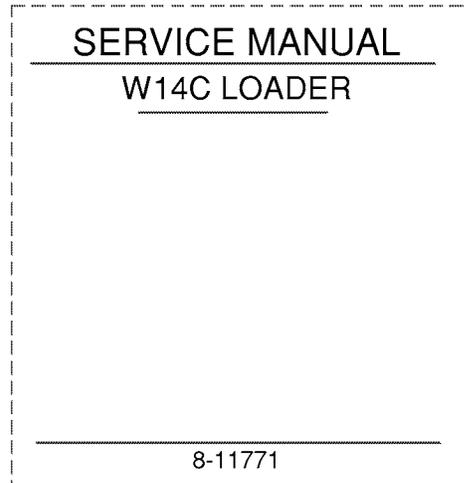


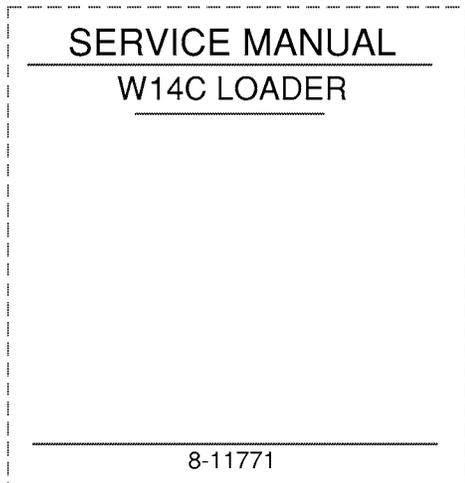
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2. Slide into pocket on Binder Spine.

TYPE 1-4



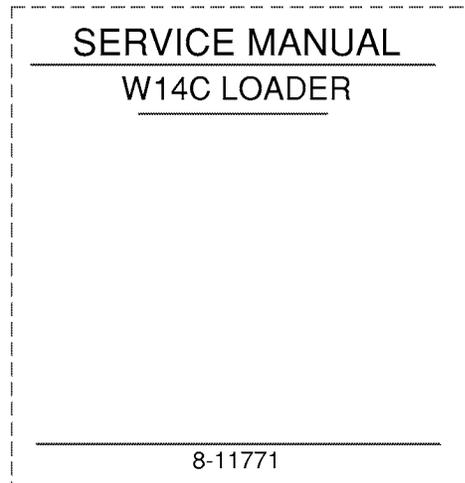
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2. Slide into pocket on Binder Spine.

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TYPE 1-4



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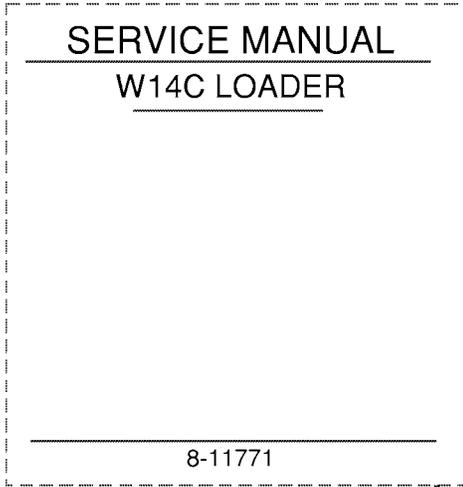
TYPE 1-4

W14C Loader

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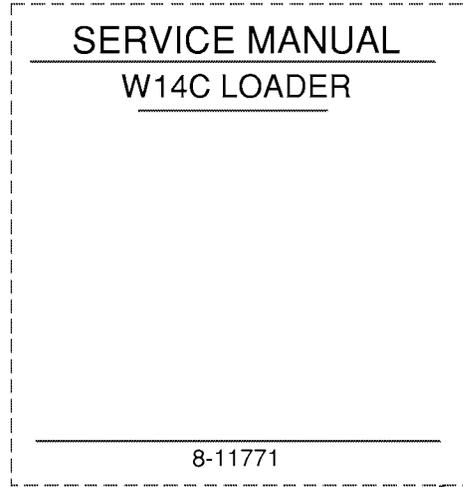
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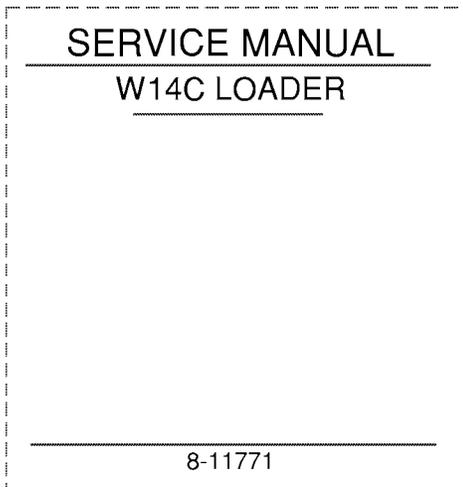
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2. Slide into pocket on Binder Spine.

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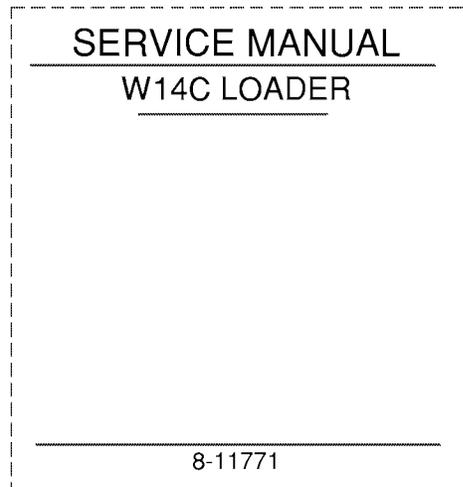
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2. Slide into pocket on Binder Spine.

TYPE 1-4



1. Trim along dashed line.
2. Slide into pocket on Binder Spine.

TYPE 1-4

1001

STANDARD TORQUE SPECIFICATIONS

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TORQUE SPECIFICATIONS - DECIMAL HARDWARE

Use the torques in this chart when special torques are not given. These torques apply to fasteners with both UNC and UNF threads as received from suppliers, dry, or when lubricated with engine oil. Not applicable if special graphites, molydisulfide greases, or other extreme pressure lubricants are used.

Grade 5 Bolts, Nuts, and Studs		
		
Size	Pound- Feet	Newton metres
1/4 in	9-11	12-15
5/16 in	17-21	23-28
3/8 in	35-42	48-57
7/16 in	54-64	73-87
1/2 in	80-96	109-130
9/16 in	110-132	149-179
5/8 in	150-180	203-244
3/4 in	270-324	366-439
7/8 in	400-480	542-651
1.0 in	580-696	787-944
1-1/8 in	800-880	1085-1193
1-1/4 in	1120-1240	1519-1681
1-3/8 in	1460-1680	1980-2278
1-1/2 in	1940-2200	2631-2983

Grade 8 Bolts, Nuts, and Studs		
		
Size	Pound- Feet	Newton metres
1/4 in	12-15	16-20
5/16 in	24-29	33-39
3/8 in	45-54	61-73
7/16 in	70-84	95-114
1/2 in	110-132	149-179
9/16 in	160-192	217-260
5/8 in	220-264	298-358
3/4 in	380-456	515-618
7/8 in	600-720	814-976
1.0 in	900-1080	1220-1465
1-1/8 in	1280-1440	1736-1953
1-1/4 in	1820-2000	2468-2712
1-3/8 in	2380-2720	3227-3688
1-1/2 in	3160-3560	4285-4827

NOTE: Use thick nuts with Grade 8 bolts.

TORQUE SPECIFICATIONS - METRIC HARDWARE

Use the following torques when special torques are not given.

These values apply to fasteners with coarse threads as received from supplier, plated or unplated, or when lubricated with engine oil. These values do not apply if graphite or molydisulfide grease or oil is used.

Grade 8.8 Bolts, Nuts, and Studs		
		
Size	Pound-Feet	Newton metres
M4	2-3	3-4
M5	5-6	6.5-8
M6	8-9	10.5-12
M8	19-23	26-31
M10	38-45	52-61
M12	66-79	90-107
M14	106-127	144-172
M16	160-200	217-271
M20	320-380	434-515
M24	500-600	675-815
M30	920-1100	1250-1500
M36	1600-1950	2175-2600

Grade 10.9 Bolts, Nuts, and Studs		
		
Size	Pound-Feet	Newton metres
M4	3-4	4-5
M5	7-8	9.5-11
M6	11-13	15-17.5
M8	27-32	37-43
M10	54-64	73-87
M12	93-112	125-15
M14	149-179	200-245
M16	230-280	310-380
M20	450-540	610-730
M24	780-940	1050-1275
M30	1470-1770	2000-2400
M36	2580-3090	3500-4200

Grade 12.9 Bolts, Nuts, and Studs



Usually the torque values specified for grade 10.9 fasteners can be used satisfactorily on grade 12.9 fasteners.

TORQUE SPECIFICATIONS - STEEL HYDRAULIC FITTINGS

Tube OD Hose ID	Thread Size	Pound- Feet	Newton metres
37 Degree Flare Fittings			
1/4 in 6.4 mm	7/16-20	6-12	8-16
5/16 in 7.9 mm	1/2-20	8-16	11-21
3/8 in 9.5 mm	9/16-18	10-25	14-33
1/2 in 12.7 mm	3/4-16	15-42	20-56
5/8 in 15.9 mm	7/8-14	25-58	34-78
3/4 in 19.0 mm	1-1/16-12	40-80	54-108
7/8 in 22.2 mm	1-3/16-12	60-100	81-135
1.0 in 25.4 mm	1-5/16-12	75-117	102-158
1-1/4 in 31.8 mm	1-5/8-12	125-165	169-223
1-1/2 in 38.1 mm	1-7/8-12	210-250	285-338

Tube OD Hose ID	Thread Size	Pound- Feet	Newton metres
Straight Threads with O-ring			
1/4 in 6.4 mm	7/16-20	12-19	16-25
5/16 in 7.9 mm	1/2-20	16-25	22-23
3/8 in 9.5 mm	9/16-18	25-40	34-54
1/2 in 12.7 mm	3/4-16	42-67	57-90
5/8 in 15.9 mm	7/8-14	58-92	79-124
3/4 in 19.0 mm	1-1/16-12	80-128	108-174
7/8 in 22.2 mm	1-3/16-12	100-160	136-216
1.0 in 25.4 mm	1-5/16-12	117-187	159-253
1-1/4 in 31.8 mm	1-5/8-12	165-264	224-357
1-1/2 in 38.1 mm	1-7/8-12	250-400	339-542

Split Flange Mounting Bolts		
Size	Pound- Feet	Newton metres
5/16-18	15-20	20-27
3/8-16	20-25	26-33
7/16-14	35-45	47-61
1/2-13	55-65	74-88
5/8-11	140-150	190-203

TORQUE SPECIFICATIONS - O-RING FACE SEAL FITTING

Nom. SAE Dash Size	Tube OD	Thread Size	Pound-Feet	Newton Metres	Thread Size	Pound-Feet	Newton Metres
O-ring Face Seal End					O-ring Boss End Fitting or Locknut		
-4	1/4 in 6.4 mm	9/16-18	10-12	14-16	7/16-20	17-20	23-27
-6	3/8 in 9.5 mm	11/16-16	18-20	24-27	9/16-18	25-30	33-40
-8	1/2 in 12.7 mm	13/16-16	32-40	43-54	3/4-16	45-50	61-68
-10	5/8 in 15.9 mm	1-14	46-56	60-75	7/8-14	60-65	81-88
-12	3/4 in 19.0 mm	1-3/16-12	65-80	90-110	1-1/16-12	85-90	115-122
-14	7/8 in 22.2 mm	1-3/16-12	65-80	90-110	1-3/16-12	95-100	129-136
-16	1.0 in 25.4 mm	1-7/16-12	92-105	125-140	1-5/16-12	115-125	156-169
-20	1-1/4 in 31.8 mm	1-11/16-12	125-140	170-190	1-5/8-12	150-160	203-217
-24	1-1/2 in 38.1 mm	2-12	150-180	200-254	1-7/8-12	190-200	258-271

Section 1002

FLUIDS AND LUBRICANTS

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ENGINE OIL RECOMMENDATIONS.....3

DIESEL FUEL4

CAPACITIES AND LUBRICANTS

Engine Oil

- Capacity with Filter Change 16.7 U.S. quarts (15.1 litres)
- Type of oil.....See Engine Oil Recommendations on page 1002-0

Engine Cooling System

- Capacity.....24 U.S. quarts (22.7 litres)
- Type of coolant..... Ethylene glycol and water mixed for lowest ambient temperature
At last 50/50 mix

Fuel Tank

- Capacity..... 38 U.S. gallons (143 litres)
- Type of Fuel.....See Diesel fuel specifications on page 1002-4

Hydraulic System

- Hydraulic reservoir refill capacity 18.5 U.S. gallons (70 litres)
- Type of oil.....Case TCH Fluid

Transmission

- Capacity..... 5.5 U.S. gallons (20.8 litres)
- Type of Oil.....Case TCH Fluid

Axles

- Capacity of differential (each)21.2 U.S. quarts (20 litres)
- Capacity of planetary (each)25 U.S. quarts (2.4 litres)
- Type of oil.....Case Transaxle Fluid

ENGINE OIL RECOMMENDATIONS

CaselH No. 1 Engine Oil is recommended for use in your CaselH Engine. CaselH Engine Oil will lubricate your engine correctly under all operating conditions. If CaselH No. 1 Multi-Viscosity Engine Oil is not available, CaselH No. 1 Single Grade Engine Oil can be used.

If CaselH No. 1 Multi-Viscosity or Single Grade Engine Oil is not available, use only oil meeting API engine oil service category CE.



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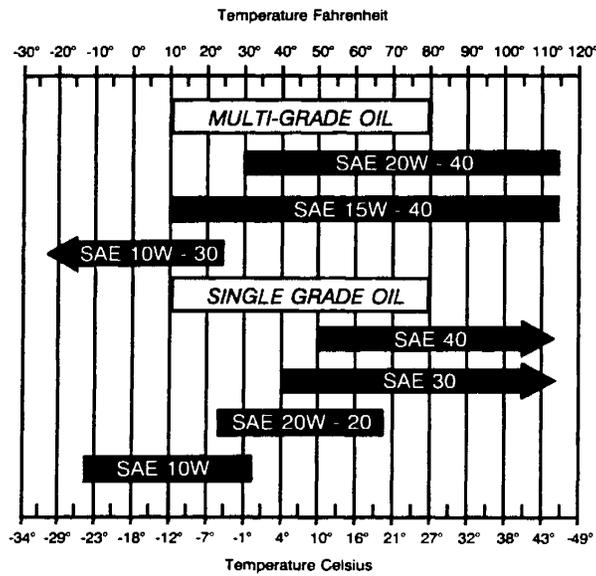


See the chart below for recommended viscosity at ambient air temperature ranges.

NOTE: Do not put Performance Additives or other oil additive products in the engine crankcase. The oil intervals given in this manual are according to tests with CaselH lubricants.

LUBRICATION OIL VISCOSITY

AMBIENT AIR TEMPERATURE RANGES



737L9

DIESEL FUEL

Use No. 2 diesel fuel in the engine of this machine. The use of other fuels can cause the loss of engine power and high fuel consumption.

In very cold temperatures, a mixture of No.1 and No. 2 diesel fuels is temporarily permitted. See the following Note.

NOTE: See your fuel dealer for winter fuel requirements in your area. If the temperature of the fuel lowers below the cloud point (wax appearance point), wax crystals in the fuel will cause the engine to lose power or not start.

The diesel fuel used in this machine must meet the specifications in the chart below or Specification D975-81 of the American Society for Testing and Materials.

Fuel Storage

If you keep fuel in storage for a period of time, you can get foreign material or water in the fuel storage tank. Many engine problems are caused by water in the fuel.

Keep the fuel storage tank outside and keep the fuel as cool as possible. Remove water from the storage container at regular periods of time.

Fill the fuel tank at the end of the day to prevent condensation in the fuel tank.

Specifications for Acceptable No. 2 Diesel Fuel

API gravity, minimum	34
Flash point, minimum	140°F (60°C)
Cloud point (wax appearance point), maximum	-5°F (-20°C) See Note above
Pour point, maximum	-15°F (-26°C) See Note above
Distillation temperature, 90% point	540 to 640°F (282 to 338°C)
Viscosity, at 100°F (88°C)	
Centistokes	2.0 to 4.3
Saybolt Seconds Universal	32 to 40
Cetane number, minimum	43 (45 to 55 for winter or high altitudes)
Water and sediment, by volume	0.05 of 1%
Sulfur, by weight, maximum	0.5 of 1%
Copper strips corrosion, maximum	No. 2
Ash, by weight, maximum	0.01 of 1%

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Engine Removal and Installation and Radiator Removal and Installation	2000
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Lubrication System	2445
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Turbocharger Failure Analysis	2565

Section 2000

ENGINE REMOVAL AND INSTALLATION AND
RADIATOR REMOVAL AND INSTALLATION

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RADIATOR INSTALLATION.....	13
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SPECIFICATIONS

Special Torques

Cap screws that fasten the transmission to the flywheel housing 420 to 504 pound-inches (47 to 57 Nm)

Bolt that fastens the rear engine support to the frame 135 to 165 pound-feet (183 to 223 Nm)

Cap screws that fasten the flex plates to the flywheel 300 to 360 pound-inches (34 to 41 Nm)

Fan Blade Clearance 7/16 Inch (11 mm) Clearance all the way around the fan shroud

Cooling System Capacity 24 U.S. quarts (22.7 litres)

Hydraulic Reservoir Capacity 18.5 U.S. gallons (70 litres)

Belt Tension For The Air Conditioner Compressor

New belt tension 95 to 115 pounds (43 to 52 kg)

Used belt tension 90 to 110 pounds (41 to 50 kg)

SPECIAL TOOLS

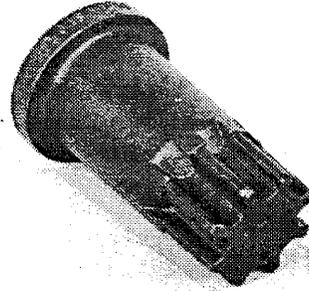
Order special tools from one of the following addresses.

In the U.S.A. and Canada

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

In Europe

VL Churchill Ltd
P.O. Box 3, Daventry
Northants, NN11 4NF
England



B430842M

CAS-1690 Tool Used To Rotate The Flywheel

This tool is first used in step 137.

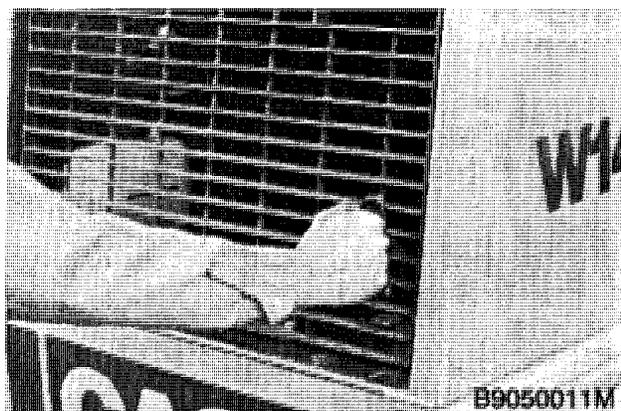
RADIATOR REMOVAL

STEP 1



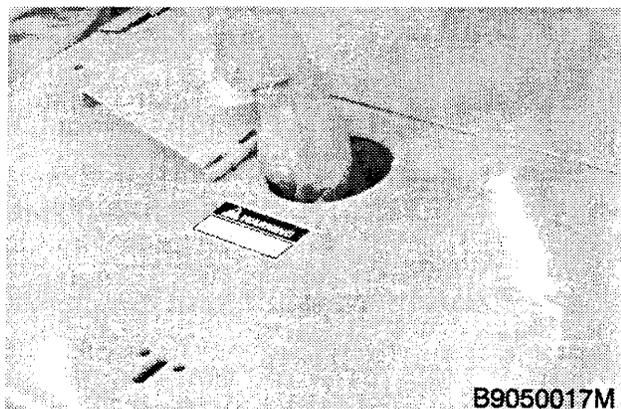
Park the machine on a level surface and lower the bucket to the floor. Stop the engine and apply the parking brake.

STEP 2



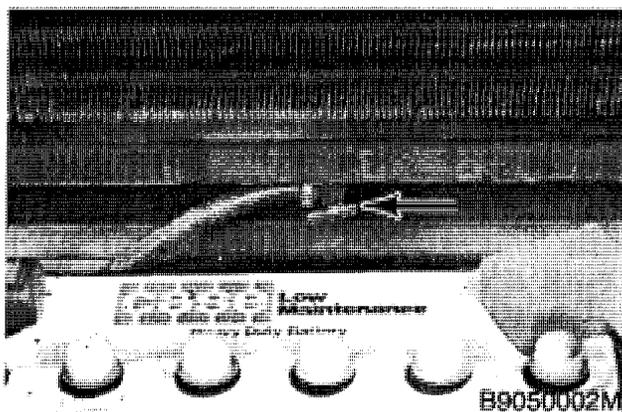
Open the grille.

STEP 3



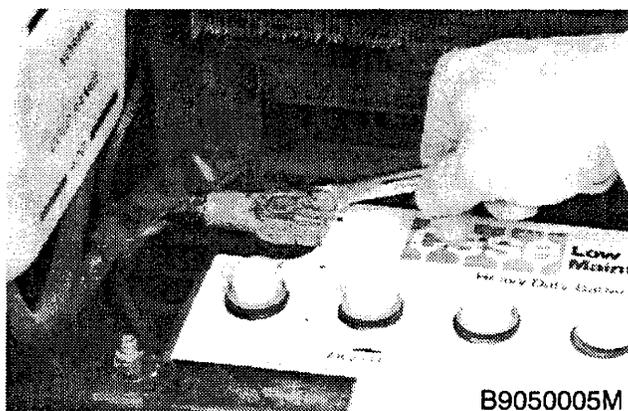
Let the engine cool. Loosen and remove the radiator cap.

STEP 4



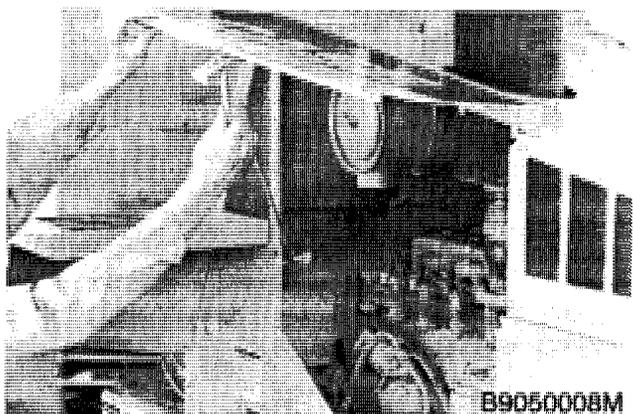
Open the drain valve and drain the cooling system. The cooling system holds 24 U.S. quarts (22.7 litres) of coolant.

STEP 5



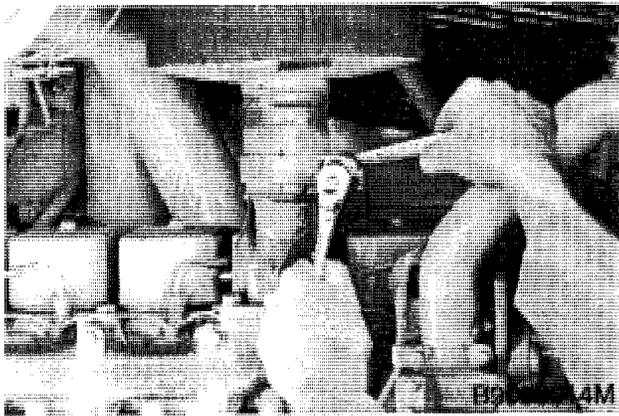
Disconnect the ground cable from the negative post on the battery.

STEP 6



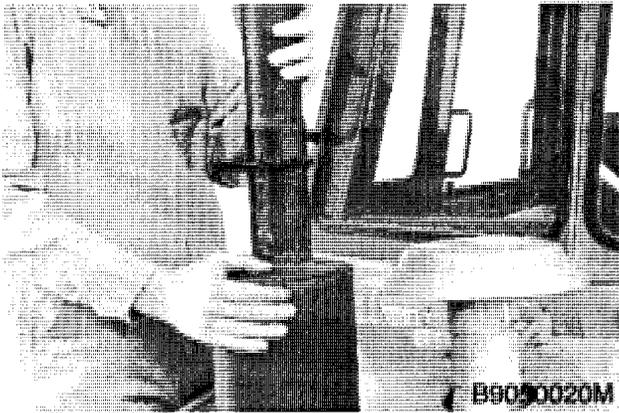
Open the access doors on each side of the engine compartment.

STEP 7



Loosen the clamp for the muffler.

STEP 8



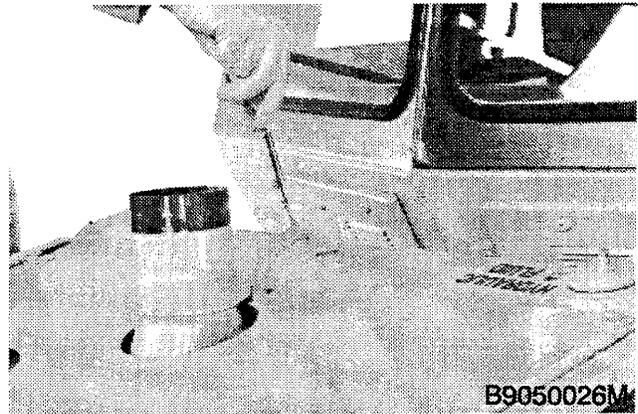
Remove the muffler.

STEP 9



Loosen the clamp and remove the cap for the air cleaner. If the air cleaner is equipped with a precleaner, remove the precleaner.

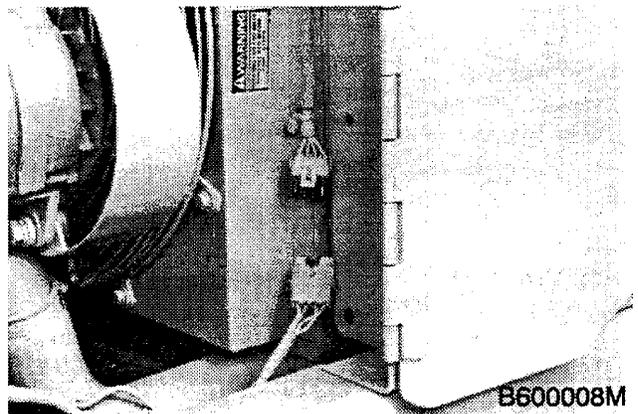
STEP 10



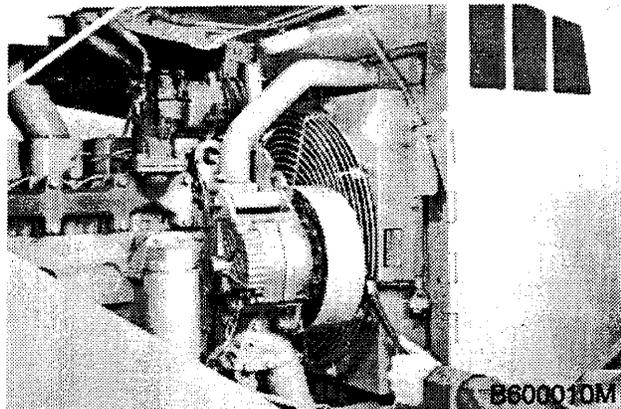
Loosen the clamp and disconnect the hose from the fitting at the top of the reservoir.

NOTE: If the machine is equipped with an air conditioner, do steps 11 through 17. If the machine is not equipped with an air conditioner, go to step 18.

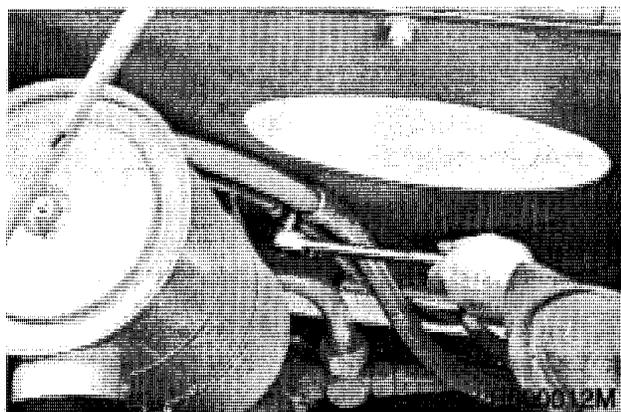
STEP 11



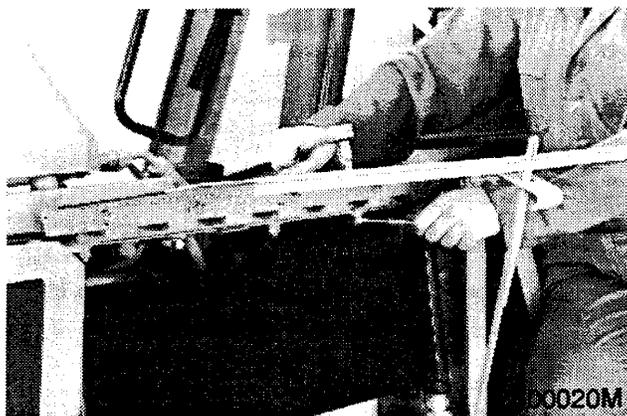
Disconnect the wire harness for the condenser.

STEP 12

Loosen and remove the cap screws, lock washers, and flat washers that fasten the two clamps for the wire harness to the fan shroud. Loosen and remove the nuts, lock washers, and bolts that fasten the two clamps for the wire harness to the upper inside of the fan shroud.

STEP 13

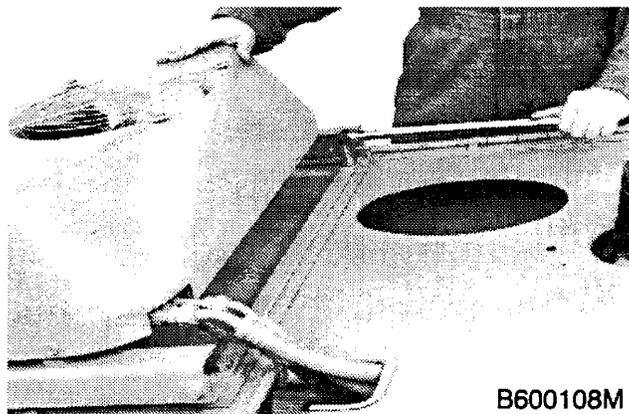
Loosen and remove the nut, lock washer, flat washer, and bolt that fasten the clamps of the hoses for the compressor and condenser to the hood.

STEP 14

Loosen and remove the nuts, lock washers, flat washers, and bolts that fasten the right access door to the hood.

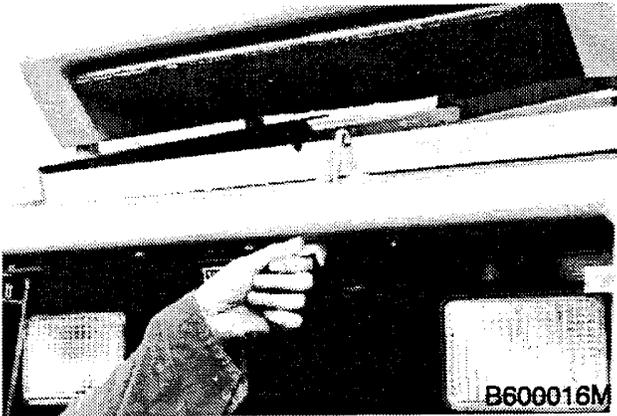
STEP 15

Remove the right access door.

STEP 16

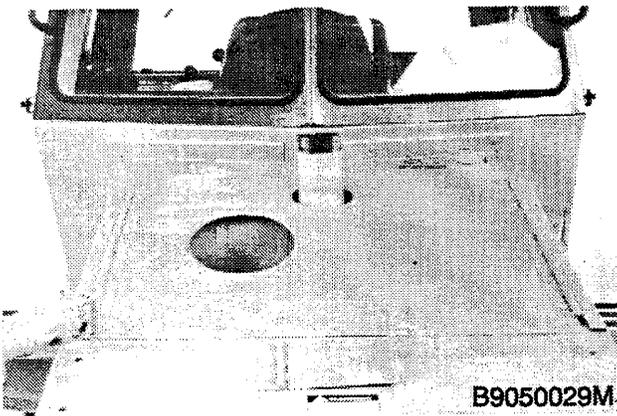
Loosen and remove the nuts, lock washers, flat washers, and bolts that fasten the condenser assembly to the hood.

STEP 17



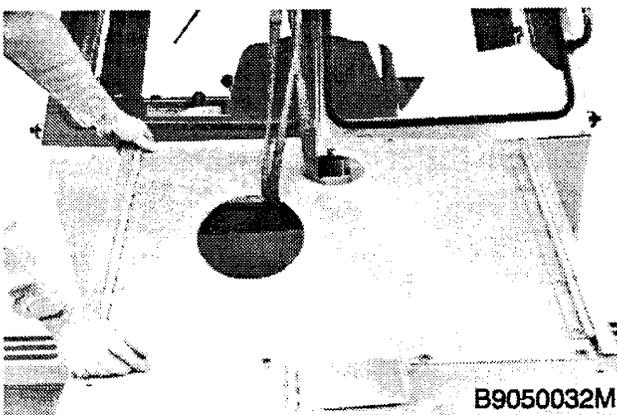
Release the latch that holds the condenser assembly. Move the condenser assembly out of the way.

STEP 18



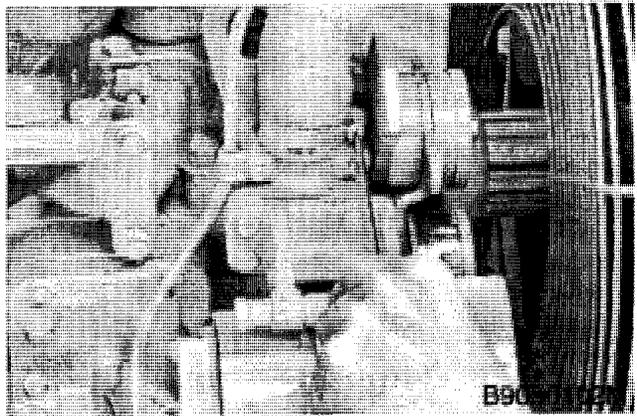
Loosen and remove the cap screws, lock washers, and flat washers that hold the hood.

STEP 19



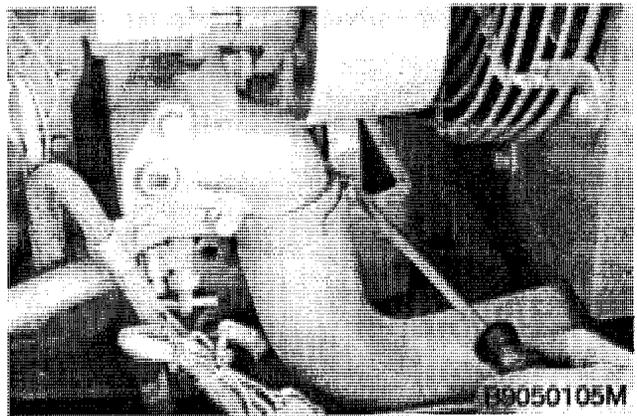
Remove the hood and access door(s) from the machine.

STEP 20



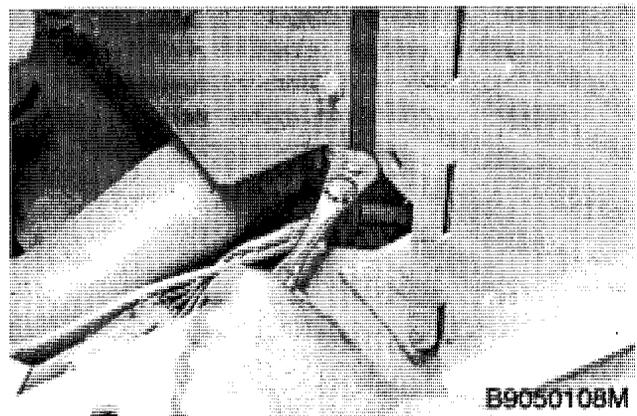
Disconnect the top radiator hose from the engine.

STEP 21



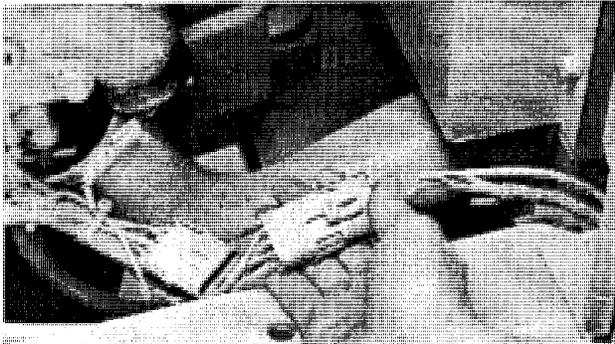
Disconnect the bottom radiator hose from the engine.

STEP 22



Loosen and remove the nut, lock washer, flat washers, and bolt that fasten the clamp on the wire harness for the rear lights to the machine.

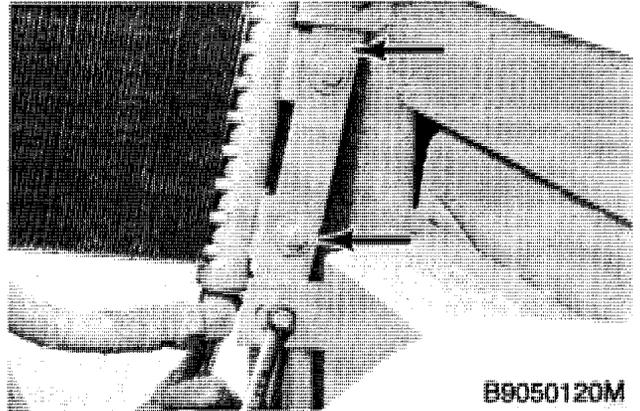
STEP 23



B9050111M

Disconnect the connector for the rear lights and backup alarm from the wire harness.

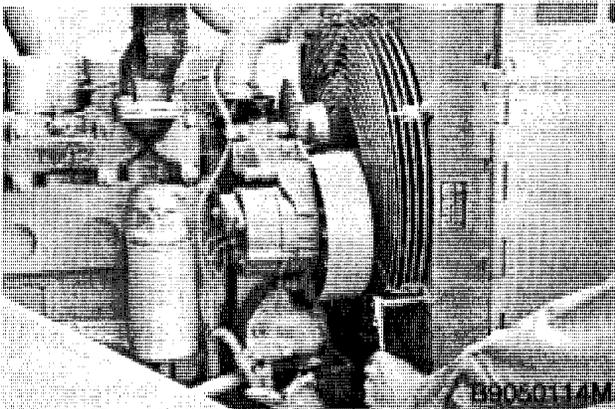
STEP 26



B9050120M

Loosen and remove the nuts, lock washers, flat washers, and bolts that fasten the hydraulic oil cooler to the radiator shroud.

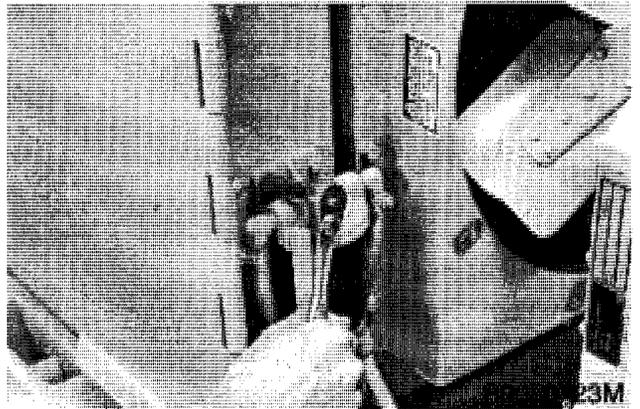
STEP 24



B9050114M

Loosen and remove the cap screws, lock washers, and flat washers that fasten the fan guard to the fan shroud.

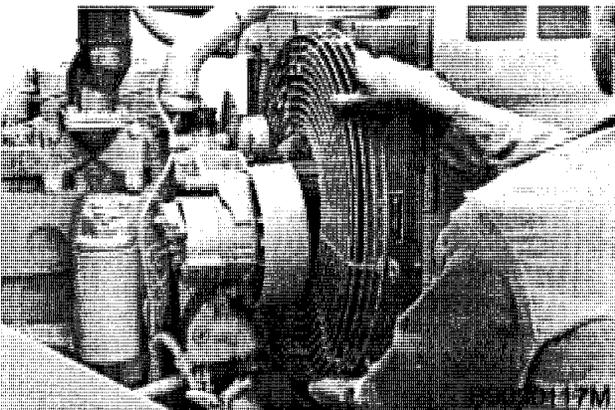
STEP 27



B9050123M

Loosen and remove the nuts, lock washers, flat washers, and bolts that fasten the fuel sediment bowl to the radiator shroud.

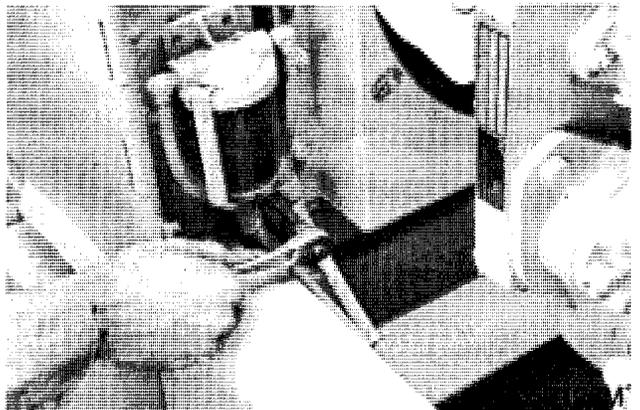
STEP 25



B9050117M

Remove the fan guard.

STEP 28



Loosen and remove the nut, flat washers, lock washer, spacer, and bolt that fasten the clamps on the hoses for the fuel sediment bowl to the radiator shroud. Move the fuel sediment bowl out of the way.

STEP 29



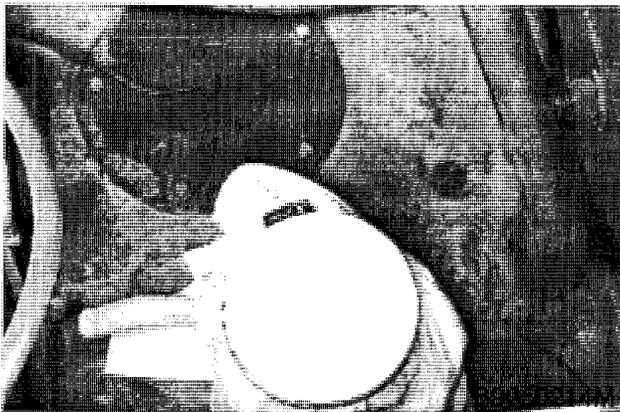
Loosen and remove the nut, lock washer, flat washers, and bolt that fasten the fuel filler pipe in the radiator shroud.

STEP 30



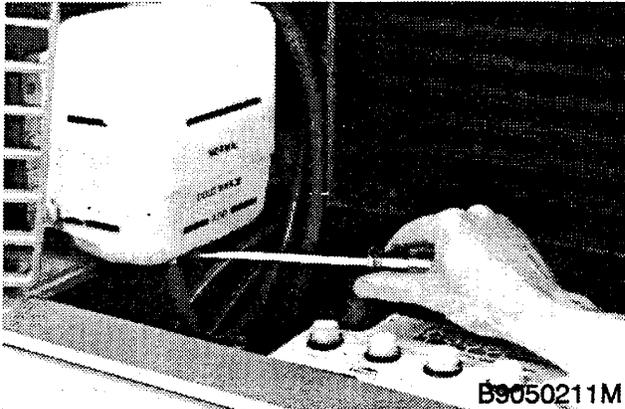
Loosen the clamp on the hose for the fuel filler pipe and remove the fuel filler pipe.

STEP 31



Close or cover the opening for the fuel tank.

STEP 32



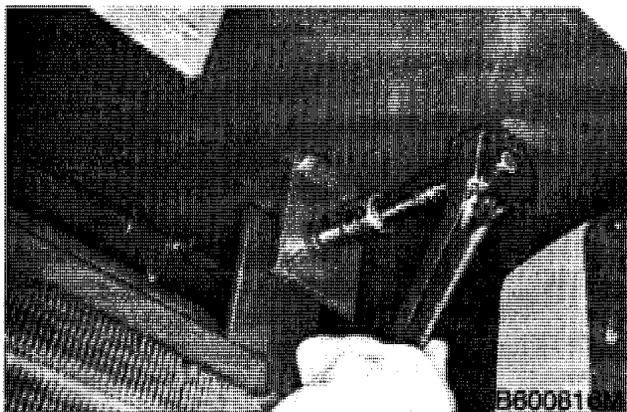
Disconnect the bottom hose and drain the coolant from the coolant reservoir.

STEP 33



Loosen and remove the nuts, lock washers, flat washers, and bolts that fasten the rear of the radiator shroud to the frame.

STEP 34



Loosen and remove the nuts, lock washers, and flat washers that fasten the flex bolts on the radiator to the mounting brackets on the radiator shroud. Move the radiator until the flex bolts disengage the mounting brackets on the radiator shroud.

STEP 35



Loosen and remove the nuts, lock washers, flat washers, and bolts that fasten the front of the radiator shroud to the frame.

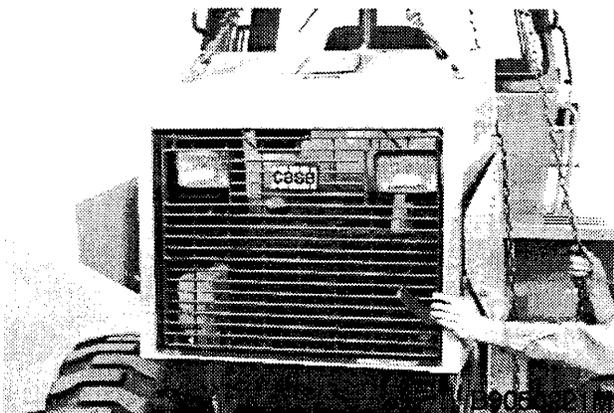
NOTE: Put identification marks on both sides of the frame for correct alignment of the radiator shroud during installation.

STEP 36



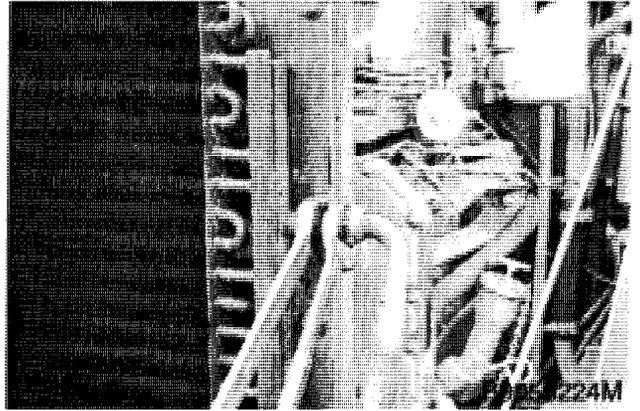
Fasten suitable lifting equipment to the radiator shroud.

STEP 37



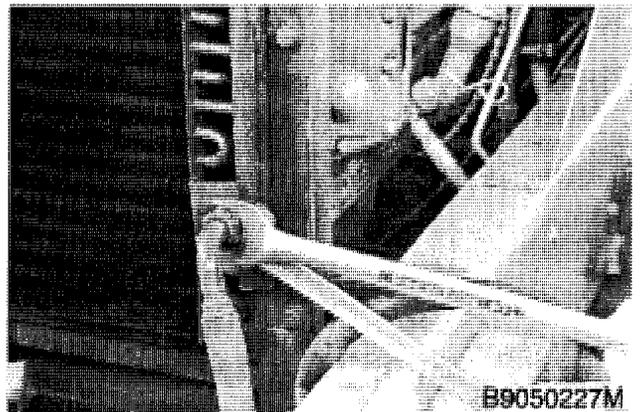
The radiator shroud must be lifted over the top of the radiator. Remove the radiator shroud from the machine.

STEP 38



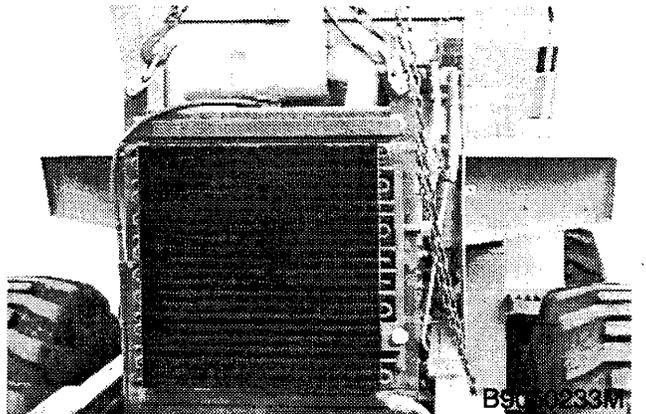
Disconnect the top hose from the transmission oil cooler. Install a plug in the hose and a cap on the fitting.

STEP 39



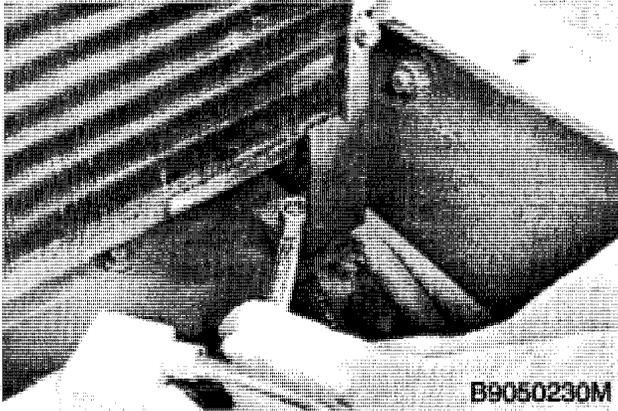
Disconnect the bottom hose from the transmission oil cooler. Install a plug in the hose and a cap on the fitting.

STEP 40



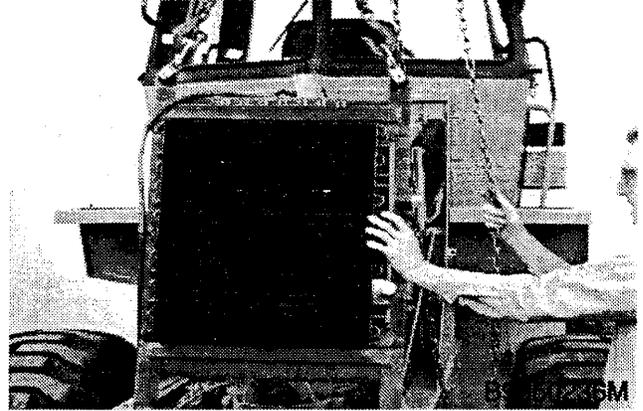
Connect suitable lifting equipment to the radiator.

STEP 41



Loosen and remove the nuts, lock washers, flat washers, and bolts that fasten the radiator to the radiator mounting bracket.

STEP 42

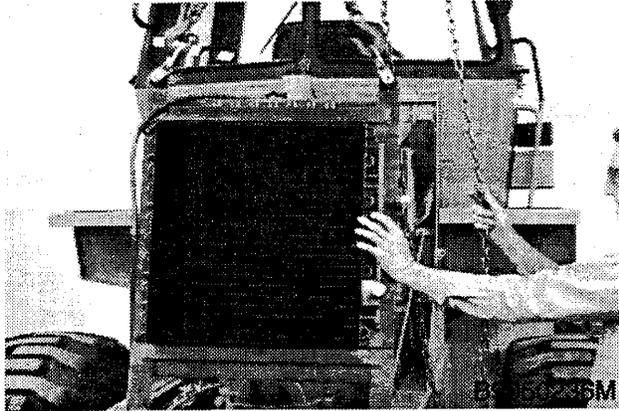


Remove the radiator and transmission oil cooler assembly from the machine.

STEP 43

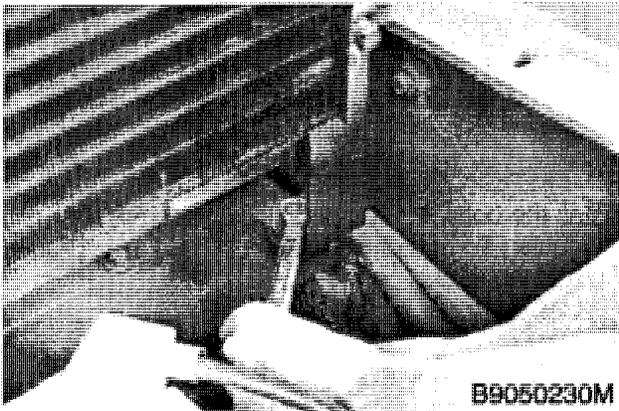
Check the condition of the insulators in the radiator mounting bracket. If the insulators are damaged, install new insulators.

STEP 44



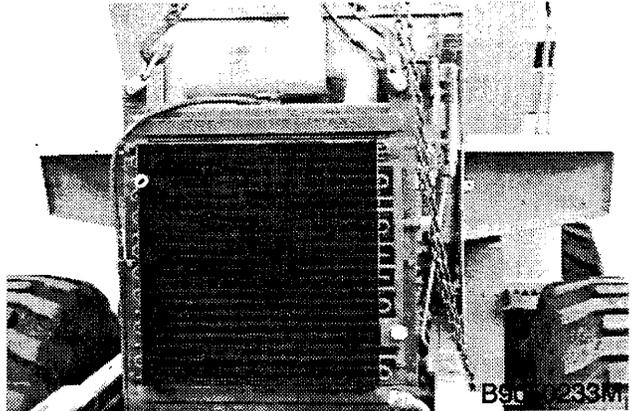
Lift the radiator and transmission oil cooler assembly over the machine and lower the radiator and transmission oil cooler into position.

STEP 45



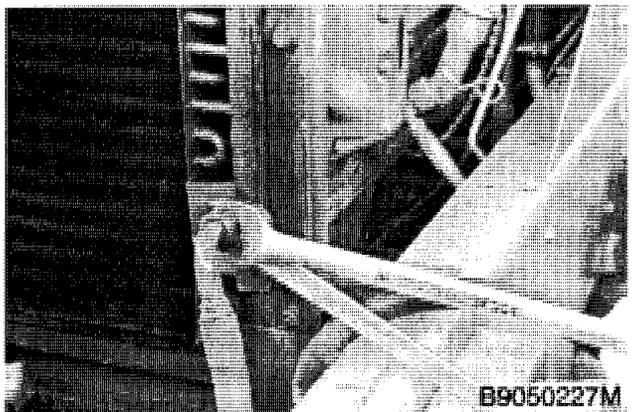
Install the bolts, flat washers, lock washers, and nuts that fasten the radiator to the radiator mounting bracket. Tighten the nuts.

STEP 46



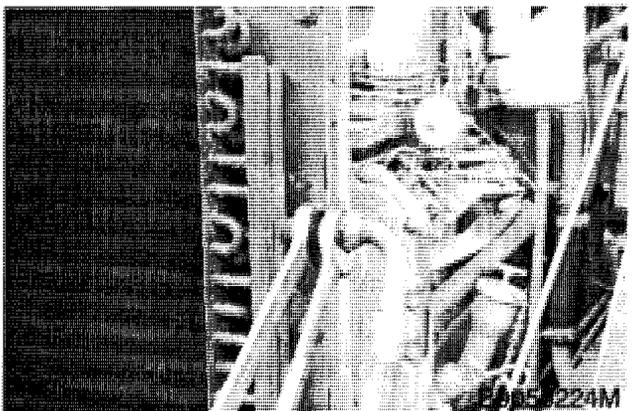
Disconnect and remove the lifting equipment from the radiator.

STEP 47



Remove the plug from the hose and the cap from the fitting and connect the bottom hose to the transmission oil cooler.

STEP 48



Remove the plug from the hose and the cap from the fitting and connect the top hose to the transmission oil cooler.