

W14B LOADER

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1001

SAFETY RULES SERVICE MANUAL INTRODUCTION AND TORQUE SPECIFICATIONS

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SAFETY RULES

 This symbol means **ATTENTION! BECOME ALERT! YOUR SAFETY IS INVOLVED.** The message that follows the symbol contains important information about safety. Carefully read the message. Make sure you fully understand the causes of possible injury or death. 1-1-C


IMPORTANT: To prevent injury on job, follow the Warning, Caution, and Danger notes in this section and other sections throughout this manual. Follow the instructions carefully.


The procedures recommended and shown in this manual are good, effective service methods. However, all possible procedures and service hazards may not be covered. Therefore, if you use a tool or procedure not recommended, you must make sure that the method you select is a safe method.

Put the warning tag shown below on the key for the key switch when you are servicing or repairing this machine. One warning tag is on every new machine. You can buy additional warning tags, part number 331-4614, from Service Parts Supply.

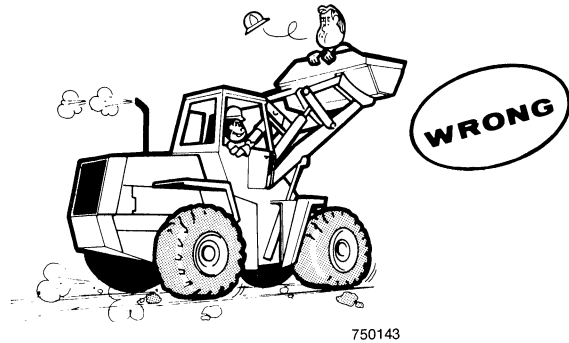



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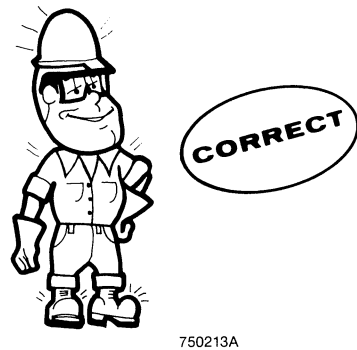
 **WARNING:** Read operator's manual to familiarize yourself with control lever functions. 46-27


 **WARNING:** Operate tractor and equipment controls from the seat position only. Any other method could result in serious injury. 48-55

 **WARNING:** This is a one man machine, no riders allowed. 35-8



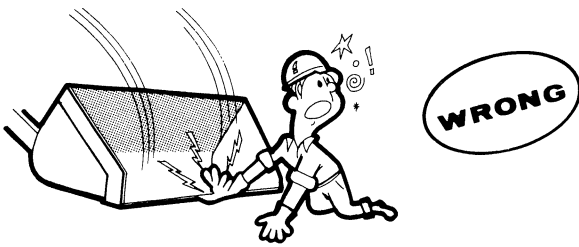
 **WARNING:** If you wear clothing that is too loose or do not use the correct safety equipment for your job, you can be injured. Always wear clothing that will not catch on objects. Extra safety equipment that can be required includes hard hat, safety shoes, ear protection, eye or face protection, heavy gloves and reflector clothing. 45-3-A



 **WARNING:** When working in the area of the fan belt with the engine running, avoid loose clothing if possible, and use extreme caution. 35-4

WARNING: If the bucket must be raised during servicing or repairs, use an acceptable stand to hold the loader frame in place. 18-94

WARNING: Use insulated gloves or mittens when working with hot parts. 47-41A



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CAUTION: When removing hardened pins such as a pivot pin, or a hardened shaft, use a soft head (brass or bronze) hammer or use a driver made from brass or bronze and a steel head hammer. 46-17

WARNING: When doing checks and tests on the equipment hydraulics, follow the procedures as they are written. DO NOT change the procedure. 47-44

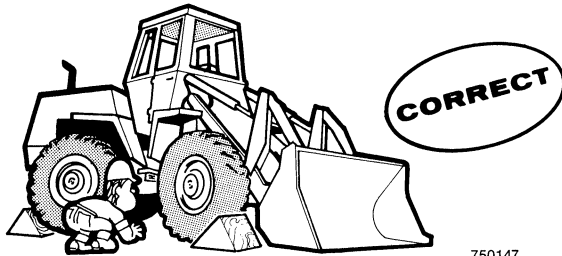
CAUTION: When using a hammer to remove and install pivot pins or separate parts, using compressed air or using a grinder, wear eye protection that completely encloses the eyes (approved goggles or other approved eye protectors). 46-13

WARNING: When putting the hydraulic cylinders on this machine through the necessary cycles to check operation or to remove air from a circuit, make sure all people are out of the way. 47-45

CAUTION: When servicing or repairing the machine, keep the shop floor and operator's compartment and steps free of oil, water, grease, tools, etc. Use an oil absorbing material and/or shop cloths as required. Use safe practices at all times. 40-8

WARNING: Locate the machine on level ground and block the wheels securely before working under the machine. Failure to follow the above procedure can result in personal injury. 46-77

CAUTION: Use suitable floor (service) jacks or chain hoists to raise wheels or track off the floor. Always block machine in place with suitable safety stands. 40-7-A



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CAUTION: Some components of this machine are very heavy. Use suitable lifting equipment or additional help as instructed in this service manual. 40-10

CAUTION: Pin sized and smaller streams of hydraulic oil under pressure can penetrate the skin and result in serious infection. If hydraulic oil under pressure does penetrate the skin, seek medical treatment immediately. Maintain all hoses and tubes in good condition. Make sure all connections are tight. Make a replacement of any tube or hose that is damaged or thought to be damaged. DO NOT use your hand to check for leaks; use a piece of cardboard or wood. 40-6-A

DANGER: Engine exhaust fumes can cause death. If it is necessary to start the engine in a closed place, remove the exhaust fumes from the area with an exhaust pipe extension. If you do not have an exhaust pipe extension, open the doors and get outside air into the area. 48-56



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SERVICE MANUAL INTRODUCTION

This service manual has been prepared with the latest service information available. Troubleshooting, removal, disassembly, inspection and installation procedures, and complete specifications and tightening references can be found in most sections. Some sections have drawings but no written procedure because the job is so easily done. This service manual is one of the most important tools available to the service technician.

Right, Left, Front, and Rear

The terms right-hand and left-hand and front and rear as used in this manual indicate the right and left sides, and front and rear of the machine as seen from the operator's seat for correct operation of the machine or attachment.

Text

If the service manual is for more than one machine or different models of components (planetary axles, gear boxes, control valves, etc.) the procedures have the steps necessary to service each model.

Table of Contents

A Table of Contents is in the front of this manual. The Table of Contents shows the main divisions and the sections that are in each division. The individual sections, where necessary, have a Table of Contents on the cover or second page of that section.

Page Numbers

All page numbers are made of two numbers separated by a dash, such as 4002-9. The number before the dash is the section number. The number following the dash is the page number in that section. Page numbers will be found at the upper right or left of each page.

Illustrations

Illustrations are put as near as possible to the text and are to be used as part of the text.

Clear and Simple English

This manual is written in C.A.S.E. (Clear and Simple English). C.A.S.E. is easier to read and understand than "regular" English because C.A.S.E. uses a small number of common words and has special rules for writing.

Special Tools

Special tools are needed to remove and install, disassemble and assemble, check and adjust some component parts of this machine. Some special tools can be easily made locally and the necessary information to make the tool is in this service manual. Other special tools are more difficult to make locally and are available from Service Tools in the U.S. and from Jobborn Manufacturing in Canada. Use these tools according to the instructions in this service manual for your personal safety and to do the job correctly.

Order special tools from either of the following companies:

Service Tools
P.O. Box 314
Owatonna, Minnesota 55060

Jobborn Manufacturing Co.
97 Frid Street
Hamilton, Ontario L8P 4M3
Canada

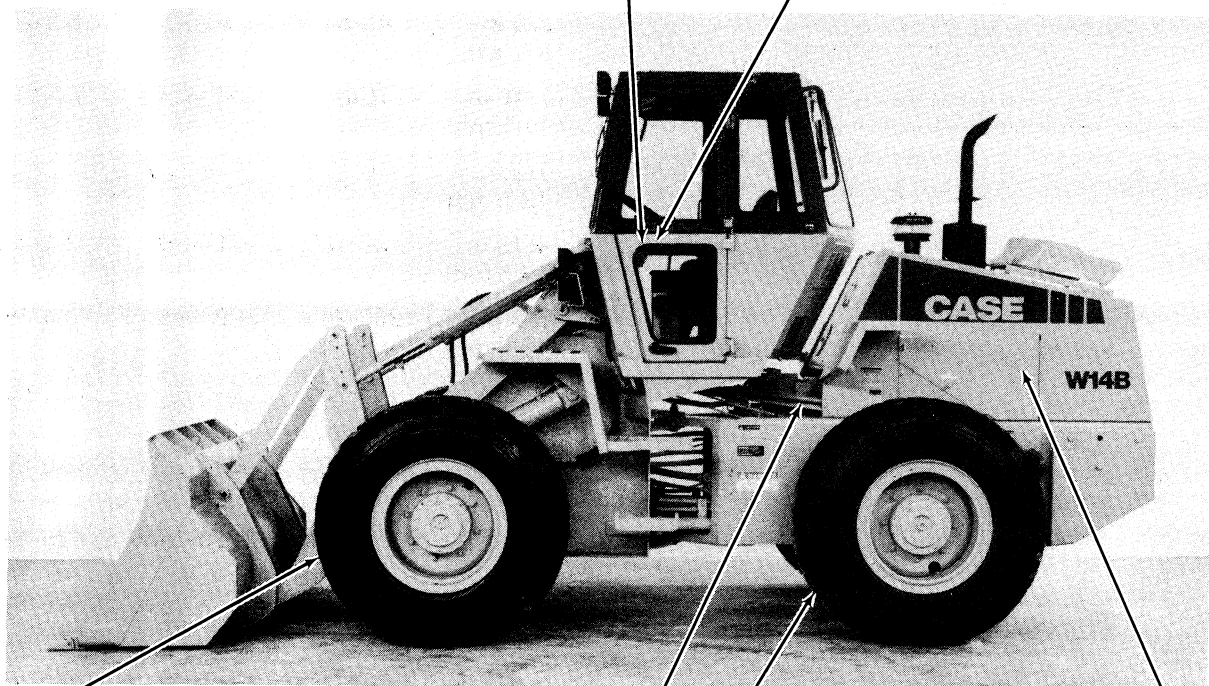
PRODUCT IDENTIFICATION NUMBER (PIN) AND SERIAL NUMBERS

NOTE: A serial number plate is also on many components such as the starter, alternator, pumps, etc.

PRODUCT IDENTIFICATION NUMBER (PIN)
(Inside door on front frame)

MODEL NUMBER

ROPS SERIAL NUMBER
(Cab - Inside door on front frame.
Canopy - Left rear of seat)



FRONT AXLE SERIAL NUMBER
(Plate on axle housing near differential)

TRANSMISSION SERIAL NUMBER
(Plate on top of transmission)

ENGINE SERIAL NUMBER
(Right side, edge of timing gear housing)

REAR AXLE SERIAL NUMBER
(Plate on axle housing near differential)

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1002

FLUIDS AND LUBRICANTS CHART AND MAINTENANCE CHART

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FLUIDS AND LUBRICANTS CHART

COMPONENT	CAPACITY		SPECIFICATION
	U.S.	Metric	
Fuel tank	38 gallons	144 litres	See Operators Manual
Engine crankcase	16 quarts	15.1 litres	Case HDM engine oil Multi-viscosity Above 32° F (-1° C) .. SAE20W-40 CC, CD Above 10° F (-12° C) .. SAE15W-40 CC, CD Below 90° F (32° C) .. SAE10W-30CC, CD Single viscosity Above 50° F (10° C) SAE40 CC, CD Above 40° F (4° C) SAE30 CC, CD 25 to 70° F (4 to 21° C) .SAE20W-20 CC, CD 32 to -15° F (0 to -26° C) .SAE10W CC, CD
Hydraulic system			Case TCH Fluid Alternate oil Type C3 hydraulic fluid (SAE 10)
Total system	26.5 gallons	100 litres	
Reservoir	18.5 gallons	70 litres	
Transmission	22 quarts	20.8 litres	
Front axle			Case FDL gear lubricant Alternate gear lubricant SAE 85-140, API-GL5
Center bowl	16 pints	7.6 litres	
Planetary, each	5 pints	2.4 litres	
Rear axle			
Center bowl	19 pints	8.9 litres	
Planetary, each	3 pints	1.4 litres	
Engine cooling system	24 quarts	22.7 litres	A mixture of half ethylene glycol (antifreeze) and half water must be used at all times. If the coldest outside temperature will be less than -34° F (-36° C) add antifreeze.
Batteries	As required		Add drinking water or distilled water.
Grease fittings	As required		Molydisulfide grease
Master cylinders	As required		DOT-3 brake fluid

SYSTEMGARD™ TESTING SCHEDULE

Get samples of lubricants for Systemgard™ analysis at the intervals shown below. Follow the instructions with the Systemgard™ kits.

	Every 100 hours of operation	Every 500 hours of operation (at least three times yearly)
Engine	X	X
Hydraulic System		X
Transmission		X
Differential		X
Final drive/planetary		X
Power shuttle		X

MAINTENANCE CHART

This chart shows the maximum intervals of service for the correct maintenance of the machine. Shorten the intervals as required when operating conditions are severe.

INTERVAL	SERVICE	INSTRUCTIONS
After 1, 5, 10, 20, and 50 hours of operation	Tighten the wheel nuts.	Section 6129
After the first 20 hours of operation, new machine only	Do the After Delivery Check.	Operators Manual
After every 10 hours of operation or daily, whichever occurs first	Check level of oil in engine crankcase.	Operators Manual
	Check the level of the oil in the reservoir.	Section 8001
	Drain the water from the rear air reservoir.	Operators Manual
	Lubricate the center pivot pins.	Operators Manual
	Lubricate the trunnion pins.	Operators Manual
After every 50 hours of operation	Check condition of drive belt (alternator).	Operators Manual
	Check level of brake fluid in reservoir.	Operators Manual
	Check level of coolant in reservoir.	Operators Manual
	Check level of oil in transmission	Section 6101
	Check fuel sediment bowl for water and sediment.	Operators Manual
	Clean filters for ROPS cab.	Section 9061
	Lubricate pivot pins for bucket.	Operators Manual
	Lubricate pivot pins for steering cylinders.	Operators Manual
	Lubricate universal joints and slip yokes.	Operators Manual
Lubricate center bearing for front drive shaft.	Operators Manual	

INTERVAL	SERVICE	INSTRUCTIONS
After every 100 hours of operation	Check air pressure and condition of tires. Clean spark arrester muffler. Lubricate pivot pins for loader frame.	Section 6129 Operators Manual Operators Manual
After every 250 hours of operation	Change engine oil and filter. Check level of coolant in radiator. Check level of fluid in batteries. Check level of gear lubricant in front and rear axles. Check tension and condition of drive belt for compressor for air conditioning. Lubricate pivots for loader control levers.	Operators Manual Operators Manual Section 4005 Section 6101 Operators Manual Operators Manual
After every 500 hours of operation	Replace fuel filters. Replace filter for transmission. Inspect ROPS cab or canopy.	Section 3410 Section 6101 Section 9061
After every 1000 hours of operation	Replace filter for hydraulic system. Change the oil in the transmission. Change the gear lubricant in the front and rear axles. Check clearance of engine valves.	Section 8001 Section 6101 Section 6101 Section 2415
After every 2000 hours of operation or yearly, whichever occurs first	Change the oil in the reservoir Service the air cleaner. Also see As Required below. Flush the cooling system.	Section 8001 Section 2001 Operators Manual
As required	Service the air cleaner when the warning stays illuminated. Replace filter for hydraulic system when warning lamp stays illuminated. Check torque for wheel nuts after a wheel has been removed and installed. Clean screen in fill tube for fuel tank.	Section 2001 Section 8001 Section 6129 Operators Manual

Section 1010

GENERAL ENGINE SPECIFICATIONS

Written In *Clear
And
Simple
English*

IMPORTANT: *This engine was made using the metric measurement system. All measurements and checks must be made with metric tools to make sure of an accurate reading when inspecting parts.*

Section 1024

SPECIFICATION DETAILS

Written In *Clear
And
Simple
English*

IMPORTANT: *This engine was made using the metric measurement system. All measurements and checks must be made with metric tools to make sure of an accurate reading when inspecting parts.*

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RUN-IN INSTRUCTIONS

Engine Lubrication

Fill the 6-590 engine crankcase with CC or CD service classification oil that has the correct viscosity rating for the ambient air temperature. Install new oil filters, after the engine has been rebuilt.

Fill the 6T-590 and the 6TA-590 engine crankcase with CD service classification oil that has the correct viscosity rating for the ambient air temperature. Install new oil filters, after the engine has been rebuilt.

Run-In Procedure For Rebuilt Engine

- Step 1 Disconnect the wire to the electric shut-off on the injection pump so that the engine will not start. Crank the engine for 30 seconds until there is oil pressure, then reconnect the wire.
- Step 2 Remove the air from the cooling system at the temperature sending unit for the 6-590 and 6T-590 engine. Loosen the upper plug on the aftercooler to remove the air from the cooling system for the 6TA-590 engine.
- Step 3 Run the engine at 1000 RPM minimum load for 5 minutes and check for oil leaks.
- Step 4 During the Run-In, continue to check the oil pressure, coolant level, and coolant temperature.

Run-In Procedure For Rebuilt Engines (With A Dynamometer)

The following procedure must be followed when using a PTO dynamometer to Run-In the engine. The dynamometer will control the engine load at each speed and will remove stress on new parts during Run-In.

During the Run-In, continue to check the oil pressure, coolant level and coolant temperature.

STEP	TIME	ENGINE SPEED	DYNAMOMETER SCALE LOAD
1	5 Minutes	1000 RPM	50
2	5 Minutes	1100 RPM	1/2
3	5 Minutes	2200 RPM	Full

Run-In Procedure for Rebuilt Engines (Without A Dynamometer)

STEP	TIME	ENGINE SPEED	LOAD
1	5 Minutes	1000 RPM	No Load
2	5 Minutes	1100 RPM	Light Load
3	5 Minutes	2200 RPM	Full

Run-In Procedure (Agriculture Tractors)

For the first 8 hours of field operation stay one gear lower than normal. For the next 12 hours DO NOT "lug" the engine. Prevent "lugging" by moving the lever to a lower gear. The engine must not be "lugged" below the rated engine RPM during early hours of life.

Run-In Procedure (Construction Equipment)

For the first 8 hours, operate the engine at full throttle maintaining a normal load. DO NOT "baby" the engine, but avoid converter or hydraulic stall. The engine must not be "lugged" below the Rated Engine RPM (Do not stall the engine more than 10 seconds).

ENGINE SPECIFICATION DETAILS

Cylinder Block	Metric Value
Type	Non-Sleeved
Material	Cast Iron
ID of Cylinder	102.00 to 102.04 mm
Maximum Service Limit	102.116 mm
Cylinder Out of Round (Maximum)	0.038 mm
Cylinder Taper (Maximum)	0.076 mm
0.5 mm Oversize Piston	
Machine Cylinder Bore to	102.40 to 102.44 mm
Hone Cylinder Bore to	102.50 to 102.54 mm
1.00 mm Oversize Piston	
Machine Cylinder Bore to	102.900 to 102.960 mm
Hone Cylinder Bore to	103.00 to 103.04 mm

Service Cylinder Sleeve

Type	Dry, Can Be Replaced
Material	Cast Iron
Machine Cylinder Block Bore to	104.485 to 104.515 mm
Installation	Press Fit
Hone Cylinder Bore to	102.00 to 102.10 mm

Piston

Type	Cam Ground
Material	Aluminum alloy
OD at 12 mm From the Bottom, 90 Degrees From Piston Pin	
Standard Size Piston	101.873 to 101.887 mm
Minimum Service Limit	101.823 mm
0.5 mm Oversize Piston	102.373 to 102.387 mm
Minimum Service Limit	102.323 mm
1.0 mm Oversize Piston	102.873 to 102.887 mm
Minimum Service Limit	102.823 mm
ID of Piston Pin Bore	40.006 to 40.012 mm
Maximum Service Limit	40.025 mm
Width of 1st Ring Groove (Top)	2.465 to 2.485 mm
Width of 2nd Ring Groove (Intermediate)	2.425 to 2.445 mm
Width of 3rd Ring Groove (Oil Ring)	4.040 to 4.060 mm
Protrusion Above Cylinder Block (Maximum)	0.660 mm

Piston Pin

Type	Full Float
OD of Pin	39.997 to 40.003 mm
Minimum Service Limit	39.990 mm

Piston Rings

No. 1 Compression (6T-590 and 6TA-590 Engine)	Key Stone Type (Barrel Face)
End Gap in 102.02 ID	0.40 to 0.70 mm
No. 1 Compression 6-590 Engine	Rectangular Type (Barrel Face)
End Gap in 102.02 ID	0.25 to 0.55 mm
Maximum Service Limit	0.806 mm
Side Clearance	0.075 to 0.120 mm
Maximum Service Limit	0.15 mm
No. 2 Compression	Rectangular Type (Taper Face)
End Gap in 102.02 ID	0.25 to 0.55 mm
Maximum Service Limit	0.806 mm
Side Clearance	0.075 to 0.120 mm
Maximum Service Limit	0.15 mm
No. 3 Oil Control Rings	Two Piece
End Gap in 102.02 ID	0.25 to 0.55 mm
Maximum Service Limit	0.806 mm
Side Clearance	0.130 mm

Cylinder Head

Warpage (Maximum)	0.20 mm
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Lifters

Material	Hardened Iron
OD of Lifter	15.961 to 15.977 mm
Minimum Service Limit	15.960 mm
Bore Diameter in Block	16.000 to 16.030 mm
Maximum Service Limit	16.055 mm

Connecting Rod

Bushing	Steel Backed Leaded Bronze
Bushing ID Installed (Ream to Size)	40.053 to 40.067 mm
Maximum Service Limit	40.092 mm
Bearing Liners	Replaceable
Journal ID Without Bearing Liners	72.987 to 73.013 mm
Bearing Oil Clearance	0.038 to 0.116 mm
Maximum Service Limit	0.129 mm
Side Clearance	0.100 to 0.300 mm
Maximum Service Limit	0.330 mm
Connecting Rod Bend (Maximum)	
Without Bushing	0.200 mm
With Bushing	0.150 mm
Connecting Rod Twist (Maximum)	
Without Bushing	0.500 mm
With Bushing	0.300 mm

Crankshaft

Type	Hardened Steel, Balanced
Main Bearing Liners	Replaceable
Crankshaft End Clearance	0.137 to 0.264 mm
Center Main Bearing Thrust Surface Thickness	2.50 mm
Connecting Rod Journal	
OD, Standard	68.987 to 69.013 mm
Maximum Service Limit	68.962 mm
0.25 mm OD Undersize, Grind to	68.737 to 68.763 mm
Maximum Service Limit	68.712 mm
0.50 mm OD Undersize, Grind to	68.487 to 68.513 mm
Maximum Service Limit	68.462 mm
0.75 mm OD Undersize, Grind to	68.237 to 68.263 mm
Maximum Service Limit	68.212 mm
1.00 mm OD Undersize, Grind to	67.987 to 68.013 mm
Maximum Service Limit	67.962 mm
Connecting Rod Journal Maximum Taper	0.013 mm
Journals Out of Round Maximum	0.050 mm
Undersize Main Bearing Liners For Service	0.25, 0.50, 0.75 and 1.00 mm
Main Bearing Oil Clearance	0.041 to 0.119 mm
Maximum Service Limit	0.140 mm
Main Bearing Journal	
OD, Standard	82.987 to 83.013 mm
Maximum Service Limit	82.962 mm
0.25 mm OD Undersize, Grind to	82.737 to 82.763 mm
Maximum Service Limit	82.712 mm
0.50 mm OD Undersize, Grind to	82.487 to 82.513 mm
Maximum Service Limit	82.462 mm
0.75 mm OD Undersize, Grind to	82.237 to 82.263 mm
Maximum Service Limit	82.212 mm
1.00 mm OD Undersize, Grind to	81.987 to 82.013 mm
Maximum Service Limit	81.962 mm
Main Bearing Journal Bore ID No Liners	87.982 to 88.018 mm
Maximum Service Limit	88.031 mm
Main Journal Width:	
1st, 2nd, 3rd, 5th and 6th	37.424 to 37.576 mm
4th	37.475 to 37.525 mm
Connecting Rod Journals Width	38.950 to 39.050 mm

Camshaft

Type	Hardened Iron
Bushing (Front Only)	1, Replaceable
Bushing Lubrication:	
Front Bushing	Pressure Lubricated
Intermediate	Pressure Lubricated
Rear	Pressure Lubricated
Oil Clearance	0.076 to 0.152 mm
ID of No. 1 Bushing (Installed)	54.107 to 54.133 mm
Maximum Service Limit	54.146 mm
ID of No. 1 Oversize (57.36 to 57.40 mm OD) Service Bushing	54.107 to 54.133 mm
Maximum Service Limit	54.146 mm
ID of No. 2, 3, 4, 5 and 6 Service Bushing	54.107 to 54.133 mm
Maximum Service Limit	54.146 mm
Width of No. 1 Bushing	25.15 to 25.65 mm
Width of No. 2, 3, 4, 5 and 6 Service Bushing	17.75 to 18.25 mm
Camshaft Bushing Journal OD	53.987 to 54.013 mm
Minimum Serviceable Limit	53.962 mm
Camshaft Bore Diameter in Block	
No. 1 Bushing	57.222 to 57.258 mm
No. 1 Oversize Bushing, Machine to	57.722 to 57.758 mm
No. 2, 3, 4, 5 and 6 Less Bushings	54.107 to 54.133 mm
No. 2, 3, 4, 5 and 6 Oversize for Bushings, Machine to	57.222 to 57.258 mm
Camshaft Thrust Thickness	9.42 to 9.58 mm
Minimum Service Limit	9.34 mm
Camshaft Thrust Clearance	0.130 to 0.340 mm
Maximum Service Limit	0.470 mm

Turbocharger

Horizontal Travel of Turbine Shaft	0.10 to 0.16 mm
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Gear Train

Backlash:	
Crankshaft Gear to Camshaft Gear	0.08 to 0.33 mm
Crankshaft Gear to Idler Gear	0.08 to 0.33 mm
Camshaft to Fuel Pump Gear	0.08 to 0.33 mm
Idler Gear to Oil Pump	0.08 to 0.33 mm
Camshaft to Auxiliary	0.08 to 0.33 mm
Maximum Service Limit (All Gears)	0.45 mm

Rocker Arm Assembly

OD of Shaft	18.963 to 18.975 mm
Minimum Service Limit	18.938 mm
ID of Arm Bore	19.000 to 19.026 mm
Maximum Service Limit	19.051 mm
Lubrication	Pressure From Oil Gallery

Intake Valve

Tappet Clearance (Cold)	0.254 mm
Face Angle	29 Degrees
Face Run-Out	0.038 mm
Valve Head Edge Thickness, Minimum	1.50 mm
Length	128.84 to 129.46 mm
OD of Stem	7.960 to 7.980 mm
Minimum Service Limit	7.940 mm
OD of Head	44.870 to 45.130 mm
Seat Angle	30 Degrees
Seat Contact Width	1.32 to 1.92 mm
Seat Run-Out	0.10 mm
Insert Height	6.84 to 6.96 mm
OD of Insert	47.063 to 47.089 mm
ID of Insert	Tapered
Valve Recession Below Head Surface	0.99 to 1.52 mm
Maximum Service Limit	1.52 mm
ID of Valve Guide Bore	8.019 to 8.039 mm
Maximum Service Limit	8.089 mm

Exhaust Valve

Tappet Clearance (Cold)	0.508 mm
Face Angle	44 Degrees
Face Run-Out	0.038 mm
Valve Head Edge Thickness, Minimum	1.50 mm
OD of Head	41.870 to 42.130 mm
OD of Stem	7.960 to 7.980 mm
Minimum Service Limit	7.940 mm
Length	128.74 to 129.36 mm
Insert Seat Angle	45 Degrees
Seat Contact Width	1.47 to 2.07 mm
Seat Run-Out	0.10 mm
Insert Height	6.65 to 6.77 mm
OD of Insert	43.713 to 43.739 mm
ID of Insert	Tapered
Valve Recession Below Head Surface	0.99 to 1.52 mm
Maximum Service Limit	1.52 mm
ID of Valve Guide Bore	8.019 to 8.039 mm
Maximum Service Limit	8.089 mm

Valve Springs

Free Length	55.63 mm
Total Coils	7.25
Wire Diameter	4.830 to 4.930 mm
Compressed to 38.53 mm	(Valve Open) 785 to 839 N
Maximum Service Limit	765 N
Compressed to 49.25 mm	(Valve Closed) 285 to 321 N
Minimum Service Limit	270 N

2000

ENGINE REMOVAL AND INSTALLATION AND RADIATOR REMOVAL AND INSTALLATION

TABLE OF CONTENTS

Engine	2000-2	Radiator	2000-15
Removal	2000-2	Removal	2000-15
Installation	2000-7	Installation	2000-21
Illustration of Flywheel and Housing ..	2000-14	Illustration of Radiator Installation	2000-27

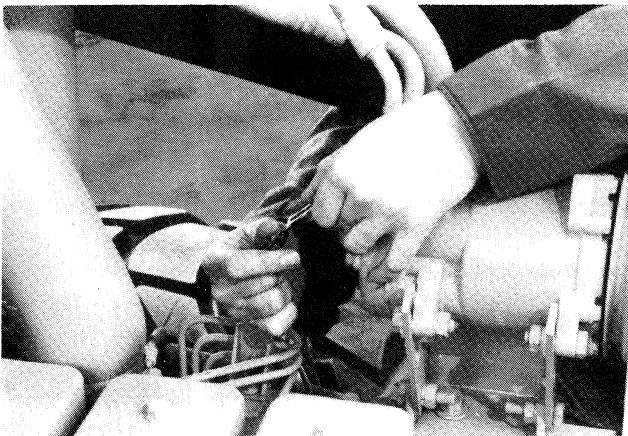
ENGINE

Removal

NOTE: If the engine is being removed to remove the transmission and the transmission is equipped with a parking brake, the parking brake linkage must be disconnected before releasing the air from the air system.

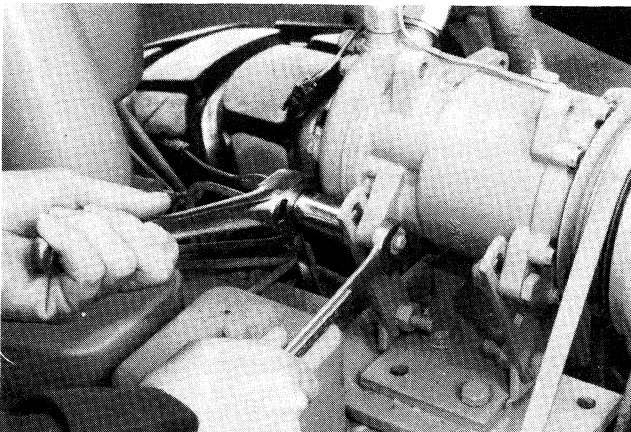
1. See Radiator Removal on page 2000-15 and remove the radiator from the machine.
2. Drain the oil from the hydraulic reservoir.
3. Open the drain valve for the air reservoir.
4. If the machine is equipped with air conditioning do the following:

- a. Disconnect the electrical connector for the air conditioning compressor.



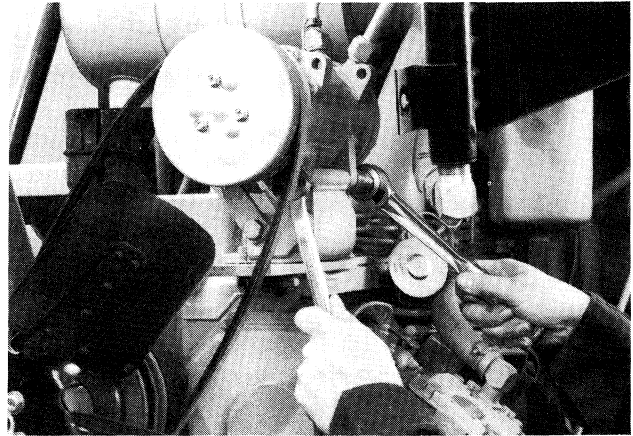
600438

- b. Loosen and remove the bolts, lock washers, and nuts that fasten the air conditioning compressor to the adjustment bracket.



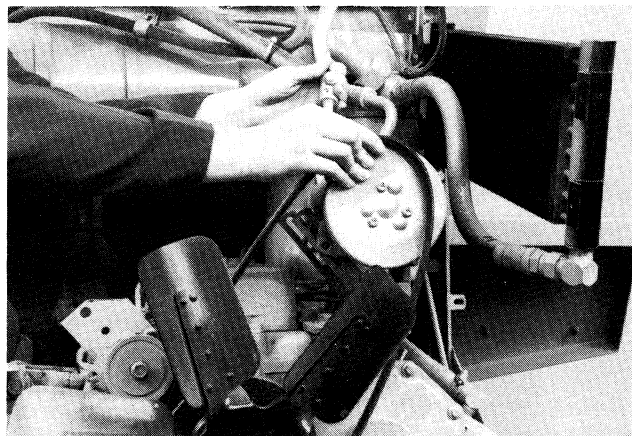
600442

- c. Loosen the nut on the bolt that fastens the air conditioning compressor to the mounting bracket.



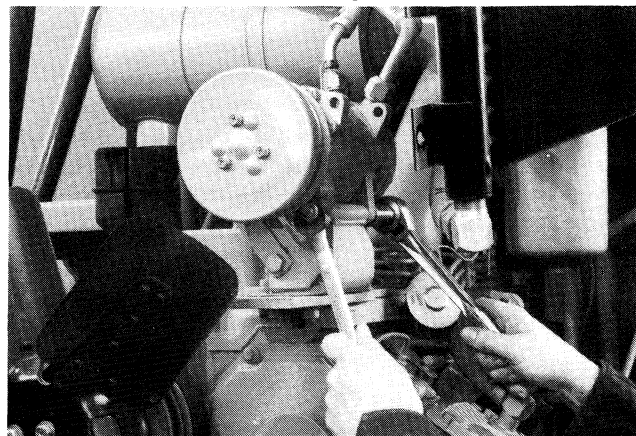
600403

- d. Move the air conditioning compressor until the belt can be removed. Remove the belt from the air conditioning compressor.



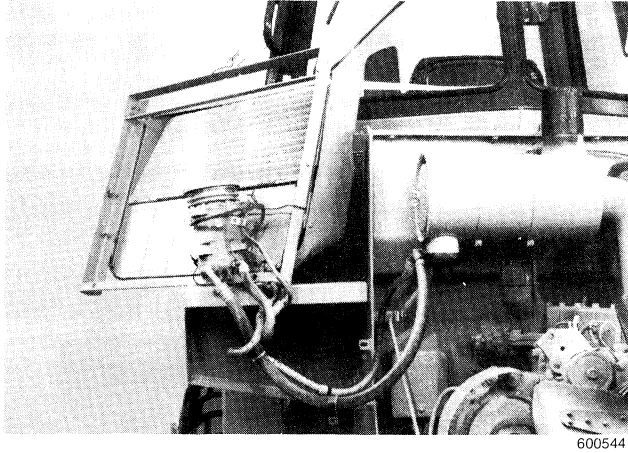
600444

- e. Remove the nut, flat washer, lock washer, and bolt that fastens the air conditioning compressor to the mounting bracket.

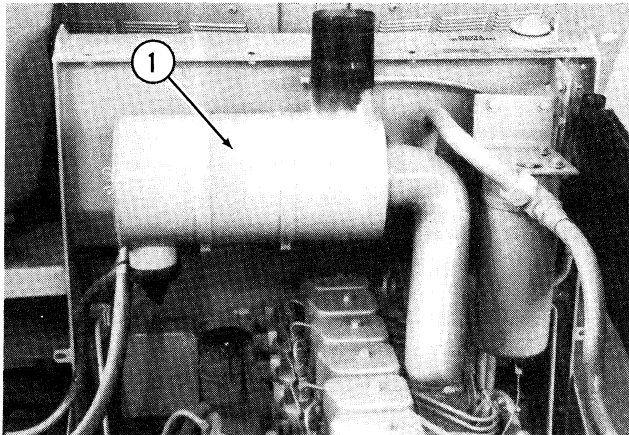


600404

f. Remove the air conditioning compressor from the mounting bracket. Fasten the air conditioning compressor to the air conditioning condenser assembly. Move the air conditioning compressor and condenser assembly out of the way.



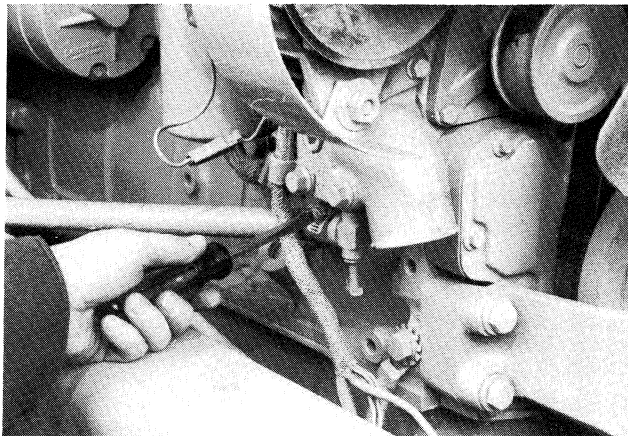
5. Remove the air cleaner from the machine.



1. Air Cleaner

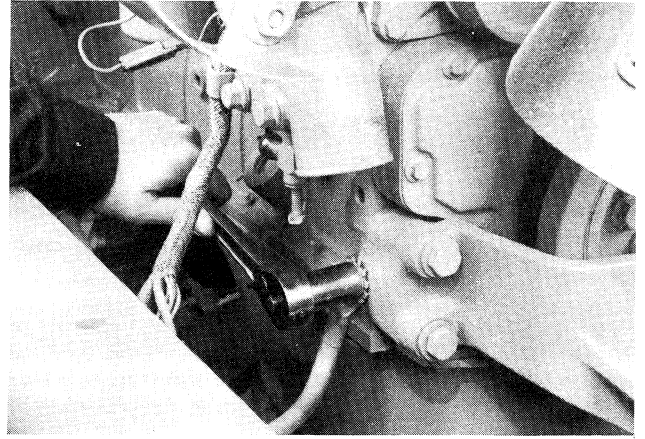
6. Put a cover over the intake manifold opening.

7. Loosen the clamp on the heater hose at the engine.



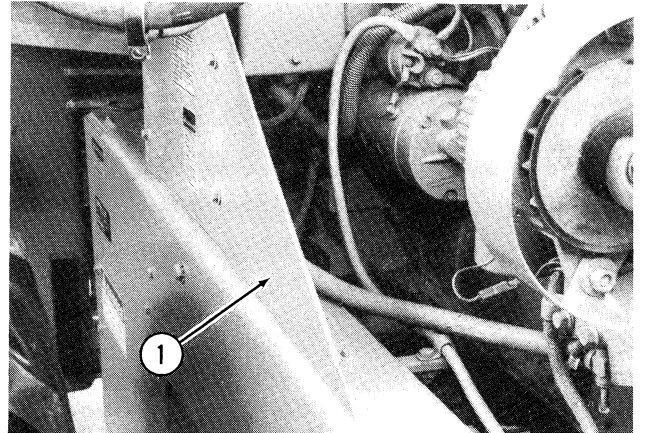
8. Remove the hose from the engine.

9. Loosen and remove the cap screw and external tooth washer that fasten the battery ground cable to the engine.



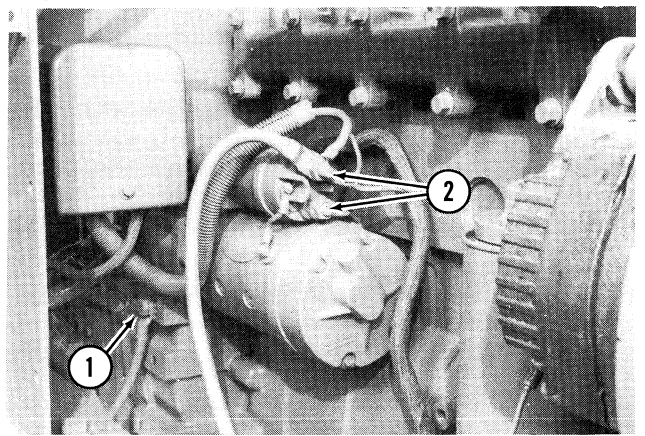
10. Move the battery ground cable out of the way.

11. Remove the bolts, flat washers, lock washers, and nuts that fasten the side panels to the machine. Remove the side panels from the machine.



1. Side Panel

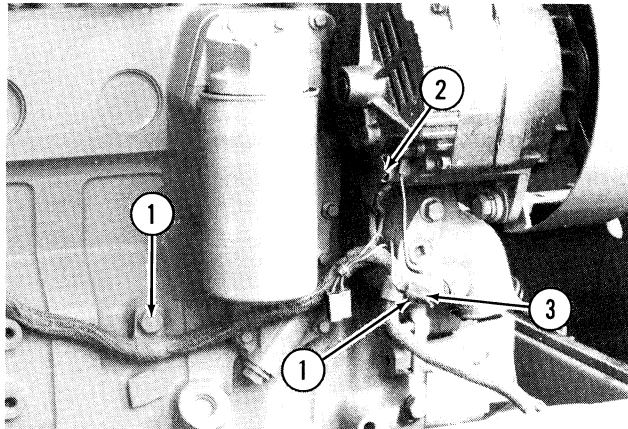
12. Loosen and remove the cap screw and external tooth washer that fasten the ground cable to the engine.



1. Ground Cable
2. Nuts

13. Loosen and remove the nuts that fasten the cables and wires to the starter solenoid. See photograph at bottom right of page 2000-3.

14. Loosen and remove the cap screws and flat washers that fasten the clamps on the wiring harness to the engine.



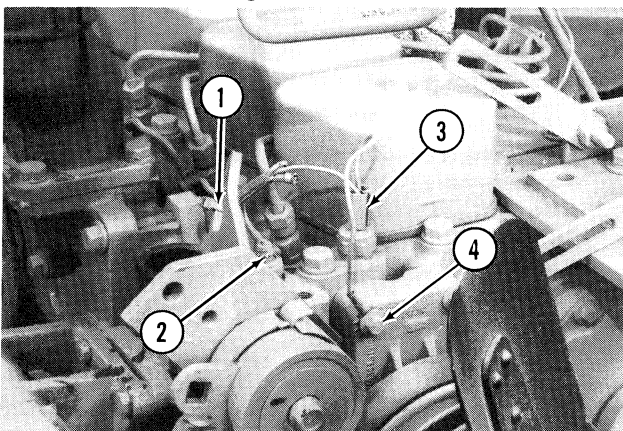
1. Cap Screw
2. Plastic Cap
3. Electrical Connector

600513

15. See photo for step 14 above. Remove the plastic cap from the alternator. Loosen and remove the nut and external tooth washer that fasten the battery terminal wire to the alternator. Remove the wire from the battery terminal on the alternator.

16. Disconnect the electrical connector for the wiring harness from the wire for the alternator.

17. Remove the tie strap that fastens the wiring harness to the lifting eye.



1. Tie Strap
2. Nut
3. Electrical Connector
4. Cap Screw

600520

See photo at bottom left for steps 18, 19, and 20.

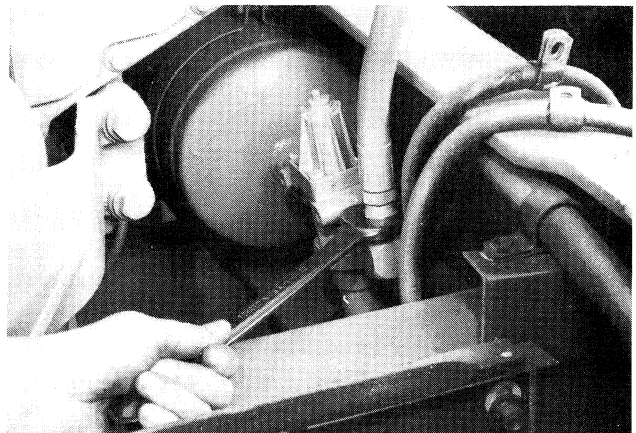
18. Loosen and remove the nut (item 2) and external-internal tooth washers that fasten the wire to the engine temperature switch. Remove the wire from the engine temperature switch.

19. Disconnect the electrical connector (item 3) from the engine temperature switch for the ether injection system.

20. Loosen and remove the cap screw (item 4) and external-internal tooth washer that fasten the ground wire to the engine.

21. Move the wiring harness out of the way.

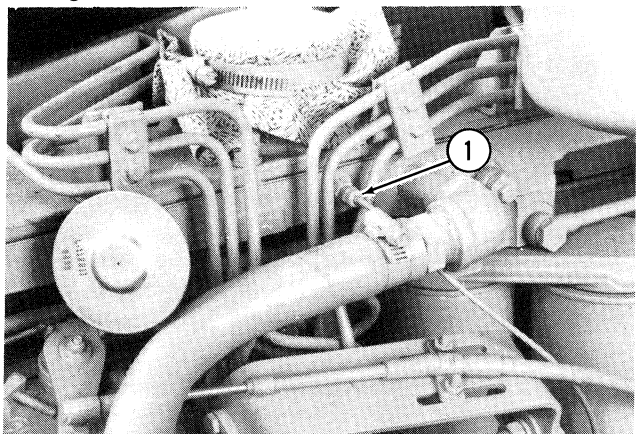
22. Disconnect the hose for the air compressor at the fitting on the governor.



600615

23. Install a cap on the fitting and a plug in the hose.

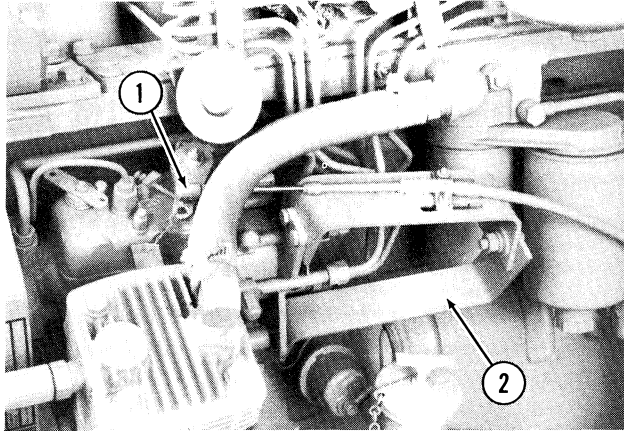
24. Disconnect the ether injection tube from the fitting in the intake manifold.



1. Ether Injection Tube

600630

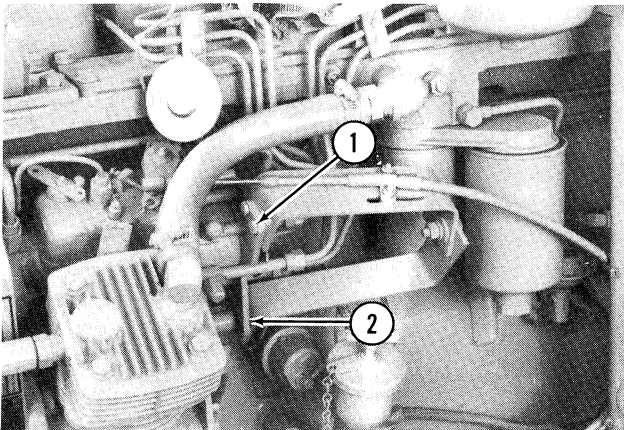
25. Disconnect the throttle linkage from the arm on the fuel injection pump.



1. Throttle Linkage
2. Throttle Cable Mounting Bracket

600638

26. Loosen and remove cap screws, bolts, flat washers, lock washers, and nuts that fasten the throttle cable mounting bracket to the engine.

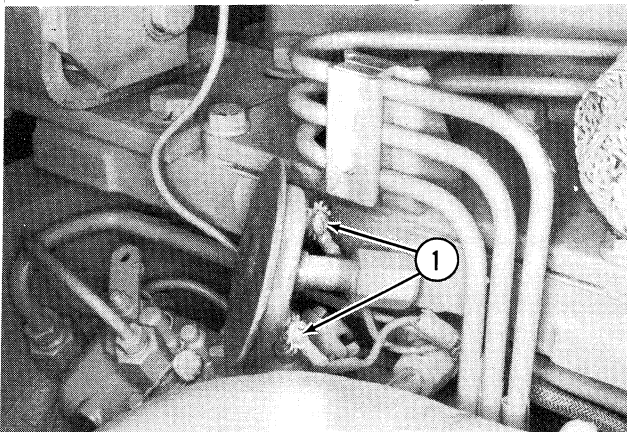


1. Bolts
2. Cap Screws

600642

27. Move the throttle cable and mounting bracket out of the way.

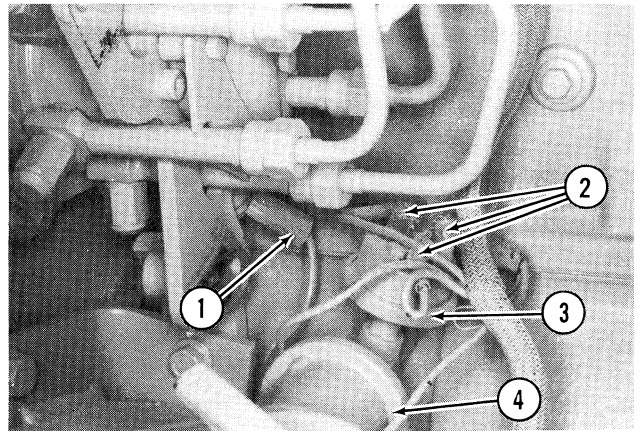
28. Loosen and remove the screws and external-internal tooth washers that fasten the wires to the switch for the air cleaner warning lamp.



1. Screws

600733

29. Disconnect the electrical connector from the fuel shutoff solenoid in the fuel injection pump.



1. Electrical Connector
2. Screws
3. Oil Pressure Switch
4. Oil Pressure Sender

600738

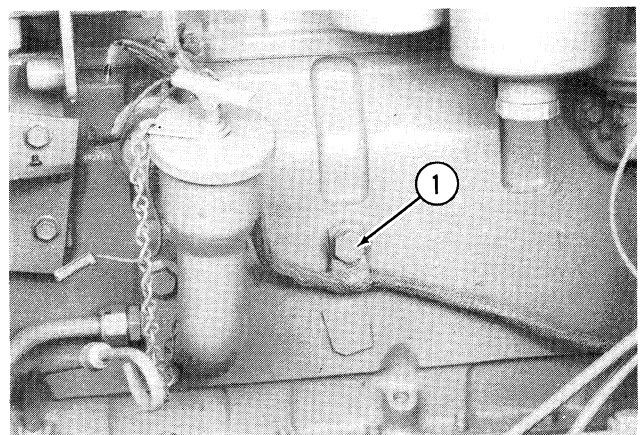
See photo above for steps 30, 31, and 32.

30. Put identification tags on each of the wires as it is removed from the oil pressure switch.

31. Loosen and remove the screws, external-internal tooth washers, and flat washers that fasten the wires to the oil pressure switch. It can be possible that the oil pressure switch must be turned for access to each screw.

32. Loosen and remove the nut and external-internal tooth washer that fasten the wire to the oil pressure sender. Remove the wire from the oil pressure sender.

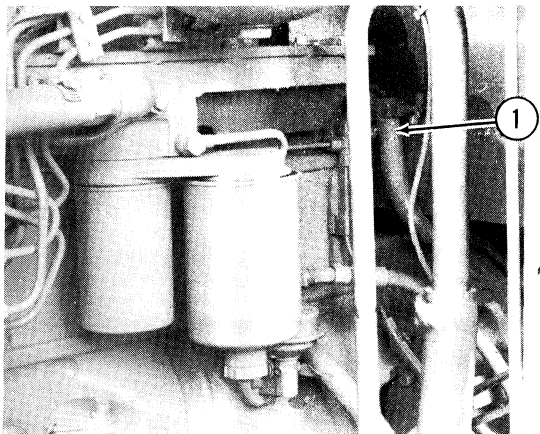
33. Loosen and remove the cap screw and flat washer that fasten the clamp on the wiring harness to the engine.



1. Cap Screw

601544

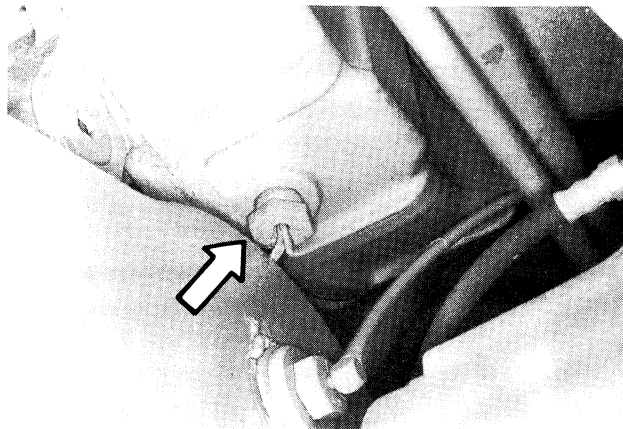
34. Remove the clamp on the heater hose. Remove the heater hose from the fitting on the engine.



1. Clamp

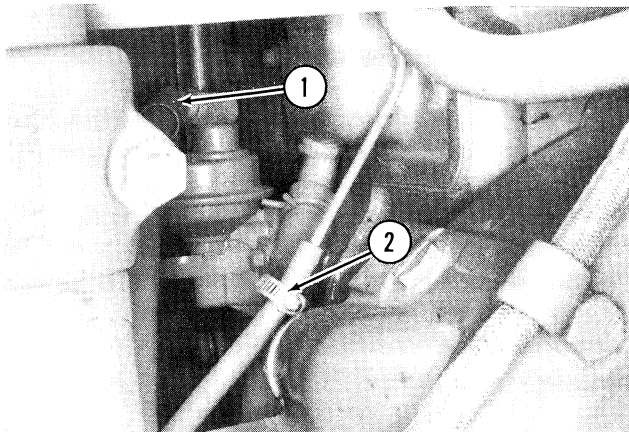
601504

38. Loosen and remove the plug from the bottom of the flywheel housing for the necessary clearance.



605208

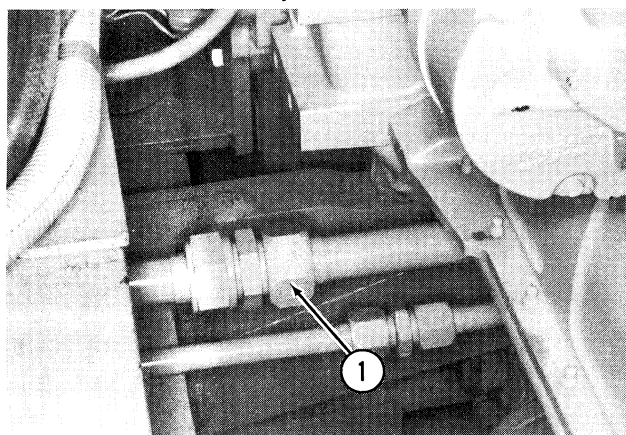
35. Disconnect the hose from the fitting on the hand primer pump.



1. Hose
2. Clamp

600743

39. Disconnect the hydraulic tube shown and move the tube out of the way.

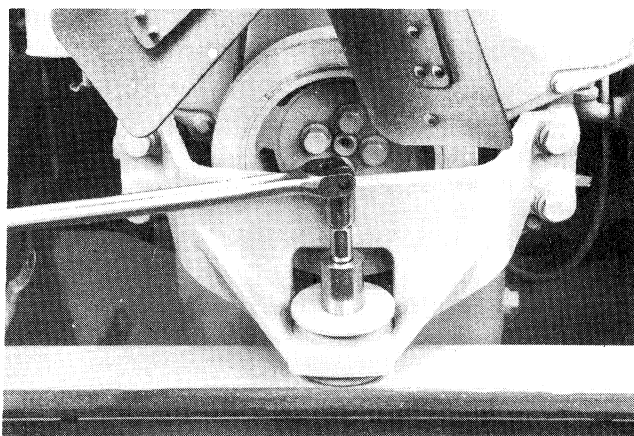


1. Hydraulic Tube

605212

36. Loosen the clamp on the hose from the fuel injectors. Remove the hose from the fuel injector line.

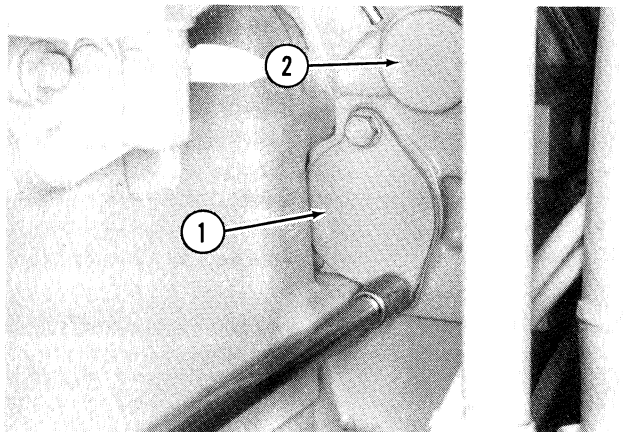
37. Loosen and remove the bolt, flat washers, insulator, and nut from the engine mount.



600526

40. Loosen the nuts on the clamps that fasten the hydraulic tube to the left side of the machine.

41. Loosen and remove the cap screws that fasten the dust cover to the flywheel housing.



1. Dust Cover
2. Plastic Plug

600709



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first, and then click the above link

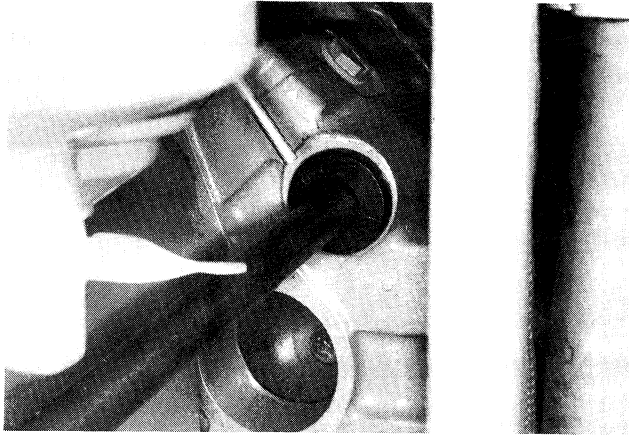
to download the complete manual.

Thank you so much for reading

42. Remove the plastic plug from the flywheel housing (item 2, photo for step 41).

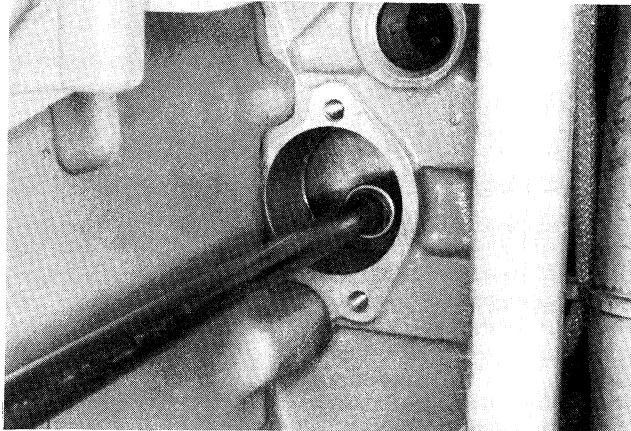
43. There are eight cap screws that fasten the flex plate to the flywheel. Only one cap screw at a time can be removed. The flywheel must be rotated to align each cap screw with the dust cover hole. Do the following steps to remove the eight cap screws.

- a. Use the CAS-1690 to align a cap screw with the dust cover hole.



605202

- b. Remove the cap screw and lock washer that fastens the flex plate to the flywheel.

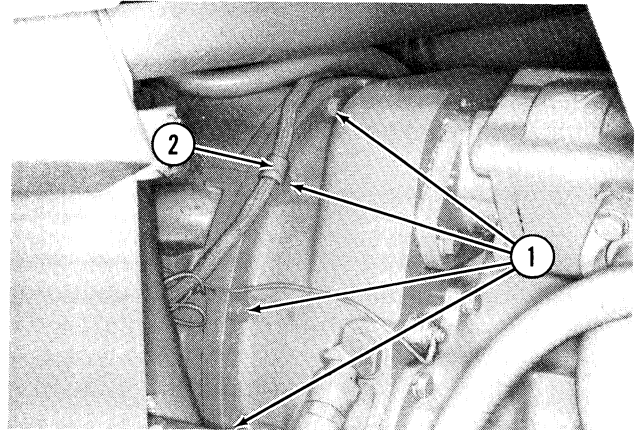


605204

- c. Repeat steps a and b until all eight cap screws and lock washers are removed.

44. Connect the lifting fixture to the lifting eyes on the engine. Connect acceptable lifting equipment to the lifting fixture.

45. Loosen and remove the cap screw, nuts, flat washers, wiring harness clamp, and heater hose clamp that fasten the flywheel housing to the torque converter housing.



1. Cap Screws
2. Wiring Harness Clamp

600701

46. Raise the rear of the engine to clear the frame.



601506

47. Move the engine toward the rear of the machine and remove the engine from the machine.

Installation

1. Put the engine in position over the frame.



601506

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