

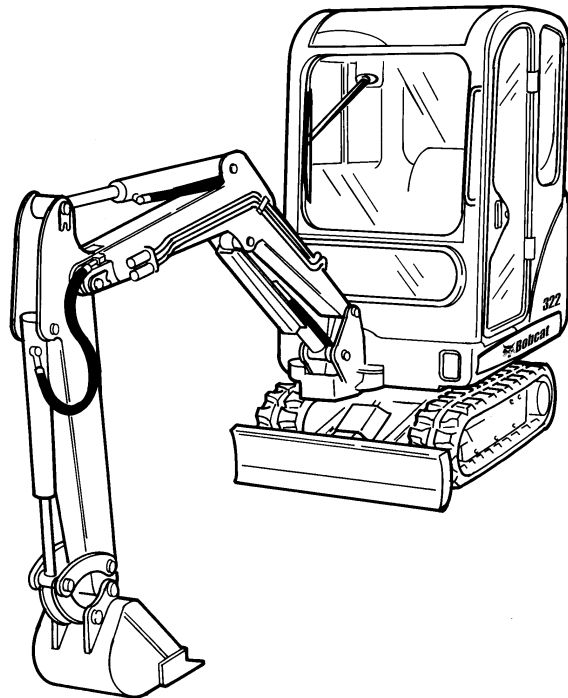
320
322



Bobcat®

Service Manual

320 - S/N 223911001 & Above
322 - S/N 224011001 & Above
(G Series)



MAINTENANCE SAFETY



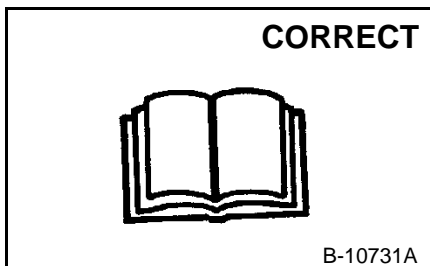
WARNING

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

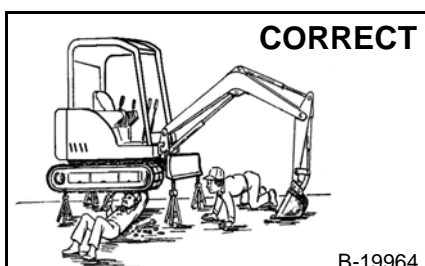


Safety Alert Symbol: This symbol with a warning statement, means: "Warning, be alert! Your safety is involved!" Carefully read the message that follows.



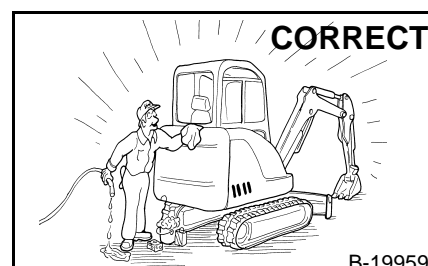
B-10731A

- ⚠ Never service the Bobcat Compact Excavator without instructions.



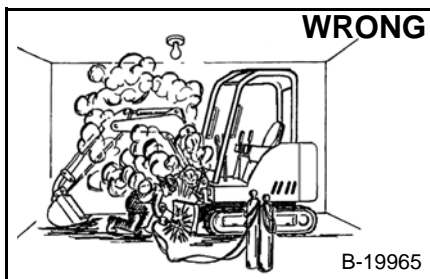
B-19964

- ⚠ Use the correct procedure to lift and support the excavator.



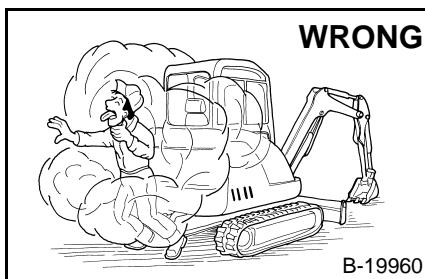
B-19959

- ⚠ Cleaning and maintenance are required daily.



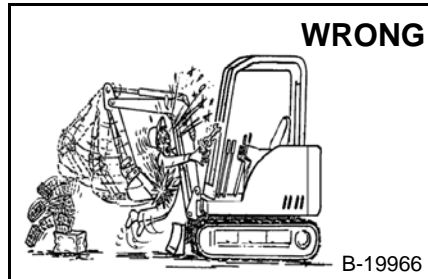
B-19965

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



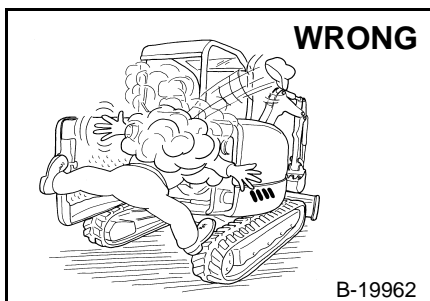
B-19960

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



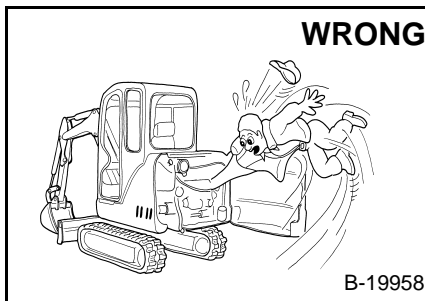
B-19966

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



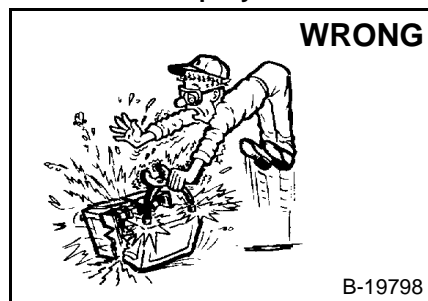
B-19962

- ⚠ 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.



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.



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 BOBCAT SERVICE PERSONNEL**. Always use genuine Bobcat replacement parts. The Service Safety Training Course is available from your Bobcat dealer.

MSW28-0805

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**SAFETY AND
MAINTENANCE**

**HYDRAULIC
SYSTEM**

**UNDER-
CARRIAGE**

**UPPER-
STRUCTURE &
SWING SECTION**

**ELECTRICAL
SYSTEM AND
ANALYSIS**

**ENGINE
SERVICE**

HEATER

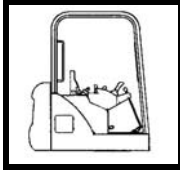
SPECIFICATIONS

FOREWORD

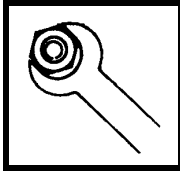
This manual is for the Bobcat Hydraulic Excavator mechanic. It provides necessary servicing and adjustment procedures for the hydraulic Excavator and its component parts and systems. Refer to the Operation & Maintenance Manual for operating instructions, starting procedure, daily checks, etc.

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

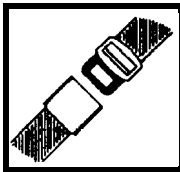
1. Check that ROPS/TOPS/FOPS is in good condition and is NOT modified.



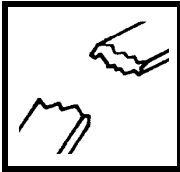
2. Check that ROPS/TOPS mounting hardware is tightened and is Bobcat approved.



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



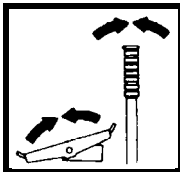
4. Inspect for loose or broken parts or connections.



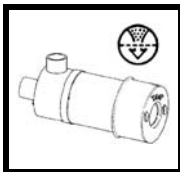
5. Machine signs must be legible and in the correct location.



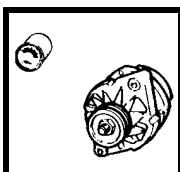
6. Steering levers, control levers and foot pedals must return to neutral. Check that foot pedals lock and control lever locks are in working order.



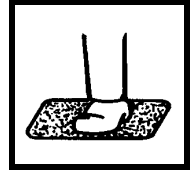
7. Inspect the air cleaner for damage or leaks. Check the condition of the filters.



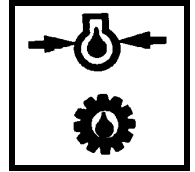
8. Check the electrical charging system.



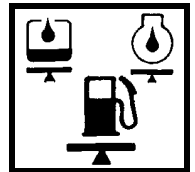
9. Safety treads must be in good condition.



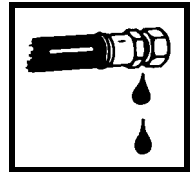
10. Check for correct function of indicator lamps (Optional on some models).



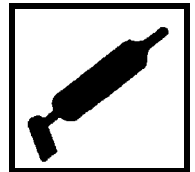
11. Check hydraulic fluid level, engine oil level and fuel supply.



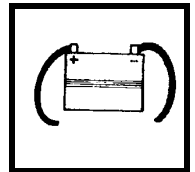
12. Inspect for fuel, oil or hydraulic fluid leaks.



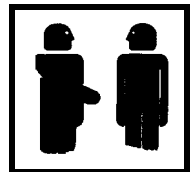
13. Lubricate the Excavator.



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.



SAFETY INSTRUCTIONS



Safety Alert Symbol

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



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



WARNING

Warnings on the machine and in the manuals are for your safety. Failure to obey warnings can cause injury or death.

W-2044-1285

IMPORTANT

This notice identifies procedures which must be followed to avoid damage to the machine.

I-2019-0284

The following publications provide information on the safe use and maintenance of the Bobcat machine and attachments:

- The Delivery Report is used to assure that complete instructions have been given to the new owner and that the machine is in safe operating condition.
- The Operation & Maintenance Manual delivered with the machine or attachment contains operating information as well as routine maintenance and service procedures. It is a part of the machine and can be stored in a container provided on the machine. Replacement Operation & Maintenance Manuals can be ordered from your Bobcat dealer.
- Machine signs (decals) instruct on the safe operation and care of your Bobcat machine or attachment. The signs and their locations are shown in the Operation & Maintenance Manual. Replacement signs are available from your Bobcat dealer.
- An Operator's Handbook fastened to the operator cab. It's brief instructions are convenient to the operator. The handbook is available from your dealer in an English edition or one of many other languages. See your Bobcat dealer for more information on translated versions.
- The AEM Safety Manual delivered with the machine gives general safety information.
- The Service Manual and Parts Manual are available from your dealer for use by mechanics to do shop-type service and repair work.
- The Compact Excavator Operator Training Course is available through your local dealer or at www.training.bobcat.com or www.bobcat.com. This course is intended to provide rules and practices of correct operation of the Bobcat Excavator. The course is available in English and Spanish versions.
- Service Safety Training Courses are available from your Bobcat dealer or at www.training.bobcat.com or www.bobcat.com. They provide information for safe and correct service procedures.
- The Bobcat Compact Excavator Safety Video is available from your Bobcat dealer or at www.training.bobcat.com or www.bobcat.com.

SI EXC-0206 SM

320/ 322 Excavator
Service Manual

SAFETY INSTRUCTIONS (CONT'D)

Fire Prevention

The machine and attachments have components that are at high temperature under normal operating conditions. The primary source of high temperatures is the engine and exhaust system. The electrical system, if damaged or incorrectly maintained, can be a source of arcs or sparks.

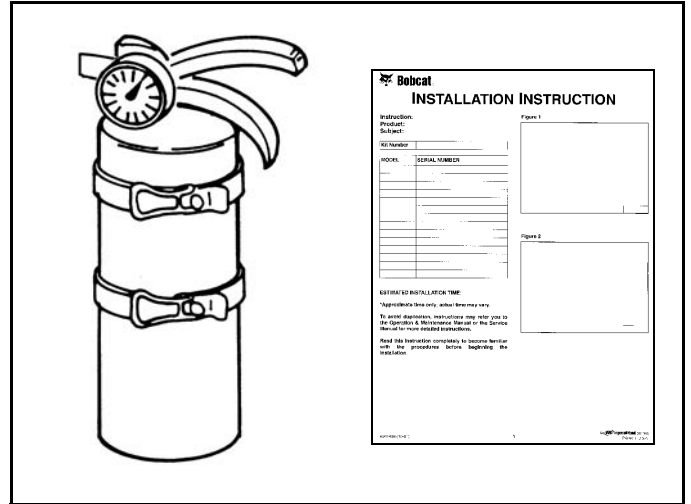
Flammable debris (leaves, straw, etc.) must be removed regularly. If flammable debris is allowed to accumulate, it will increase fire hazard. Clean often to avoid this accumulation. Flammable debris in the engine compartment is a potential hazard.

The spark arrestor muffler is designed to control the emission of hot particles from the engine and exhaust system, but the muffler and the exhaust gases are still hot.

- Do not use the machine where exhaust, arcs, sparks or hot components can contact flammable material, explosive dust or gases.
- The operator cab, engine compartment, and engine cooling system must be inspected every day and cleaned if necessary to prevent fire hazard and overheating.
- Check all electrical wiring and connections for damage. Keep the battery terminals clean and tight. Repair or replace any damaged part.
- Check fuel and hydraulic tubes, hoses and fittings for damage and leakage. Never use open flame or bare skin to check for leaks. Tighten or replace any parts that show leakage. Always clean fluid spills. Do not use gasoline or diesel fuel for cleaning parts. Use commercial nonflammable solvents.
- Do not use ether or starting fluids on any engine which has glow plugs. These starting aids can cause explosion and injure you or bystanders.
- Always clean the machine, disconnect the battery, and disconnect the wiring from the controllers before welding. Cover rubber hoses, battery and all other flammable parts. Keep a fire extinguisher near the machine when welding. Have good ventilation when grinding or welding painted parts. Wear a dust mask when grinding painted parts. Toxic dust or gas can be produced.
- Stop the engine and let it cool before adding fuel. **NO SMOKING!**

- Use the procedure in the Operation & Maintenance Manual for connecting the battery and for jump starting.
- Use the procedure in the Operation & Maintenance Manual for cleaning the spark arrestor muffler (if equipped).

Figure 1



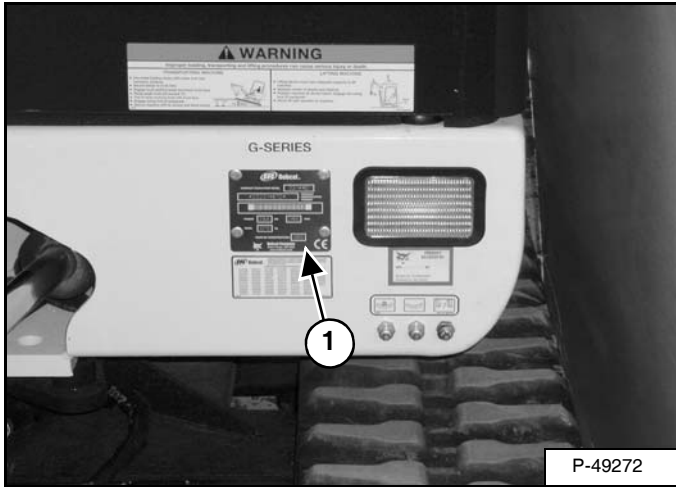
- Know where fire extinguishers and first aid kits are located and how to use them. Fire extinguishers are available from your Bobcat dealer [Figure 1].

SERIAL NUMBER LOCATIONS

Always use the serial number of the Excavator when requesting service information or when ordering parts. Early or later models (identification made by serial number) may use different parts, or it may be necessary to use a different procedure in doing a specific service operation.

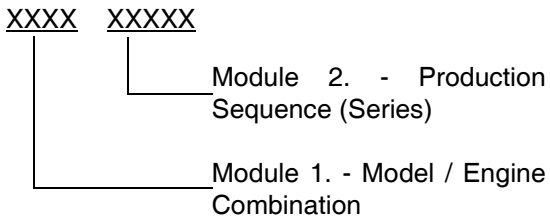
Excavator Serial Number

Figure 1



The Excavator serial number plate (Item 1) is located on the frame of the machine in the location shown [Figure 1].

Explanation of Excavator Serial Number:



1. The four digit Model/Engine Combination Module number identifies the model number and engine combination.

2. The five digit Production Sequence Number identifies the order which the Excavator is produced.

Engine Serial Number

Figure 2

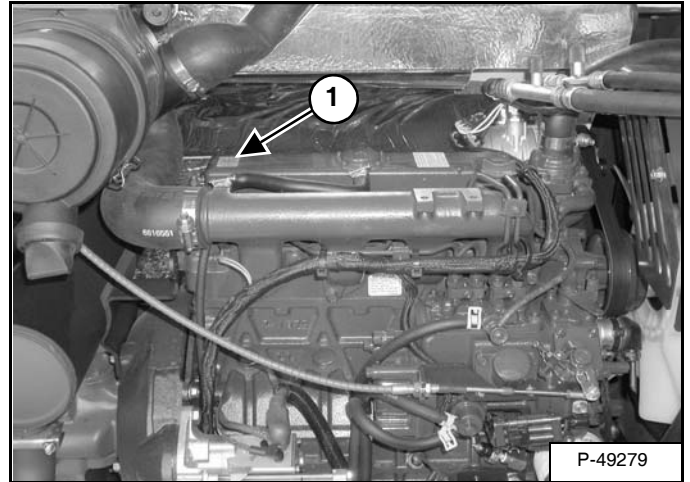
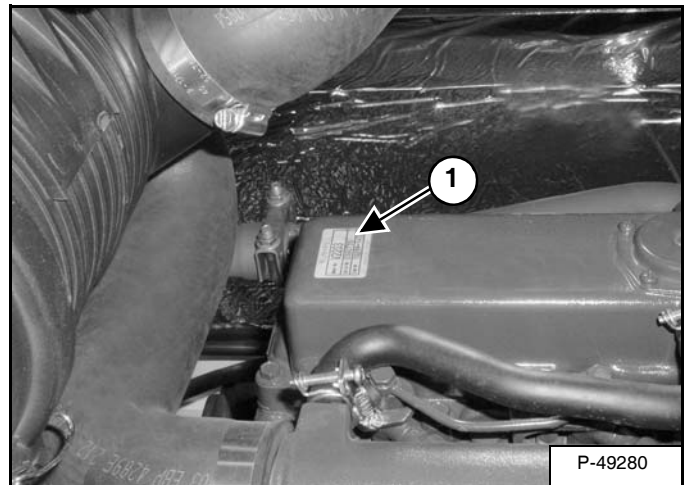


Figure 3



The engine serial number (Item 1) [Figure 2] & [Figure 3] is located on the engine in the locations shown.

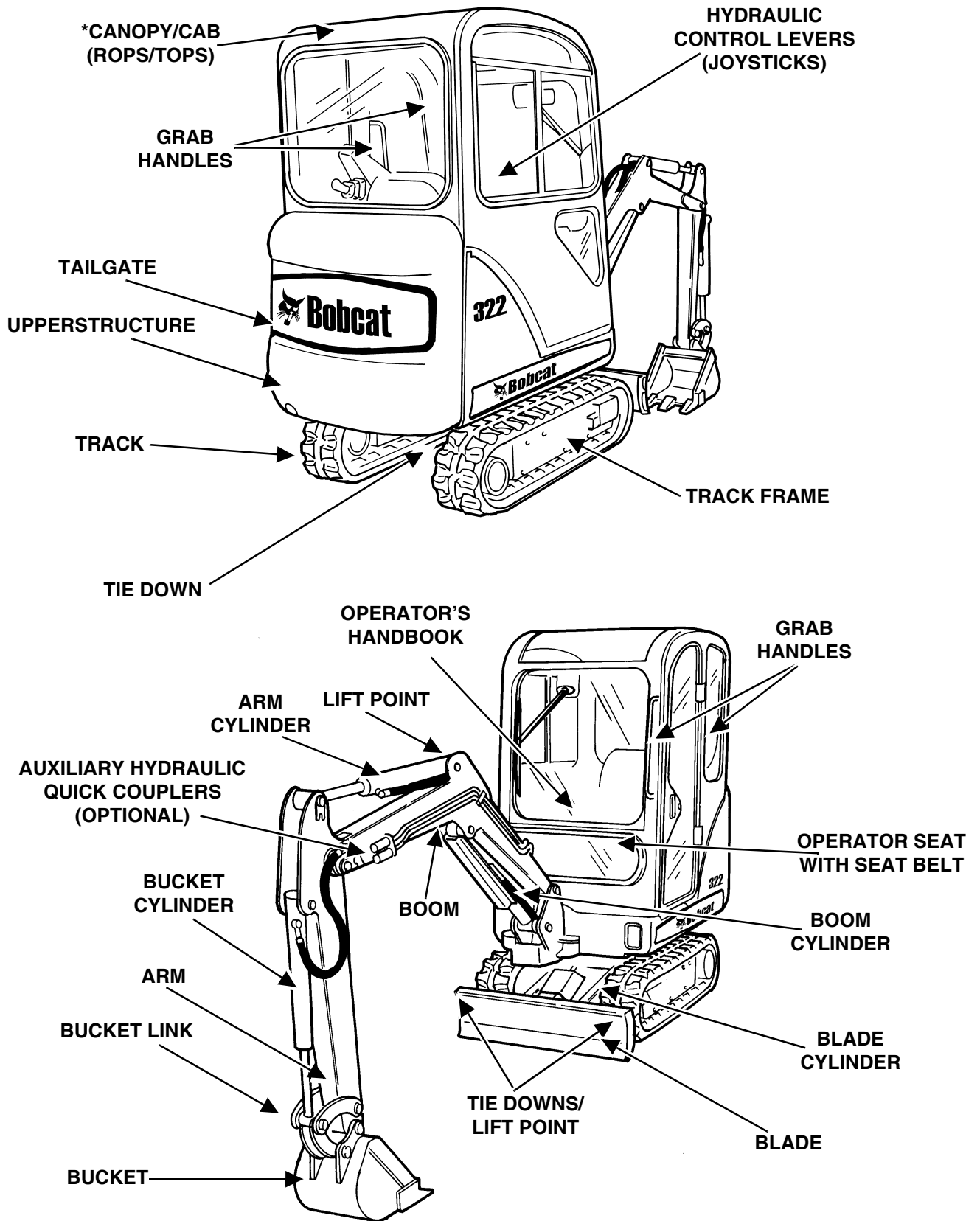
DELIVERY REPORT

Figure 4

The diagram shows a form layout for a delivery report. It features a main title 'DELIVERY REPORT' at the top. Below the title, there are two columns of horizontal lines representing text input fields. On the left side, there is a section with a dark header containing the word 'WARNING' in white capital letters, followed by several lines of text. At the bottom right of the form, there is a small rectangular box containing the alphanumeric code 'B-16315'.

The delivery report must be filled out by the dealer and signed by the owner or operator when the Bobcat Excavator is delivered. An explanation of the form must be given to the owner. Make sure it is filled out completely **[Figure 4]**.

BOBCAT EXCAVATOR IDENTIFICATION



* FOGS (Falling Object Guards) is available from your Bobcat Excavator dealer.

B-23067
B-23066

SAFETY AND MAINTENANCE

AIR CLEANER SERVICE 10-60-1
 Daily Check 10-60-1
 Replacing The Filters. 10-60-1

ALTERNATOR BELT 10-140-1
 Adjusting The Alternator Belt 10-140-1

CONTROL CONSOLE LOCKOUTS 10-160-1
 Inspection And Maintenance 10-160-1

ENGINE COOLING SYSTEM 10-70-1
 Checking Coolant Level. 10-70-1
 Cleaning The Cooling System 10-70-1
 Replacing The Coolant 10-70-2

ENGINE LUBRICATION SYSTEM 10-90-1
 Checking Engine Oil 10-90-1
 Oil Chart. 10-90-1
 Replacing Oil And Filter. 10-90-2

FUEL SYSTEM 10-80-1
 Draining The Fuel Tank 10-80-3
 Filling The Fuel Tank 10-80-1
 Fuel Specifications. 10-80-1
 Removing Air From The Fuel System 10-80-3
 Removing Water From The Fuel Filter. 10-80-2
 Replacing The Fuel Filter. 10-80-2

HEATER AIR FILTERS. 10-61-1
 Fresh Air Filter 10-61-1
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HYDRAULIC SYSTEM 10-100-1
 Checking And Adding Hydraulic Oil. 10-100-1
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 Procedure 10-10-1

LIFTING THE EXCAVATOR. 10-12-1

LUBRICATION OF THE HYDRAULIC EXCAVATOR. 10-110-1

Continued On Next Page

SAFETY AND MAINTENANCE (CONT'D)

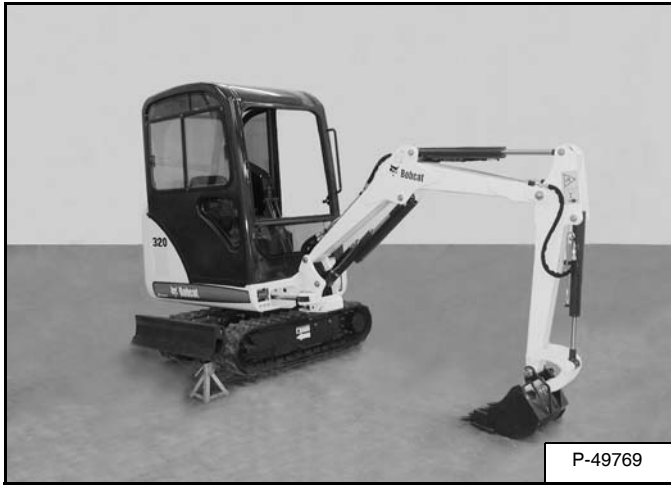
OPERATOR CAB ROPS/TOPS	10-20-1
Cab Door	10-20-1
Emergency Exits	10-20-1
Front Window	10-20-2
Right Side Windows	10-20-4
SEAT BELT	10-150-1
Inspection And Maintenance	10-150-1
SERVICE SCHEDULE	10-50-1
Chart	10-50-1
SPARK ARRESTOR MUFFLER	10-130-1
SWING LOCK	10-11-1
TAILGATE	10-40-1
Adjusting The Bumper	10-40-1
Adjusting The Tailgate Latch	10-40-1
Opening And Closing The Tailgate	10-40-1
TRANSPORTING THE EXCAVATOR	10-30-1
TRAVEL MOTOR	10-120-1
Checking Oil Level	10-120-1
Draining The Travel Motor	10-120-1

LIFTING AND BLOCKING THE EXCAVATOR

Procedure

Always park the machine on a level surface.

Figure 10-10-1



Raise one side of the machine (approximately 4 inches) using the boom and arm as shown in **[Figure 10-10-1]**.

Raise the blade fully and install jackstands under the blade and the track frame. Lower the machine until all machine weight is on the jackstands.

Stop the engine.

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

WARNING

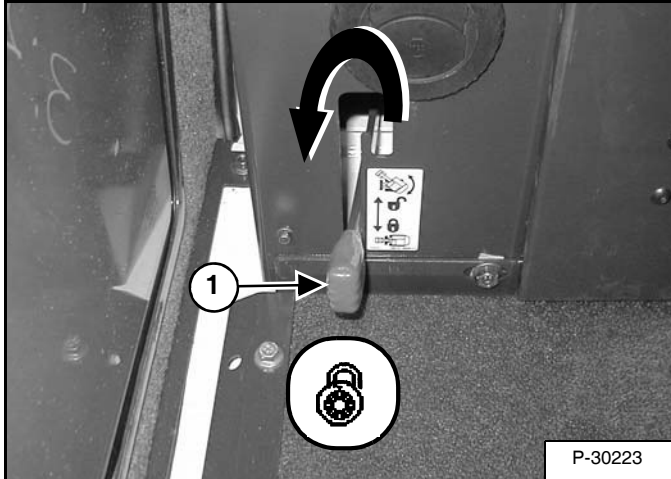
AVOID INJURY OR DEATH

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

W-2142-0189

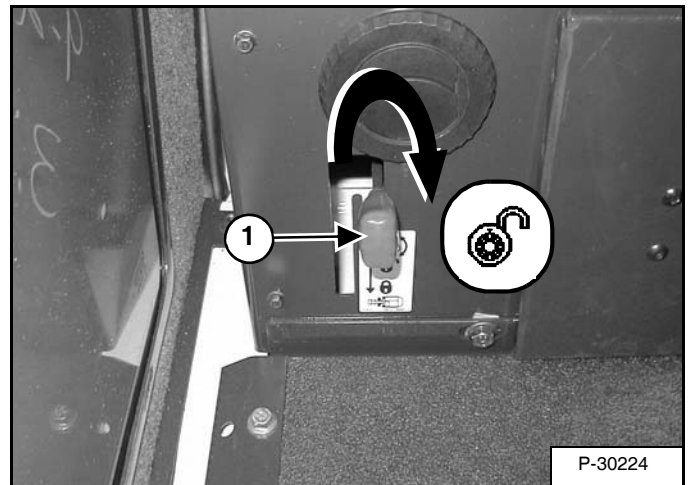
SWING LOCK

Figure 10-11-2



Move the lever (Item 1) [Figure 10-11-2] *down* to engage the Slew Lock. When the Slew Lock is engaged (locked), the upperstructure of the Excavator is locked to the track frame and will not rotate. The upper structure must be parallel to the track frame to engage the Slew Lock.

Figure 10-11-3



Move the lever (Item 1) [Figure 10-11-3] *up* to disengage the upperstructure from the track frame. Secure the lever in the unlocked position.

 **WARNING**

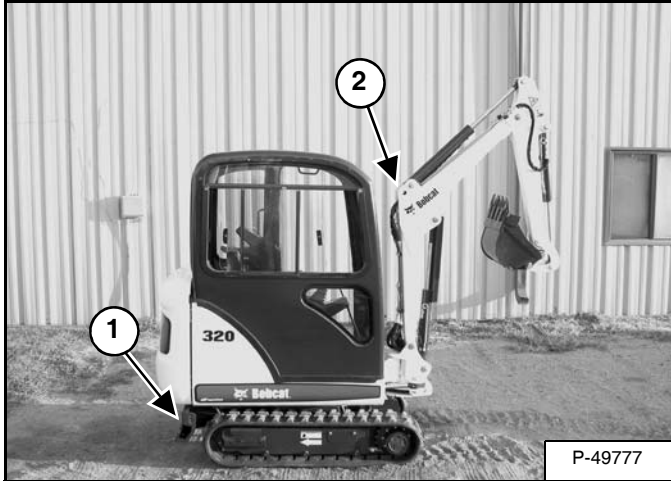
AVOID INJURY

The slew lock lever must be engaged when transporting the machine.

W-2197-1203

LIFTING THE EXCAVATOR

Figure 10-12-4



Fully extend the cylinders of the bucket, arm, and boom so that the Excavator is in the position as shown [Figure 10-12-4].

Engage the upperstructure slew lock. (See SWING LOCK on Page 10-11-1.)

Raise the blade all the way.

Put all the control levers in neutral.

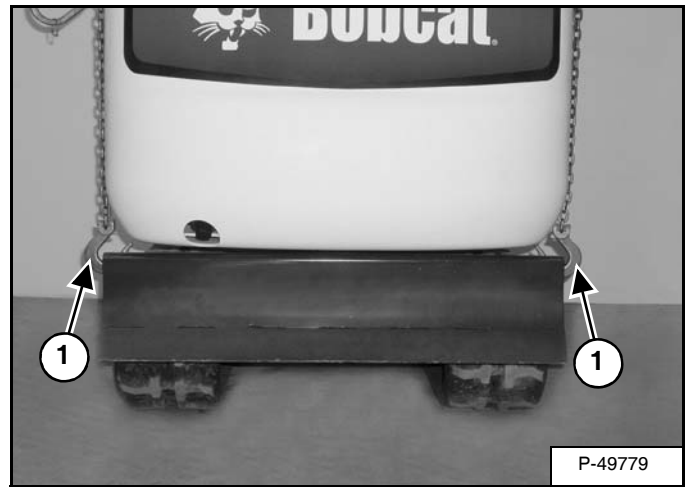


AVOID INJURY OR DEATH

- Use a lifting fixture with sufficient capacity for the weight of the Excavator plus any added attachments.
- Maintain center of gravity and balance when lifting.
- Do not swing boom or upperstructure. Engage the slew locking lever.
- Never lift with operator on machine.

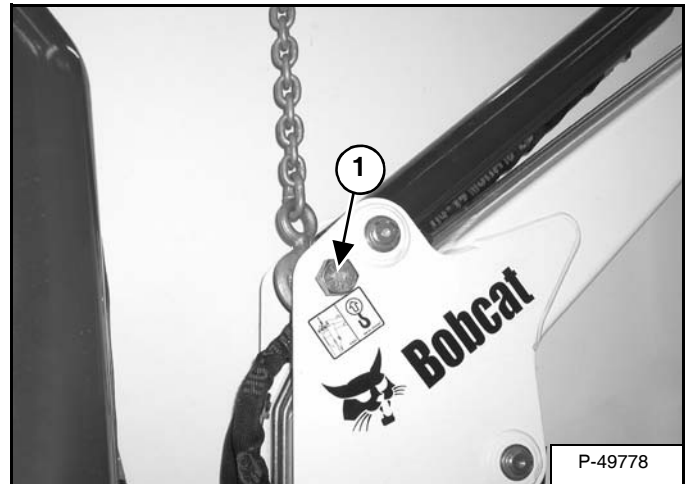
W-2202-0595

Figure 10-12-5



Fasten chains to the ends of the blade (Item 1) [Figure 10-12-4] and [Figure 10-12-5] and up to a lifting fixture above the canopy/cab. The lifting fixture must extend over the sides of the canopy/cab to prevent the chains from hitting the ROPS/TOPS.

Figure 10-12-6



Install a one inch (25 mm) bolt and nut (Grade 5 or 8) through the holes at the boom (Item 1) [Figure 10-12-4] and [Figure 10-12-6]. Fasten a chain from the bolt to the lift fixture.

OPERATOR CAB ROPS/TOPS

Emergency Exits

The left door, front window, and right side rear window provide exits.

Figure 10-20-7



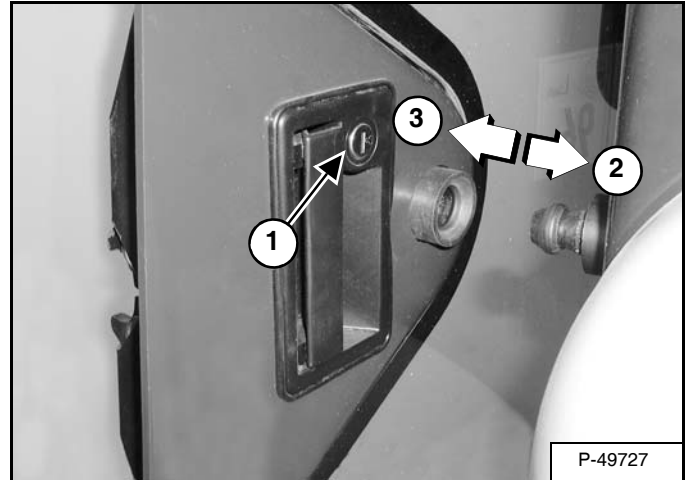
Figure 10-20-8



Slide the window to the front of the Excavator and exit through the side window [Figure 10-20-7], or open the front window and exit [Figure 10-20-8].

Cab Door

Figure 10-20-9



The cab door can be locked (Item 1) [Figure 10-20-9] with the same key as the starter switch.

Push the door all the way open (Item 2) [Figure 10-20-9] until the latch engages to hold the door in the open position.

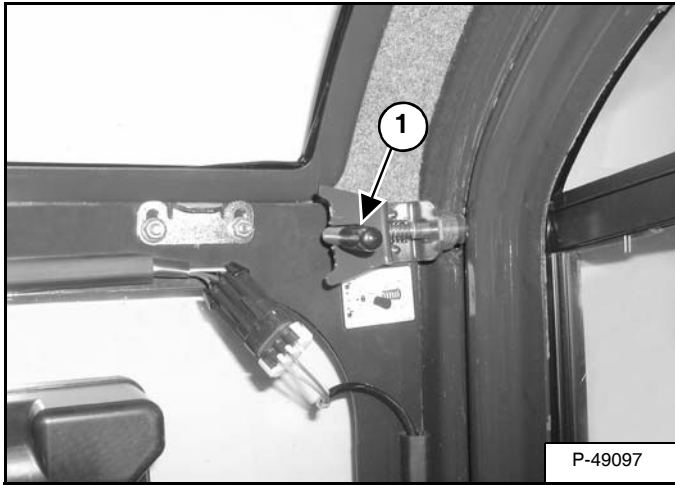
Pull the door away from the cab (Item 3) [Figure 10-20-9] to disengage the latch and close the door.

OPERATOR CAB (ROPS / TOPS) (CONT'D)

Front Window

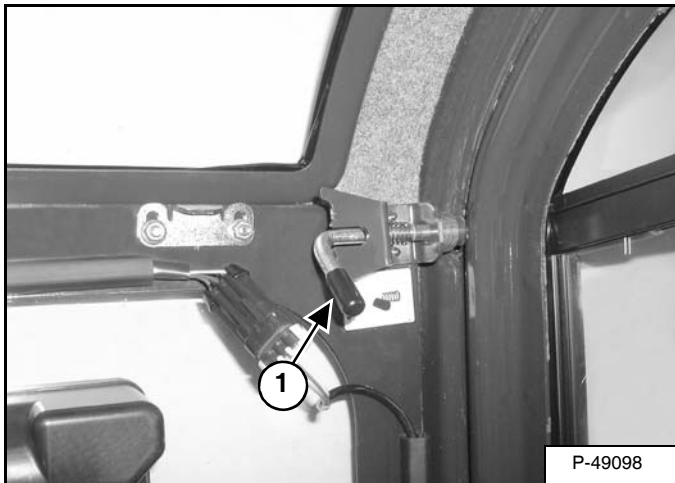
Opening The Front Window

Figure 10-20-10



Retract the two top window latch pins (Item 1) [Figure 10-20-10].

Figure 10-20-11



Turn the two top latches (Item 1) [Figure 10-20-11] to the unlocked position.

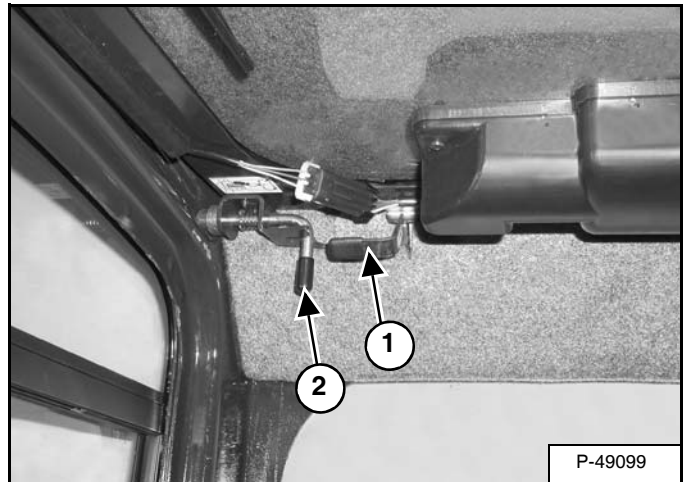
Figure 10-20-12



Use both window grab handles to pull the top of the window in [Figure 10-20-12].

Continue moving the window in and up over the operator's head until the window is fully raised.

Figure 10-20-13



When the window is fully raised, the latch (Item 1) will close on the bracket. Turn the two top latches (Item 2) [Figure 10-20-13] to the locked position.

OPERATOR CAB (ROPS/TOPS) (CONT'D)

Closing The Front Window

Support the window while releasing both window latch pins and placing the pins in the unlocked position **[Figure 10-20-13 on Page 10-20-2]**.

Support the window using the left grab handle and pull down on the latch (Item 1) **[Figure 10-20-13 on Page 10-20-2]** to release the window.

Use both window grab handles to pull the window down **[Figure 10-20-12 on Page 10-20-2]**.

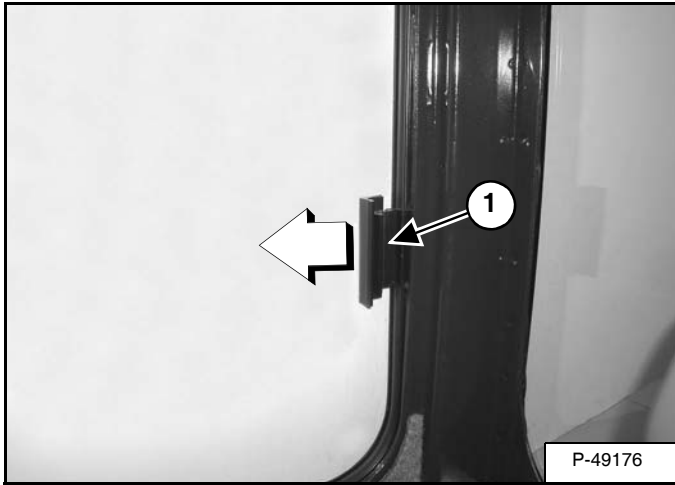
Rotate the top latches (Item 1) **[Figure 10-20-11 on Page 10-20-2]** to the locked position (Item 1) **[Figure 10-20-10 on Page 10-20-2]**.

OPERATOR CAB (ROPS/TOPS) (CONT'D)

Right Side Windows

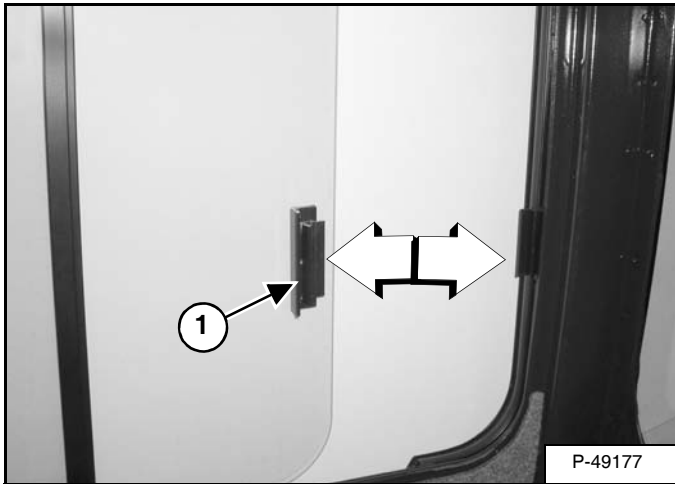
Opening the right rear window

Figure 10-20-14



Pull forward on the latch (Item 1) [Figure 10-20-14].

Figure 10-20-15

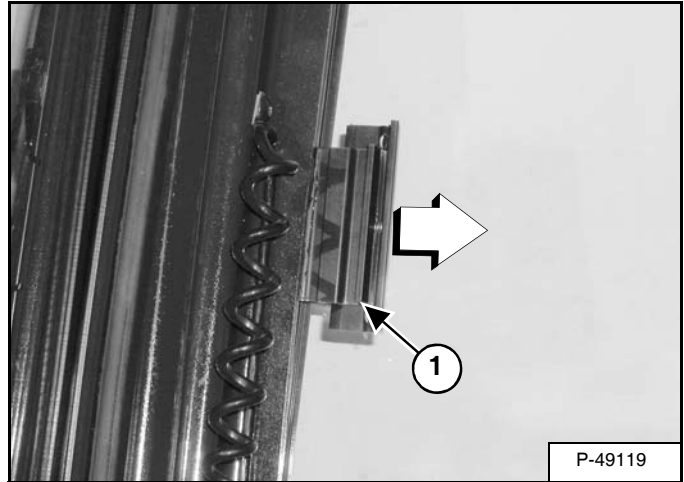


Pull the latch/handle (Item 1) [Figure 10-20-15] forward to open the window.

Push the handle back to close the window.

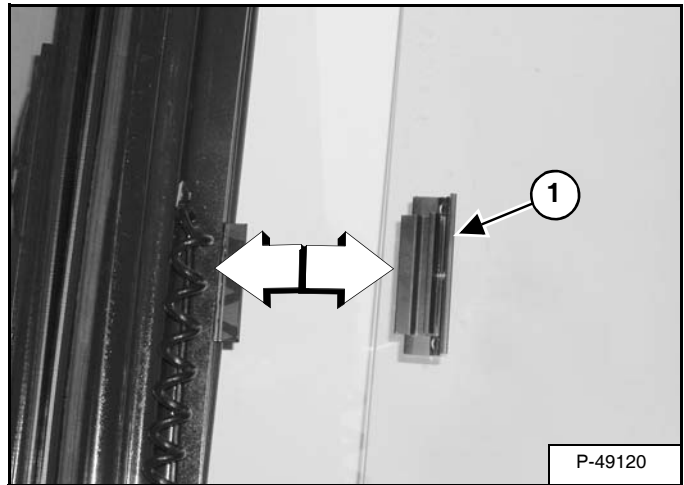
Opening the right front window

Figure 10-20-16



Pull back on the latch (Item 1) [Figure 10-20-16].

Figure 10-20-17



Pull the latch/handle (Item 1) [Figure 10-20-17] back to open the window.

Push the handle forward to close the window.

TRANSPORTING THE EXCAVATOR

When transporting the machine, observe the rules, motor vehicle laws and vehicle limit ordinances. Use a transport and towing vehicle of adequate length and capacity.

Secure the parking brakes and block the wheels of the transport vehicle.

Remove the blade extensions (if equipped). See Blade Extension Removal And Installation. (See Extension Removal And Installation on Page 30-10-1)

Retract the track frame if required. See the correct Operation And Maintenance Manual for the proper procedure.

Align the ramps with the center of the transport vehicle. Secure the ramps to the truck bed and be sure ramp angle does not exceed 15 degrees.

Use metal loading ramps with a slip resistant surface that are the correct length and width, and can support the weight of the machine.

The rear of the trailer must be blocked or supported when loading or unloading the Excavator to prevent the front of the transport vehicle from raising.

Determine the direction of the track movement before moving the machine (blade forward). Engage the slew lock . (See SWING LOCK on Page 10-11-1.)

Figure 10-30-18



Move the machine forward onto the transport vehicle [Figure 10-30-18].

Do not change direction of the machine while it is on the ramps. Lower the boom, arm, and bucket to the transport vehicle.

Stop the engine and remove the key. Put blocks under the front and rear of the tracks.

Figure 10-30-19



Figure 10-30-20



Fasten chains to the front corners of the blade and to the tie down loop at the rear [Figure 10-30-19] & [Figure 10-30-20] to prevent it from moving when going up or down slopes, or during sudden stops.

Use chain binders to tighten the chains and then safely tie the chain binder levers to prevent loosening.

WARNING

Adequately designed ramps of sufficient strength are needed to support the weight of the machine when loading onto a transport vehicle. Wood ramps can break and cause personal injury.

W-2058-0494

TAILGATE

Opening And Closing The Tailgate



AVOID INJURY OR DEATH

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

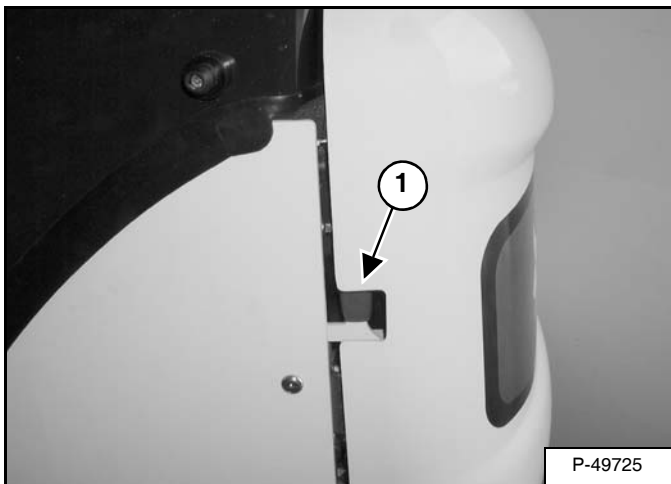
W-2012-0497



Keep the rear door closed when operating the machine. Failure to do so could seriously injure a bystander.

W-2020-1285

Figure 10-40-1



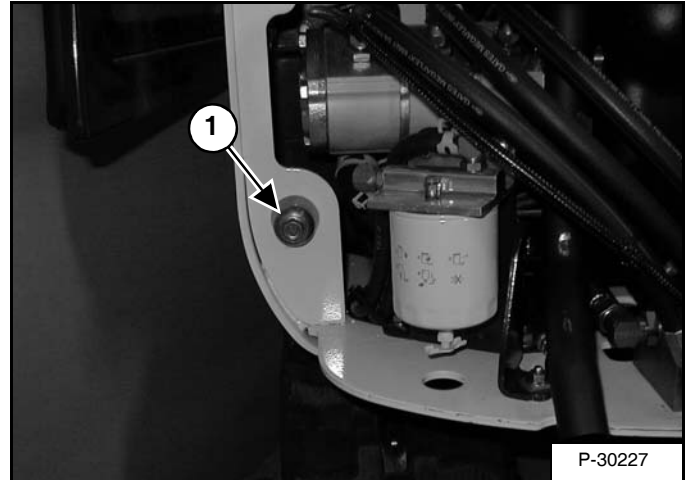
Release the latch (Item 1) [Figure 10-40-1] and pull the tailgate open.

Push firmly to close the tailgate.

Note: The tailgate can be locked using the start key.

Adjusting The Bumper

Figure 10-40-2

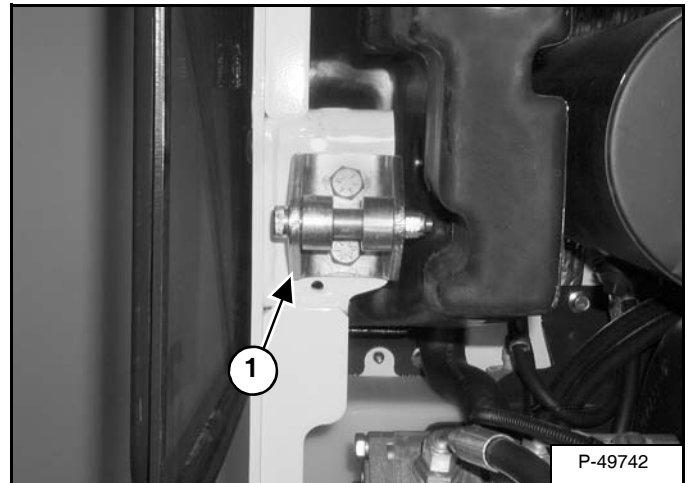


The door bumper (Item 1) [Figure 10-40-2] can be adjusted for alignment with the tailgate.

Close the tailgate before operating the Excavator.

Adjusting The Tailgate Latch

Figure 10-40-3



The door catch (Item 1) [Figure 10-40-3] can be adjusted by loosening the two bolts, moving the catch, and tightening the two bolts.

Close the tailgate before operating the Excavator.

SERVICE SCHEDULE

Chart

Maintenance work must be done at regular intervals. Failure to do so will result in excessive wear and early failures. The service schedule is a guide for correct maintenance of the Bobcat Excavator.



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

SERVICE SCHEDULE		HOURS					
ITEM	SERVICE REQUIRED	8-10	50	100	250	500	■ 1000
Engine Coolant	Check coolant level. Add premixed coolant as needed.						
Engine Oil	Check the engine oil level and add as needed.						
Hydraulic Fluid, Hoses and Tubelines	Check the hydraulic fluid level and add as needed. Check for damage and leaks. Repair or replace as needed.						
Engine Air Filter and Air System	Check condition indicator and empty dust cup as needed. Check air system for leaks.						
Tracks	Check and adjust track tension as needed.						
Indicators and Lights	Check for correct operation of all indicators and lights.						
Control Console Lockout	Check for proper function. Repair or replace as needed.						
Operator Canopy/Cab	Check condition. Check mounting hardware.						
Seat Belt	Check condition. Check mounting hardware.						
Safety Signs and Safety Treads	Check for damaged signs (decals) and safety treads. Replace any signs or safety treads that are damaged or worn.						
Pivot Points	Grease all machinery pivot points.						
Cab Heater Air Filter (Option)	Clean the filter as needed.						
Swing Circle and Pinion	Grease three fittings.						
Fuel Tank & Filter	Drain water and sediment from fuel tank and fuel filter.						
Battery	Check battery, cables, connections and electrolyte level. Add distilled water as needed.						
Engine Oil and Filter	Replace oil & filter. Use CD or better grade oil and Bobcat filter.		•				
Alternator / Fan Belt	Check condition of belt and adjust as needed.		•				
Spark Arrestor Muffler	Clean the spark chamber.						
Fuel Filter	Replace fuel filter.						
Travel Motor	Check lubricant level in both travel motors.			••			
Radiator, & Oil Cooler	Clean debris from the radiator fins.						
Hydraulic Filter	Replace the filter.			••			
Engine Air Cleaner	Replace the air cleaner filter.						
Alternator & Starter	Check the alternator and starter connections.			••			
Engine Valves	Check and adjust the engine valve clearance.						
Case Drain Filter	Replace the filter.						
Travel Motor	Replace lubricant in both travel motors.						
Engine Cooling System	Drain and flush the cooling system. Replace premixed coolant.						
Hydraulic System	Replace the hydraulic fluid and filters. Clean the reservoir.			••			

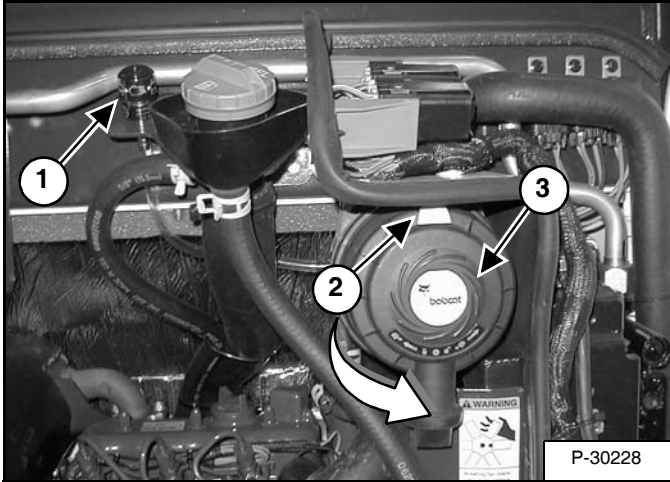
- Also at first 50 hours
- Also at first 100 Hours
- Or every 6 months.

AIR CLEANER SERVICE

See the SERVICE SCHEDULE for the correct service interval. (See SERVICE SCHEDULE on Page 10-50-1.)

Daily Check

Figure 10-60-4



Check the condition indicator (Item 1) [Figure 10-60-4]. If the red ring shows in the condition indicator, the filter needs to be replaced.

Replace the inner filter every third time the outer filter is replaced or as indicated.

Replacing The Filters

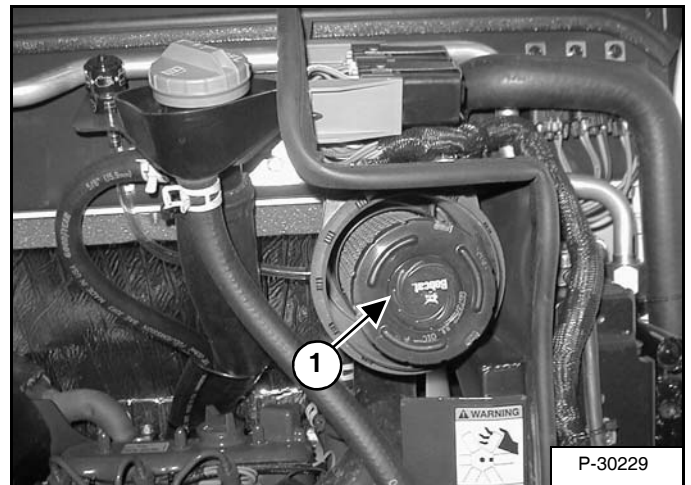
Outer Filter

Pull the locking tab (Item 2) [Figure 10-60-4].

Turn the dust cup (Item 3) [Figure 10-60-4] counter-clockwise about 1/8 turn.

Remove and clean the dust cup.

Figure 10-60-5



Pull the outer filter (Item 1) [Figure 10-60-5] from the air cleaner housing.

Check the housing for damage.

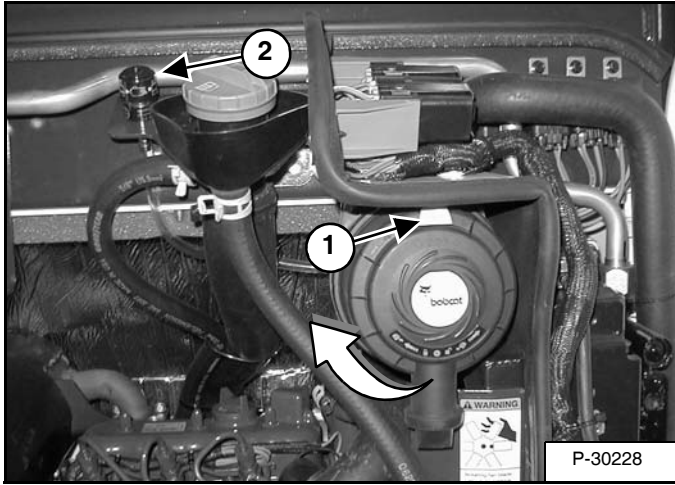
Clean the housing and the seal surface. DO NOT use compressed air.

Install a new outer filter.

AIR CLEANER (CONT'D)

Replacing The Filters (Cont'd)

Figure 10-60-6



Install the dust cup and turn about 1/8 turn [Figure 10-60-6].

Push locking tab in (Item 1) [Figure 10-60-6].

Check the air intake hose and the air cleaner housing for damage. Make sure all connections are tight.

Inner Filter

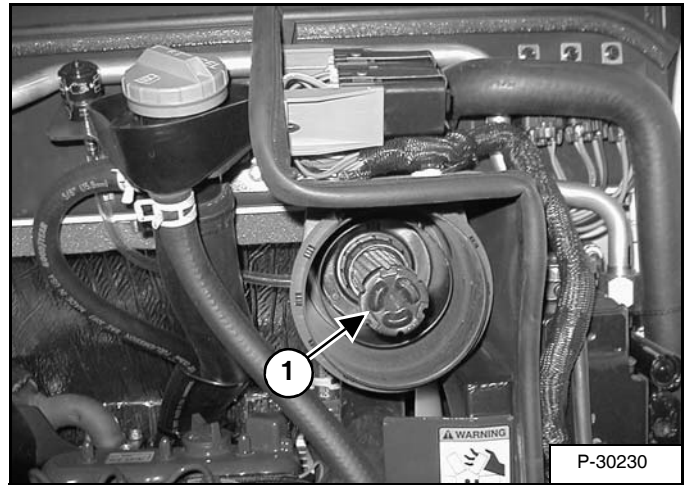
Only replace the inner filter under the following conditions:

- Replace the inner filter every *third* time the outer filter is replaced.
- After the outer filter has been replaced, press the button (Item 2) [Figure 10-60-6] on the top of the condition indicator and start the engine. Run at full RPM, then reduce engine speed and stop the engine. If the red ring shows in the condition indicator, replace the inner filter.

Remove the dust cup, outer filter and inner filter.

NOTE: Make sure all sealing surfaces are free of dirt and debris.

Figure PM-7



Install the new inner filter. [Figure PM-7].

Install the outer filter and the dust cup.

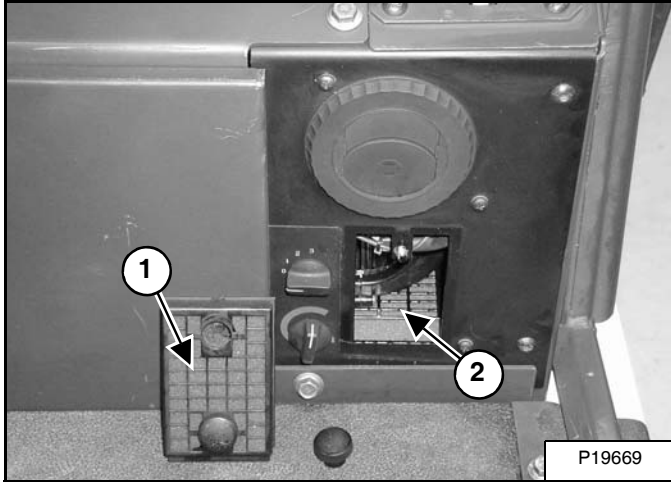
Press the button on the condition indicator to remove the red ring.

HEATER AIR FILTERS

Recirculation Filter

The recirculation filter must be cleaned regularly. The filter is located at the left of the operator seat.

Figure 10-61-8



The recirculation filter is located on the front of the heater panel (Item 1) [Figure 10-61-8].

Remove the knobs and remove the filter. Wash the filter with a mild detergent and water. Dry the filter before installing. Install the filter and tighten knobs.

Fresh Air Filter

The fresh air filter must be cleaned regularly.

The fresh air filter is located on the bottom of the heater, (Item 2) [Figure 10-61-8].

Remove the filter. Wash the filter with a mild detergent and water. Dry the filter before installing. Install the filter and secure.

ENGINE COOLING SYSTEM

Check the cooling system every day to prevent overheating, loss of performance or engine damage.

Cleaning The Cooling System

Open the tailgate.

Use air pressure or water pressure to clean the radiator and oil cooler.

Checking Coolant Level



AVOID BURNS

Do not remove radiator cap when the engine is hot. You can be seriously burned.

W-2070-1003

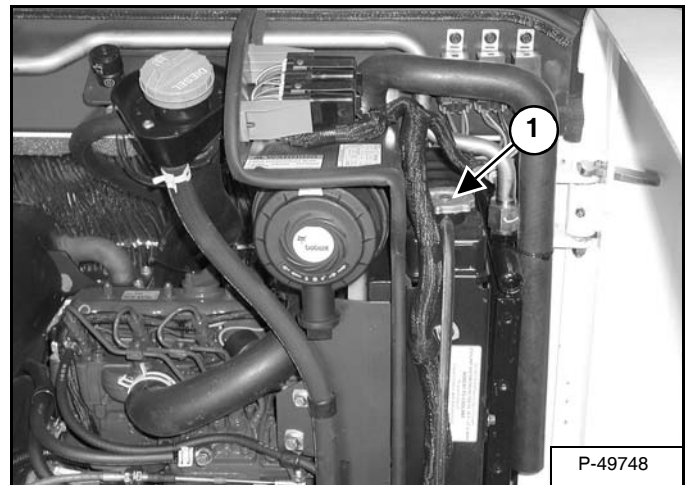


Wear safety glasses to prevent eye injury when any of the following conditions exist:

- When fluids are under pressure.
- Flying debris or loose material is present.
- Engine is running.
- Tools are being used.

W-2019-1285

Figure 10-70-9



When the engine is cool, remove the radiator cap (Item 1) [Figure 10-70-9].

The coolant level must be 0.750 to 1.0 inch (20 - 25 mm) below the filler neck.

If the coolant level is low, add premixed coolant to the radiator.



AVOID ENGINE DAMAGE

Always use the correct ratio of water to antifreeze.

Too much antifreeze reduces cooling system efficiency and may cause serious premature engine damage.

Too little antifreeze reduces the additives which protect the internal engine components; reduces the boiling point and freeze protection of the system.

Always add a premixed solution. Adding full strength concentrated coolant can cause serious premature engine damage.

I-2124-0497

ENGINE COOLING SYSTEM (CONT'D)

Replacing The Coolant

See the SERVICE SCHEDULE for correct service intervals. (See SERVICE SCHEDULE on Page 10-50-1.)

Turn the upperstructure so there is access to the engine and radiator from between the tracks. Stop the engine.

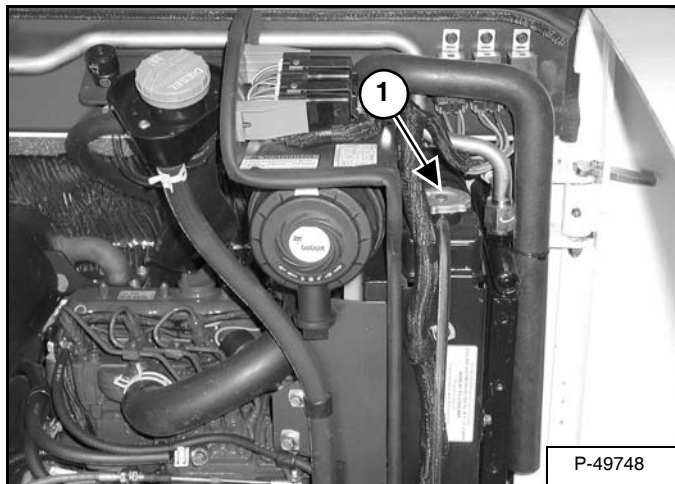
! WARNING

AVOID BURNS

Do not remove radiator cap when the engine is hot. You can be seriously burned.

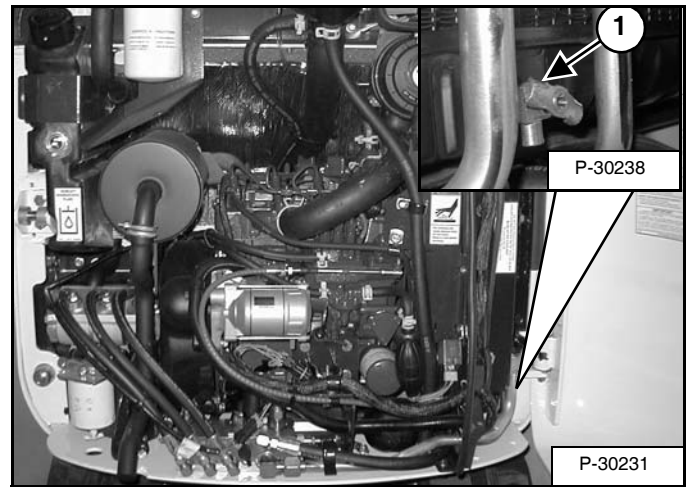
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Figure 10-70-10



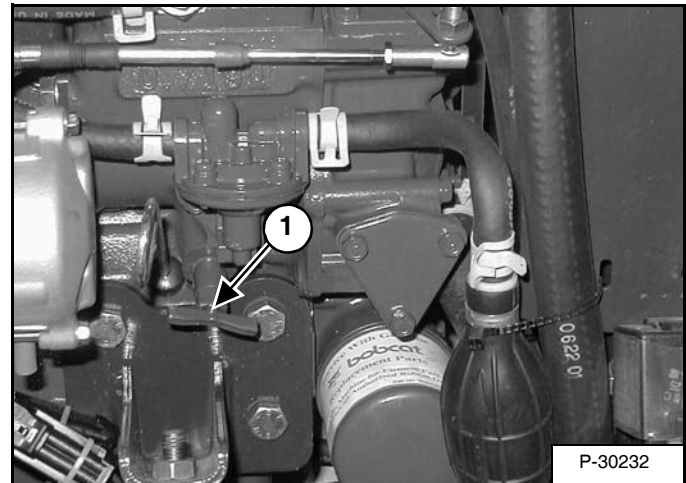
When the engine is cool, loosen and remove the radiator cap (Item 1) [Figure 10-70-10].

Figure PM-11



Open the drain valve (Item 1) [Figure PM-11] at the bottom of the radiator and drain the coolant into a container.

Figure 10-70-12



Open the drain valve (Item 1) [Figure 10-70-12] on the engine block and drain the coolant into a container.

After all the coolant is removed, close the drain valve.

Recycle or dispose of the used coolant in an environmentally safe manner.

Mix the coolant in a separate container. (See FUEL, COOLANT AND LUBRICANTS on Page SPEC-60-1.)

NOTE: The cooling system is factory filled with propylene glycol (purple color). DO NOT mix propylene glycol with ethylene glycol.

ENGINE COOLING SYSTEM (CONT'D)

Replacing The Coolant (Cont'd)

Add premixed coolant; 47% water and 53% propylene glycol to the recovery tank if the coolant level is low.

One gallon and one pint of propylene glycol mixed with one gallon of water is the correct mixture of coolant to provide a -34°F (-37°C) freeze protection.

IMPORTANT

AVOID ENGINE DAMAGE

Always use the correct ratio of water to antifreeze.

Too much antifreeze reduces cooling system efficiency and may cause serious premature engine damage.

Too little antifreeze reduces the additives which protect the internal engine components; reduces the boiling point and freeze protection of the system.

Always add a premixed solution. Adding full strength concentrated coolant can cause serious premature engine damage.

I-2124-0497

Use a refractometer to check the condition of propylene glycol in your cooling system.

Add premixed coolant until the level is correct.

Run the engine until it is at operating temperature. Stop the engine. Check the coolant level and add as needed. Install the radiator cap and tighten.

Add coolant to the recovery tank as needed.

Close the tailgate.

FUEL SYSTEM

Fuel Specifications

Use only clean, high quality diesel fuel, Grade No. 2 or Grade No. 1.

The following is a suggested blending guideline which should prevent fuel gelling problems during freezing temperature

Temp. F° (C°)	No. 2	No. 1
+15° (9°)	100%	0%
Down to -20° (-29°)	50%	50%
Below -20° (-29°)	0%	100%

See your fuel supplier for local recommendations.



Stop and cool the engine before adding fuel. NO SMOKING! Failure to obey warnings can cause an explosion or fire.

W-2063-0887



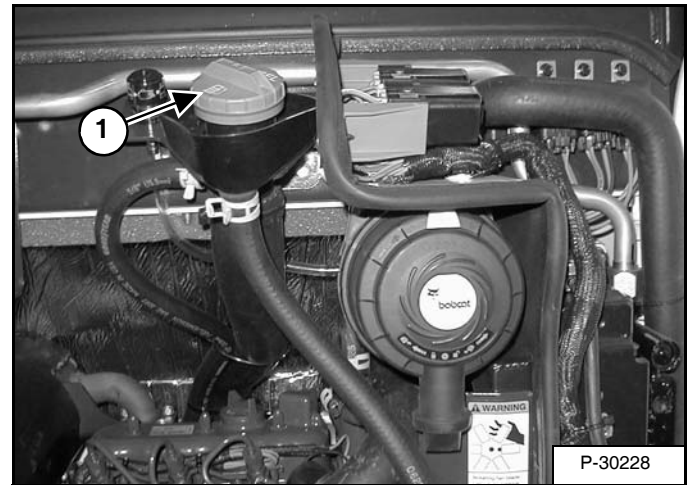
Always clean up spilled fuel or oil. Keep heat, flames, sparks or lighted tobacco away from fuel and oil. Failure to use care around combustibles can cause explosion or fire which can result in injury or death.

W-2103-1285

Filling The Fuel Tank

Open the tailgate.

Figure 10-80-1



Remove the fuel fill cap (Item 1) [Figure 10-80-1].

Use a clean, approved safety container to add fuel. Add fuel only in an area that has a free movement of air and no flames or sparks. **NO SMOKING!**

Install and tighten the fuel fill cap. Close the tailgate.

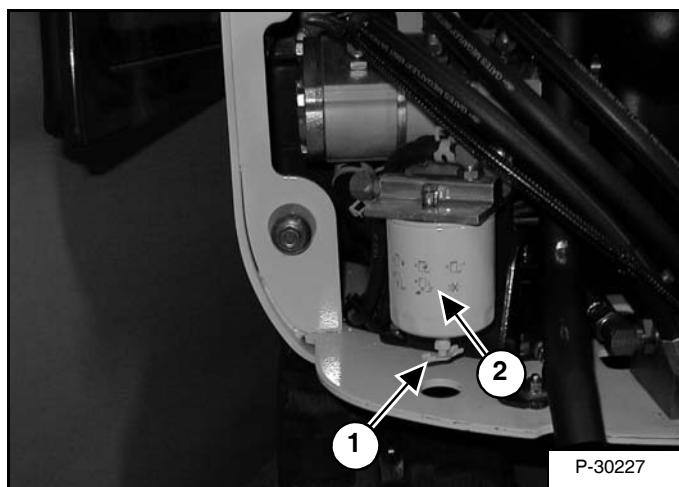
See the SERVICE SCHEDULE for the service interval when to remove water from or replace the fuel filter. (See SERVICE SCHEDULE on Page 10-50-1.)

FUEL SYSTEM (CONT'D)

Removing Water From The Fuel Filter

Open the tailgate.

Figure 10-80-2



Loosen the drain (Item 1) [Figure 10-80-2] at the bottom of the filter to drain water from the filter.

Replacing The Fuel Filter

Remove the filter (Item 2) [Figure 10-80-2].

Clean the area around the filter housing. Put clean oil on the seal of the new filter. Install the fuel filter and hand tighten.

Remove the air from the fuel system. See Removing Water From The Fuel Filter on Page 10-80-2

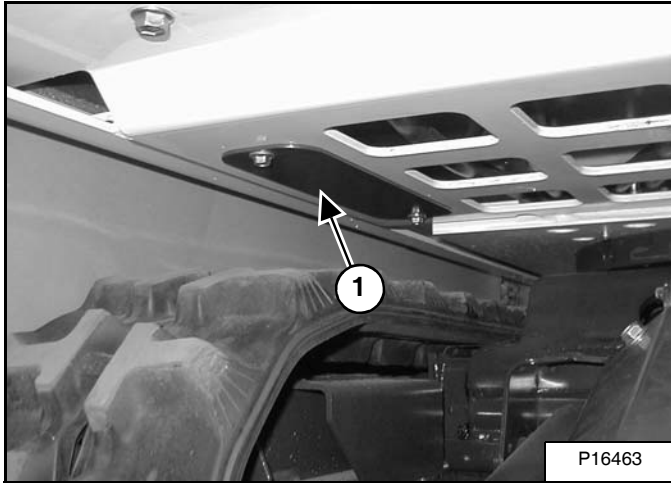
FUEL SYSTEM (CONT'D)

Draining The Fuel Tank

See the SERVICE SCHEDULE for the correct service interval. (See SERVICE SCHEDULE on Page 10-50-1.)

Turn the upperstructure until the fuel tank drain is centered between the rear tracks.

Figure 10-80-3



Remove the access panel (Item 1) [Figure 10-80-3] on the bottom of the engine compartment. Loosen the clamp and disconnect the fuel hose.

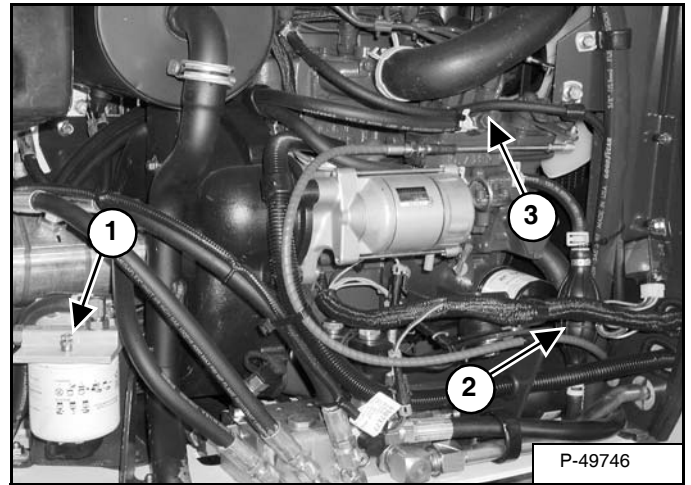
Drain the fuel into a container.

Reuse, recycle or dispose of fuel in an environmentally safe manner.

Removing Air From The Fuel System

After replacing the fuel filter or when the fuel tank has run out of fuel, air must be removed from the fuel system before starting the engine.

Figure 10-80-4



Open the fuel filter vent (Item 1) [Figure 10-80-4].

Operate the hand pump (priming bulb) (Item 2) [Figure 10-80-4] until the fuel flows from the vent with no air bubbles.

Close the vent (Item 1) [Figure 10-80-4] on the fuel filter housing.

Start the engine. It may be necessary to open the vent (Item 3) [Figure 10-80-4] (at the fuel injection pump) briefly until the engine runs smoothly.

WARNING

Diesel fuel or hydraulic fluid under pressure can penetrate skin or eyes, causing serious injury or death. Fluid leaks under pressure may not be visible. Use a piece of cardboard or wood to find leaks. Do not use your bare hand. Wear safety goggles. If fluid enters skin or eyes, get immediate medical attention from a physician familiar with this injury.

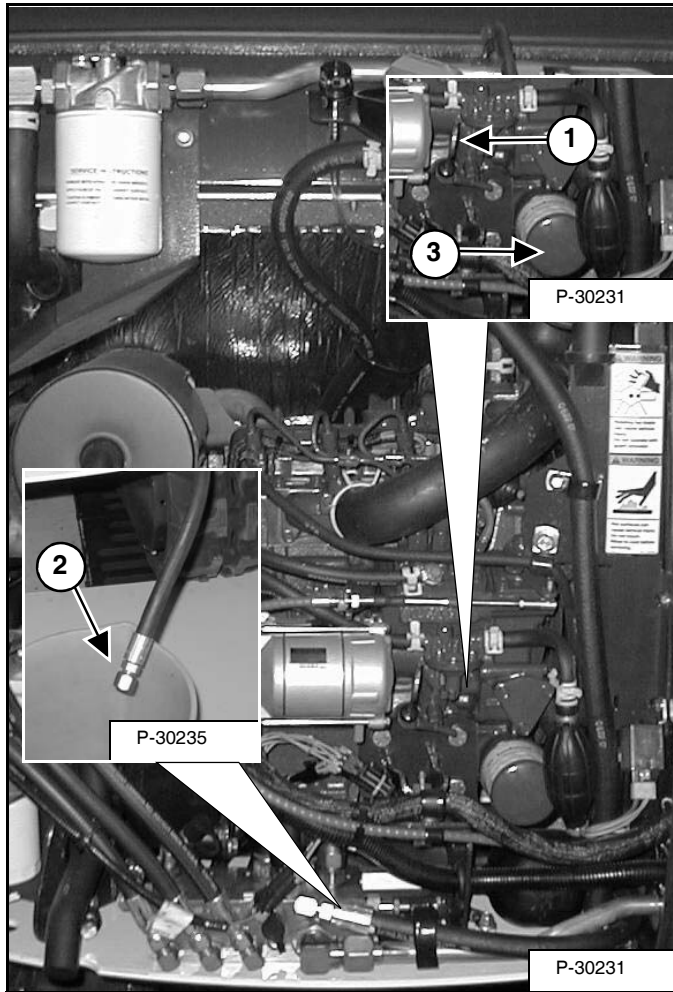
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ENGINE LUBRICATION SYSTEM

Checking Engine Oil

Check the engine oil every day before starting the engine for the work shift.

Figure 10-90-5

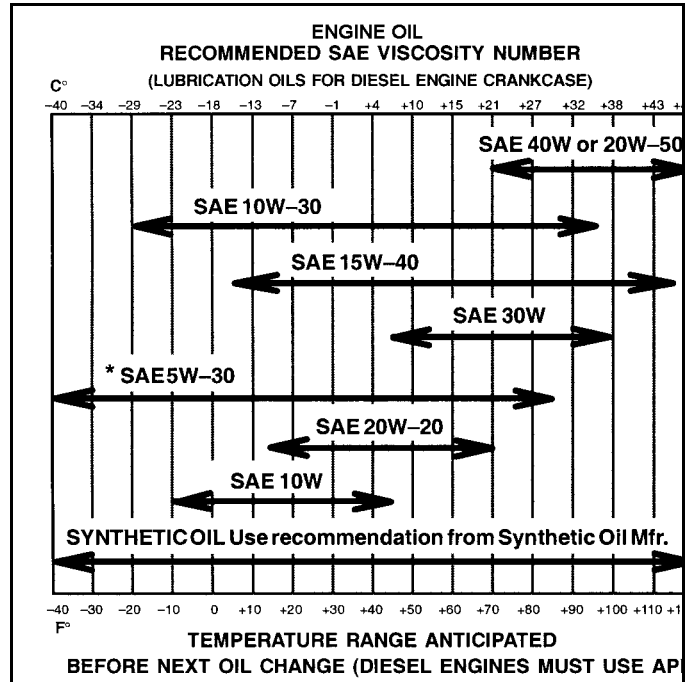


Open the rear door and remove the dipstick (Item 1) [Figure 10-90-5].

Keep the oil level between the marks on the dipstick.

Oil Chart

Figure 10-90-6



Use a good quality motor oil that meets the correct API Service Classification. See the oil chart [Figure 10-90-6].

ENGINE LUBRICATIONS SYSTEM (CONT'D)

Replacing Oil And Filter

See the SERVICE SCHEDULE for the service interval for replacing the engine oil and filter. (See SERVICE SCHEDULE on Page 10-50-1.)

Run the engine until it is at operating temperature. Stop the engine.

Open the rear door.

Remove the drain plug (Item 2) [Figure 10-90-5 on Page 1]. Drain the oil into a container and recycle or dispose of used oil in an environmentally safe manner.

Remove the oil filter element (Item 3) [Figure 10-90-5 on Page 1] and clean the filter housing surface.

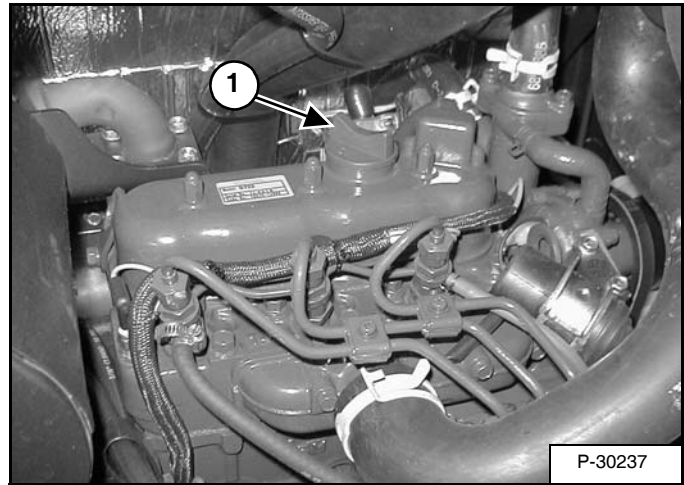
Use a genuine Bobcat filter element.

Put clean oil on the filter gasket.

Install the filter and hand tighten.

Install and tighten the oil drain plug.

Figure 10-90-7



Remove the fill cap (Item 1) [Figure 10-90-7].

Put in 3.4 qts. (3,2 L) of oil into the engine. (See FUEL, COOLANT AND LUBRICANTS on Page SPEC-60-1.)

Install the fill cap.

Start the engine and let it run for several minutes.

Stop the engine. Check for leaks at the oil filter. Check the oil level.

Add oil as needed if it is not at the top mark on the dipstick.

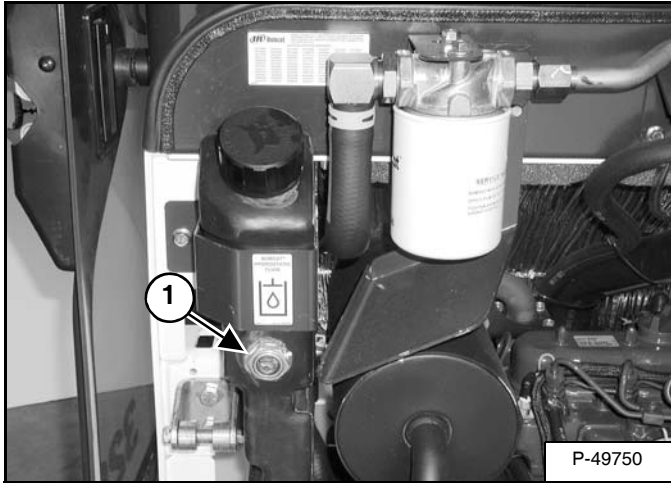
HYDRAULIC SYSTEM

Checking And Adding Hydraulic Oil

Put the machine on a level surface.

Retract the arm and bucket cylinders, put the bucket on the ground and raise the blade. Stop the engine.

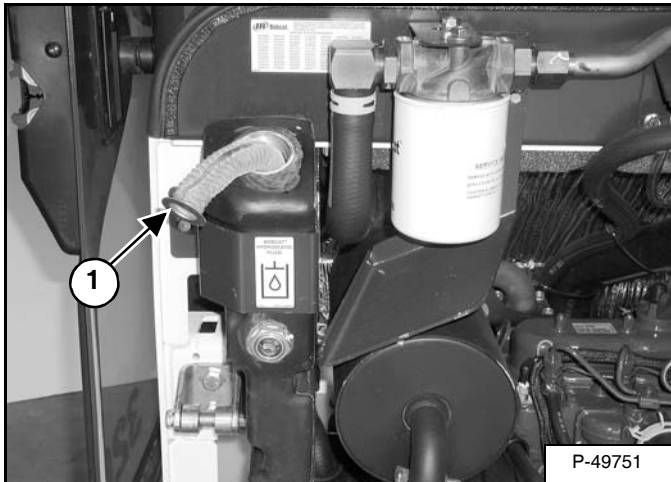
Figure 10-100-8



Open the tailgate. The fluid must be at the center of the sight gauge (Item 1) [Figure 10-100-8].

Remove oil fill cap (Item 2) [Figure 10-100-8].

Figure 10-100-9



Check the condition of the screen (Item 1) [Figure 10-100-9] in the fill neck of the reservoir. The screen must be installed in fill neck when adding oil.

Add the correct fluid to the reservoir until it is at the center of the sight gauge (Item 1) [Figure 10-100-8]. (See FUEL, COOLANT AND LUBRICANTS on Page SPEC-60-1.)

Install the cap. Close the tailgate.

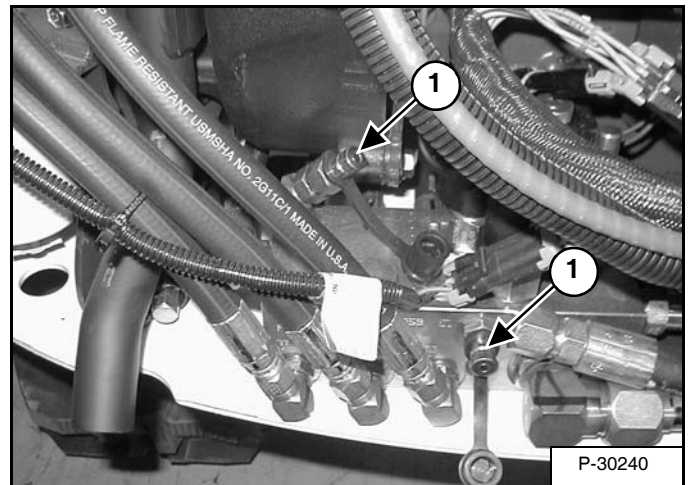
WARNING

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

Diagnostic Couplers

Figure 10-100-10



The diagnostic couplers (Item 1) [Figure 10-100-10] are located on the hydraulic block.

The couplers can be used by your Bobcat dealer to check circuit pressures.

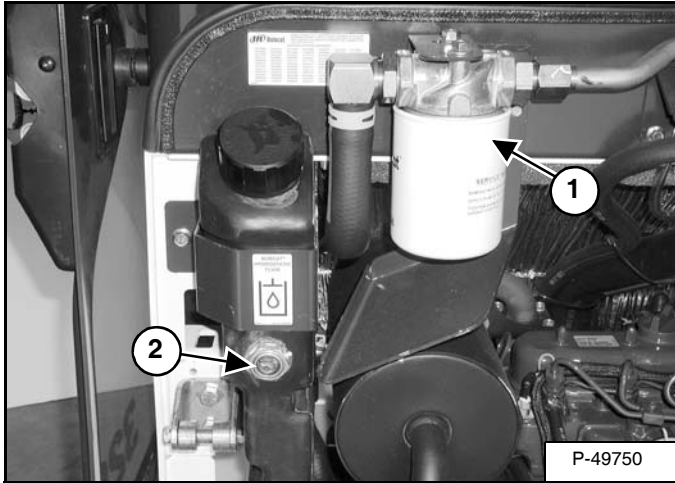
HYDRAULIC SYSTEM (CONT'D)

Replacing The Hydraulic Filter

See the SERVICE SCHEDULE for the correct service interval. (See SERVICE SCHEDULE on Page 10-50-1.)

Open the tailgate.

Figure 10-100-11



Remove the filter (Item 1) [Figure 10-100-11].

Clean the housing where the filter gasket makes contact.

Put clean hydraulic fluid on the gasket. Install the new filter and hand tighten only.

Start the engine. Run the Excavator through the hydraulic functions. Stop the engine. Check the fluid level at the sight gauge (Item 2) [Figure 10-100-11] and add as needed. Check the filter area for leaks.

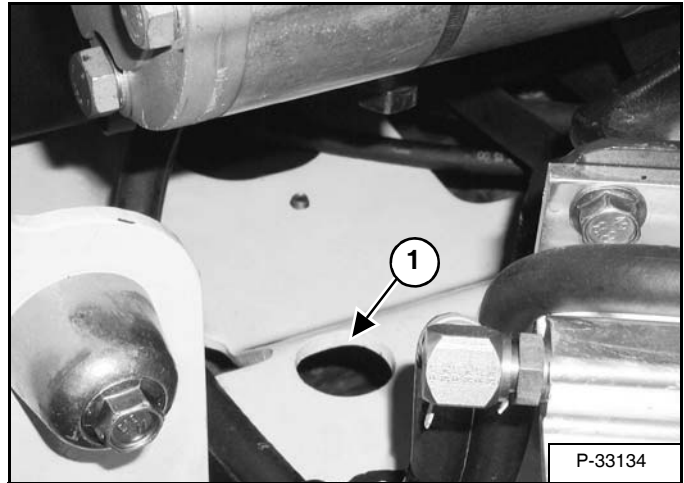
Replacing Hydraulic Oil

See the SERVICE SCHEDULE for the correct service interval. (See SERVICE SCHEDULE on Page 10-50-1.)

Retract the arm and bucket cylinders, lower the bucket to the ground. Stop the engine.

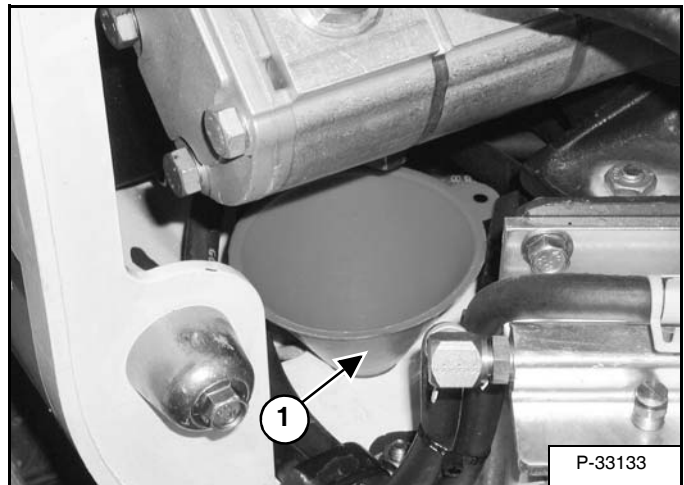
Remove and replace the hydraulic filter.

Figure 10-100-12



A hole (Item 1) [Figure 10-100-12] is provided in the housing for ease of draining the hydraulic fluid.

Figure 10-100-13



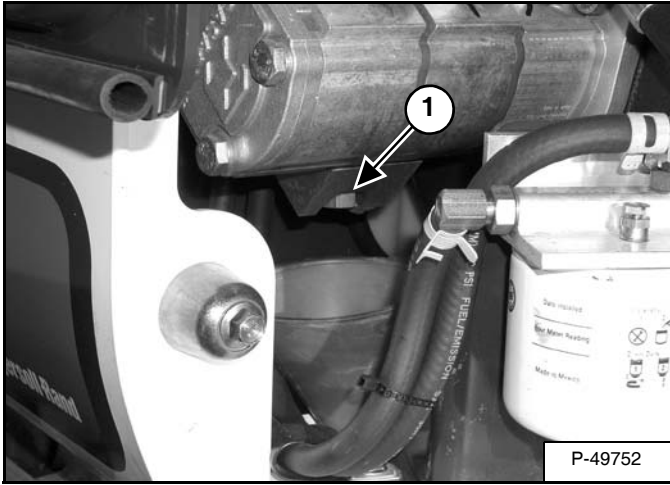
Install a funnel (Item 1) [Figure 10-100-13] in the hole.

Place a container under the funnel.

HYDRAULIC SYSTEM (CONT'D)

Replacing Hydraulic Oil (Cont'd)

Figure 10-100-14



Remove the drain plug (Item 1) [Figure 10-100-14] and drain the hydraulic fluid into the container.

IMPORTANT

Fluid such as engine oil, hydraulic fluid, coolants, grease, etc. must be disposed of in an environmentally safe manner. Some regulations require that certain spills and leaks on the ground must be cleaned in a specific manner. See local, state and federal regulations for the correct disposal.

I-2067-0499

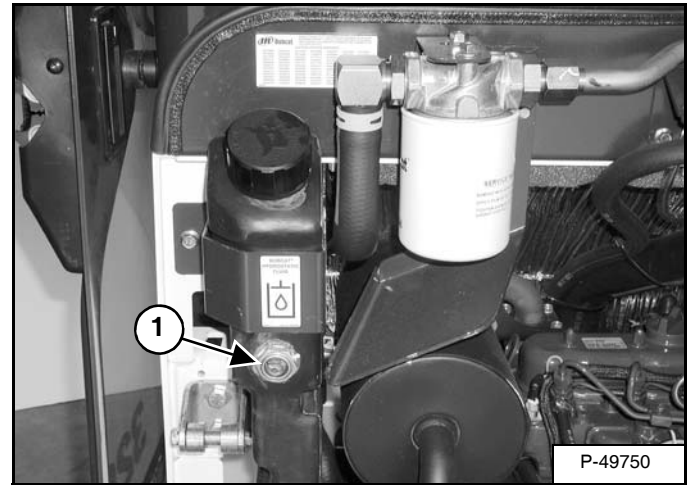
IMPORTANT

If the fluid is being drained because of a system failure, remove and clean all hydraulic lines.

I-2045-0788

Install the drain plug.

Figure 10-100-15



Add fluid to the reservoir until it is at the center of the sight gauge (Item 1) [Figure 10-100-15]. (See FUEL, COOLANT AND LUBRICANTS on Page SPEC-60-1.)

Run the Excavator through the hydraulic functions. Stop the engine. Check the fluid level and add as needed.

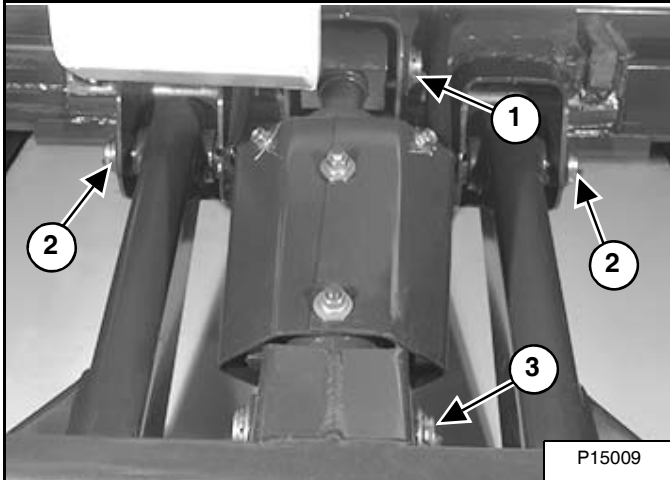
LUBRICATION OF THE HYDRAULIC EXCAVATOR

Lubricate the Hydraulic Excavator as specified in the SERVICE SCHEDULE for the best performance of the machine. (See SERVICE SCHEDULE on Page 10-50-1.)

Record the operating hours each time you lubricate the Hydraulic Excavator.

Always use a good quality lithium based multi-purpose grease when lubricating the Excavator. Apply the lubricant until extra grease shows.

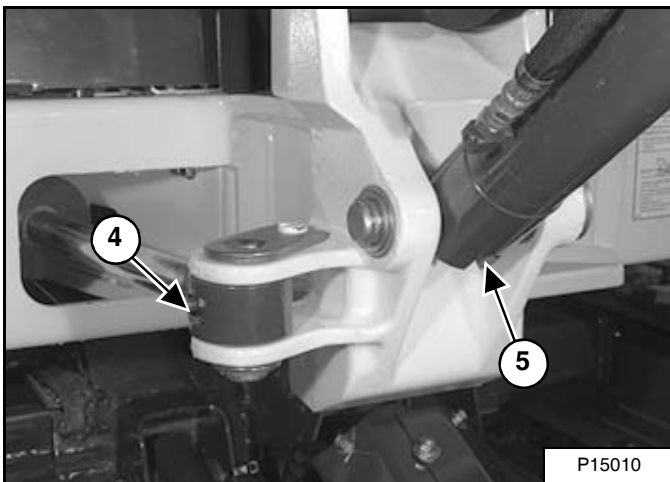
Figure 10-110-16



Ref Description (# of Fittings)

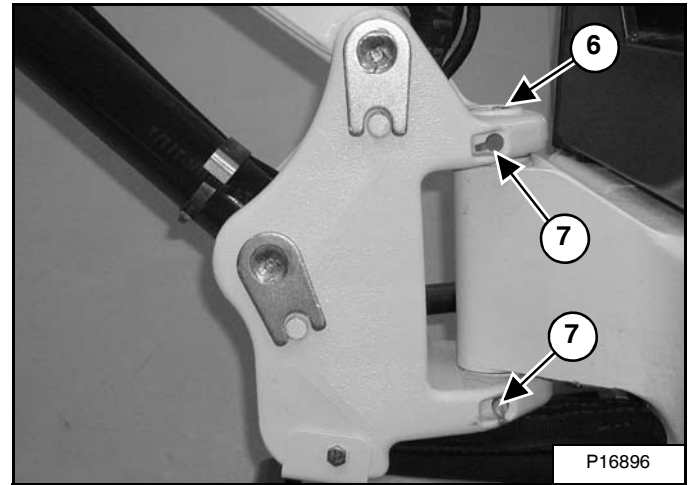
1. Blade Cylinder-Rod End, every 8-10 hours (1) [Figure 10-110-16]
2. Blade Pivots, every 8-10 hours (2) [Figure 10-110-16]
3. Blade Cylinder-Base End, every 8-10 hours (1) [Figure 10-110-16]

Figure 10-110-17



4. Boom Swing Cylinder-Rod End, every 8-10 hours (1) [Figure 10-110-17]
5. Boom Cylinder-Base End, every 8-10 hours (1) [Figure 10-110-17]

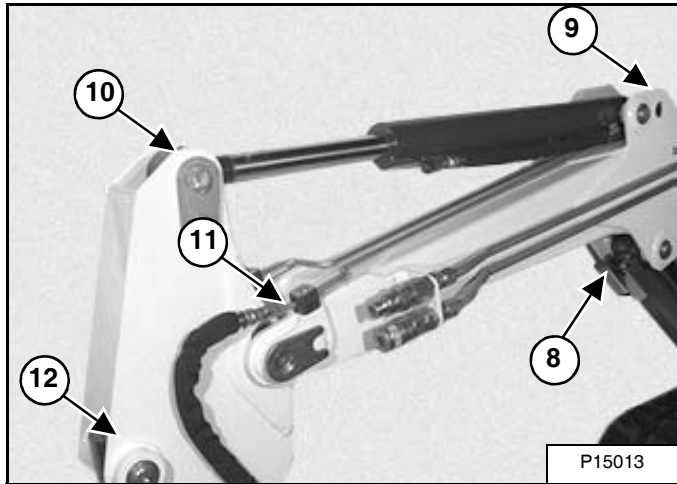
Figure 10-110-18



6. Boom Base Pivot, every 8-10 hours (1) [Figure 10-110-18]
7. Boom Swing Pivot, every 8-10 hours (2) [Figure 10-110-18]

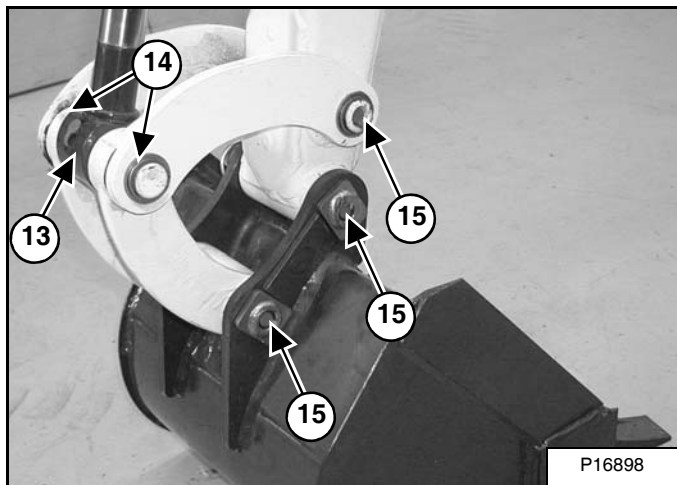
**LUBRICATION OF THE HYDRAULIC EXCAVATOR
(CONT'D)**

Figure 10-110-19



- 8. Boom Cylinder-Rod End, every 8-10 hours (1) [Figure 10-110-19]
- 9. Arm Cylinder-Base End, every 8-10 hours (1) [Figure 10-110-19]
- 10. Arm Cylinder-Rod End, every 8-10 hours (1) [Figure 10-110-19]
- 11. Arm Pivot, every 8-10 hours (1) [Figure 10-110-19]
- 12. Bucket Cylinder-Base End, every 8-10 hours (1) [Figure 10-110-19]

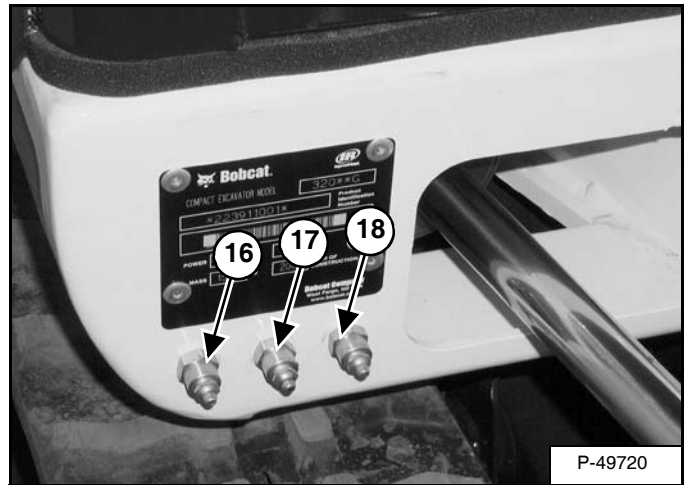
Figure 10-110-20



- 13. Bucket Cylinder-Rod End, every 8-10 hours (1) [Figure 10-110-20]
- 14. Bucket Link Pivots, every 8-10 hours (2) [Figure 10-110-20]

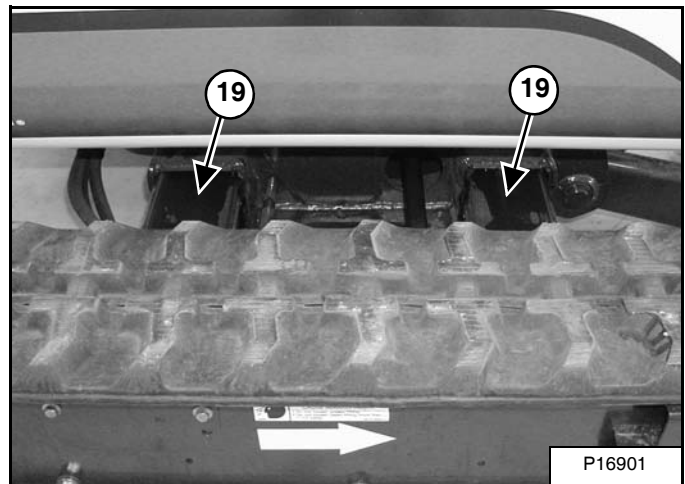
- 15. Bucket Pivots, every 8-10 hours (3) [Figure 10-110-20]

Figure 10-110-21



- 16. Swing Circle Pinion, every 50 hours. Pump 4 times with a grease gun. Rotate the upperstructure 180° and repeat. [Figure 10-110-21]
 - 17. Swing Circle Bearing, every 50 hours [Figure 10-110-21]
- NOTE: Do not over-grease the swing circle; damage to the seal could result. Pump 4 to 5 times with a grease gun. Rotate the upperstructure 90° and repeat three more times.**
- 18. Boom Swing Cylinder-Base End every 50 hours [Figure 10-110-21]

Figure 10-110-22



- 19. Track Expansion Tube, as required [Figure 10-110-22].

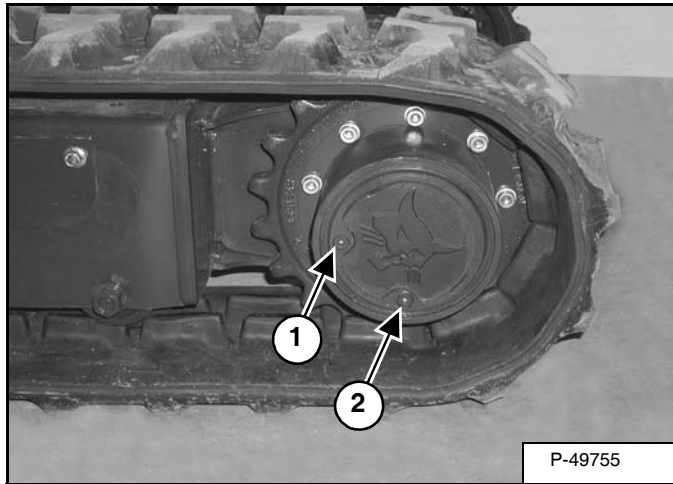
NOTE: Spread lubriplate gearshield extra heavy grease evenly on wear surfaces on both sides

of Excavator as required.

TRAVEL MOTOR

Checking Oil Level

Figure 10-120-23



Put the machine on a level surface with the plugs positioned as shown (Items 1 & 2) [Figure 10-120-23].

Remove the plug (Item 1) [Figure 10-120-23]. The oil level should be at the bottom edge of the plug hole.

Add gear lube through the hole if the oil level is below the hole. See Chart for capacity and type. (See FUEL, COOLANT AND LUBRICANTS on Page SPEC-60-1.)

Install and tighten both plugs.

Repeat the procedure for the other side.

Draining The Travel Motor

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

Put the machine on a level surface with the plugs positioned as shown (Items 1 & 2) [Figure 10-120-23].

Remove the bottom plug (Item 2) and top plug (Item 1) [Figure 10-120-23] and drain into a container. Recycle or dispose of the used lubricant in an environmentally safe manner.

After all the gear lube is removed, install plug (Item 2) [Figure 10-120-23].

Add gear lube to the plug hole (Item 1) [Figure 10-120-23] until the gear lube level is at the bottom edge of the plug hole. See Chart for capacity and type. (See FUEL, COOLANT AND LUBRICANTS on Page SPEC-60-1.)

Install and tighten the plug.

Repeat the procedure for the other side.

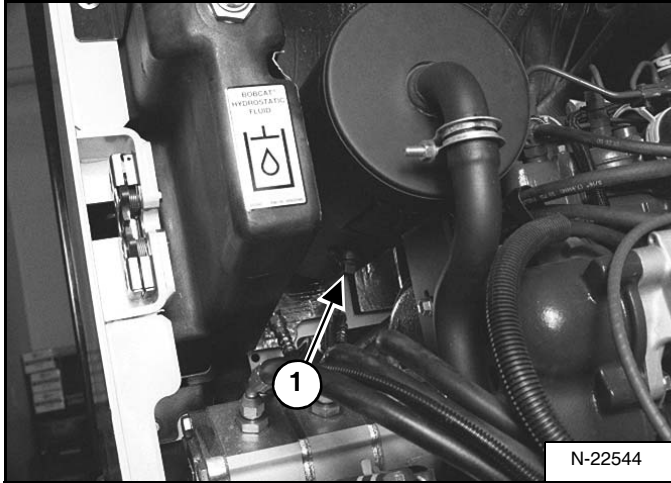
SPARK ARRESTOR MUFFLER

See the SERVICE SCHEDULE for the correct service interval. (See SERVICE SCHEDULE on Page 10-50-1.)

Do not operate the Excavator with a defective exhaust system.

Stop the engine. Open the rear door.

Figure 10-130-1



Remove the plug (Item 1) [Figure 10-130-1] from the bottom of the muffler.

Start the engine and run for about ten seconds while a second person, wearing safety glasses, holds a piece of wood over the outlet of the muffler. (The carbon deposits will be forced out of the muffler cleanout hole.)

Stop the engine. Install and tighten the plug.

Close the rear door.

WARNING

When an engine is running in an enclosed area, fresh air must be added to avoid concentration of exhaust fumes. If the engine is stationary, vent the exhaust outside. Exhaust fumes contain odorless, invisible gases which can kill without warning.

W-2050-1285

WARNING

Stop engine and allow the muffler to cool before cleaning the spark chamber. Wear safety goggles. Failure to obey can cause serious injury.

W-2011-1285

WARNING

Never use machine in atmosphere with explosive dust or gases or where exhaust can contact flammable material. Failure to obey warnings can cause injury or death.

W-2068-1285

WARNING

When the engine is running during service, the steering levers must be in neutral.

Failure to do so can cause injury or death.

W-2203-0595

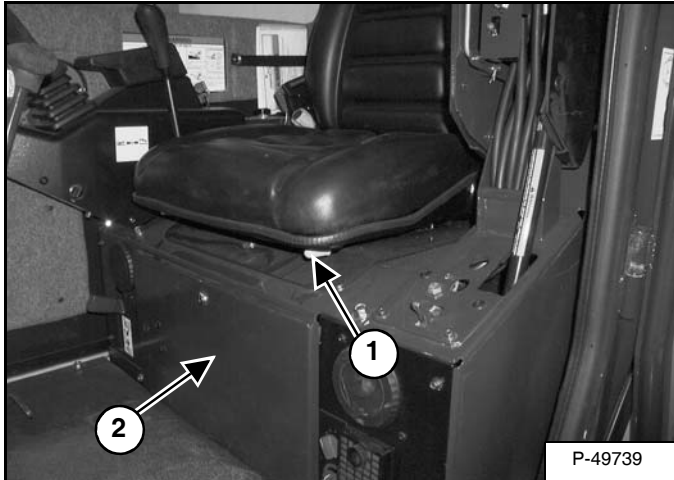
ALTERNATOR BELT

Adjusting The Alternator Belt

Replace the belt if it has stretched or there are cracks in the belt. Replace the pulley if the belt contacts the bottom of the groove in the pulley.

Stop the engine.

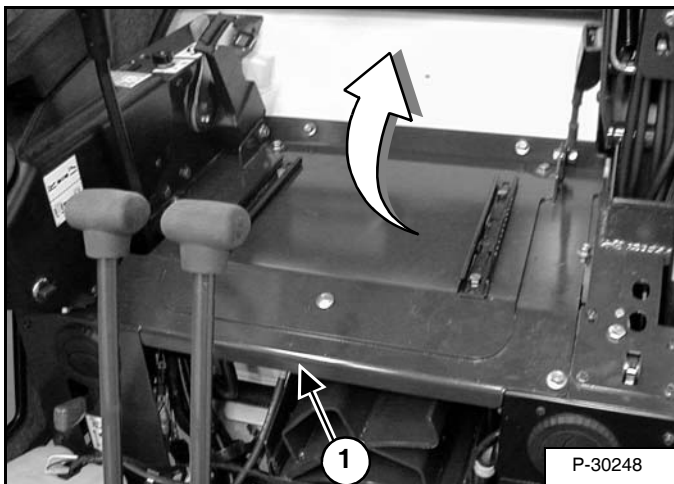
Figure 10-140-2



Release the seat lever (Item 1) [Figure 10-140-2]. Pull the seat to the front and remove it from the Excavator.

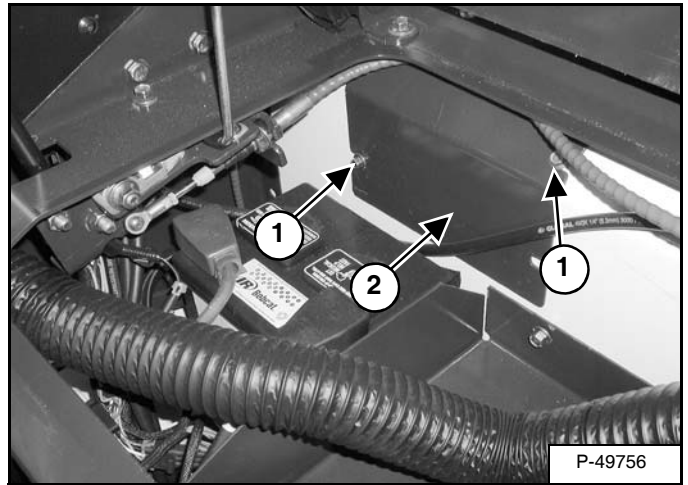
Use the start key to remove the cover (Item 1) [Figure 10-140-2] from the storage compartment.

Figure 10-140-3



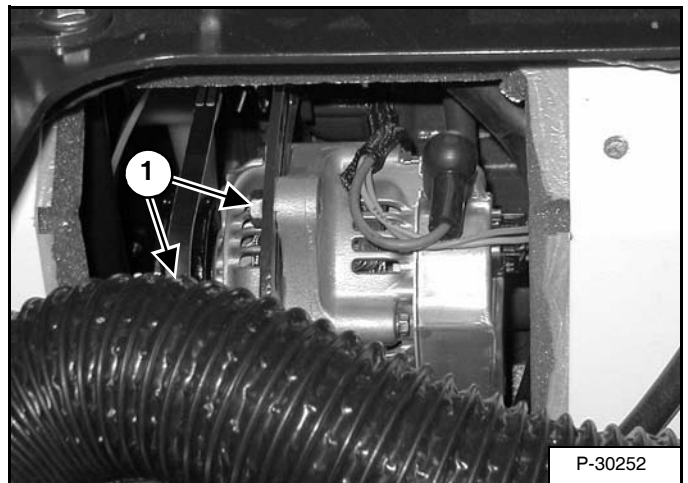
Reach into the storage compartment (Item 1) and turn the release for the seat pan. Raise the seat pan and tip it toward the rear of the machine [Figure 10-140-3].

Figure 10-140-4



Remove two bolts (Item 1) and remove the access panel (Item 2) [Figure 10-140-4].

Figure 10-140-5



Loosen the alternator mounting and adjustment bolts (Item 1) [Figure 10-140-5].

Move the alternator toward the front of the machine [Figure 10-140-5] until the belt has 0.50 inch (13 mm) movement at the middle of the belt span with 13 lbs. (58 N) of force.

Tighten the mounting and adjustment bolts.

Install the access panel, lower the seat pan and engage the latch.

Install the seat and the storage compartment cover.

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.

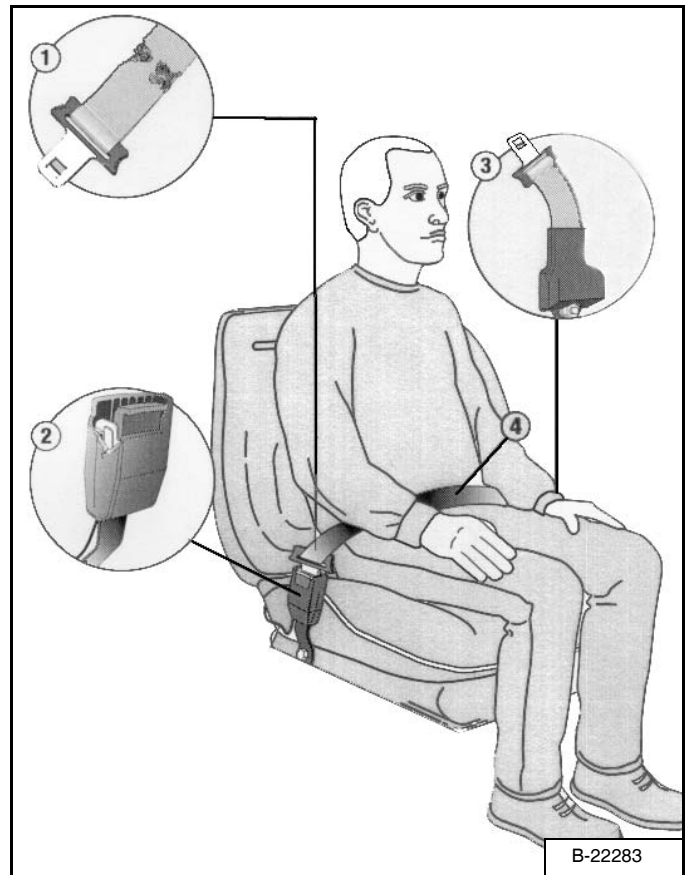
W-2466-0703

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.

The seat belt system should be repaired or replaced if it shows cuts, fraying, extreme or unusual wear, significant discolorations due to ultraviolet (UV) rays from the sun, dusty/dirty conditions, abrasion to the seat belt webbing, or damage to the buckle, latch plate, retractor (if equipped), or hardware.

Figure 10-150-6



The items below are referenced in [Figure 10-150-6].

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.
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.

See your Bobcat dealer for approved seat belt system replacement parts for your machine.

CONTROL CONSOLE LOCKOUTS

Inspection And Maintenance

Figure 10-160-7



Figure 10-160-8



When either console is raised [Figure 10-160-7] & [Figure 10-160-8], the hydraulic control levers (joysticks) and traction system must not function.

Sit in the operator's seat, fasten the seat belt and start the engine.

Raise the left console. (Green light on the consoles will go off.)

Move the joystick control levers. There should be no movement of the boom, crowd, house swing or bucket.

Move the steering control levers. there should be no movement of the Excavator tracks.

Lower the left console. Raise the right console and repeat the inspection procedure.

The joystick control levers and traction system must be deactivated when either console is raised.

Service the system if these controls do not deactivate when either control console is raised. (See your Bobcat dealer for service.)

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HYDRAULIC SYSTEM

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HYDRAULIC/HYDROSTATIC SCHEMATIC 320L (S/N 223911001 AND ABOVE)

(PRINTED JULY 2006)
V-0849le

LEGEND

- ① HYDRAULIC RESERVOIR
(PRESSURIZED)with FILL
STRAINER
Capacity 6.8 Qts. (6,5 L)
- ② PRESSURIZED BREATHER/FILL CAP
with FILTER
5 PSI (0,34 Bar) - Outlet
0.435 PSI (0,03 Bar) - Inlet
- ③ SOLENOID VALVE - SYSTEM BY-PASS
- ④ MAIN RELIEF VALVE
2500 PSI (172 Bar)
- ⑤ TEST PORT - "G" Port - Gauge Test Port
- ⑥ HYDRAULIC FILTER ELEMENT
10 Micron
- ⑦ FILTER BY-PASS 25 PSI (1,72 Bar)
- ⑧ SWING MOTOR CROSS PORT RELIEF
VALVE 1475 PSI (102 Bar)
When Tested at "G" Port
- ⑨ HYDRAULIC PUMP . Triple Section -
Gear Pump:
Pump Section 1
8.0 GPM (30,0 L/min.) at High Engine Idle
Pump Sections 2 & 3
4.0 GPM (15,0 L/min.) at High Engine Idle
- ⑩ TRAVEL MOTOR SPOOL - RIGHT HAND
- ⑪ TRAVEL MOTOR SPOOL - LEFT HAND
- ⑫ ORIFICE0.040 inch (1,02 mm)
- ⑬ PORT RELIEF VALVE
Boom Cylinder (Rod End)
3335 PSI (230 Bar)
- ⑭ PORT RELIEF VALVE
Boom Cylinder (Base End)
3335 PSI (230 Bar)
- ⑮ PORT RELIEF VALVE
Bucket Cylinder (Rod End)
3335 PSI (230 Bar)
- ⑯ PORT RELIEF VALVE
Bucket Cylinder (Base End)
2900 PSI (200 Bar)
- ⑰ PORT RELIEF VALVE
Arm Cylinder (Rod End)
3335 PSI (230 Bar)
- ⑱ PORT RELIEF VALVE
Arm Cylinder (Base End)
2900 PSI (200 Bar)
- ⑲ TEST PORT - "F" Port - Factory Fill Port
- ⑳ PRESSURE REDUCING VALVE
435 PSI (30 Bar)
- ㉑ ACCUMULATOR
Nitrogen 165 PSI (11 Bar)
non-rechargeable
- ㉒ CONSOLE LOCK OUT SOLENOID
- ㉓ BUILD UP VALVE . 218 PSI (15 Bar)
- ㉔ ORIFICE 0.063" (1.70 mm)
Bore of Tee Fitting
- ㉕ OIL COOLER

NOTE: Unless otherwise specified
springs have NO significant
pressure value.

**Thank you very much
for your reading.**

Please Click Here

**Then Get More
Information.**