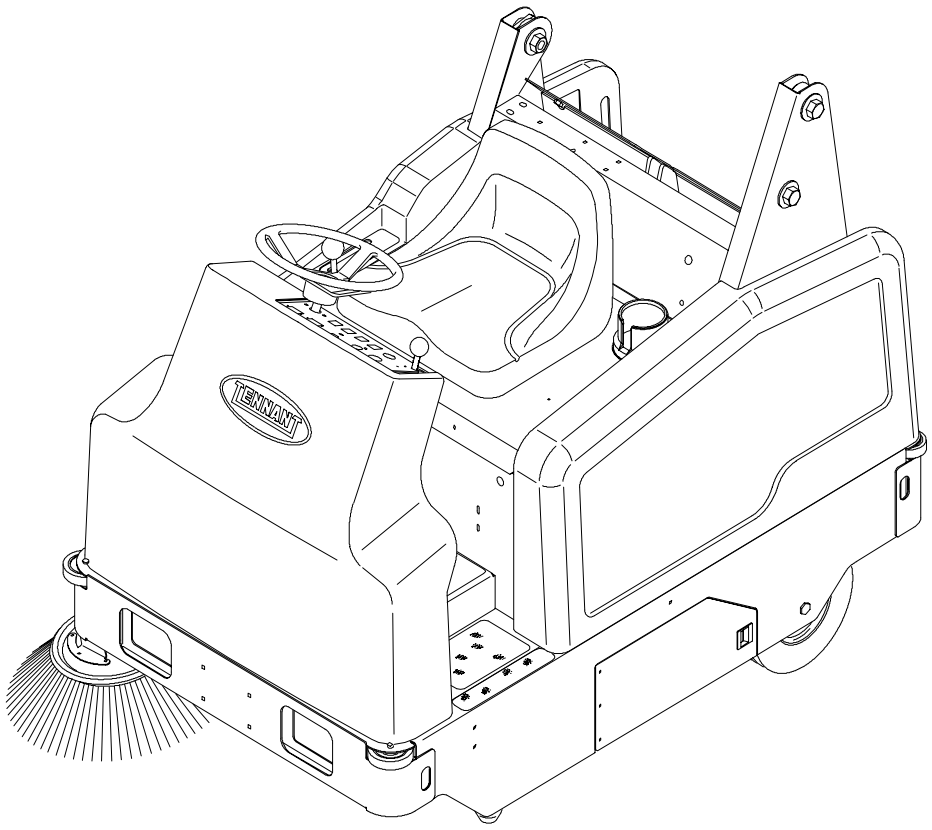
6200D

Service Manual



330395
Rev. 01 (6-02)

This service manual is intended to be used as an aid in the detailed service, repair, and troubleshooting of your TENNANT Model 6200D.

The set is organized into six major groups: General Information, Chassis, Sweeping, Electrical, Hydraulics, and Engine–D.

General Information: Safety precautions, machine specifications, machine maintenance chart, machine tieing, machine jacking, machine storing, machine pushing or towing, and hardware information.

Chassis: Tire/wheel replacement, brake adjustment and replacement, steering adjustment and replacement.

Sweeping: V–belt replacement, brush replacement, bearing replacement, skirt/seal repair/replacement, and sweeping troubleshooting.

Electrical: Battery maintenance and replacement, electrical schematics, and electrical troubleshooting.

Hydraulics: Cylinder replacement, pump (s) replacement, hydraulic motor replacement, hydraulic schematic, and hydraulic troubleshooting.

Engine – D: Air filter replacement, oil changing, cooling system maintenance, engine troubleshooting, engine removal, and engine repairs.

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SAFETY PRECAUTIONS

The following symbols are used throughout this manual as indicated in their description:

WARNING: To warn of hazards or unsafe practices that could result in severe personal injury or death.

FOR SAFETY: To identify actions that must be followed for safe operation of equipment.

The machine is suited to sweep disposable debris. Do not use the machine other than described in this Operator Manual. The machine is not designed for use on public roads.

The following information signals potentially dangerous conditions to the operator or equipment:

WARNING: Engine emits toxic gases. Severe respiratory damage or asphyxiation can result. Provide adequate ventilation. Consult with your regulatory authorities for exposure limits. Keep engine properly tuned.

WARNING: Lift arm pinch point. Stay clear of hopper lift arms.

WARNING: Moving belt and fan. Keep away.

WARNING: Raised hopper may fall. Engage hopper support bar.

FOR SAFETY:

1. **Do not operate machine:**
   - **Unless trained and authorized.**
   - **Unless operation manual is read and understood.**
   - **In flammable or explosive areas unless designed for use in those areas.**
   - **In areas with possible falling objects unless equipped with overhead guard.**

2. **Before starting machine:**
   - **Check for fuel leaks.**
   - **Keep sparks and open flame away from refueling area.**
   - **Make sure all safety devices are in place and operate properly.**
   - **Check brakes and steering for proper operation.**

3. **When starting machine:**
   - **Keep foot on brake and directional pedal in neutral.**

4. **When using machine:**
   - **Use brakes to stop machine.**
   - **Go slowly on inclines and slippery surfaces.**
   - **Use care when reversing machine.**
   - **Do not carry riders on machine.**
   - **Always follow safety and traffic rules.**
   - **Report machine damage or faulty operation immediately.**

5. **Before leaving or servicing machine:**
   - **Stop on level surface.**
   - **Set parking brake.**
   - **Turn off machine and remove key.**

6. **When servicing machine:**
   - **Avoid moving parts. Do not wear loose jackets, shirts, or sleeves when working on machine.**
   - **Block machine tires before jacking up machine.**
   - **Jack up machine at designated locations only. Block machine up with jack stands.**
   - **Use hoist or jack that will support the weight of the machine.**
   - **Wear eye and ear protection if using pressurized air or water.**
   - **Disconnect battery connections before working on machine.**
   - **Avoid contact with battery acid.**
   - **Use cardboard to locate leaking hydraulic fluid under pressure.**
   - **Use Tennant supplied or equivalent replacement parts.**

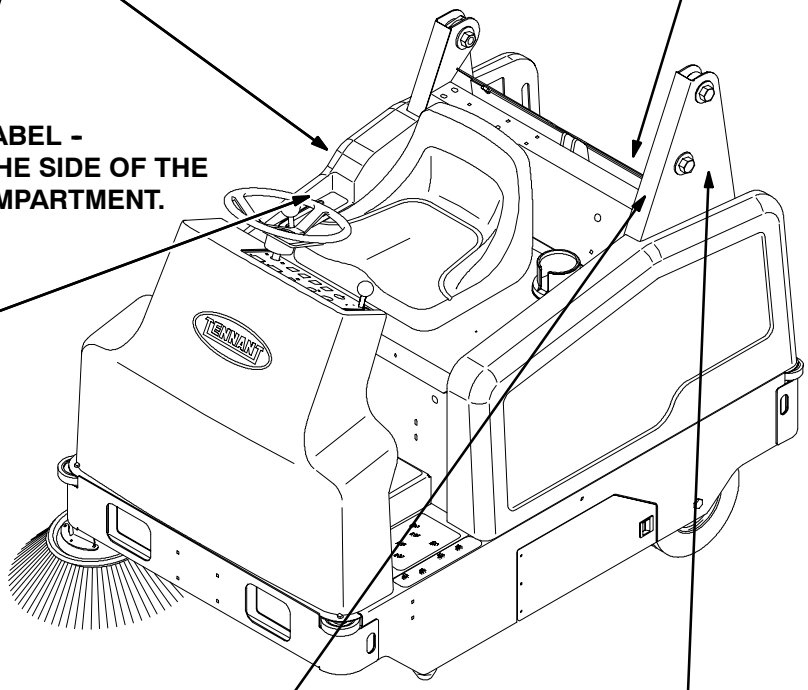
7. **When loading/unloading machine onto/off truck or trailer:**
   - **Turn off machine.**
   - **Use truck or trailer that will support the weight of the machine.**
   - **Use winch. Do not drive the machine onto/off the truck or trailer unless the load height is 380 mm (15 in) or less from the ground.**
   - **Set parking brake after machine is loaded.**
   - **Block machine tires.**
   - **Tie machine down to truck or trailer.**

The following safety labels are mounted on the machine in the locations indicated. If these or any labels become damaged or illegible, install a new label in its place.

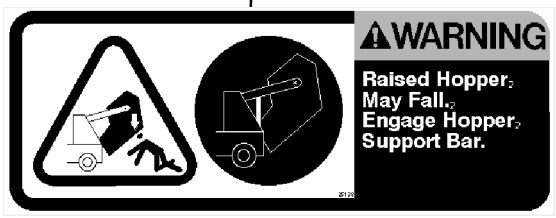
MOVING BELT AND FAN LABEL – LOCATED ON TOP OF THE RADIATOR SHROUD.

EMISSIONS LABEL – LOCATED BEHIND THE OPERATOR'S SEAT.

FOR SAFETY LABEL – LOCATED ON THE SIDE OF THE OPERATOR COMPARTMENT.



HOPPER LIFT ARMS LABEL – LOCATED ON BOTH LIFT ARMS.



HOPPER SUPPORT LABEL – LOCATED ON BOTH LIFT ARMS AND THE HOPPER SUPPORT BAR.

SPECIFICATIONS

GENERAL MACHINE DIMENSIONS/CAPACITIES

Item	Dimension/capacity
Length	1956 mm
Width	1070 mm
Width w/side brush	1120 mm
Height	1440 mm
Height with overhead guard	2045 mm
Track	94 mm
Wheelbase	97 mm
Main sweeping brush diameter	280 mm
Main sweeping brush length	711 mm
Side brush diameter	520 mm
Sweeping path width	711 mm
Sweeping path width with one side brush	1070 mm
Sweeping path width with two side brushes	1400 mm
Main sweeping brush pattern width	65 mm
Hopper weight capacity	135 kg
Hopper volume capacity	125 L
Dust filter area	4.6 sq m
GVWR	927 kg
Ceiling height minimum dumping clearance	2286 mm
Sound level – continuous	81± dB(A)
Sound level – peak	81± dB(A)
Vibration level does not exceed	2.5 m/s^2

GENERAL MACHINE PERFORMANCE

Item	Measure
Maximum forward speed	8.1 km/h
Maximum reverse speed	4.8 km/h
Minimum aisle turn	2095 mm
Minimum turning radius, left	1400 mm
Minimum turning radius, right	1400 mm
Maximum rated incline with empty hopper	10°/18%
Maximum rated incline with full hopper	6°/11%

POWER TYPE

Engine	Type	Ignition	Cycle	Aspiration	Cylinders	Bore	Stroke
Kubota Z482	Piston	Diesel	4	Natural	2	67 mm	68 mm
	Displacement		Net power, governed			Net power, maximum	
	479 cc		8 kw @ 2500 rpm			10.5 kw @ 3600 rpm	
	Fuel		Cooling system			Electrical system	
	Diesel Fuel tank: 7.2 L		Water/ethylene glycol atifreeze Radiator: 0.95 L Total: 2.84 L			12 V nominal 12.5 A alternator	
	Idle speed		(Fast) governed speed			Engine lubricating oil with filter	
	2500 ± 50 rpm (gov)		2500 ± 50 rpm (gov)			2.5 L SAE 10W-30 CD/CE rated	

STEERING

Type	Power source	Emergency steering
Front wheel, manual controlled	Manual steering	Manual

HYDRAULIC SYSTEMS

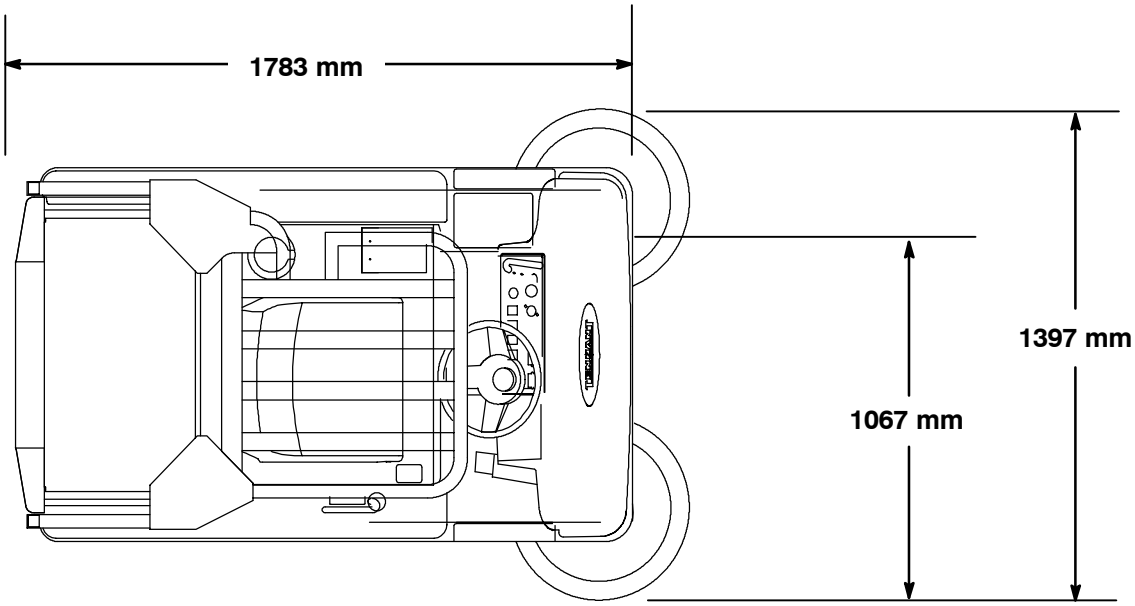
System	Capacity	Fluid Type
Main hydraulic reservoir	7.58 L	TENNANT part no. 65869-above 7° C
Main hydraulic total	9.48 L	TENNANT part no. 65870-below 7° C
Hydraulic lift reservoir	0.53 L	TENNANT part no. 65870 (Hydraulic lift res. only)
Hydraulic lift total	1.4 L	

BRAKING SYSTEM

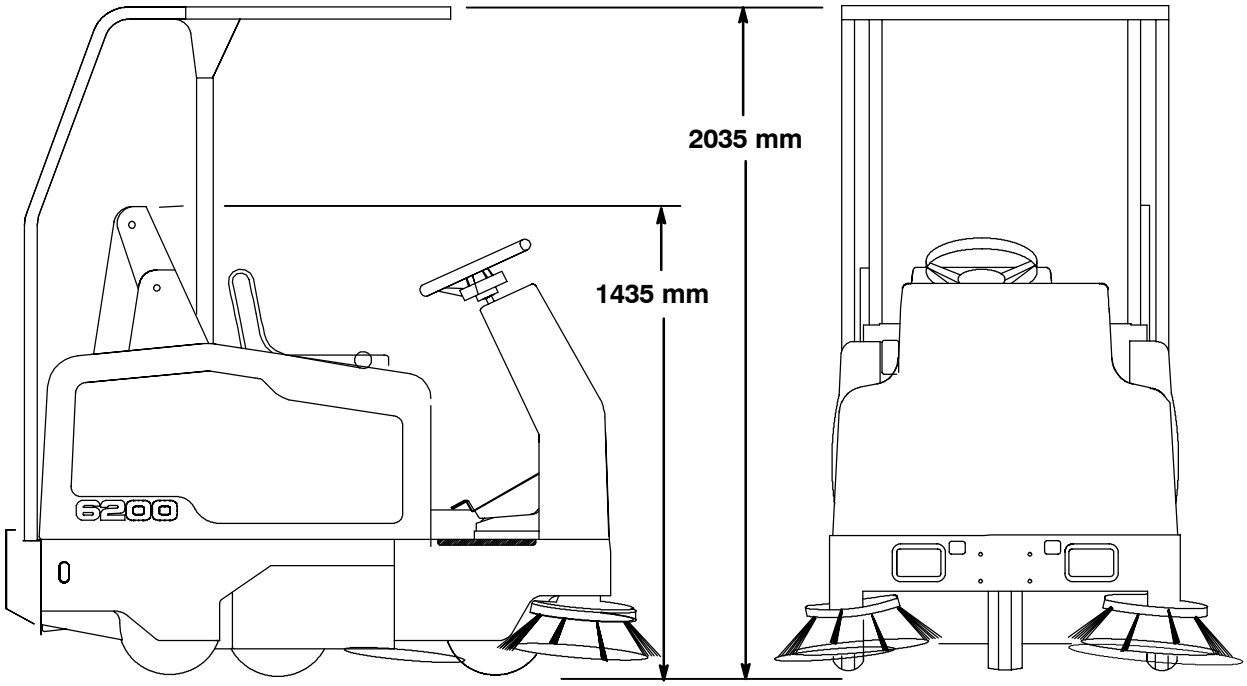
Type	Operation
Service brakes	Mechanical disc brake (1), one front wheel, cable actuated
Parking brake	Utilizes service brakes, cable actuated

TIRES

Location	Type	Size
Front (1)	Solid	90 x 305 mm
Rear (2)	Solid	76 x 305 mm



TOP VIEW



SIDE VIEW FRONT VIEW

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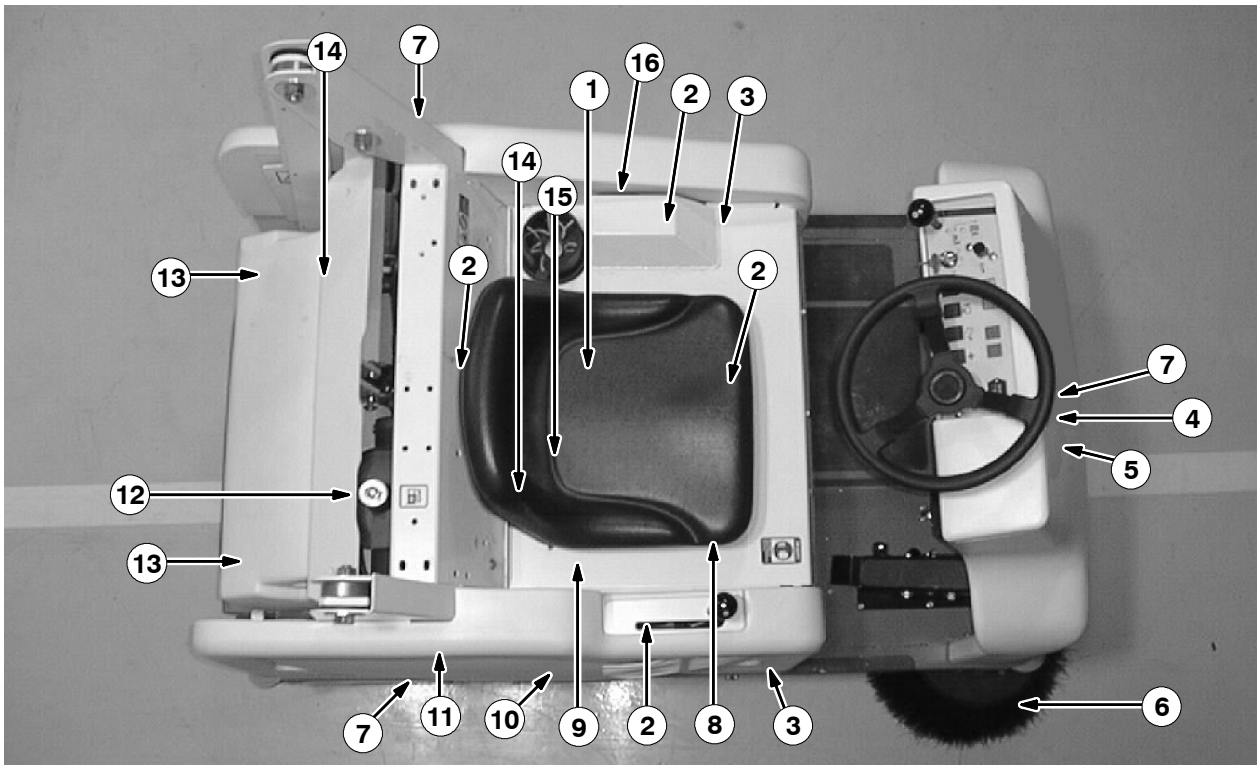
MACHINE DIMENSIONS

MAINTENANCE



MAINTENANCE CHART

Interval	Key	Description	Procedure	Lubricant/ Fluid	No. of Service Points
Daily	1	Engine	Check oil level	EO	1
	2	Brush compartment skirts	Check for damage, wear and adjustment	–	5
	3	Side skirts	Check for damage, wear and adjustment	–	2
	9	Main brush	Check for damage, wear and adjustment	–	1
	6	Side brush(es)	Check for damage, wear and adjustment	–	1 (2)
			Check brush pattern	–	1 (2)
	13	Hopper dust filter	Shake	–	1
50 Hours	9	Main brush	Rotate end-for-end	–	1
			Check brush pattern	–	1
	1	Fuel lines	Check for damage and wear	–	All
100 Hours	1	Engine	Change oil and filter element	EO	1
			Replace air filter element	–	1
			Check air filter housing dust cap	–	1
	16	Radiator	Check core exterior for debris	–	1
			Check coolant level	WG	1

Interval	Key	Description	Procedure	Lubricant/ Fluid	No. of Service Points
100 Hours	13	Hopper dust filter	Check for damage, clean or replace	–	1
	4	Steering castor pivot bearing	Lubricate	SPL	1
	13	Hopper seals	Check for damage or wear	–	6
	13	Hopper filter seals	Check for damage or wear	–	2
	13	Vacuum seal	Check for damage or wear	–	1
	11	Vacuum fan belt	Check tension and wear	–	1
	10	Main brush belt	Check tension and wear	–	1
	14	Hydraulic pump belt	Check tension and wear	–	1
	15	Jackshaft belt	Check tension and wear	–	1
	14	Hydraulic fluid reservoirs	Check fluid levels	–	2
	7	Tires	Check for damage or wear	–	3
200 Hours	5	Brake	Check adjustment	–	1
	4	Steering gear chain	Lubricate	EO	1
	6	Side brush(es) guard	Check for damage or wear	–	1 (2)
	16	Radiator hoses and clamps	Check tension and wear	–	2
400 Hours	1	Fuel filter cartridge	Replace element	–	1
800 Hours	14	Hydraulic fluid reservoirs	Change hydraulic fluid	HYDO	2
	14	Hydraulic hoses	Check for wear and damage	–	All
	14	Hydraulic fluid filter	Replace filter element	–	1
	14	Main hydraulic reservoir cap	Replace cap	–	1
	14	Main hydraulic reservoir strainer	Replace strainer	–	1
	7	Wheels	Check rear wheel axle torque	–	2
	8	Battery	■Clean and tighten battery cable connections	–	2
	16	Cooling system	Flush	WG	1

LUBRICANT/FLUID
EO . . . . Engine oil, SAE 10W-30, CD/CE rated
HYDO . Tennant or approved hydraulic fluid
SPL . . . Special lubricant, Lubriplate EMB grease (TENNANT part no. 01433-1)
WG . . . . Water and permanent-type ethylene glycol anti-freeze, -34° C

NOTE: More frequent intervals may be required in extremely dusty conditions.

NOTE: Also check procedures indicated (■) after the first 50 hours of operation.

PUSHING, TOWING, AND TRANSPORTING THE MACHINE

PUSHING OR TOWING THE MACHINE

If the machine becomes disabled, it can be pushed or towed from the front or rear, but it is easier and more stable to tow from the front end.

Only push or tow the machine for a *very short distance* and do not exceed 1.6 kp/h (1 mph). It is NOT intended to be pushed or towed a long distance or at a high speed.

ATTENTION! Do not push or tow machine for a long distance or damage may occur to the propelling system.

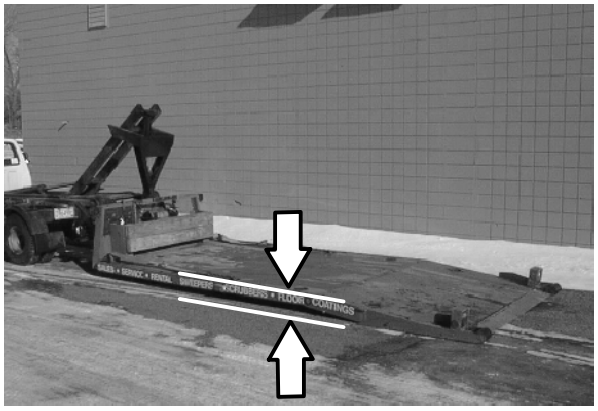
TRANSPORTING THE MACHINE

1. Position the front of the machine at the loading edge of the truck or trailer.
   FOR SAFETY: Use truck or trailer that will support the weight of the machine.

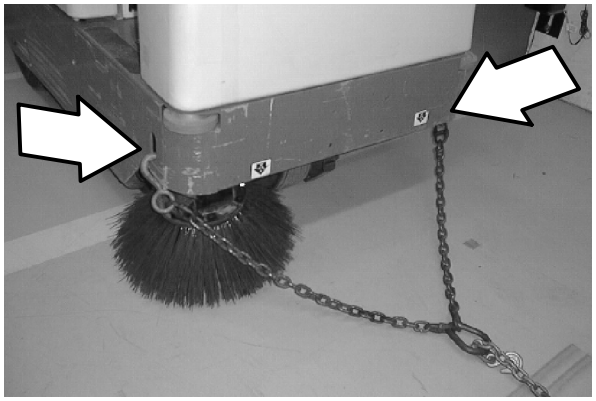
NOTE: Empty the hopper before transporting the machine.

2. If the loading surface is not horizontal or is higher than 380 mm (15 in) from the ground, use a winch to load machine.

   If the loading surface is horizontal AND is 380 mm (15 in) or less from the ground, the machine may be driven onto the truck or trailer.



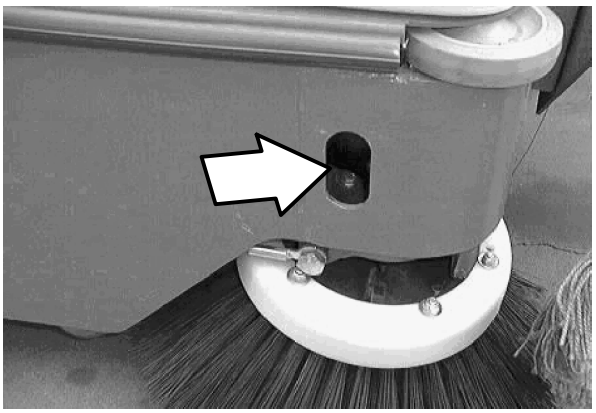
3. To winch the machine onto the truck or trailer, attach the winching chains to the front tie down located in the front of the machine frame.
   FOR SAFETY: When loading machine onto truck or trailer, use winch. Do not drive the machine onto the truck or trailer unless the loading surface is horizontal AND is 380 mm (15 in) or less from the ground.



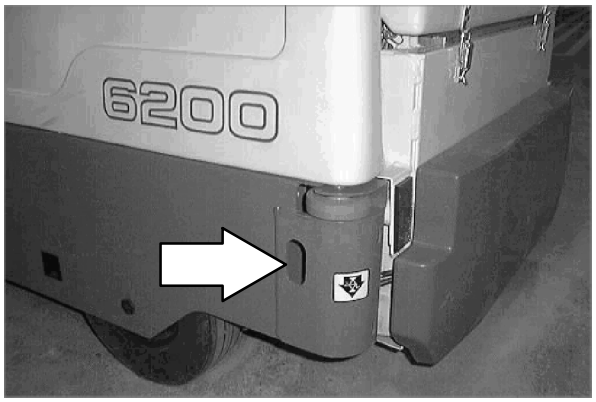
4. Position the machine onto the truck or trailer as far as possible. If the machine starts to veer off the centerline of the truck or trailer, stop and turn the steering wheel to center the machine.

5. Set the parking brake and block the machine tires. Tie down the machine to the truck or trailer before transporting.

   The front tie-down locations are the holes in the front of the machine frame.



   The rear tie-down locations are the holes in the sides of the machine frame near the rear bumper.



6. If the loading surface is not horizontal or is higher than 380 mm (15 in) from the ground, use a winch to unload machine.

   If the loading surface is horizontal AND is 380 mm (15 in) or less from the ground, the machine may be driven off the truck or trailer.

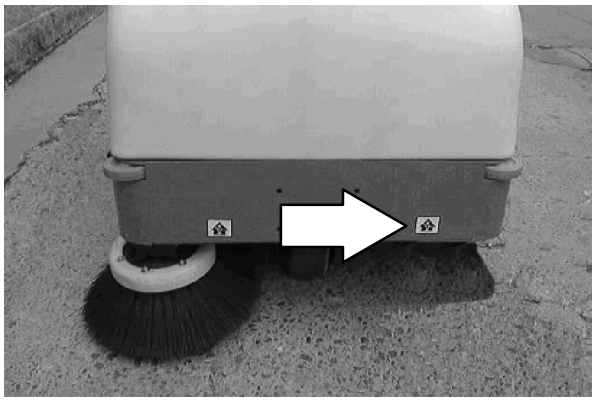
   FOR SAFETY: When unloading machine off truck or trailer, use winch. Do not drive the machine off the truck or trailer unless the loading surface is horizontal AND 380 mm (15 in) or less from the ground.

MACHINE JACKING

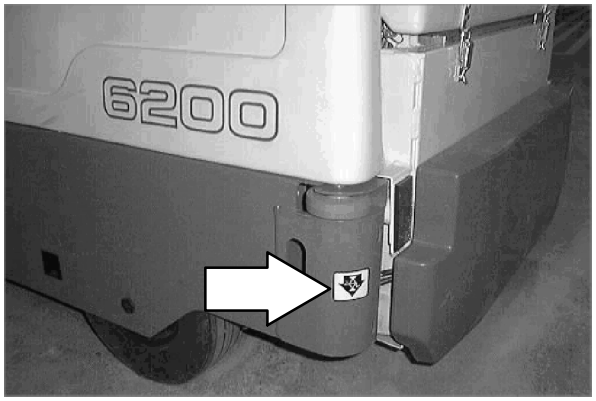
Empty the hopper before jacking the machine. You can jack up the machine for service at the designated locations. Use a hoist or jack that will support the weight the machine. Always stop the machine on a flat, level surface and block the tires before jacking up the machine.

FOR SAFETY: Before leaving or servicing machine, stop on level surface, set parking brake, turn off machine, and remove key.

The front jacking locations are on the flat bottom edge of the front of the machine frame.



The rear jacking locations are on the corners of the rear frame.



FOR SAFETY: When servicing machine, block machine tires before jacking up machine.

FOR SAFETY: When servicing machine, jack up machine at designated locations only. Block machine up with jack stands.

STORING MACHINE

Before storing the machine for an extended time, the machine needs to be serviced to lessen the chance of rust, sludge, and other undesirable deposits from forming.

HARDWARE INFORMATION

The following charts state standard plated hardware tightening ranges for normal assembly applications. Decrease the specified torque by 20% when using a thread lubricant. Do not substitute lower grade hardware for higher grade hardware. If higher grade hardware than specified is substituted, tighten only to the specified hardware torque value to avoid damaging the threads of the part being threaded into, as when threading into speed nuts or weldments.

STANDARD BOLT TORQUE CHART

Thread Size	SAE Grade 5 Torque ft lb (Nm)	SAE Grade 8 Torque ft lb (Nm)
0.25 in	7–10 (9–14)	10–13 (14–38)
0.31 in	15–20 (20–27)	20–26 (27–35)
0.38 in	27–35 (37–47)	36–47 (49–64)
0.44 in	43–56 (58–76)	53–76 (72–103)
0.50 in	65–85 (88–115)	89–116 (121–157)
0.62 in	130–170 (176–231)	117–265 (159–359)
0.75 in	215–280 (291–380)	313–407 (424–552)
1.00 in	500–650 (678–881)	757–984 (1026–1334)

NOTE: Decrease torque by 20% when using a thread lubricant.

METRIC BOLT TORQUE CHART

Thread Size	Class 8.8 Torque ft lb _Nm)	Class 10.9 Torque ft lb (Nm)
M4	2 (3)	3 (4)
M5	4 (5)	6 (8)
M6	7 (9)	10 (14)
M8	18 (24)	25 (34)
M10	32 (43)	47 (64)
M12	58 (79)	83 (112)
M14	94 (127)	133 (180)
M16	144 (195)	196 (265)
M20	260 (352)	336 (455)
M24	470 (637)	664 (900)

NOTE: Decrease torque by 20% when using a thread lubricant.

Exceptions to the above chart:

Check the machine for exceptions!

BOLT IDENTIFICATION

Identification Grade Marking	Specification and Grade
	SAE–Grade 5
	SAE–Grade 8
	ISO–Grade 8.8
	ISO–Grade 10.9

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THREAD SEALANT AND LOCKING COMPOUNDS

Thread sealants and locking compounds may be used on this machine. They include the following:

Locktite 515 sealant – gasket forming material. TENNANT Part No. 75567,15 oz (440 ml) cartridge.

Locktite 242 blue – medium strength thread locking compound. TENNANT Part No. 32676, 0.5 ml tube.

Locktite 271 red – high strength thread locking compound. TENNANT Part No. 19857, 0.5 ml tube.

HYDRAULIC FITTING INFORMATION

HYDRAULIC TAPERED PIPE FITTING (NPT) TORQUE CHART

NOTE: Ratings listed are when using teflon thread seal.

Size	Minimum Torque	Maximum Torque
1/4 NPT	10 ft lb (14 Nm)	30 ft lb (41 Nm)
1/2 NPT	25 ft lb (34 Nm)	50 ft lb (68 Nm)
3/4 NPT	50 ft lb (68 Nm)	100 ft lb (136 Nm)

HYDRAULIC TAPERED SEAT FITTING (JIC) TORQUE CHART

Tube O.D. (in)	Thread Size	Maximum Torque
0.25	0.44-20	9 ft lb (12 Nm)
0.38	0.56-18	20 ft lb (27 Nm)
0.50	0.75-16	30 ft lb (41 Nm)
0.62	0.88-14	40 ft lb (54 Nm)
0.75	1.12-12	70 ft lb (95 Nm)
1.0	1.31-12	90 ft lb (122 Nm)

HYDRAULIC O-RING FITTING TORQUE CHART

Tube O.D. (in)	Thread Size	Minimum Torque	Maximum Torque
0.25	0.44-20	6 ft lb (8 Nm)	9 ft lb (12 Nm)
0.38	0.56-18	13 ft lb (18 Nm)	20 ft lb (27 Nm)
		*10 ft lb (14 Nm)	12 ft lb (16 Nm)
0.50	0.75-16	20 ft lb (27 Nm)	30 ft lb (41 Nm)
		*21 ft lb (28 Nm)	24 ft lb (33 Nm)
0.62	0.88-14	25 ft lb (34 Nm)	40 ft lb (54 Nm)
0.75	1.12-12	45 ft lb (61 Nm)	70 ft lb (95 Nm)
1.0	1.31-12	60 ft lb (81 Nm)	90 ft lb (122 Nm)

NOTE: Do not use sealant on o-ring threads.

*Aluminum bodied components

MACHINE TROUBLESHOOTING

Problem	Cause	Remedy
Excessive dusting	Vacuum fan damper closed	Press the vacuum fan / filter shaker switch to the on position
	Brush skirts and dust seals worn, damaged, out of adjustment	Replace or adjust brush skirts or dust seals
	Hopper dust filter clogged	Shake and/or clean or replace dust filter
	Hopper full	Empty hopper
	Vacuum fan failure	Contact Tennant service personnel
Poor sweeping performance	Brush bristles worn	Replace brushes
	Main and side brushes not adjusted properly	Adjust main and side brushes
	Debris caught in main brush drive mechanism	Remove debris from drive mechanism
	Main brush drive failure	Contact Tennant service personnel
	Side brush drive failure	Contact Tennant service personnel
	Hopper full	Empty hopper
	Hopper lip skirts worn or damaged	Replace lip skirts
	Wrong sweeping brush	Contact Tennant representative for recommendations
	Large debris trap damaged	Repair or replace large debris trap
	Hopper dust filter clogged	Shake and/or clean or replace dust filter
Machine will not start	Engine oil level low	Check and fill
	Fuel tank valve closed	Open valve beneath fuel tank
	Fuel tank empty	Fill fuel tank

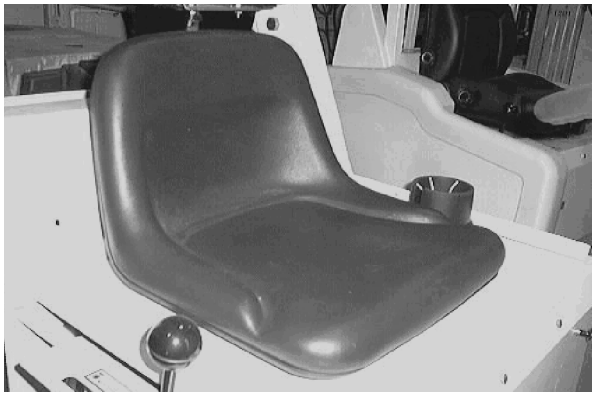
CONTENTS

INTRODUCTION

This section includes information on the main chassis related components for example the seat, steering, brakes, and tires.

OPERATOR SEAT

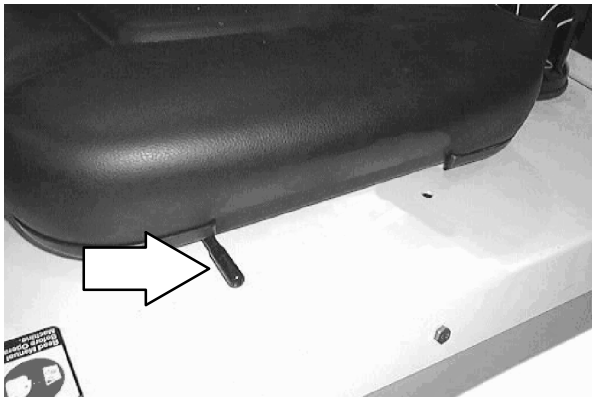
The *operator seat* is a fixed back style.



ADJUSTABLE OPERATOR SEAT (OPTION)

The *adjustable operator seat* is a fixed back style with a forward–backward adjustment.

Adjust: Pull the lever in, slide the seat backward or forward to the desired position, and release the lever.



DELUXE SUSPENSION SEAT (OPTION)

The *deluxe suspension seat* has four adjustments. The adjustments are for the lumbar support, backrest angle, operator weight adjustment and front to back adjustment.

The *lumbar adjustment knob* controls the firmness of the lumbar support.

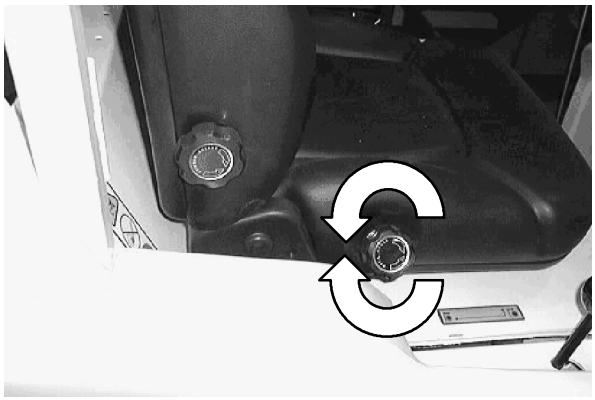
Increase firmness:Turn knob clockwise.

Decrease firmness:Turn knob counterclockwise.

The *backrest angle knob* adjusts the angle of the backrest.

Increase angle: Turn the angle adjustment knob counterclockwise.

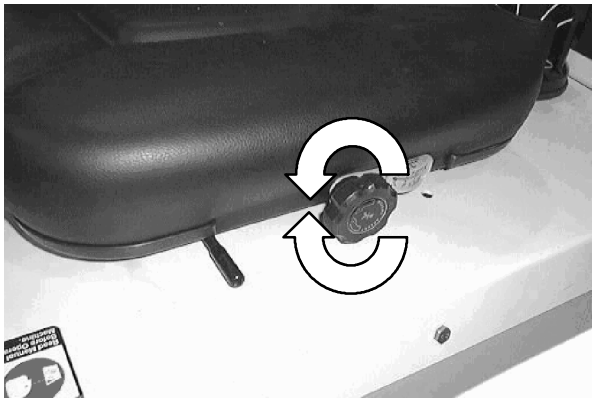
Decrease angle: Turn the angle adjustment knob clockwise.



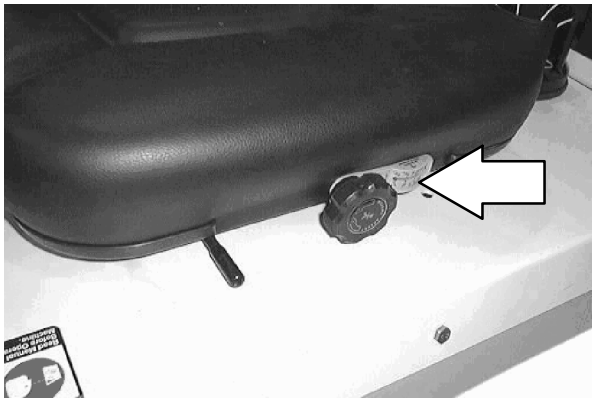
The *weight adjustment knob* controls the firmness of the operator's seat.

Increase firmness: Turn the weight adjustment knob clockwise.

Decrease firmness: Turn the weight adjustment knob counterclockwise.

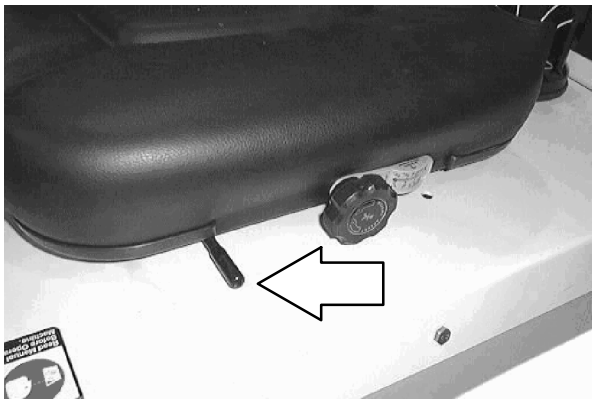


Use the gauge next to the weight adjustment knob to help determine proper seat firmness for the operator.



The *front-to-back adjustment lever* adjusts the seat position.

Adjust: Pull the lever out and slide the seat forward or backward to the desired position. Release the lever.



STATIC DRAG CHAIN

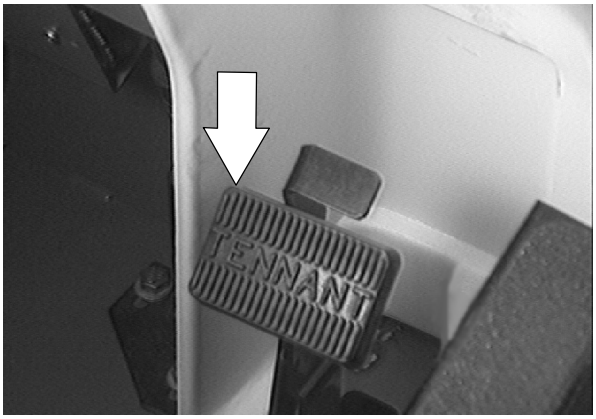
A static drag chain prevents the buildup of static electricity in the machine. The chain is attached to the machine by a rear main brush skirt retaining bolt.

Make sure the chain is touching the floor at all times.

BRAKES AND TIRES

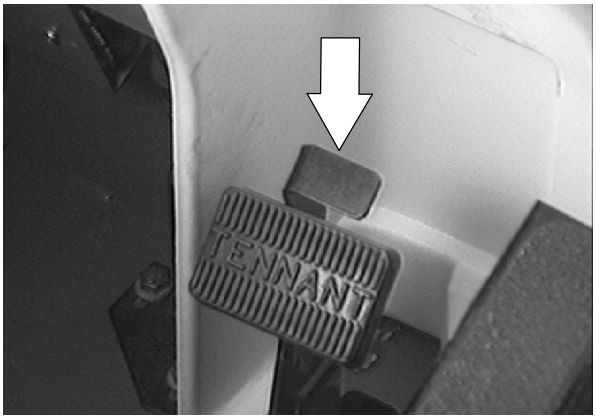
SERVICE BRAKES

The service brake is located on the front wheel assembly. It is actuated with a foot brake pedal in the operators compartment.



PARKING BRAKE

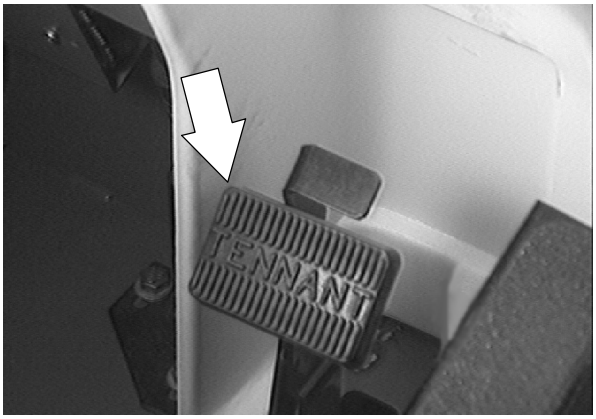
The parking brake is located on the front wheel assembly. It is actuated with a smaller toe lever on the top of the foot brake pedal in the operators compartment. It is deactivated by simply pushing on the foot brake pedal.



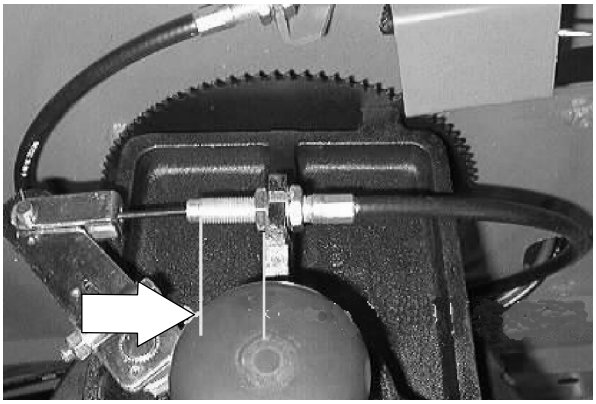
TO ADJUST SERVICE BRAKES

The service brakes should be adjusted when an excessive amount of brake pedal stroke is needed to stop the machine.

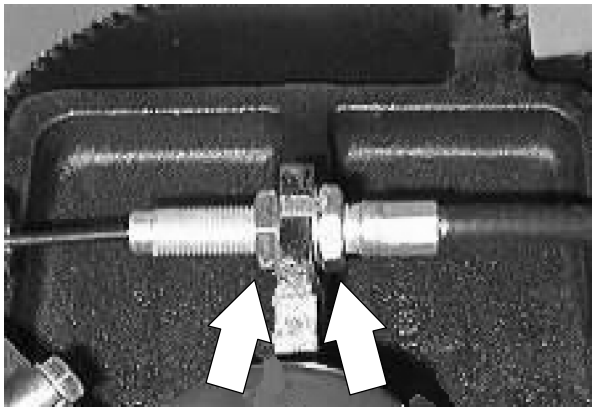
FOR SAFETY: Before Leaving Or Servicing Machine; Stop On Level Surface, Block Rear Wheels.



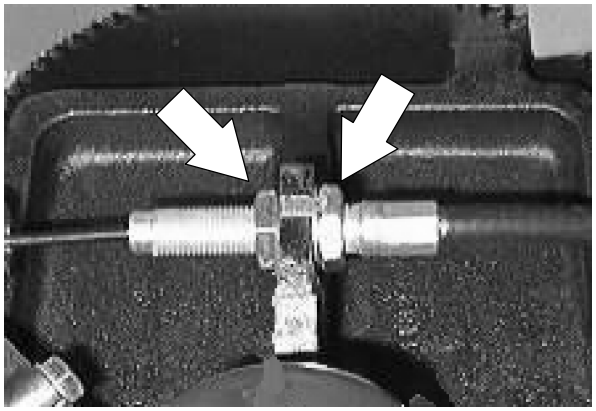
1. Go under the machine in the front right corner.



2. Locate the area where the brake cable attaches to the drive support. The beginning adjustment should be **1.375 in.** of conduit showing on the cable end.
3. Turn the steering wheel all the way to the right.



4. Loosen the two jam nuts on the brake cable, where it attaches to the drive support casting.
5. Move the cable away from the brake lever far enough to remove the slack in the pedal movement.

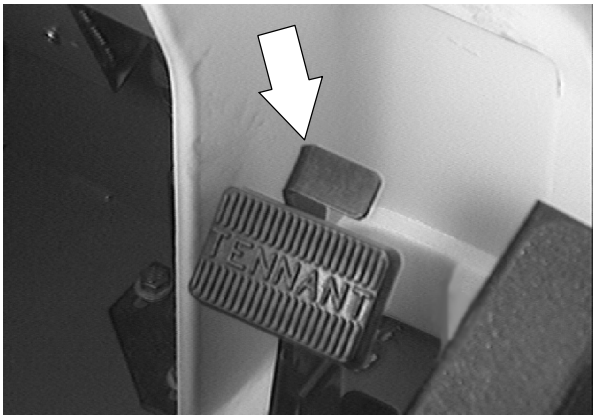


6. Re-tighten the two jam nuts firmly. Operate the machine and check the brake pedal for a shorter stroke.

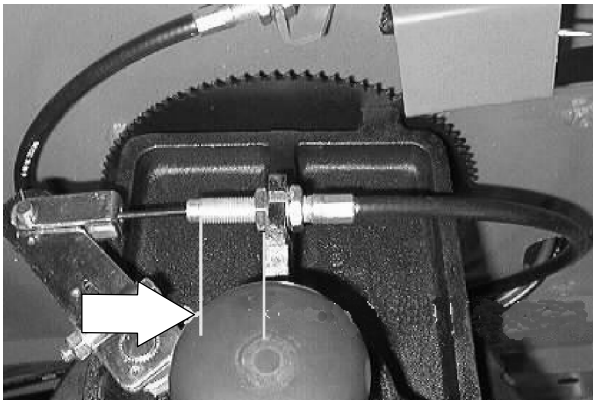
TO ADJUST PARKING BRAKE

The parking brake should be adjusted when an excessive amount of brake pedal stroke is needed to hold the machine.

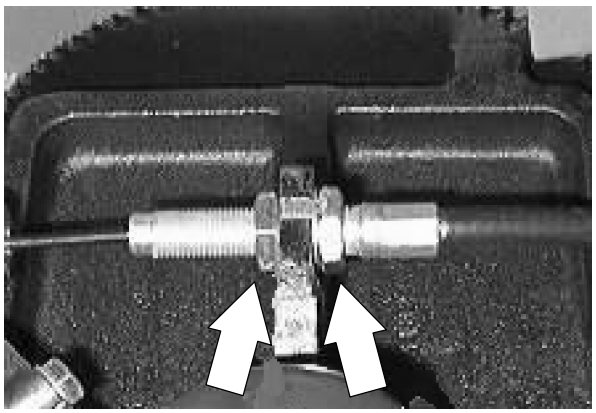
FOR SAFETY: Before Leaving Or Servicing Machine; Stop On Level Surface, Block Rear Wheels.



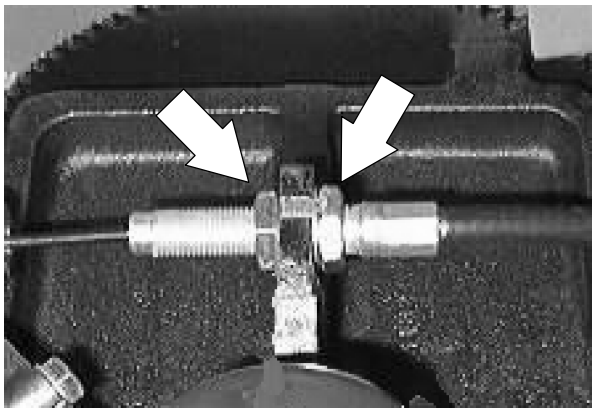
1. Go under the machine in the front right corner.



2. Locate the area where the brake cable attaches to the drive support. The beginning adjustment should be **1.375 in.** of conduit showing on the cable end.
3. Turn the steering wheel all the way to the right.



4. Loosen the two jam nuts on the brake cable, where it attaches to the drive support casting.
5. Move the cable away from the brake lever far enough to remove the slack in the pedal movement.

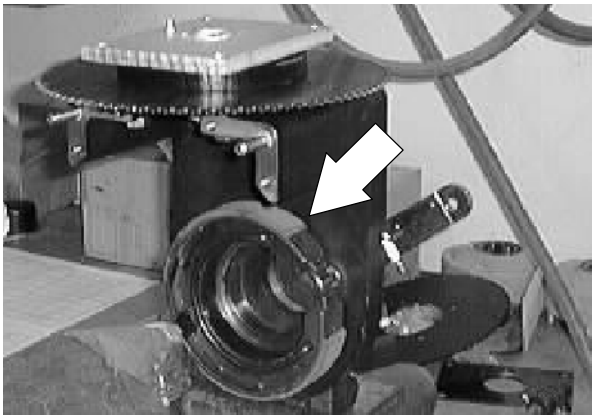


6. Re-tighten the two jam nuts firmly. Operate the machine and check the brake pedal for a shorter stroke.

TO REPLACE DRIVE ASSEMBLY BRAKE SHOES

The front brake shoes should be replaced when the machine no longer stops easily or the adjustment in the brake cable has been used up.

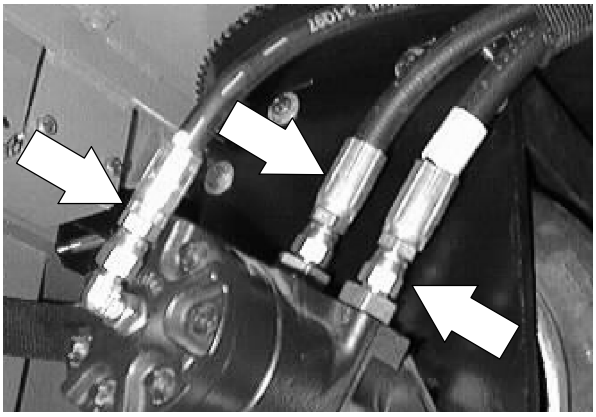
FOR SAFETY: Before Leaving Or Servicing Machine; Stop On Level Surface, Block Rear Wheels.



1. Raise the seat support and disconnect the battery cables.

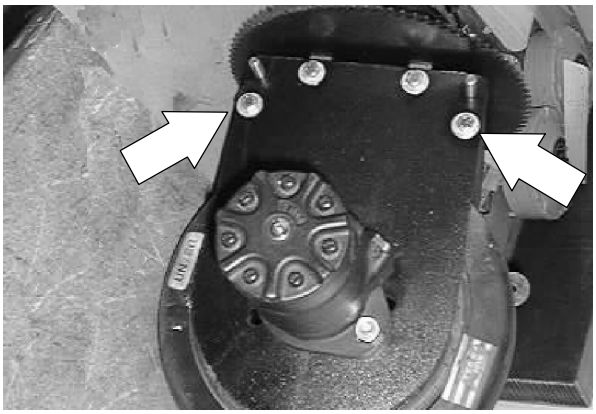
2. Raise the front of the machine and place jack stands under the frame.

3. Mark, disconnect, and plug the hydraulic hoses leading to the drive motor.

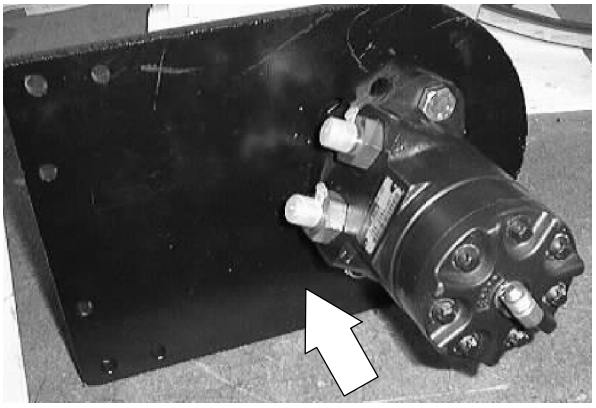


NOTE: Observe hydraulic cleanliness requirements when opening hydraulic lines.

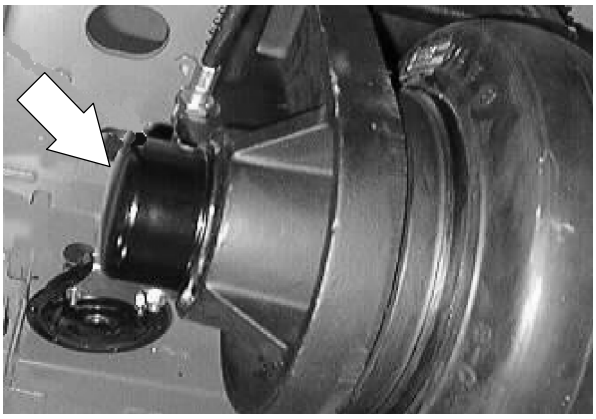
4. Remove the four hex screws holding the outer plate, motor, and drive hub to the main drive assembly.



5. Pull the outer plate, motor, and drive hub off the main drive assembly.



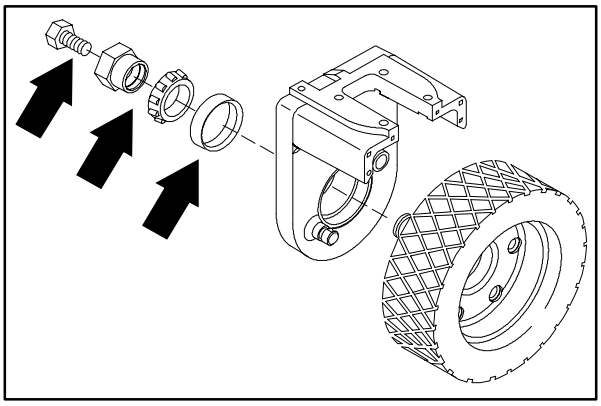
6. Go to the other side of the drive assembly and remove the hub cap. This will expose the outer bearing, hex sleeve, and lock bolt.



7. Remove the lock bolt.
   (this is a right-hand thread screw).

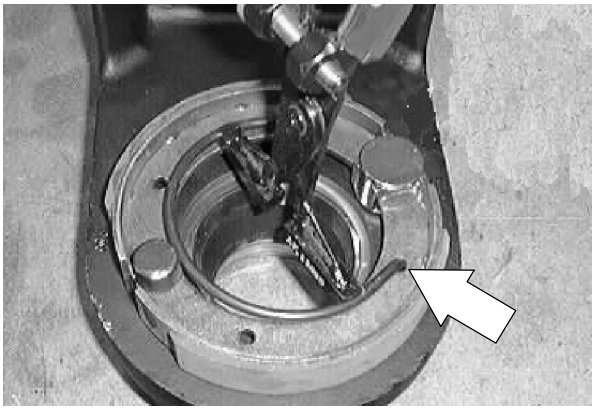
8. Remove the hex sleeve and outer bearing cone assembly.
   (this is a left hand thread nut).

9. The axle/tire/wheel assembly can now be removed from the drive assembly. This will expose the brake shoes.



10. Remove the large ”C” spring holding the two brake shoes together. Remove the brake shoes.

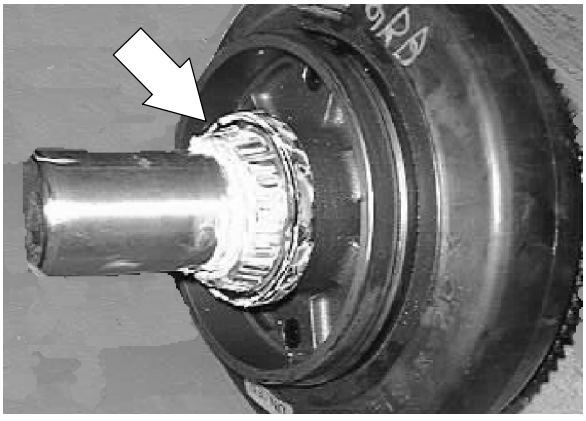
NOTE: There is a great deal of tension on the ”C” spring. Care must be used when spreading the spring for removal or installation.



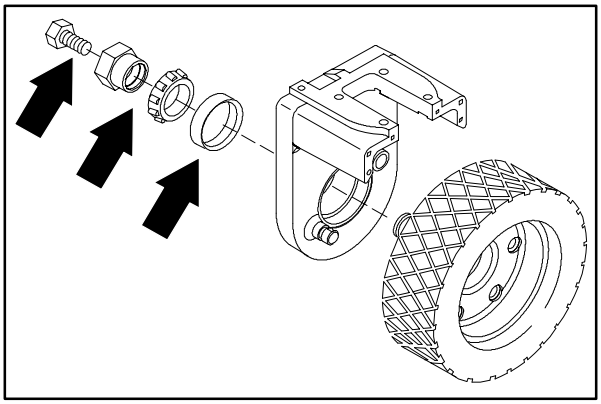
11. Install the new brake shoes on the drive assembly in the same orientation as the old ones were removed.

12. Reinstall the ”C” spring on the new brake shoes.

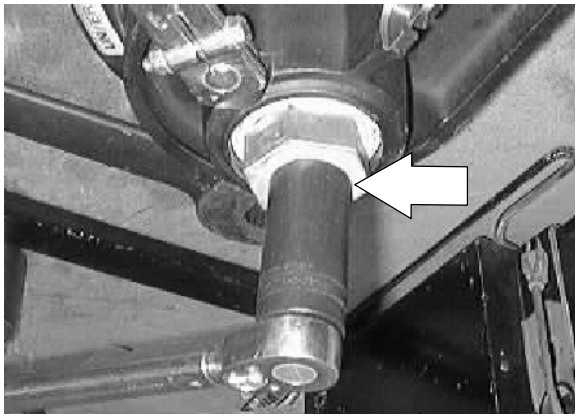
13. Reinstall the axle/tire/wheel assembly into the drive assembly. Make sure the inner and outer wheel bearings are completely greased when re-assembling.



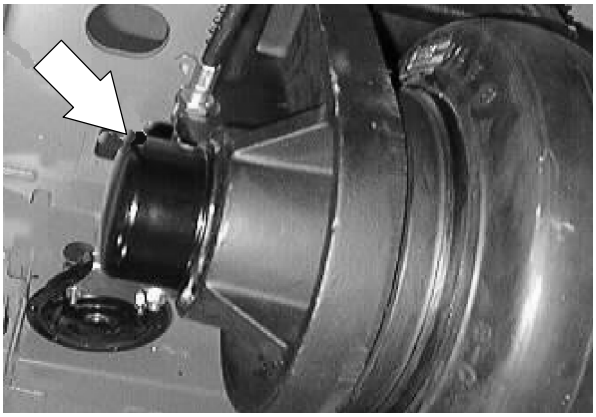
14. Reinstall the outer bearing and hex sleeve assembly **(this is a left hand thread nut)**.Tighten to at least 100 ft lbs and then back off the hex sleeve to 0 ft lbs. Re-torque hex sleeve to 30 ft lbs.



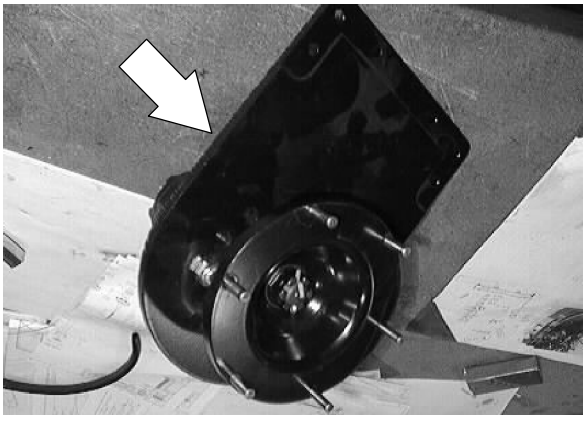
15. Install the lock bolt in the end of the hex sleeve. Tighten the lock bolt to 200 Nm (150 ft lb) while holding the hex sleeve from turning.



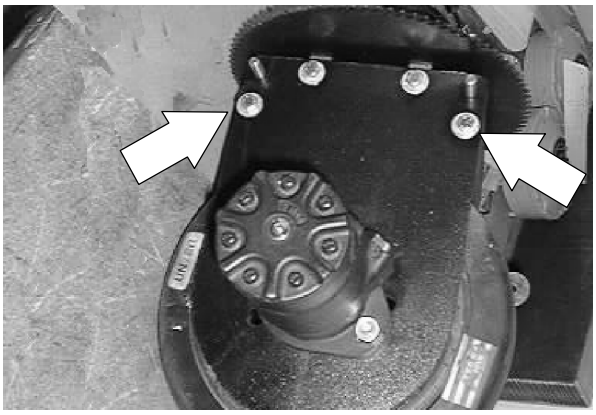
16. Reinstall the hub cap in the drive assembly.



17. Go to the other side of the drive assembly and install the plate, hub, and motor assembly onto the drive assembly.

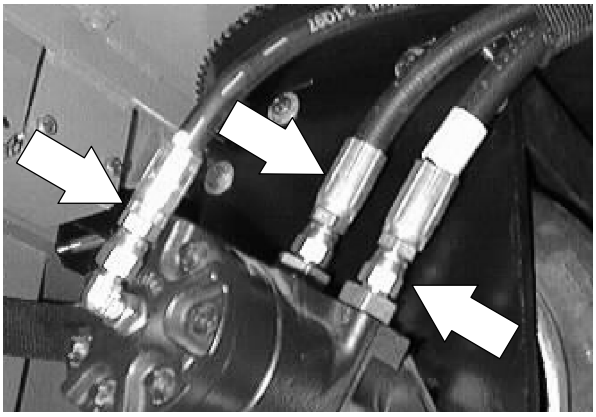


18. Install the 4 hex screws and washers. Tighten to 18 – 24 Nm (15 – 20 ft lb).

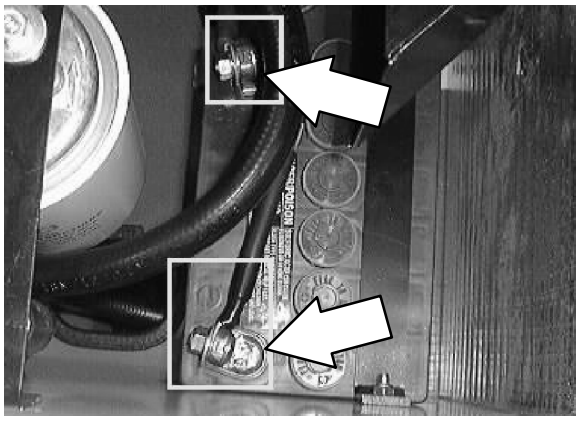


19. Reconnect the hydraulic hoses to the drive motor.

20. Remove the jack stands and lower the machine.



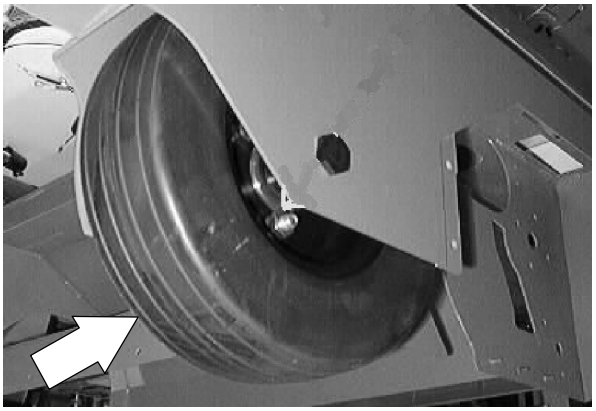
21. Reconnect the battery cables.



22. Drive the machine and check the brakes for proper operation. Adjust if necessary. See TO ADJUST SERVICE BRAKES instructions.

REAR TIRES AND WHEELS

The rear tires on the model 6200D are semi-pneumatic. The rear tire and wheel assemblies are idler wheels only--they have no braking capabilities.



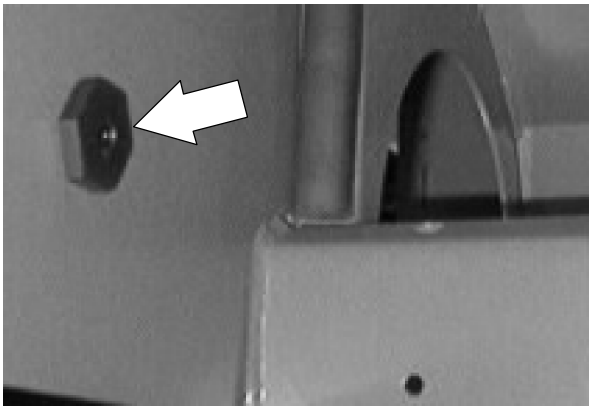
TO REMOVE REAR TIRE

FOR SAFETY: Before Leaving Or Servicing Machine; Stop On Level Surface, Set Parking Brake.

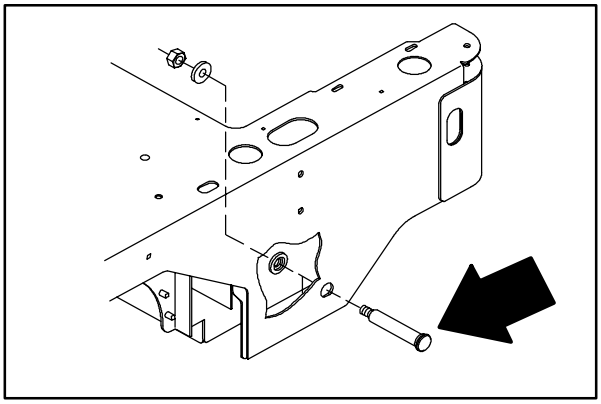
1. Jack up the rear corner of the machine where the tire needs to be removed.

NOTE: Do not raise both rear wheels off the floor at the same time. The machine will become unstable because of the single front tire.

2. Go under the machine in the area of the rear tire. Locate the lock nut holding the axle shaft to the machine frame. Remove the lock nut and washer.



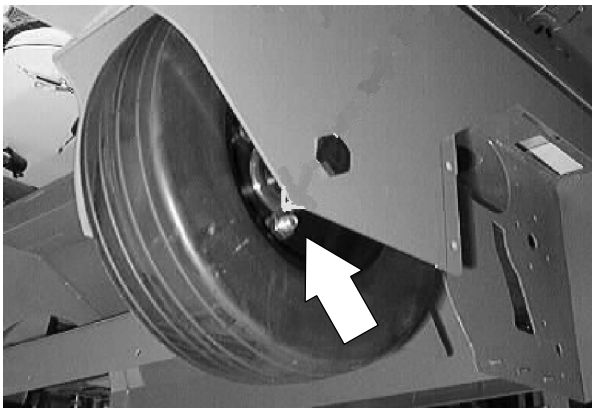
3. Support the tire while you pull the axle out of the wheel assembly. Drop the wheel assembly out of the machine.



TO INSTALL REAR TIRE

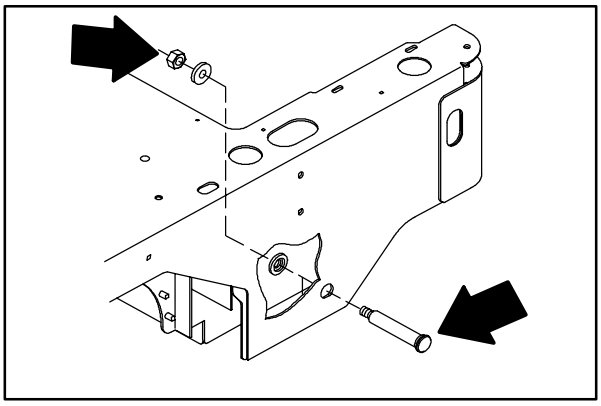
FOR SAFETY: Before Leaving Or Servicing Machine; Stop On Level Surface, Set Parking Brake.

1. Position the wheel assembly in the machine. (short side of hub toward outside) Raise the tire up and align the hole in the wheel bearing with the axle hole in the frame.



NOTE: The lug nuts must face the outside of the machine.

2. Install the axle shaft in the machine from the outside of the frame.

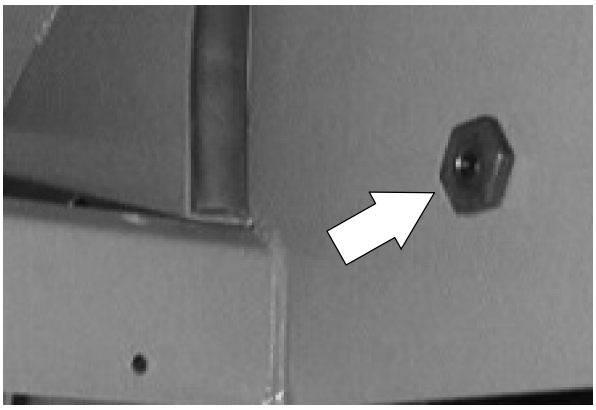


NOTE: The axle has a flat portion that must line up with the flat in the axle mount hole.

3. Install the washer and nut on the axle. Tighten to 68 – 81 Nm (50 – 60 ft lb).

4. Remove the jack stands and lower the machine.

5. Drive the machine and check for proper operation.

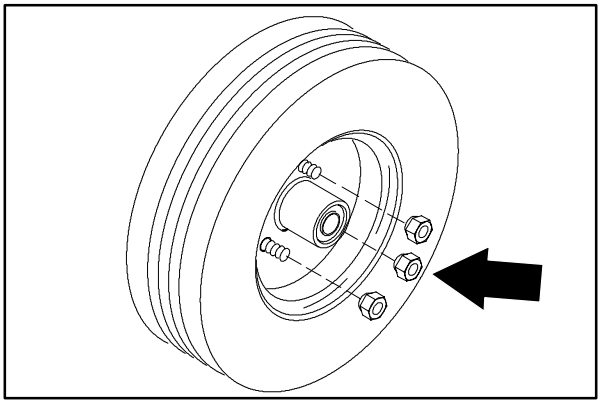


TO REPLACE REAR WHEEL BEARINGS

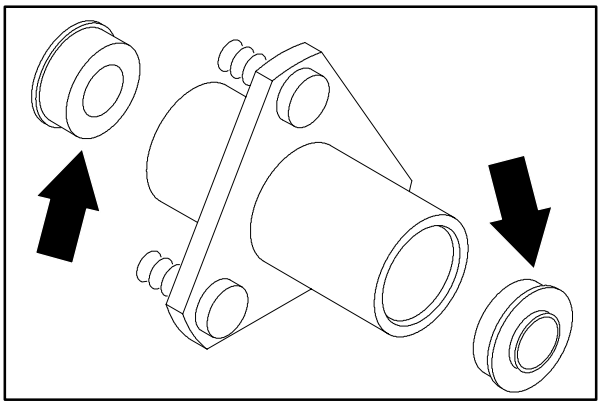
FOR SAFETY: Before Leaving Or Servicing Machine; Stop On Level Surface, Set Parking Brake.

1. Remove the rear wheel assembly. See TO REMOVE REAR TIRE instructions.

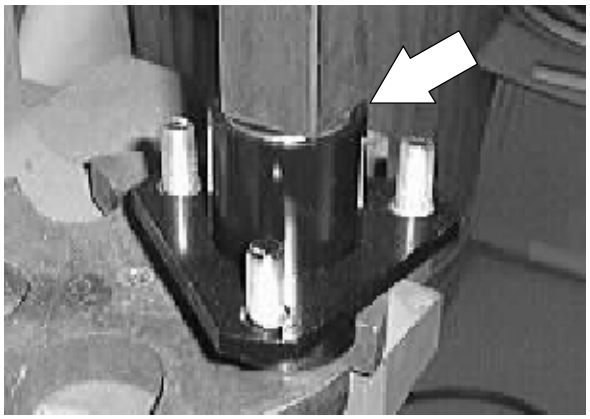
2. Remove the three lug nuts holding the bearing housing to the wheel assembly. Remove the bearing housing.



3. Use a press to remove the wheel bearings from the housing.

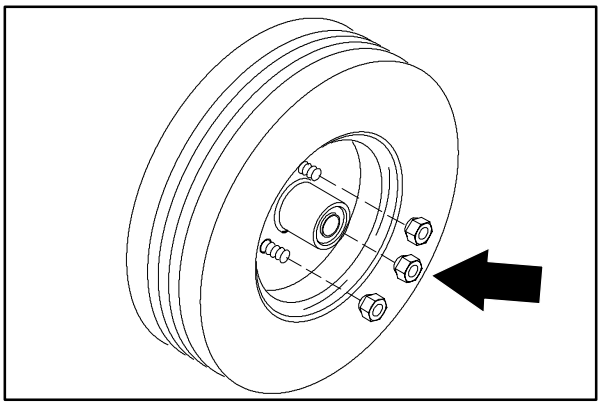


4. Press the new wheel bearings into the housing. Press the bearing in until the flange is seated on the housing.

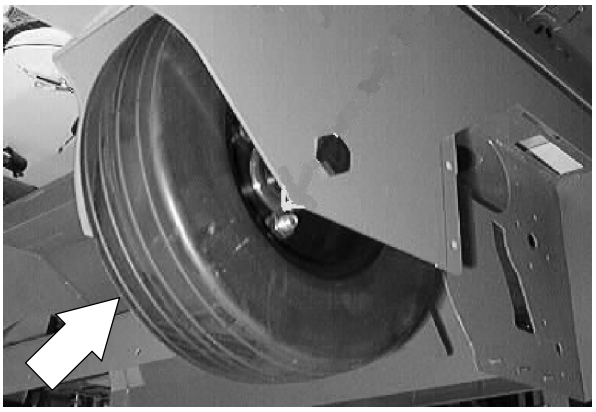


5. Reinstall the wheel on the bearing housing. (coining on wheel facing lug nuts) Tighten the three lug nuts to 58 – 76 Nm (43 – 56 ft lb).

NOTE: The lug nuts must face the outside of the machine.

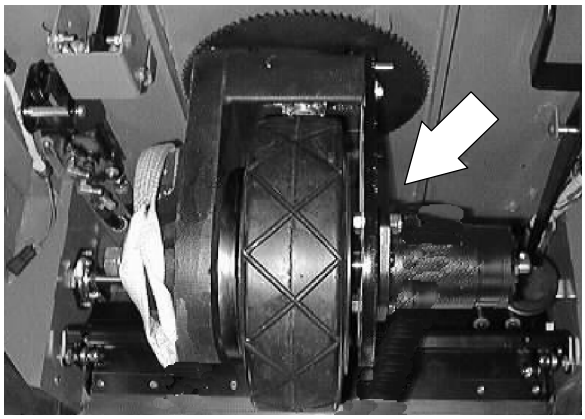


6. Reinstall the rear wheel assembly in the machine. See TO INSTALL REAR TIRE instructions.



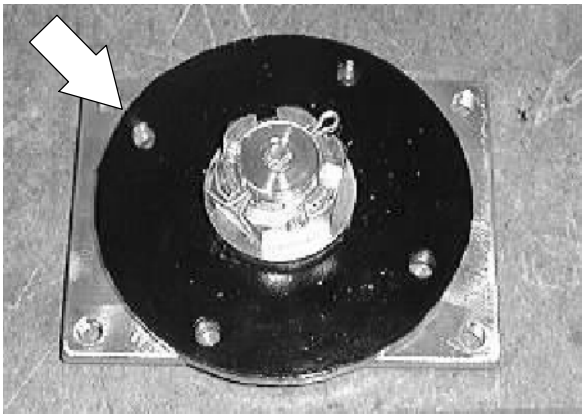
FRONT TIRE AND WHEEL, AND WHEEL DRIVE SUPPORT

The front drive assembly controls the forward and reverse movement of the machine along with the braking and steering. The brakes are actuated with a cable and uses a sprocket and chain assembly for the steering. Forward and reverse is accomplished with an hydraulic motor and drive hub.



FRONT WHEEL SUPPORT CASTER BEARING ASSEMBLY

The front wheel support caster bearing is located between the bottom swivel plate and the upper swivel plate weldment. The bearing is a flat needle bearing style.

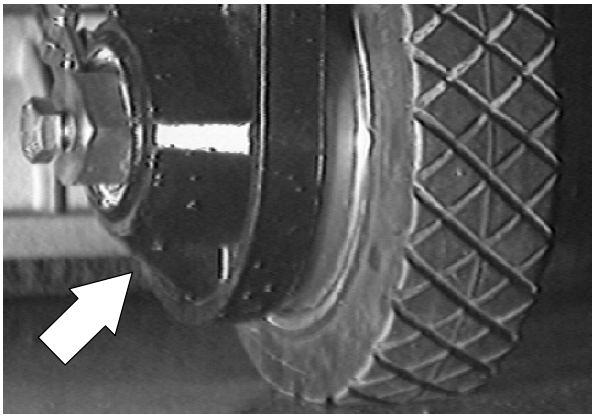


TO REMOVE FRONT DRIVE ASSEMBLY

FOR SAFETY: Before Leaving Or Servicing Machine; Stop On Level Surface, Set Parking Brake.

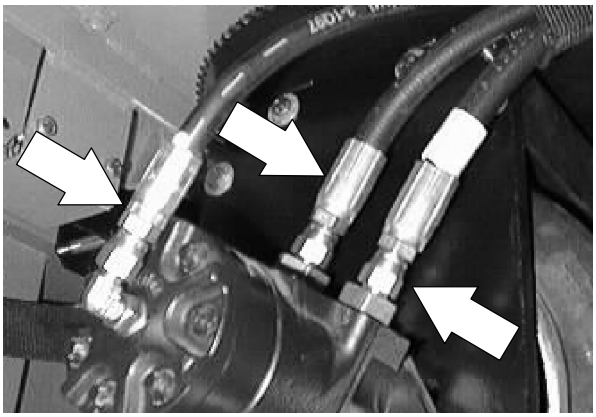
1. Raise the seat support and disconnect the battery cables.

2. Raise the front of the machine and place jack stands under the frame.

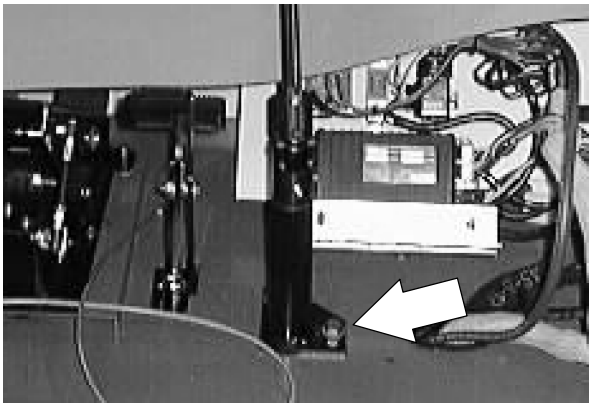


3. Mark, plug and disconnect the hydraulic hoses leading to the drive motor.

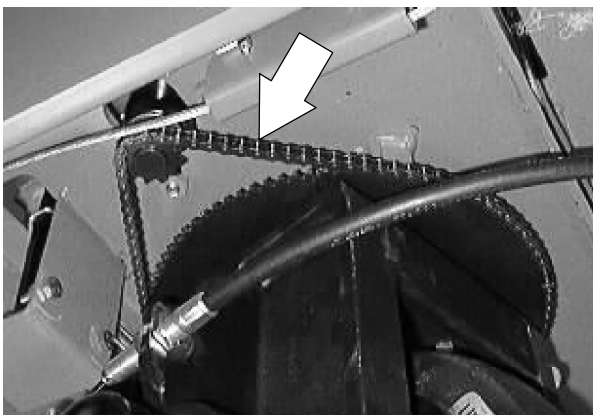
NOTE: Observe hydraulic cleanliness requirements when opening hydraulic lines.



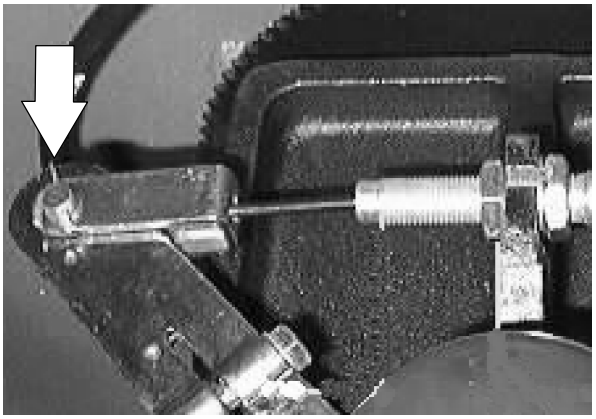
4. Go in operators compartment and loosen the lower steering shaft mount screws.



5. Pull the mount back to give the steering chain slack. Locate and remove the master link and steering chain.

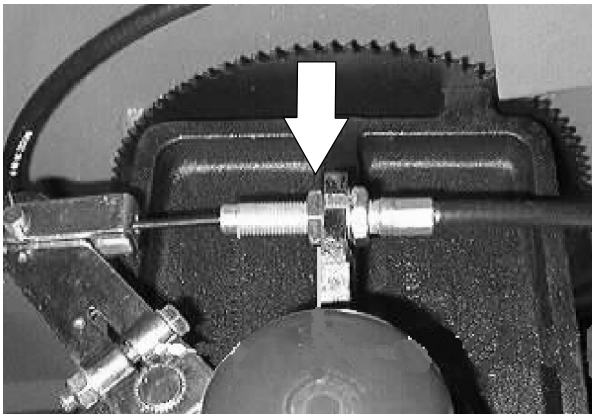


6. Remove the cotter pin and clevis pin from the end of the brake cable where it attaches to the lever on the wheel support.

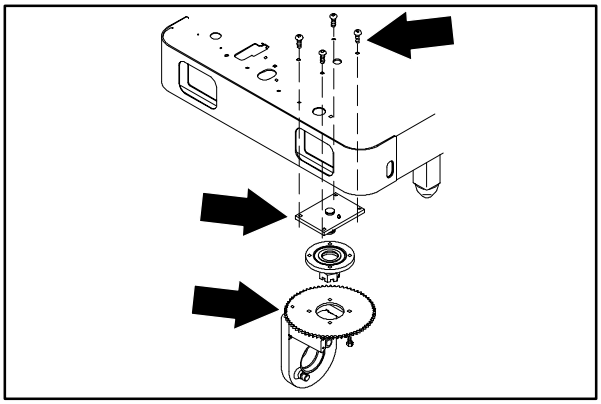


7. Loosen the jam nut on the brake cable were it attaches to the wheel support. Remove the brake cable from the wheel support.

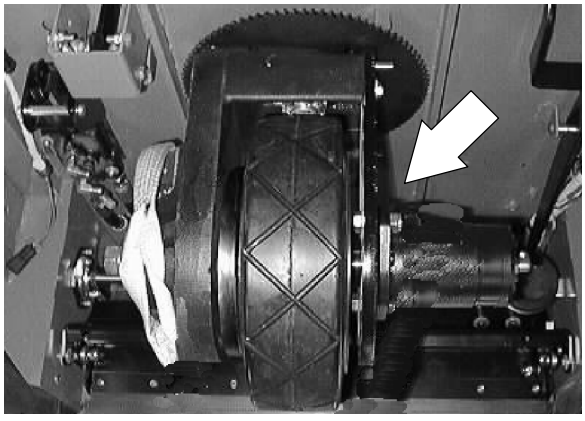
8. Position a floor jack or transmission jack under the drive wheel. This will support the drive assembly when the hardware is removed.



9. Go to the operators compartment and locate the 4 button head screws holding the drive assembly to the floor plate. Remove the 4 screws while supporting the drive assembly.



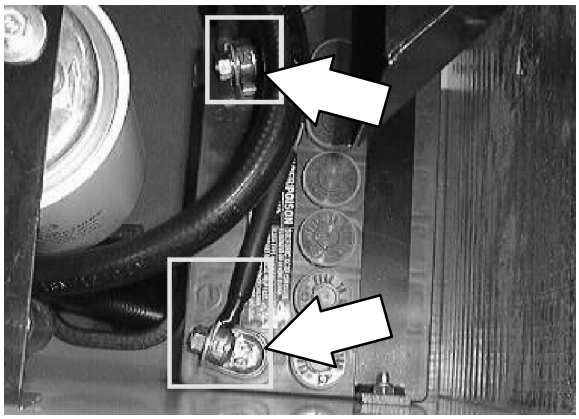
10. Remove the drive assembly from the machine.



TO INSTALL FRONT DRIVE ASSEMBLY

FOR SAFETY: Before Leaving Or Servicing Machine; Stop On Level Surface, Set Parking Brake.

1. Raise the seat support and disconnect the battery cables.

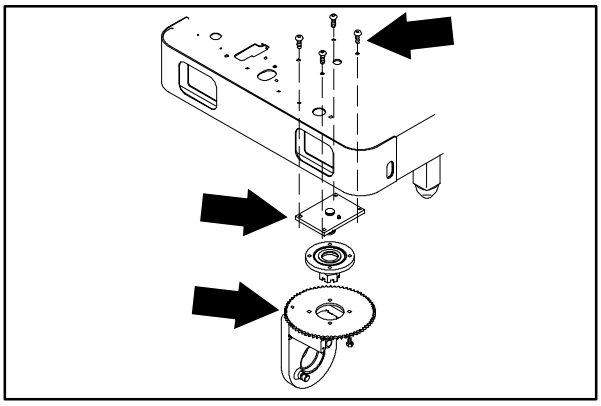


2. Raise the front of the machine and place jack stands under the frame.

3. Place the front drive assembly on a floor jack or transmission jack. This will support the drive assembly when installing it in the machine.

4. Position the drive assembly under the machine in front.

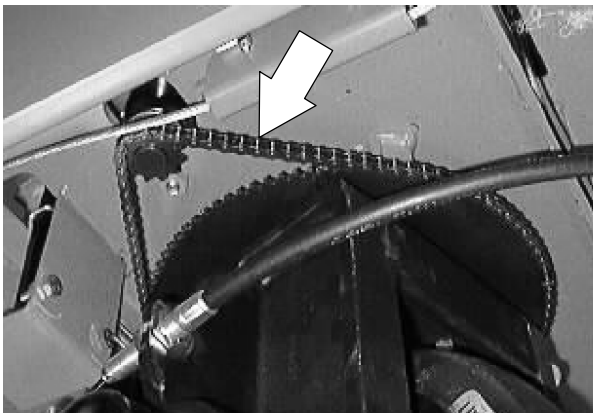
5. Raise the drive assembly up until the mount holes in the floor plate are aligned with the mount holes in the upper swivel plate weldment on top of the drive assembly.



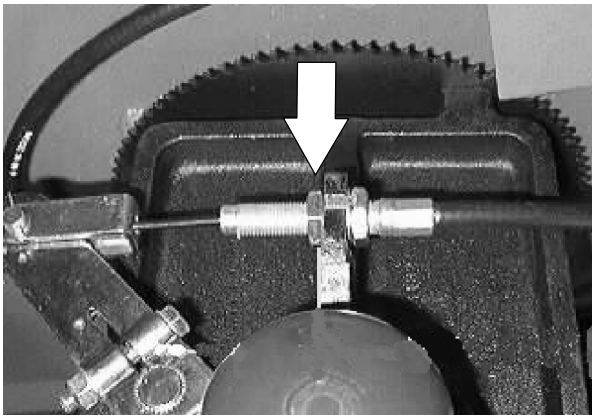
NOTE: Make sure to position the grease zerk in the access hole in the machine floor plate.

6. Install the four button head screws and tighten to 64 – 83 Nm (47 – 61 ft lb).

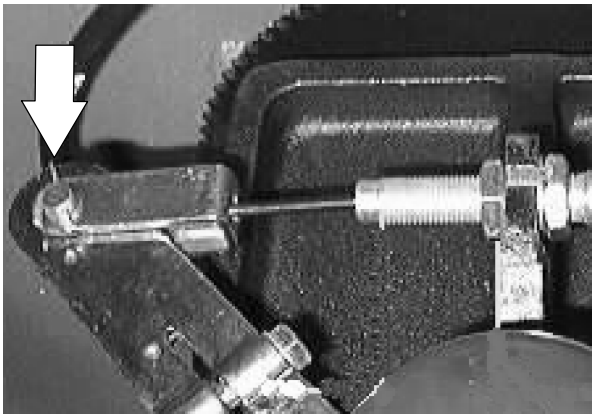
7. Reinstall the steering chain and master link. Adjust the steering chain. See TO ADJUST STEERING CHAIN instructions.



8. Reinstall the brake cable on the wheel support. Tighten the jam nut on the brake cable where it attaches to the wheel support.

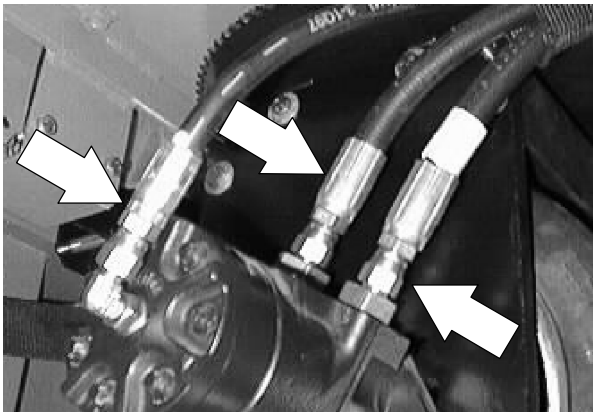


9. Reinstall the cotter pin and clevis pin in the end of the brake cable where it attaches to the lever on the wheel support.

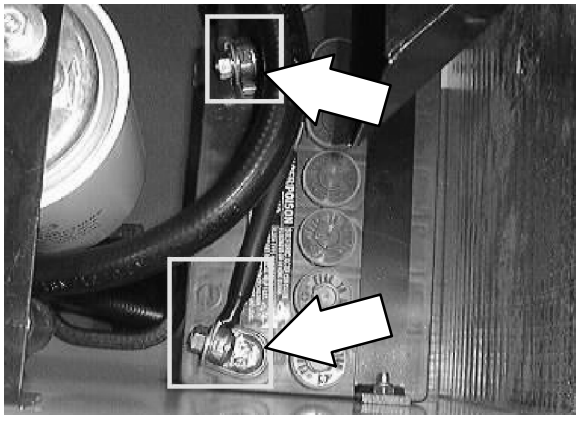


10. Reconnect the hydraulic hoses to the drive motor.

11. Remove the jack stands and lower the machine.



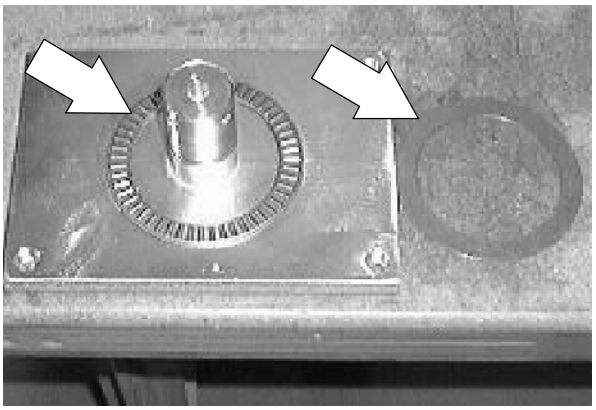
12. Reconnect the battery cables.



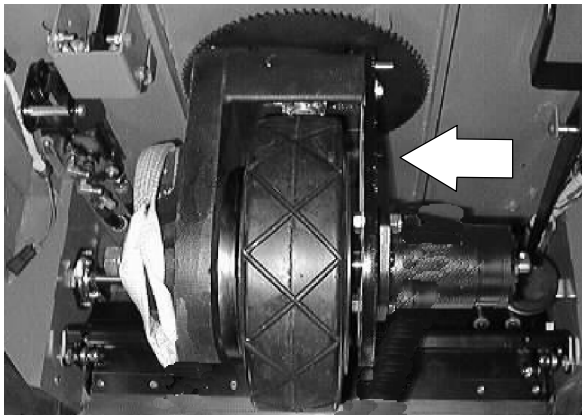
13. Operate the machine and check for proper operation. Check the brakes for proper operation. Adjust if necessary. See TO ADJUST SERVICE BRAKES instructions.

TO REPLACE DRIVE ASSEMBLY CASTER BEARING AND THRUST WASHERS

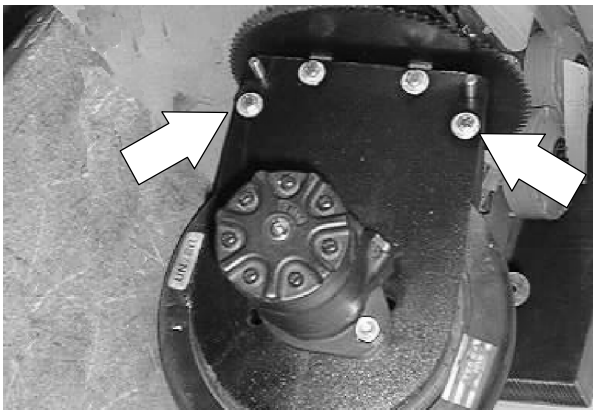
FOR SAFETY: Before Leaving Or Servicing Machine; Stop On Level Surface, Set Parking Brake.



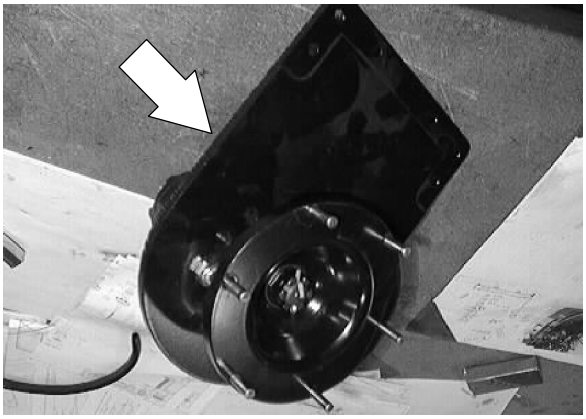
1. Remove the drive assembly from the machine. See TO REMOVE FRONT DRIVE ASSEMBLY instructions.



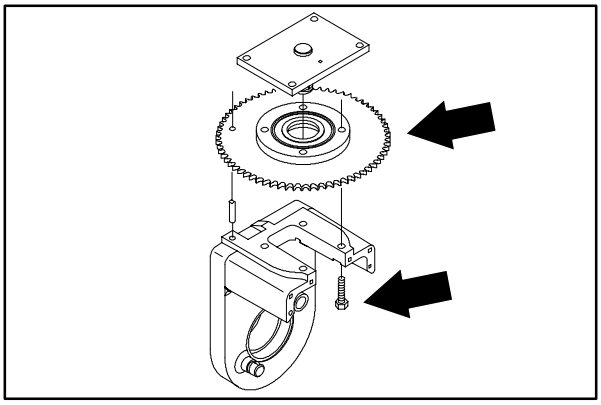
2. Remove the four hex screws holding the outer plate, drive motor, and drive hub to the main drive assembly.



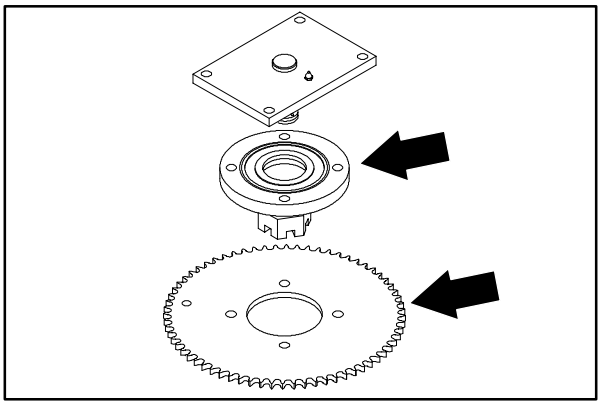
3. Pull the drive hub, outer plate, and hydraulic motor out of the drive wheel and away from the drive assembly.



4. Remove the four hex screws holding the pivot and sprocket assembly to the drive assembly.

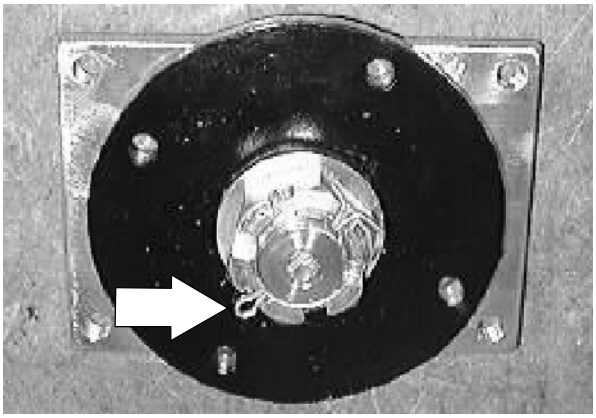


5. Remove the sprocket from the pivot assembly.

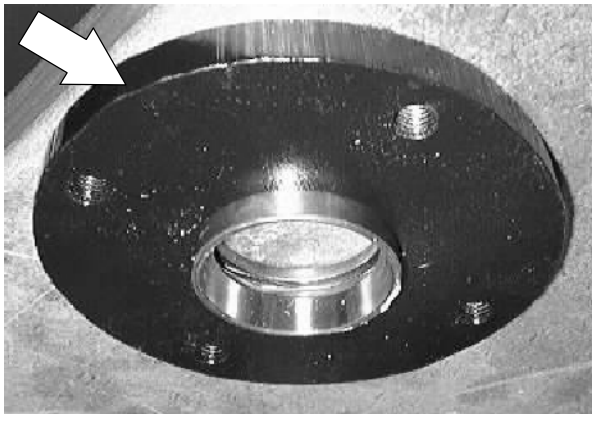


6. Remove the cotter pin and castle nut from the upper swivel plate weldment.

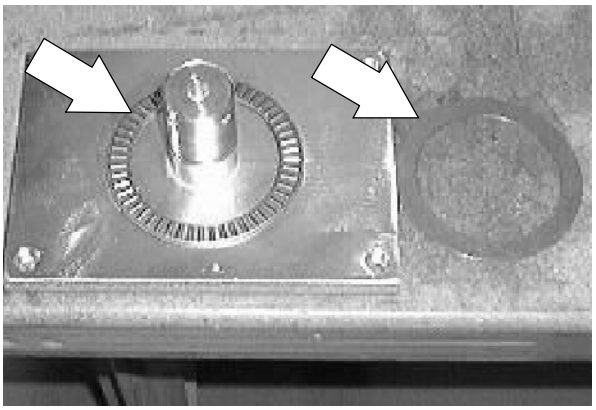
7. Remove the flat washer and cone bearing from the bottom swivel plate.



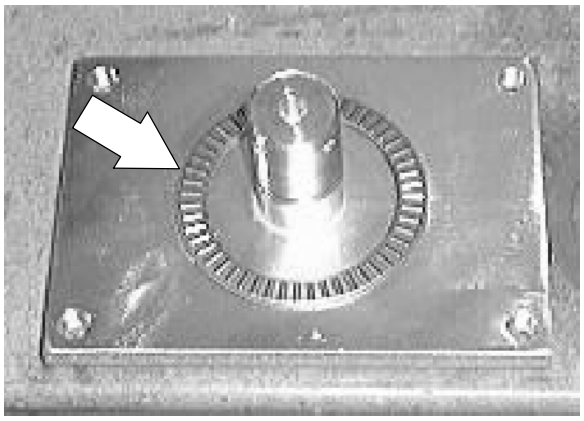
8. Lift the bottom swivel plate off the upper swivel plate weldment.



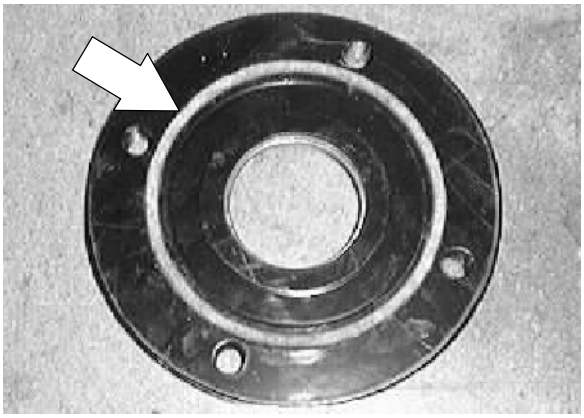
9. Remove and discard both thrust washers and the caster bearing from the upper swivel plate weldment.



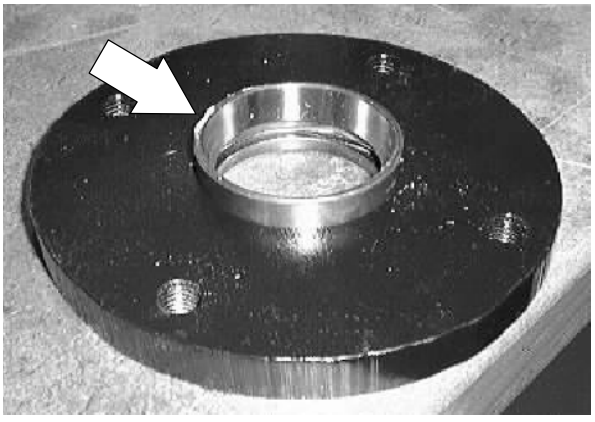
10. Apply grease on both sides of the new caster bearing.
11. Position the new caster bearing on top of the new lower thrust washer.
12. Reinstall the second new thrust washer on top of the new caster bearing.



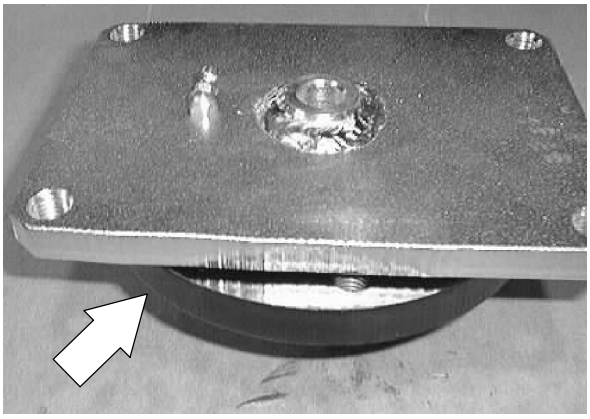
13. Reinstall the bottom swivel plate on the upper swivel plate weldment. Make sure the grease seal is in place on the upper swivel plate weldment.



14. Reinstall the bearing cone and flat washer on the bottom swivel plate. Make sure the bearing cone is greased.

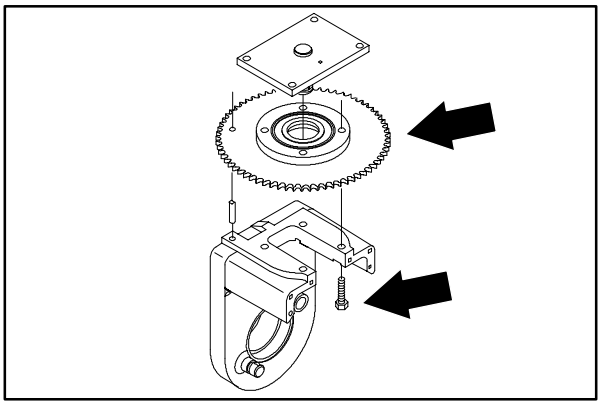


15. Reinstall the castle nut and tighten to (125 ft lbs). Then back off to the next nearest hole and install the cotter pin. Check to make sure the caster bearing can be turned by hand. Reduce torque if necessary.

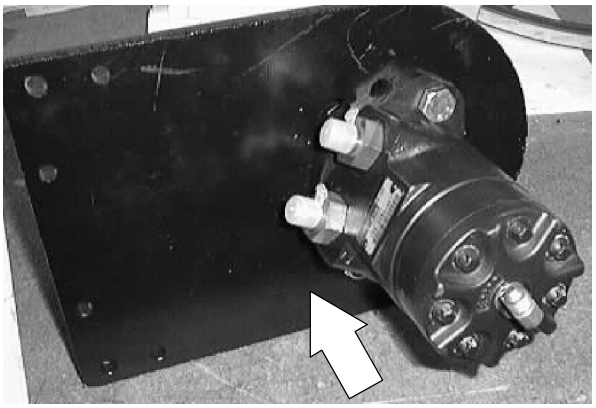


16. Reinstall the sprocket on the front drive assembly.

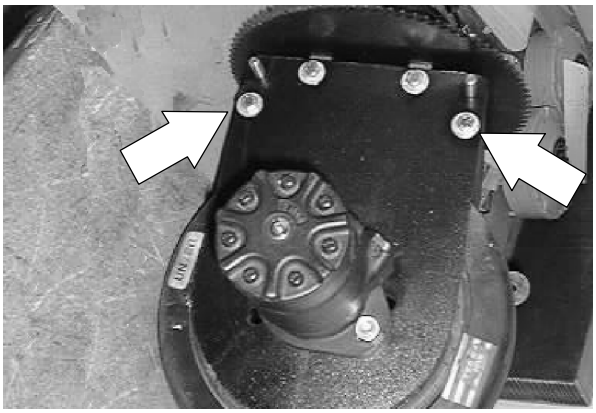
17. Reinstall the pivot and sprocket assembly on the drive assembly. Reinstall the four screws and tighten to 68 – 81 Nm (50 – 60 ft lb).



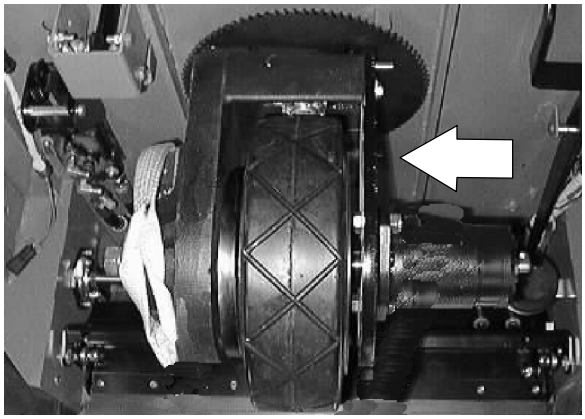
18. Install the drive hub, outer plate, and drive motor assembly onto the pins of the drive assembly.



19. Install the 4 hex screws and washers. Tighten to 18 – 24 Nm (15 – 20 ft lb).

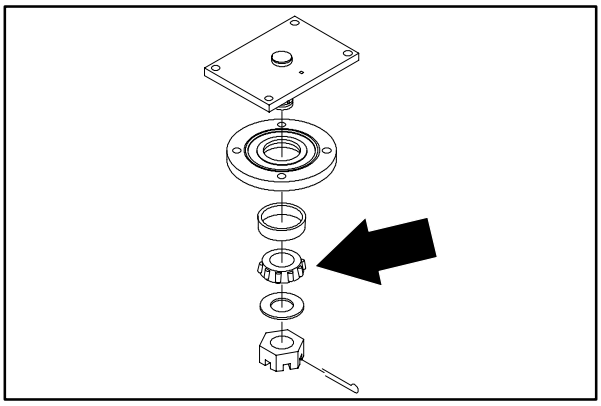


20. Reinstall the drive assembly in the machine. See TO INSTALL FRONT DRIVE ASSEMBLY instructions.



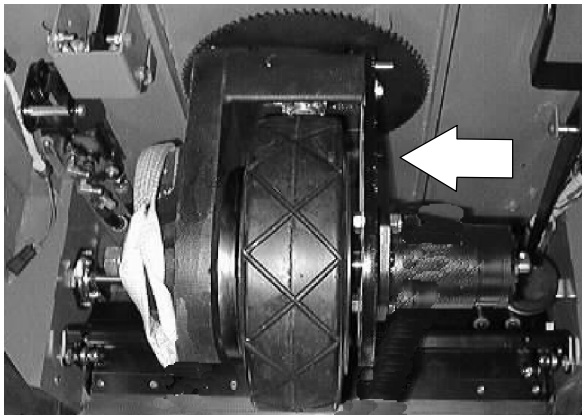
21. Operate the machine and check for smooth steering operation. Check the brakes for proper operation. Adjust if necessary. See TO ADJUST SERVICE BRAKES instructions.

TO REPLACE DRIVE ASSEMBLY PIVOT CONE BEARING

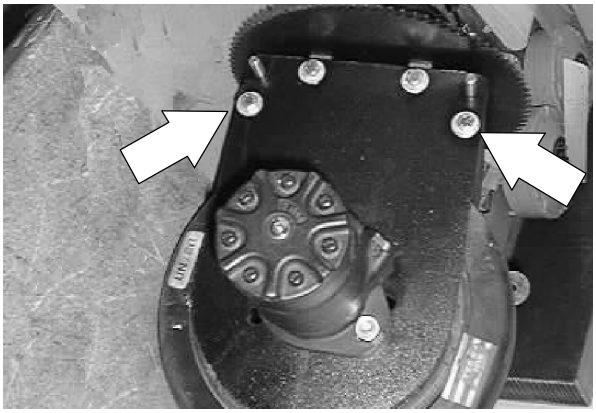


FOR SAFETY: Before Leaving Or Servicing Machine; Stop On Level Surface, Set Parking Brake.

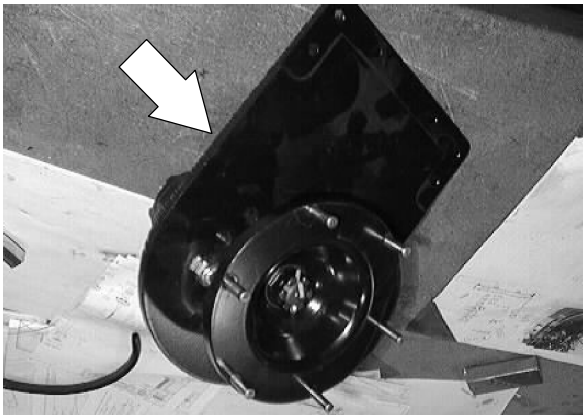
1. Remove the drive assembly from the machine. See TO REMOVE FRONT DRIVE ASSEMBLY instructions.



2. Remove the four hex screws holding the outer plate, drive motor, and drive hub assembly to the main drive assembly.

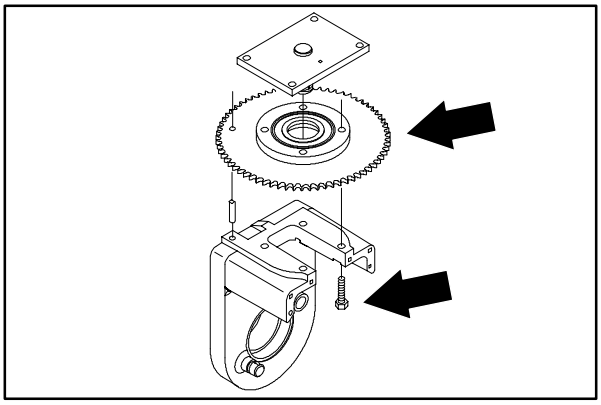


3. Pull the drive hub, outer plate, and drive motor assembly out of the drive wheel and away from the drive assembly.

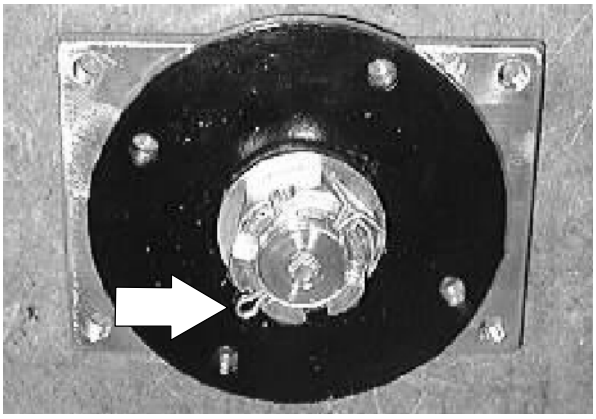


4. Remove the four hex screws holding the pivot and sprocket assembly to the drive assembly.

5. Remove the sprocket from the pivot assembly.



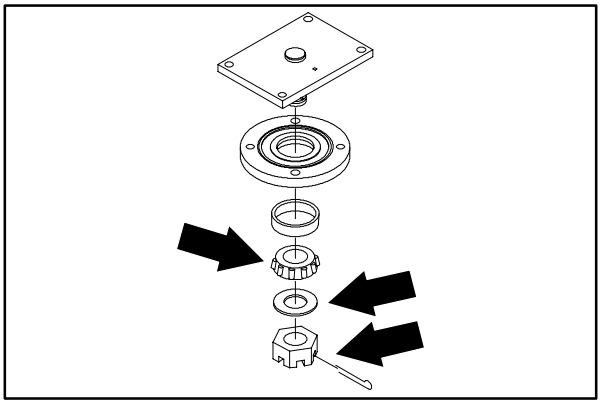
6. Remove the cotter pin and castle nut from the upper swivel plate weldment.



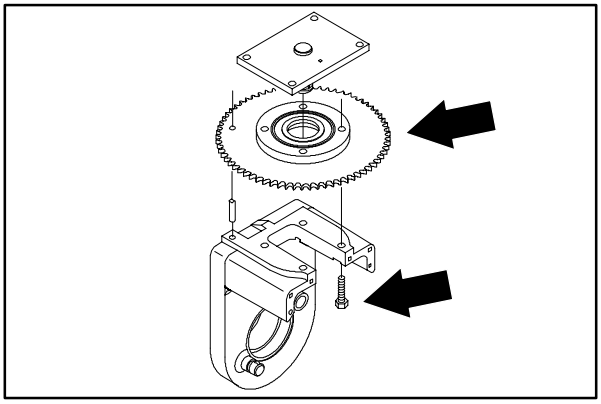
7. Remove the flat washer and old cone bearing from the bottom swivel plate.

8. Install the new cone bearing and flat washer on the bottom swivel plate. Make sure the new cone bearing is greased.

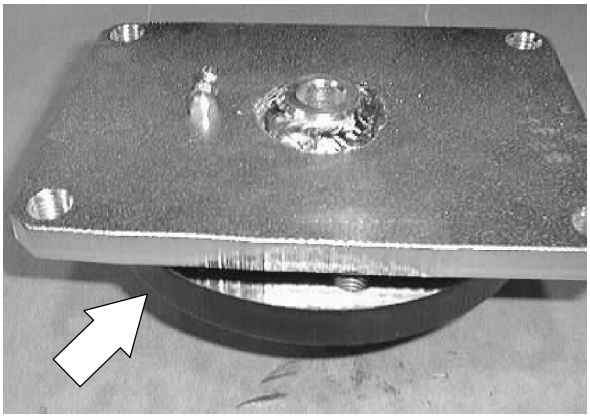
9. Reinstall the castle nut and tighten to 200 Nm (150 ft lbs). Then tighten to the next nearest hole and install the cotter pin.



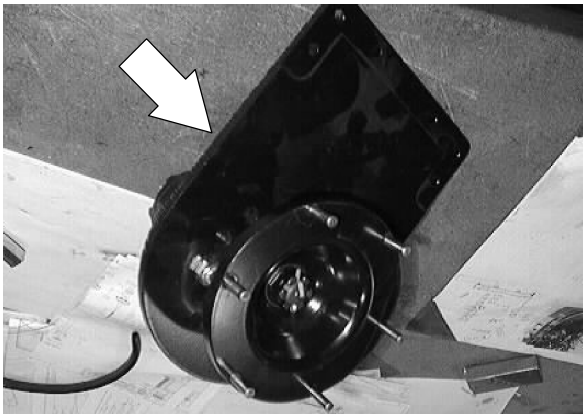
10. Reinstall the sprocket on the pivot assembly.



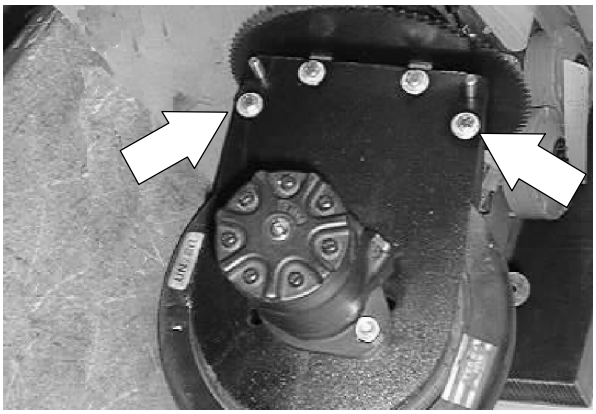
11. Reinstall the pivot and sprocket assembly on the drive assembly. Reinstall the four screws and tighten to 68 – 81 Nm (50 – 60 ft lb).



12. Install the drive hub, outer plate, and drive motor assembly into the wheel assembly and onto the pins of the drive assembly.

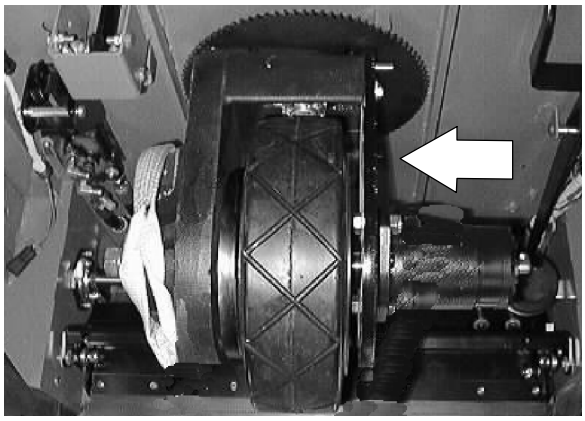


13. Install the 4 hex screws and washers. Tighten to 18 – 24 Nm (15 – 20 ft lb).



14. Reinstall the drive assembly in the machine. See TO INSTALL FRONT DRIVE ASSEMBLY instructions.

15. Operate the machine and check for smooth steering operation. Check the brakes for proper operation. Adjust if necessary. See TO ADJUST SERVICE BRAKES instructions.

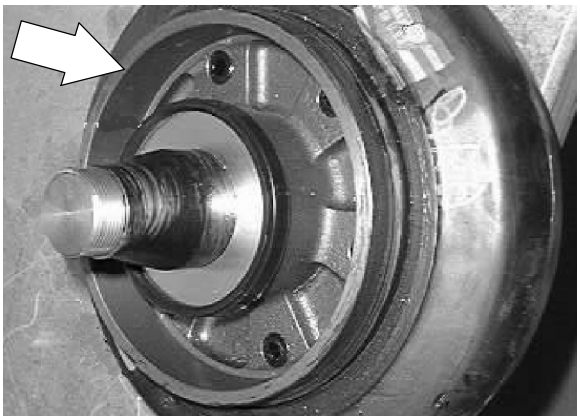


TO REPLACE FRONT TIRE AND WHEEL ASSEMBLY

FOR SAFETY: Before Leaving Or Servicing Machine; Stop On Level Surface, Set Parking Brake.

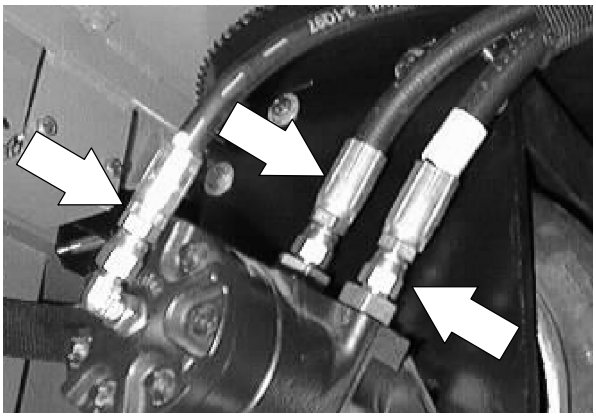
1. Raise the seat support and disconnect the battery cables.

2. Raise the front of the machine and place jack stands under the frame.

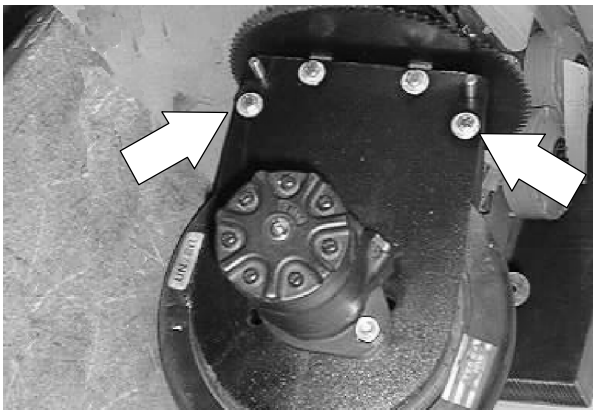


3. Mark, disconnect, and plug the hydraulic hoses leading to the drive motor.

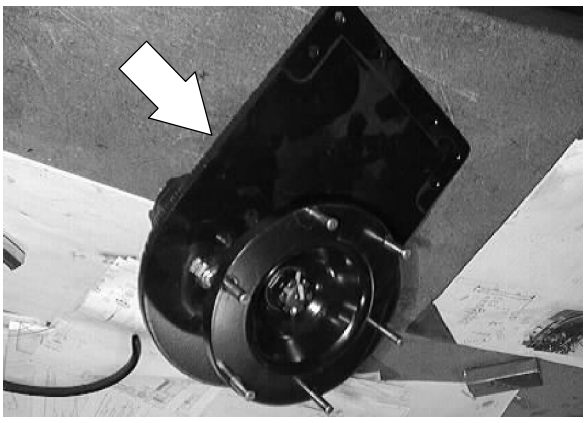
NOTE: Observe hydraulic cleanliness requirements when opening hydraulic lines.



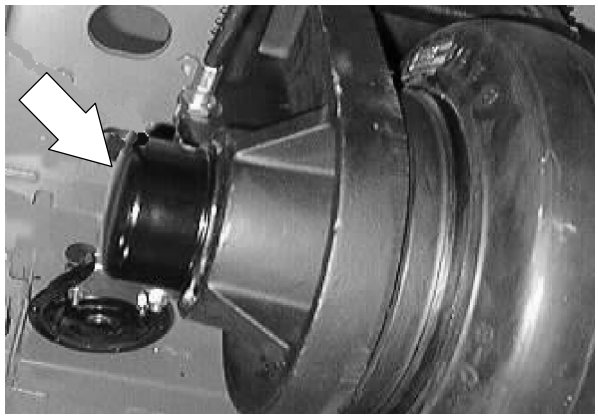
4. Remove the four hex screws holding the outer plate, drive motor, and drive hub assembly to the main drive assembly.



5. Pull the drive hub, outer plate, and drive motor out of the drive wheel and away from the drive assembly.

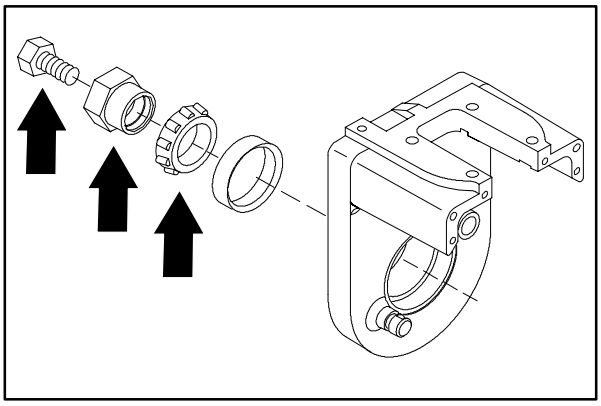


6. Go to the other side of the drive assembly and remove the hub cap. This will expose the outer bearing, hex sleeve, and lock bolt.

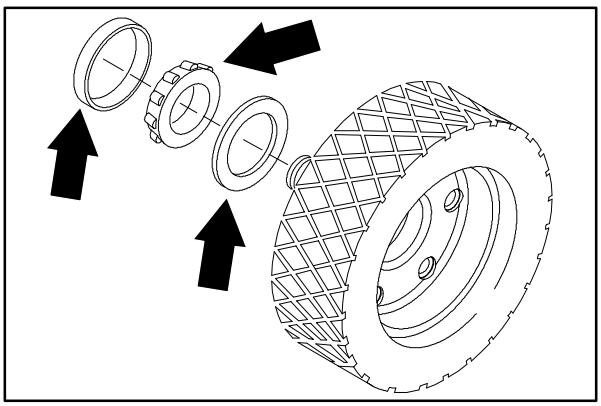


7. Remove the lock bolt.
(this is a right-hand thread screw).

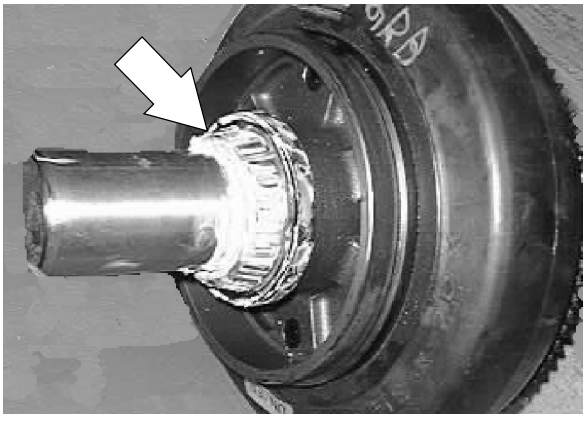
8. Remove the hex sleeve and outer bearing cone assembly.
(this is a left hand thread nut).



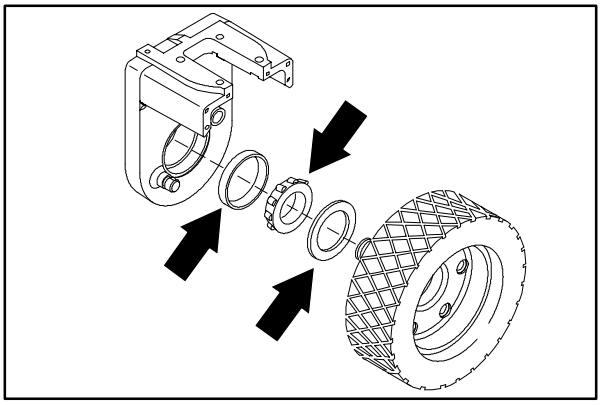
9. The inner bearing, axle shaft, and tire/wheel assembly can now be removed from the drive assembly. Use a press to remove the inner bearing from the existing tire/wheel assembly.



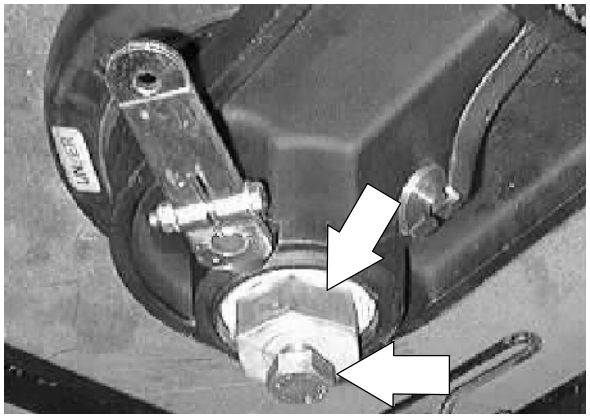
10. Install the inner bearing on the new tire/wheel assembly.



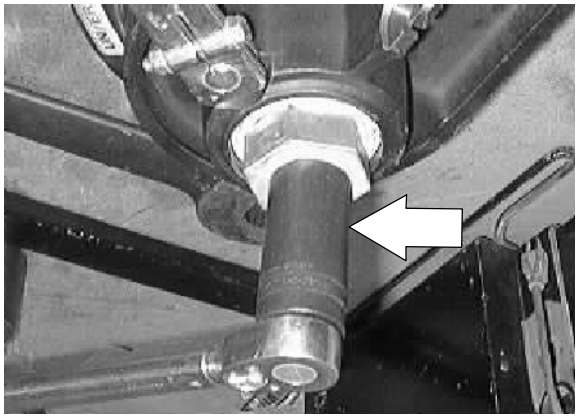
11. Reinstall the new tire/wheel assembly in the drive assembly. Make sure the inner and outer wheel bearings are completely greased when re-assembling.



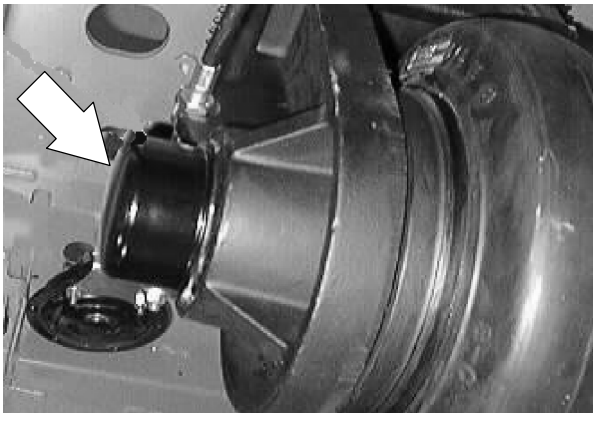
12. Reinstall the outer bearing and hex sleeve assembly. **(this is a left hand thread nut)** Tighten to at least 100 ft lbs and then back off the hex sleeve to 0 ft lbs. Re-torque hex sleeve to 30 ft lbs.



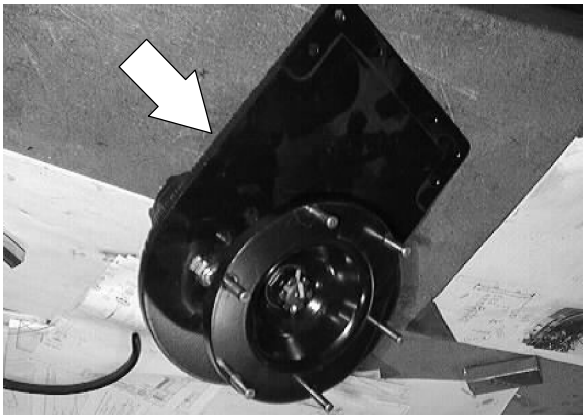
13. Install the lock bolt in the end of the hex sleeve. Tighten the lock bolt to 200 Nm (150 ft lb) while holding the hex sleeve from turning.



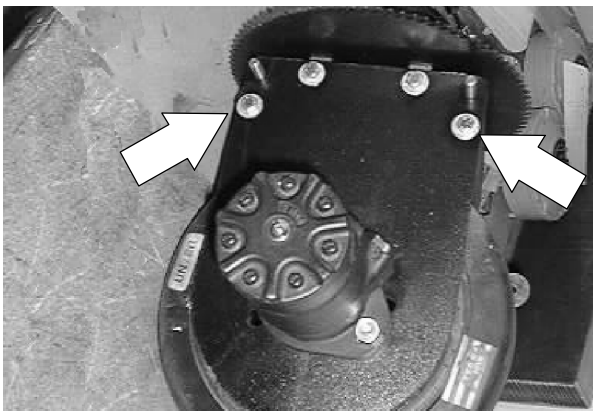
14. Reinstall the hub cap in the drive assembly.



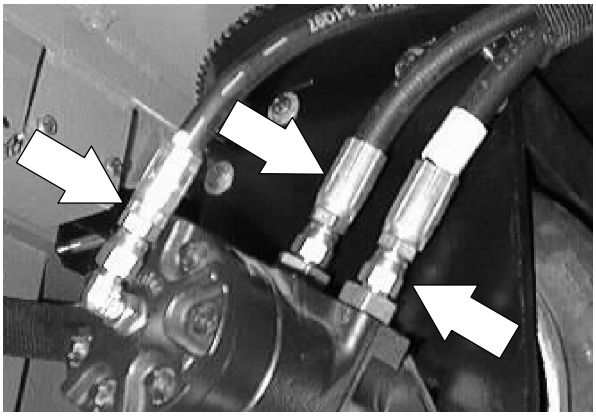
15. Go to the other side of the drive assembly. Install the drive hub, outer plate, and drive motor assembly into the wheel assembly and onto the pins of the drive assembly.



16. Install the 4 hex screws and washers. Tighten to 18 – 24 Nm (15 – 20 ft lb).



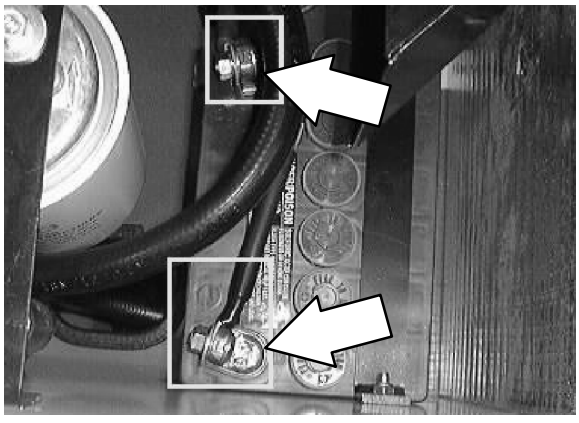
17. Reconnect the hydraulic hoses to the drive motor.



18. Reconnect the battery cables.

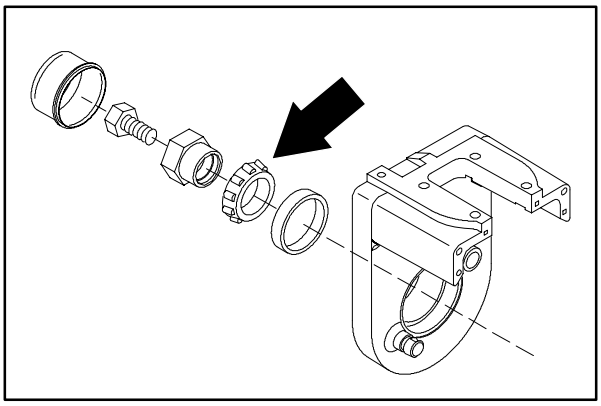
19. Remove the jack stands and lower the machine.

20. Drive the machine and check for proper operation.



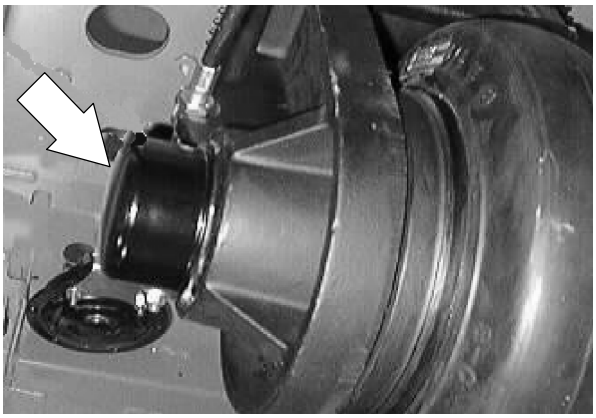
TO REPLACE FRONT DRIVE ASSEMBLY OUTER WHEEL BEARING

FOR SAFETY: Before Leaving Or Servicing Machine; Stop On Level Surface, Set Parking Brake.

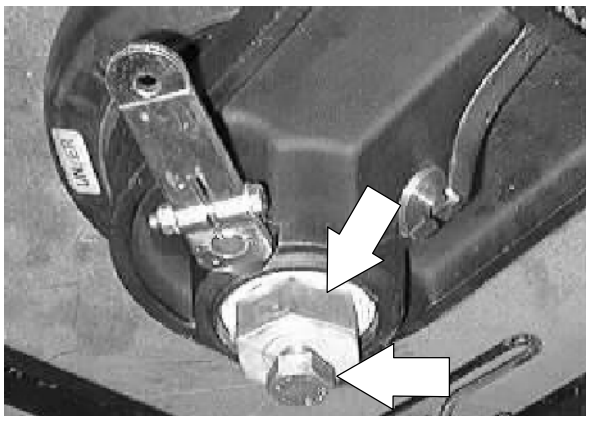


1. Raise the seat support and disconnect the battery cables.

2. Raise the front of the machine and place jack stands under the frame.

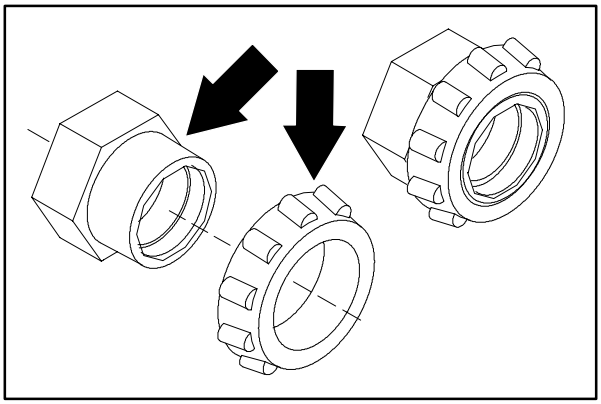


3. Go to the side of the drive assembly opposite the drive motor and remove the hub cap. This will expose the outer bearing, hex sleeve, and lock bolt.



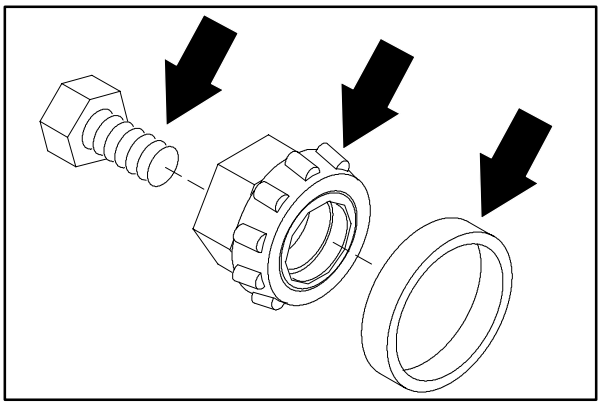
4. Remove the lock bolt.
   (this is a right-hand thread screw).

5. Remove the hex sleeve and outer bearing cone assembly.
   (this is a left hand thread nut).

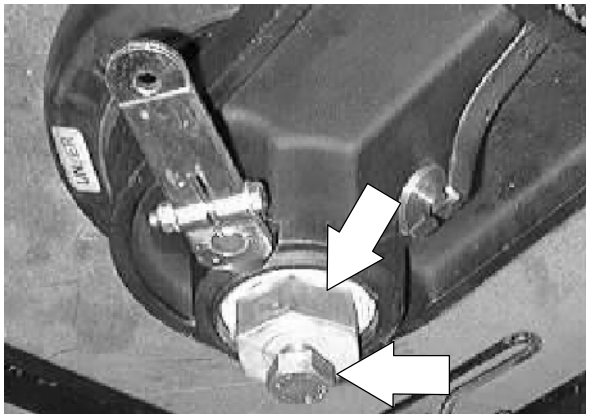


6. Use a press to remove the old outer bearing cone from the hex sleeve. Install a new outer bearing on the hex sleeve or replace the bearing and sleeve assembly. Apply grease to the new bearing.

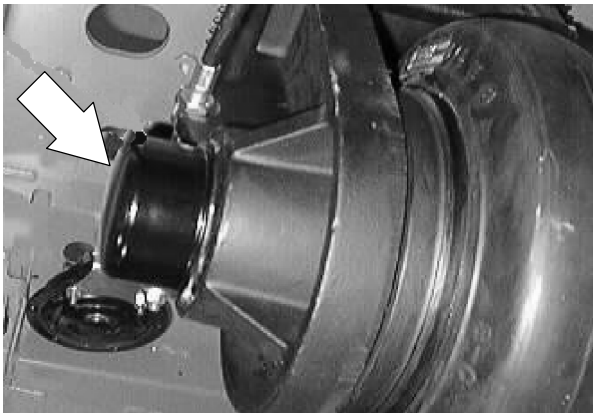
7. Install the new outer bearing and hex sleeve assembly on the wheel shaft. **(this is a left hand thread nut).** Tighten to at least 100 ft lbs and then back off the hex sleeve to 0 ft lbs. Re-torque hex sleeve to 30 ft lbs.



8. Install the lock bolt **(this is a right-hand thread screw)** in the end of the hex sleeve. Tighten the lock bolt to 200 Nm (150 ft lb) while holding the hex sleeve from turning.



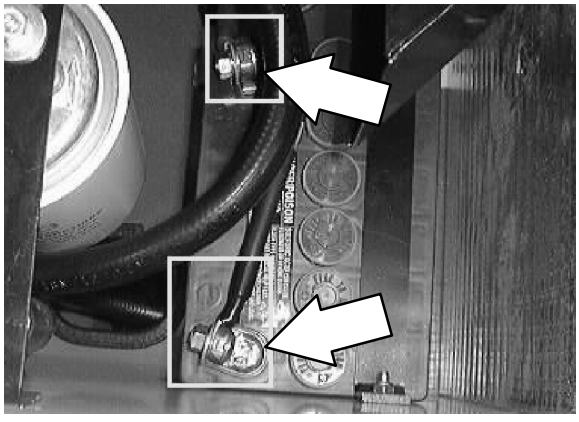
9. Reinstall the hub cap in the drive assembly.



10. Reconnect the battery cables.

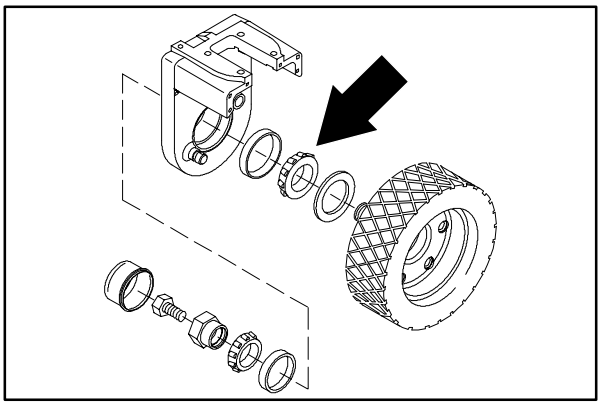
11. Remove the jack stands and lower the machine.

12. Drive the machine and check for proper operation.



TO REPLACE FRONT DRIVE ASSEMBLY INNER WHEEL BEARING

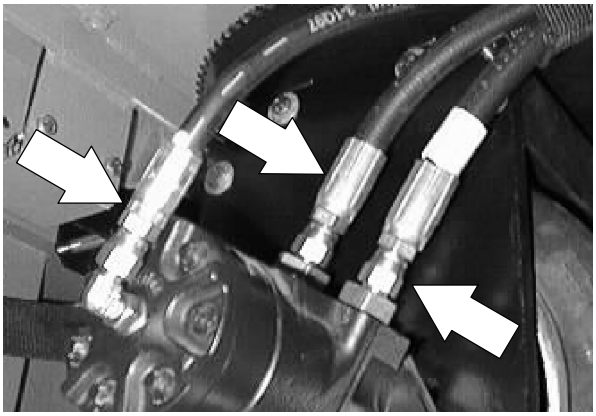
FOR SAFETY: Before Leaving Or Servicing Machine; Stop On Level Surface, Set Parking Brake.



1. Raise the seat support and disconnect the battery cables.

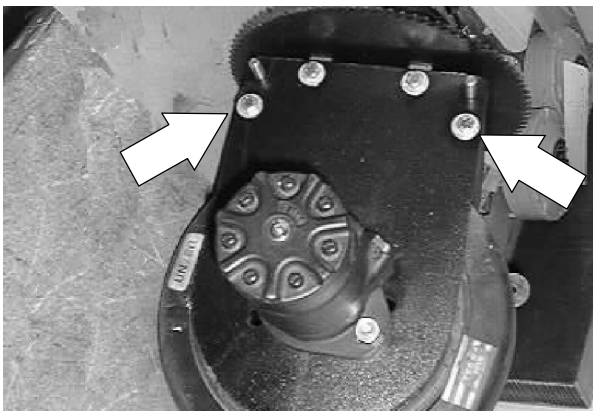
2. Raise the front of the machine and place jack stands under the frame.

3. Mark, disconnect, and plug the hydraulic hoses leading to the drive motor.

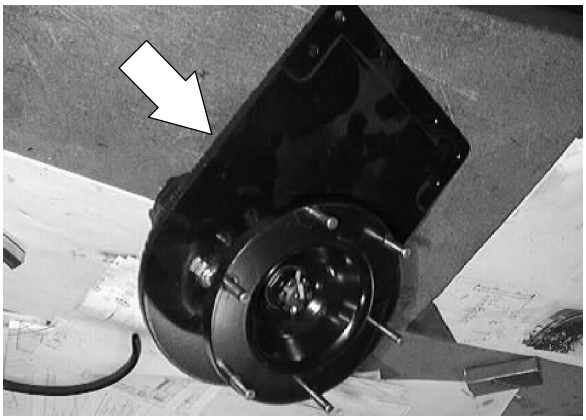


NOTE: Observe hydraulic cleanliness requirements when opening hydraulic lines.

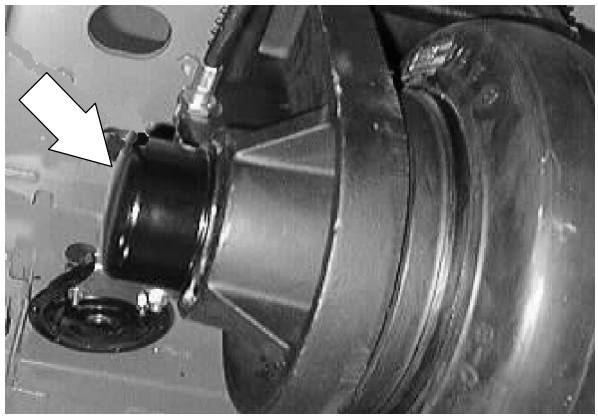
4. Remove the four hex screws holding the outer plate, drive motor, and drive hub assembly to the main drive assembly.



5. Pull the drive hub, outer plate, and drive motor assembly out of the drive wheel and away from the drive assembly.

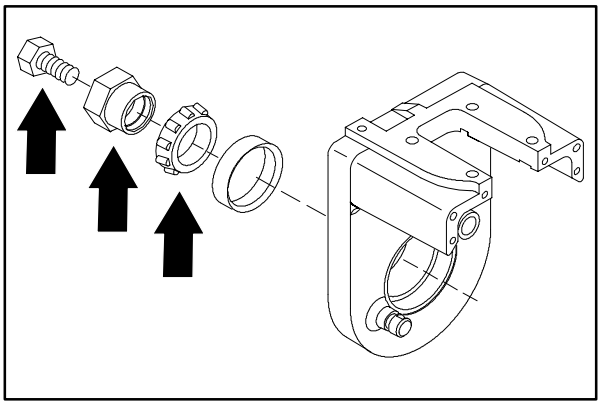


6. Go to the other side of the drive assembly and remove the hub cap. This will expose the outer bearing, hex sleeve, and lock bolt.

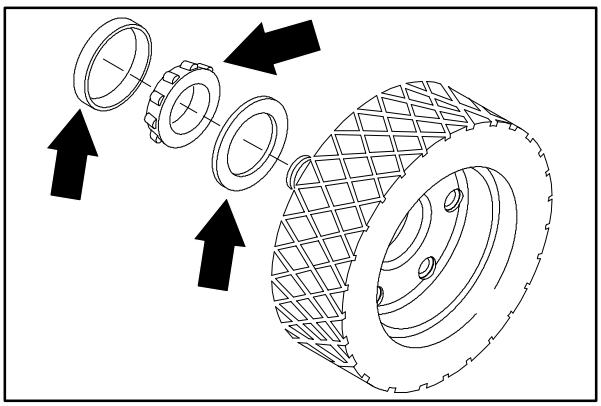


7. Remove the lock bolt.
(this is a right-hand thread screw).

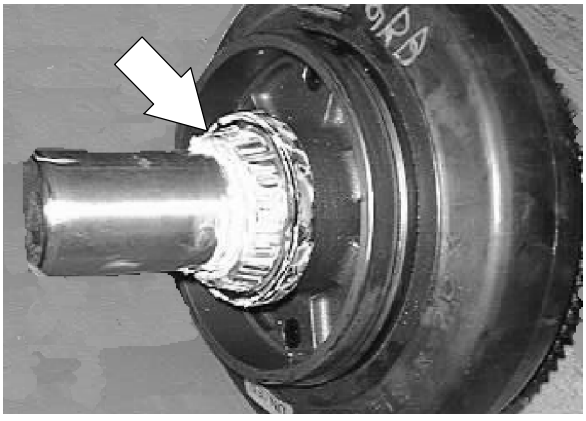
8. Remove the hex sleeve and outer bearing cone assembly.
(this is a left hand thread nut).



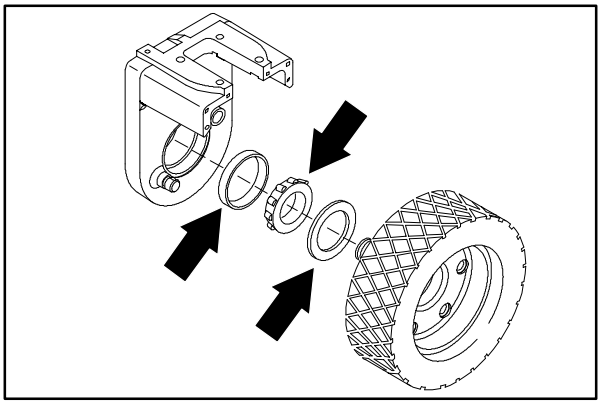
9. The inner bearing, axle shaft, and tire/wheel assembly can now be removed from the drive assembly. Use a press to remove the inner bearing from the existing tire/wheel assembly. Discard the old wheel bearing.



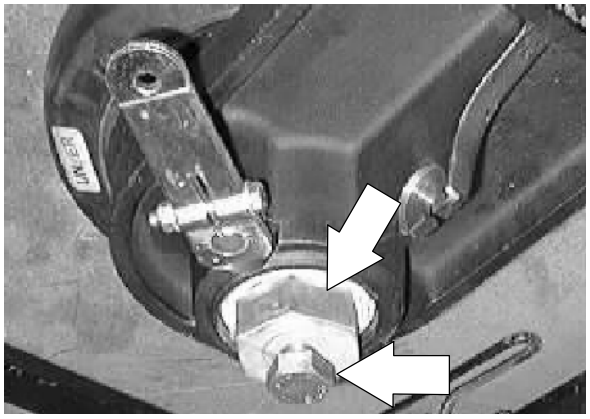
10. Press a new inner wheel bearing on the wheel shaft. Apply grease to the new bearing.



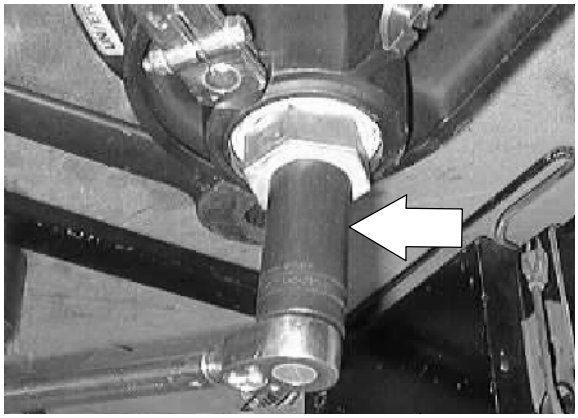
11. Reinstall the tire/wheel assembly in the drive assembly. Make sure the inner and outer wheel bearings are completely greased when re-assembling.



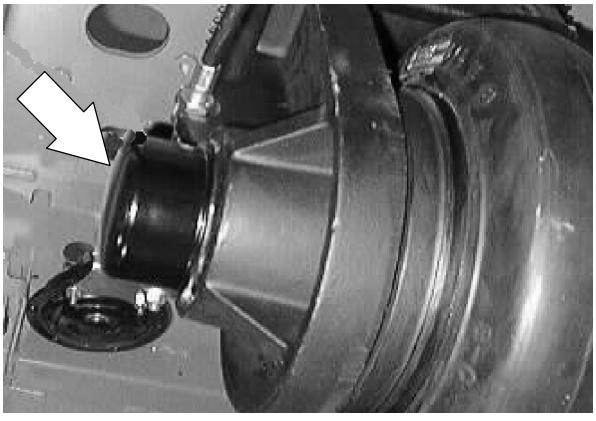
12. Reinstall the outer bearing and hex sleeve assembly. **(this is a left hand thread nut)** Tighten to at least 100 ft lbs and then back off the hex sleeve to 0 ft lbs. Re-torque hex sleeve to 30 ft lbs.



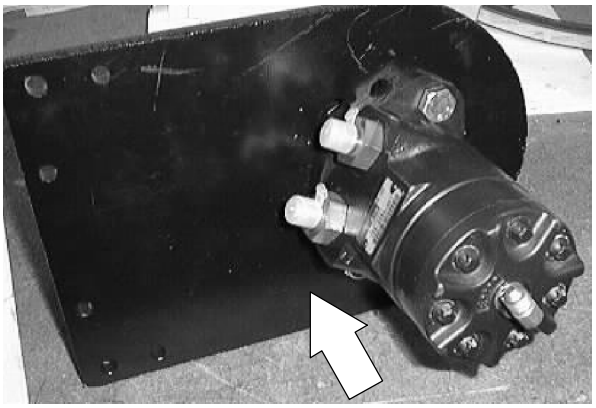
13. Install the lock bolt in the end of the hex sleeve. Tighten the lock bolt to 200 Nm (150 ft lb) while holding the hex sleeve from turning.



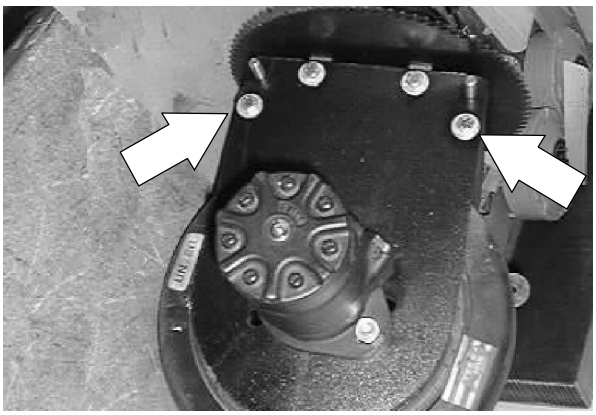
14. Reinstall the hub cap in the drive assembly.



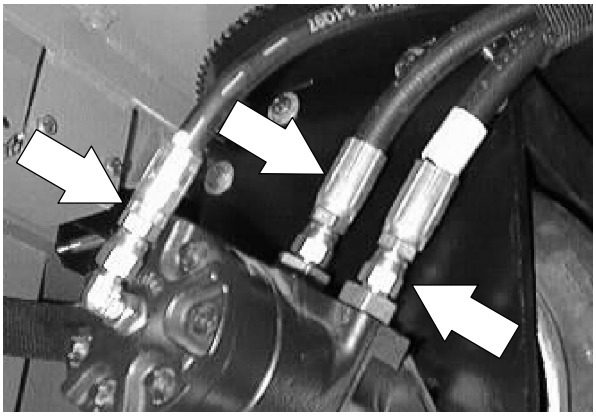
15. Go to the other side of the drive assembly. Install the drive hub, outer plate, and drive motor assembly into the wheel assembly and onto the pins of the drive assembly.



16. Install the 4 hex screws and washers. Tighten to 18 – 24 Nm (15 – 20 ft lb).



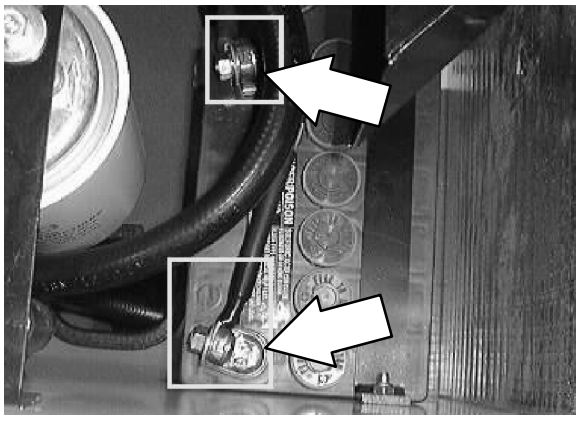
17. Reconnect the hydraulic hoses to the drive motor.



18. Reconnect the battery cables.

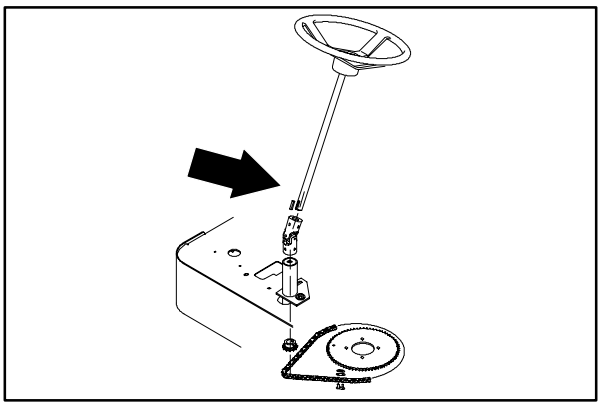
19. Remove the jack stands and lower the machine.

20. Drive the machine and check for proper operation.



STEERING

The steering on the model 6200D is controlled with two sprockets and one chain. A large diameter sprocket is mounted on the top of the front drive assembly and a small diameter sprocket is mounted on the bottom of the steering shaft. The steering chain runs around both of these sprockets.

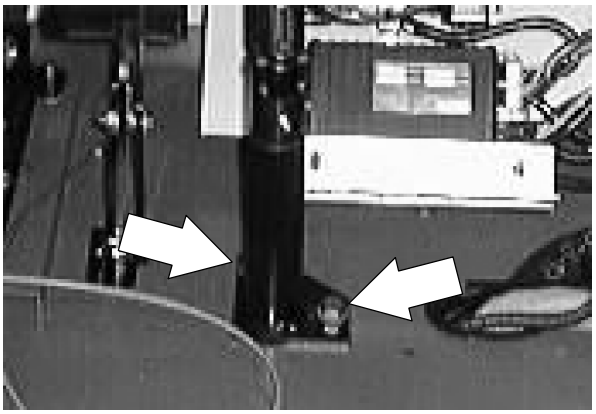


After extended use, the steering chain may stretch slightly. Any slack in the chain can be removed by following the adjustment procedure listed below.

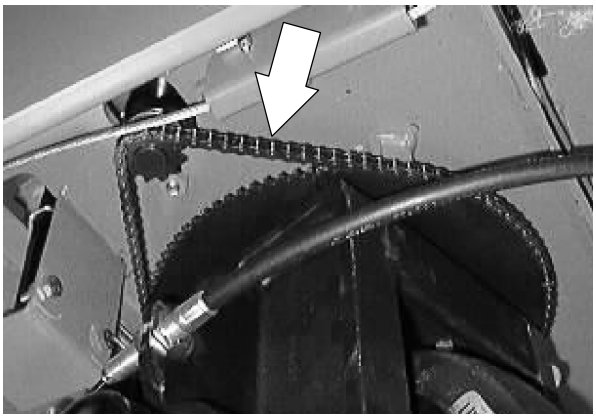
TO ADJUST STEERING CHAIN

FOR SAFETY: Before Leaving Or Servicing Machine; Stop On Level Surface, Set Parking Brake.

1. Go into the operators compartment and locate the two hex screws holding the lower steering shaft bearing assembly to the floor plate. Loosen these two hex screws.



2. Push the lower steering shaft assembly forward until the slack has been removed from the steering chain. Tighten the two hex screws to 18 – 24 Nm (15 – 20 ft lb).



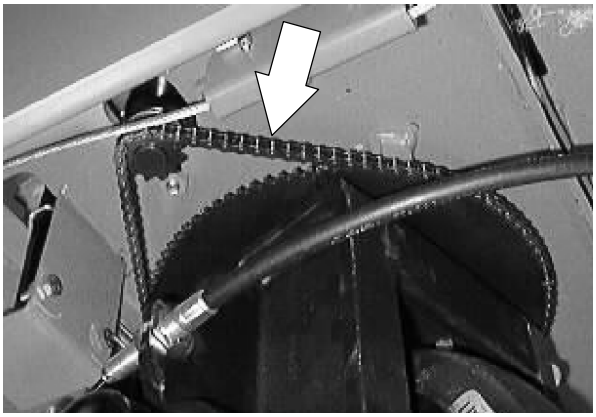
3. Operate the machine and check the steering for proper operation.

NOTE: There is also a half link that can be removed for more adjustment.

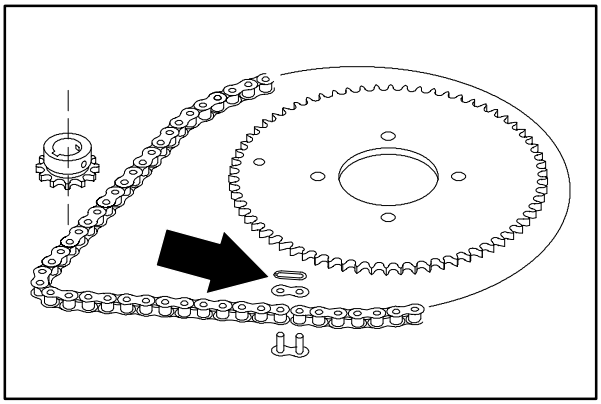
TO REPLACE STEERING CHAIN

FOR SAFETY: Before Leaving Or Servicing Machine; Stop On Level Surface, Set Parking Brake.

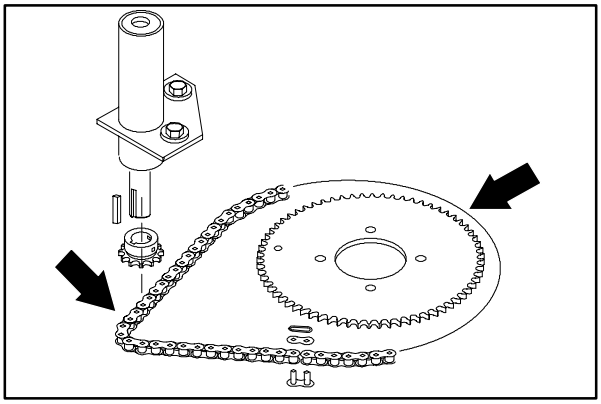
1. Raise the seat support and disconnect the battery cables.
2. Raise the front of the machine and place jack stands under the frame.
3. Go under the machine and locate the steering chain.



4. Rotate the steering wheel until the master link on the chain is accessible.
5. Remove the chain master link. Remove the steering chain from both sprockets.
6. Remove and discard the steering chain from the machine.

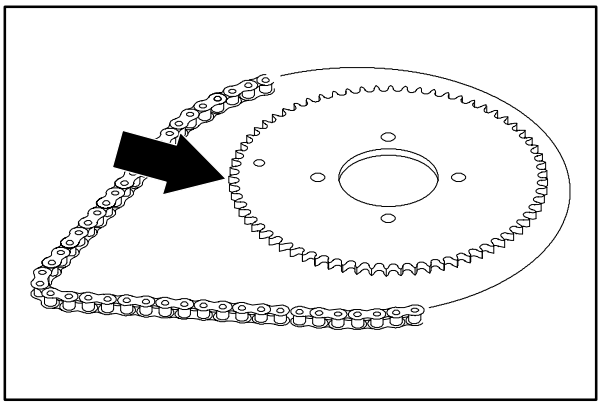


7. Route the new chain around both steering sprockets. Install the master link.
8. Remove the jack stands and lower the machine. Reconnect the battery cables.
9. Operate the machine and check the steering for proper operation.

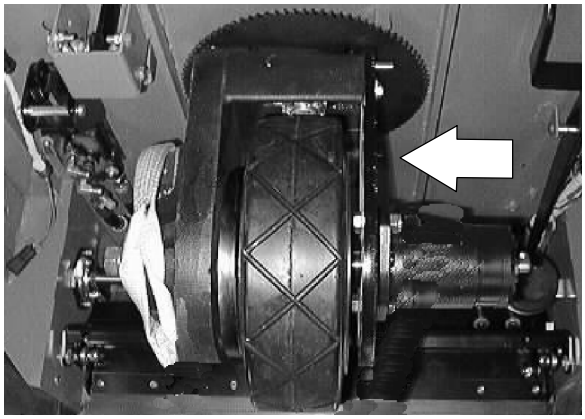


TO REPLACE LARGE STEERING SPROCKET

FOR SAFETY: Before Leaving Or Servicing Machine; Stop On Level Surface, Set Parking Brake.

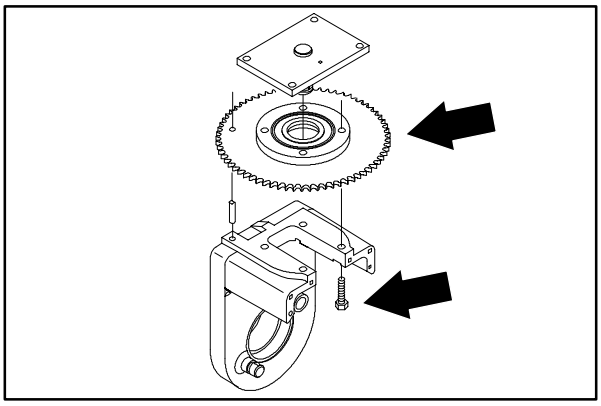


1. Remove the drive assembly from the machine. See TO REMOVE FRONT DRIVE ASSEMBLY instructions.



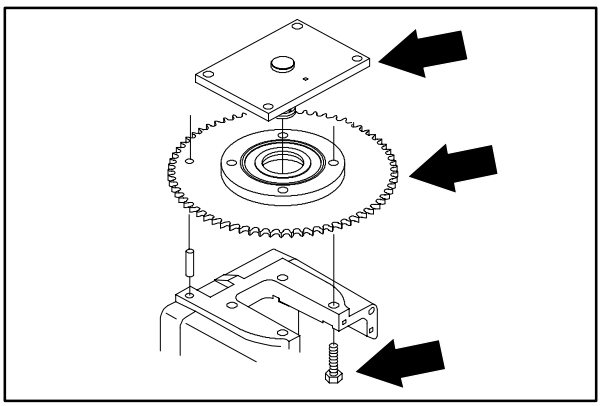
2. Remove the four hex screws holding the pivot and sprocket assembly to the drive assembly.

3. Remove the old sprocket from the pivot assembly.

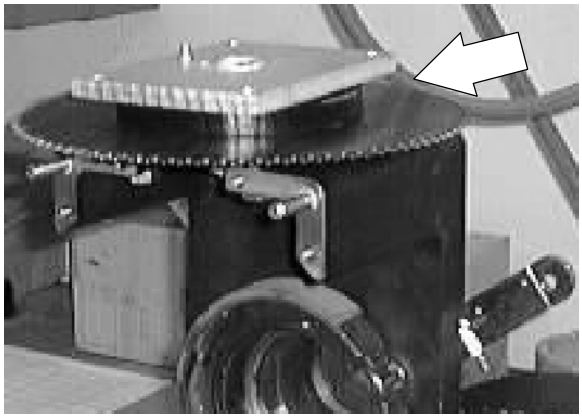


4. Install the new sprocket on the pivot assembly.

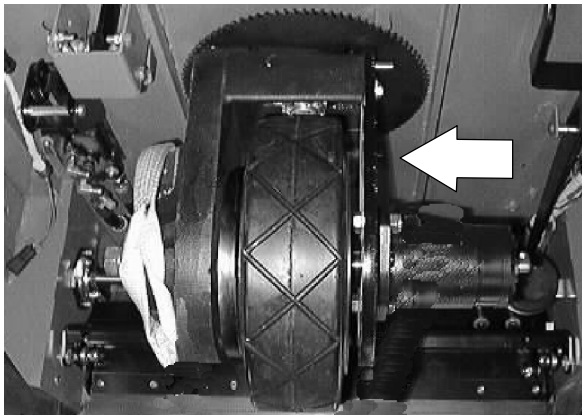
NOTE: Make sure the roll pin in the top of the drive assembly lines up with the hole in the sprocket.



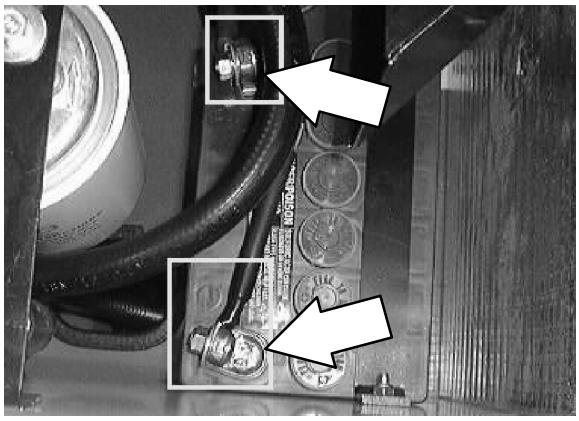
5. Reinstall the pivot and sprocket assembly on the drive assembly. Reinstall the four screws and tighten to 68 – 81 Nm (50 – 60 ft lb).



6. Reinstall the drive assembly in the machine. See TO INSTALL FRONT DRIVE ASSEMBLY instructions.



7. Reconnect the battery cables.



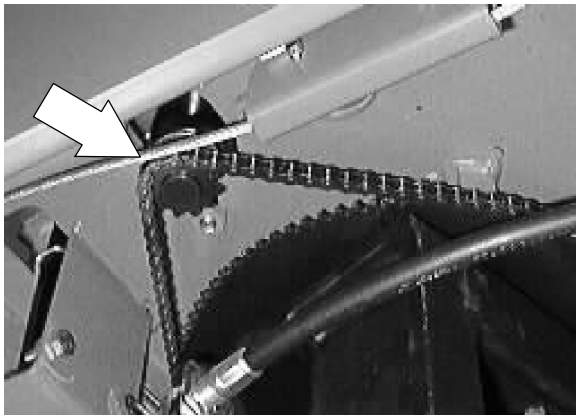
8. Operate the machine and check for smooth steering operation.

TO REPLACE SMALL STEERING SPROCKET

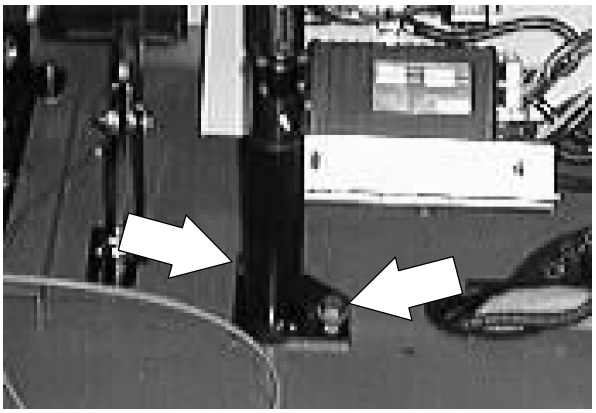
FOR SAFETY: Before Leaving Or Servicing Machine; Stop On Level Surface, Set Parking Brake.

1. Raise the seat support and disconnect the battery cables.

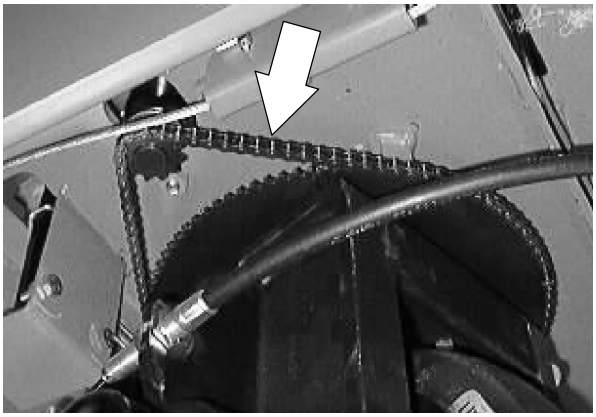
2. Raise the front of the machine and place jack stands under the frame.



3. Go into the operators compartment and locate the lower steering shaft mount assembly. Loosen the two screws and pull the mount back to give the steering chain slack.

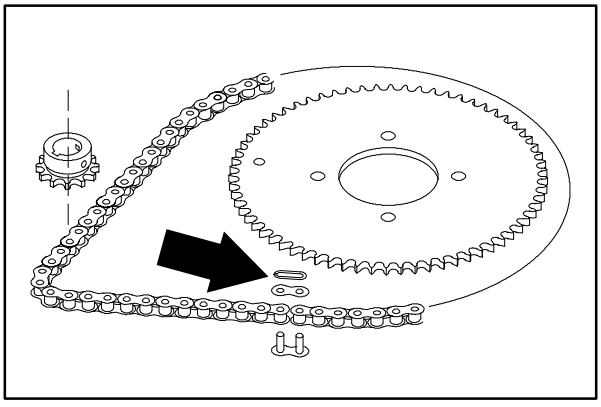


4. Go under the machine and locate the steering chain.

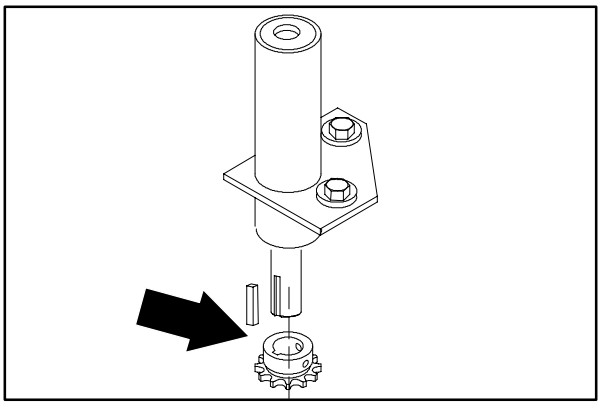


5. Rotate the steering wheel until the master link on the chain is accessible.

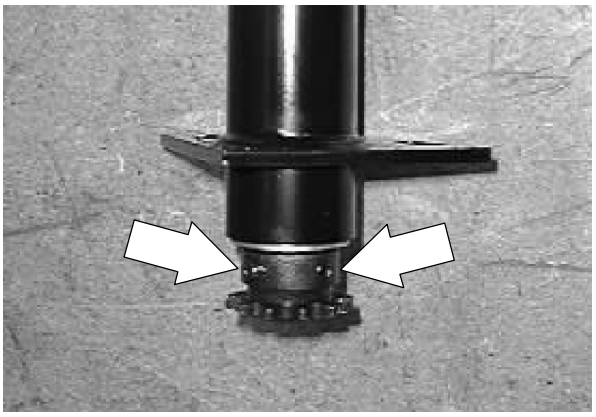
6. Remove the chain master link. Remove the steering chain from both sprockets.



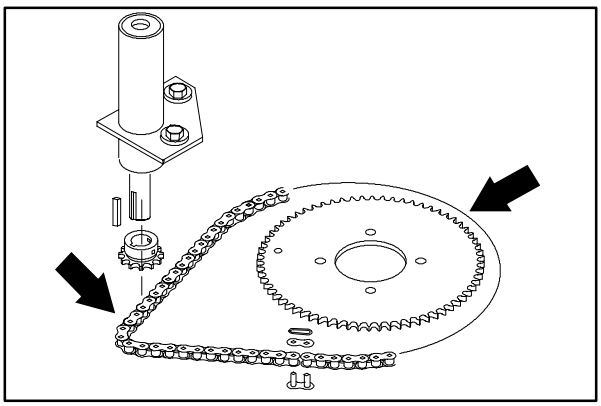
7. Loosen the set screws holding the small sprocket to the lower shaft. Slip the small sprocket off the shaft.



8. Install the new small sprocket on the lower steering shaft. Firmly tighten the set screws.



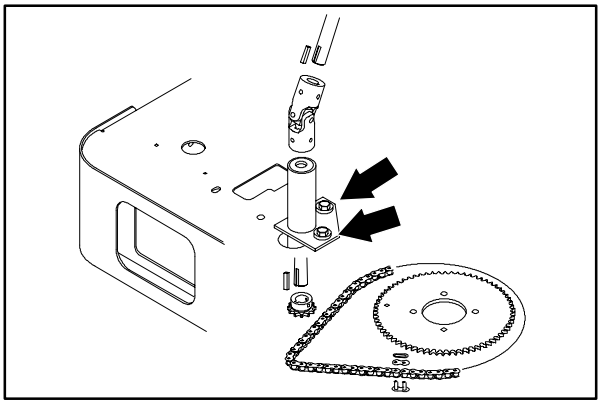
9. Route the steering chain around both steering sprockets. Install the master link.



10. Adjust the steering chain. See TO ADJUST STEERING CHAIN instructions.

11. Remove the jack stands and lower the machine.

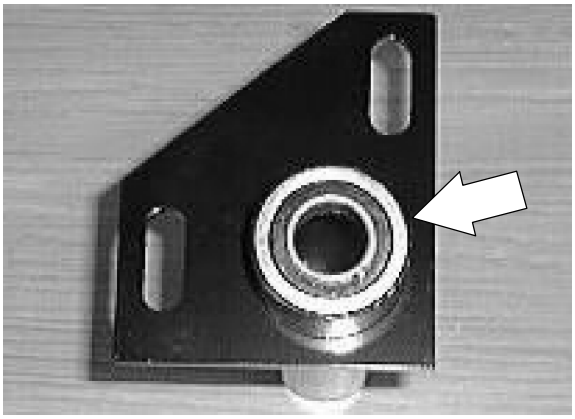
12. Operate the machine and check the steering for proper operation.



TO REPLACE STEERING HOUSING BEARINGS

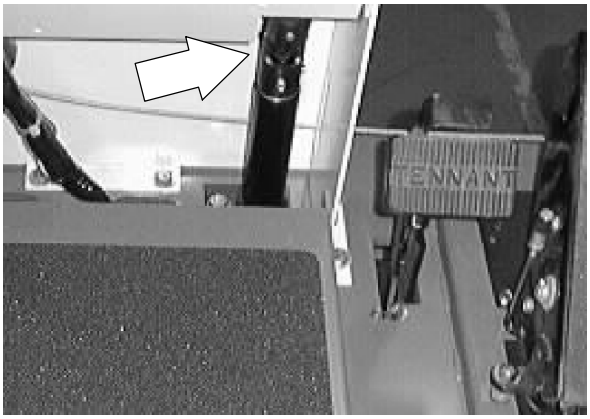
FOR SAFETY: Before Leaving Or Servicing Machine; Stop On Level Surface, Set Parking Brake.

1. Jack up the front of the machine at the jack point. Install jack stands under the machine frame.

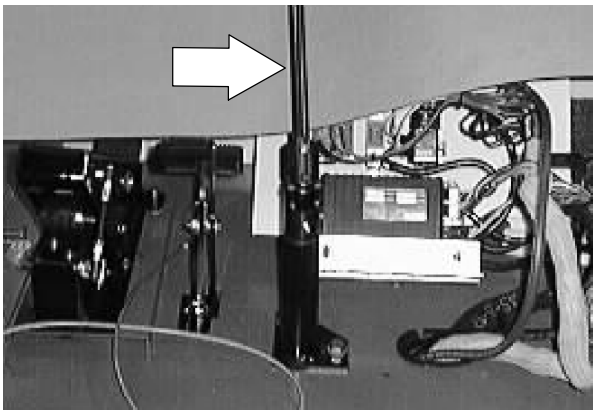


2. Turn the steering wheel all the way to the left.

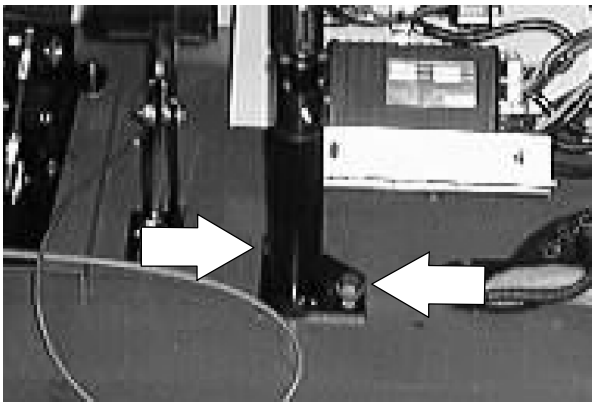
3. Go to the operators compartment and locate the steering U-joint. Loosen the two set screws on the top of the steering U-joint.



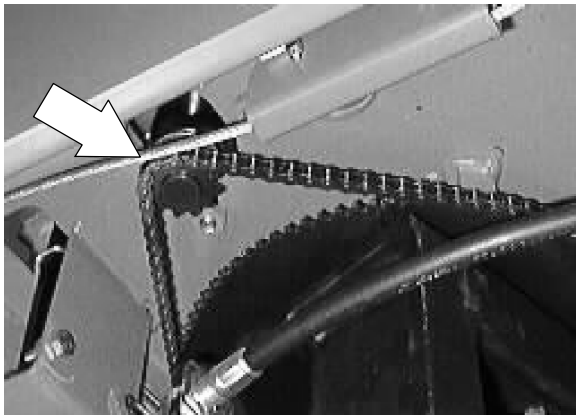
4. Pull the steering wheel and long steering shaft up and out of the top of the steering U-joint.



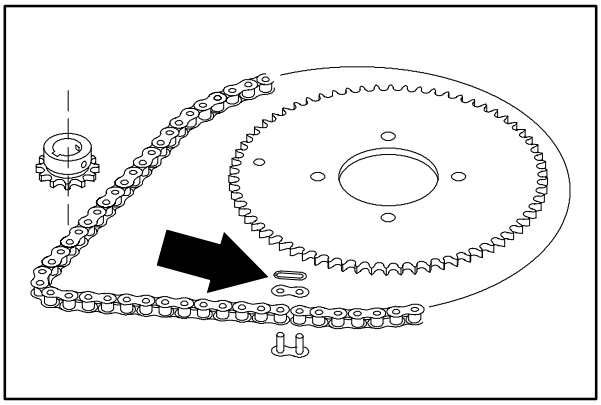
5. Remove the two hex screws holding the steering bearing housing to the machine frame. Push the bearing housing back in the slots.



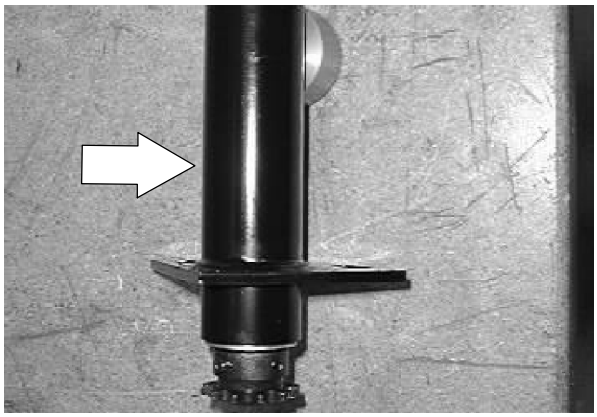
6. Go under the machine and locate the small steering chain sprocket.



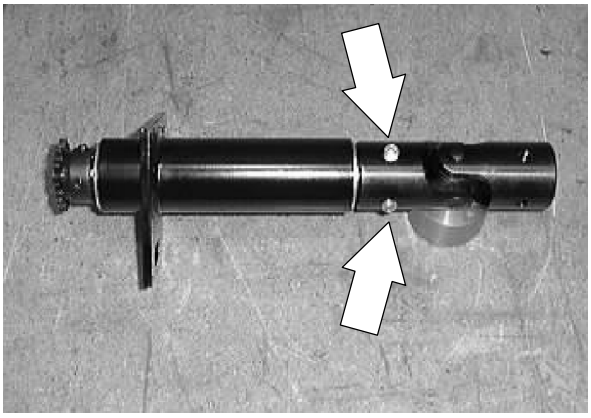
7. Locate the master link on the steering chain. Remove the master link and steering chain from the small steering sprocket.



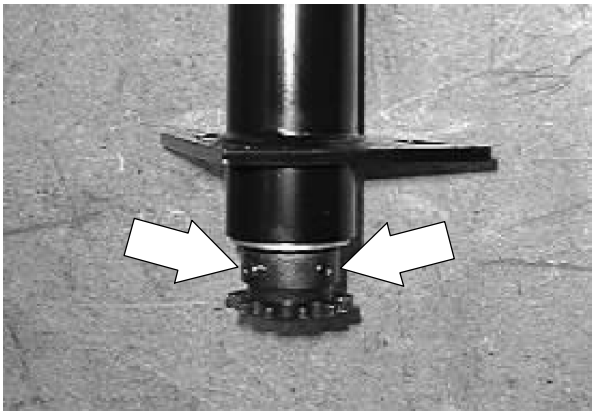
8. Remove the steering housing from the machine.



9. Loosen the two set screws holding the U-joint to the top of the short steering shaft. Remove and retain the U-joint and square key.

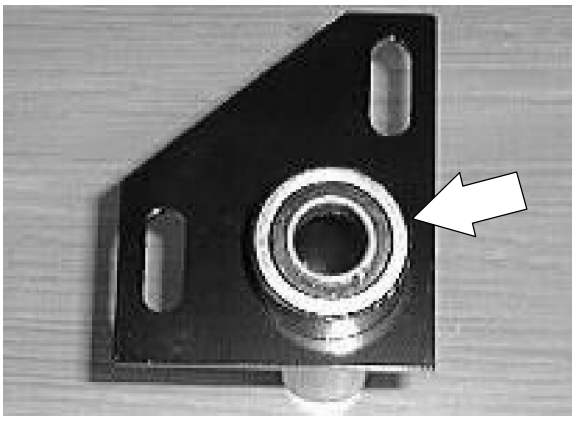


10. Loosen the set screw holding the small steering sprocket to the bottom of the short steering shaft. Remove and retain small sprocket and woodruff key.



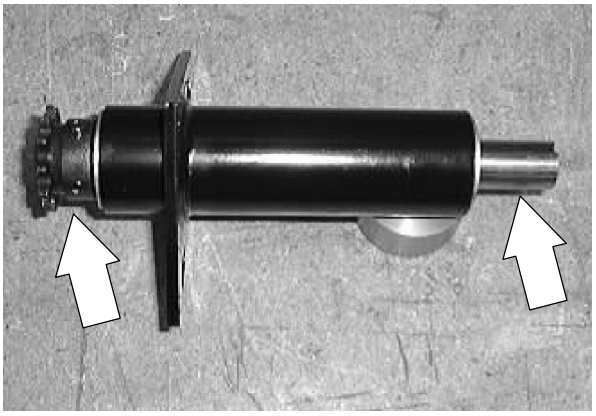
11. Use an arbor press to press the short steering shaft and two bearings out of the housing. Discard the bearings. Retain the short shaft. *Note the orientation of the shaft in the housing.*

12. Use the arbor press to install the new bearings into the steering housing.

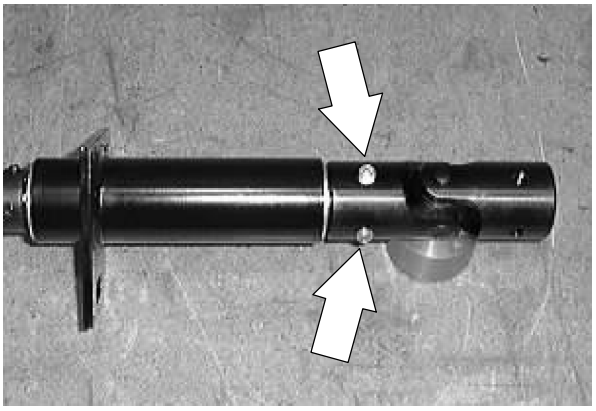


13. Use the arbor press to install the short steering shaft into the new bearings.

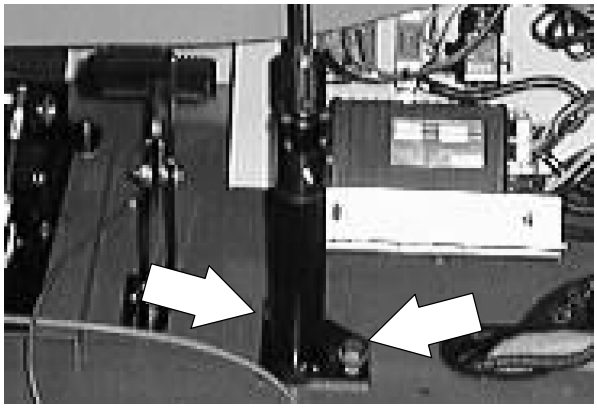
14. Reinstall the small steering sprocket and woodruff key on the bottom of the steering housing. Tighten the set screws tight.



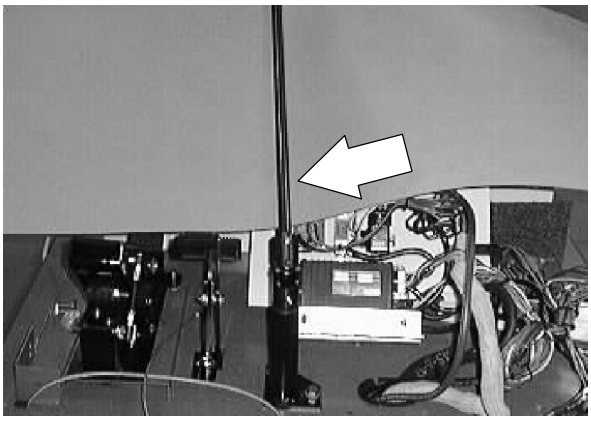
15. Reinstall the U-joint and square key on the top of the steering housing. Tighten the set screws tight.



16. Reinstall the steering housing in the machine. Reinstall the two hex screws. Leave loose for now.

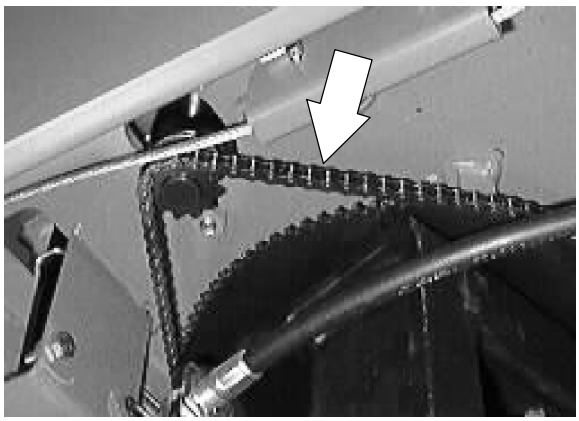


17. Position the long steering shaft and steering wheel into the top of the steering U–joint. Tighten the set screws tight.



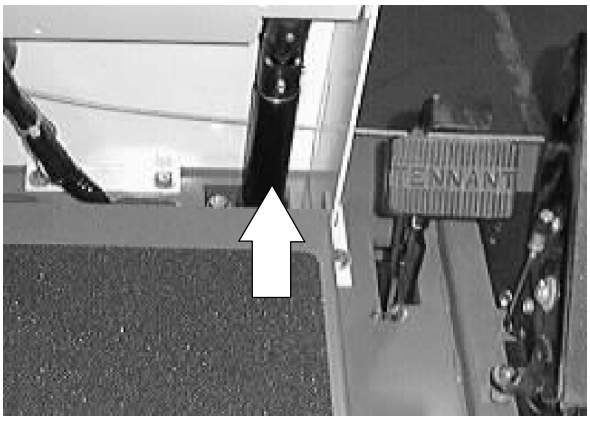
18. Go under the machine and reinstall the steering chain around the small steering sprocket. Reinstall the master link.

19. Turn the steering wheel all the way to the left and then to the right. Find the point in the rotation where the steering chain is the tightest.



20. Push the bearing housing forward in the slots. This will remove any excess slack in the steering chain. Tighten the two hex screws to 37 – 48 Nm (26 – 34 ft lb).

21. Remove the jack stands and lower the machine to the floor. Operate the machine and check the steering chain for proper operation.

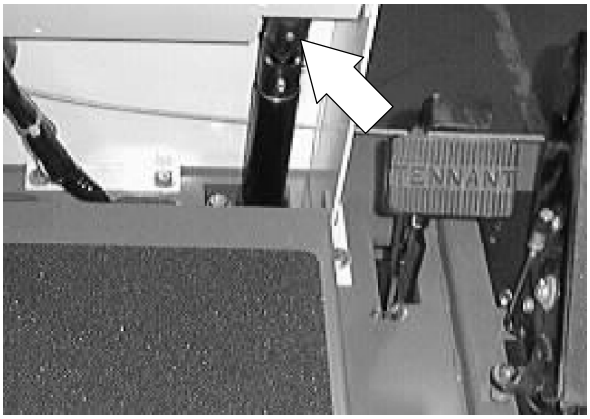


TO REPLACE STEERING U-JOINT

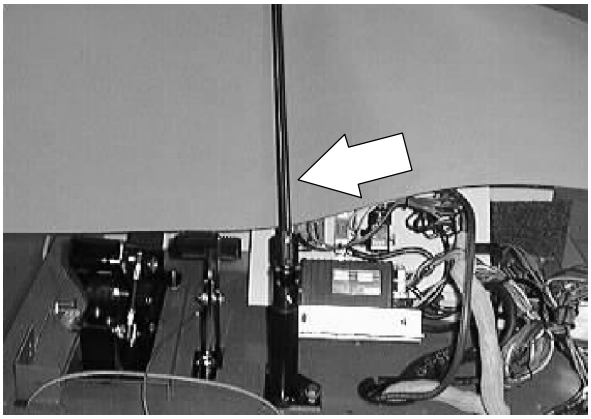
FOR SAFETY: Before Leaving Or Servicing Machine; Stop On Level Surface, Set Parking Brake.

1. Jack up the front of the machine at the jack point. Install jack stands under the machine frame.

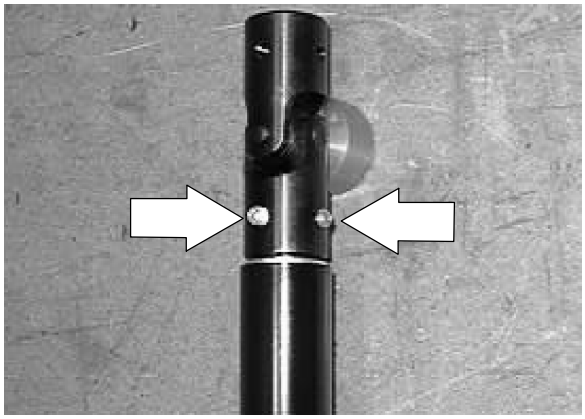
2. Go to the operators compartment and locate the steering U-joint. Loosen the two set screws on the top of the steering U-joint.



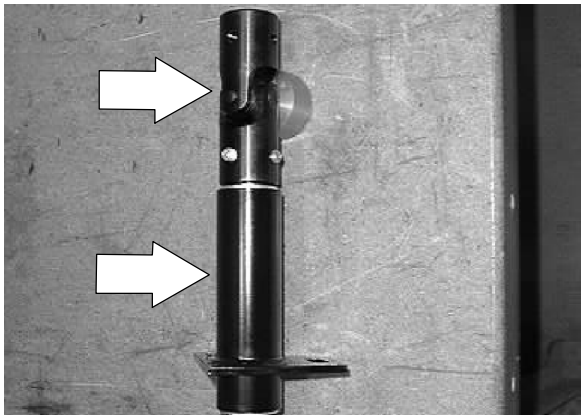
3. Pull the steering wheel and long steering shaft up and out of the top of the steering U-joint.



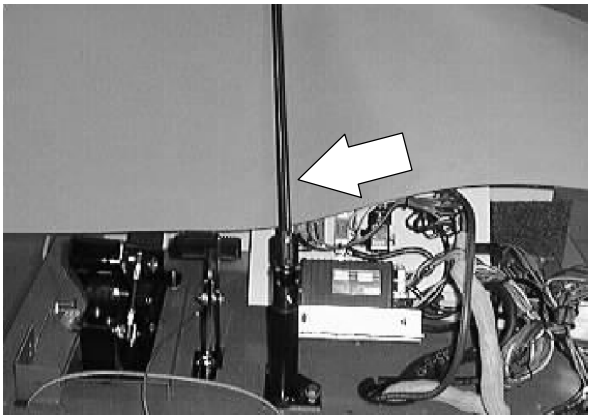
4. Loosen the two set screws holding the U-joint to the top of the short steering shaft. Remove and discard the U-joint and square key.



5. Install the new U-joint and square key on the top of the steering housing. Tighten the set screws tight.



6. Position the long steering shaft and steering wheel into the top of the steering U-joint. Tighten the set screws tight.

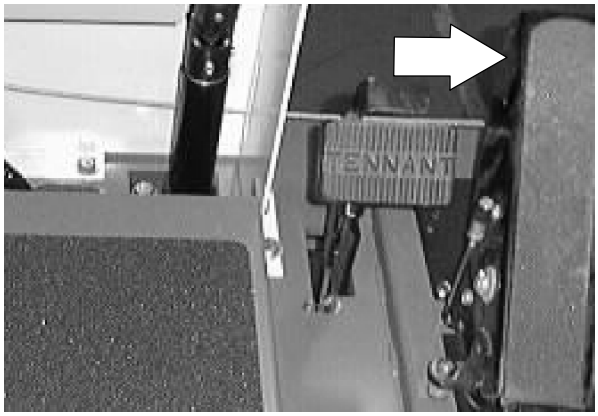


7. Operate the machine and check the steering U-joint for proper operation.

DIRECTIONAL PEDAL

The directional pedal controls the direction of travel and the propelling speed of the machine. Change the speed of the machine with the pressure of your foot on the pedal; the harder you press the faster the machine travels.

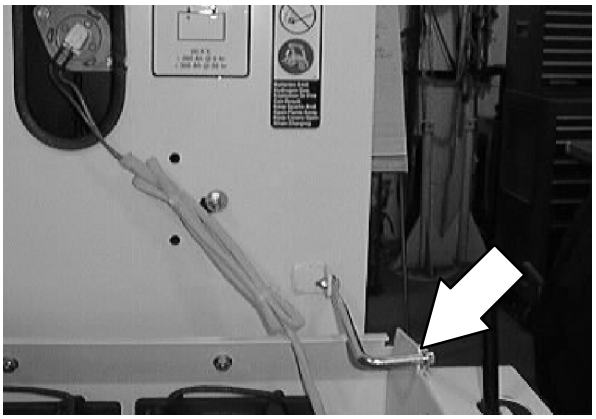
Use the brake pedal to stop the machine.



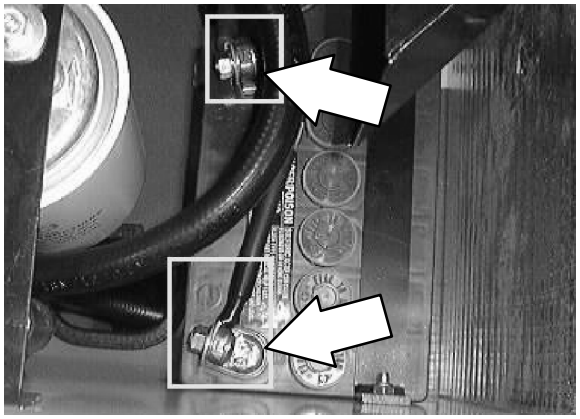
TO REMOVE DIRECTIONAL PEDAL ASSEMBLY

FOR SAFETY: Before Leaving Or Servicing Machine; Stop On Level Surface, Set Parking Brake.

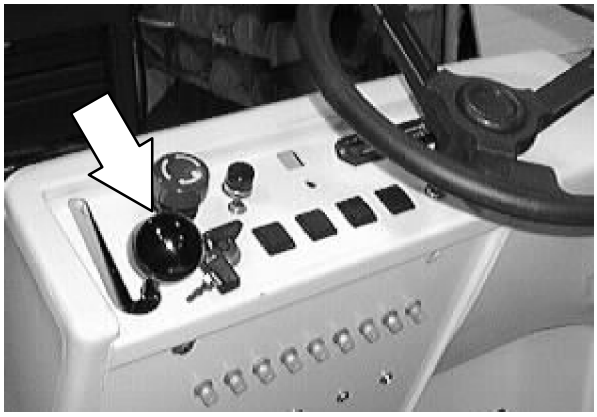
1. Open the seat support and engage the prop rod.



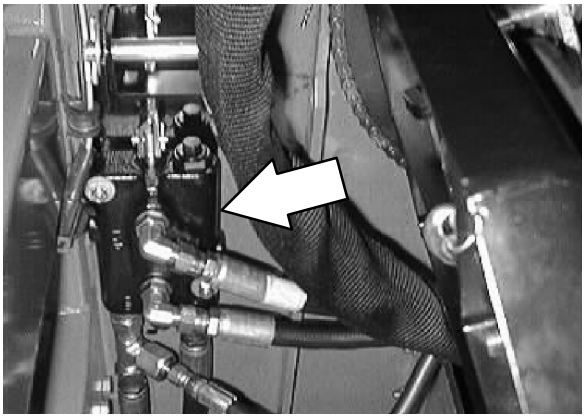
2. Disconnect the machine batteries.



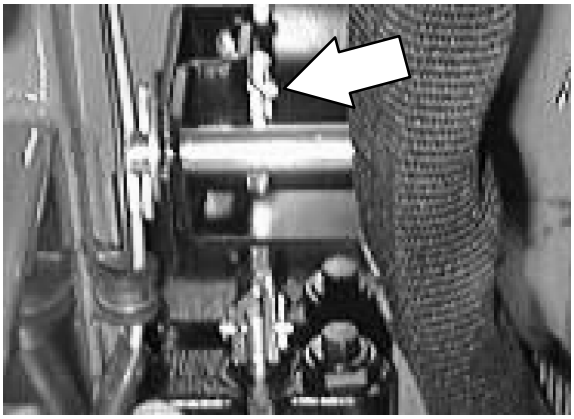
3. Lower the side brush.



4. Go under the machine in the area of the right hand side brush. Locate the directional pedal linkage rod and control valve.

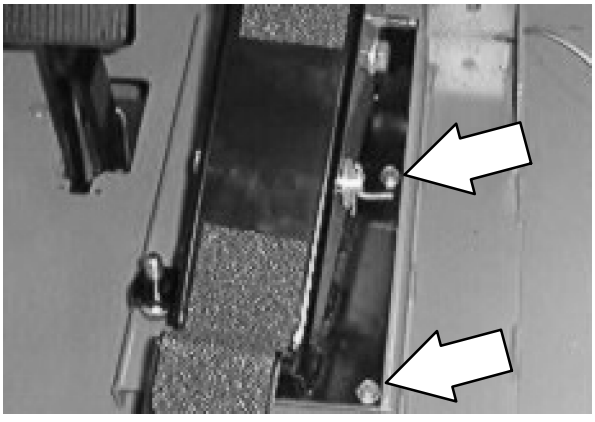


5. Disconnect the directional pedal link at the lower ball joint.



6. Go the the operators compartment and locate the directional pedal assembly. Remove the four thread rolling screws holding the directional pedal to the floor plate.

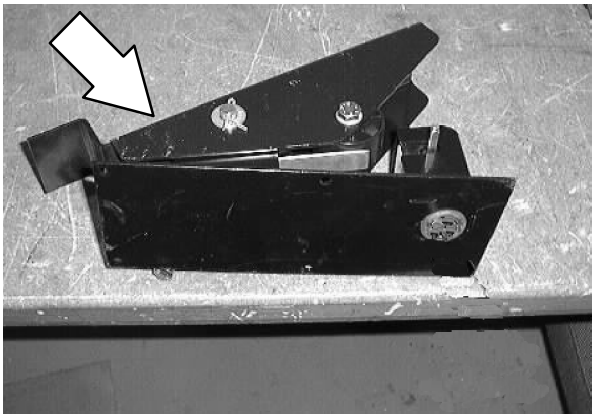
7. Remove the pedal assembly from the machine.



TO INSTALL DIRECTIONAL PEDAL ASSEMBLY

FOR SAFETY: Before Leaving Or Servicing Machine; Stop On Level Surface, Set Parking Brake.

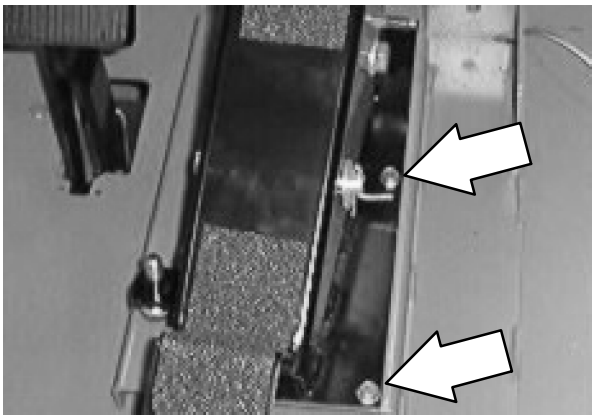
1. Position the directional pedal assembly in the machines operators compartment.



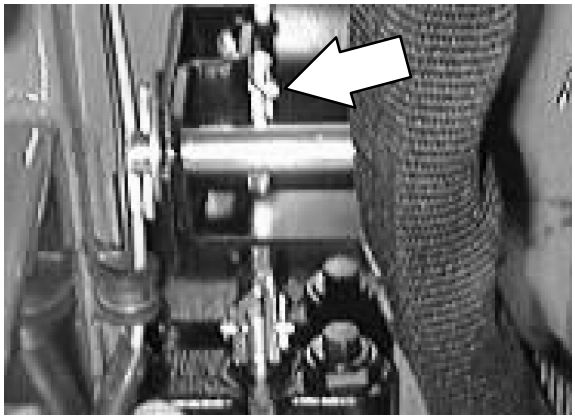
2. Position the pedal link through the access hole in the floor plate.

3. Line up the mount holes in the pedal assembly plate with the mount holes in the machines floor plate.

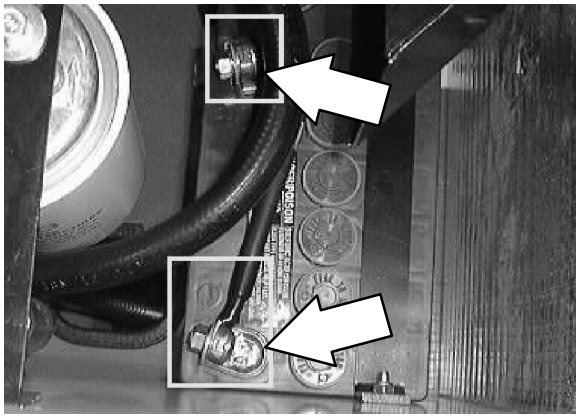
4. Reinstall the four thread rolling screws and tighten to 8 – 10 Nm (6 – 7 ft lb).



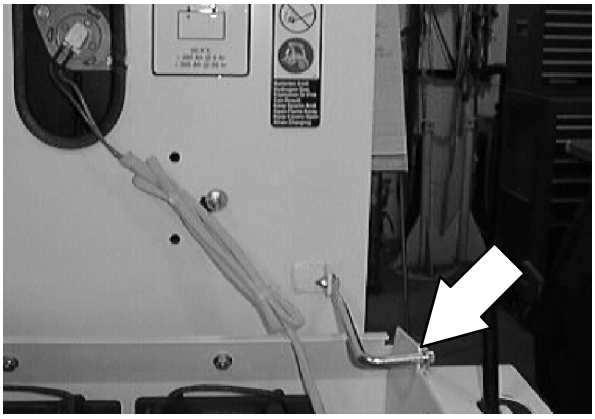
5. Go under the machine in the area of the right hand side brush. Locate the control valve pivot link. Position the ball joint into the hole on the pivot. Tighten the nut.



6. Reconnect the battery cables.



7. Disengage the prop rod and lower the seat support.



8. Start the machine and check for proper operation.

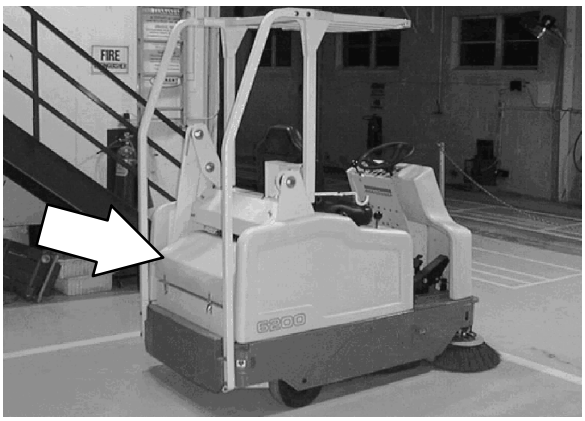
CONTENTS

INTRODUCTION

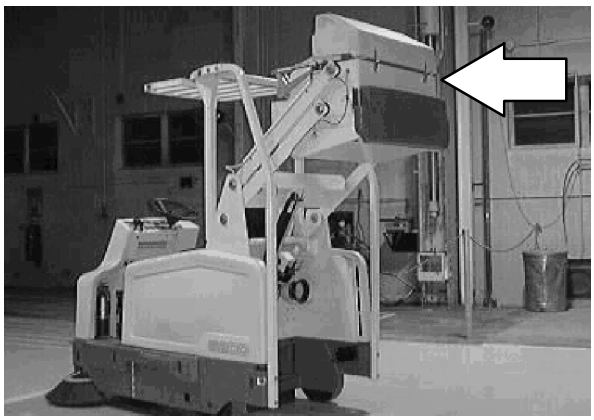
This section includes information on the sweeping operation of the model 6200D. The side brush sweeps debris in front of the machine and the main brush sweeps the debris into the hopper. The vacuum fan pulls air from the hopper and through the dust filter.

DEBRIS HOPPER

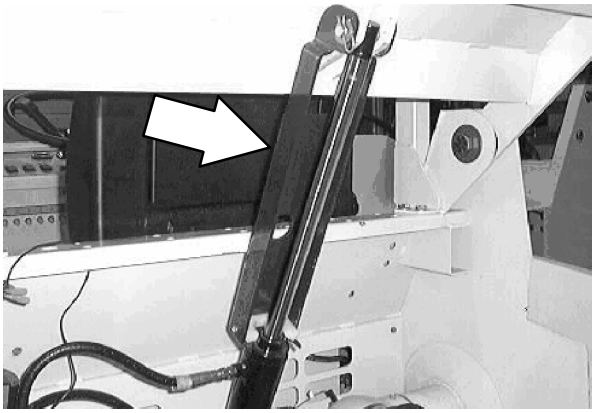
The hopper is located at the rear of the machine behind the battery compartment.



The hopper is raised and lowered with an hydraulic lift cylinder. The lift cylinder is provided hydraulic flow from a electro/hydraulic unit. The electro/hydraulic unit is activated with a dash mounted switch.



The hopper is held in the raised position with a prop arm.



HOPPER DUST FILTER

The Instant Access™ hopper filter filters the air pulled up from the hopper. The dust filter is equipped with a shaker to remove the accumulated dust particles. The dust filter shaker is operated by the main brush, vacuum and filter shaker switch.

Shake the dust filter before emptying the hopper and at the end of every work shift. Check and clean or replace the dust filter after every 100 hours of operation.

To clean the Instant Access™ filter, use one of the following methods:

- SHAKING – Press and hold the main brush, vacuum and filter shaker switch to the **Filter shaker** position.
- TAPPING – Remove the filter and tap the filter gently on a flat surface with the dirty side down. Do not damage the edges of the filter element and seals, or the filter will not seat properly in the filter frame.
- AIR – Blow air through the dust filter, opposite the direction of the arrows. This may be done with the dust filter in the machine. Always wear eye protection when using compressed air.

  FOR SAFETY: When servicing machine, wear eye and ear protection if using pressurized air or water.

- WATER – Soak the dust filter in a water and mild detergent solution. Rinse the dust filter until it is clean. Air dry the wet dust filter; do not use compressed air to dry a wet filter.

NOTE: Be sure the dust filter is completely dry before reinstalling it in the machine.

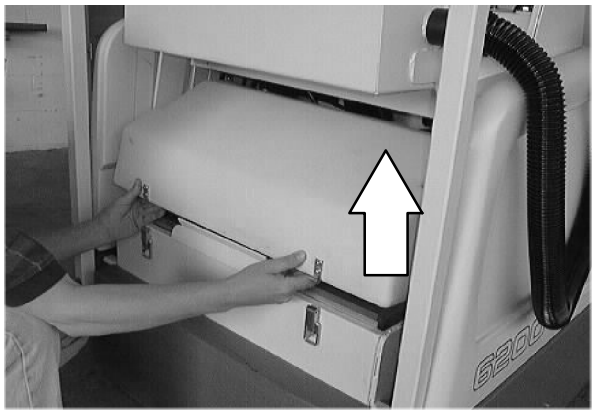
REPLACING HOPPER DUST FILTER

FOR SAFETY: Before Leaving Or Servicing Machine; Stop On Level Surface, Set Parking Brake.

1. Stop the machine, set the parking brake and turn the machine power off.

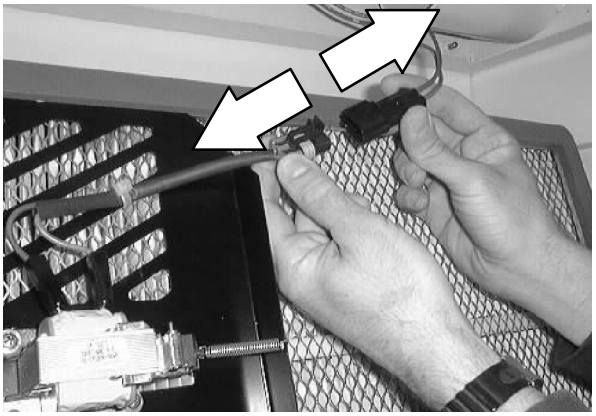
FOR SAFETY: Before leaving or servicing machine, stop on level surface, set parking brake, turn off machine, and remove key.

2. Unlatch and remove hopper cover.

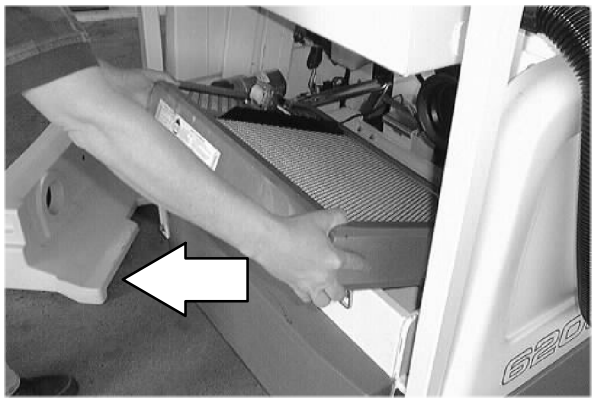


3. Unplug the filter shaker from the main harness.

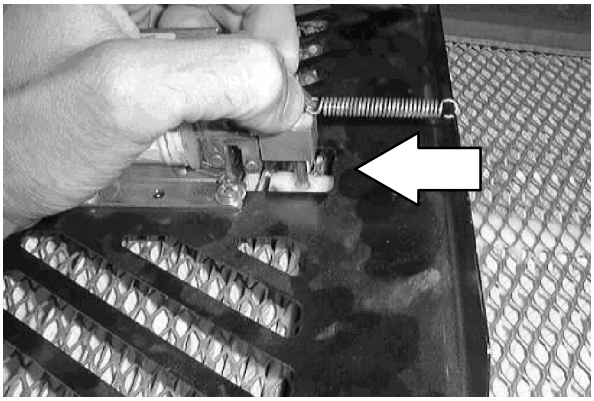
NOTE: Carefully pull the wires apart from the bodies of the plugs Do not unplug the connections from the shaking mechanism. Do not pull on the wires. Damage could occur to the wires or the shaking mechanism.



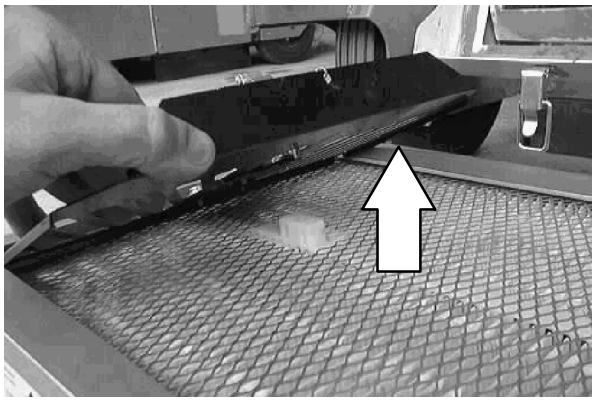
4. Lift dust filter assembly out of hopper.



5. Pull back on the tension spring, releasing tension from the shaking mechanism.

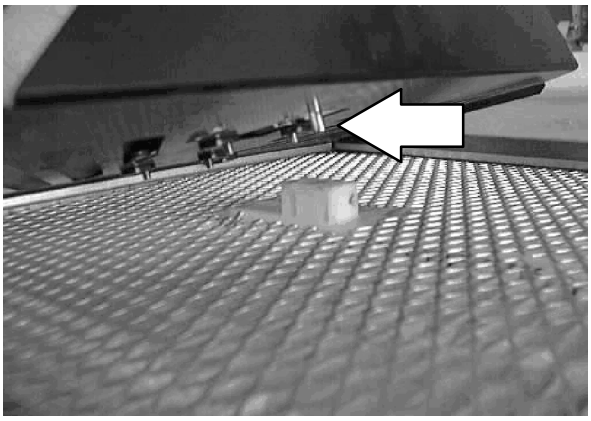


6. Lift the VCS™ system filter shaker off of the filter.

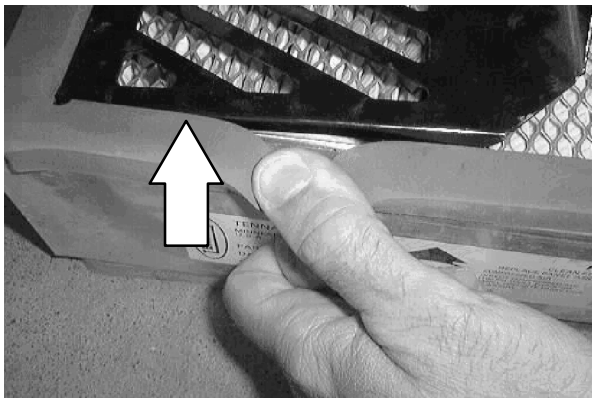


7. Clean or discard the Instant Access™ filter as required.

8. Replace the VCS™ system filter shaker. Use care to insert the shaking pin into the filter comb correctly.

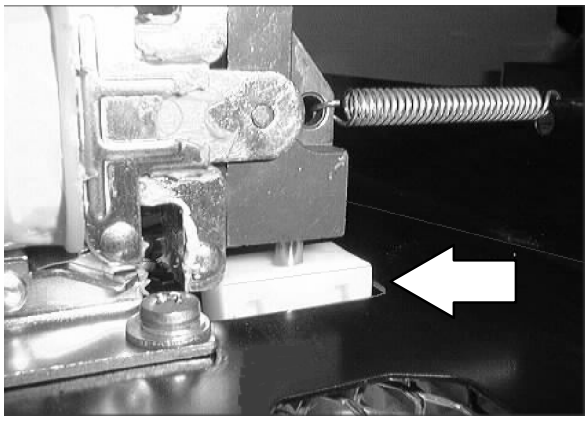


9. Place the edges of the shaker firmly between the filter and the filter seal.

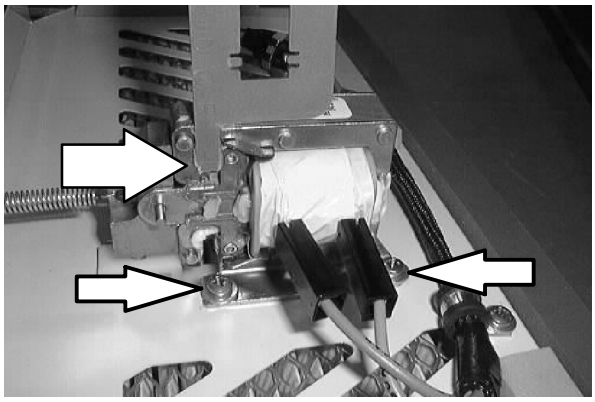


NOTE: When installed properly, the shaker plate cannot move in either front-to-back or side-to-side directions. If the shaker is loose, it will not function properly.

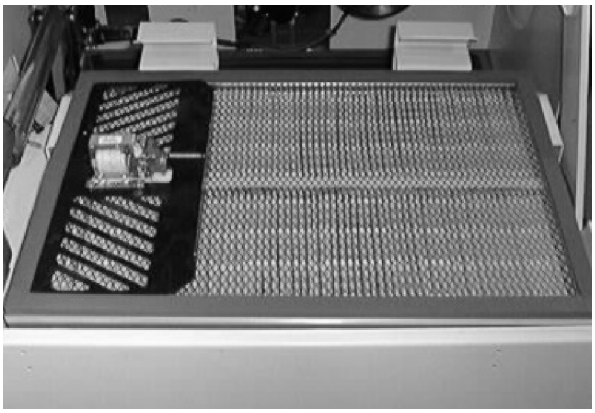
10. The filter shaker should lay flat against the filter. Check to make sure the comb tab is not caught below the filter shaker plate.



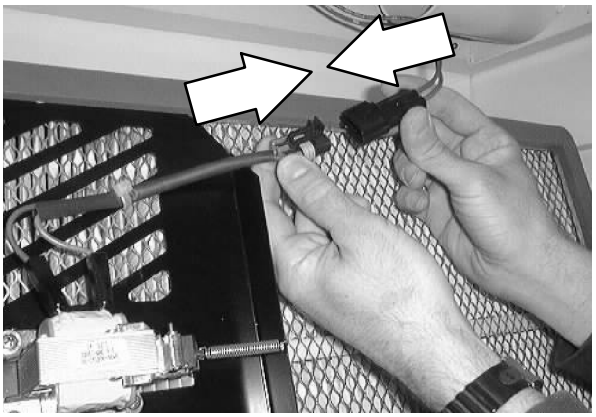
11. Check the shaker solenoid gap with the end of the shipping tab. The gap should be the same width as the tab. If it is not, loosen the mounting screws, adjust the gap by repositioning the shaker solenoid, then retighten the screws.



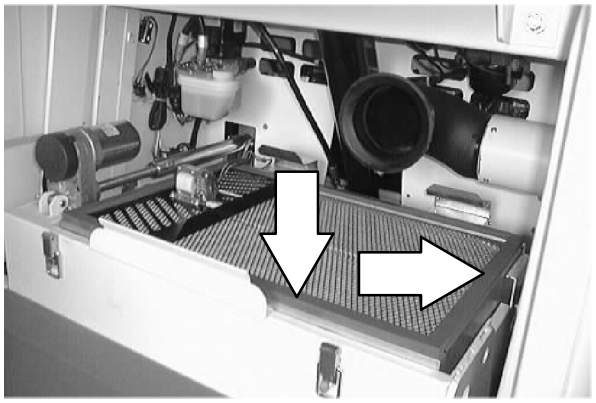
12. Return the filter back to the machine.



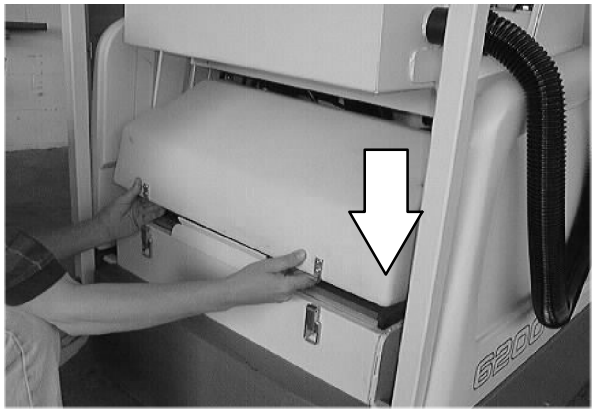
13. Reconnect the main harness to the shaker mechanism.



14. Check the dust filter seals.

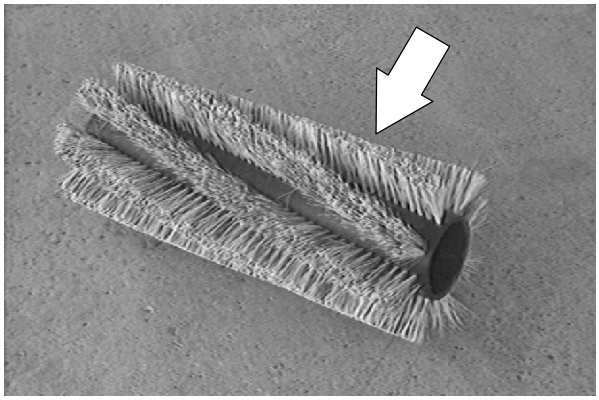


15. Replace hopper cover and secure with latches.



MAIN BRUSH

The main brush is cylindrical and spans the width of the machine, sweeping debris into the hopper.



Check the brush daily for wear or damage. Remove any string or wire tangled on the main brush, main brush drive hub, or main brush idler hub.

Check the main brush pattern every 50 hours of operation. The pattern should be 50 to 75 mm (2 to 3 in) wide with the main brush in the lowered position.

Rotate the main brush end-for-end after every 50 hours of operation for maximum brush life and best sweeping performance.

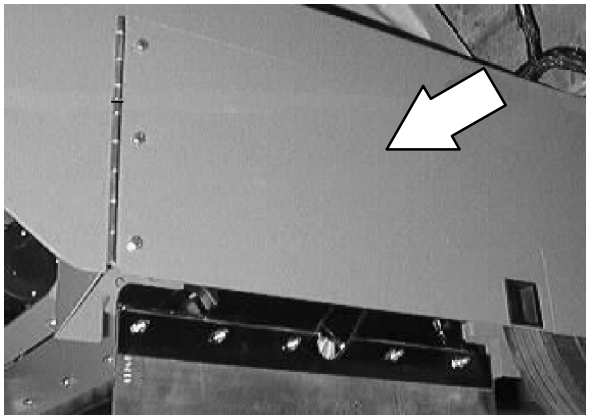
Replace the main brush when the remaining bristles measure 25 mm (1 in) in length.

TO REPLACE MAIN BRUSH

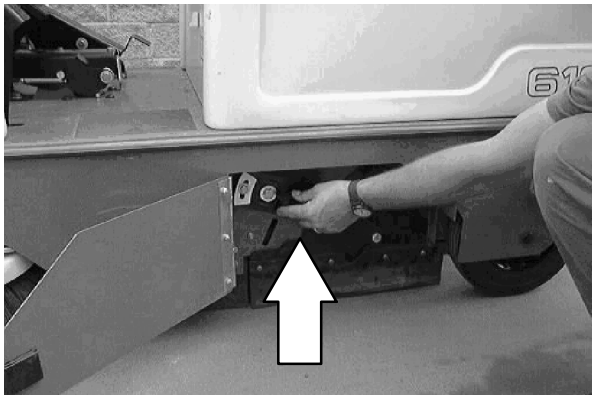
FOR SAFETY: Before Leaving Or Servicing Machine; Stop On Level Surface, Set Parking Brake.

1. Stop the machine, set the parking brake and turn the machine power off.

2. Open the left side main brush access door.



3. Loosen the idler arm mounting knob and three other side skirt mounting knobs. Remove the brush idler arm assembly.



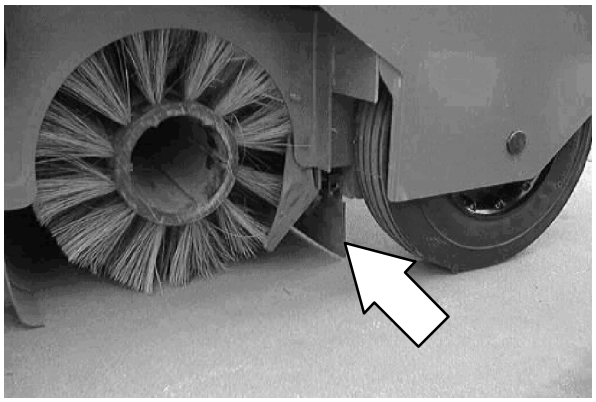
4. Grasp the main brush; pull it off the brush drive plug and out of the main brush compartment.

5. Put the new or rotated end-for-end main brush on the floor next to the access door.

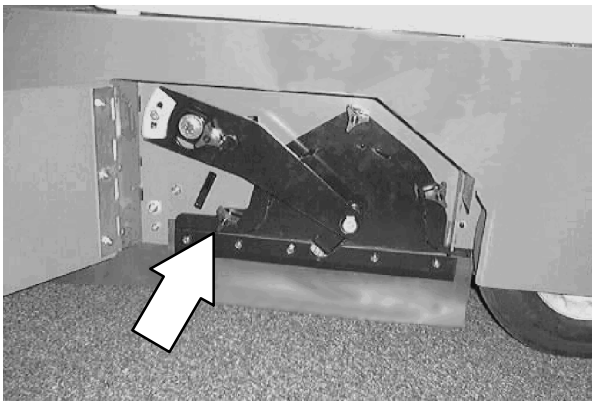
6. Slide the main brush onto the drive plug. Rotate the brush until it engages the drive plug, and push it all the way onto the plug.

7. Check that the recirculation skirt is tucked in behind the frame.

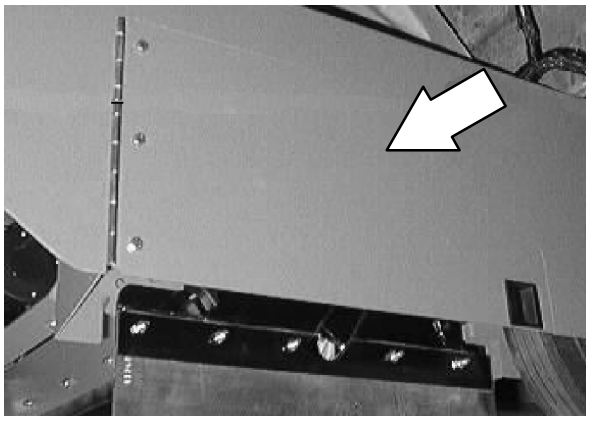
8. Slide the main brush idler arm plug onto the main brush.



9. Secure the idler arm on the bolts. Hand tighten the mounting knobs.



10. Close the main brush access door.

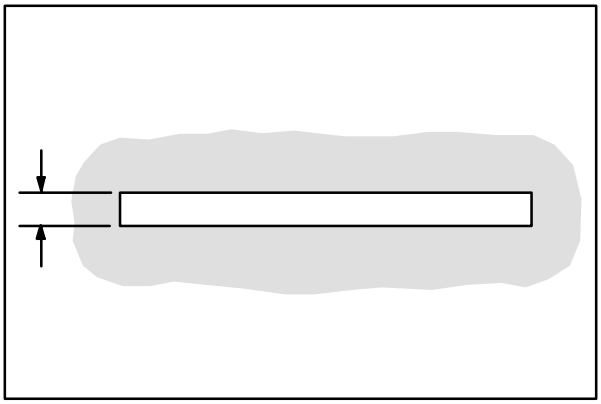


CHECKING AND ADJUSTING MAIN BRUSH PATTERN

1. Apply chalk, or some other material that will not blow away easily, to a smooth, level floor.

2. Raise the side brush and main brush and position the main brush over the chalked area.

3. Start and lower the main brush for 15 to 20 seconds while keeping a foot on the brakes to keep the machine from moving.



NOTE: If chalk or other material is not available, allow the brushes to spin on the floor for two minutes. A polish mark will remain on the floor.

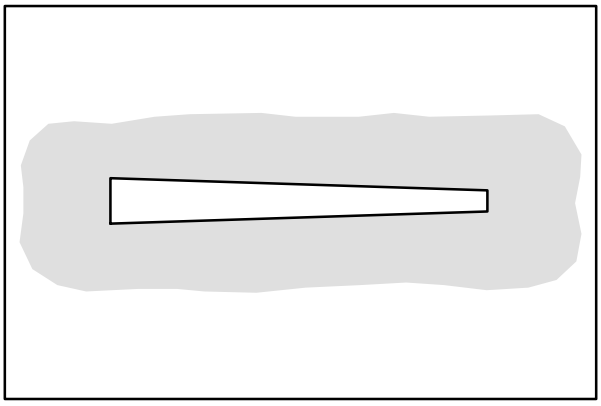
4. Raise the main brush.

5. Drive the machine off the test area.

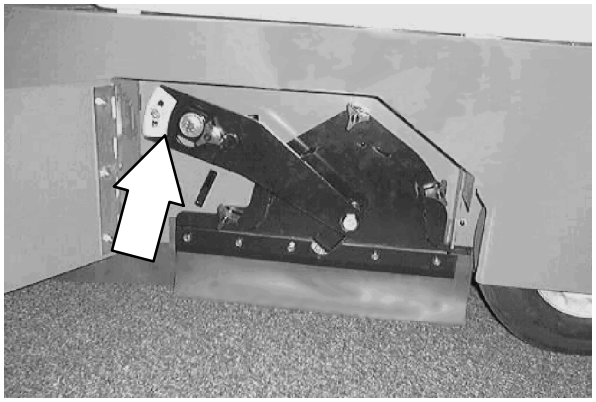
6. Observe the width of the brush pattern. The proper brush pattern width is 50 to 75 mm (2 – 3 in).

   The brush taper is factory set and should not need adjustment unless parts of the brush system have been replaced.

   If the main brush pattern is tapered, more than 15 mm (0.5 in) on one end than the other, adjust the taper as follows:



1. Loosen the brush shaft bearing bracket mounting bolt and the idler arm securing head.



2. Allow the brush to operate and float into position for approximately 30 seconds.

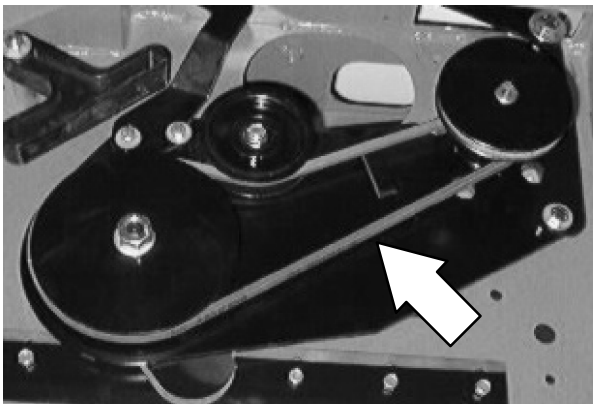
3. Tighten the adjustment bolt and idler arm securing knob.

4. Check the main brush pattern and readjust as necessary.

MAIN BRUSH BELTS

Check the main brush belts for wear after every 100 hours of operation. The idler keeps tension on the belt. The tension is set manually.

WARNING: Moving belt and fan. Keep away.

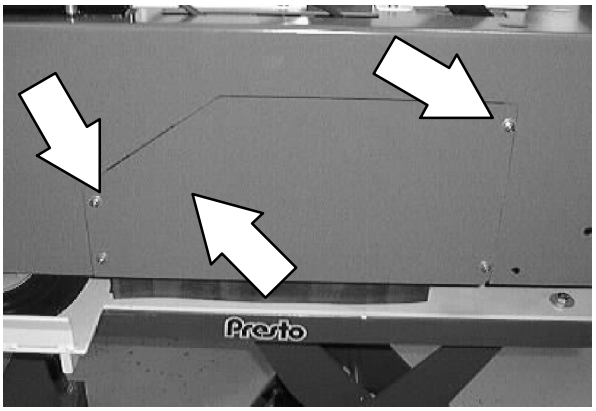


TO REPLACE MAIN BRUSH DRIVE BELT

FOR SAFETY: Before Leaving Or Servicing Machine; Stop On Level Surface, Set Parking Brake.

1. Remove the four screws holding the right hand brush door to the machine frame. Remove the right hand side brush door.

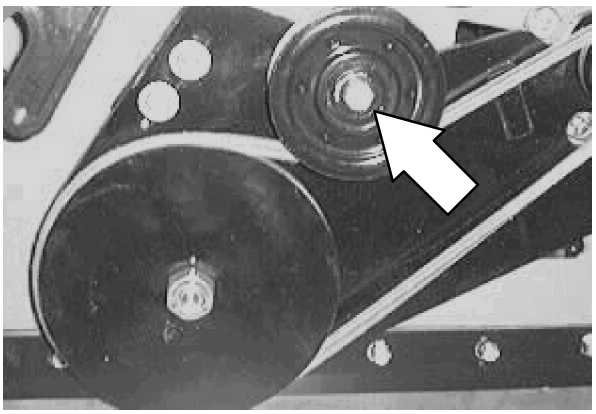
2. Remove the vacuum fan drive belt from the lower sheave. See TO REPLACE VACUUM FAN DRIVE BELT instructions in this section.



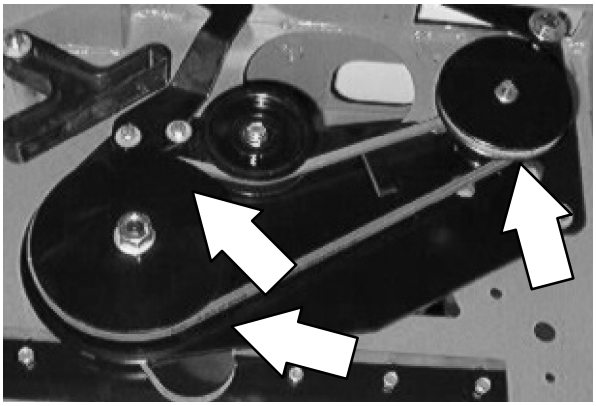
3. Locate the main brush drive belt idler pulley between the small drive pulley and the larger brush pulley.

4. Loosen the hex nut in the center of the idler pulley.

5. Push the idler pulley back in the slot.

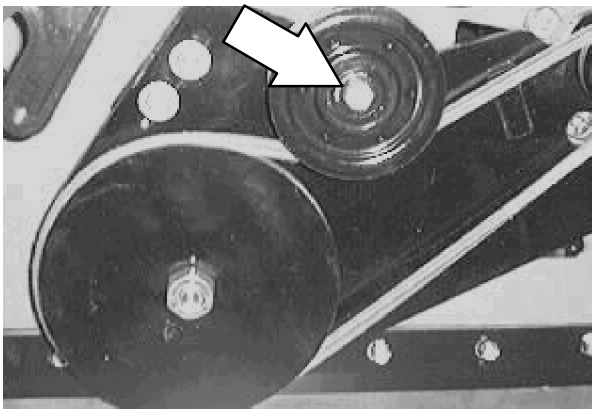


6. Remove the main brush drive belt from the two remaining pulleys. Remove and discard the old drive belt.



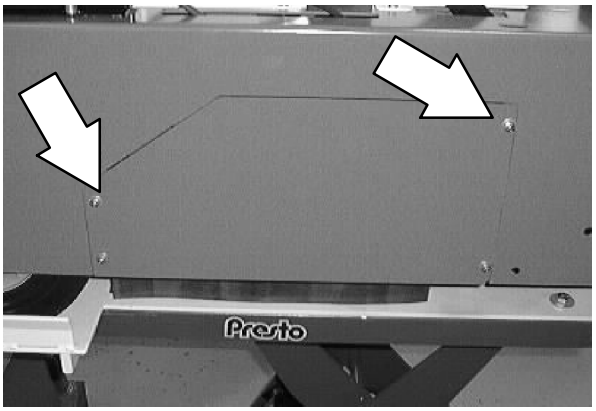
7. Position the new main brush drive belt onto the brush drive pulleys.

8. Move the idler pulley forward in the slot until the belt is tight. Tighten the hex nut to 18 – 24 Nm (15 – 20 ft lb).



9. Reinstall the vacuum fan drive belt onto the lower sheave. See TO REPLACE VACUUM FAN DRIVE BELT instructions in this section.

10. Reinstall the right hand side brush door.

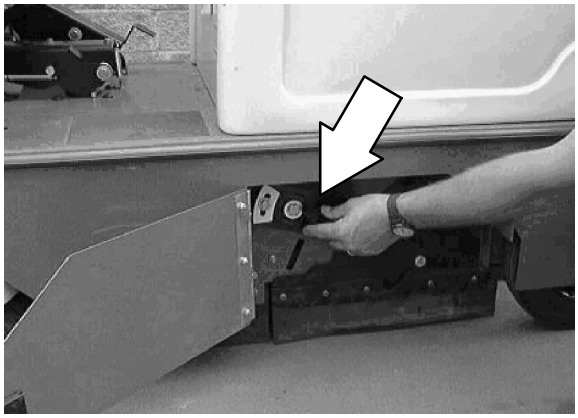


11. Operate the machine and check the main brush for proper operation.

TO REPLACE MAIN BRUSH IDLER PLUG BEARING

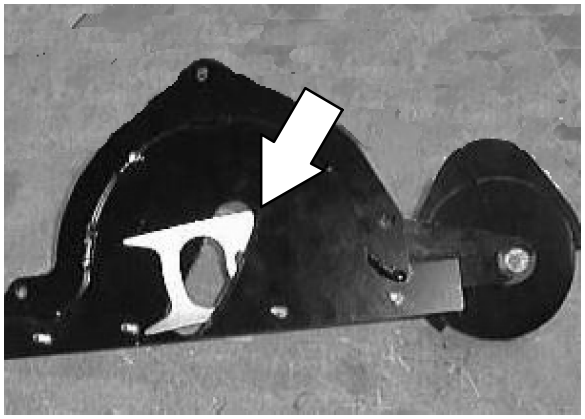
FOR SAFETY: Before Leaving Or Servicing Machine; Stop On Level Surface, Set Parking Brake.

1. Open the left hand side brush door.

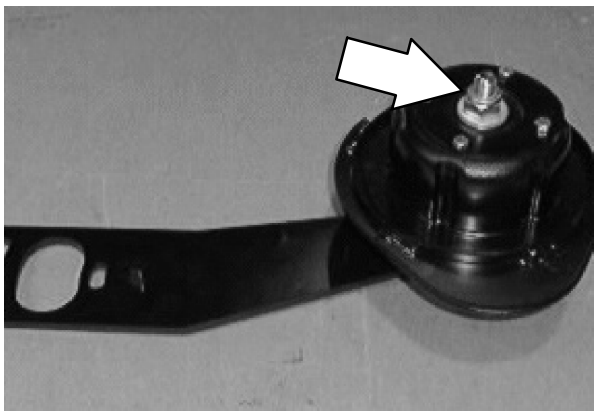


2. Remove the main brush idler mount plate. See TO REPLACE MAIN BRUSH instructions in this sections.

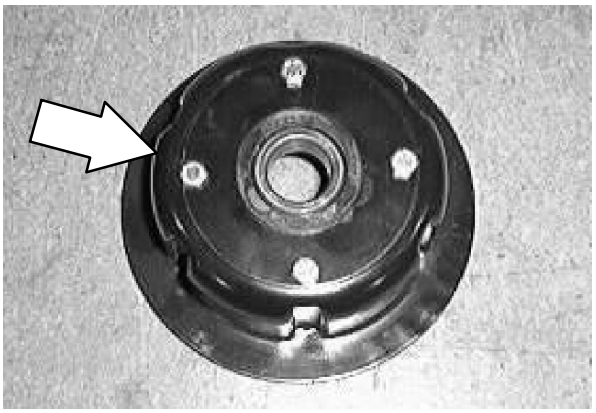
3. Remove the idler arm from the brush lift plate.



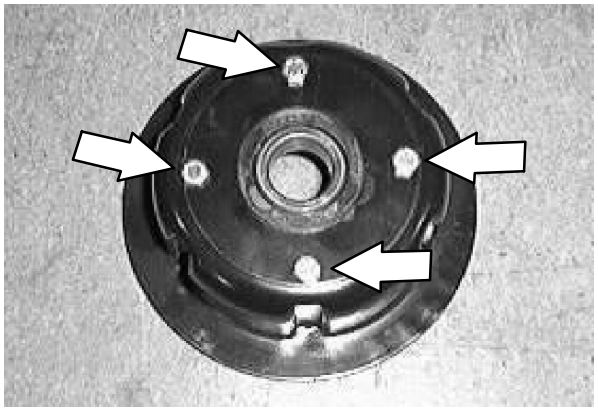
4. Remove the hex screw, nut, and washer holding the idler plug assembly to the brush lift plate.



5. Remove the idler plug assembly from the lift plate.



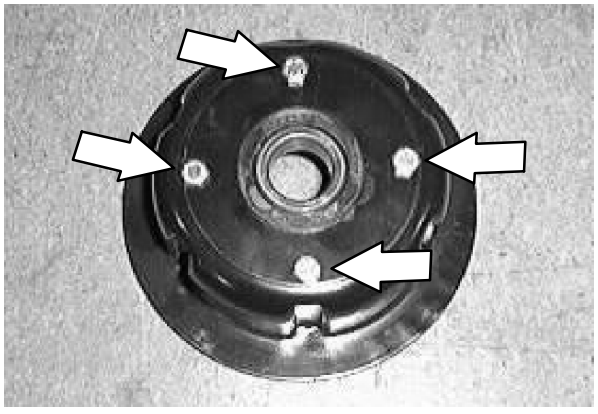
6. Remove the four hex screws holding the bearing retainer to the idler plug. Remove the retainer.



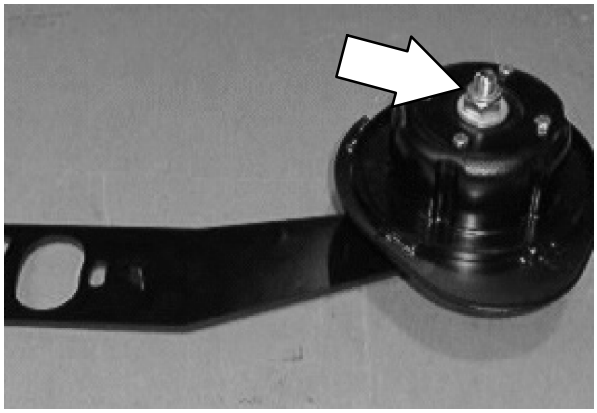
7. Remove and discard the idler ball bearing from the idler plug.

8. Position the new ball bearing into the idler plug.

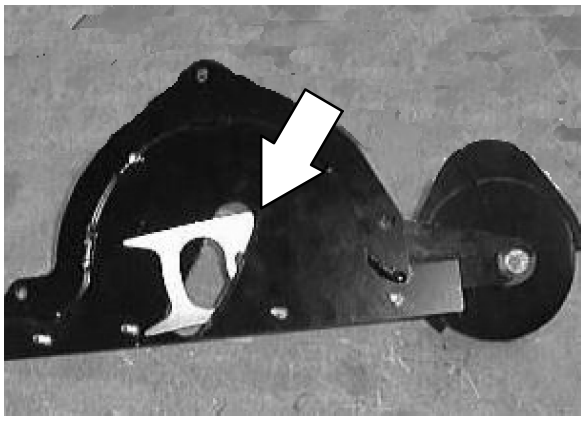
9. Reinstall the bearing retainer plate on the idler plug. Reinstall the four screws and tighten to 8 – 10 Nm (6 – 7 ft lb).



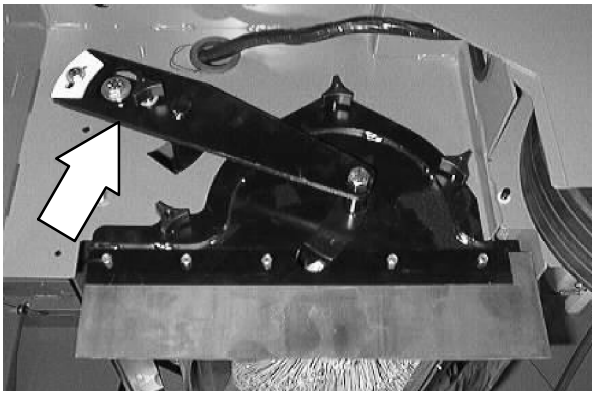
10. Reinstall the idler plug assembly onto the brush lift plate. Reinstall the hex screw, washer, and nyloc nut. Tighten to 37 – 48 Nm (26 – 34 ft lb).



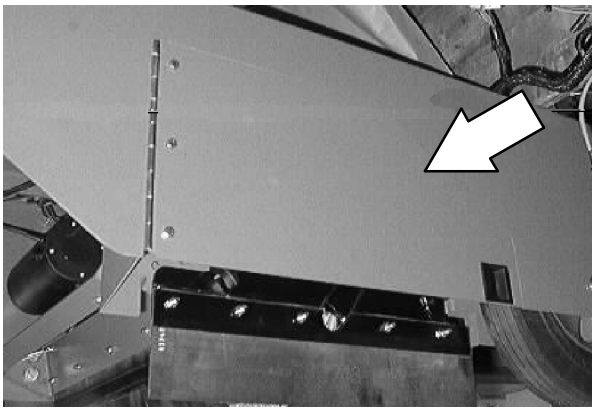
11. Reinstall the idler arm onto the brush lift plate.



12. Reinstall the main brush idler mount plate. See TO REPLACE MAIN BRUSH instructions in this sections.



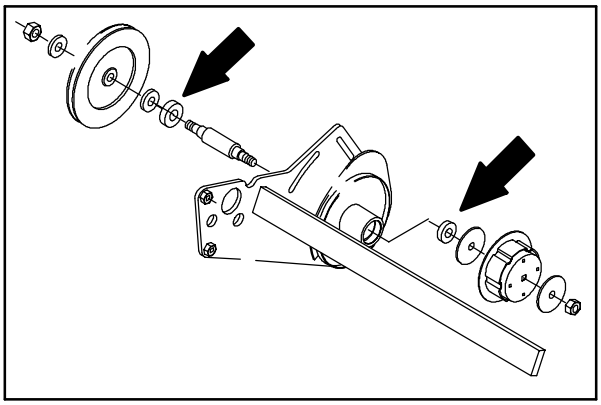
13. Close the left hand side brush door.



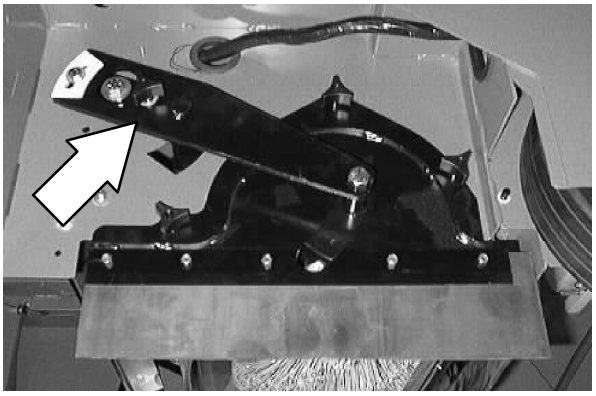
14. Operate the machine and check the main brush for proper operation.

TO REPLACE MAIN BRUSH DRIVE PLUG SHAFT BEARINGS

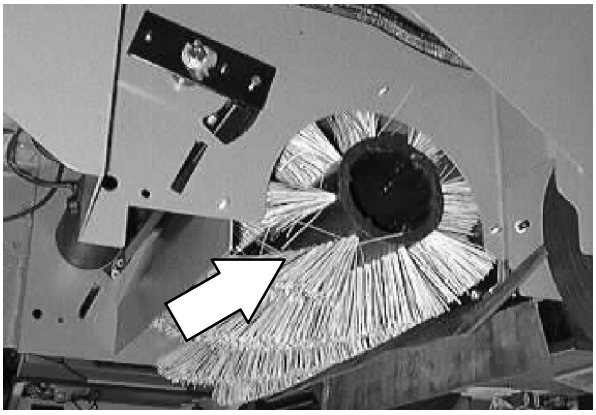
FOR SAFETY: Before Leaving Or Servicing Machine; Stop On Level Surface, Set Parking Brake.



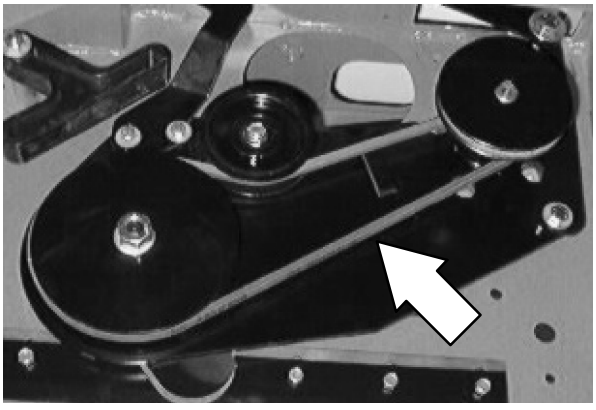
1. Jack up the front of the machine at the jack points. Install jack stands under the machine frame.
2. Open the left hand side brush door. Remove the right hand brush door.
3. Remove the main brush idler mount plate. See TO REPLACE MAIN BRUSH instructions in this sections.



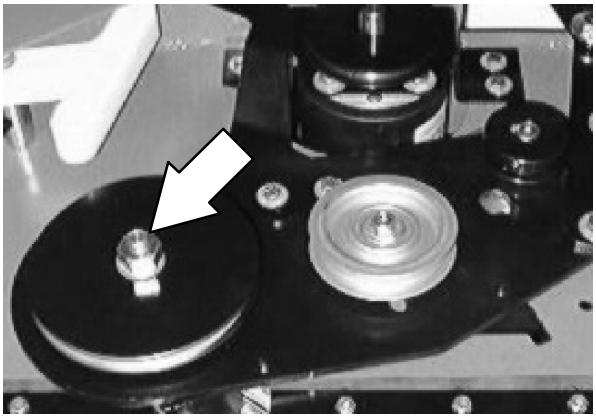
4. Remove the main brush. See TO REPLACE MAIN BRUSH instructions in this sections.



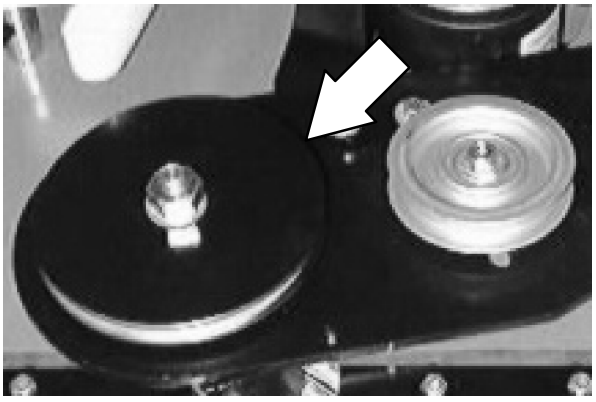
5. Remove the main brush drive belt. See TO REPLACE MAIN BRUSH DRIVE BELT instructions in this section.



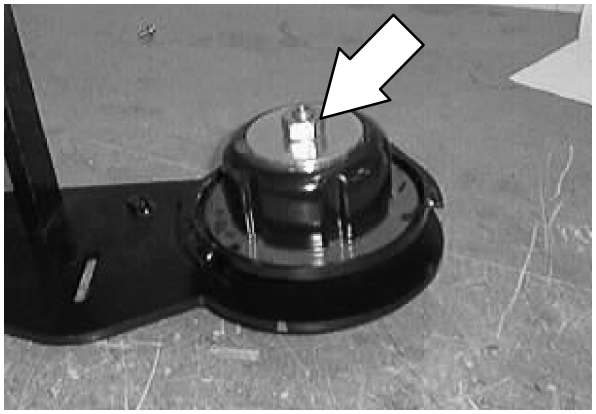
6. Hold the main brush V-belt pulley (large one) from turning. Remove the large nut from the center of this pulley. **NOTE: THIS IS A LEFT HAND THREAD NUT.**



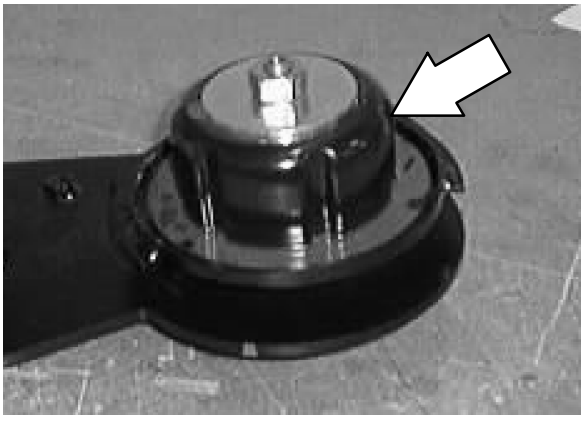
7. Remove the main brush V-belt pulley (larger one) from the main brush shaft. Make sure to retain the washer from behind the pulley.



8. Hold the main brush drive plug from turning. Remove the large nut from the center of the drive plug. **NOTE: THIS IS A LEFT HAND THREAD NUT.**



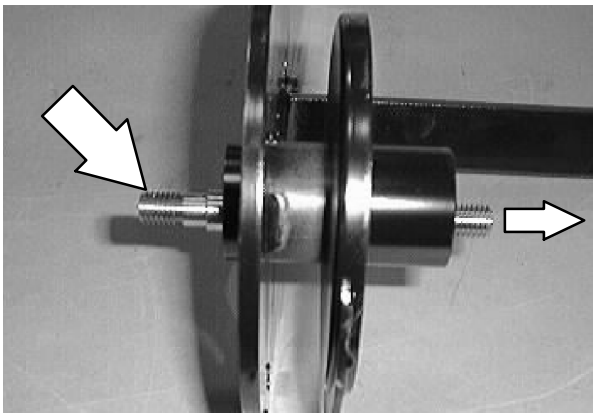
9. Remove the main brush idler plug assembly from the main brush shaft.



10. Reinstall the nut on the outside of the main brush shaft.

11. Use a hammer to lightly tap on the end of the shaft with the nut reinstalled. Tap on the shaft until the inner bearing is out of the housing.

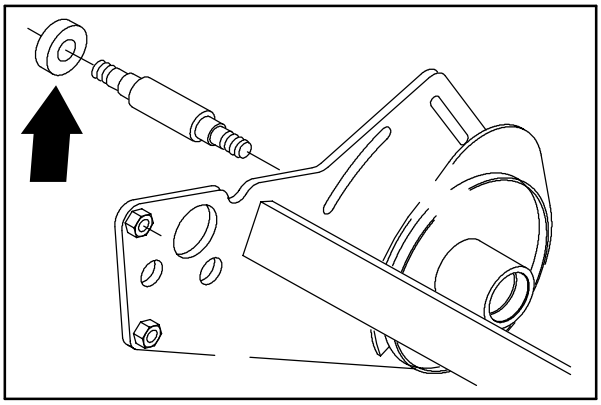
12. Remove the nut from the main brush shaft. Remove the shaft and bearing from the machine.



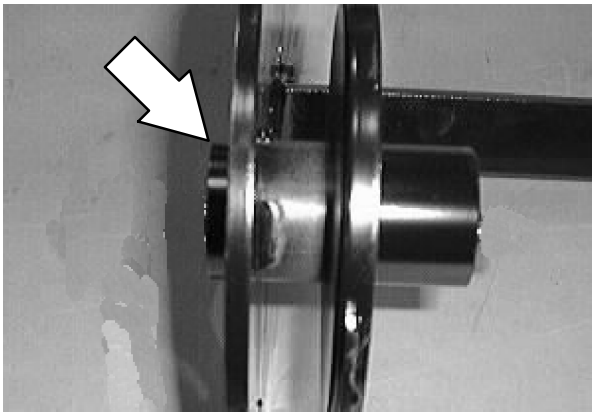
13. Use a long screw driver or punch to remove the remaining outer bearing from the main brush housing. Discard the bearing.

14. Use an arbor press to remove the bearing from the main brush shaft. Discard the bearing.

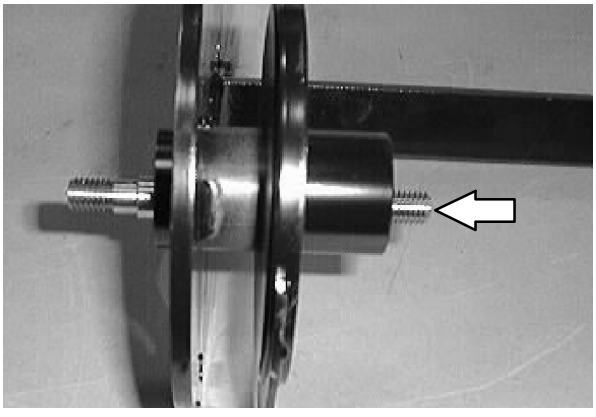
15. Install one new bearing onto the main brush shaft.



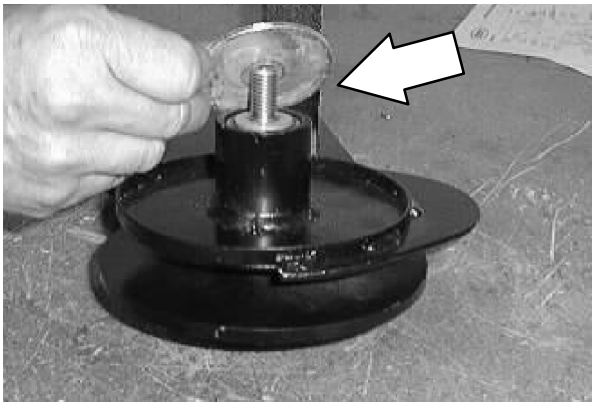
16. Install one new bearing into the outer side of the main brush bearing housing.



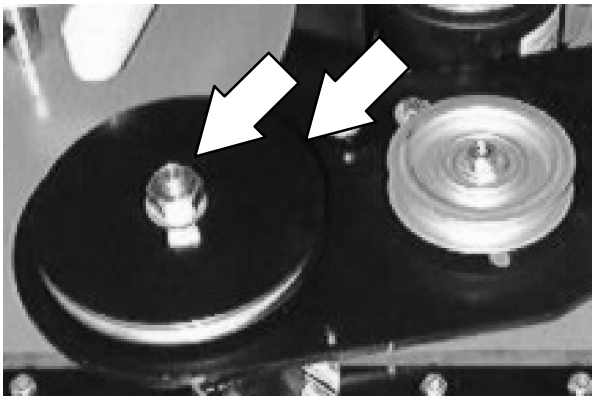
17. Install the new bearing and main brush shaft assembly into the main brush bearing housing. Install the nut onto the inside of the main brush shaft. Use a hammer to lightly tap the bearing and shaft into the housing.



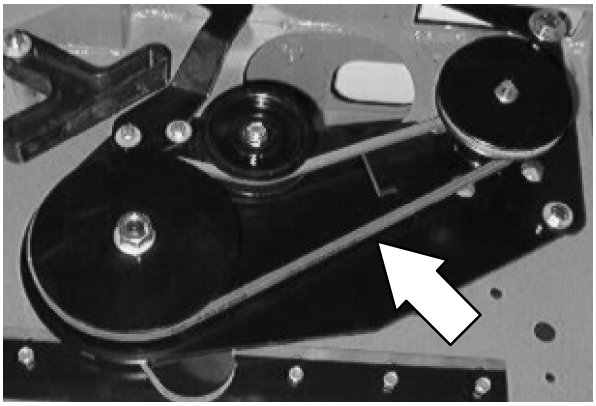
18. Reinstall the main brush drive plug and washer onto the main brush shaft on the inside. Reinstall the left hand nut. Hand tighten tight.



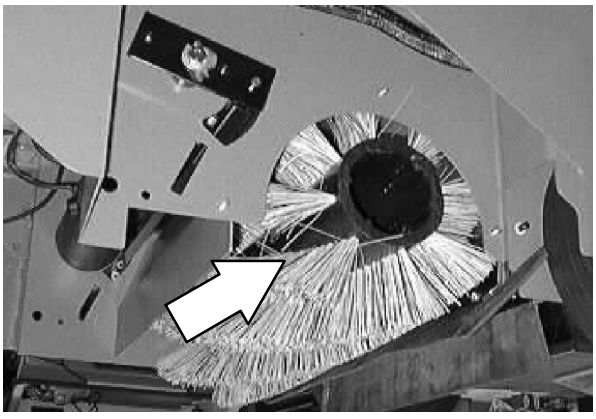
19. Reinstall the washer and V-belt pulley onto the outside of the main brush shaft. Reinstall the left hand nut. Tighten to 52 - 67 Nm (39 - 51 ft lb).



20. Reinstall the main brush drive belt. See TO REPLACE MAIN BRUSH DRIVE BELT instructions in this section.



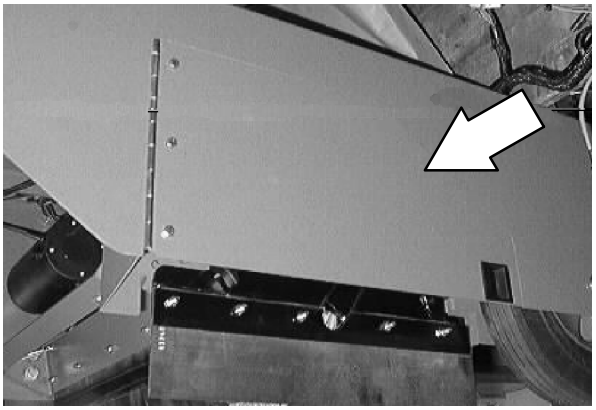
21. Reinstall the main brush. See TO REPLACE MAIN BRUSH instructions in this sections.



22. Reinstall the right hand brush door and close the left hand brush door.

23. Remove the jack stands and lower the machine.

24. Operate the machine and check the main brush for proper operation.

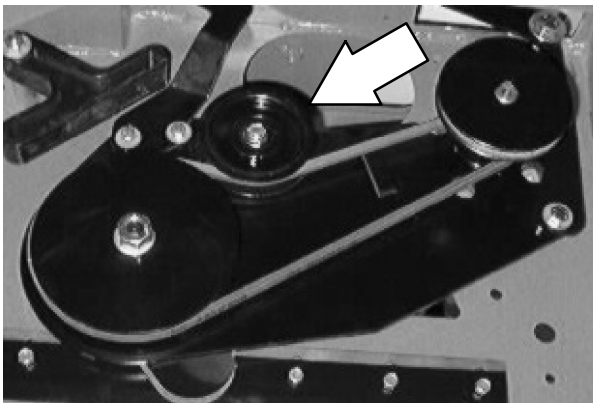


TO REPLACE MAIN BRUSH DRIVE BELT IDLER PULLEY

FOR SAFETY: Before Leaving Or Servicing Machine; Stop On Level Surface, Set Parking Brake.

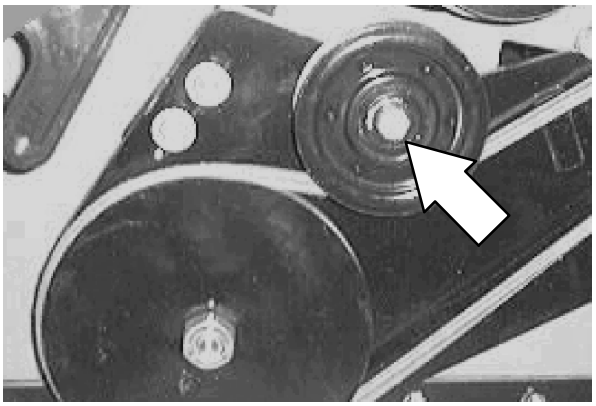
1. Remove the four screws holding the right hand brush door to the machine frame. Remove the right hand side brush door.

2. Locate the main brush drive belt idler pulley between the small drive pulley and the larger brush pulley.

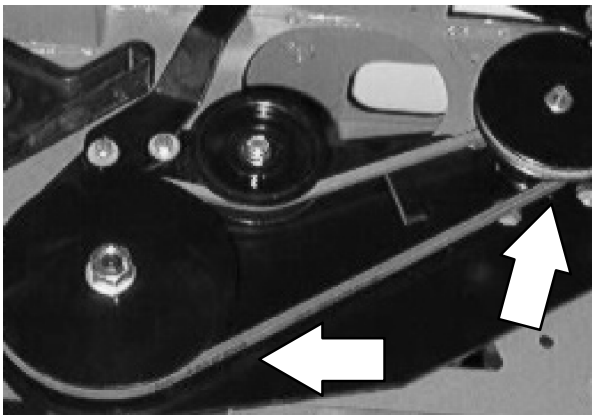


3. Loosen the hex nut in the center of the idler pulley.

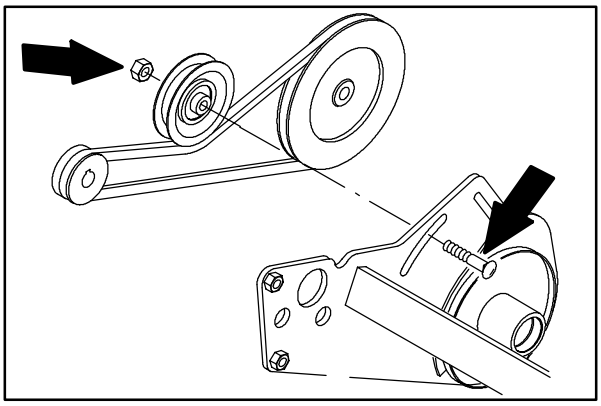
4. Push the idler pulley back in the slot.



5. Remove the main brush drive belt from the two remaining pulleys.

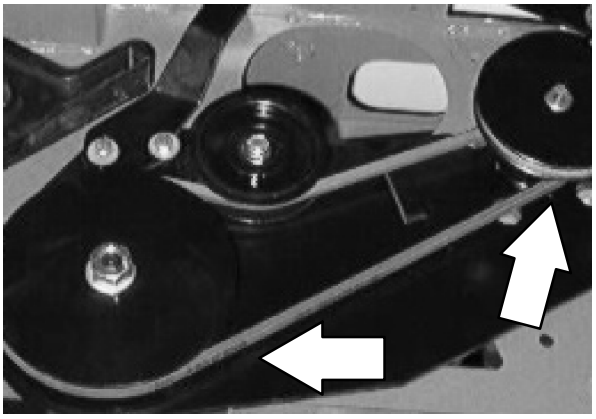


6. Remove the hex nut in the center of the idler pulley. Remove and discard the pulley.

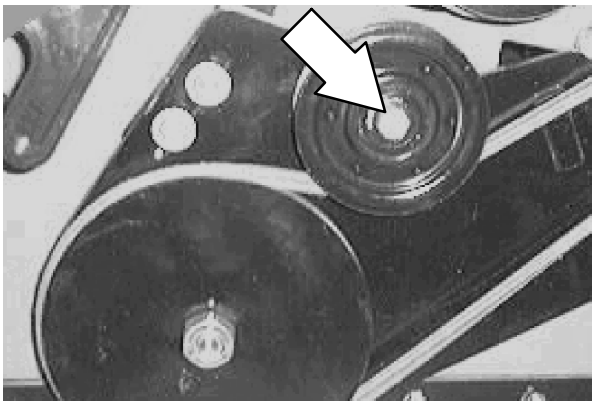


7. Install the new idler pulley onto the hex bolt. Reinstall the hex nut. Leave loose for now.

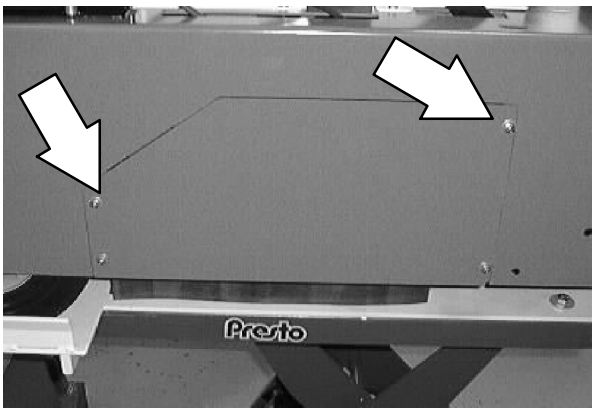
8. Reinstall the V-belt around the two drive pulleys and on top of the idler pulley.



9. Pull down on the idler pulley until the belt is tight. Tighten the pulley nut to 18 – 24 Nm (15 – 20 ft lb).



10. Reinstall the right hand side brush door.



11. Operate the machine and check the main brush for proper operation.

JACK SHAFT BRUSH BELT

Check the jack shaft belt for wear after every 200 hours of operation. The idlers keep tension on the belts. The tension is set manually.

WARNING: Moving belt and fan. Keep away.

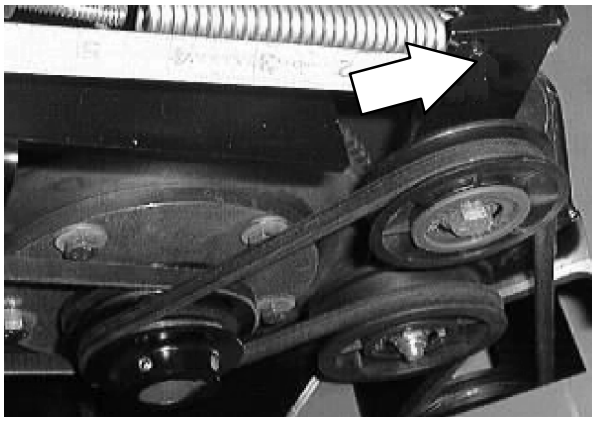
TO REPLACE MAIN BRUSH JACKSHAFT BELT

FOR SAFETY: Before Leaving Or Servicing Machine; Stop On Level Surface, Set Parking Brake.

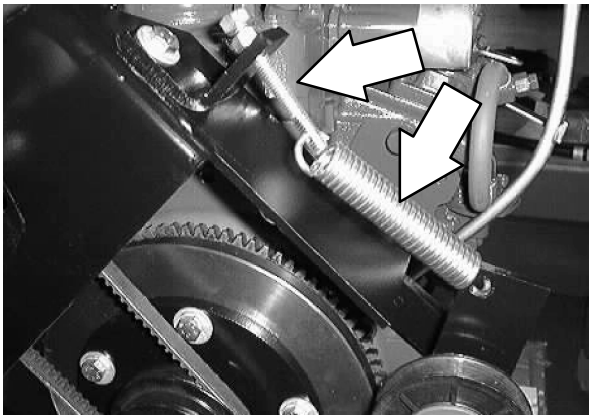
1. Open the seat support and engage the prop rod. Disconnect the battery cables.

2. Remove the main brush. See TO REPLACE MAIN BRUSH instructions in this section.

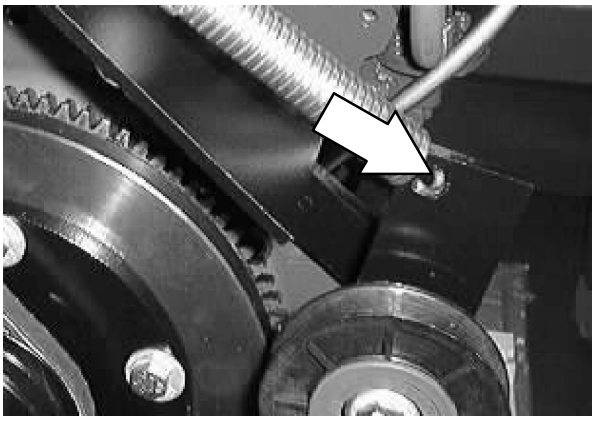
3. Locate the main brush jack shaft belt tension idler pulley mount plate near the flywheel sheave.



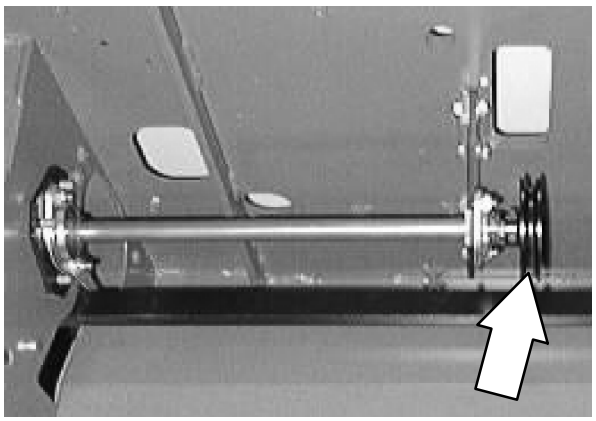
4. Loosen the jam nuts holding the idler plate tension spring threaded rod. Remove the tension spring.



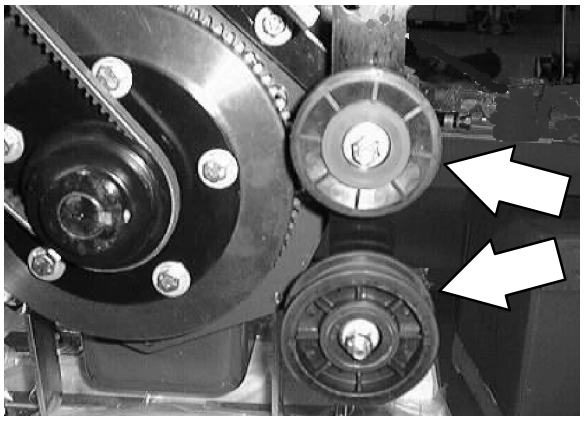
5. Push the idler pulley mount plate down to loosen the tension on the main brush center V-belt.



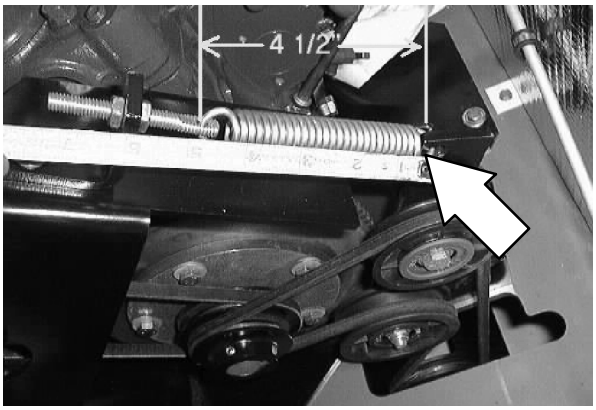
6. Remove the V-belt from the engine sheave, idler sheaves, and main brush jack shaft sheave. Remove the V-belt from the machine.



7. Install the new V-belt onto the engine sheave, idler sheaves, and main brush shaft sheave.

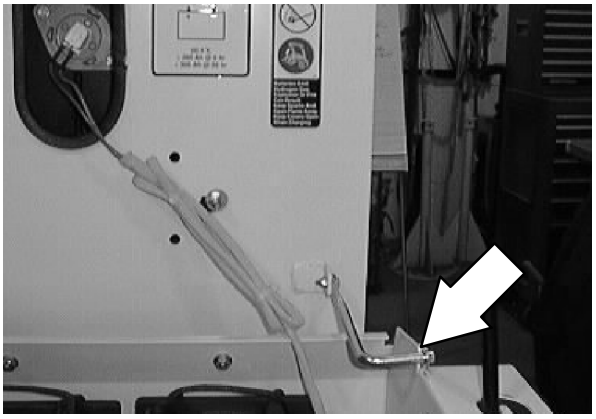


8. Pull the tension idler pulley mount plate and reconnect the tension spring. Tighten the jam nuts on the threaded rod until the tension spring is 4.5 in. long.



9. Reinstall the main brush.

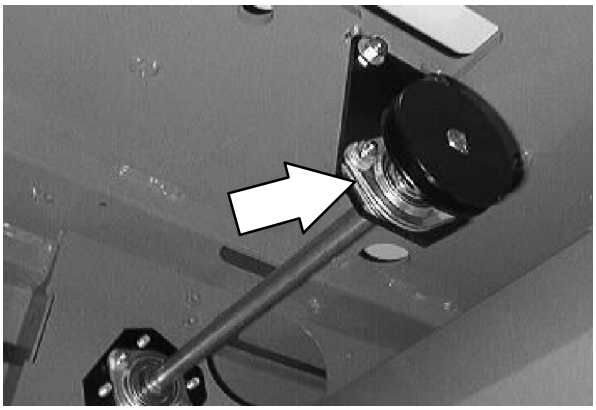
10. Disengage the seat rod and close the seat assembly.



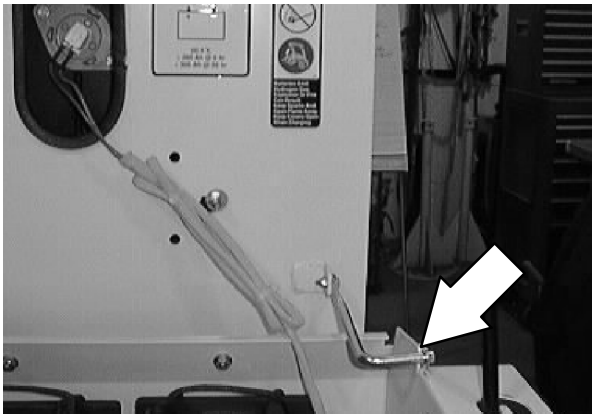
11. Operate the machine and check the main brush for proper operation.

TO REPLACE MAIN BRUSH JACKSHAFT INNER BEARING

FOR SAFETY: Before Leaving Or Servicing Machine; Stop On Level Surface, Set Parking Brake.

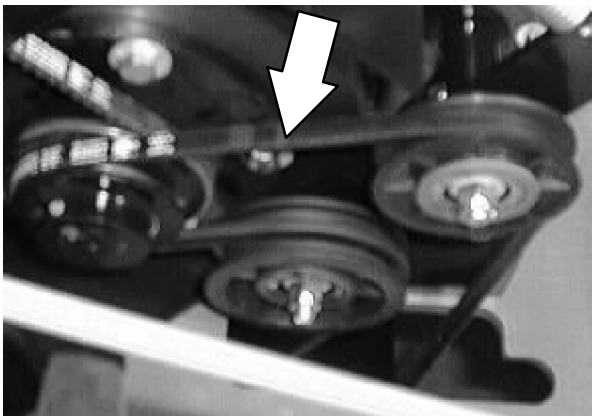


1. Open the seat support and engage the prop rod. Disconnect the battery cables.

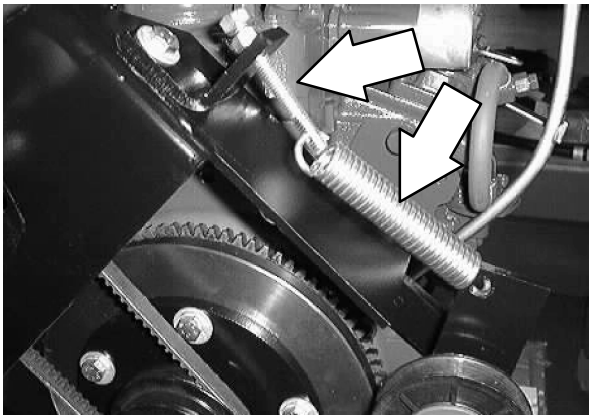


2. Remove the main brush. See TO REPLACE MAIN BRUSH instructions in this section.

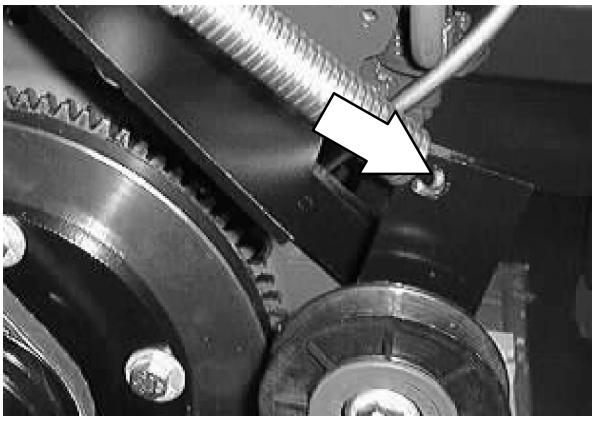
3. Locate the main brush jack shaft belt on the engine mounted sheave plate.



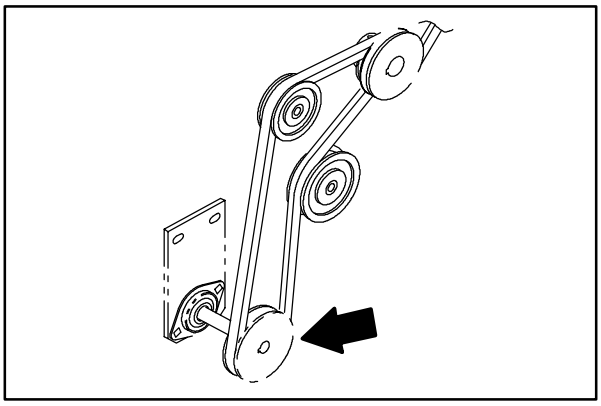
4. Loosen the jam nuts holding the idler plate tension spring threaded rod. Remove the tension spring.



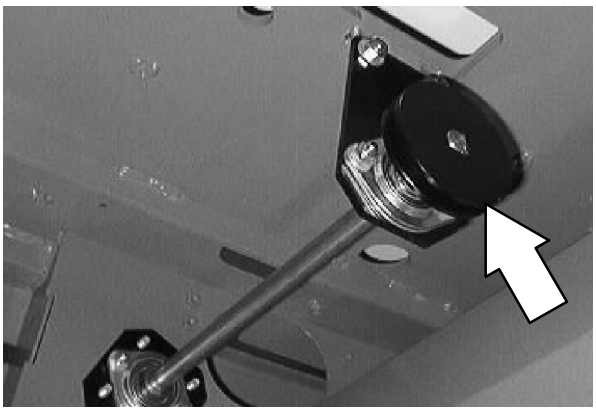
5. Push the idler pulley mount plate down to loosen the tension on the main brush center V-belt.



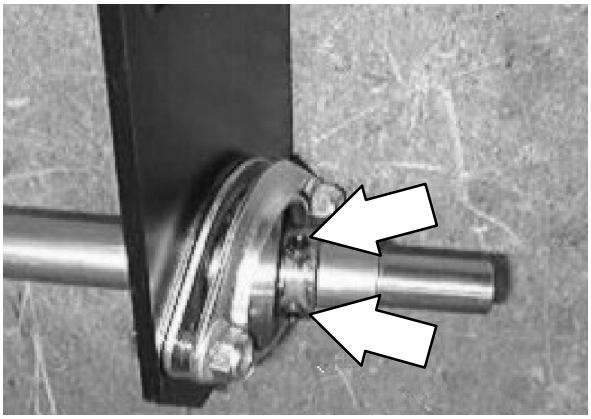
6. Remove the V-belt from the main brush jack shaft sheave.



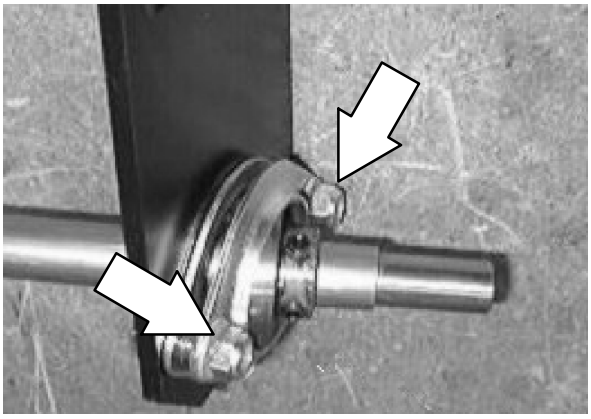
7. Locate the main brush jack shaft V-belt sheave in the brush compartment area. Loosen the two set screws. Remove the sheave from the jack shaft. Retain the square key.



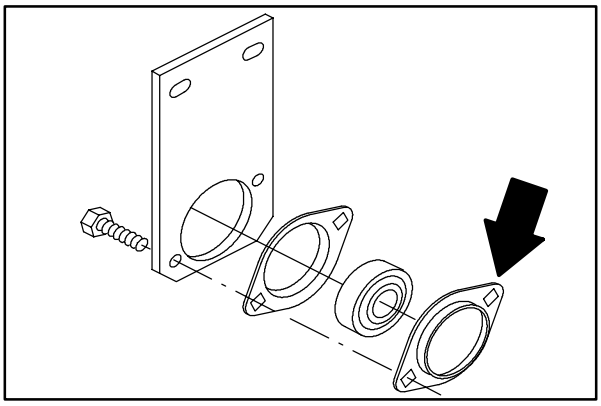
8. Loosen the two set screws on the bearing lock collar.



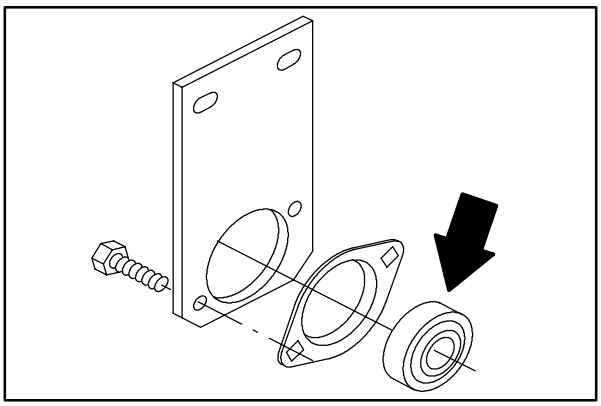
9. Remove the two hex screws and nuts holding the bearing flanges to the mount bracket.



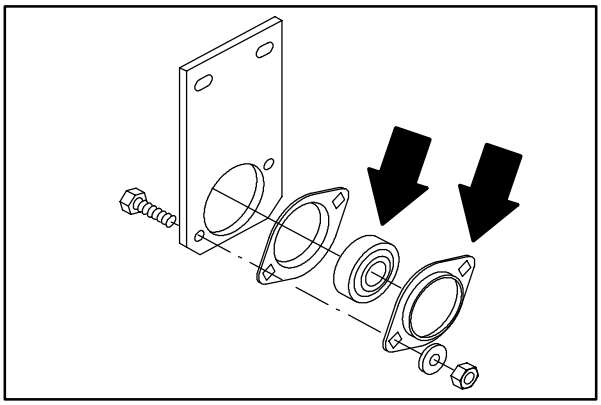
10. Remove the outer bearing flange from the mount bracket.



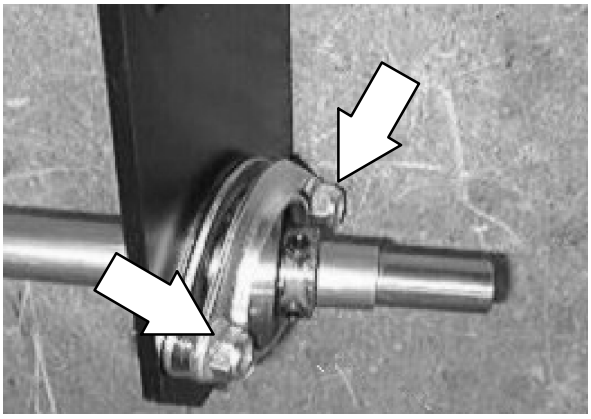
11. Pull the inner bearing off the jack shaft. Leave the inner bearing flange in place.



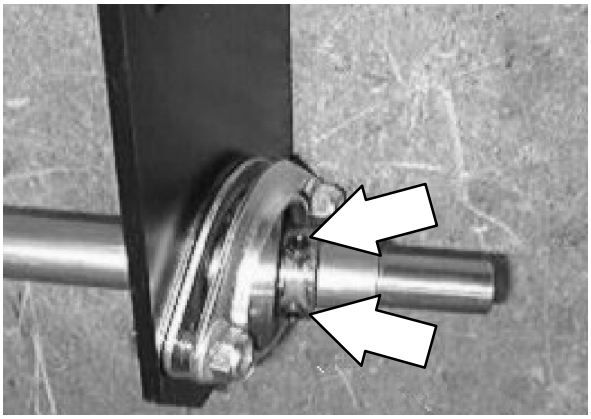
12. Install the new bearing onto the main brush jack shaft. Make sure the bearing lock collar is installed facing out.



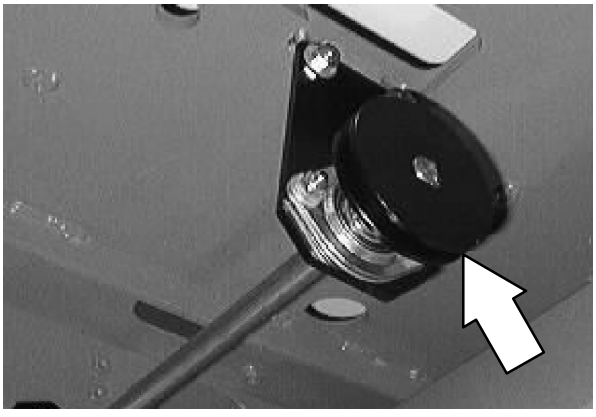
13. Position the outer bearing flange onto the mount bracket. Reinstall the hardware. Leave loose for now.



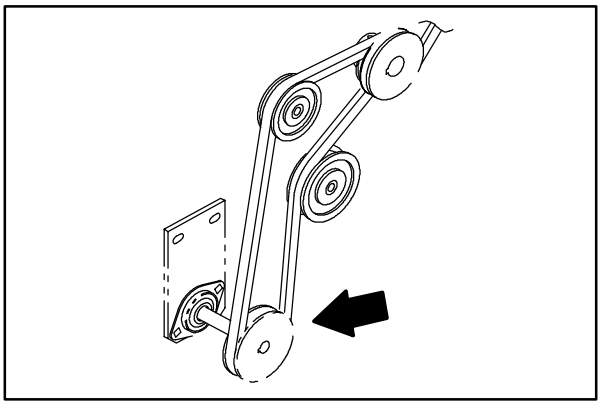
14. Push the bearing in until it is seated against the inner flange. Tighten the hardware to 18 – 24 Nm (15 – 20 ft lb). Hand tighten the two bearing collar set screws tight.



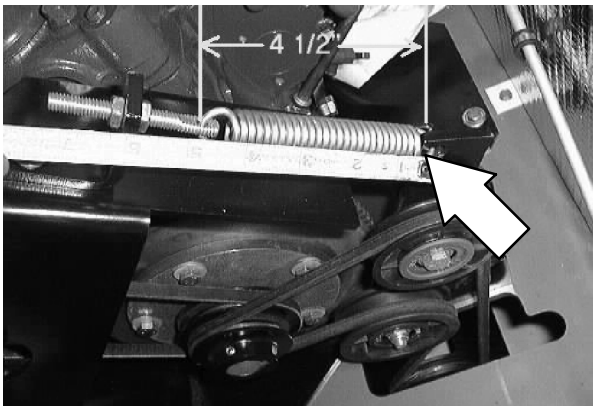
15. Reinstall the sheave onto the end of the jack shaft. Make sure the square key is in place on the jack shaft. *Position the sheave so the face is flush with the end of the shaft.* Hand tighten the two sheave set screws tight.



16. Position the V-belt over the jack shaft sheave.



17. Pull the tension idler pulley mount plate and reconnect the tension spring. Tighten the jam nuts on the threaded rod until the tension spring is 4.5 in. long.

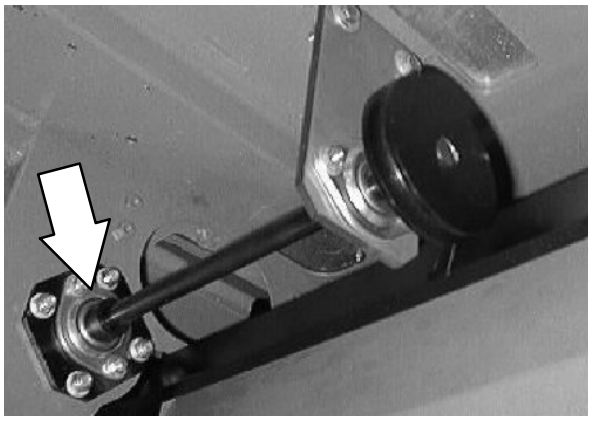


18. Reinstall the main brush.

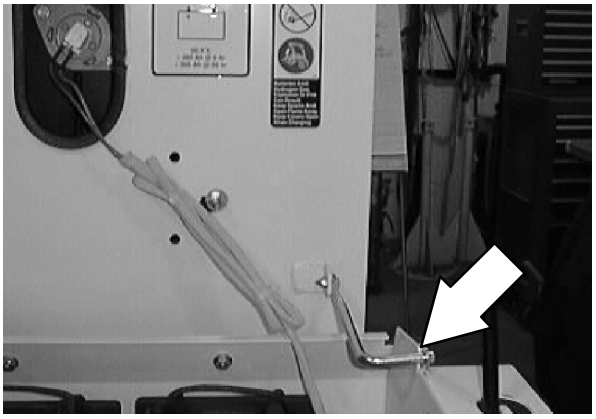
19. Start the machine and operate the main brush. Check for proper operation.

TO REPLACE MAIN BRUSH JACKSHAFT OUTER BEARING

FOR SAFETY: Before Leaving Or Servicing Machine; Stop On Level Surface, Set Parking Brake.



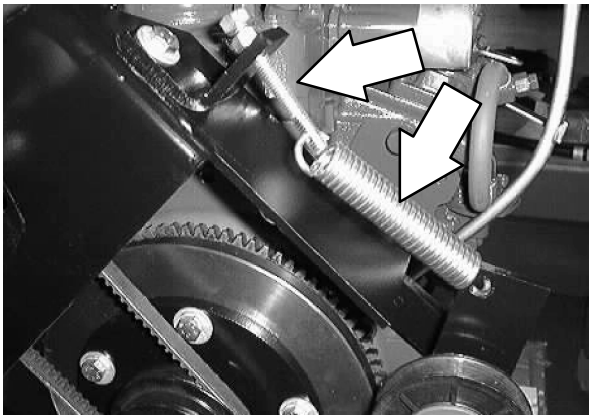
1. Open the seat support and engage the prop rod. Disconnect the battery cables.



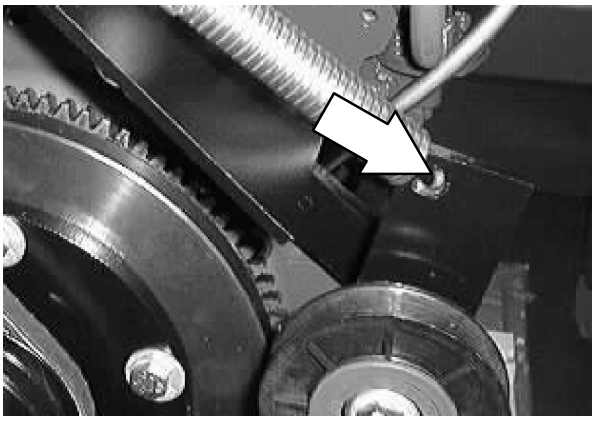
2. Remove the main brush. See TO REPLACE MAIN BRUSH instructions in this section.

3. Locate the main brush jack shaft belt on the engine mounted sheave plate.

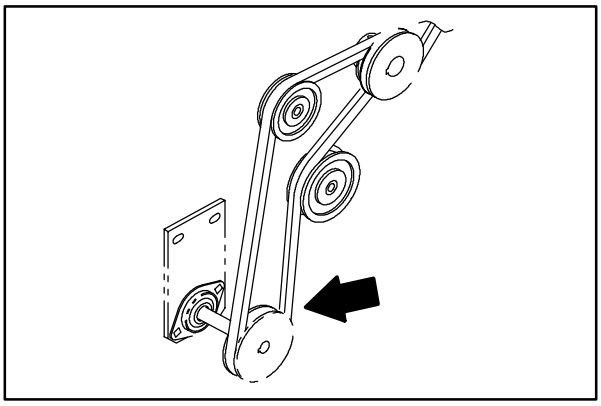
4. Loosen the jam nuts holding the idler plate tension spring threaded rod. Remove the tension spring.



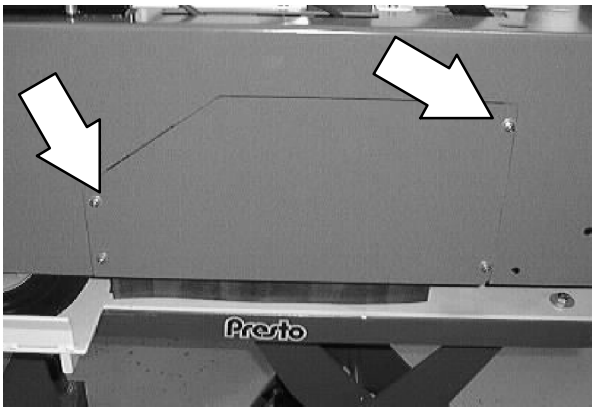
5. Push the idler pulley mount plate down to loosen the tension on the main brush center V-belt.



6. Remove the V-belt from the main brush jack shaft sheave.



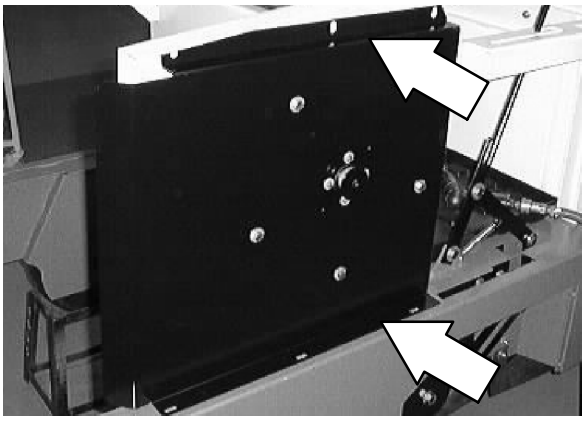
7. Remove the four screws holding the right hand brush door to the machine frame. Remove the right hand side brush door.



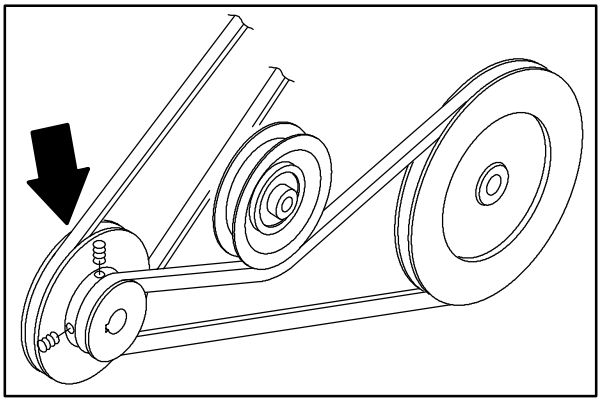
8. To access the vacuum fan drive belt, remove the right hand side panel. Start by lifting up on the panel, pop the brush lift slot over the black knob, then move the panel backward and off the machine.

9. Loosen the five hex screws holding the vacuum fan housing to the machine frame.

10. Push the vacuum fan assembly forward in the slots to loosen the vacuum fan V-belt.



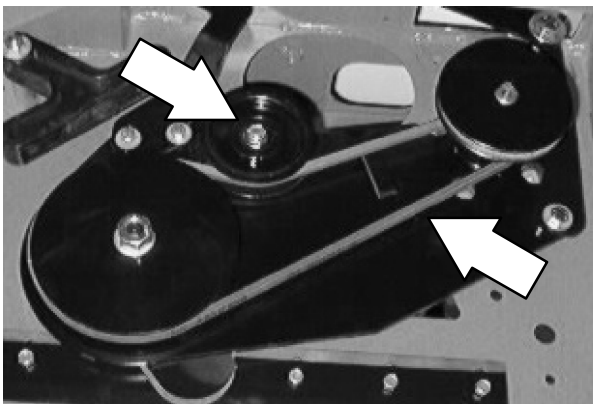
11. Remove the vacuum fan V-belt from the two groove jack shaft sheave.



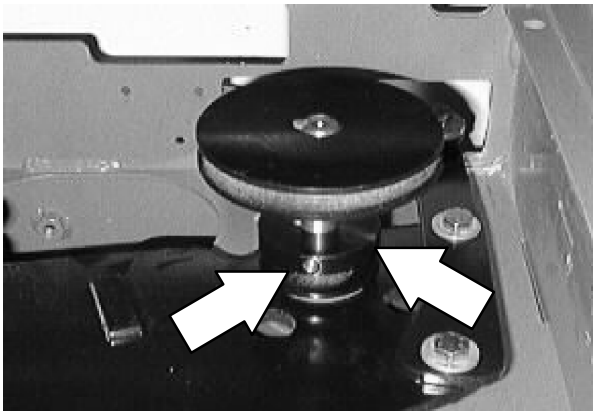
12. Locate the main brush drive belt idler pulley between the jack shaft drive pulley and the larger brush pulley.

13. Loosen the hex nut in the center of the idler pulley.

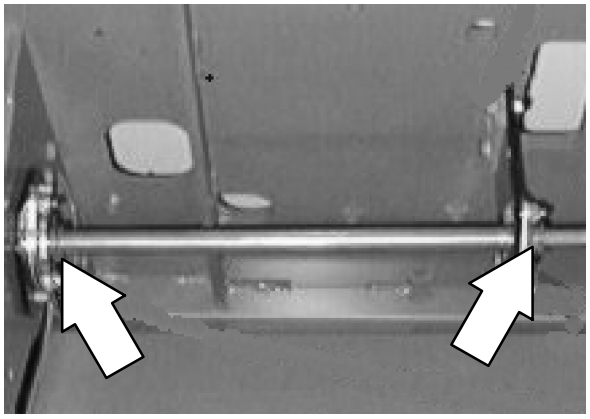
14. Push the idler pulley back in the slot. Remove the main brush V-belt from the jack shaft sheave.



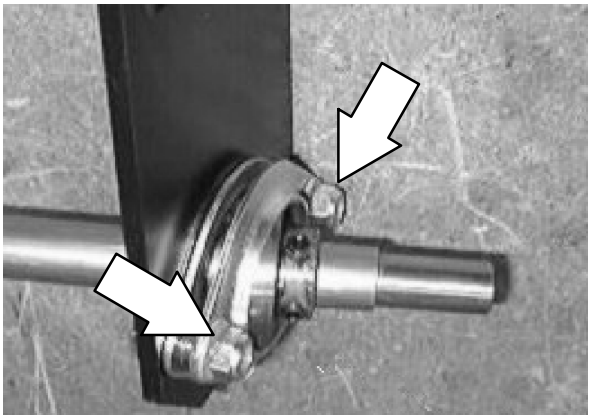
15. Loosen the two set screws holding the 2-groove sheave to the outside end of the main brush jack shaft. Pull the sheave off the shaft. Retain the shaft key.



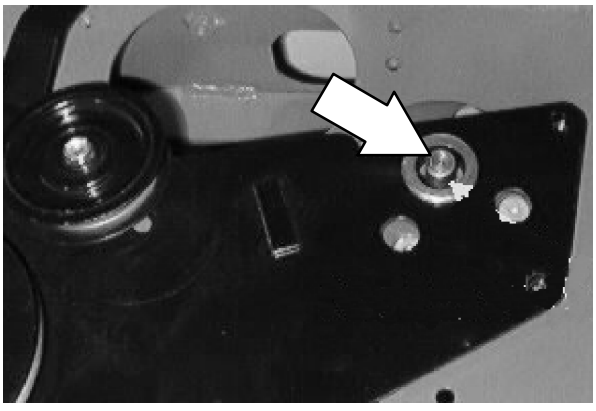
16. Loosen the two set screws on each of the jack shaft bearing locking collars.



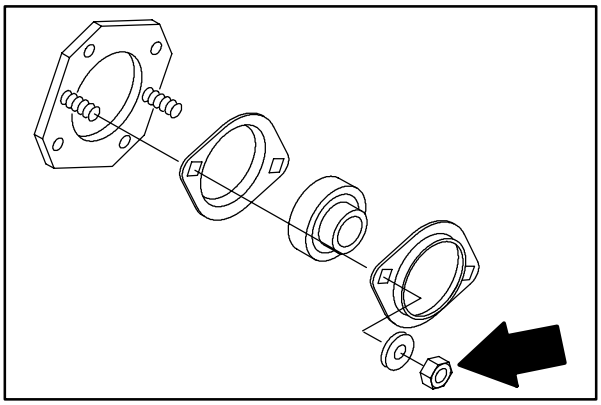
17. Loosen the hardware holding each of the two jack shaft bearing flanges to the mount brackets.



18. Push the jack shaft in, toward the center of the machine. Push the shaft in far enough so it clears the outer bearing.

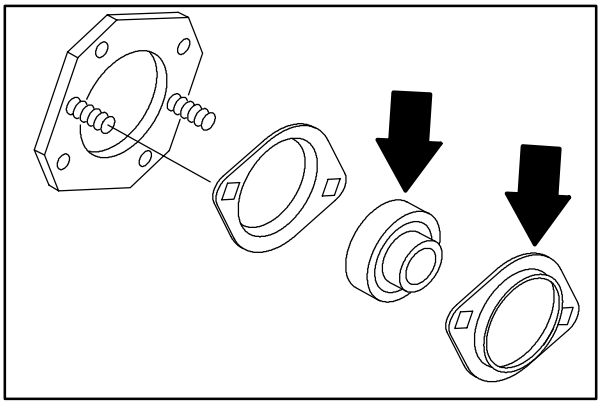


19. Remove the two nuts holding the jack shaft bearing flanges to the inside wall of the right hand side of the main brush wrap.

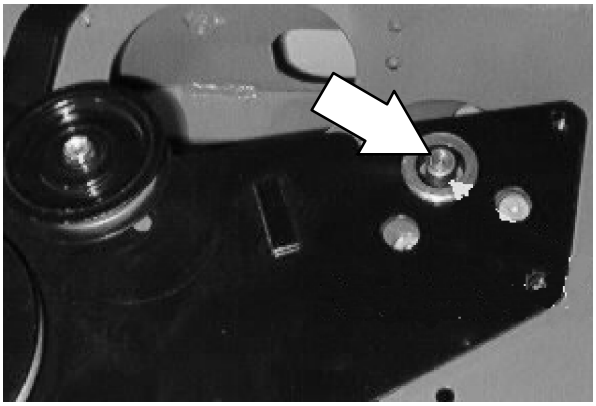


20. Remove the outer jack shaft bearing flange and bearing from the machine. Leave the inner bearing flange in place.

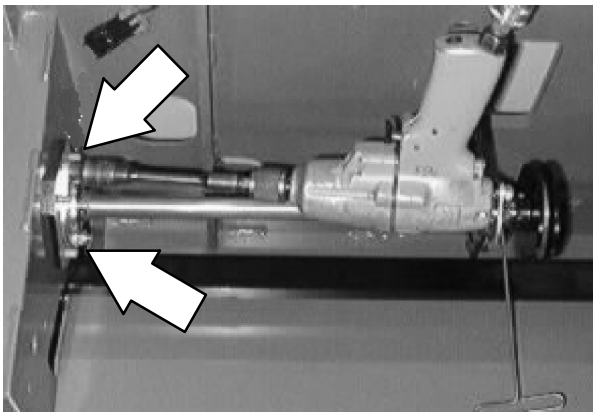
21. Position the new outer bearing and the outer bearing flange onto the mount plate. Reinstall the two nuts. Leave hardware loose for now.



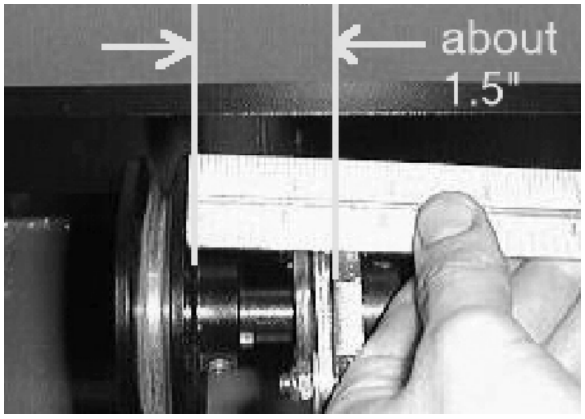
22. Push the jack shaft through the new bearing until the end is showing out the right hand side of the brush wrap.



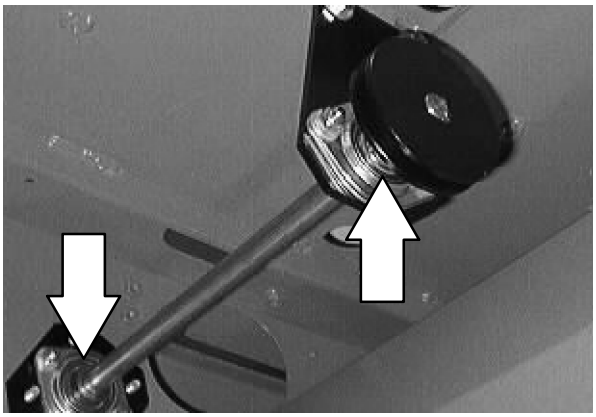
23. Go under the machine in the brush wrap area. Tighten the hardware holding the two jack shaft bearing flanges to the mount brackets. Tighten the hardware to 18 – 24 Nm (15 – 20 ft lb).



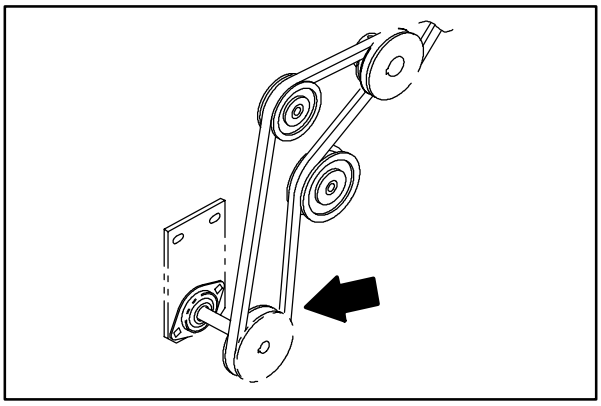
24. Position the jack shaft so the distance between the inside face of the inner jack shaft sheave and the bearing flange mount bracket is about 1.5 inch.



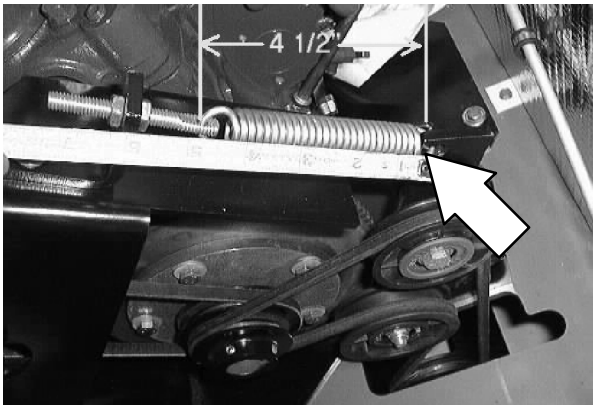
25. Hand tighten the two set screws on each jack shaft bearing tight.



26. Position the V-belt over the jack shaft sheave.

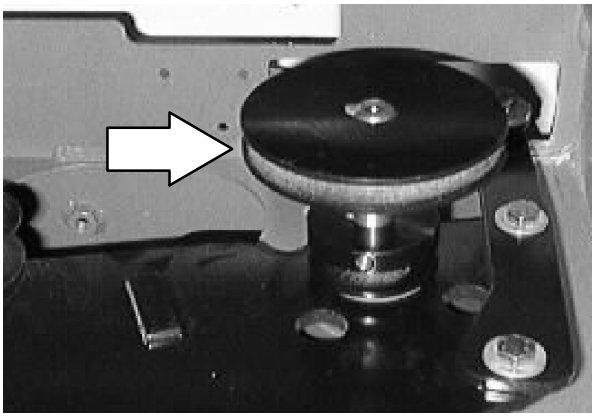


27. Pull the tension idler pulley mount plate and reconnect the tension spring. Tighten the jam nuts on the threaded rod until the tension spring is 4.5 in. long.



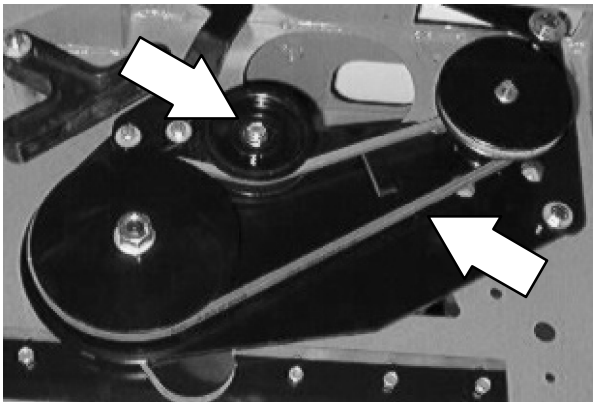
28. Reinstall the main brush.

29. Go to the right side of the machine in the main brush area. Reinstall the square key and two groove sheave (small sheave to the inside) onto the outer end of the jack shaft. Hand tighten the two set screws tight.

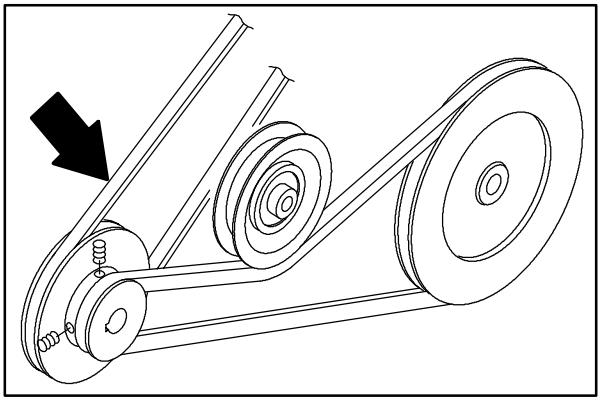


30. Position the main brush drive belt onto the jack shaft and brush drive pulleys.

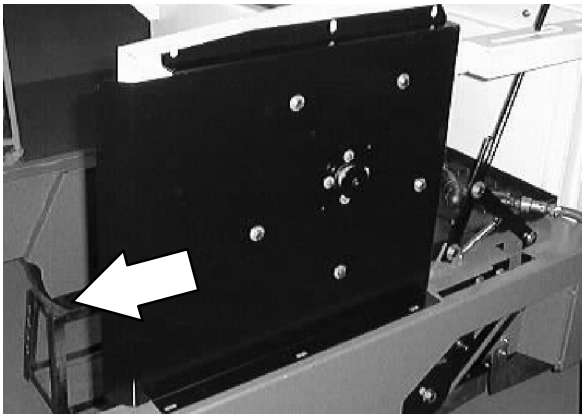
31. Move the idler pulley forward in the slot until the belt is tight. Tighten the hex nut to 18 – 24 Nm (15 – 20 ft lb).



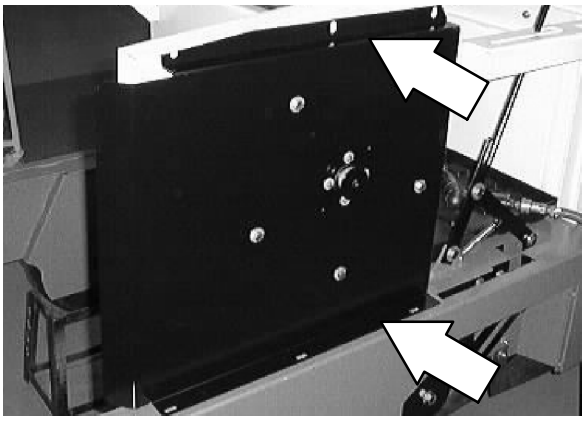
32. Install the vacuum fan V–belt over the jack shaft sheave.



33. Pull the vacuum fan assembly toward the back of the machine to tighten the V-belt. The correct tension is when the belt deflects 8.38 mm (0.33 in) from a force of .42 kg (.90 to .95 lb) at belt midpoint. Tighten the screws hand tight.

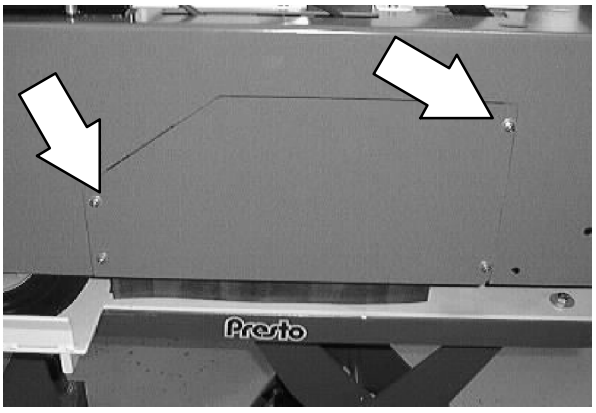


34. Tighten the five mounts screws hand tight.



35. Reinstall the right hand machine cover.

36. Reinstall the right hand side brush door.



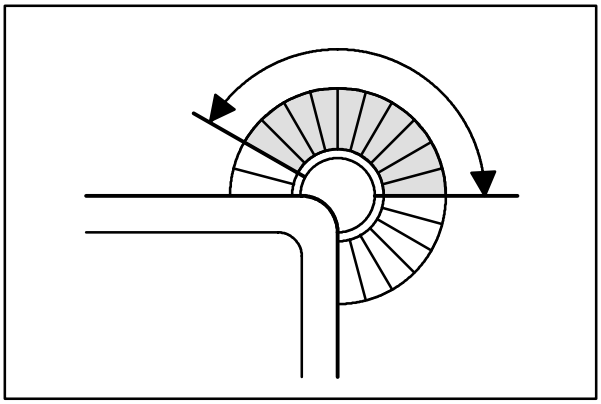
37. Operate the machine and check the main brush for proper operation.

SIDE BRUSH

The side brush sweeps debris along edges into the path of the main brush.

Check the brush daily for wear or damage. Remove any string or wire found tangled on the side brush or side brush drive hub.

Check the side brush pattern daily. The side brush bristles should contact the floor in a 10 o'clock to 3 o'clock pattern when the brush is in motion. Adjust the side brush pattern by loosening the hex screw located above the side brush cable pulley in the front of the operators compartment. Move the pulley mount bracket up or down to achieve the proper side brush pattern. Retighten the hex screw.

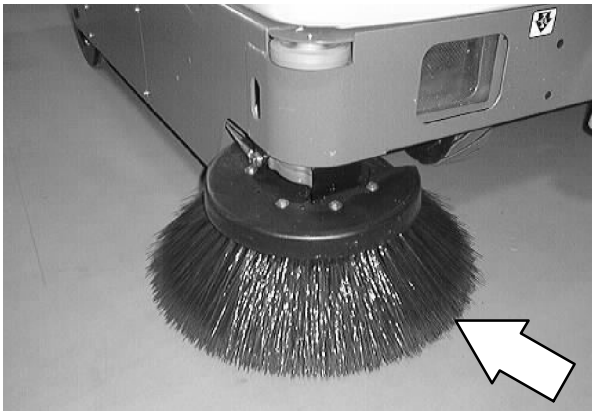


The side brush should be replaced when it no longer sweeps effectively for your application. A guideline length is when the remaining bristles measure 50 mm (2 in) in length. You may need to replace the side brush sooner if you are sweeping light litter or use a brush with shorter bristles if you are sweeping heavy debris.

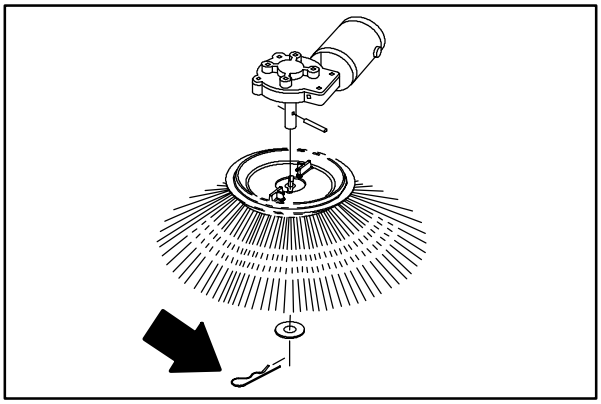
REPLACING SIDE BRUSH

1. Stop the machine, set the parking brake and turn the machine power off.

   FOR SAFETY: Before Leaving Or Servicing Machine; Stop On Level Surface, Set Parking Brake.

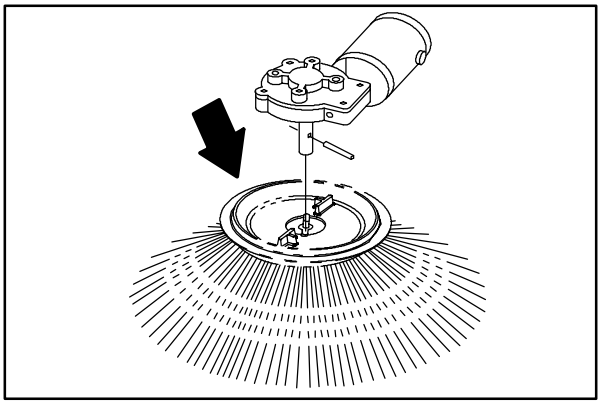


2. Remove the side brush retaining pin from the side brush drive shaft by pulling the pin keeper off over the end of the pin.



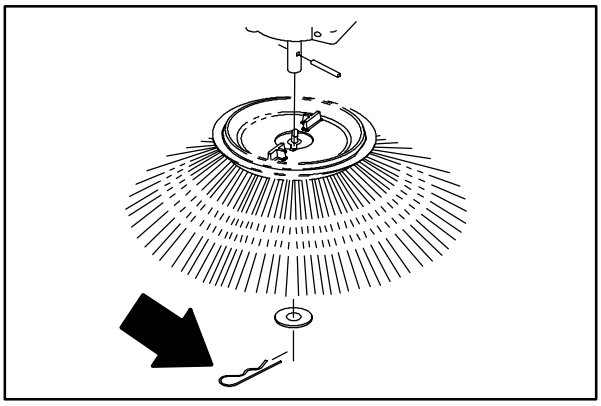
3. Slide the side brush off the side brush drive shaft.

4. Slide the new side brush onto the side brush drive shaft.

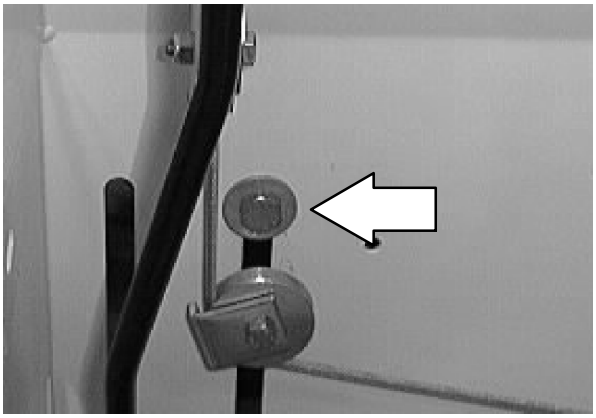


5. Insert the side brush retaining pin through the side brush hub and shaft.

6. Secure the pin by clipping the pin keeper over the end of the pin.

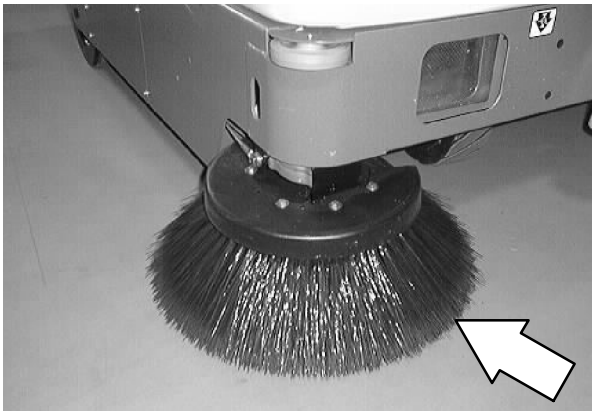


7. Adjust the side brush pattern by loosening the hex screw located above the side brush cable pulley in the front of the operators compartment. Move the pulley mount bracket up or down to achieve the proper side brush pattern. Retighten the hex screw.



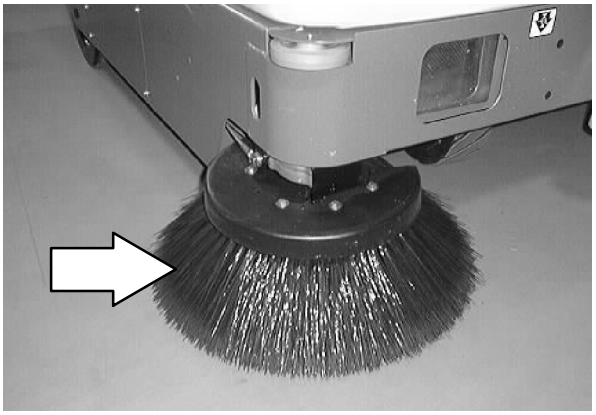
SIDE BRUSH GUARD

Check the side brush guard after every 200 hours of operation. Replace the brush guard after it begins to show serious wear.



SIDE BRUSH PIVOT

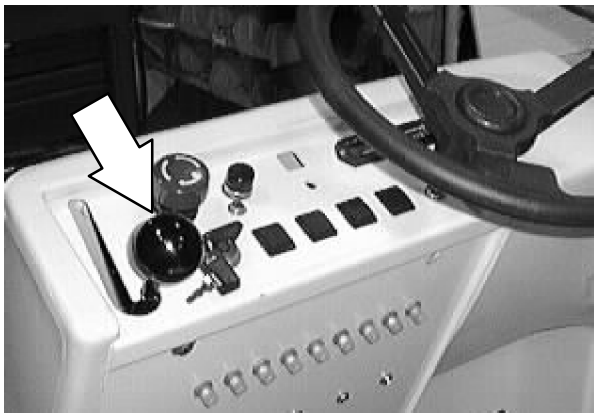
The side brush pivot should be checked for excessive movement after every 200 hours of operation. Torque the front and rear compression springs to reduce excessive movement.



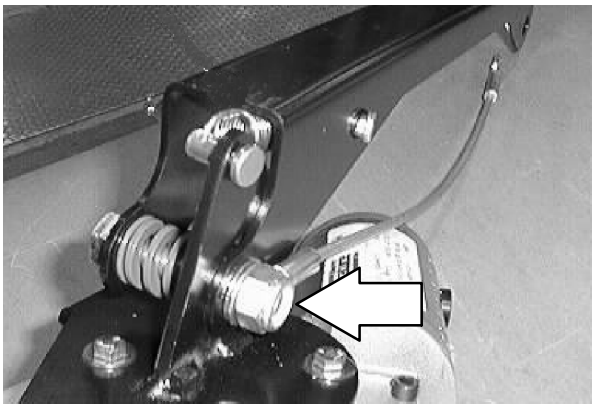
TO REPLACE SIDE BRUSH LIFT CABLE

FOR SAFETY: Before Leaving Or Servicing Machine; Stop On Level Surface, Set Parking Brake.

1. Lower the side brush handle.

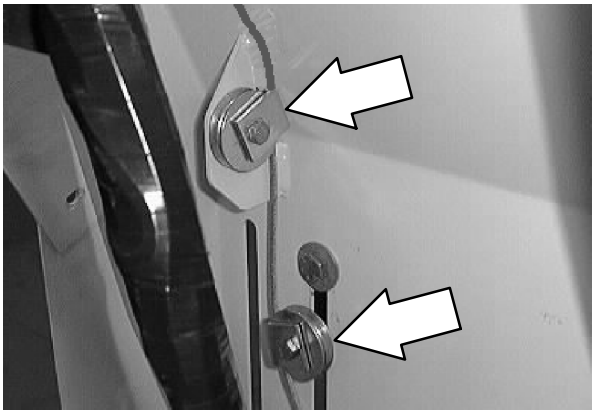


2. Go under the front of the machine near the side brush. Locate the side brush lift cable clevis under the brush pivot hex nut. Remove the nut only. Pull the side brush lift cable off the hex screw.



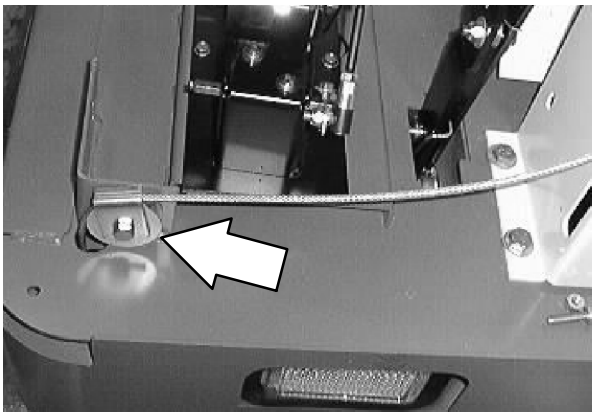
3. Go to the operators compartment. Remove the two cable pulleys, sleeves, and cable clips from the side brush lift cable.

NOTE: Note the orientation of the cable clips for proper re-assembly.

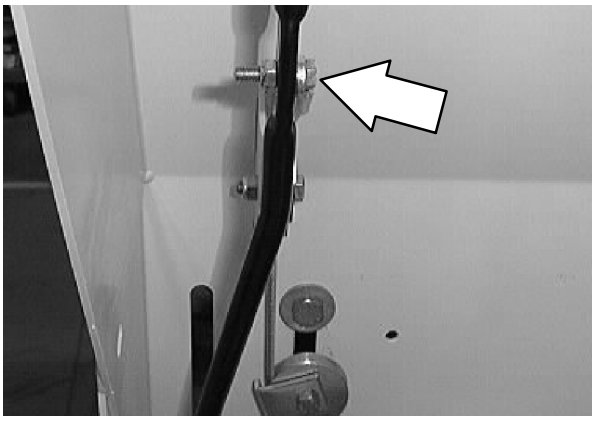


4. Go to the front corner of the operators compartment and remove the cable pulley, sleeve, and cable clip from the side brush lift cable.

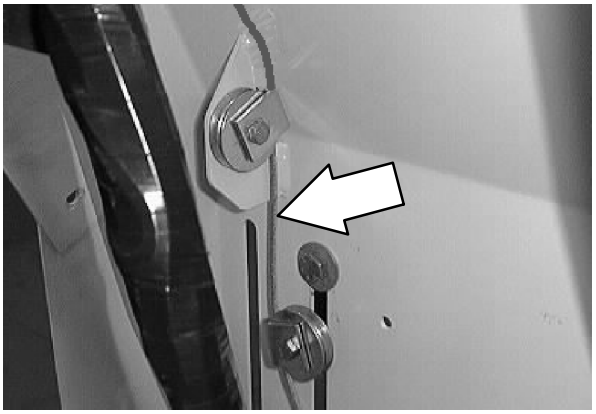
NOTE: Note the orientation of the cable clips for proper re-assembly.



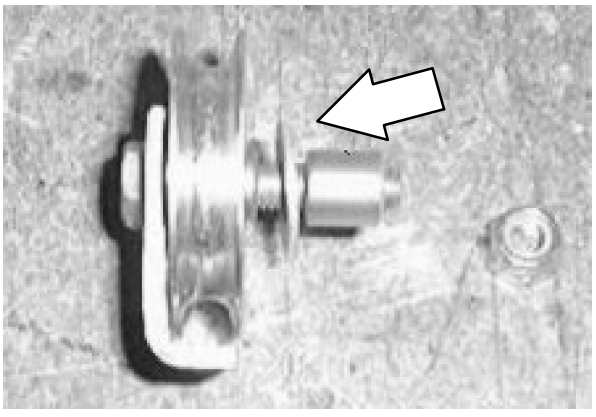
5. Go up under the instrument panel and remove the hex screw and nut holding the end of the side brush lift cable to the lift handle. Remove the side brush lift cable from the machine.



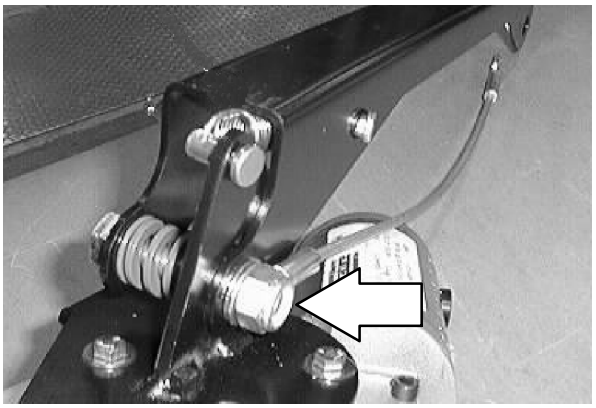
6. Route the new side brush lift cable in the machine.



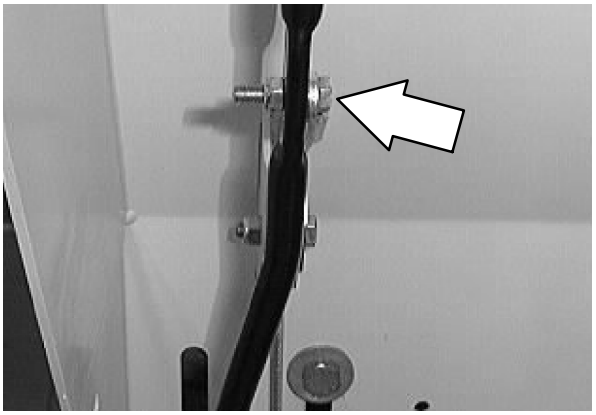
7. Reinstall the three cable pulleys, sleeves, and cable clips. Make sure the cable clips are in the correct orientation. Tighten the hardware to 18 – 24 Nm (15 – 20 ft lb).



8. Connect the new side brush lift cable to the side brush pivot screw. Hand tighten the hex nut. Cable should pivot on the hardware.



9. Connect the side brush lift cable to the lift handle.



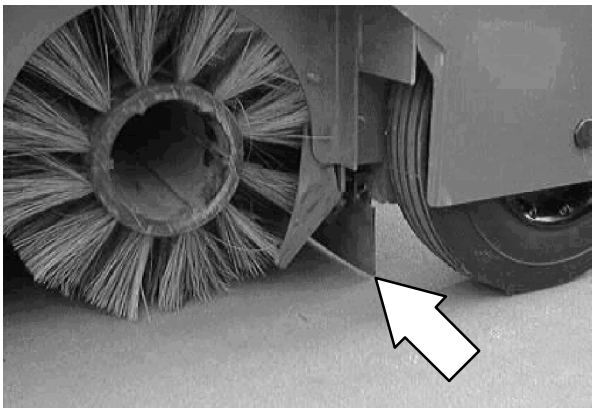
10. Raise the side brush. Check the new cable for smooth operation.

SKIRTS AND SEALS

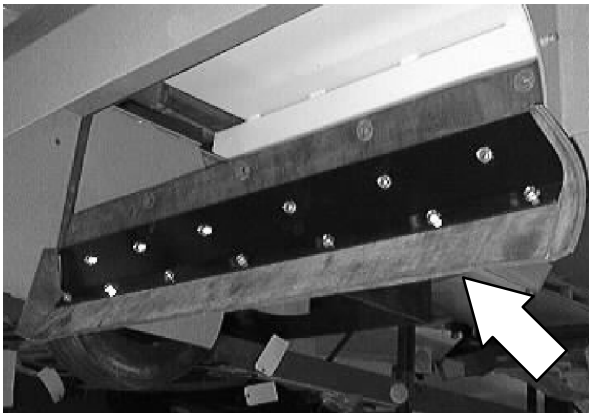
REAR SKIRT

The two rear skirts are located on the bottom rear of the main brush compartment. The vertical skirt should clear the floor up to 2 mm (0.09 in). The recirculation skirt requires no adjustment.

Check the skirts for wear or damage and adjustment daily.

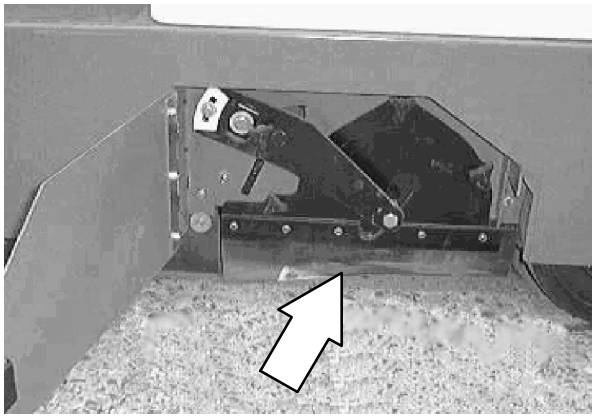


NOTE: The recirculation skirt must be folded in between the brush and the machine frame before the brush door is mounted on for the machine to work properly.



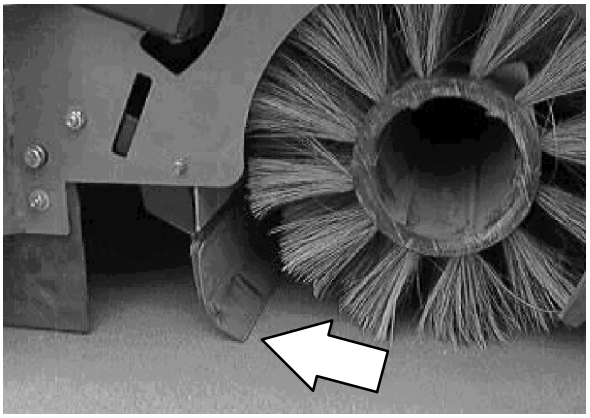
SIDE SKIRTS

The side skirts are located on both sides of the main brush compartment. The skirts should clear the floor up to 5 mm.



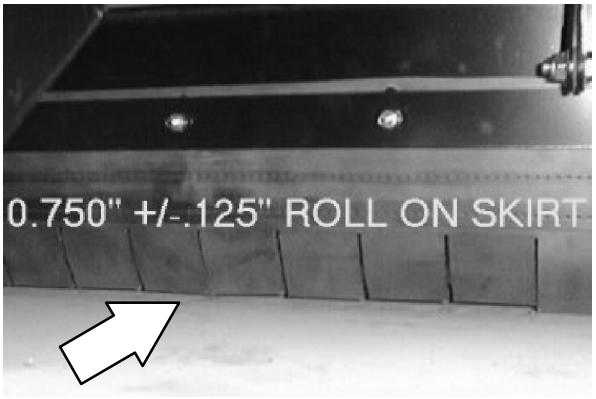
LARGE DEBRIS TRAP SKIRT

The large debris trap skirt is located along the front of the main brush. This skirt is raised and lowered by the large debris trap pedal, allowing larger debris to be trapped and swept up into the hopper.



This skirt should be adjusted so it touches the floor and is curled back, toward the main brush **(curl back should be 3/4 inch =/- 1/4 inch).** Sweeping performance will be adversely affected if this skirt does not contact the floor.

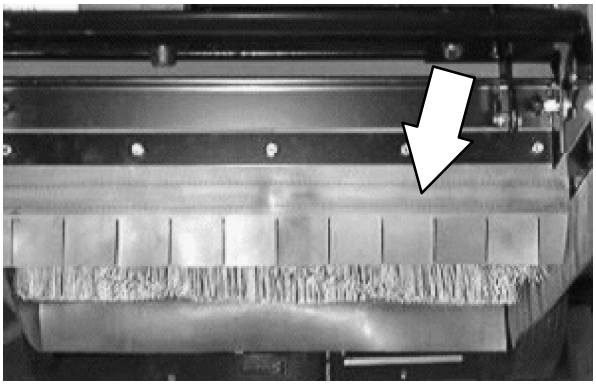
Check the skirt for wear or damage after every 100 hours of operation.



FRONT SKIRT

The front skirt is located along the front of the main brush. The front skirt can be raised with the foot pedal in the operators compartment. Raising the front skirt will allow large debris to enter the main brush area and be deposited into the hopper.

Check the seal for wear or damage after every 100 hours of operation.

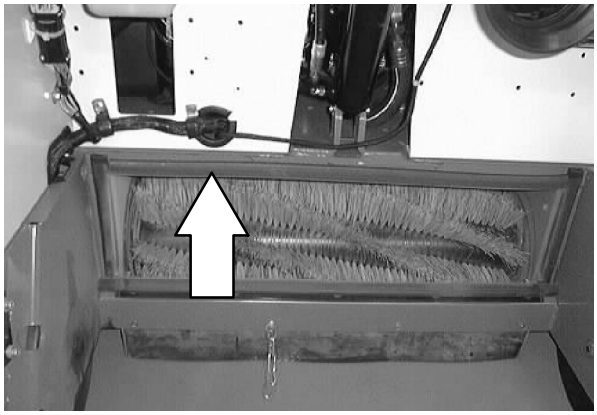


HOPPER SEALS

The hopper seals are located around the edge of the opening between the main brush and the hopper. The hopper rests against the seals when the hopper is in the closed position.

Check the seals for wear or damage after every 100 hours of operation.

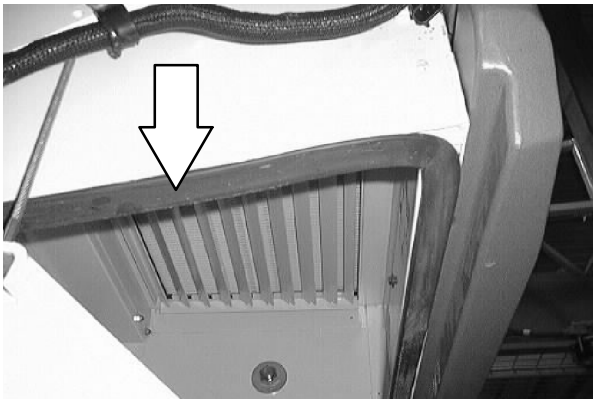
WARNING: Raised hopper may fall. Engage hopper support bar.



HOPPER DOOR SEAL

The hopper door seal is located on the bottom of the hopper and seals the hopper door when the hopper door is closed.

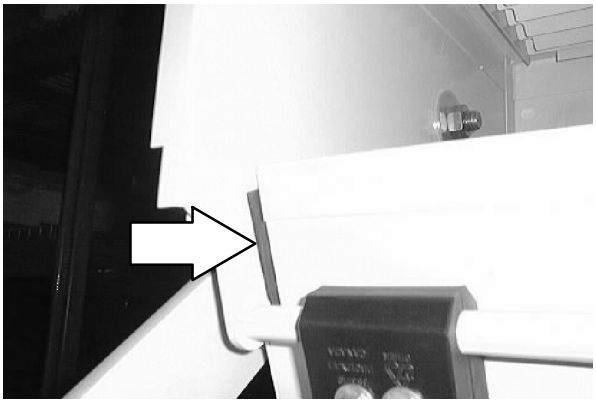
Check the seal for wear or damage after every 100 hours of operation.



HOPPER LIP SEAL

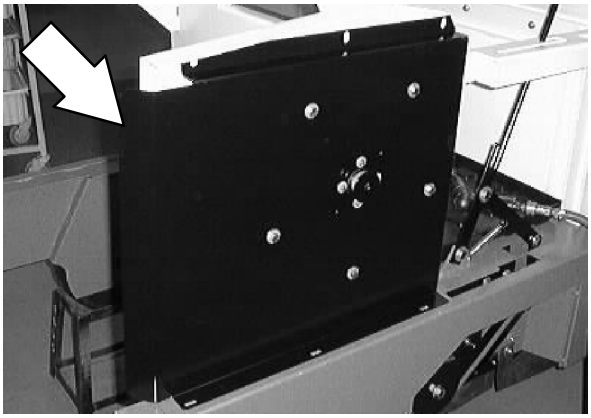
The hopper lip seal is located on the inside of the rear lip of the hopper door and seals the inside lip of the hopper door with the hopper.

Check the seal for wear or damage after every 100 hours of operation.



VACUUM FAN

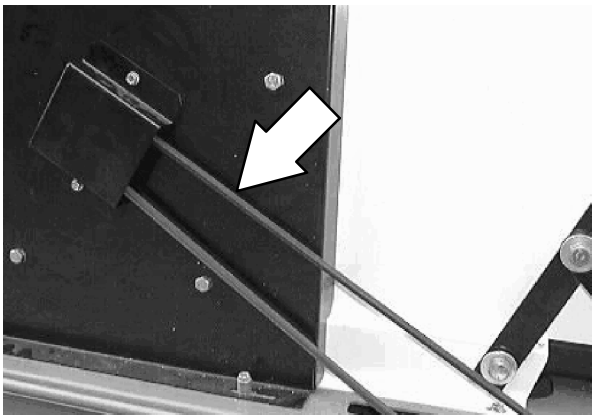
The vacuum system pulls dust and air into the hopper through the Instant Access™ filter. The vacuum fan is powered by the engine and driven with a V-belt.



VACUUM FAN BELT

Check the vacuum fan belt tension and wear after every 100 hours of operation. The correct tension is when the belt deflects 13.0 mm (0.50 in) from a force of 15 kg (30 to 40 lb) at belt midpoint.

WARNING: Moving belt and fan. Keep away.

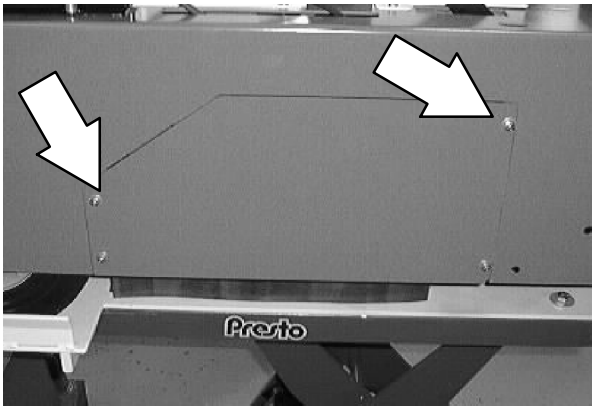


TO REPLACE VACUUM FAN DRIVE BELT

FOR SAFETY: Before Leaving Or Servicing Machine; Stop On Level Surface, Set Parking Brake.

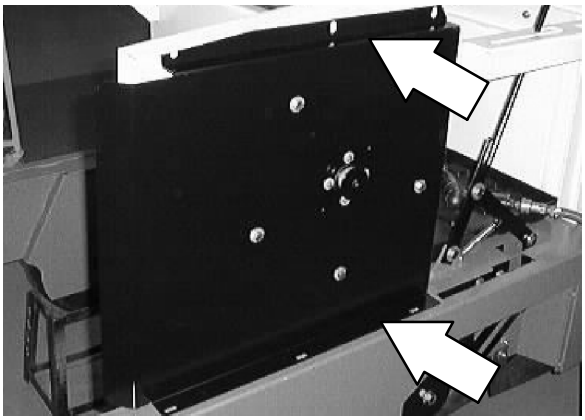
1. To access the vacuum fan drive belt, remove the right hand side panel. Start by lifting up on the panel, pop the brush lift slot over the black knob, then move the panel backward and off the machine.

2. Remove the right hand side brush door.

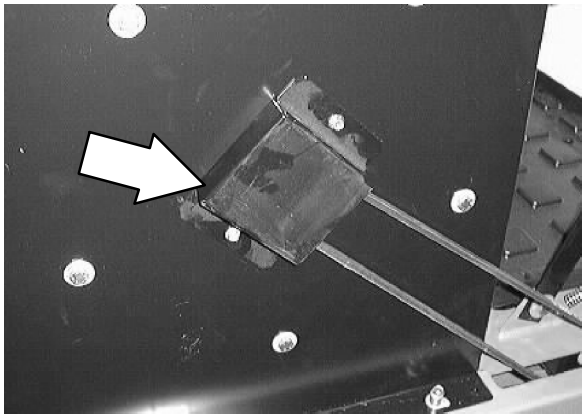


3. Loosen the five hex screws holding the vacuum fan housing to the machine frame.

4. Push the vacuum fan assembly forward in the slots to loosen the vacuum fan V-belt.

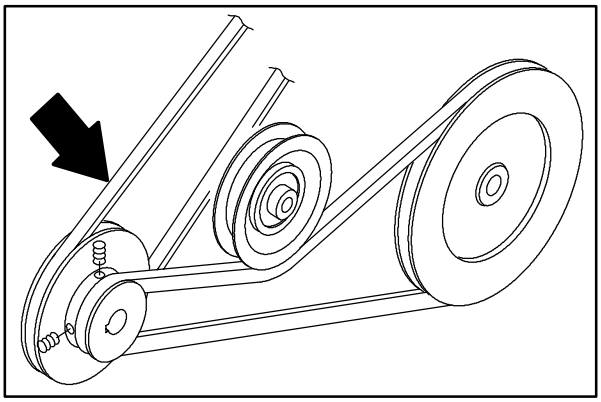


5. Remove the two hex screws holding the cover over the V-belt pulley. Remove the cover.

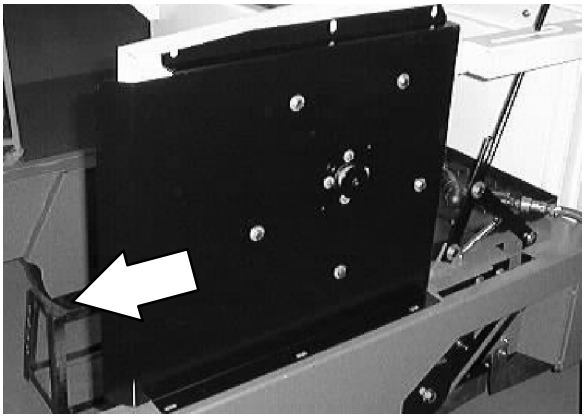


6. Remove the vacuum fan V-belt from the jack shaft and impeller pulleys. Remove the old V-belt from the machine.

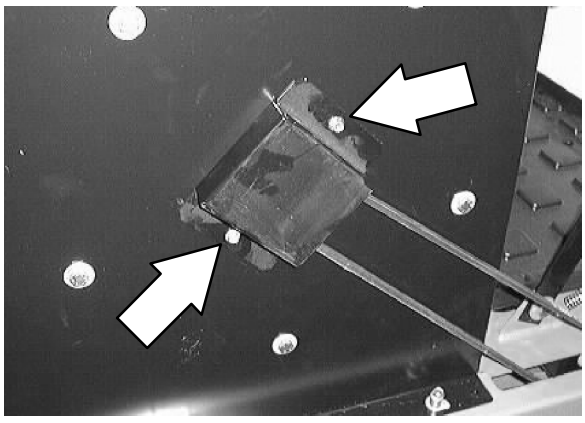
7. Install the new vacuum fan V-belt over both pulleys.



8. Pull the vacuum fan assembly toward the back of the machine to tighten the V-belt. Tighten the five mounts screws hand tight.

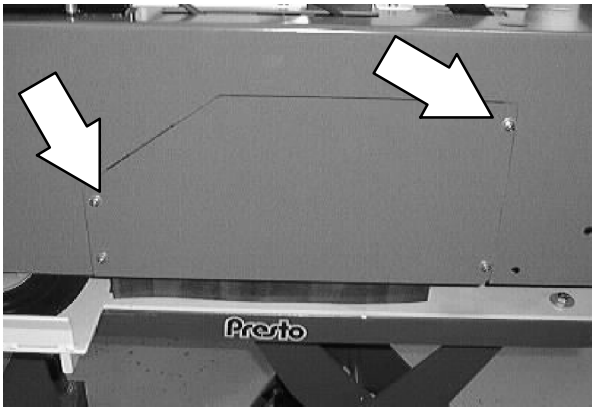


9. Reinstall the V-belt cover. Tighten the two screws hand tight.



10. Reinstall the right hand machine cover.

11. Reinstall the right hand brush door.



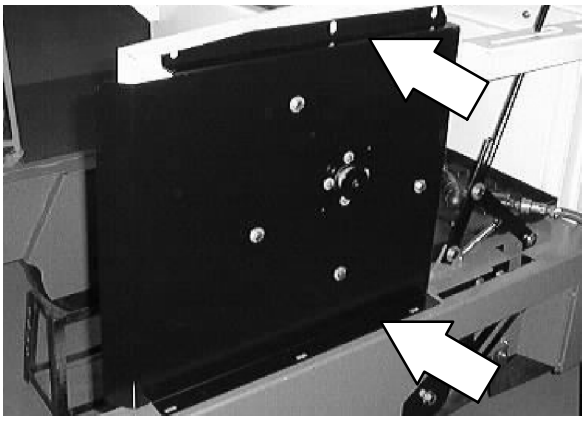
12. Operate the machine. Check the vacuum fan for proper operation.

TO TENSION VACUUM FAN DRIVE BELT

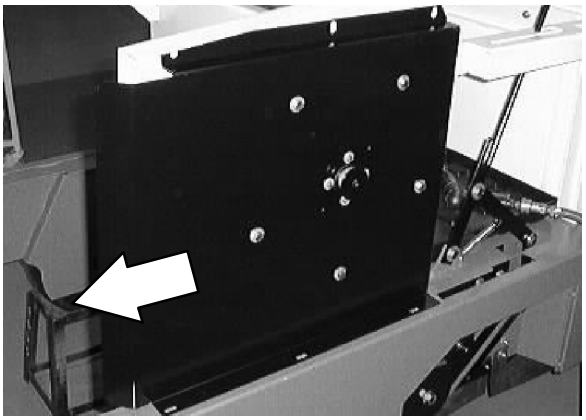
FOR SAFETY: Before Leaving Or Servicing Machine; Stop On Level Surface, Set Parking Brake.

1. To access the vacuum fan drive belt, remove the right hand side panel. Start by lifting up on the panel, pop the brush lift slot over the black knob, then move the panel backward and off the machine.

2. Loosen the four hex screws holding the vacuum fan housing to the machine frame.



3. Pull the vacuum fan assembly toward the back of the machine to tighten the V-belt. The correct tension is when the belt deflects 8.38 mm (0.41 in) from a force of .42 kg (.88 to .93 lb) at belt midpoint.

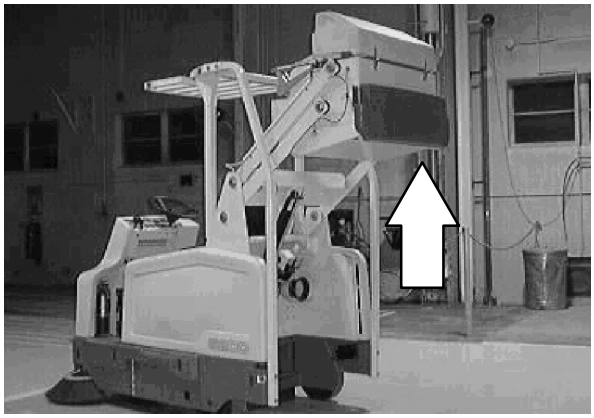


4. Tighten the four vacuum housing mount screws hand tight.
5. Reinstall the right hand machine cover.
6. Operate the machine. Check the vacuum fan for proper operation.

TO REPLACE VACUUM FAN IMPELLER

1. Raise the hopper and engage the hopper up prop arm. Shut off the machine.

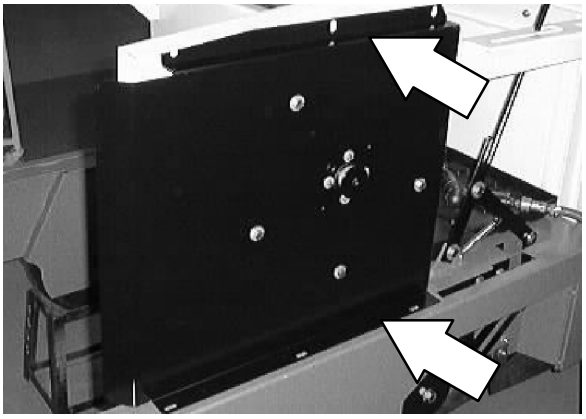
   FOR SAFETY: Before Leaving Or Servicing Machine; Stop On Level Surface, Set Parking Brake.



2. To access the vacuum fan drive belt, remove the right hand side panel. Start by lifting up on the panel, pop the brush lift slot over the black knob, then move the panel backward and off the machine.

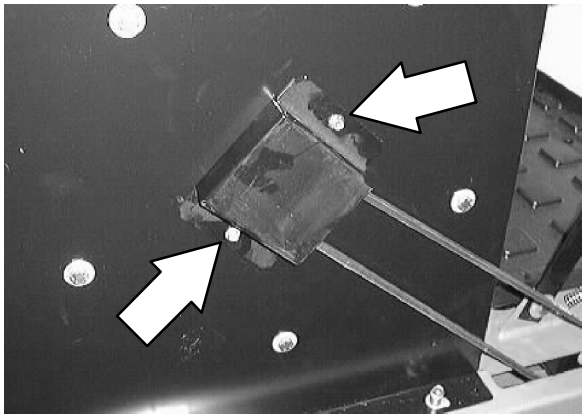
3. Loosen the five hex screws holding the vacuum fan housing to the machine frame.

4. Push the vacuum fan assembly forward in the slots to loosen the vacuum fan V-belt.

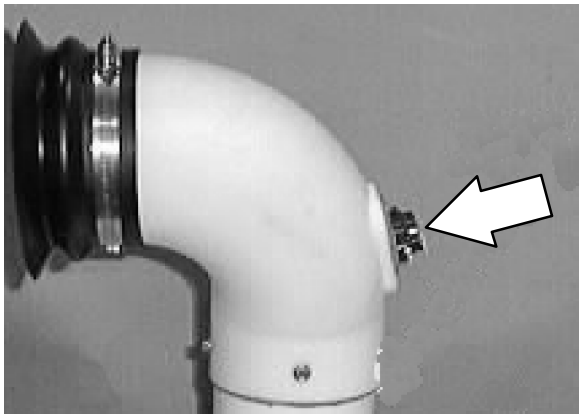


5. Remove the two hex screws holding the cover over the V-belt pulley. Remove the cover.

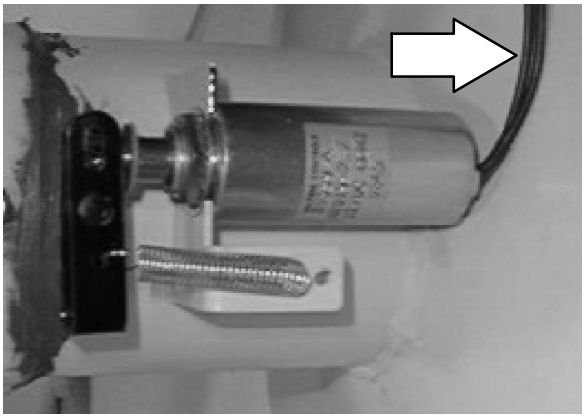
6. Remove the vacuum fan V-belt from the vacuum fan sheave.



7. Disconnect the wires from the Thermo Sentry™.



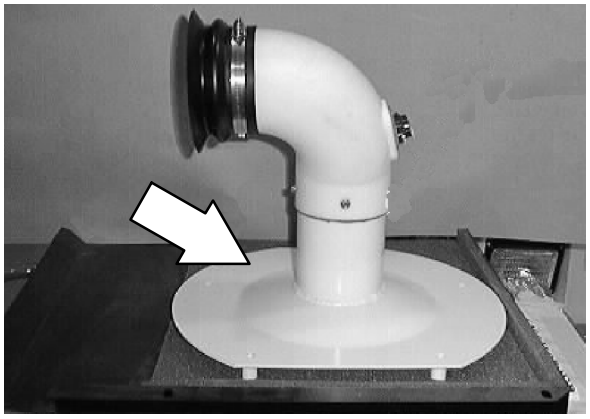
8. Disconnect the wires leading to the vacuum fan shut off solenoid.



9. Remove the five hex nuts holding the vacuum fan assembly to the machine. Remove the assembly from the machine.

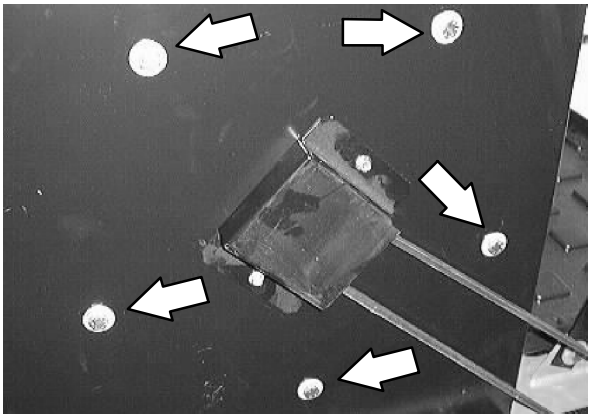
NOTE: Make sure to retain the two steel sleeves from the bottom two hex screws.

10. Place the assembly on a work bench with the vacuum fan inlet plate facing up.



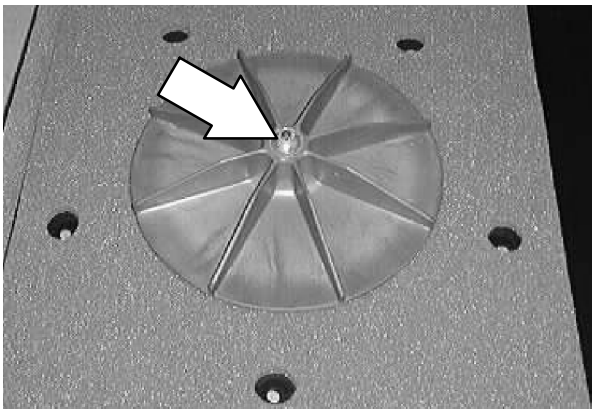
11. Remove the five hex screws and nuts holding the vacuum fan inlet plate to the bearing housing plate. Remove the inlet plate from the housing.

NOTE: Make sure to retain the five steel sleeves.



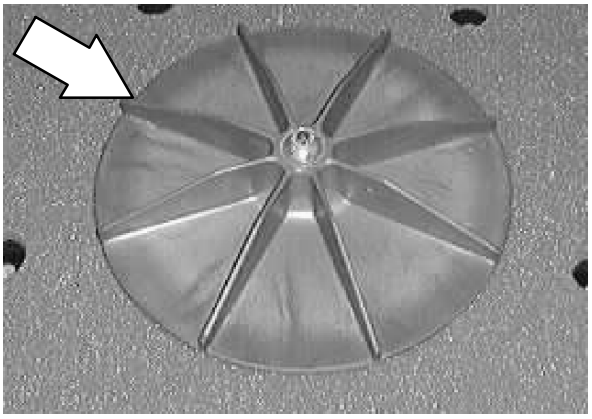
12. Remove the nyloc nut holding the vacuum fan impeller to the fan shaft. Pull the impeller off the shaft.

NOTE: Make sure to retain the square key.

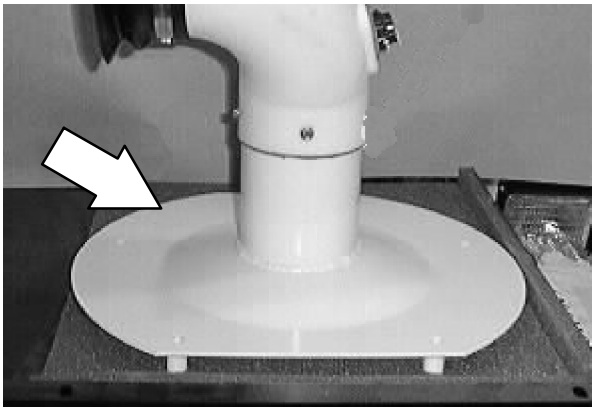


13. Install the new vacuum fan impeller onto the fan shaft. Make sure to reinstall the square key on the fan shaft.

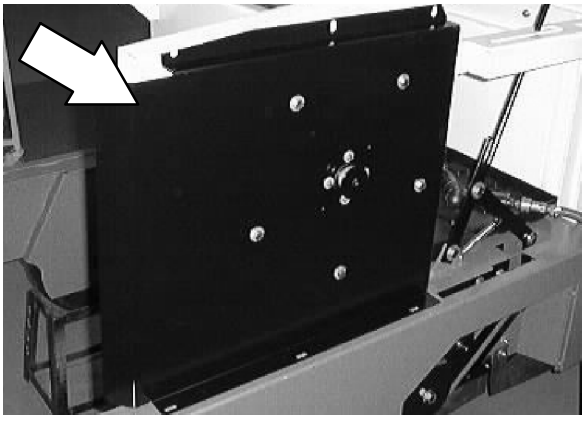
14. Reinstall the nyloc nut onto the fan shaft. Tighten to 11 – 14 Nm (7 – 10 ft lb).



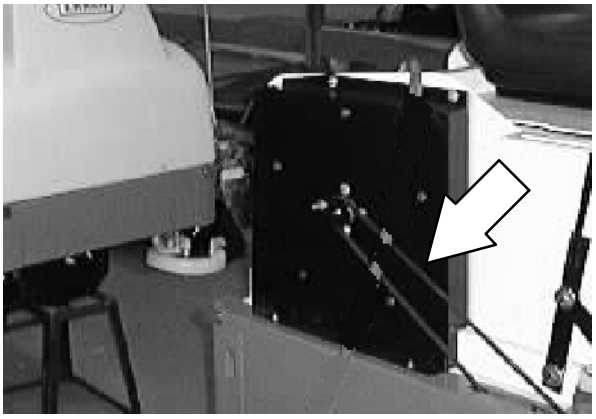
15. Reinstall the vacuum fan inlet plate onto the bearing housing plate. Reinstall the five steel sleeves, hex screws, and nuts. Center the hole in the plate over the impeller fins. Tighten the hardware to 18 – 24 Nm (15 – 20 ft lb).



16. Position the vacuum fan assembly onto the right side off the machine. Reinstall the five hex screws and nuts. *Make sure to install the two steel sleeves on the bottom two hex screws.* Leave the hardware loose for now.

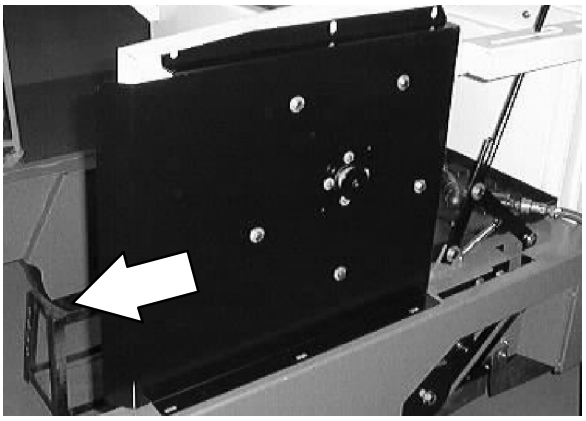


17. Install the vacuum fan V-belt over the fan sheave.

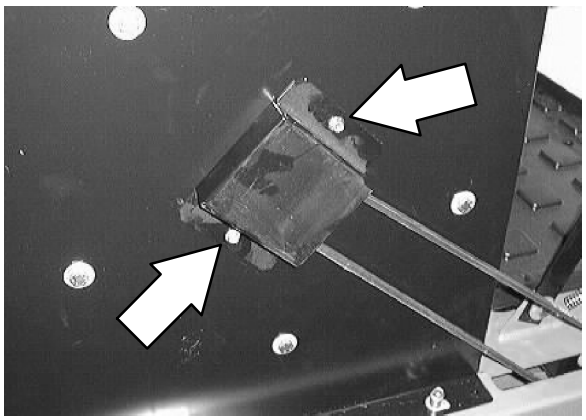


18. Pull the vacuum fan assembly toward the back of the machine to tighten the V-belt. The correct tension is when the belt deflects 8.38 mm (0.41 in) from a force of .42 kg (.88 to .93 lb) at belt midpoint.

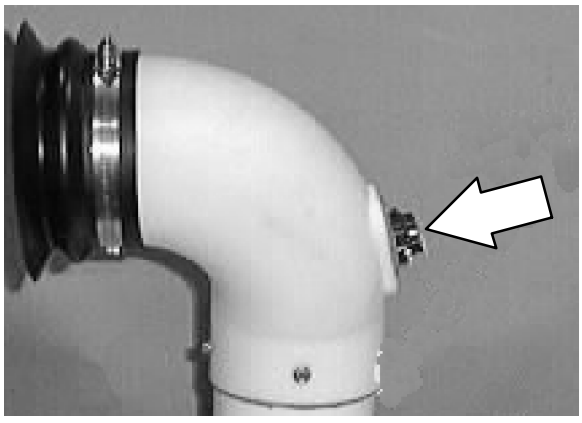
19. Tighten the five mounts screws hand tight.



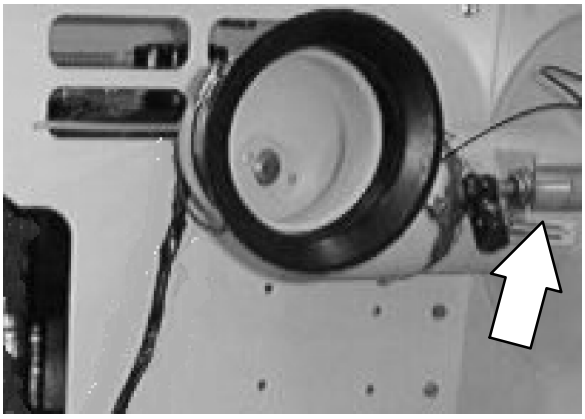
20. Reinstall the V-belt cover. Tighten the two screws hand tight.



21. Connect the wires to the Thermo Sentry™.

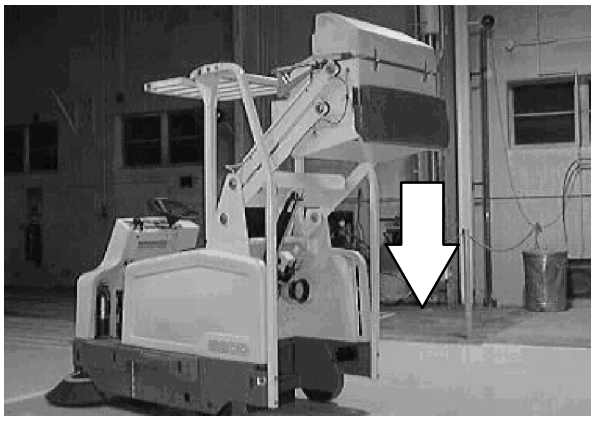


22. Reconnect the wires leading to the vacuum fan shut off solenoid.



23. Reinstall the right hand machine cover.

24. Start the machine, raise the hopper, disengage the prop arm. Lower the hopper.



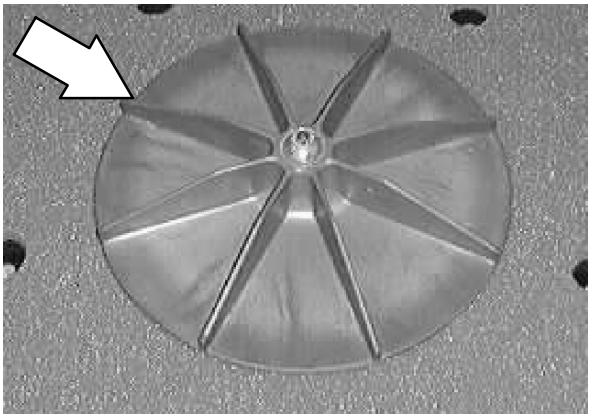
25. Operate the machine. Check the vacuum fan for proper operation.

TO REPLACE VACUUM FAN IMPELLER BEARINGS

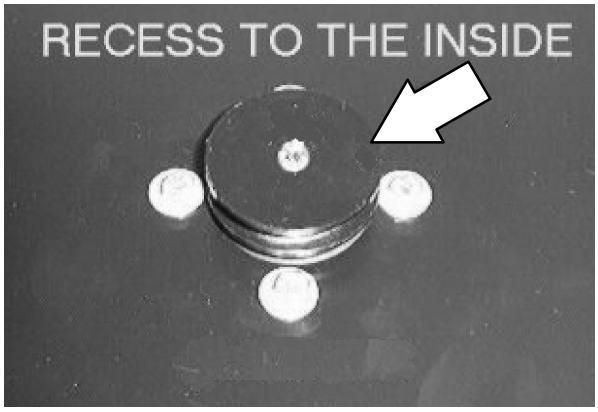
FOR SAFETY: Before Leaving Or Servicing Machine; Stop On Level Surface, Set Parking Brake.

1. See TO REPLACE VACUUM FAN IMPELLER instructions to remove the vacuum fan assembly from the machine and and the impeller from the housing.

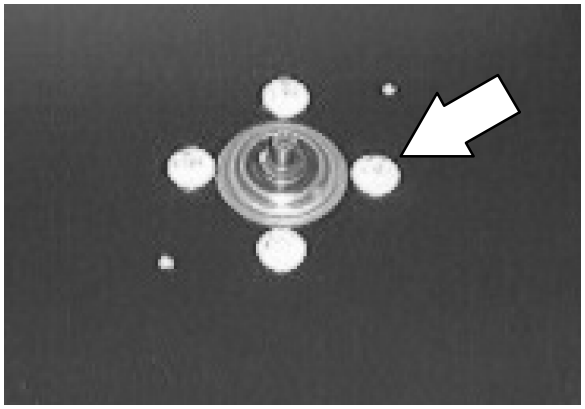
NOTE: Once the vacuum fan impeller has been removed, go to step 2.



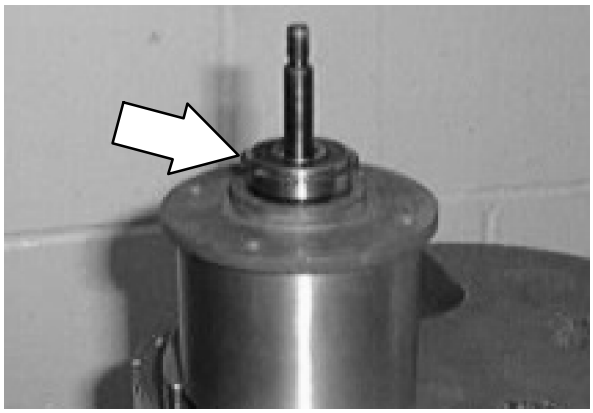
2. Loosen the two set screws holding the V-belt pulley to the fan shaft. Remove the pulley.



3. Remove the four hex screws holding the vacuum fan bearing assembly to the bearing plate. Remove the bearing assembly.

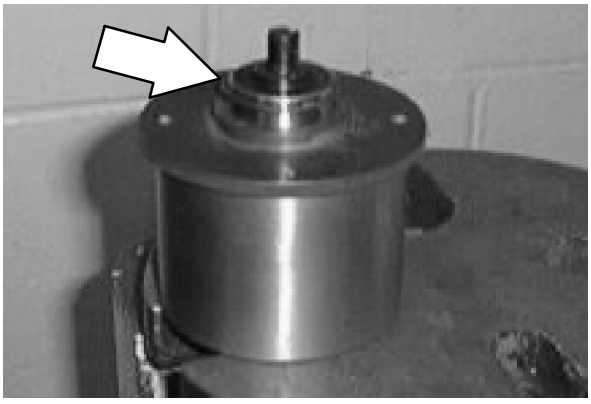


4. Use a arbor press to remove the fan shaft and two bearings from the housing.

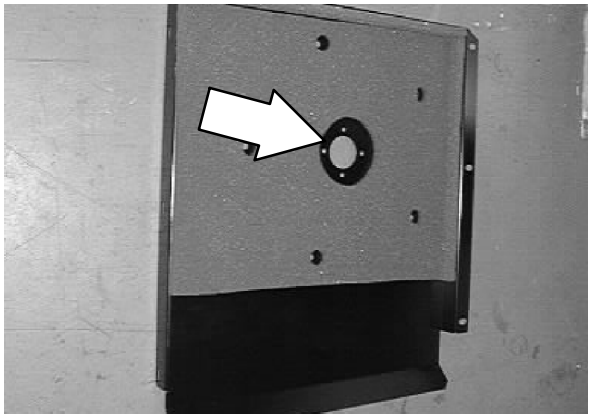


5. Use the arbor press to install the new bearings into the housing. *The short end of fan shaft is on the side of housing with the thin flange. The long end of fan shaft is on the side of the housing with the wide flange.*

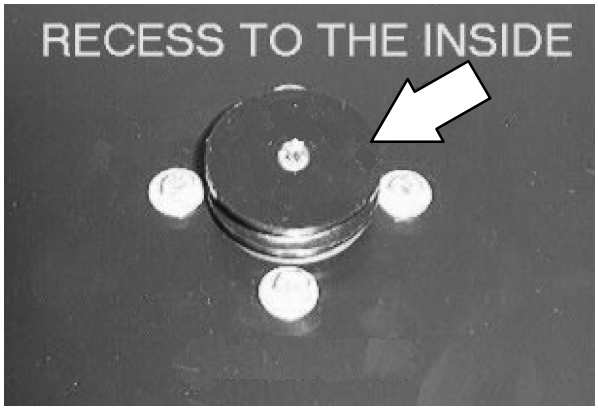
NOTE: Make sure the bearings are pressed down tight. The fan will be noisy if there is any play in the bearings. The retaining rings must be tight to the housing.



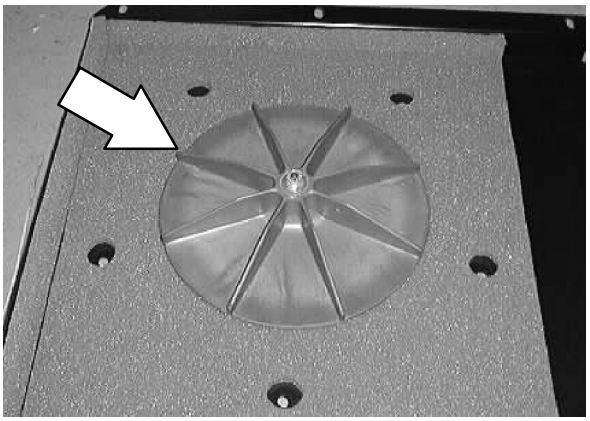
6. Reinstall the bearing housing onto the bearing housing plate. The long end of the shaft is on the side with the sound foam. Reinstall the four hex screws and washers. Tighten to 8 – 10 Nm (6 – 8 ft lb).



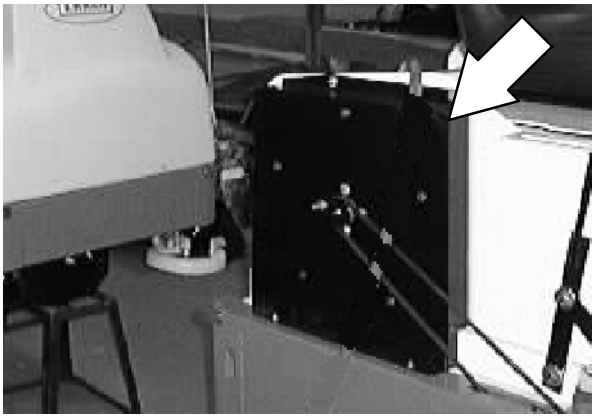
7. Reinstall the V-belt pulley on the short end of the fan shaft. *The recessed side of the pulley goes to the inside*. Hand tighten the set screws tight.



8. Reinstall the vacuum fan impeller onto the fan shaft. Make sure to reinstall the square key on the fan shaft.



9. See TO REPLACE VACUUM FAN IMPELLER instructions to install the vacuum fan impeller and the vacuum fan assembly into the machine.



MACHINE TROUBLESHOOTING

Problem	Cause	Remedy
Excessive dusting	Vacuum fan damper closed	Press the vacuum fan / filter shaker switch to the on position
	Brush skirts and dust seals worn, damaged, out of adjustment	Replace or adjust brush skirts or dust seals
	Hopper dust filter clogged	Shake and/or clean or replace dust filter
	Hopper full	Empty hopper
	Vacuum fan failure	Contact Tennant service personnel
Poor sweeping performance	Brush bristles worn	Replace brushes
	Main and side brushes not adjusted properly	Adjust main and side brushes
	Debris caught in main brush drive mechanism	Remove debris from drive mechanism
	Main brush drive failure	Contact Tennant service personnel
	Side brush drive failure	Contact Tennant service personnel
	Hopper full	Empty hopper
	Hopper lip skirts worn or damaged	Replace lip skirts
	Wrong sweeping brush	Contact Tennant representative for recommendations
	Large debris trap damaged	Repair or replace large debris trap
	Hopper dust filter clogged	Shake and/or clean or replace dust filter
Machine will not start	Engine oil level low	Check and fill
	Fuel tank valve closed	Open valve beneath fuel tank
	Fuel tank empty	Fill fuel tank

CONTENTS

INTRODUCTION

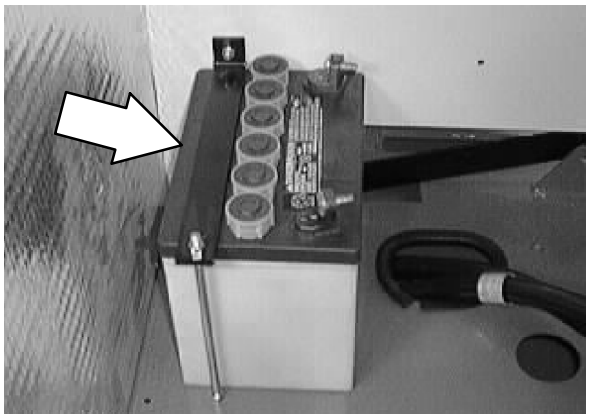
The model 6200D electrical system consists of the battery, instrument panel, side brush motor, switches, relays, and circuit breakers.

ELECTRICAL SYSTEM

The electrical system on the model 6200D is a 12 volt system consisting of a battery, alternator, circuit breakers, relays, and switches.

BATTERY

The battery is located under the operator's seat and can be accessed by lifting the seat up.



After the first 50 hours of operation, and every 200 hours after that, clean and tighten the battery connections.

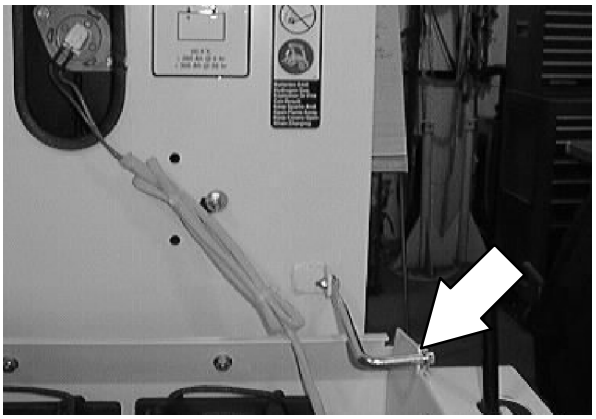
Check the electrolyte level every 200 hours of operation. Only add distilled water.

FOR SAFETY: When Servicing Machine, Avoid Contact With Battery Acid.

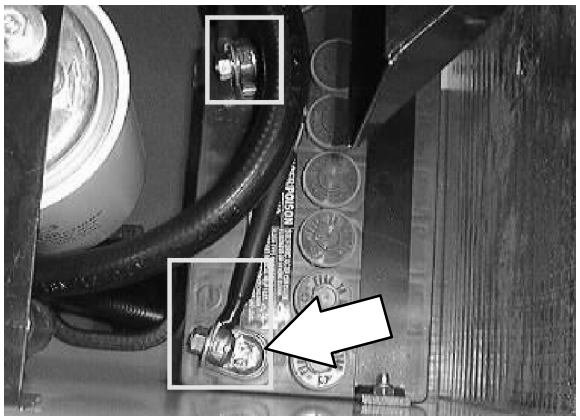
TO CHARGE BATTERY

FOR SAFETY: Before Leaving Or Servicing Machine; Stop On Level Surface, Set Parking Brake, turn off machine, and remove key.

1. Open the seat support and engage the prop rod.



2. Remove the battery negative cable.

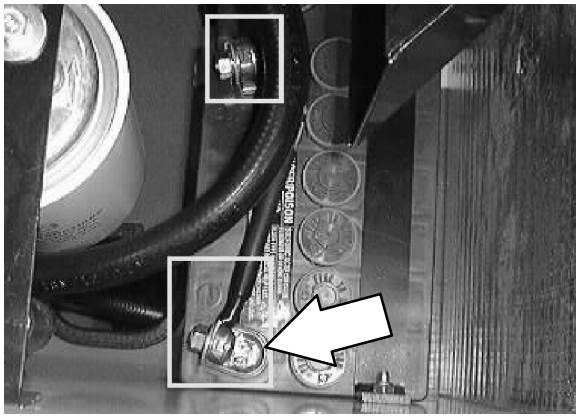


3. Connect the battery charger to the battery. Make sure to hook the red clamp on the positive post and the black clamp to the negative post.

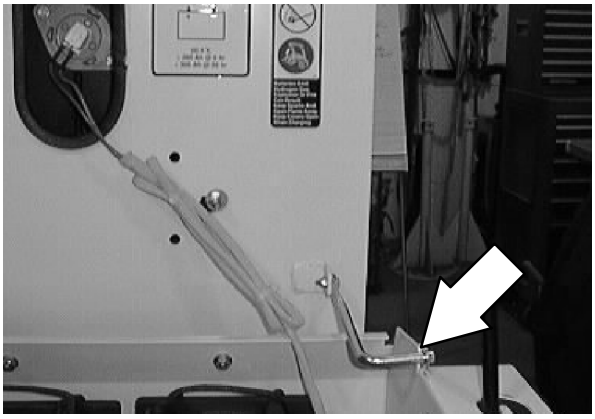
4. Start the charger. Check the voltage meter on the charger for proper charge voltage.

5. Remove the charger after the voltage meter reads a full charge.

6. Reinstall the negative battery cable and start the machine. Check the battery for proper operation.



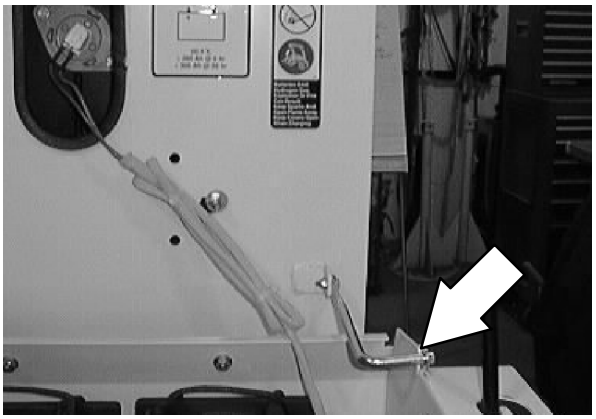
7. Disengage the prop rod and lower the seat support.



TO REPLACE BATTERY

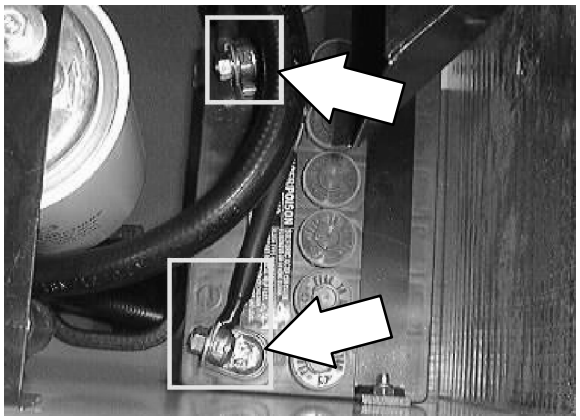
FOR SAFETY: Before Leaving Or Servicing Machine; Stop On Level Surface, Set Parking Brake, turn off machine, and remove key.

1. Open the seat support and engage the prop rod.

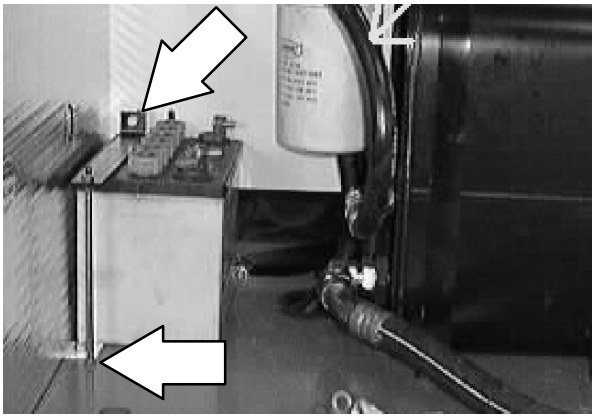


2. Locate the battery at the right hand side of the machine, in front of the hydraulic tank.

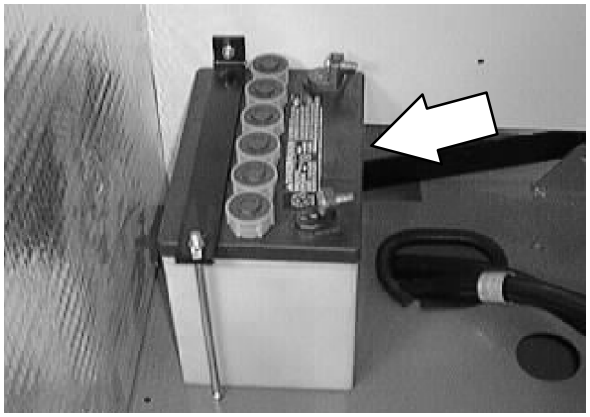
3. Remove the battery negative cable and positive cable from the battery terminals.



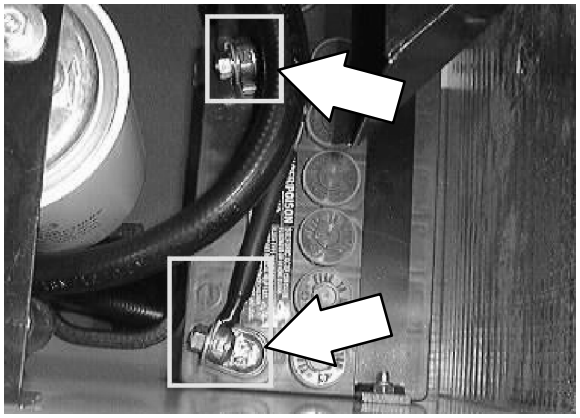
4. Remove the hardware holding the battery hold down bracket to the seat support. Lift the battery out of the machine.



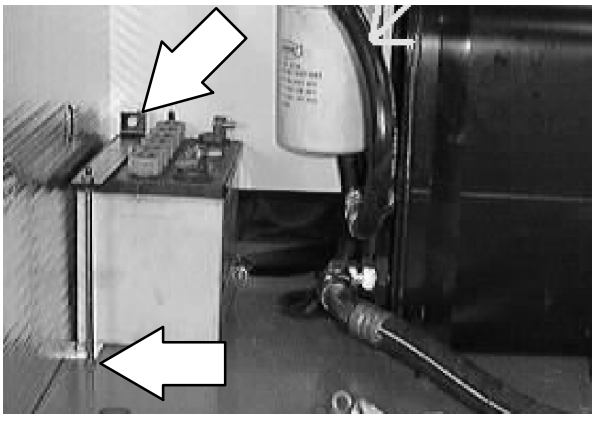
5. Install the new battery in the machine in the same orientation as the old one.



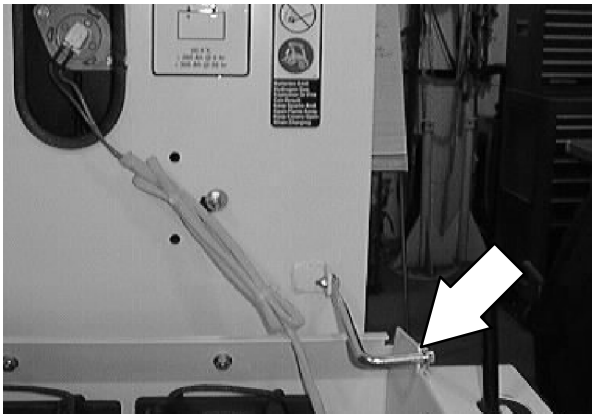
6. Reconnect the battery cables to the battery *(red cable to positive post, black cable to negative post).*



7. Reinstall the battery hold down bracket.



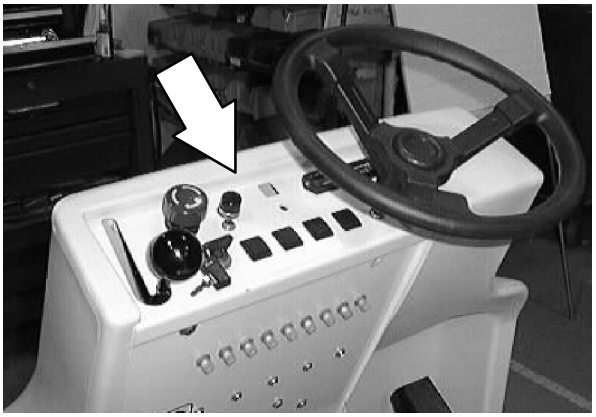
8. Disengage the prop rod and lower the seat support.



9. Check the new battery for proper operation. If battery needs charging, see TO CHARGE BATTERY instructions in this section.

INSTRUMENT PANEL

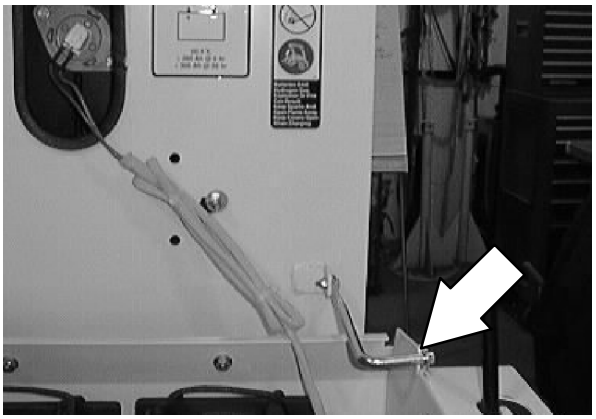
The instrument panel on the model 6200D contains the switches, gauges, and instruments needed to run the machine functions.



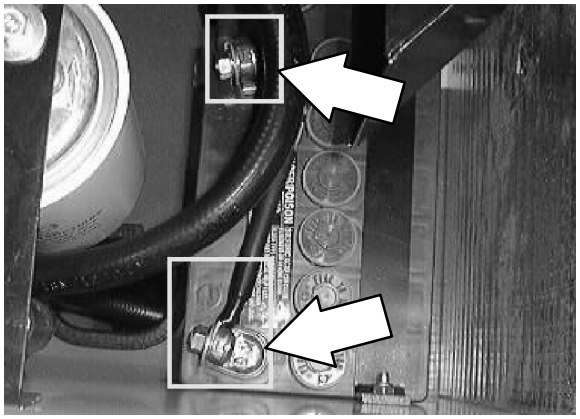
TO ACCESS CIRCUIT BREAKER OR INSTRUMENT PANEL

FOR SAFETY: Before Leaving Or Servicing Machine; Stop On Level Surface, Set Parking Brake.

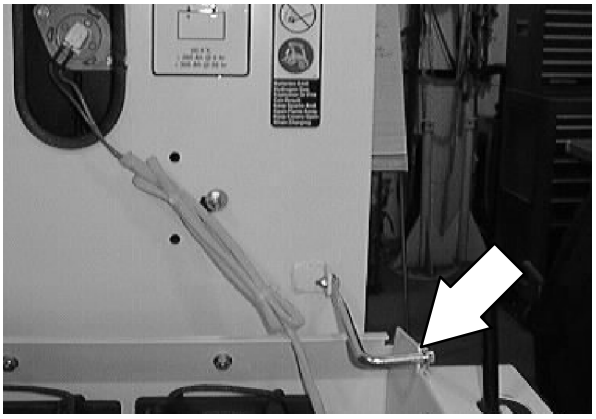
1. Open the seat support and engage the prop rod.



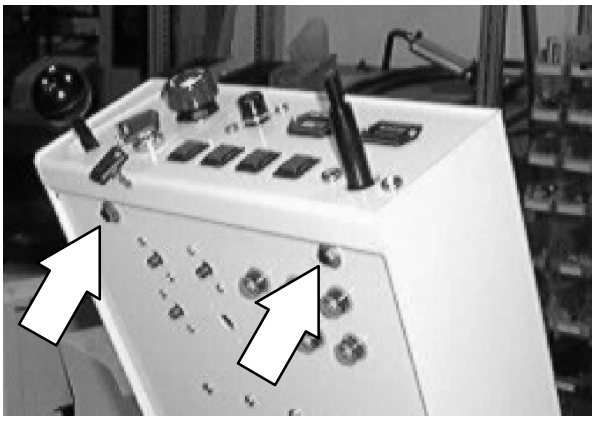
2. Disconnect the machine battery cables.



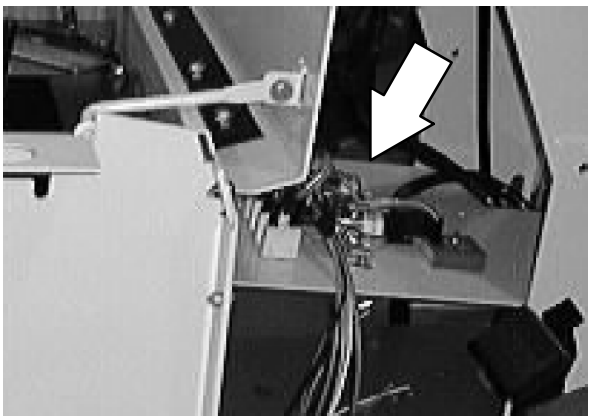
3. Disengage the prop rod and lower the seat support.



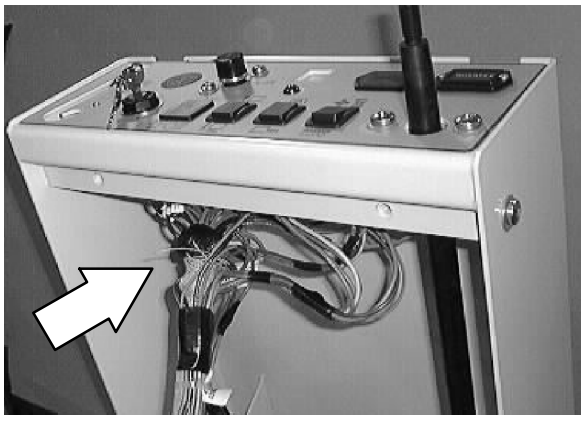
4. Remove the two hex screws holding the circuit breaker panel to the front shroud.



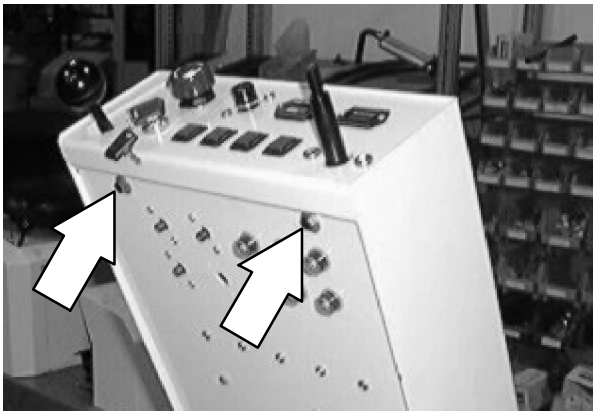
5. Pivot the circuit breaker panel back away from the front shroud.



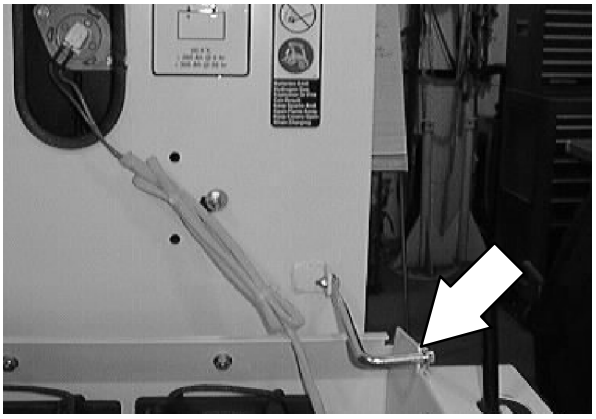
6. With the circuit breaker panel pivoted down, electrical components on the circuit breaker panel and the main instrument panel can be accessed.



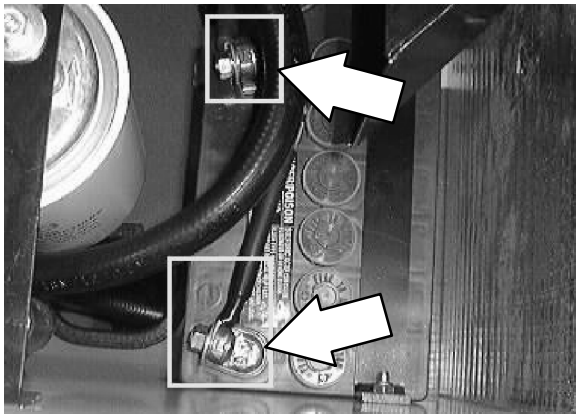
7. Pivot the instrument panel back up to the front shroud. Reinstall the hardware and hand tighten tight.



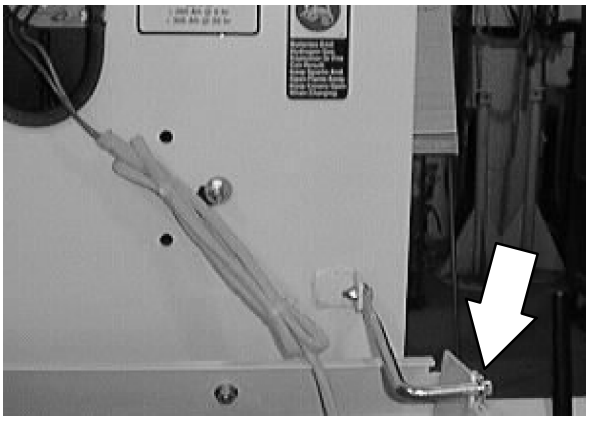
8. Open the seat support and engage the prop rod.



9. Reconnect the battery.



10. Disengage the prop rod and lower the seat support.



11. Start the machine and check for proper operation.

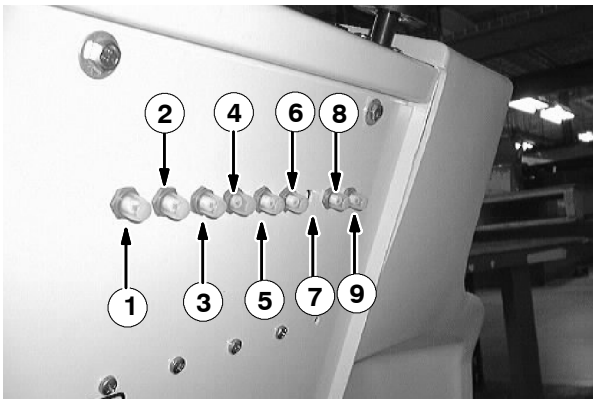
CIRCUIT BREAKERS

The *circuit breakers* are resettable electrical circuit protection devices. Their design stops the flow of current in the event of a circuit overload. Once a circuit breaker is tripped, it must be reset manually. Press the reset button after the breaker has cooled down. The circuit breakers will not reset until they have had a chance to cool down.

If the overload that caused the circuit breaker to trip is still there, the circuit breaker will continue to stop current flow until the problem is corrected.

Circuit breakers 1 through 9 are located above the foot pedals in the circuit breaker panel.

The chart lists the circuit breakers and the electrical components they protect.

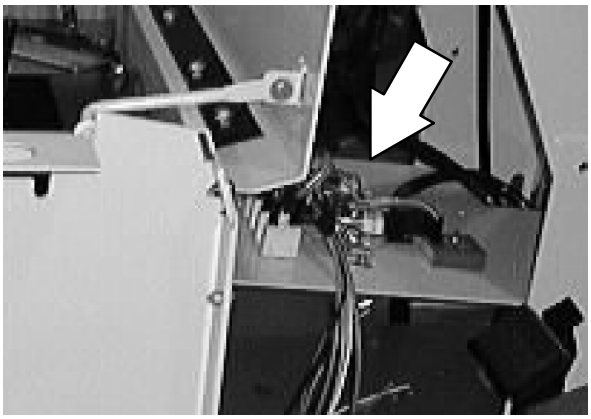


Circuit Breaker	Rating	Circuit Protected
CB-1	15 A	Horn, Reverse, Back up alarm opt.
CB-2	15 A	Filter shaker
CB-3	15 A	Side brush(es)
CB-4	40 A	Hopper lift motor
CB-5	15 A	Main
CB-6	15 A	Hopper door
CB-7	15 A	Headlight, Taillight-Warning light
CB-8	15 A	Glow plugs
CB-9	15 A	Fuel solenoid

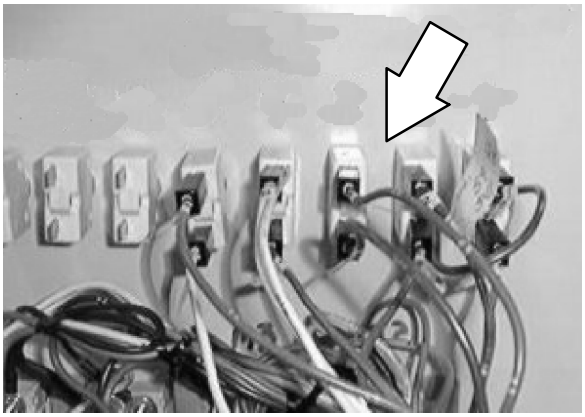
TO REPLACE CIRCUIT BREAKER

FOR SAFETY: Before Leaving Or Servicing Machine; Stop On Level Surface, Set Parking Brake.

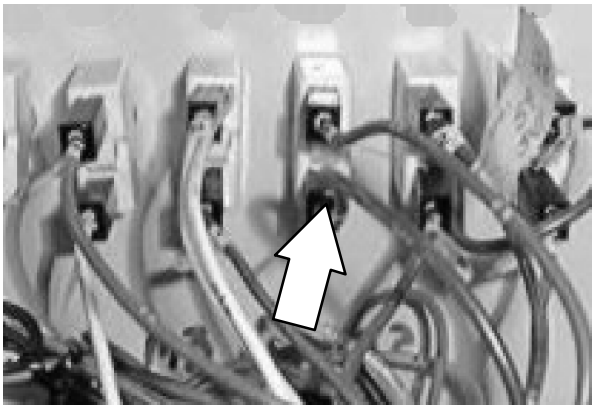
1. Pull the instrument panel back away from the front shroud for better access to the circuit breakers. See TO ACCESS CIRCUIT BREAKER OR INSTRUMENT PANEL instructions.



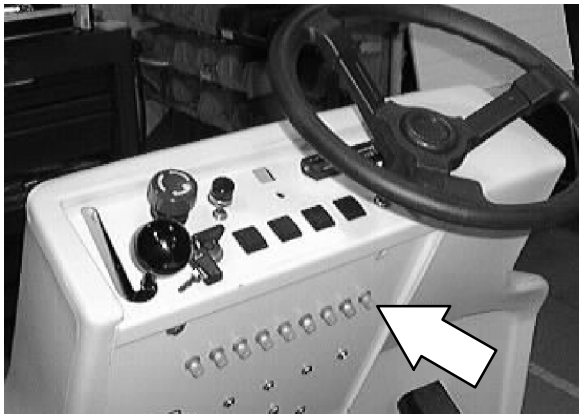
2. Locate the circuit breaker that needs to be changed.



3. Mark and disconnect the wires leading to the back of the circuit breaker.



4. Remove the water proof rubber boot from the circuit breaker. Retain the rubber boot.

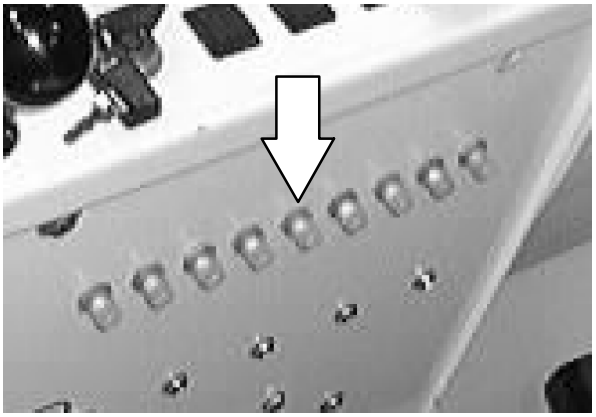


5. Remove the black threaded bushing from the front of the circuit breaker.

6. Push the circuit breaker out of the hole. Discard the circuit breaker.

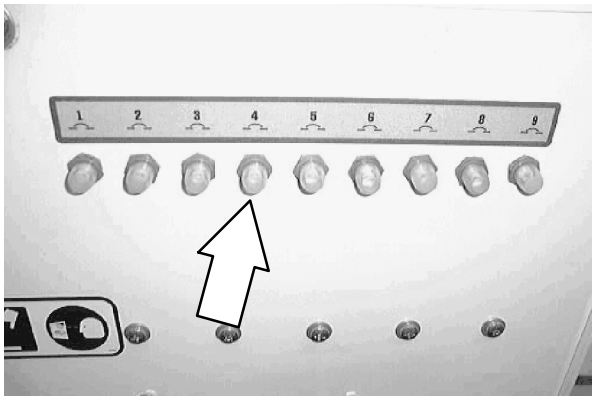
7. Position the new circuit breaker into the mount hole.

NOTE: The mount hole has a "D" shape to match the shape of the circuit breaker.

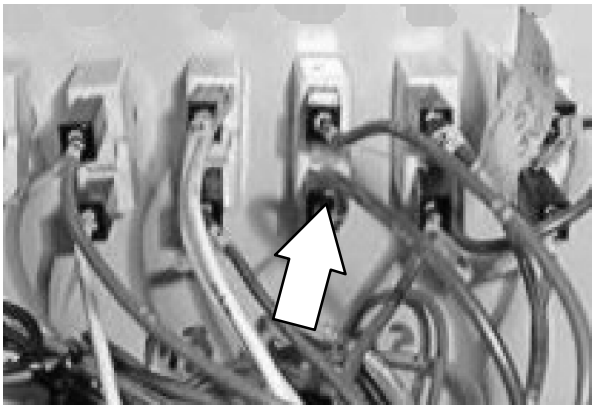


8. Install the black threaded bushing onto the new circuit breaker.

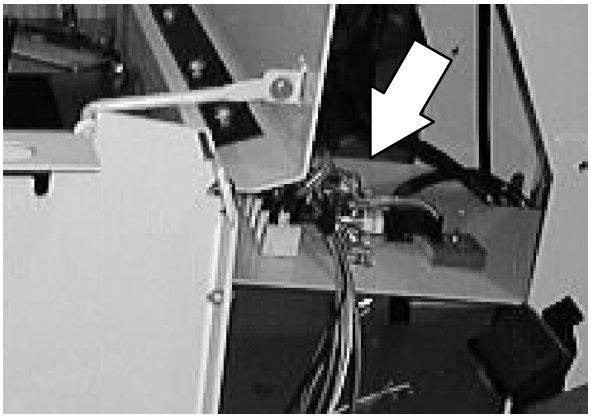
9. Install the rubber boot onto the out side of the new circuit breaker.



10. Reconnect the electrical wires to the new circuit breaker. See schematic in the ELECTRICAL section.



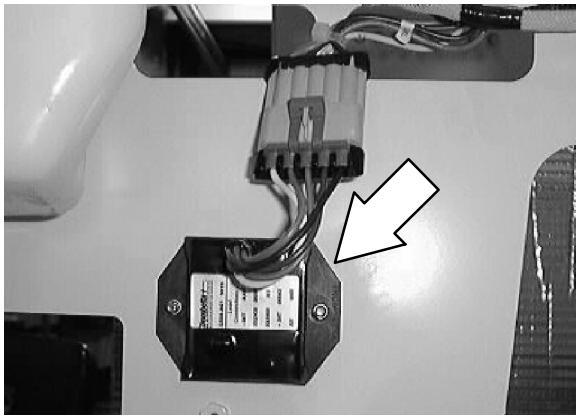
11. Pivot the instrument panel back onto the front shroud. Reinstall the hardware and hand tighten tight. See TO ACCESS CIRCUIT BREAKER OR INSTRUMENT PANEL instructions.



12. Start the machine and check the new circuit breaker for proper operation.

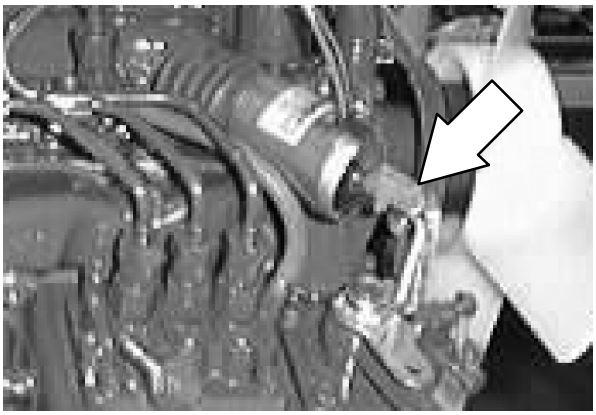
SOLENOID CONTROL MODULE

The solenoid control module controls the throttle solenoid.



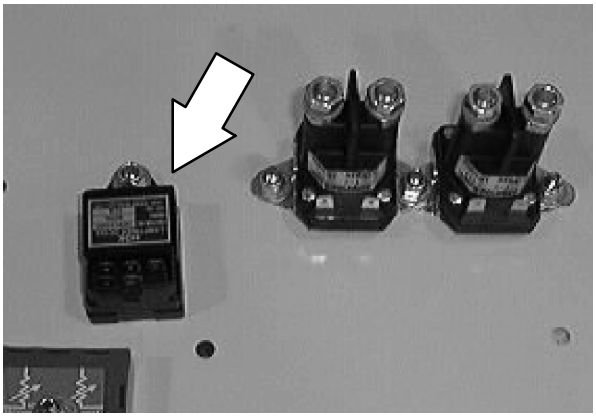
THROTTLE SOLENOID

The throttle solenoid positively opens and closes the throttle arm at the injector pump when the key is turned on or off.



GLOW PLUG TIMER

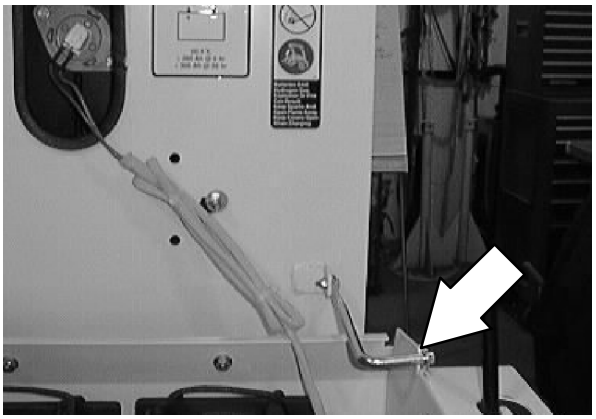
The glow plug timer is used to operate the glow plugs to ease the starting of the engine on the 6200D.



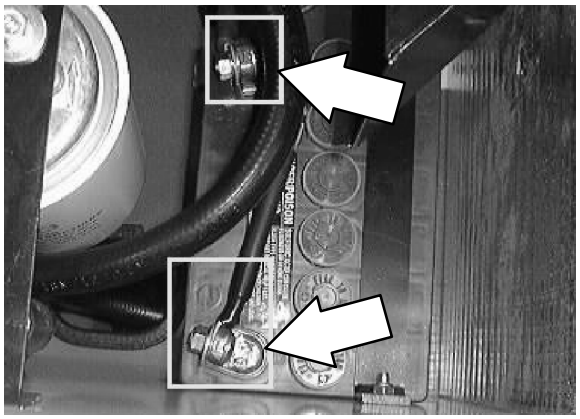
TO REPLACE ENGINE FUEL SHUTOFF SOLENOID

FOR SAFETY: Before Leaving Or Servicing Machine; Stop On Level Surface, Set Parking Brake, turn off machine, and remove key.

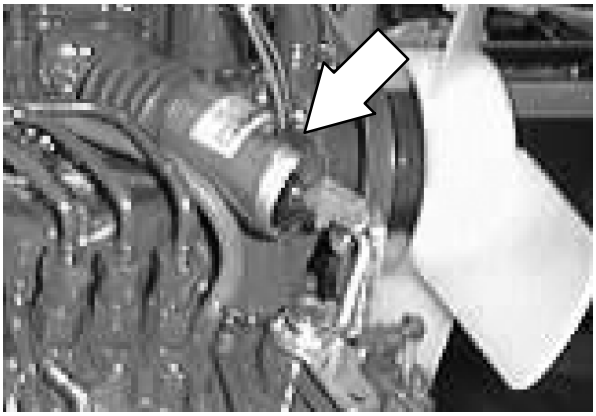
1. Open the seat support.



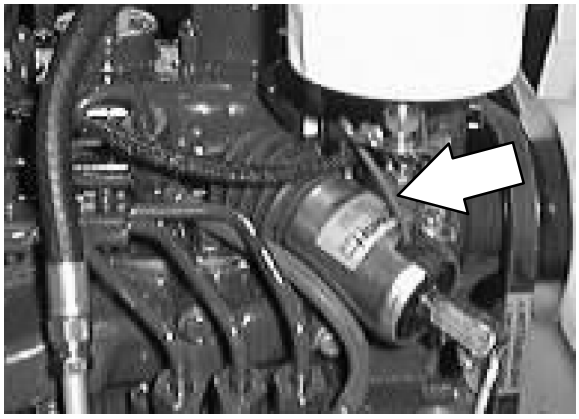
2. Remove the battery negative cable.



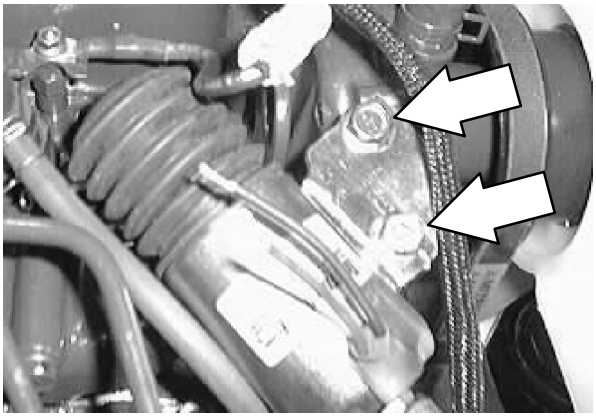
3. Go to the left hand side of the engine. Locate the fuel shutoff solenoid in the area to the right of the steel injector lines.



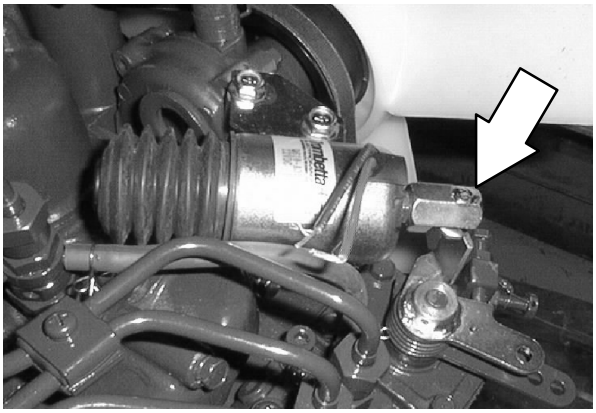
4. Disconnect the fuel shutoff solenoid from the main electrical harness.



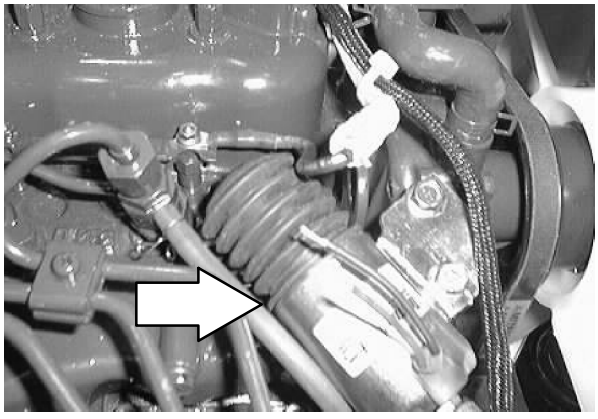
5. Remove the two hex screws holding the solenoid to the engine.



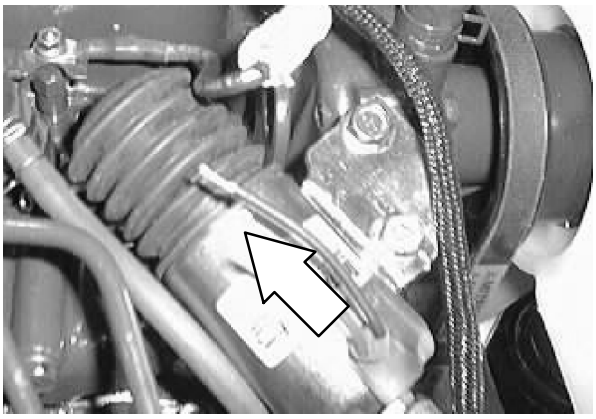
6. Pull the solenoid up to disconnect the pin on the end of the solenoid from the hook on the end of the throttle arm.



7. Position the new solenoid on the engine. Place the pin on the end of the solenoid plunger rod into the hook on the throttle arm. Reinstall the two hex screws. Leave loose for now.

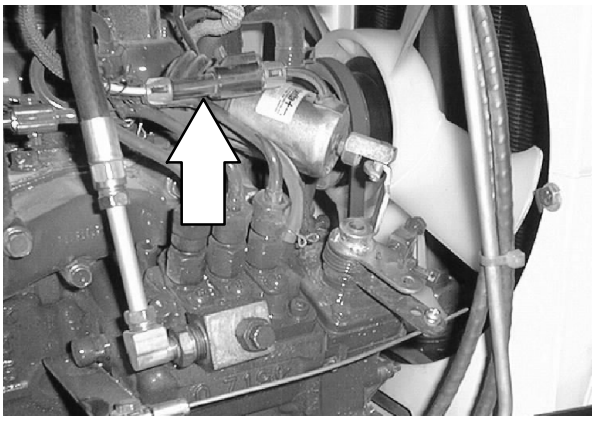


8. Pull the body of the solenoid away from the plunger (this pre-loads shaft). Tighten the two hex screws while pulling on the body. Tighten to 11 – 14 Nm (7 – 10 ft lb).



9. Connect the new fuel solenoid to the main harness.

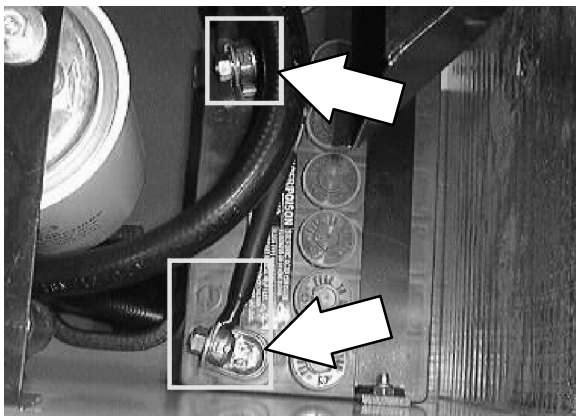
NOTE: Make sure to reinstall existing or install new cable ties to tie the electrical wires to the body of the solenoid to eliminate vibration at the wires.



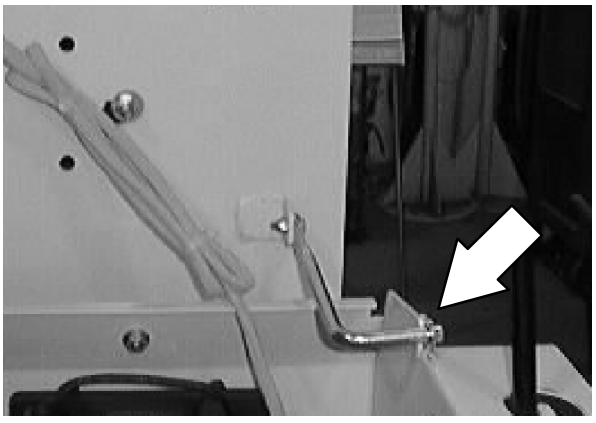
10. Reconnect the negative battery cable to the battery.

11. Observe the solenoid while turning on the key. The fuel solenoid plunger should move along with the throttle arm

NOTE: The fuel solenoid should make an audible click when the key is turned on.



12. Lower the seat support.

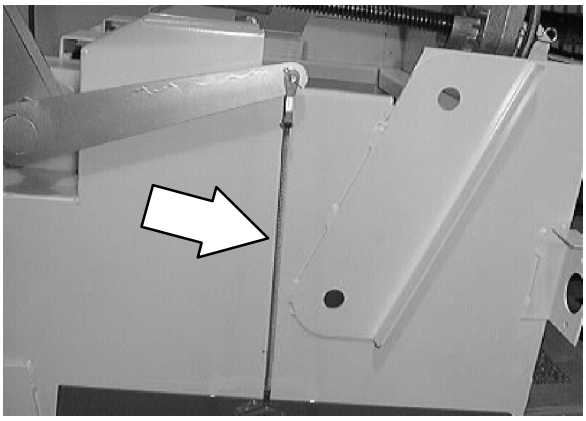


13. Start the machine and check for proper operation.

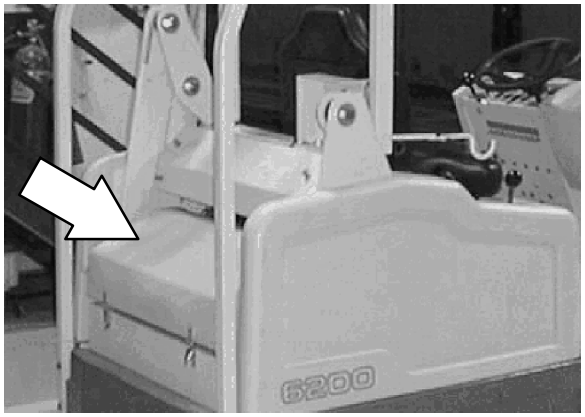
TO REPLACE DUMP DOOR ACTUATOR

FOR SAFETY: Before Leaving Or Servicing Machine; Stop On Level Surface, Set Parking Brake.

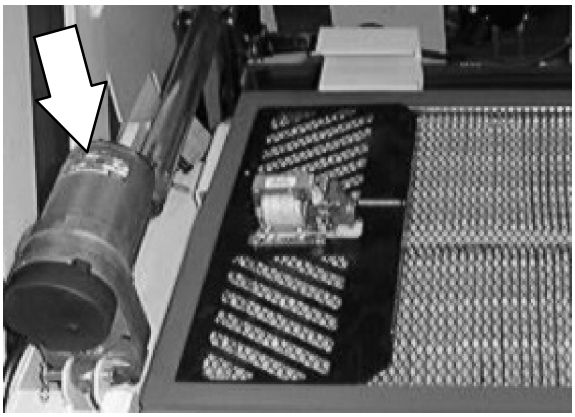
1. Place a wood block under the hopper dump door. Turn on the key and open the door until the two cables (one each side of the hopper) go slack.



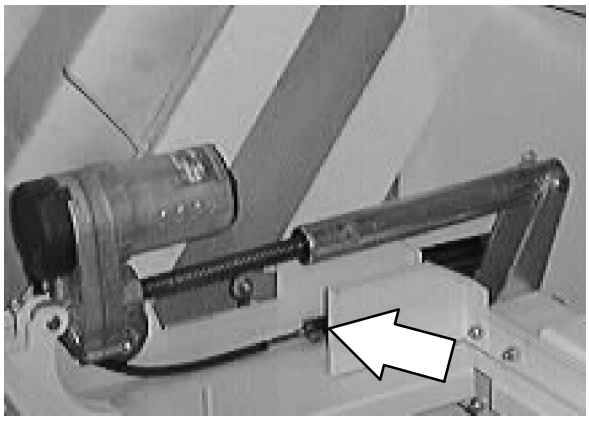
2. Un-latch and remove the hopper filter cover.



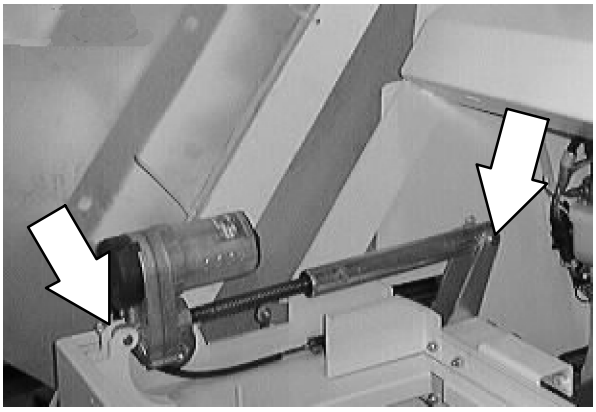
3. Locate the dump door actuator on the left side of the hopper panel filter and shaker.



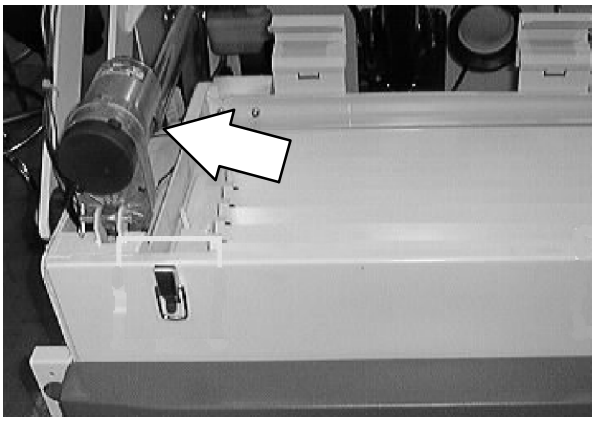
4. Disconnect the actuator electrical plug from the main harness.



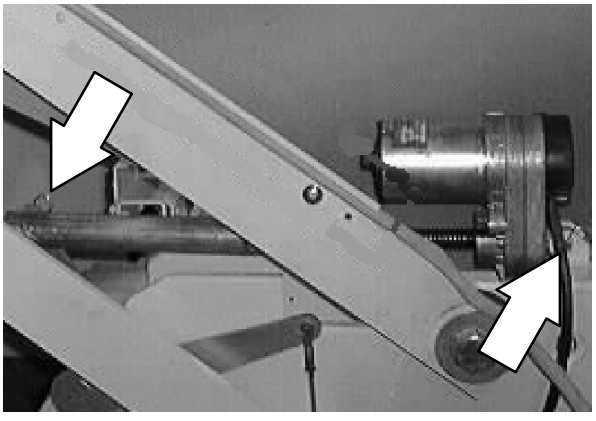
5. Remove the hair pin and clevis pin from each end of the actuator. Remove the actuator from the machine.



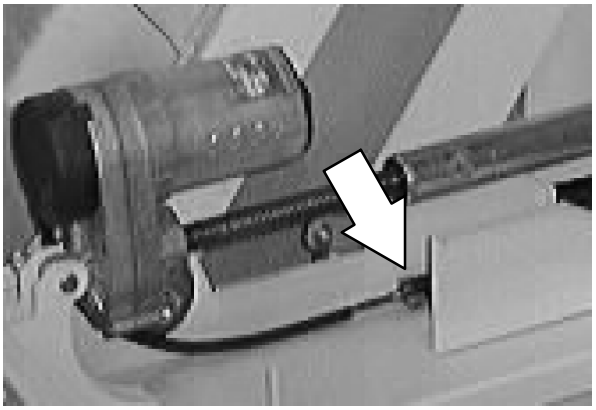
6. Install the new dump door actuator into the machine in the same orientation as the old one.



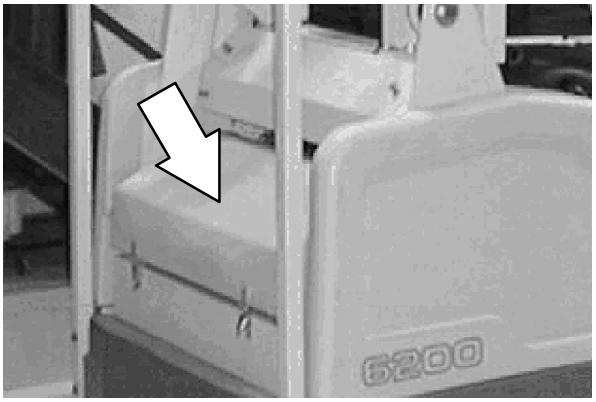
7. Reinstall the hair pin and clevis pin into each end of the new actuator.



8. Connect the new dump door actuator to the main electrical harness.

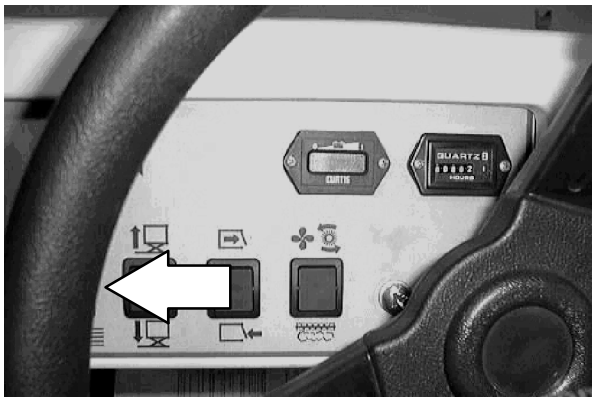


9. Reinstall the hopper cover and latch it down.



10. Turn on the key and close the dump door. Remove the wood block from under the dump door.

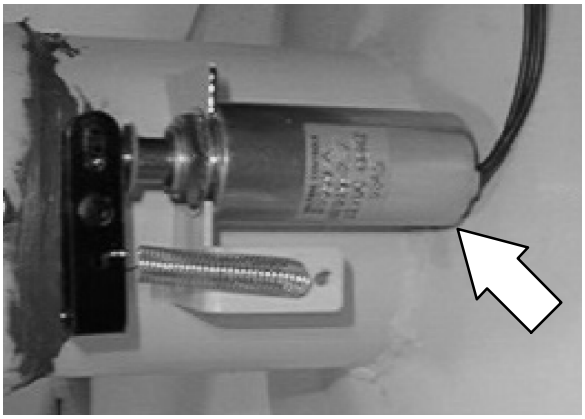
11. Operate the machine and check the new dump door actuator for proper operation.



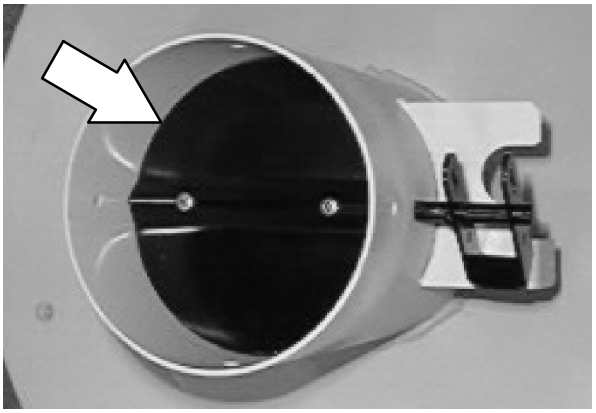
THERMO SENTRY™

The Thermo Sentry™ is an electrical device used to detect excess heat or fire in the hopper filter area.

If fire is detected in the hopper filter area, the Thermo Sentry™ sends a signal to the shut off solenoid.



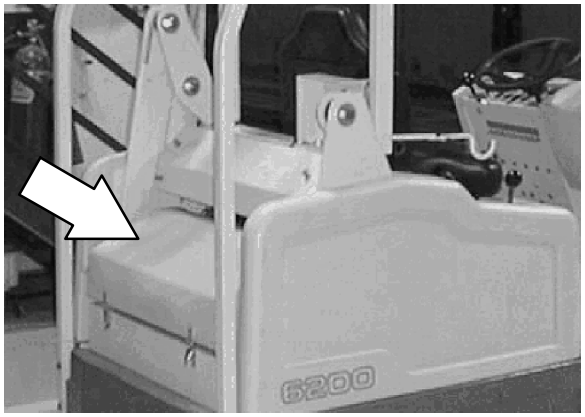
The solenoid in turn closes the shut off valve plate in the vacuum tube.



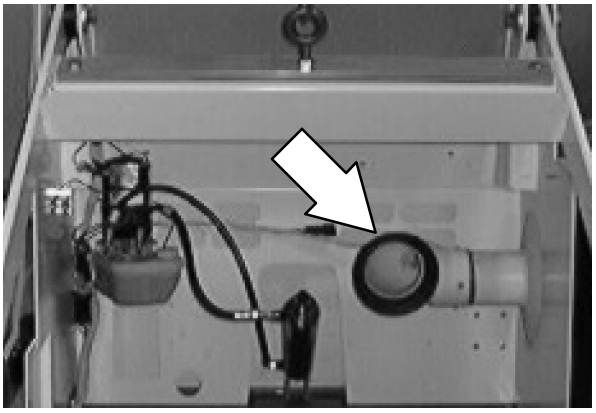
TO REPLACE THERMO SENTRY™

FOR SAFETY: Before Leaving Or Servicing Machine; Stop On Level Surface, Set Parking Brake.

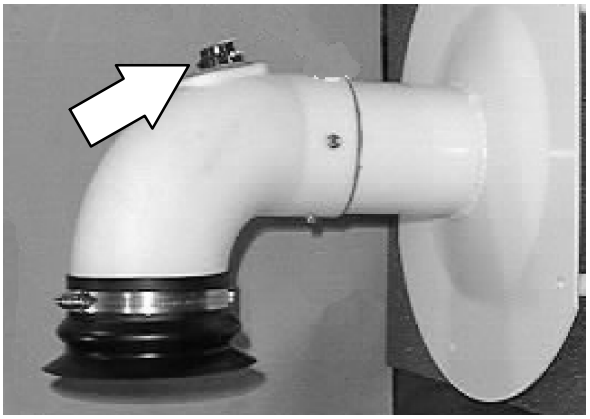
1. Un-latch and remove the hopper filter cover.



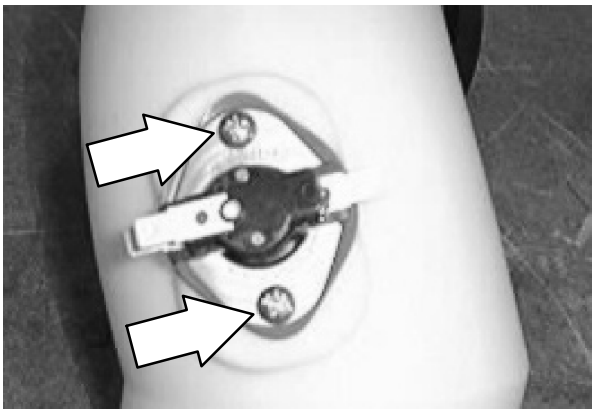
2. Locate the Thermo Sentry™ at the back side of the 90 degree section of the vacuum tube.



3. Remove the wires leading to the Thermo Sentry™.

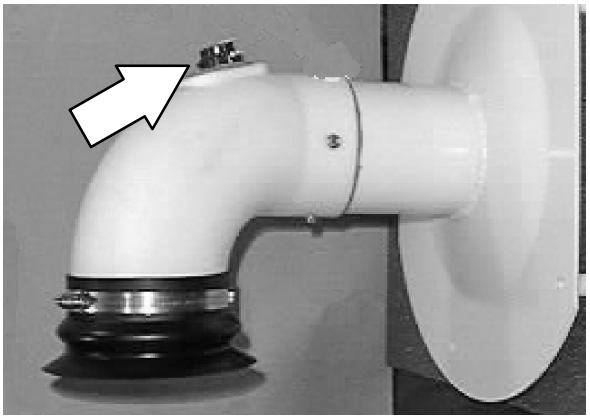


4. Remove the two screws and nuts holding the Thermo Sentry™ to the vacuum tube.

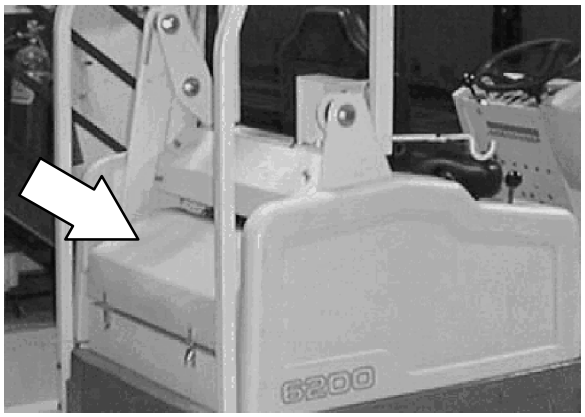


5. Install the new Thermo Sentry™ onto the vacuum tube. Reinstall the hardware and hand tighten. Make sure the gasket is installed under the Thermo Sentry™.

6. Reconnect the wires to the Thermo Sentry™.



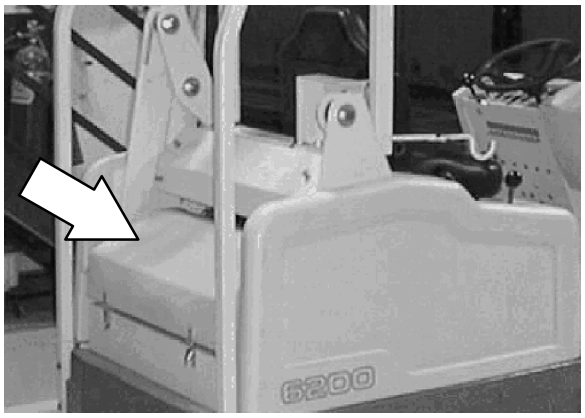
7. Reinstall the hopper cover.



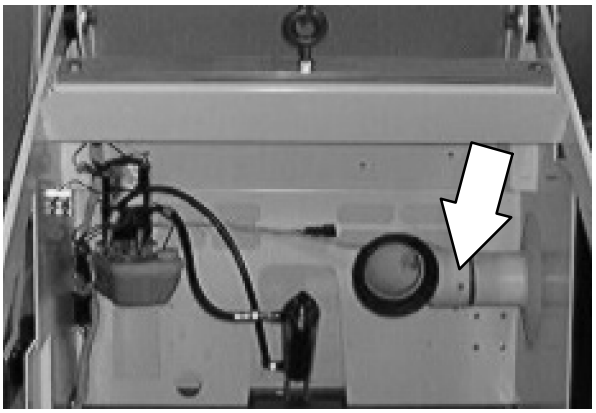
TO REPLACE VACUUM FAN SHUT OFF SOLENOID

FOR SAFETY: Before Leaving Or Servicing Machine; Stop On Level Surface, Set Parking Brake.

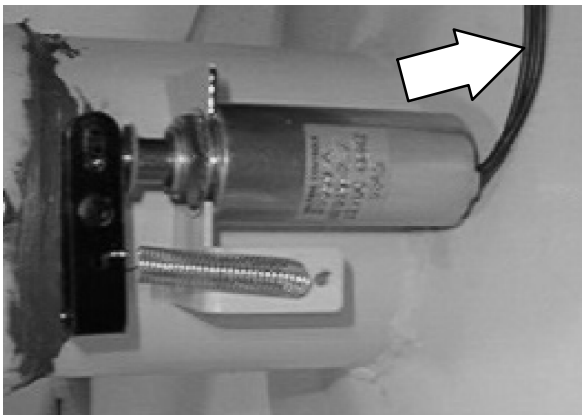
1. Un-latch and remove the hopper filter cover.



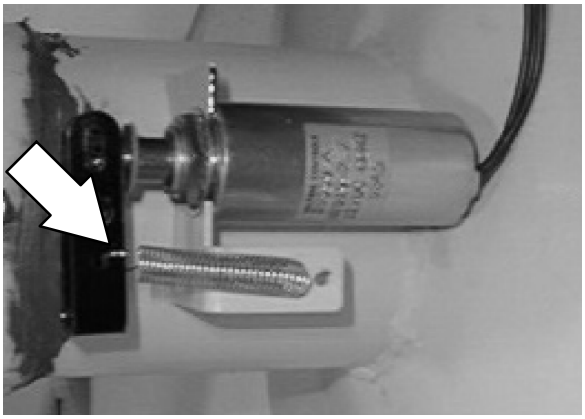
2. Locate the shut off solenoid at the front side of the 90 degree section of the vacuum tube.



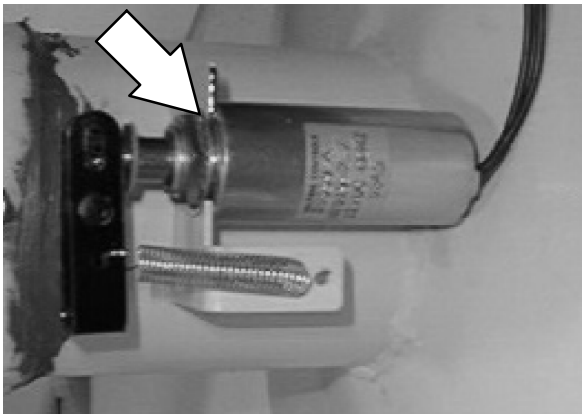
3. Remove the wires leading to the shut off solenoid.



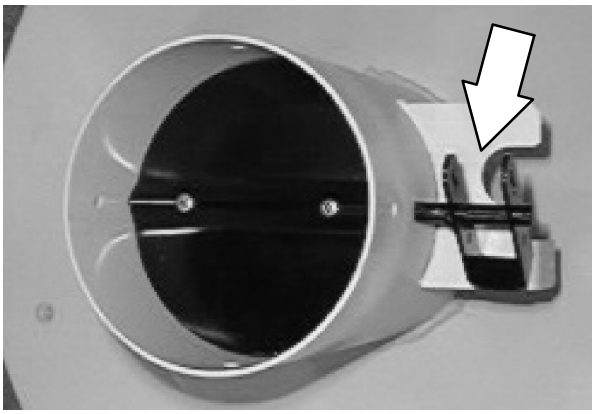
4. Disconnect the tension spring from the shut off lever.



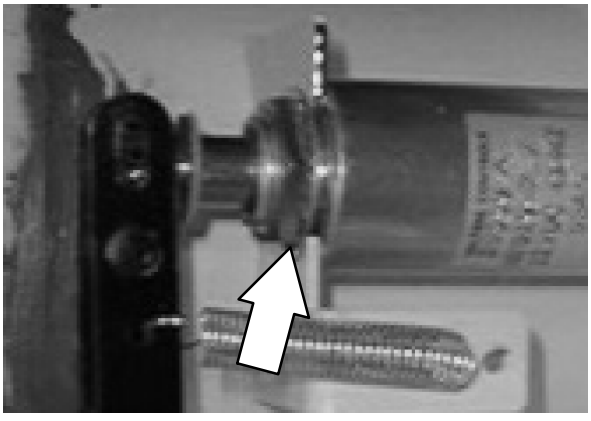
5. Loosen the large nut holding the shut off solenoid to the mount bracket.



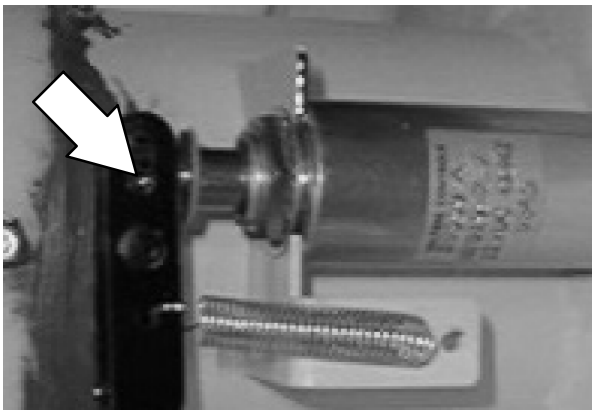
6. Remove the clevis pin holding the solenoid plunger to the shut off lever. Remove the solenoid from the machine.



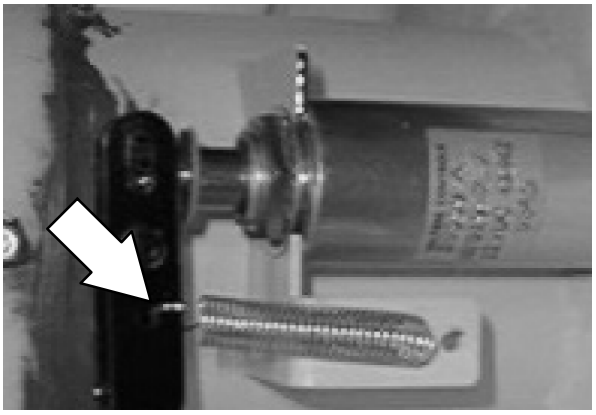
7. Install the new vacuum fan shut off solenoid onto the mount bracket. Hand tighten the jam nut.



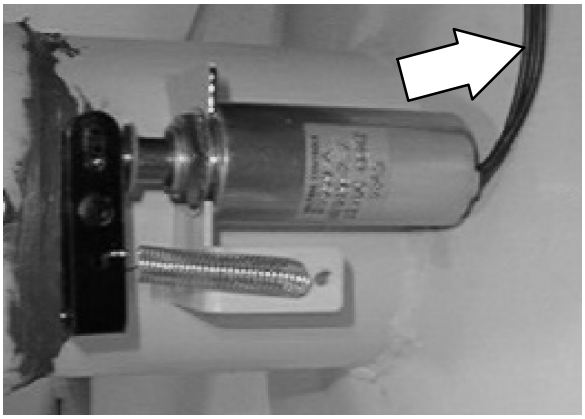
8. Reinstall the clevis pin into the end of the solenoid plunger and shut off lever arm.



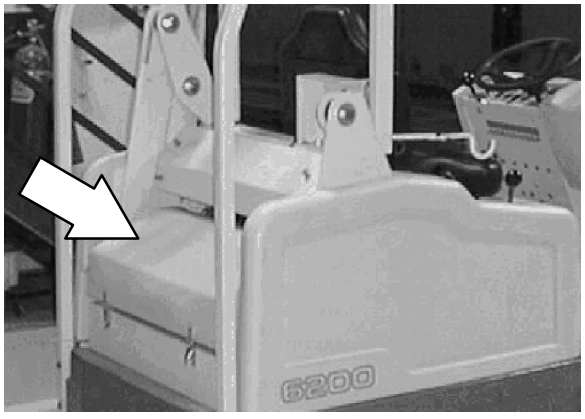
9. Reconnect the tension spring to the shut off lever arm.



10. Reconnect the main harness to the new solenoid.



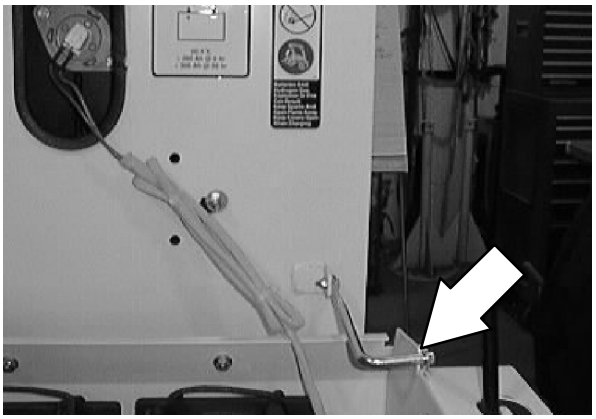
11. Reinstall the hopper cover.



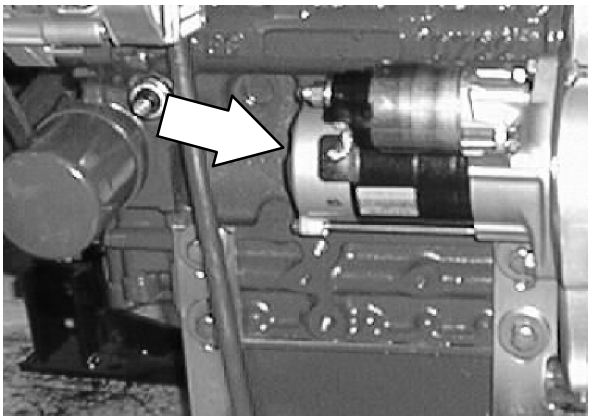
TO REPLACE ENGINE STARTER

FOR SAFETY: Before Leaving Or Servicing Machine; Stop On Level Surface, Set Parking Brake, Turn Off Machine And Remove Key.

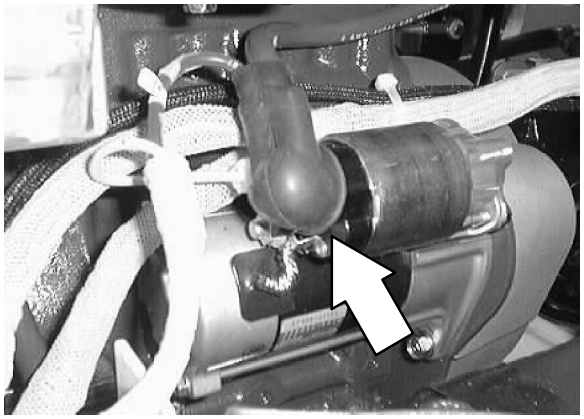
1. Tilt the seat assembly forward and engage the prop rod. Disconnect the battery cables from the battery.



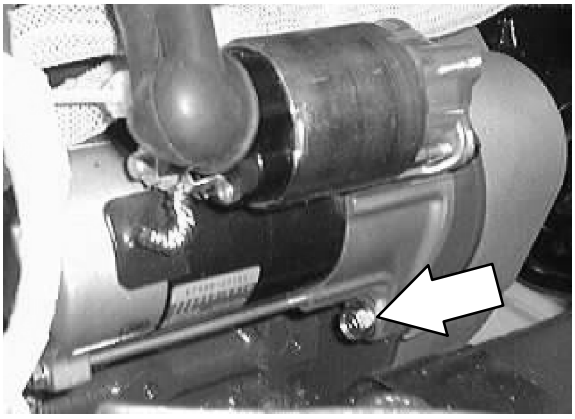
2. Locate the alternator on the right side of the engine.



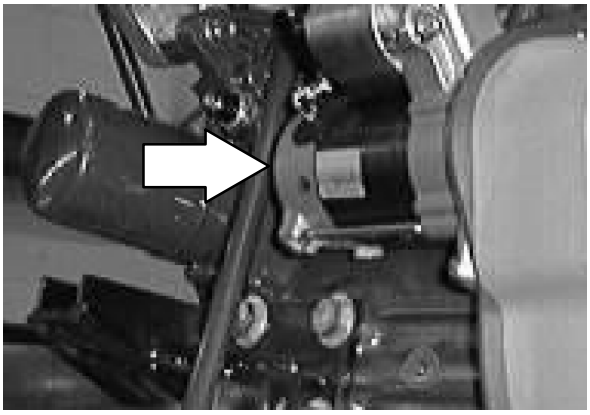
3. Disconnect the wires from the starter motor.



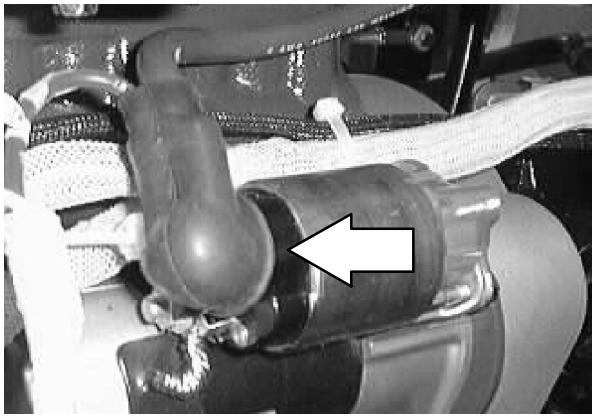
4. Remove the two hex screws holding the starter to the engine. Remove the starter from the flywheel housing and out of the machine.



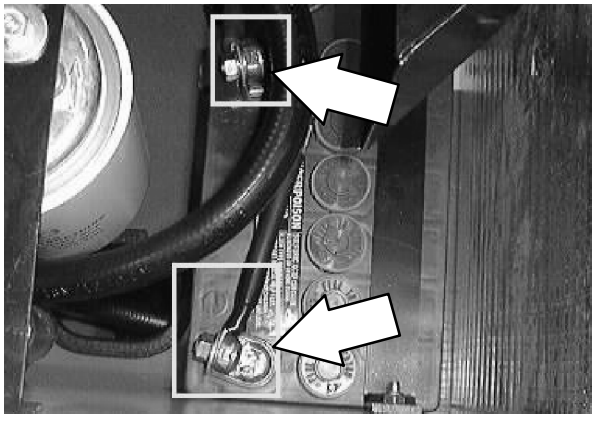
5. Position the new starter back in the flywheel housing. Re-use the two hex screws and tighten to 18 – 24 Nm (15 – 20 ft lb).



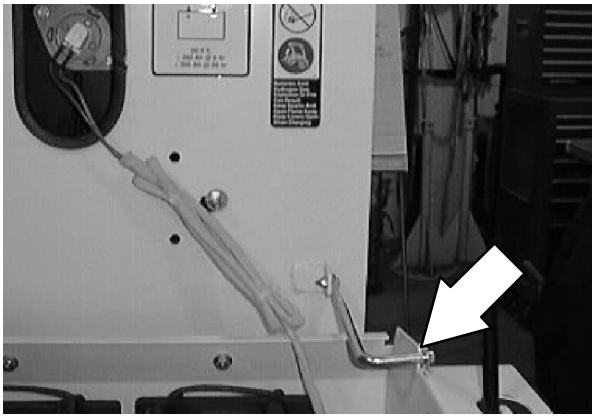
6. Reconnect the electrical wires to the starter. See schematic in this section.



7. Reconnect the battery cables to the battery.



8. Disengage the seat prop rod and pivot the seat assembly down.

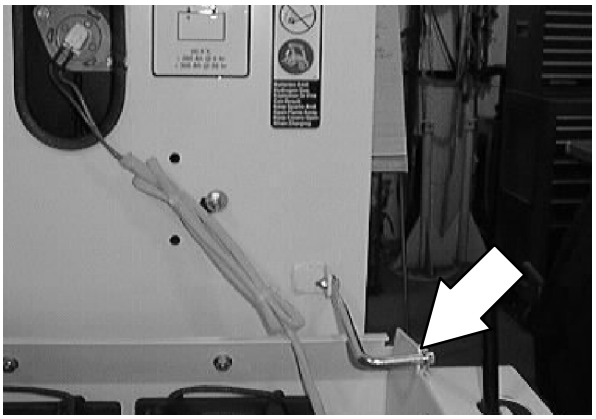


9. Check the new starter for proper operation.

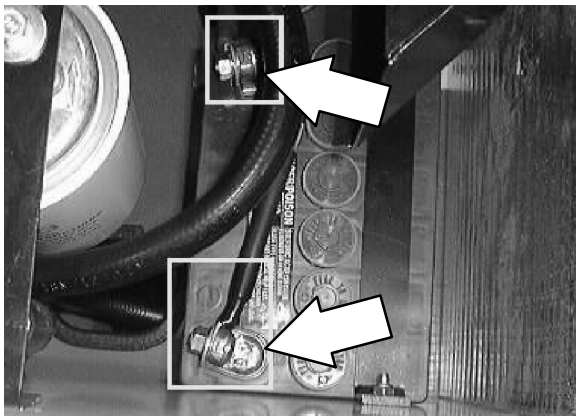
TO REPLACE MACHINE ALTERNATOR

FOR SAFETY: Before Leaving Or Servicing Machine; Stop On Level Surface, Set Parking Brake, Turn Off Machine And Remove Key.

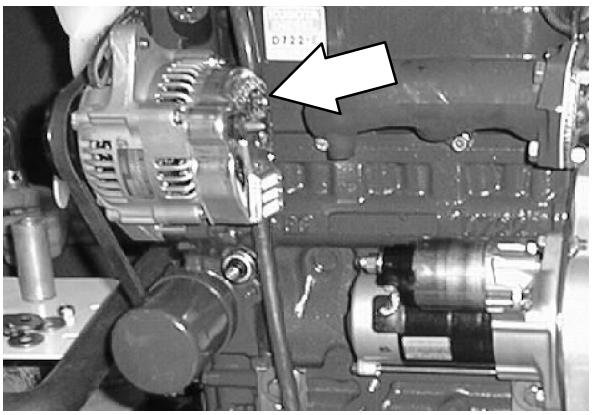
1. Tilt the seat assembly forward and engage the prop rod.



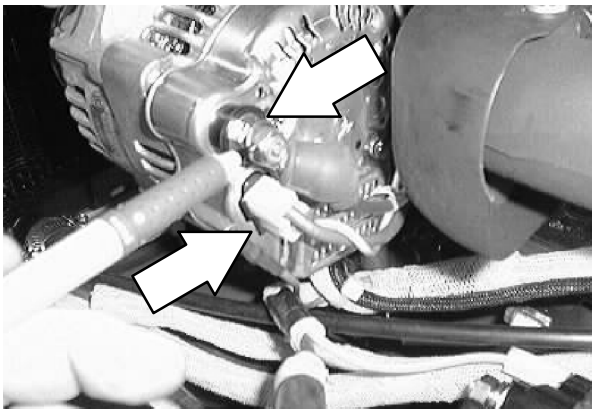
2. Disconnect the battery cables from the battery.



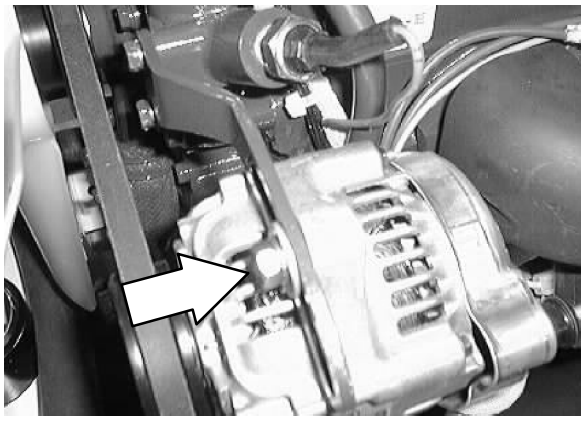
3. Locate the alternator on the right side of the engine.



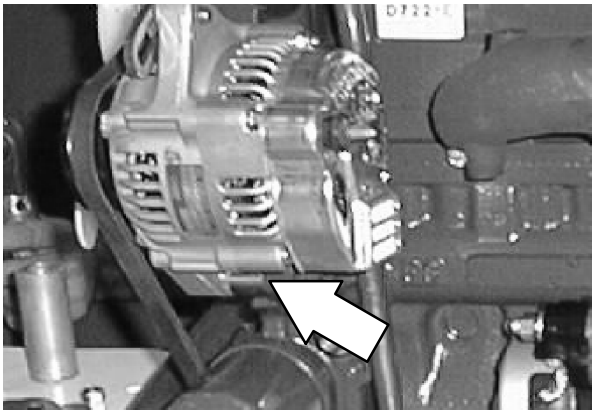
4. Disconnect the wires from the back of the alternator.



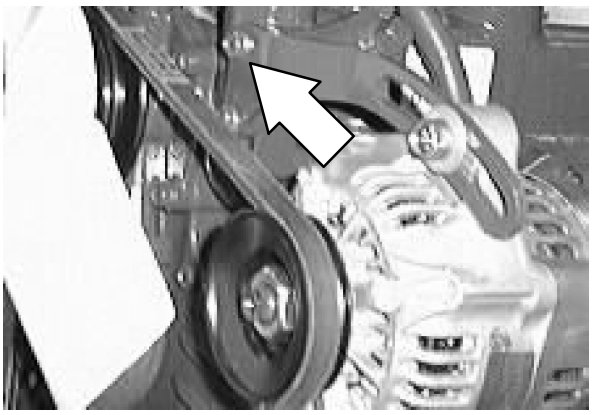
5. Loosen the hex screw holding the top of the alternator to the pivot bracket.



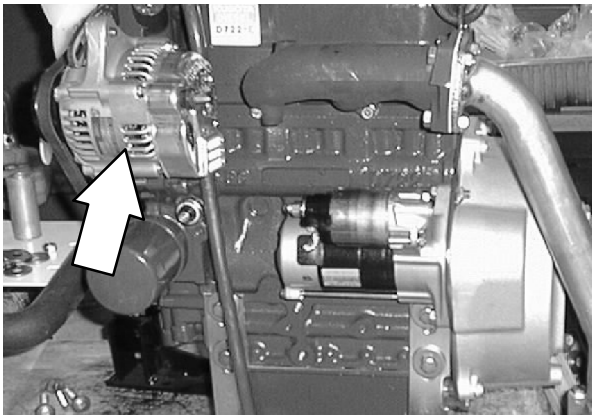
6. Loosen the hex screw on the bottom of the alternator.



7. Pivot the alternator in toward the engine and remove the fan belt from the sheave.

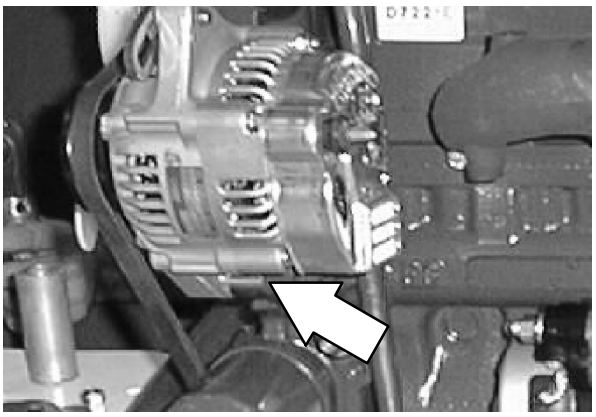


8. Remove both hex screws. Remove the old alternator out past the exhaust pipe.

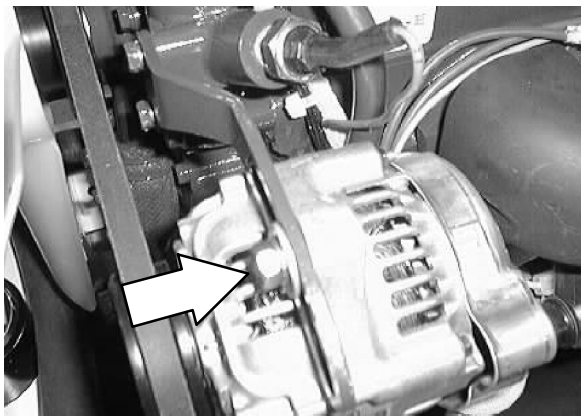


9. Position the new alternator into the engine area.

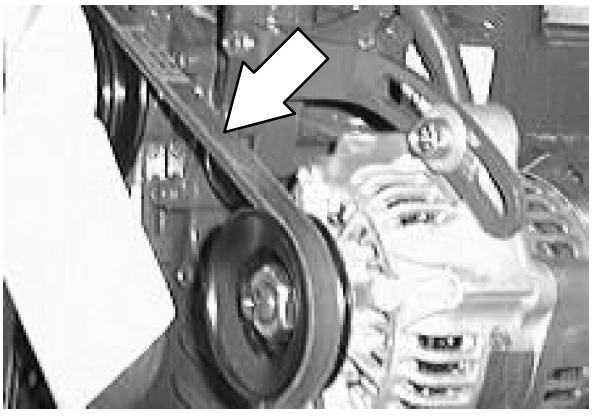
10. Reinstall the longer, lower hex bolt and nut. Leave loose for now.



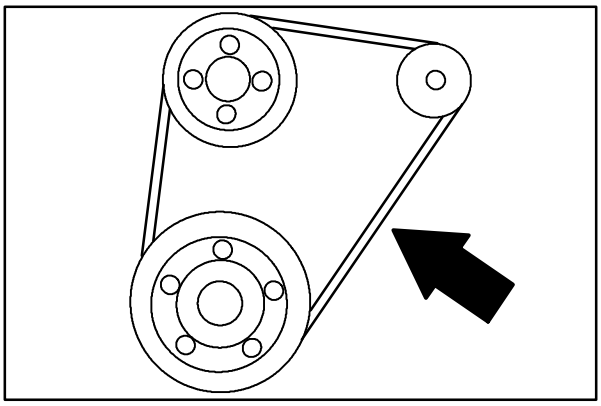
11. Reinstall the shorter hex bolt in the top of the alternator. Leave loose for now.



12. Reinstall the fan/alternator belt.

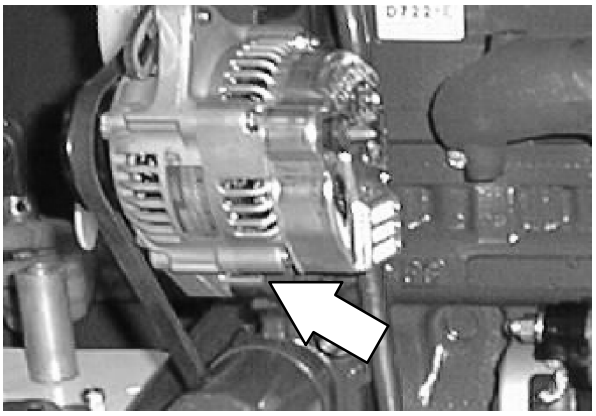


13. Pull the alternator away from the engine until the belt is tight. Proper belt tension is 10 mm (0.40 in) from a force of 4 to 5 kg (8 to 10 lb) applied at the mid-point of the longest span. Check and adjust the belt tension every 100 hours of operation. Tighten the top hex bolt tight.

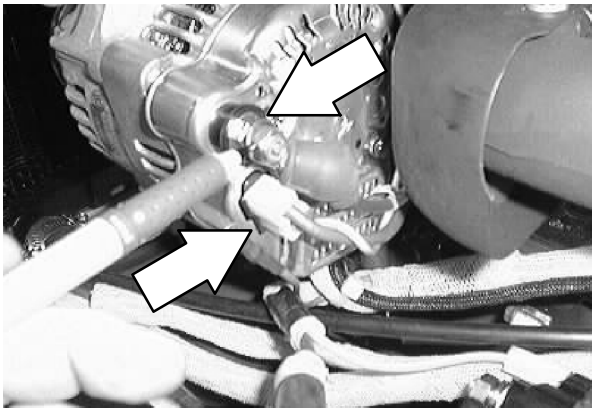


WARNING: Moving Belt And Fan Blades. Keep Away.

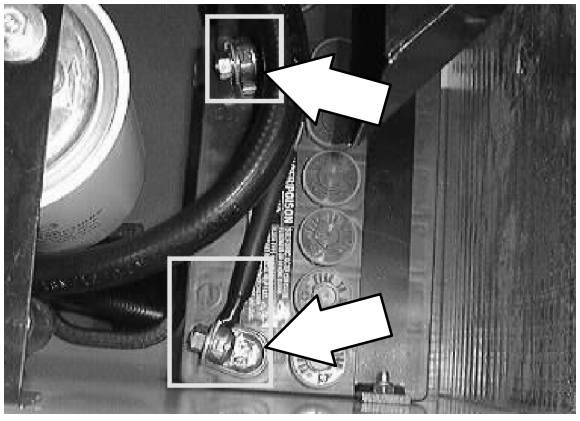
14. Firmly tighten the lower hex bolt.



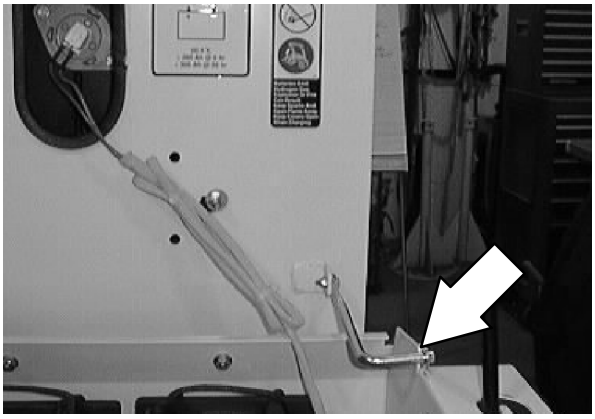
15. Reconnect the wires to the back of the alternator. See schematic in this section.



16. Reconnect the battery cables.

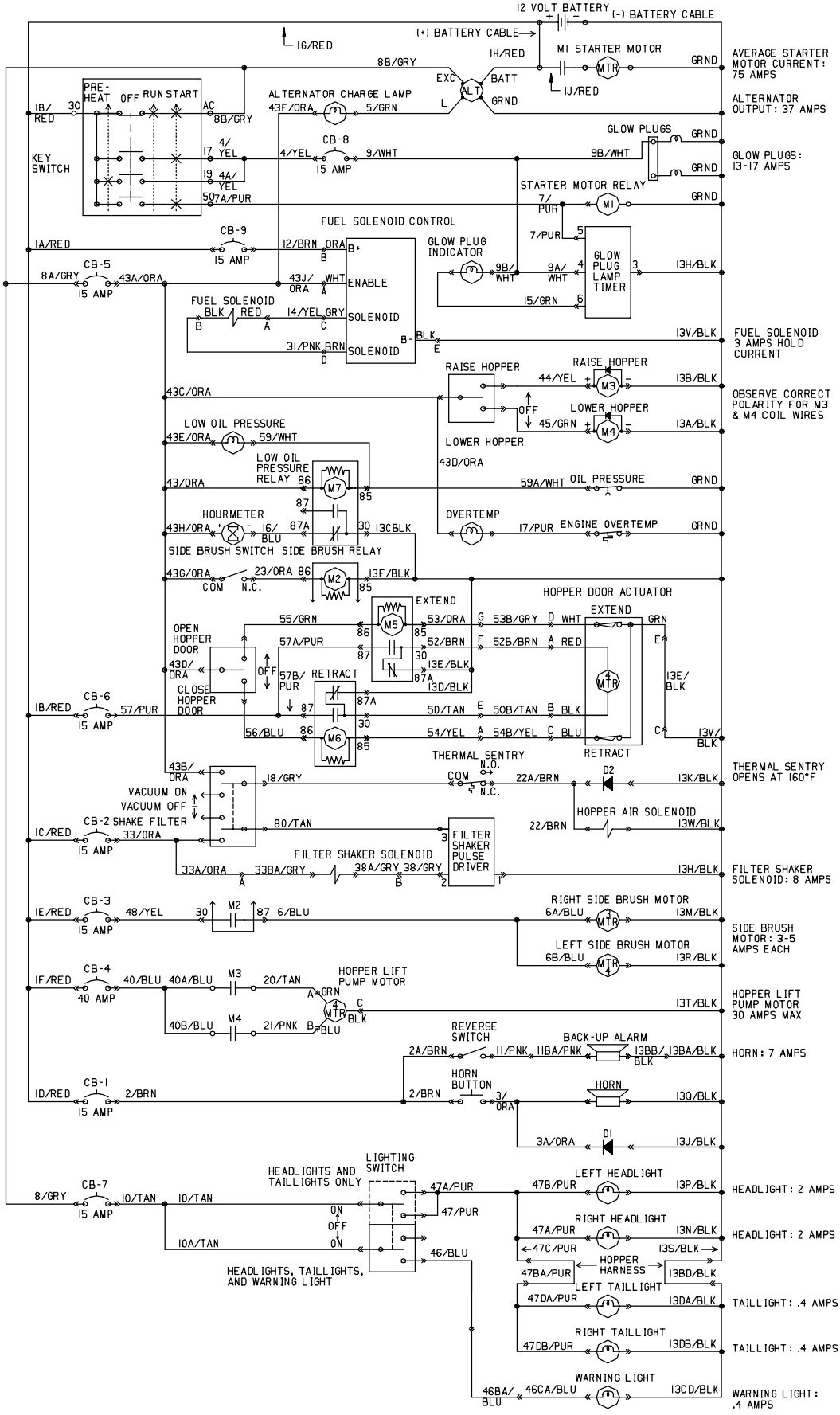


17. Close the seat support.



18. Operate the machine. Check the new alternator for proper operation.

ELECTRICAL SCHEMATIC



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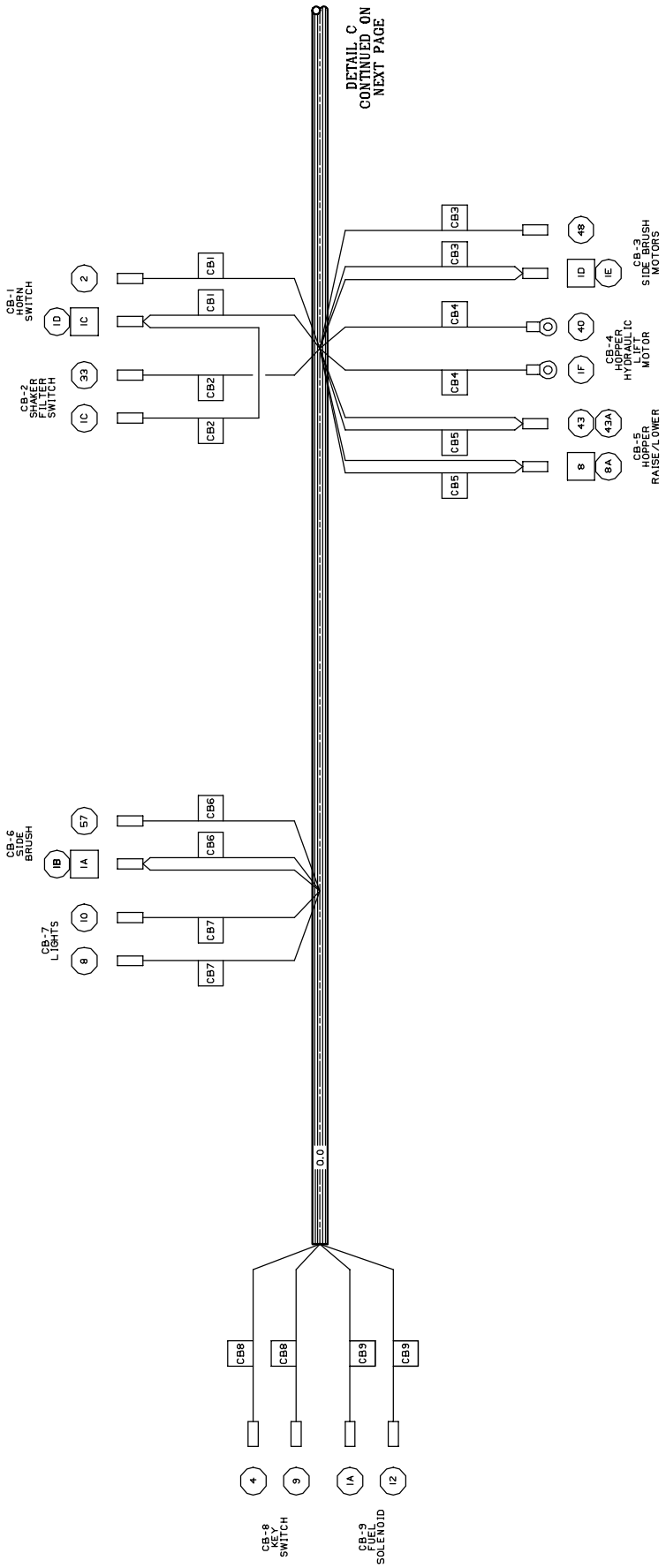
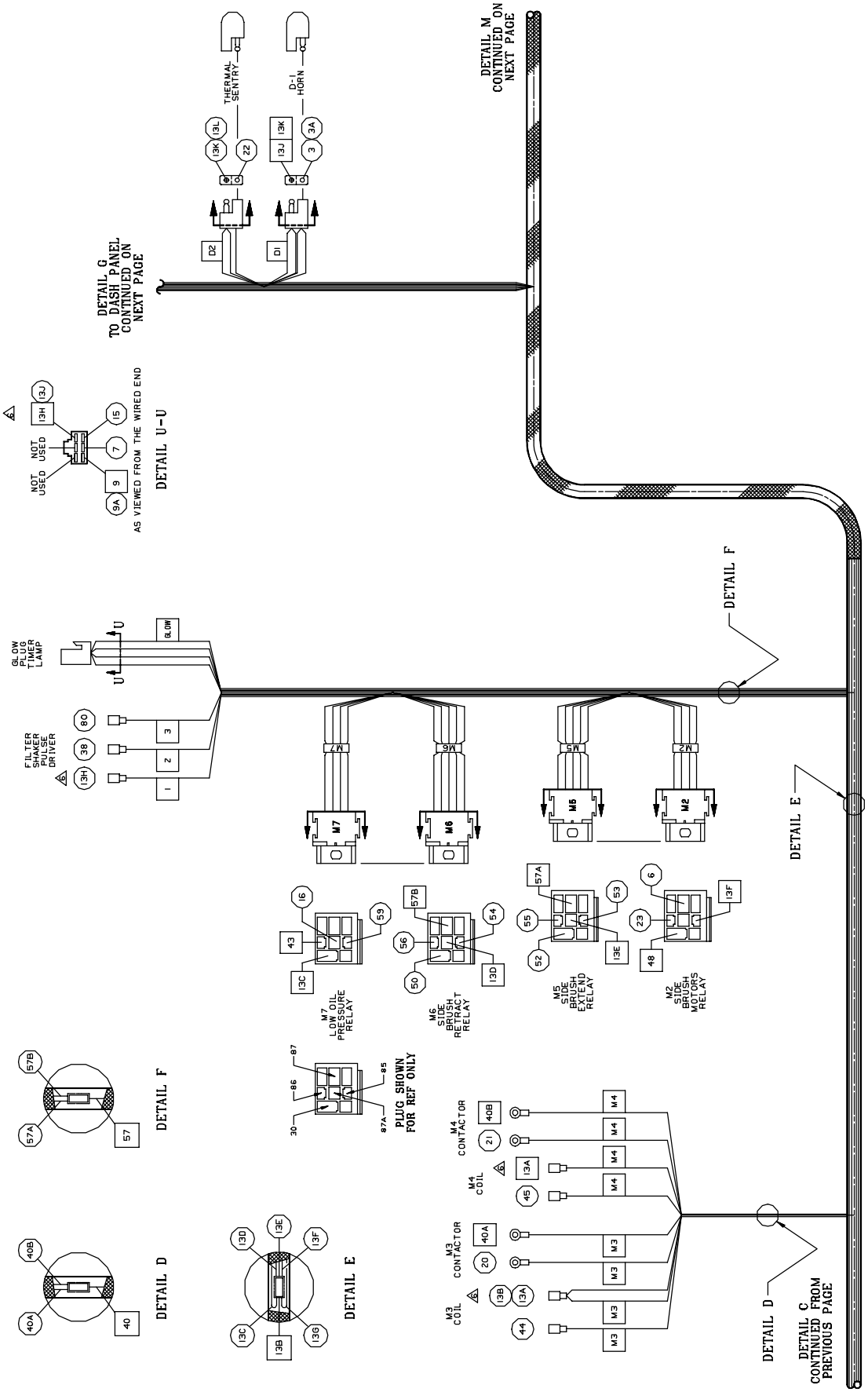
WIRE HARNESSES GROUP

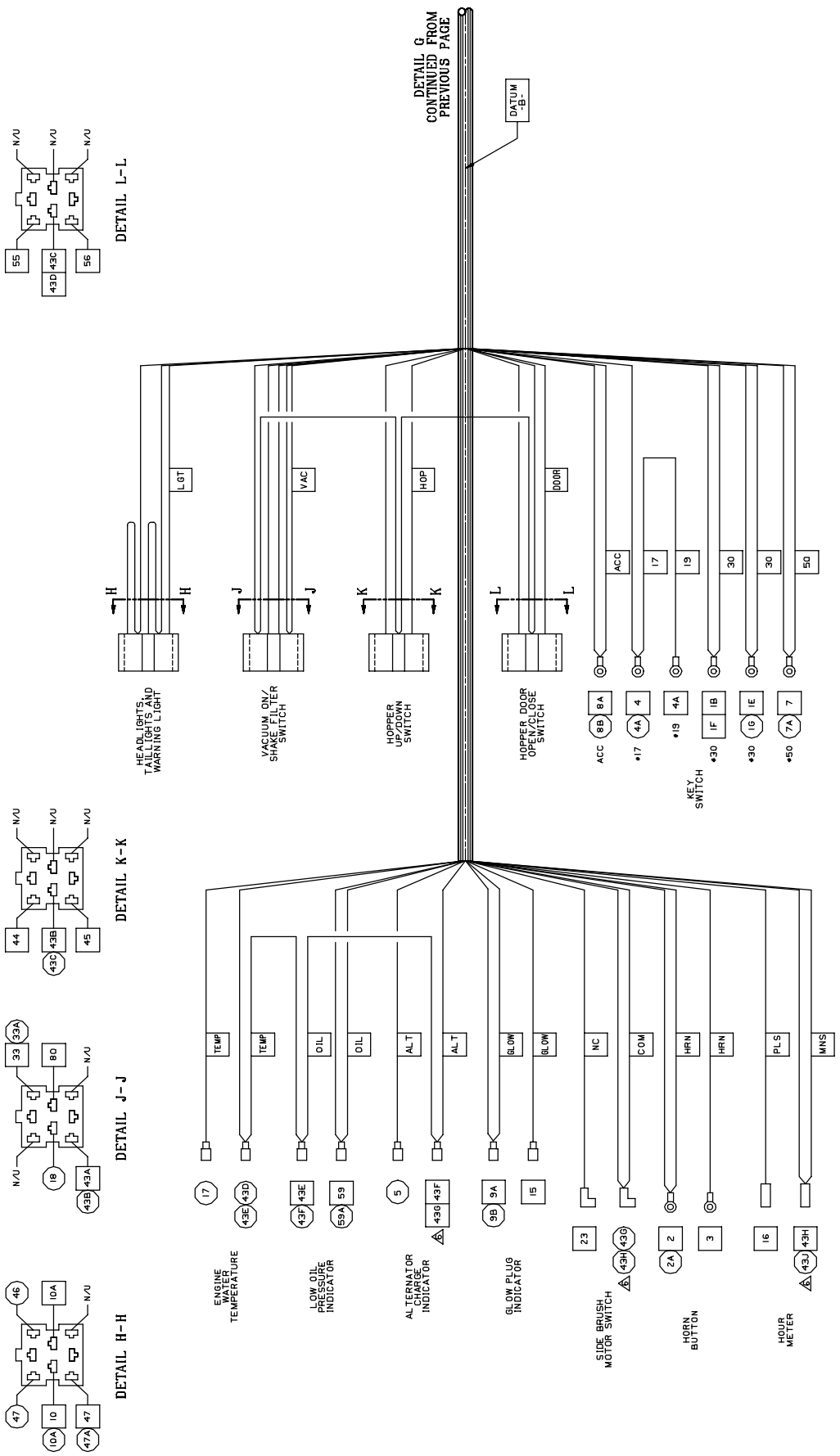


WIRE HARNESSES GROUP



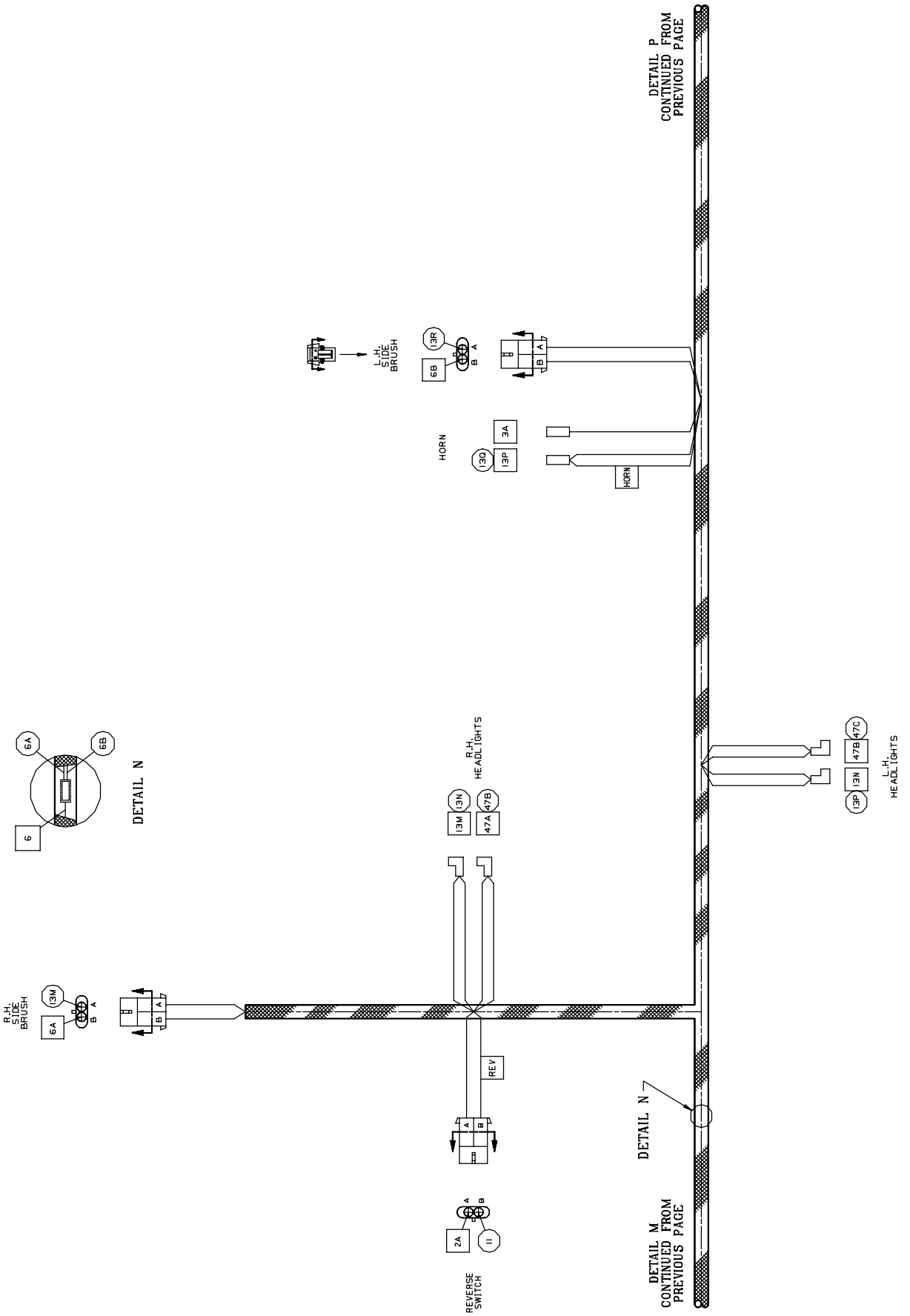
352986 - 353189 - D

WIRE HARNESSES GROUP



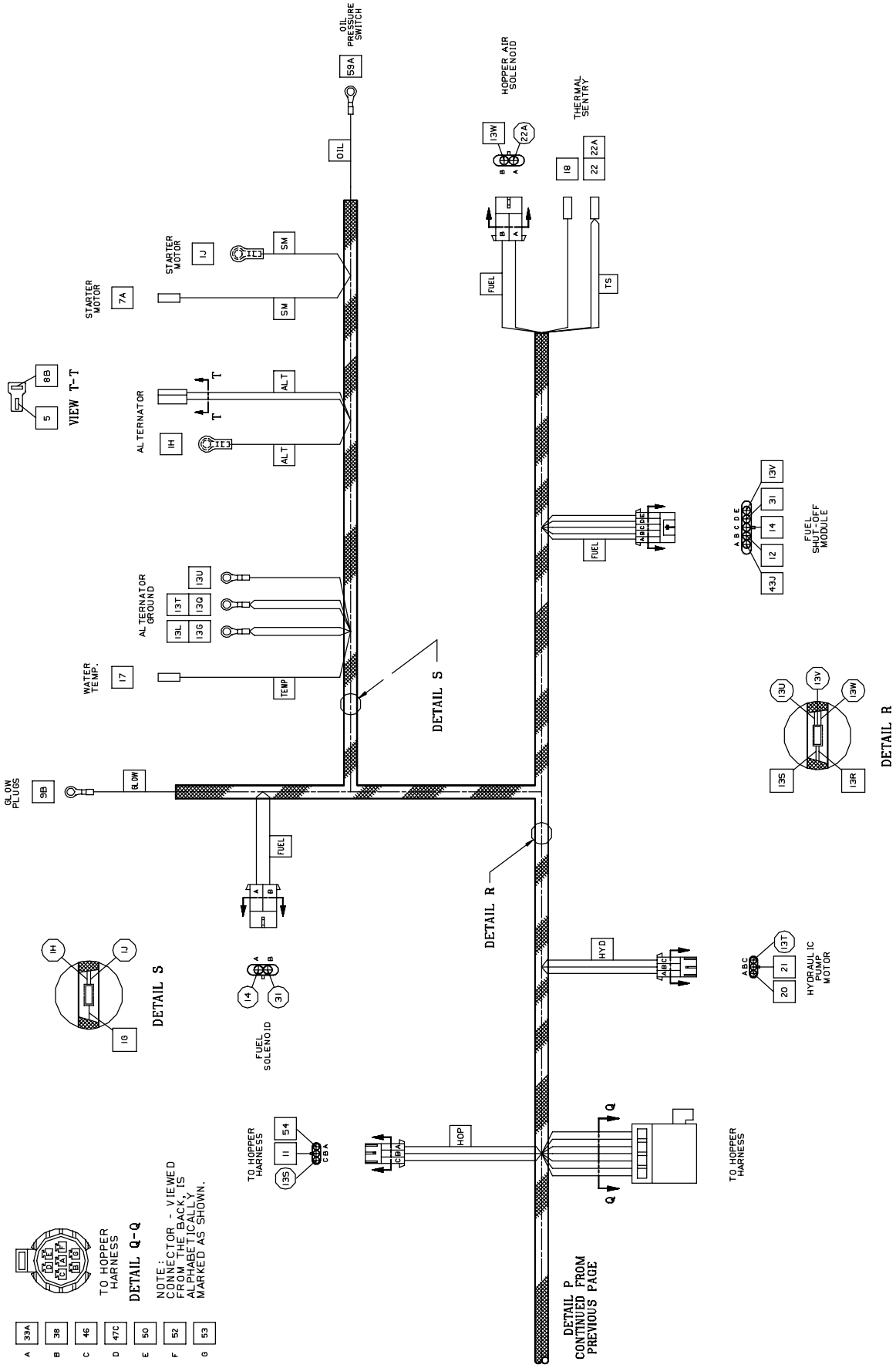
352986 - 353189 - D

WIRE HARNESSES GROUP



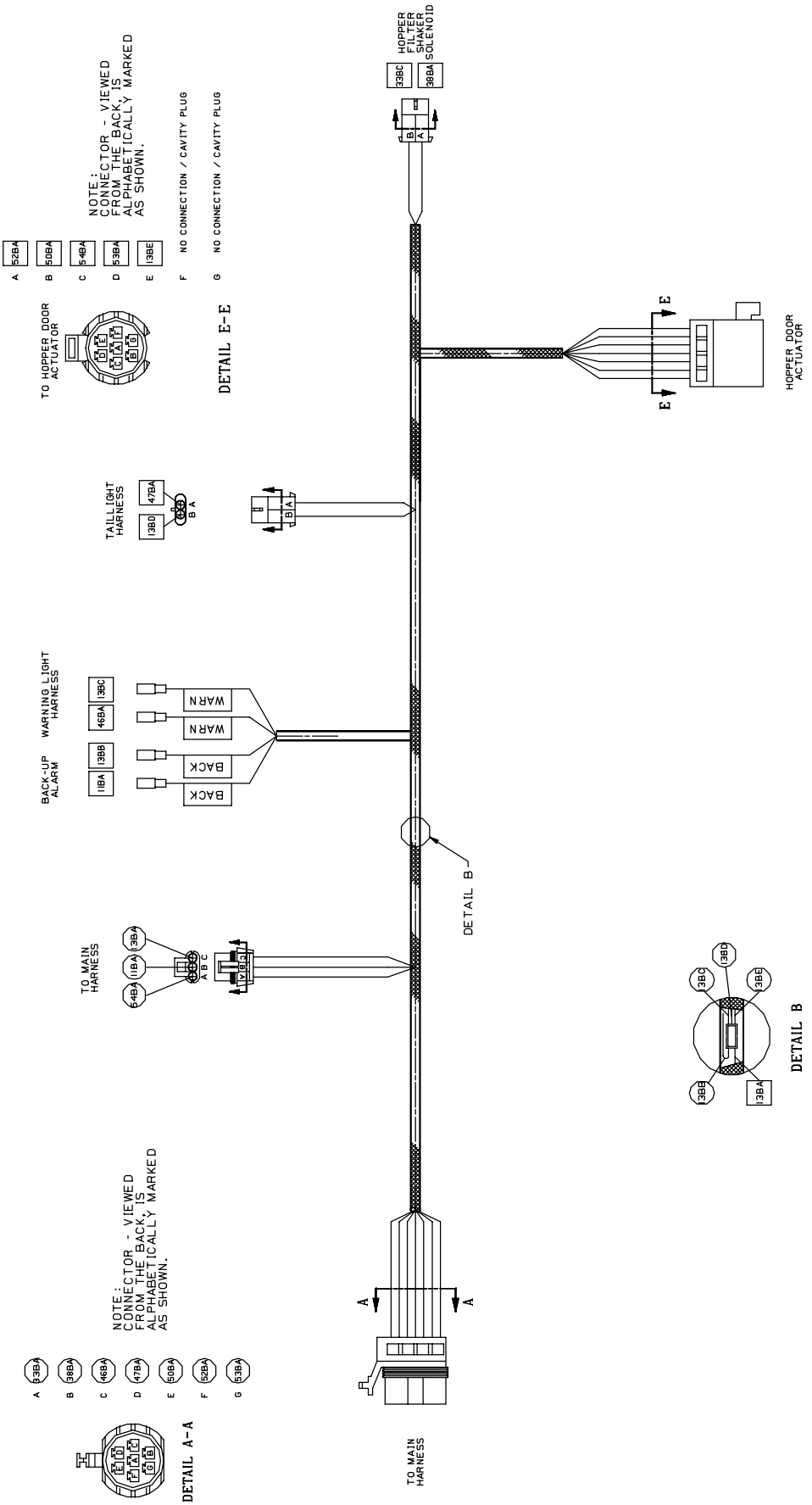
352986 - 353189 - D

WIRE HARNESSES GROUP



352986 - 353189 - D

WIRE HARNESSES GROUP



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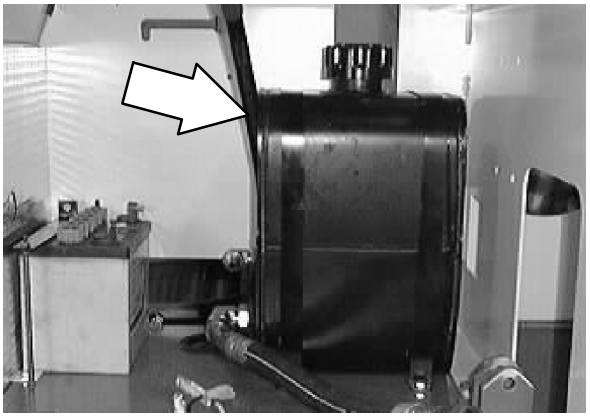
CONTENTS

INTRODUCTION

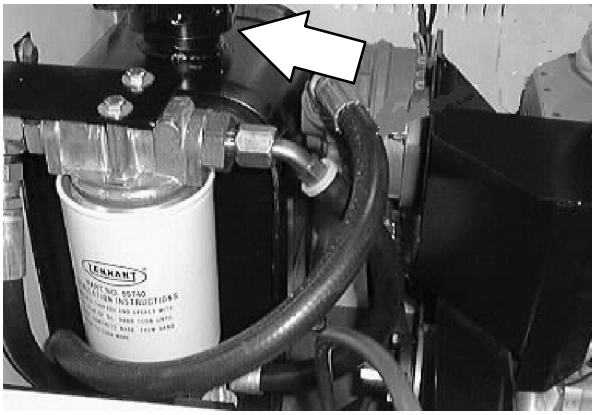
The hydraulic system on the model 6200D consists of the hydraulic pump, directional control valve, electro/hydraulic pump, reservoir, hopper lift cylinder, and drive motor.

HYDRAULIC FLUID RESERVOIR

The reservoir is located on the right side of the machine next to the engine.



A filler cap is mounted on top of the reservoir. It has a built in breather and fluid level dipstick. Replace the cap after every 800 hours of operation.



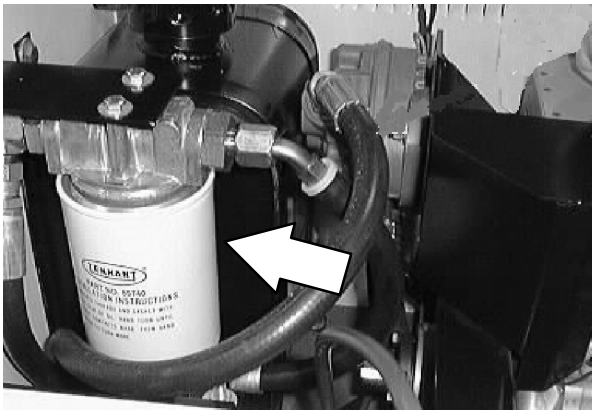
Check the hydraulic fluid level at *operating temperature* daily. The dipstick is marked with full and add markings to indicate the level of hydraulic fluid in the reservoir. Cold fluid level is mid-point of add and full lines.

Lubricate the filler cap gasket with a film of hydraulic fluid before putting the cap back on the reservoir.

ATTENTION! Do not overfill the hydraulic fluid reservoir or operate the machine with a low level of hydraulic fluid in the reservoir. Damage to the machine hydraulic system may result.

Drain and refill the hydraulic fluid reservoir with new hydraulic fluid every 800 hours of operation.

The hydraulic fluid filter is located in front of the hydraulic reservoir near the rear of the engine compartment. Replace the filter element every 800 hours of operation.



HYDRAULIC FLUID

The quality and condition of the hydraulic fluid plays a very important role in how well the machine operates. TENNANT's hydraulic fluid is specially selected to meet the needs of TENNANT machines.

TENNANT's hydraulic fluid provides a longer life for the hydraulic components.

TENNANT part no.	Ambient Temperature
65870	below 7° C (45° F)

If a locally-available hydraulic fluid is used, make sure the specifications match TENNANT hydraulic fluid specifications. Using substitute fluids can cause premature failure of hydraulic components.

ATTENTION! Hydraulic components depend on system hydraulic fluid for internal lubrication. Malfunctions, accelerated wear, and damage will result if dirt or other contaminants enter the hydraulic system.

HYDRAULIC HOSES

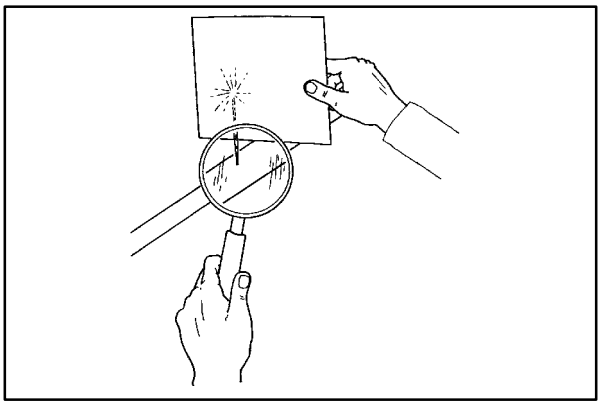
Check the hydraulic hoses every 200 hours of operation for wear or damage.

Fluid escaping at high pressure from a very small hole can be almost invisible, and can cause serious injuries.

See a doctor at once if injury results from escaping hydraulic fluid. Serious infection or reaction can develop if proper medical treatment is not given immediately.

FOR SAFETY: When Servicing Machine, Use Cardboard To Locate Leaking Hydraulic Fluid Under Pressure.

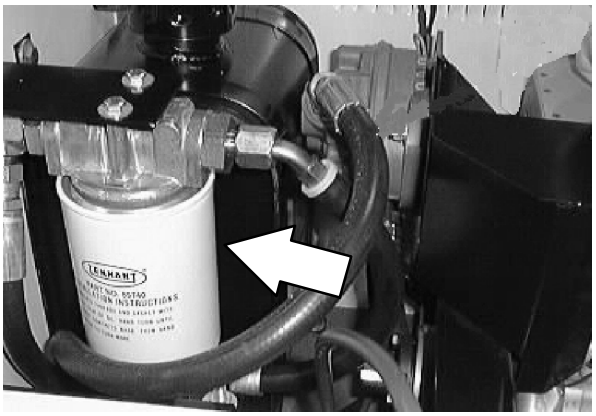
If you discover a fluid leak, contact your mechanic/supervisor.



00002

HYDRAULIC FLUID FILTER

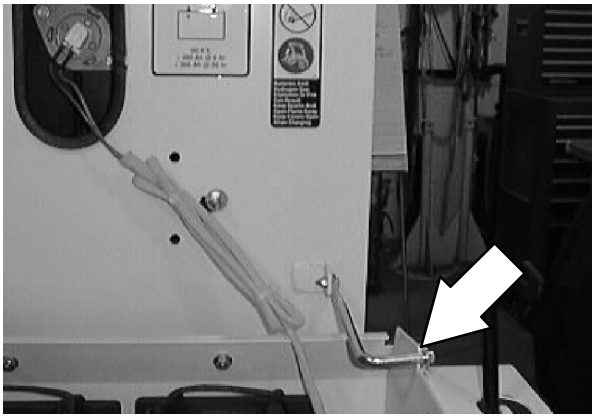
The hydraulic fluid filter is located at the front of the hydraulic tank. The filter is used to keep the fluid free from contaminates. The filter should be changed every 800 hours.



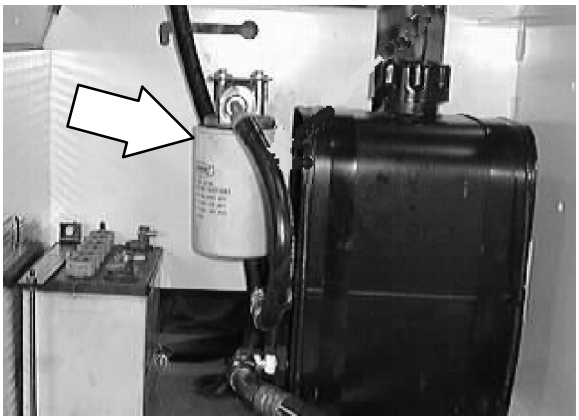
TO REPLACE HYDRAULIC FLUID FILTER

FOR SAFETY: Before Leaving Or Servicing Machine; Stop On Level Surface, Set Parking Brake, turn off machine, and remove key.

1. Open the seat support and engage the prop rod.

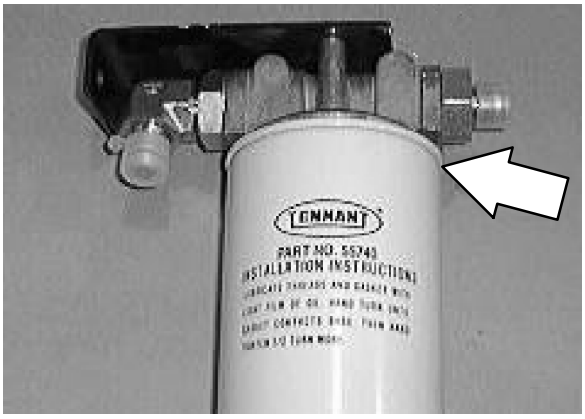


2. Locate the hydraulic fluid filter in front of the hydraulic tank.



3. Place a small drip pan or rag under the filter.

4. Un-screw the filter from the filter head. Properly discard the old filter.

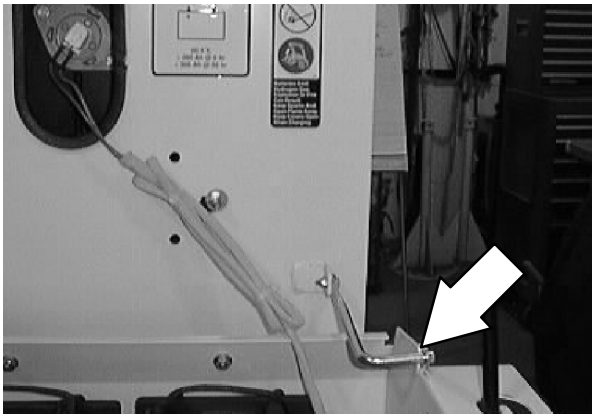


5. Place a small amount of hydraulic oil on the rubber O-ring on the new filter.

6. Screw the new filter onto the filter head. Tighten until snug then 1/4 turn.

7. Remove the drain pan or rag.

8. Disengage the prop rod and close the seat support.



9. Start the machine and check the new hydraulic fluid filter for any leaks.

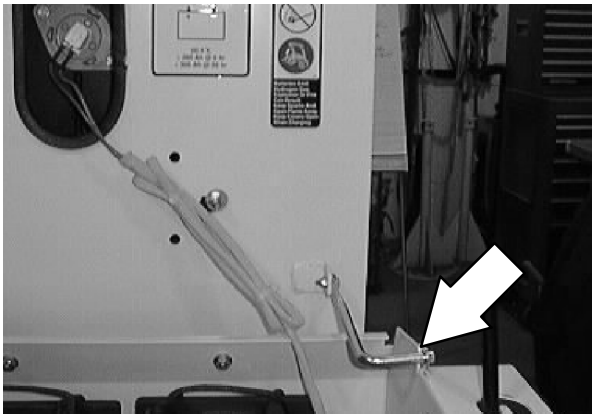
HYDRAULIC PUMP

The hydraulic pump is used to provide flow to the control valve and drive motor.

TO REPLACE HYDRAULIC PUMP

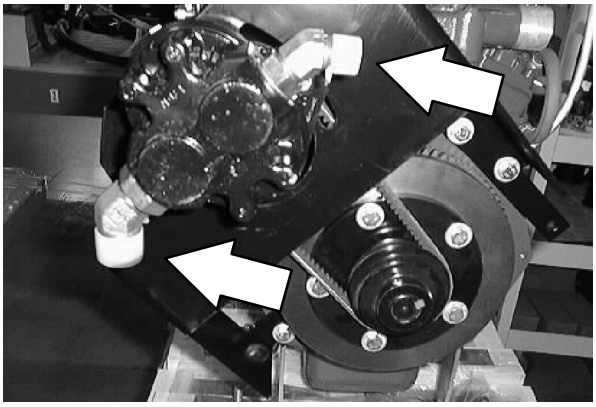
FOR SAFETY: Before Leaving Or Servicing Machine; Stop On Level Surface, Set Parking Brake, Turn Off Machine And Remove Key.

1. Tilt the seat assembly forward and engage the prop rod. Disconnect the battery cables from the battery.

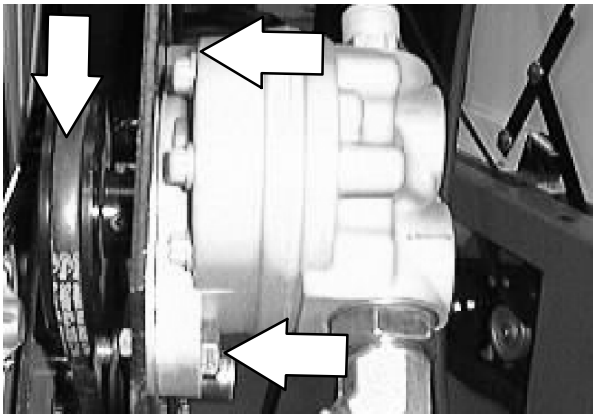


2. Mark, disconnect, and plug the two hoses leading to the hydraulic pump.

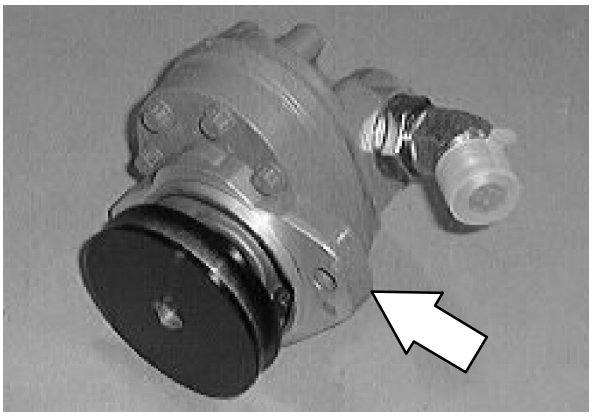
NOTE: Observe hydraulic cleanliness requirements when opening hydraulic lines.



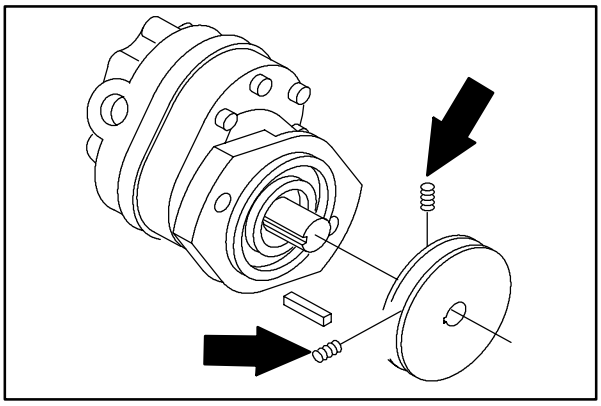
3. Loosen the bolts holding the hydraulic pump to the mount plate. Push the pump to loosen the V-belt. Remove the V-belt from the pump sheave.



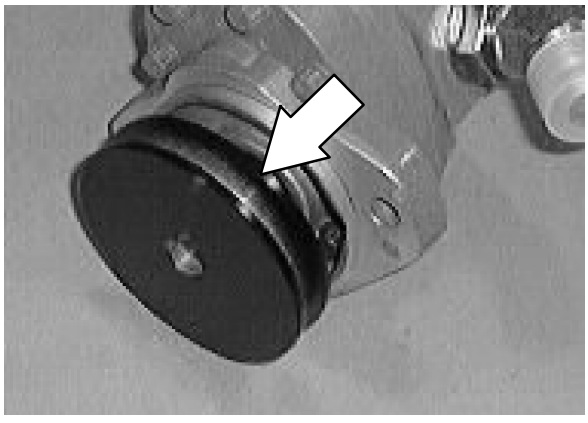
4. Remove the bolts and hydraulic pump from the machine.



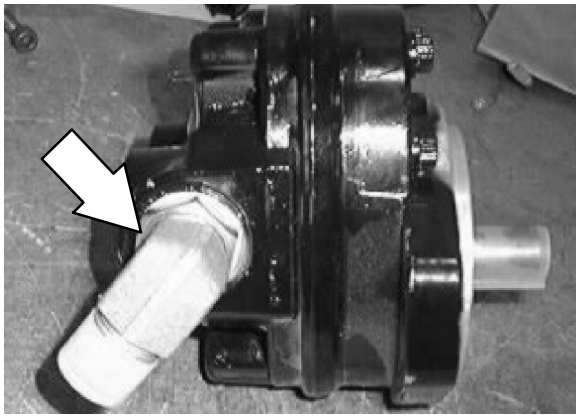
5. Loosen the two set screws holding the V-belt sheave to the pump shaft. Remove the sheave from the old hydraulic pump. Make sure to retain the square key.

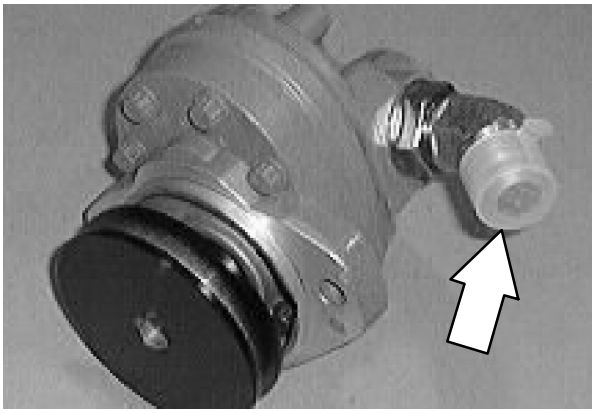


6. Install the V-belt sheave onto the shaft of the new hydraulic pump in the same orientation that it was removed. Leave the set screws loose for now.

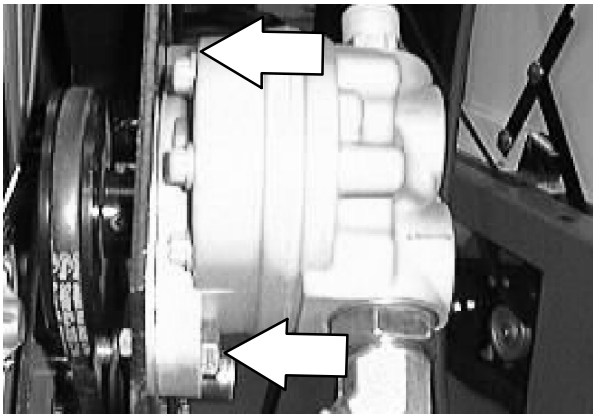


7. Remove the two hydraulic fittings from the old hydraulic pump and install into the new pump in the same orientation.

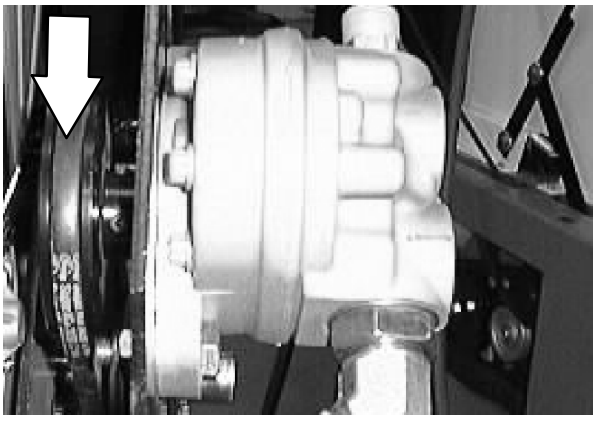




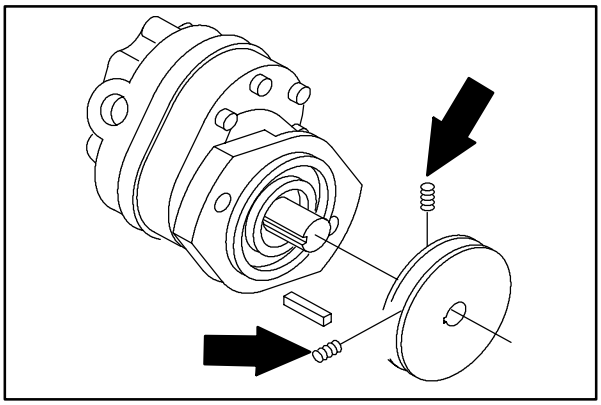
8. Install the new hydraulic pump assembly onto the mount plate on the side of the engine. Reinstall the hardware. Leave loose for now.



9. Position the hydraulic pump V-belt on the pump sheave and flywheel sheave. Pull up on the hydraulic pump to tension V-belt. Hand tighten the hardware tight. The correct tension is when the belt deflects 4.0 mm (0.16 in) from a force of .45 kg (10.0 lb) at belt midpoint of the longest span.

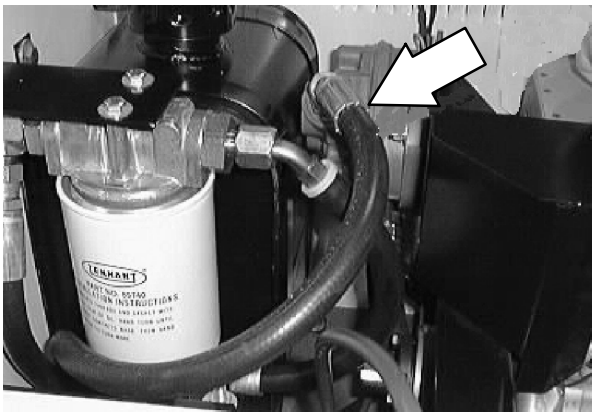


10. Use a straight edge to align the hydraulic pump sheave with the sheave on the engine. Tighten the two set screws.



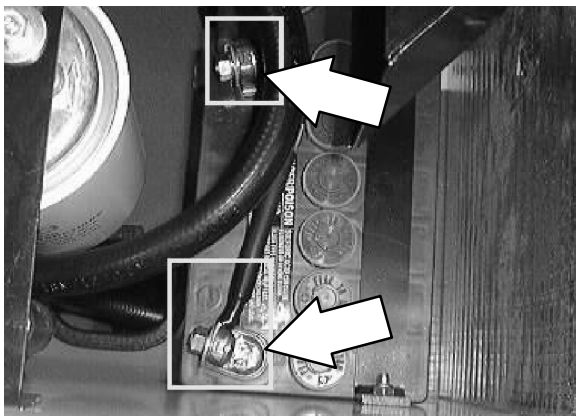
11. Reconnect the hydraulic hoses to the pump. See schematic in this section.

NOTE: Observe hydraulic cleanliness requirements when opening hydraulic lines.

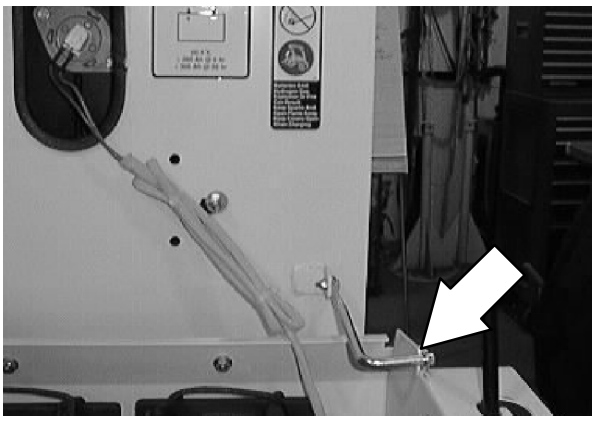


12. Reconnect the battery cables.

13. Start the machine and check the new pump for proper operation and for leaks.



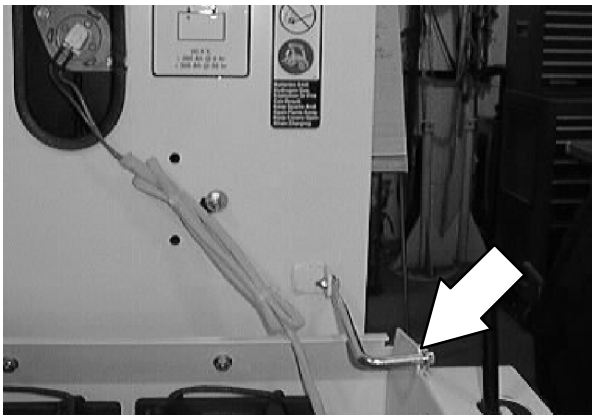
14. Disengage the prop rod and lower the seat support.



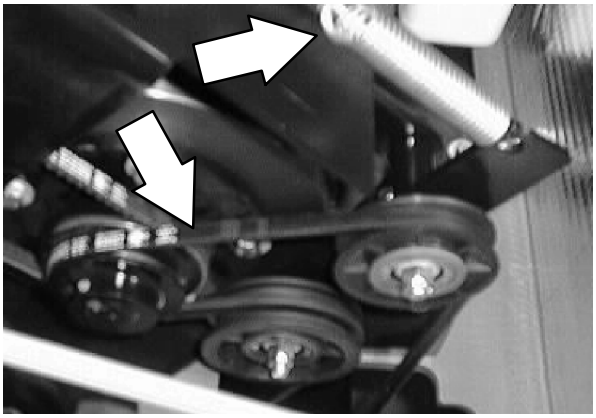
TO REPLACE HYDRAULIC PUMP V-BELT

FOR SAFETY: Before Leaving Or Servicing Machine; Stop On Level Surface, Set Parking Brake, Turn Off Machine And Remove Key.

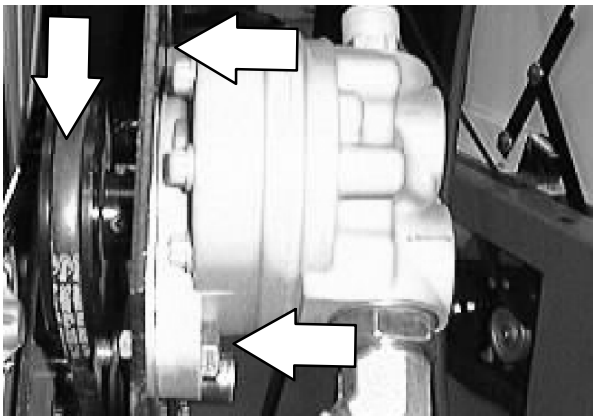
1. Tilt the seat assembly forward and engage the prop rod. Disconnect the battery cables from the battery.



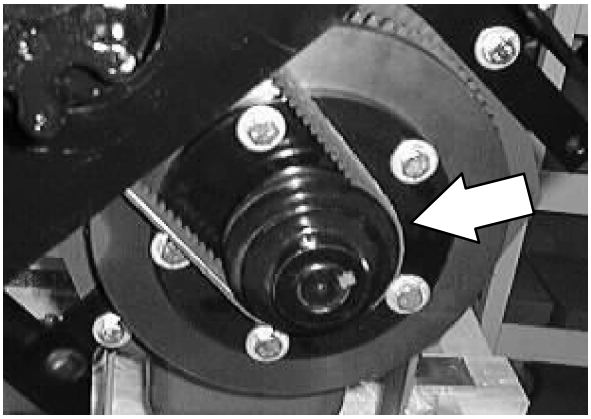
2. Loosen the jack shaft V-belt tension spring threaded rod. Push forward on the V-belt idler arm and remove the V-belt from the flywheel sheave.



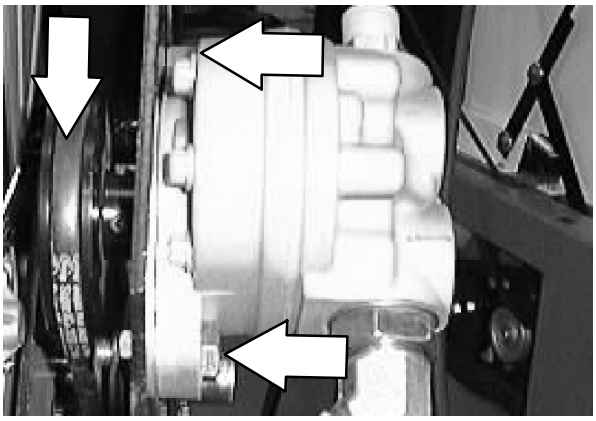
3. Loosen the hardware holding the hydraulic pump to the mount bracket. Push the pump down and remove the V-belt from the pump sheave.



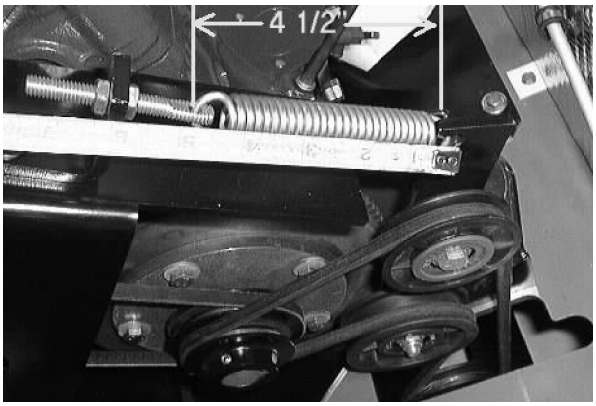
4. Remove the main brush jackshaft V-belt from the engine sheave.



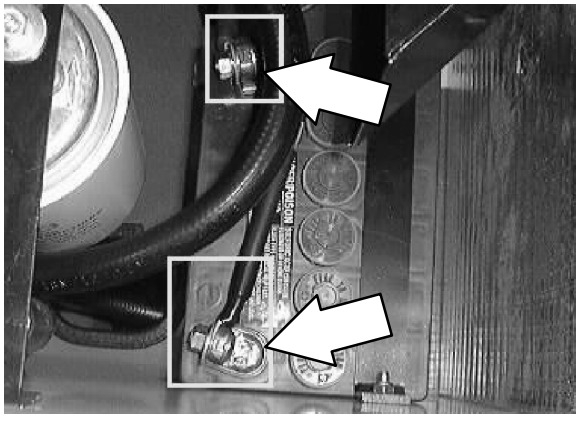
5. Position the new hydraulic pump V-belt on the pump sheave and flywheel sheave. Pull up on the hydraulic pump to tension V-belt. Hand tighten the hardware tight. The correct tension is when the belt deflects 4.0 mm (0.16 in) from a force of .45 kg (10.0 lb) at belt midpoint of the longest span.



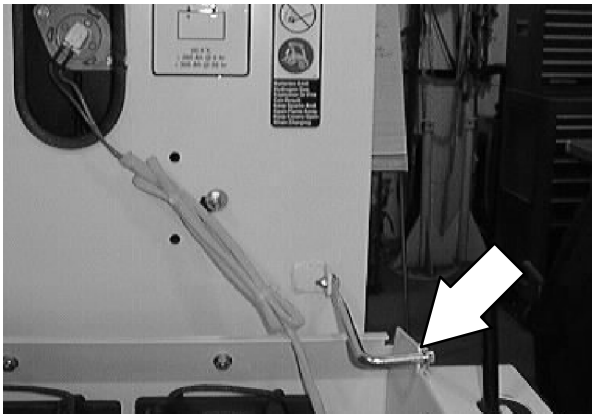
6. Position the existing jackshaft V-belt onto the two idler sheaves and flywheel sheave. Tighten the jam nut on the tension spring threaded rod until the spring is 4.5 inches (114.3 mm) in length. *The correct tension is when the belt deflects 6.0 mm* (0.25 in) *from a force of .45 kg* (10.0 lb) *at belt midpoint of the longest span.*



7. Reconnect the battery cables.



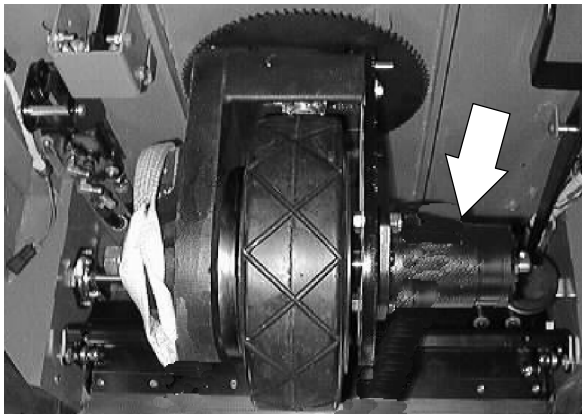
8. Start the machine and check the pump for proper operation and for leaks.



9. Disengage the prop rod and lower the seat support.

HYDRAULIC DRIVE MOTOR

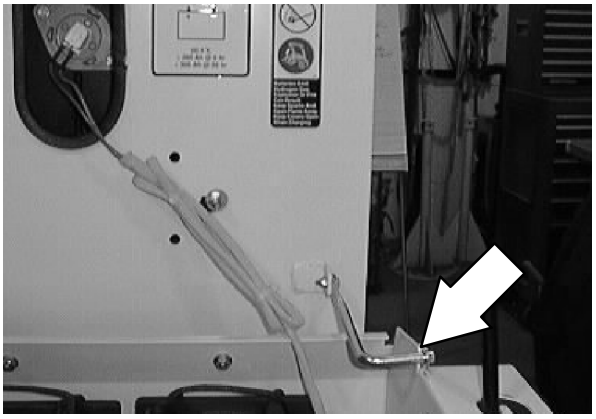
The front drive wheel motor propels the 6200D forward and reverse. The propel pump provides hydraulic flow to the drive motor through the foot operated control valve.



TO REPLACE DRIVE MOTOR

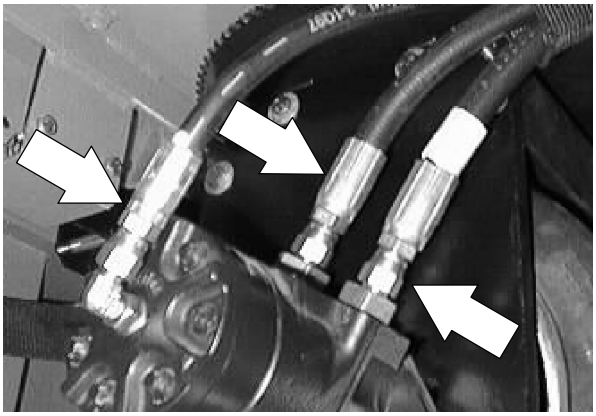
FOR SAFETY: Before Leaving Or Servicing Machine; Stop On Level Surface, Set Parking Brake, Turn Off Machine And Remove Key.

1. Tilt the seat assembly forward and engage the prop rod. Disconnect the battery cables from the battery.



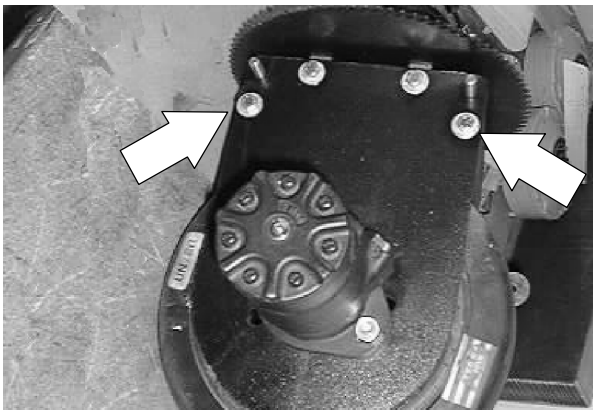
2. Raise the front of the machine and install jackstands under the machine frame.

3. Mark, disconnect, and plug the three hoses leading to the drive motor.

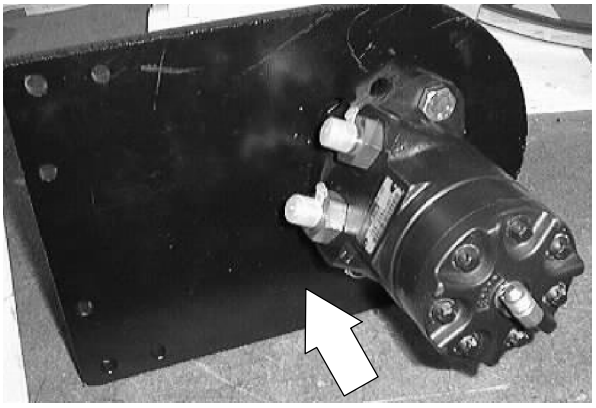


NOTE: Observe hydraulic cleanliness requirements when opening hydraulic lines.

4. Remove the four hex screws holding the outer plate, motor, and drive hub to the main drive assembly.

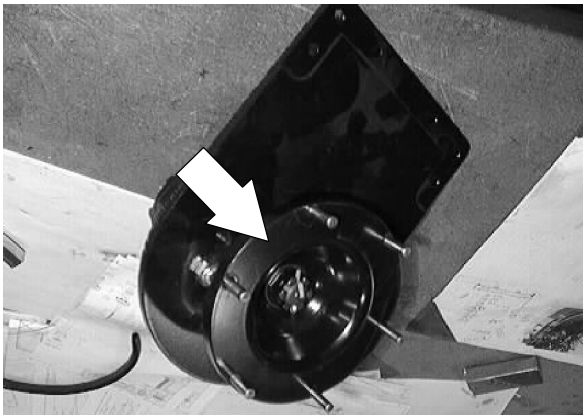


5. Pull the outer plate, motor, and drive hub off the main drive assembly.



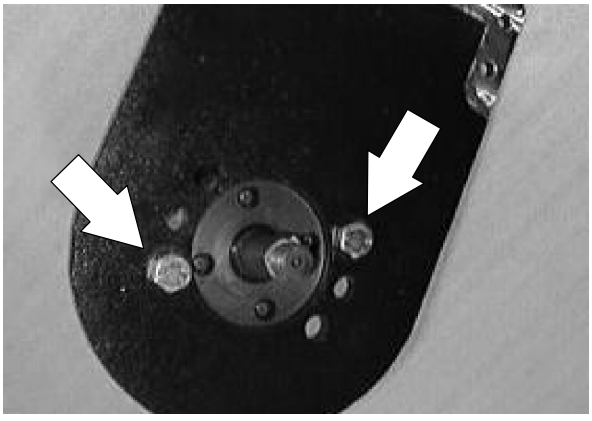
6. Go to the drive hub side of the drive assembly.

7. Remove the cotter pin and castle nut holding the drive hub to the motor shaft. Use a puller to remove the drive hub from the motor.

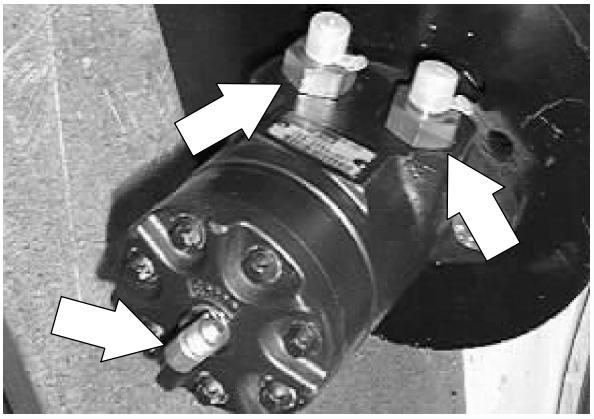


8. Remove the hardware holding the old drive motor to the mount plate. Remove the drive motor from the mount plate.

NOTE: Note the orientation of the motor to the mount plate.

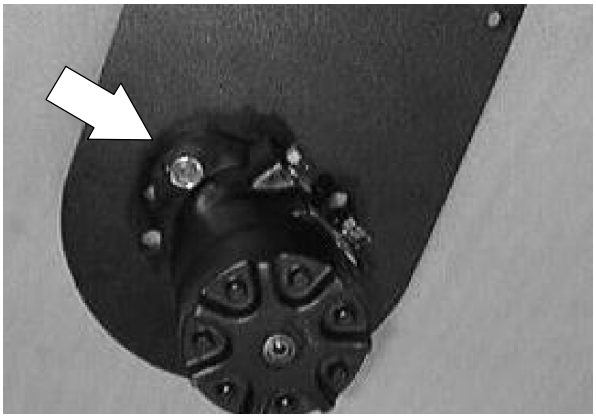


9. Remove the three hydraulic fittings from the old motor and install into the new hydraulic motor in the same orientation.

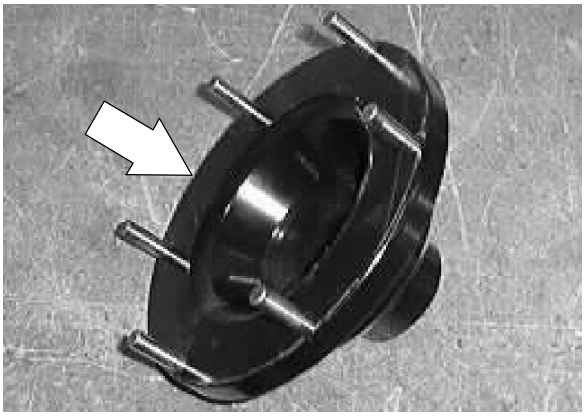


NOTE: Observe hydraulic cleanliness requirements when opening hydraulic lines.

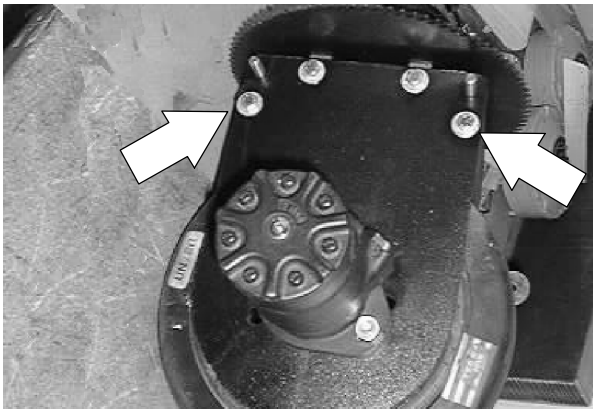
10. Position the new motor and fittings onto the existing motor mount plate. *Note the orientation of the motor to the mount plate.* Install the two screws and nuts. Tighten to 37 – 48 Nm (26 – 34 ft lb).



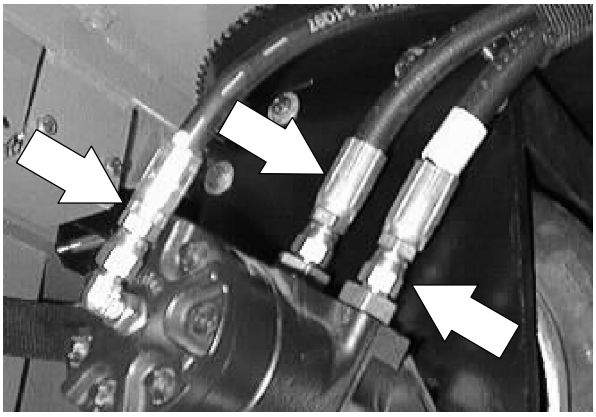
11. Position the key and hub onto the output shaft of the new motor.



12. Position the new motor, drive hub, and mount plate onto the drive assembly. Reinstall the 4 hex screws and washers. Tighten to 18 – 24 Nm (15 – 20 ft lb).

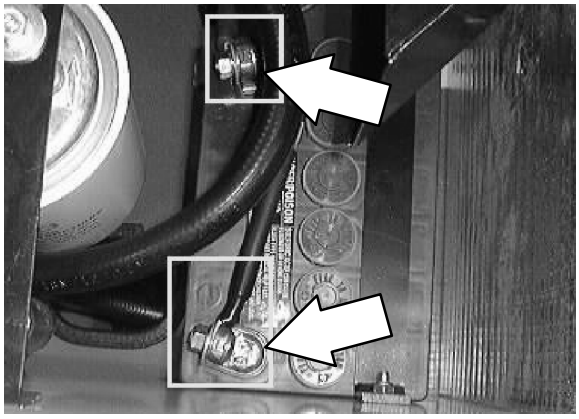


13. Connect the hydraulic hoses to the new drive motor. See schematic in this section.

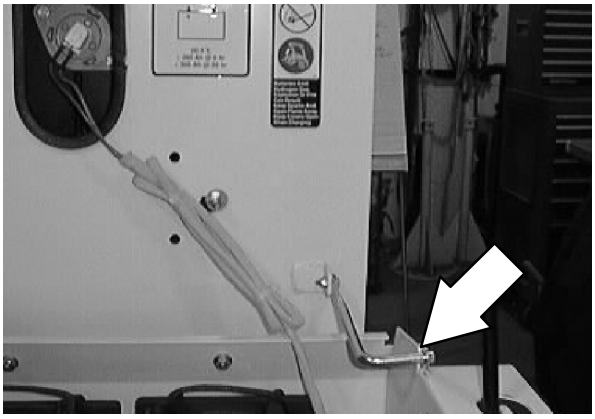


NOTE: Observe hydraulic cleanliness requirements when reconnecting hydraulic lines.

14. Reconnect the battery cables.



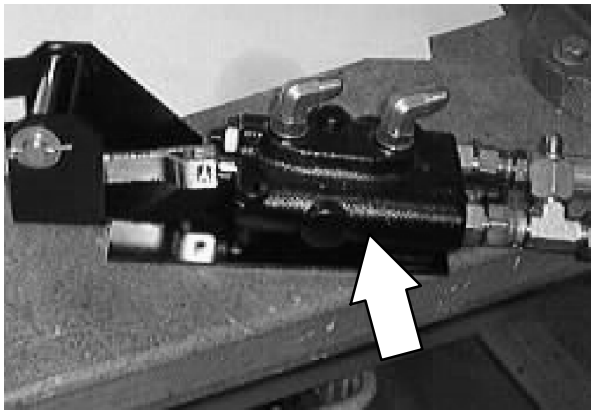
15. Disengage the prop rod and lower the seat support.



16. Remove the jack stands and lower the machine to the floor. Operate the machine and check for proper operation.

DIRECTIONAL CONTROL VALVE

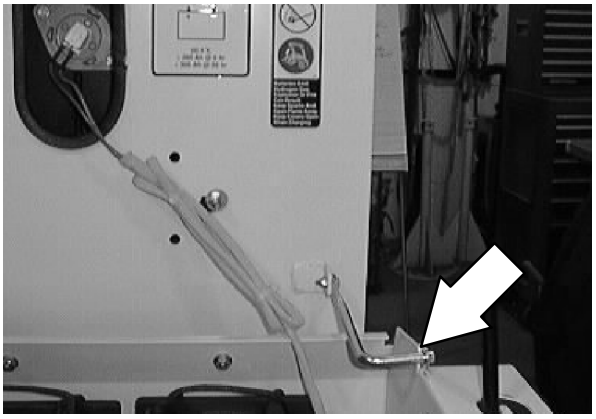
The directional control valve is located on the under side of the frame in the area of the foot control pedal. The directional control valve is used to control the forward and reverse movement of the machine.



TO REPLACE DIRECTIONAL CONTROL VALVE

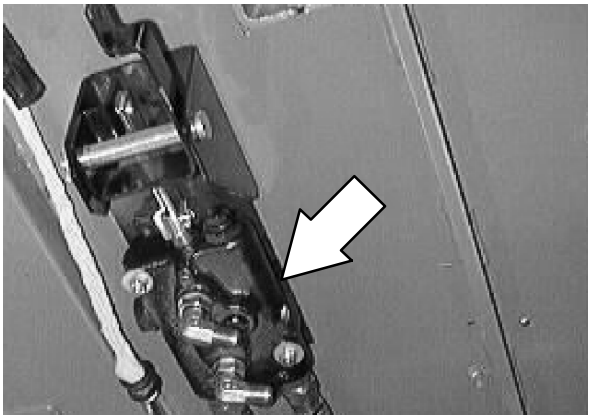
FOR SAFETY: Before Leaving Or Servicing Machine; Stop On Level Surface, Set Parking Brake, Turn Off Machine And Remove Key.

1. Tilt the seat assembly forward and engage the prop rod. Disconnect the battery cables from the battery.

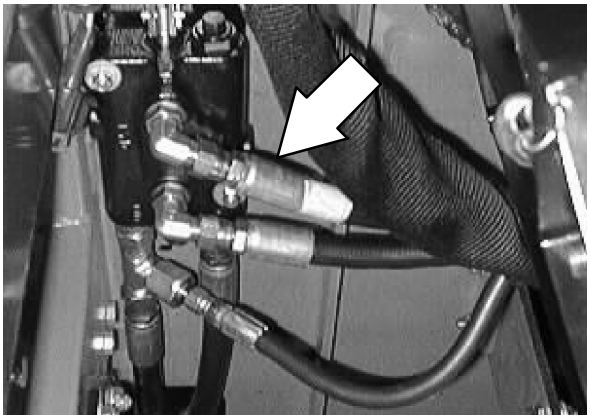


2. Raise the front of the machine and install jackstands under the machine frame.

3. Go under the machine in the front, right corner and locate the valve under the directional pedal.



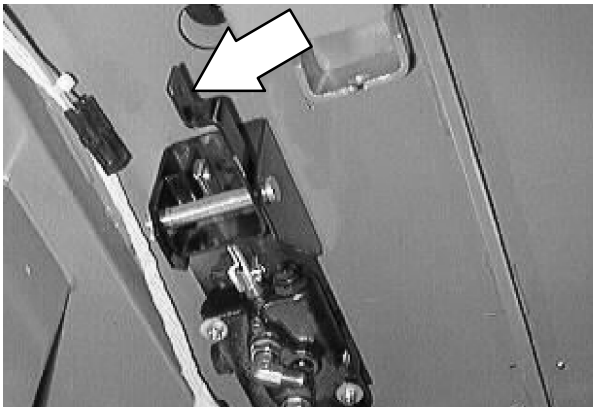
4. Mark, disconnect, and plug the hoses leading to the control valve.



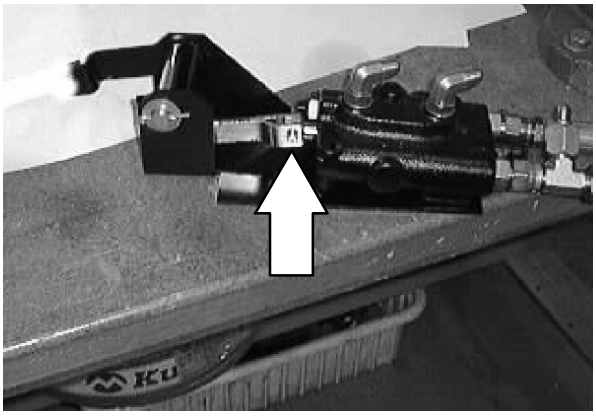
NOTE: Observe hydraulic cleanliness requirements when opening hydraulic lines.

5. Disconnect the lower ball joint from the directional pedal down at the control valve linkage.

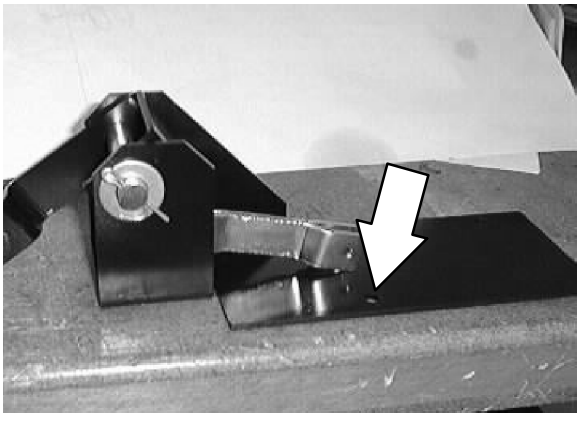
6. Remove the two screws holding the control valve and mount plate assembly to the bottom of the machine frame. Remove the assembly from the machine.



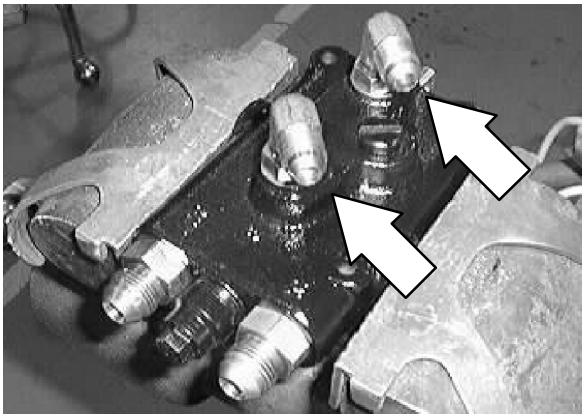
7. Remove the cotter pin and clevis pin holding the pivot linkage to the spool on top of the control valve.



8. Remove the two screws and nuts holding the control valve to the mount plate. Remove the valve from the mount plate.



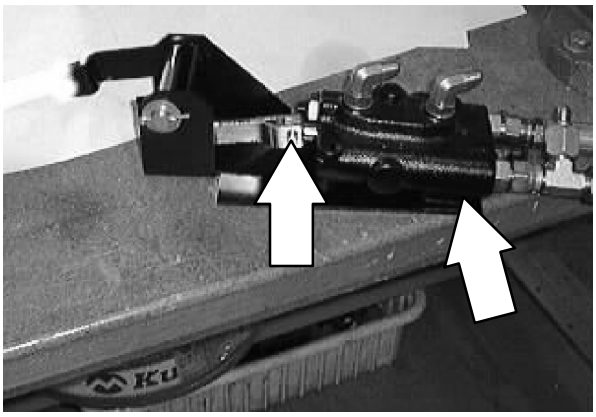
9. Remove the four hydraulic fittings from the old control valve and install into the new valve in the same orientation.



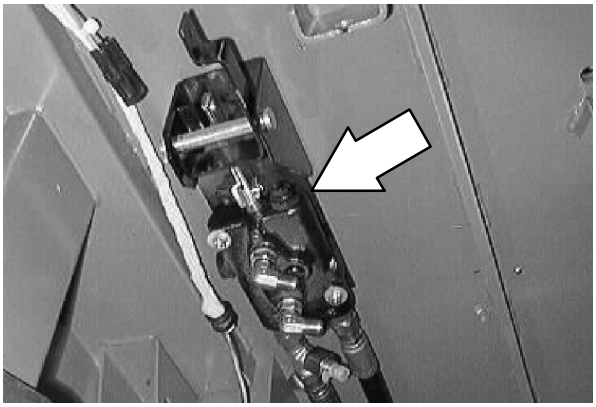
NOTE: Observe hydraulic cleanliness requirements when opening hydraulic lines.

10. Position the new valve onto the mount plate and reinstall the hardware. Tighten to 11 – 14 Nm (7 – 10 ft lb). **NOTE: Position hex nuts on the valve side.**

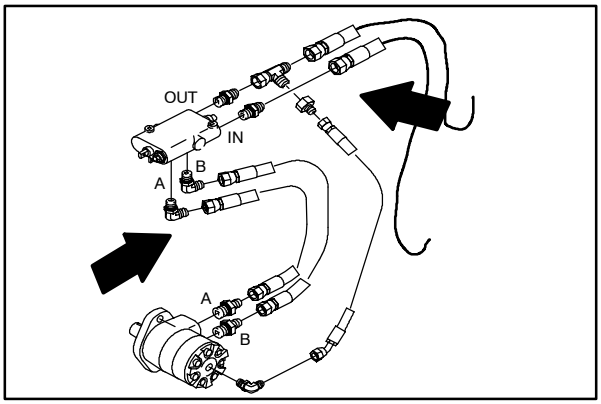
11. Align the mount hole in the pivot linkage with the hole in the top of the valve plunger. Reinstall the cotter and clevis pin.



12. Position the new valve and mount plate assembly into the machine with the pivot linkage facing the front of the machine. Reinstall the mounting hardware and tighten to 11 – 14 Nm (7 – 10 ft lb).

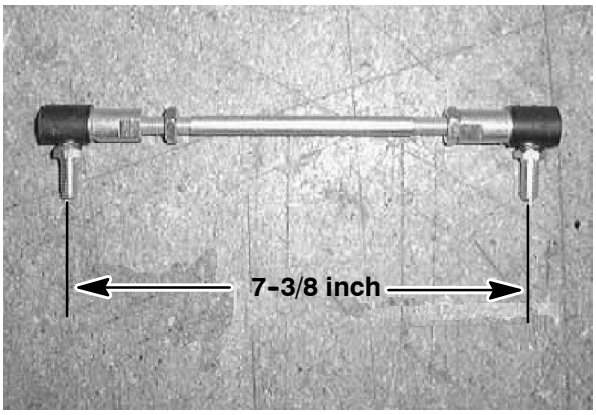


13. Reconnect the hydraulic hoses to the new valve. See schematic in this section.



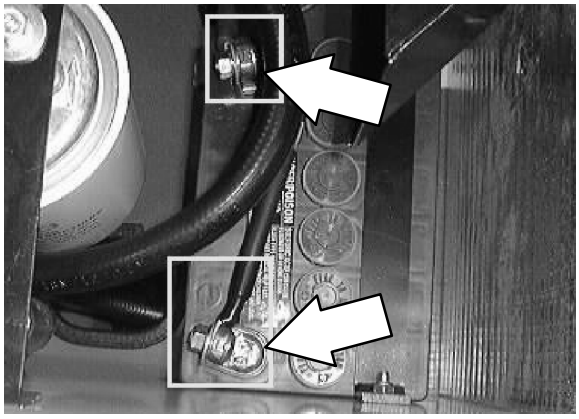
NOTE: Observe hydraulic cleanliness requirements when opening hydraulic lines.

14. Reconnect the ball joint and rod from the directional pedal to the pivot linkage. Check the rod for the correct dimension. The distance between the center line of the two ball joints should be 7-3/8 in. See TO ADJUST DIRECTIONAL PEDAL LINKAGE instructions in the CHASSIS section.

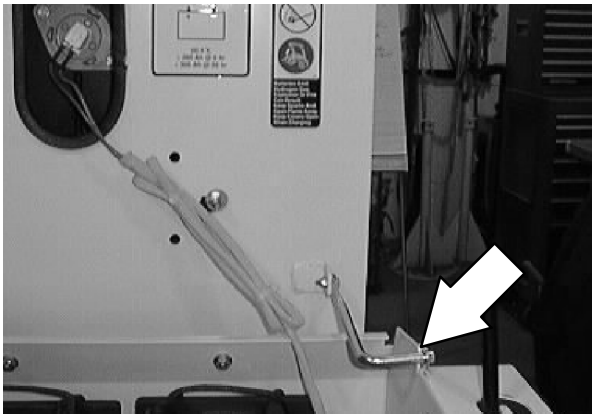


15. Remove the jackstands and lower the machine.

16. Reconnect the battery cables.



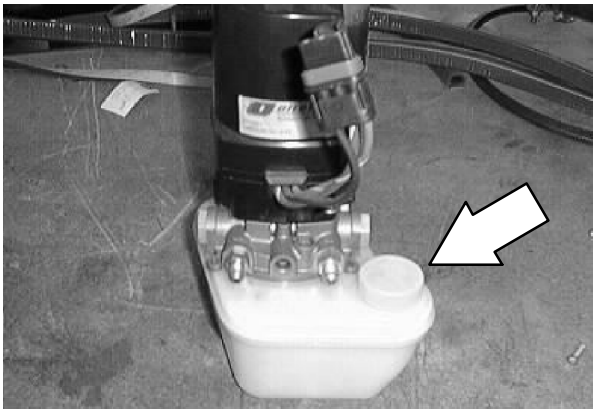
17. Disengage the prop rod and lower the seat support.



18. Start the machine and check the new directional control valve for proper operation.

ELECTRO/HYDRAULIC FLUID RESERVOIR

The electro/hydraulic reservoir is located behind the hopper compartment, under the lift arms.



A filler cap is mounted on top of the reservoir.

Check the hydraulic fluid level at operating temperature after every 100 hours of operation. Make sure the hopper support bar is in place before checking hydraulic fluid level. The side of the reservoir is marked with FULL and ADD levels to indicate the level of hydraulic fluid in the reservoir.

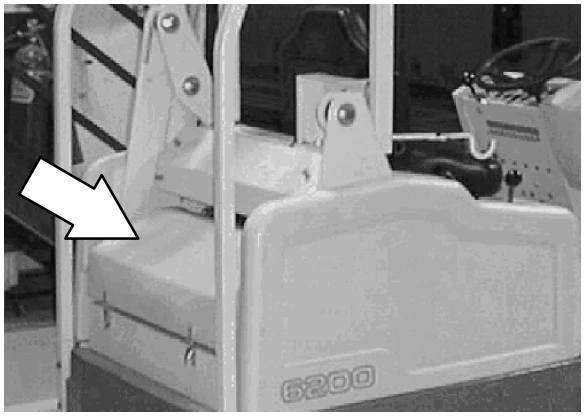
ATTENTION! Do not overfill the hydraulic fluid reservoir or operate the machine with a low level of hydraulic fluid in the reservoir. Damage to the machine hydraulic system may result.

Drain and refill the hydraulic fluid reservoir with new hydraulic fluid after every 800 hours of operation.

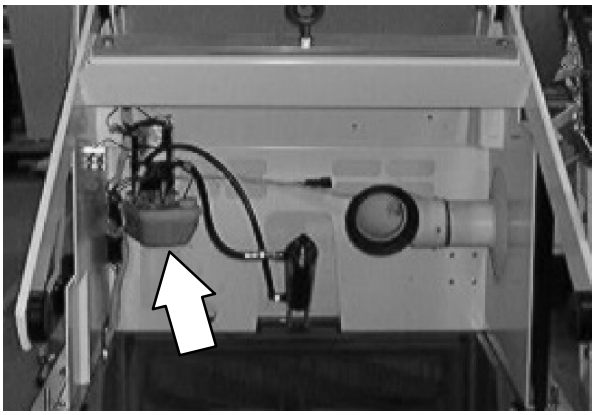
TO REPLACE ELECTRO/HYDRAULIC LIFT UNIT

FOR SAFETY: Before Leaving Or Servicing Machine; Stop On Level Surface, Set Parking Brake, Turn Off Machine And Remove Key.

1. Un-latch and remove the hopper filter cover.

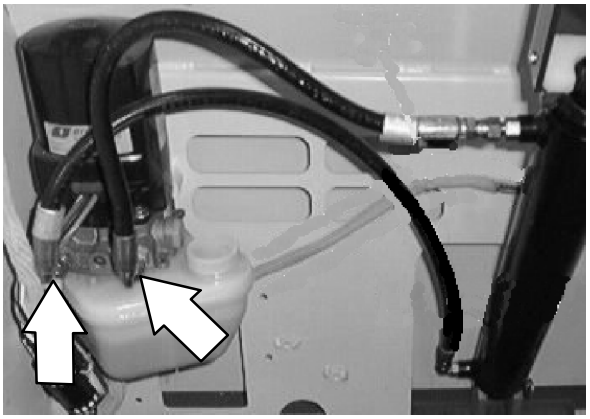


2. Locate the hopper lift electro/hydraulic unit at the rear, left side of the machine.

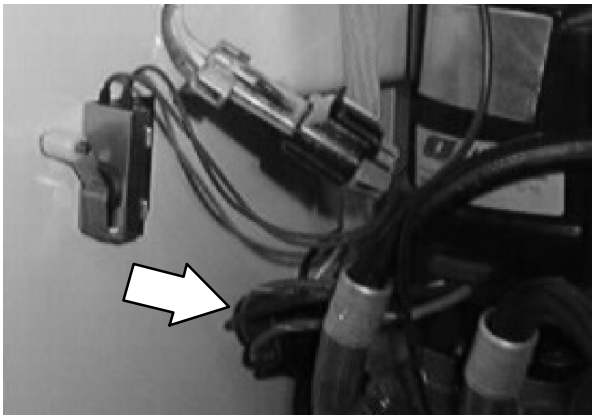


3. Mark, disconnect, and plug the two hoses leading to the hopper lift electro/hydraulic unit.

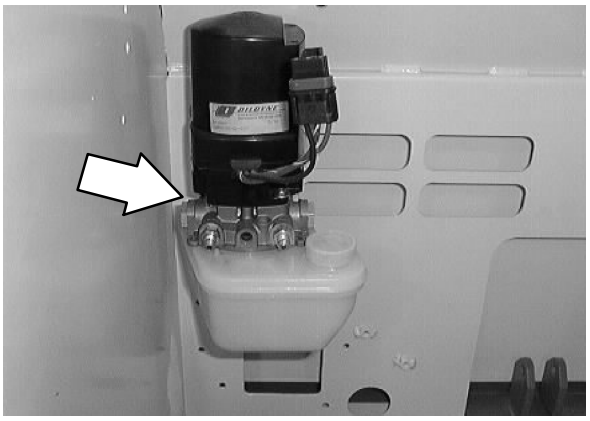
NOTE: Observe hydraulic cleanliness requirements when opening hydraulic lines.



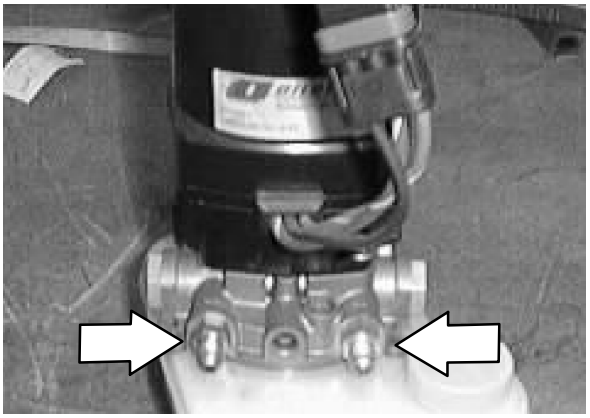
4. Disconnect the hopper lift electro/hydraulic unit from the main harness.



5. Remove the two hex screws holding the electro/hydraulic unit to the lift arm panel. Remove the unit from the machine. Make sure to retain the two spacers.

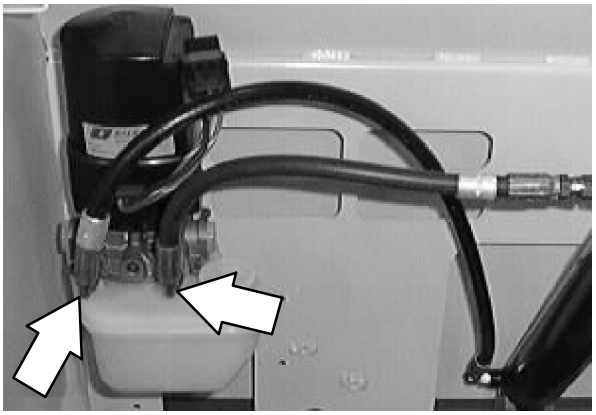


6. Remove the two hydraulic fittings from the existing electro/hydraulic unit. Install the two fittings into the new unit.

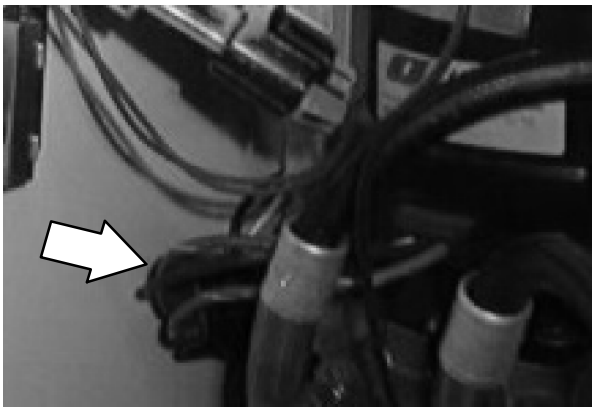


7. Install the new electro/hydraulic unit onto the lift arm panel. Reinstall the two hex screws and spacers *(spacers between unit and panel).* Tighten to 18 – 24 Nm (15 – 20 ft lb).

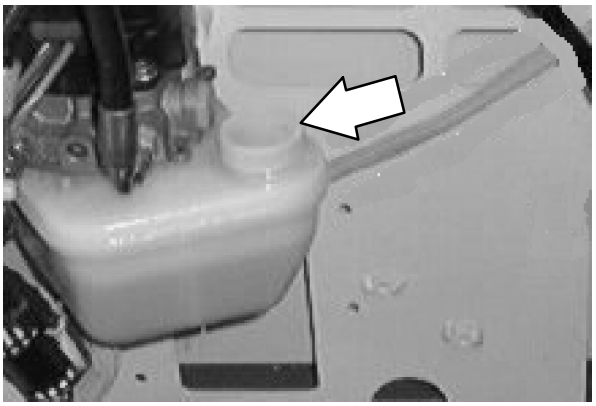
8. Reconnect the two hydraulic hoses to the new electro/hydraulic unit.



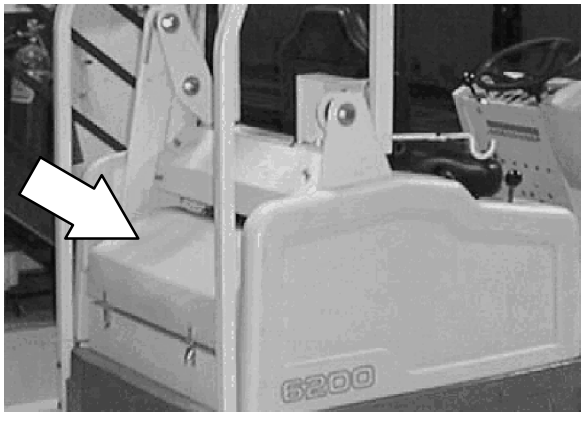
9. Connect the plug from the main electrical harness into the connector from the new unit.



10. Check the hydraulic fluid reservoir tank.



11. Reinstall the hopper cover and engage both latches.

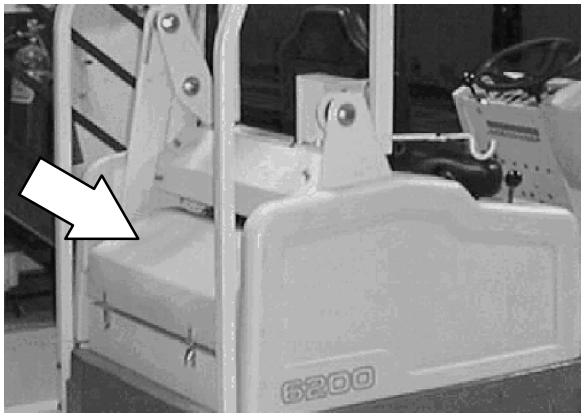


12. Operate the machine. Check the new hopper lift electro/hydraulic unit for proper operation.

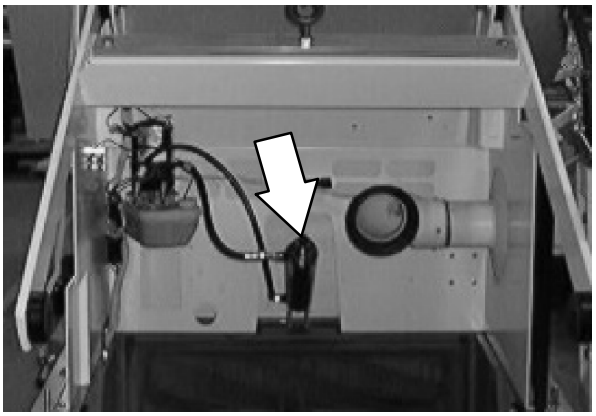
TO REPLACE HOPPER LIFT CYLINDER

FOR SAFETY: Before Leaving Or Servicing Machine; Stop On Level Surface, Set Parking Brake, Turn Off Machine And Remove Key.

1. Un-latch and remove the hopper filter cover.

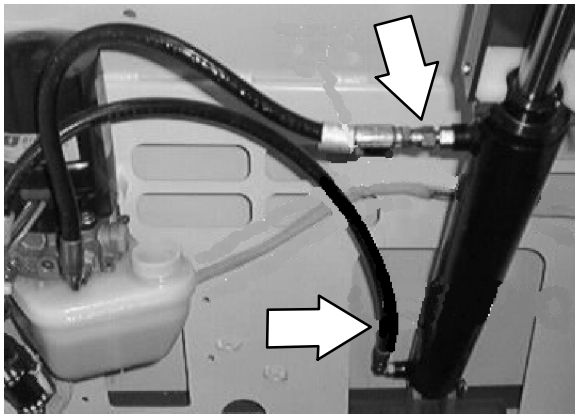


2. Locate the hopper lift cylinder at the rear, center of the machine.

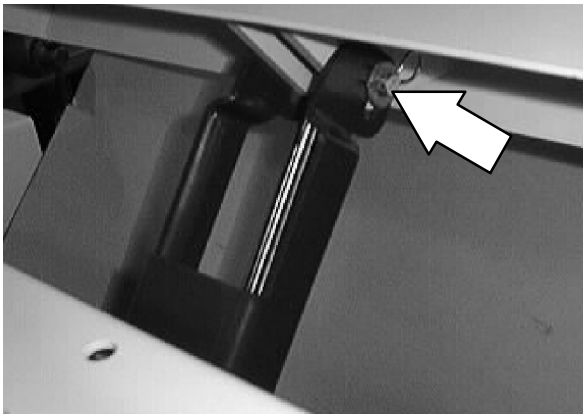


3. Mark, disconnect, and plug the two hoses leading to the lift cylinder.

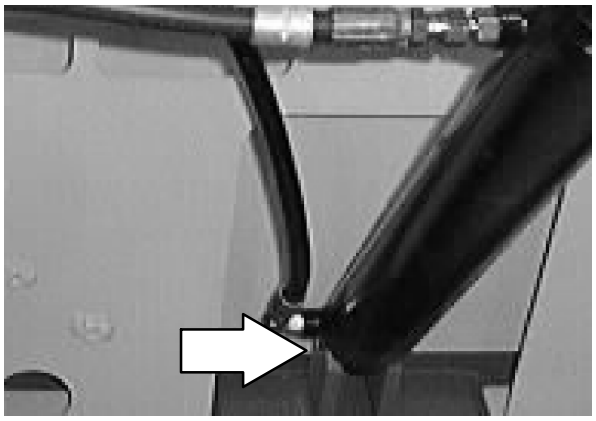
NOTE: Observe hydraulic cleanliness requirements when opening hydraulic lines.



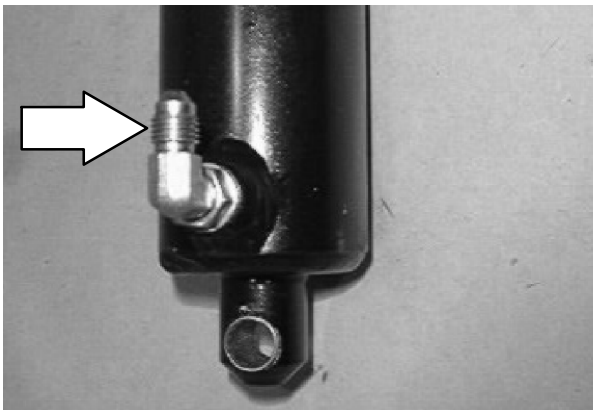
4. Remove the upper cotter pin and clevis pin from the hopper lift cylinder.



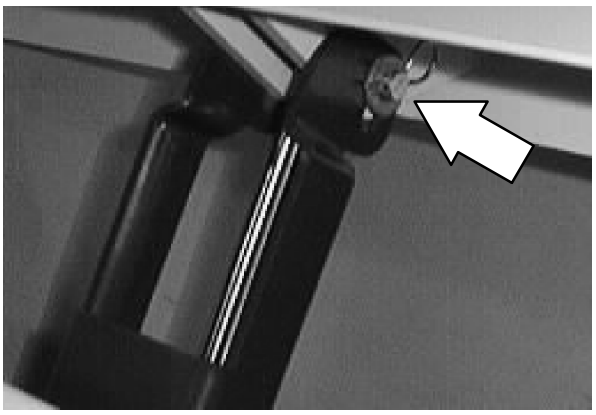
5. Remove the lower cotter pin and clevis pin from the hopper lift cylinder. Remove the lift cylinder from the machine.



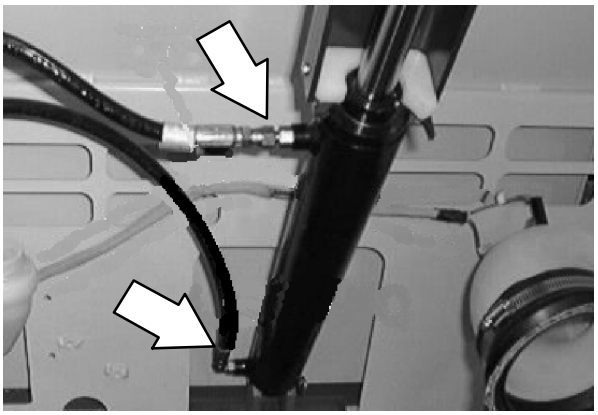
6. Remove the hydraulic fittings from the existing lift cylinder and install in the new cylinder in the same orientation.



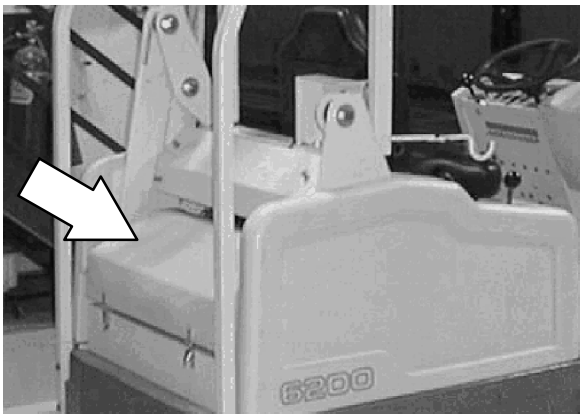
7. Install the new lift cylinder into the machine. Reinstall the upper and lower clevis pins and cotter pins.



8. Reconnect the two hydraulic hoses to the new hopper lift cylinder.

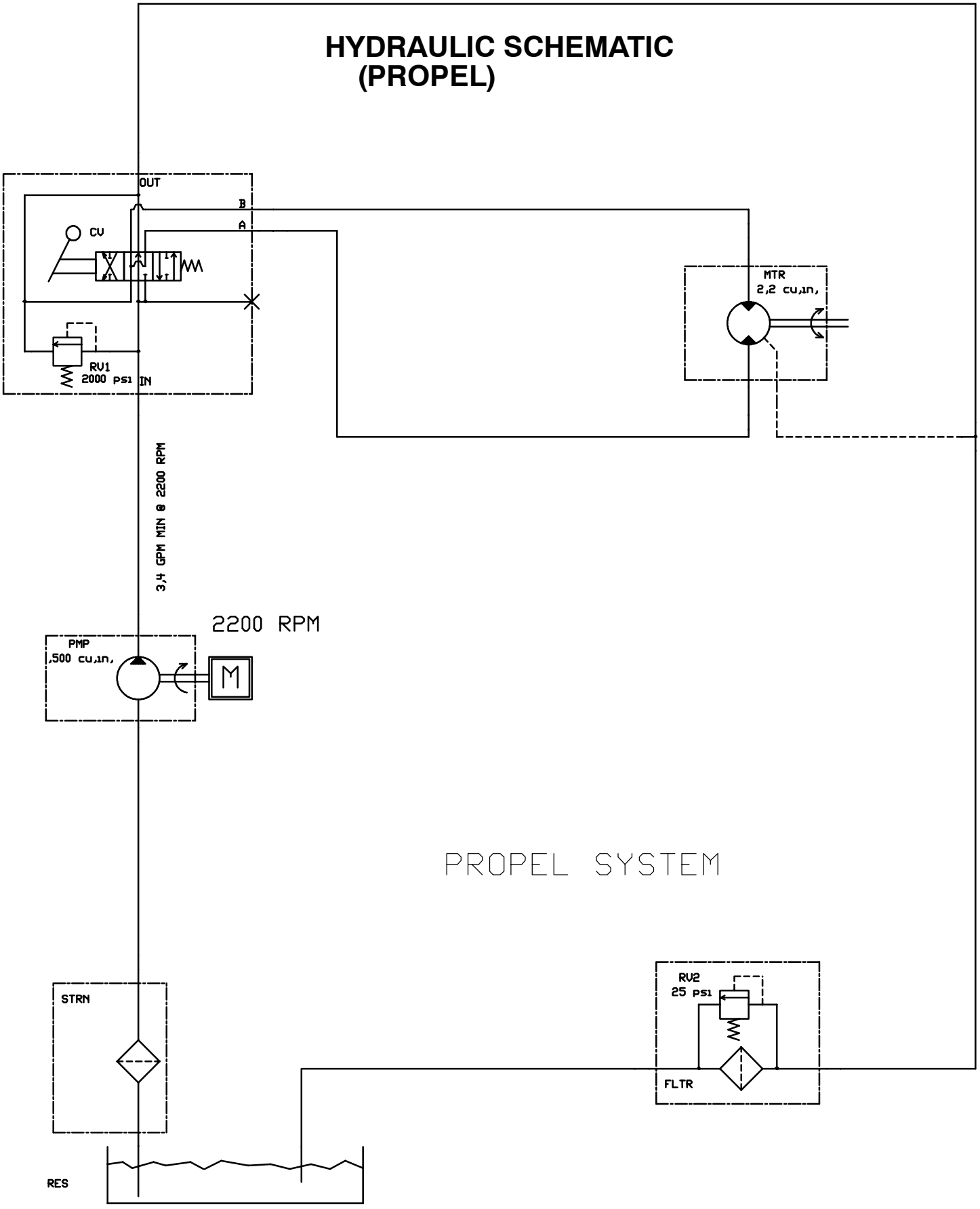


9. Reinstall the hopper cover and engage both latches.

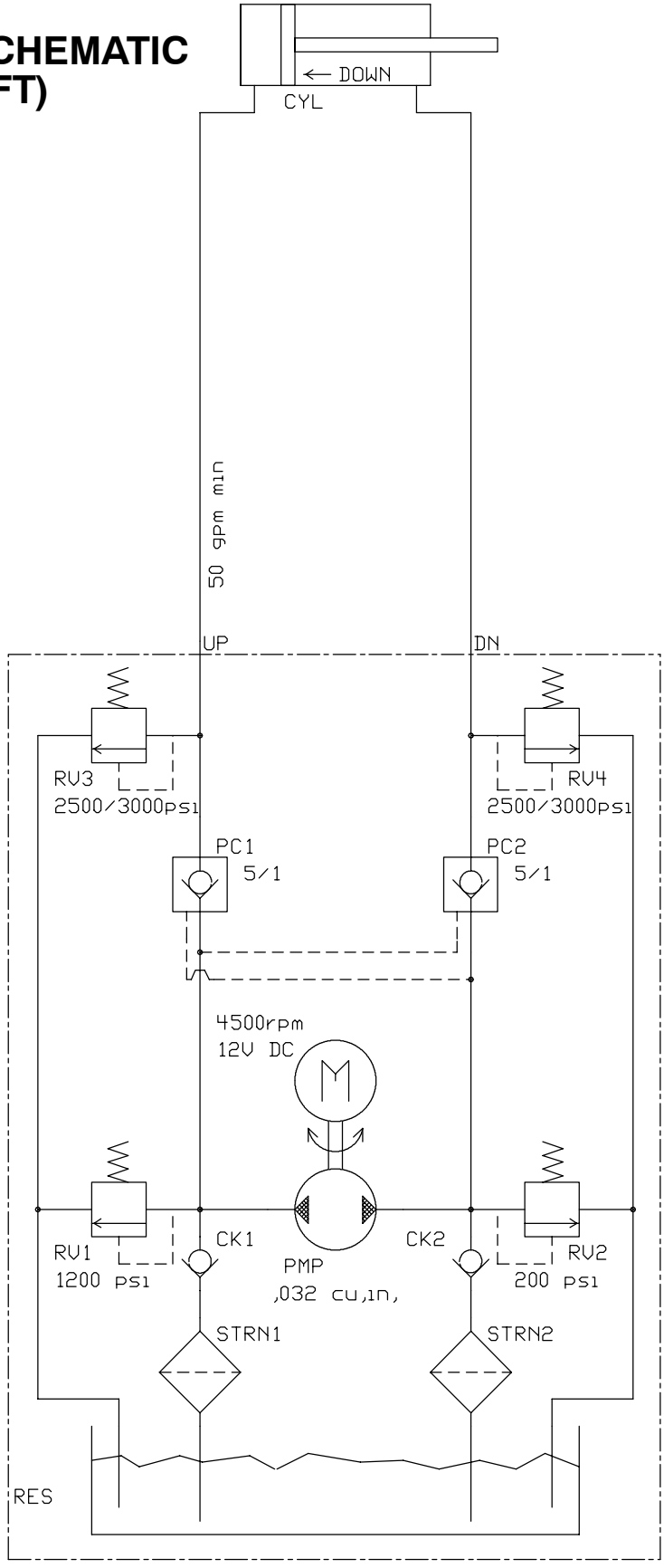


10. Operate the machine. Check the new hopper lift cylinder for proper operation.

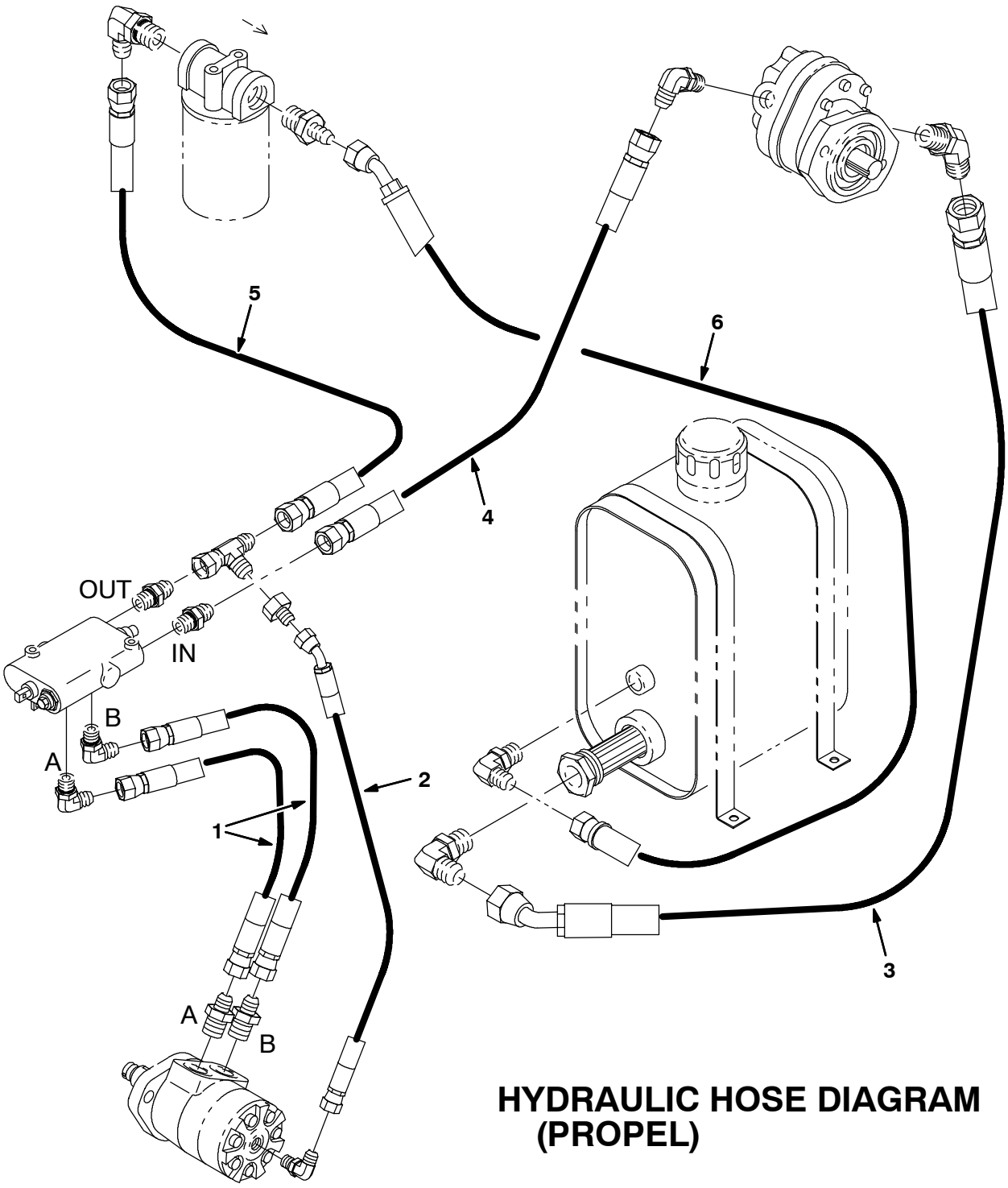
HYDRAULIC SCHEMATIC (PROPEL)



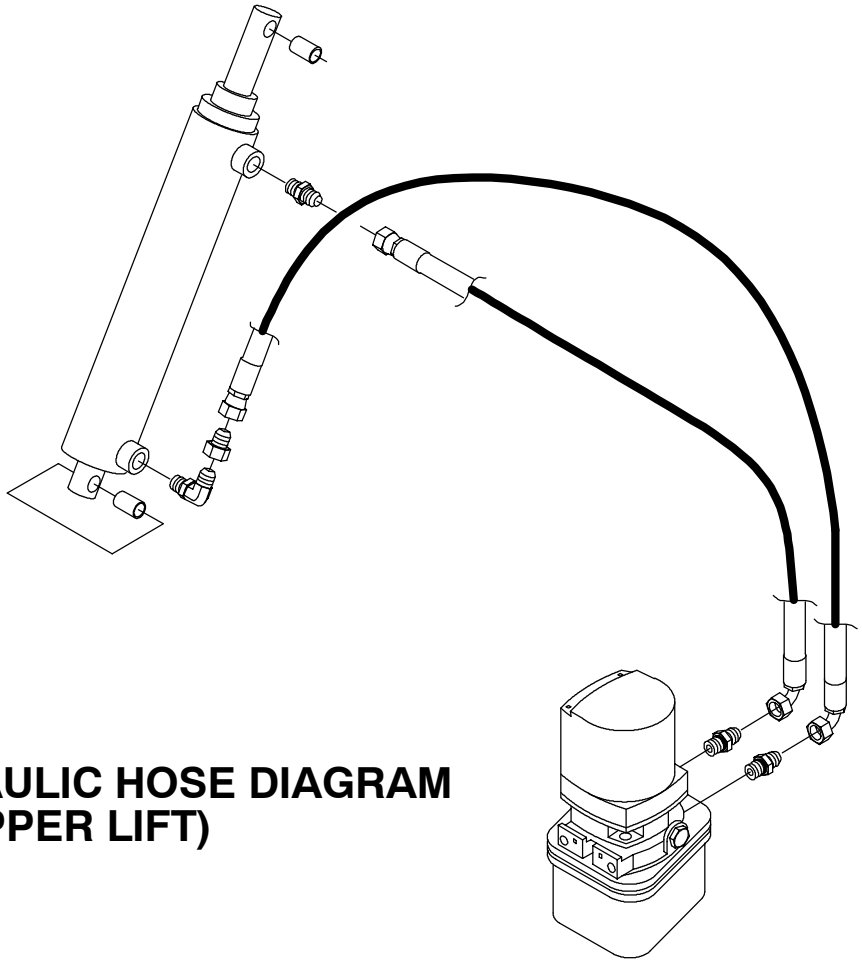
HYDRAULIC SCHEMATIC (HOPPER LIFT)



HOPPER LIFT SYSTEM



HYDRAULIC HOSE DIAGRAM (PROPEL)

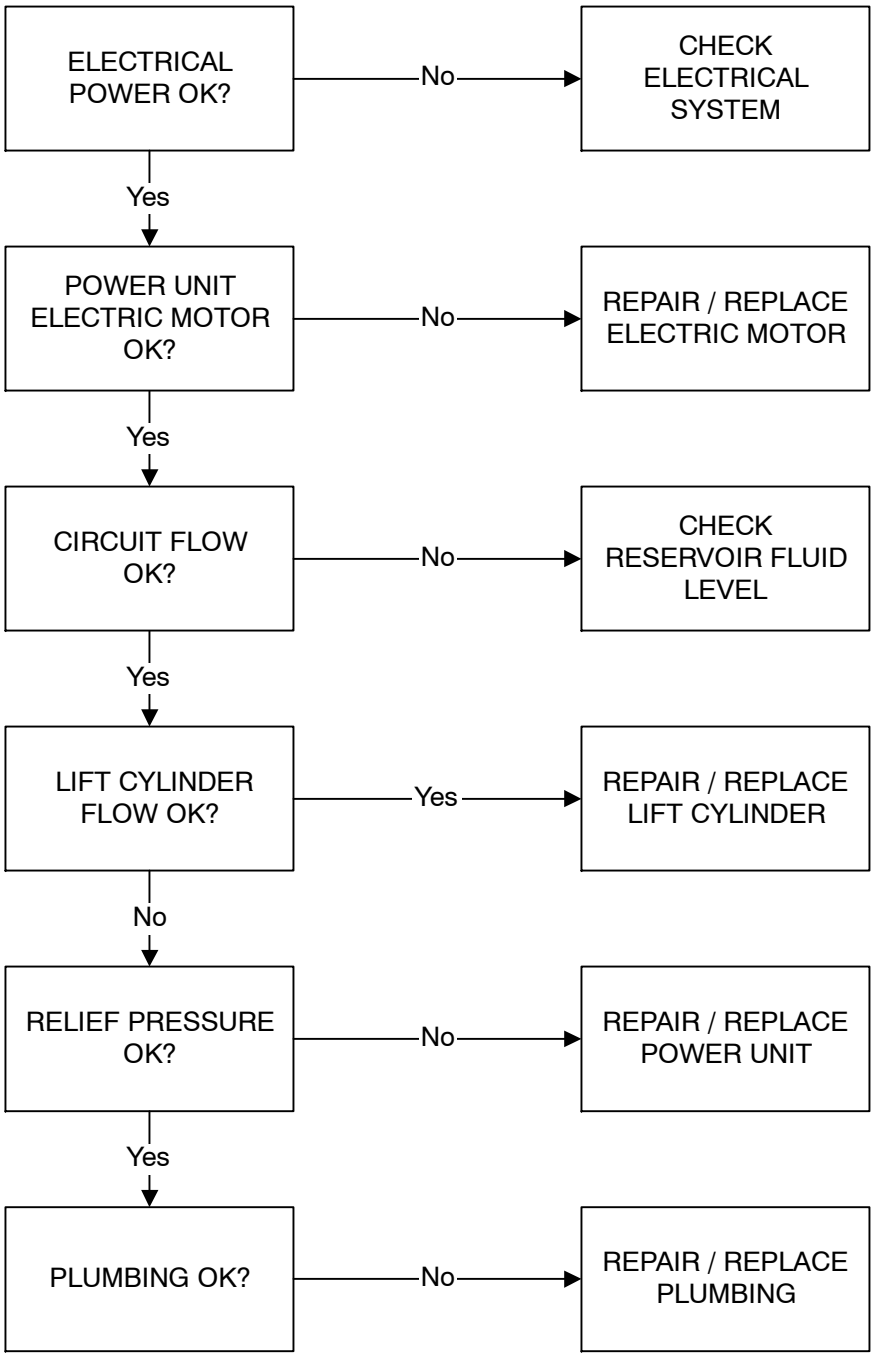


HYDRAULIC HOSE DIAGRAM (HOPPER LIFT)

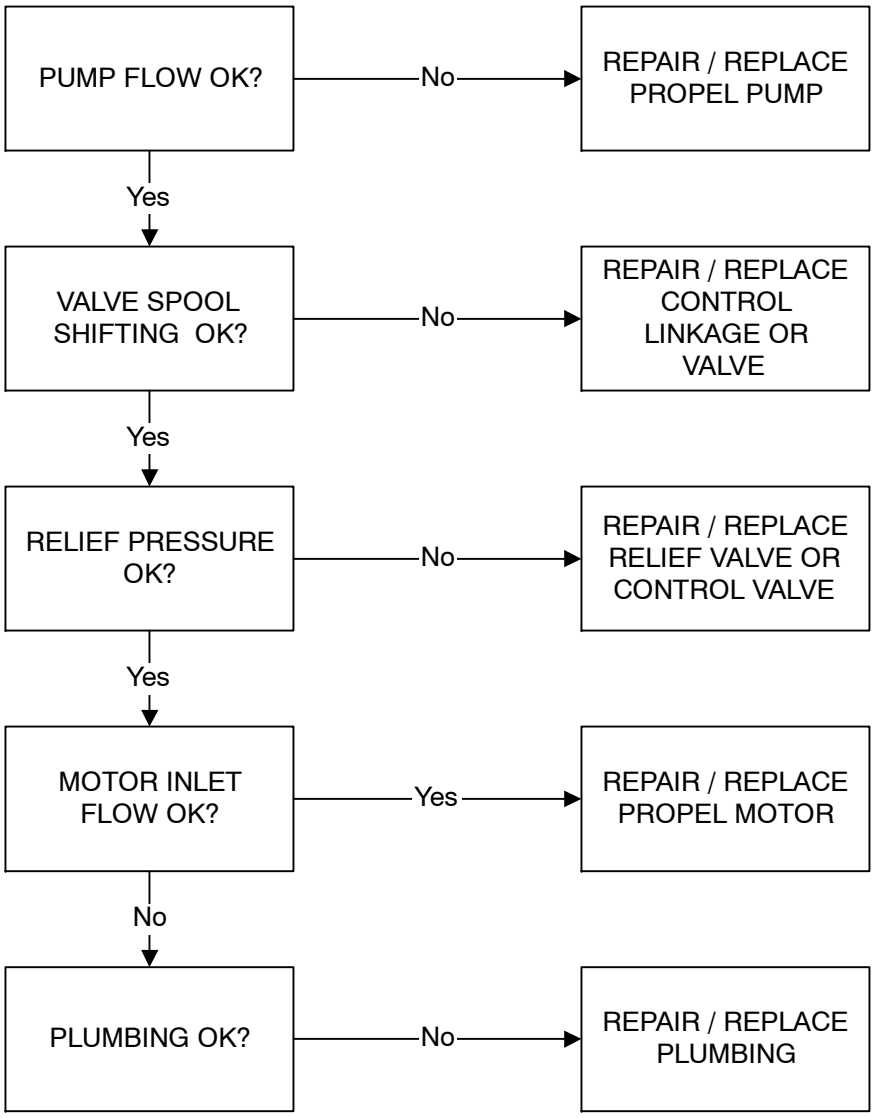
TROUBLESHOOTING

The troubleshooting chart that follows is organized to lead you through the hydraulic circuits.

HOPPER WILL NOT RAISE/LOWER



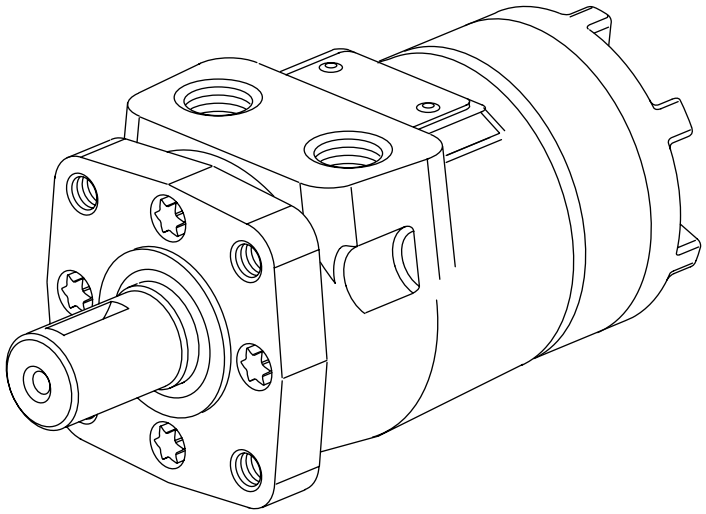
PROPEL MOTOR WILL NOT PROPEL



Char-Lynn®
Hydraulic Motor

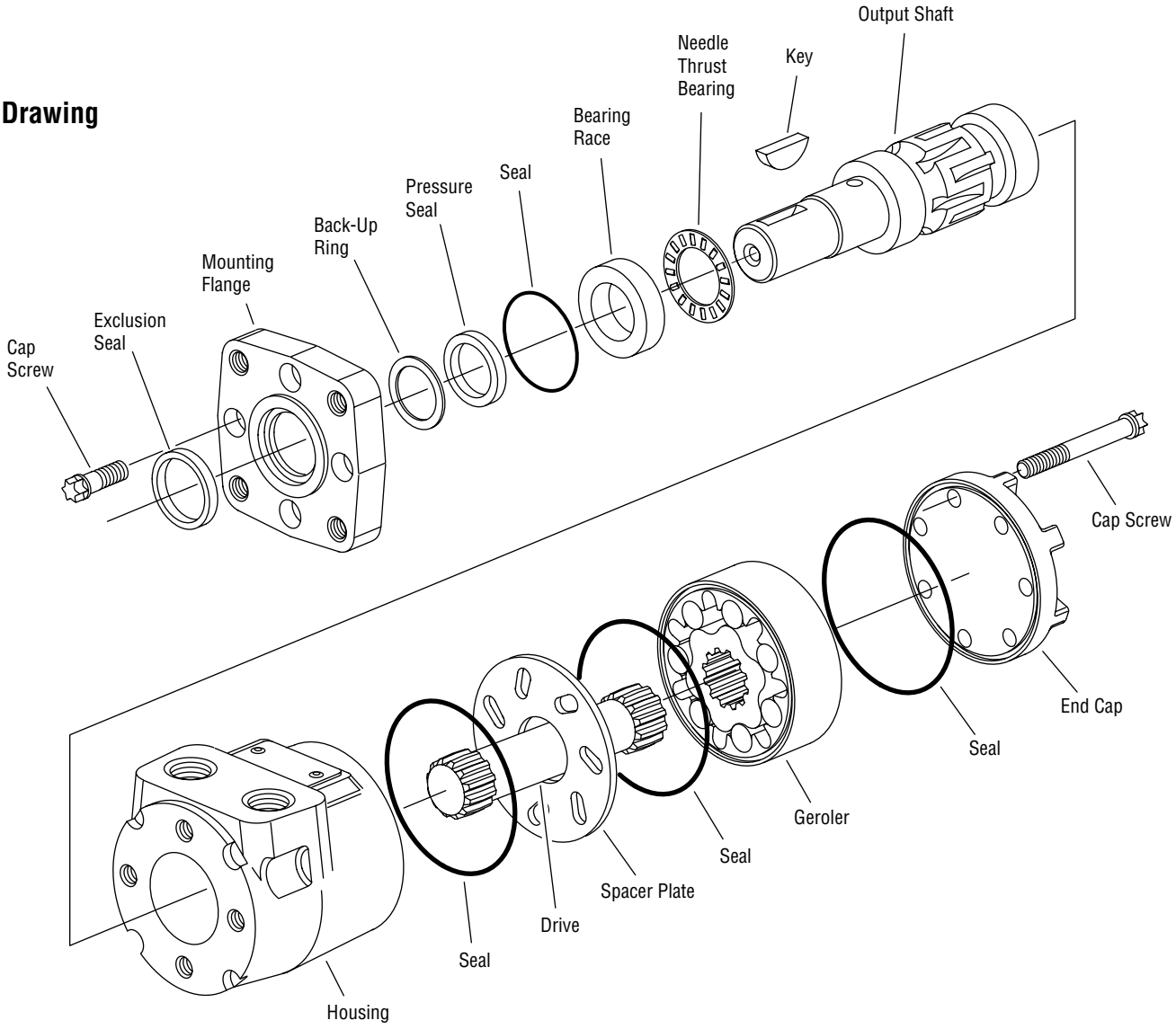
No. 7-145
November, 1996

Repair Information



T Series
General Purpose Geroler® Motor 001

Parts Drawing



Tools Required

- Torque wrench (34 Nm [300 lb-in] capacity)
- 300 - 400 mm [12 - 16 in.] breaker bar
- 5/16 in. – 6 point (E10 Drive) socket no. 64489-000* (Heavy Duty 56 Nm [500 lb-in] capacity)
- Small blade screwdriver
- 3/16 in. hex key
- Shaft seal installation tool P/N 600523*
- Shaft sleeve or bullet
  P/N 600304* for 1 inch dia. shaft
  P/N 600466* for 7/8 inch dia. shaft

*Tools available, through Eaton order entry department.

T Series
Geroler Motors

Disassembly

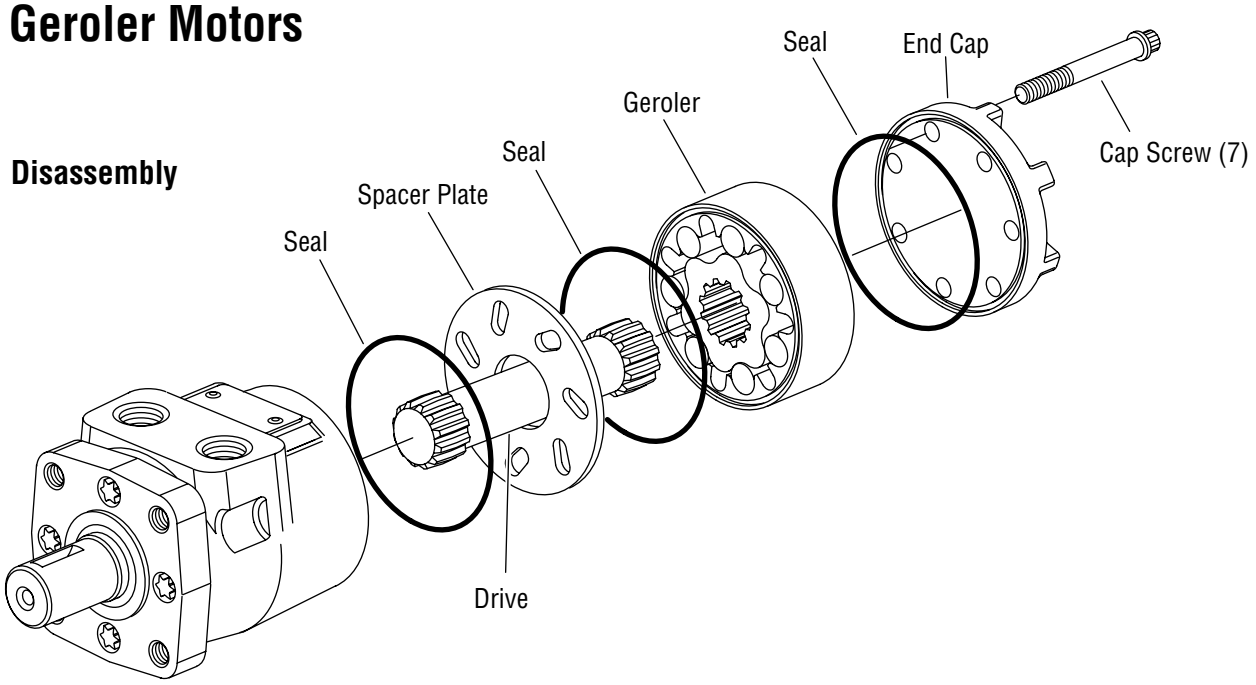


Figure 1

Cleanliness is extremely important when repairing hydraulic motors. Work in a clean area. Before disconnecting the hydraulic lines, clean the port area of the motor. Before disassembly, drain the oil from the motor. Then plug the ports and thoroughly clean the exterior of the motor. Check the output shaft, remove any burrs, nicks, or sharp edges.

1 Clamp the motor in a vise so the shaft is vertical and the end cap is on top. Clamp on the mounting flange using just enough clamping force to hold the motor securely. Protect the mounting flange with soft vise jaws.

2 Remove the seven cap screws from the end cap and disassemble the motor as shown in Figure 1. Do not disassemble the Geroler.

3 Un-clamp the motor and remove the output shaft, thrust needle bearing, and thrust bearing race (see Figure 2).

4 Clamp the motor in a vise so the mounting flange is on top. Clamp across the port area. **Do not clamp on the motor housing.** Use just enough clamping force to hold the motor securely.

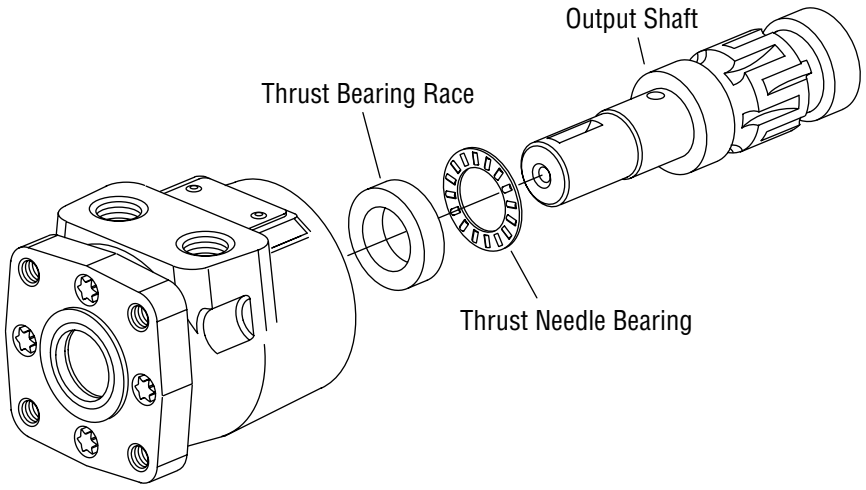


Figure 2

Disassembly

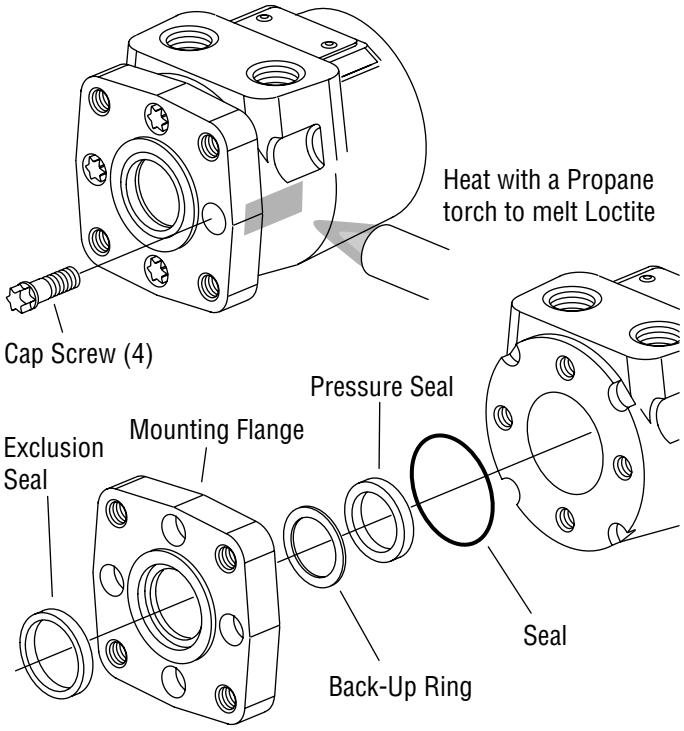


Figure 3

5 Remove the four cap screws that hold the mounting flange to the motor housing.

Caution: These screws were Loctited during assembly. **Do Not exceed 56 Nm [500 lb-in] of removal torque.**

If the Loctite is holding the screws too tightly, heat the motor housing, with a propane torch, while turning the screw. Apply heat to where the screw threads into the motor housing, see figure 3. Apply just enough heat to remove the screw, do not overheat the motor housing or mounting flange.

6 Remove the mounting flange from the motor housing. The exclusion seal, pressure seal, and back-up ring will come off with the mounting flange.

7 Carefully remove the exclusion seal, pressure seal, and back-up ring from the mounting flange. A seal removal tool may be fabricated by bending and rounding the end of a small blade screwdriver, see figure 4.

Important: Do not damage the mounting flange where the shaft passes through it.

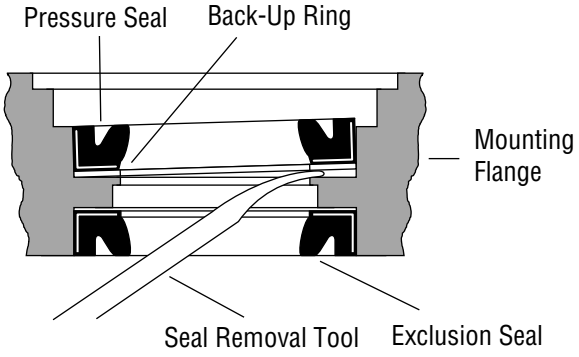


Figure 4

Reassembly

Check all mating surfaces. Replace any parts with scratches or burrs that could cause leakage. Wash all metal parts in clean solvent. Blow them dry with pressurized air. Do not wipe parts dry with paper towels or cloth as lint in a hydraulic system will cause damage. Check the key way and chamfered area of the output shaft; remove any nicks, burrs, or sharp edges that could damage the shaft seals during reassembly.

Note: Always use new seals when reassembling hydraulic motors. Refer to parts list 6-146 for seal kit part numbers, replacement parts, and ordering information.

Important: During reassembly lubricate the new seals with a petroleum jelly such as Vaseline®. Also lubricate machined surfaces and bearings with clean hydraulic fluid.

8 Remove all of the old Loctite® from the mounting flange cap screws and their threaded holes. The threads must be clean and dry for the new Loctite to hold properly.

9 Lubricate and install the output shaft, needle thrust bearing, and bearing race into the housing.

Important: Do not permit oil to get into the four threaded holes.

10 Lubricate the exclusion seal and press it into its seat in the mounting flange. Figure 5 shows the correct seal orientation.

T Series Geroler Motors

Reassembly

11 Lubricate and install the back-up ring and pressure seal. Use seal installation tool no. 600523 to press the pressure seal into place (see Figure 5).

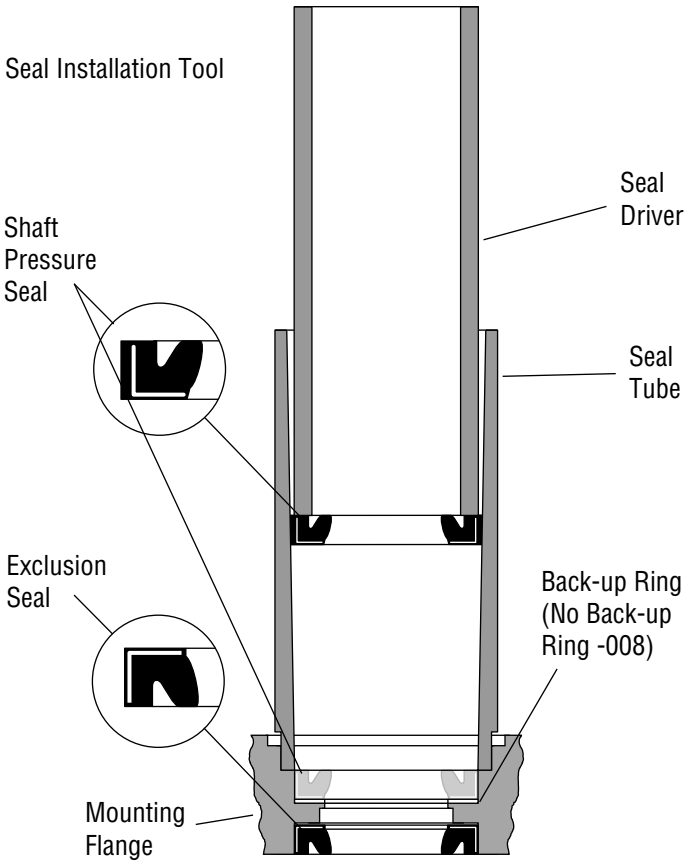


Figure 5

Important: Be sure the exclusion seal and pressure seal are undamaged and properly seated.

12 Apply three or four drops of Loctite 277 to the threads of the four holes in the motor housing where the mounting flange will be attached. Apply the Loctite so that it coats the threads. Remove all excess Loctite.

13 Install a protective sleeve or bullet over the output shaft. Lubricate the inner edges of the exclusion and pressure seals. Lubricate and install the 49 mm [1 15/16 in.] diameter o-ring seal on the mounting flange. Then slide the mounting flange down over the shaft.

14 Remove the protective sleeve and install the four cap screws. Tighten the cap screws, in a criss-cross pattern, to 28 Nm [250 lb-in]. Be sure the output shaft does not fall out of the housing.

Important: The Loctite must cure completely before the motor is put into service. Loctite curing time is six hours. Use of Loctite Primer reduces curing time to 15 minutes. Follow the instructions on the Loctite package.

15 Clamp the motor in the vise so the output shaft is vertical and down. Clamp on the mounting flange.

16 Pour clean hydraulic fluid into the motor to provide start-up lubrication.

17 Lubricate and install one of the three largest diameter seals in the groove in the motor housing.

18 Install the drive.

Note: If the splined ends of the drive are different lengths, install the longer end into the shaft.

Motor Timing

19 Align shaft timing dot with any bolt hole. Bolt hole will be used for timing reference.

20 Install spacer plate, and note the position of the threaded hole in housing aligned with the timing dot on shaft.

Important: Be sure the slots in the spacer plate provide passage for hydraulic fluid as well as the cap screws. If the spacer plate is flipped the motor will not operate.

21 Lightly stretch, lubricate and install the second of three large diameter seals in the groove in the Geroler.

22 Install the Geroler.

Standard Timing Align any star point with the threaded hole noted for the location of the timing dot (see Figure 6).

Reverse Timing Align any star valley with the threaded hole noted for the location of the timing dot (see Figure 6).

23 Rotate the geroler to align the screw holes and install drive spacer if applicable.

24 Lubricate and install the last one of the three large diameter seals in the groove in the end cap.

25 Install the end cap and seven cap screws.

26 Tighten the cap screws in a criss-cross pattern, to 27-28 Nm [235-250 lb-in].

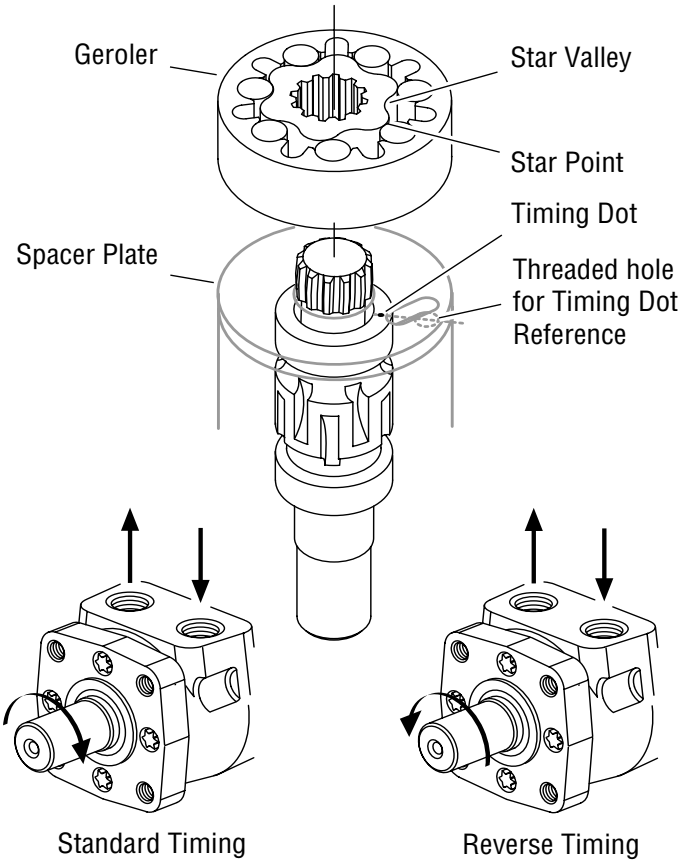
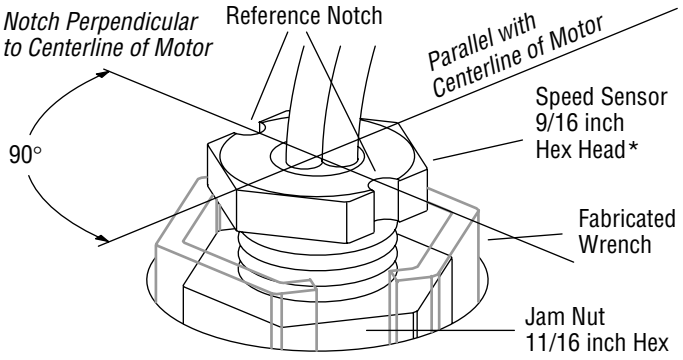


Figure 6

Speed Sensor Installation



*Turn Speed Sensor in to bottom (making sure jam nut is backed off sufficiently), back off 1/4 turn (CCW) and if reference notch(s) is not positioned as shown above continue turning (CCW) to align reference notch 90° off of centerline of motor or perpendicular to motor shaft. Hold speed sensor in this position and tighten jam nut to 8,5 — 14 Nm [75 — 125 lb-in].

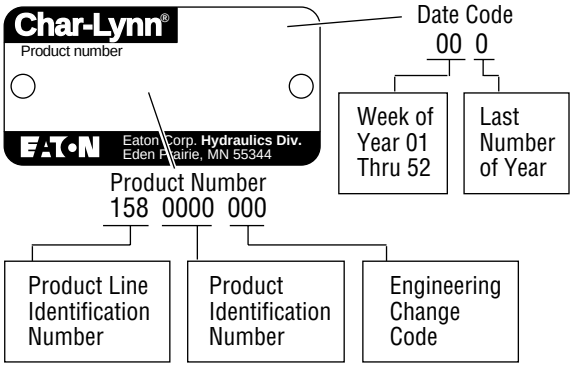
How to Order Replacement Parts

Each Order Must Include the Following:

1. Product Number
2. Date Code
3. Part Name
4. Part Number
5. Quantity of Parts

For More Detailed Information Contact Eaton Corp. Hydraulics Division 15151 Highway 5 Eden Prairie, MN 55344.

- Specifications and performance Data, Catalog No. 11-885
- Replacement Part Numbers and Kit Information — Parts Information No. 6-146



Product Numbers—T Series -001

Add three digit prefix **—158**-to four digit number from chart for complete product number—Example 158-1068.

Mounting	Shaft	Ports	Displ. cm³/r [in³/r] Product Number **158-xxxx**											
			36 [2.2]	49 [3.0]	66 [4.0]	80 [4.9]	102 [6.2]	131 [8.0]	157 [9.6]	195 [11.9]	244 [14.9]	306 [18.7]	370 [22.6]
2 Bolt Flange	1 in. Straight w/Woodruff Key	7/8-14 O-ring	**158**- —	—	-1537	-1034	-1035	-1538	-1036	-1037	-1038	-1039	-1040
		1/2 NPTF	**158**- —	—	-1540	-1026	-1027	-1541	-1028	-1029	-1030	-1031	-1032
		Manifold	**158**- —	—	-1543	-1042	-1043	-1544	-1044	-1045	-1046	-1047	-1048
	1 in. SAE 6B Splined	7/8-14 O-ring	**158**- —	—	-1552	-1082	-1083	-1553	-1084	-1085	-1086	-1087	-1088
		1/2 NPTF	**158**- —	—	-1555	-1074	-1075	-1556	-1076	-1077	-1078	-1079	-1080
		Manifold	**158**- —	—	-1558	-1090	-1091	-1559	-1092	-1093	-1094	-1095	-1096
4 Bolt Flange	1 in. Straight w/Woodruff Key	7/8-14 O-ring	**158**- —	—	-1570	-1010	-1011	-1571	-1012	-1013	-1014	-1015	-1016
		1/2 NPTF	**158**- —	—	-1573	-1002	-1003	-1574	-1004	-1005	-1006	-1007	-1008
		Manifold	**158**- —	—	-1576	-1018	-1019	-1577	-1020	-1021	-1022	-1023	-1024
	1 in. SAE 6B Splined	7/8-14 O-ring	**158**- —	—	-1579	-1058	-1059	-1580	-1060	-1061	-1062	-1063	-1064
		1/2 NPTF	**158**- —	—	-1582	-1050	-1051	-1583	-1052	-1053	-1054	-1055	-1056
		Manifold	**158**- —	—	-1585	-1066	-1067	-1586	-1068	-1069	-1070	-1071	-1072

158-1068

DNV
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ISO-9001 CERTIFICATED FIRM
DET NORSKE VERITAS INDUSTRY BV, THE NETHERLANDS

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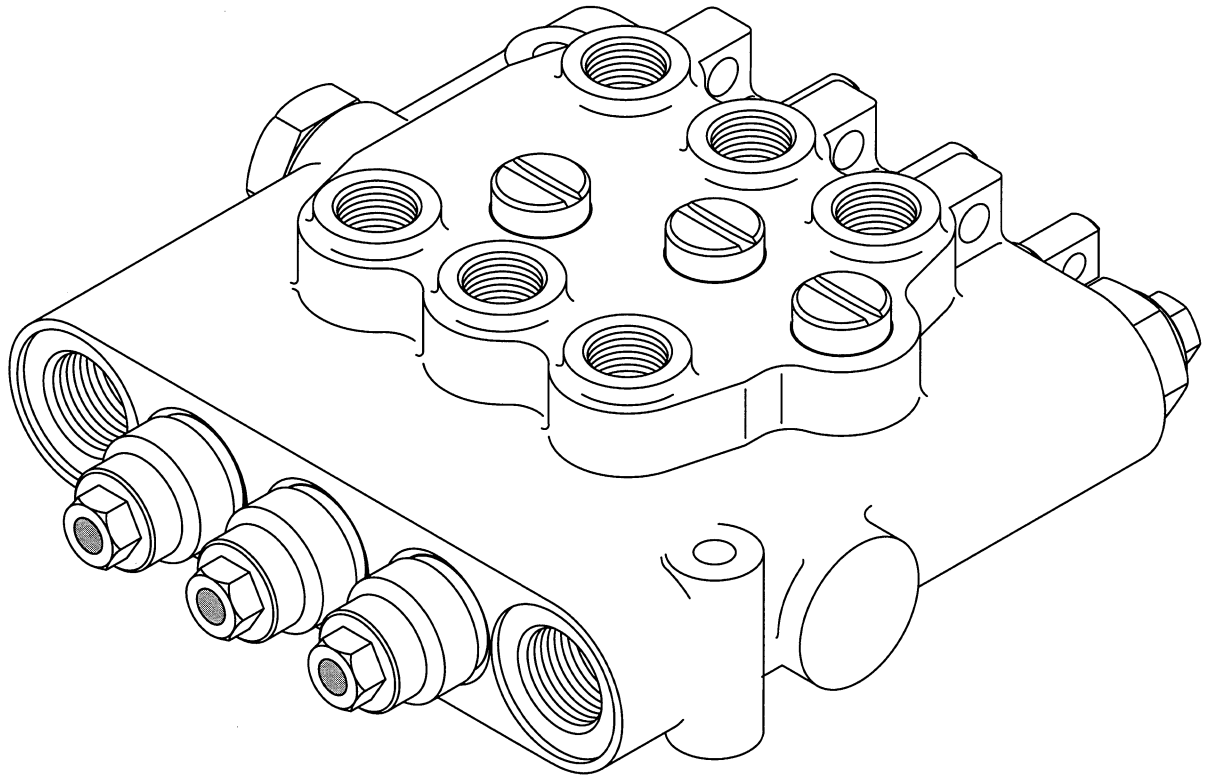
Revised June 1991

Eaton
Hydraulics
Division

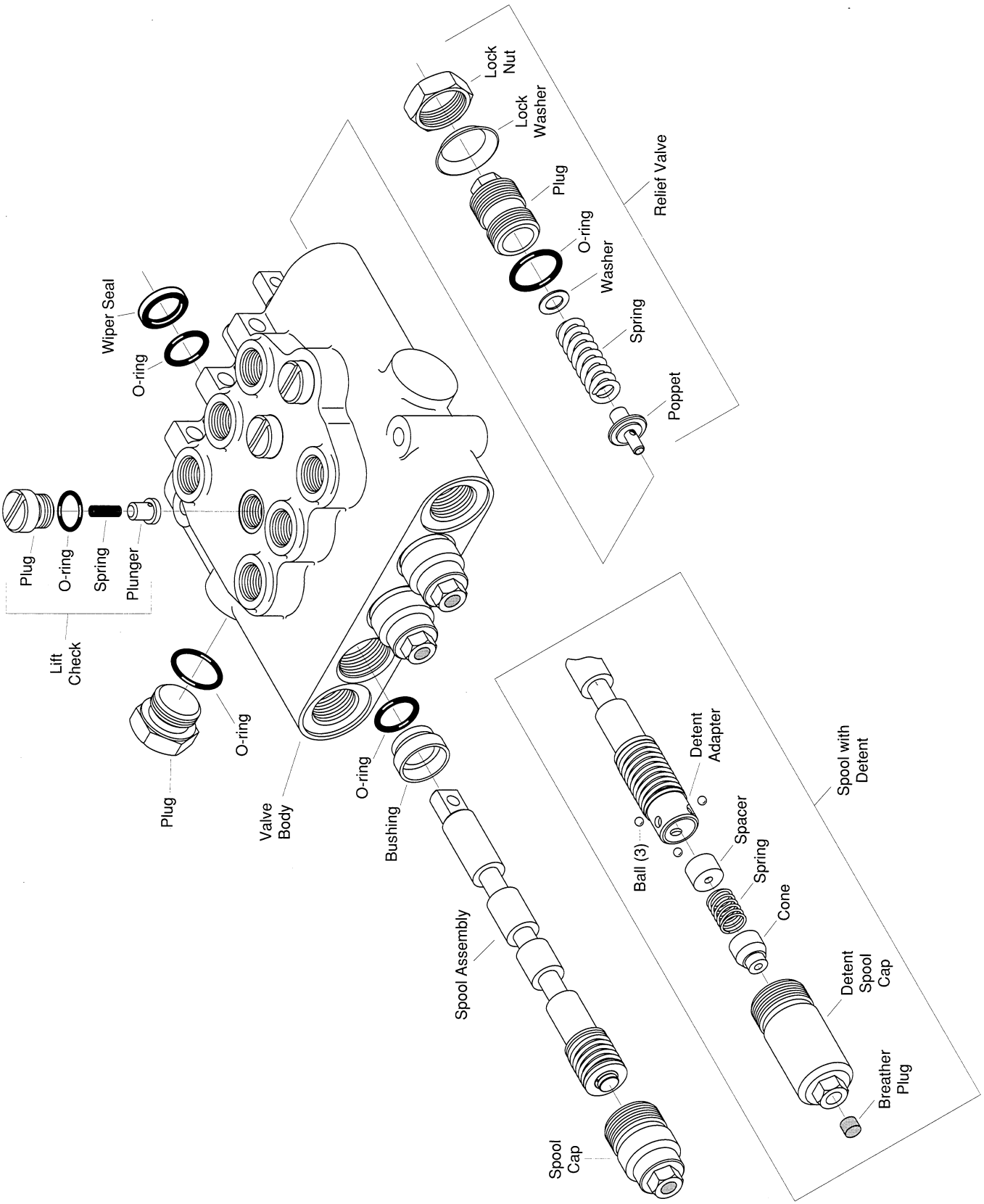
Repair Information

Model 30920 - 30930 Directional Control Valve



EATON

Parts Drawing



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Disassembly

Refer to the Parts Drawing as you preform the repairs.

1. Plug all ports and clean the outside of the valve thoroughly.

2. Mark the spools and their specific bores. The spools are matched to the bores and must not be switched.

3. Remove the spool caps and slide the spool assemblies from their bores.

If spools are detented, take care not to lose the balls, spacer, detent spring, or cone.

4. Remove the o-rings and bushings from the spools.

5. Remove the wiper seals and o-rings from the valve body.

6. Disassemble the spool assemblies only if the retaining ring, spacer, spool spring, or washer need to be replaced see figure 1.

Note: Do not disassemble spool assemblies with detents.

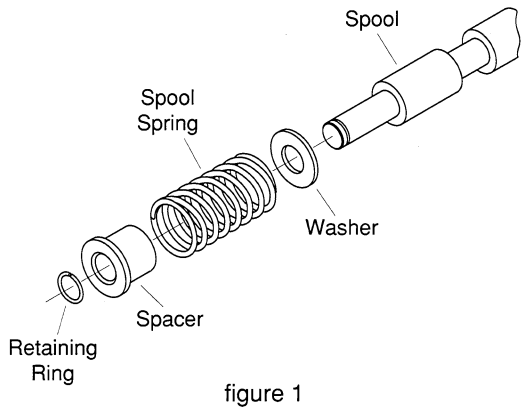

figure 1

7. Remove the lift check plugs, springs, and lift check plungers.

8. Remove the plug from the BYD port. This may be a solid plug, pressure beyond plug, or closed center plug.

9. Remove the relief valve lock nut, lock washer, plug, and o-ring .

10. Remove the washer, relief valve spring, and poppet.

11. Remove all o-rings and back-up rings from the plugs.

Inspection

1. Inspect the spools for wear. If wear is excessive, the valve becomes non-serviceable.

2. Inspect all of the springs and replace as necessary. Replace spool springs as shown in figure 1.

Note: The spool springs on detented spools are not serviceable.

3. Inspect the relief valve parts for wear and replace as necessary.

4. Inspect the lift check plungers and their seats in the valve body.

Reassembly

1. Wash all metal parts in clean solvent and blow them dry with compressed air. Do not wipe parts dry with paper towels or cloth. Lint in a hydraulic system will cause damage.

Note: Replace all o-rings, back-up rings and wiper seals as new.

2. Install new o-rings and wiper seals in the valve body.

3. Slide the bushings and new o-rings over the spools.

4. Liberally lubricate the spools with clean hydraulic fluid and install them in their proper bores.

5. Install the spool caps and tighten them to 20 - 25 lb-ft [27 - 34 Nm].

6. If spools are detented, install the spool caps as follows:

Remove the brass breather plug from the spool cap using a 3/16 inch drift punch.

Insert the punch through the hole in the spool cap.

Put the spacer, detent spring, cone, and balls into the detent adapter.

Hold the parts in place with the drift punch, while threading the spool cap into the valve body.

Tighten the cap to 20 - 25 lb-ft [27 - 34 Nm].

Install the breather plug.

7. Install the lift check plungers, springs, and lift check plugs. Use new o-rings and tighten the plugs to 20 - 25 lb-ft [27 - 34 Nm].

8. Install a new o-ring on the relief valve plug .

9. Insert the washer and relief valve spring into the plug .

10. Place the poppet on the spring and carefully install the relief valve into the valve body.

11. Install the lock washer and nut .

12. Adjust the relief valve setting and tighten the lock nut to 21 - 24 lb-ft [28 - 33 Nm].

Eaton Corporation **Hydraulics Division,** 15151 Highway 5, Eden Prairie, MN 55344 Telephone (612) 937-9800

Eaton G.m.b.H. **Hydraulics Division** ✉ 100 410 • D-5620 Velbert 1 West Germany ☎ 49-2051-2070

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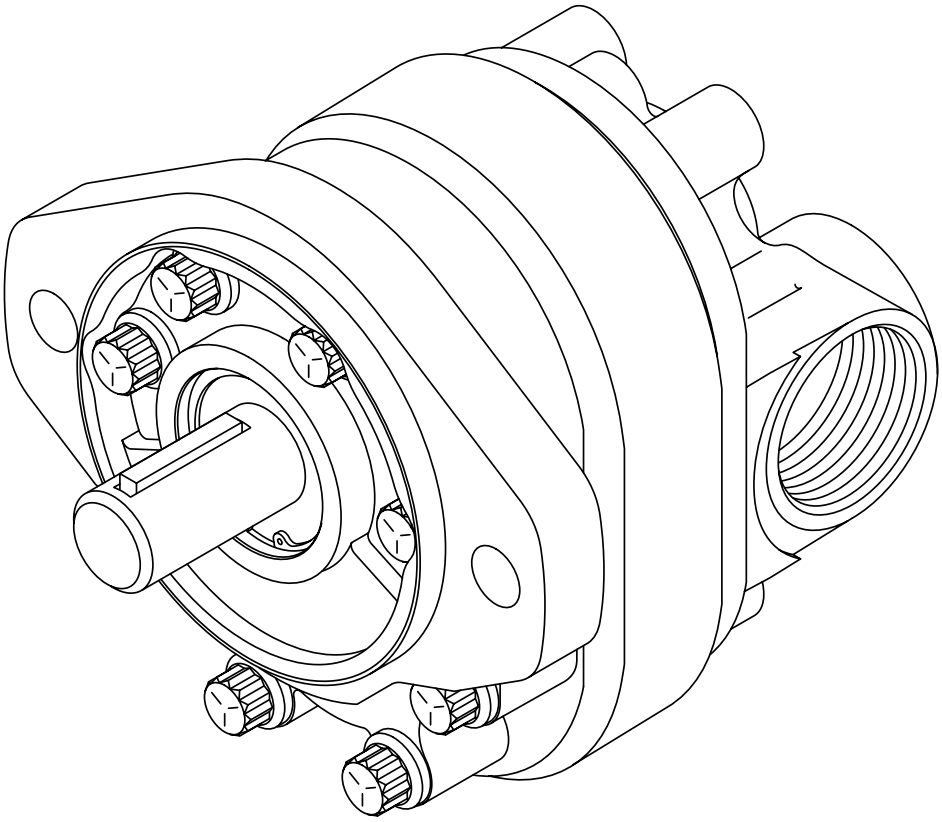
Issued June 1989

Eaton®
Gear Pumps

No. 7-624
October,1995

Repair Information



Series 26
Model 26000 Single Gear Pumps

Introduction

Table of Contents

Introduction

This manual provides service information for the Eaton model 26000 single gear pumps. Step by step instructions for the complete disassembly, inspection, and reassembly of the pumps are included.

The following recommendations should be followed to insure successful repairs.

- Remove the pump from the application.
- Cleanliness is extremely important.
- Clean the port areas thoroughly before disconnecting the hydraulic lines.
- Plug the pump ports and cover the open hydraulic lines immediately after they're disconnected.
- Drain the oil and clean the exterior of the pump before making repairs.
- Wash all metal parts in clean solvent.
- Use compressed air to dry the parts. Do not wipe them dry with paper towels or cloth.
- The compressed air should be filtered and moisture free.
- Always use new seals when reassembling hydraulic pumps.
- For replacement parts and ordering information refer to parts list 6-634.
- Lubricate the new rubber seals with a petroleum jelly (vaseline) before installation.
- Torque all bolts over gasket joints, then repeat the torquing sequence to makeup for gasket compression.
- Verifying the accuracy of pump repairs on an authorized test stand is essential.

Identification and Tools Required

Product Number: 26 0 01 - R Z A

Series
26 = Gear Pump
(SAE "A" Mount)

Features
0 = Standard Single Pump
1 = Standard Single W/ Relief
2 = Flow Divider Backplate
3 = Flow Divider W/ Load Sense
4 = Tandem Backplate
5 = Multiple Pumps

Displacement cm^3/r [in^3 /r]

01 = 6.6 [.40]	**08** = 22.5 [1.37]
02 = 8.2 [.50]	**09** = 24.3 [1.48]
03 = 9.5 [.58]	**10** = 25.2 [1.54]
04 = 10.8 [.66]	**11** = 27.7 [1.69]
05 = 13.8 [.84]	**12** = 29.0 [1.77]
06 = 16.7 [1.02]	**13** = 30.6 [1.87]
07 = 19.7 [1.20]	

Input Rotation
R = Right-hand (clockwise)
L = Left-hand (Counterclockwise)

Catalog / Non-Catalog
Z = Cataloged Pump
A-Y = Non-Cataloged Pump

Shafts , Porting Size and Location

Side Ports
A = 3/4 in. 11 Tooth, 1 5/16-12 UN-2B Suction, 7/8-14 UNF-2B Pressure
C = 3/4 in. Str. Keyed, 1 5/16-12 UN-2B Suction, 7/8-14 UNF-2B Pressure
E = 3/4 in. 9 Tooth, 1 5/16-12 UN-2B Suction, 7/8-14 UNF-2B Pressure
G = 5/8 in. Str. Keyed, 1 1/16-12 UN-2B Suction, 7/8-14 UNF-2B Pressure
J = 5/8 in. 9 Tooth, 1 1/16-12 UN-2B Suction, 7/8-14 UNF-2B Pressure
L = 5/8 in. Str. Keyed, 1 5/16-12 UN-2B Suction, 7/8-14 UNF-2B Pressure
N = 3/4 in. 11 Tooth, 1 1/16-12 UN-2B Suction, 7/8-14 UNF-2B Pressure
R = 3/4 in. Str. Keyed, 1 1/16-12 UN-2B Suction, 7/8-14 UNF-2B Pressure

Rear Ports
B = 3/4 in. 11 Tooth, 1 5/16-12 UN-2B Suction, 7/8-14 UNF-2B Pressure
D = 3/4 in. Str. Keyed, 1 5/16-12 UN-2B Suction, 7/8-14 UNF-2B Pressure
F = 3/4 in. 9 Tooth, 1 5/16-12 UN-2B Suction, 7/8-14 UNF-2B Pressure
H = 5/8 in. Str. Keyed, 1 1/16-12 UN-2B Suction, 7/8-14 UNF-2B Pressure
K = 5/8 in. 9 Tooth, 1 1/16-12 UN-2B Suction, 7/8-14 UNF-2B Pressure
M = 5/8 in. Str. Keyed, 1 5/16-12 UN-2B Suction, 7/8-14 UNF-2B Pressure
P = 3/4 in. 11 Tooth, 1 1/16-12 UN-2B Suction, 7/8-14 UNF-2B Pressure
S = 3/4 in. Str. Keyed, 1 1/16-12 UN-2B Suction, 7/8-14 UNF-2B Pressure

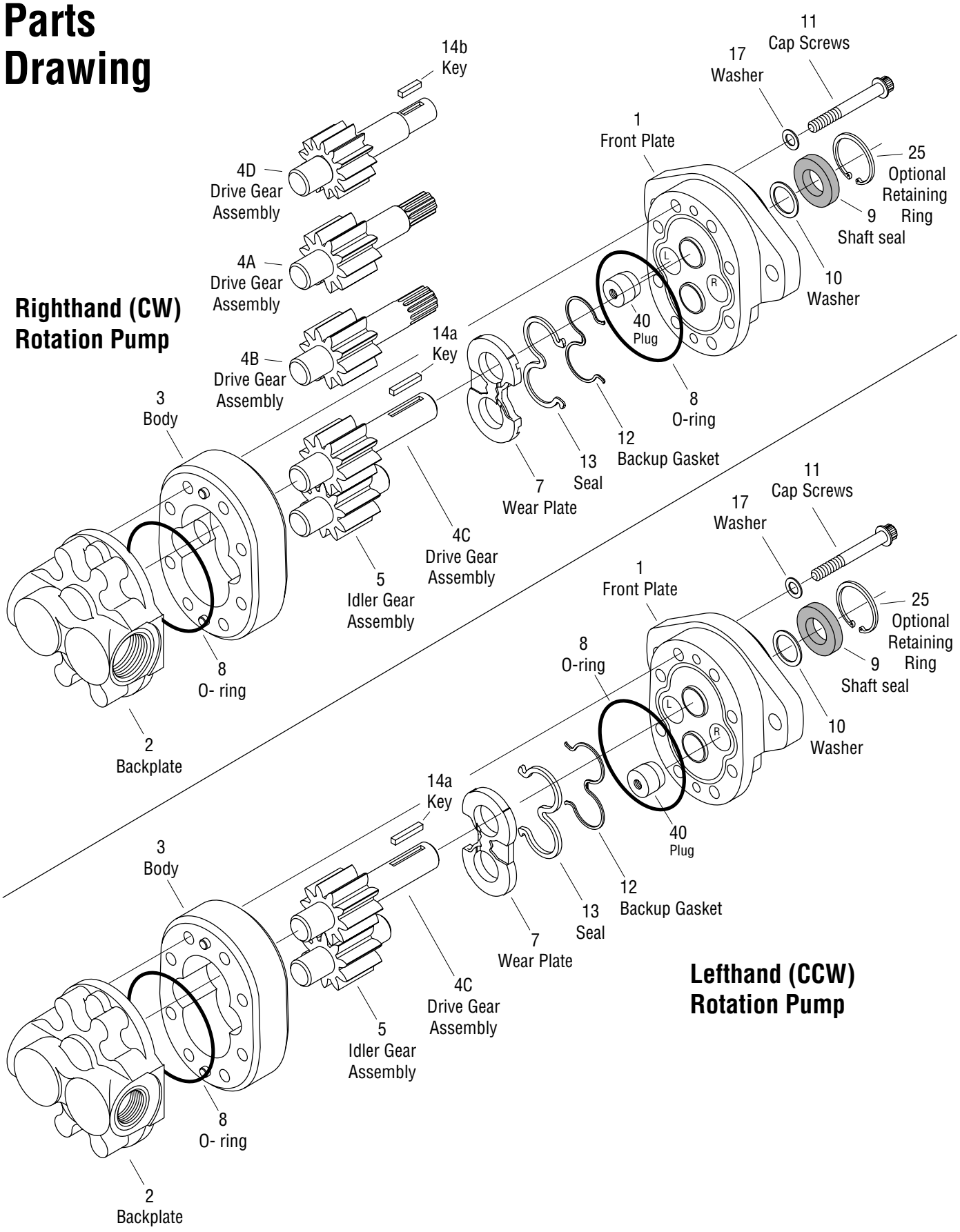
B 95 01 31 JB Serial Number Code:

Testers Initials
Day of Month (two digits)
Month (two digits)
Last two digits of year built. (95 for 1995 etc.)
Revision level of parts list.

Tools Required

- 3/8 in. socket and ratchet wrench
- Internal Retaining Ring Pliers (straight .090 tip)
- O-ring Pick
- Thread 3/8 dia. UNC bolt/screw
- Torque Wrench (135.6 N·m [100 lbf·ft] capacity)
- Hammer (soft face)
- Light Petroleum Jelly
- Seal Driver
- Arbor Press

Parts Drawing



Disassembly

Repair Information - Model 26000

Work in a clean area; cleanliness is extremely important when repairing hydraulic pumps. Before disconnecting the lines, clean port area of pump. Disconnect hydraulic lines, removing pump assembly from vehicle and plugging ports. Thoroughly clean the outside of pump. After cleaning, remove port plugs and drain oil.

Disassembly

1 Remove *key* from drive shaft if keyed drive gear assembly is used.

2 Put a *location mark* across front plate, body and backplate to assure proper reassembly.

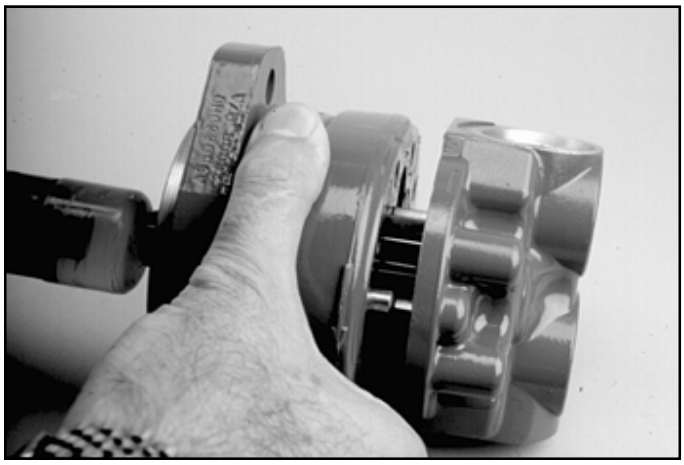
3 Clamp pump in vise, shaft end up.

4 Remove *cap screws* (eight each) and washer (four each).

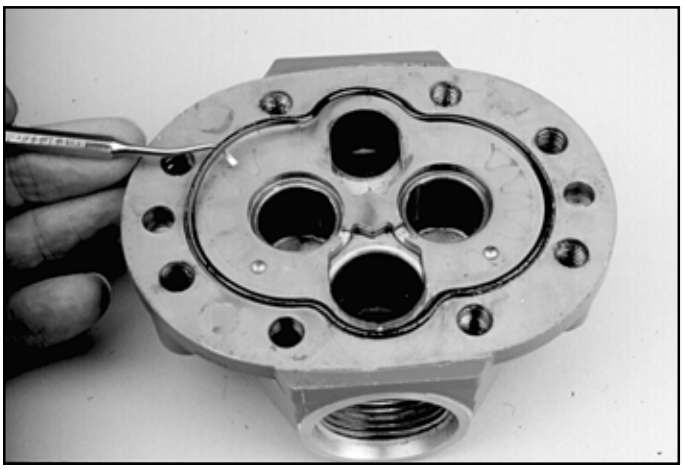
5 Remove pump from vise, hold pump in hands and tap shaft with plastic hammer or rawhide mallet to separate front plate from backplate. Body will remain with either front plate or backplate.

Parts List

	Item No.	Description	Qty.
	1	Front plate Assembly	1
	2	Backplate	1
	3	Body Assembly	1
	4	Drive Gear Assembly	1
	5	Idler Gear Assembly	1
~	7	Wear Plate	1
~	8	O-ring	2
~	9	Shaft Seal	1
~	10	Washer	1
	11	Cap Screw	8
~	12	Backup Gasket	1
~	13	Seal	1
	14	Key for Straight Shaft	1
~	17	Washer	4
	25	Retaining Ring (optional)	1
	40	Plug	1
~ Seal Kit		26000-901 for Single Pumps	



6 Remove *o-ring* seal from backplate.

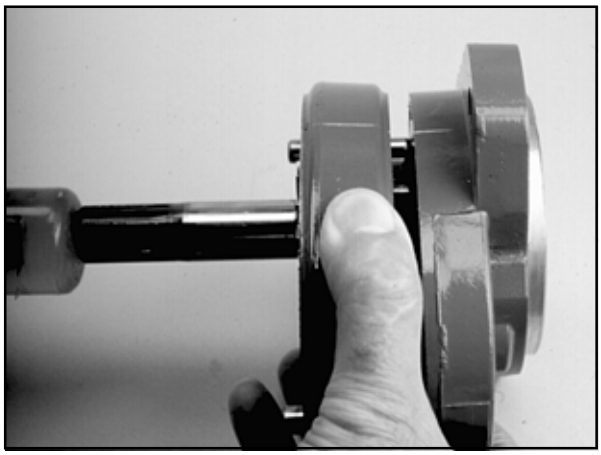


7 To disassemble the *relief valve backplate, flow divider backplate, and tandem flow divider backplate* see page 11 & 12.

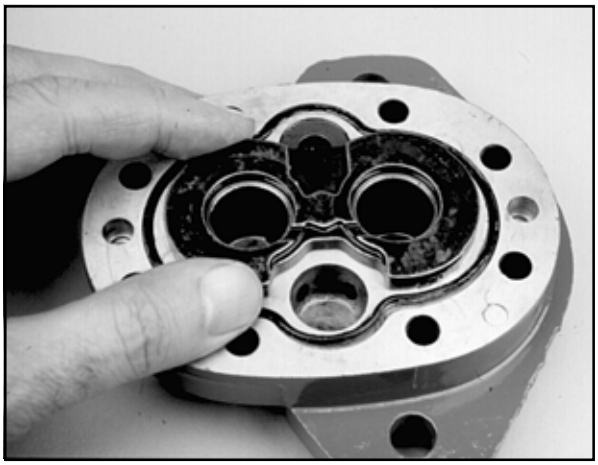
Disassembly

8 Remove *idler gear assembly* from body.

9 To separate *body* from the plate it remained with, place *drive gear assembly* in gear pocket and tap protruding end with plastic hammer or rawhide mallet. Remove drive gear assembly.



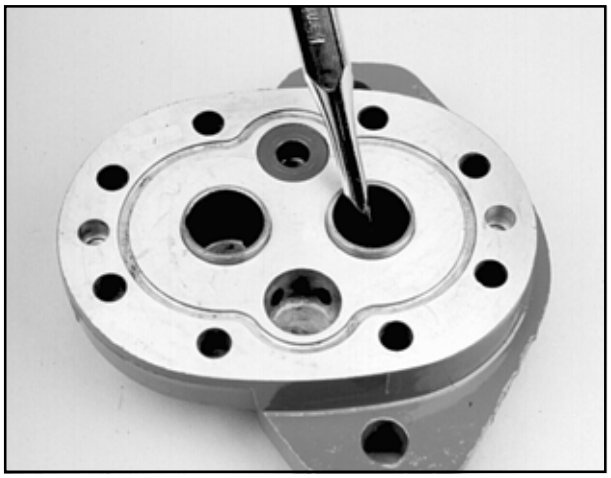
10 Remove wear plate and o-ring seal, noting position of open side of wear plate.



11 Remove *back-up gasket and seal* from wear plate by extracting with a o-ring tool.

12 Remove snap ring (if applicable) from the front of the front plate shaft seal area.

13 Remove *shaft seal* and *washer* from front plate with a blunt punch from the back side.



14 Removing the *plug* in front plate is not necessary, unless you intend to change rotation. See Reversibility - Changing Input Rotation of Pump.

Reversibility

Changing Input Rotation of Pump

1 Place pump in a protected jaw vise with shaft end up. Remove the eight cap screws.

2 Remove front plate, noting orientation of drive shaft through bearing in reference to the backplate.

3 Notice the location of the open side of wear plate and remove wear plate.

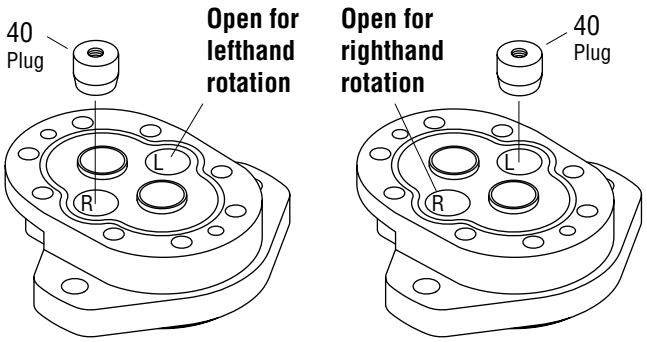
4 Switch *drive gear and idler gear* within gear pockets. Do not flip idler gear end for end.

Note: Gear housing body and backplate do not need altering.

5 Re-install wear plate into gear pockets over the gears with seal and backup gasket up. (Same orientation as removed)

6 Front plate disassembly and assembly:

- Thread 3/8 UNC threaded bolt into *plug* cavity. Start with fingers, then place bolt head in vise and turn front plate to engage threads 2-3 turns.
- Holding bolt in vise, tap front plate with rubber hammer to disengage *plug*.
- Remove *plug* from bolt.
- Install plug in the other casting cavity and tap flush with rubber hammer. Note L or R at bottom of cavity.



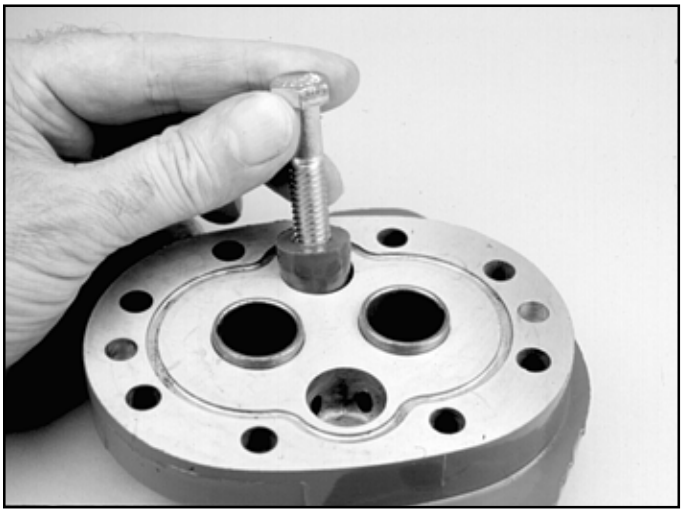
- Ensure that bearing drain holes are free of debris.
- Note proper placement of o-ring in groove of front plate.

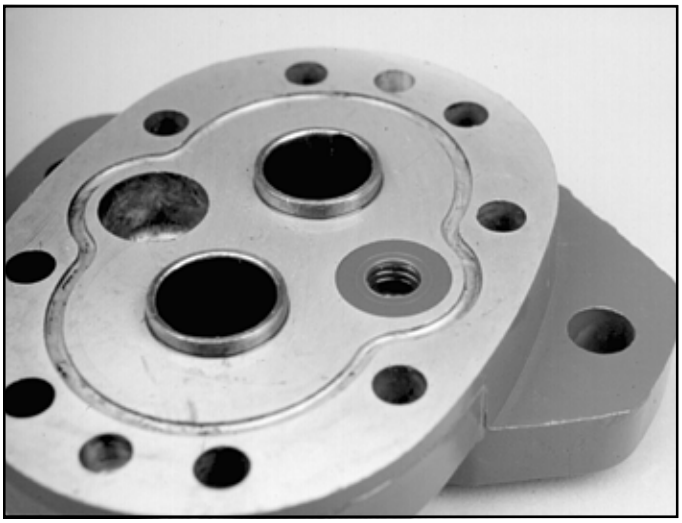
7 Hold o-ring in groove of front plate with petroleum jelly. Reassemble front plate over drive shaft end, being careful not to damage shaft seal.

8 Torque 8 cap screws 34 to 38 N•m [25 to 28 lbf•ft].

9 Lubricate gears and mating surfaces with hydraulic oil through ports.

10 Rotate shaft (manually) to ensure proper assembly of components.





Inspection

Inspect Parts for Wear

General

1 Clean and dry all parts.

2 Remove all nicks and burrs from all parts with emery cloth.

Gear Assembly Inspection

1 Check spline drive shaft for twisted or broken teeth or check keyed drive shaft for broken or chipped keyway.

2 Inspect both the drive gear and idler gear shafts at bushing points and seal area for rough surfaces and excessive wear.

3 Replace gear assembly if shaft measures less than 19 mm [.748 in] in bushing area. (One gear assembly may be replaced separately; shafts and gears are available as assemblies only.)

4 Inspect gear for scoring and excessive wear.

5 Replace gear assembly if gear width is below the following dimensions. Refer to chart on this page.

6 Assure that snap rings are in grooves on either side of drive and idler gears.

7 If edge of gear teeth are sharp, break edge with emery cloth.

Front plate and Backplate Inspection

1 Oil groove in bushings in front plate should be in line with dowel pin holes and 180° apart. The oil grooves in the backplate bushings should be at approximately 37° to the pressure side.

2 Replace the backplate or front plate if I.D. of bushings exceed 19,2 mm [.755 in] (Bushings are not available as separate items).

3 Bushings in front plate should be at 3,20 mm [.126 in] above surface of front plate.

4 Check for scoring on face of backplate. Replace if wear exceeds ,038 mm [.0015 in.].

Body Inspection

1 Check body inside gear pockets for excessive scoring or wear.

2 Replace body if I.D. of gear pockets exceeds 43,7 mm [1.719 in].

Model Number	26001	26002	26003	26004	26005	26006	26007	26008	26009	26010	26011	26012	26013
Pump Disp. cm^3/r [in^3/r]	6,6 [.40]	8,2 [.50]	9,5 [.58]	10,8 [.66]	13,8 [.84]	16,7 [1.02]	19,7 [1.20]	22,5 [1.37]	24,3 [1.48]	25,2 [1.54]	27,7 [1.69]	29,0 [1.77]	30,6 [1.87]
Gear Width mm [in]	7,85 [.309]	9,75 [.384]	11,20 [.441]	12,95 [.510]	16,15 [.636]	19,35 [.762]	22,56 [.888]	25,76 [1.014]	28,12 [1.107]	28,96 [1.140]	32,16 [1.266]	33,78 [1.330]	35,36 [1.392]

Reassembly

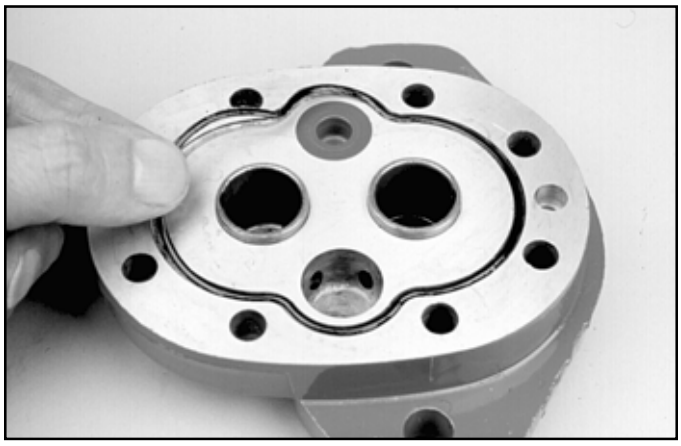
General Information

It is important that the relationship of the backplate, body, wear plate and front plate is correct. You will note two half moon cavities in the body. Note: The smaller half moon port cavity must be on the pressure side of the pump. The side of wear plate with midsection cut out must be on suction side of pump. Suction side of backplate is always side with larger port boss.

Reassembly

1 During the reassembly replace the *wear plate, seal, back-up gasket, shaft seal and o-rings* as new parts.

2 Install *o-ring* in groove of front plate.

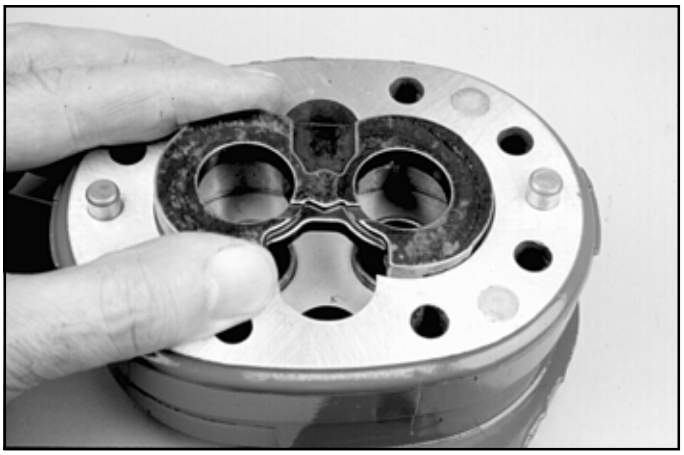


3 Apply a thin coat of petroleum jelly or hydraulic oil to both milled gear pockets of body. Slip body onto front plate with half moon port cavities in body facing away from front plate.

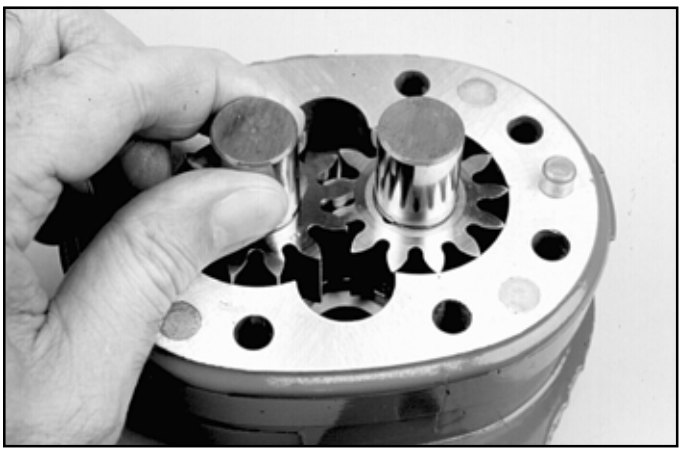
Note: The small half moon port cavity must be on the pressure side (the plugged side of the front plate) of pump.

4 Install new *seal* and new *backup gasket* into wear plate. Note in the middle of the backup gasket a flat section or support. This area must face away from the wear plate inside the seal.

5 Place new *wear plate, seal,* and *backup gasket* into gear pocket with seal and backup gasket next to front plate. The side of the wear plate with the mid section cut-away must be on the suction side of pump.

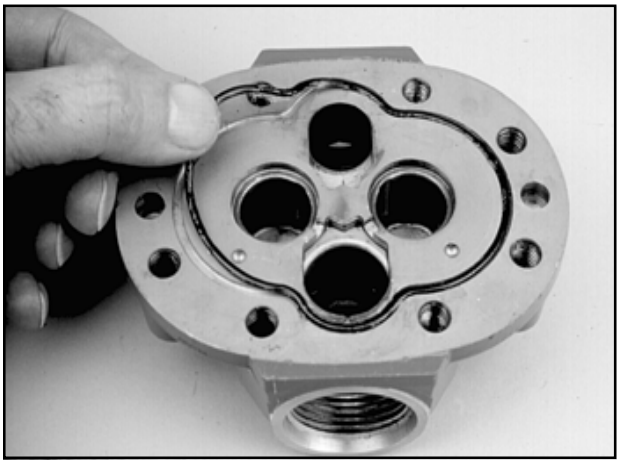


6 Dip *gear assemblies* into oil and slip into front plate bushings and gears into pockets of body.



Reassembly

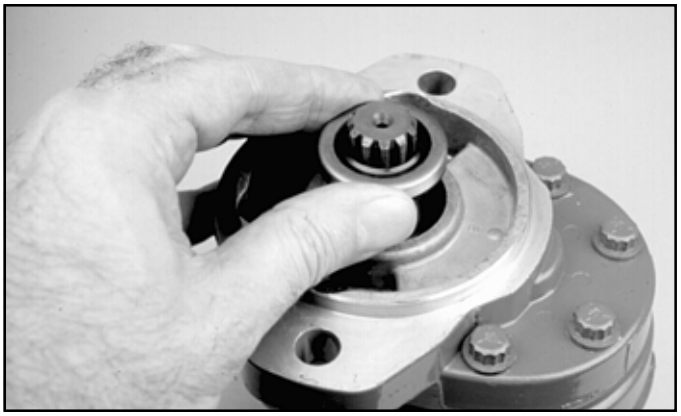
7 Install new *o-ring* in groove of backplate.



8 Make sure port orientation is correct and then slide *backplate* over gear shafts until dowel pins are engaged.

9 Secure with *cap screws* and new *washers*. Tighten cap screws evenly in a crisscross pattern 34 to 38 N•m [25 to 28 lbf•ft] torque.

10 Place washer over drive shaft into housing. Liberally oil shaft seal and install over drive shaft, carefully so that rubber sealing lips are not cut.



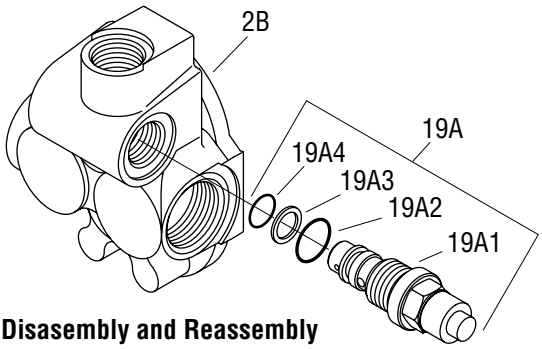
11 Place 1-5/16 in. O.D. sleeve over shaft and press in shaft seal until flush with front surface of front plate.

13 Install key on keyed shaft.

Note: Refer to Start-up Procedure and Trouble Shooting Procedure.

Specific Backplate Parts List

Relief Valve Backplate



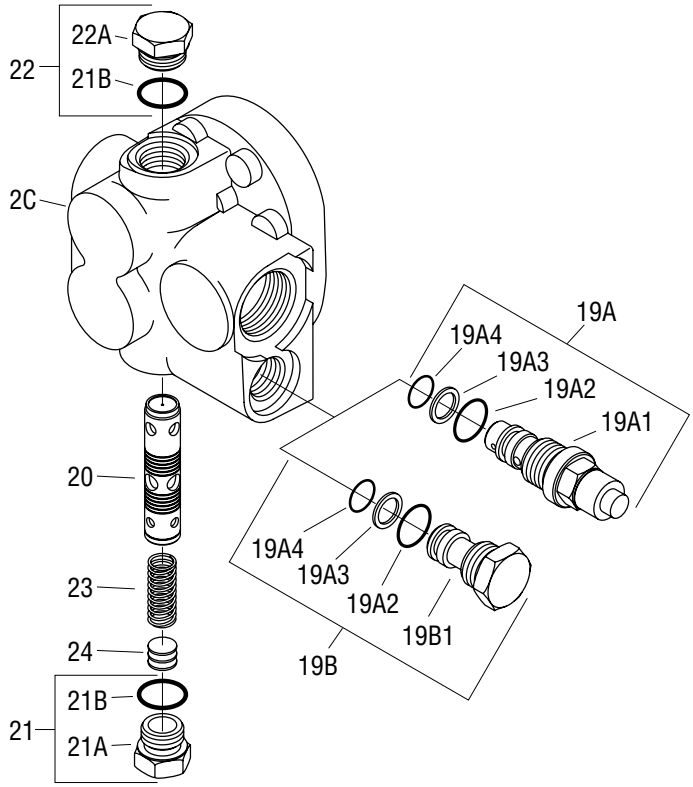
Item No.	Description	Qty.
2	Relief Valve Backplate	1
18	O-ring	3
19A	Relief Valve Assembly	1
19A1	Relief Valve	1
~ 19A2	O-ring	1
~ 19A3	Backup Ring	1
~ 19A4	O-ring	1
19B	Plug Assembly	1
19B1	Plug	1

Disasembly and Reassembly

1 After removing *relief valve*, remove and replace o-rings and backup ring with new parts.

2 Install *relief valve* and torque 41 to 46 N•m [30 to 34 lbf•ft]

Flow Divider Backplate



Item No.	Description	Qty.
2C	Flow Divider Backplate	1
19A	Relief Valve Assembly	1
19A1	Relief Valve	1
~ 19A2	O-ring	1
~ 19A3	Backup Ring	1
~ 19A4	O-ring	1
19B	Plug Assembly	1
19B1	Plug	1
20	Flow Divider Spool	1
21	Plug/O-ring Assembly	1
21A	Plug	1
~ 21B	O-ring	2
22	Plug/O-ring Assembly	1
22A	Plug	1
23	Spring	1
24	Shim (.0239 inch thick)	A/R
A/R	– As Required	

Disasembly and Reassembly

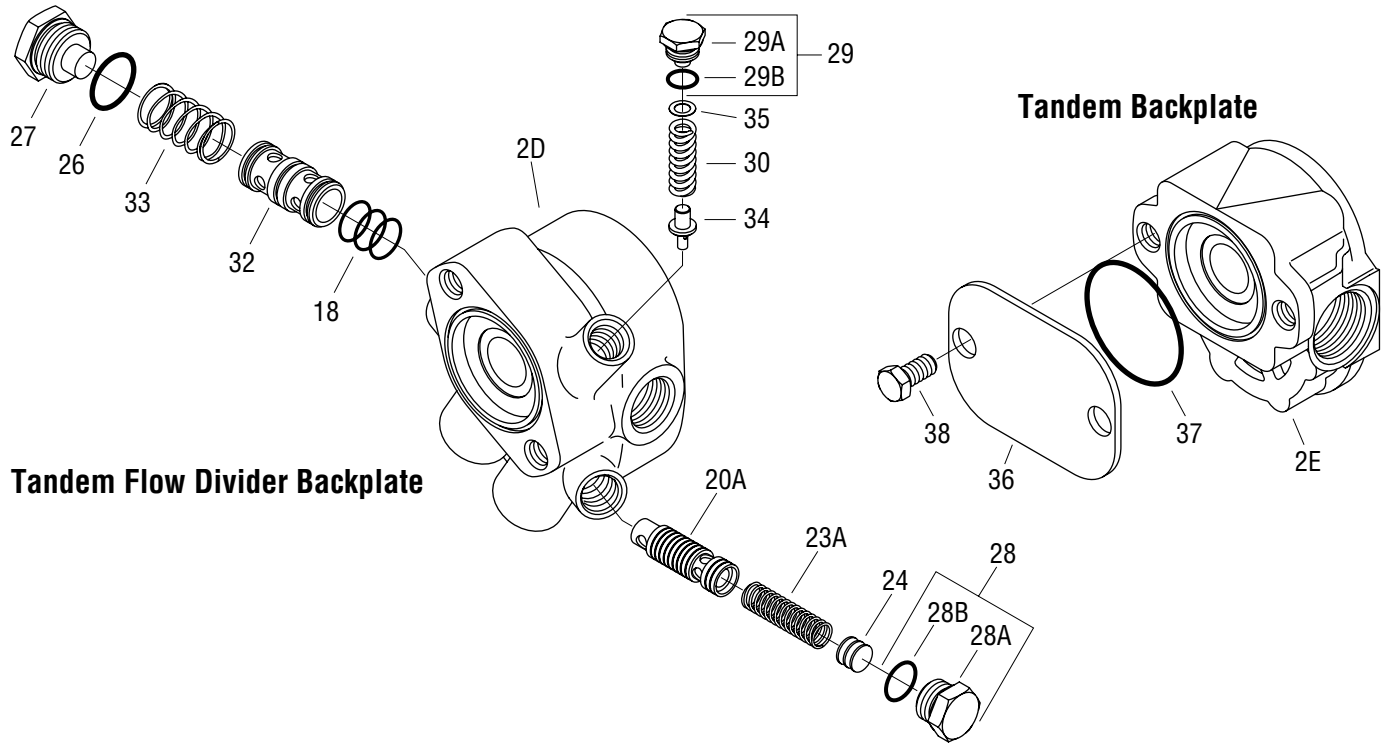
1 After removing *relief valve or plug*, remove and replace o-ring and backup ring with new parts.

2 Install *relief valve or plug* and torque 41 to 46 N•m [30 to 34 lbf•ft]

3 Remove flow divider *plugs, shims, spring, and spool* from backplate. (Notice orientation of spool with cavity in backplate)

4 Install new plug *seals* on plugs. Install *spool, spring, shims, and plug assemblies* into backplate. Torque plugs 29 to 33 N•m [21 to 24 lbf•ft]

Specific Backplate Parts List



Disasembly and Reassembly

1 Remove *relief valve plug, shim, spring, and poppet* from backplate. Do not remove internal relief valve seat. Seat is loctited to a predetermined depth. Remove o-ring from plug and replace with new o-ring.

2 Install *poppet, spring, shim, and relief valve plug* and torque 14 to 16 N•m [10 to 12 lbf•ft]

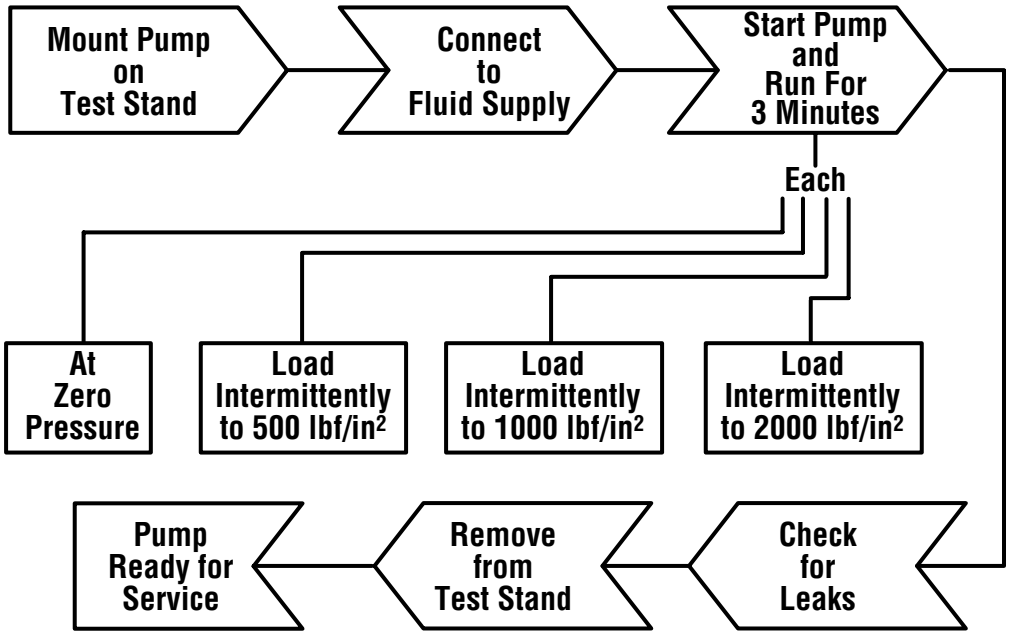
3 Remove flow divider *plugs, shims, springs, spool, and sleeve* from backplate. (Notice orientation of spool with cavity in backplate) Remove *o-rings* from sleeve and replace with new *o-rings*.

4 Install *sleeve, spool, springs, shims, and plug assemblies* into backplate. Torque plug #27 48 to 54 N•m [35 to 40 lbf•ft] and plug #28 29 to 33 N•m [21 to 24 lbf•ft]

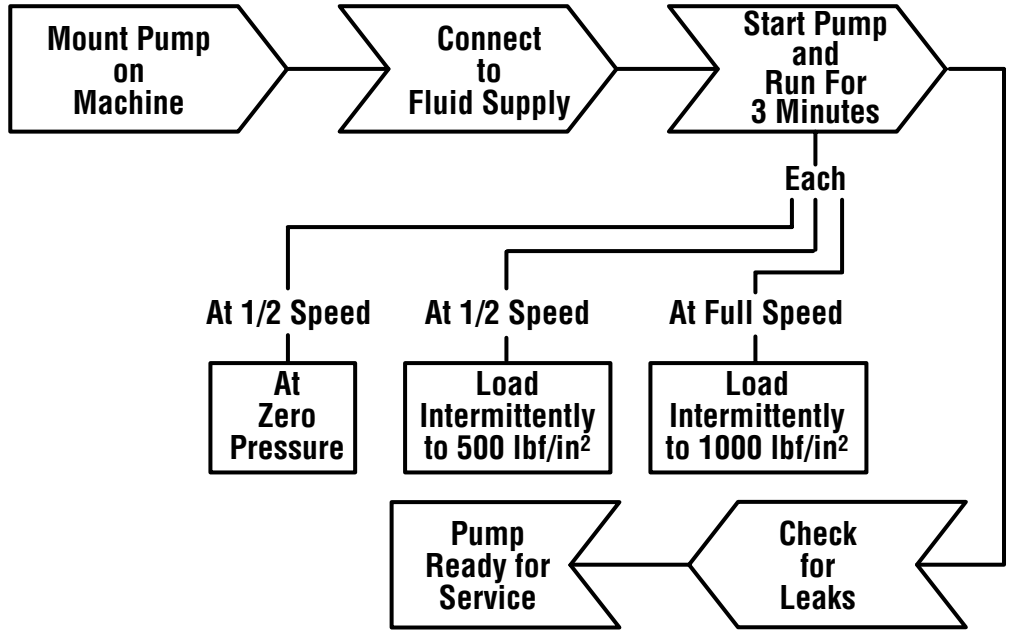
	Item No.	Description	Qty.
	2D	Tandem Flow Divider Backplate	1
	2E	Tandem Backplate	1
	18	O-ring	3
	20A	Spool for Tandem Flow Divider Backplate	
	23A	Spring for Tandem Flow Divider Backplate	1
	24	Shim (.0239 inch thick)	A/R
~	26	O-ring	1
	27	Plug	1
	28	Plug/O-ring Assembly	1
	28A	Plug	1
~	28B	O-ring	2
	29	Plug/O-ring Assembly	1
	29A	Plug	1
~	29B	O-ring	1
	30	Relief Valve Spring	1
	32	Sleeve	1
	33	Spring	1
	34	Poppet	1
	35	Shim Washer (.010 inch thick)	A/R
	36	Tandem Cover Plate	1
	37	O-ring	1
	38	Cap Screw	2
	A/R	– As Required	

Placing Series 26 Gear Pump Back into Operation

When test stand is *available*.



When test stand is *not available*.



Trouble Shooting

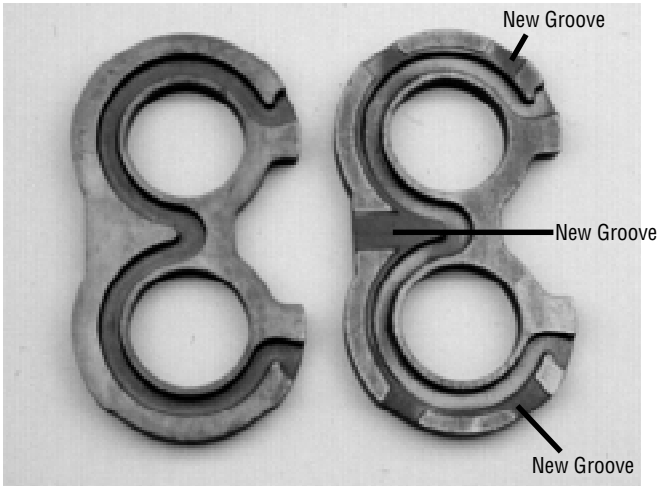
Problem	Possible Cause	Correction
Cavitation	a. Oil too heavy. b. Oil filter plugged. c. Suction line plugged or too small.	a. Change to proper viscosity b. Clean filter. c. Clean line and check size of line.
Oil heating	a. Oil supply low. b. Contaminated oil. c. Setting of relief valve too high or too low. d. Oil in system too light.	a. Fill reservoir. b. Drain reservoir and refill with clean oil. c. Set to correct pressure. d. Drain reservoir and refill with proper viscosity oil.
Shaft seal leakage	a. Worn shaft seal. b. Worn shaft in seal area. c. Debris in shaft seal suction side drain holes.	a. Replace shaft seal. b. Replace drive assembly. c. Disassemble pump and inspect.
Foaming oil	a. Low oil level b. Air leaking into suction line c. Wrong kind of oil.	a. Fill reservoir. b. Tighten fittings. c. Drain and fill reservoir with non-foaming oil.

Note

Wear Plate Identification

A product improvement has been made to the Model 26000 gear pump with a new designed wear plate. To identify the new wear plate, look for grooves placed in the seal side of the wear plate as shown below.

OLD
Wear Plate



NEW
Wear Plate

This new wear plate enables better pressure clamping with aerated oil in pumps 1.37 cubic inch or smaller. Aerated oil may occur during a cold start-up in applications with long suction lines or when the mouth of the inlet line is temporarily exposed to air.

Order parts from 6-634 Parts Information booklet.
Each order must include the following information.

1. Product and/or Part Number
2. Serial Number Code
3. Part Name
4. Quantity

Eaton Corporation
Hydraulics Division
15151 Hwy. 5
Eden Prairie, MN 55344
Telephone 612/937-9800
Fax 612/937-7130

Eaton Ltd.
Hydraulics Division
Glenrothes, Fife
Scotland, KY7 4NW
Telephone 01-592-771-771
Fax 01-592-773-184

Eaton GmbH
Hydraulics Products
Am Schimmersfeld 7
40880 Ratingen, Germany
Telephone 02102-406-830
Fax 02102-406-800

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CONTENTS

DIESEL ENGINE SERVICE MANUAL

Kubota
TENNANT Part Number 393654

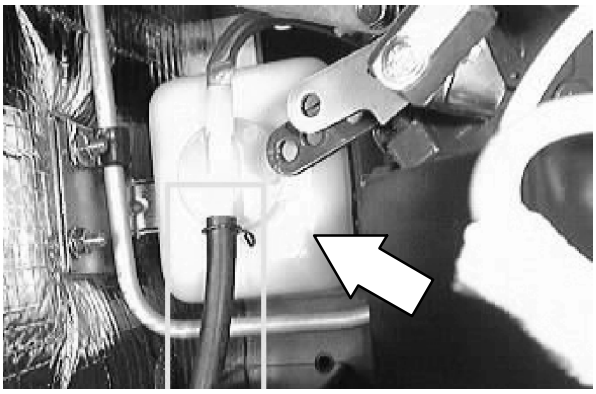
INTRODUCTION

This section includes repair information on the engine and related systems, such as fuel, electrical, and belts. Also, engine removal and installation.

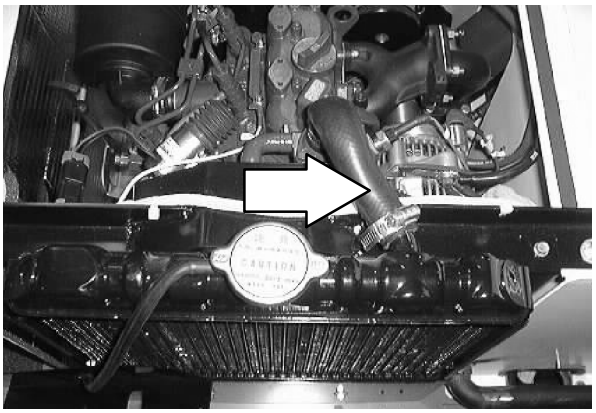
COOLING SYSTEM

Check the radiator coolant level daily in the overflow reservoir. Use clean water mixed with a permanent-type, ethylene glycol antifreeze to a -34° C (-30° F) rating. Add coolant to the overflow reservoir.

FOR SAFETY: When Servicing Machine, Avoid Contact With Hot Engine Coolant.

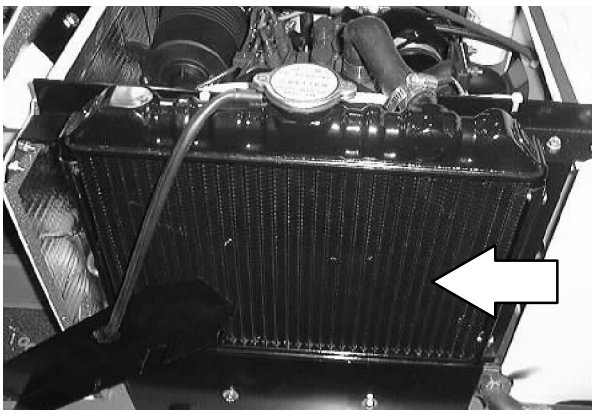


Check the radiator hoses and clamps every 200 hours of operation. Tighten the clamps if they are loose. Replace the hoses and clamps if the hoses are cracked, harden, or swollen.



Check the radiator core for debris daily. Blow or rinse all dust, which may have collected on the radiator, in through the radiator fins, and out the grill, opposite the direction of normal air flow. Be careful not to bend the cooling fins when cleaning. Clean thoroughly to prevent the fins becoming encrusted with dust. Clean the radiator and cooler only after the radiator has cooled to avoid cracking.

FOR SAFETY: When Servicing Machine, Wear Eye And Ear Protection When Using Pressurized Air Or Water.

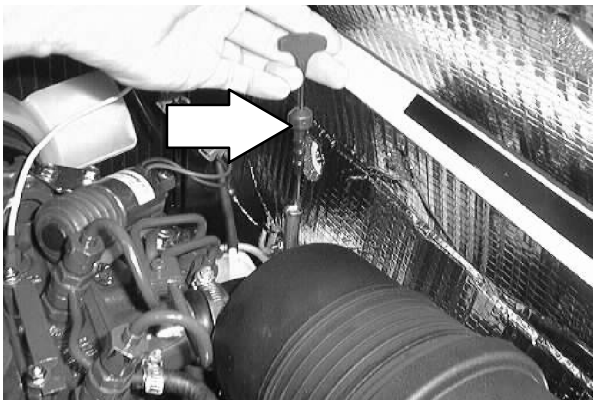


Flush the radiator and the cooling system every 1600 hours of operation, using a dependable cleaning compound.

LUBRICATION

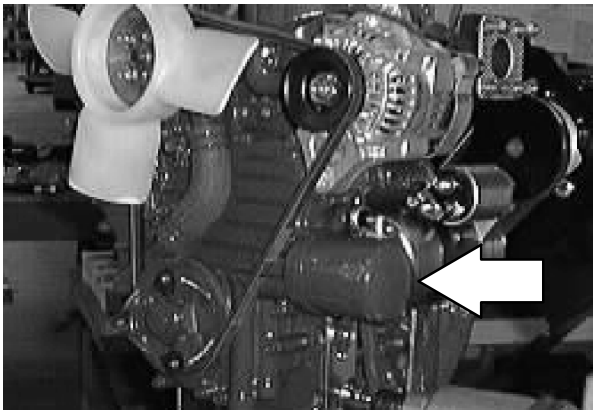
ENGINE OIL

Check the engine oil level daily. The engine oil dipstick can be accessed by lifting up the seat support. Change the engine oil and oil filter after every 100 hours of machine operation. The capacity of this engine is 2.2 liters (0.66 U. S. gallon). Use an automobile grade SAE #20, #30, or 10W–30.



ENGINE OIL FILTER

Open the seat support assembly. Locate the engine oil filter on the right side of the engine. Change the engine oil and oil filter after every 100 hours of machine operation. Use SAE–CD/CE 10W30 rated engine oil 2.2L (2.2 qt).



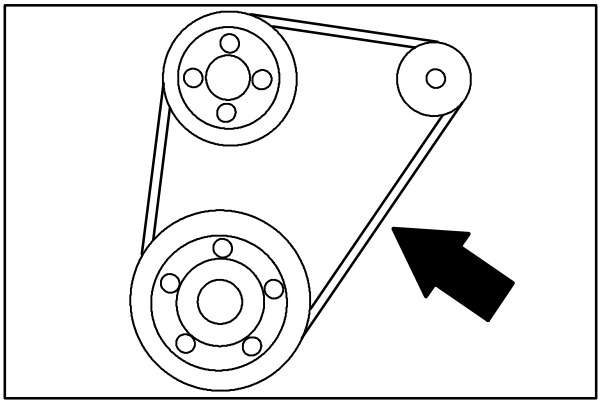
BELTS

ENGINE BELT

The engine fan belt is driven by the engine crankshaft pulley and drives the alternator pulley. Proper belt tension is 10 mm (0.40 in) from a force of 4 to 5 kg (8 to 10 lb) applied at the mid-point of the longest span.

Check and adjust the belt tension every 100 hours of operation.

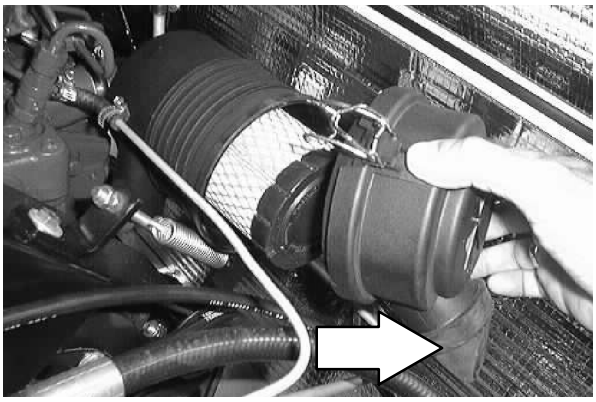
WARNING: Moving Belt And Fan Blades. Keep Away.



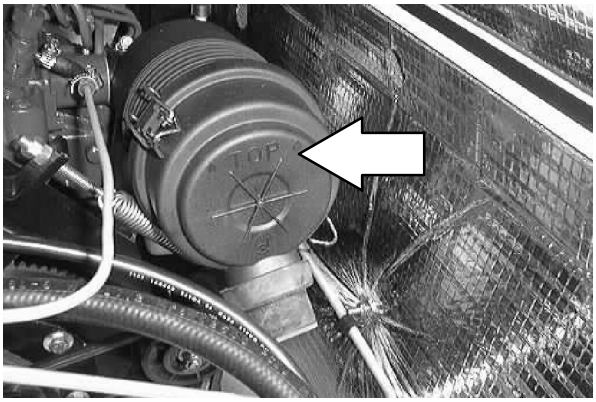
AIR INTAKE SYSTEM

AIR FILTER

The engine air filter housing has a dust cap and a dry cartridge-type air filter element. Empty the dust cap daily. Check the dust cap every 100 hours of operation to make sure it is expelling dust. Replace the dust cap if the rubber is worn.



The air filter element must be replaced whenever it is damaged or has been cleaned three times.



To clean the filter element, remove it from the filter housing. Carefully clean the end cap and the interior of the housing with a damp cloth. Clean the housing sealing surfaces.

Using an air hose, direct clean, dry air, maximum 205 kPa (30 psi), up and down the pleats on the inside of the element. Do not rap, tap or pound dust out of the element.

FOR SAFETY: When Servicing Machine, Wear Eye And Ear Protection When Using Pressurized Air Or Water.

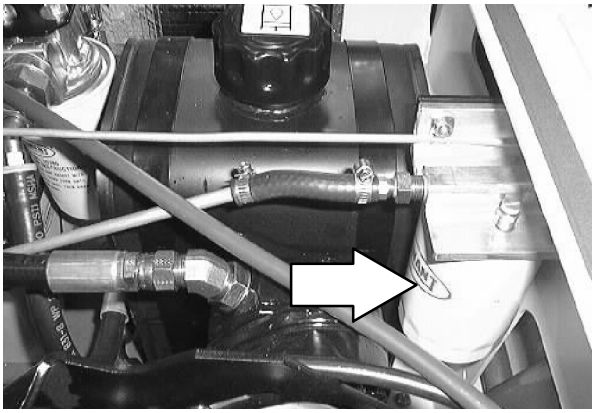
After cleaning the air filter element, inspect it for damage by placing a bright light inside. The slightest rupture requires replacement of the element. Inspect the seals on the ends of the element, they should be flexible and undamaged.

Install the dust cap on the air filter housing with the arrows pointing up.

FUEL SYSTEM

FUEL FILTER/WATER SEPARATOR

The fuel filter/water separator cartridge filters impurities from the diesel fuel. It is located on the left side of the engine, under the seat shroud.



Replace the fuel filter element every 200 hours of operation. **Check the fuel filter water trap daily for water. Drain any water that has collected in the cartridge.**

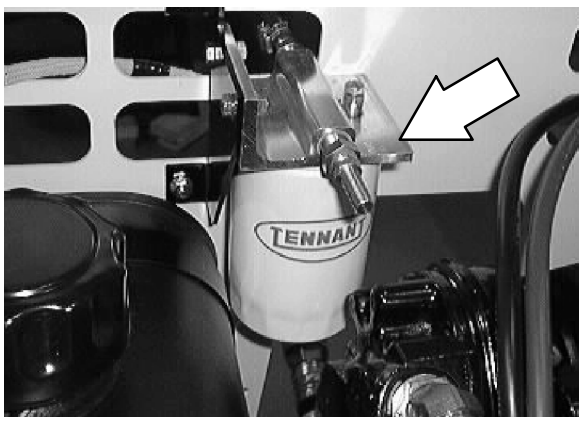
TO REPLACE FUEL FILTER/WATER SEPARATOR

FOR SAFETY: Before Leaving Or Servicing Machine; Stop On Level Surface, Set Parking Brake, And Turn Off Machine.

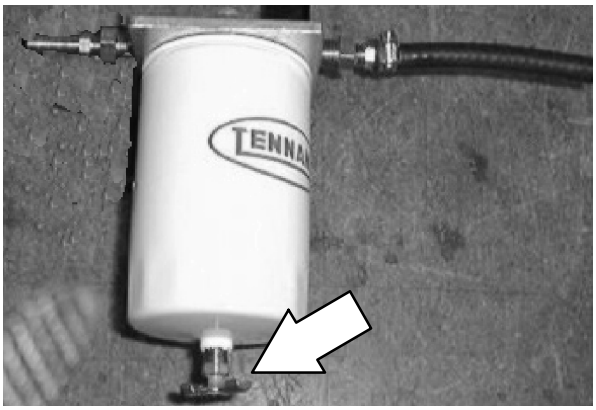
1. Open the seat support.

2. Locate the fuel filter/water separator on the left side of the engine.

NOTE: Place a drain pan under the filter.



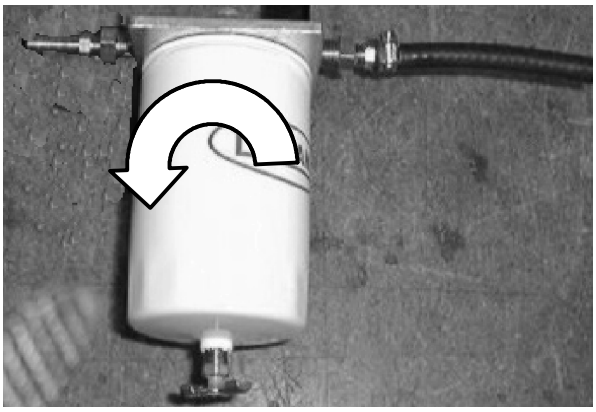
3. Open the pet-cock on the bottom of the filter cartridge. Let any water drain from the filter.



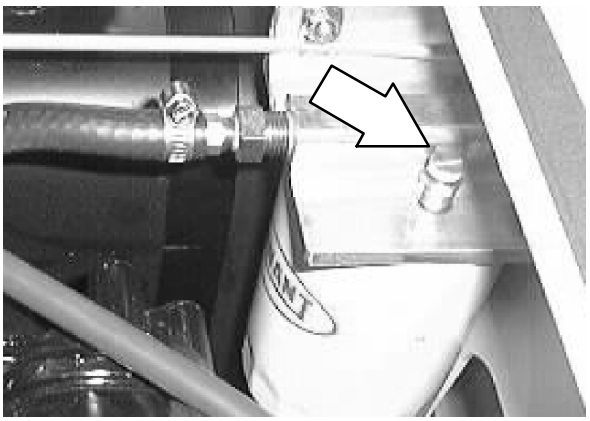
4. Un-screw the filter from the filter head. Properly discard the old filter.

5. Place a small amount of oil on the rubber O-ring on the new filter.

6. Screw the new filter onto the filter head. Tighten until snug then 1/4 turn.



7. Open the air breather on top of the filter head and turn the engine over. Close the air breather when the diesel fuel coming out of the breather is free of air bubbles. **The engine may start at any time during this procedure.** *Clean up any spilled diesel fuel. Remove the drain pan.*

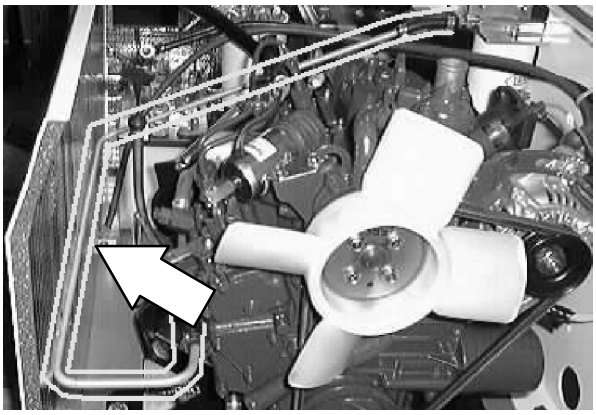


8. Close the seat shroud.

9. Start the machine and check the new filter for any leaks.

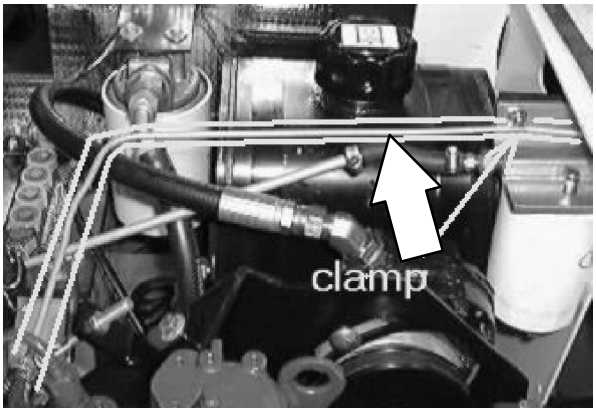
FUEL LINES

Check the fuel lines every 50 hours of operation. If the clamp band is loose, apply oil to the screw of the band, and securely tighten the band.

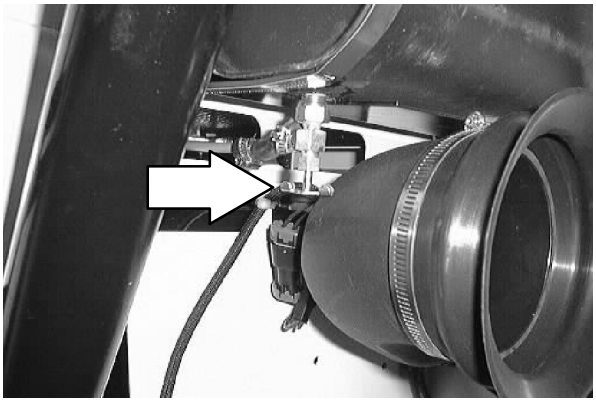


Parts of the fuel line are made of rubber. The fuel lines may become worn out whether the engine has been used much or not. Replace the rubber fuel lines and clamp bands every two years.

If the fuel lines and clamp bands are found worn or damaged before two years' time, replace or repair them at once. Bleed the fuel system after replacement of any of the fuel lines, see TO PRIME THE FUEL SYSTEM. When the fuel lines are not installed, plug both ends with clean cloth or paper to prevent dirt from entering the lines. Dirt in the lines can cause fuel injection pump malfunction.



There is a valve located under the fuel tank. This valve can be used to shut off the fuel flow if the fuel lines need to be serviced.



PRIMING FUEL SYSTEM

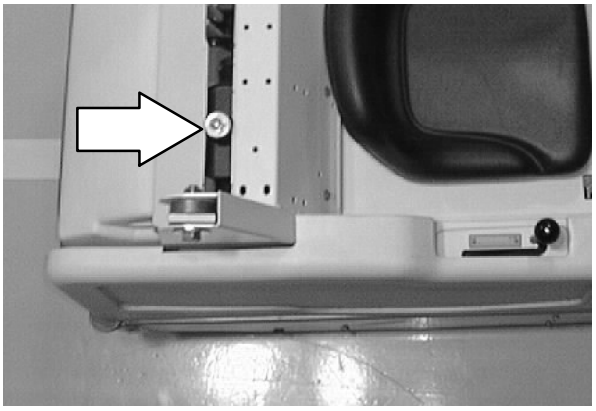
Priming the fuel system removes pockets of air in the fuel lines and fuel components. Air in the fuel system will prevent smooth engine operation.

Prime the fuel system after running out of fuel, changing the fuel filter, disconnecting the low pressure fuel lines, or any part of the low pressure fuel system leaks during engine operation.

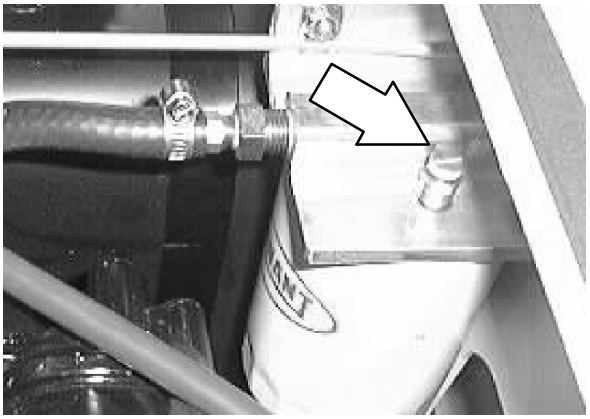
TO PRIME FUEL SYSTEM

FOR SAFETY: Before Leaving Or Servicing Machine; Stop On Level Surface, Set Parking Brake, And Turn Off Machine.

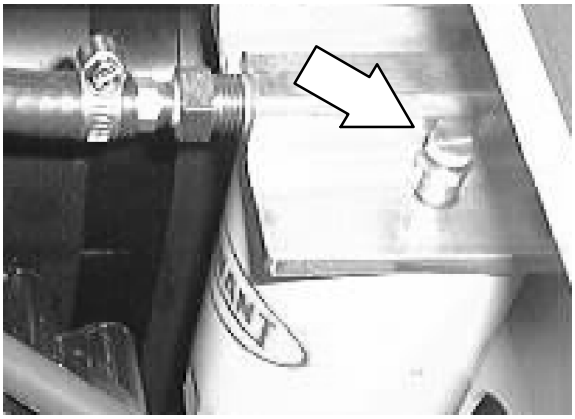
1. Open the seat support. Make sure the fuel tank is full.



2. Open the breather vent on top of the fuel filter/water separator.



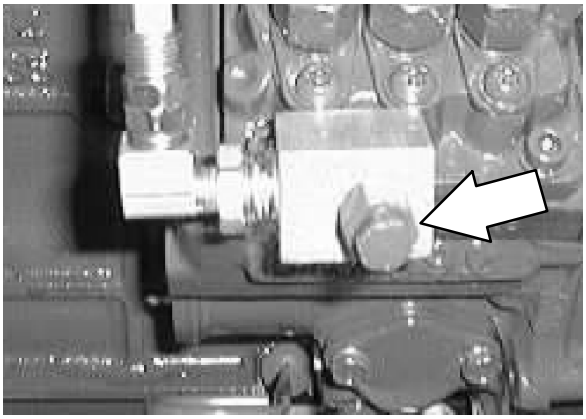
3. Turn the key to the start position until fuel, free from air, appears at the filter vent point. Close the breather vent.



4. Loosen the bleed screw at the banjo fitting on the injector pump.

5. Turn the key to the start position until fuel, free from air, appears at the banjo fitting on the injector pump. Tighten the connection.

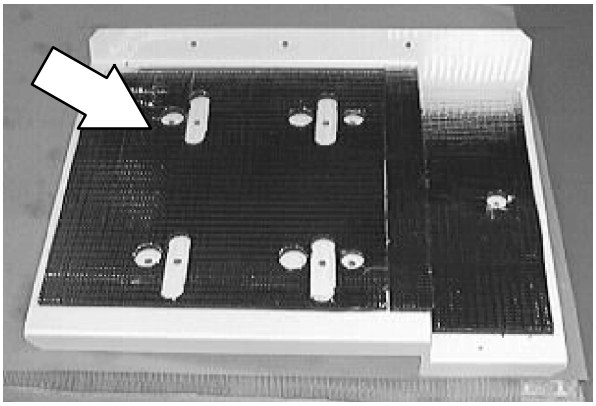
6. Clean up any spilled fuel. Operate the machine and check for proper operation.



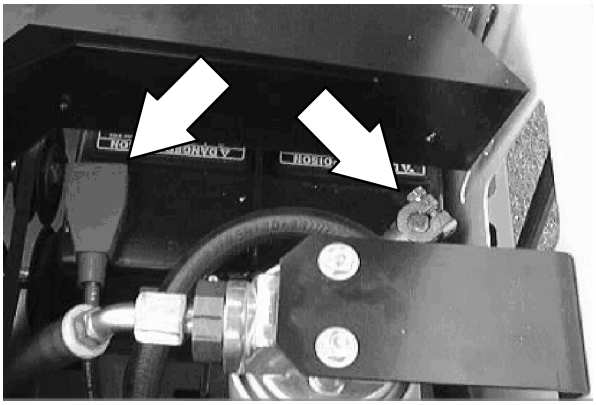
TO REMOVE ENGINE

FOR SAFETY: Before Leaving Or Servicing Machine; Stop On Level Surface, Set parking brake.

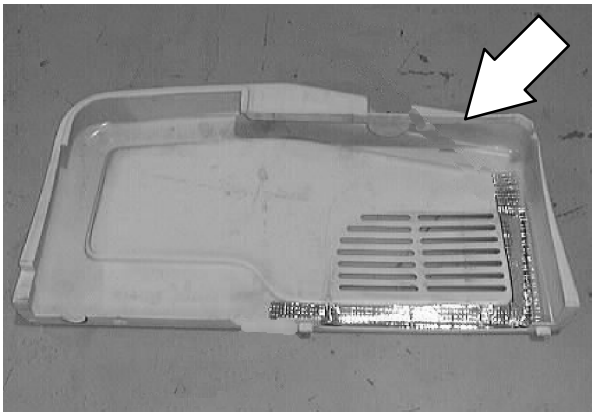
1. Pivot the seat support open and remove it from the machine.



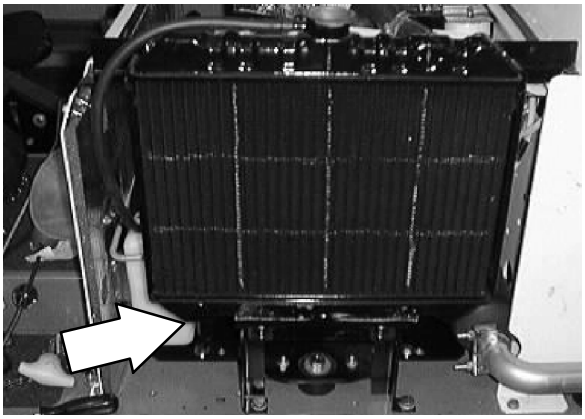
2. Disconnect the battery cables.



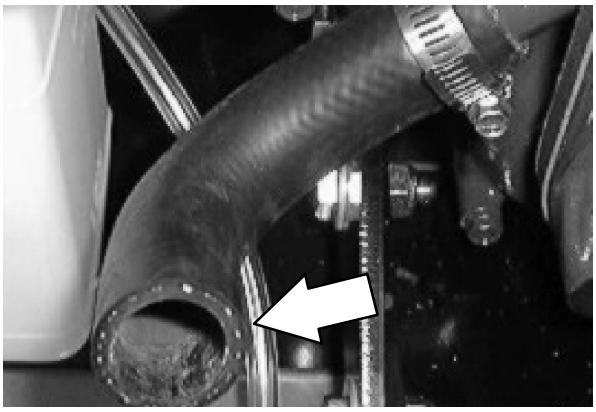
3. Remove the left hand side panel.



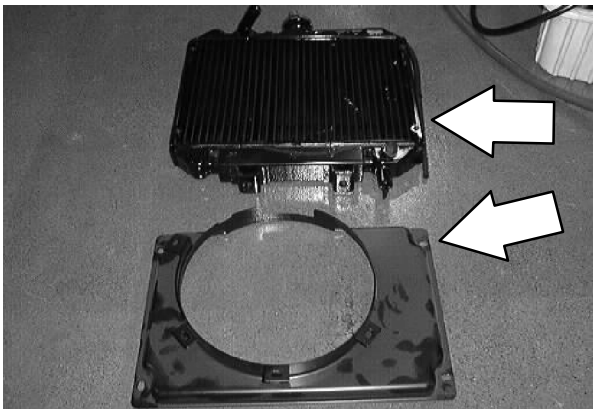
4. Drain the radiator.



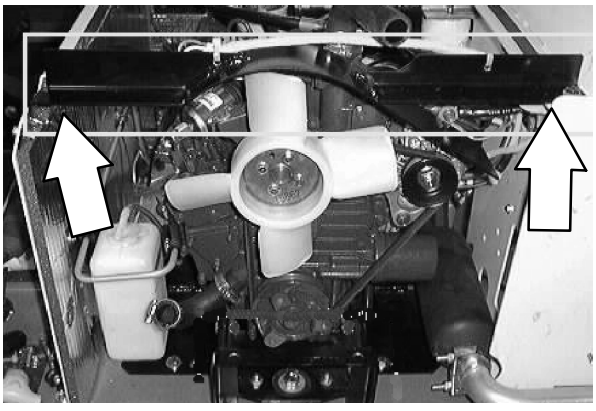
5. Disconnect the upper and lower radiator hoses from the radiator.



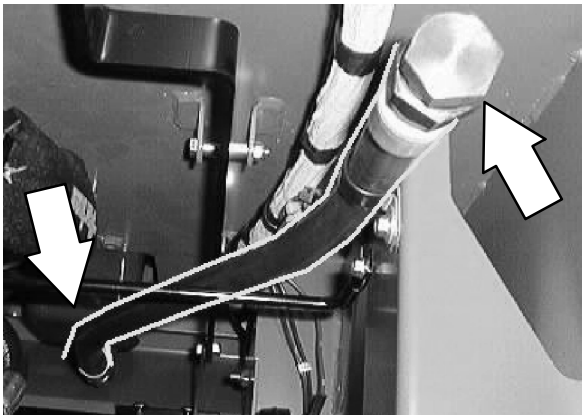
6. Remove the radiator and shroud from the machine.



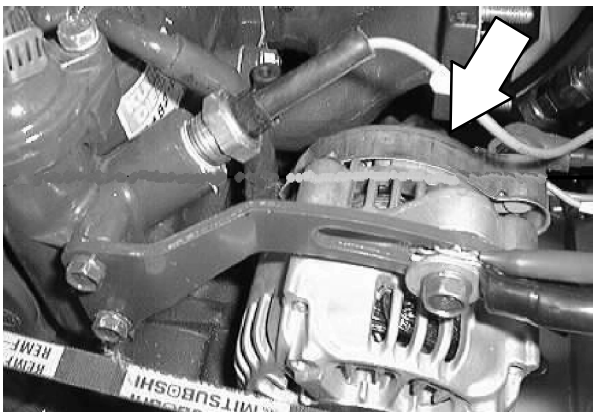
7. Remove the seat mount brace.



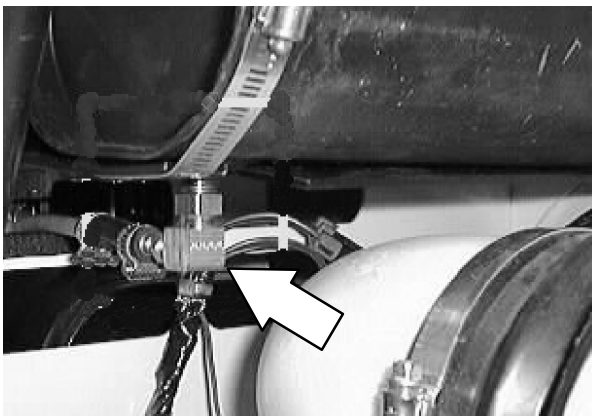
8. Drain the engine oil. Remove the remote oil drain hose from the fitting on the engine oil pan.



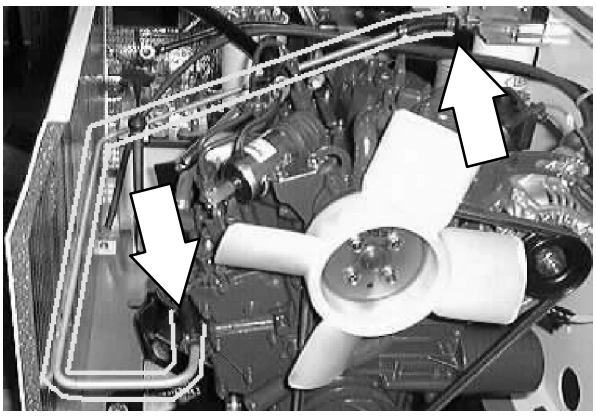
9. Mark and disconnect the alternator wires, low oil pressure switch wires, starter wires, ground cable, and a positive battery cable.



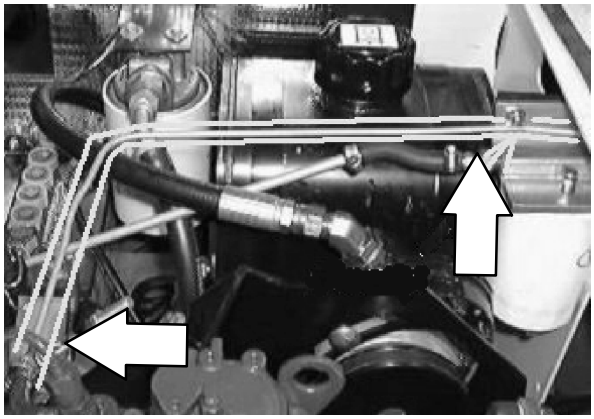
10. Shut the valve off at the fuel tank.



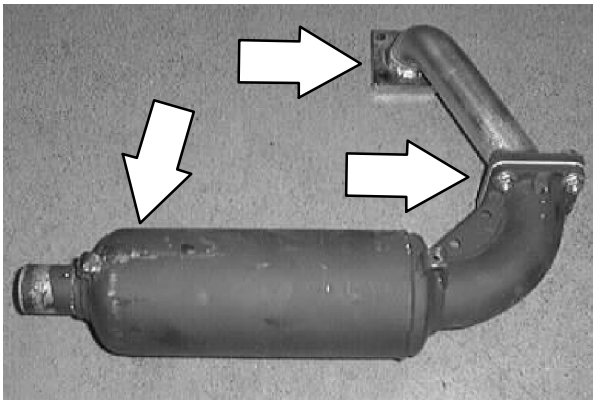
11. Disconnect and remove the main fuel line.



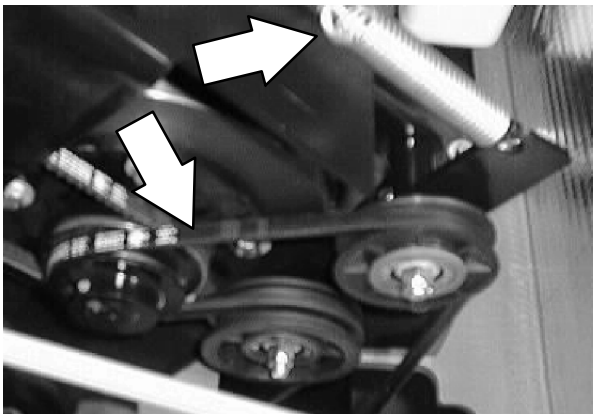
12. Disconnect and remove the fuel return line.



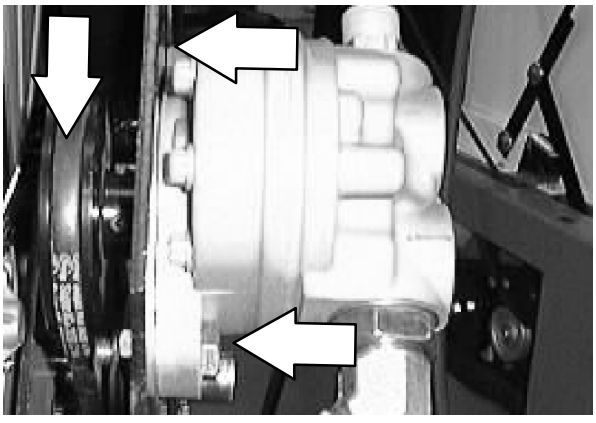
13. Disconnect the exhaust pipe from the muffler at the engine manifold. Remove the exhaust pipe and muffler from the machine.



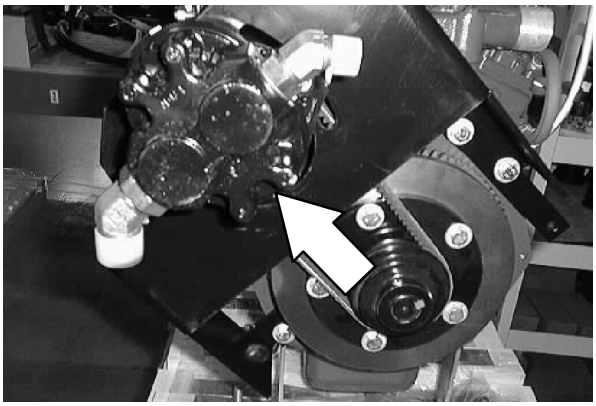
14. Loosen the jack shaft V-belt tension spring threaded rod. Push forward on the V-belt idler arm and remove the V-belt from the flywheel sheave.



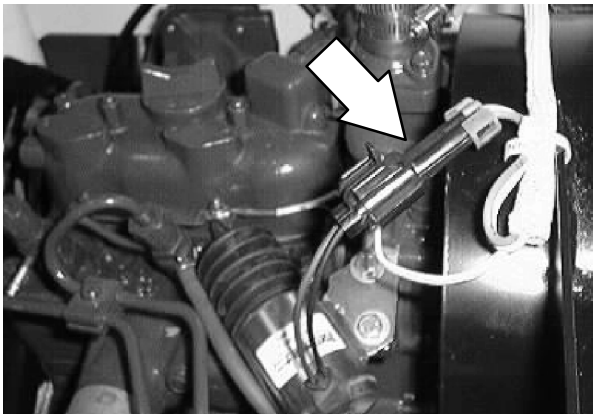
15. Loosen the hardware holding the hydraulic pump to the mount bracket. Push the pump down and remove the V-belt from the pump sheave.



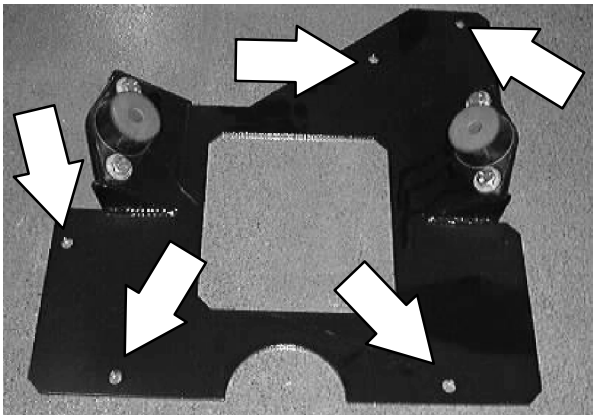
16. Pull the hydraulic pump, sheave, and two hoses back away from the mount bracket. DO NOT disconnect the hydraulic hoses from the pump.



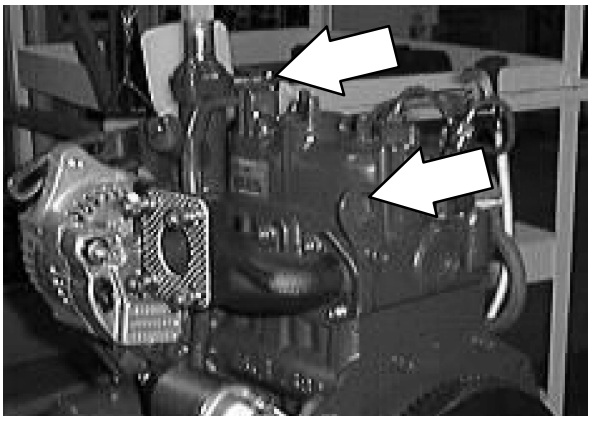
17. Disconnect the throttle shut-off solenoid.



18. Remove the five hex screws holding the engine/motor mount plate to the machine frame.



19. The engine can now be removed from the machine. Use a chain in the two engine hoops. *Be careful not to hook any wires or hydraulic lines when lifting the engine out of the machine.*

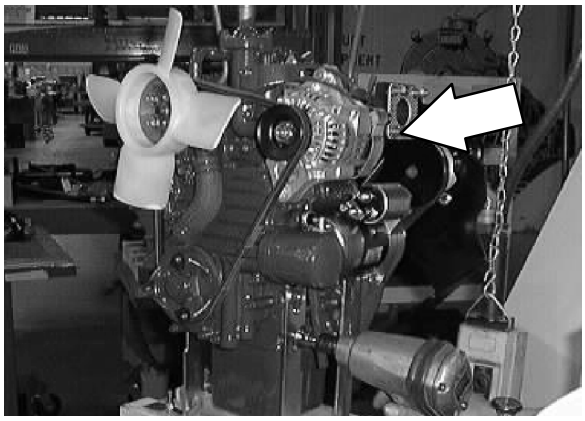


TO INSTALL ENGINE

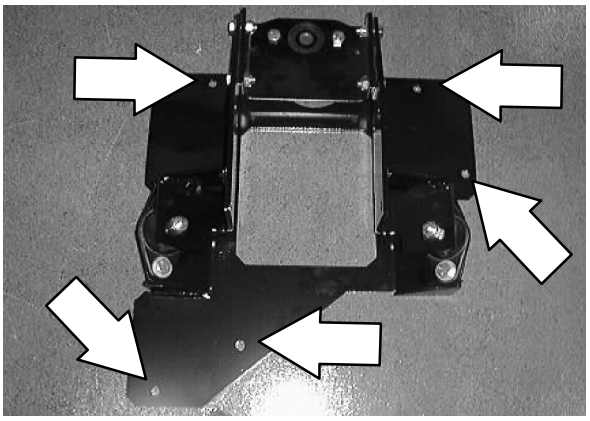
FOR SAFETY: Before Leaving Or Servicing Machine; Stop On Level Surface, Set parking brake.

1. Position the engine in the machine.

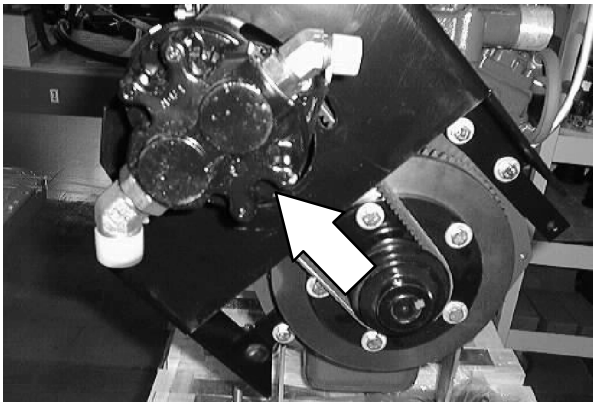
NOTE: Be careful not to catch any wires or hydraulic lines when setting the engine into the machine.



2. Line up the five mount holes on the motor mount plate with the mount holes in the machine frame. Install the five engine mount bolts and washers. Tighten to 37 – 48 Nm (26 – 34 ft lb).

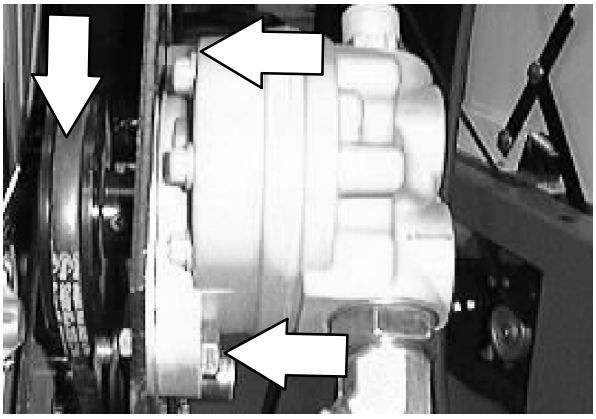


3. Position the hydraulic pump and hoses onto the mount bracket. Reinstall the hardware, leave loose for now.

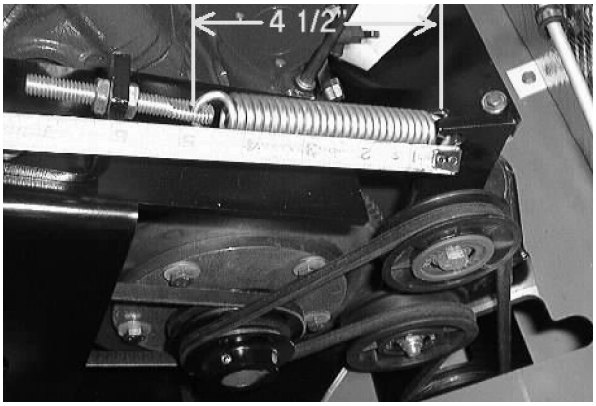


4. Position the hydraulic pump V-belt on the pump sheave and flywheel sheave. Pull up on the hydraulic pump to tension V-belt. Hand tighten the hardware tight. The correct tension is when the belt deflects 4.0 mm (0.16 in) from a force of .45 kg (10.0 lb) at belt midpoint of the longest span.

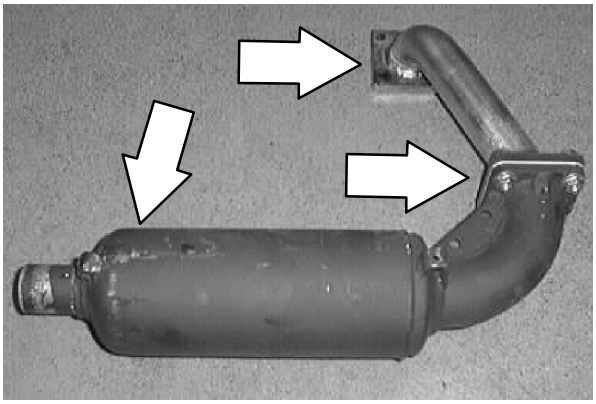
   FOR SAFETY : When servicing machine, avoid moving parts. Do not wear loose jackets, shirts or sleeves when working on machine.



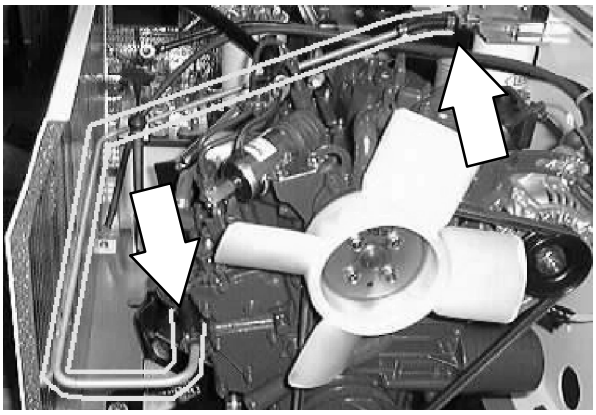
5. Position the jackshaft V-belt onto the two idler sheaves and flywheel sheave. Tighten the jam nut on the tension spring threaded rod until the spring is 4.5 inches (114.3 mm) in length. *The correct tension is when the belt deflects 6.0 mm* (0.25 in) *from a force of .45 kg* (10.0 lb) *at belt midpoint of the longest span.*



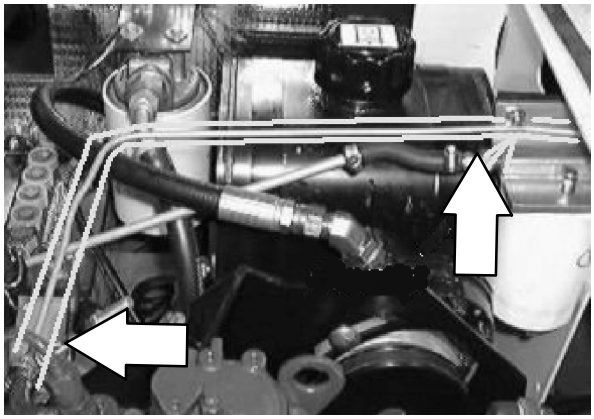
6. Reinstall the exhaust pipe onto the engine manifold. Reinstall the muffler and tail pipe.



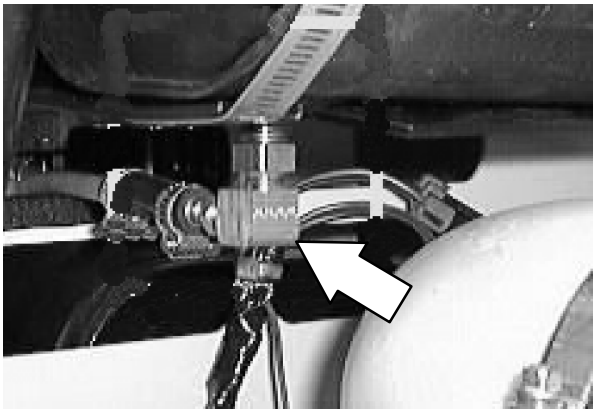
7. Reconnect the main fuel line.



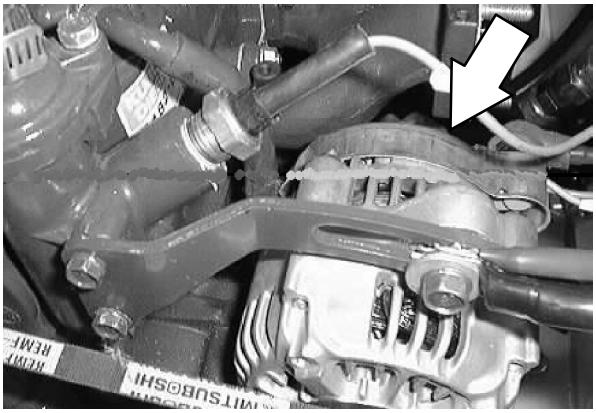
8. Reconnect the fuel return line.



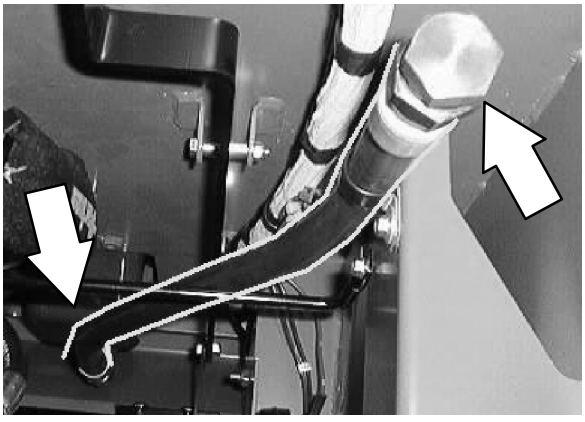
9. Turn on the valve at the fuel tank.



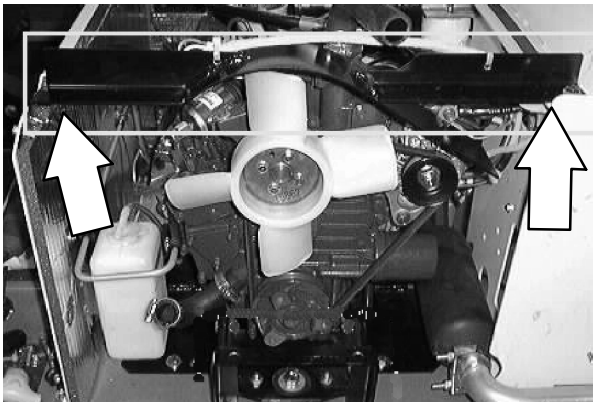
10. Reconnect the alternator wires, low oil pressure switch wires, starter wires, ground cable, and a positive battery cable.



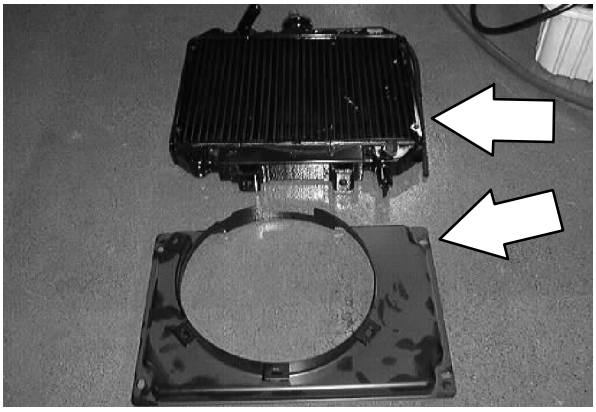
11. Reinstall the remote oil drain hose onto the fitting on the engine oil pan. Fill the engine with 2.2 qt (2.5L) CD/CE grade oil.



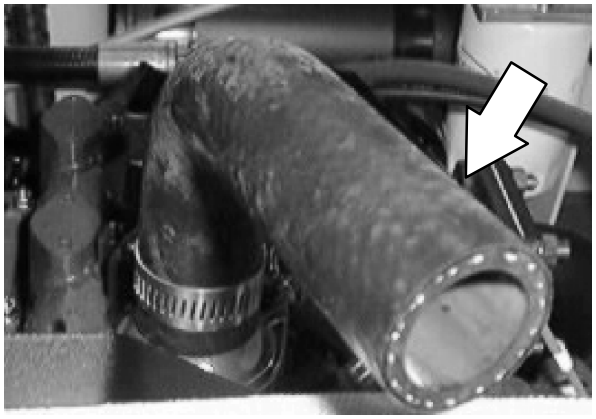
12. Reinstall the seat mount brace. Install the hardware and tighten to 6 – 8 ft lb (8 – 10 Nm).



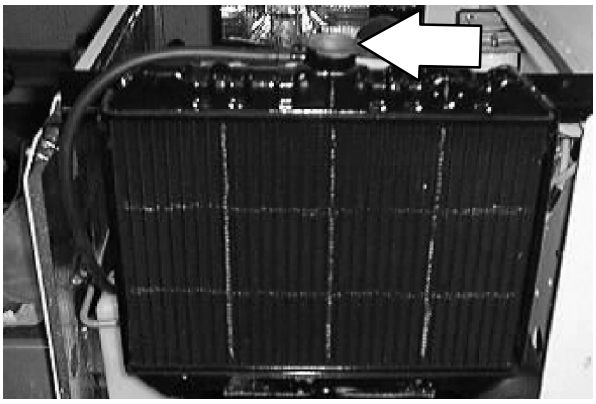
13. Reinstall the radiator and shroud onto the radiator mount bracket. Hand tighten the hardware tight.



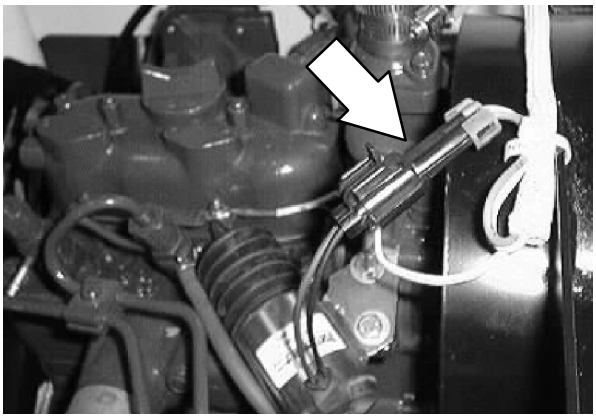
14. Reconnect the upper and lower radiator hoses to the radiator. Hand tighten the wormdrive clamps.



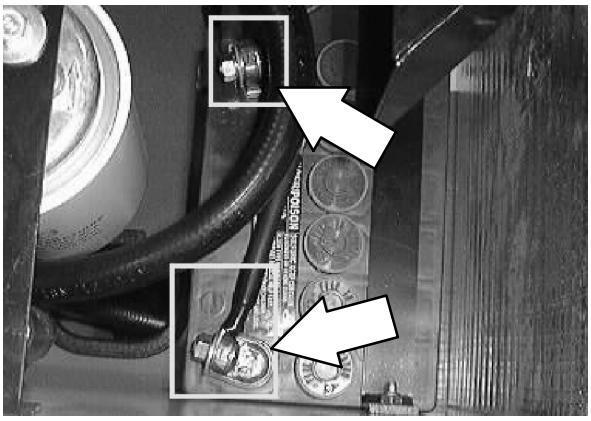
15. Refill the radiator with coolant.



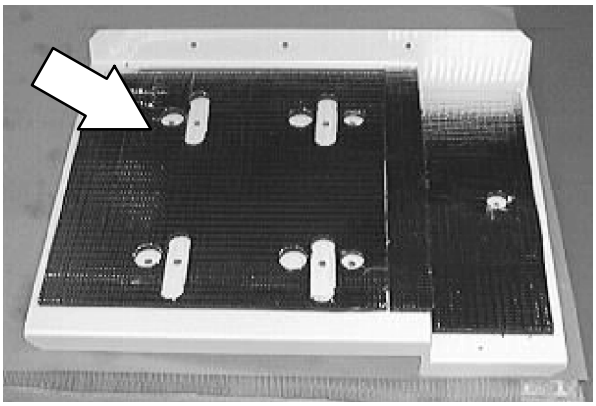
16. Reconnect the throttle shut-off solenoid.



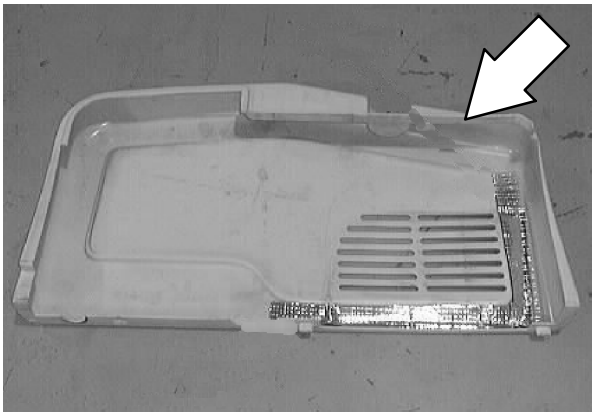
17. Reconnect the battery cables to the battery.



18. Reinstall the seat support.



19. Reinstall the left hand side panel.



20. Start the engine and check for proper operation.

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