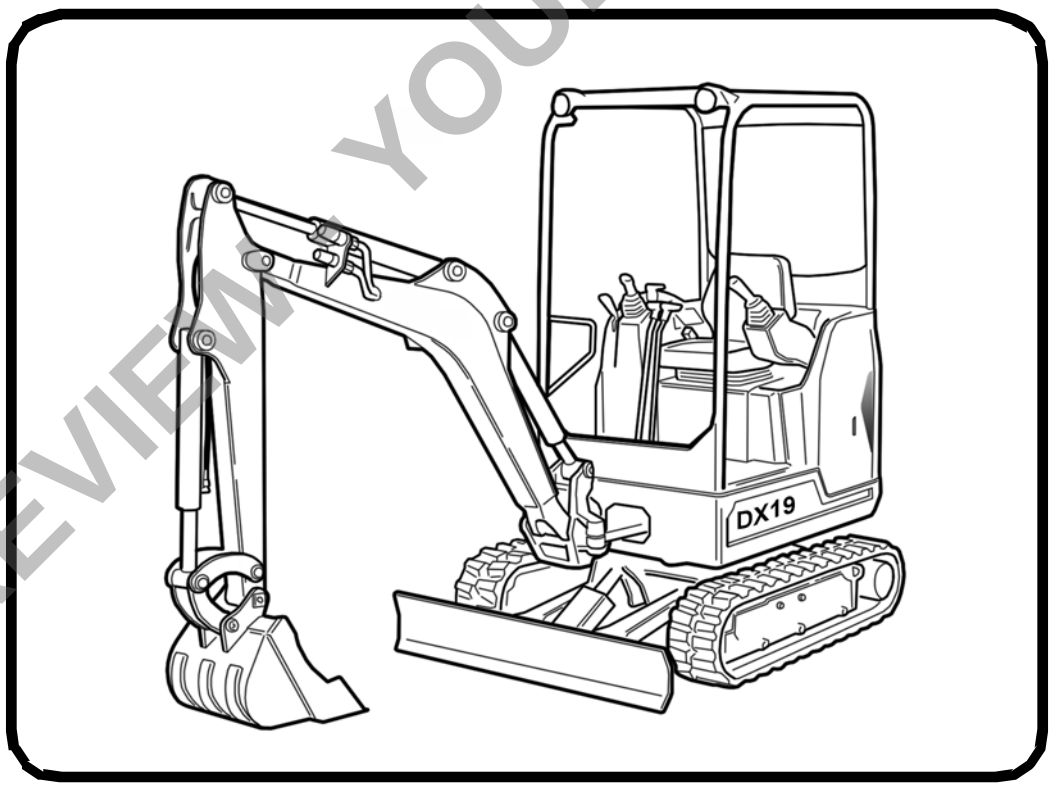
DOOSAN

EN

Shop Manual
DX19 Compact Excavator

S/N DBMB3Y8AVF0E11001 & Above



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7278164EN (07-15) (0)

Printed in Belgium
Original Instructions

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T2, T4-K

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MAINTENANCE SAFETY

WARNING

Instructions are necessary before operating or servicing machine. Read and understand the Operation & Maintenance Manual, Operator's Handbook and signs (decals) on machine. Follow warnings and instructions in the manuals when making repairs, adjustments or servicing. Check for correct function after adjustments, repairs or service. Untrained operators and failure to follow instructions can cause injury or death. W-2003-0807

Safety Alert Symbol: This symbol with a warning statement, means: "Warning, be alert! Your safety is involved!" Carefully read the message that follows.

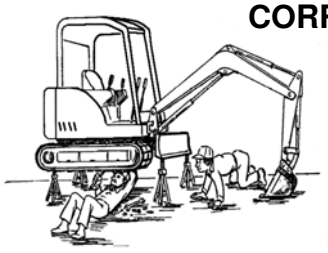
CORRECT



P-90216

Never service the Doosan Excavator without instructions.

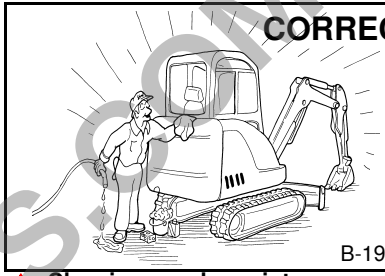
CORRECT



B-19964

Use the correct procedure to lift and support the excavator.

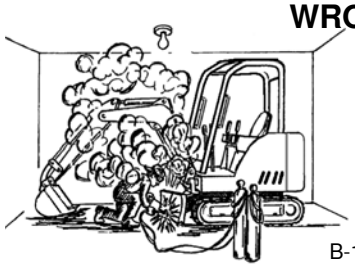
CORRECT



B-19959

Cleaning and maintenance are required daily.

WRONG



B-19965

Have good ventilation when welding or grinding painted parts.

Wear dust mask when grinding painted parts. Toxic dust and gas can be produced.

WRONG

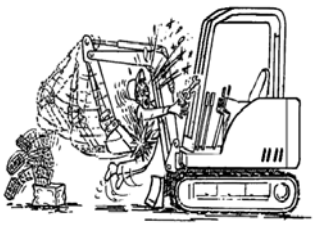


B-19960

Vent exhaust to outside when engine must be run for service.

Exhaust system must be tightly sealed. Exhaust fumes can kill without warning.

WRONG

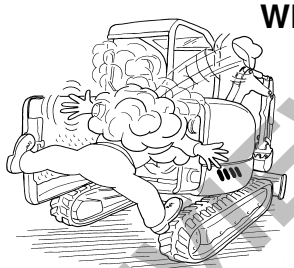


B-19966

Always lower the bucket and blade to the ground before doing any maintenance.

Never modify equipment or add attachments not approved by Doosan Company.

WRONG



B-19962

Stop, cool and clean engine of flammable materials before checking fluids.

Never service or adjust machine with the engine running unless instructed to do so in the manual.

Avoid contact with leaking hydraulic fluid or diesel fuel under pressure. It can penetrate the skin or eyes.

Never fill fuel tank with engine running, while smoking, or when near open flame.

WRONG



B-19958

Keep body, jewelry and clothing away from moving parts, electrical contact, hot parts and exhaust.

Wear eye protection to guard from battery acid, compressed springs, fluids under pressure and flying debris when engines are running or tools are used. Use eye protections approved for type of welding.

Keep tailgate closed except for service. Close and latch tailgate before operating the excavator.

WRONG



B-19798

Lead-acid batteries produce flammable and explosive gases.

Keep arcs, sparks, flames and lighted tobacco away from batteries.

Batteries contain acid which burns eyes or skin on contact.

Wear protective clothing. If acid contacts body, flush well with water. For eye contact flush well and get immediate medical attention.

Maintenance procedures which are given in the Operation & Maintenance Manual can be performed by the owner/operator without any specific technical training. Maintenance procedures which are **not** in the Operation & Maintenance Manual must be performed **ONLY BY QUALIFIED DOOSAN SERVICE PERSONNEL. Always use genuine Doosan replacement parts.** The Service Safety Training Course is available from your Doosan dealer.

MSW28-0409

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CONTENTS

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HYDRAULIC SYSTEM 20-01

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UPPERSTRUCTURE & SWING 40-01

ELECTRICAL SYSTEM 50-01

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HEATING AND VENTILATION 70-01

SPECIFICATIONS SPEC-01

ALPHABETICAL INDEX INDEX-01

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LIFTING AND BLOCKING THE EXCAVATOR

Procedure

Always park the machine on a level surface.

⚠ WARNING

AVOID INJURY OR DEATH

Instructions are necessary before operating or servicing machine. Read and understand the Operation & Maintenance Manual, Operator's Handbook and signs (decals) on machine. Follow warnings and instructions in the manuals when making repairs, adjustments or servicing. Check for correct function after adjustments, repairs or service. Untrained operators and failure to follow instructions can cause injury or death.

W-2003-0807

⚠ WARNING

Put jackstands under the blade and rear corners of the undercarriage before working under the machine. Failure to block up the machine may allow it to move or fall and result in injury or death.

W-2218-1195

Figure 10-10-1

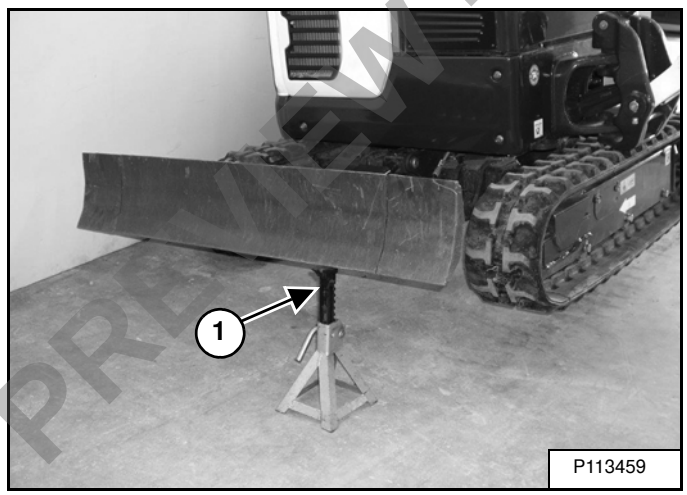
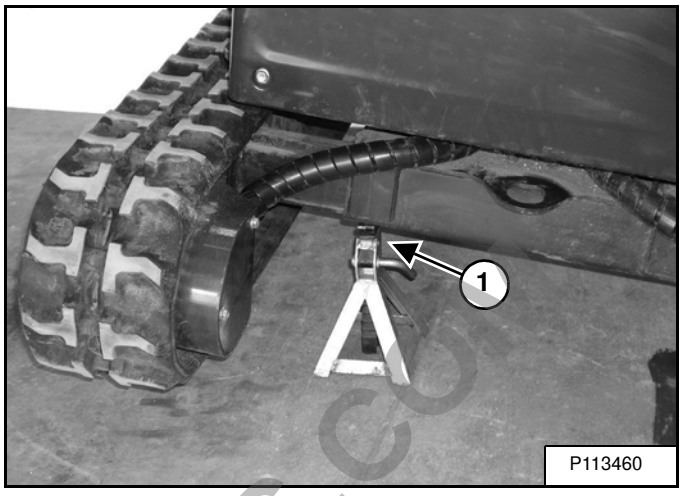


Figure 10-10-2



Raise one side of the machine (approximately 101,6 mm (4 in)) using the boom and arm **[Figure 10-10-1]** and **[Figure 10-10-2]**.

Raise the blade fully and install jack stands under the blade and track frame (Item 1) **[Figure 10-10-1]** and **[Figure 10-10-2]**. Raise the boom until all machine weight is on the jack stands.

Repeat the procedure for the other side.

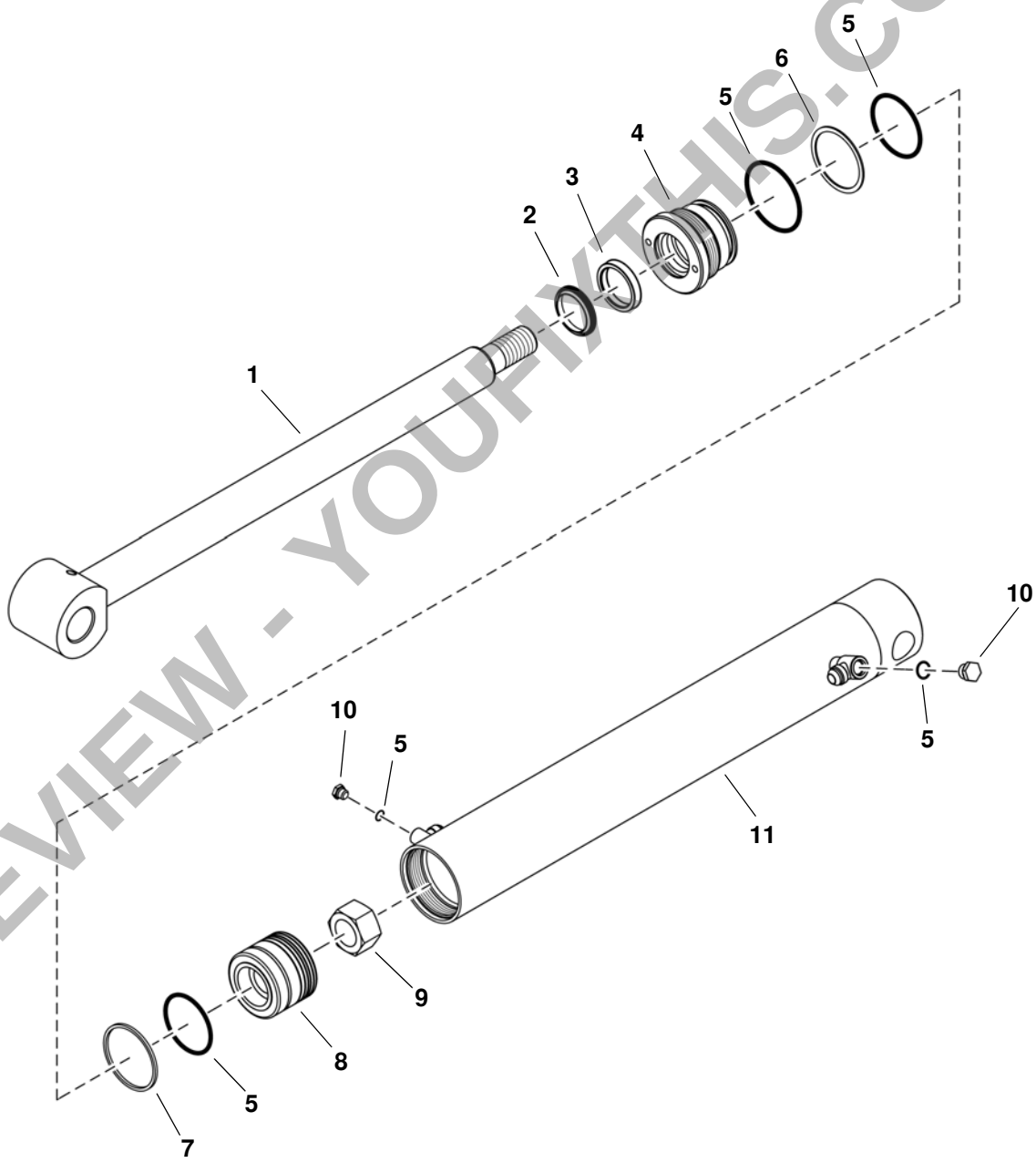
Stop the engine.

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Parts Identification

1. Rod
2. Wiper
3. Rod Seal
4. Head
5. O-ring
6. Back-up Ring
7. Piston Seal
8. Piston
9. Nut
10. Plug
11. Tube



EM5184S

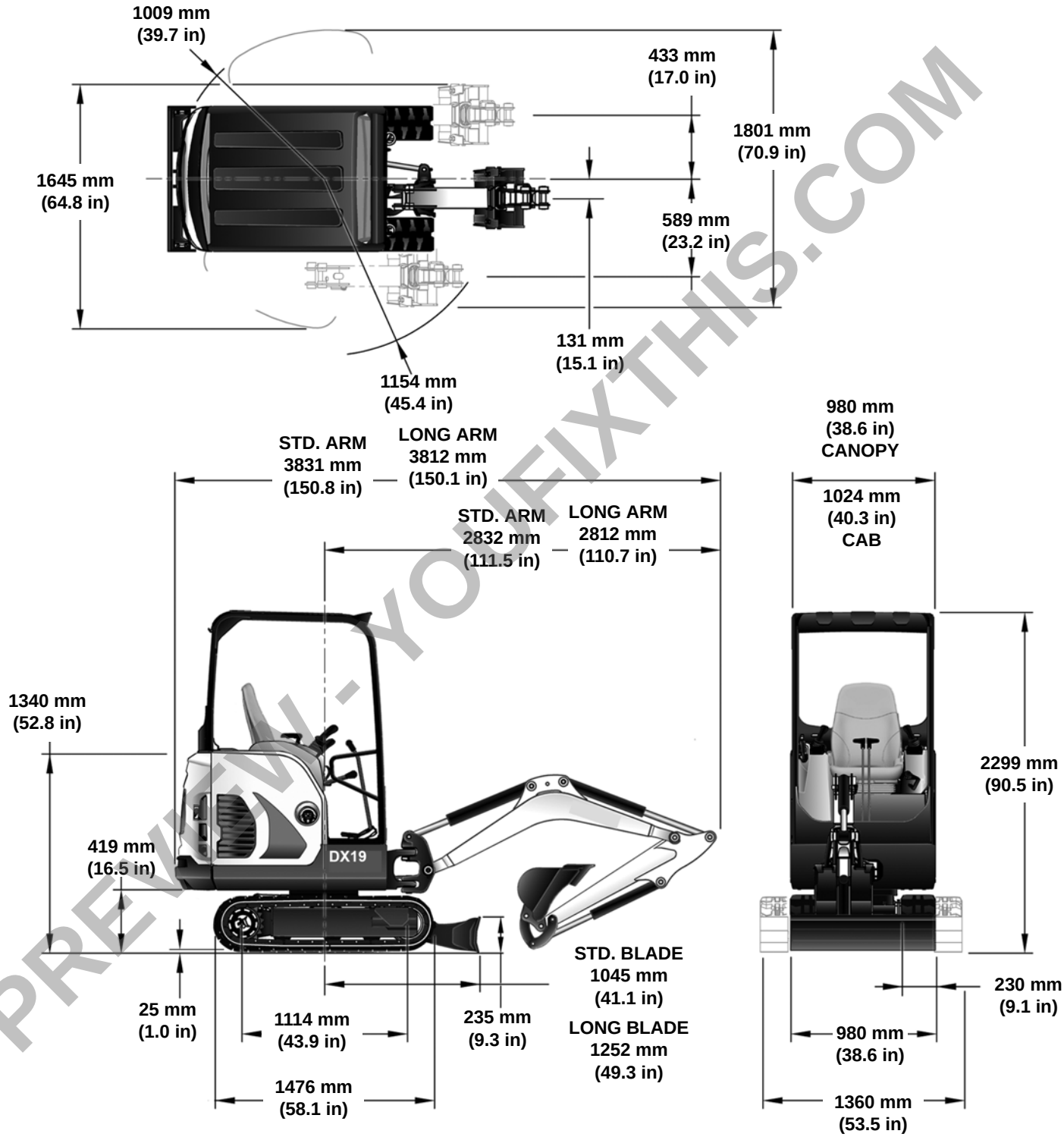
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EXCAVATOR SPECIFICATIONS

Machine Dimensions

- Where applicable, specification conform to SAE or ISO standards and are subject to change without notice.



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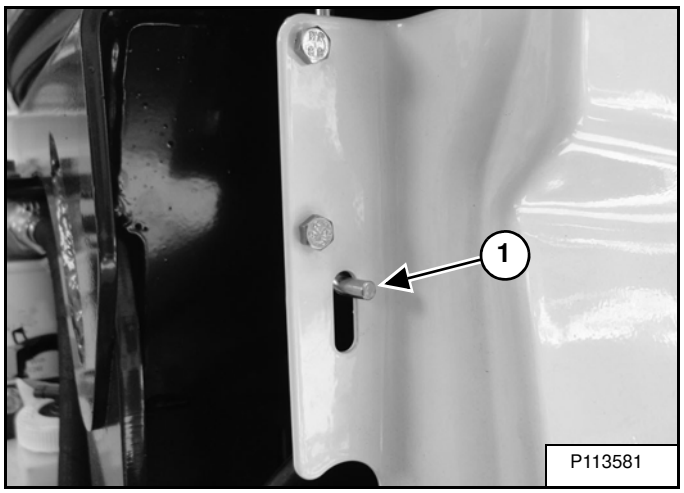
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RIGHT SIDE COVER

Opening And Closing Right Side Cover

Right Side

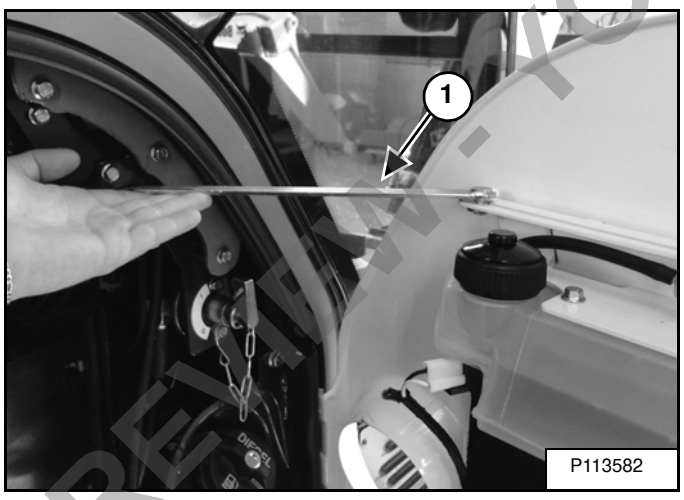
Figure 10-60-4



Open the tailgate to access the right side cover latch (Item 1) **[Figure 10-60-4]**.

Pull out the lever (Item 1) **[Figure 10-60-4]** and open the right side cover.

Figure 10-60-5



Open the right side cover and rotate forward until it is held open by the latch (Item 1) **[Figure 10-60-5]**.

To close the tailgate, lift up on the latch (Item 1) **[Figure 10-60-5]** and slowly start to close the tailgate.

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SEAT BELT

Inspection And Maintenance

⚠ WARNING

Failure to properly inspect and maintain the seat belt can cause lack of operator restraint resulting in serious injury or death.

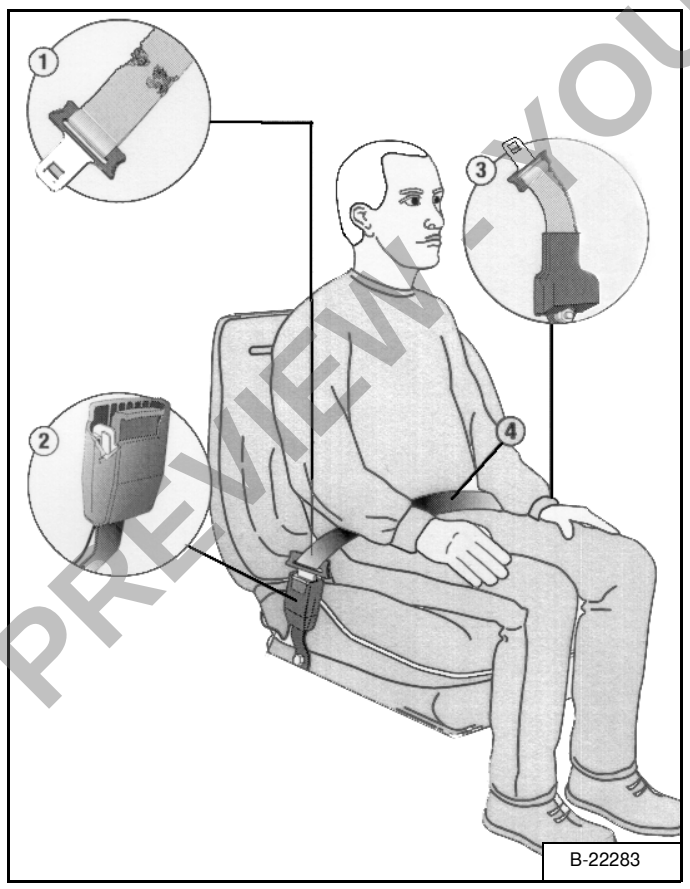
W-2466-0703

Check the seat belt daily for correct function.

Inspect the seat belt system thoroughly yearly or more often if the machine is exposed to severe environmental conditions or applications.

Any seat belt system that shows cuts, fraying, extreme or unusual wear, significant discolorations due to ultraviolet (UV) exposure, dusty / dirty conditions, abrasion to the seat belt webbing, or damage to the buckle, latch plate, retractor (if equipped), or hardware or any other obvious problem should be replaced immediately.

Figure 10-180-1



The items below are referenced in **[Figure 10-180-1]**.

1. Check the seat belt webbing. If the system is equipped with a retractor, pull the webbing completely out and inspect the full length of the webbing. Look for cuts, wear, fraying, dirt and stiffness.

2. Check the buckle and latch for proper function. Make sure latch plate is not excessively worn, deformed or buckle is not damaged or casing broken.

3. Check the retractor web storage device (if equipped) by extending the seat belt webbing to determine if it extends and retracts the webbing correctly.

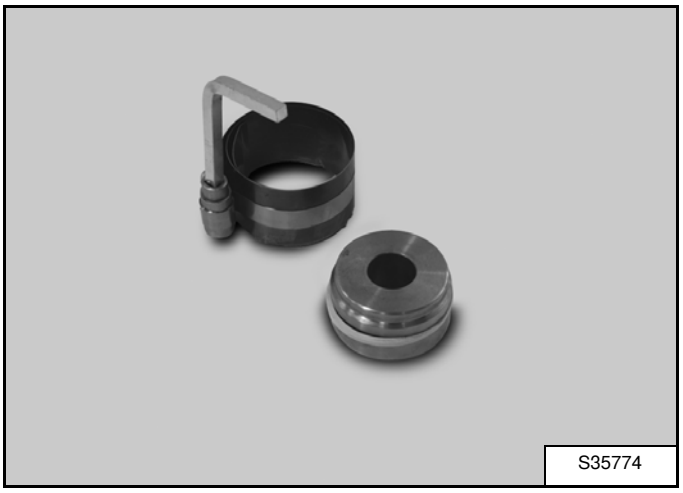
4. Check webbing in areas exposed to ultraviolet (UV) rays from the sun or extreme dust or dirt. If the original color of the webbing in these areas is extremely faded and / or the webbing is packed with dirt, the webbing strength may have weakened.

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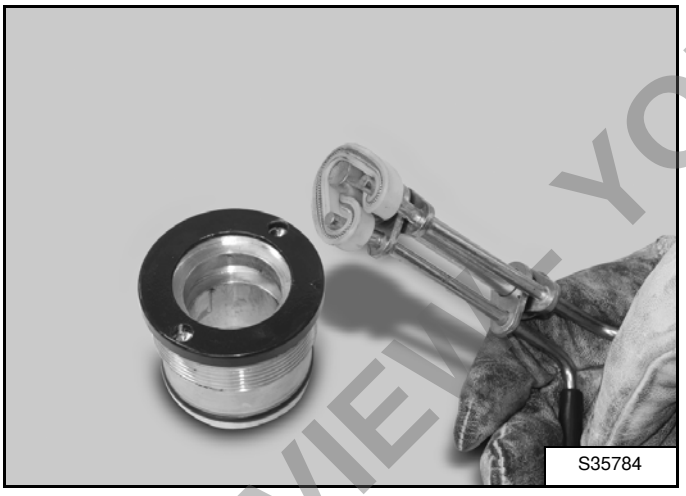
Assembly (Cont'd)

Figure 20-23-16



Use a ring compressor to compress the seal to the correct size. Leave the piston in the compressor for about three minutes **[Figure 20-23-16]**.

Figure 20-23-17



Install the rod seal on the rod seal tool **[Figure 20-23-17]**.

NOTE: Install the spring side of the seal toward the inside of the cylinder.

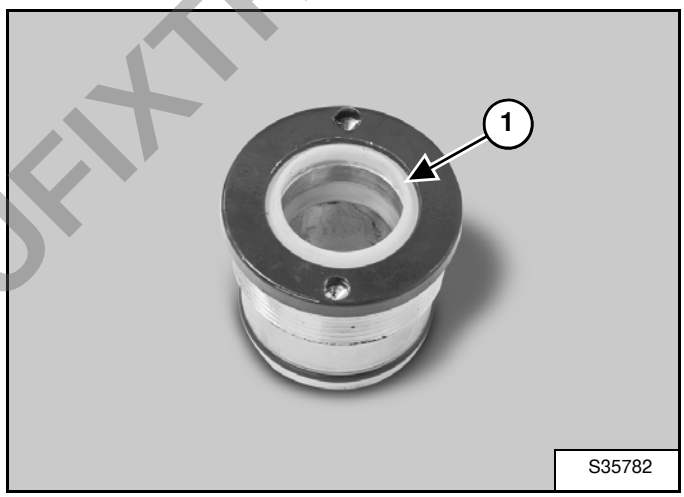
Rotate the handles to collapse the rod seal **[Figure 20-23-17]**.

Figure 20-23-18



Install the rod seal in the head **[Figure 20-23-18]**.

Figure 20-23-19



Install the wiper seal with the wiper (Item 1) **[Figure 20-23-19]** toward the outside of the head.

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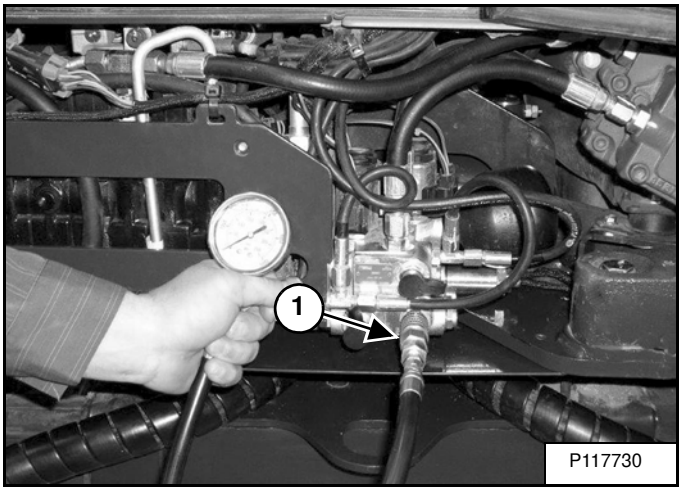
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VALVES (CROSS PORT RELIEF) (CONT'D)

Testing (Cont'd)

Remove the left upperstructure cover panel. (See Removal And Installation on Page 40-60-1.)

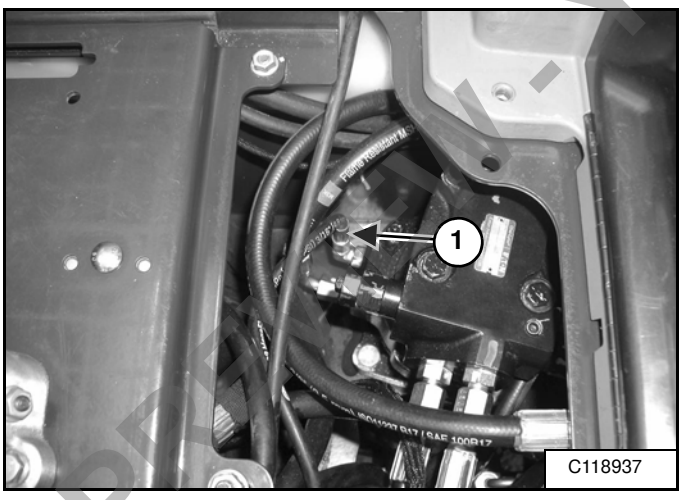
Figure 20-32-1



Connect the test gauge coupler and 34,5 MPa (345 bar) (5000 psi) gauge to the diagnostic coupler (Item 1) **[Figure 20-32-1]** at the G port.

Remove the floor mats and floor panels. (See Removal And Installation on Page 40-140-1.)

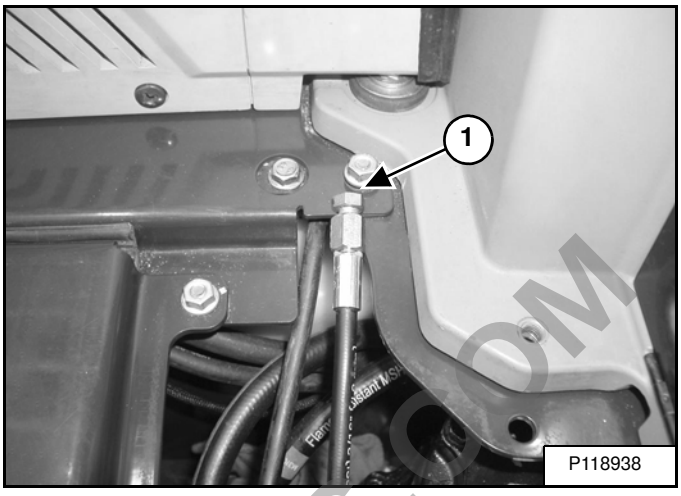
Figure 20-32-2



Disconnect the pilot hose for the swing brake (Item 1) **[Figure 20-32-2]** to the swing motor.

NOTE: This will keep the swing brake disc engaged when the swing function is activated.

Figure 20-32-3



Install a plug and cap (Item 1) **[Figure 20-32-3]** on the hose and the fitting.

Lower the control console and fasten the seat belt.

Start the engine and run at full rpm until hydraulic fluid is at operating temperatures 66°C (150°F).

Engage the upperstructure slew right function.
Record the pressure on the gauge.

Engage the upperstructure slew left function.
Record the pressure on the gauge.

The crossport relief valve pressure should be as follows:

A target pressure of 16900 kPa (169 bar) (2451 psi) with an acceptable range of 16200 - 17600 kPa (162 - 176 bar) (2349 - 2552 psi).

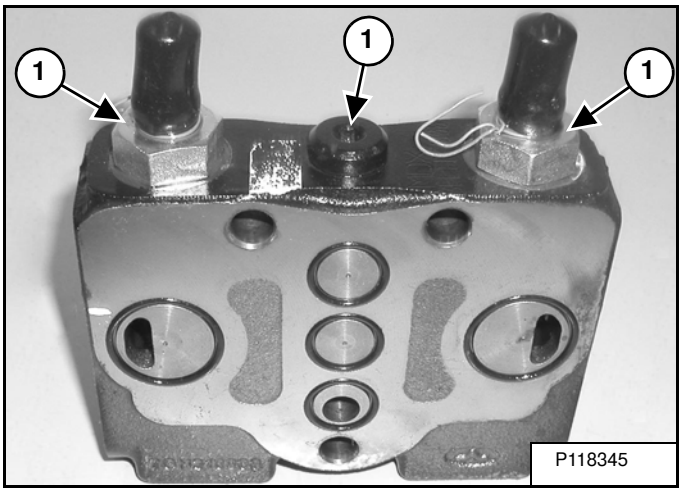
Stop the engine.

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Slew Valve Section Disassembly And Assembly (Cont'd)

Figure 20-40-104



Remove the O-rings from the fittings (Item 1) **[Figure 20-40-104]**.

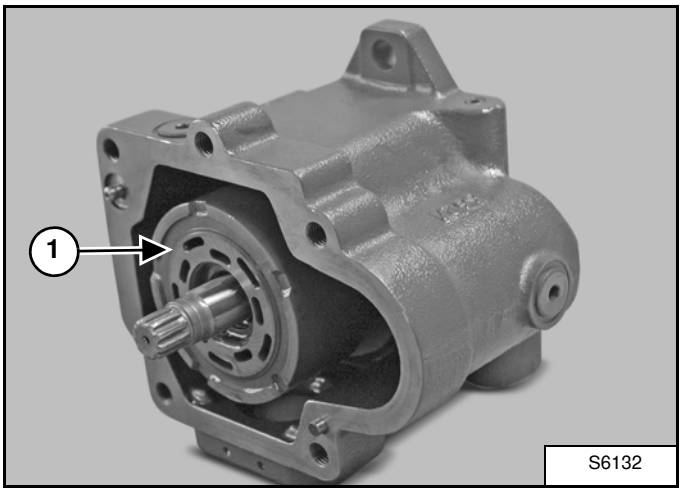
Installation: Tighten the fitting to 69 - 78 N•m (51 - 58 ft-lb) torque.

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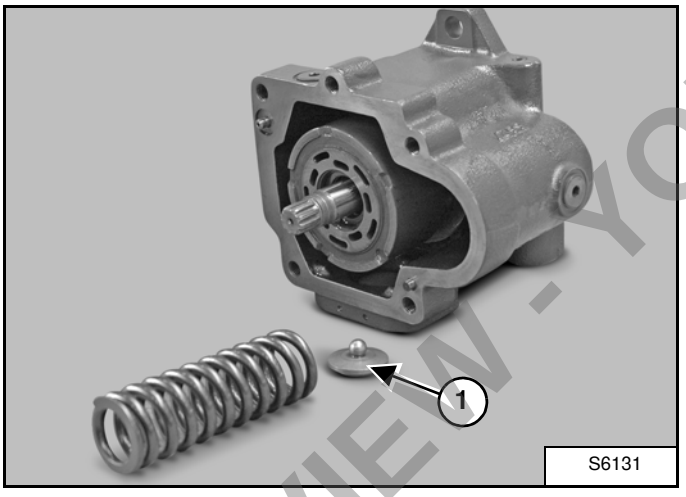
Piston Pump Assembly (Cont'd)

Figure 20-50-95



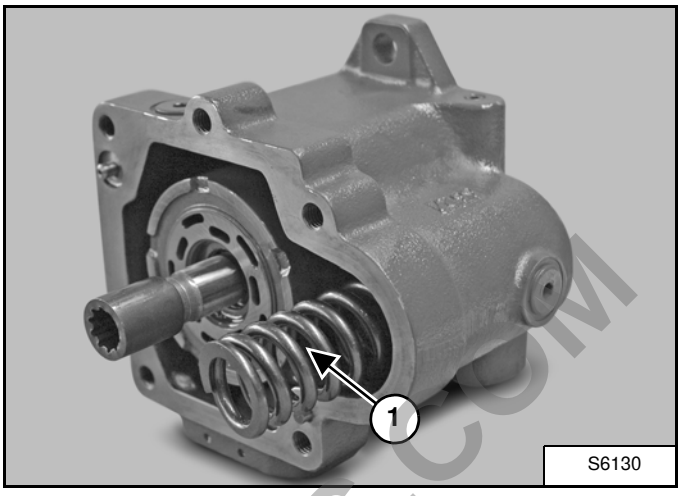
Install the cylinder block assembly (Item 1) **[Figure 20-50-95]**.

Figure 20-50-96



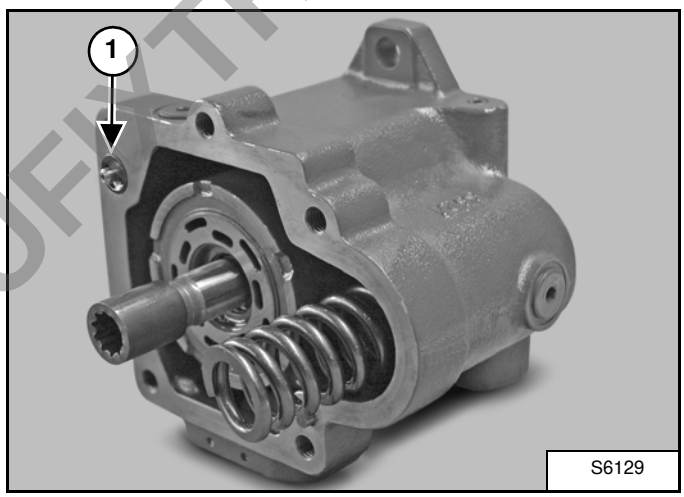
Install the spring seat (Item 1) **[Figure 20-50-96]**.

Figure 20-50-97



Install the spring (Item 1) **[Figure 20-50-97]**.

Figure 20-50-98



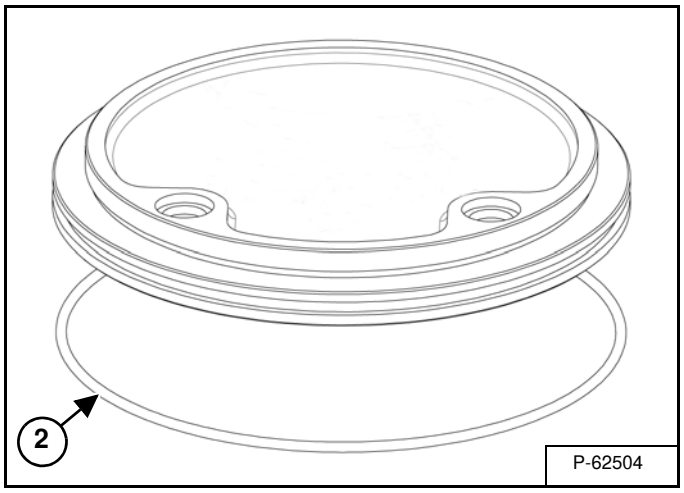
Install the O-ring (Item 1) **[Figure 20-50-98]**.

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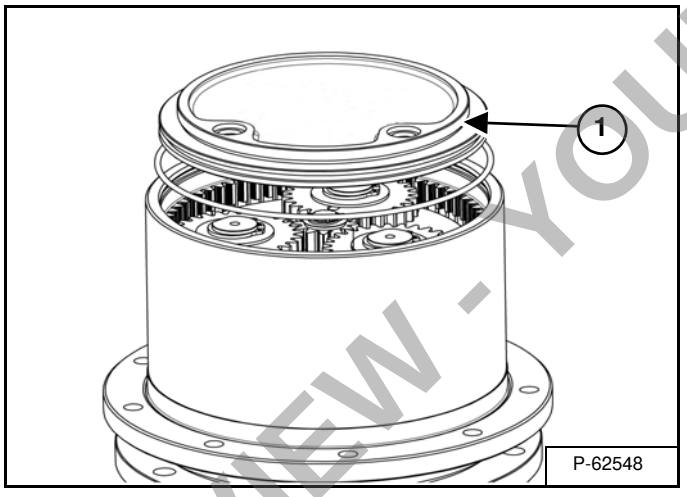
Assembly (Cont'd)

Figure 20-80-55



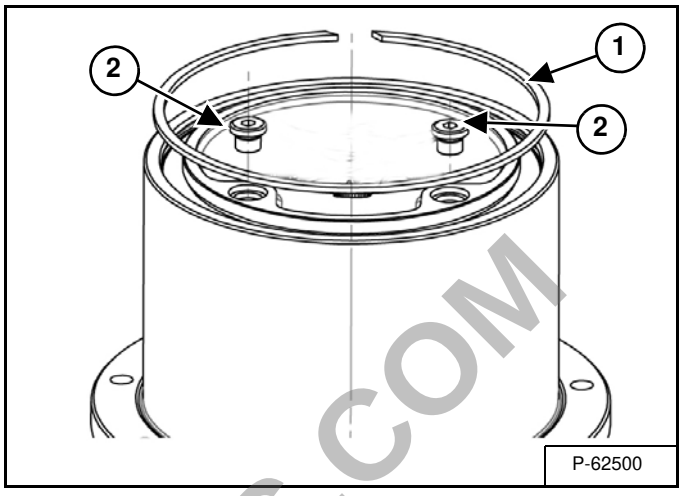
Install the O-Ring (Item 1) **[Figure 20-80-55]** on the cover.

Figure 20-80-56



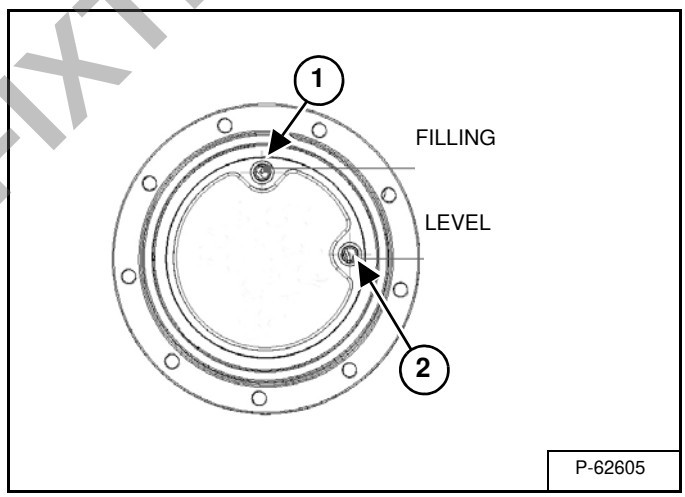
Install the cover (Item 1) **[Figure 20-80-56]** in the housing.

Figure 20-80-57



Install the snap ring (Item 1) **[Figure 20-80-57]** securing the reduction gear cover.

Figure 20-80-58



Add 0.42 qt. (0,4 L) of gear lube 90W to the top plug hole (Item 1) until the gear lube is at the bottom of the plug hole (Item 2) **[Figure 20-80-58]**.

Install and tighten the two plugs (Item 2) **[Figure 20-80-57]**.

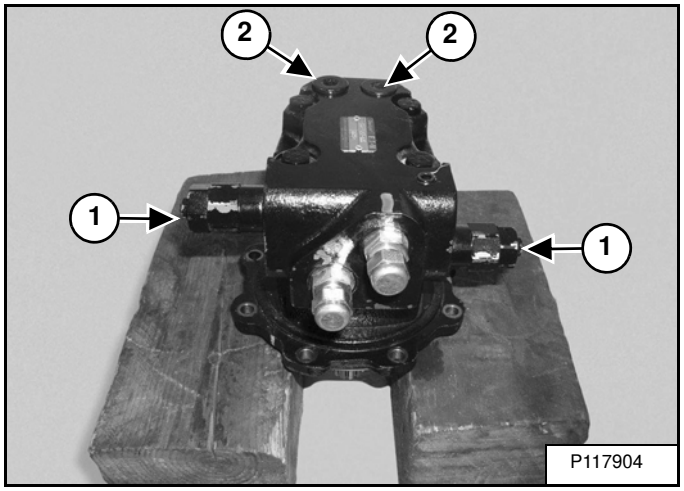
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Motor Disassembly (Cont'd)

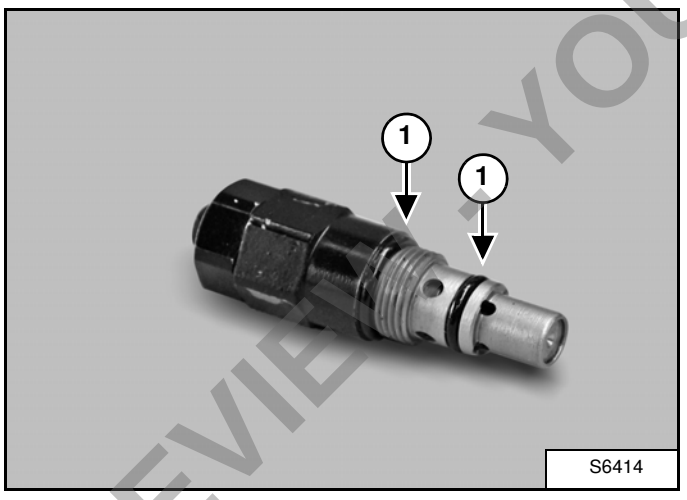
Mark the outside of the swing motor for ease of assembly.

Figure 20-100-7



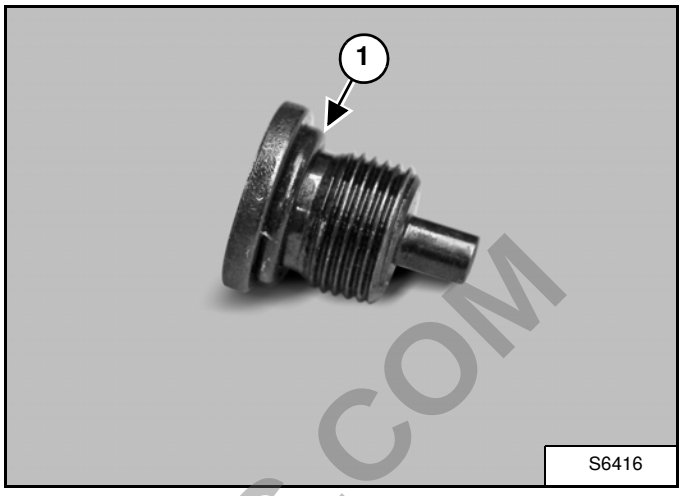
Remove the crossport relief valves (Item 1). Remove the plugs (Item 2) **[Figure 20-100-7]**.

Figure 20-100-8



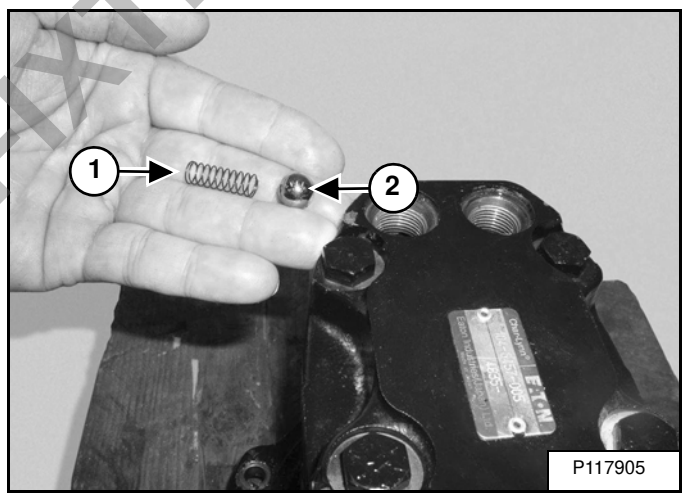
Remove the O-rings (Item 1) **[Figure 20-100-8]** from the crossport relief valves.

Figure 20-100-9



Remove the O-ring (Item 1) **[Figure 20-100-9]** from the plug.

Figure 20-100-10



Remove the springs (Item 1) and balls (Item 2) **[Figure 20-100-10]**.

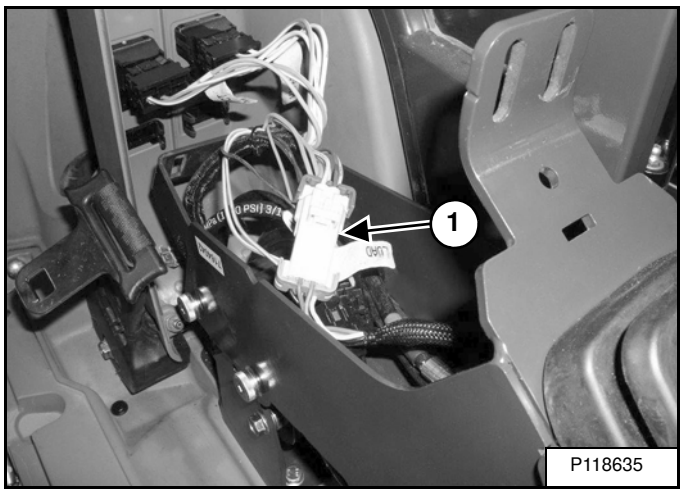
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Handle Removal And Installation

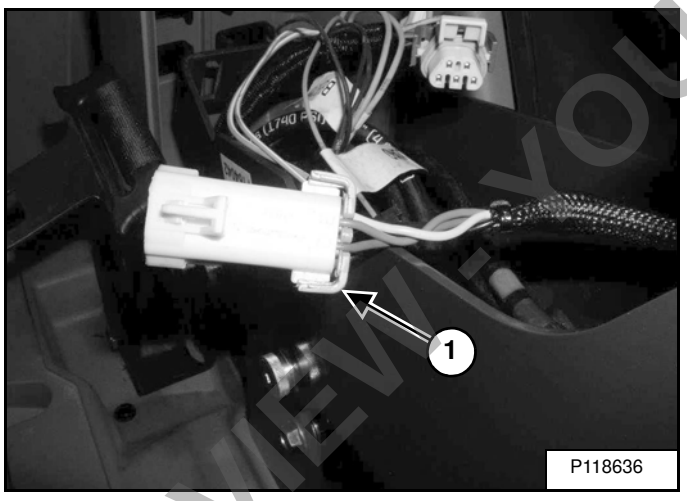
Remove the left console cover. (See Removal And Installation on Page 40-60-1.)

Figure 20-111-111



Disconnect the wire harness (Item 1) **[Figure 20-111-111]**.

Figure 20-111-112



Remove the lock (Item 1) **[Figure 20-111-112]** from the electrical connector.

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Adjusting Tension

⚠ WARNING

AVOID INJURY

Keep fingers and hands out of pinch points when checking the track tension.

W-2142-0903

Figure 30-20-6

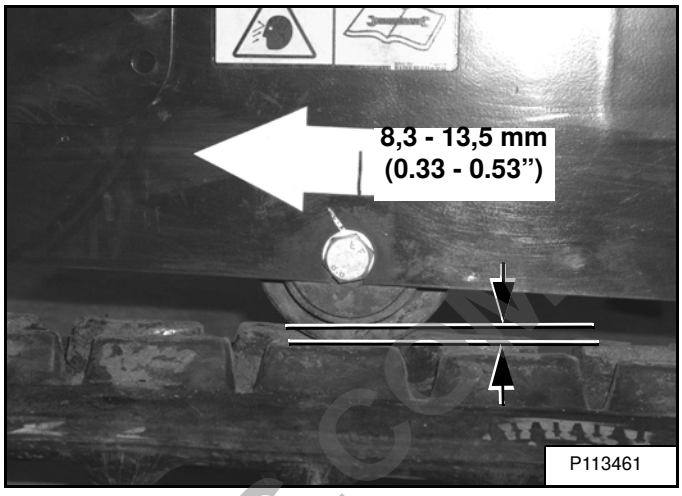
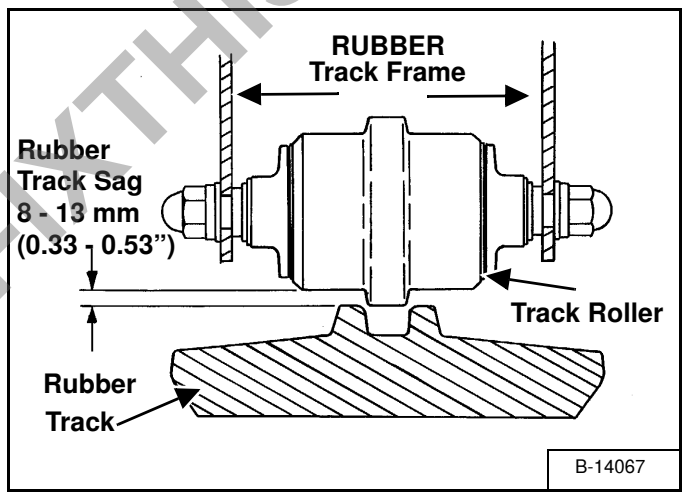


Figure 30-20-7



Measure the clearance at either middle track roller. DO not get fingers into pinch points between the track and the track roller. Use a bolt or a dowel of the appropriate size to check the gap between the contact edge of the roller and the top edge of the track guide **[Figure 30-20-6]** and **[Figure 30-20-7]**.

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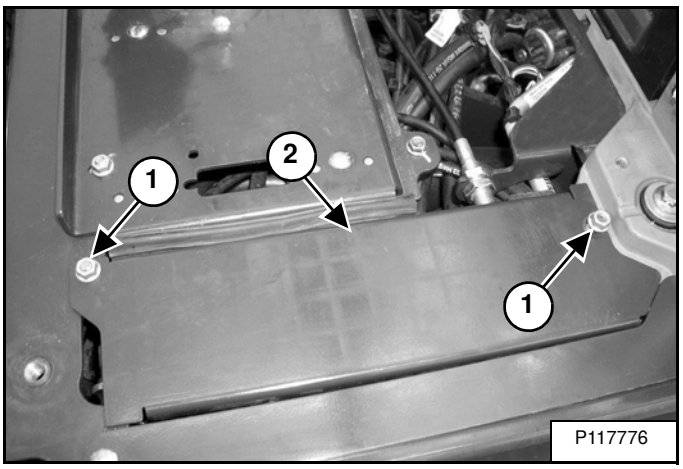
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OPERATOR BONNET (CONT'D)

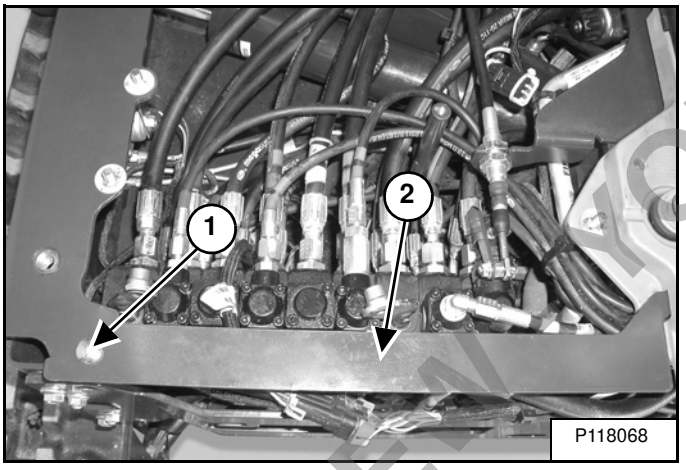
Removal And Installation (Cont'd)

Figure 40-230-4



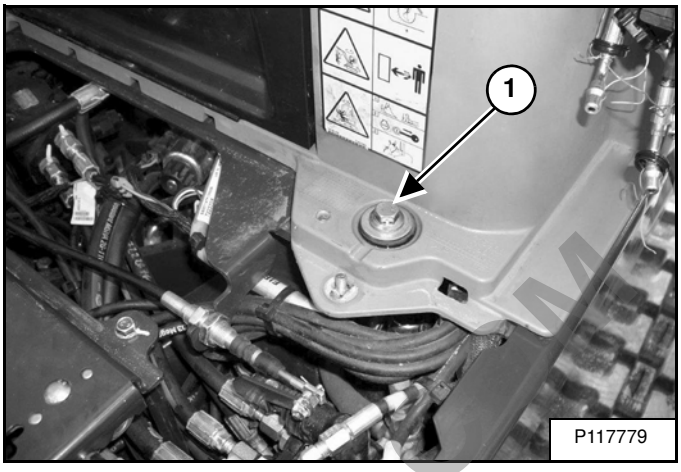
Remove the nuts (Item 1) and cover (Item 2) **[Figure 40-230-4]**.

Figure 40-230-5



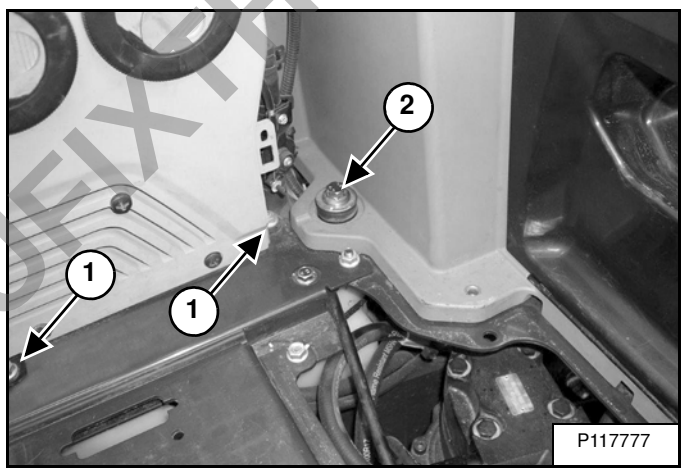
Remove the nut and bolt (Item 1) and the plate (Item 2) **[Figure 40-230-5]**.

Figure 40-230-6



Remove the bolt (Item 1) **[Figure 40-230-6]**.

Figure 40-230-7



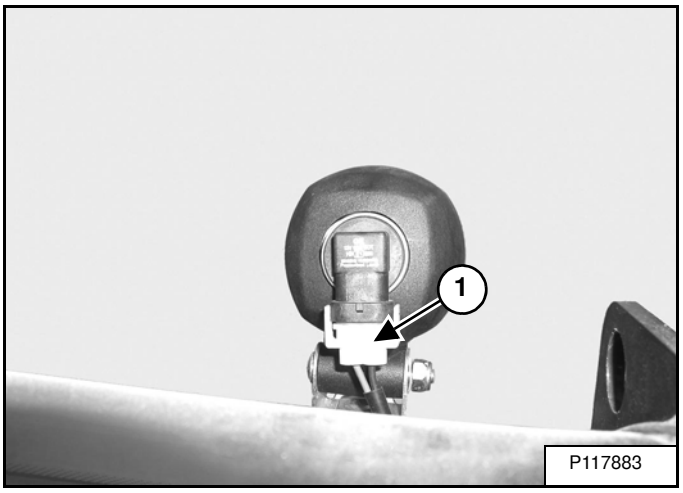
Remove the nuts (Item 1) and reposition the heater. Remove the bolt (Item 2) **[Figure 40-230-7]**.

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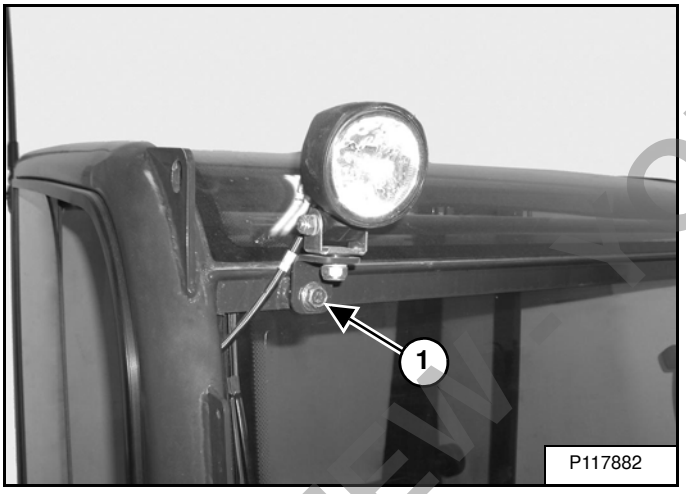
Cab Light Removal And Installation

Figure 50-50-5



Disconnect the wiring harness (Item 1) **[Figure 50-50-5]**.

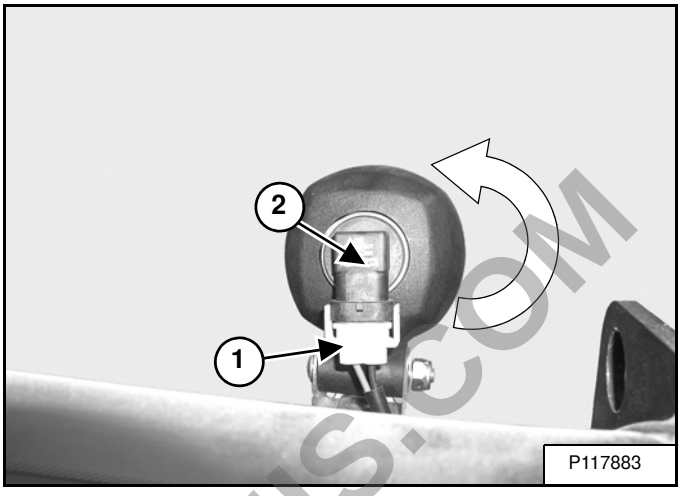
Figure 50-50-6



Remove the mounting bolt (Item 1) **[Figure 50-50-6]**.

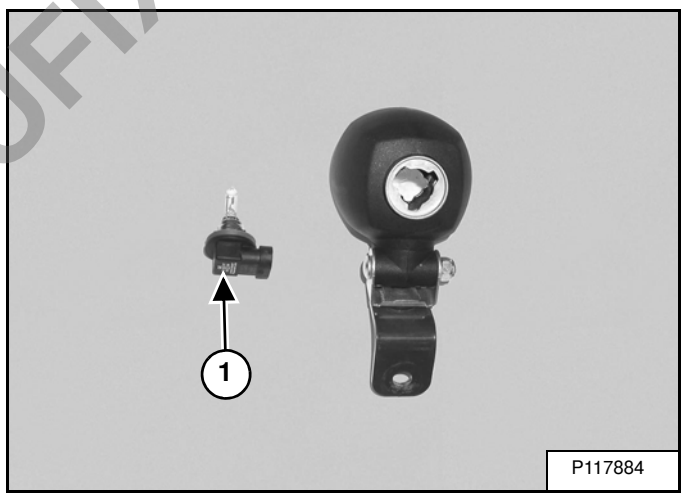
Cab Light Bulb Replacement

Figure 50-50-7



Disconnect the wire harness (Item 1). Rotate light bulb assembly (Item 2) **[Figure 50-50-7]** counterclockwise and pull straight out from the cab light.

Figure 50-50-8



Remove the light bulb assembly (Item 1) **[Figure 50-50-8]**.

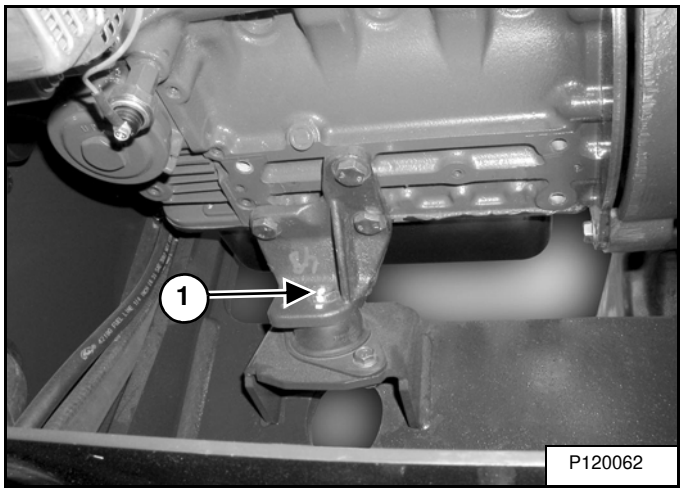
NOTE: Don not touch glass of halogen bulb with your fingers or allow bulb to come in contact with oils. If contaminated, the bulb should be cleaned with mild alcohol and a clean cloth.

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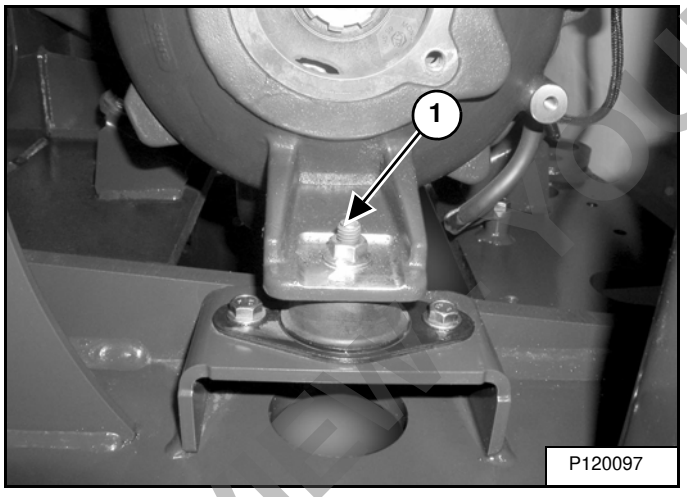
Removal And Installation (Cont'd)

Figure 60-10-15



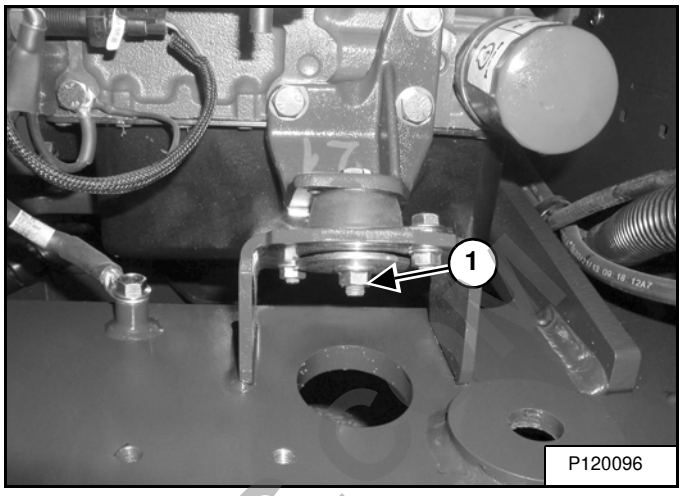
Remove the front engine mount (Item 1) **[Figure 60-10-15]**.

Figure 60-10-16



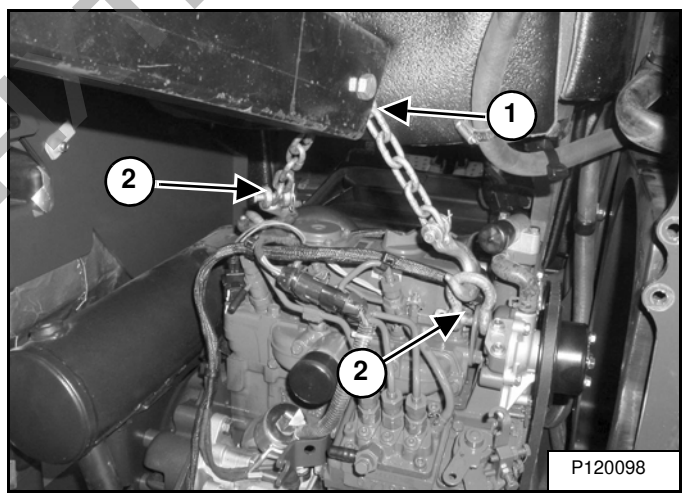
Remove the left side engine mount (Item 1) **[Figure 60-10-16]**.

Figure 60-10-17



Remove the rear engine mount (Item 1) **[Figure 60-10-17]**.

Figure 60-10-18



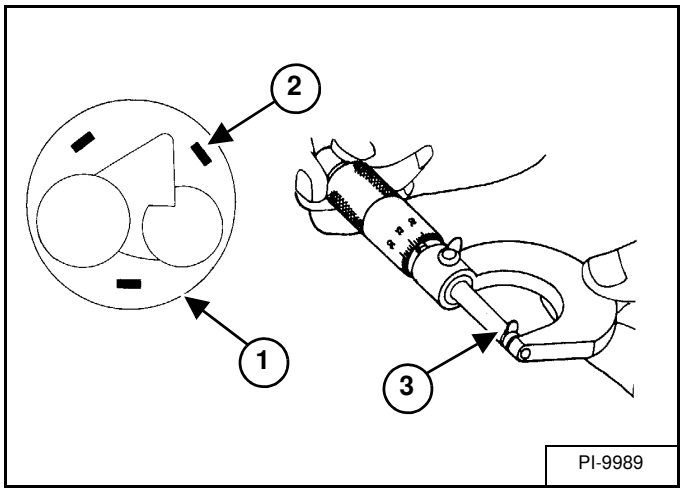
Install lifting device and chain (Item 1) to the lifting brackets (Item 2) **[Figure 60-10-18]**.

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Cylinder Head Top Clearance

Figure 60-70-19



Install the cylinder head gasket. Put the piston (Item 1) **[Figure 60-70-19]** being checked at T.D.C.

Put 3 pieces of 1,5 mm (0.06 in) diameter solder (Item 2) **[Figure 60-70-19]** on the top piston. Use grease to hold them in position.

NOTE: Put the solder in position so they do not touch the valves.

Turn the piston to bottom dead center.

Install the cylinder head and tighten to the correct torque in the correct sequence (See Cylinder Head Removal And Installation on Page 60-70-3.)

Turn the crankshaft until the piston exceeds T.D.C. Remove the cylinder head.

Remove the solder wire (Item 3) **[Figure 60-70-19]** and measure it.

If the measurement exceeds the specifications, check the oil clearance of the crank pin journal or the piston pin

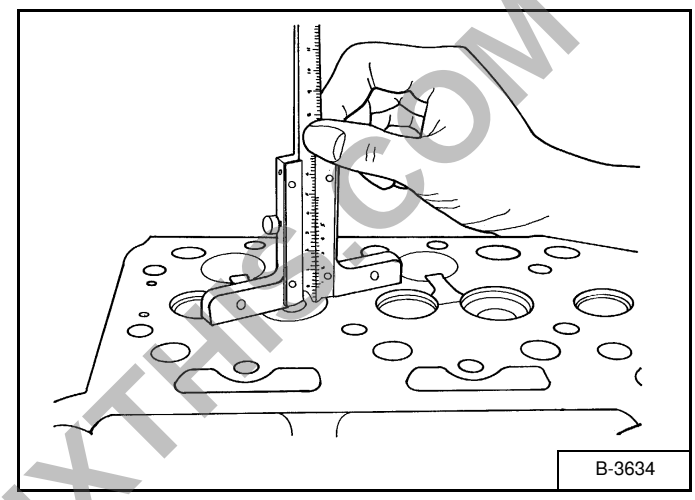
Top clearance 0,50 - 0,70 mm (0.0197 - 0.0276 in)

Valve Guide - Servicing

Remove the valve and spring from the cylinder head (See Cylinder Head Removal And Installation on Page 60-70-3.)

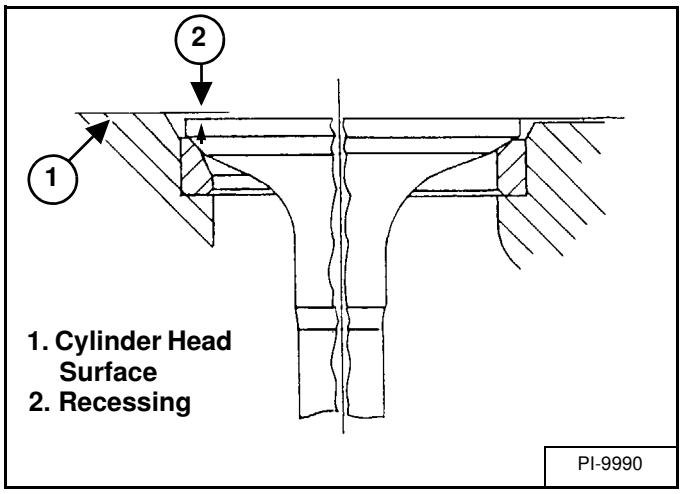
Clean the valve seat and combustion chamber.

Figure 60-70-20



Install the valve into the guide. Measure the valve recessing with a depth gauge **[Figure 60-70-20]**.

Figure 60-70-21



If the measurement exceeds the allowable limit, replace the valve or cylinder head **[Figure 60-70-21]**.

Recessing	0,10 mm (0.004 in)
Allowable Limit (Recessing)	0,30 mm (0.012 in)

Remove the carbon from the valve guide.

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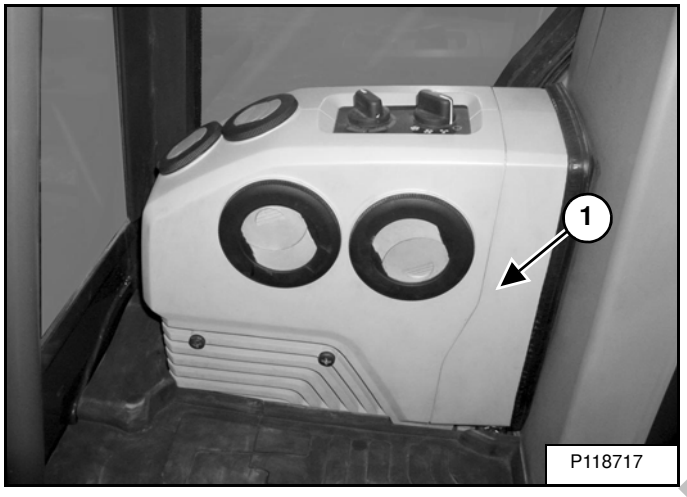
HEATER UNIT

Removal And Installation

Drain the engine coolant. (See Removing And Replacing Coolant on Page 10-100-3.)

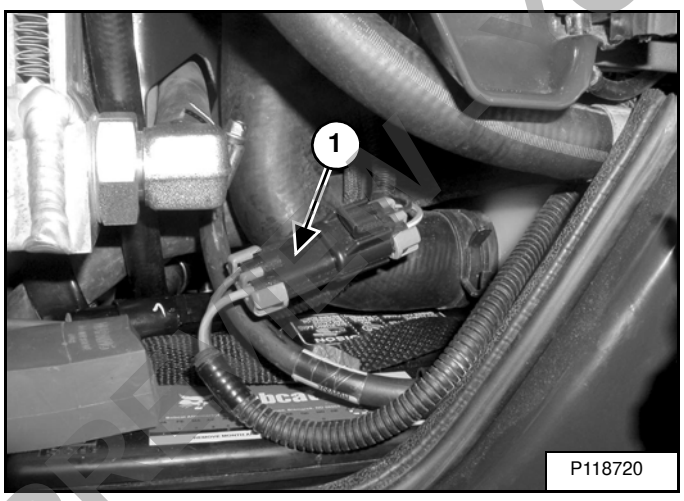
Remove the floor mats. (See Removal And Installation on Page 40-140-1.)

Figure 70-30-1



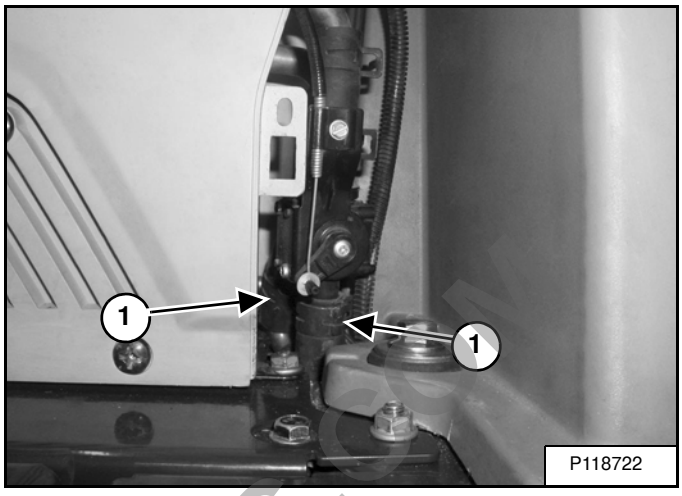
Remove the rear cover of heater unit (Item 1) **[Figure 70-30-1]**.

Figure 70-30-2



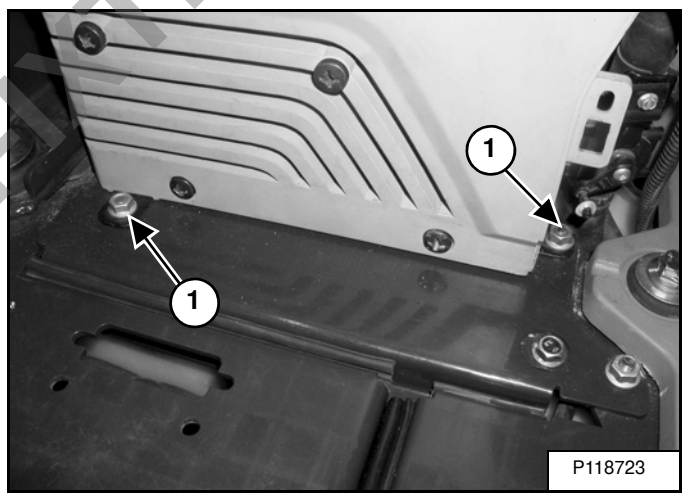
Disconnect the fan switch harness (Item 1) **[Figure 70-30-2]**.

Figure 70-30-3



Remove the two clamps (Item 1) **[Figure 70-30-3]** for the heater hoses.

Figure 70-30-4



Remove the two mounting nuts (Item 1) **[Figure 70-30-4]**.

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