

MAINTENANCE SAFETY



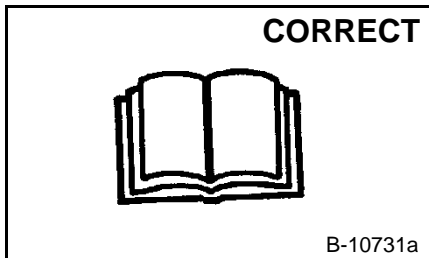
WARNING

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-2003-0903

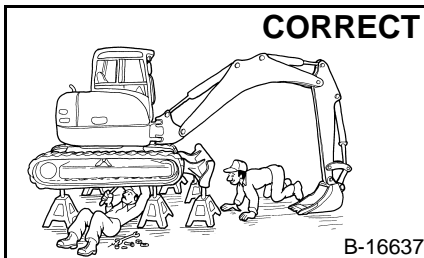


Safety Alert Symbol: This symbol with a warning statement, means: "Warning, be alert! Your safety is involved!" Carefully read the message that follows.



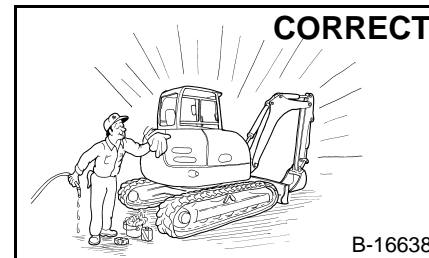
B-10731a

- ⚠ Never service the Bobcat Hydraulic Excavator without instructions.



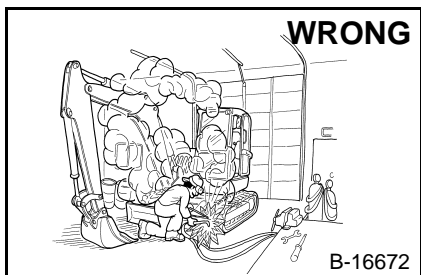
B-16637

- ⚠ Use the correct procedure to lift and support the excavator.
- ⚠ Always lift the blade fully before installing jackstands.



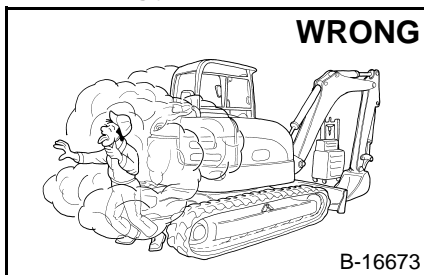
B-16638

- ⚠ Cleaning and maintenance are required daily.



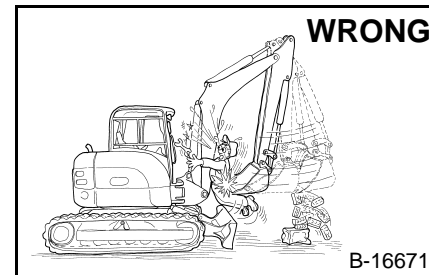
B-16672

- ⚠ Have good ventilation when welding or grinding painted parts.
- ⚠ Wear dust mask when grinding painted parts. Toxic dust and gas can be produced.



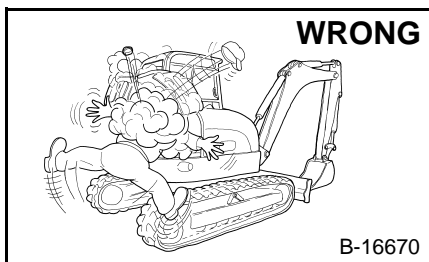
B-16673

- ⚠ Vent exhaust to outside when engine must be run for service.
- ⚠ Exhaust system must be tightly sealed. Exhaust Fumes can kill without warning.



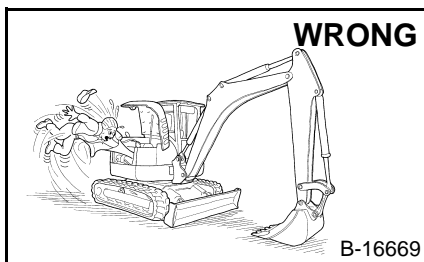
B-16671

- ⚠ Always lower the bucket and blade to the ground before doing any maintenance.
- ⚠ Never modify equipment or add attachments not approved by Bobcat Company.



B-16670

- ⚠ 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.



B-16669

- ⚠ 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 protection approved for type of welding.
- ⚠ Keep tailgate closed except for service, Close and latch tailgate before operating the excavator.



B-6589

- ⚠ 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.

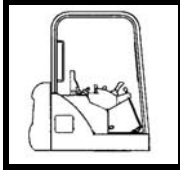
Maintenance procedures which are given in the Operation & Maintenance Manual can be performed by the owner/operator without any specific technical training. Maintenance procedures which are **not** in the Operation & Maintenance Manual must be performed **ONLY BY QUALIFIED BOBCAT SERVICE PERSONNEL**.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

FOREWORD

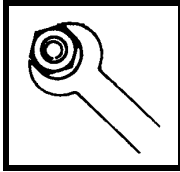
This manual is for the Bobcat Hydraulic Excavator mechanic. It provides necessary servicing and adjustment procedures for the hydraulic excavator and its component parts and systems. Refer to the Operation & Maintenance Manual for operating instructions, starting procedure, daily checks, etc.

A general inspection of the following items must be made after the hydraulic excavator has had service or repair:

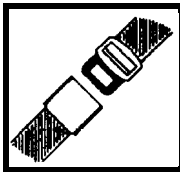
1. Check that the ROPS/TOPS/FOPS is in good condition and is NOT modified.



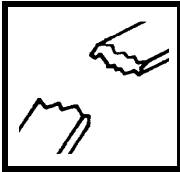
2. Check that ROPS mounting hardware is tightened and is Bobcat approved.



3. The seat belt must be correctly installed, functional and in good condition.



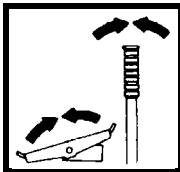
4. Inspect for loose or broken parts or connections.



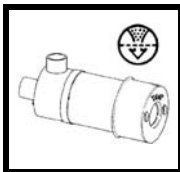
5. Machine signs must be legible and in the correct location.



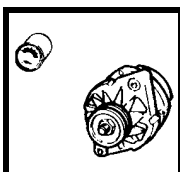
6. Steering levers, control levers and foot pedals must return to neutral. Check that foot pedals lock and control lever locks are in working order.



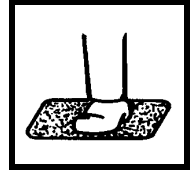
7. Inspect the air cleaner for damage or leaks. Check the condition of the element.



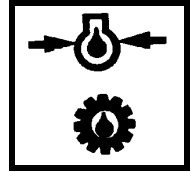
8. Check the electrical charging system.



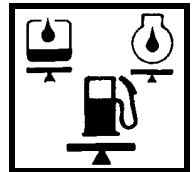
9. Safety treads must be in good condition.



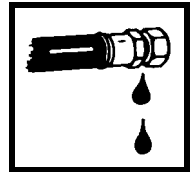
10. Check for correct function of indicator lamps (Optional on some models).



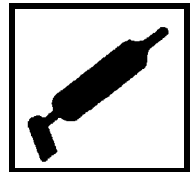
11. Check hydraulic fluid level, engine oil level and fuel supply.



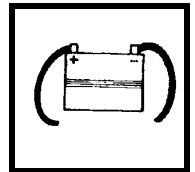
12. Inspect for fuel, oil or hydraulic fluid leaks.



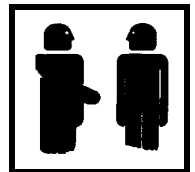
13. Lubricate the excavator.



14. Check the condition of the battery and cables.



Recommend to the owner that all necessary corrections be made before the machine is returned to service.



**CALIFORNIA
PROPOSITION 65 WARNING**
Diesel engine exhaust and some of its constituents are known to the state of California to cause cancer, birth defects and other reproductive harm.

FUEL SYSTEM (CONT'D)

Draining The Fuel Tank

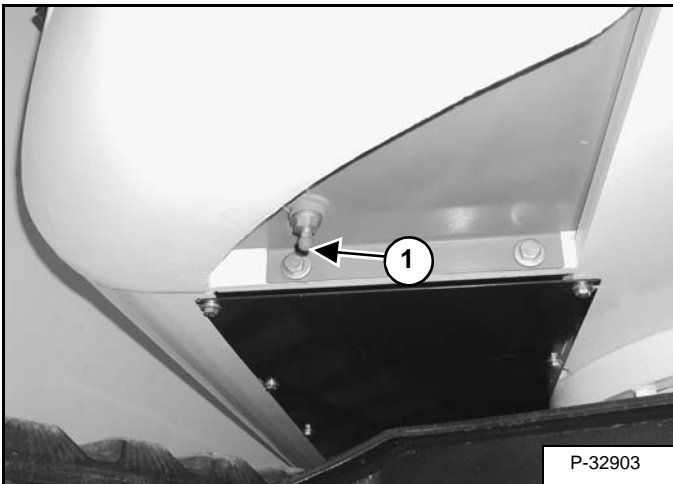
See the Service Schedule for the correct service interval to drain the fuel tank. (See SERVICE SCHEDULE on Page 10-50-1.)

Figure 10-80-18



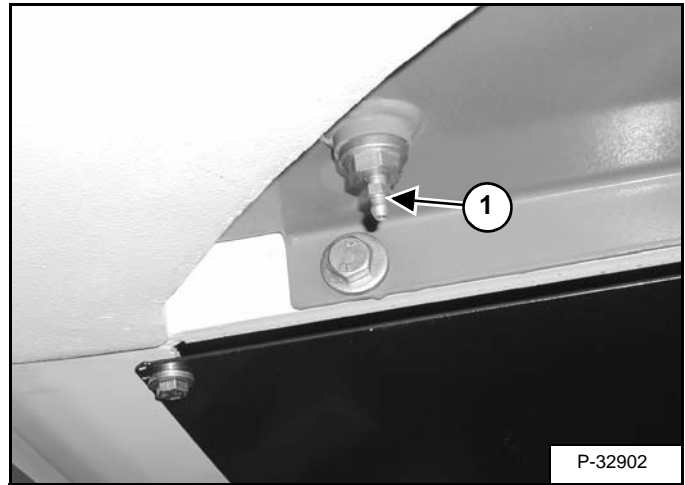
Position the excavator as shown [Figure 10-80-18].

Figure 10-80-19



Remove the cap (Item 1) [Figure 10-80-19] from the drain.

Figure 10-80-20



Open the drain (Item 1) [Figure 10-80-20] and drain the fuel into a container.

 **WARNING**

Always clean up spilled fuel or oil. Keep heat, flames, sparks or lighted tobacco away from fuel and oil. Failure to use care around combustibles can cause explosion or fire which can result in injury or death.

W-2103-1285

BUCKET CYLINDER

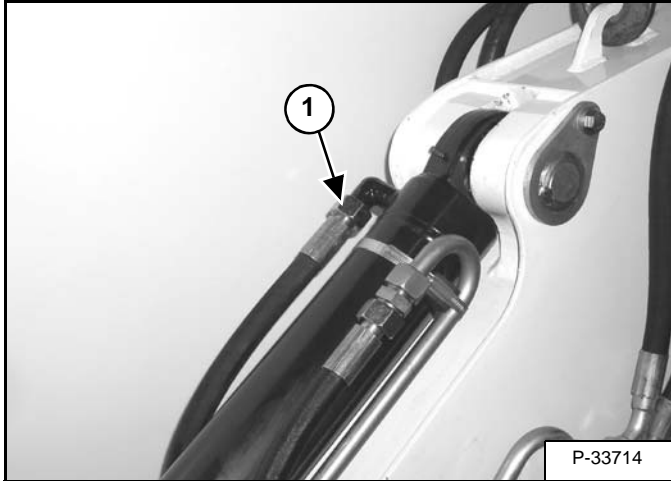
Testing

Fully retract the bucket and arm cylinders.

Lower the boom to the ground.

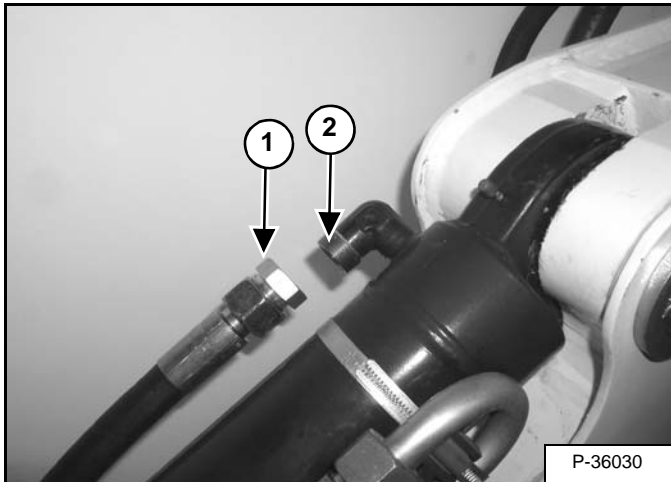
With the engine off and the key in the run position, move the joysticks to relieve hydraulic pressure.

Figure 20-23-63



Remove the hydraulic hose (Item 1) [Figure 20-23-63] from the base end of the bucket cylinder.

Figure 20-23-64



Install a plug (Item 1) [Figure 20-23-64] on the hose.

Start the engine and retract the bucket cylinder.

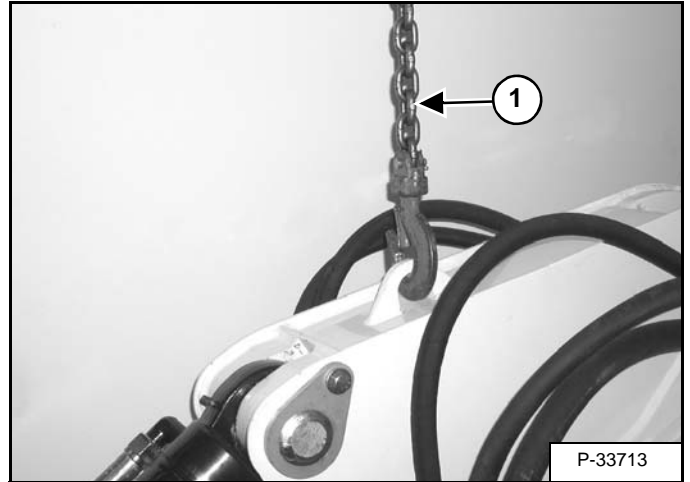
If there is any oil leakage from the base end fitting (Item 2) [Figure 20-23-64] on the bucket cylinder, remove the cylinder for repair or replacement.

Removal And Installation

Fully retract the bucket cylinder.

Fully retract the arm cylinder and lower the boom until the bucket is on the ground.

Figure 20-23-65



Support the arm with a chain hoist (Item 1) [Figure 20-23-65].

With the engine off and the key in the run position, move the joysticks to relieve hydraulic pressure.

IMPORTANT

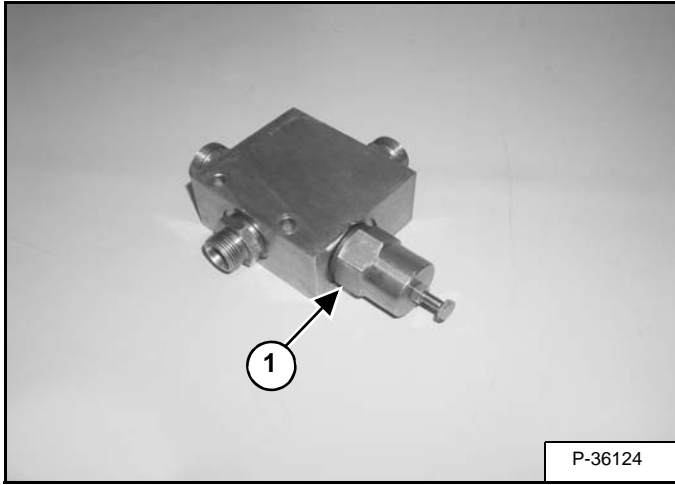
When repairing hydrostatic and hydraulic systems, clean the work area before disassembly and keep all parts clean. Always use caps and plugs on hoses, tubelines and ports to keep dirt out. Dirt can quickly damage the system.

I-2003-0888

DUMP VALVE (CONT'D)

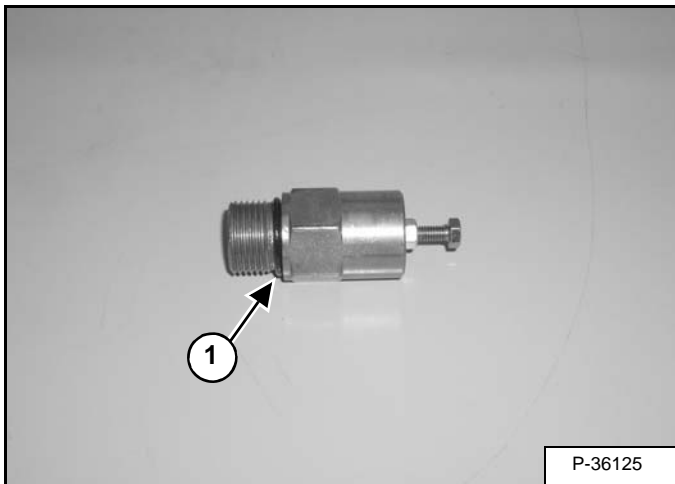
Disassembly And Assembly

Figure 20-34-5



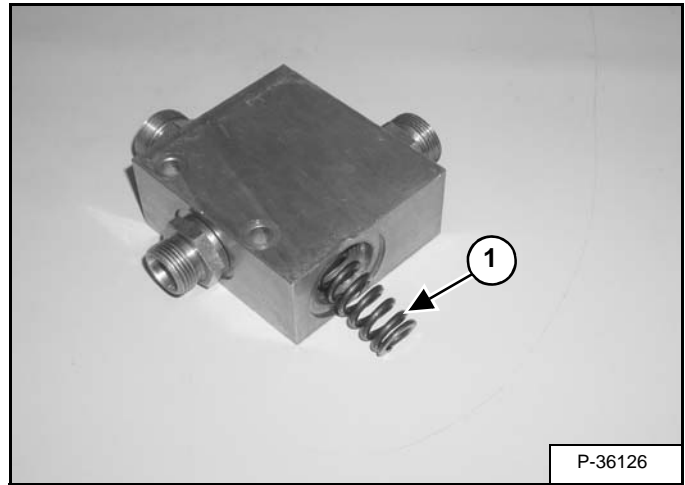
Remove the valve (Item 1) [Figure 20-34-5].

Figure 20-34-6



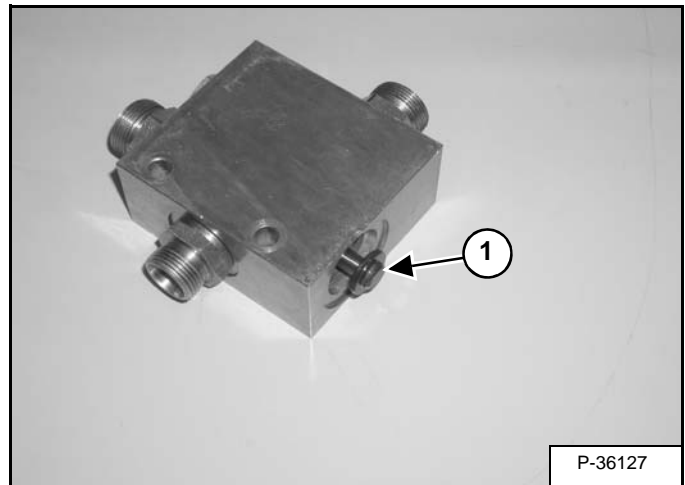
Remove the O-ring (Item 1) [Figure 20-34-6].

Figure 20-34-7



Remove the spring (Item 1) [Figure 20-34-7].

Figure 20-34-8



Remove the spool (Item 1) [Figure 20-34-8].

HYDRAULIC PISTON PUMP (S/N 522311001 & ABOVE) (CONT'D)

Torque Limiter Valve Assembly

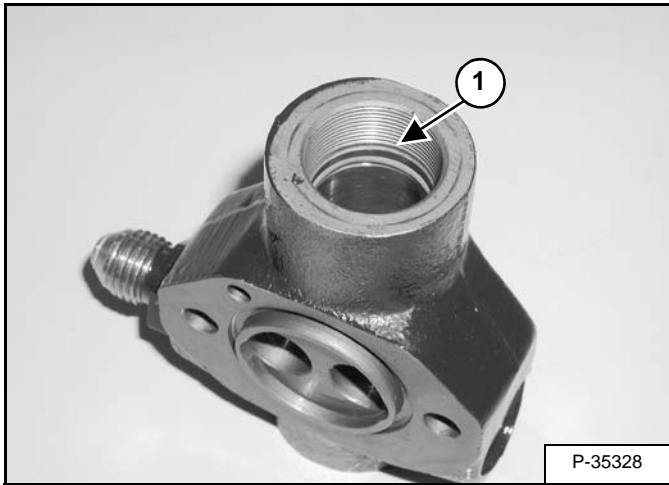
Clean all the parts in solvent and dry with compressed air.

Inspect seats and spools for wear.

Apply clean oil to new O-rings and spools.

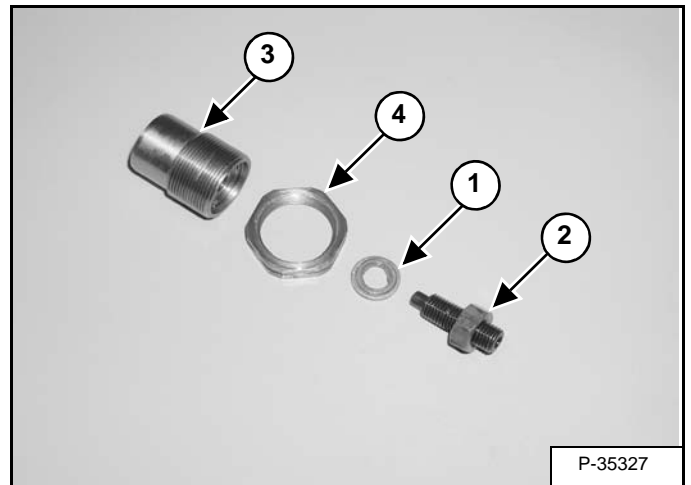
The following procedures are only used if the adjustment assembly is removed.

Figure 20-50-62



Install the O-ring (Item 1) [Figure 20-50-62] in the torque motor valve body.

Figure 20-50-63

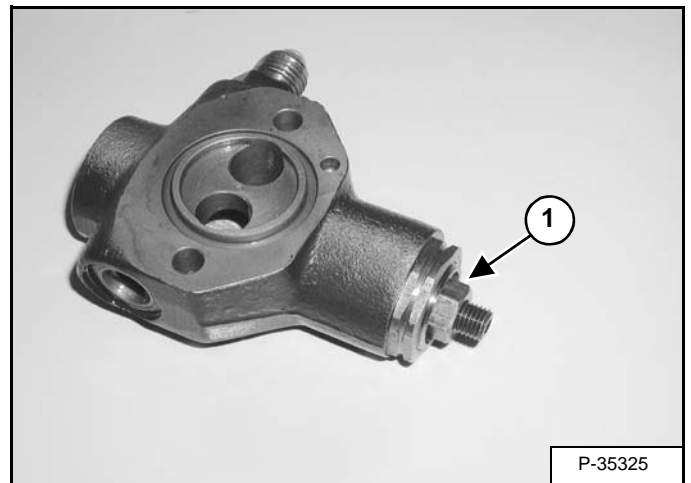


Install the O-ring washer (Item 1) on the adjustment screw (Item 2) [Figure 20-50-63].

Install the adjustment screw (Item 2) in the adjustment body (Item 3) [Figure 20-50-63].

Install the nut (Item 4) [Figure 20-50-63] on the adjustment body.

Figure 20-50-64

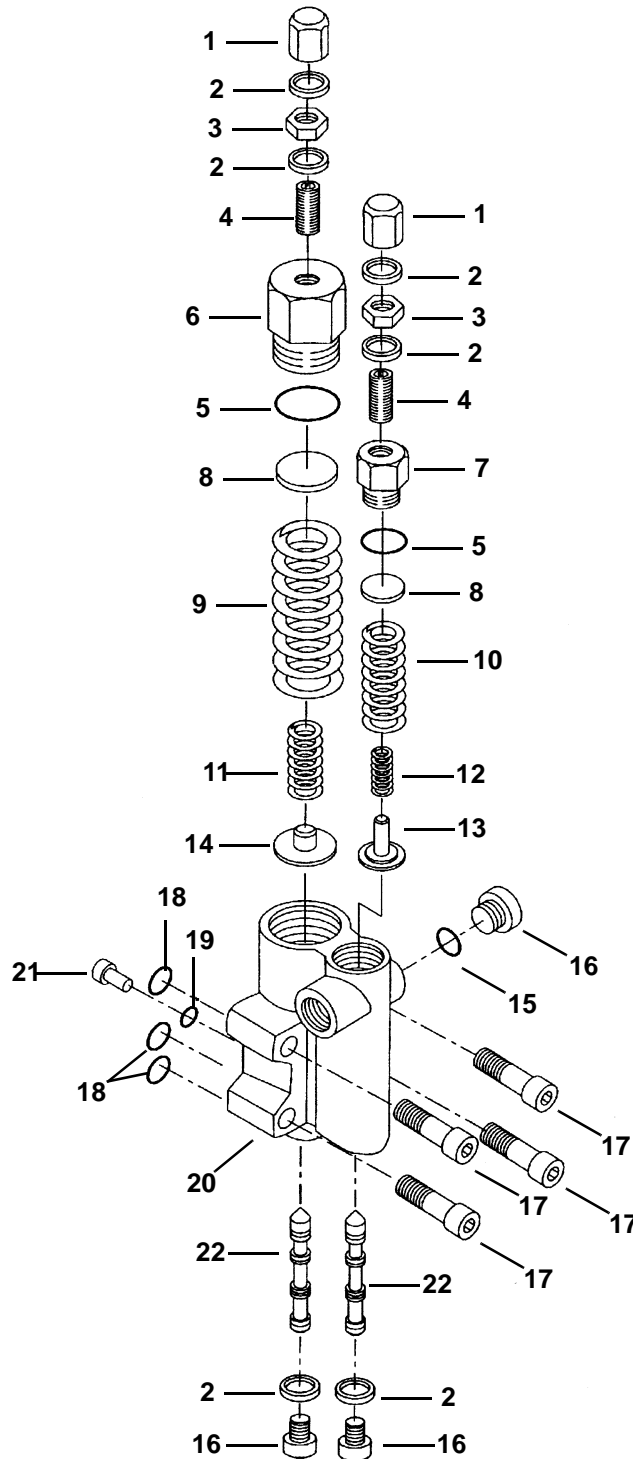


Install the adjustment screw/adjustment body (Item 1) [Figure 20-50-64] assembly into the valve body.

HYDRAULIC PISTON PUMP (S/N 528911001 & ABOVE
AND S/N 528611001 & ABOVE) (CONT'D)

Pump Control Parts Identification

1. Cap
2. O-Ring
3. Jam Nut
4. Adjusting Screw
5. O-Ring
6. Adjustment Assembly
7. Adjustment Assembly
8. Disc
9. Spring
10. Spring
11. Spring
12. Spring
13. Spring Retainer
14. Spring Retainer
15. O-Ring
16. Plug
17. Bolt
18. O-Ring
19. O-Ring
20. Housing
21. Orifice
22. Spool

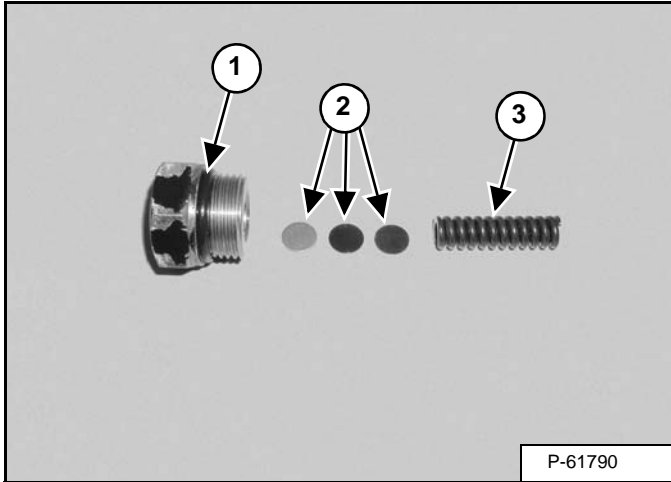


TS-01531

TRAVEL MOTOR (CONT'D)

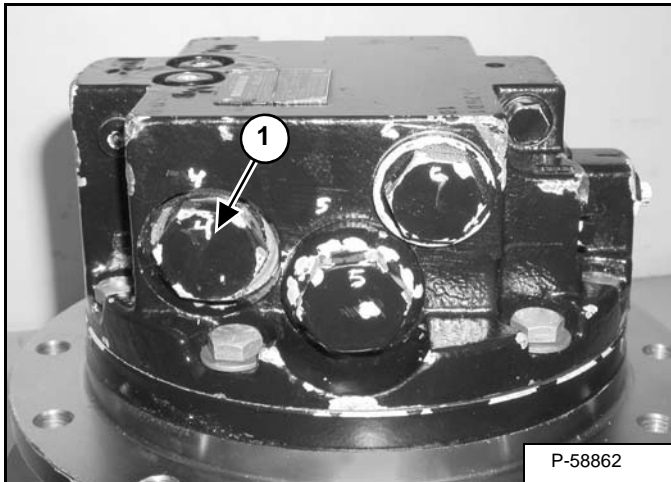
Assembly (Cont'd)

Figure 20-70-107



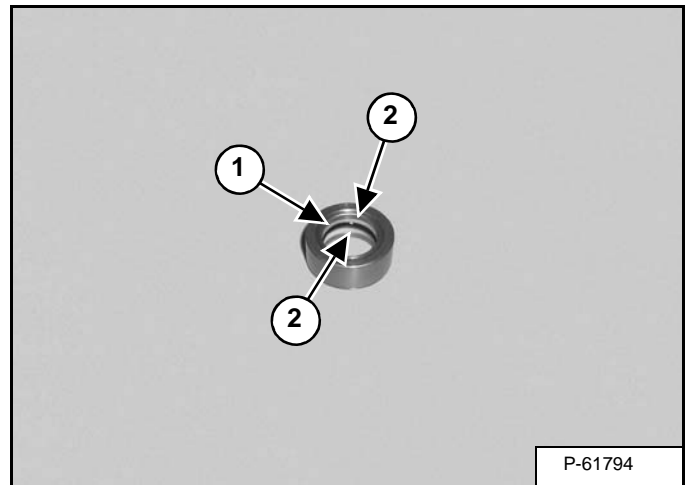
Install the O-ring (Item 1), shims (Item 2), and spring (Item 3) [Figure 20-70-107].

Figure 20-70-108



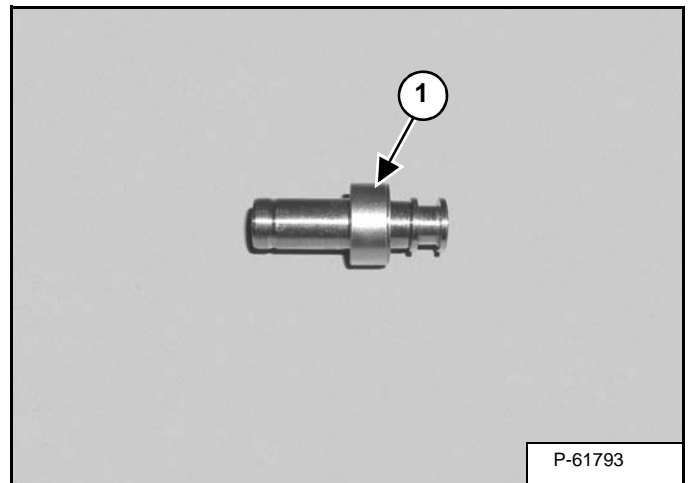
Install the plug (Item 1) [Figure 20-70-108].

Figure 20-70-109



Install the O-ring (Item 1) and back-up rings (Item 2) [Figure 20-70-109].

Figure 20-70-110

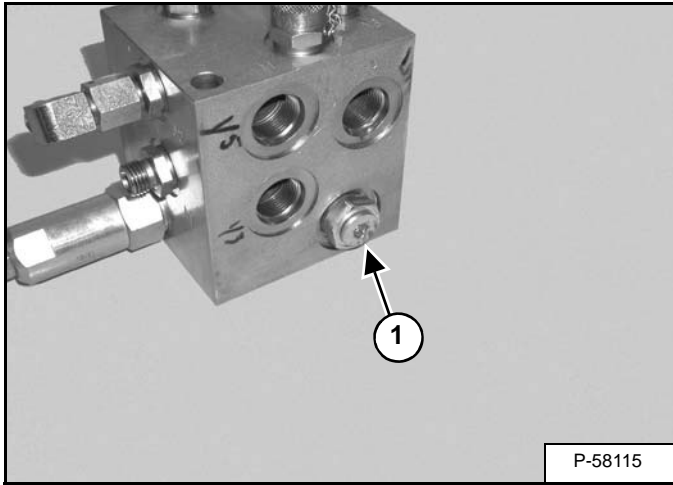


Install the spool guide (Item 1) [Figure 20-70-110].

JOYSTICK LOCKOUT/TWO SPEED VALVE (S/N 528911001 & ABOVE AND S/N 528611001 & ABOVE) (CONT'D)

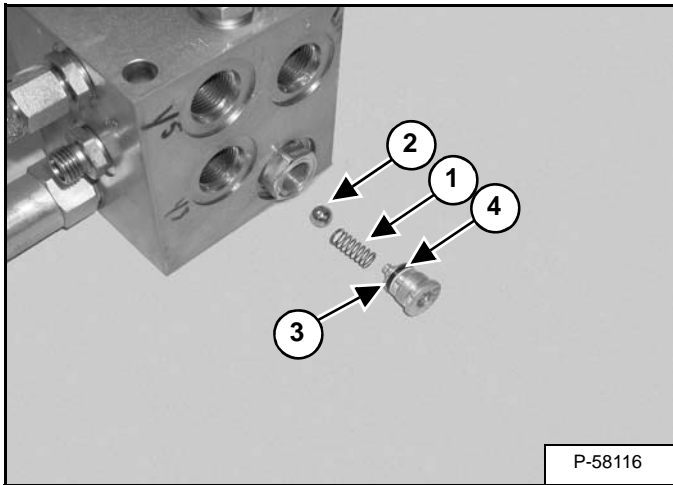
Disassembly And Assembly (Cont'd)

Figure 20-102-15



Remove the plug (Item 1) [Figure 20-102-15].

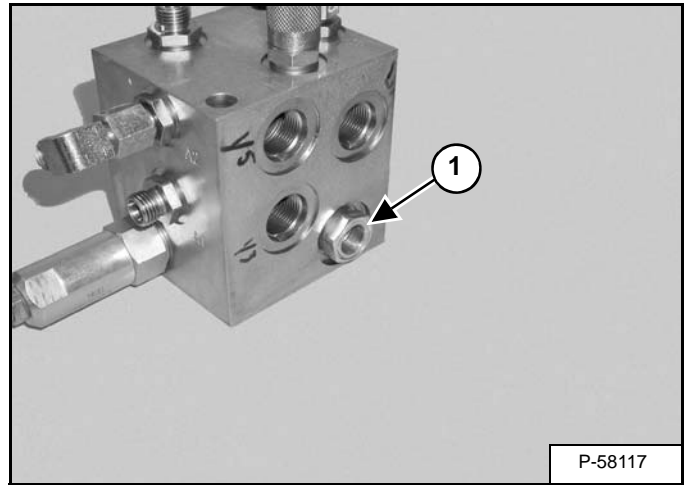
Figure 20-102-16



Remove the spring (Item 1) and ball (Item 2) [Figure 20-102-16].

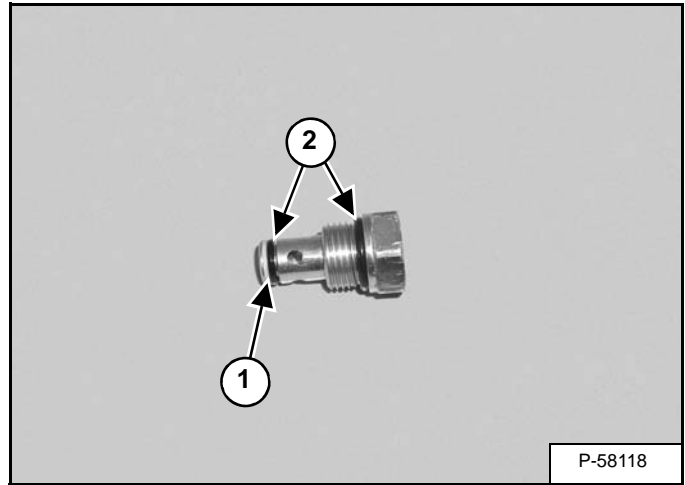
Remove the O-ring (Item 3) and back-up ring (Item 4) [Figure 20-102-16] from the plug.

Figure 20-102-17



Remove the valve body (Item 1) [Figure 20-102-17].

Figure 20-102-18

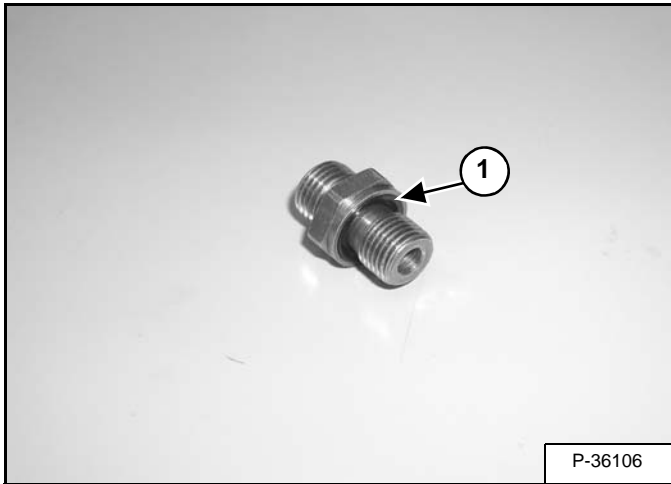


Remove the back-up ring (Item 1) and O-rings (Item 2) [Figure 20-102-18].

BOOM LOAD HOLDING VALVE (CONT'D)

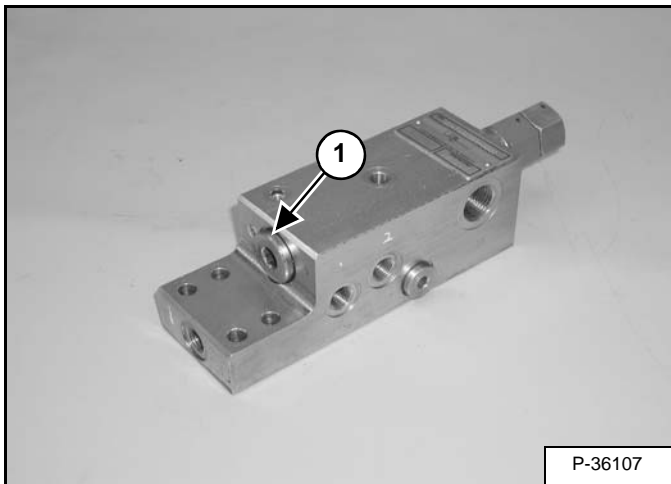
Disassembly (Cont'd)

Figure 20-200-57



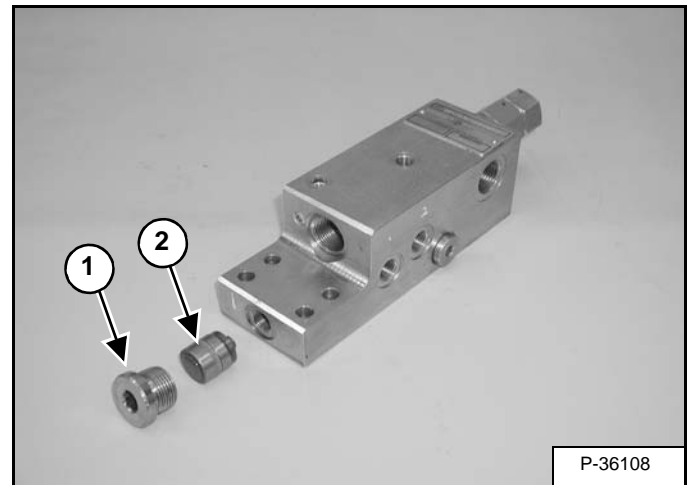
Remove the O-ring (Item 1) [Figure 20-200-57] from the fittings.

Figure 20-200-58



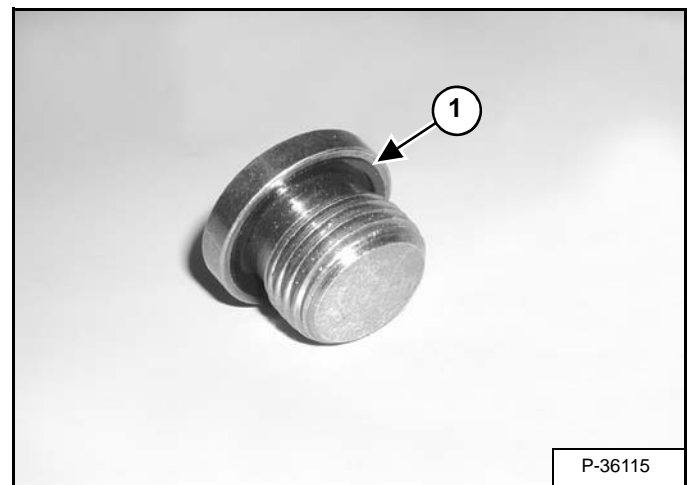
Loosen the plug (Item 1) [Figure 20-200-58].

Figure 20-200-59



Remove the plug (Item 1) and poppet (Item 2) [Figure 20-200-59].

Figure 20-200-60



Remove the O-ring (Item 1) [Figure 20-200-60] from the plug.

TRACK DAMAGE IDENTIFICATION (CONT'D)

Lug Abrasion

Prevention:

Figure 30-80-16

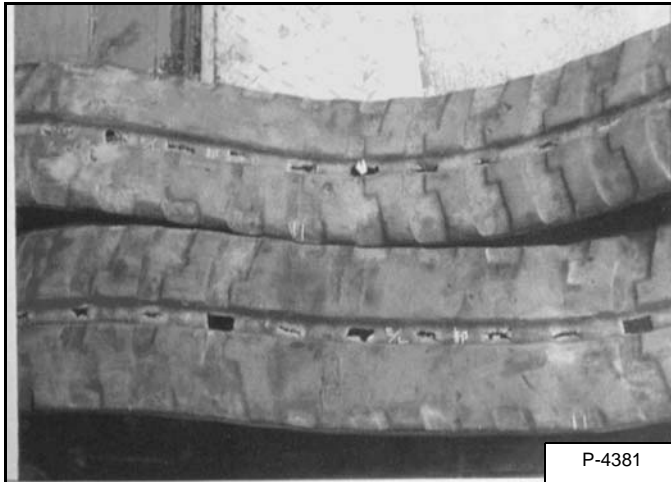
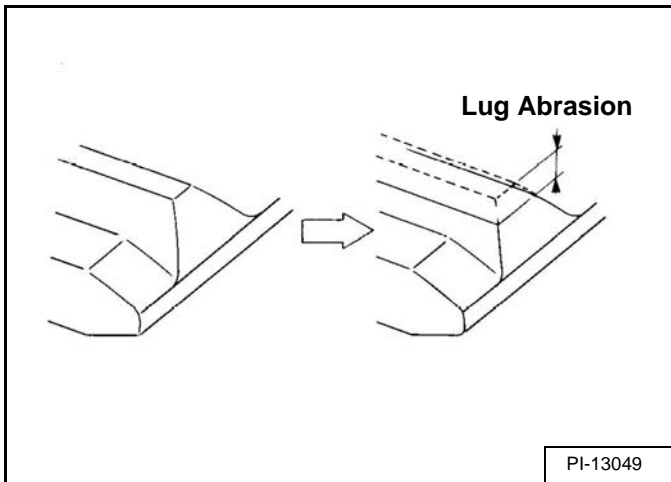


Figure 30-80-17



As its service time proceeds, the lug side inevitably undergoes abrasion [Figure 30-80-16] & [Figure 30-80-17].

Replacement:

No replacement is required.

Causes Of The Damage:

Lug abrasion is more or less inevitable. Even if lug abrasion is proceeding, the rubber track can be used. However, as the traction performance deteriorates accordingly, it is highly recommended to replace the abraded tracks with new ones when the lug height becomes less than 0.197 in (5 mm).

Prevention:

In order to prevent the rubber track from abnormal or premature abrasion, following operating conditions should be avoided:

Making quick and repeated turns on concrete and asphalt roads

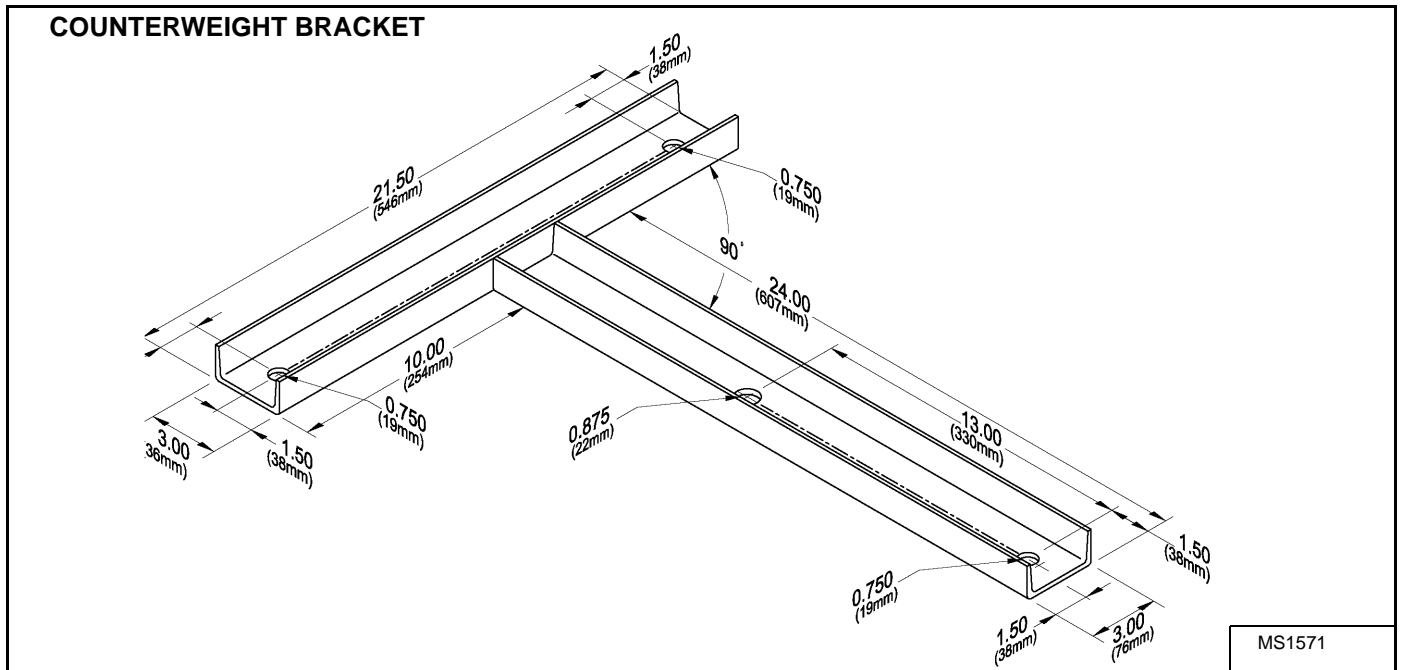
Driving up and down hilly paths with slippage

Making frequent turns on paths covered with rocks and wood

COUNTERWEIGHT

Removal And Installation

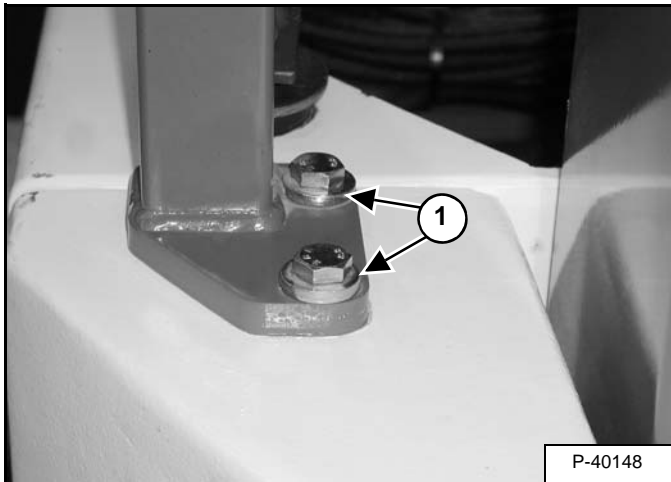
Figure 40-170-1



Build the service lifting bracket [Figure 40-170-1] used to remove and install the counterweight.

Remove the rear cover. (See REAR COVER on Page 40-150-1.)

Figure 40-170-2

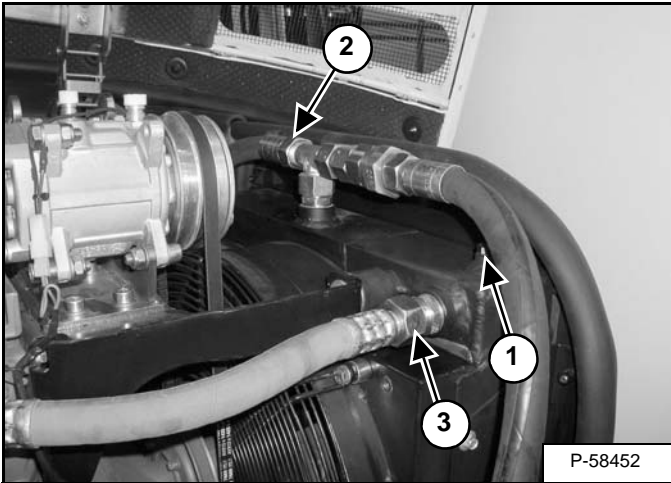


Remove the two bolts (Item 1) [Figure 40-170-2] and washers from both rear legs of the support bracket.

RADIATOR/OIL COOLER (S/N 528911001 & ABOVE AND S/N 528611001 & ABOVE) (CONT'D)

Removal And Installation (Cont'd)

Figure 60-41-4

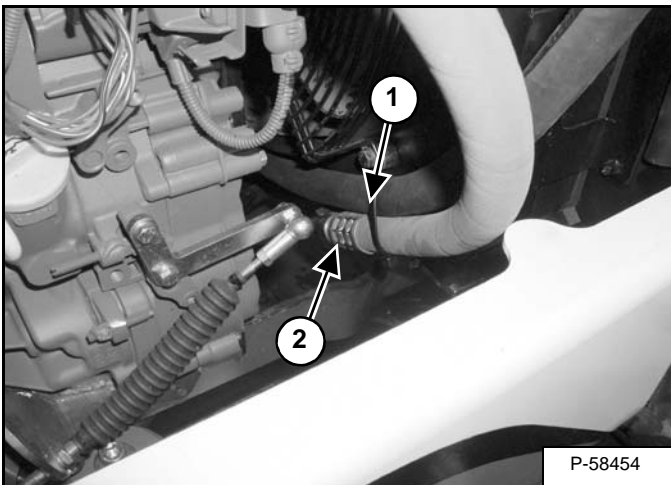


Remove the plug (Item 1) [Figure 60-41-4] and washer to assist draining the radiator.

Install the plug and washer. Remove the drain hose after the radiator is drained.

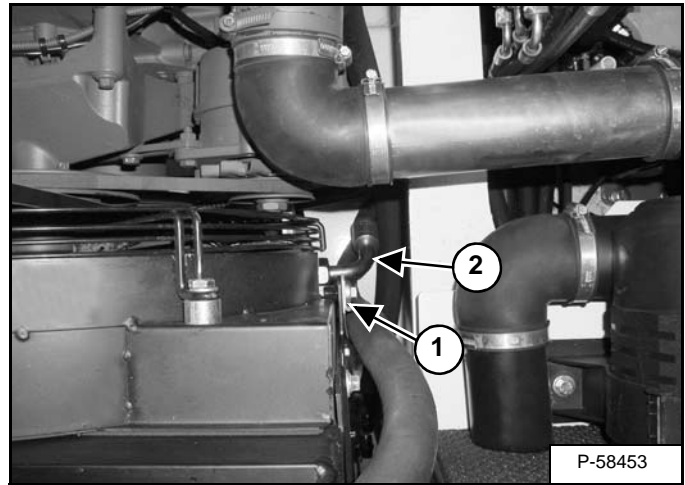
Remove the upper hydraulic cooler hose (Item 2) and upper radiator hose (Item 3) [Figure 60-41-4].

Figure 60-41-5



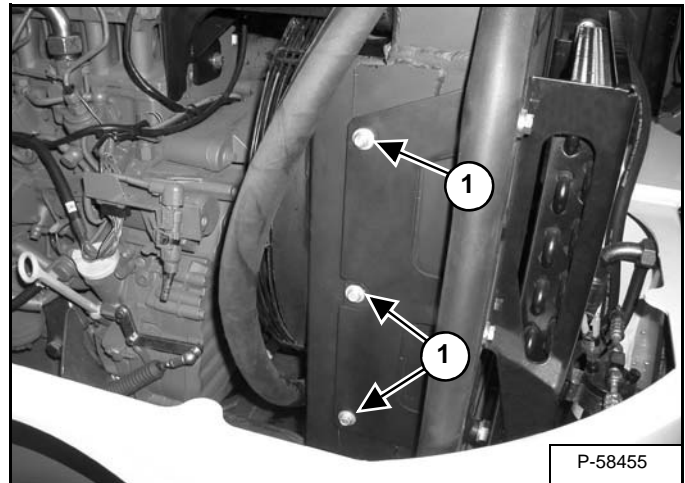
Remove the tie strap (Item 1). Remove the lower radiator hose (Item 2) [Figure 60-41-5].

Figure 60-41-6



Remove the bolt (Item 1) and clamp. Remove the lower hydraulic cooler hose (Item 2) [Figure 60-41-6].

Figure 60-41-7

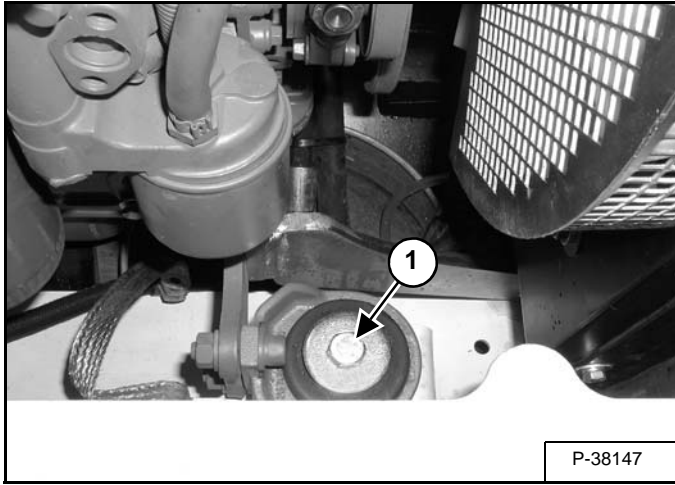


Remove the six bolts (Item 1) [Figure 60-41-7] and washers. (Three per side)

ENGINE (S/N 522311001 & ABOVE) (CONT'D)

Removal And Installation (Cont'd)

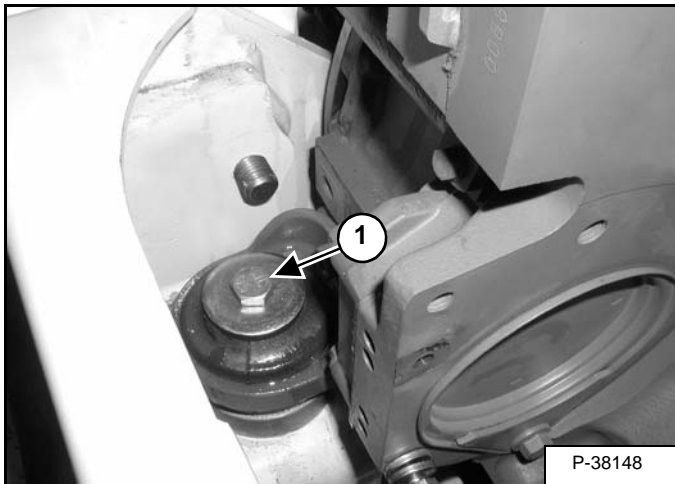
Figure 60-60-28



Remove the front two engine mount bolts (Item 1) [Figure 60-60-28].

Installation: Tighten the bolts to 48-55 ft.-lb. (65-75 N•m) torque.

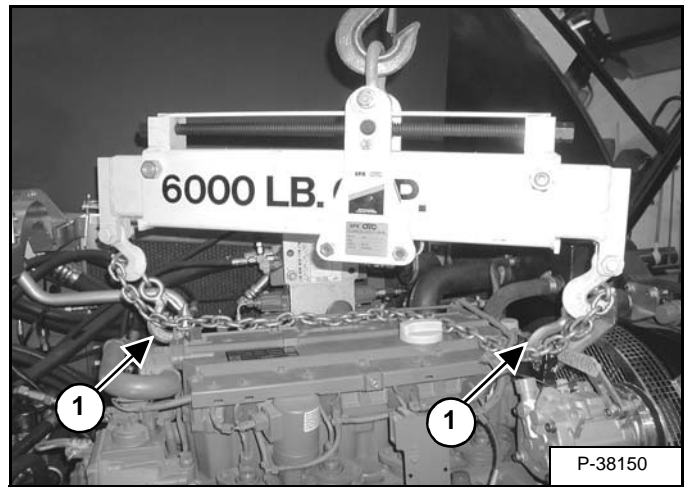
Figure 60-60-29



Remove the rear two engine mount bolts (Item 1) [Figure 60-60-29].

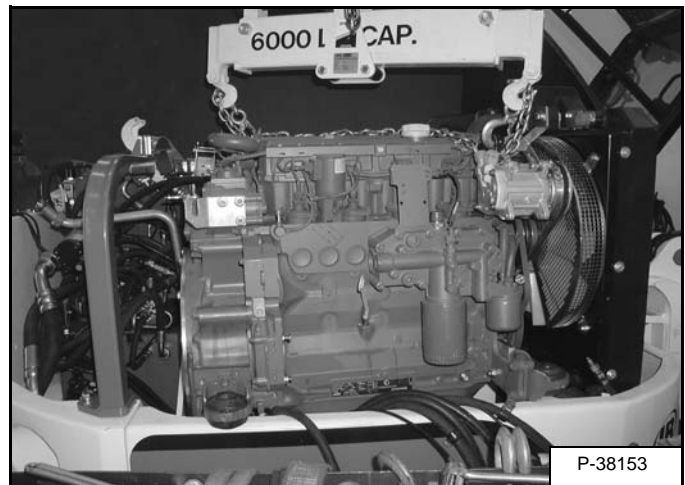
Installation: Tighten the bolts to 48-55 ft.-lb. (65-75 N•m) torque.

Figure 60-60-30



Install a hoist on the engine lift mounts (Item 1) [Figure 60-60-30].

Figure 60-60-31

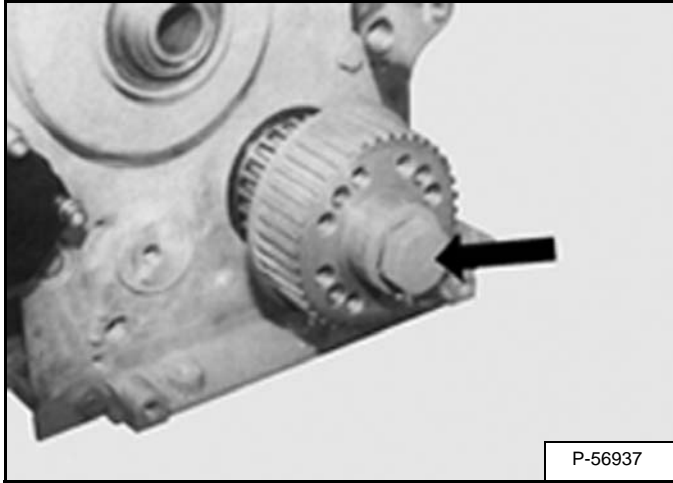


Remove the engine [Figure 60-60-31].

RECONDITIONING THE ENGINE (S/N 528911001 & ABOVE AND S/N 528611001 & ABOVE) (CONT'D)

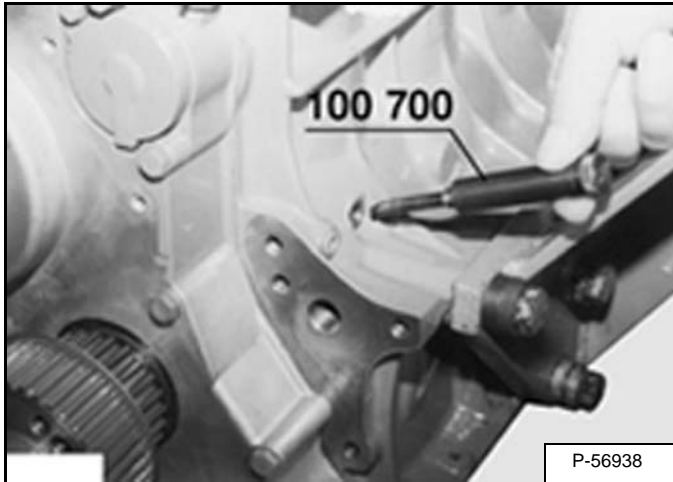
Assembly (Cont'd)

Figure 60-81-61



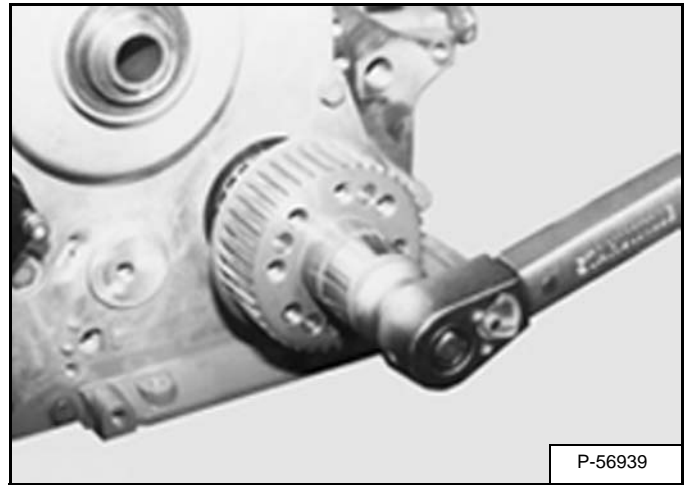
Install the bolt [Figure 60-81-61].

Figure 60-81-62



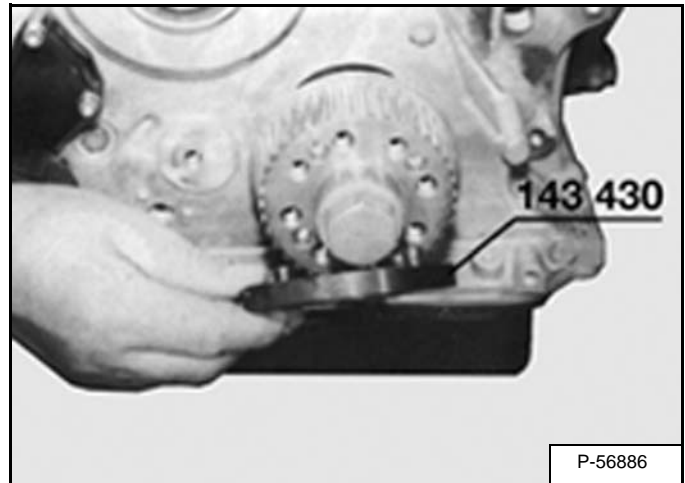
Install the crankshaft timing tool [Figure 60-81-62].

Figure 60-81-63



Tighten the bolt to 96 ft.-lb. (130 N•m) torque [Figure 60-81-63].

Figure 60-81-64



Install the intermediate disc on the crankshaft [Figure 60-81-64].