THOMAS EQUIPMENT LIABILITY WARRANTY

THE WARRANTY IS THE ONLY OBLIGATION OF THOMAS OR A THOMAS DEALER TO THE PURCHASER OR ANYONE ELSE CONCERNING A PRODUCT, ITS SERVICE, ITS USE OR PERFORMANCE OR ITS LOSS OF USE OR FAILURE TO PERFORM. NEITHER THOMAS NOR A THOMAS DEALER HAVE MADE AND NEITHER WILL MAKE ANY OTHER EXPRESSED OR IMPLIED REPRESENTATION, WARRANTY OR AGREEMENT CONCERNING A PRODUCT. NEITHER THOMAS NOR A THOMAS DEALER HAVE MADE OR WILL MAKE ANY REPRESENTATION, WARRANTY OR AGREEMENT CONCERNING A PRODUCTS MERCHANTABILITY OR OTHER QUALITY, ITS SUITABILITY FOR PURCHASER'S PURPOSE (EVEN IF A PURCHASER HAS INFORMED THOMAS OR A THOMAS DEALER OF THAT PURPOSE), ITS DURABILITY, PERFORMANCE OR OTHER CONDITION.

EVEN IF THOMAS OR A THOMAS DEALER WAS ADVISE OF THE POSSIBILITY OF SUCH LOSS, NEITHER THOMAS NOR A THOMAS DEALER WILL BE LIABLE TO PURCHASER OR ANYONE ELSE FOR ANY INDIRECT, INCIDENTAL CONSEQUENTIAL, PUNITIVE, ECONOMIC, COMMERCIAL, OR SPECIAL LOSS WHICH IS IN ANY WAY ASSOCIATED WITH A PRODUCT. THIS INCLUDES ANY LOSS OF USE OR NON-PERFORMANCE OF A PRODUCT, ANY REPLACEMENT RENTAL OR ACQUISITION COST, ANY LOSS OF REVENUE OR PROFITS, ANY FAILURE TO REALIZE EXPECTED SAVINGS, ANY INTEREST COSTS, ANY IMPAIRMENT OF OTHER GOODS, ANY INCONVENIENCE OR ANY LIABILITY OF PURCHASER TO ANY OTHER PERSON.

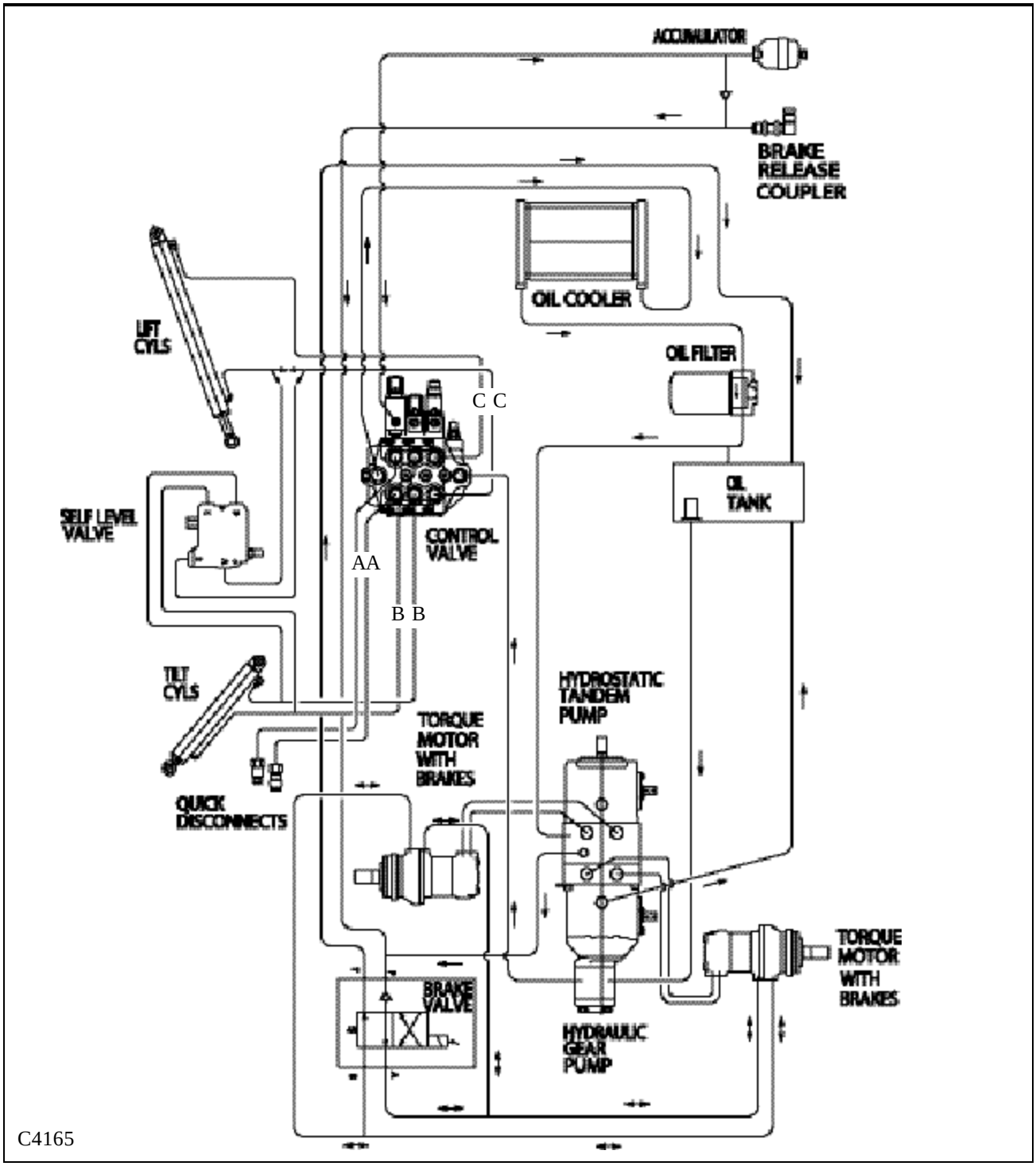
PURCHASER MAY NOT ATTEMPT TO ENLARGE ITS RIGHTS UNDER THE WARRANTY BY MAKING A CLAIM FOR INDEMNITY, FOR BREACH OF CONTRACT, FOR BREACH OF COLLATERAL WARRANTY, FOR A TORT (INCLUDING NEGLIGENCE, MISREPRESENTATION OR STRICT LIABILITY) OR BY CLAIMING ANY OTHER CAUSE OF ACTION.

THE WARRANTY IS A CONDITION OF SALE OF THE PRODUCT TO PURCHASER AND WILL THEREFORE APPLY EVEN IF PURCHASER ALLEGES THAT THERE IS A TOTAL FAILURE OF THE PRODUCT.

*N.B. Read and practice your **Thomas** operating and servicing instructions. Failure to do this may void your warranty.*

Publication Number 49012

HYDRAULIC LAYOUT 1.1



A Auxiliary Circuit
B Tilt Circuit
C Lift Circuit

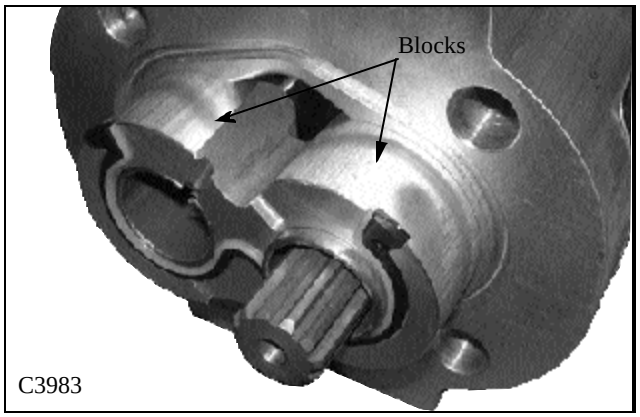
NOTE: Foot pedal control operated machine illustrated. Items (A3 / B3) are reversed for hand control operated machines.

Hydraulic fluid comes out the port closest to the spool end of the valve when the spool is pushed in. Hydraulic fluid received at the fixed end of the cylinder pushes it out. When the hydraulic cylinder receives fluid at the ram (rod) end, it retracts.

1

Assembly

6. Prepare the bearing blocks by cleaning both blocks (fig. C3983). Inspect the flat surfaces of the bearing blocks for burrs or scratches on the edges. If necessary, remove burrs with very fine emery paper. Then rewash the bearings. Inspect the DU bushings for wear. There should be no bronze showing. Using clean hydraulic oil, lubricate the internal and external surfaces of your blocks.

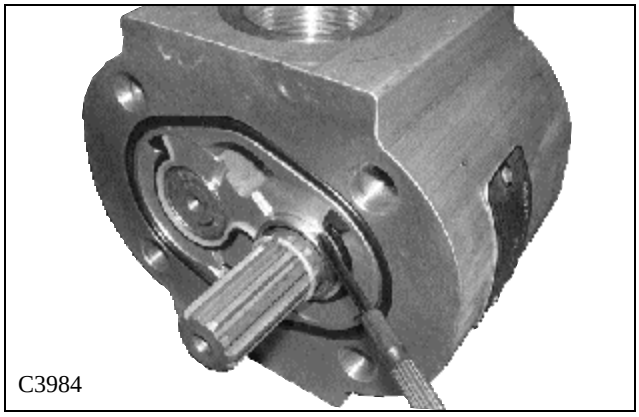


C3983

7. Assemble the bearing blocks and gears. Lubricate the journals and gear faces. Assemble the bearing blocks and gears in the same orientation that it was disassembled. Align all marks made during disassembly. Ensure the front and rear block occupy the same location with respect tot he housing as they did before disassembly. Misalignment of the gear teeth may increase operating noise.

8. Install the gear and block assembly into the body of the cavity. Align the assembly marks to ensure that the gear block assembly is installed with the same orientation as before assembly.

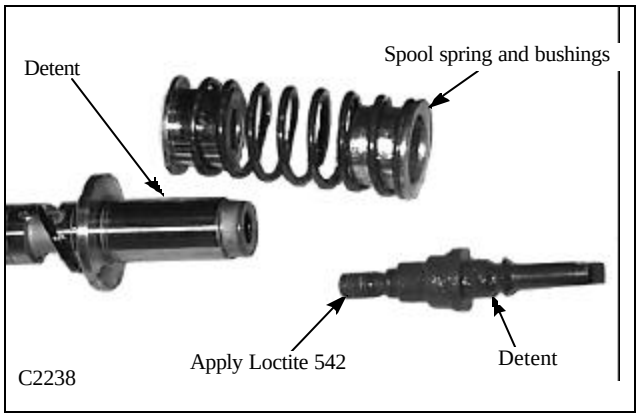
9. Once the gears and the bearing blocks are installed into the housing, clean the mating surfaces. Remove any excess lubrication and grease from the mating surfaces of the pump body. Ensure that these surfaces are dry and free of contamination before moving on to the next step. Install the o-rings and back-up rings on both the bearing blocks and the housing (fig. C3984).


C3984

CONTROL VALVE 1.3

Disassembly / Repair 175 (cont'd)

11 Install the spring return / centering cover and tighten the mounting screws evenly to 6.6 Nm (4.9 lbs / ft). Install the end cap to the cover and tighten to 9.8 Nm (7.2 lbs / ft). (fig. C2258)



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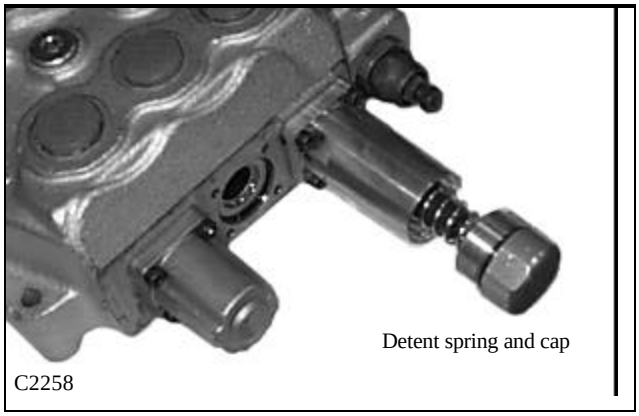
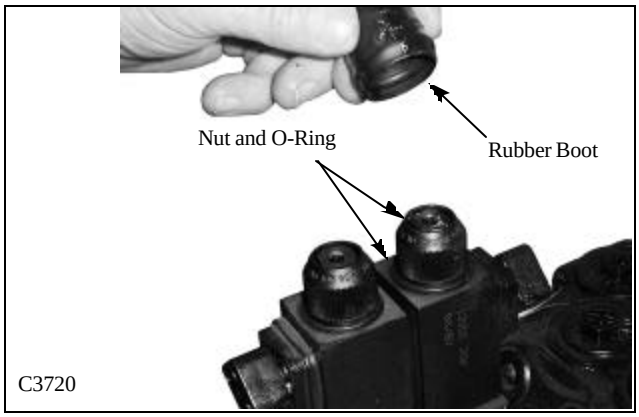
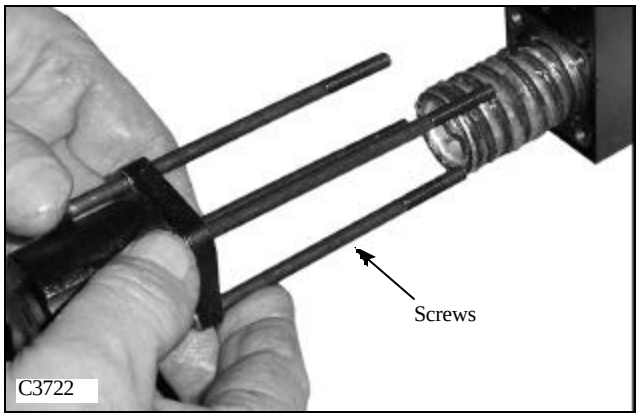


Solenoid Controlled Auxiliary

1 Remove the rubber boot covering the retaining nut on top of each solenoid coil.
2 Remove the nut and O-ring and pull off the solenoid coil (s). (fig. C3720)



3 Remove the screws retaining the solenoid assembly to the control valve. (fig. C3722). Upon assembly tighten the screws to 6.6 Nm (4.9lbs / ft).



HYDRAULIC CYLINDERS 1.4

Tilt cylinder Replacement

For tilt cylinder removal:

1 Lower the boom arms, remove any attachment and extend the tilt cylinders. Shut off the engine and cycle the controls to relieve excessive back pressure in the hydraulic system.(fig. C3649)

2 Loosen or remove the hydraulic hoses from hydraulic tubing under the boom arm step if you are changing the hoses also. (fig. C3441)

3 Remove the hydraulic hoses from the tilt cylinder. Plug and or cap all open ports or lines to prevent contamination. (fig. C3439)

4 Remove the lock nuts from the bolts retaining the pivot pins to the loader and remove the bolts. (fig. C3649)

5 Remove the pivot pins by tapping out with a brass drift pin. (fig. C3646)

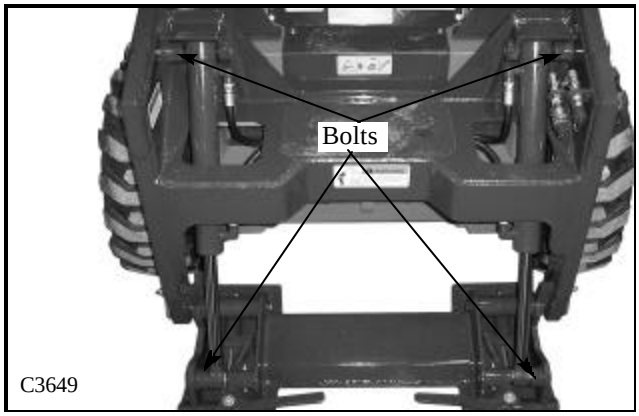
6 Remove the cylinder from the loader.

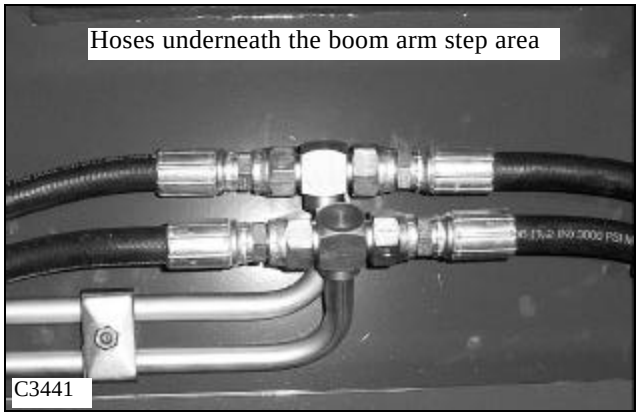
7 Upon reassembly, inspect the pivot pins and bushings for wear and replace as required. Reverse order for cylinder installation.

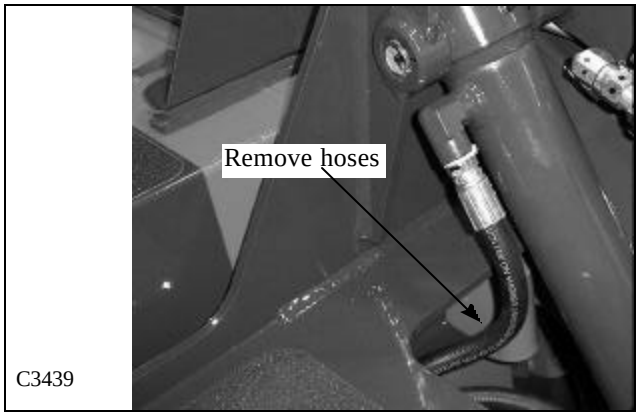
8 Upon start up, check for system leaks and replenish the hydraulic oil reservoir as required.

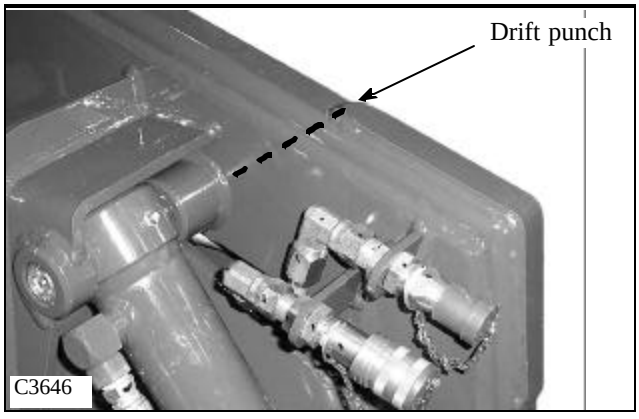
WARNING

Use extreme caution when checking the hydraulic system for leaks. Fluid under pressure can penetrate the skin and cause serious injury. Never tighten or repair hydraulic lines while the engine is operating.









TROUBLE SHOOTING 1.8

1

Problem	Cause	Corrective Action	Section
Hydraulic oil overheating.	Reservoir low on oil.	Check for leaks and replenish as required.	1.8
	Oil cooler plugged or dirty.	Clean the cooling fins.	1.7
	Auxiliary hydraulics engaged.	Disengage.	4.9
	Cooling fan damaged or inoperative	Check fan and drive belt	1.7
	Engine RPM too low.	Check engine RPM and reset.	7.11
	Temperature sender defective.	Replace.	8
	Relief valve failure or out of adjustment.	Check pressure, adjust or replace.	1.4
	Wrong type of hydraulic fluid.	Replace.	1.8

TORQUE CHART 1.9

Torque Chart

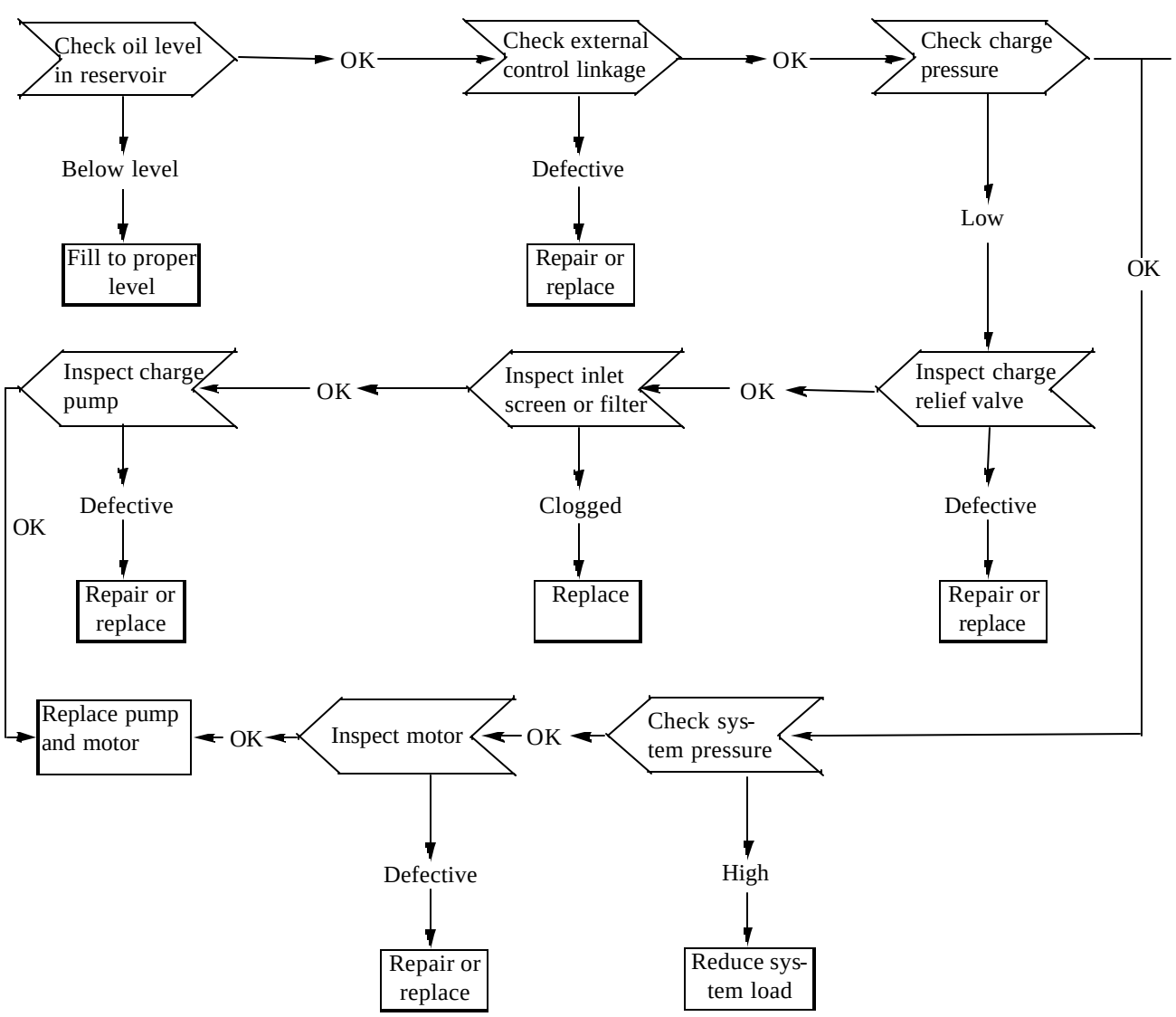
NOTE: all torques are in ft / lbs. (Multiply by 1.36 = N.m.)

HOSE SIZE	37º JIC FITTINGS	HOSE SIZE	ORB FITTINGS
1/4	9 to 10	1/4	14 to 16
5/16	15 to 16	5/16	18 to 20
3/8	20 to 22	3/8	24 to 26
1/2	30 to 33	1/2	50 to 60
5/8	40 to 44	5/8	72 to 80
3/4	70 to 77	3/4	125 to 135
7/8	82 to 90	7/8	160 to 180
1	55 to 60	1	200 to 220
1 1/4	120 to 132	1 1/4	210 to 280
1 1/2	131 to 144	1 1/2	270 to 360
2	300 to 330		

The following torque specifications are for steel ORB fittings into aluminum.			
HOSE SIZE	ORB FITTINGS	HOSE SIZE	ORB FITTINGS
1/4	5 to 7	3/4	40 to 45
5/16	8 to 10	7/8	50 to 55
3/8	10 to 12	1	90 to 99
1/2	21 to 24	1 1/4	80to 90
5/8	27 to 30		

TROUBLE SHOOTING 2.3

Symptom: System Will Not Operate In Either Direction



TANDEM PUMP REPLACEMENT 2.9

Upon reassembly, inspect the outside area of the tandem pump housing for damage that may have occurred in transit or handling.

1 Attach a lifting device to the tandem pump.

2 Install the lower charge pressure inlet fitting to the tandem pump and attach the brake valve hose. (fig. C3478) Follow the torque chart on page 2 - 43.

3 Install the tandem pump to the loader.

WARNING

To prevent personal injury, do not attempt to lift heavy objects without assistance.

4 Line up the u-joint to the tandem pump input splined shaft as you guide the pump into it's mounting location. (fig. C3479)

5 Install the 2 rear mounting bolts.

6 Line up the front mounting brace holes and install the bolt. (fig. C3451)

7 Torque the 2 rear mounting bolts to 60 ft/lbs. (82 N.m.) Torque the front pump bracket mounting bolt to 50. (68 N.m.) Torque the front lower mounting bracket bolt at 20 to 25 ft/lbs. (32 N.m.) Remove the lifting device.

8 Connecting the 4 high pressure drive hoses and fittings to the tandem pump can only be accomplished in a certain sequence. (fig. C3480) Follow the Torque Chart in Section 2.13, page 2 - 43 when tightening fittings and hoses. If you have removed the hoses completely use the following pattern to reconnect:

A Hose no. 4 connects to the bottom port of the right hand drive motor.

B Hose no. 1 connects to the bottom port of the left hand drive motor.

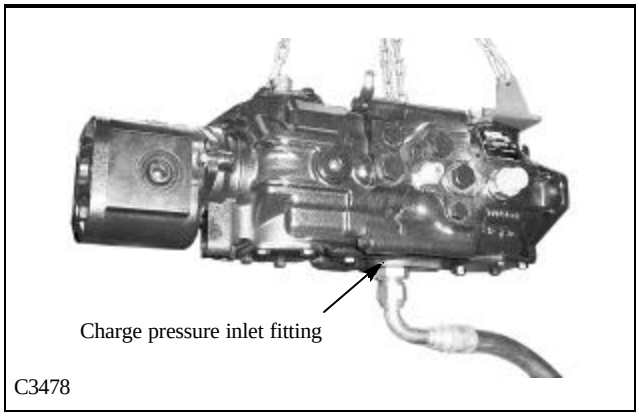
C Hose no. 2 connects to the top port of the left hand drive motor.

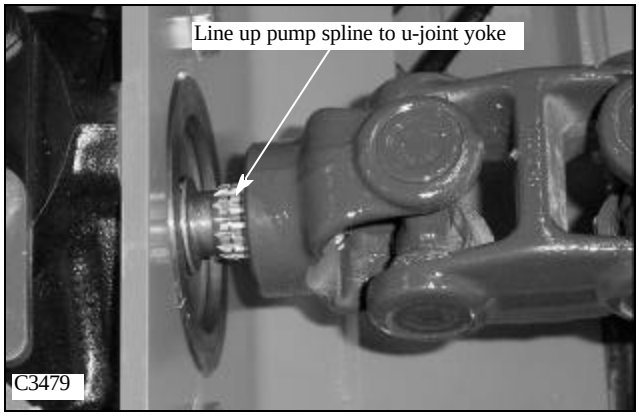
D. Hose no. 3 connects to the top port of the right hand drive motor.

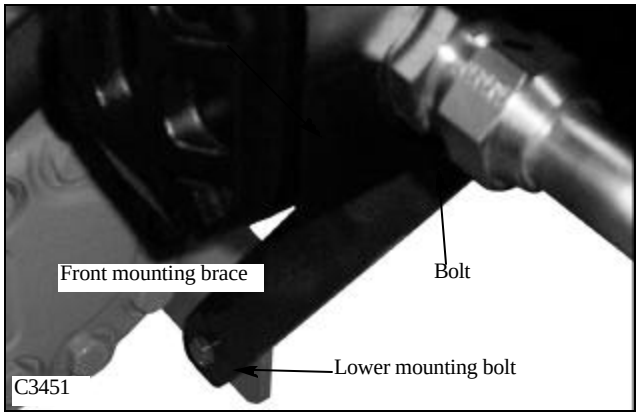
9 Connect the charge inlet hose from the oil filter to the tandem pump. Torque the fittings and hoses according to the Torque Chart in Section 2.13 page 2 - 43.

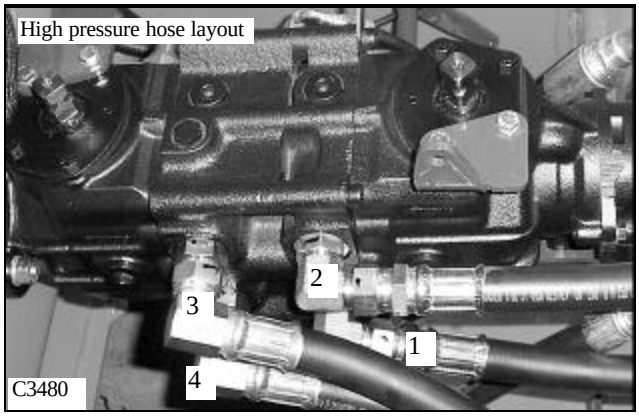
IMPORTANT

When making repairs to the hydraulic system, keep the work area and parts clean. Use caps and plugs on all open line and ports





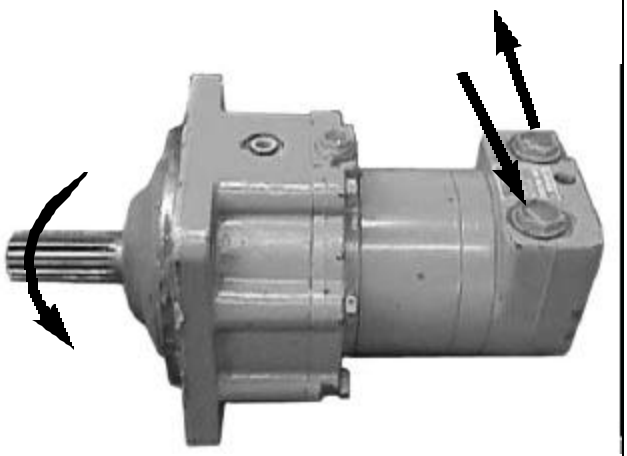




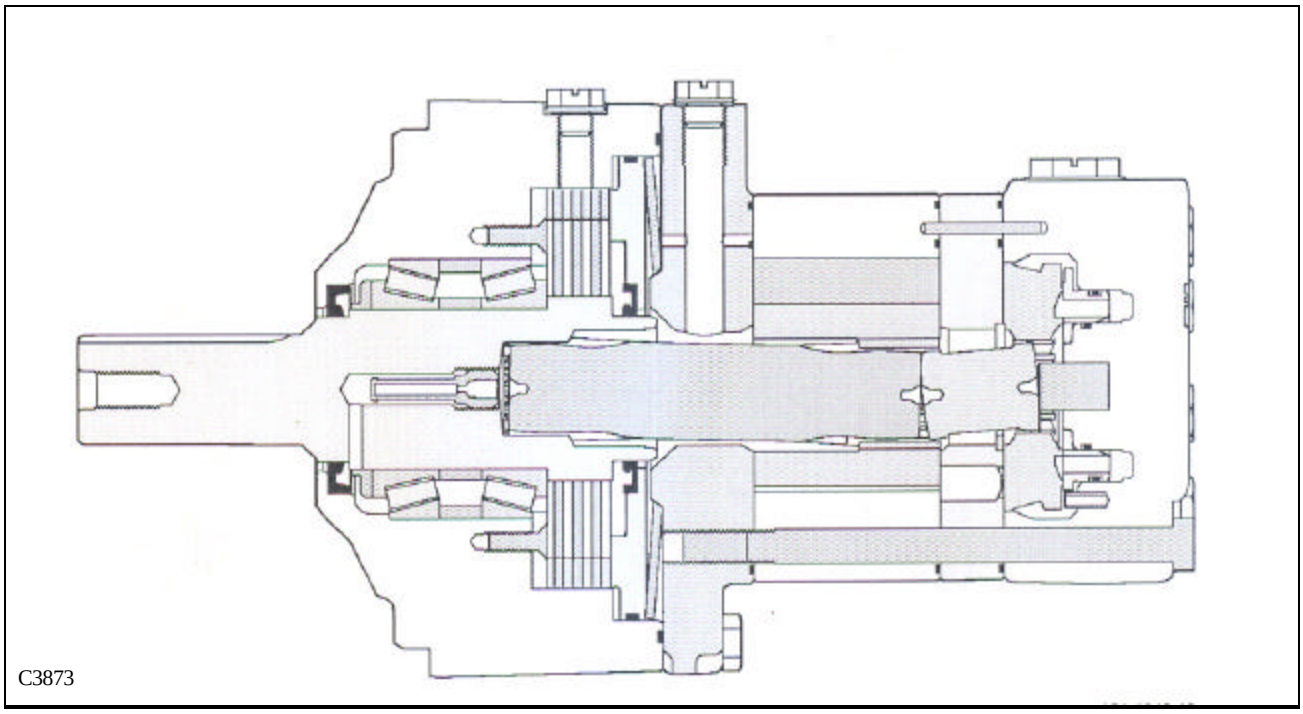
DRIVE MOTOR 2.11

For smooth and continuous motor output rotation, the torque motor utilizes a disc valve which operates in synchronization with the geroler star. The disc valve arrangement consist of a stationary balance plate, rotating disc valve and a stationary valve plate.
The disc valve contains an inlet fluid passage port for each star valley and a return fluid passage point.
A separate crowned driveshaft is used to synchronize the disc valve and the geroler star so that they turn as one. To accept fluid from the disc valve, the valve plate also contains internal porting passages to each outer ring pocket area.

C3488



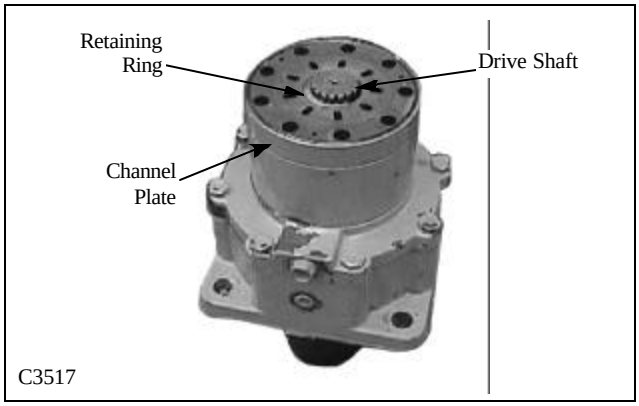
2



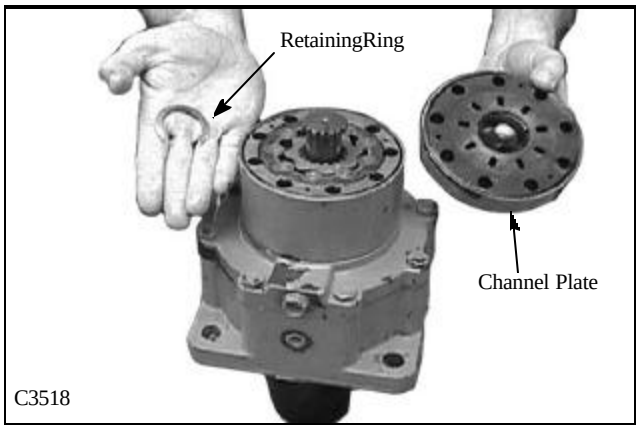
C3873

Fluid enters the housing through the inlet port and is directed to the balance plate. The balance ring contains an inner and outer seal to separate the high and low pressure fluid passages. Fluid passes through the stationary balance plate to the rotating disc valve. The rotating disc valve ports the fluid to the stationary valve plate and the proper side of the geroter pockets causing the rotor star to turn.
As the rotor star rotates, and each fluid pocket reaches its full open position, the return porting in the rotating disc valve opens to allow the fluid in the pocket area to pass back through the valve plate, disc valve, balance plate and out through the housing return port, as the pocket closes.
The disc valve is timed to the gerotor rotor star to govern the the inlet fluid flow to the output shaft rotation. If the timing of the disc valve to the geroter star is off one tooth, the relationship of input fluid flow to output motor shaft rotation will be reversed.

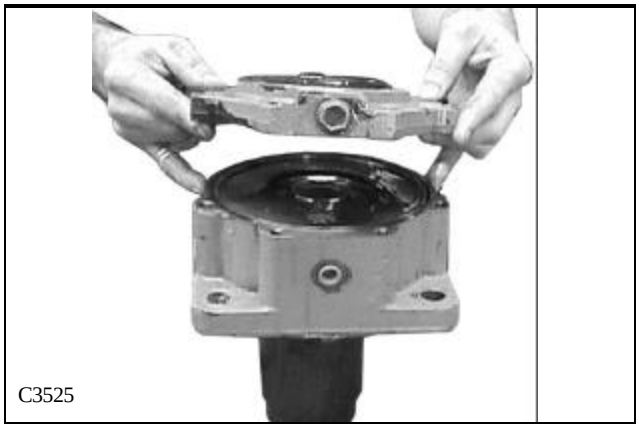
Disassembly (cont'd)



12 Remove the retaining ring, then the channel plate, and then lift off the drive shaft which will then expose the gearwheel and the Cardon shaft. (fig. C3518)



13 With the drive section removed, losen the eight (8) brake cover screws and lift off the housing to expose the "spring" plate. (fig. C3525, C3526))



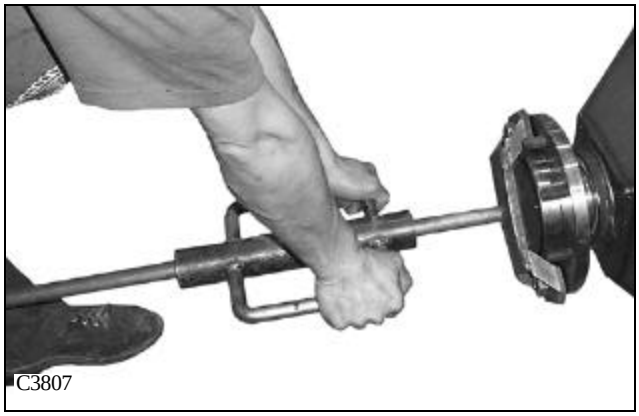
CONVERSION CHART 2.13

CONVERSION FACTORS

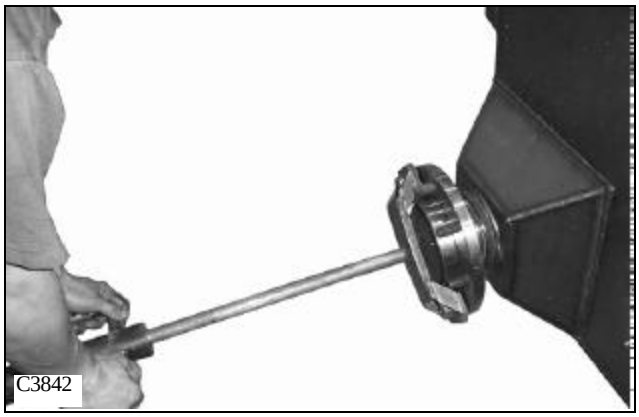
U.S. To Metric

	MULTIPLY	BY	TO OBTAIN
Area:	sq. foot	0.092 903	square meter
	acre	0.404 686	hectare
Force:	ounce force	0.278 014	newton
	pound force	4.448 222	newton
Length:	inch	25.4	millimeter
	foot	0.304 8	meter
	mile	1.609 344	kilometer
Mass:	pound	0.453 592	kilogram
	ounce	28.35	gram
Mass/Area:	ton/acre	2241 702	kilogram/hectare
Mass/Energy:	lb/hp/hr	608.277 4	gr/kW/hr
Mass/Volume:	lb/cubic yd.	0.5930276	kg/cubic meter
Power:	horsepower	0.745 700	kilowatt
Pressure:	lbs/sq.in.	6.894 757	kilopascal
	lbs/sq.in.	0.069	bar
	lbs/sq.in.	0.070 303	kg/sq.cm
Temperature:	degree F	1.8 F - 32	degree C
Torque:	pound/inch	0.112 985	newton meter
	pound/foot	1.355 818	newton meter
Velocity:	miles/hr.	1.609 344	kilometer/hr.
Volume:	cubic inch	16.387 06	cubic centimeter
	cubic foot	0.028 317	cubic meter
	cubic yard	0.764 555	cubic meter
	ounce (U.S. fluid)	29.573 53	milliliter
	quart (U.S. liquid)	0.946 353	litre
	quart (Imperial)	1.136 523	litre
	gallon (U.S.)	3.785 412	litre
	gallons (Imperial)	4.546 092	litre
Volume/Time:	gallon/min.	3.785 412	litre/min.

14 Attach a special axle puller tool, Thomas P/N 957372, to the axle flange wheel studs using the wheel nuts that are on the loader. (fig. C3807)
15 Using the slide hammer action of the special puller, remove the axle. The rear bearing and axle sprocket will remain in the final drive housing.
16 Remove the axle sprocket and bearing from the final drive housing through the inspection cover area.


C3807

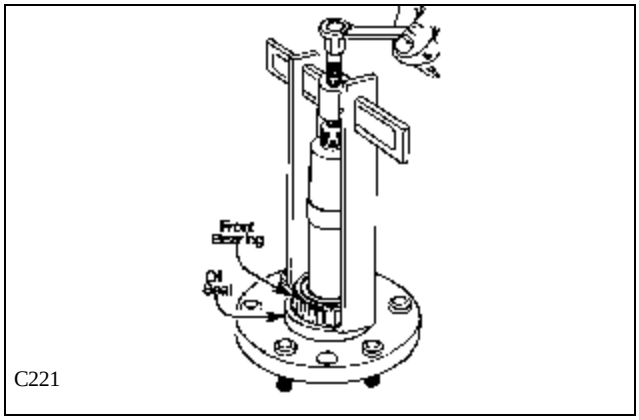
17 Using a bearing puller, remove the bearing still pressed in place on the axle. (fig. C3842, C3669)
18 Remove and discard the axle oil seal.


C3842

Inspection

1 Inspect the seal surface area for scaring, pitting or nicks. Minor scratches may be removed using fine emery cloth. Replace the axle if worn excessively.
2 Inspect the axle threads for damage. Replace axle if the threads are non serviceable.
3 Inspect axle spline for wear and replace if neccessary.
4 Replace any axle studs as required (page 3-13)
5 Inspect the axle sprocket for abnormal tooth wear and inspect sprocket spline for wear. Replace the sprocket if necessary.
6 Inspect the bearing races in the final drive housing. Replace them if necessary using a brass drift punch and hammer. Cooling the replacement races in a freezer will aid in using this procedure.
7 Replace the bearings if new races are installed or if they are pitted or damaged.


C3669



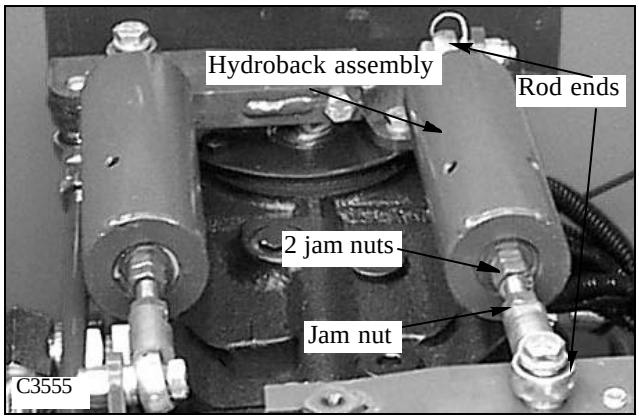
C221

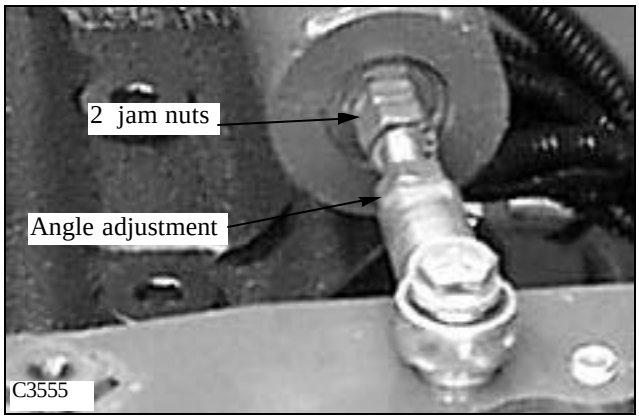
Neutral Adjustment (con't.)

6 Loosen the 2 jam nuts next to the main body. (fig. C3555)
7 Turn the 2 nuts away from the main body of the hydroback.
8 Cycle the control lever several times.
9 Push the control lever rearward until you feel resistance. Stop.
10 Turn the 2 jam nuts back toward the main body of the hydroback until the nut just touches the flat washer.
11 Cycle the control lever again checking for a neutral position. If the lever returns to neutral, tighten the 2 jam nuts together. If the hydroback still does not center, the hydroback has internal damage or wear. Replace the hydroback assembly with a new one.

IMPORTANT

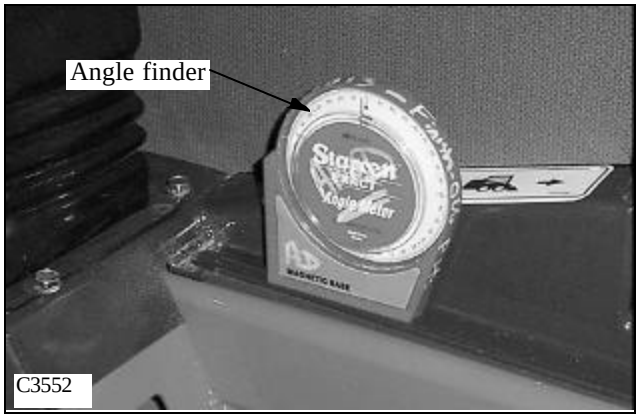
Repairs or adjustment to the control lever system may change the loader neutral position. Make sure the loader is raised securely off the ground before restarting the engine.





Hydro Back Replacement

Replacing the hydro back changes the steering control lever angle. To correctly set the angle after the hydro back has been installed:
1 Replace the hydro back by removing the 2 bolts located at either end of the hydro back assembly.
2 Install the hydro back in the reverse order. Check the steering control rod ends and replace them now if they are worn.
3 Use an angle finder to check the base measurement angle the loader is sitting at. (fig. C3552) Note the angle the loader is sitting at. This measurement will have to be added or subtracted to the next measurement to give the most accurate adjustment.
4 Attach an angle finder to the most vertical part of the control lever. (fig. C3553)
5 Turn the hydro back threaded rod (fig. C3555) in or out of the female rod end to move the control lever to a reading of 0º. Be sure to allow for angle the loader is sitting at. (Base angle) Jam the nut against the rod end when completed.
Make sure there is a minimum of 3/8'' (6mm) of thread holding the female rod end to the threaded rod.



Control Lever Replacement

1 Raise the boom arms, engage the boom supports and shut off the engine.

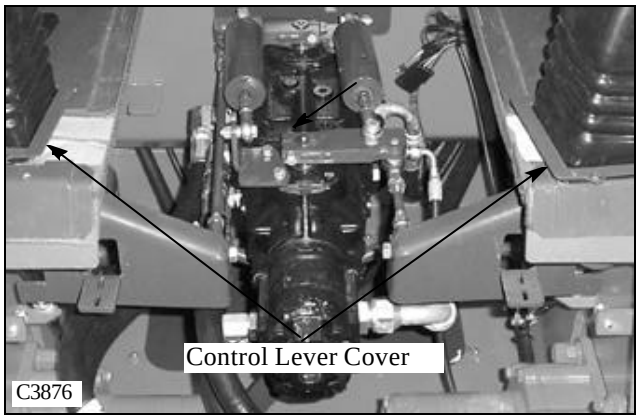
WARNING

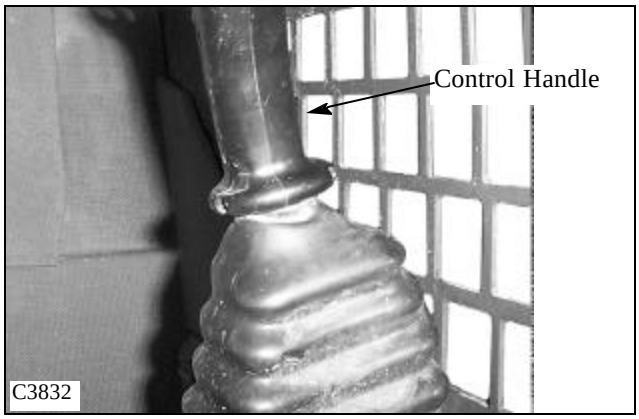
Never work under the boom arms without the boom supports engaged.

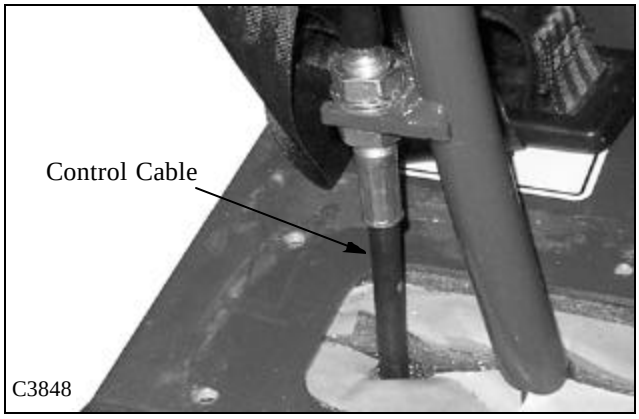
2 Remove the seat and hydrostatic shield.
3 Remove control lever plates and boots. Disconnect throttle if necessary. (fig. C3876, C3832)
4 Remove cotter pins from the lever base ass'y and cable and remove the clevis pin. (fig. C3848)
5 Loosen the cable nuts and remove cable from mount on control lever.
6 Remove bolts from control rod.
7 Remove mounting bolts for control lever. (fig. C3847)
8 Remove control lever saving the plastic sleeve. Replace if necessary.
9 Replace all parts in reverse order. Cycle the control lever after installation to check for binding and travel clearance. Check control angles, wheel speed and tracking to ensure optimum performance.

NOTE: If the loader is equiped with optional electronic accessories operated by control handle mounted switches, the control handle switch wiring will need to be disconnected and transferred to the new steering lever.

If the control lever functions are sloppy due to excessive wearing of the swivel bushing, the swivel assembly may need replaced.







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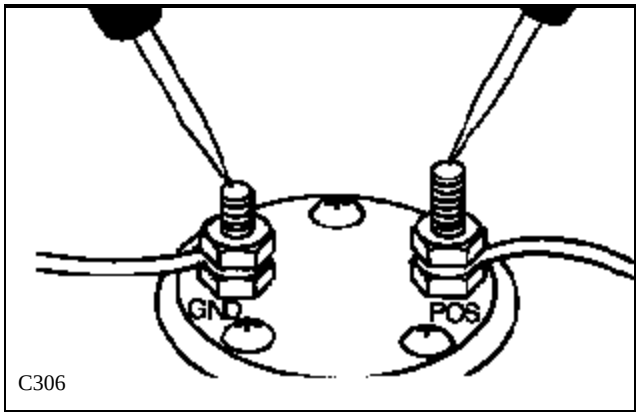
Testing the Fuel Sender

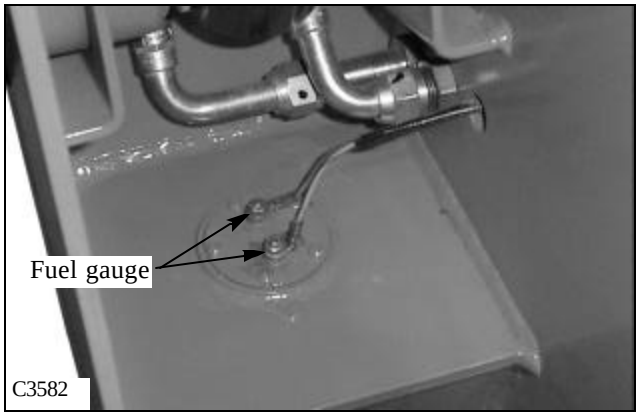
1 With the ignition switch off, connect an ohmmeter between the positive and negative terminals of the fuel sending unit. (fig. C306)
2 An ohmmeter reading of 50 to 500 is normal. A reading higher or lower means a faulty sender and will need replaced.



C306

Replacement

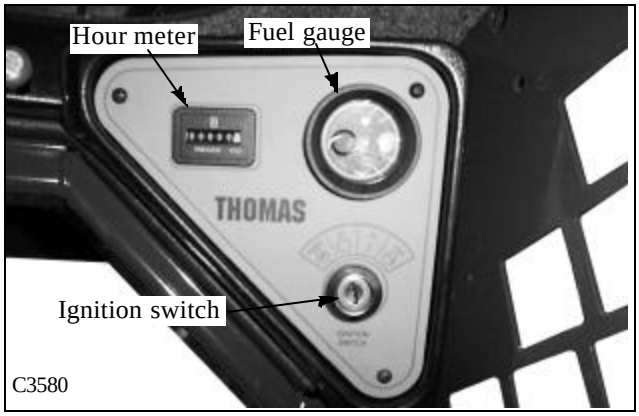
1 Remove any attachment, raise the boom arms and engage the boom support pins. Shut off the engine and engage the parking brake.
2 Remove the 2 wires connected to the fuel sending unit. The fuel sender is located just below the lift cylinder, right hand side, on the fuel tank.
3 Remove the 5 screws retaining the sender to the fuel tank.
4 Remove the sending unit and discard the gasket.
5 Install a new sending unit and gasket. Use gasket sealant on both sides of the gasket.
6 Use thread sealant on the screws and torque the screws to 20 inch / lbs. (fig. C3582)
7 Connect the sender wires taking care not to over tighten the nuts and stripping the studs. Green wire is ground.



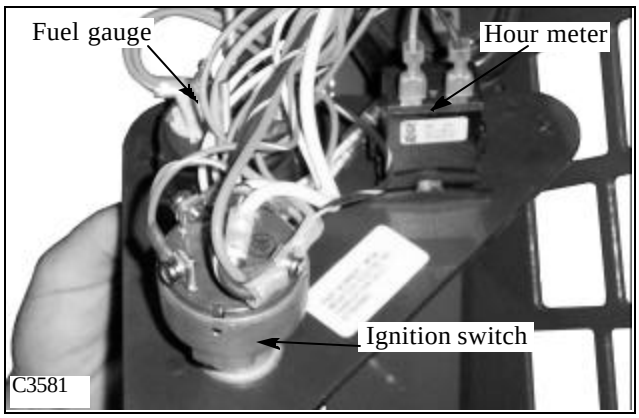
C3582

Testing the Hour Meter

The hour meter records the number of engine operating hours.
To check the hour meter, remove the 3 screws retaining the right hand dash panel to the dash pod. (fig. C3580, C3581)
Using a 12 volt test meter, connect the positive lead to the positive terminal of the hour meter and the ground lead of the tester to a good ground. Turn the ignition switch to the "RUN" position.
A reading of 12 volts means the hour meter is operating properly.
No voltage reading means there could be a problem in the wire running from the "ACC" terminal on the ignition switch to the positive side of the hour meter or a defective ignition switch.

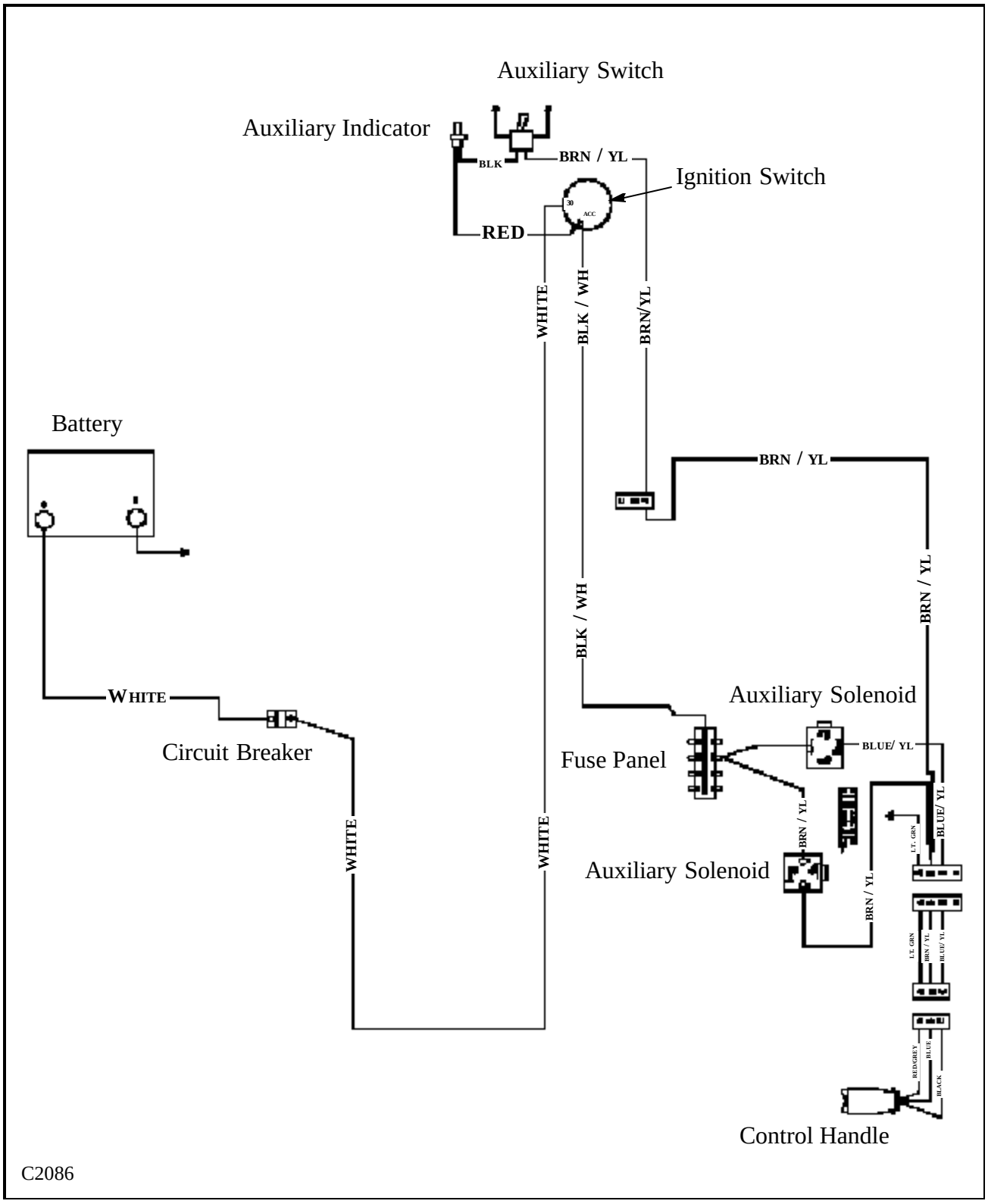


C3580



C3581

ELECTRIC AUXILIARY CIRCUIT 5.11



5

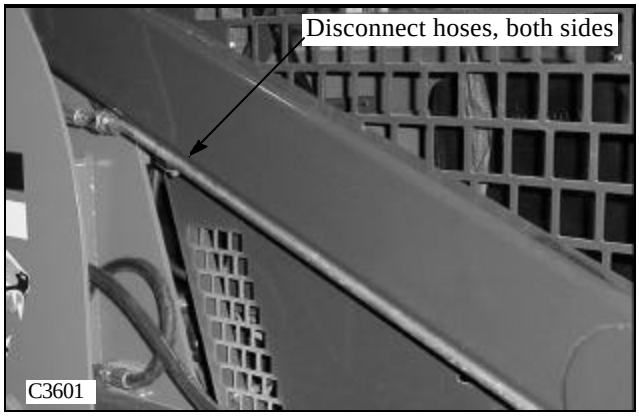
BOOM ARMS 6.2

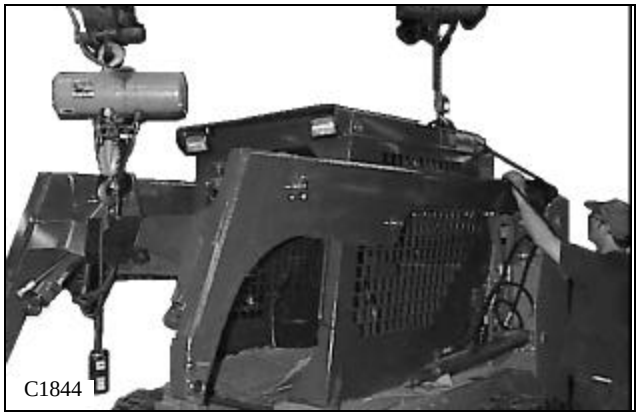
Removal

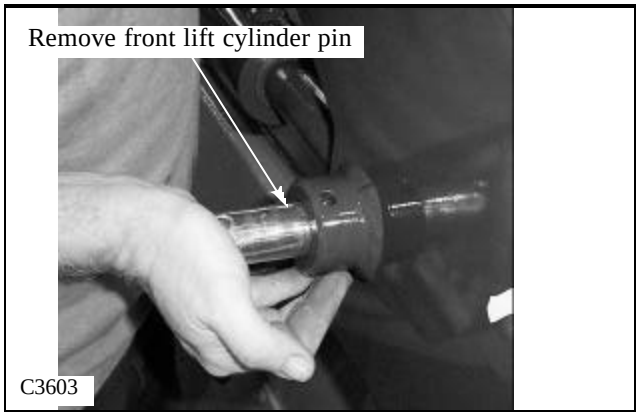
1 Lower the boom arms and shut off the engine. Turn the ignition key to the “RUN” position and cycle the boom and tilt controls to relieve hydraulic backpressure. Lock the boom lift control in the float position.
2 Return the key to the “OFF” position and engage the parking brake (raise the restraint bar).
3 Remove the quick - tach assembly from the boom arms. (See Section 6.1)
4 Disconnect the hydraulic hoses between the boom arm and reservoir tanks. Cap the open hose ends to prevent contamination. (fig. C3601)
5 Fasten chains or lifting straps with an adequate capacity to sustain the weight of the boom arms. Most of the weight is at the front of the boom arms. Attach one set of straps as close as possible to the front, (fig. C1844), and the other set approximately half way toward the rear.
6 Using an overhead hoist, raise the boom arms enough to take the weight off of the lift cylinders. Remove the bolts from the pivot pins in the lift cylinders that are mounted in the boom arms. (fig. C3603)
7 Remove the pins by reaching between the ROPS and the boom arm and pushing the pin out toward you. Take care not to let the lift cylinder fall on your hand.
8 Remove the bolts from the upper rear boom arm pivot pins mounted through the main frame. (fig. C3604)
9 Remove the pivot pins using an appropriate drift punch and hammer. Use care, do not broom up the end of the pins.
10 Raise the boom arms enough to free from the loader and remove them.

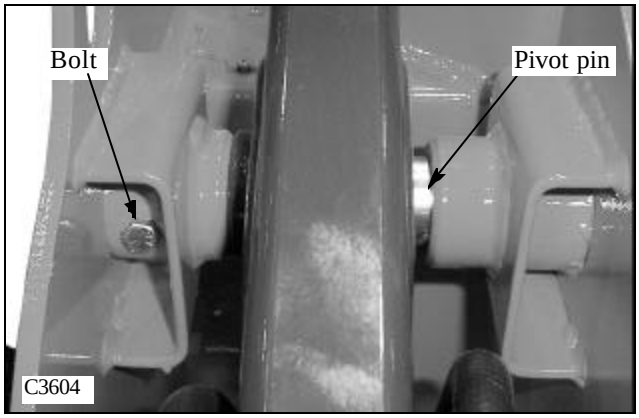
Installation

1 Upon installation follow the above procedure in the reverse order.
2 Replace any worn or gouged pins and bushings
3 All stationary bushings should be coated with anti - seize compound to assist ease of future disassembly. Do not get the anti - seize compound on moving or pivoting parts. The compounds contain abrasives that may cause premature wear of pivot pins and bushings.
4 Torque the hydraulic hose fittings as outlined in the Section 1 Hydraulics torque chart page 1-35.









Air Filter (cont'd)

3 If required, remove the safety air filter element by pulling straight out of the air cleaner housing. (fig. C3621)

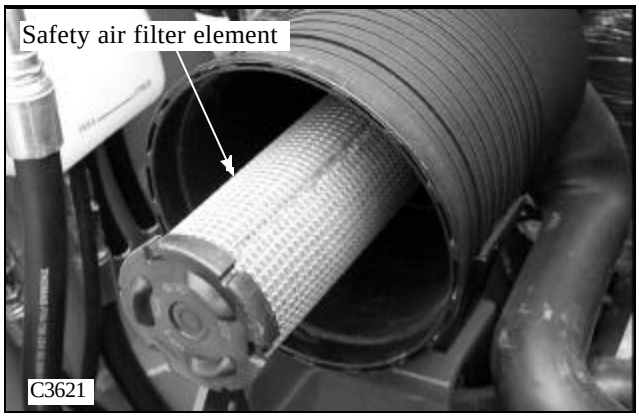
4 After removing the air filter elements, carefully wipe out any excess dirt from the air cleaner housing. (fig. C3622)

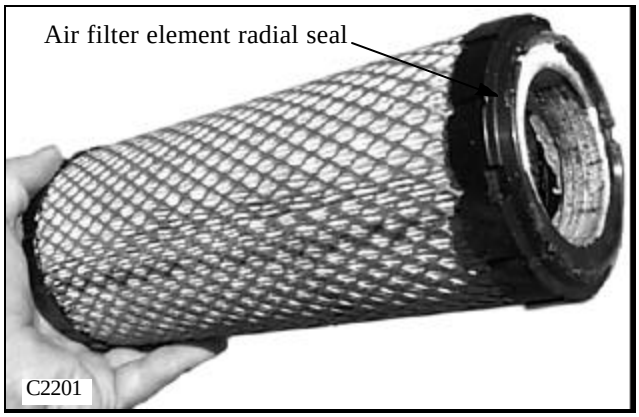
5 Check the air filter element seal before installing to the air cleaner housing. (fig. C2201) Be sure the seal is not damaged, torn or gouged. Do not use a filter with a damaged seal.

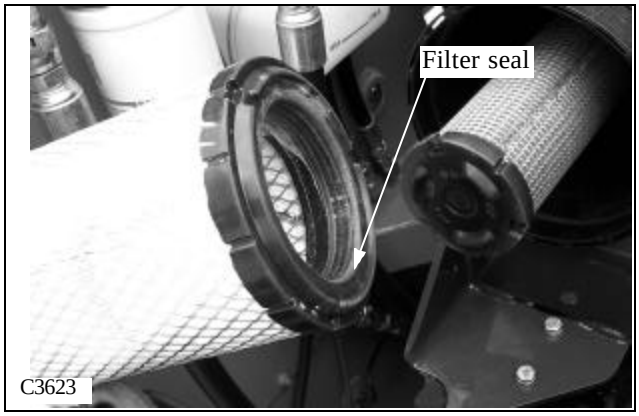
6 When installing the air filter elements to the air cleaner housing. support the back of housing with one hand and push the air filter element into position as gently as possible. (fig. C3623)

7 Install the air cleaner cover onto the housing. Be sure to align the latch hooks with the notches in the air cleaner housing.

Do not use the latches to push the air filter elements into position.

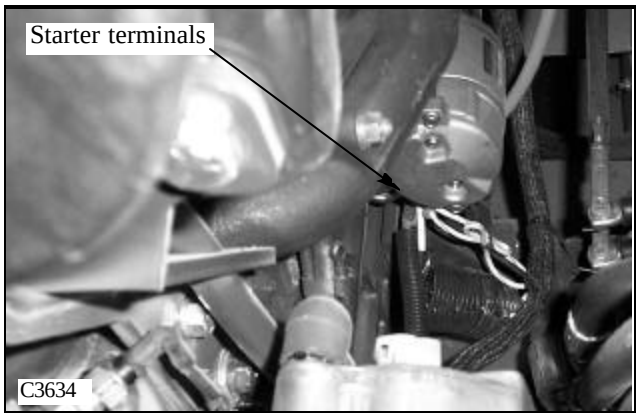




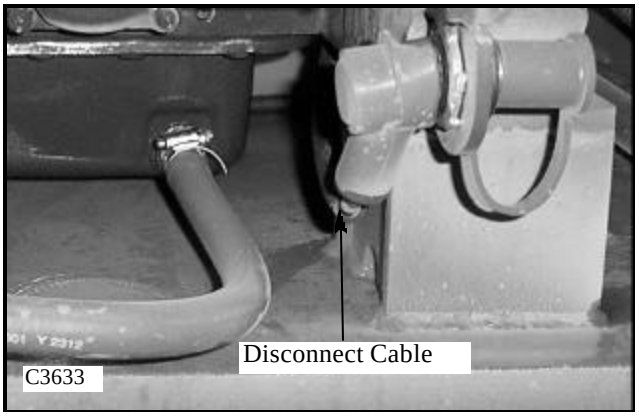


Removal (cont'd)

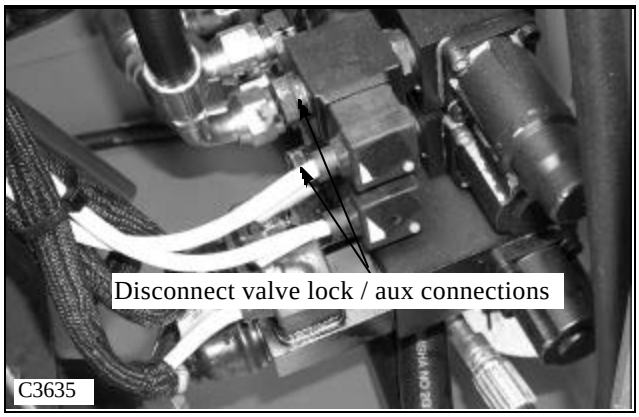
13 Disconnect the ground straps (cables) mounted from the engine to the loader frame.



14 Disconnect the engine starter cable coming from the positive terminal of the battery. (fig. C3634)



15 Disconnect the electrical cable from the boosting lug terminal. (fig. C3633)



16 Disconnect the hydraulic control valve electrical connections. (fig. C3635) Tag the connections for location to prevent mixing up upon engine replacement.

SECTION 8
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TROUBLESHOOTING 8.2

8.2G Diesel Engine

Symptom	Cause	Remedy
Engine does not start	No fuel	Replenish fuel
	Air in the fuel	Vent air
	Water in the fuel	Change fuel and repair or replace fuel system
	Fuel pipe clogged	Clean
	Fuel filter clogged	Clean or change
	Excessively high viscosity of fuel or engine oil at low temperature	Use the specified fuel or engine oil
	Fuel with low octane number	Use the specified fuel
	Fuel leak due to loose injection pipe retaining nut	Tighten nut
	Incorrect injection timing	Adjust
	Fuel cam shaft worn	Replace
	Injection nozzle clogged	Clean
	Injection pump malfunctioning	Repair or replace
	Seizure of crankshaft, camshaft, piston, cylinder liner or bearing	Repair or replace
	Compression leak from cylinder	Replace head gasket, tighten cylinder head bolt, glow plug and nozzle holder
	Improper valve timing	Correct or replace timing gear
	Piston ring and liner worn	Replace
	Excessive valve clearance	Adjust
Starter does not run	Battery discharged	Charge
	Starter malfunctioning	Repair or replace
	Key switch malfunctioning	Repair or replace
	Wiring disconnected	Connect
Engine revolution is not smooth	Fuel filter clogged or dirty	Clean or change
	Air cleaner clogged	Clean or change
	Fuel leak due to loose injection pipe retaining nut	Tighten nut
	Injection pump malfunctioning	Repair or replace
	Incorrect nozzle opening pressure	Adjust
	Injection nozzle stuck or clogged	Repair or replace
	Fuel overflow pipe clogged	Clean
	Governor malfunctioning	Repair
Either white or blue exhaust smoke is observed	Excessive engine oil	Reduce to the specified level
	Low grade fuel used	Repair or replace
	Fuel filter clogged	Adjust
	Air cleaner clogged	Adjust top clearance
Either black or dark gray exhaust smoke is observed	Overload	Lessen the load
	Low grade fuel used	Use the specified fuel
	Fuel filter clogged	Clean or change
	Air cleaner clogged	Clean or change

SPECIFICATIONS 8.4

1700

Engine

Make and model	Kubota V2203
Type	Verticle , In Line, 4 Cycle
Number of cylinders	4
Cylinder bore	87 mm (3.43 inches)
Stroke	92.4 mm (3.64 inches)
Displacement	134 cu. in.(2197cc)
Maximum engine speed (no load)	2950 RPM
Low idle setting	1000 RPM
Cooling system	Liquid
Horsepower (Gross)	49.5 @ 2800 RPM
Power (ISO 9249 Net Power)	34.3 Kw (46 hp) @ 2800 RPM
Torque (ISO 9249 Net Power)	155 N.m. (115 lbs / ft.) @ 1600 RPM
Compression ratio	23.0: 1
Firing order (viewed from gear case end)	1 - 3 - 4 - 2
Fuel injection timing	18° BTDC.
Injector working pressure	1990 - 2133 PSI (137 - 147 Kgf / cm^3)
Direction of rotation (viewed from flywheel end)	Counter - clockwise
Location of timing marks	N / A
Valve clearance, (cold)	0071 - .0087 in (0 - .18 - 0.22 mm)
Fuel type	Diesel No. 2
Air cleaner	Replaceable dry cartridge w/indicator
Engine oil capacity with filter	8. 5 qts. (8 l)
Oil type	10W30API CF
Cooling system capacity	2.17 gal. (8.2 L)
Radiator cap pressure setting	12. 8 PSI (88 KPa)
Thermostat rating	Fully open 185°F (85°C)

Hydraulic System

Pump type	Gear, 1.37 cu. in.	
Capacity (at rated RPM and Pressure)	14.5 GPM (54.8 l/m)	
Rated RPM	2800	
Rated pressure	2400 (Zero Flow) PSI (165.5 bar)	
Filtration	5 Micron	
Hydraulic fluid	10W30 API Class, SJ	
Control valve	Series type with float on lift and detent on auxiliary	
Oil cooler	674 BTU. (711 KCal)	
Cylinders.	Lift	Tilt.....
Type	Double acting	Double acting
Qty per loader	2	2.....
Bore diameter	2.5 in.	2.5 in.
Rod diameter	1.5 in.	1.5 in.
Stroke	32 in.	15.5 in.