



Precision Vacuum Planters

Twin-Row Mounted Planter

NG *Plus* 3

Operator & Parts Manual

Includes Instructions for:

- Safety
- Operation
- Maintenance

INTRODUCTION

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 3 planter.

Serial Number _____

Date _____

The WARRANTY for your NG Plus 3 planter is printed on the back cover.

While reading your manual you will see the symbol  and the words **CAUTION, WARNING, DANGER.**

Pay particular attention to the safety information given. Failure to observe the safety symbols can cause damage to the machine and/or personal injury. A detailed description of the safety symbols and their meaning is found in the safety section of this manual.

2 precautions for successful planting:

1. Choose a reasonable working speed adapted to the field conditions and desired accuracy.
2. Check proper working of the seed metering, seed placement, spacing and density when starting up and from time to time during planting.

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

QUICK REFERENCE

TWIN-ROW 3pt Mounted Planter

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SPECIFICATIONS

Three Point Mounted 7x7 Toolbar Frame – TWIN-ROW

FRAME – Three Point Mounted
 Double Rigid Toolbar:
 7"x7" Bottom Toolbar
 5"x5" Top Toolbar

PLANTING UNIT – NG Plus 3 Monosem
 Vacuum Metering Box
 Double Disc Opener
 Gauge Wheels
 Adjustable Closing Wheels

STANDARD ROW SPACING

7 ½" - 9" Spacing Between the Twin Rows	WIDTH	WEIGHT*
4 x 2 Row – 30-40" Rows -----	14'	3569 lbs.
6 x 2 Row – 30-40" Rows -----	20'	4559 lbs.
8 x 2 Row – 30-40" Rows -----	25'	5960 lbs.

*The base machine weights include planter frame, optional row markers, drive components, tires and wheels, hydraulic cylinders and NG Plus 2 row units with seed hopper and lid.

DRIVE SYSTEM

Ground Drive, 7.60 x 15" 6-Ply Tires
 Two Drive/Gauge Wheels on 4x2 &
 6x2 Row
 Four Drive/Gauge Wheels on 8x2 Row

TRANSMISSION

Two End Mounted, Quick Change Sprockets
 No. 50 Chain with Spring Loaded Idler

MARKERS

Low Profile Single and Double Fold

TURBOFAN

High Output 500 or 1000 rpm
 Extra High Output 540 rpm

OPTIONAL EQUIPMENT

Hydraulic Drive
 Electronic Seed Monitor
 Microsem Insecticide System
 Disc Hiller system, w/Flat or V Press Wheel

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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. The operator can avoid many accidents by observing the warning signs.

Keep the safety warning signs clean and readable. Replace all damaged warning labels on your machine that are not readable or are missing.

The signal words used in this manual or on the machine are DANGER, WARNING, and CAUTION. The appropriate signal word for each has been selected using the following guidelines:

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

Carefully study and understand this manual.

Do not wear loose fitting clothing which may catch in moving parts.

It is recommended that suitable protective hearing and safety glasses be worn.

The operator may come in contact with certain materials which may require specific safety equipment, relative to the handling of such materials (examples: extremely dusty, molds, fungi, bulk fertilizers, insecticides, etc).

Assure that planter tires are inflated evenly.

Give the planter a visual inspection for any loose bolts, worn parts or cracked welds, and make necessary repairs. Never operate any equipment that is not in safe working condition.

Be sure that there are no tools lying on or in the planter.

Do not hurry the learning process or take the unit for granted. Ease into it and become familiar with your new planter.

Practice operation of your planter and its attachments. Completely familiarize yourself and other operators with its operation before using.

Do not allow anyone to stand between the tongue or hitch and the towing vehicle when backing up to the planter.

Always make sure there are no persons near the planter when the wings are being lowered from transport position.

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

Install lock ups on markers, as provided prior to transporting the planter or working around the unit.



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.

SAFETY PRECAUTIONS

No passengers allowed 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 area to be planted 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.

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 has been 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 halting operation, even 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.

Store the 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.

Wheel chocks may be needed to prevent the parked planter from rolling.



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 your 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, be sure all tools, parts and service equipment are removed.

SAFETY PRECAUTIONS

If the planter has been altered in anyway from the original design, the manufacturer does not accept any liability for injury or warranty.



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, trained personnel should be called to service and/or mount tires.

Failure to follow proper procedures when mounting a tire on a rim can produce an explosion which 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 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.



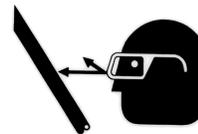
Hydraulic System Safety

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 or adjusting or disconnecting.

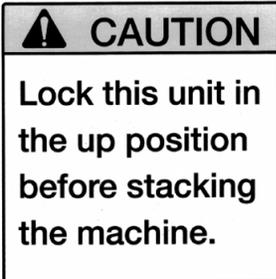
Wear proper hand and eye protection when searching for leaks. Use wood or cardboard instead of hands.

Keep all components in good repair.



SAFETY PRECAUTIONS

Shown below are various safety stickers, part number and location. Keep the safety warning signs clean and readable. Replace all damaged warning labels on your machine that are not readable or are missing.



ST053

On front of hopper of the inside wing unit of the stacking toolbar



ST055

On inside of the granular hopper lid



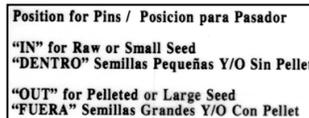
ST054

On front toolbar



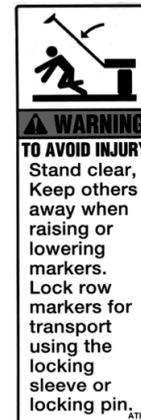
ST056

On front of pull-type toolbar



ST051

On MS metering box



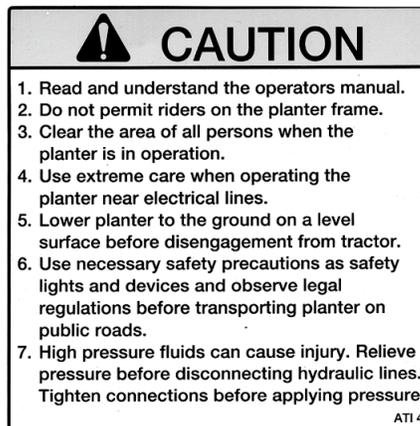
ST052

On row marker



ST057

On PTO shaft



ST050

On front of toolbar

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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 properly inflated, that all drive chains have the proper tension, alignment and lubrication.



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



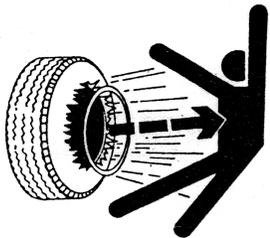
DANGER Rim and tire servicing can be dangerous. Explosive separation of a tire and rim parts can cause serious injury or death.

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.

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

PREPARING THE PLANTER

3- Point Mounted Planters

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



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

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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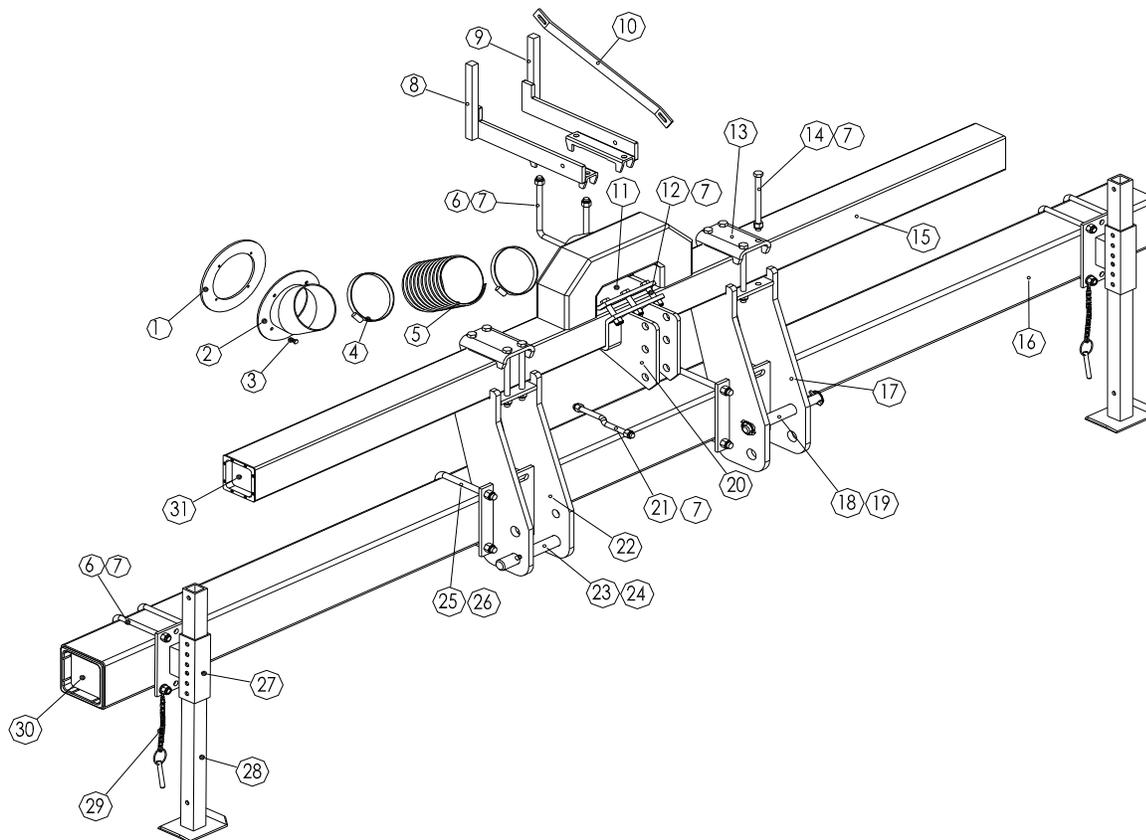
FRAME

7" x 7" Twin-Row Frame, Rigid

For 4 x 2 row Frames

The Twin-row frames are rigid and consist of a lower 7" x 7" square toolbar and an upper 5" x 5" square toolbar. The rigid toolbar is equipped with a 3-point hitch for mounting to the tractor. Refer to section **PREPARATION** for hitching the planter to the tractor.

IMPORTANT: Periodically check that the bolts attaching the hitch, stands and turbofan mounting brackets are tight. Vibrations from operation can cause them to loosen or break. Also check that the hose (part No. 900395) is not cracked or deteriorated, to avoid losing air in the vacuum system.



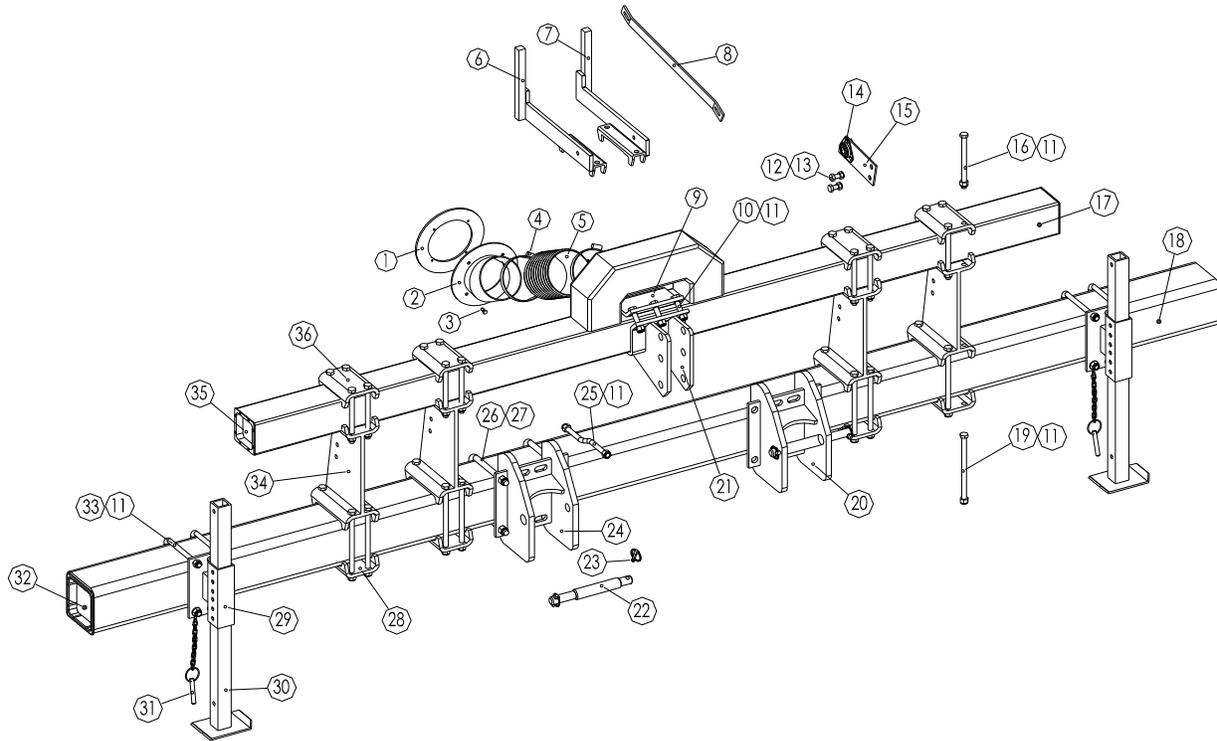
ITEM	PART No.	DESCRIPTION
1	900131	Gasket, for standard fan
2	900379	Turbofan inlet stub
3	F38615	Hex head bolt, 8 x 20
4	JHS128	6" hose clamp
5	900395.1	Hose, 6" Dia x 7" long
6	4502.S	U Bolt, 7x7, 5/8-11
7	F37188	Nylon locknut, 5/8-11
8	900392.1	Turbofan support, RH
9	900393.1	Turbofan support, LH
10	900360	Fan vibration strap
11	4889	Counter clamp, upper hitch
12	F15315	Hex head bolt, 5/8-11 x 3", Gr 8
13	E7571	Top cap, toolbar spacer
14	F15329	Hex head bolt, 5/8-11 x 8", Gr 8
15	900359	5" X 5" Top bar
16	4500.2	7" x 7" Main toolbar

ITEM	PART No.	DESCRIPTION
17	800188.L	Hitch/ Spacer combination, LH
18	4898	Hitch pin, CAT II/III
19	11476	Lynch pin, 9mm
20	4890	Hitch, top link
21	900237	Z bolt, 5/8-11 x 10", Gr 5
22	800188.R	Hitch/ Spacer combination, RH
23	O302-592	Hitch pin, CAT III
24	O104-036	Lynch pin 7/16"
25	4502.SA	U Bolt, 7 x 7, 3/4-10
26	F37190	Nylon locknut, 3/4-10
27	E1030	Mounting bracket, jack stand
28	E1031	Jack stand
29	KA4733	Pin and chain, stand adjustment
30	4517.S	End cap, 7 x 7
31	4517	End cap, 5x5

FRAME

7" x 7" Twin-Row Frame, Rigid

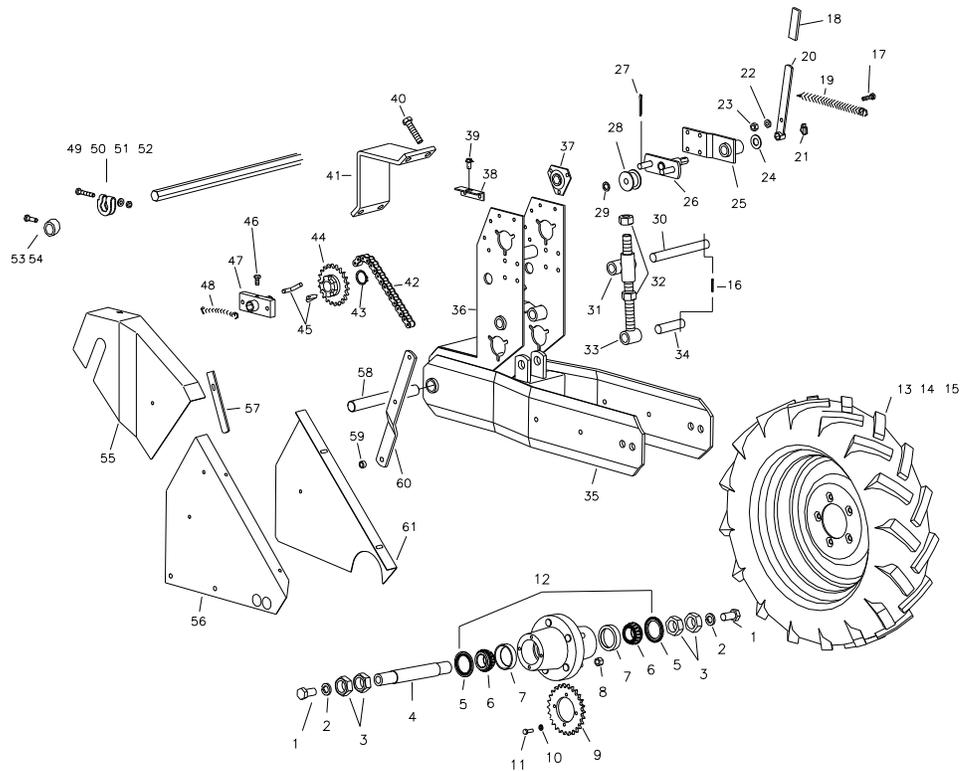
For frames 6 x 2 and Larger



ITEM	PART No.	DESCRIPTION	ITEM	PART No.	DESCRIPTION
1	900131	Gasket, for standard fan	19	F15333	Hex head bolt, 5/8-11 x 10", Gr 8
2	900379	Turbofan inlet stub	20	4896	Lower hitch bracket, LH
3	F38615	Hex head bolt, 8 x 20	21	4890	Hitch, top link
4	JHS128	6" hose clamp	22	4898	Hitch pin, CAT II/III
5	900395.1	Hose, 6" Dia. X 7" long	23	11476	Lynch pin, 9mm
6	900392.1	Turbofan support, RH	24	4897	Lower hitch bracket, RH
7	900393.1	Turbofan support, LH	25	900237	Z bolt, 5/8-11 x 10", Gr 5
8	900360	Fan vibration strap	26	4502.SA	U Bolt, 7 x 7, 3/4-10
9	4889	Counter clamp, upper hitch	27	F37190	Nylon locknut, 3/4-10
10	F15315	Hex head bolt, 5/8-11 x 3", Gr 8	28	E7572	Bottom cap, toolbar spacer
11	F37188	Nylon locknut, 5/8-11	29	E1030	Mounting bracket, jack stand
12	F38738	HCS 14-2.0 X 35 Z 8.8	30	E1031	Jack stand
13	F40171	Lock nut 12mm YZ	31	KA4733	Pin and chain, stand adjustment
14	4515	Flange bearing 7/8" hex bore	32	4517.S	End cap, 7 x 7
15	4891	Bearing support	33	4502.S	U Bolt, 7 x 7, 5/8-11
16	F15329	Hex head bolt, 5/8-11 x 8", Gr 8	34	E7570	Toolbar spacer
17	900359.1	Top toolbar, 5 x 5	35	4517	End cap, 5 x 5
18	4500.2	Toolbar, 7 x 7, 3/8" wall	36	E7571	Top cap, toolbar spacer

FRAME

7" x 7" Wheel Block



ITEM	PART No.	DESCRIPTION
	4520	Hex shaft. Specify length.
1	F13359	Hex head bolt, 3/4-10 x 1-1/2", Gr.5
2	F33632	Lock washer, 3/4"
3	F36274	Jam nut, 1-1/4-12
4	AS7191-E-16	Spindle
5	P602106	Grease seal
6	P752318	Tapered roller bearing (Peer 14136A)
7	P702216	Cup for tapered roller bearing
8	P201602	Lug nut, 1/2-20
9	4782.A	Drive Sprocket, 26 tooth, #50
10	F33620	Lock washer, 5/16"
11	F13055	Hex head bolt, 5/16-18 x 1", Gr.5
12	A525200-5	Hub assembly (Hub and items 5-8)
13	G170227132	Tire only, 7.60 x 15, 6ply
14	AW51522V	Rim only, 5 x 15 w/valve guard
15	900015.2	Tire assembly (items 13 & 14)
16	10172095	Roll pin, 6 x 50
	10172093	Roll pin, 6 x 40
17	10502018	Hex head bolt, 10 x 35
18	4894	Plastic cover for handle
19	9613.S	Spring
20	4787	Handle, chain tightener
21	9557	Lynch pin
22	F40308	Nut, 10mm
23	F10486-01956	Nylon locknut, 10mm

FRAME

7" x 7" Wheel Block

ITEM	PART No.	DESCRIPTION
24	10623028	Washer, 21x40x2
25	4784.A	Idler support bracket
26	4786.B	Idler bracket
27	10170067	Cotter pin, 5 x 40
28	4772	Idler roller
29	10622026	Washer, 16.5x26x2
30	4779	Upper pin, 25mm x 215mm
31	4777	Bushing tee
32	30600025	Nut, 24mm
33	4775.A	Threaded rod, 24mm
34	4778	Lower pin, 25mm x 103mm
35	4773.B	Tapered wheel mounting frame
36	4774.1	Wheel unit bracket
37	4515	Bearing complete with flanges
	4515.1	Bearing only, hex bore (205KRRB2)
	4515.2	Flange
38	5132	Bracket for shield mounting
39	9724.2	Keeper bolt for shield
40	10513014	Hex head bolt, 16 x 70
41	4882	Clamp facing, 7x7
42	4791.A	Drive chain, #50, 130 links w/conn link
43	6915	Snapping, external (30mm)
44	4790.A	Sprocket, slipclutch (22 teeth)
45	4789	L pin, for slipclutch
46	10502014	Hex head bolt, 10 x 20
48	L123237	HITCH WELDMENT (8 ROW 30)
47	4788	Slipclutch block
48	5247	Spring
	10170067	Cotter pin, 5 x 40
49	4523.1	Narrow hex shaft stop, complete
50	F38620	Hex head bolt, 8 x 45
51	10620064	Washer, 8.5x16x2
52	F40307	Nut, 8mm
53	10502012	Hex head bolt, 10 x 15
54	4523	Bushing stop
55	5130.G	Left hand upper chain guard (shown)
	5130.D	Right hand upper chain guard
56	4783.GB	Left hand lower chain guard (shown)
	4783.DB	Right hand lower chain guard
57	5131	Shield guide bar
58	4776.A	Front pin, 30mm x 260mm
59	1538	Spacer bushing, 12x18x10mm wide
60	5129	Shield mounting brace
61	4729.G	Lower left inside chain guard (shown)
	4729.D	Lower right inside chain guard

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3-point Mounted, 7" x 7", and Stacking Toolbar Frame

PLANTING RATE CHART

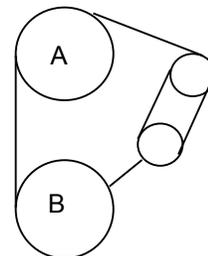
3pt Mounted & Stacking Planters

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

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

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

SOWING DISTANCES



Number of
Holes in the Transmission sprocket selection
Seed Disc

A	26	24	23	26	24	23	24	23	19	19	17	18	19	17	18	17	14	14	14
B	17	17	19	23	23	24	26	26	23	24	23	26	28	26	28	28	24	26	28
	Seed Spacing (inches)																		
9	7.9	8.6	10.0	10.7	11.6	12.7	13.1	13.7	14.7	15.3	16.4	17.5	17.9	18.6	18.9	20.0	20.8	22.5	24.3
12	6.0	6.4	7.5	8.1	8.7	9.5	9.9	10.3	11.0	11.5	12.3	13.1	13.4	13.9	14.2	15.0	15.6	16.9	18.2
18	4.0	4.3	5.0	5.4	5.8	6.3	6.6	6.9	7.3	7.7	8.2	8.8	8.9	9.3	9.4	10.0	10.4	11.3	12.1
24	3.0	3.2	3.8	4.0	4.4	4.7	4.9	5.1	5.5	5.7	6.2	6.6	6.7	7.0	7.1	7.5	7.8	8.5	9.1
30	2.4	2.6	3.0	3.2	3.5	3.8	3.9	4.1	4.4	4.6	4.9	5.3	5.4	5.6	5.7	6.0	6.2	6.8	7.3
36	2.0	2.1	2.5	2.7	2.9	3.2	3.3	3.4	3.7	3.8	4.1	4.4	4.5	4.6	4.7	5.0	5.2	5.6	6.1
40	1.8	1.9	2.3	2.4	2.6	2.8	3.0	3.1	3.3	3.4	3.7	3.9	4.0	4.2	4.2	4.5	4.7	5.1	5.5
48	1.5	1.6	1.9	2.0	2.2	2.4	2.5	2.6	2.8	2.9	3.1	3.3	3.4	3.5	3.5	3.7	3.9	4.2	4.6
60	1.2	1.3	1.5	1.6	1.7	1.9	2.0	2.1	2.2	2.3	2.5	2.6	2.7	2.8	2.8	3.0	3.1	3.4	3.6
72	1.0	1.1	1.3	1.3	1.5	1.6	1.6	1.7	1.8	1.9	2.1	2.2	2.2	2.3	2.4	2.5	2.6	2.8	3.0
90	0.79	0.86	1.00	1.07	1.16	1.27	1.31	1.37	1.47	1.53	1.64	1.75	1.79	1.86	1.89	2.00	2.08	2.25	2.43
120	0.60	0.64	0.75	0.81	0.87	0.95	0.99	1.03	1.10	1.15	1.23	1.31	1.34	1.39	1.42	1.50	1.56	1.69	1.82

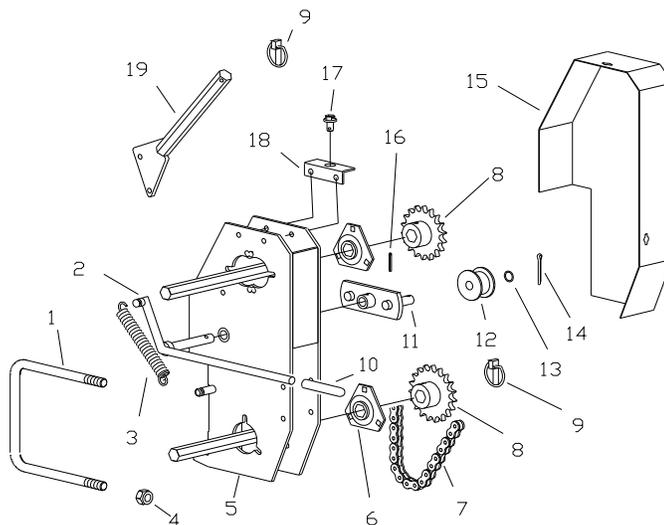
TRANSMISSION

7" x 7" Transmission

ADJUSTMENT AND ASSEMBLY

Planting population rate changes are made at the end mounted transmission. The planter is designed to allow simple, rapid changes in sprockets to obtain the desired population. By removing the lynch pins (9) on the hexagon shafts, sprockets can be interchanged with those from the sprocket storage rod bolted to the transmission. The planting rate chart on the following page will aid you in selecting the correct sprocket combinations.

NOTE: One transmission is equipped on a 6-row 30"-40" and two transmissions on 8 and 12-row 30"-40". When using two transmissions the unit hex shaft must be split in the center.

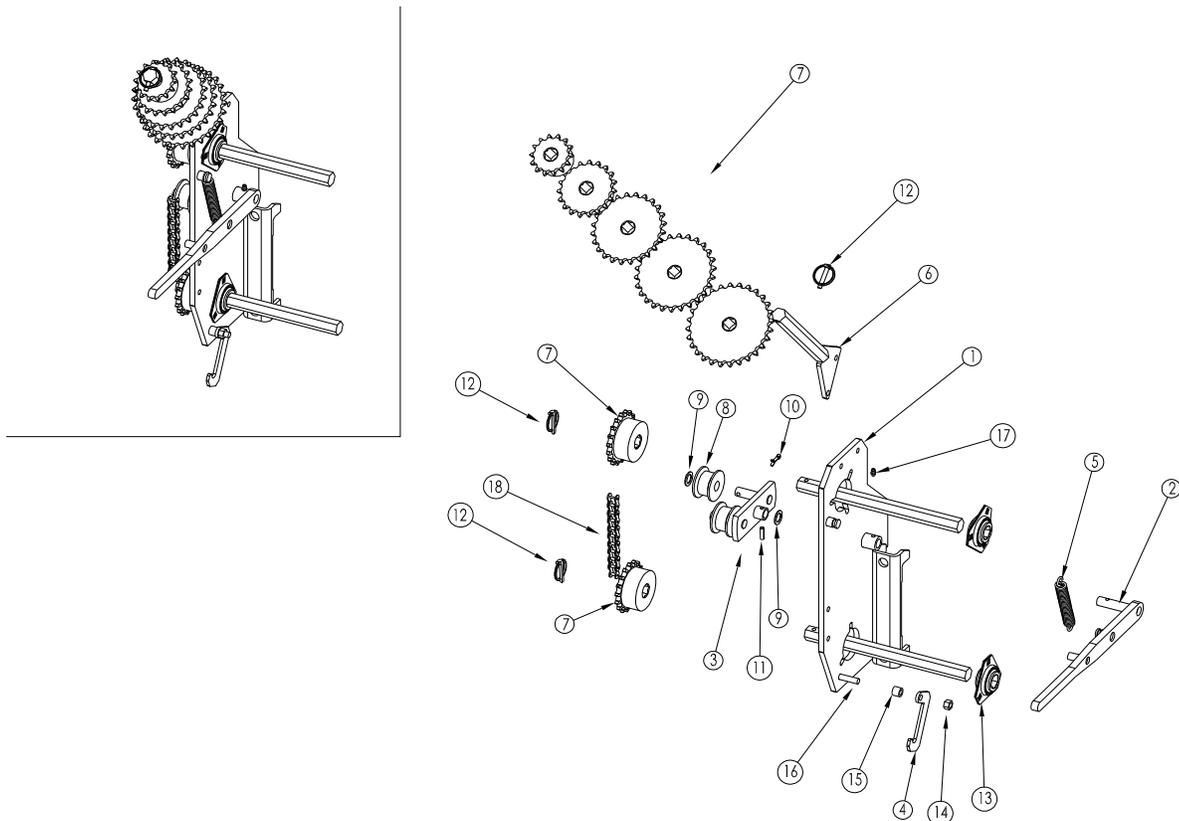


ITEM PART No.	DESCRIPTION
1 4502.S	U Bolt, 7 x 7, 5/8-11
2 4798.G	Lever, right side (shown)
4798.D	Lever, left side
3 9147	Spring
4 F37188	Nylon locknut, 5/8-11
5 4797.B	Gearbox frame
6 4515	Bearing complete with flanges
4515.1	Bearing only, hex bore (205KRRB2)
4515.2	Flange
7 4795.A	Drive chain, #50, 72 links w/conn link
8 G50B14	Sprocket, 14 tooth, #50 (standard)
G50B15	Sprocket, 15 tooth, #50
G50B17	Sprocket, 17 tooth, #50 (standard)
G50B18	Sprocket, 18 tooth, #50
G50B19	Sprocket, 19 tooth, #50 (standard)
G50B21	Sprocket, 21 tooth, #50
G50B23	Sprocket, 23 tooth, #50 (standard)
G50B24	Sprocket, 24 tooth, #50 (standard)

ITEM PART No.	DESCRIPTION
G50B25	Sprocket, 25 tooth, #50
G50B26	Sprocket, 26 tooth, #50 (standard)
G50B27	Sprocket, 27 tooth, #50
G50B28	Sprocket, 28 tooth, #50 (standard)
G50B30	Sprocket, 30 tooth, #50
9 6077	Lynch pin, 6mm
10 4895	Plastic cover for lever
11 4796.A	Idler bracket
12 4772	Idler roller
13 10622026	Washer, 16.5x26x2
14 10170067	Cotter pin, 5 x 40
15 5128.D	Chain guard, right side (shown)
5128.G	Chain guard, left side
16 10172090	Roll pin, 6 x 25
17 9724.2	Keeper bolt for shield
18 5132	Bracket for guard mounting
19 4793.A	Storage rod for sprockets

SINGLE PLATE TRANSMISSION

3-pt Mounted, 7" x 7", and Stacking Toolbar Frame



ITEM	PART No.	DESCRIPTION
1	E6001.1L	Plate L.H. (shown)
	E6001.1R	Plate R.H.
2	800238	Handle
3	4796.A	Idler bracket
4	800237	Hook
5	4334	Spring
6	4793.A	Storage rod for sprockets
7	G50B14	Sprocket, 14 tooth, #50 (std.)
	G50B15	Sprocket, 15 tooth, #50
	G50B17	Sprocket, 17 tooth, #50 (std.)
	G50B18	Sprocket, 18 tooth, #50
	G50B19	Sprocket, 19 tooth, #50 (std.)
	G50B21	Sprocket, 21 tooth, #50
	G50B23	Sprocket, 23 tooth, #50 (std.)
	G50B24	Sprocket, 24 tooth, #50 (std.)
	G50B25	Sprocket, 25 tooth, #50
	G50B26	Sprocket, 26 tooth, #50 (std.)
	G50B27	Sprocket, 27 tooth, #50
	G50B28	Sprocket, 28 tooth, #50 (std.)
	G50B30	Sprocket, 30 tooth, #50

ITEM	PART No.	DESCRIPTION
8	KD0916	Idler roller
9	10622024	Washer M16.5 X 26 X 1
10	10170067	Cotter pin M5 X 40
11	10172090	Roll pin M6 X 25
12	6077	Lynch pin M6
13	4515	Bearing w/flangettes
	4515.1	Bearing only (205KRRB2)
	4515.2	Flangette only (2 req'd)
	CB-1110	Carriage bolt, 5/16-18 X 1"
	W-1410	Washer, 5/16" SAE
	W-1610	Lock washer, 5/16"
	N-1001	5/16 Hex nut
14	N-2101	Nylock nut 3/8"
	W-2210	Washer, 3/8" USS
15	KD2971-10	Bushing
16	H-3130	Hex bolt 3/8-16 X 1 3/4"
17	F60102	Grease zerk 1/8" NPT
18	4795.A	Chain #50 X 72 pitch
	E6000	Transmission complete

TRANSMISSION

Twin-Row

DENSITIES – SEED POPULATION CHART

AVG SEED

SPACING

ROW SPACING

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

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DRIVE

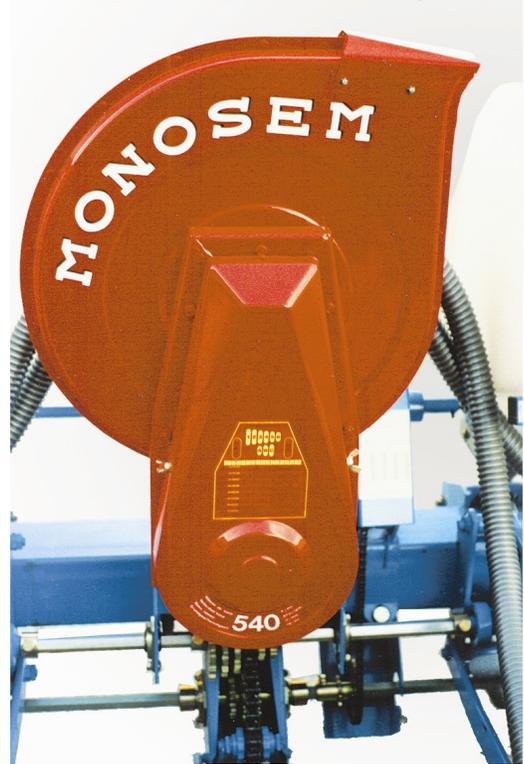
Standard Turbofan 540, 450 & 1000 RPM with PTO Drive

Your Monosem planter will be equipped with either a 540, 450 or 1000 rpm turbofan. A special pump pulley is available as optional equipment for the 450 and 540 turbofans.

It is recommended to use a 450 rpm turbofan when using a hydraulic drive.

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

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



PTO (Power Take Off)

The PTO connects the tractor to the turbofan.



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

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



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

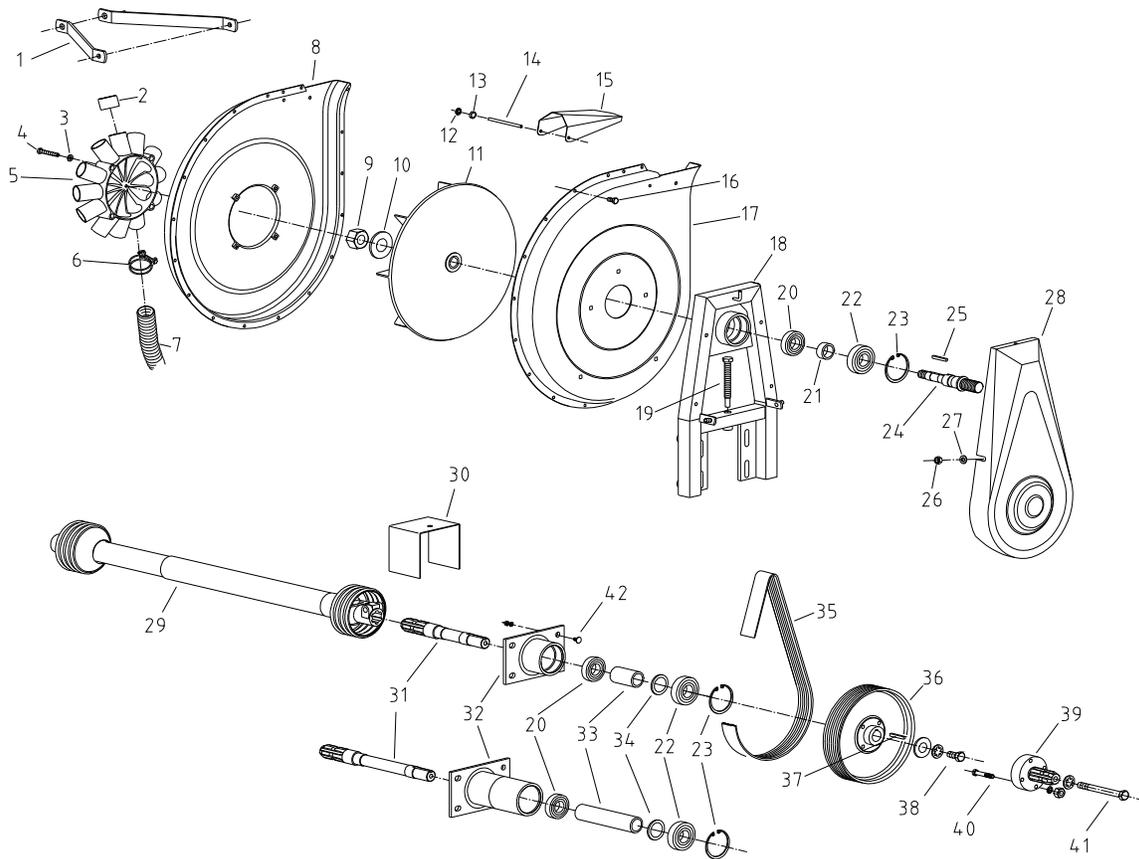


Vacuum gauge

DRIVE

Standard Turbofan 540, 450 and 1000 rpm

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)

DRIVE

Standard Turbofan 540, 450 and 1000 rpm

ASSEMBLY

ITEM	PART No.	DESCRIPTION
18	4400.1	Support frame
19	4440	Special bolt tension adjustment
20	4407	Bearing 62mm (62062RS)
21	4410.A	Spacer upper shaft
22	4408	Bearing 72mm (63062RS)
23	4409	Snap ring internal 72mm
24	4452	Upper shaft, 540 & 1000 rpm (1 1/8" dia. pulley)
	4452.1	Upper shaft, 450 rpm (7/8" dia. pulley)
25	4439.A	Key upper shaft (6x6x45mm)
26	NM-21015	Lock nut 10mm
27	10620089	Washer 10.5x20x2mm
28	4414.1	Cover shield for belt
	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"
	N-3000	Hex nut 7/16-14

DRIVE

High Output Turbofan 500 & 1000 RPM With PTO Drive

The high output turbofan was designed to provide 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.

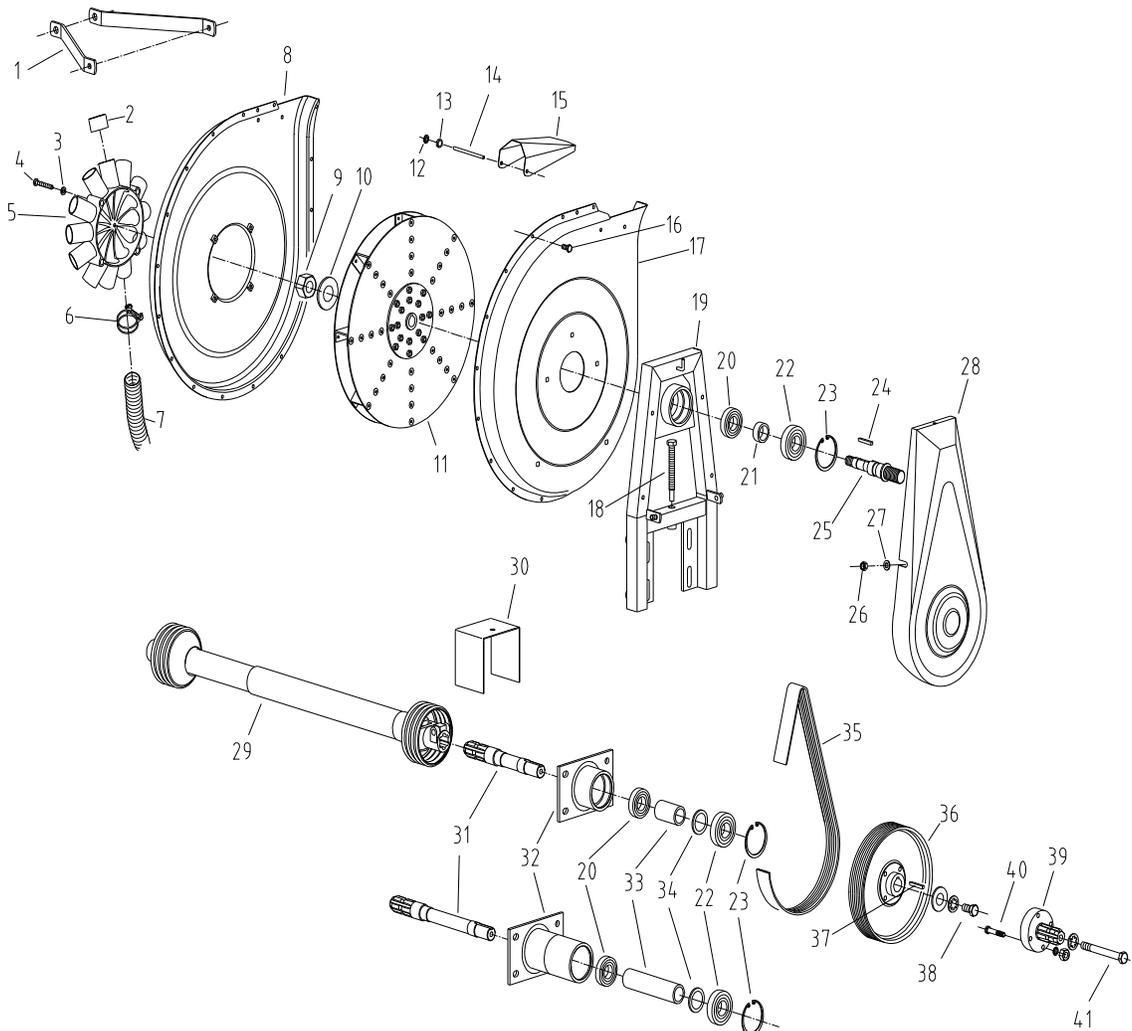
An extended shaft (#4405.A2) is used for planters with 7" X 7" mounted toolbar frames and PTO drive, to provide more room for the PTO.

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.

A vacuum gauge may be mounted to the turbofan.

ASSEMBLY



DRIVE

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.



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.



High Output Turbofan 500 & 1000 RPM

ASSEMBLY

PART	DESCRIPTION	PART	DESCRIPTION
1	4532 Support strap – 565mm long (22 1/4")	29	4428.B PTO drive shaft 540 rpm, 24" long
	4532.1 Support strap – 340mm long (13 3/8")		4431.B PTO drive shaft 540 rpm, 36" long
	4532.2 Support strap – 480mm long (18 7/8")		PTO drive shaft HD 1000 rpm 20 spline
2	4451 Plastic cap	30	4434.3 Safety shield
3	10620064 Washer 8.5x16x2mm	31	4405.A Lower shaft (1 3/8" 6-spline)
4	10511062 Bolt, M8x55 (to secure manifold)		4405.A2 Extended shaft 7X7 toolbar w/PTO
5	4450 12-hole manifold	32	4404.A Shaft Housing (lower drive shaft)
6	4453 Hose clamp		Extended housing 7X7 toolbar w/PTO
7	Vacuum hose 40mm ID (specify length)		4404.3 Spacer bushing (lower shaft)
	4454	33	4411 Long bushing 7X7 toolbar w/PTO
8	4402.C Fan Housing, (manifold Side)		4411.2 Washer, 31x41x3mm
9	NM-72005 Lock nut, M20 (to secure fan blade)	34	10624018 Washer, 31x41x3mm
10	10623042 Washer, 22.5x48x3mm	35	4413.B Belt, 500 rpm (1244J25)
11	4403.D Fan Blade (aluminum, 17 3/4" Dia.)		4413.1B Belt, 1000 rpm (991J25)
12	6090 Snap ring (6mm)	36	4412.B Pulley, 500 rpm (11 3/8" Dia.)
13	6089 Rubber ring		4412.1B Pulley, 1000 rpm (5 7/8" Dia.)
14	4455 Pin for outlet shield	37	Key stock for lower shaft (8x7x40mm)
15	4429.A Outlet shield		4437 Bolt, M12x30 (to secure pulley)
16	10500091 Hex bolt M6x12	38	HM-61230 Washer, 13x40x4mm (to secure pulley)
17	4401.B Fan Housing, (support frame side)		10621061 External tooth lock washer (12x20mm)
18	4440 Belt tension adjustment bolt		10101012 Pump pulley (6 spline stub shaft)
19	4400.1A Support Frame	39	4426 Bolt M8x50
20	4407 Bearing 62mm (62062RS)	40	HM-2850 External tooth lock washer (8x14mm)
21	4410.A Spacer bushing (upper shaft)		10629009 Bolt, M12x110
22	4408 Bearing 72mm (63062RS)	41	HM-65110 External tooth lock washer (12x20mm)
23	4409 Snap ring, internal (72mm)		10101012
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		
28	4414.1A Cover shield for belt		

DRIVE

Extra High Output Turbofan 540 & 1000 RPM With PTO Drive

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.

A vacuum gauge may also be mounted 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.

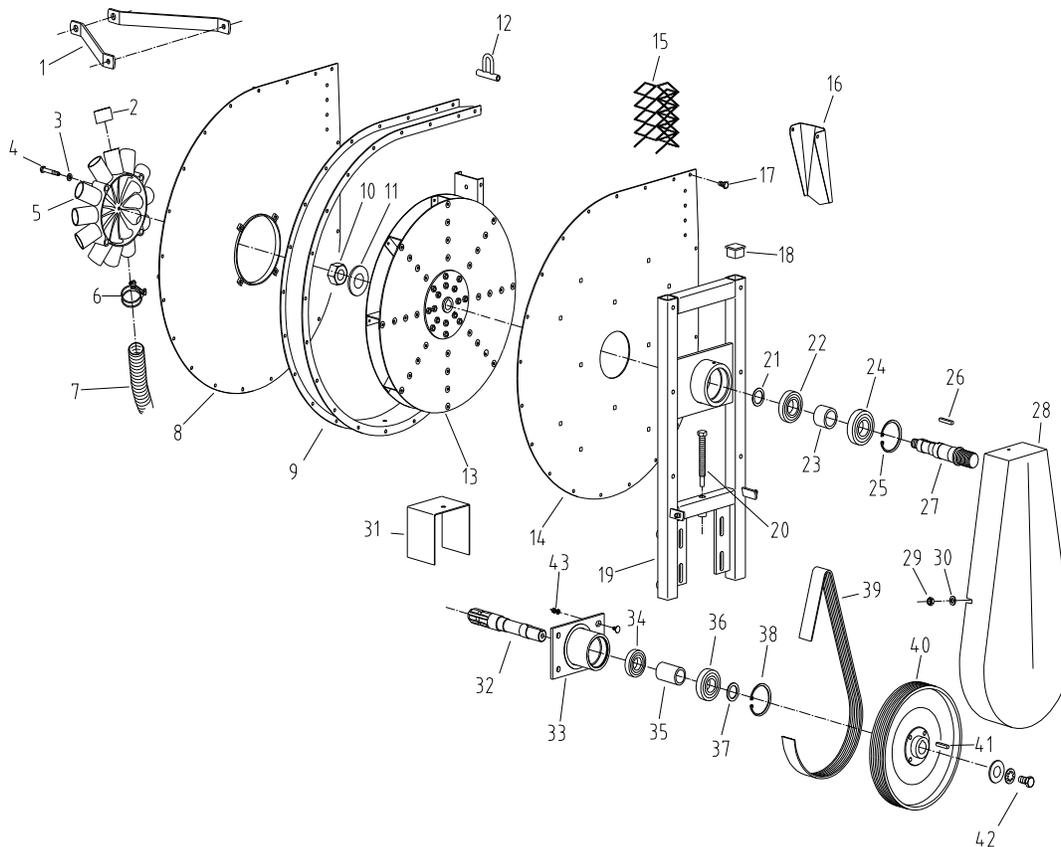
The following warning is placed on your PTO shaft for your safety.



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.



ASSEMBLY



DRIVE

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

ASSEMBLY

ITEM	PART No.	DESCRIPTION
1	4532.2	Turbofan support strap - 480mm long (18 7/8")
2	4451	Plastic cap, 40mm
3	10620064	Washer 8.5x16x2mm
4	10511062	Hex bolt M8x55
5	4450	12 hole manifold
6	4453	Hose clamp
7	4454	Vacuum hose (40mm ID, specify length)
8	4242	Fan housing (manifold side)
9	4243	Fan housing sidewall
10	NM-72005	Nylon locknut, 20mm (to secure fan blade)
11	10623042	Washer 22.5x48x3mm
12	4253	Support eye
13	4244.co	Fan blade, aluminium 19 5/8" dia.
14	4241	Fan housing (support frame side)
15	4254	Screen
16	4429.a	Outlet shield
17	10500091	Hex bolt M6x12
18	9525	End cap
19	4240	Support frame
20	4440	Bolt to adjust belt tension
21	10624016	Washer, 31x41x2mm (on upper shaft)
22	4251	Bearing upper shaft (62072RS1)
23	4247	Spacer bushing (upper shaft)
24	4252	Bearing upper shaft (63072RS1)
25	4246	Snpring, 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	Snpring, 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

Hydraulic Drive

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

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

The desired vacuum is dependent on the correct amount of oil flow to the hydraulic motor. Starving the motor of oil will cause the vacuum to drop. An excessive amount of oil flowing into the motor can result in damage to the motor or the fan blade. When attempting to shut off the turbofan, the blade must be allowed to "wind down" slowly. If the flow of oil stops abruptly, the bypass block on the motor will re-circulate the oil already in the motor helping to prevent damage to the blade and motor. Still, you should not allow the flow of oil to stop suddenly.

This is accomplished with the tractor hydraulic controls. Refer to your tractor operator manual for further information.

Controlling oil flow to the motor can be done in one of two ways: (1) with a flow control valve that is optional for the hydraulic motor, or (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.

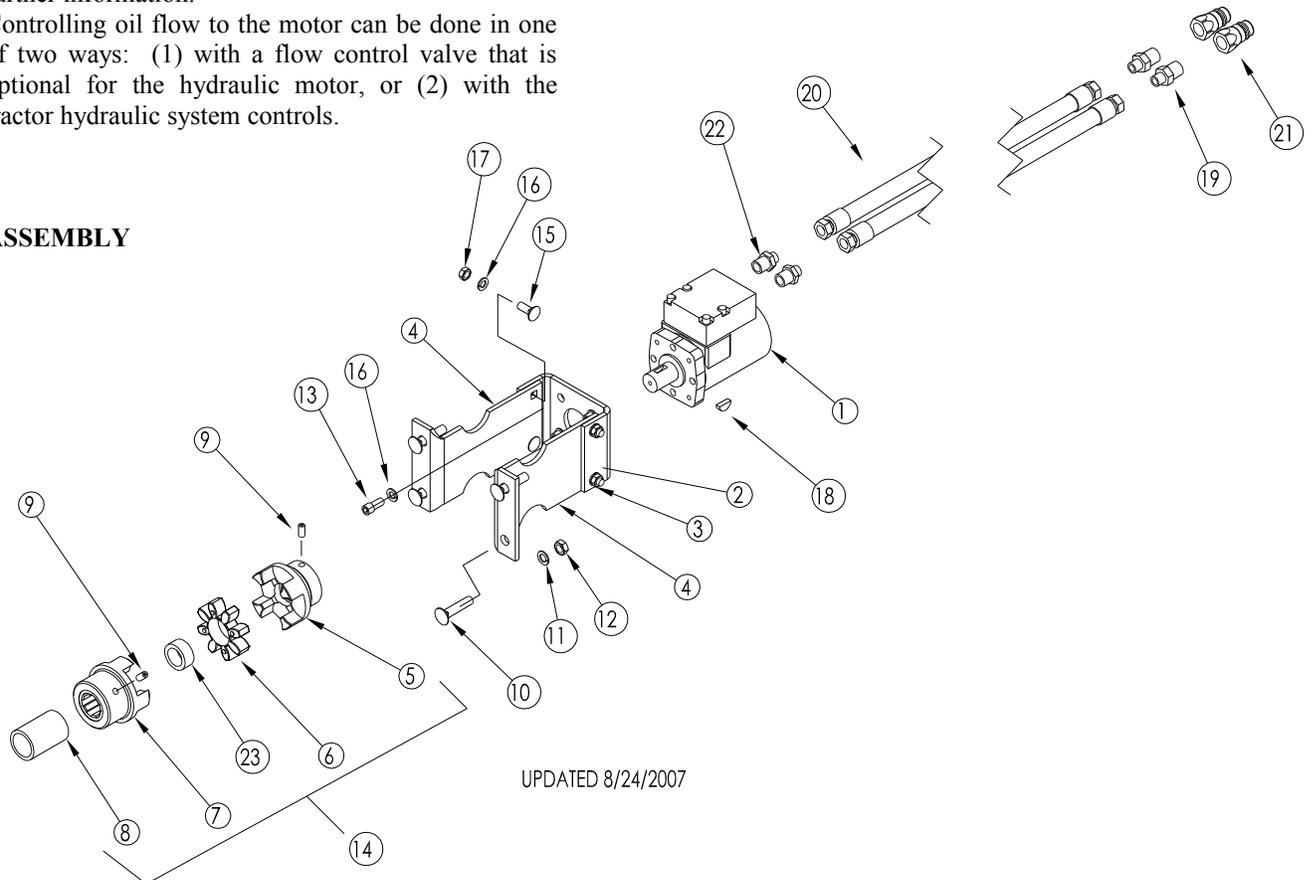
Oil requirements are as follows:

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.

ASSEMBLY



DRIVE

Hydraulic Drive

ASSEMBLY

**Hydraulic Drive
 For Standard, High Output, and Extra High Output Turbofan**

PART No.	DESCRIPTION
1	FTA0232 HYDRAULIC MOTOR WITH BYPASS BLOCK F101-1017 HYDRAULIC MOTOR ONLY (NO BYPASS BLOCK) FP10270-2 BYPASS BLOCK ONLY, WITH HARDWARE F60540 SEAL KIT
2	M1000 BOLT TOGETHER MOTOR MOUNT, COMPLETE
3	800320 MOTOR MOUNT FRONT CAP
4	800321 MOTOR MOUNT LEG
5	5042 FAN COUPLER, MOTOR SIDE
6	5041 FAN COUPLER RUBBER SPIDER
7	5040 FAN COUPLER, FAN SIDE
8	5038 SHAFT SPACER, 33mm ID X 42mm OD X 45mm
9	10591915 HEX ALAN SCREW, M18x16
10	CB-3322 CARRIAGE BOLT 7/16" X 2"
11	W-3610 LOCK WASHER 7/16"
12	N-3000 NUT 7/16"
13	F23305 HEX SOCKET CAP SCREW, 3/8" X 1"
14	640926 FAN COUPLER ASSEMBLY
15	CB-2210 CARRIAGE BOLT 3/8" X 1"
16	W-2610 LOCK WASHER 3/8"
17	N-2000 NUT 3/8"
18	F14193 WOODRUFF KEY
19	J2404-8-8 HYDRAULIC FITTING
20	11459.15A HYDRAULIC HOSES, 5' WITH AMERICAN FITTINGS
21	900273 HYDRAULIC COUPLER, MALE
22	J6400-8 HYDRAULIC FITTING, MOTOR END

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.

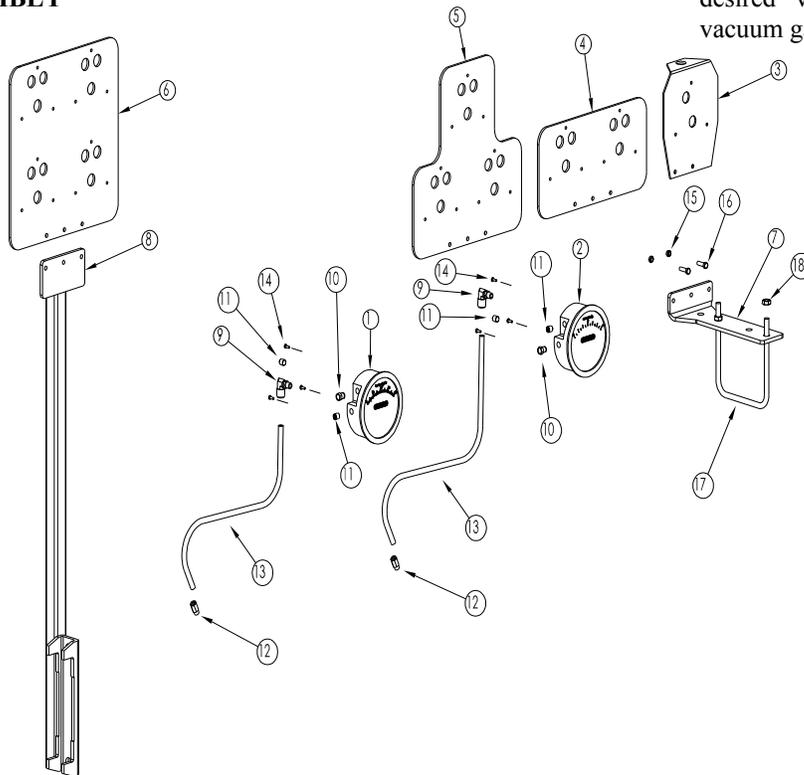
Small (Sugarbeet/Pickle)	15"-20"
Medium (Corn)	20"-25"
Large (Beans/Peanut)	25"-30"

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

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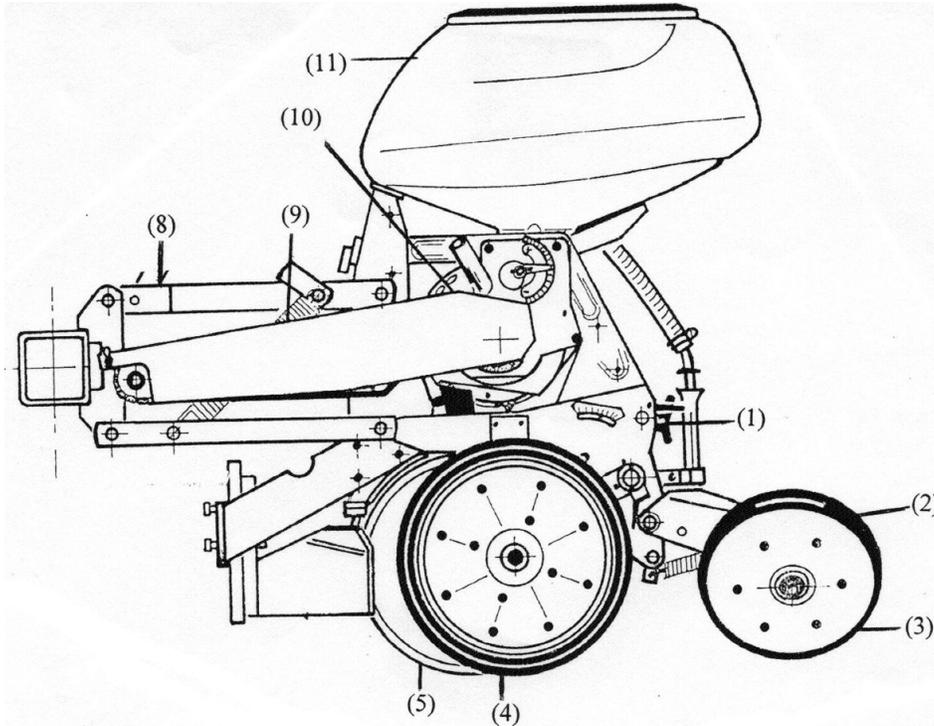
7. OPTIONAL EQUIPMENT

ROW UNIT

NG Plus 3

The NG Plus 3 row unit is shown below with standard features.

Other options are available for specific conditions or uses.



- (1) – Hand wheel
- (2) – Hand wheel
- (3) – Adjustable V Press Wheels
- (4) – Independent Gauge Wheels
- (5) – Heavy-Duty Disc Openers
- (8) – Heavy Duty Parallel Linkage
- (9) – Stabilizing Springs
- (10) – Metering Box
- (11) – Heavy-Duty Plastic Hopper

SEED DEPTH

The seed depth is adjusted by the hand wheel (1) that changes the height of the depth gauge wheels (4) in relation to the disc openers (5). A sticker close to the hand wheel, indicating a gradual scale, ensures the uniformity of the depth control on all row units of the planter. Be sure that all row units of the planter are set 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. Their soil pressure is regulated by the hand wheel (2). This adjustment allows for shallow (beet), medium (corn) or deep (bean) planting. This pressure has to be chosen carefully with relationship to the type and humidity of the soil, in order to assure proper seed to soil contact.

The width between the bottoms of the adjustable press wheels can also be adjusted with the addition of spacer bushings placed next to the bracket. A spacer of 10mm (25/64") is standard, and can be replaced with a bushing of 8mm (5/16") for narrower closing (such as sugarbeet seed).

Using an oilcan, lubricate the closing wheel assembly at pivot points daily, or as needed. Optional disc closing systems with flat or V press wheels are available. See section under optional wheels.

ROW UNIT

NG Plus 3

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. The Optional gauge wheel scrapers can be added, if necessary, to lessen soil buildup to maintain a uniform depth control.

In order for the disc openers to remain properly cleaned and free of soil build-up, the flange of the gauge wheels need to be 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.

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. A new interchangeable firming point attached to the frame and positioned ahead of the seed tube also acts as a disc scraper. As mentioned above, 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.

STABILIZER SPRINGS

The pair of stabilizer springs (9) located within the parallel linkage (shown above) absorbs shock and helps to stabilize the unit in rough terrain. Optional heavy duty down pressure springs are also available.

SEED HOPPER

A 52, 60 or 90 ltr. plastic hopper with lid (11) is standard, depending on the type of planter and seed usage

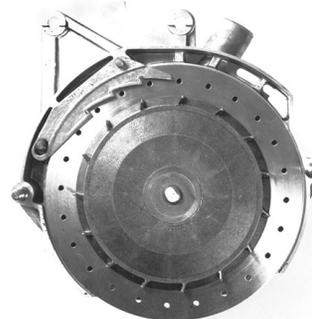
DRIVE CHAIN

The drive chain has a hardened surface that increases wear resistance and extends the life of the chain. 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 the chain idlers should be checked periodically to ensure they rotate freely. The drive chain is 5R, and has 124 links with the connector link. Use a chain lubricant spray daily, or as needed.

SEED METERING SYSTEM

The seed metering system (10) consists of a 2-part metering box made of cast aluminum that is equipped with stainless steel seed discs that deliver 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.



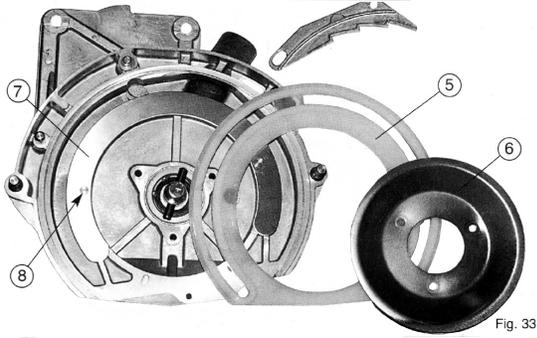
The stationary part of the metering box is called the **main housing**, shown below, and is mounted in the planter unit frame.

Components in the main housing are the plastic wear gasket (5) and cap (6), seed disc and seed scraper. The plastic wear gasket, on which the seed disc rotates, should be smooth and in good condition. Under normal operating conditions, it should be replaced only after 1250 to 2500 acres. The metal brace (7) should be positioned with its tab notched in the hole of the housing. The outer edge of the plastic wear gasket is then rotated into the groove, locking into place when the stub fits into the hole of the housing, and is then held in position by the cap (6) and 3 bolts.

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.

ROW UNIT

NG Plus 3

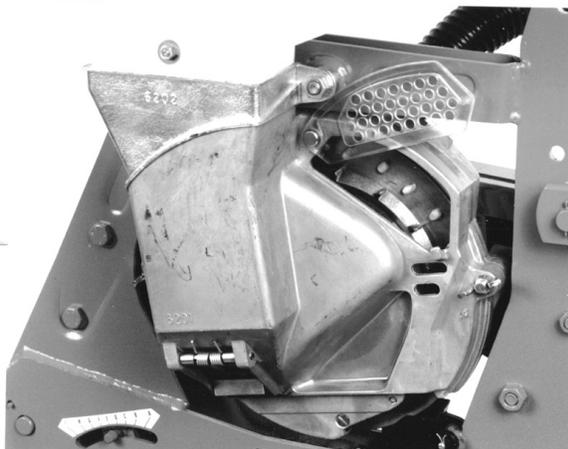


On the outside of the main housing is the lever for adjusting the air suction to the weight of the seed, as well as setting the height of the seed scraper.



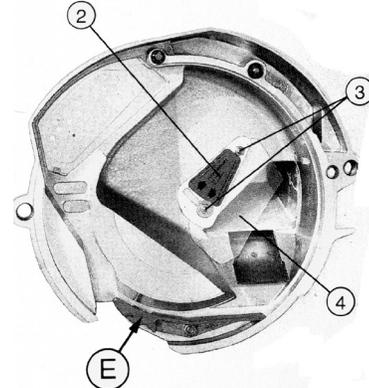
The second part of the metering box is called the **cover**. The cover is secured to the main housing by 2 wing nuts. The components on the outside of the cover are a control window and trap door. The components on the inside of the cover are a metal shutter, and ejector block.

The control window is made of clear plastic and allows for viewing of the seed against the seed disc. It can also be raised for close inspection.

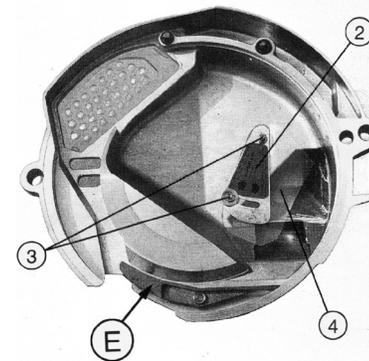


The metal shutter regulates the flow of seeds coming from the hopper and provides a constant and sufficient level in front of the disc. According to the seed used, the shutter has to be checked and adjusted at 2 different positions before planting.

The interior shutter is adjusted by lowering it after loosening the 2 bolts (3). A small plastic sheet (4) is located under the shutter and is also used to limit the level of seeds in front of the disc.



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



2– Low Position: For small seeds, such as cucumbers, beet, peppers, etc. The low position moves the shutter over part of the opening.

NOTE: A special metal shutter is available for planting small seeds such as cabbage, rapeseed, etc., to reduce the seed flow into the seed chamber.

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, it is recommended to check its condition periodically.

ROW UNIT

NG Plus 3

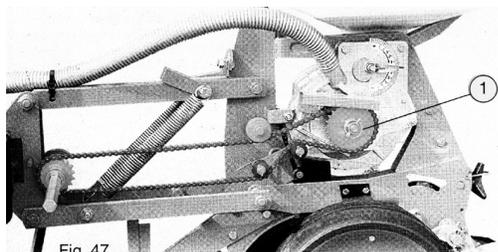
EXTRA LARGE SEED

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 position of the metal shutter should be in a high position for these large seeds.

NOTE: If your planter was ordered to plant extra large seed as the main crop and it has the special metering box cover installed, you will also be able to use this cover for smaller seed as corn or beans, by adjusting the metal shutter to a low position.

DISENGAGING THE METERING BOX

The individual disengaging of a metering unit is possible by removing the lynch pin (1) or by disconnecting the vacuum hose.



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, check to see if the seed tubes are in good condition, as consistent and regular seeding will depend on this. To replace the seed tube, remove the gauge wheel and disc opener on one side to remove the top pin holding the tube in place.

Electronic seed monitors (that monitor the flow of seed through the seed tube) are optional. See optional equipment.

Note: If the optional V shoe insert is used for small seed, it must be removed when planting larger seeds such as beans, as it will cause plugging due to normal crimping of the seed tube during installation.

METERING BOX ADJUSTMENT

The outside lever on the metering box cover is unique. It makes two adjustments at the same time.

It is these two factors that influence the degree of singulation of the seed.

(1) It adjusts the height of the scraper in relationship to the holes in the disc, and (2) at the same time adjusts the air suction (from the turbofan) to the weight of the seed.

When the indicator (1) is positioned to the "+", it raises the scraper over the holes of the disc and increases the amount of suction (closing the size of the hole (2)). This may cause doubles if raised too high.

When the indicator (1) is positioned to the "-" it lowers the scraper over the holes and reduces the degree of suction (opening the size of the hole (2)). This may cause skipping if it is too low.

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

Below is a recommendation for setting the indicator.

Corn	+1 (0 to +2)
Cotton	+1
Beans	+4 to +5
Sunflowers	+1 (0 to +2)
Coated Sugarbeet	+2
Uncoated Sugarbeet	0 (-2 to +1)
Pickles/Melon	- 1 ½ (-1 to -2)
Soybeans/Peas	+4
Sorghum	+3
Kidney Beans	+5
Peanuts	+4 ½ (+4 to +5)
Rape Seed/Cabbage	+2

This applies to 500-rpm PTO speed, except for large seed (kidney beans, peanuts, etc.) for which a slightly higher speed (5-10%) is preferable. It is then recommended to run at 540 rpm PTO speed.

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

ROW UNIT

NG Plus 3

METERING BOX ADJUSTMENT

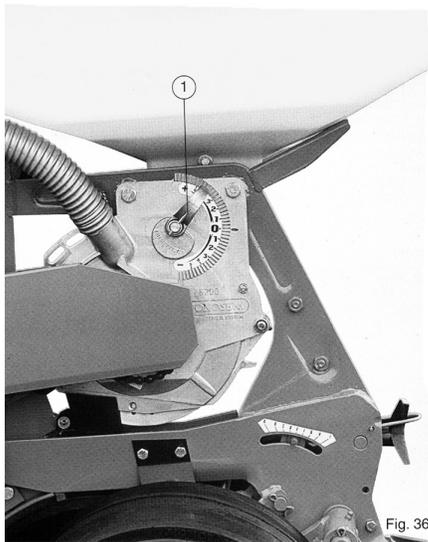


Fig. 36

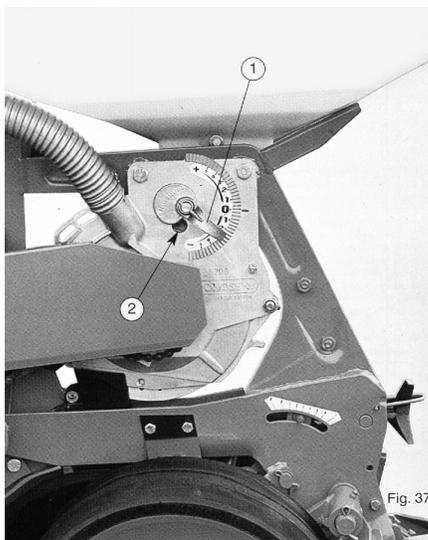


Fig. 37

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 screws onto the seed disc with 6 special screws.

If you remove your seed discs from the metering box, to clean or use different seed discs, it would be beneficial, when re-using the seed discs, to place them back into the same metering box. You can use a marker to identify the seed disc to the metering box.

SEED CHUTE

A seed chute (shown below) is supplied with each planter, and simplifies emptying of the hoppers.



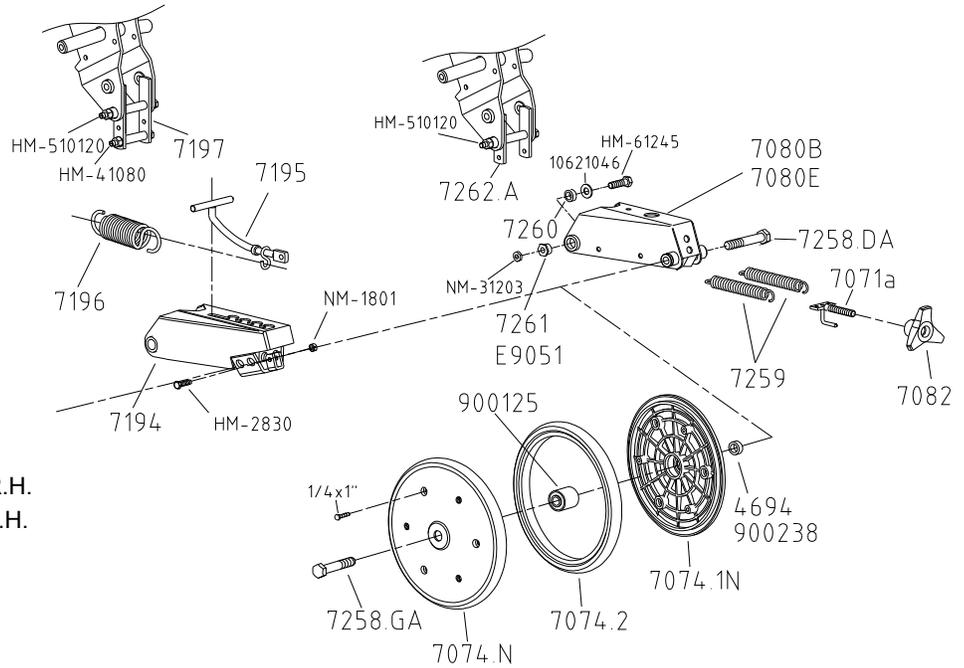
ROW UNIT

NG Plus 3

CLOSING WHEEL ASSEMBLY

PART No. DESCRIPTION

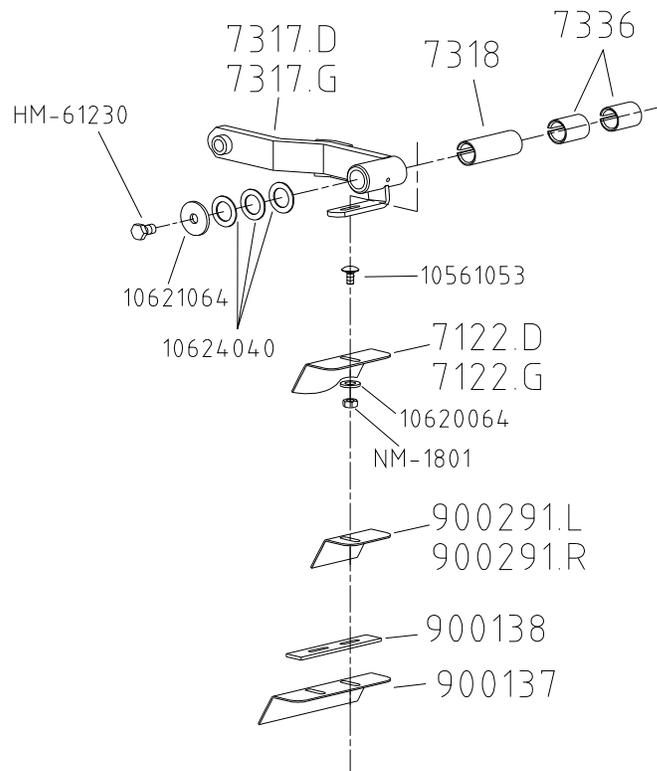
4694	Bushing 10mm
7074.1N	Nylon rim half
7074.2	Tire 1" x 12"
7074.N	Closing wheel complete 1" x 12"
7080.B	Bracket adjustable closing wheels
7080.E	Bracket for narrow and twin rows
7082	Handwheel
7194	Bracket for T-handle
7195	T-handle
7196	Spring
7197	Spring support
7258.DA	Special bolt M16 x 80 R.H.
7258.GA	Special bolt M16 x 80 L.H.
7259	Spring
7260	Spacer bushing
7261	Threaded pivot bushing
7262.A	Spring support
900125	Bearing 40mm
900238	Bushing 8mm
10621046	Washer M13 x 27 x 2
HM-2830	Hex bolt M8 x 30
NM-1801	Hex nut M8
E9051	Eccentric bushing
HM-41080	Bolt M10 x 80
HM-510120	Bolt M10 x 120
HM-61245	Bolt M12 x 45
NM-31203	Jam nut M12



GAUGE WHEEL ARM

PART No. DESCRIPTION

7318	One piece bushing
7336	Two piece bushing
900137	Scraper blade dbl. g.w.
900138	Extension dbl. g.w.
10561053	Carriage bolt M8 x 18
10620064	Washer M8.5 x 16 x 2
10621064	Washer M13 x 45 x 5
10624040	Washer M33 x 45 x 1.5
7122.D	Scraper blade RH std. g.w.
7122.G	Scraper blade LH std. g.w.
7317.D	Gauge wheel arm RH
7317.G	Gauge wheel arm LH
900291.L	Scraper blade LH narrow g.w.
900291.R	Scraper blade RH narrow g.w.
HM-61230	Hex bolt M12 x 30
NM-1801	Hex nut M8



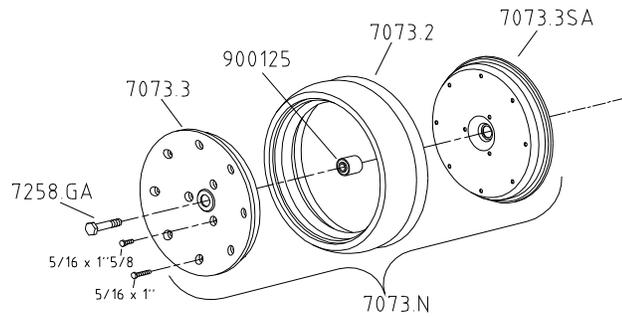
ROW UNIT

NG Plus 3

GAUGE WHEEL ASSEMBLY

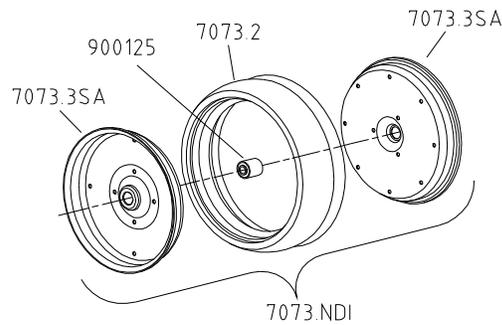
7073.N Gauge wheel complete (black nylon rim)

- 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



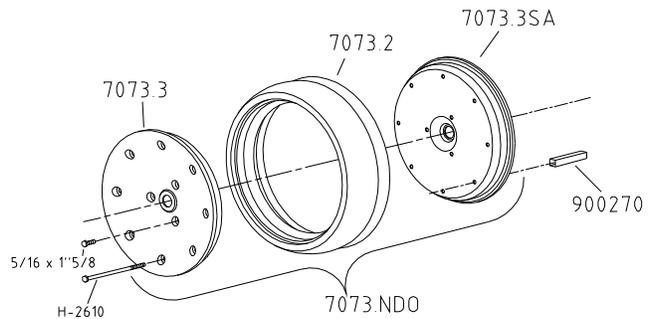
7073.NDI Dual gauge wheel, inside

- (2 blk steel rims with bearing)
- 900125 Bearing, 40mm (DAC1640442RSL)



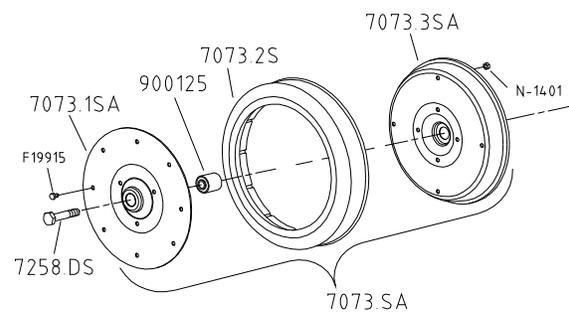
7073.NDO Dual gauge wheel, outside

- (1 steel rim, 1 nylon rim, no bearing)
- 900270 Spacer, 4" length
- H-2610 Bolt, 5/16" x 6"



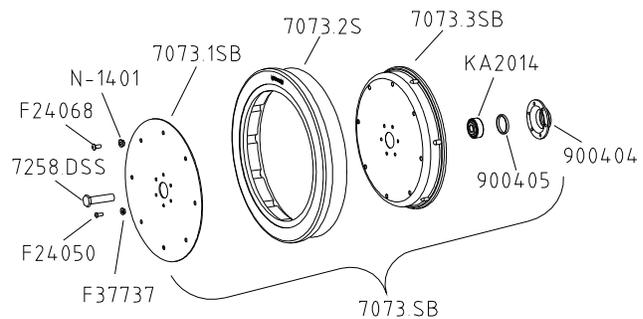
7073.SA Narrow gauge wheel, complete

- 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

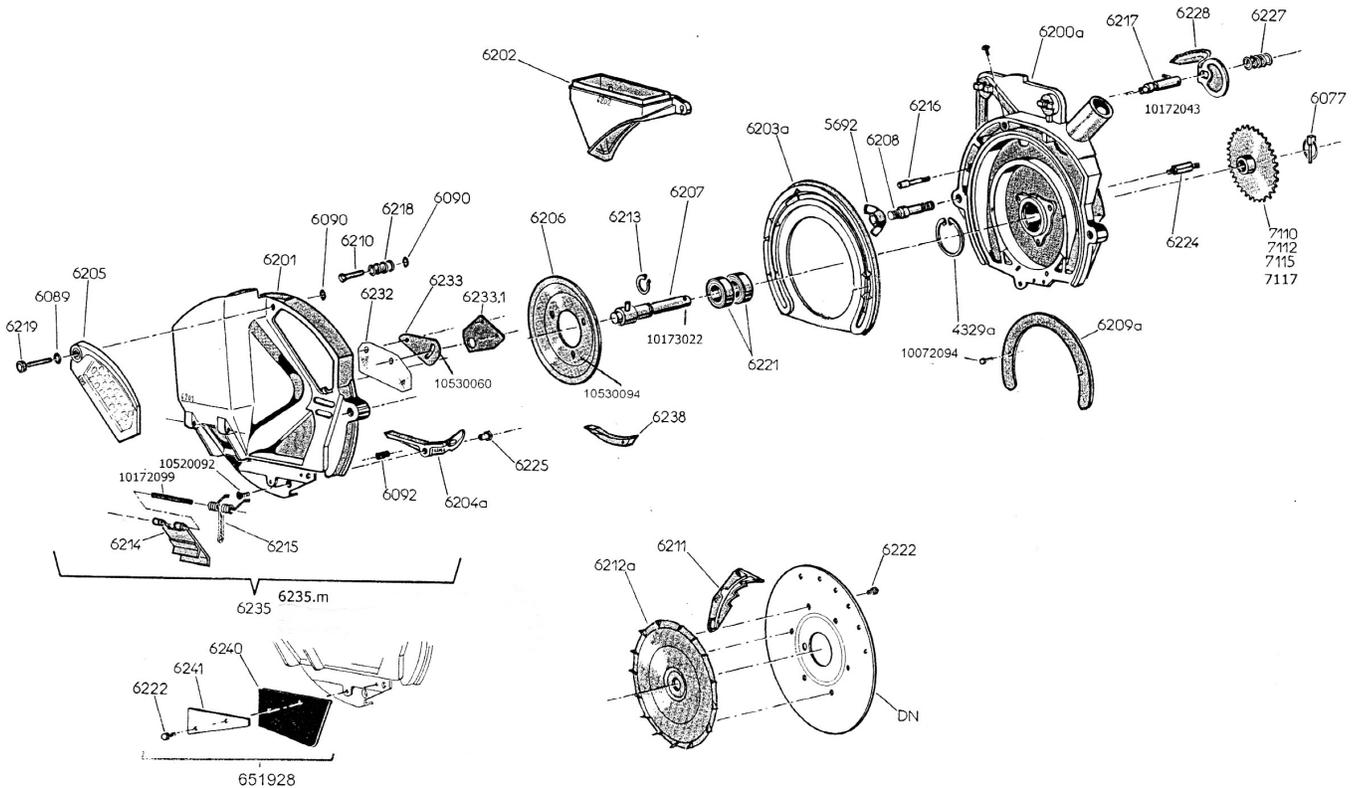
- 900404 Bearing housing
- 900405 Spacer
- 7073.1SB Outer rim (steel)
- 7073.2S Tire only, narrow
- 7073.3SB Inner rim (black steel)
- 7258.DSS RH Bolt 16 x 60, W/ 7/32" thick bolt head
- 7258.GSS LH Bolt 16 x 60, W/ 7/32" thick bolt head
- F24050 1/4" -20 x 5/8 Button head socket screw
- F24068 5/16"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

NG Plus 3

METERING BOX ASSEMBLY



PART No.	DESCRIPTION
4329.a	Snapping, internal, 57mm
5692	Wing nut, 10mm
6077	Lynch pin, 6mm dia.
6089	Rubber ring
6090	Snapping, 6mm
6092	Spring
6200.a	Housing only for meter box
6201	Meter box cover only
6202	Collar brace
6203.a	Plastic insert
6204.a	Bronze ejector block assembly
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
6214	Trap door
6215	Spring for trap door
6216	Fixed pin for seed scraper
6217	Adjustable pin for seed scraper, uses 4x35 roll pin
6218	Spring
6219	Pin for control window
6221	Bearing 42mm, (ref. 60042RS)

PART No.	DESCRIPTION
6222	Screw, used for agitator and wind flap
6225	Nut, to secure ejector block
6227	Spring for selector handle
6228	Selector handle
6232	Gasket for inside meter box cover
6233	Shutter, standard cover
6233.1	Shutter for small seed, standard cover
6233.2	Shutter for medium to small seed, standard cover
6233.2s	Shutter for small seed, large seed cover only
6233.3s	Shutter for medium seed, large seed cover only
6235	Standard cover complete
6235.m	Large seed cover complete, accepts both 6204.a or 6238
6238	Aluminum ejector block (for large seed covers)
6240	Rubber shield
6241	Metal tightener plate
7110	Sprocket, 27 tooth, (4% slow down from std sprocket 7115)
7112	Sprocket, 21 tooth (20% speed up from std sprocket 7115)
7115	Sprocket, 26 tooth, standard drive sprocket
7117	Double sprocket, 26-12 to drive US insecticide
651928	Protection kit
10072094	Screw, 5x6 to secure brace 6209.a
10172043	Roll pin, 4x35 for 6217 pin
10172099	Roll pin, 6x70 to secure trap door
10173022	Roll pin, 8x50 for 6207 shaft
10520092	Screw, 6x16 for ejector block assembly
10530060	Bolt, 5x20
10530094	Phillips screw, 6x20

ROW UNIT

NG Plus 3

METERING BOX - TROUBLE SHOOTING

Excessive Skipping

- Seed scraper is too low. (Incorrect setting on the indicator.)
- Seed scraper is bent. (Not flat)
- Seed disc is bent or worn.
- Seed scraper is dirty with chemical product.
- Plastic wear surface of metering box is warped or used up.
- Holes of the seed disc are clogged (sugarbeets, rapeseed, cabbage.) To be double-checked from time to time.
- Excessive working speed.
- Defective vacuum hoses.
- Insufficient vacuum suction.
- PTO 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.

Excessive Doubling

- Seed scraper is too high. (Incorrect setting on the indicator.)
- Seed scraper is worn.
- Holes of the seed disc too large for seed.
- Excessive working speed.
- Seed level too high in the metering box.

Irregular Seeding (Skipping and Doubles)

- Excessive working speed.
- Holes of the seed disc are too large. (Cut off seeds.)
- Fields are too steep
- Shutter is adjusted incorrectly

Irregular Spacing

- Excessive working speed.
- Soil is too wet and is sticking to tires.
- Incorrect tire pressure.
- Shutter is adjusted incorrectly.
- Ejector is damaged.

ROW UNIT

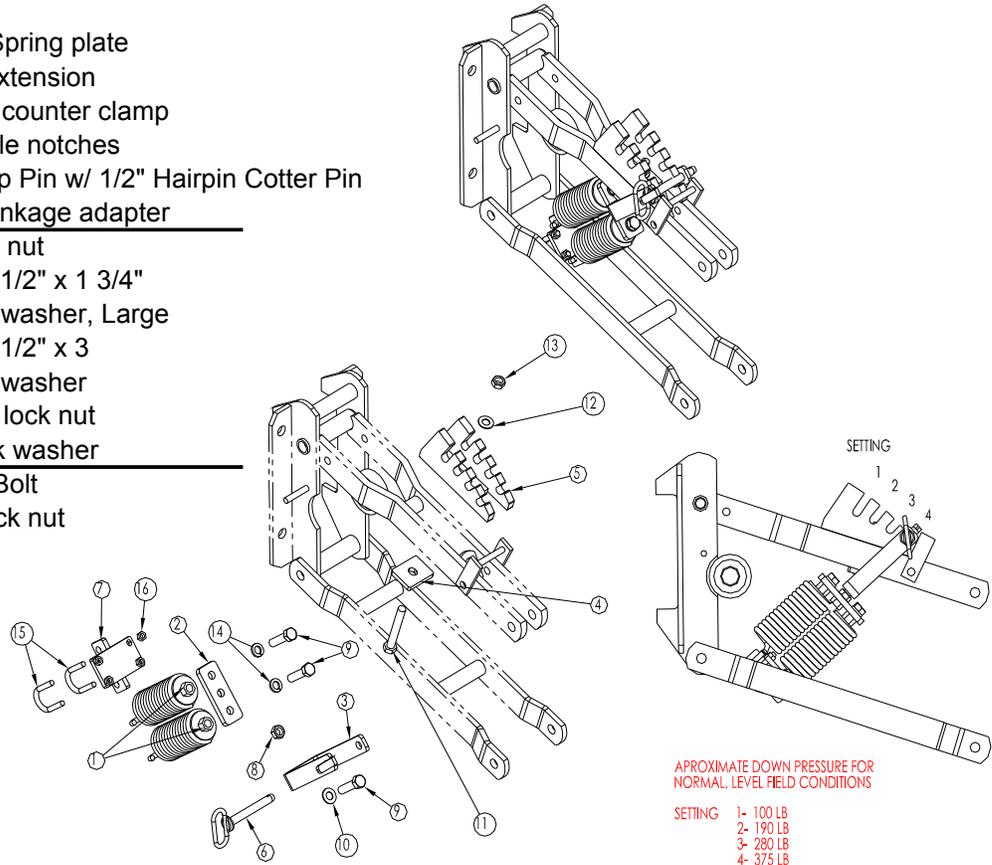
NG Plus 3

UP / DOWN PRESSURE SPRING

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

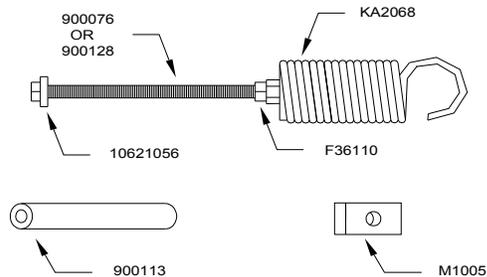
ITEM PART No. DESCRIPTION

1	KA2068	Spring
2	800208	Double Spring plate
3	800145.B	Spring Extension
4	800144	Notched counter clamp
5	800143.A	Adjustable notches
6	800228	Easy Grip Pin w/ 1/2" Hairpin Cotter Pin
7	800211	Narrow linkage adapter
8	F36210	1/2" Jam nut
9	F13210	Hex bolt 1/2" x 1 3/4"
10	F33012	1/2" Flat washer, Large
11	F33215	Hex bolt 1/2" x 3
12	F33086	1/2" Flat washer
13	F37214	1/2" Rev lock nut
14	F123498	1/2" Lock washer
15	F42012	5/16" U-Bolt
16	F37021	5/16" Lock nut



UP/DOWN PRESSURE SPRING KIT PART #'S

KA2068.ASY	Down Pressure Spring Kit
KA2068	Spring
10621056	Washer, 13x30x6
900076	Bolt, all thread, 1/2-13x8"
900113	Spacer bushing
F36110	Nut, 1/2-13
M1005	Upper linkage tab (if needed)
KA2068.ASYU	Up Pressure Spring Kit
KA2068	Spring
10621056	Washer, 13x30x6
900128	Bolt, all thread, 1/2-13x10"
F36110	Nut, 1/2-13
M1005	Upper linkage tab (if needed)



ROW UNIT

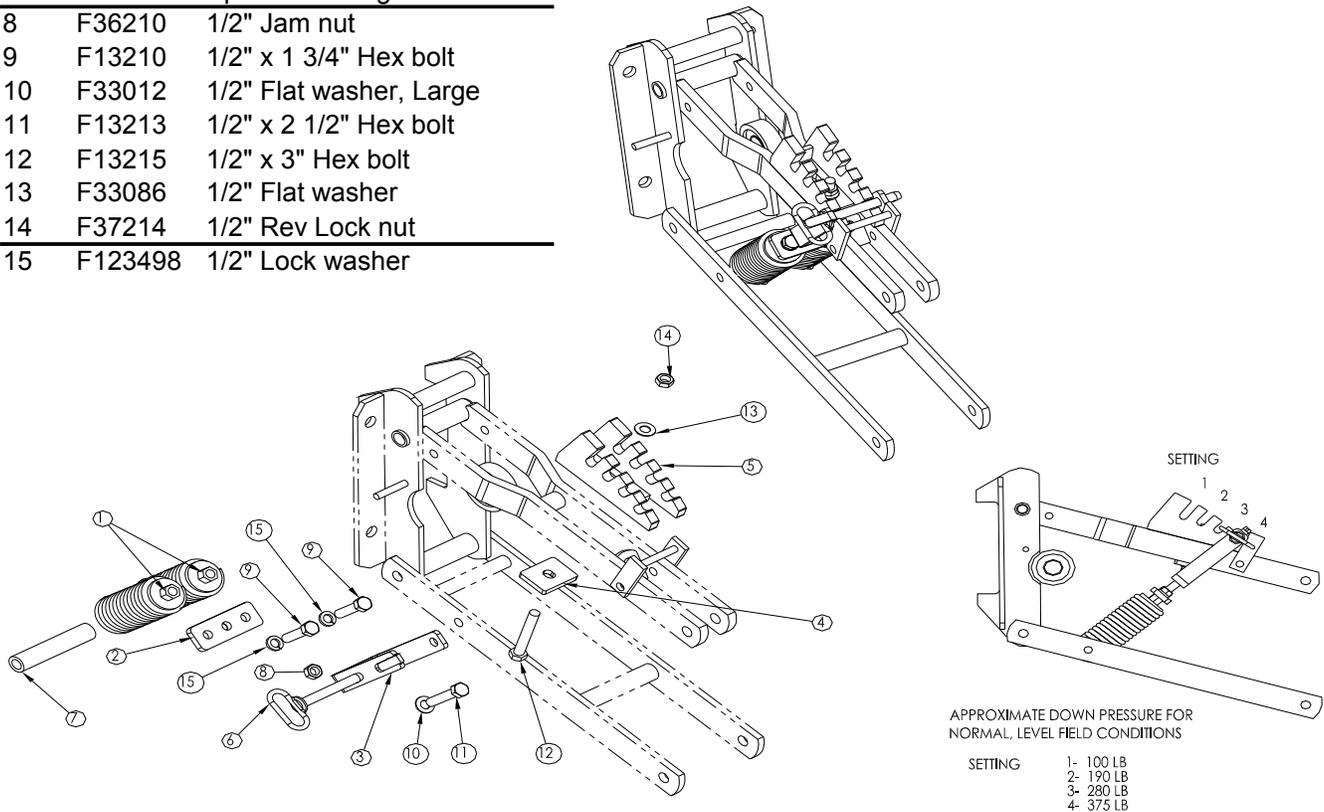
NG Plus 3

UP / DOWN PRESSURE SPRING

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

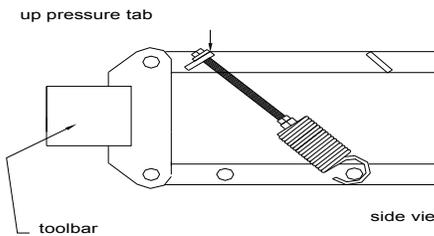
ITEM PART No. DESCRIPTION

1	KA2068	Spring
2	800208	Double Spring Plate
3	800145.B	Spring Extension
4	800144	Notch Counter Clamp
5	800143.A	Adjustable Notches
6	800228	Easy Grip pin w 1/2" Hairpin cotter pin
7	900113	Spacer bushing
8	F36210	1/2" Jam nut
9	F13210	1/2" x 1 3/4" Hex bolt
10	F33012	1/2" Flat washer, Large
11	F13213	1/2" x 2 1/2" Hex bolt
12	F13215	1/2" x 3" Hex bolt
13	F33086	1/2" Flat washer
14	F37214	1/2" Rev Lock nut
15	F123498	1/2" Lock washer

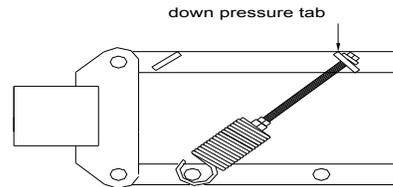


APPROXIMATE DOWN PRESSURE FOR NORMAL, LEVEL FIELD CONDITIONS

SETTING	1- 100 LB
	2- 190 LB
	3- 280 LB
	4- 375 LB



side view of parallel linkage



ROW UNIT

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.

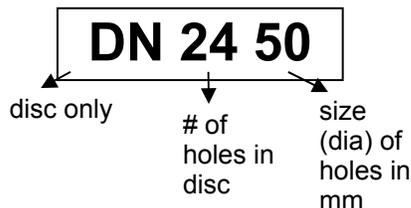
Example:

Seed Disc # DN 2450

DN indicates disc only (no agitator)

24 indicates 24 holes

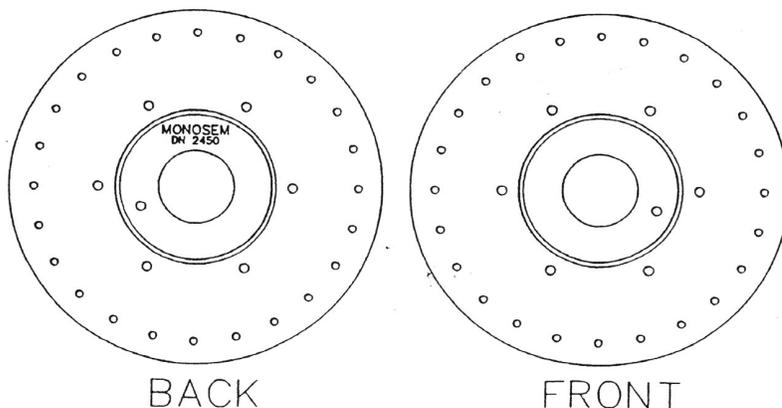
50 indicates the holes are diameter 5.0 mm.



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

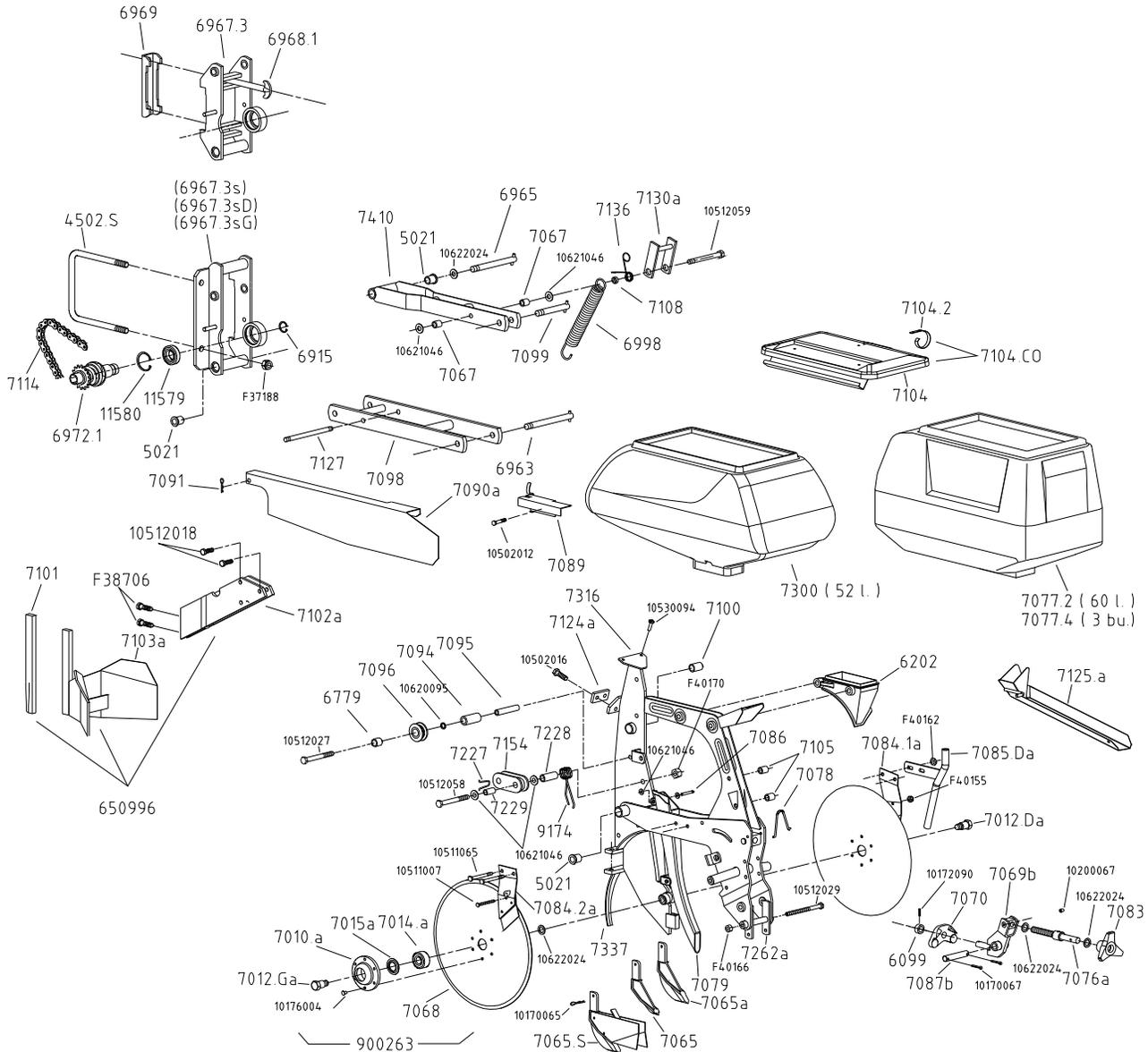
CROP	SEED DISC		SEED SPACING
Beans	DC3665	Large, Kidney	2 3/8 - 7"
	DC4850	Large, Pinto, Romano, Lima, Chicapee	1 3/4 - 5 1/2"
	DC6045	Medium, Snap, Baby Limas, Soybeans	1 3/8 - 4 3/8"
	DC6035	Small, Navy, Peas	1 3/8 - 4 3/8"
Broccoli and Cabbage	DC3612 (low population)		2 3/8 - 7"
	DC7212 (high population)		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		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

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"
	DC0925 (high population)		9 1/2 - 28"
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 3 Assembly



PART No.	DESCRIPTION
4502.S	U bolt, for 7" x 7" x 5/8-11
4503	Nylon locknut, 16mm
5021	Bushing, self lubricated
6099	Collar with 6x25 roll pin
6202	Collar brace
6779	Bushing, self lubricated
6915	Snapping, 30mm
6963	Pivot pin, lower linkage, 165mm(16mm jam nut)
6965	Pivot pin, upper linkage, 155mm (16mm jam nut)
6967.3	Clamp facing, 5x5 toolbar
6967.3S	Clamp facing, 7x7 toolbar
6967.3SD	Clamp facing, 7x7 toolbar R.H.
6967.3SG	Clamp facing, 7x7 toolbar L.H.

PART No.	DESCRIPTION
6968.1	T-bolt, 16mm
6969	Clamp plate, 5x5 toolbar
6972.1	Slipclutch
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
7067	Spacers for unit lockup bracket

ROW UNIT

NG Plus 3 Assembly

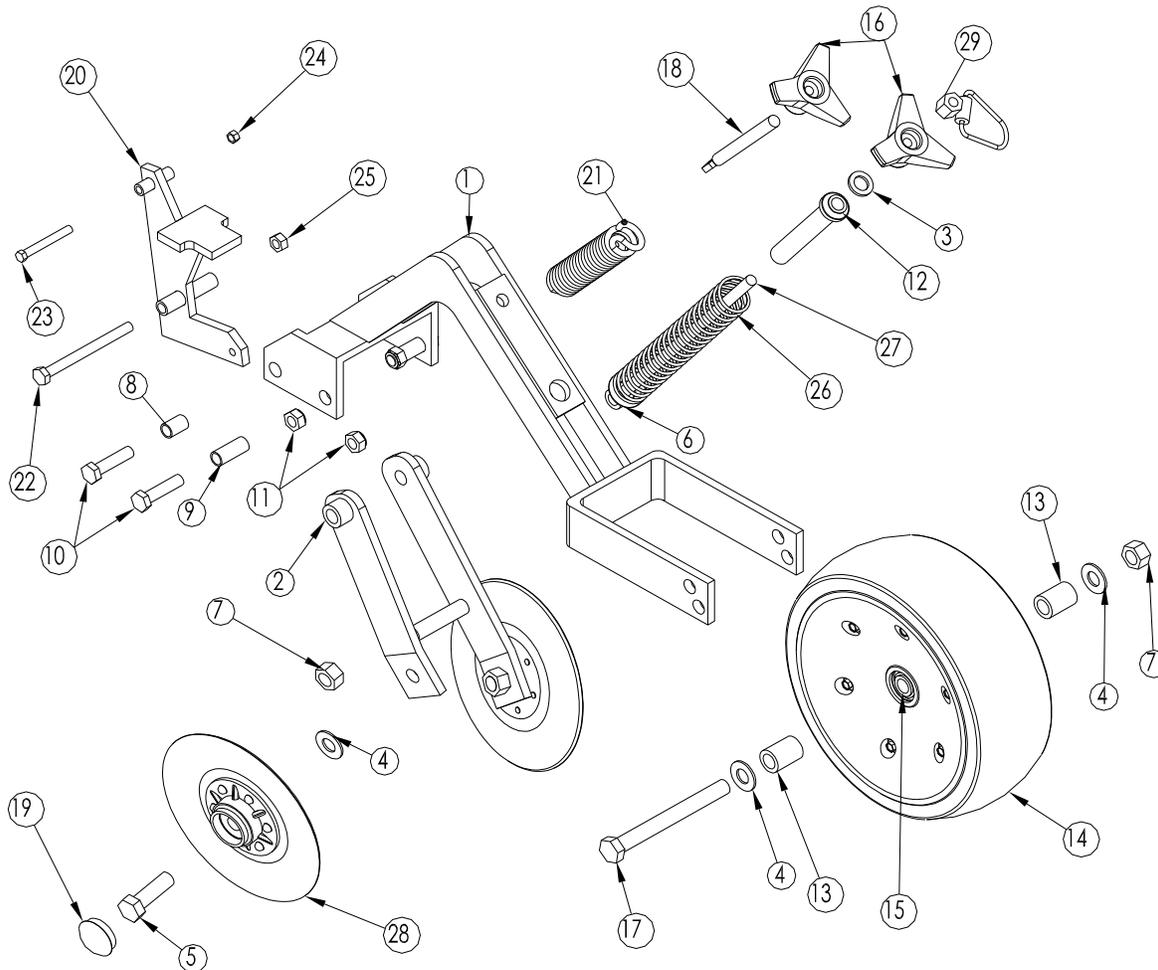
PART No.	DESCRIPTION
7068	Opening disc only
7069.B	Bracket for wheel stop/depth control rod
7070	Swing bracket
7076.A	Threaded for depth adjustment
7077.2	Seed hopper, standard, 60 ltr
7077.3	Seed hopper, Twin row, 60 ltr
7077.3A	Seed hopper, TwinRow/reversed, 60 ltr
7077.4	Seed hopper, 3 bu.
7077.UNR	Seed hopper, 50 ltr (1.4 bu, uses 7088.n lid)
7078	Wire stop for depth control rod
7079	Blank seed tube
7083	Handwheel for depth control, uses 6x30 roll pin
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	Pivot pin, upper linkage, 75mm (16mm jam nut)
7100	Bushing, self lubricated
7101	Front point, clod remover
7102.A	Mounting bracket, clod remover
7103.A	Clod remover
7104	Lid w/o spring clip
7104.CO	Lid complete w/spring clip
7104.2	Spring clip
7105	Spacer
7108	Bushing, self lubricated
7114	Drive chain, 5R, 124 links w conn. Link
7124.A	Unit stop
7125.A	Seed chute

PART No.	DESCRIPTION
7127	Threaded rod
7130.A	Unit lock up bracket
7136	Spring
7262.A	Spring support bracket
7300	Seed hopper, 52 ltr.
7316	Main frame NG+3
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
F37188	Nylon locknut 5/8"
F40155	Lock nut 6mm
F40162	Nut, 8mm
F40166	Nut, 10mm
F40170	Nut, 12mm
10170065	Cotter pin, M5 x 30
10170067	Cotter pin, M5 x 40
10172090	Roll pin, M6 x 25
10176004	Rivet, 6 x 22mm
10200067	Red cap, depth indicator
10502012	Bolt, M10 x 15
10502016	Bolt, M10 x 25
10511007	Bolt, M6 x 100
10511065	Bolt, M8 x 75
10512018	Bolt, M10 x 35
10512027	Bolt, M10 x 100
10512029	Bolt, M10 x 120
10512058	Bolt, M12 x 110
10512059	Bolt, M12 x 120
10530094	Bolt, M6 x 20. oval head slotted
10620095	Washer, 10.5 x 27 x 2mm
10621026	Washer, 13 x 18 x 2mm
10621046	Washer, 13x27x2mm
10622024	Washer, 16.5 x 26 x 1mm
10622052	Washer, 17 x 50 x 1mm

ROW UNIT

Twin-Row

7.5" HILLER DISC W/ FLAT PRESS WHEEL CLOSING ASSEMBLY



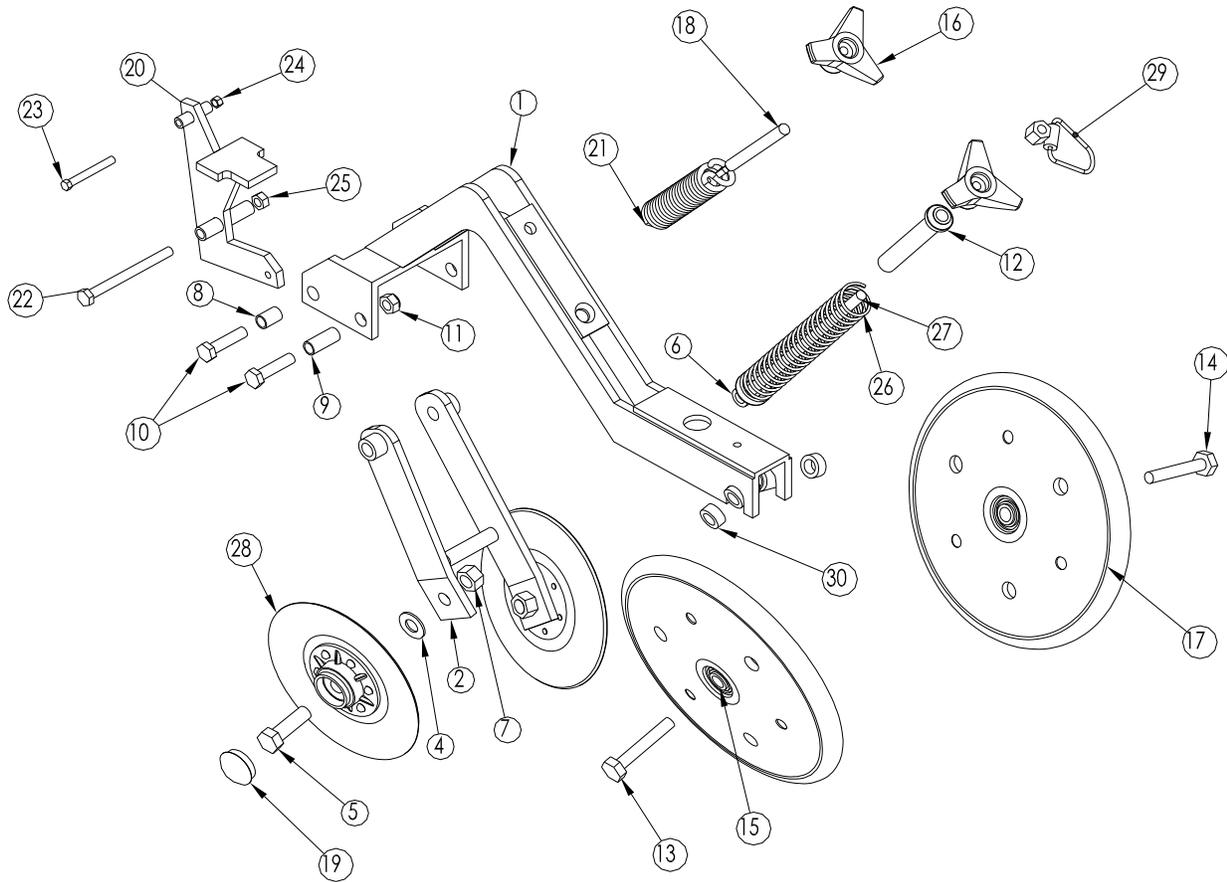
ITEM	PART No.	DESCRIPTION
1	E7521	Closing wheel frame
2	7210.S	Hiller disc mounting bracket
3	F33086	Flat washer, 1/2" SAE
4	F33819	Flat washer, 5/8" SAE
5	F13311	Hex head bolt, 5/8-11 x 2", Gr 5
6	11210	Spring cap
7	F37216	Rev lock nut, 5/8-11
8	E7522.1	Bushing, 23mm long
9	E7523.1	Bushing, 38mm long
10	F39210	Hex head bolt, 12 x 50
11	F40171	Nylon locknut, 12mm
12	7209	Tube for threaded rod
13	900235	Spacer, bushing, 32mm
14	11540.AM	Wheel, 4x 12 flat, complete
	11540.AMC	Wheel, 4x 12 concave, complete
15	900125	Bearing, 40mm (DAC1640442RSLCS)
16	7082	Adjustment knob

ITEM	PART No.	DESCRIPTION
17	F15325	Hex head bolt, 5/8-11x 6", Gr 5
18	7071.2	Tension rod, 12 x 130mm
19	KD11845	Dust cap
20	E7524	Spring mounting bracket/ frame stop
21	7075	Spring
22	F38670	Hex head bolt, 10 x 120
23	F38624	Hex head bolt, 8 x 65
24	F40307	Nut, 8mm
25	F40308	Nut, 10mm
26	5513	Spring
27	7210.1A	Threaded adjustment rod, 12mm
28	900262	Hiller disc
29	E7525	Nut with retainer ring
	E7525.1	Nut only
	E7526	Retainer ring

ROW UNIT

Twin-Row

7.5" HILLER DISC W/ V PRESS WHEEL CLOSING ASSEMBLY

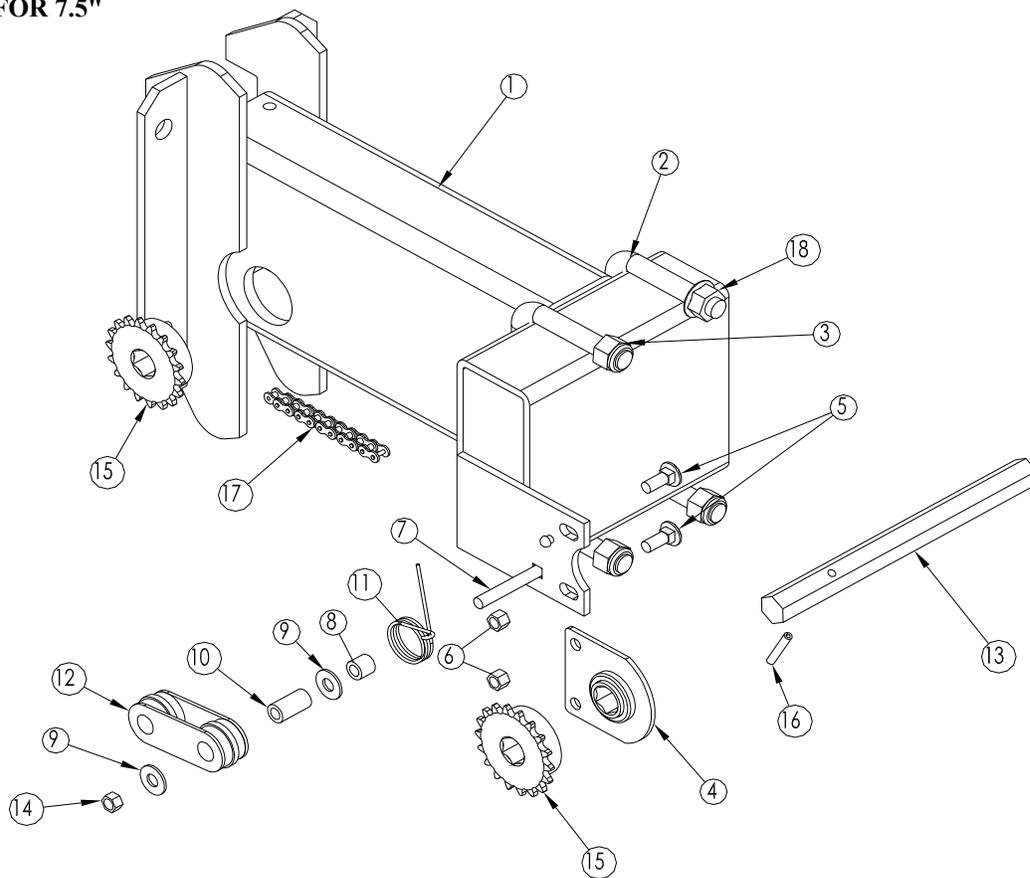


ITEM	PART NO.	DESCRIPTION	ITEM	PART NO.	DESCRIPTION
1	E7527	Closing wheel frame	17	7074.N	Closing wheel, complete
2	7210.S	Hiller disc mounting bracket		7074.2	Tire only, 1 x 12
3	F33086	Flat washer, 1/2" SAE		7074.A40	Nylon half rim
4	F33819	Flat washer, 5/8" SAE	18	7071.2	Tension rod, 12 x 130mm
5	F13311	Hex head bolt, 5/8-11 x 2", Gr 5	19	KD11845	Dust cap
6	11210	Spring cap	20	E7524	Spring mounting bracket/ frame stop
7	F37216	Rev lock nut, 5/8-11	21	7075	Spring
8	E7522.1	Bushing, 23mm long	22	F38670	Hex head bolt, 10 x 120
9	E7523.1	Bushing, 38mm long	23	F38624	Hex head bolt, 8 x 65
10	F39210	Hex head bolt, 12 x 50	24	F40307	Nut, 8mm
11	F40171	Nylon locknut, 12mm	25	F40308	Nut, 10mm
12	7209	Tube for threaded rod	26	5513	Spring
13	30513115	Hex head bolt, 16 x 80, LH	27	7210.1A	Threaded adjustment rod, 12mm
14	30513015	Hex head bolt, 16 x 80, RH	28	900262	Hiller disc
15	900125	Bearing, 40mm (DAC1640442RSLCS)	29	E7525	Nut with retainer ring
16	7082	Adjustment knob		E7525.1	Nut only
				E7526	Retainer ring
			30	900238	Spacer bushing, 8mm wide

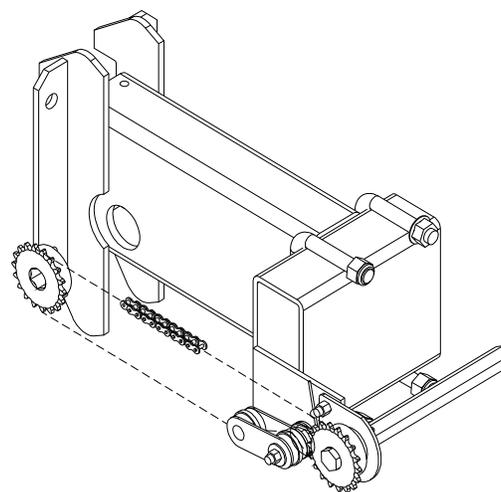
ROW UNIT

Twin-Row

OFFSET ASSEMBLY FOR 7.5"



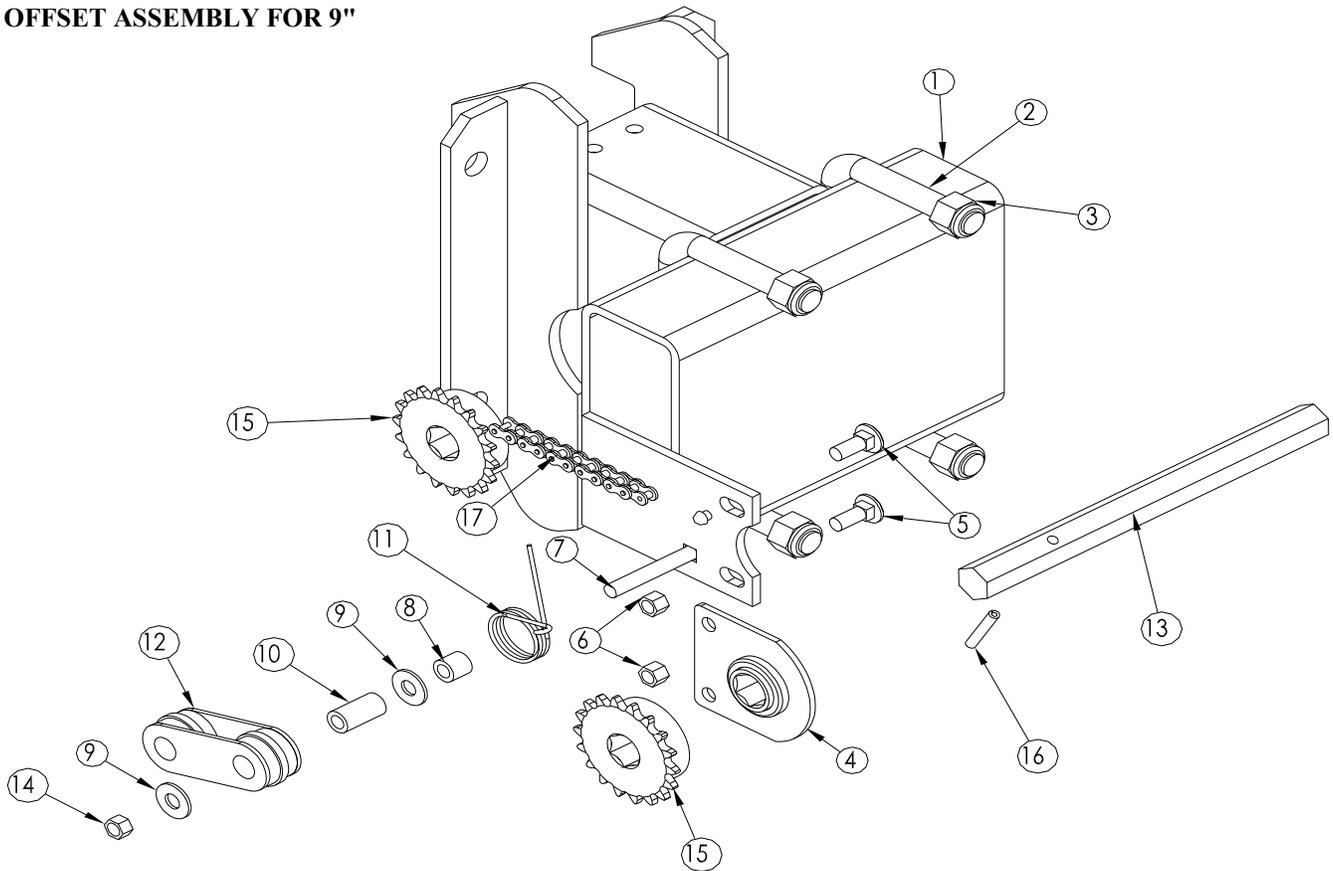
ITEM	PART No.	DESCRIPTION
1	E7501.1	Twin-row offset bracket 7.5"
2	900164	U Bolt 7"x 3"x 5/8"-11
3	N-5101	5/8"-11 Nylock nut
4	KA2180	Bearing hanger 7/8" hex
5	CB-2210	CB 3/8"-16x 1"
6	N-2101	Nylock nut 3/8"-16
7	CB-2231	CB 3/8"-16x 2.5"
8	KD2971	Tube marker 5/8" OD x 3/8" ID
9	W-2210	3/8" Flat washer
10	KD1026	Sleeve bushing 1 3/16"
11	KD11219	Spring, US Insect idler
12	KD11962	Idler
13	E7502.1	Hex shaft for 7.5" offset bracket
14	N-2300	Rev lock nut 3/8"- 16
15	G40B18	Sprocket 40-18
16	F64251	Spring pin 1/4"x 1 1/2"
17	900327	Chain #40
18	N-5401	Flange nut 5/8"-16 REG



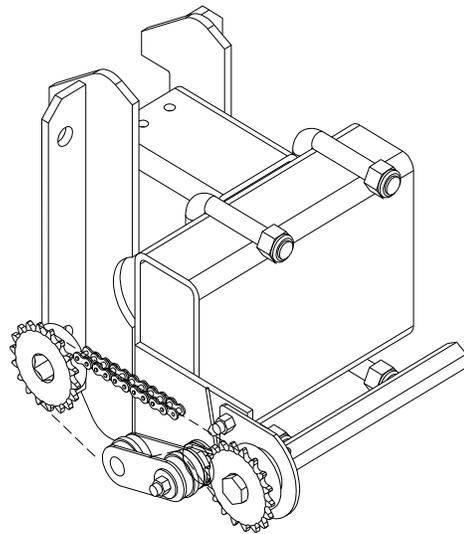
ROW UNIT

Twin-Row

OFFSET ASSEMBLY FOR 9"



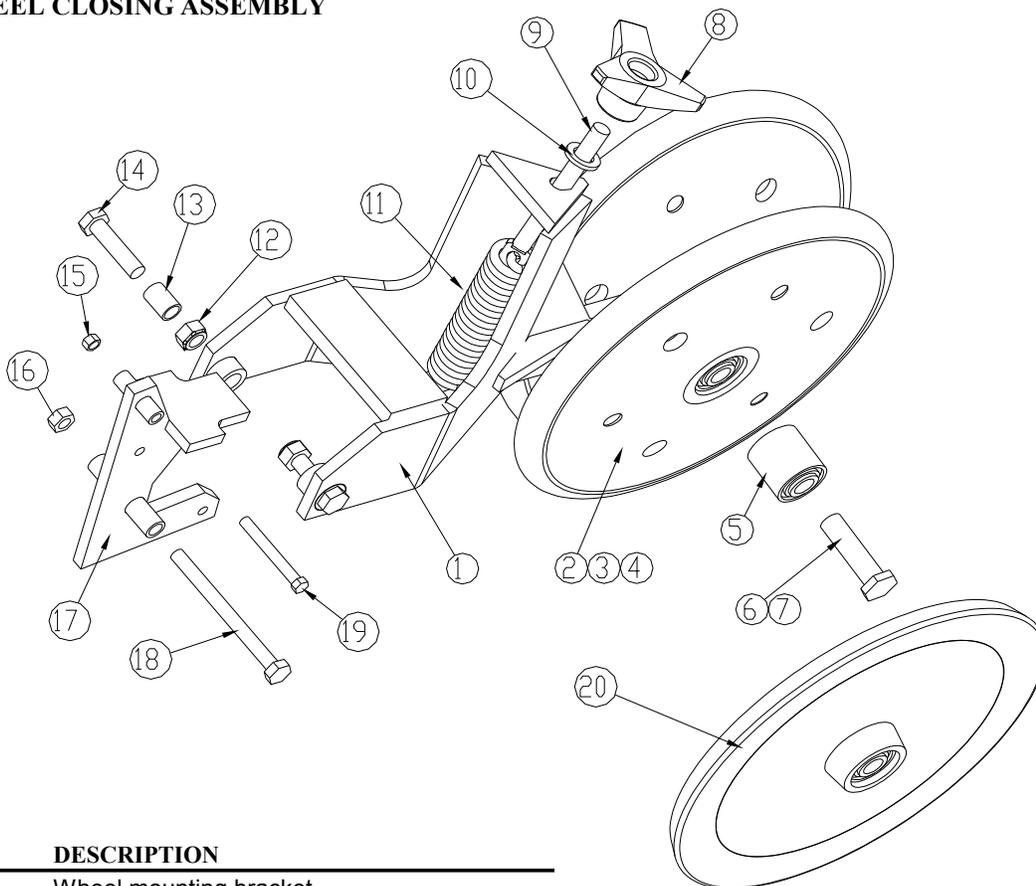
ITEM	PART No.	DESCRIPTION
1	E1001.A	Twin-row offset bracket
2	900164	U Bolt 7"x 3"x 5/8"-11
3	N-5101	5/8"-11 Nylock nut
4	KA2180	Bearing hanger 7/8" hex
5	CB-2210	CB 3/8"-16x 1"
6	N-2101	Nylock nut 3/8"-16
7	CB-2231	CB 3/8"-16x 2.5"
8	KD2971	Tube marker 5/8" OD x 3/8" ID
9	W-2210	3/8" Flat washer
10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



ROW UNIT

Twin-Row

7.5" V PRESS WHEEL CLOSING ASSEMBLY

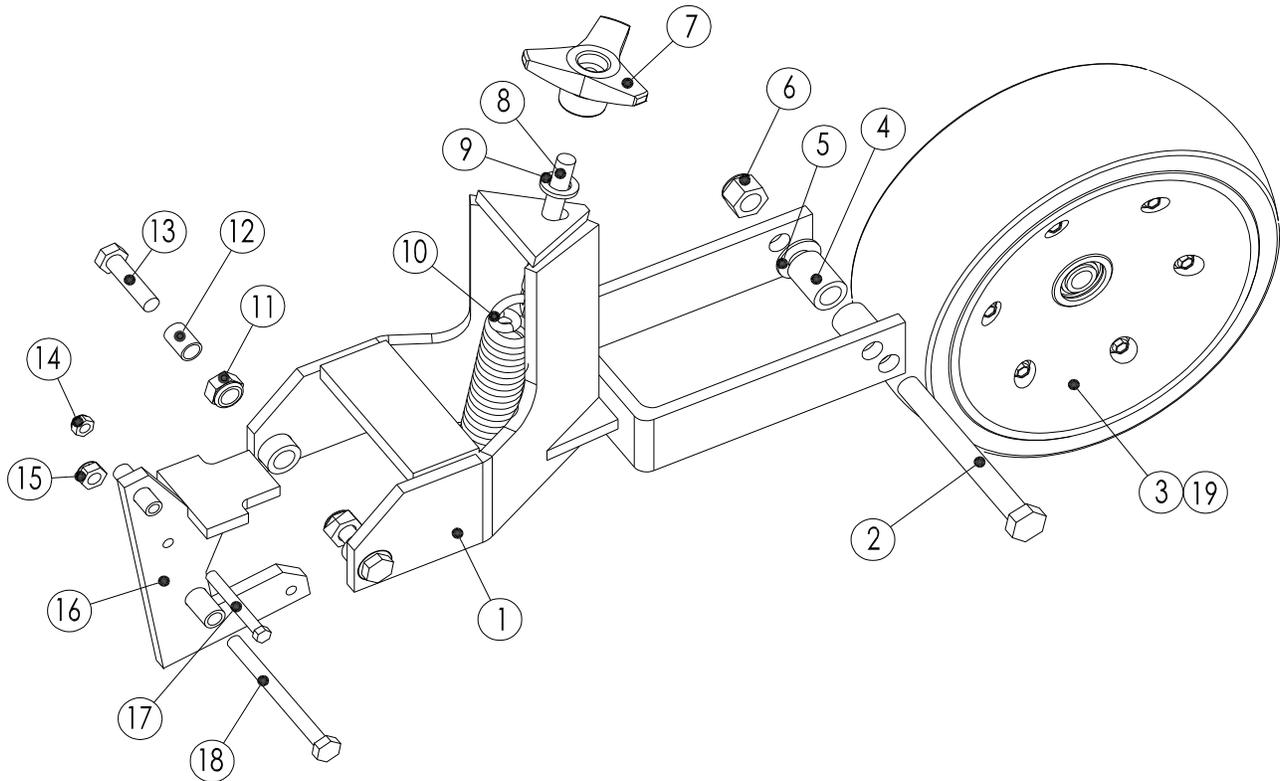


ITEM	PART No.	DESCRIPTION
1	E7528	Wheel mounting bracket
2	7074.N	Closing wheel complete
3	7074.A40	One half of closing wheel rim, nylon
4	7074.2	Rubber tire, closing wheel, 1 X 12"
5	900125	Bearing 40mm (DAC 1640442RSLCS)
6	7258.GSS	Hex head bolt (thin head) LH, 16 X 60mm
7	7258.DSS	Hex head bolt (thin head) RH, 16 X 60mm
8	7082	Hand wheel, 12mm
9	7071.2	Threaded adjustment rod, 12x 130mm
10	W-4405	Flat washer, 1/2" SAE
11	7075	Spring
12	NM-31205	Nylon locknut, 12mm
13	E7522.1	Bushing, 23mm
14	HM-61250	Hex head bolt, 12 X 50mm
15	NM-1801	Locknut, 8mm
16	NM-21011	Locknut, 10mm
17	E7524	Spring plate
18	HM-510120	Hex head bolt, 10 X 120mm
19	HM-2865	Hex head bolt, 8 X 65mm
20	KA6597	Cast iron closing wheel, complete
	E7524.asy	Spring plate assembly (items 8 - 11, and 15 - 19)
	E7528.asy	Mounting bracket assembly (items 1, 6, 7, and 12 -14)

ROW UNIT

Twin-Row

7.5" FLAT PRESS WHEEL CLOSING ASSEMBLY

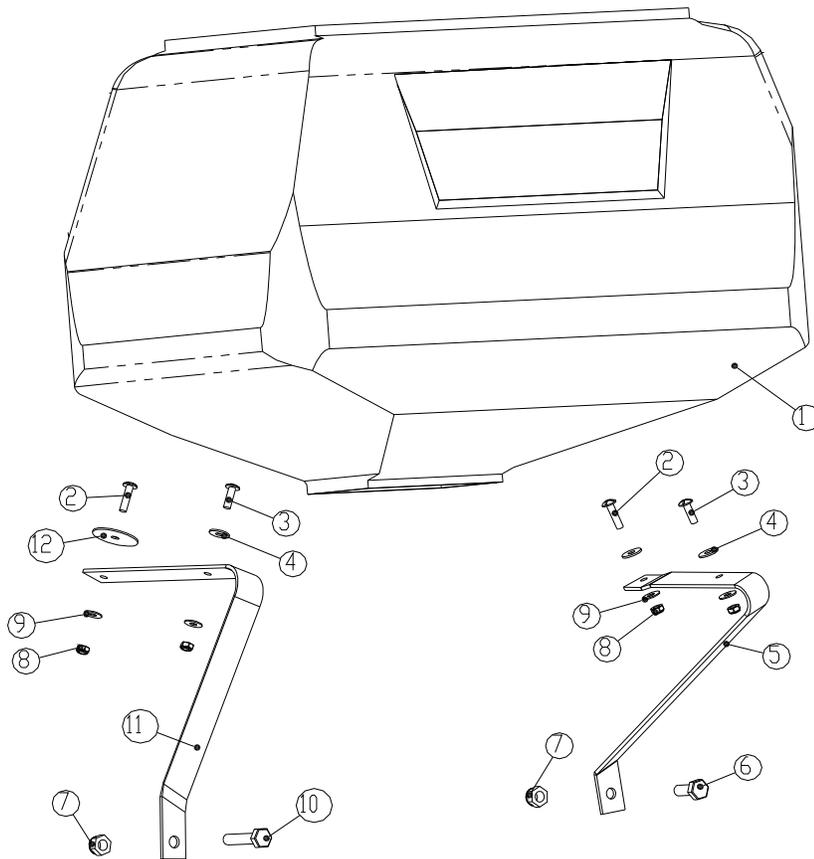


ITEM	PART No.	DESCRIPTION
1	E7530	Wheel mounting bracket
2	F15325	Hex bolt 5/8-11 x 6"
3	11540.AM	Flat closing wheel, 4" x 12" crowned
	11540.AMC	Flat closing wheel, 4" x 12" concave
4	900235	Bushing - 32mm
5	F33086	Flat washer - 5/8" SAE
6	F37188	Nylock nut 5/8-11
7	7082	Knob 12MM
8	7071.2	Tension rod - 12 x 130mm
9	F33800	Flat washer - 1/2" SAE
10	7075	Spring
11	F40171	Lock nut M12
12	E7522.1	Bushing 23mm
13	F39210	Hex bolt M12 x 50mm
14	F40163	Lock nut M8
15	F40167	Lock nut M10
16	E7524	Spring plate
17	F38624	Hex bolt M8 x 65mm
18	F38670	Hex bolt M10 x 120mm
19	900125	Wheel bearing 40mm (DAC1640442RSLCS)

ROW UNIT

Twin-Row

HOPPER ASSEMBLY



ITEM	PART No.	DESCRIPTION
1	7077.3A	Reversed hopper
2	10530096	Screw M6 x 25 phillips head
3	10530094	Screw M6 x 20 phillips head
4	10620041	Washer, 6.5x18x1.5mm
5	E1020	Front hopper bracket
6	F38655	Bolt M10 x 25
7	F40167	Nylock M10
8	F40155	Nylock M6
9	10620041	Washer, 6.5x18x1.5mm
10	F38659	Bolt M10 x 45
11	E1021	Rear hopper bracket
12	20016010	Washer, 7x41x1 stainless

7. OPTIONAL EQ.

7. 0. MISC.

**NO-TILL COULTER
CLOD REMOVERS
RESIDUE MANAGER
NO-TILL LINKAGE**

7. 1. ROW MARKERS

7. 2. AIR INSECTICIDE

7. 3. GRANULAR INSECTICIDE

7. 4. MICROSEM INSECTICIDE

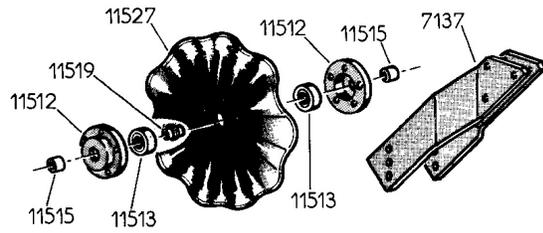
7. 5. DRY FERTILIZER

7. 7. LIQUID FERTILIZER

OPTIONAL EQUIPMENT

NO TILL COULTER

Unit Mounted



640652

PART No. DESCRIPTION

7137	Unit mounting coulter support
11512	Hub Disc
11513	Bearing (6204 -2RS)
11515	Spacing Ring Coulter
11519	Spindle, Coulter blade
11527	Coulter blade, 14'
640652	Complete Coulter

SPACERS

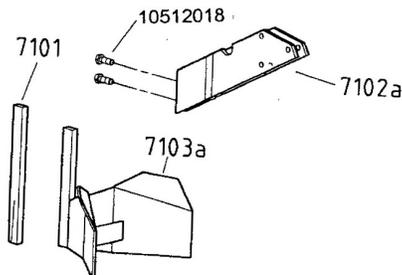
Front and Rear Spacers are used to hang accessories from a 2" x 2" diamond toolbar. The spacers are mounted on the 5" x 5" main frame toolbar.

PART No. DESCRIPTION

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.

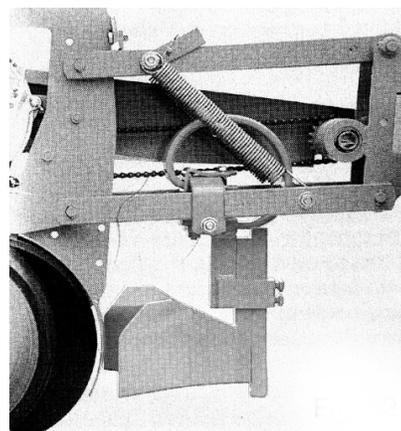
CLOD REMOVERS

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. The use of a clod remover in very rocky soils may be a problem due to clogging and blocking. In that event, it is better to mount a flexible support bracket for the clod remover as shown below.



PART No. DESCRIPTION

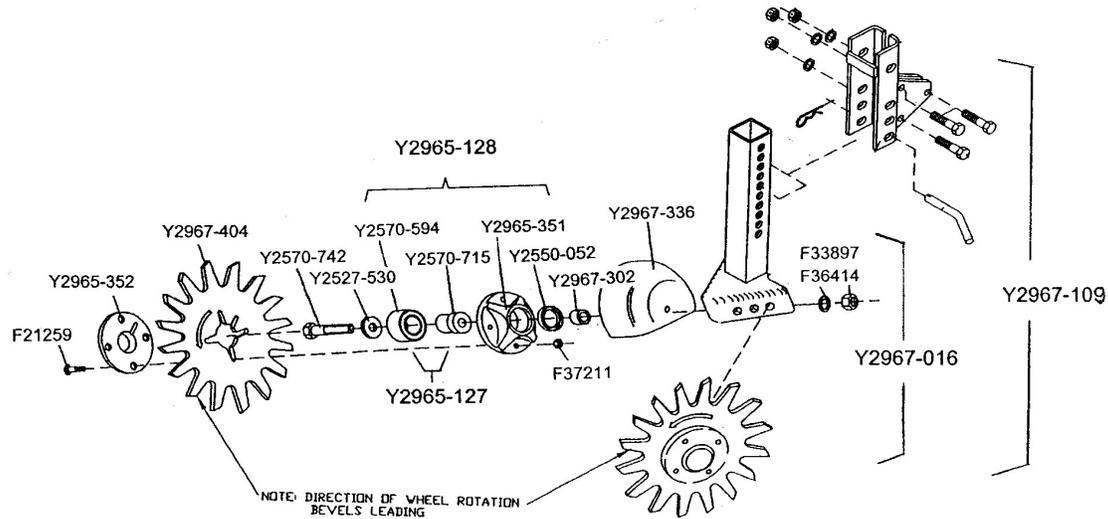
7101	Front point, clod remover
7102a	Mounting bracket, clod remover
7103a	Clod remover
10512018	Bolt , 10x35
650996	Complete clod remover



OPTIONAL EQUIPMENT

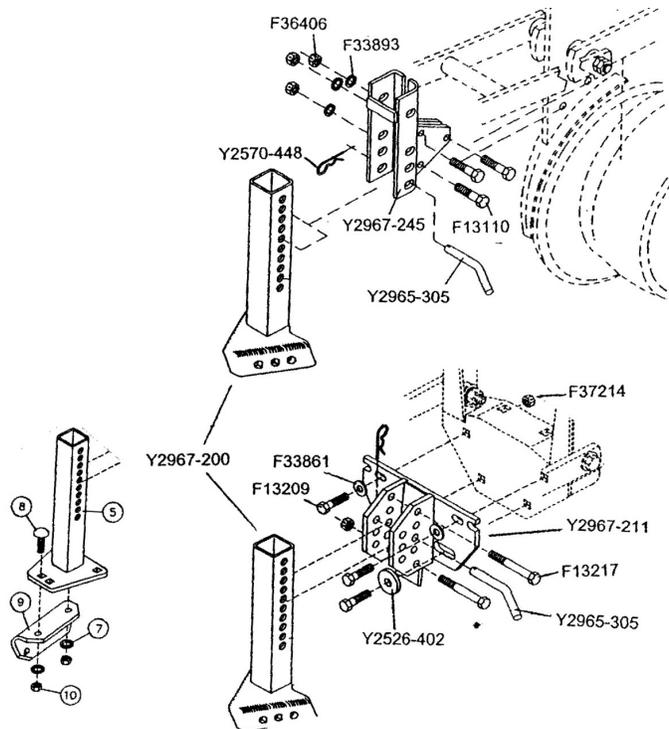
RESIDUE MANAGER

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



PART No.	DESCRIPTION
Y2967-109	Residue manager assy complete w/ mnt bracket

F13110	Bolt, 3/8 -16 x 1 3/4 Gr. 5
F13209	Bolt, 1/2- 13 x 1 1/2 Gr. 5
F13217	Bolt, 1/2- 13 x 3 1/2 Gr. 5
F21259	Carriage bolt, 5/16 -18 x 1 1/2 Gr. 5
F33861	Flat washer, 1/2
F33893	Lockwasher, 3/8
F33897	Lockwasher, 5/8"
F36406	Nut 3/8- 16
F36414	Nut, 5/8- 11
F37211	Rev lock nut, 5/16- 18
F37214	Rev lock nut, 1/2- 13
Y2526-402	Machine bushing, 9/16 ID x 1 3/4 OD x 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

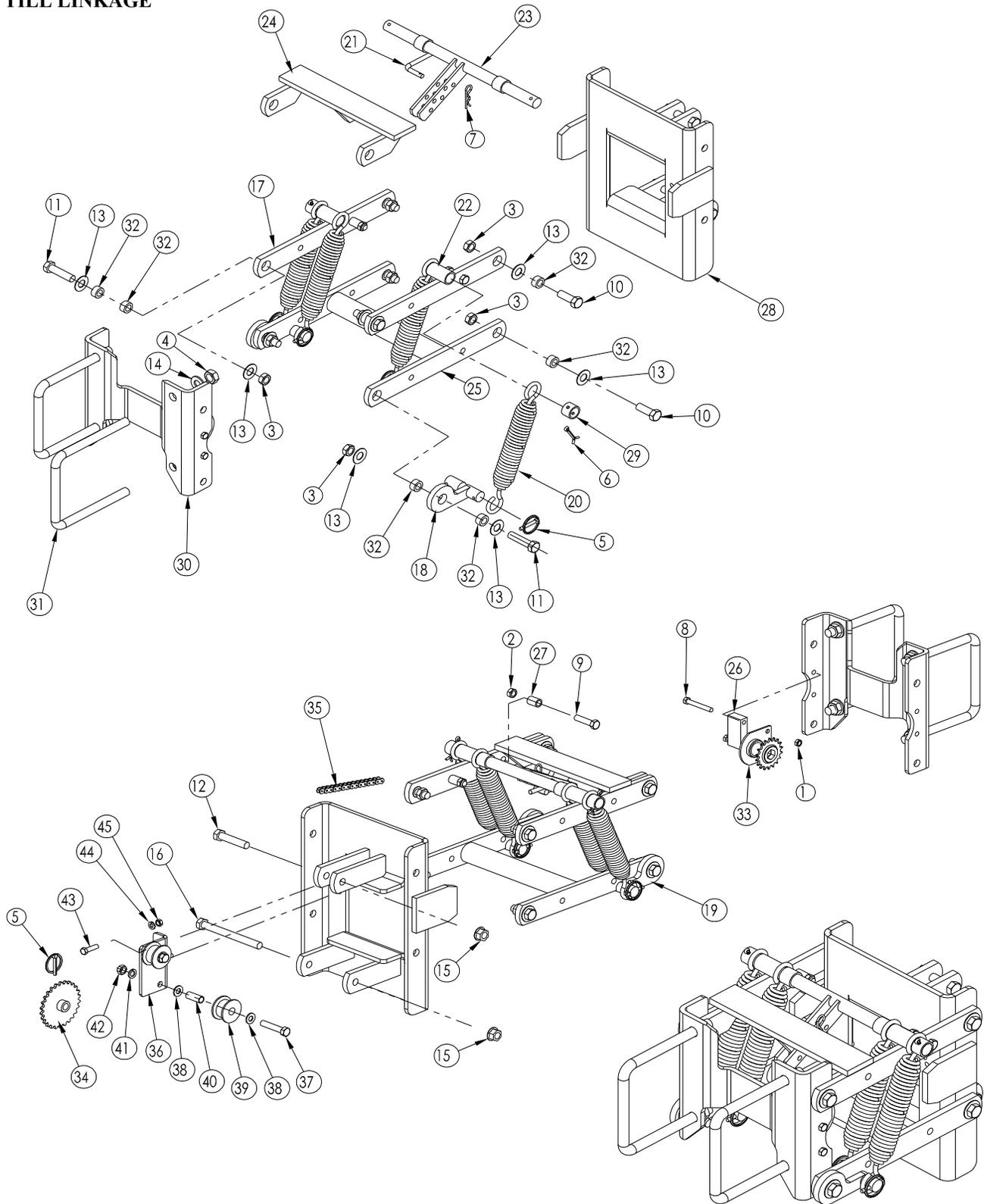


PART No.	DESCRIPTION
5	Y2967-234 Single Wheel Arm WA
7	Y2525-352 1/2 Medium Lockwasher ZP
8	Y2505-339 1/2- 13 x 1 1/2 Car. Clt GR 5 ZP
9	Y2967-405 Wheel Mount
10	Y2520-352 1/2- 13 Hex nut ZP

OPTIONAL EQUIPMENT

7" X 7" Toolbar Frame

NO TILL LINKAGE



OPTIONAL EQUIPMENT

7" X 7" Toolbar Frame

NO TILL LINKAGE

ITEM	PART No.	DESCRIPTION
1	F37264	Top lock nut, 3/8-16
2	F37268	Top lock nut, 1/2-13
3	F37272	Top lock nut, 5/8-11
4	F37274	Top lock nut, 3/4-10
5	6077	Lynch pin, 1/4 x 1 1/4
6	F65147	Cotter pin, 1/4 x 2
7	L1-557-010403	Hairpin, 1/8
8	F13114	Hex bolt, 3/8-16 x 2 3/4
9	F13211	Hex bolt, 1/2-13 x 2
10	F13310	Hex bolt, 5/8-11 x 1 3/4
11	F13313	Hex bolt, 5/8-11 x 2 1/2
12	F13315	Hex bolt, 5/8-11 x 3
13	F33863	Washer 5/8"
14	F33864	Washer 3/4"
15	F37349	Nut, flange head 5/8-11
16	F13326	Hex bolt, 5/8-11 x 6 1/2
17	L124546	Parallel arm
18	L124591	Spring anchor LH
19	L124592	Spring anchor RH
20	L124630	Spring
21	L124643	Pin, spring adjustment
22	L124645	Spacer
23	L124686	Spring bar
24	L124687	Front bar
25	L124700	Lower parallel arm
26	L124708	Spacer block sprocket
27	L124709	Spacer bushing
28	L124729	Baseplate
29	L125007	Bushing
30	L125158	Mounting plate
31	4502.SA	U-bolt, 7 x 7 x 3/4
32	L71505214	Bushing 1" OD x 17/32"
33	KA1720	Bearing sprocket
34	7110.S	Sprocket, 27 tooth #41 chain
35	900259	Chain, #41 x 124 links
36	800310	Roller bracket
37	F13213	Hex bolt, 1/2-13 x 2 1/2
38	F33012	Washer, 1/2"
39	KD0916	Chain roller
40	E7523.1	Bushing, 38mm
41	F33626	Lock washer, 1/2"
42	F37214	Reversible lock nut, 1/2-13
43	F13107	Hex bolt, 3/8-16 x 1 1/4
44	F33622	Lock washer, 3/8"
45	F36406	Hex nut, 3/8-16
	L124846	Linkage and spring kit (less sprocket, chain, and rollers)

ROW MARKERS

7" x 7" Toolbar Frame

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 center line of the planter. Both the planter and the marker assembly should be lowered to the ground when measurements are taken. The measurement should be taken from the point where the blade contacts the ground. Adjust the left and right row markers equally to the determined length and securely tighten the clamping bolts.

Example:

of Rows x Row Spacing (inches) = Dimension
between Planter Center line and
Marker Disc Blade.

6 rows x 30" row spacing = 180".

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



WARNING To avoid injury, stand clear and keep others away when raising or lowering markers. 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.



MARKER SPEED ADJUSTMENT

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

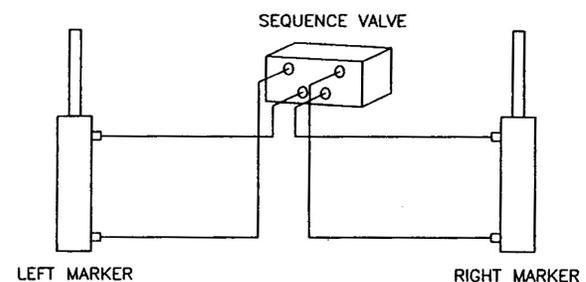
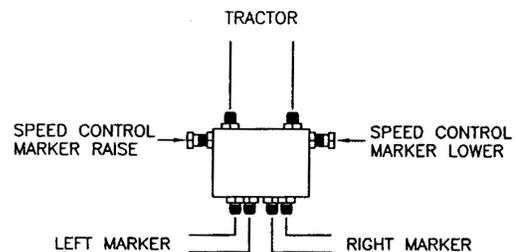


DANGER The flow controls should be properly adjusted before the marker assembly is first put into use. Excessive travel speed of the markers can be dangerous and/or damage the marker assembly.

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

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

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



Single central marker sequence valve

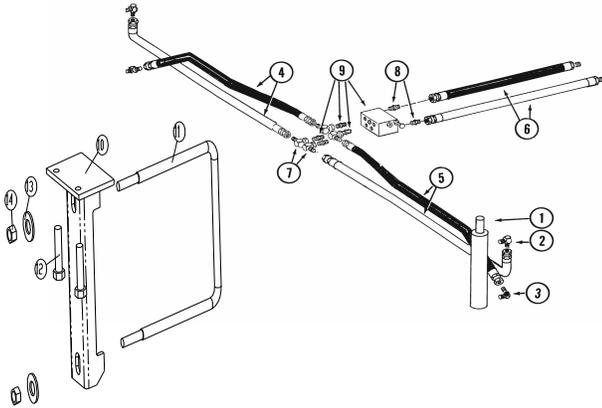
ROW MARKERS

7" x 7" Toolbar Frame

HYDRAULIC MARKER SYSTEM -Single Valve

ASSEMBLY

PH5024(R111)



ITEM	PART No.	DESCRIPTION
1		See marker asm
2	J6801-08	Elbow fitting
3	J6400-08	Hydraulic fitting
4	11459.S	3/8" Hydraulic hose asm
5	11459.S	3/8" Hydraulic hose asm
6	11459.S	3/8" Hydraulic hose asm
7	J6500-08-06	Hydraulic fitting
8	J6400-08-06	Hydraulic fitting
9	KA5552	Sequence valve
10	4853	Mounting bracket
11	4647.SS	3/8 U-Bolt
12	F13105	Hex bolt 3/8-16 x 1
13	F33008	3/8 Washer
14	F37024	Nylock 3/8-16

TROUBLESHOOTING

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

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

If the same marker is always operating,

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

If both markers lower and raise at the same time

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

Increase hydraulic flow, spool may not be shifting.

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

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

If neither marker will move

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

If the markers are moving too fast

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

If the marker operation speed is sporadically changing

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

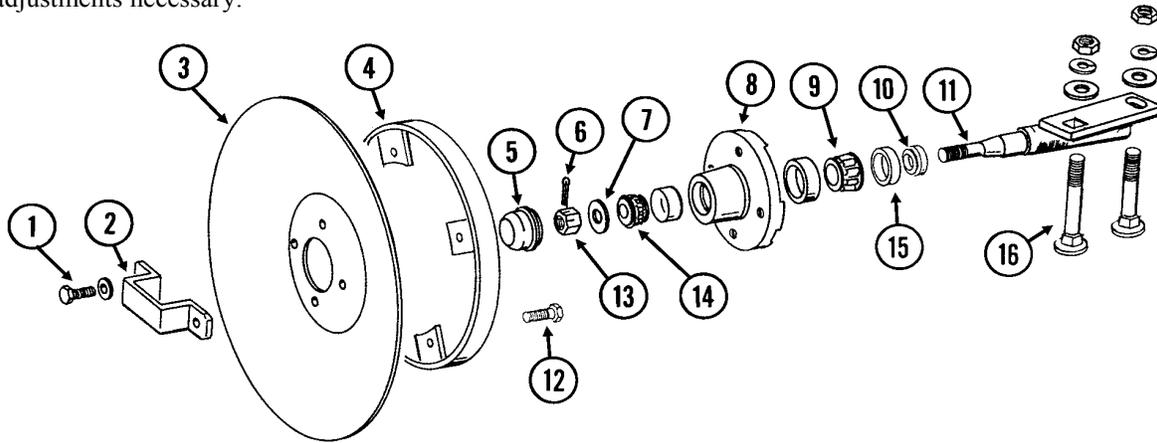
ROW MARKERS

Marker Spindle / Hub / Blade

The marker blade is installed so the concave side of the blade is outward to throw dirt away from the grease seals. The spindle bracket is slotted so the hub and blade can be angled to throw more or less dirt. To adjust the hub and spindle, loosen the hardware and move the bracket as required. Tighten the bolts to the specified torque.

IMPORTANT: A marker blade assembly that is set at a sharper angle than necessary will add unnecessary stress to the complete marker assembly and shorten the life of bearings and blades. Set the blade angle only as needed to leave a clear mark.

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



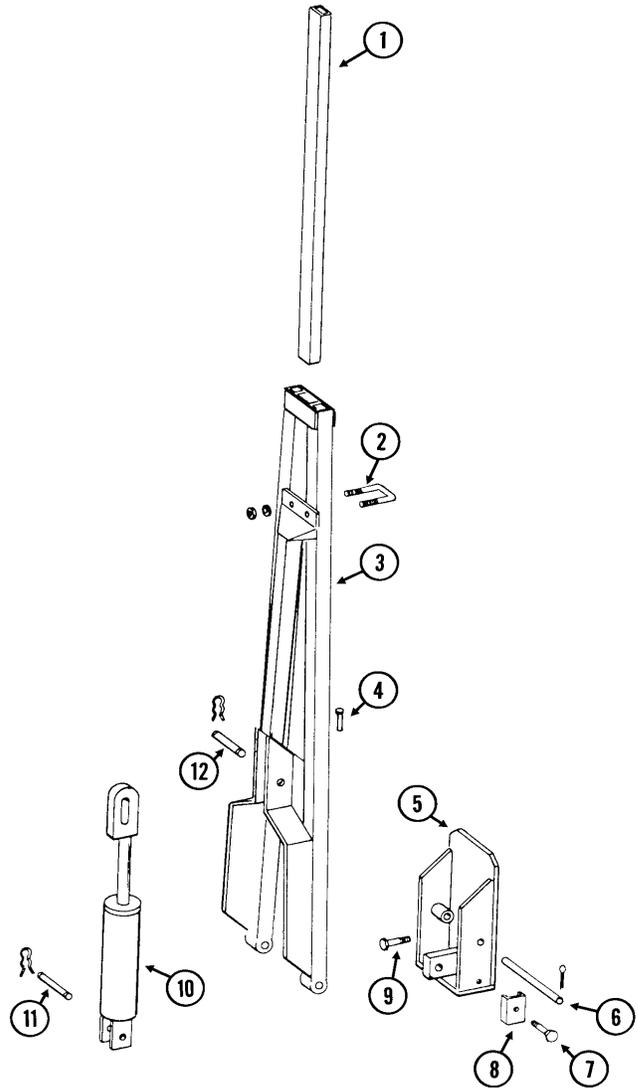
ITEM	PART No.	DESCRIPTION		
1	K10722	Hex head cap screw, 1/2" -20x 1"	15	KA0243 Grease seal
	W-5610	Lock washer, 1/2"	16	K10844 Carriage bolt, 1/2" -13x 3 1/2"
2	KD2597	Retainer		K10168 Machine bushing, 1/2", 7 gauge
3	KD0746	Solid blade, 16" (shown)		W-4610 Lock washer, 1/2"
	KD10283	Notched blade, 16" (Optional)		N-4000 Hex nut, 1/2" -13
4	KA5853	Depth band	A.	KA1678 Hub and spindle assy, RH
5	KD0840	Dust cap		KA1679 Hub and spindle assy, LH
6	K10544	Cotter pin, 5/32" x 1"		(Items 1, 2, 5-11, and 13-15)
7	W-5410	Washer, 5/8" SAE		
8	KA0167	Hub with cups		
	KR0151	Outer cup		
	KR0150	Inner cup		
9	KA0245	Inner bearing		
10	KA0899	Rubber seal		
11	KA1676	Spindle, righthand		
	KA1677	Spindle, lefthand		
12	H-2100	Hex head cap screw, 5/16" -18x 1"		
	K10109	Lock nut, 5/16"-18, grade 8		
13	K10725	Hex slotted nut, 5/8" -18		
14	KA0257	Outer bearing		

ROW MARKERS

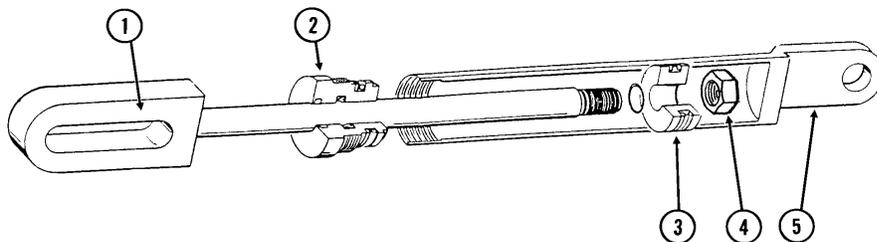
7" x 7" Single Fold Row Marker

ASSEMBLY

ITEM	PART No.	DESCRIPTION
1	KD0453-02	Extension tube 4R30
	KD0453-07	Extension tube 4RW/6R30
2	KD2721	U bolt, 2" x 2"x 1/2 -13
	K10228	Lock washer, 1/2"
	K10102	Hex nut, 1/2" -13
3	KA5175	Arm 4R30
	KA5184	Arm 4RW
	KA5183	Arm 6R30
	K10640	Grease fitting, 1/4" -28
4	KD0462	Safety lockup pin
	K10670	Hair pin clip, No. 3
	K10187	Spring pin, 5/32" x 2"
5	KA5177	Mount 4R30
	KA5178	Mount 6R30
	K10640	Grease fitting, 1/4" -28
6	KD0438	Pin, 13 1/2"
	K10460	Cotter pin 1/4x2"
7	K10133	Hex head cap screw, 5/16" -18x 1 1/2"
	K10109	Lock nut, 5/16" -18
8	KD5892	Hose clamp, 5/8" x 1 1/2" x 1 1/2"
9	K10008	Hex head cap screw, 5/8" -11x 2"
	K10230	Lock washer 5/8
10	KA8919	Cylinder
11	KR0367	Pin, 2 7/8"
	KR0193	Clip
12	KR0375	Pin, 3 1/2"
	KR0193	Clip



SINGLE FOLD MARKER CYLINDER

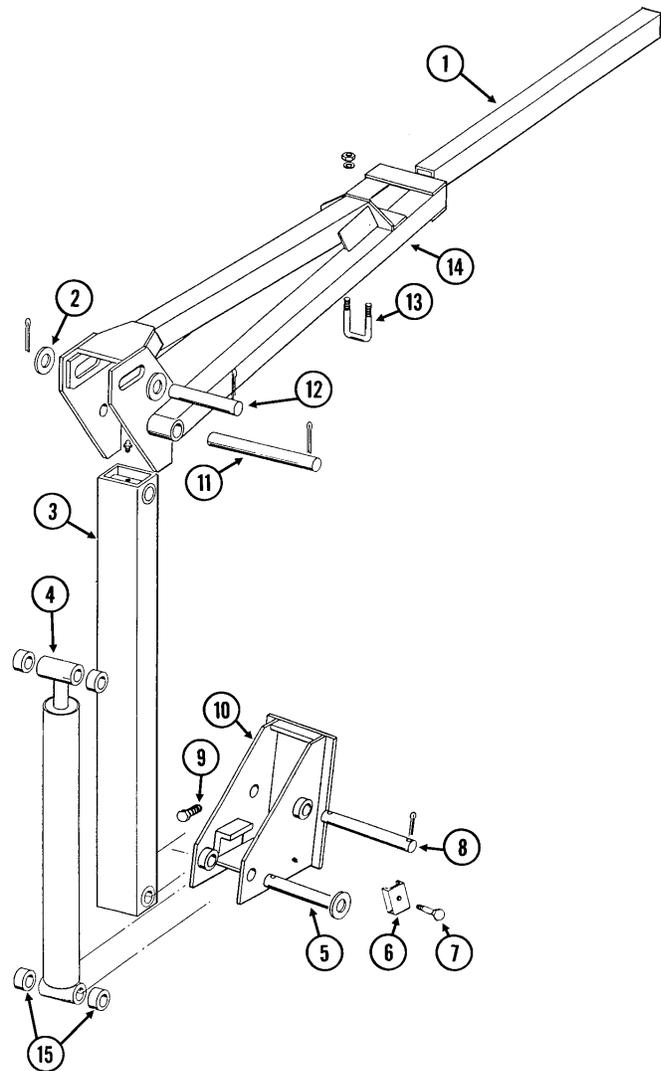


ITEM	PART No.	DESCRIPTION
	KA8919	Cylinder complete, 2" x 8"
1	KA8918	Rod assembly
2	KD12510	Gland
3	KD12511	Piston
4	K10967	Lock nut, 3/4" -16
	KR1529	Seal kit, includes 1 T seal, 2 O-rings, 1 BU ring, 1 U cup, 1 wiper

ROW MARKERS

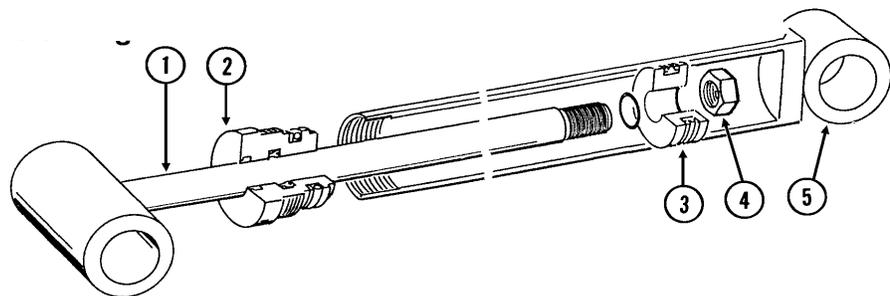
7" x 7" Two Fold Row Marker

ITEM	PART No.	DESCRIPTION
1	KD0453-03	Extension tube 6RW/8R30
2	K10226	Washer, 1 1/4" SAE
3	KA5173	First stage arm w/ grease fittings
	K10641	Grease fitting, 1/8" NPT
4	KA9443	Cylinder
5	KD15386	Pin, 1 1/4" x 7 5/8"
	K10460	Cotter pin, 1/4"x 2"
6	KD5875	Hose clamp
7	K10133	Hex head cap screw, 5/16" -18x 1 1/2"
	K10109	Lock nut, 5/16" -18
8	KD0652	Pin, 1 1/4" x 9 1/2"
	K10460	Cotter pin, 1/4"x 2"
9	K10879	Flanged 12 point bolt 5/8" -11x2
10	KA5130	Mount
11	KD3214	Pin, 1 1/4" x 12 1/4"
	K10460	Cotter pin, 1/4"x 2"
12	KD2161	Pin, 1 1/4" x 8 1/4"
	K10460	Cotter pin, 1/4"x 2"
13	KD2721	U bolt, 2"x 2"x 1/2" -13
	K10228	Lock washer, 1/2"
	K10102	Hex nut, 1/2" -13
14	KA5190	Second stage arm 6R36/38
	KA5188	Second stage arm 8R30
15	KD0752-41	Sleeve 1" (if applicable)



TWO FOLD MARKER CYLINDER

3/4" - 16 O-Ring Ports



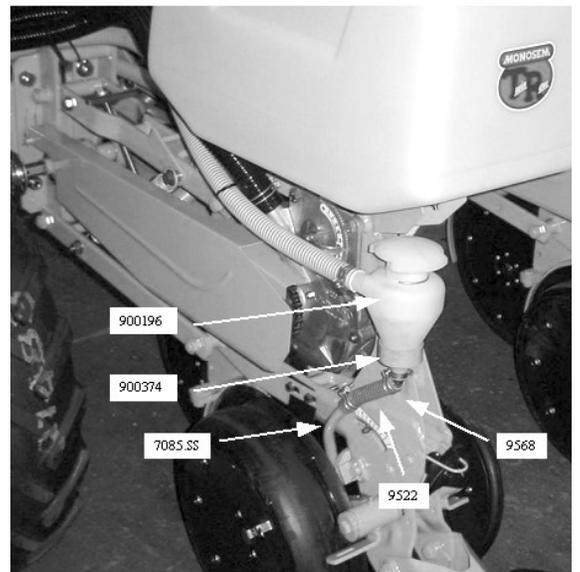
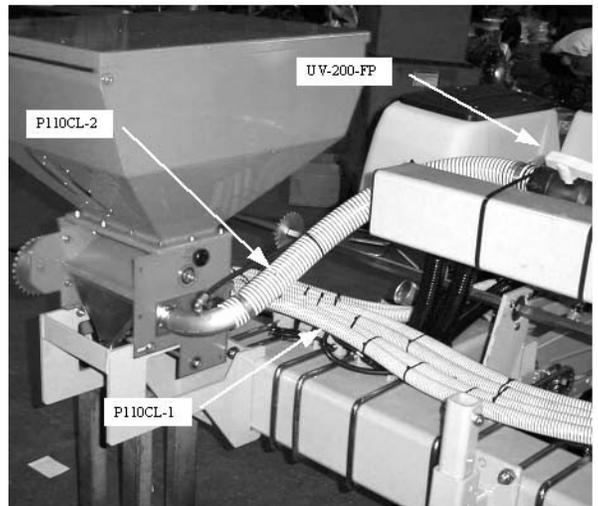
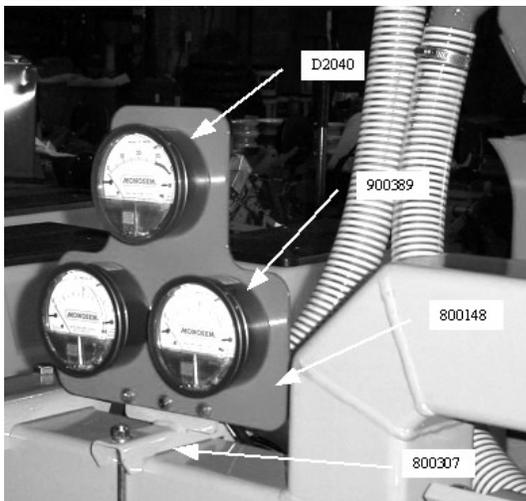
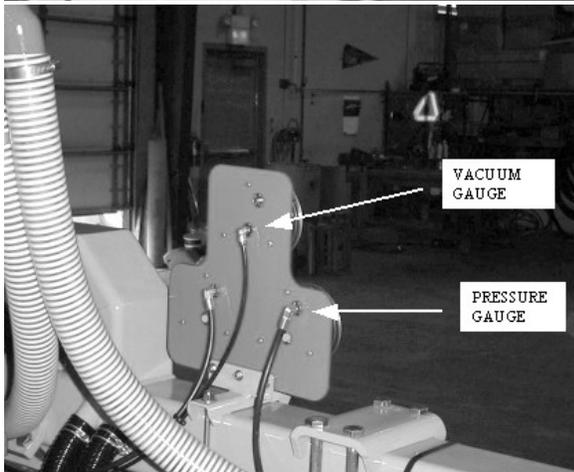
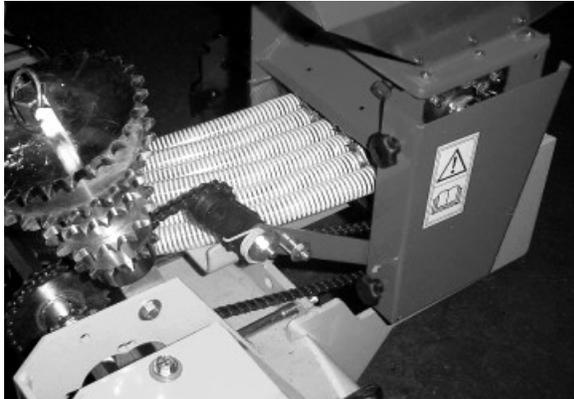
ITEM	PART No.	DESCRIPTION
	KA9443	Cylinder complete, 2" x 20 1/16"
	KA9440	Rod assembly
	KD12510	Gland
3	KD12511	Piston
4	K10967	Lock nut, 3/4" -16
	KR1529	Seal kit, includes 1 T seal, 2 O-rings, 1 BU ring, 1 U cup, 1 wiper

AIR INSECTICIDE

SYSTEM ASSEMBLY

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

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

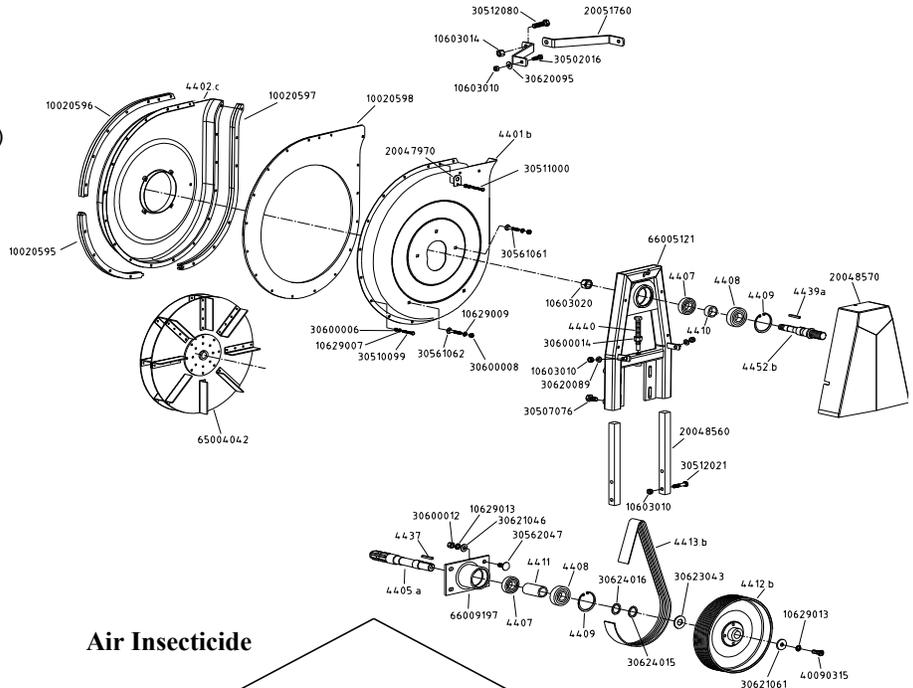


PART NO.	DESCRIPTION
D2040	Vacuum Gauge
90389	Pressure Gauge
800148	Panel Triple Gauge
800307	Bracket Gauge panel
UV-200-FP	2” Ball valve, (requires Fitting TERHB200-200, qty 2)
P110CL-2	2” Hose (Specify Length)
P110CL-1	1” Hose (Specify Length)
UV-200-FP	2” Ball valve, (requires Fitting TERHB200-200,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

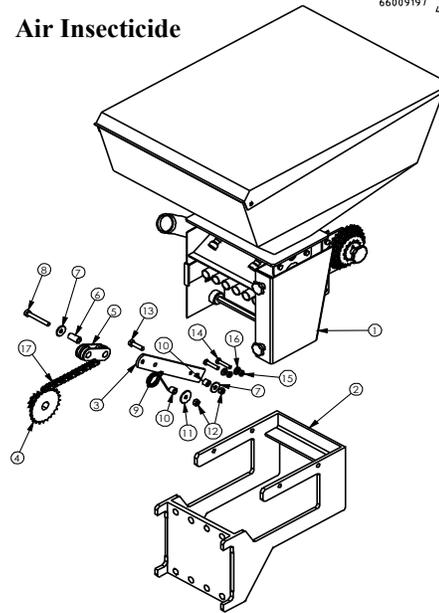
AIR INSECTICIDE

Double Turbofan

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



Air Insecticide



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

MICROSEM MICROGRANULAR INSECTICIDE SYSTEM

STANDARD MICROSEM SYSTEM

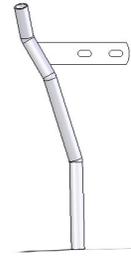
The microsem system meters microgranular products such as insecticide and herbicide with precision. The system is ground driven and has a positive displacement. The output is set by means of a transmission that is unaffected by a change in planting speed. The microsem system is mounted to the toolbar 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.

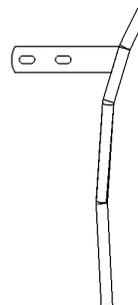
INSECTICIDE DROP TUBE

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

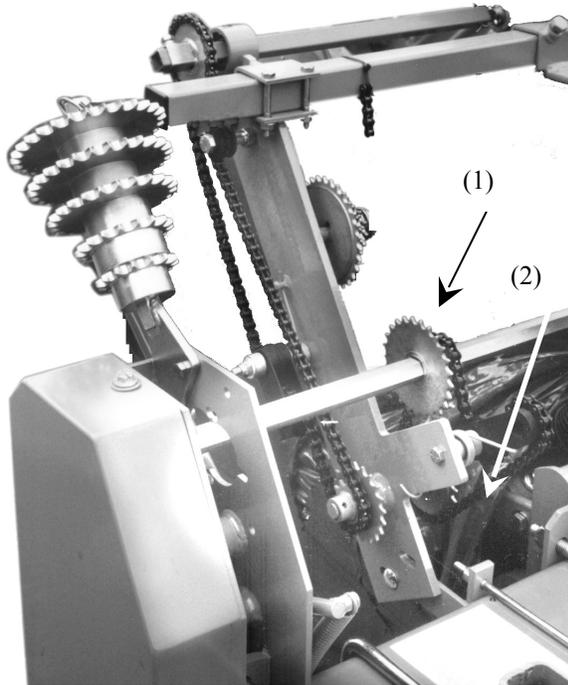


Mounts on the left hand side of the unit, with the same bolts that attach the disc scraper. It deposits material down in the seed trench behind the seed tube. The top of the tube curves towards the rear to accept the feeder hose from the Air Insecticide System.

MICROSEM MICROGRANULAR INSECTICIDE SYSTEM

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.

$$\begin{aligned} \text{Ounces} & \times 31.103481 = \text{grams} \\ \text{Inches} & \times 2.54 = \text{cm} \end{aligned}$$

Use the following formula:

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

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

Possible Sprocket Combinations

Ratios Obtained

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

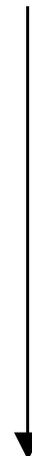
Less Product



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

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

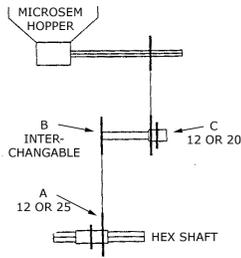
More Product



MICROSEM MICROGRANULAR INSECTICIDE SYSTEM

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

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

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

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

#'s per acre	17.82	19.60	21.40	23.20				
COUNTER 15G 22"	25/ 18/ 20	25/ 16/ 20	25/ 15/ 20	25/ 14/ 20				
LORSBAN 15G 30"	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	3.56	8.90	10.95	13.35	17.80	22.25	26.70	
TEMIK 15G 22"		12 / 18 / 12	12 / 15 / 12	12 / 22 / 20	12 / 15 / 20	25 / 15 / 12	25 / 22 / 20	
GYPSUM 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	1.78	4.45	8.90	
TEMIK 15 G 22"		12 / 15 / 12	25 / 12 / 12	
CORNCOB 30"	12 / 25 / 12	25 / 22 / 12	25 / 18 / 20	
GRIT 36"	12 / 22 / 12	12 / 15 / 20	25 / 15 / 20	
40"	12 / 18 / 12	25 / 15 / 12	25 / 12 / 20	

#'s per acre	2.70	3.20	3.70	4.50	5.60	6.70	7.80	9.40
ZENECA 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
FORCE 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
3G 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	

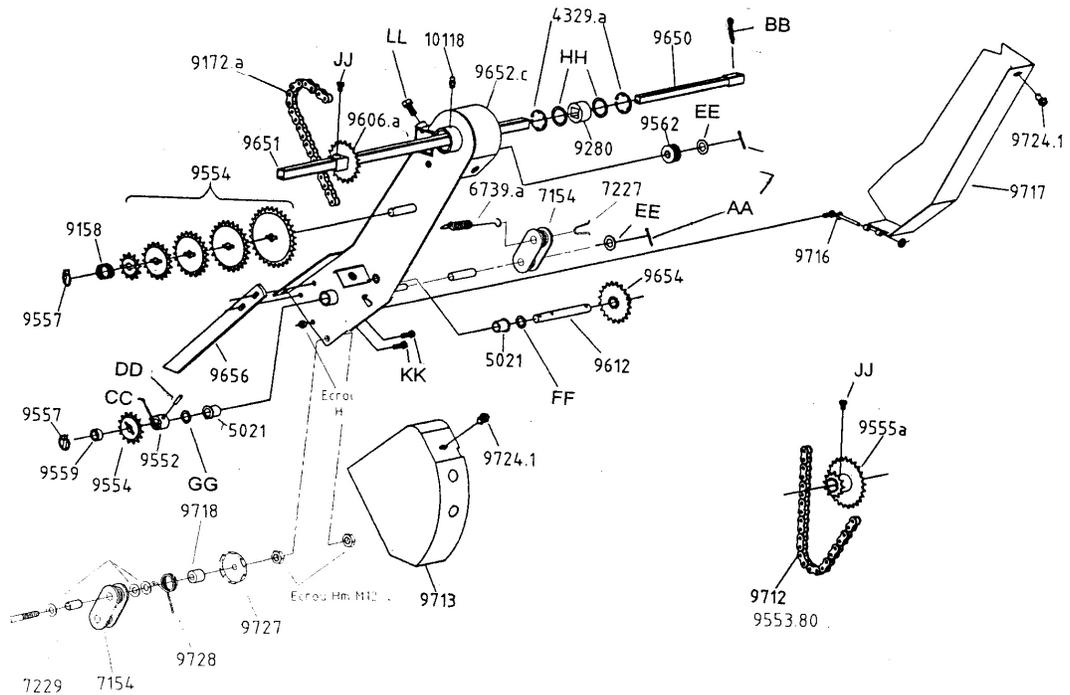
#'s per acre	3.40	4.00	4.60	4.90	5.50	6.70	8.10	10.10
RIDOMIL 22"	12 / 22 / 12	12 / 18 / 12	12 / 16 / 12	12 / 15 / 12	12 / 22 / 20	12 / 18 / 20	12 / 15 / 20	25 / 15 / 12
GOLD GR 30"	12 / 16 / 12	12 / 15 / 12	12 / 22 / 20	12 / 18 / 20	25 / 20 / 12	25 / 18 / 12	25 / 22 / 12	25 / 18 / 20
PC11G 36"	12 / 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	3.10	3.50	4.20	5.10	5.70	7.00	8.50	10.60
GOLD PC 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	13.50	16.00	20.00	22.40
AMEBIN 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

Standard Microsem Transmission



PART No. DESCRIPTION

4329.a	Snapping
5021	Self lubricated bushing
6739.a	
7154	Idler
7227	Spring stop Idler
7229	
9158	Spring (holds on extra sprockets)
9280	Bushing, nylon w/square hole
9552	Bushing, requires 2-4x25 & 1-6x30 roll pin
9553.80	Chain microsem drive
9554.11	Sprocket, 20 tooth, 5R
9554.13	Sprocket, 22 tooth, 5R(standard)
9554.16	Sprocket, 25 tooth, 5R(standard)
9554.21	Sprocket, 30 tooth, 5R(standard)
9554.26	Sprocket, 35 tooth, 5R
9554.3	Sprocket, 12 tooth, 5R(standard)
9554.4	Sprocket, 13 tooth, 5R
9554.5	Sprocket, 14 tooth, 5R
9554.6	Sprocket, 15 tooth, 5R(standard)
9554.7	Sprocket, 16 tooth, 5R
9555.a	Double sprocket, 12-25 tooth, 5R(hex bore)
9554.9	Sprocket, 18 tooth, 5R(standard)
9557	Lynch pin, small(6mm)
9559	Bushing (17mmID x 25mmOD, 10mm long)
9606.a	Sprocket, 20 tooth, 5R, top dr shaft(square)
9612	Intermediate shaft(3 holes,2 for 6x30 roll pins)
9650.09	Drive shaft(inner), 33-1/2" long
9651.09	Drive shaft(outer), 33-1/2" long

PART No. DESCRIPTION

9651.12	Drive shaft(outer), 47" long
9654	shaft
9656	Support arm (for drive frame)
9658	Bushing (12mmID x 19mmOD, 24mm long)
9712.a	Chain, 5R(106 links w/conn. link)
9713	Shield for drive chain
9716	Pivot pin weldment
9717	Shield for drive chain
9718	
9719	
9724.1	Shield keeper bolts
9727	Disc for spring, chain idler
9728	
10118	Grease zerk, 6mm, straight
642500	Complete drive shaft(33-1/2" & 47")
642502	Complete drive shaft(both 33-1/2")
AA	10170031 -Cotter pin, 3.5 x 25
BB	10170068 - Cotter pin, 5 x 45
CC	10172041 - Roll pin, 4 x 25
DD	10172091 - Roll pin, 6 x 30
EE	10621026 - Washer, 13 x 18 x 2
FF	10622024 - Washer, 16 x 26 x 1
GG	10622044 - Washer, 17 x 30 x 2
HH	10624016 - Washer, 31 x 41 x 2
JJ	F38613 - hex bolt, 8 x 12
KK	F38616 - hex bolt, 8 x 25
LL	F38705 - hex bolt, 12 x 25
MM	F38716 - hex bolt, 12 x 80

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.

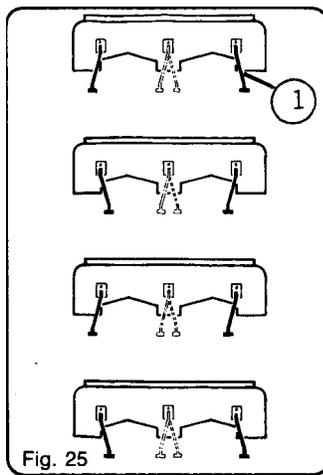
DRY FERTILIZER

3-Point Mounted Planters

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

3-point 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

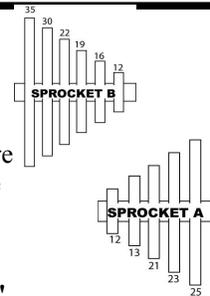
NOTE: Because all fertilizers do not have the same density and the granules can be irregular, it is impossible to furnish an exact setting chart.

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	120
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

ASSEMBLY

PART No.	DESCRIPTION	PART No.	DESCRIPTION
4329.a	Snapping, internal	9262.1a	Standard auger (blue)
4502	U bolt, 16mm	9262.2	High output auger (red)
4515	Bearing complete with flangettes	9262.2a	High output auger (red) w/small ends
4515.1	Bearing only (205KRRB2)	9263.1	Trap door - 1 outlet
4515.2	Flangettes (2)	9263.2	Trap door - 2 outlet
5021	Bushing (self lubricated)	9264.b	Spindle, meter assembly
7009	Disc only	9265	Auger cover, (9" wide)
7009.1a	Disc complete w/hub & bearing	9265.a	Auger cover, (4 3/4" wide)
7010.a	Hub only (mounts with 6x20 bolts)	9266.1	Telescoping drive shaft between meters, complete
7012.ga	Lefthand spindle	9266.2	Drive shaft between meters
7012.da	Righthand spindle	9267	Hinge for trap door
7014.a	Bearing	9268	Hopper reinforce strap (8x18 carriage bolt)
7015.a	Sealing washer	9269.1a	Sieve for 1 outlet hopper
7016.d	Right scraper, inside	9269.2a	Sieve for 2 outlet hopper
7016.g	Left scraper, inside	9269.3a	Sieve for 3 outlet hopper
7017.b	Bracket, for outside scrapers	9270	Sieve hanger bracket
7018.a	Outside scraper	9271	Plastic cap
9153.1c	Tine offset to the left	9272	Hopper reinforce strap (8x18 carriage bolt)
9153.2c	Tine offset to the right	9273	Plastic plug for outlet on trap door
9154.a	Reinforcement bar	9280	Bushing (square hole) supports drive shaft
9157.a	Fertilizer knife w/point	9286	Fixed mounting bracket
9157.1	Replacement cast point (5x34 rivets)	9287	Adjustable mounting bracket
9169.a	Support bracket	9288	Hopper support bracket
9170.a	Clamp bracket	9289.1	Support bar (1'4")
9171.b	Upper sprocket cluster (12-16-19-22-30-35)	9289.2	Support bar (2' 10")
9172.b	Chain, 5R (108 links w/conn link)	9289.3	Support bar (4' 6")
9173.a	Support bracket for drive shaft (single bushing)	9310.02	Drive shaft, hex (inner) (.235cm)
9173.1	Support bracket (double bushing)	9311.02	Drive shaft, hex (outer) (.215cm)
9174	Spring	9311.04	Drive shaft, hex (outer) (.38cm)
9179	Chain tightener bracket	9311.05	Drive shaft, hex, (outer) (.52cm)
9180.b	Main housing for assembly	9525	End cap
9181	Spring support for discs	9555.a	Lower sprocket cluster (12-25)
9182	Mounting bar	9555.2	Lower sprocket cluster (12-13-21-23-25)
9183	Clamp for disc assembly	9562	Chain idler roller
9183.1	Clamp for knife assembly	F38706	Bolt, 12x30
9184	Shield	F40179	Nylon locknut, 16mm
9254.1	Fertilizer hopper, 1 outlet, 225 lb capacity	10170068	Cotter pin, 5x45
9254.2a	Fertilizer hopper, 2 outlet, 400 lb capacity	10172065	Roll pin, 5x30
9254.3a	Fertilizer hopper, 3 outlet (625 lb capacity)	10172093	Roll pin, 6x40
9255	Meter housing, aluminum	10173018	Roll pin, 8x30
9255.asy	Meter assy complete, with High output auger	10176003	Rivet, 5x34 countersunk head
9256	Spring, trap door	10500094	Bolt, 6x20 (mount disc to hub)
9257.1	Metal lid for 1 outlet hopper	10508007	Bolt, 16x30
9257.2	Metal lid for 2 outlet hopper	10561053	Carriage bolt 8x18mm
9257.3	Metal lid for 3 outlet hopper	10562016	Carriage bolt 10x25
9258	Hose clamp	10621024	Washer, 13x18x2
9259.a	Support, inside 3-row hopper	10624014	Washer, 31x41x1
9261	Support inside hopper		

LIQUID FERTILIZER

3-point Mounted Planters

PUMP MOUNTING AND HOSE ARRANGEMENT

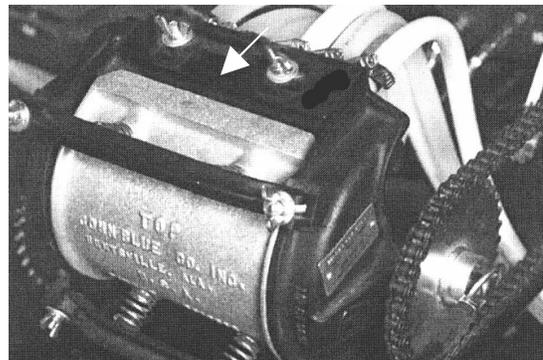
The squeeze pump is shipped with the discharge manifold in the rearward or non-operating position. Before operating or mounting the pump, position the discharge manifold in the forward or operating position and secure by tightening the wing nuts.

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.

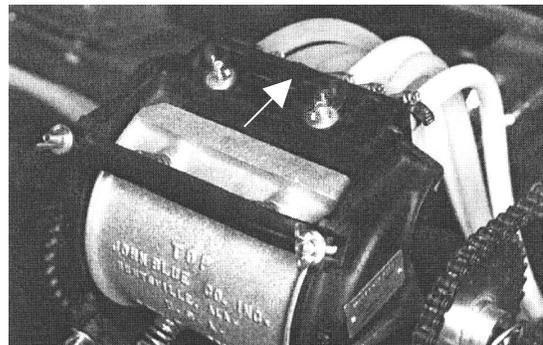
The shut-off valves should be closed to shut off the flow when the pump is not in use, either overnight, or for an extended amount of time. Also close the valves when servicing either the pump or the hoses.

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

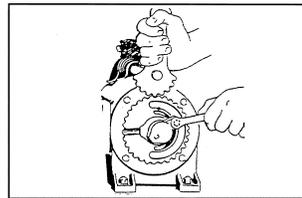
L-1383	8	40.0	43.0	44.5	53.3
L-1384	9	35.9	38.2	39.5	47.4
L-1385	10	32.2	34.3	39.5	42.6
L-1386	15	21.5	22.9	23.6	28.4
L-1381	20	16.1	17.1	17.7	21.3
L-1387	22	14.6	15.6	16.1	19.3
L-1388	23	14.0	14.9	15.4	18.4
L-1389	26	12.5	13.3	13.7	16.5
L-1390	30	10.7	11.4	11.8	14.2
L-1391	31	10.3	11.0	11.3	13.6
L-1392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

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:

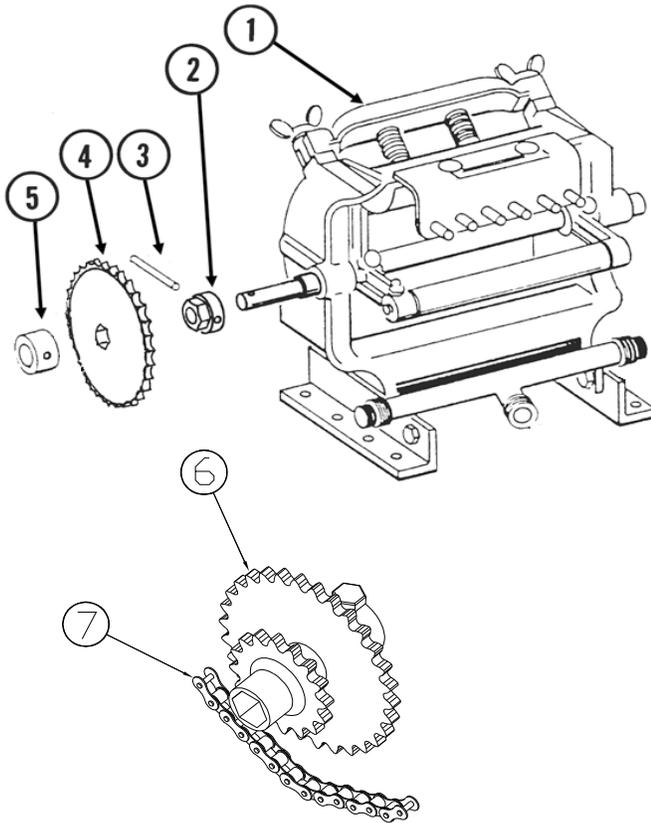
For 36" rows, multiply by .83 by result

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.