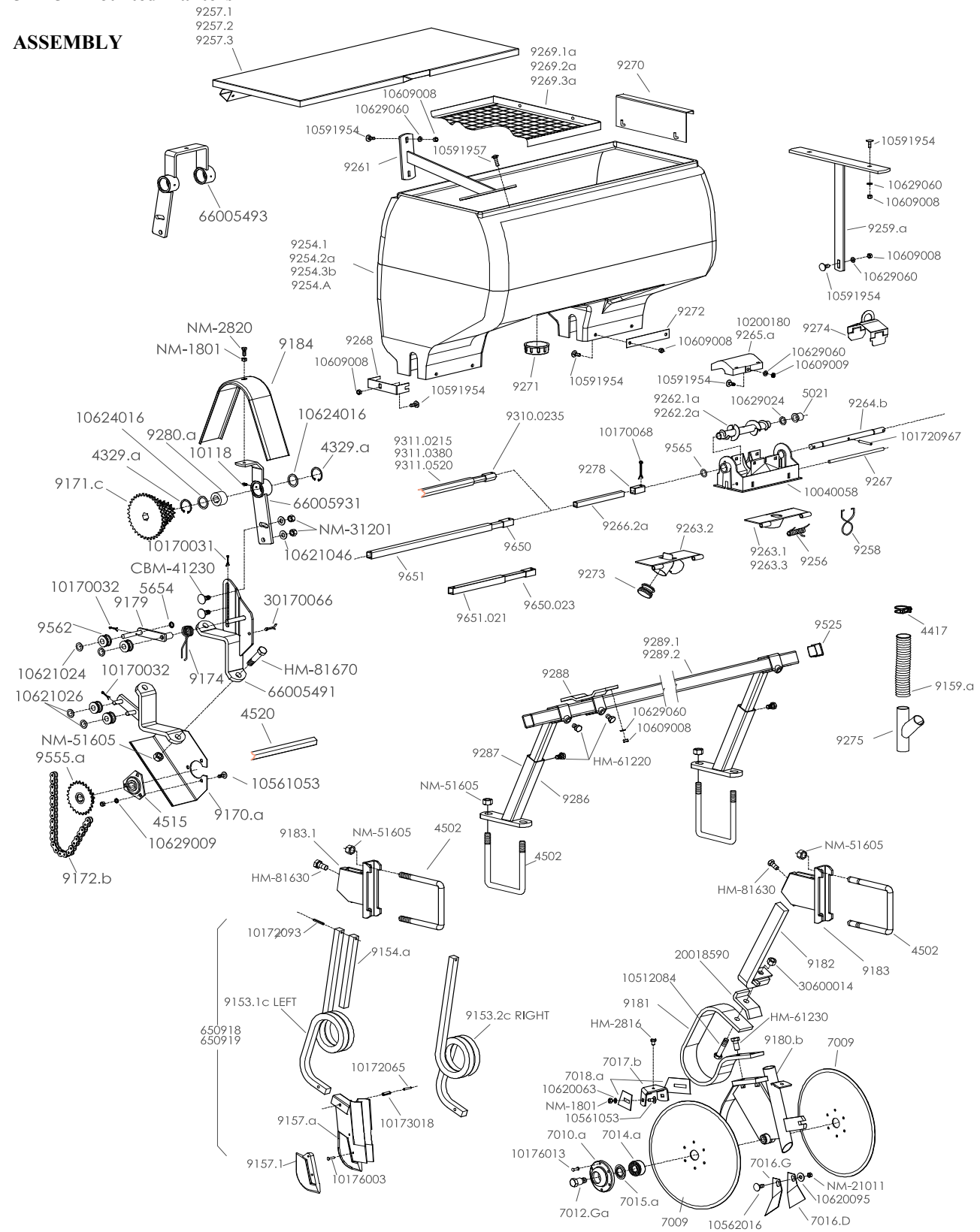
**APPLICATION RATES IN LBS/ACRE**

A / B	22"		30"		36"		40"	
	Standard Blue Auger	High Output Red Auger	Standard Blue Auger	High Output Red Auger	Standard Blue Auger	High Output Red Auger	Standard Blue Auger	High Output Red Auger
	12/ 35	92	217	68	160	57	133	51
13/ 35	101	238	74	175	62	146	56	131
12/ 30	110	258	81	190	67	158	60	142
13/ 30	116	272	85	200	71	166	64	150
12/ 22	145	340	106	250	88	208	79	187
13/ 22	162	380	119	280	99	233	89	210
21/ 35	165	388	121	285	101	238	91	214
12/ 19	170	401	125	295	105	246	94	221
23/ 35	176	414	130	305	108	254	97	229
13/ 19	185	435	136	320	113	267	102	240
21/ 30	190	448	140	330	117	275	105	248
25/ 35	193	455	142	335	119	279	107	251
12/ 16	202	476	149	350	124	292	111	262
25/ 30	208	490	153	360	128	300	115	270
13/ 16	219	516	162	380	135	317	121	285
25/ 30	225	530	166	390	138	325	125	293
21/ 22	257	605	189	445	158	371	142	334
12/ 12	272	639	200	470	167	392	150	353
23/ 22	283	666	208	490	173	408	156	368
13/ 12	295	693	217	510	181	425	163	383
21/ 19	300	707	221	520	184	433	166	390
25/ 22	306	720	225	530	187	441	169	398
23/ 19	329	775	242	570	202	475	182	428
25/ 19	355	836	261	615	218	512	196	461
23/ 16	387	911	285	670	237	558	214	503
25/ 16	425	999	312	735	260	612	234	551
21/ 12	477	1122	351	825	292	687	263	619
23/ 12	520	1224	383	900	319	750	287	675
25/ 12	566	1333	417	980	347	816	312	735

**DRY FERTILIZER**

**5" x 5" Mounted Planters**

**ASSEMBLY**



**DRY FERTILIZER**

**5" x 5" Mounted Planters**

**ASSEMBLY**

<b>PART No.</b>	<b>DESCRIPTION</b>
4329.a	Snapping, internal
4502	U bolt, 16mm
4515	Bearing complete with flanges
4515.1	Bearing only (205KRRB2)
4515.2	Flanges (2)
4520	7/8" HEX SHAFT
5021	Bushing (self lubricated)
7009	Disc only
7009.1a	Disc complete w/hub & bearing
7010.a	Hub only (mounts with 6x20 bolts)
7012.ga	Lefthand spindle
7012.da	Righthand spindle
7014.a	Bearing
7015.a	Sealing washer
7016.d	Right scraper, inside
7016.g	Left scraper, inside
7017.b	Bracket, for outside scrapers
7018.a	Outside scraper
9153.1c	Tine offset to the left
9153.2c	Tine offset to the right
9154.a	Reinforcement bar
9157.a	Fertilizer knife w/point
9157.1	Replacement cast point (5x34 rivets)
9169.a	Support bracket
9170.a	Clamp bracket
9171.b	Upper sprocket cluster (12-16-19-22-30-35)
9172.b	Chain, 5R (108 links w/conn link)
9173.a	Support bracket for drive shaft (single bushing)
9173.1	Support bracket (double bushing)
9174	Spring
9179	Chain tightener bracket
9180.b	Main housing for assembly
9181	Spring support for discs
9182	Mounting bar
9183	Clamp for disc assembly
9183.1	Clamp for knife assembly
9184	Shield
9254.1	Fertilizer hopper, 1 outlet, 225 lb capacity
9254.2a	Fertilizer hopper, 2 outlet, 400 lb capacity
9254.3a	Fertilizer hopper, 3 outlet (625 lb capacity)
9255	Meter housing, aluminum
9255.asy	Meter assy complete, with High output auger
9256	Spring, trap door
9257.1	Metal lid for 1 outlet hopper
9257.2	Metal lid for 2 outlet hopper
9257.3	Metal lid for 3 outlet hopper
9258	Hose clamp
9259.a	Support, inside 3-row hopper
9261	Support inside hopper
9262.1a	Standard auger (blue)

**PART No. DESCRIPTION**

9262.2	High output auger (red)
9262.2a	High output auger (red) w/small ends
9263.1	Trap door - 1 outlet
9263.2	Trap door - 2 outlet
9264.b	Spindle, meter assembly
9265	Auger cover, (9" wide)
9265.a	Auger cover, ( 4 3/4" wide)
9266.1	Telescoping drive shaft between meters, comple
9266.2	Drive shaft between meters
9267	Hinge for trap door
9268	Hopper reinforce strap (8x18 carriage bolt)
9269.1a	Sieve for 1 outlet hopper
9269.2a	Sieve for 2 outlet hopper
9269.3a	Sieve for 3 outlet hopper
9270	Sieve hanger bracket
9271	Plastic cap
9272	Hopper reinforce strap (8x18 carriage bolt)
9273	Plastic plug for outlet on trap door
9274	COVER SHIELD CLIP
9280	Bushing (square hole) supports drive shaft
9286	Fixed mounting bracket
9287	Adjustable mounting bracket
9288	Hopper support bracket
9289.1	Support bar (1'4")
9289.2	Support bar (2' 10")
9289.3	Support bar (4' 6")
9310.0235	Drive shaft, hex (inner) (.235cm)
9311.0215	Drive shaft, hex (outer) (.215cm)
9311.038	Drive shaft, hex (outer) (.38cm)
9311.052	Drive shaft, hex, (outer) (.52cm)
9525	End cap
9555.a	Lower sprocket cluster (12-25)
9555.2	Lower sprocket cluster (12-13-21-23-25)
9562	Chain idler roller
CBM-41230	M12 X 30MM CAR BOLT CL8.8 ZNC
F38706	Bolt, 12x30
F40179	Nylon locknut, 16mm
10170068	Cotter pin, 5x45
10172065	Roll pin, 5x30
10172093	Roll pin, 6x40
10173018	Roll pin, 8x30
10176003	Rivet, 5x34 countersunk head
10500094	Bolt, 6x20 (mount disc to hub)
10508007	Bolt, 16x30
10561053	Carriage bolt 8x18mm
10562016	Carriage bolt 10x25
10621024	Washer, 13x18x2
10624014	Washer, 31x41x1
30170066	
66005491	Support bracket
66005493	
66005931	SPEC UPPER SUPPORT BRKT

## LIQUID FERTILIZER

### 3-point Mounted Planters

#### PUMP MOUNTING AND HOSE ARRANGEMENT

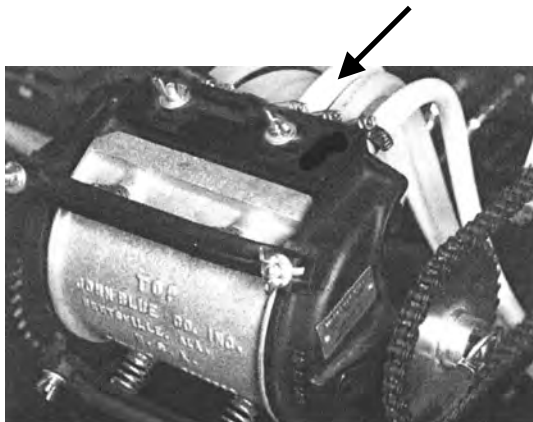
The squeeze pump is shipped with the discharge manifold in the rearward or non-operating position. Before operating or mounting the pump, position the discharge manifold in the forward or operating position and secure by tightening the wing nuts.

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.

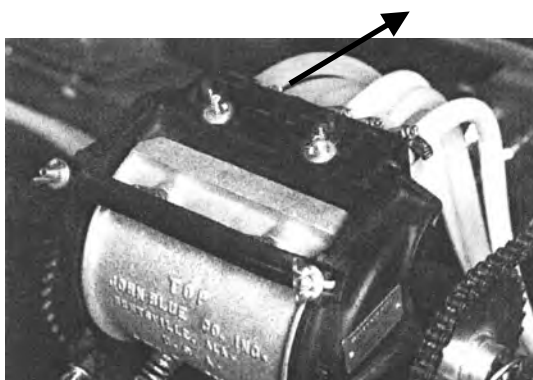
The shut-off valves should be closed to shut off the flow when the pump is not in use, either overnight, or for an extended amount of time. Also close the valves when servicing either the pump or the hoses.

To prolong the life of the hoses, the discharge manifold must be repositioned to the rearward position when not in 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

If the fertilizer is placed too close to the seed, it may cause germination or seedling damage especially 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

### 3-point Mounted Planters

#### DELIVERY RATE CHART

The following delivery rate chart provides an approximate application rate only. Actual delivery will vary with temperature and the type of fertilizer being used.

Chart is shown in gallons per acre. This chart is for a pump with a 1/2" hose. For settings with a 5/16" hose, cut gal/acre in half.

#### 8 Tooth Driver Sprocket

Sprocket					
Part #	Driven	40"	38"	36"	30"
L-1383	8	21.9	23.1	23.9	29
L-1384	9	19.1	20.4	21.0	25.3
L-1385	10	17.2	18.3	18.9	22.7
L-1386	15	11.4	12.1	12.5	15.
L-1381	20	8.6	9.1	9.4	11.3
L-1387	22	7.7	8.2	8.5	10.2
L-1388	23	7.5	8.0	8.3	9.6
L-1389	26	6.7	7.1	7.3	8.8
L-1390	30	5.8	6.2	6.4	7.7
L-1391	31	5.6	5.9	6.1	7.4
L-1392	32	5.5	5.8	6	7.3

Gallons per Acre

#### 15 Tooth Driver Sprocket

L-1383	8	40.0	43.0	44.5	53.3
L-1384	9	35.9	38.2	39.5	47.4
L-1385	10	32.2	34.3	39.5	42.6
L-1386	15	21.5	22.9	23.6	28.4
L-1381	20	16.1	17.1	17.7	21.3
L-1387	22	14.6	15.6	16.1	19.3
L-1388	23	14.0	14.9	15.4	18.4
L-1389	26	12.5	13.3	13.7	16.5
L-1390	30	10.7	11.4	11.8	14.2
L-1391	31	10.3	11.0	11.3	13.6
L-1392	32	10.1	10.7	11.1	13.3

Gallons per Acre

#### 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

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### 3-point Mounted Planters

#### PISTON PUMP APPLICATION RATES

Pump Setting	2	3	4	5	6	7	8	9	10
4-row 30"	13	19	26	32	38	45	51	58	64
4-row 36"	11	16	21	27	32	37	43	48	54
4-row 38"	10	15	20	26	30	35	41	46	51
6-row 30"	9	13	17	21	25	30	35	39	43
6-row 36"	7	11	14	18	21	25	29	32	36
6-row 38"	7	10	13	17	20	24	27	31	34
8-row 30"	7	10	13	16	19	23	26	29	32
8-row 36"	5	8	11	13.5	16	19	21.5	24	27
8-row 38"	5	7	10	13	15	18	20	23	25
12-row 30"	4	6.5	8.5	11	13	15	17	19.5	21
12-row 36"	4	5.5	7	9	11	12.5	14.5	16	18
12-row 38"	3	5	6.5	8.5	10	12	13.5	15	17

The above chart is for planters equipped with ground drive wheels that have 7.60 x 15 tires , 26 tooth drive sprocket, and a 22 tooth driven. This chart is based on average wheel slippage and liquid viscosities. This chart is also based on standard pump sprockets of 30 tooth drive and 16 tooth driven. Other sprockets are available.

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.

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:

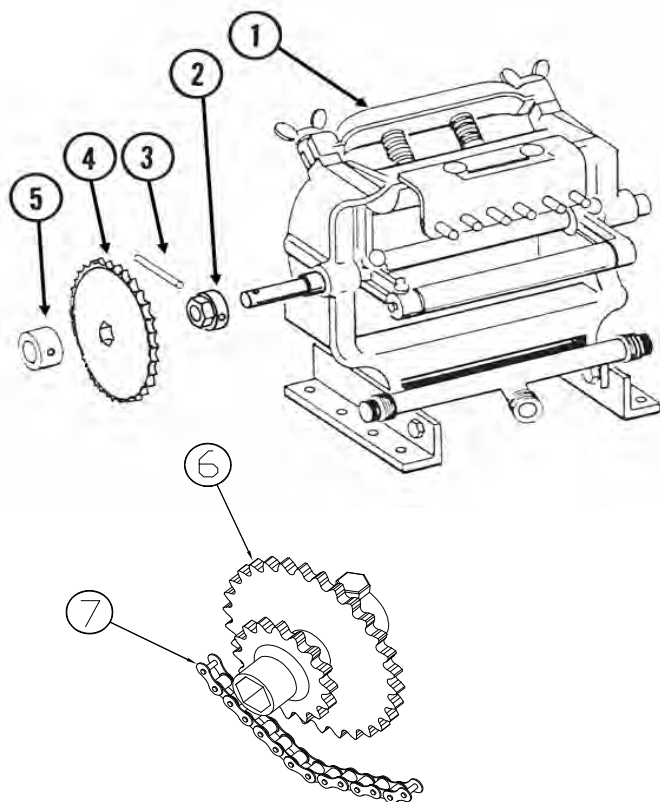
For 36" rows, multiply by .83 by result

For 38" rows, multiply by .79 by result

**LIQUID FERTILIZER**

**3-point Mounted Planters**

**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	MPL3016	DOUBLE SPROCKET, 16-30T
7	MPL2040A	DRIVE CHAIN 4 FT.

**TROUBLESHOOTING**

**PROBLEM: Pump hard or impossible to prime**

POSSIBLE CAUSE SOLUTION  
 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 SOLUTION  
 Valves are 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 spring.

**PROBLEM: Over meters.**

POSSIBLE CAUSE SOLUTION  
 Broken discharge valve spring. Replace spring.  
 Trash is under valves. Inspect and clean valves.  
 Improper rate setting. Adjust pump setting.

**PROBLEM: Leaks through when stopped.**

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

**PROBLEM: Fertilizer solution leaking under stuffing box.**

POSSIBLE CAUSE SOLUTION  
 Packing washers are worn out. Replace.

**PROBLEM: Pump is using excessive oil.**

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

**PROBLEM: Pump operates noisily.**

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