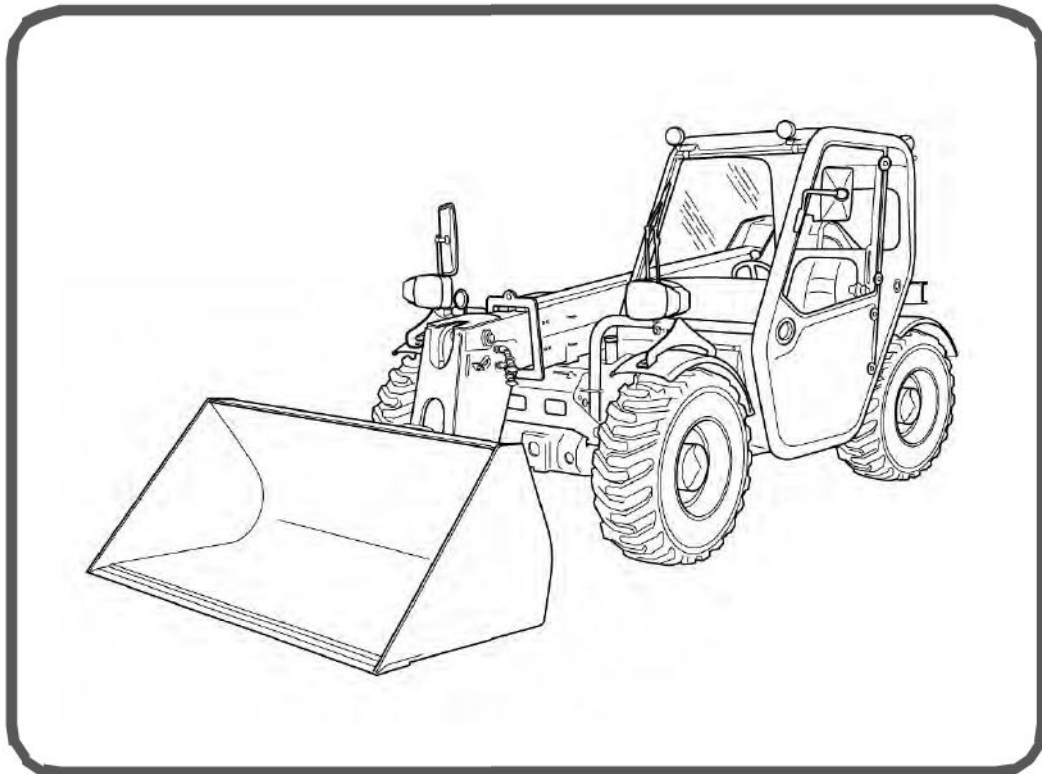




Bobcat®

Service Manual T2250 Telescopic Handler

S/N AC1911000 & Above



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MAINTENANCE SAFETY

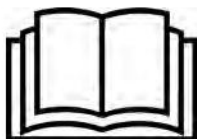


WARNING

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

W-2003-0807

CORRECT



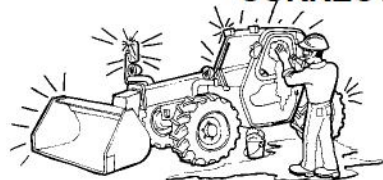
P-90216

- ⚠ Never service the Bobcat VersaHANDLER 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.

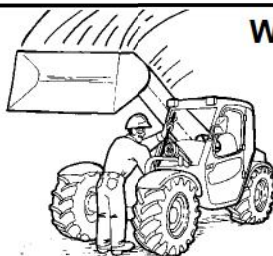
CORRECT



B-16082

- ⚠ Cleaning and maintenance are required daily.

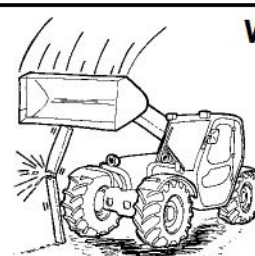
WRONG



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.

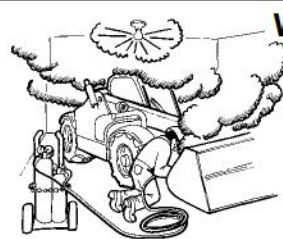
WRONG



B-16079

- ⚠ Never work on VersaHANDLER 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.

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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.

MSW12-0409

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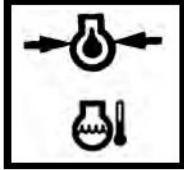
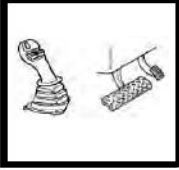



The full manual is available for immediate download.

<https://www.ebooklibonline.com>

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:

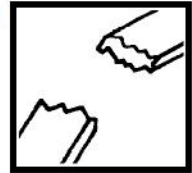
- | | | | |
|--|---|---|---|
| <p>1. Check that ROPS/FOPS (including right side window) is in good condition and is not modified.</p> |  | <p>8. The parking brake must function correctly.</p> |  |
| <p>2. Check that ROPS mounting hardware is tightened and is Bobcat approved.</p> |  | <p>9. Enclosure door latches must open and close freely.</p> |  |
| <p>3. The seat belt must be correctly installed, functional and in good condition.</p> |  | <p>10. Attachment locking pins must function correctly and be in good condition. Bob-Tach wedges and linkages (if equipped) must function correctly and be in good condition.</p> |  |
| <p>4. Check boom stop, replace if damaged.</p> |  | <p>11. Safety treads must be in good condition.</p> |  |
| <p>5. Machine signs (decals) must be legible and in the correct location.</p> |  | <p>12. Check for correct function of indicator lamps and gauges.</p> |  |
| <p>6. Joystick control lever and foot pedals must return to neutral.</p> |  | <p>13. Check hydraulic fluid level, engine oil level and fuel supply.</p> |  |
| <p>7. Check for correct function of the work lights.</p> |  | <p>14. Inspect for fuel, oil or hydraulic fluid leaks.</p> |  |

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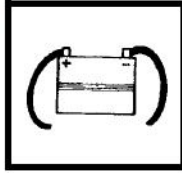
15. Lubricate the telescopic handler.



20. Inspect for loose or broken parts or connections.



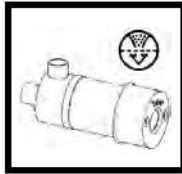
16. Check the condition of the battery and cables.



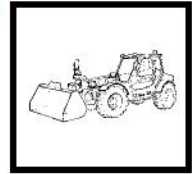
21. Check for any field modification not completed.



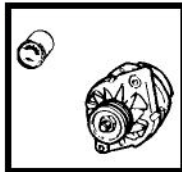
17. Inspect the air cleaner for damage or leaks. Check the condition of the element.



22. Operate the machine and check all functions.



18. Check the electrical charging system.



23. Check function or condition of all equipped options and accessories (examples: back-up alarm, fire extinguisher, rotating beacon, front stabilizers, etc.).



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



24. 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-2003-0807

IMPORTANT

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

I-2019-0284



DANGER

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.
- 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 Telescopic Handler 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 Telescopic Handler.
- The Telescopic Handler Safety Video is available from your Bobcat dealer or at www.training.bobcat.com or www.bobcat.com.

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.

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SI VH EMEA-0409 SM

SAFETY INSTRUCTIONS (CONT'D)



Cutting or drilling concrete containing sand or rock containing quartz may result in exposure to silica dust. Use a respirator, water spray or other means to control dust.

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.

SI VH EMEA-0409 SM

FIRE PREVENTION (CONT'D)

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.

Spark Arrestor Exhaust System

The spark arrestor exhaust system 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.

Check the spark arrestor exhaust system regularly to make sure it is maintained and working properly. Use the procedure in the Operation & Maintenance Manual for cleaning the spark arrestor muffler (if equipped).

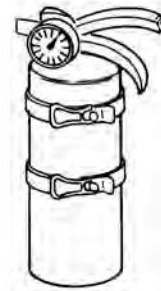
Welding And Grinding

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



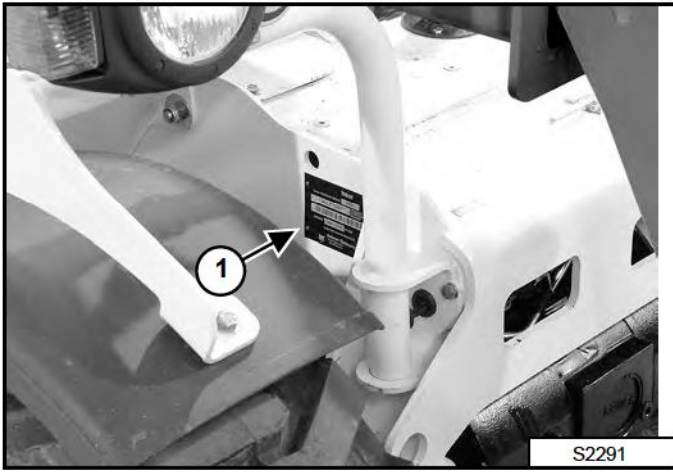
Know where fire extinguishers and first aid kits are located and how to use them. Inspect the fire extinguisher and service the fire extinguisher regularly. Obey the recommendations on the instructions plate.

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SERIAL NUMBER LOCATION

Always use the serial number of the telescopic handler when requesting service information or when ordering parts.

Figure 1

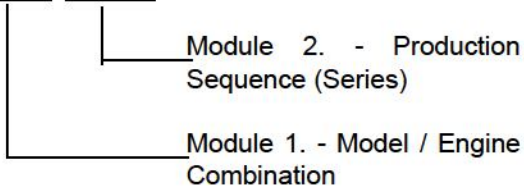


Telescopic Handler Serial Number

The telescopic handler serial number plate is located on the right side of the chassis in front [Figure 1].

Explanation of telescopic handler serial number:

XXXX XXXXX



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 telescopic handler is produced.

Engine Serial Number

Figure 2



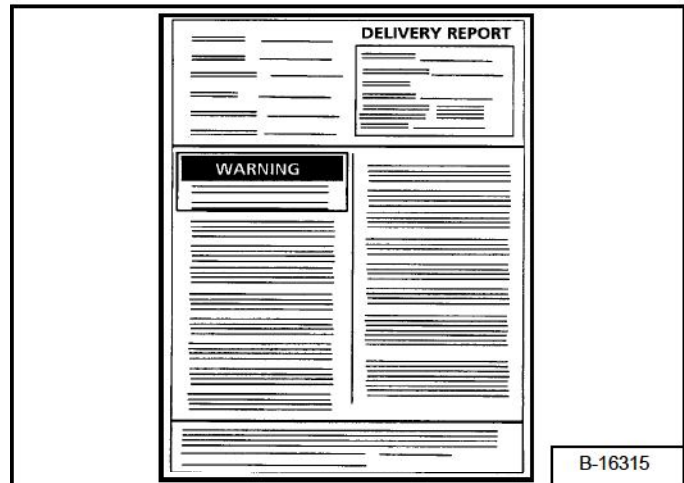
The engine serial number can be found on top of the valve cover (Item 1) [Figure 2]. Always use the full number when ordering replacement parts.

Other Serial Numbers

Other components may also have serial numbers and an identification plate. Always use these serial numbers when ordering parts.

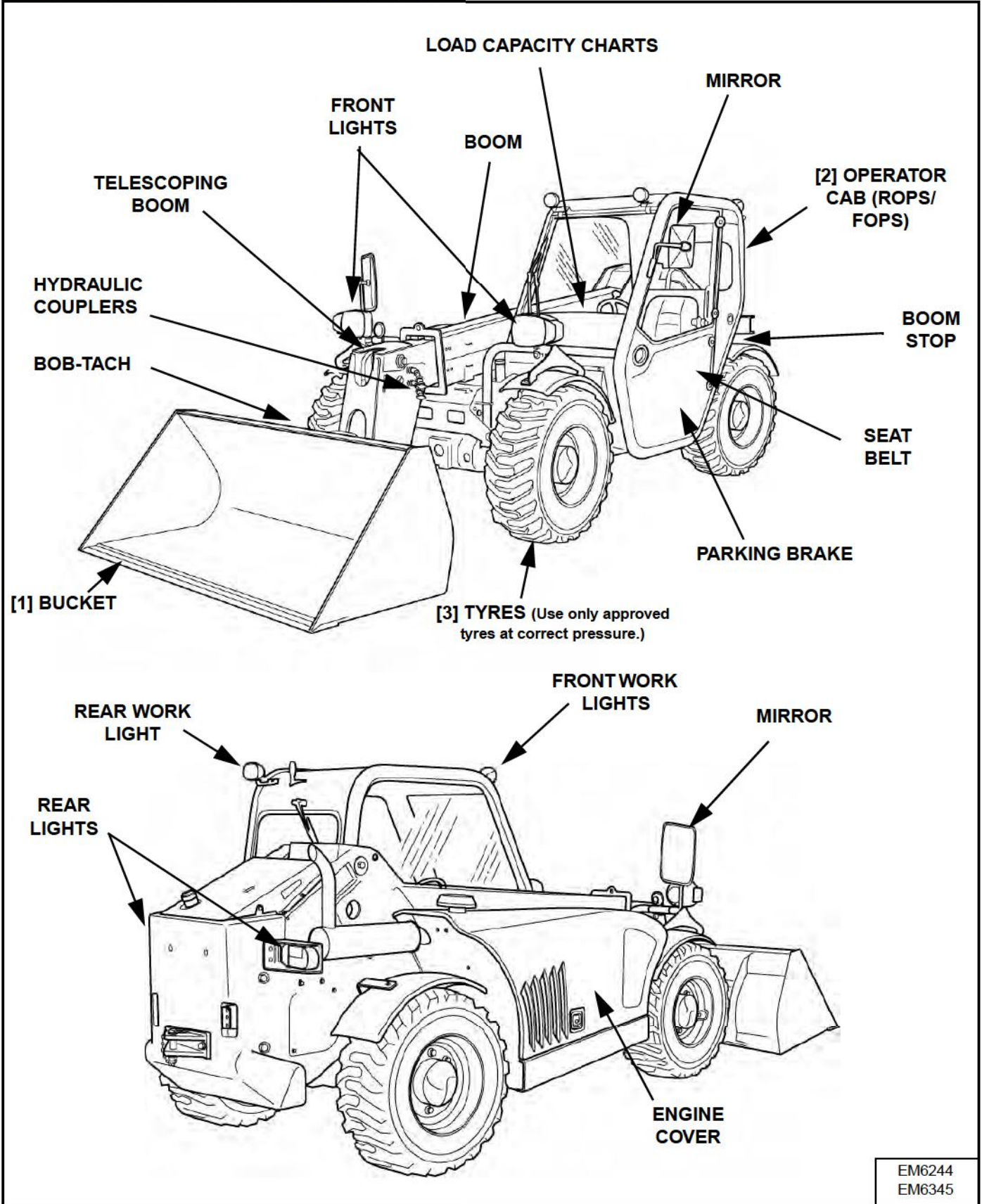
DELIVERY REPORT

Figure 3



The delivery report must be completed by the dealer and signed by the owner or operator when the Bobcat telescopic handler is delivered. An explanation of the form must be given to the owner. Make sure it is complete [Figure 3].

BOBCAT TELESCOPIC HANDLER IDENTIFICATION



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LIFTING AND BLOCKING THE TELESCOPIC HANDLER

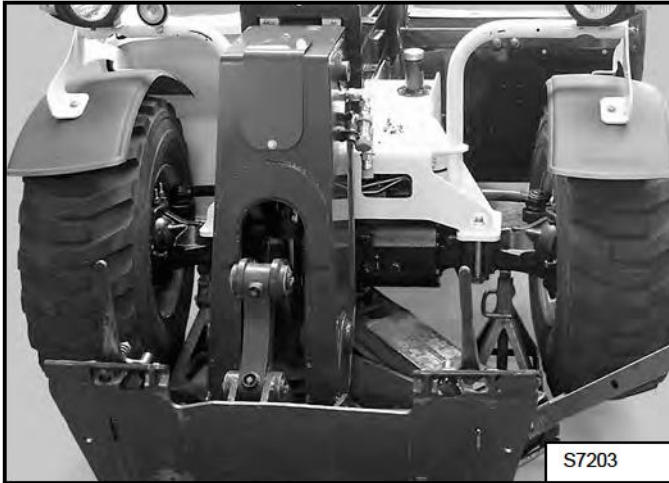
Procedure

WARNING

Put jackstands under the front axles and rear corners of the frame before running the engine for service. Failure to use jackstands can allow the machine to fall or move and cause injury or death.

W-2017-0286

Figure 10-10-1



Always park the machine on a level surface.

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

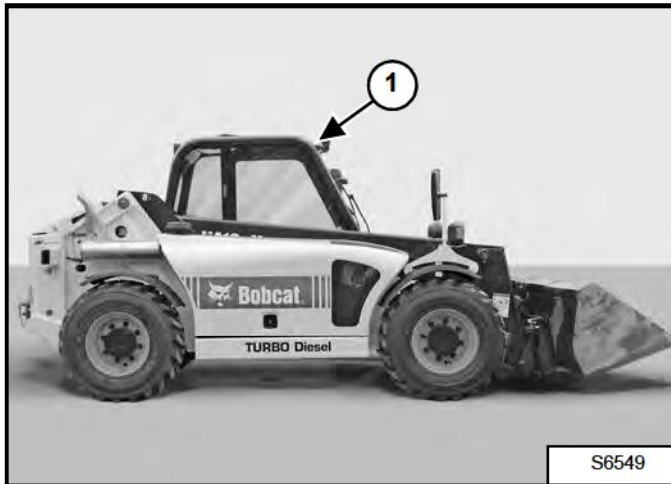
Figure 10-10-2



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

OPERATOR CAB (ROPS / FOPS)

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.

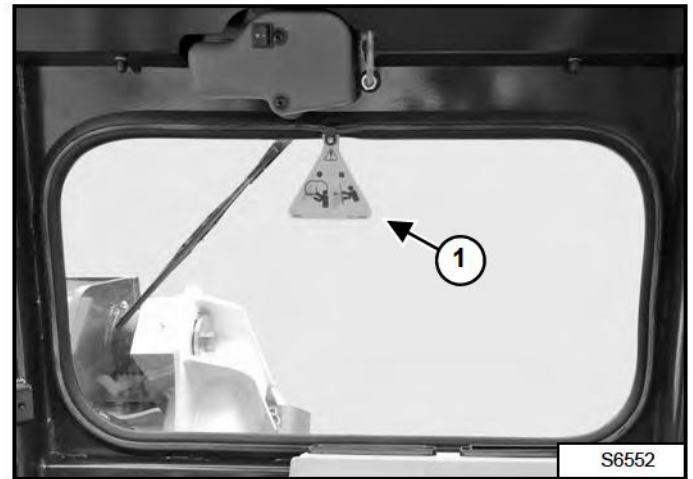


Never modify operator cab by welding, grinding, drilling holes or adding attachments unless instructed to do so by Bobcat Company. Do not operate without right window. Changes to the cab can cause loss of operator protection from rollover and falling objects, and result in serious injury or death.

W-2906-0211

Emergency Exit

Figure 10-20-2



Pull the tag on top of the rear window (Item 1) [Figure 10-20-2] to remove the rubber cord.

Push the rear window out of the rear of the operator cab. (Models with enclosed cab only.)

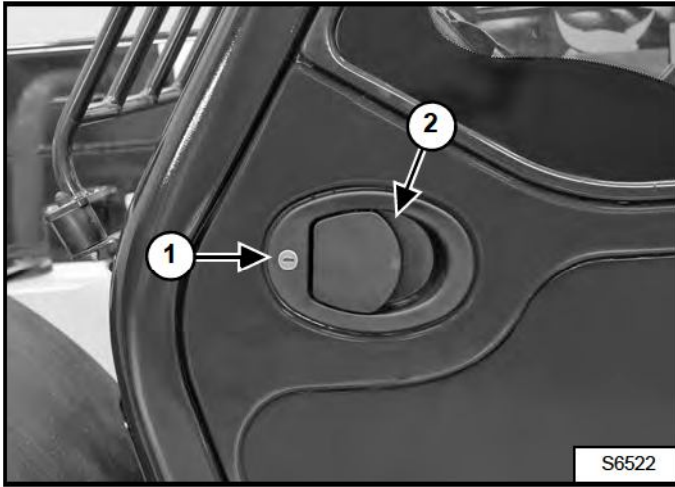
Exit through the rear of the operator cab.

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

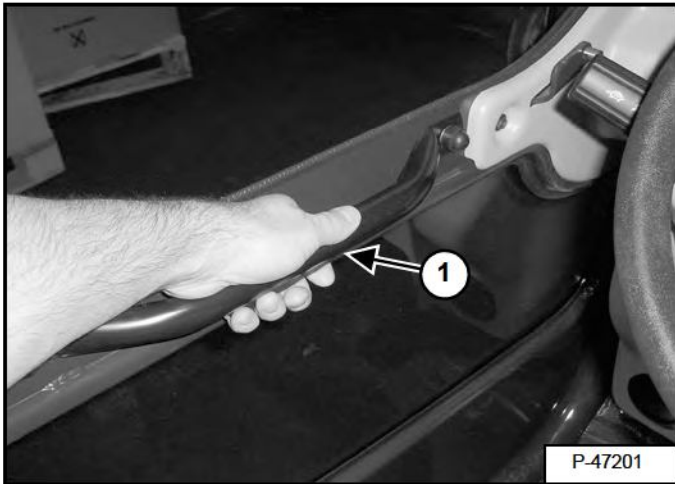
Cab Door

Figure 10-20-3



The cab door can be locked (Item 1) [Figure 10-20-3] with the start key.

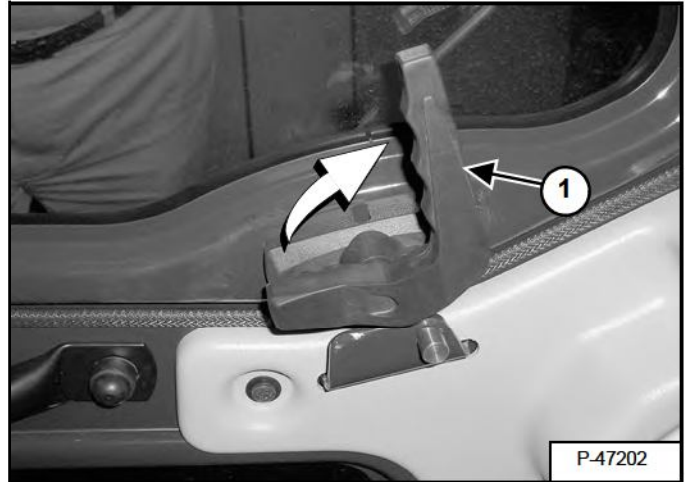
Figure 10-20-4



The cab door can be opened from the outside of the cab using the latch (Item 2) [Figure 10-20-3] and from the inside of the cab by squeezing the latch (Item 1) [Figure 10-20-4] (as shown).

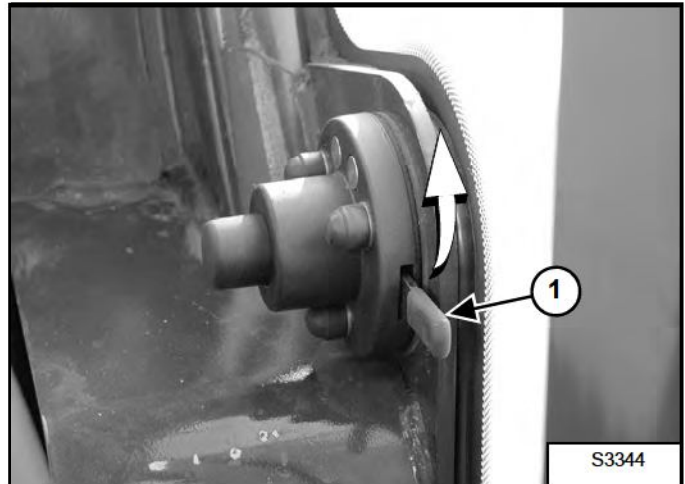
Cab Door Window

Figure 10-20-5



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

Figure 10-20-6



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

TRANSPORTING THE TELESCOPIC HANDLER ON A TRAILER

Loading And Unloading

Figure 10-30-1



The telescopic handler must be loaded backward on the trailer.

The rear of the trailer must be blocked or supported (Item 1) [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. For the weight of telescopic handler, see "Performance" on page 2.

WARNING

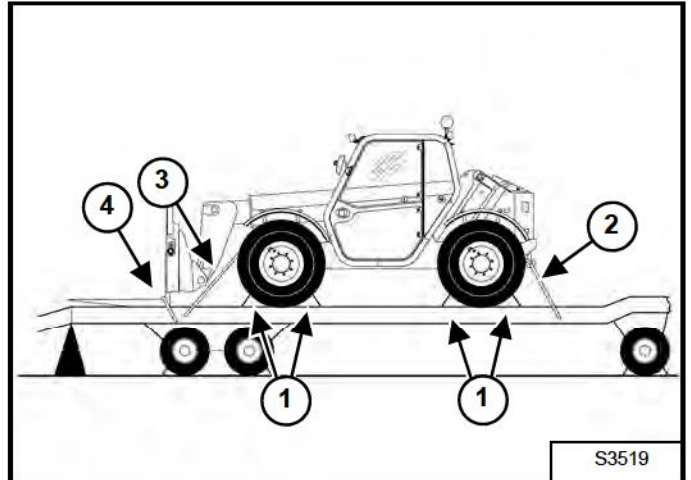
AVOID SERIOUS INJURY OR DEATH

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

Fastening

Figure 10-30-2




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

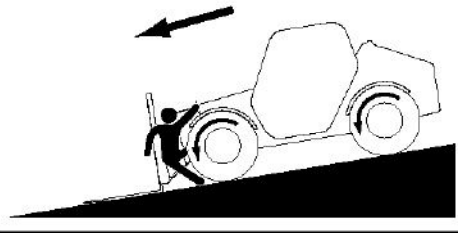
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TOWING THE TELESCOPIC HANDLER

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



WARNING



**Unexpected Machine Movement
Can Cause Serious Injury or Death**

Before adjusting screws to
bypass the park brake system:

- Block wheels to prevent roll away.

Before operating machine:

- Return adjustment screws to the
operating position.

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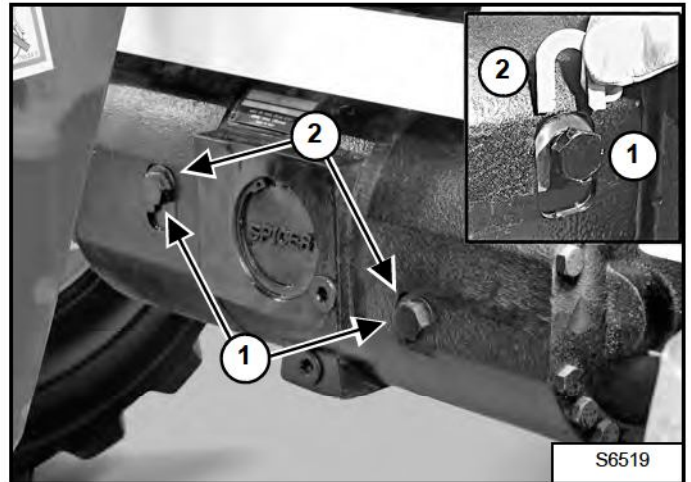
Block the wheels to prevent the machine from rolling.

Releasing The Brake Discs

The brakes are engaged by spring pressure and released by hydraulic pressure. The parking brake must be released manually before towing (if the engine can not be started to release the brakes or there is no hydraulic pressure). Only the front axle has brakes.

The following procedure describes how to release the brakes:

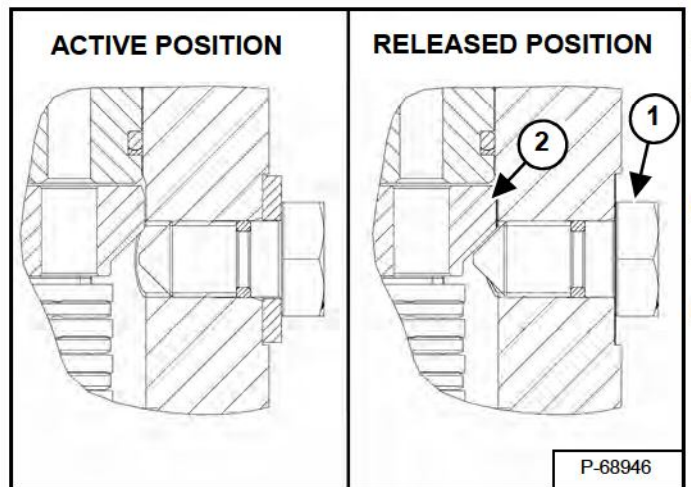
Figure 10-40-1



Loosen the four bolts (Item 1) until the slotted spacers (Item 2) [Figure 10-40-1] can be removed from under the bolt heads (the bolts and spacers are located on both the front and rear side of the front axle).

Remove the spacers (Item 2) [Figure 10-40-1] and save for reuse.

Figure 10-40-2



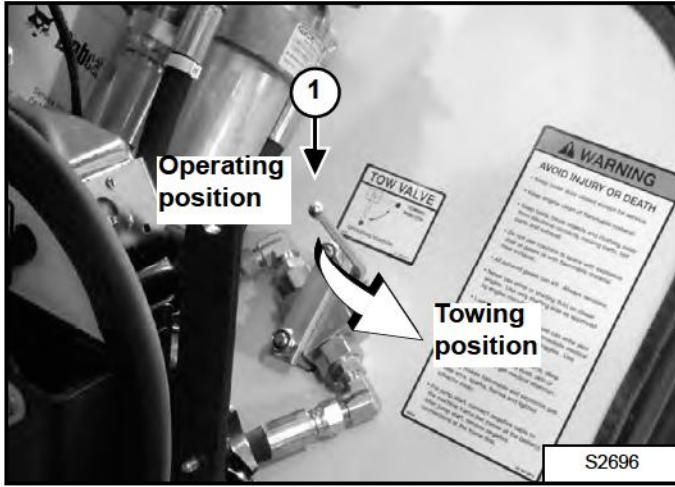
After removing the spacers, evenly tighten the front and rear bolts (Item 1) to hold the parking brake piston (Item 2) [Figure 10-40-2] in the released position.

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TOWING THE TELESCOPIC HANDLER (CONT'D)

Towing

Figure 10-40-3

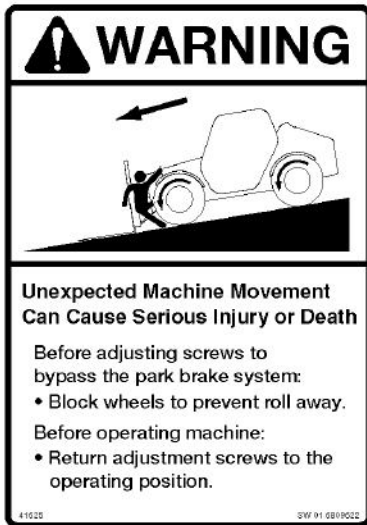


Raise the engine cover.

Turn the tow valve (Item 1) [Figure 10-40-3] counterclockwise 90 degrees to TOWING POSITION.

Tow the Telescopic Handler at a slow speed.

NOTE: The vehicle will not be able to brake until the four bolts (Item 1) [Figure 10-40-3] & [Figure 10-40-3] are returned to their original position.



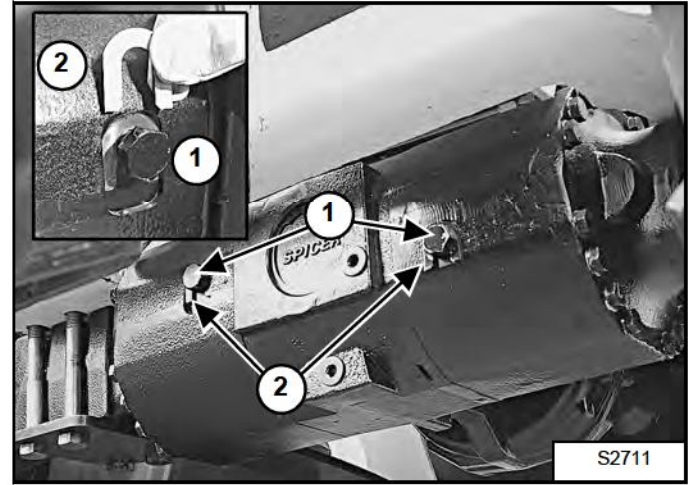
Block the wheels to prevent the machine from rolling.

After towing is completed, turn the tow valve (Item 1) [Figure 10-40-3] clockwise 90 degrees to the OPERATING POSITION.

NOTE: If the tow valve is not returned to the operating position, the machine will not be able to be driven forward or backward.

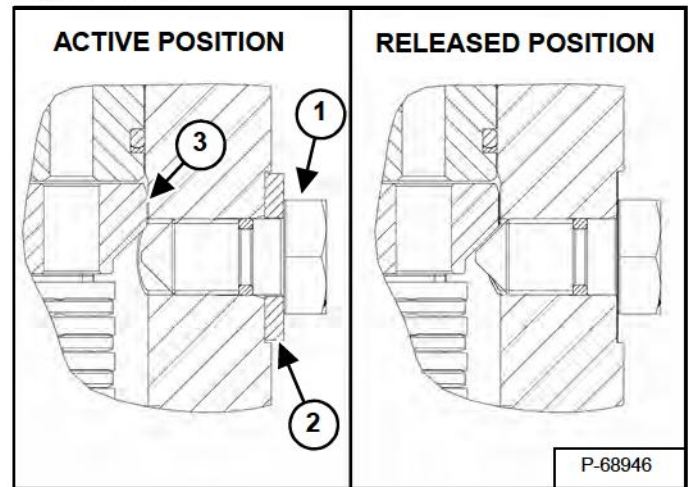
Engaging The Brake Discs

Figure 10-40-4



Loosen the four bolts (Item 1) until the spacers (Item 2) [Figure 10-40-4] can be installed under the bolt heads (the bolts and washers are located on both the front and rear side of front axle).

Figure 10-40-5



Evenly tighten the front and rear bolts (Item 1) to hold the spacers (Item 2) [Figure 10-40-4] & [Figure 10-40-5].

Tighten the bolts to 95-115 N•m (70-85 ft-lb) torque.

This will allow the parking brake piston (Item 3) [Figure 10-40-5] to be active again.

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 telescopic handler.



WARNING

Instructions are necessary before operating or servicing machine. Read and understand the Operation & Maintenance Manual 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-EN-0903

SERVICE SCHEDULE		HOURS					
ITEM	SERVICE REQUIRED	10	50	100	250	[5] 500	[6] 1000
Engine Oil	Check the oil level and add as needed. Do not overfill.						
Hydraulic Fluid	Check the fluid level and add as needed.						
Safety Signs, Safety Tread and Mirrors	Check for damaged signs (decals), safety treads, load charts and mirrors. Replace if damaged or missing.						
Fuel Filter	Remove the trapped water.						
Tyres	Check for damaged tyres and correct air pressure. Inflate to MAXIMUM pressure shown on sidewall of the tyre.						
Seat Belt	Check condition. Check mounting hardware.						
Brakes and Controls	Check for function. Service as necessary.						
Gauges, Horn and Backup Alarm	Check for correct operation. Repair or replace as needed.						
General	Check for loose or broken parts, damaged cab, seat belt and instrument operations. Check for installation of right hand cab window. Clean mirrors and windows. Repair or replace as needed.						
Engine Cooling System	Check oil cooler, radiator and air conditioner condenser. Check coolant level COLD in reservoir. Add premixed coolant as necessary. (See ENGINE COOLING SYSTEM.) Check cooling system for leaks.						
Engine Air Filter	Check condition indicator. Service only when required. Do not use compressed air to clean elements. Empty dust cup.						
Engine Air Intake System	Check for leaks and damaged components.						
Bob-Tach Pivot, Wedges, Cylinder and Link Pin Pivots	Lubricate with multipurpose lithium based grease.						
Axle Steering Pivot Points	Lubricate with multipurpose lithium based grease.						
Rear Axle Pivots	Lubricate with multipurpose lithium based grease.						
Boom and Cylinder Pivots	Lubricate with multipurpose lithium based grease.						
Hydraulic Hoses, Tubelines and Connections	Check for damage and leaks. Repair or replace as needed.						
Universal Joints and Slip Yoke on Drive Shaft	Lubricate with multipurpose lithium based grease.						
Cab Filter	Clean dust out of the cab filter. Replace every 500 hours.						
Battery	Check cables and connections						
Wheel Nuts	Check wheel nut torque. Tighten as needed [360 N•m (265 ft-lb)].	[1]					
Fuel Filter	Replace the fuel filter element. Use the genuine Bobcat Filter.		[2]				
Engine / Hydro. Drive Belt	Check for wear or damage. Check tension and adjust or replace as needed.						
Alt. and Air Cond. Belt (If Equipped)	Check condition. Replace as needed.						
Door hinges	Lubricate door hinges with multipurpose lithium based grease.						
Hydraulic/Hydrostatic Oil Filters	Replace the hydraulic/hydrostatic oil filter elements. Use a genuine Bobcat filter.		[2]				
Engine Oil and Filter	Replace the engine oil and filter. Use a genuine Bobcat filter		[2]				
Cab Filter	Replace the cab filter.						
Planetary Carriers	Replace the fluid. See SPECIFICATIONS for correct oil type and capacities.					[3]	
Axle Fluid, Differential Fluid, Gear Box Fluid	Replace the fluid. See SPECIFICATIONS for correct oil type and capacities.			[3]		[2]	
Hydraulic Fluid	Replace the hydraulic fluid.						
Telescopic Boom Wear Blocks	Check for wear and adjust as needed. Replace if necessary.						
Pivot Pins and Bushings	Check for wear on the pivot pins and bushings.						
Breathers	Clean gear box, axle housing, and hydraulic tank breathers. Replace as needed.						
Engine Coolant	Check freeze protection of antifreeze -30°C (-34°F). Flush cooling system and replace with premixed coolant						Every 2 years

[1] Check wheel nut torque every 8 hours for the first 24 hours.

[2] Perform service first time, then as indicated in chart.

[3] Check level.

[4] Replace fluid first time, then as indicated in chart.

[5] or every 6 months.

[6] or every 12 months.

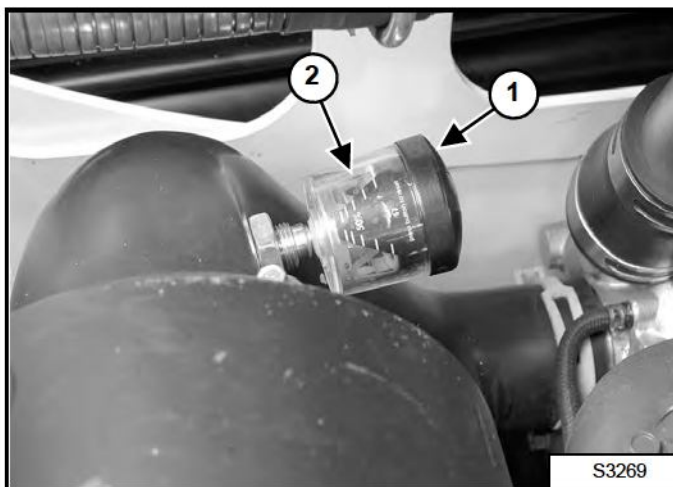
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AIR CLEANER SERVICE

Replacing The Filter Element

Outer filter

Figure 10-60-1

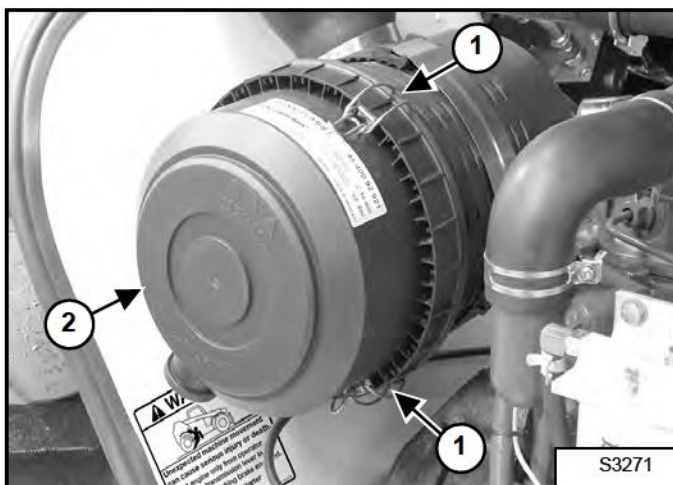


Replace the large (outer) filter element only when the red ring shows in the window of the condition indicator (Item 1) [Figure 10-60-1].

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.

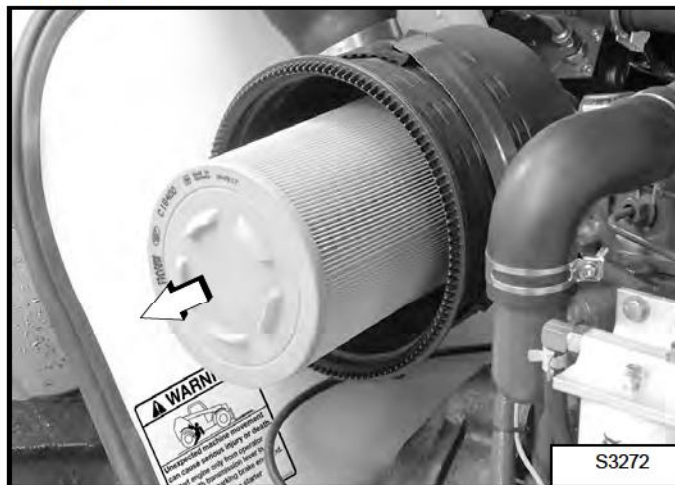
Figure 10-60-2



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

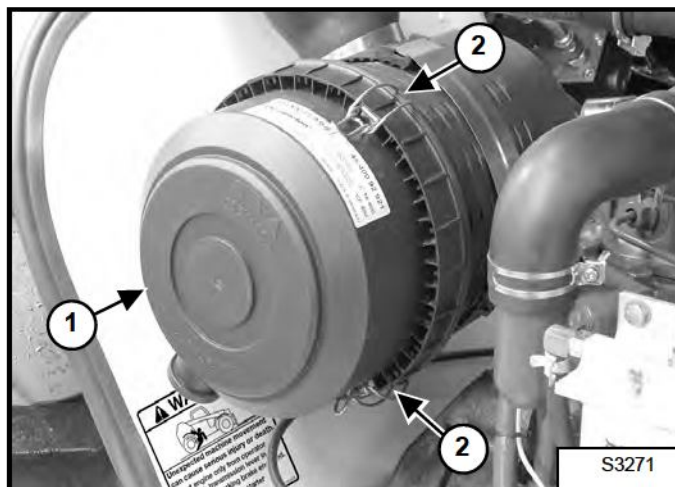


Pull the element straight out [Figure 10-60-3].

NOTE: Make sure all sealing surfaces are free of dirt and debris. Do not use compressed air to remove dirt or debris.

Install a new outer element.

Figure 10-60-4



Install the dust cover (Item 1) [Figure 10-60-4] and fasten.

Connect the filter housing clamps (Item 2) [Figure 10-60-4].

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AIR CLEANER SERVICE (CONT'D)

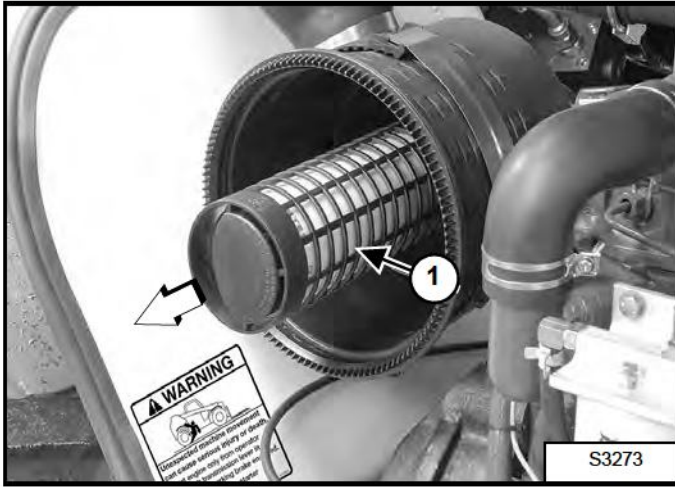
Replacing The Filter Element (Cont'd)

Inner Filter

Remove the outer element.

NOTE: Make sure all sealing surfaces are free of dirt and debris. Do not use compressed air to remove dirt or debris

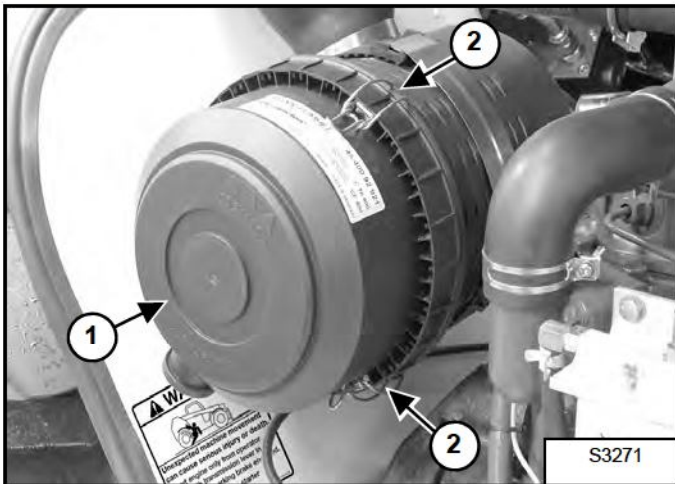
Figure 10-60-5



Remove the inner filter (Item 1) [Figure 10-60-5] and install a new element.

Install the outer element.

Figure 10-60-6



Install the dust cover (Item 1) [Figure 10-60-6] and fasten.

Connect the filter housing clamps (Item 2) [Figure 10-60-6].

ENGINE COOLING SYSTEM

Check the cooling system every day to prevent overheating, loss of performance or engine damage. (See SERVICE SCHEDULE on Page 10-50-1.)



AVOID INJURY OR DEATH

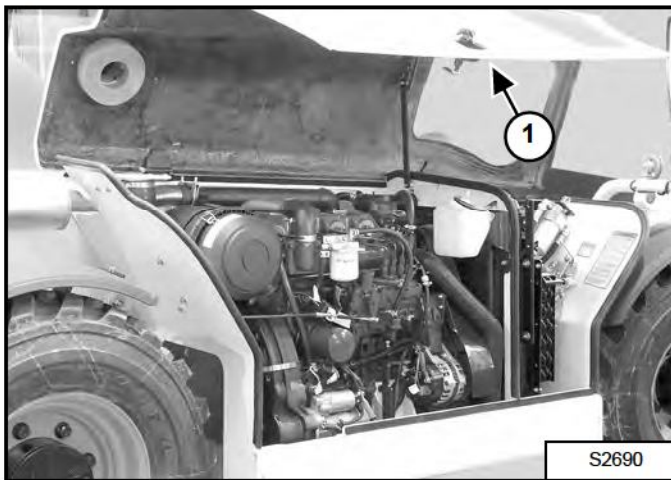
Wear safety glasses to prevent eye injury when any of the following conditions exist:

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

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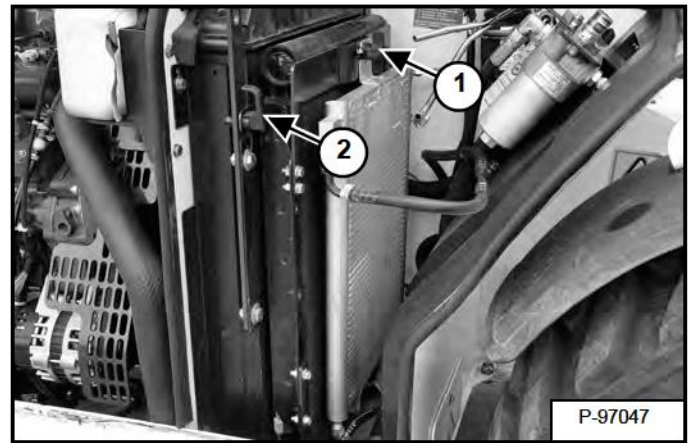
Cleaning

Figure 10-70-1



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

Figure 10-70-2



Loosen the knob (Item 1) [Figure 10-70-2] and tilt the condenser (if equipped) forward.

Loosen the knob (Item 2) [Figure 10-70-2] and tilt the oil cooler forward.

Use low air pressure or water pressure to clean the condenser (if equipped), oil cooler and radiator.

Reposition the oil cooler and tighten the knob (Item 2) [Figure 10-70-2].

Reposition the condenser and tighten the knob (Item 1) [Figure 10-70-2] (if equipped).

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ENGINE COOLING SYSTEM (CONT'D)

Removing And Replacing The Coolant

! WARNING

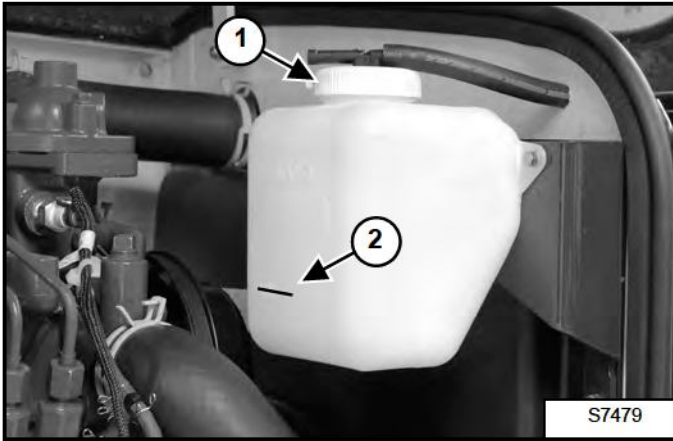
AVOID BURNS

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

W-2070-1203

Open the engine cover.

Figure 10-70-3



Remove the cap (Item 1) [Figure 10-70-3] from the coolant reservoir.

IMPORTANT

AVOID ENGINE DAMAGE

Always use the correct ratio of water to antifreeze.

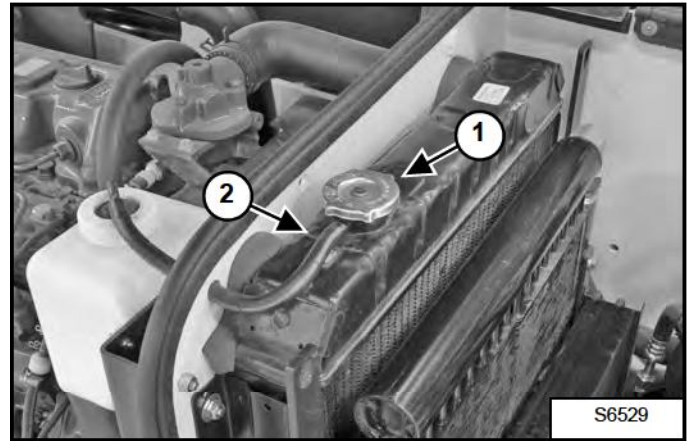
Too much antifreeze reduces cooling system efficiency and may cause serious premature engine damage.

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.

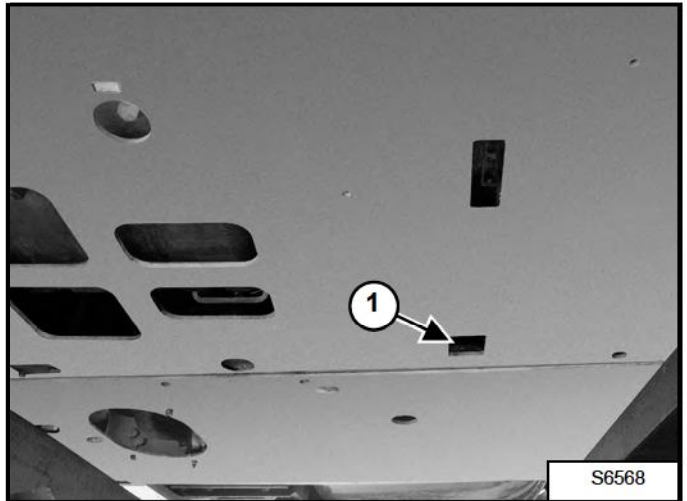
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Figure 10-70-4



Remove the radiator cap (Item 1) [Figure 10-70-4].

Figure 10-70-5



Open the radiator drain valve (Item 1) [Figure 10-70-5] at the bottom of the engine compartment.

Drain the coolant into a container. Recycle or dispose of coolant in an environmentally safe manner.

Close the drain valve (Item 1) [Figure 10-70-5].

ENGINE COOLING SYSTEM (CONT'D)

Removing And Replacing The Coolant (Cont'd)

Mix the coolant in a separate container.

NOTE: The cooling system is factory filled with ethylene glycol (EG) coolant. **DO NOT** mix ethylene glycol with propylene glycol.

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

Add premixed coolant to the reservoir if the coolant level is low. (See Operation And Maintenance Manual for more information.)

Add coolant to the radiator. The coolant level must be right below the connection with the overflow bottle (Item 2) [Figure 10-70-4].

When using concentrated coolant instead of a ready-to-use premix: mix the coolant in a separate container with 50% ethylene glycol and 50% water.

Install the radiator cap.

Add coolant to the overflow bottle as needed.

Run the engine until it is at operating temperature.

Stop the engine.

Check the coolant level when the engine is cold and add coolant as needed until it is at the mark (Item 1) [Figure 10-70-3] on the overflow bottle.

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.

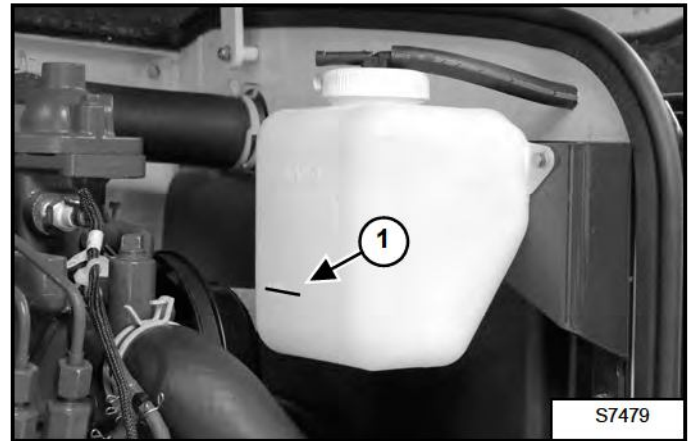
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Checking Level

Open the engine cover.

Check the coolant level in the coolant reservoir.

Figure 10-70-6



The coolant level must be at or slightly above the minimum (min) mark (Item 1) [Figure 10-70-6] on the coolant reservoir when the engine is cold.

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

At a minimum, Low Sulfur (500 ppm sulfur) Diesel Fuel must be used in this machine.



The following fuels may also be used in this machine:

- Ultra Low Sulfur (15 ppm sulfur) Diesel Fuel.
- Biodiesel Blend Fuel - Must contain no more than five percent biodiesel mixed with low sulfur or ultra low sulfur petroleum based diesel. This is commonly marketed as B5 blended diesel fuel.

Filling The Fuel Tank

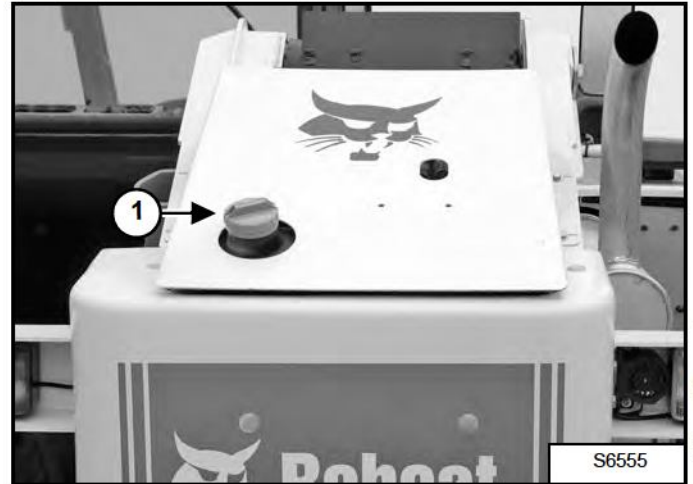


AVOID INJURY OR DEATH

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

W-2063-0807

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].

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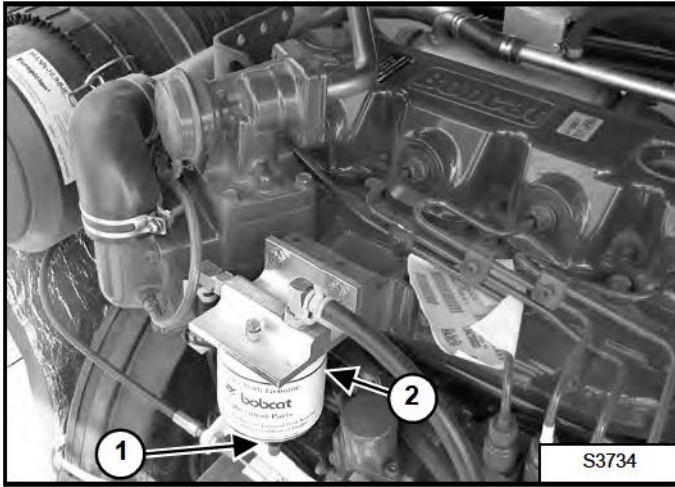
to download the complete manual.

Thank you so much for reading

FUEL SYSTEM (CONT'D)

Fuel Filter

Figure 10-80-2



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

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

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

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

WARNING

AVOID INJURY OR DEATH

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.

W-2103-0508

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