T40140

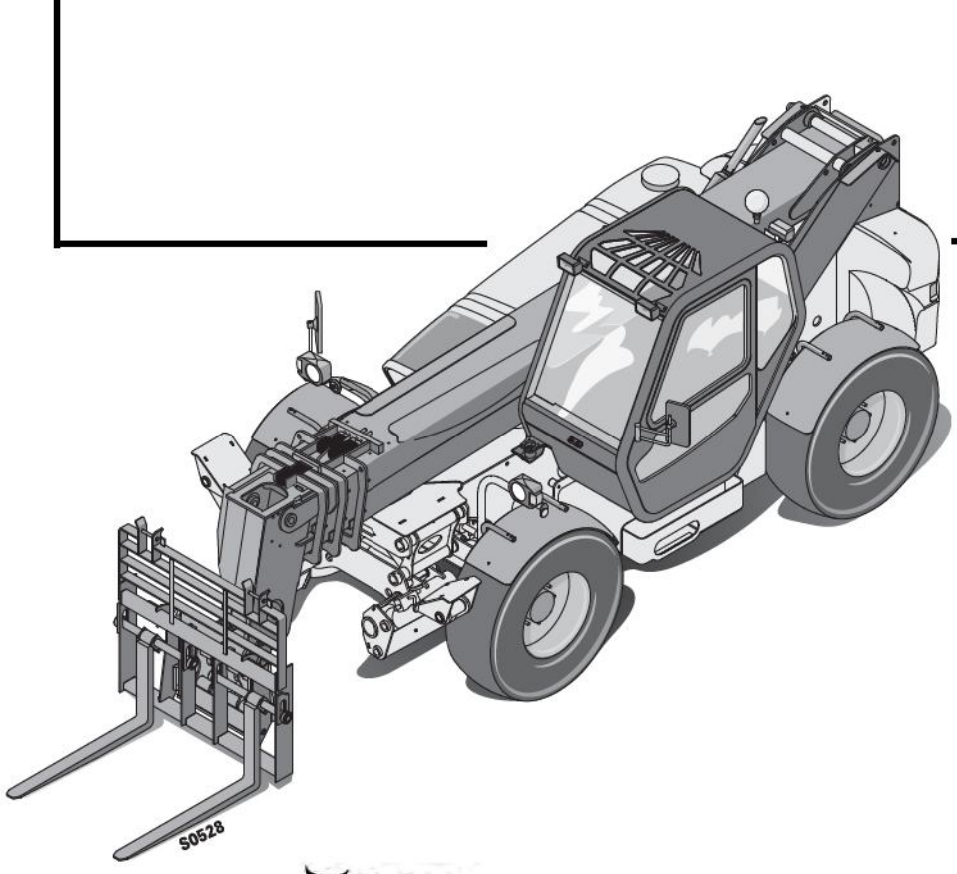
S/N 363212001 & above

T40170

S/N 363312001 & above

Bobcat®

SERVICE MANUAL



4950145-EN (08-08)

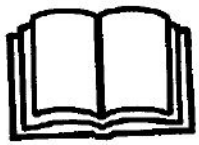
Bobcat

Printed in Europe

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

CORRECT

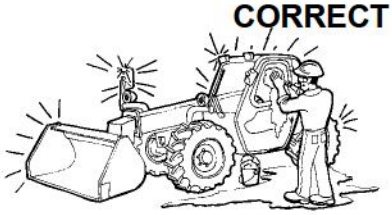


B-10731a

Never service the Bobcat Telescopic Handler without instructions.

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

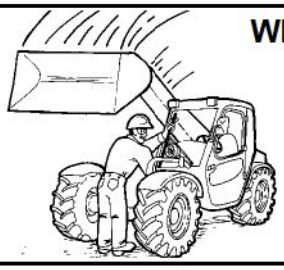
CORRECT



B-16082

Cleaning and maintenance are required daily.

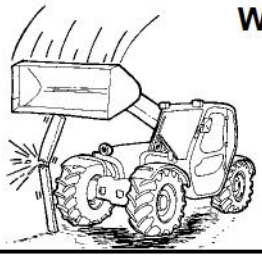
WRONG



B-16080

Disconnecting or loosening any hydraulic tubeline, hose, fitting, component or a part failure can cause boom to drop. Do not go under boom when raised unless supported by an approved boom stop. Replace if damaged.

WRONG

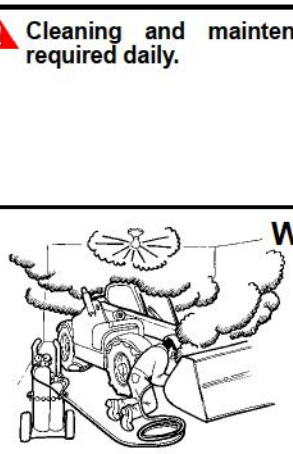


B-16079

Never work on Telescopic Handler with boom up unless boom is held by an approved boom stop. Replace if damaged.

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

WRONG



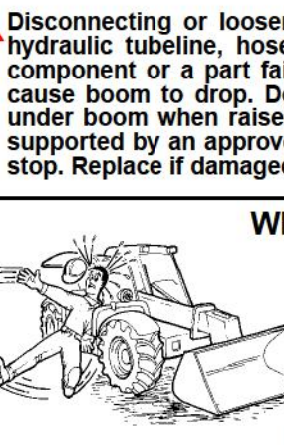
B-16081

Have good ventilation when welding or grinding painted parts.

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

Avoid exhaust fume leaks which can kill without warning. Exhaust system must be tightly sealed.

WRONG



B-16078

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.

WRONG

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.**

MSW12-0805

ALPHABETICAL INDEX

CONTENTS

FOREWORD

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

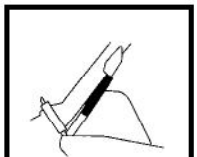
A general inspection of the following items must be made after the Telescopic Handler has had service or repair:

1. Check that ROPS / FOPS (including right side window) is in good condition and is not modified.

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

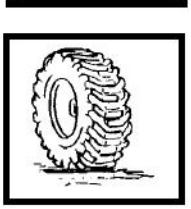
3. The seat belt must be correctly installed, functional and in good condition.

4. Check boom support device, replace if damaged.



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

6. Check tires for wear and pressure. Use only approved tires.



7. Check for correct function of the work lights.

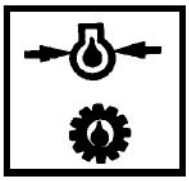
8. The parking brake must function correctly.

9. Enclosure door latches must open and close freely.

10. Attachment locking pins must function correctly and be in good condition.

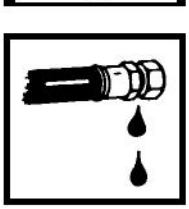
11. Safety treads must be in good condition.

12. Check for correct function of indicator lamps and gauges.



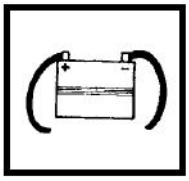
13. Check hydraulic fluid level, engine oil level and fuel supply.

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

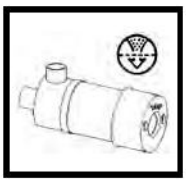


15. Lubricate the Telescopic Handler

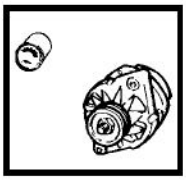
16. Check the condition of the battery and cables.



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



18. Check the electrical charging system.



19. Inspect for loose or broken parts or connections.

20. Operate the Telescopic Handler and check all functions.

21. Check for any field modification not completed.

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

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

IMPORTANT

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

I-2019-0284

The signal word DANGER on the machine and in the manuals indicates a hazardous situation which, if not avoided, will result in death or serious injury.

D-1002-1107

WARNING

The signal word WARNING on the machine and in the manuals indicates a potentially hazardous situation which, if not avoided, could result in death or serious injury.

W-2044-1107

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.
- The Service Manual and Parts Manual are available from your dealer for use by mechanics to do shop-type service and repair work.

The dealer and owner / operator review the recommended uses of the product when delivered. If the owner / operator will be using the machine for a different application(s) he or she must ask the dealer for recommendations on the new use.

Cutting or drilling concrete containing sand or rock containing quartz may result in exposure to silica dust.

SI VH-0308 SM

FIRE PREVENTION

Maintenance

The machine and some attachments have components that are at high temperatures 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 can cause a fire hazard. Clean often to avoid this accumulation. Flammable debris in the engine compartment is a potential fire hazard.

The operator's area, engine compartment and engine cooling system must be inspected every day and cleaned if necessary to prevent fire hazards and overheating.

All fuels, most lubricants and some coolants mixtures are flammable. Flammable fluids that are leaking or spilled onto hot surfaces or onto electrical components can cause a fire.

Operation

Do not use the machine where exhaust, arcs, sparks or hot components can contact flammable material, explosive dust or gases.

Electrical

Check all electrical wiring and connections for damage. Keep the battery terminals clean and tight. Repair or replace any damaged part or wires that are loose or frayed.

Battery gas can explode and cause serious injury. Use the procedure in the Operation & Maintenance Manual for connecting the battery and for jump starting. Do not jump start or charge a frozen or damaged battery. Keep any open flames or sparks away from batteries. Do not smoke in battery charging area.

Hydraulic System

Check hydraulic tubes, hoses and fittings for damage and leakage. Never use open flame or bare skin to check for leaks. Hydraulic tubes and hoses must be properly routed and have adequate support and secure clamps. 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.

Fueling

Stop the engine and let it cool before adding fuel. No smoking! Do not refuel a machine near open flames or sparks. Fill the fuel tank outdoors.

Starting

Do not use ether or starting fluids on any engine that has glow plugs. These starting aids can cause explosion and injure you or bystanders.

Use the procedure in the Operation & Maintenance Manual for connecting the battery and for jump starting.

SI VH-0308 SM

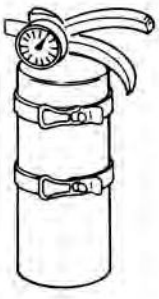
Welding And Grinding

Always clean the machine and attachment, disconnect the battery, and disconnect the wiring from the Bobcat 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 dust mask when grinding painted parts. Toxic dust or gas can be produced.

Dust generated from repairing nonmetallic parts such as hoods, fenders or covers can be flammable or explosive. Repair such components in a well ventilated area away from open flames or sparks.

Fire Extinguishers



Know where fire extinguishers and first aid kits are located and how to use them. Inspect the fire extinguisher and service the fire extinguisher regularly. Obey the recommendations on the instructions plate.

SI VH-0208

SERIAL NUMBER LOCATIONS

Always use the serial number of the Telescopic Handler 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.

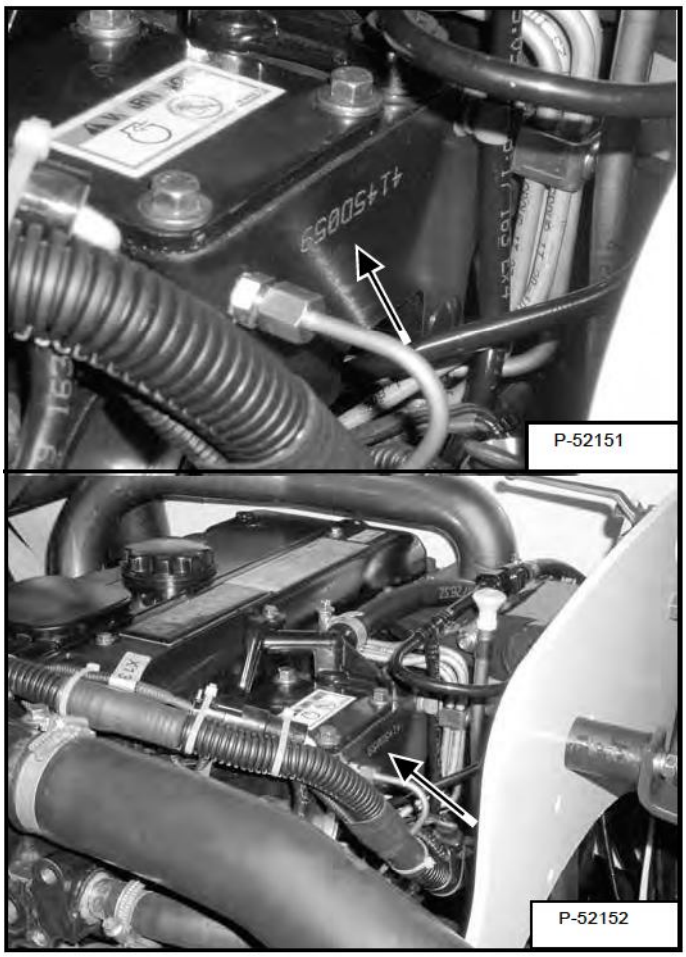
Telescopic Handler Serial Number

Figure 1

The front, on the right side of the chassis **[Figure 1]**.

Engine Serial Number

Figure 2



The engine serial number is stamped on a plate near the injection pump or at the rear of the cylinder block **[Figure 2]**. Always use the full number when ordering replacement parts.

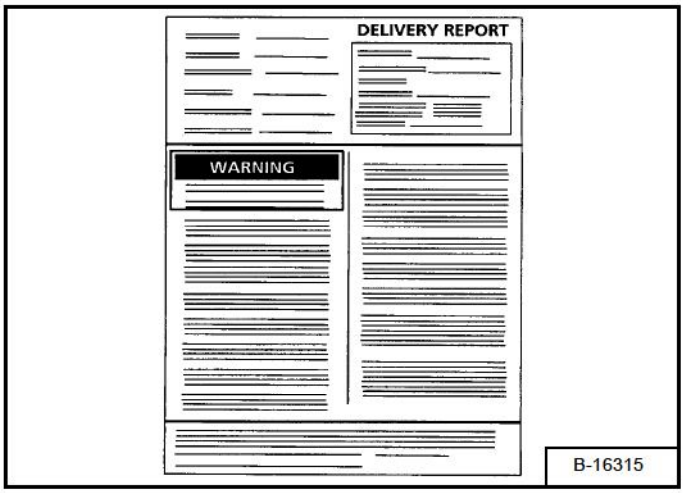
Other Serial Numbers

Some components may also have serial numbers. Always use these serial numbers when requesting parts.

Delivery Report

The Delivery Report must be filled out by the dealer and signed by the owner or operator when the Telescopic Handler is delivered. An explanation of the form must be given to the owner. Make sure it is filled out completely **[Figure 3]**.

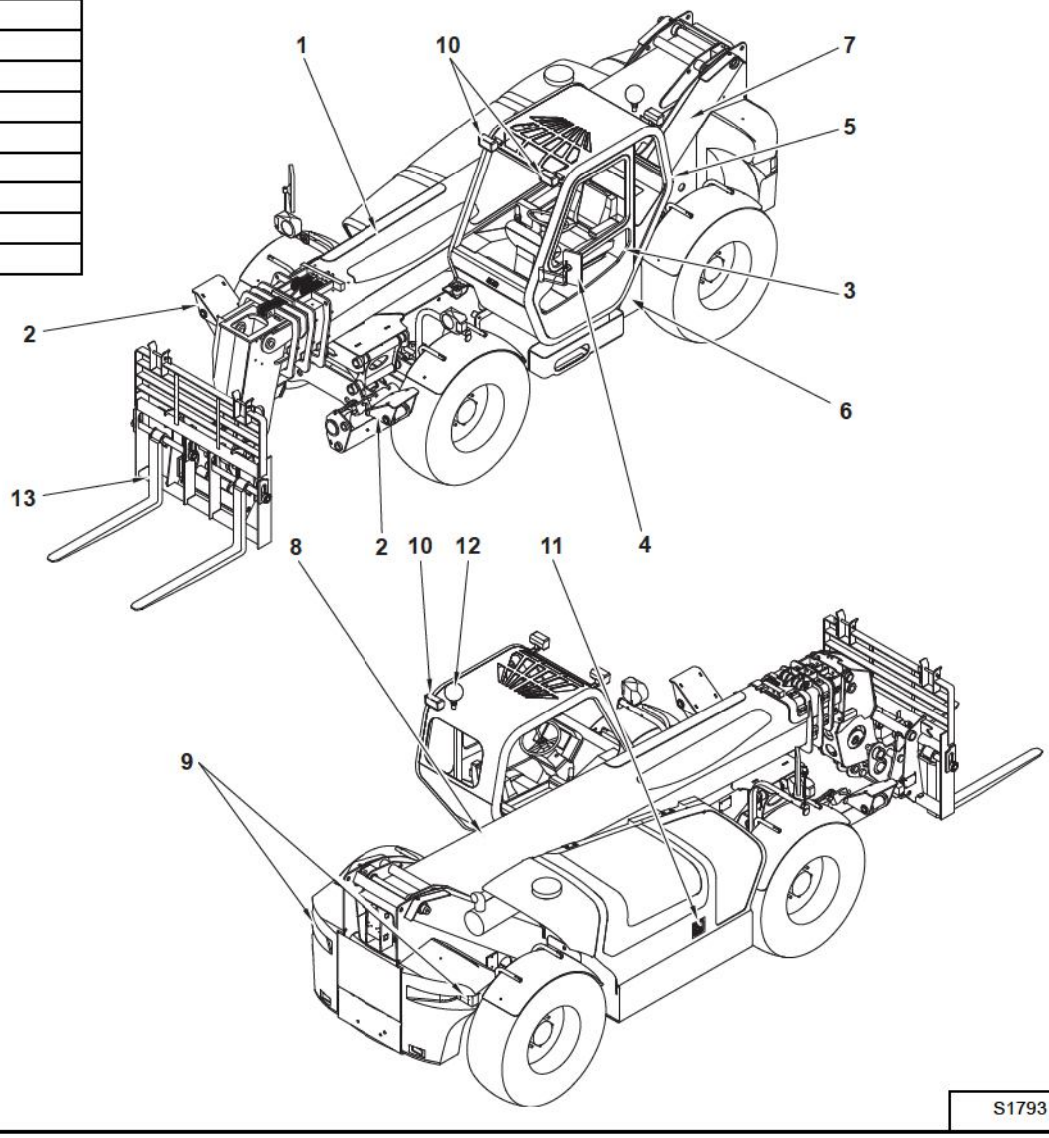
Figure 3



Bobcat Telescopic Handler Identification

Figure 4

Ref.	Designation
1	Telescopic boom
2	Stabilisers
3	Fuel tank
4	Mirror
5	Operator Cab
6	Battery compartment
7	Boom stop (option)
8	Engine exhaust
9	Lights
10	Working lights
11	Engine cover
12	Rotating beacon
13	Pallet forks



SAFETY AND MAINTENANCE

Continued On Next Page

LIFTING AND BLOCKING THE TELESCOPIC HANDLER

Procedure

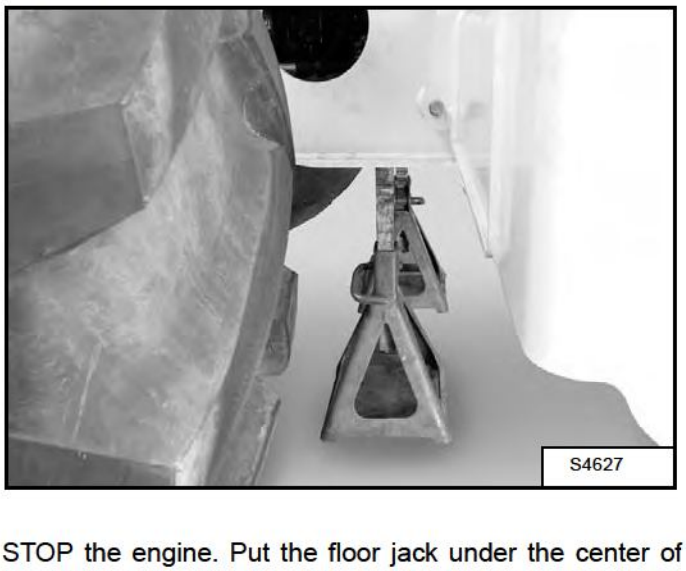
Always park the machine on a level surface.

⚠ WARNING

The seat bar system must deactivate the lift, and tilt control functions when the seat bar is up. Service the system if joysticks do not deactivate.

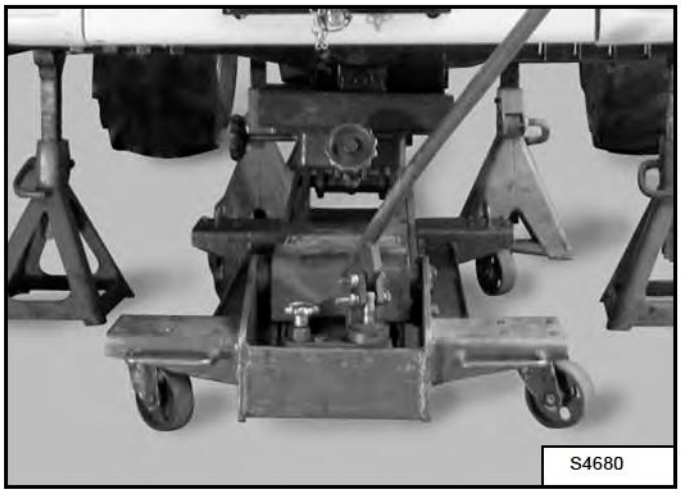
W-2461-0603

Figure 10-10-1



STOP the engine. Put the floor jack under the center of the front axle. Lift the Telescopic Handler and install jackstands as shown in **[Figure 10-10-1]**.

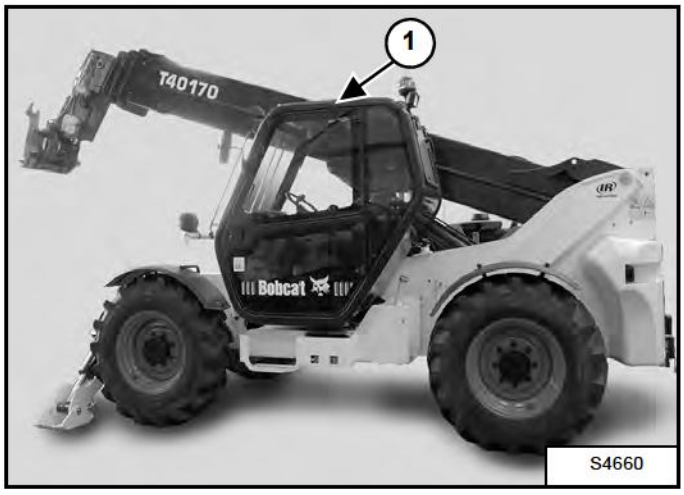
Figure 10-10-2



Put the floor jack under the center of the rear axle. Lift the Telescopic Handler and install jackstands **[Figure 10-10-2]**.

OPERATOR CAB

Figure 10-20-1



The Telescopic Handler has an operator cab (ROPS and FOPS) (Item 1) **[Figure 10-20-1]** to protect the operator from rollover and falling objects. Check with your dealer if the operator cab has been damaged. Never operate without right window. The seat belt must be worn for roll over protection.

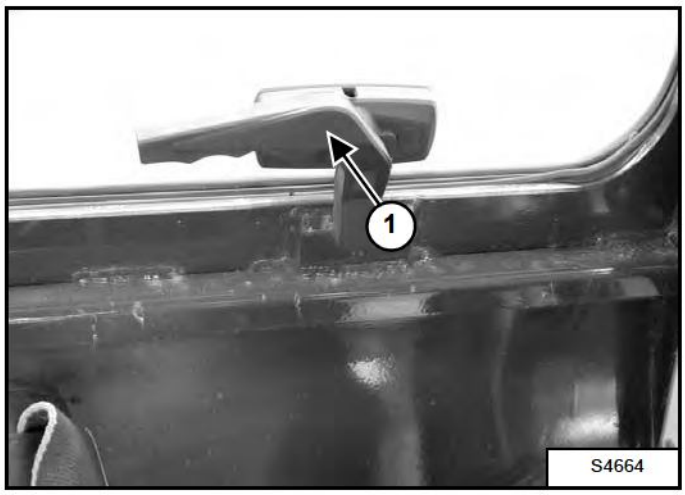
ROPS / FOPS - Roll Over Protective Structure per SAE J1040 and ISO 3471, and Falling Object Protective Structure per SAE J1043 and ISO 3449 (FOPS Level II).

⚠ WARNING

Never modify operator cab by welding, grinding, drilling holes or adding attachments unless instructed to do so by Bobcat. Do not operate without right window. Changes to the cab can cause loss of operator protection from rollover and falling objects, and result in serious injury or death.

Emergency Exit

Figure 10-20-2



Turn the handle (Item 1) **[Figure 10-20-2]** and push the rear window open. (Models with enclosed cab only.) Exit through the rear window opening.

Cab Door

Figure 10-20-3

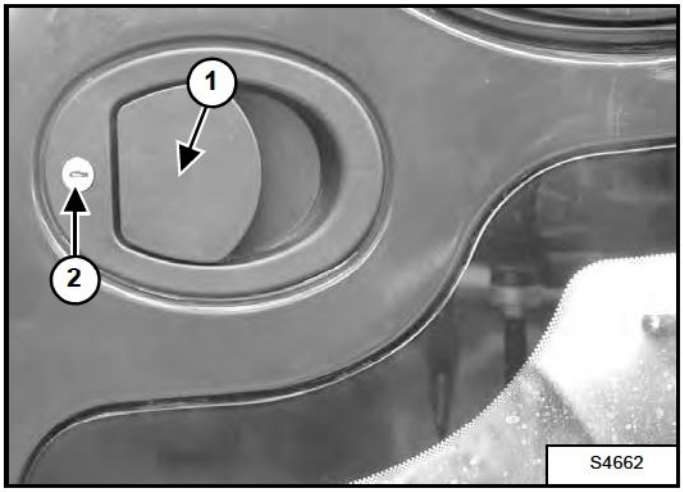
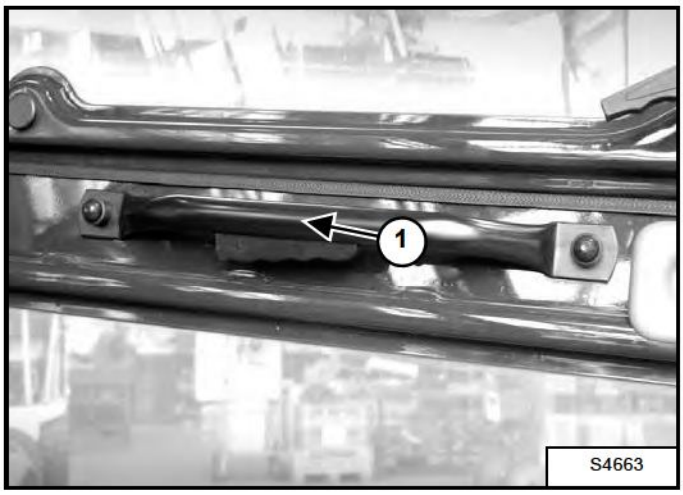


Figure 10-20-4

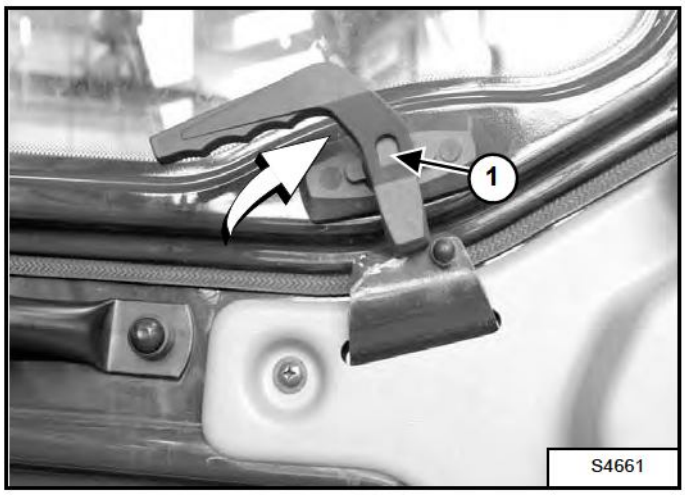


The cab door can be opened from the outside of the cab using the latch (Item 1) **[Figure 10-20-3]** and open from the inside of the cab when you squeeze the latch (Item 1) **[Figure 10-20-4]** (as shown).

The cab door can be locked (Item 2) **[Figure 10-20-3]** with the start key.

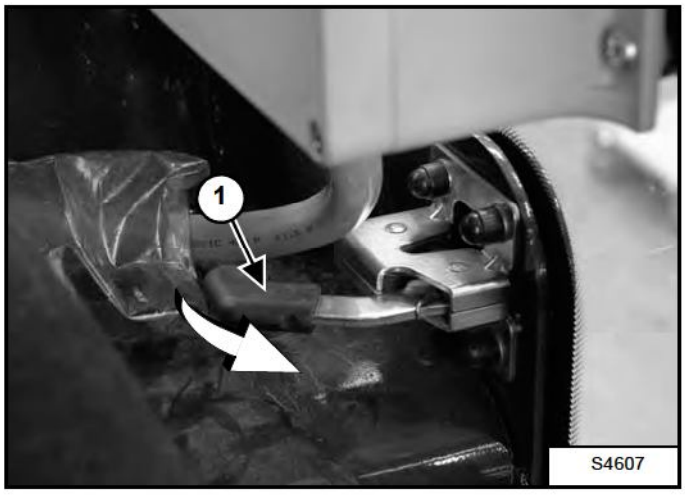
Cab Door Window

Figure 10-20-5



Turn the handle (Item 1) **[Figure 10-20-5]** (as shown). Push open the window fully until it latches against the cab.

Figure 10-20-6



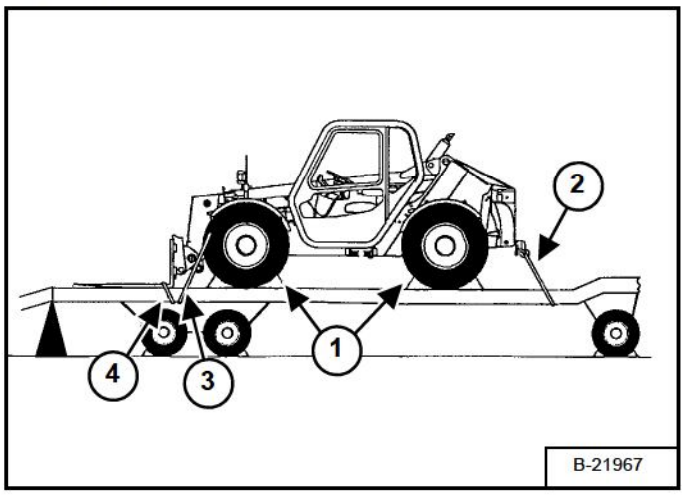
Pull the lever (Item 1) **[Figure 10-20-6]** inside the cab to disengage the latch and close the window.

TRANSPORTING THE TELESCOPIC HANDLER

Procedure

Always drive the Telescopic Handler backwards (heavy end up) onto the transport vehicle.

Figure 10-30-1



The rear of the trailer must be blocked or supported **[Figure 10-30-1]** when loading or unloading the Telescopic Handler to prevent the front end of the trailer from raising up.

Be sure the transport and towing vehicles are of adequate size and capacity. (See “Performance Specifications” on page SPEC-10-2 for weight of the Telescopic Handler).

Fasten the Telescopic Handler to the transport vehicle to prevent it from moving during sudden stops or when going up or down slopes.

- Block the wheels (Item 1) **[Figure 10-30-1]**.
- Fasten the machine frame to the transport vehicle (Items 2 & 3) **[Figure 10-30-1]**.
- Attach the forks or bucket attachment to the transport vehicle (Item 4) **[Figure 10-30-1]**.

⚠ WARNING

AVOID SERIOUS INJURY OR DEATH

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-2058-0807

TOWING THE TELESCOPIC HANDLER

Procedure

The Telescopic Handler can be towed a short distance such as removing it from mud or loading onto a transport vehicle.

Figure 10-40-1

Block the wheels to prevent the machine from rolling.

Releasing The Park Brake

The brakes are engaged by spring pressure and released by hydraulic pressure. The park brake must be released manually before towing. Only the front axle has brakes.

The following procedure describes how to release the brakes:

Figure 10-40-2

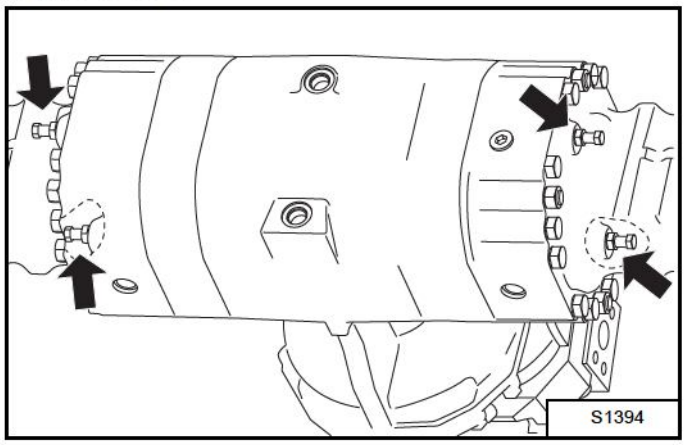
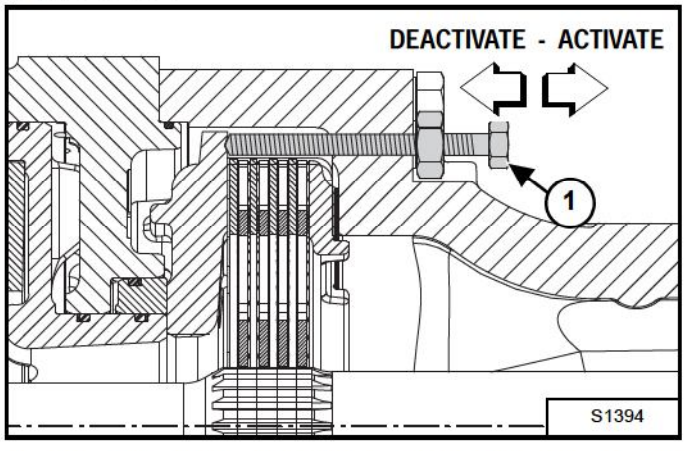


Figure 10-40-3



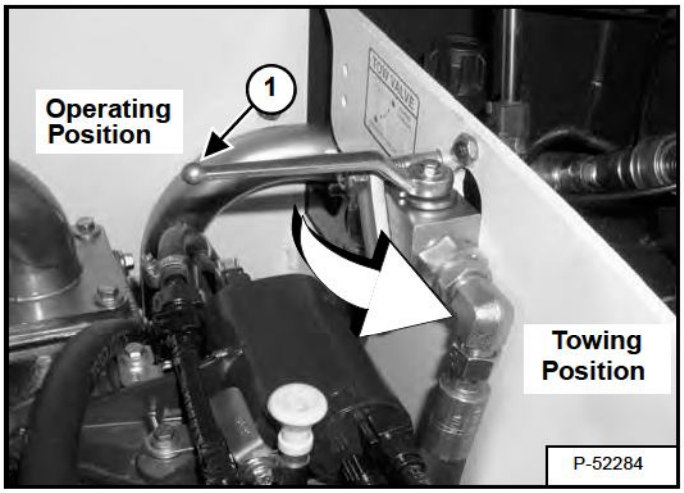
At each end of the central part of the front axle are two bolts (see **[Figure 10-40-2]** & (Item 1) **[Figure 10-40-3]**). When screwed in, these bolts will remove the spring pressure that engages the brake disks. **[Figure 10-40-3]** shows the function of such a bolt inside the axle.
The work will first be carried out on the two bolts on one side of the front axle then the two bolts on the other side:

1. Loosen the locking nuts of the bolts and create some clearance for the bolts.
2. Turn the two bolts (Item 1) **[Figure 10-40-3]** IN, 1/4 turn at a time, alternating between the two bolts until the bolts are firmly seated.
3. Repeat this on the two opposite side bolts on the front axle.

The brakes are now released for towing the vehicle.

Please note that the vehicle will not be able to brake until the bolts are returned to their original position.

Figure 10-40-4



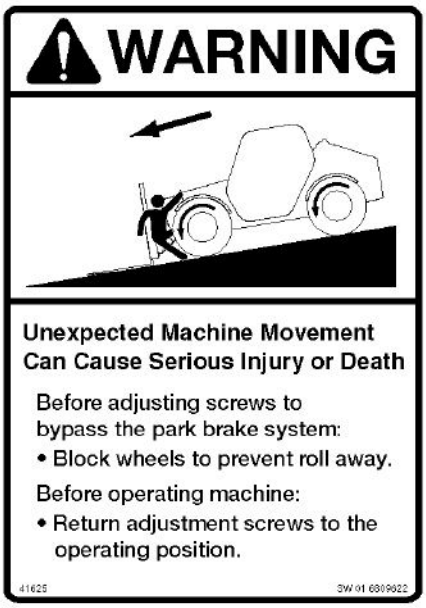
Raise the engine cover.

Turn the tow valve counterclockwise 90° (Item 1) **[Figure 10-40-4]** to TOWING POSITION.

Tow the Telescopic Handler at a slow speed.

Engaging Brake Disks:

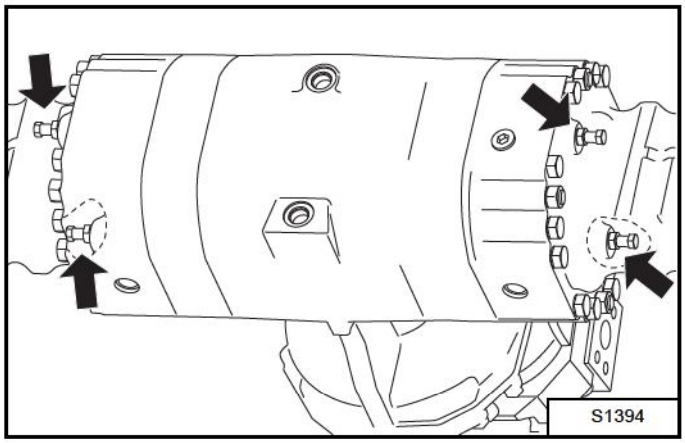
Figure 10-40-5



Block the wheels to prevent the machine from rolling.

After towing is completed, turn the tow valve (Item 1) **[Figure 10-40-4]** clockwise 90° to the OPERATING POSITION.

Figure 10-40-6



To reactivate the park brake, release the four bolts **[Figure 10-40-6]** on the front axle to their original position (turn the two bolts out, 1/4 turn at a time, until no resistance can be felt. Repeat this procedure for the opposite side two bolts).
Make sure that all four bolts have been turned out until they can easily be loosened by hand.
Tighten the locking nuts.

This will allow the park brake piston to be active again.

SERVICE SCHEDULE

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 Telescopic Handler.

⚠ WARNING

Instructions are necessary before operating or servicing machine. Read and understand the Operation & Maintenance Manual, 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-2003-0199

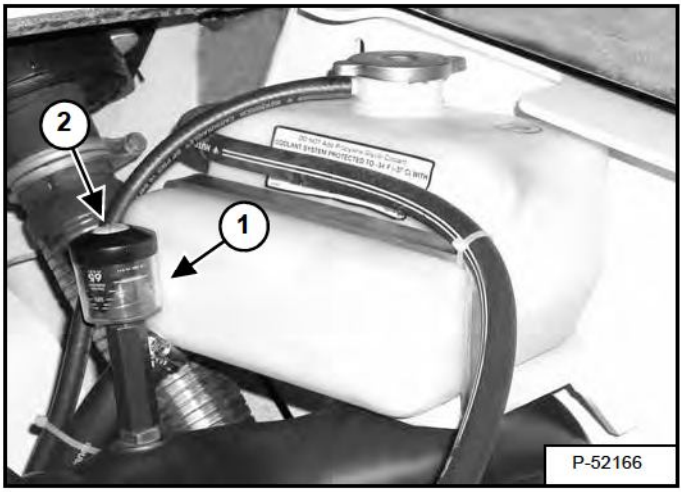
OPERATION	PAGE	HOURS					
		10	50	200	500	800 (4)	1000 (5)
Diesel engine							
Replacement of the outer filter element	See Page 10-60-1						
Replacement of the inner filter element	See Page 10-60-1						
Checking the coolant level	See Page 10-70-1						
Checking the engine oil level	See Page 10-90-1						
Replacing the lubricating oil	See Page 10-90-2						
Replacing the oil filter	See Page 10-90-2						
Replacing the fuel filter cartridge (7)	See Page 10-80-1						
Hydraulic system							
Checking the fluid level	See Page 10-100-1						
Replacing hydraulic fluid	See Page 10-100-2						
Replacing the hydraulic / hydrostatic filter cartridge	See Page 10-100-1						
Mechanical transmission							
Checking the state of tires (rotation)	See Page 10-130-1						
Checking the tightness of wheel nuts (1)	See Page 10-130-1						
Lubricating the rear axle rolling element bearings	See Page 10-120-1						
Lubricating the axle steering pivots	See Page 10-120-1						
Checking the oil level in the front axle central casing	See Page 10-110-2			monthly			
Checking the oil level in the rear axle central casing	See Page 10-110-2			monthly			
Checking the oil level on both axles gear reducers	See Page 10-110-1						
Draining and changing the oil in the front axle central casing (3)	See Page 10-110-3						
Draining and changing the oil on the rear axle central casing (3)	See Page 10-110-2						
Draining and changing the oil on two axles gear reducers (3)	See Page 10-110-1						
Structure							
Lubricating the hinge pins	See Page 10-120-1						
Electrical system							
Checking the battery fluid level	See Page 60-10-1						
Checking the state of fuses, diodes and relays	See Page 60-10-1						
Checking the working order of controls, lighting and signalling	See Page 60-10-2						
Checking the state of electric connections	See Page 60-10-2						

(1) Check wheel nut torque every 8 hours for the first 24 hours.
(2) First maintenance after 50 hours then according to the table.
(3) Replace the first time after 100 hrs, then according to the table.
(4) Or every 12 months.
(5) Or every 12 months.
(6) Frequency may vary in certain dusty environments.
(7) To be replaced after 250 hours if the fuel filter bowl is badly fouled.

AIR CLEANER SERVICE

Replacing Filter Element

Figure 10-60-1

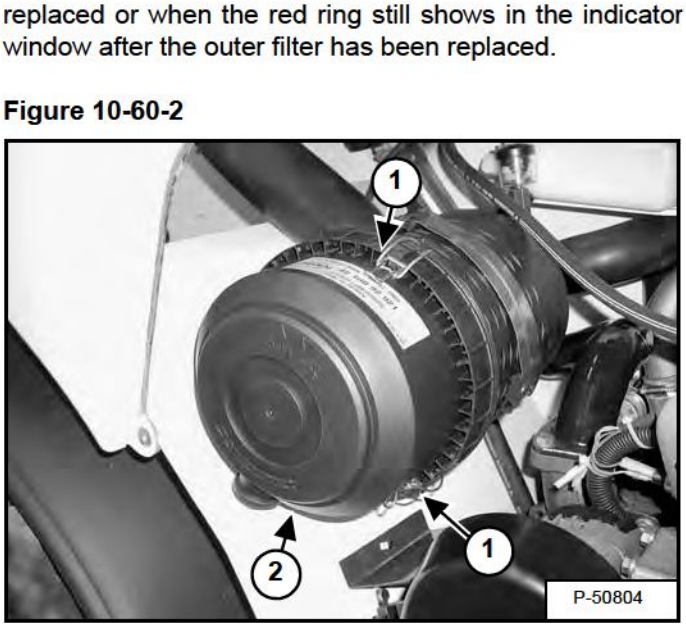


Replace the large (outer) filter element only when the red ring shows in the window of the condition indicator (Item 1) **[Figure 10-60-1]**.

NOTE: Before replacing the filter element, push the button on the condition indicator (Item 2) [Figure 10-60-1]. Start the engine. If the red ring does not show, do not replace the filter element.

Replace the inner filter every third time the outer filter is replaced or when the red ring still shows in the indicator window after the outer filter has been replaced.

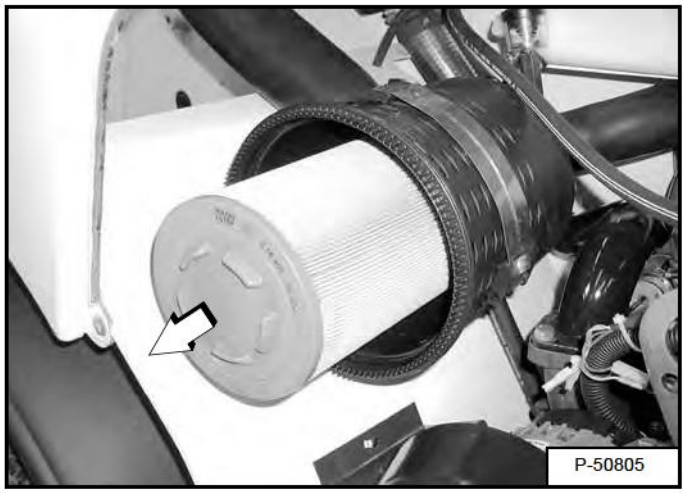
Figure 10-60-2



Loosen the filter housing clamps (Item 1) **[Figure 10-60-2]**.

Release the fastener and remove the cover (Item 2) **[Figure 10-60-2]**.

Figure 10-60-3



Pull the element straight out **[Figure 10-60-3]**.

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

Install a new outer element.

Install the dust cover and fasten **[Figure 10-60-3]**.

Connect the filter housing clamps.

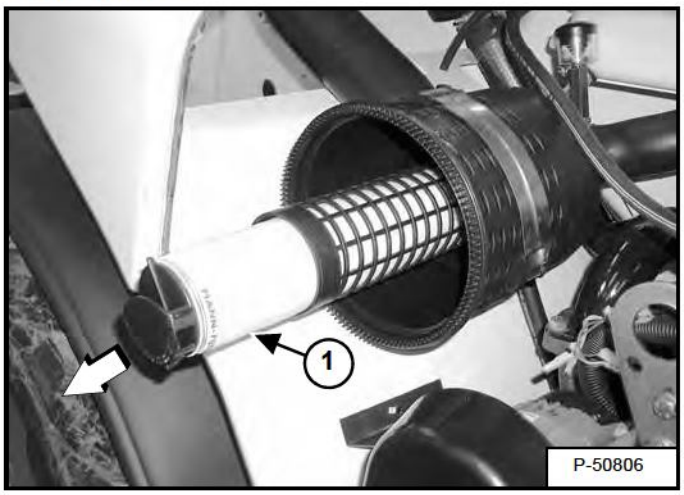
Replacing Filter Element (Cont'd)

Inner Filter

Remove the outer element.

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

Figure 10-60-4



Remove the inner filter (Item 1) **[Figure 10-60-4]** and install a new element.

Install the outer element.

Install the dust cover and fasten **[Figure 10-60-4]**.

Connect the filter housing clamp (Item 1) **[Figure 10-60-4]**.

ENGINE COOLING SYSTEM

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

⚠ WARNING

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

Cleaning The Cooling System

Figure 10-70-1

Open the engine cover (Item 1) **[Figure 10-70-1]**.

Figure 10-70-2

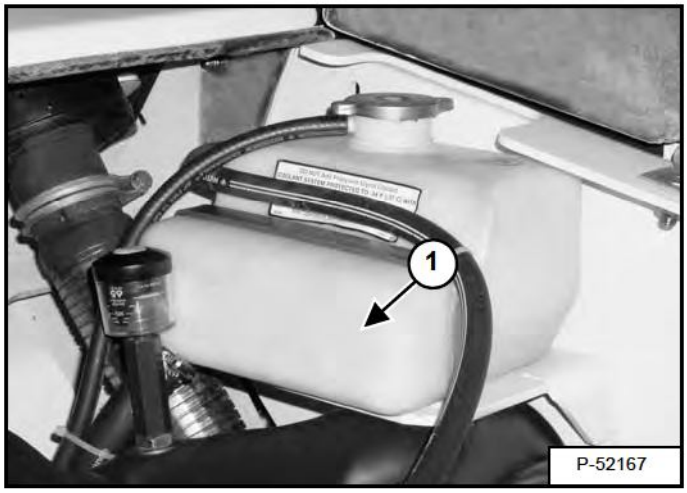
Use low air pressure or water pressure to clean the radiator and oil cooler **[Figure 10-70-2]**.

Checking The Coolant Level

Open the engine cover.

Check the coolant level in the coolant reservoir.

Figure 10-70-3



The coolant level must be between the MIN and MAX marks (Item 1) **[Figure 10-70-3]** on the coolant reservoir when the engine is cold.

Close the engine cover.

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.

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Replacing The Coolant

⚠ WARNING

AVOID BURNS

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

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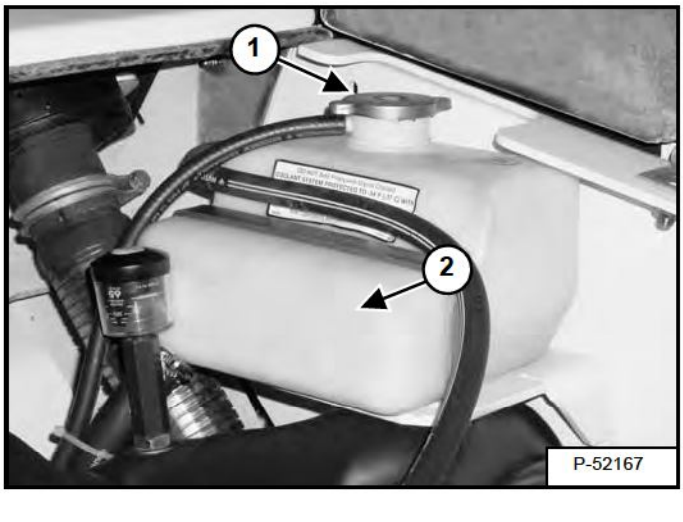
Open the engine cover.

Figure 10-70-4



Remove the cap (Item 1) **[Figure 10-70-4]** from the coolant reservoir.

Remove the fan shield.

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.

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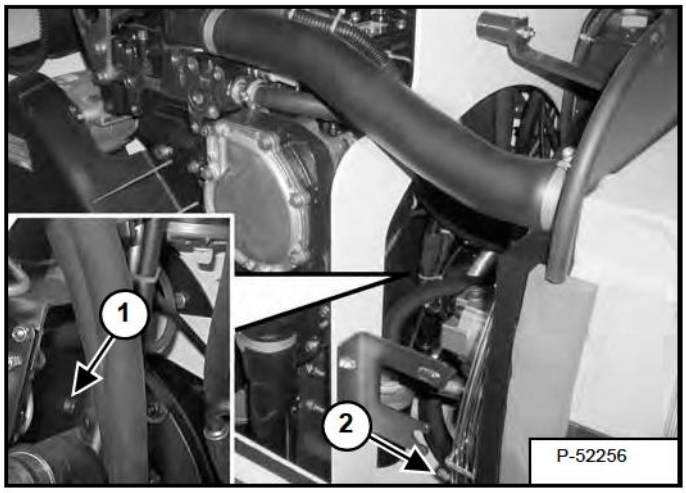
Figure 10-70-5



Remove the engine block drain plug (Item 1) **[Figure 10-70-5]**.

Open the drain valve (Item 2) **[Figure 10-70-5]** and drain all of the coolant into a container. Dispose of used coolant in an environmentally safe manner.

Close the drain valve.

Mix the coolant in a separate container.

NOTE: The Telescopic Handler is factory filled with ethylene glycol coolant.

Add premixed coolant, 50% water and 50% ethylene glycol to the reservoir if the coolant level is low.

One gallon (3,8 L) of ethylene glycol mixed with one gallon (3,8 L) of water is the correct mixture of coolant to provide a -34 °F (-37 °C) freeze protection.

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

Fill the radiator with the premixed coolant. Install the radiator cap.

Add coolant to the reservoir. The coolant level must be between the MIN and MAX marks (Item 2) **[Figure 10-70-4]** on the coolant reservoir.

Run the engine until it is at operating temperature.

Stop the engine.

Check the coolant level (cold) in the reservoir when cool.

Add coolant as needed.

FUEL SYSTEM

Fuel Specifications

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

The following is one suggested blending guideline which should prevent fuel gelling problems in cold temperatures:

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.

Filling The Fuel Tank

⚠ WARNING

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

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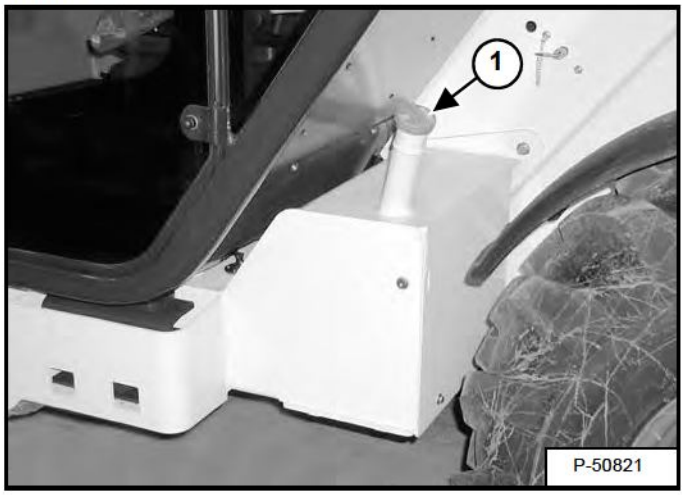
Figure 10-80-1



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

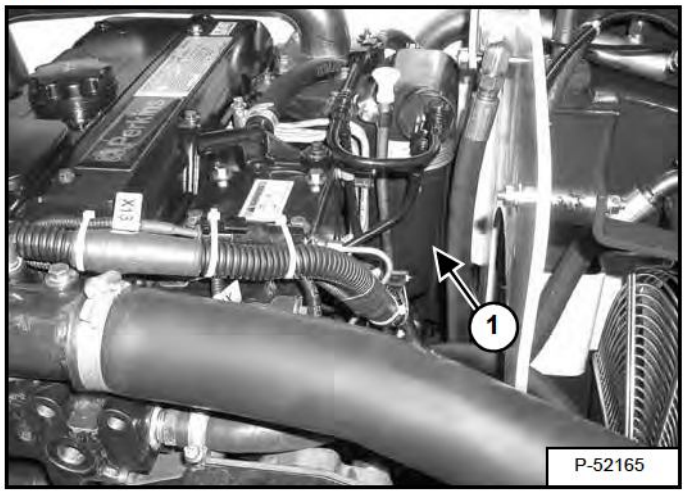
Use a clean, approved safety container to add fuel of the correct specifications. Add fuel only in an area that has free movement of air and no open flames or sparks. **NO SMOKING!**

Install and tighten the fuel fill cap **[Figure 10-80-1]**.

Fuel Filter

See "SERVICE SCHEDULE" on page 10-50-1 for the service interval when to clean the sediment bowl.

Figure 10-80-2



See "SERVICE SCHEDULE" on page 10-50-1 for the service interval when to replace the fuel filter.

Remove the filter element (Item 1) **[Figure 10-80-2]**.

Clean the area around the filter housing.

Put oil on the seal of the new filter element.

Install the fuel filter, and hand tighten.

⚠ 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.

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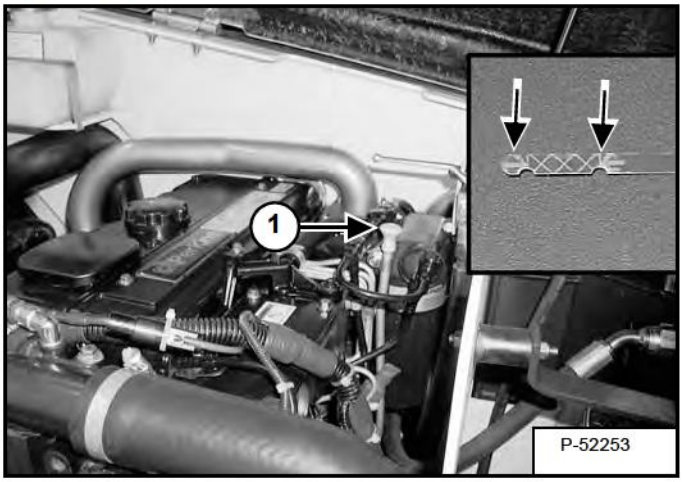
ENGINE LUBRICATION SYSTEM

Checking Engine Oil

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

Figure 10-90-1



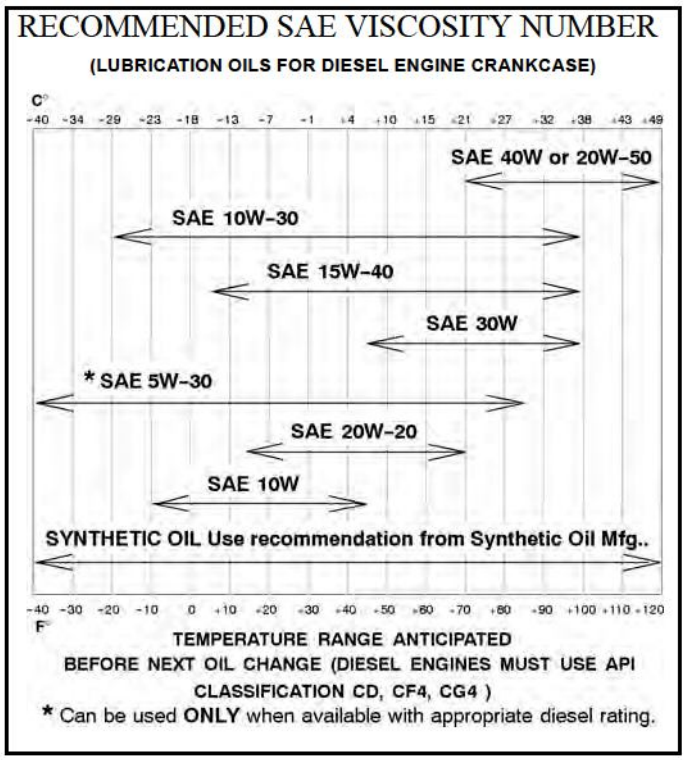
Open the engine cover and remove the dipstick (Item 1) **[Figure 10-90-1]**.

Keep the oil level between the marks on the dipstick (Inset) **[Figure 10-90-1]**.

Use a good quality motor oil that meets API Service Classification of CD or better. (See Oil Chart, **[Figure 10-90-2]**.)

Oil Chart

Figure 10-90-2



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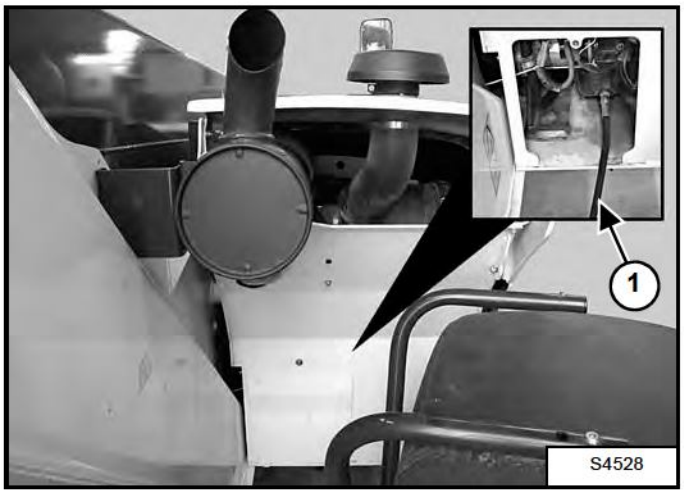
Replacing Oil And Filter

See "SERVICE SCHEDULE" on page 10-50-1 for the service interval for replacing the engine oil and filter.

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

Figure 10-90-3



Remove the access panel at the rear of the engine compartment. Route the hose (Item 1) **[Figure 10-90-3]** out through the access hole. Remove the cap.

Drain the oil into a container and recycle or dispose of used oil in an environmentally safe manner.

Install cap and put the drain hose into the engine compartment, install the access cover.

⚠ 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.

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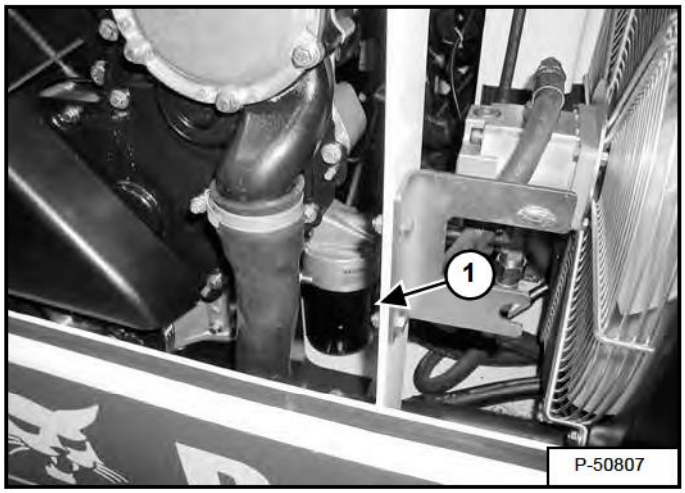
Figure 10-90-4



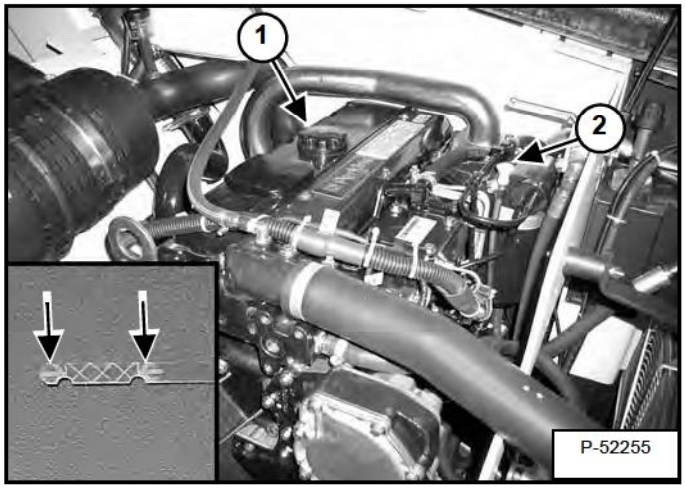
Open the engine cover.

Remove the oil filter (Item 1) **[Figure 10-90-4]**.

Clean the filter housing surface.

Put clean oil on the new oil filter gasket. Install the filter and hand tighten.

Figure 10-90-5



Remove the filler cap (Item 1) **[Figure 10-90-5]**.

Put oil in the engine. (See "Capacities" on page SPEC-10-3).

Install fill cap, start the engine and let it run for several minutes.

Stop the engine, and check for leaks at the oil filter.

Remove the dipstick (Item 2) **[Figure 10-90-5]** and check the oil level. Add oil as needed if it is not at the top mark on the dipstick.