MASSEY FERGUSON

MF 9000

Series Planters

Models: 9202 / 9222

SERVICE MANUAL

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Massey Ferguson®

9202 / 9222
Planter

SERVICE MANUAL
4283528M1

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GENERAL INFORMATION

GENERAL

FIG. 1

FIG. 1: Model 9222 Horizontal Wing Fold Planter

Horizontal Wing Fold Planters use forward folding frame designs, providing narrow transport widths for pull-type 12-row models. The planter is a good selection for customers with no-till or reduced-tillage operations. All models are available with rigid or flexible frames.

The models include:

Model 9202	12-Row, 30 inch	Rigid Frame
Model 9222	12-Row, 30 inch	Flex Frame

The planters use row units with positive air metering for accurate seed spacing.

This manual contains information necessary for the correct adjustment and safe operation of your planter. Read the manual carefully.

WARNING: Pictures in this manual may show protective shields and guards opened or removed for illustration purposes. Be sure all shields and guards are in place during operation.

This manual was prepared from the latest information available at publication time. The Company reserves the right to make changes at any time without notice or obligation.

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SERIAL NUMBER PLATE LOCATION

FIG. 2: The serial number plate (1) is located on the left end of the frame.

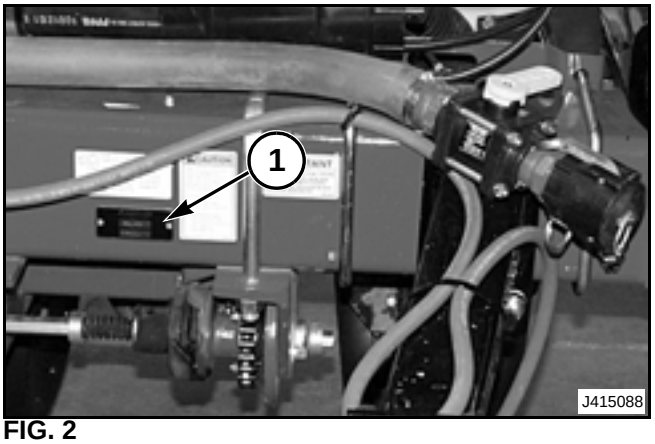

FIG. 2

Serial Number Description

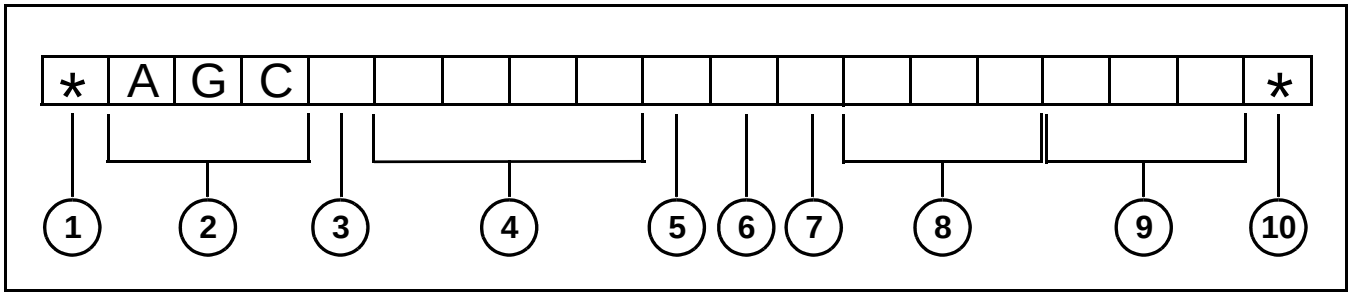

FIG. 3

FIG. 3: Description of the serial number for model year 2010 and up.

(1) Beginning symbol

(2) World Manufacturer Code

(3) Brand Code

(4) Model Identifier (Model number)

(5) Check Letter (0 or used if model identifier is five digits)

(6) Model Year Code (A=2010, B=2011, C=2012, and on)

(7) Plant Code

(8) Family Code

(9) Unit Number for the Year

(10) Ending symbol

NOTE: For serial number breaks in this manual, only the information from the model year code and following will be given.

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SAFETY INFORMATION

This is the safety alert symbol. The safety alert symbol will direct your attention to information that involves your safety.

Read and understand all safety information in the machine operator's manual before continuing with these instructions.

PREPARATION

Clean oil, dirt, and crop material from the area on the machine where the work is to be done.

SAFETY ALERT SYMBOL

FIG. 4: The safety alert symbol means ATTENTION! BECOME ALERT! YOUR SAFETY IS INVOLVED!

Look for the safety alert symbol both in this manual and on safety signs on this machine. The safety alert symbol will direct your attention to information that involves your safety and the safety of others.

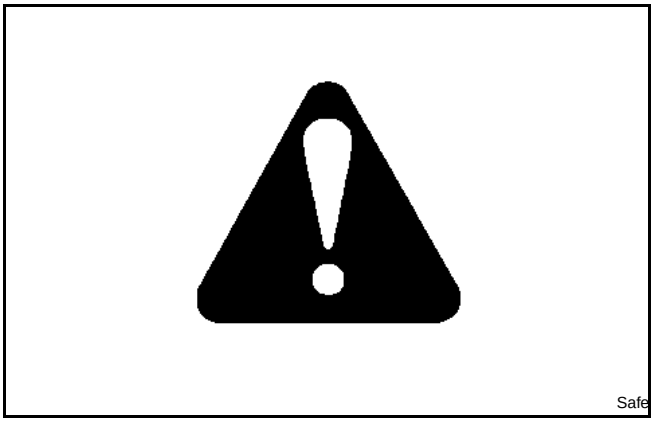

FIG. 4

SAFETY MESSAGES

FIG. 5: The words DANGER, WARNING or CAUTION are used with the safety alert symbol. Learn to recognize these safety alerts and follow the recommended precautions and safety practices.

DANGER: Indicates an imminently hazardous situation that, if not avoided, will result in DEATH OR VERY SERIOUS INJURY.

WARNING: Indicates a potentially hazardous situation that, if not avoided, could result in DEATH OR SERIOUS INJURY.

CAUTION: Indicates a potentially hazardous situation that, if not avoided, may result in MINOR INJURY.

FIG. 5

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INFORMATIONAL MESSAGES

The words IMPORTANT and NOTE are not related to personal safety, but are used to give additional information and tips for operating or servicing this equipment.

IMPORTANT: Identifies special instructions or procedures which, if not strictly observed, could result in damage to or destruction of the machine, process, or its surroundings.

NOTE: Identifies points of particular interest for more efficient and convenient repair or operation.

SAFETY SIGNS

WARNING: DO NOT remove or obscure safety signs. Replace any safety signs that are not readable or are missing. Replacement signs are available from your dealer in the event of loss or damage. The actual location of the safety signs is illustrated at the end of this section.

If a used machine has been purchased, make sure all safety signs are in the correct location and can be read.

Replace any safety signs that can not be read or are missing. Replacement safety signs are available from your dealer.

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A WORD TO THE OPERATOR

FIG. 6: It is YOUR responsibility to read and understand the safety section in this manual and the manual for all attachments before operating this machine. Remember YOU are the key to safety. Good safety practices not only protect you, but also the people around you.

Study the features in this manual and make them a working part of your safety program. Keep in mind that this safety section is written only for this type of machine. Practice all other usual and customary safe working precautions, and above all REMEMBER - SAFETY IS YOUR RESPONSIBILITY. YOU CAN PREVENT SERIOUS INJURY OR DEATH.

This safety section is intended to point out some of the basic safety situations that may be encountered during the normal operation and maintenance of your machine. This section also suggests possible ways of dealing with these situations. This section is NOT a replacement for other safety practices featured in other sections of this manual.

Personal injury or death may result if these precautions are not followed.

Learn how to operate the machine and how to use the controls properly.

Do not let anyone operate the machine without instruction and training.

For your personal safety and the personal safety of others, follow all safety precautions and instructions found in the manuals and on safety signs affixed to the machine and all attachments.

Use only approved attachments and equipment.

Make sure your machine has the correct equipment needed by the local regulations.

WARNING: An operator should not use alcohol or drugs which can affect their alertness or coordination. An operator on prescription or 'over the counter' drugs needs medical advice on whether or not they can properly operate machines.

CAUTION: If any attachments used on this equipment have a separate Operator Manual, see that manual for other important safety information.

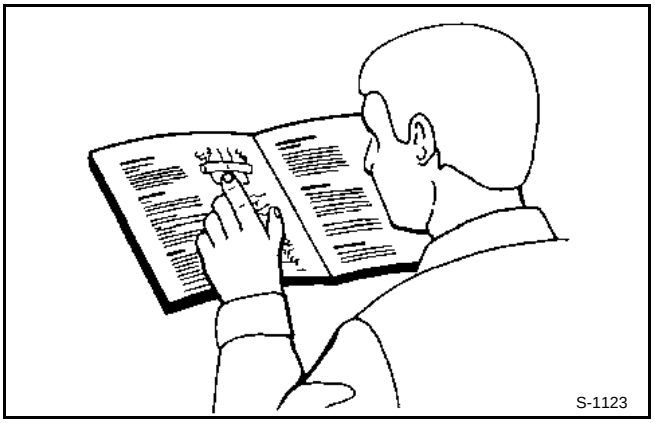

FIG. 6

WHEEL LIFT CYLINDER STOPS

WARNING: Install wheel lift cylinder stops in the storage positions when not in use.

WARNING: To avoid walking under raised planter, wheel lift cylinder stops must be installed when planter is unfolded.

WARNING: Always install wheel lift cylinder stops when working under or around planter and when transporting planter.

FIG. 7: With the planter fully raised, install wheel lift cylinder stops (1) on wheel lift cylinders. Install pin through each wheel lift cylinder stop.

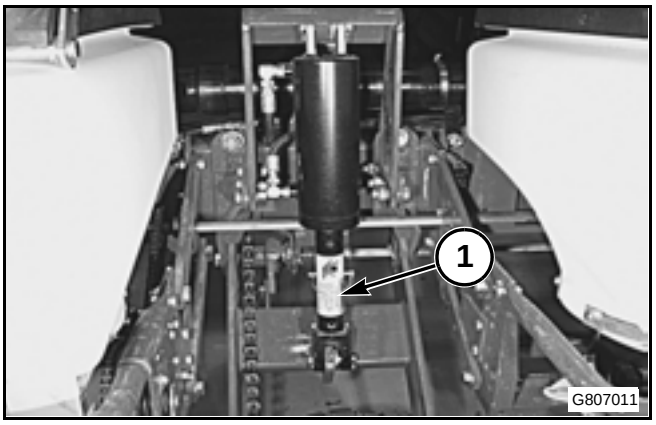

FIG. 7

FIG. 8: Wheel lift cylinder stops (1) in the storage position. Install pin through each wheel lift cylinder stop.

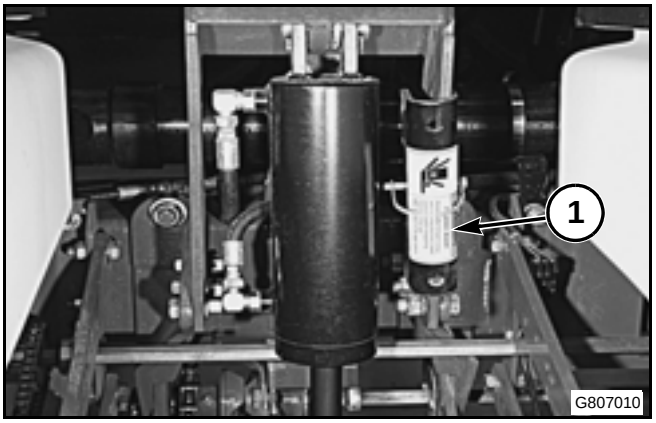

FIG. 8

MARKER LOCKUP VALVES

WARNING: Always lock up markers in raised and folded position when working around, storing or transporting planter.

FIG. 9: With markers fully raised, turn marker lockup valves to lockup (closed) position to stop fluid flow to marker lift cylinders.

The marker lockup valve (1) is in the closed position.

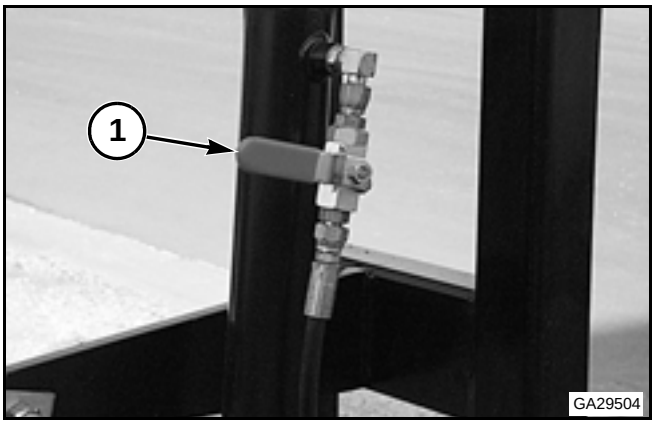

FIG. 9

FIG. 10: To operate markers, turn marker lockout valves to operating (open) position.

The marker lockup valve (1) is in the open position.

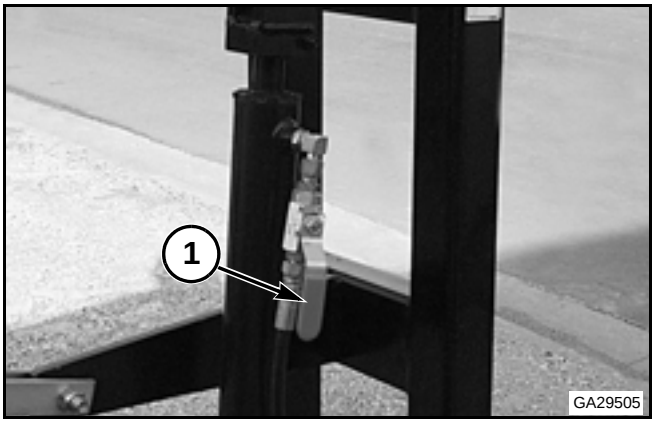

FIG. 10

WING LATCHES

FIG. 11: When the planter wings are folded and latches (1) are engaged, install pins (2) to keep latches closed. When wings are unfolded, keep pins in storage holes.

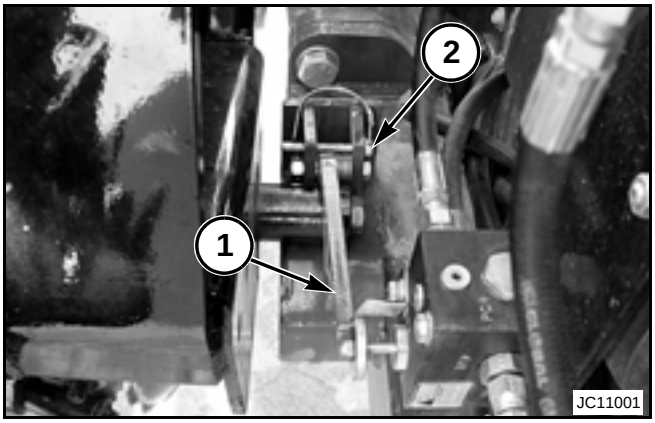

FIG. 11

FIG. 12: Lock Pin Locations

(1) Locked Position

(2) Storage Position

(3) Latch

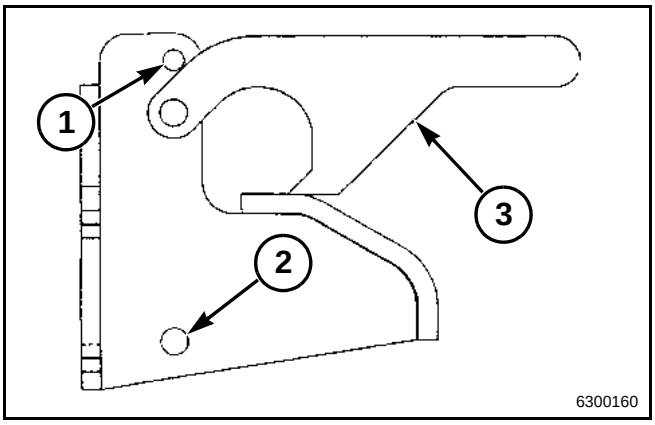

FIG. 12

TOP LINK - FLEX FRAME

WARNING: Always install top link when servicing, storing, or transporting the planter.

FIG. 13: With the planter fully raised, install top link (1) with pins and pin clips.

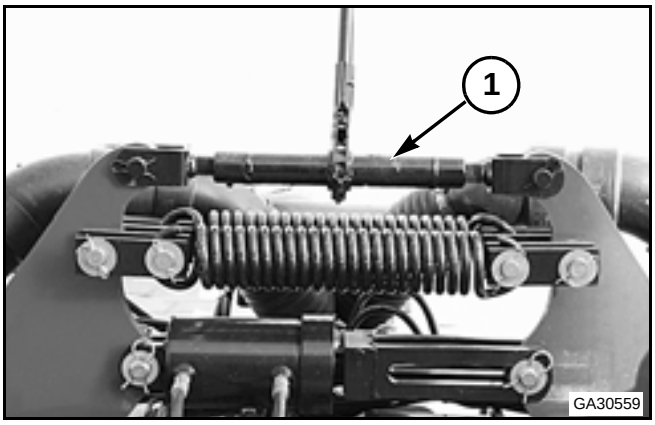

FIG. 13

FIG. 14: During field operation, store top link (1) on hitch frame hose channel.

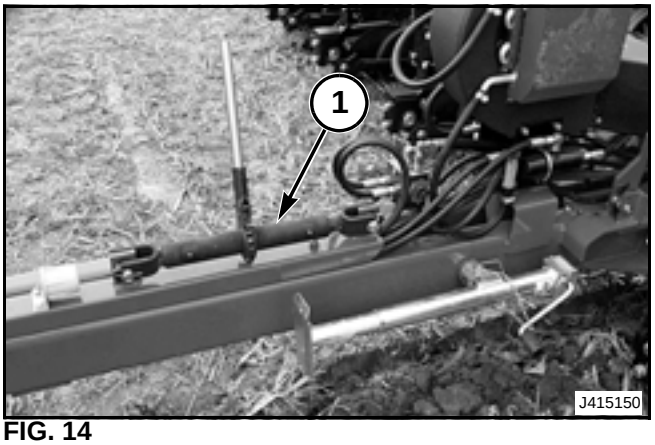

FIG. 14

SERVICING

General Operation and Service

Operating

- Read and understand all the operating and safety precautions before operating the machinery.
- In addition to the equipment configuration and design, hazard control and accident prevention depend on awareness, concern, prudence and proper training of the personnel in the operation, maintenance, transport and storage of the equipment.
- Always raise the implement, shut off the tractor engine, set the brakes, shift to park position (or neutral) and install the cylinder lockup channels before working around the machine.
- Avoid working under the planter. However, if it becomes unavoidable to do so, make sure the planter is securely blocked and the cylinder lockup channels are in place.
- Do not attempt to lubricate or adjust the planter while the machine is in operation.
- The machinery operation must be performed only by persons who are responsible and delegated to do so.
- Only the operator must be permitted on the tractor (unless tractor has a factory-installed instructor seat) when the tractor and the planter are moving. Never permit anyone to ride on the planter.
- Avoid wearing loose-fitting clothing and jewelry. Always tie up long hair that can be caught in the moving parts.
- Wear personal protective equipment (PPE) such as, but not limited to, protection for eyes, lungs, ears, head, hands and feet when operating, servicing or repairing the equipment.
- Make sure all persons are clear before operating the tractor or machine.
- Do not leave the tractor or implement unattended with the engine running.
- Never attempt to operate the planter unless seated in the operator's seat on the tractor with the seat belt fastened.
- The tractor must be equipped with rollover protective structure (ROPS), and a seat belt. Use the seat belt during operation.
- Make sure the tractor is in good operating condition, and has adequate braking capabilities.
- Do not dismount from a moving tractor.
- Regulate the ground speed to field conditions, and maintain control at all times.
- When working around discs, be careful to not get cut on the sharp edges.
- Watch for overhead wires or other obstructions when raising markers, and when moving the planter with the marker(s) raised.
- Disconnect the planter. Store the planter where children do not normally play. Stabilize the planter by using suitable supports, and block the wheels.
- Always lower the planter when not in use and relieve pressure in the hoses and cylinders.
- Do not allow children to ride on, play on, or operate equipment. Always keep children away from the equipment operating, servicing, and storage areas.
- Do not stand between the tractor and planter to install the hitch pin when the tractor engine is running.

Agricultural Chemicals

- Ag chemicals can be very hazardous. Improper use of fertilizer, fungicides, herbicides, insecticides and pesticides can injure people, plants, animals, soil and other people's property.
- Always read and follow all manufacturers' instructions before opening any chemical container.
- Even if you think you know them, read and follow instructions each time you use a chemical.
- Use same precautions when adjusting, servicing, cleaning or storing the planter as used when installing chemicals into the hoppers or tanks.
- Inform anyone who comes in contact with chemicals of the potential hazards involved and the safety precautions required.
- Stand upwind and away from the smoke from a chemical fire.
- Store or dispose of all unused chemicals only in a manner as specified by the chemical manufacturer.

Transporting

- Do not transport planter in excess of 25 km/h (15 mph).
- Use a tractor with a minimum weight of at least 2/3 of the fully loaded planter.
- Use good judgment when transporting the planter on the highway. Maintain complete control of the machine at all times.
- Comply with the state and local laws governing highway safety and regulations when moving the machinery.
- Always make the necessary safety precautions prior to transporting the machine on public roads.
- Make sure SMV (Slow Moving Vehicle) emblem is clean and visible.
- Use flashing warning lights except when prohibited by law.
- Watch for overhead wires or other obstructions when transporting the planter with markers raised.
- Make sure the markers are completely folded before transporting or parking the planter.
- Install the transport cylinder lockup devices before transporting the planter.
- For Drawbar Hitch Models: Always fasten the transport safety chain to the tractor drawbar and use the retainer on the hitch pin.

Servicing

- Always raise the implement, shut off the tractor engine, and install cylinder lockup channels before working around the machine.
- After repairing or adjusting the planter, remove all of the tools and parts from the machine before operating the planter.
- Tire changing can be very hazardous and must be done by trained personnel using the proper tools and equipment.
- Do not inflate the tire that was seriously under-inflated or run flat. Have it checked by qualified personnel.
- Lower the planter to the ground before attempting to remove a wheel for tire repair.

FIG. 15: Fluid Leak Detection

- Correct the hydraulic leaks immediately. All the fittings must be tight and all the lines and hoses in good condition. Escaping hydraulic fluid, under extremely high pressure, can penetrate the skin and cause blood poisoning. Use a piece of wood or cardboard to detect fluid leaks. If injured by escaping fluid, see a doctor immediately.

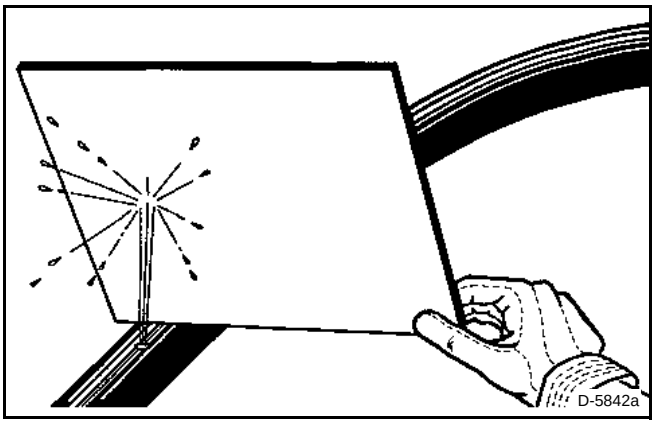

FIG. 15

Lubrication Chart

FIG.	ITEM	LUBE POINTS	8 HOURS (DAILY)	40 HOURS (WEEKLY)	BEGINNING OF SEASON	END OF SEASON
1	Parallel Arm Pivots	8 each Row Unit			O	O
2	H.D. Down Pressure Spring Pivots, Pins	4 each Row Unit			O	O
3	Frame Pivots	2 each		X	X	X
4	Flex Hitch Frame	10 each		X	X	X
5	Drive Clutches	2 each (5 places)	X		X	X
6	Depth Gauge Wheel Pivots	2 each row unit		X	X	X
6	Depth Gauge Wheel Adjuster Threads	1 each row Unit			X	X
7	Top Link (Flex Models)	2 each		X	X	X
8	Single-Disc Fertilizer Opener	3 each	X		X	X
9	Piston Fertilizer Pump	1	X		X	X
10, 11, 12	Markers*	10 each	X		X	X
	Piston Pump Crankcase	--			D	
14	Hydraulic PTO Pump	--	+		D	
15, 16	Hydraulic Filter	--			R	
--	Tillage Attachments	1 or 2 each	X		X	X
--	All Chains	--			^	^
+	Check, add fluid if necessary.					
X	Lubricate with pressure gun, using multi-purpose grease					
O	Lubricate with a few drops of light oil.					
D	Drain and replace with recommended fluid.					
R	Replace with genuine original equipment filter.					
^	Lubricate with chain and gear lube.					

NOTE: All wheel, shaft and disc bearings are permanently lubricated and sealed for life.

* Lubricate twice daily if planting relatively short rows and using markers frequently.

Lubrication Points

Refer to the chart on the previous page for the appropriate lubrication interval.

NOTE: All arrows point to the grease fittings unless otherwise noted.

IMPORTANT: All grease fittings must be free of dirt and paint to make sure entry of lubricant inside bearings. Replace all missing fittings. Force the lubricant through each bearing or pivot until the lubricant comes out of the bearing.

FIG. 16: Row Unit

Parallel Arm Pivots, oil both sides (1) (Beginning and End of Season)

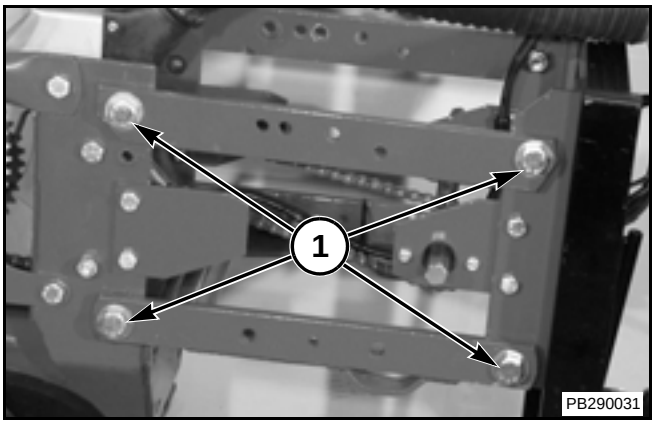

FIG. 16

FIG. 17: Heavy-Duty Down Pressure Springs

Locking Pin, oil - both sides (1), (Beginning and End of Season)

Support Pivot, oil - both sides (2), (Beginning and End of Season)

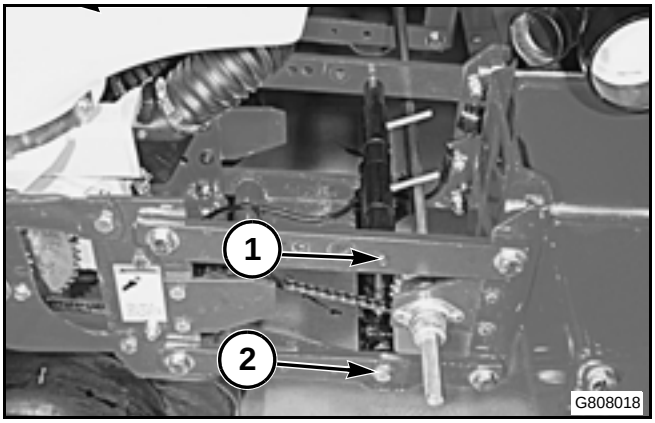

FIG. 17

FIG. 18: Frame Pivots (1), (40 hours)

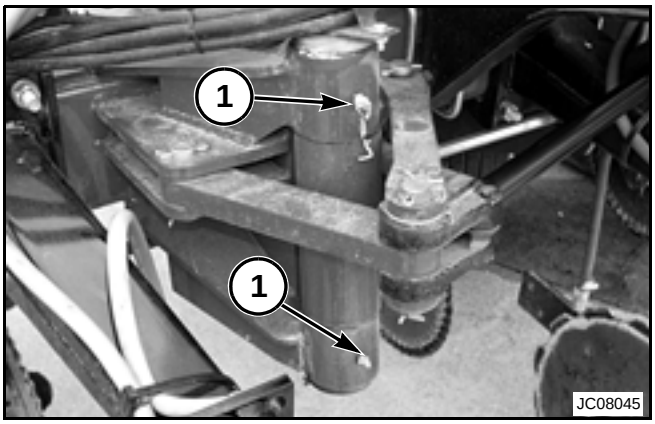

FIG. 18

FIG. 19: Flex Hitch Frame Pivots (1), (40 hours)

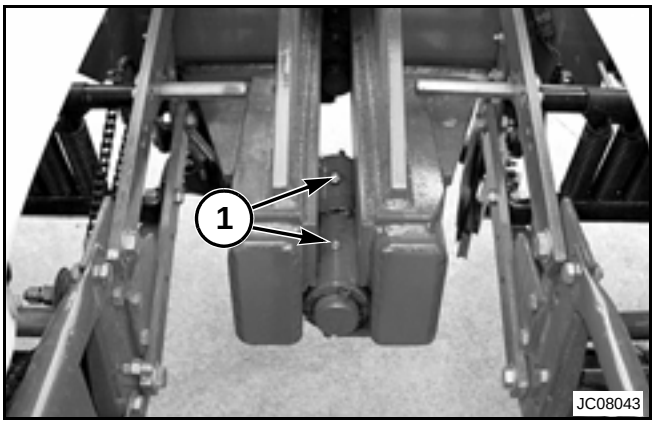

FIG. 19

FIG. 20: Drive Clutches

One grease fitting (1) on the hub. (8 hours)

One grease fitting (2) on the clutch. (8 hours)

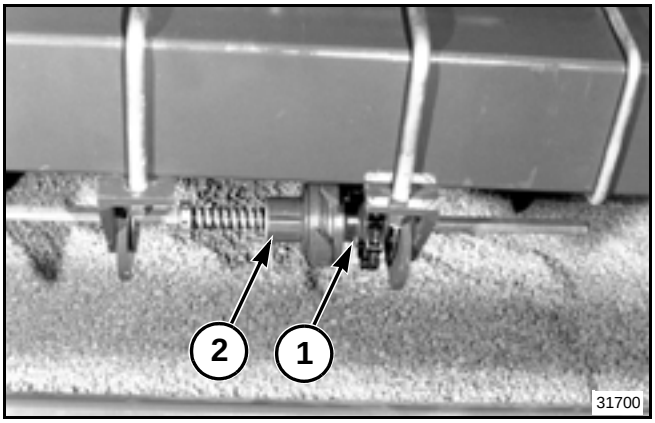

FIG. 20

FIG. 21: Rear of Row Unit

Depth Gauge Wheel Pivots (1), (40 hours)

Depth Gauge Adjuster Threads (2), (Beginning and End of Season)

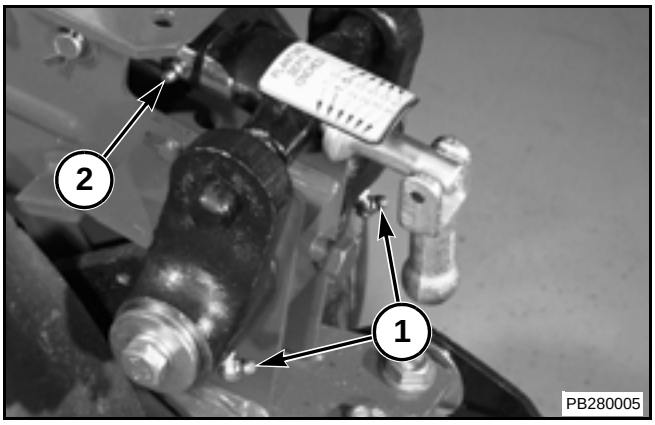

FIG. 21

FIG. 22: Top Link (Flex Models)

Two grease fittings (1) on the top link. (40 hours)

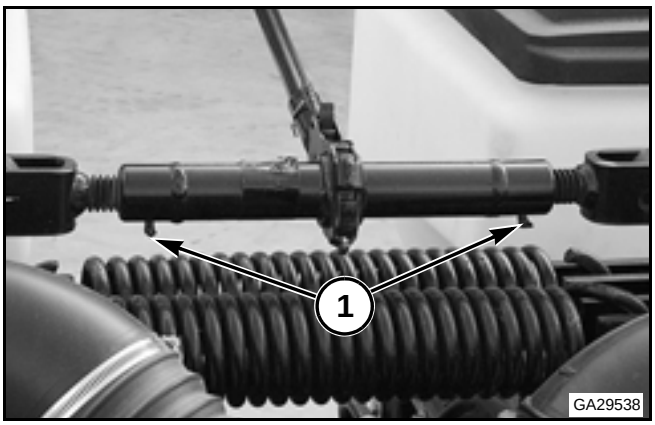

FIG. 22

FIG. 23: Fertilizer Opener

One grease fitting (1) on the lower parallel arm. (8 hours)

Two grease fitting (2) on the pivot casting. (8 hours)

One grease fitting (3) on the hub bearing. (8 hours)

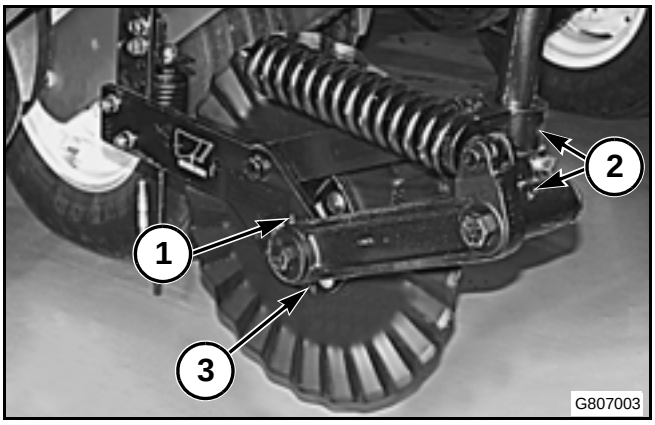

FIG. 23

FIG. 24: Fertilizer Pump plugs and grease fitting.

Check/Fill Plug (1), (8 hours)

Drain Plug (2), (8 hours)

Shaft Bearing (3), (8 hours)

One grease fitting (4). Fill until the lubricant is forced out of the bottom. (8 hours)

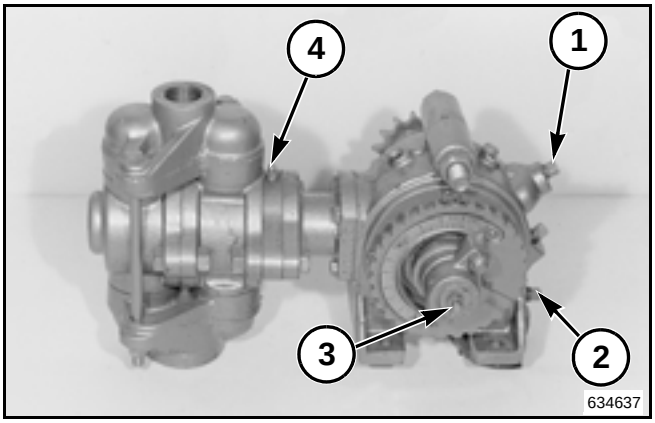

FIG. 24

FIG. 25: Inner Section Hinge (1) of the markers. (8 hours)

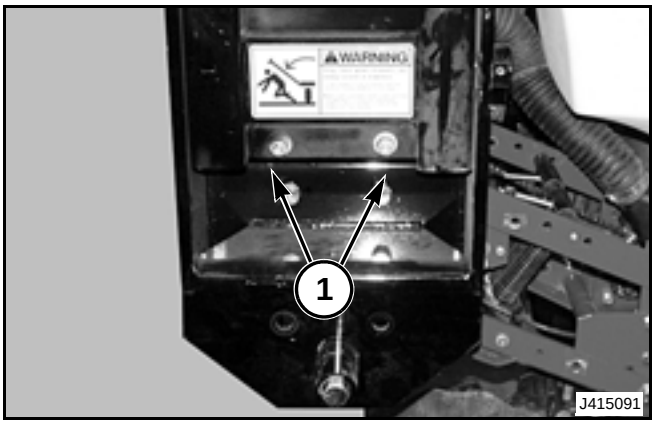

FIG. 25

FIG. 26: Middle Section Hinge (1) of the markers. (8 hours)

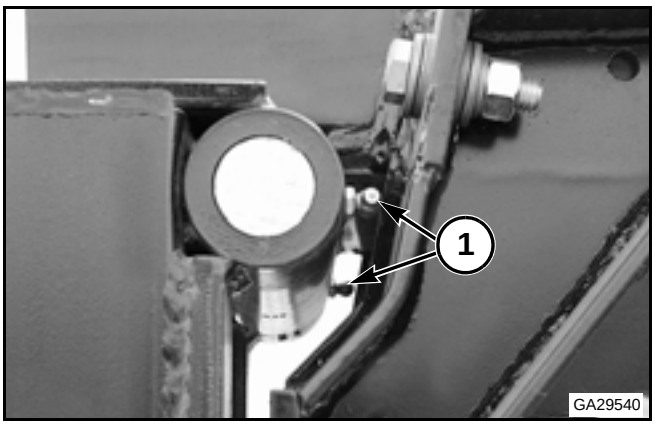

FIG. 26

FIG. 27: Outer Section Hinge (1) on the markers. (8 hours)

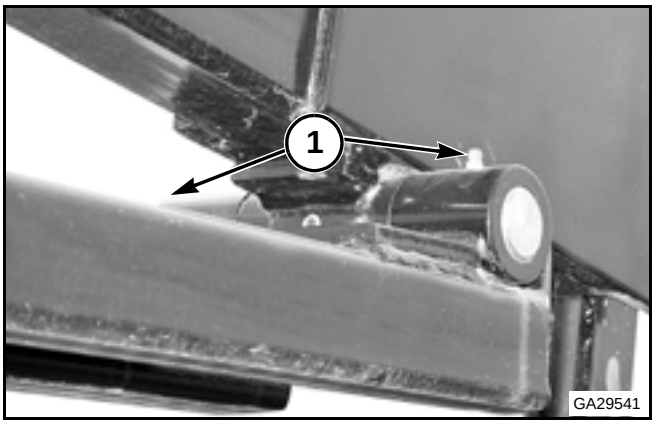

FIG. 27

General Maintenance

Beginning of Day

- Do the daily lubrication.
- Check the 9.5L-15 12-ply transport tire pressure. Inflate to 441 kPa (64 psi) or maximum pressure indicated on the outside of the tire.
- Check the fluid level in the PTO pump. Fill as necessary with universal hydraulic transmission fluid.

End of Day

- Clean accumulated chemicals off the planter.

WARNING: Use same precautions when cleaning up chemicals as when filling planter. Failure to do so could result in personal injury.

- Repair any damage occurred during the day.
- If the planter will not be used for a period of time, coat surfaces that contact soil with suitable rust preventative.
- After the first 50 hours of operation, change the blower hydraulic fluid filter.

Beginning of Season

- Clean dirt and grease off the planter.
- Lubricate the machine.
- Replace the hydraulic fluid filter, and change the PTO pump fluid. Operate the pump for a short period of time to raise the fluid temperature and circulate the fluid.
- Make sure all seed, chemical tanks, and hoppers are clean and dry before filling.
- Clean the monitor harness connections with a suitable electrical contact cleaner.
- Check the tire pressure.
- Tighten the seed discs.
- If equipped with liquid fertilizer: drain the oil/diesel fuel solution from the piston pump.

End of Season

- Remove all dirt and trash from the planter.
- Remove all seed, including seed in the metering units.
- Check brush wear in the seed meters. Replace if necessary.
- Relieve brush tension by loosening the seed discs.
- Clean all chemicals from the hoppers, tanks, tubes, spreaders, discs and any other area where chemicals have accumulated.

WARNING: Use same precautions when cleaning up chemicals as when filling planter. Failure to do so could result in personal injury.

- Clean the planter seed sensors with a sensor cleaning brush.
- Clean the inside of the air ducts.
- Lubricate as required.
- If the planter will not be used for a period of time, coat surfaces that contact soil with suitable rust preventative.
- Coat the cylinder rods and earth-polished surfaces with rust preventative.
- If equipped with liquid fertilizer: fill the piston pump with an oil/diesel fuel solution.
- Replace any damaged parts.
- Check the hydraulic hoses for leaks and abrasions. Replace as needed.
- Remove the monitor from the tractor and store in a clean, dry location.
- Store the planter away from livestock.
- Cover the planter if stored outside.
- Block the planter wheels.

WARNING: When storing planter, make sure to close marker lockout valves.

WARNING: Always install wheel lift cylinder stops when working under or around raised planter. Install wheel lift cylinder stops in the storage positions when not in use.

Tire Safety

FIG. 28: Tire explosion and serious injury can result from over inflation. Do not exceed the tire inflation pressures. See the Operator's manual for the correct tire pressure.

Replace worn or damaged tires. When tire service is needed, have a qualified tire mechanic service the tire. See the Operator's manual for the correct tire size.

Do not weld on the rim when a tire is installed. Welding will cause an explosive air/gas mixture that will ignite with high temperatures. This can happen to tires that are inflated or deflated. Removing the air or breaking the bead is not enough.

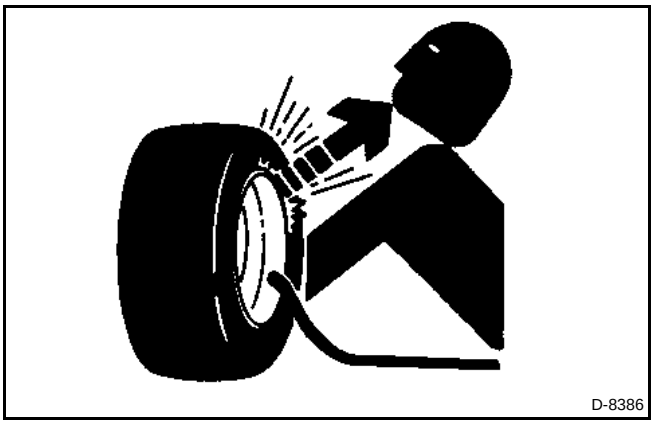

FIG. 28

ADJUSTING THE HITCH

If the planter frame is at planting depth, and the hitch is level with the ground, the procedure is complete. If not, continue the procedure.

- Start the tractor engine.
- Lower the planter frame to planting depth.

WARNING: Stop tractor engine and shift to park or neutral, set brakes and remove key before leaving the tractor.

- Install the hitch jack in the working position. Lower the jack to the ground.
- Disconnect the clevis from the hitch.
- Use the hitch jack to adjust the hitch so the hitch is level to the ground.
- Install the hitch clevis on the hitch. See Special Torque Values in the Lubrication and Maintenance section for the correct torque value and tighten the hitch bolts.
- Raise the hitch jack. Remove the hitch jack from the working position and install the hitch jack in the storage position.

DRIVE BELTS

Banded Drive Belt

FIG. 29: A banded drive belt is made of two or more V-belts (of a standard cross section size) banded together at the top with a tie band (1). The V-belts and the tie band are vulcanized together to form a multiple strand banded belt.

The cross section and spacing of the strands are such that the banded belt operates on standard sheaves.

The tie band clears the top of the sheaves so that each belt strand has full wedging capacity in the sheave grooves, just as a single belt. The banded belt operates at the same tension as matched belts on an regular multiple strand V-belt drive.

Most V-belt drives operate without any problem, requiring only regular maintenance. There are times when forces acting on the drive can cause belts to whip, turn over, or come off the sheaves. The banded belt was designed to correct these belt stability problems which are most frequently caused by intermittent or shock loading of the drive.

Banded belts have standard dimensions and cross section sizes and are made to order, with the number of strands being determined by the power needs of the drive. Spacing between the strands of the belt are the same as the standard spacing for multiple groove sheaves.

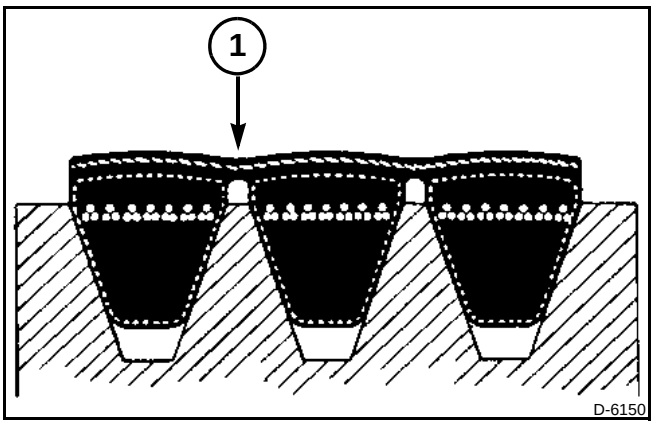

FIG. 29

Maintenance of Belts

FIG. 30: Cross sections of some of the belts used on the machine are shown.

A drive inspection must be done every one to two weeks.

Check belts frequently for excessive wear, tearing, breaking, increasing, and unraveling.

Belt tensions are controlled with spring loaded idlers on most drives on the machine. Over tightening puts too much strain on the belt and too much loading on the shafts and bearings.

Look and listen for any not normal vibration or sound while watching the drive in operation. A drive kept in good condition will operate smoothly with little noise.

Inspect the guards for looseness or damage. Keep all guards free from debris, dust, or grime deposit on either the inside or the outside of the guard. Deposits of material on the guards operate as insulation causing the drives to run hotter.

Belts that are running hot, running in a hot environment, or from slipping will harden and form cracks from the bottom of the belt up.

An internal temperature increase of 10 degrees C (18 degrees F) can cut belt life in half.

Inspect for oil or grease leaking on the drive. This can indicate over lubricated bearings or a fluid leak. If this material gets on the rubber belts, the belts can increase in size and become distorted, causing an early belt failure.

Belts must be replaced if there are signs of cracking, fraying, or not normal wear.

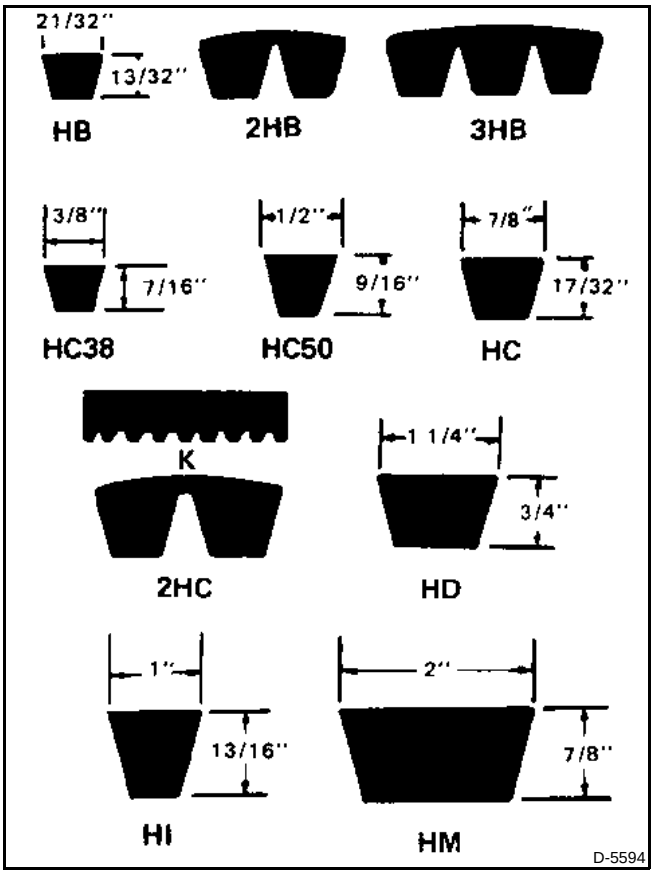

FIG. 30

Belt Changing Guides

Removal

Before Removing or Installing any drive belts.

Lower the machine to the ground.

Remove the starter key.

Engage the parking brake.

Disconnect the battery at battery switch.

Raise or remove the shields or guards and locate the guards away from the drive so that the guards do not cause problems with working on the drive.

Loosen the tensioner until the belt is slack and can be removed without prying. Never pry off a belt, as the sheave can be damaged. Prying off belts also adds risk of injury.

Inspect the old belt for any not normal wear. Excessive or not normal wear can indicate problems with the drive or past maintenance procedures. Refer to the Belt Problem and Wear Guide.

Inspect the sheaves for not normal or excessive wear, damage, distortion, and pitting. If surfaces show pitting or excessive wear, the sheave must be replaced.

Check the sheaves for deposits of dirt and dust in the bottom of the grooves. Clean sheaves with a damp cloth. Do not sand or scrape the grooves to remove debris.

Installation

Check the sheave alignment. For long belt life the sheaves must be aligned properly.

FIG. 31: Order a new belt by the part number, not by measuring the old belt.

Time must be taken to make sure the selection of the proper size belts for the different sheaves is correct.

(A) Indicates the wrong belt installed.

(B) Indicates the correct belt installed.

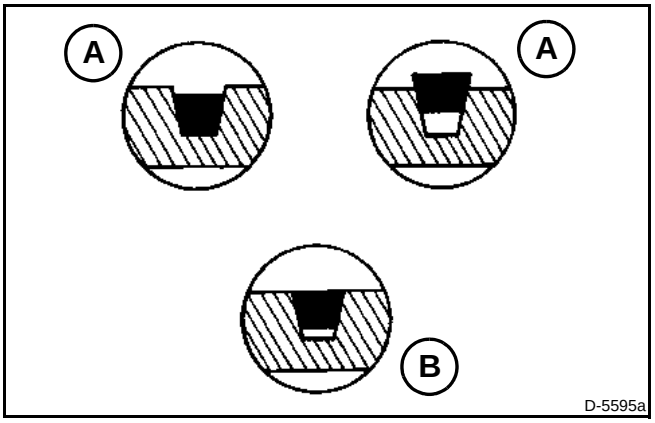

FIG. 31

FIG. 32: Replace all the belts on multiple belt drives. Never replace a single belt or part of a multiple belt drive. If a new belt is used with old belts, the load will not be divided evenly between the belts. Mixing new and old belts can lead to early belt failure and not even sheave wear.

(A) Indicates a new belt position.

(B) Indicates a used belt position.

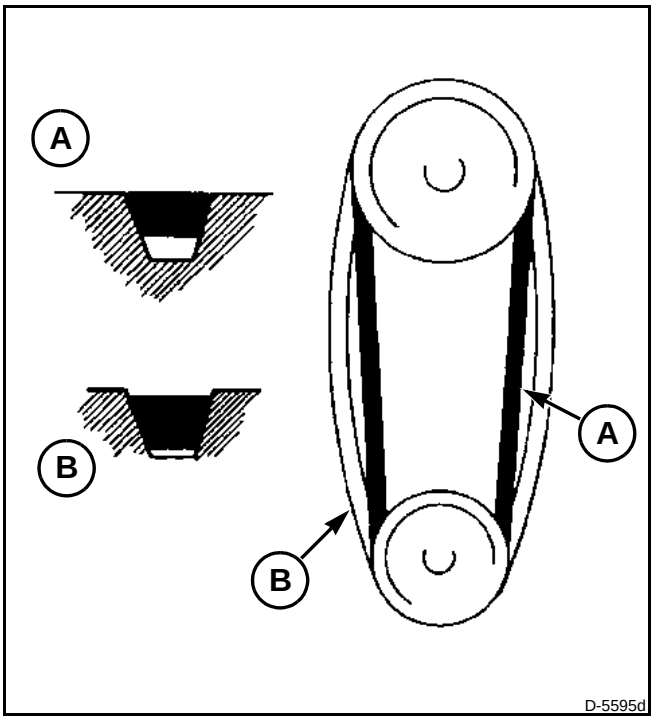

FIG. 32

FIG. 33: When replacing a belt, never force a belt over the rim of a pulley. Do not pry or use force to install the belt (A). This can break the cords in the belt. Loosen all the tensioners before installing the new belt. If the belt still can not be easily installed, run the belt over the rim while rotating the pulley (B).

Tension the belts making sure the belts are at the correct tension. More belts are damaged by not enough tension than by too much tension. But, do not over tension the belt as this damages the belt tensile members and puts an additional load on the shafts and bearings.

Rotate the belt drive three revolutions. Check the belt tension and adjust as necessary.

Check the drive alignment and adjust as necessary.

Install the guards or shields.

Start the drive, looking and listening for any not normal noise or vibration. If possible, stop the drive and check the bearings and sheaves for excessive heat. If the bearings and sheaves are too hot the belt tension can be too high or the bearings are not properly lubricated or failing. Temperature can be checked with an infrared pyrometer.

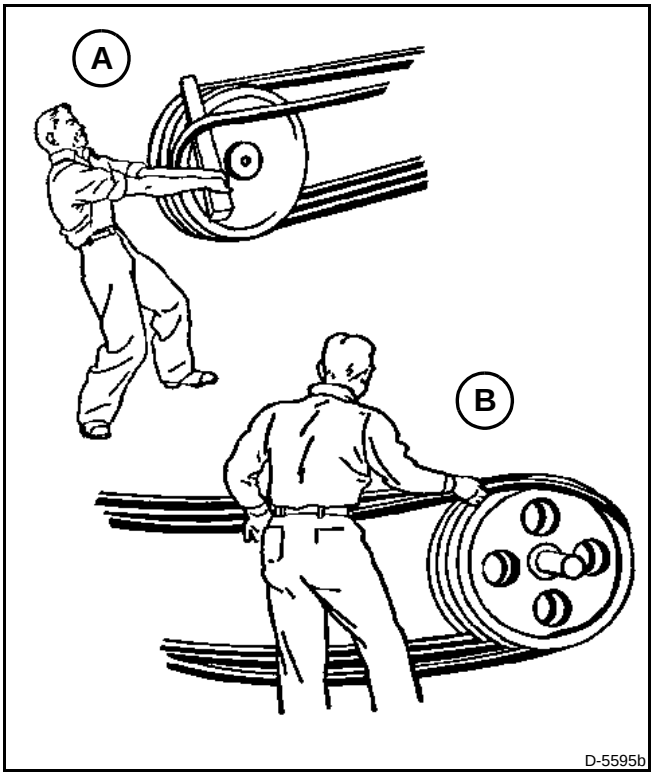

FIG. 33

Belt Sheave Alignment

FIG. 34: Check the sheave and shaft alignment. Running the belts with the sheaves out of alignment will cause severe side wear.

Not aligned belt drives will be noisier than properly aligned drives since interference is at the belts enter point into the sheave.

To check the alignment use a long straight edge (1) made of wood, metal, or any rigid material. Line the straight edge along the outside face of both sheaves. If the drive is properly aligned, the straight edge will contact each sheave evenly. The straight edge must touch the two outer edges of each sheave for a total of four points of contact.

Shafts not in alignment (C) will show up as a gap (2) between the outside face of the sheave and the straight edge.

Check for tilting or shafts not aligned by using a bubble level. For proper alignment, the bubble must be in the same position as measured on each shaft.

Not aligned correctly Parallel (A).

Not aligned correctly Angular (B).

Rotate the drive and look for excessive sheave movement. If excessive sheave movement is seen inspect the sheave and shaft. If no problem can be seen, remove and install the sheave. Not correctly mounted sheaves or out of round sheaves are some times the root of vibration or more severe problems. A dial indicator can be used to measure side to side sheave movement or diameter vibration by holding the dial indicator up to the sheave sidewall or top of the belt inside the pulley groove.

IMPORTANT: Always turn off the machine before using the dial indicator. Rotate the drive by hand to make your measurements.

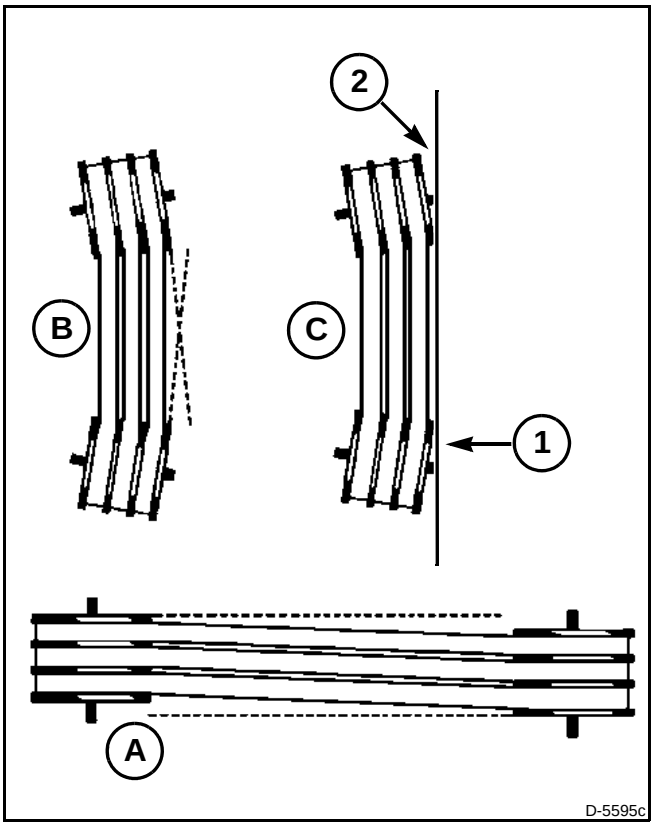

FIG. 34

Belt Run In Procedure

A run in procedure is needed for all belt drives so that the best belt life can be reached.

A run in procedure is made of starting the drive and operating the drive under full load for up to 24 hours. After the belts have run-in, stop the drive and check the belt tension.

Running the belts under full load for an extended period of time will seat the belts into the sheave grooves.

Belt tension will drop after the first run-in and seating procedure. This is normal. Adjust the belt tension as necessary.

Since tension in the belts will drop after the first run-in and seating procedure, failure to check and tension the belt will result in low belt tension and belt slippage. This slippage will result in early belt failure.

Belt Troubleshooting

When troubleshooting a belt drive problem, stand back and watch the drive while the drive is in operation and when drive is not. Is there a warm rubber smell? Is the belt moving around the drive in a normal way? Are there chirping, squealing, or grinding noises? Is there a deposit of dust or debris under the drive which will cause problems with the belts?

When the belt drive makes excessive noise, the belt is frequently blamed. To find the problem spray the belt with soapy water while the drive is running. If the noise goes away, or decreases, the belt is part of the problem. If the noise is still present, the problem can be caused by other drive components.

NOTE: Do not use belt conditioner or dressing on the belts.

Not correctly tightened belt drives can make noise.

Belt Problem and Wear Guide

The following charts show some of the more common types of drive belt failures and possible causes for each failure.

When problem solving a drive belt failure, determine which problem or SYMPTOM / OBSERVATION shows the failure that is occurring. Then find the POSSIBLE CAUSES and take action as shown under the CORRECTIONS / REMEDY column.

TABLE 1 Short Belt Life and Early Belt Failure

Symptom / Observation	Possible Causes	Corrections / Remedy
Rapid belt failure, when no reason can be seen.	Belt tensile member broken or damaged from not correct installation.	Properly install a new original equipment belt and adjust the belt tension and idler spring.
	Worn driver or driven sheave grooves (check with groove gauge).	Replace the worn sheaves. Properly install a new original equipment belt and adjust the belt tension and idler spring.
	Driver or driven sheave center distances vary during operation.	Check for failed bearings and loose bearing housing mounting hardware and repair as required. Properly install a new original equipment belt and adjust the belt tension and idler spring.

TABLE 2 Belt Extended Beyond Idler or Sheave Take Up

Symptom / Observation	Possible Causes	Corrections / Remedy
Idler spring can not be adjusted to properly tension the drive belt.	Belt extended and worn.	Properly install a new original equipment belt and adjust the belt tension and idler spring.
	Belt tensile member broken.	Properly install a new original equipment belt and adjust the belt tension and idler spring.
	Belt over loaded.	Reduce the load on the belt. Properly install a new original equipment belt and adjust the belt tension and idler spring.
Belt strands not equal.	Sheaves not aligned (not equal work done by each belt strand).	Align the sheaves. Properly install a new original equipment belt and adjust the belt tension and idler spring.
	Belt tensile members broken or damaged from not correct installation.	Properly install a new original equipment belt and adjust the belt tension and idler spring.
	Trash or debris fell into the sheave grooves.	Clean trash or debris from the sheave grooves. Correct the cause of trash or debris entering the sheave grooves and make sure all the protective shields are installed. Properly install a new original equipment belt and adjust the belt tension and idler spring.
	Belt strand lengths not matched.	Properly install a new original equipment belt and adjust the belt tension and idler spring.

TABLE 3 Belt Turns Over in Sheaves

Symptom / Observation	Possible Causes	Corrections / Remedy
Belt turns over in the sheaves and runs or can turn over and come off sheaves when no reason can be seen.	Excessive lateral belt movement.	Properly adjust the belt tension.
	Trash or debris fell into the sheave grooves.	Clean trash and debris from the sheave grooves. Correct the cause of trash and debris entering the grooves. Make sure all protective shields are installed.
	Sheaves not aligned.	Align the driver, driven, and idler sheaves. Check alignment with the drive loaded and unloaded. Properly adjust the belt tension.
	Worn sheave grooves (check with groove gauge).	Replace the worn sheaves. Properly install a new original equipment belt and adjust the belt tension and idler spring.
	Belt tensile members broken or damaged from not correct installation (belt forced onto sheaves).	Properly install a new original equipment belt and adjust the belt tension and idler spring.
	Intermittent or shock loading of the drive belt.	Correct the cause of intermittent and shock loading of the drive belt.
	Belt strand lengths are not equal (multiple strand or power band belts).	Properly install a new original equipment belts and adjust the belt tension and idler spring.

TABLE 4 Drive Belt Makes Noise

Symptom / Observation	Possible Causes	Corrections / Remedy
Belt makes noise.	Belt slippage.	Properly adjust the belt tension.
	Belt or sheaves contaminated with oil, grease, or chemicals.	Repair cause of oil, grease, or chemicals. Clean the belt and sheave grooves with a degreasing solvent that is not flammable or toxic, then wash the belts with a soap and water solution. Properly adjust the belt tension.
Belt makes a slapping sound.	Belt tension too loose.	Properly adjust the belt tension.
	Belt strand lengths are not equal.	Properly install a new original equipment belt and adjust the belt tension and idler spring.
	Driver and driven sheaves not aligned.	Align sheaves and check alignment with the sheaves loaded and unloaded. Properly adjust the belt tension.
	Idler sheave not aligned.	Align sheaves and check alignment with the sheaves loaded and unloaded. Properly adjust the belt tension.
Belt makes a rubbing sound.	Belt rubbing on some obstruction.	Remove the obstruction and align the drive to give needed clearance.
Belt makes a not normal or loud noise.	Belt profile does not equal sheave groove profile.	Replace the worn sheaves. Properly install a new original equipment belt and adjust the belt tension and idler spring.
	Worn sheave grooves (check with groove gauge).	Replace the worn sheaves. Properly install a new original equipment belt and adjust the belt tension and idler spring.
	Trash or debris fell into the sheave grooves.	Clean trash and debris from the sheave grooves. Correct the cause of trash and debris entering the sheave grooves and make sure all the protective shields are installed.
Drive makes a grinding sound.	Damaged or failed shaft bearings.	Replace the damaged or failed bearings as required.

TABLE 5 Not Correct Driven Shaft Speed

Symptom / Observation	Possible Causes	Corrections / Remedy
Rotation burns on the sides of the belt.	Belt tension too loose causing belt slippage.	Properly install a new original equipment belt and adjust the belt tension and idler spring.
	Belt or sheaves contaminated with oil, grease, and chemicals.	Repair cause of oil, grease, and chemicals. Clean the belt and sheave grooves with a degreasing solvent that is not flammable or toxic. Wash with a mild soap and water solution. Properly adjust the belt tension.

TABLE 6 Hot Shaft or Idler Sheave Bearings

Symptom / Observation	Possible Causes	Corrections / Remedy
Driver and driven shaft support bearings or idler sheave bearings run hot.	Drive belt adjusted too tight or over tightened.	Properly adjust the belt tension.
	Drive belt under tightened and slipping causing heat.	Properly adjust the belt tension.
	Worn sheave grooves (check with groove gauge) causing belts to bottom in the sheave grooves and not send power unless over tightened.	Replace the worn sheaves. Properly install a new original equipment belt and adjust the belt tension and idler spring.
	Failed bearings or poor bearing maintenance.	Replaced the failed bearings. Follow the bearing maintenance and lubrication schedule recommendations.

TABLE 7 Belt Broken

Symptom / Observation	Possible Causes	Corrections / Remedy
Belt pulled apart.	Belt over loaded.	Reduce the load on belt. Determine the cause of over loading. Properly install a new original equipment belt and adjust the belt tension and idler spring.
	Shock loading of the belt from not equal feeding.	Correct the cause of not even feeding and shock loading. Properly install a new original equipment belt and adjust the belt tension and idler spring.
	Belt came off the sheaves and became tangled in the machine.	Check the sheave alignment. Check for trash and debris in the sheave grooves. Properly install a new original equipment belt and adjust the belt tension and idler spring.
	Trash and debris has fallen into the sheave grooves.	Clean trash and debris from the sheave grooves. Correct the cause of trash and debris entering the sheave grooves and make sure all the protective shields are installed. Follow the bearing maintenance and lubrication schedule recommendations.
	Belt rolled or forced onto the sheaves breaking the belt tensile member.	Properly install a new original equipment belt and adjust the belt tension and idler spring.

TABLE 8 Belt Side Walls / Bottom Burned

Symptom / Observation	Possible Causes	Corrections / Remedy
Sides and bottom of the belt burned.	Belt slippage when machine engages.	Properly install a new belt and adjust the belt tension. Engage the machine properly.
	Belt over loaded.	Reduce the load on the belt. Correct the cause of over loading. Properly install a new belt and adjust the belt tension.
	Worn sheave grooves (check with groove gauge).	Replace the worn sheaves. Properly install a new belt and adjust the belt tension.
Rotation burns on the side walls of the belt in a separated area.	Belt slippage because of not enough belt tension.	Properly install a new belt and adjust the belt tension.
	Belt over loaded.	Reduce the load on the belt. Correct cause of the over loading. Properly install a new belt and adjust the belt tension.

TABLE 9 Belt Side Walls Flaking, Soft, Sticky, or Swollen

Symptom / Observation	Possible Causes	Corrections / Remedy
Belt cover has flaked off and side walls are soft and sticky. Low adhesion between belt cover plies. Belt cross section is swollen.	Belt or sheaves contaminated with oil, grease, or chemicals.	Repair the cause of oil, grease, or chemicals. Clean the sheave grooves with a degreasing solvent that is not flammable or toxic, then wash the grooves with a mild soap and water solution. Properly install a new belt and adjust the belt tension.
Decreased performance of belt rubber compounds.	Use of belt dressing.	Do not use belt dressing. Clean sheave grooves with a degreasing solvent that is not flammable or toxic, then wash the sheave grooves with a mild soap and water solution. Properly install a new belt and adjust the belt tension.

TABLE 10 Belt Side Walls Dry and Bottom Breaking

Symptom / Observation	Possible Causes	Corrections / Remedy
Belt side walls dry and bottom of belt cracking.	Constant belt slippage causing heat and gradually making the belt under cords hard.	Properly install a new belt and adjust the belt tension.
	Not correct storage of repair or extra belts.	Store belts unwound from pegs in a cool and dry location, away from excessive heat or direct sun light.

TABLE 11 Belt Bottom Cut

Symptom / Observation	Possible Causes	Corrections / Remedy
Belt operates over the edge of the sheaves and cuts the bottom surface.	Sheaves not aligned.	Align the sheaves. Adjust the tension. Check the alignment with the drive loaded and unloaded.
	Trash and debris in the sheave grooves.	Clean trash and debris from the sheave grooves. Correct the cause of trash and debris entering sheave grooves and make sure all the protective shields are installed.
	Belt forced over the edge of the sheaves during installation without relieving idler tension.	Back off idler tension when installing the belt.

TABLE 12 Belt Comes Off Drive Sheaves

Symptom / Observation	Possible Causes	Corrections / Remedy
Belt comes off sheaves when no reason can easily be seen.	Sheaves not aligned.	Align the sheaves. Adjust the tension. Check alignment with the drive loaded and unloaded.
	Trash and debris in the sheave grooves.	Clean trash and debris from the sheave grooves. Correct the cause of trash and debris entering the sheave grooves and make sure all the protective shields are installed.

TABLE 13 Sheaves Worn or Damaged

Symptom / Observation	Possible Causes	Corrections / Remedy
Sheave grooves worn (check with groove gauge).	Excessive belt tension.	Replace the worn sheaves. Properly install new belt and adjust the tension.
	Contamination of sheave grooves with damaging trash or debris.	Replace the worn sheaves. Correct the cause or source of damaging trash or debris entering the sheave grooves. Make sure all protective shields are installed. Properly install new belt and adjust the tension.
Sheaves damaged or broken.	Belt forced onto the sheaves.	Replace damaged or broken sheaves. Back off tension when installing belt.
	Trash or debris fell into the sheave grooves.	Replace the worn sheaves. Correct the cause of damaging trash or debris entering the sheave grooves. Make sure all protective shields are installed. Properly install the new belt and adjust the tension.
	Not correct method used to install the sheave.	Used correct method to install the sheave.

TABLE 14 Belt Moves and Vibrates

Symptom / Observation	Possible Causes	Corrections / Remedy
Belt moves too much and laterally.	Belt tension too loose.	Properly adjust the belt tension.
	Sheaves not aligned.	Align the sheaves. Adjust the belt tension.
	Belt strands not extended equally.	Properly install a new original equipment belt and adjust the belt tensioner.
Belt vibrates.	Excessive radial or lateral run out of the sheaves.	Replace the sheaves with defects.
	Loose drive components.	Tighten the loose drive components.
	Belt profile does not equal the sheave groove profile.	Properly install a new original equipment belt and adjust the belt tensioner.

TABLE 15 Belt Top Surface Worn

Symptom / Observation	Possible Causes	Corrections / Remedy
Severe wear patterns on the top surface of the belt.	Belt rubbing on belt guides, shields, or other obstruction.	Adjust the belt guides, shields, or remove obstruction. Align the sheaves. Properly adjust the belt tension.
	Back side idler sheave malfunction or damaged.	Replace the back side idler sheave.

TABLE 16 Belt Top Corners Worn

Symptom / Observation	Possible Causes	Corrections / Remedy
Top corners of the belt worn or frayed.	Worn sheaves (check with groove gauge).	Replace the worn sheaves. Properly install new belt and adjust the belt tension.
	Belt profile does not equal sheave groove profile.	Properly install new belt and adjust the belt tension.

TABLE 17 Belt Side Walls Worn

Symptom / Observation	Possible Causes	Corrections / Remedy
Belt side walls worn.	Constant belt slippage.	Properly adjust the belt tension.
	Sheaves not aligned.	Align the sheaves. Properly adjust the belt tension.
	Worn sheave grooves (check with groove gauge).	Replace the worn sheaves. Properly install new belt and adjust the belt tension.
	Belt profile does not equal sheave groove profile.	Properly install new belt and adjust the belt tension.

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