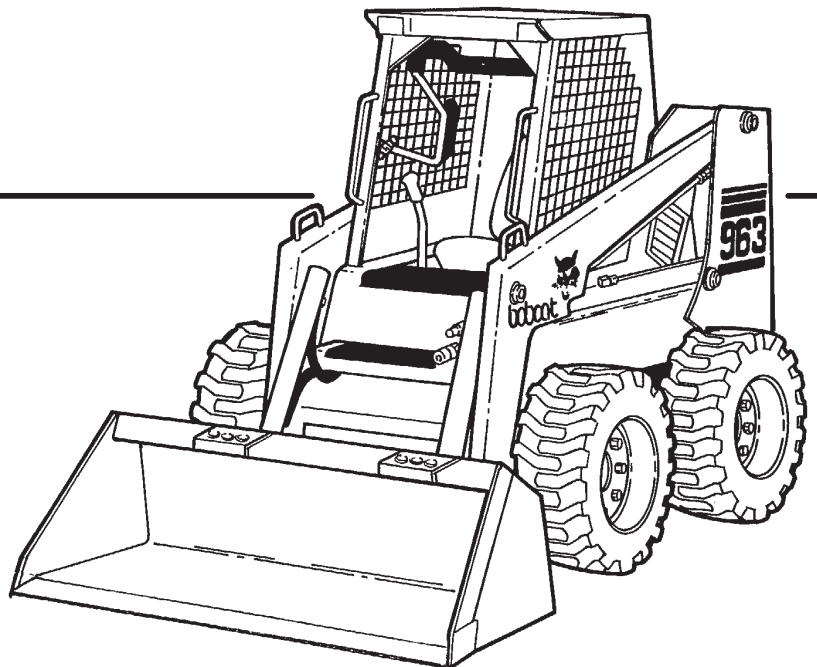


963



Service Manual



EQUIPPED WITH
BOBCAT INTERLOCK
CONTROL SYSTEM (BICS™)

MELROE
INGERSOLL-RAND

6724545 (11-97)

Printed in U.S.A.



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MAINTENANCE SAFETY



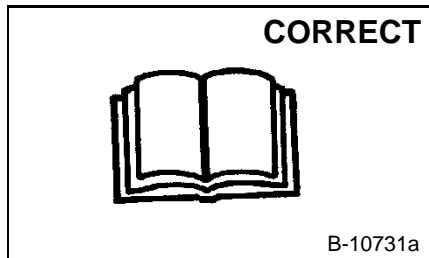
WARNING

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-2003-0903

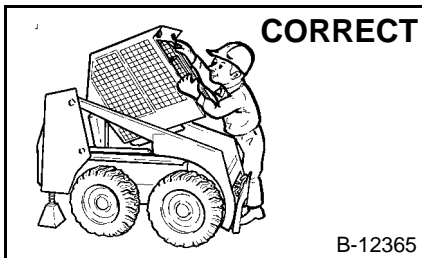


Safety Alert Symbol: This symbol with a warning statement, means: "Warning, be alert! Your safety is involved!" Carefully read the message that follows.



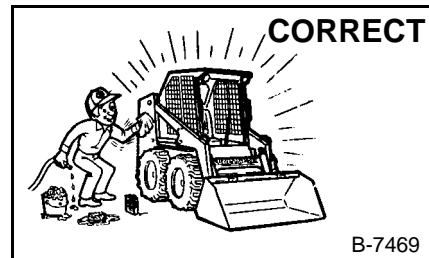
B-10731a

⚠ Never service the Bobcat Skid-Steer Loader without instructions.



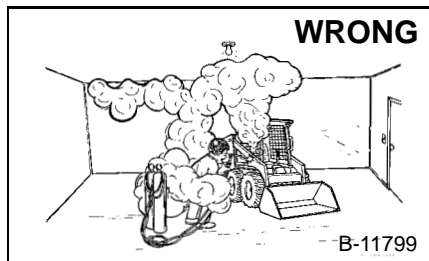
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⚠ Use the correct procedure to lift or lower operator cab.



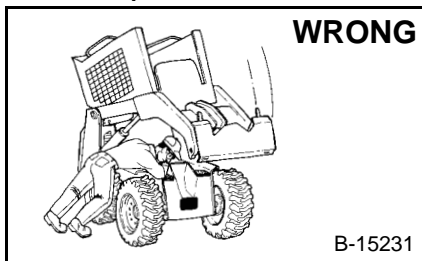
B-7469

⚠ Cleaning and maintenance are required daily.



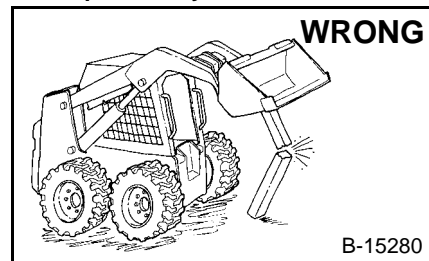
B-11799

- ⚠ 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.



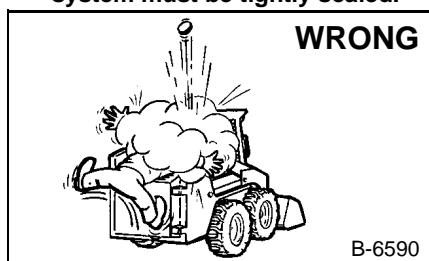
B-15231

⚠ Disconnecting or loosening any hydraulic tubeline, hose, fitting, component or a part failure can cause lift arms to drop. Do not go under lift arms when raised unless supported by an approved lift arm support device. Replace it if damaged.



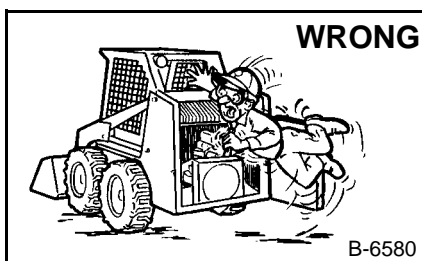
B-15280

- ⚠ Never work on loader with lift arms up unless lift arms are held by an approved lift arm support device. Replace if damaged.
- ⚠ Never modify equipment or add attachments not approved by Bobcat Company.



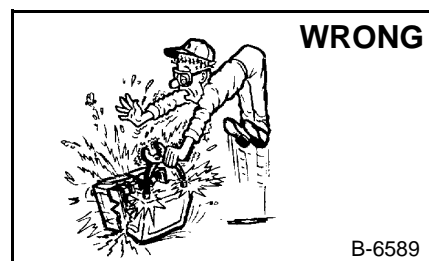
B-6590

- ⚠ Stop, cool and clean engine of flammable materials before checking fluids.
- ⚠ Never service or adjust loader 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-6580

- ⚠ Keep body, jewelry and clothing away from moving parts, electrical contact, hot parts and exhaust.
- ⚠ Wear eye protection to guard from battery acid, compressed springs, fluids under pressure and flying debris when engines are running or tools are used. Use eye protection approved for type of welding.
- ⚠ Keep rear door closed except for service. Close and latch door before operating the loader.



B-6589

- ⚠ Lead-acid batteries produce flammable and explosive gases.
- ⚠ Keep arcs, sparks, flames and lighted tobacco away from batteries.
- ⚠ Batteries contain acid which burns eyes or skin on contact. Wear protective clothing. If acid contacts body, flush well with water. For eye contact flush well and get immediate medical attention.

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

MSW01-0805

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 BICS—BOBCAT INTERLOCK CONTROL SYSTEM
 BOSS—BOBCAT OPERATION SENSING SYSTEM
 PWM—PULSE WITH MODULATION

Cont'd On Next Page

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Hello dear friend!

Thank you very much for reading.

Enter the link into your browser.

The full manual is available for immediate download.

<https://www.ebooklibonline.com>

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

**PREVENTIVE
MAINTENANCE**

**HYDRAULIC
SYSTEM**

**HYDROSTATIC
SYSTEM**

**DRIVE
SYSTEM**

**MAIN
FRAME**

**ELECTRICAL
SYSTEM**

**ENGINE
SERVICE**

**SYSTEMS
ANALYSIS**

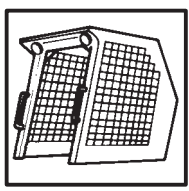

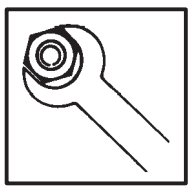
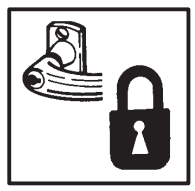
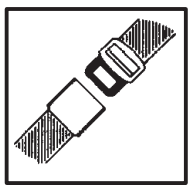
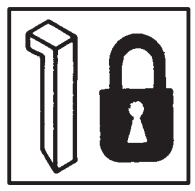
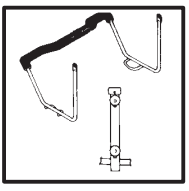
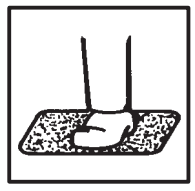
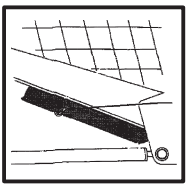
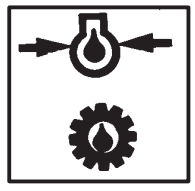

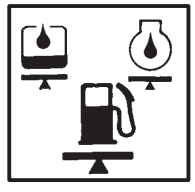
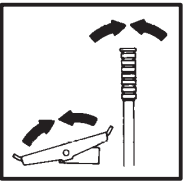
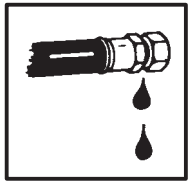


SPECIFICATIONS

**ADVANCED
HAND CONTROL
SYSTEM**

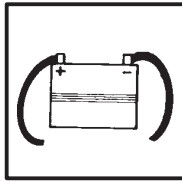
FOREWORD

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

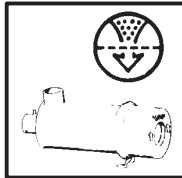
A general inspection of the following items must be made after the loader has had service or repair:

- | | | | |
|---|---|--|---|
| 1. Check that the ROPS/FOPS (Including sidescreens) is in good condition and is not modified. |  | 9. The parking brake must function correctly. |  |
| 2. Check that ROPS mounting hardware is tightened and is Melroe approved. |  | 10. Enclosure door latches must open and close freely. |  |
| 3. The seat belt must be correctly installed, functional and in good condition. |  | 11. Bob-Tach wedges and linkages must function correctly and be in good condition. |  |
| 4. The seat bar and pedal interlocks must be correctly adjusted, clean and lubricated. |  | 12. Safety treads must in good condition. |  |
| 5. Check lift arm support device, replace if damaged. |  | 13. Check for correct function of indicator lamps (Optional on some models). |  |
| 6. Machine signs must be legible and in the correct location. |  | 14. Check hydraulic fluid level, engine oil level and fuel supply. |  |
| 7. Steering levers and foot pedals must return to neutral. |  | 15. Inspect for fuel, oil or hydraulic fluid leaks. |  |
| 8. Check for correct function of the work lights. |  | 16. Lubricate the loader. |  |

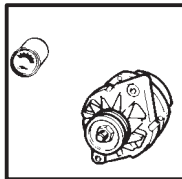
17. Check the condition of the battery and cables.



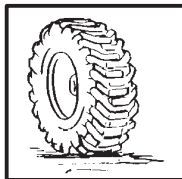
18. Inspect the air cleaner for damage or leaks. Check the condition of the element.



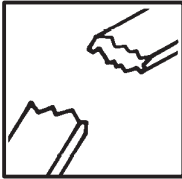
19. Check the electrical charging system.



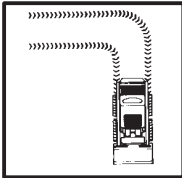
20. Check tires for wear and pressure.



21. Inspect for loose or broken parts or connections.



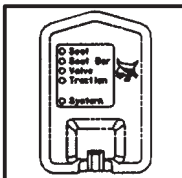
22. Operate the loader and check all functions.



23. Check for any field modification not completed.



24. Check for correct function of the Bobcat Interlock Control System (BICS™) before the machine is returned to the customer.



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



SAFETY INSTRUCTIONS

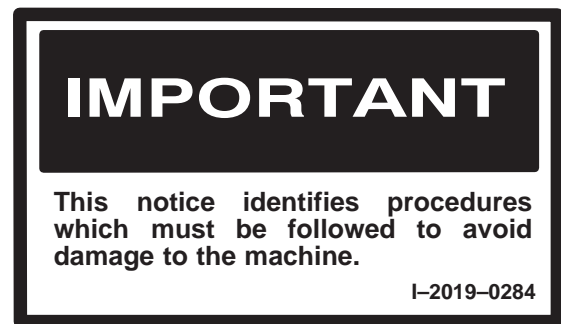
WARNING

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-2003-0299

The following publications provide information on the safe use and maintenance of the loader 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 loader gives operating information as well as routine maintenance and service procedures. It is a part of the loader and must stay with the machine when it is sold. Replacement Operation & Maintenance Manuals can be ordered from your Bobcat loader dealer.
- The loader has machine signs (decals) which instruct on the safe operation and care. The signs and their locations are shown in the Operation & Maintenance Manual. Replacement signs are available from your Bobcat loader dealer.
- The loader has a plastic Operator's Handbook fastened to the operator cab. Its 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 EMI Safety Manual (available in Spanish) delivered with the loader 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 Skid-Steer Loader Operator Training Course is available through your local dealer. This course is intended to provide rules and practices for correct operation of the Bobcat loader. The course is available in English and Spanish version.
- The Service Safety Training Course is available from your Bobcat dealer. This course provides information for safe and correct service procedures for Bobcat Skid-Steer loaders.
- The Bobcat Skid-Steer Loader Safety Video is available from your Bobcat Dealer.



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

FIRE PREVENTION

The loader has several 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 the fire hazard. The loader must be cleaned as often as necessary to avoid this accumulation. Flammable debris in the engine compartment is a fire hazard when the loader is parked with a hot engine.

The 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.

- Do not use the Bobcat loader where exhaust, arcs, sparks or hot components can contact flammable material, explosive dust or gases.
- The 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 this engine. It has a glow plug. These starting aids can cause explosion and injure you or bystanders.
- Always clean the loader and disconnect the battery before doing any welding. Cover rubber hoses, battery and all other flammable parts. Keep a fire extinguisher near the loader 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.
- Stop the engine and let it cool before adding fuel. No smoking!
- Use the procedure in the Operation & Maintenance Manual for connecting the battery.
- Use the procedure in the Operation & Maintenance Manual for cleaning the spark arrestor muffler.
- Know where fire extinguishers and first aid kits are located and how to use them.

A fire extinguisher is available from your local dealer. The fire extinguisher can be installed in the location shown **[A]**.



SERIAL NUMBER LOCATIONS

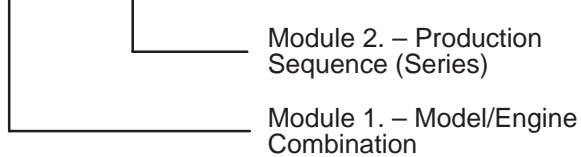
Always use the serial number of the loader when requesting service information or when ordering parts. Early or later models (identification made by serial number) may use different parts, or it may be necessary to use a different procedure in doing a specific service operation.

LOADER SERIAL NUMBER

The loader serial number plate is located on the inside of the left upright, above the grill [A].

Explanation of loader Serial Number:

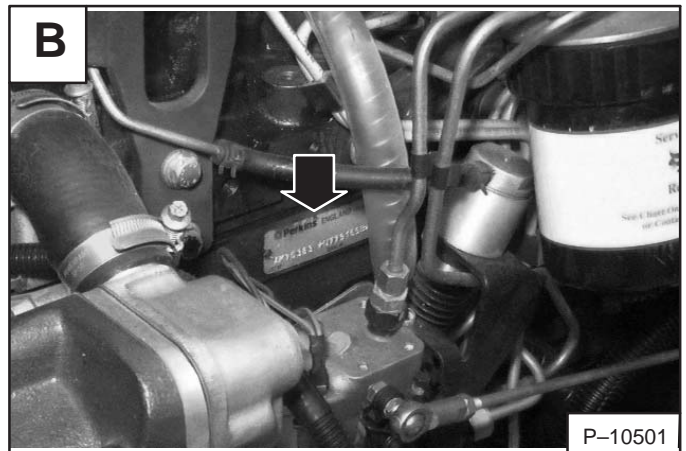
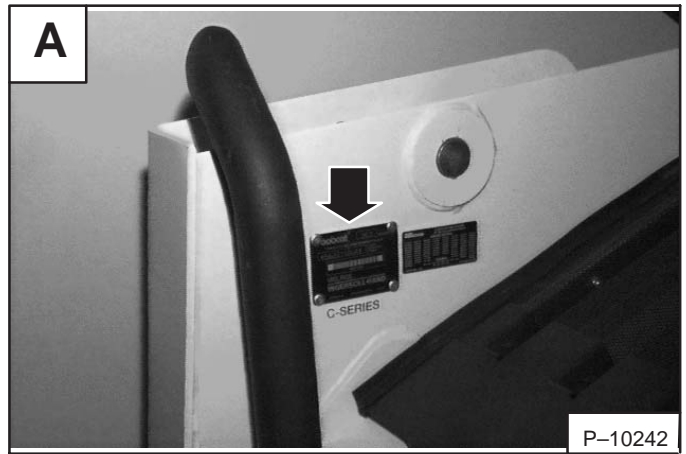
XXXX XXXXX



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 loader is produced.

ENGINE SERIAL NUMBER

The serial number is on the engine block just above the fuel injection pump [B].

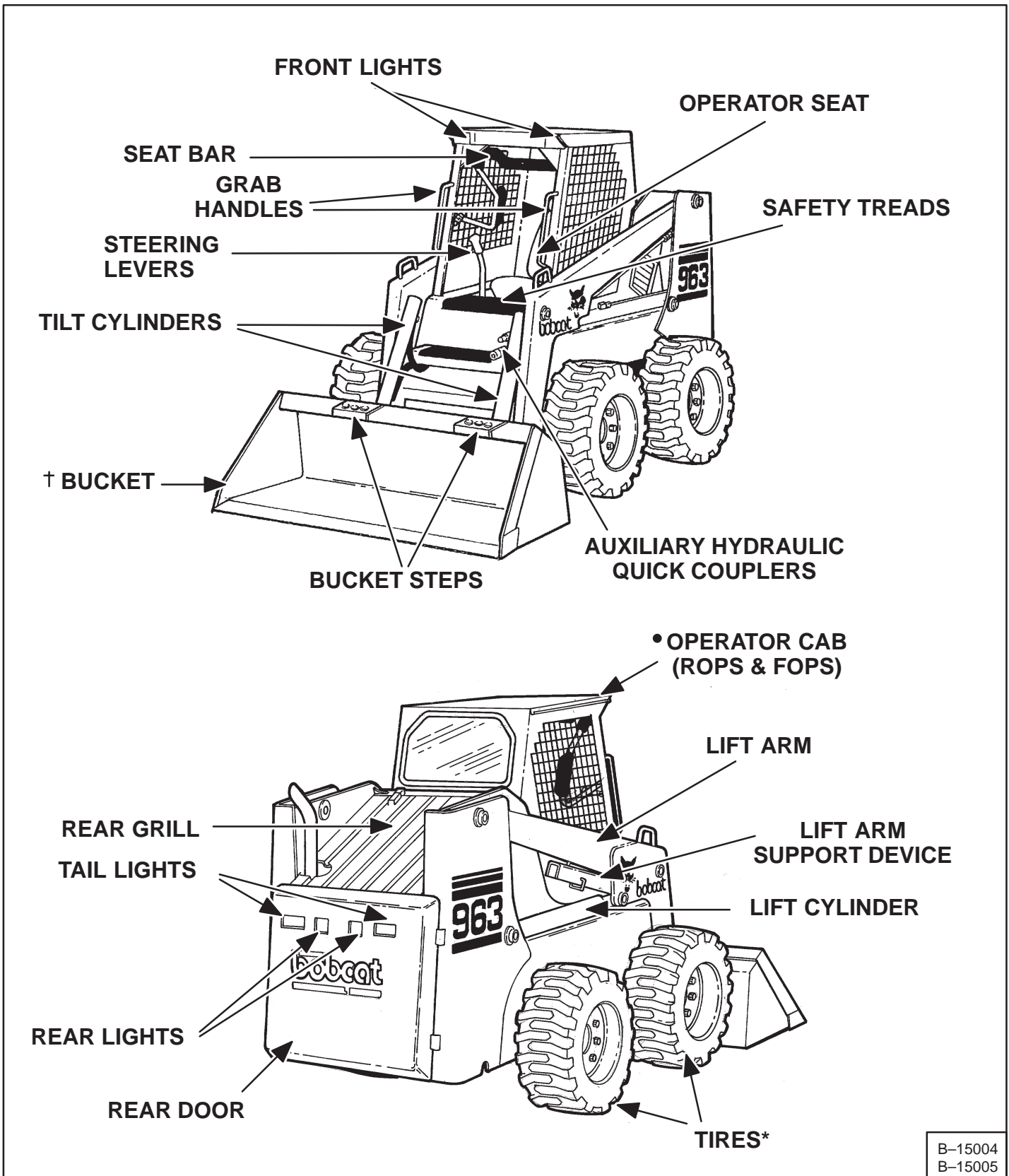


DELIVERY REPORT

The Delivery Report must be filled out by the dealer and signed by the owner or operator when the Bobcat loader is delivered. An explanation of the form must be given to the owner. Make sure it is filled out completely [C].

Image C shows the Delivery Report form, which includes sections for 'DELIVERY REPORT' and 'WARNING'. The form is divided into four quadrants by a central vertical line and a horizontal line. The top-left quadrant contains a grid of lines for data entry. The top-right quadrant is titled 'DELIVERY REPORT' and contains a grid of lines. The bottom-left quadrant is titled 'WARNING' and contains a grid of lines. The bottom-right quadrant contains a grid of lines. The reference code P-10501 is in the bottom right corner.

963 BOBCAT LOADER IDENTIFICATION



B-15004
B-15005

- * TIRES – Flotation tires (optional) are shown. The Bobcat loader is factory equipped with standard tires.
- † BUCKET – Several different buckets and other attachments are available for the Bobcat loader.
- ROPS, FOPS – Roll Over Protective Structure, Falling Object Protective Structure, per SAE J1040 and ISO 3471, and Falling Object Protective Structure per SAE J1043 and ISO 3449, Level I. Level II is available. The Bobcat loader is base-equipped with a standard operator cab as shown. Extra insulated cab is available as an option (Reduced noise level).

PREVENTIVE MAINTENANCE

PREVENTIVE MAINTENANCE

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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 loader.



WARNING

Instructions are necessary before operating or servicing machine. Read and understand 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

SERVICE SCHEDULE		HOURS					
ITEM	SERVICE REQUIRED	8-10	50	100	250	500	1000
Engine Oil	Check the oil level and add oil as needed. Do not overfill.	■					
Air Filter	Check condition indicator. Service only when required.						
Engine Air System	Check for leaks and damaged components.						
Engine Cooling System	Clean debris from oil cooler, radiator and grill. Check coolant level cold in recovery tank. Add premixed coolant as needed.	■					
Primary Fuel Filter	Remove trapped water.	■					
Lift Arms, Cylinders, Bob-Tach Pivot Pins & Wedges	Lubricate with multi-purpose lithium based grease (14 places).	■					
Seat Belt, Seat Bar and Pedal Interlocks	Check the condition of seat belt. Check the seat bar and pedal interlocks for correct operation. Clean dirt and debris from moving parts.	■					
Bobcat Interlock Control System (BICS™)	Check BICS™ functions. Clean dirt, debris or objects from under or behind seat as required.	■					
Tires	Check for damaged tires and correct air pressure.	■					
Safety Signs & Safety Tread	Check for damaged signs (decals) and safety tread. Replace any signs or safety treads that are damaged or worn.	■					
Operator Cab	Check the fastening bolts, washers and nuts. Check the condition of cab. Remove debris from the pedal area through the clean-out holes.	■					
Hydraulic Fluid, Hoses and Tubelines	Check fluid level and add as needed. Check for damage and leaks. Repair and replace as needed.		■				
Final Drive Transmission (Chaincase)	Check oil level and add as needed.		■				
Control Pedals & Steering	Check for correct operation. Repair or adjust as needed.		■				
Wheel Nuts	<input type="checkbox"/> Check for loose wheel nuts and tighten to 320-350 ft.-lbs. (434-475 Nm) torque.		■				
Spark Arrestor Muffler	Clean the spark chamber.			■			
Battery	Check battery for damage, hold down, cables, connections and electrolyte level. Add distilled water as needed.			■			
Steering Shaft	Grease two fittings on the steering cross-shaft.				■		
Engine/Hydro. Drive Belt	* Check belt tension.				■		
Alternator Belt	Check tension and adjust as needed.				■		
Fan Drive Gearbox	Check gear lubrication level.				■		
Engine Oil and Filter	† Replace oil and filter. Use CD or better grade oil and Melroe filter.				■		
Fuel Filters	Replace filter elements.				■		
Hydraulic Reservoir Breather Cap	Replace the reservoir breather cap.					■	
Hyd./Hydro. Filter	● Replace the filter element.					■	
Hydraulic Reservoir	Replace the fluid.						■
Final Drive Transmission	Replace the oil in the chaincase.						■
Bobcat Interlock Control System (BICS™)	Check lift arm by-pass control.						■

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

● Also replace hydraulic/hydrostatic filter element when the transmission warning light comes ON.

■ Or every 12 months.

* Check every 8 hours for the first 40 hours of operation.

† First oil and filter change must occur at 50 hours.

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-2003-0299

LIFTING AND BLOCKING THE LOADER

Procedure

Always park the loader on a level surface.

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

Stop the engine. Put the floor jack under the rear of the loader. Lift the rear of the loader and install jackstands [B].

Put the floor jack under the front of the loader. Lift the front of the loader and install jackstands under the axle tubes [C].

NOTE: Make sure the jackstands do not touch the tires.

A



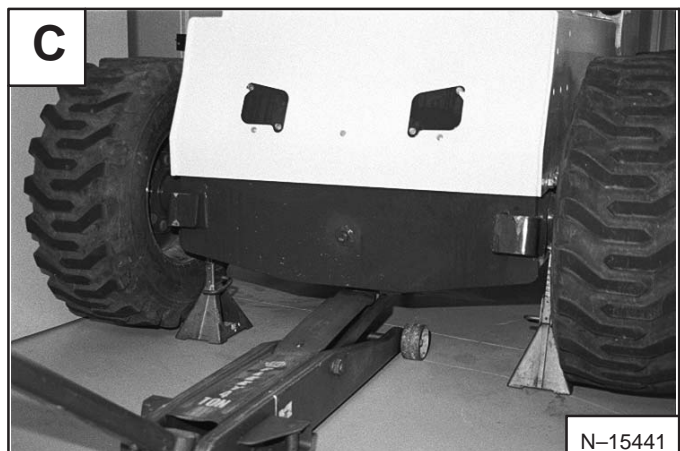
B-07023

B



N-15440

C



N-15441

TRANSPORTING THE LOADER

Procedure

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

A loader with an empty bucket or no attachment must be loaded backward onto the transport vehicle [A].

Be sure the transport vehicle is of adequate size and capacity.

The rear of the trailer must be blocked or supported [A] when loading or unloading the loader to prevent the front end of the trailer from raising up. Some ramps have a wedge shape (Item 1) [A] to support the trailer.

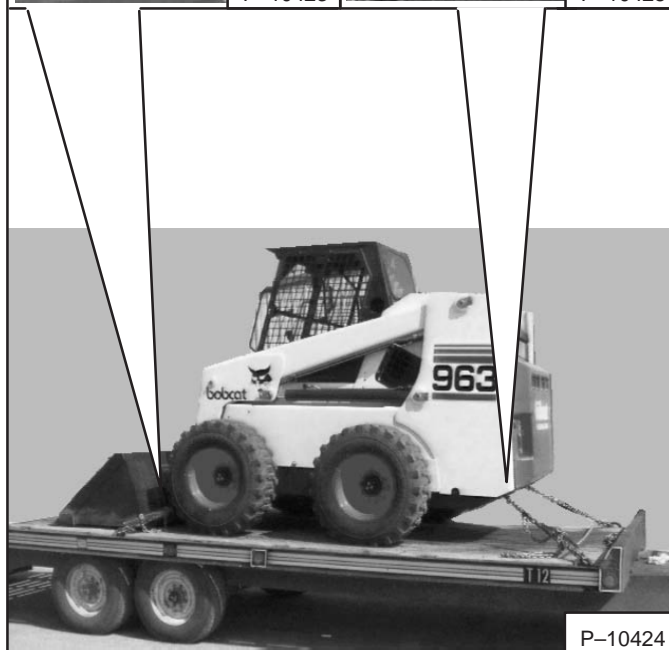
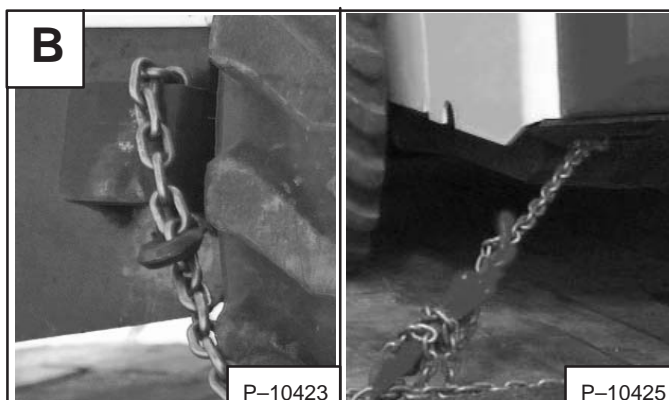
Use the following procedure to fasten the Bobcat loader to the transport vehicle to prevent the loader from moving during sudden stops or when going up or down slopes [B]:

Lower the bucket or attachment to the floor.

Stop the engine.

Engage the parking brake. Install chains at the front and rear of the loader tie down positions (Inset [B]).

Fasten each end of the chain to the transport vehicle.



TOWING THE LOADER

Procedure

To prevent damage to the loader's hydrostatic system, the loader must be towed only a short distance at a slow speed. (Example: Moving the loader onto a transport vehicle.)

The towing chain (or cable) must be rated 1-1/2 times the weight of the loader. (See *SPECIFICATIONS*, Page 9-1.)

Lift and block the rear of the loader. (See Page 1-4.)

Remove the hydrostatic motor access cover (both sides). (See Page 3-1.)

Remove the plugs (Items 1 & 2) [A] from the motor (both sides).

Remove the shuttle valve (Item 1) [B] using a small screwdriver (both sides).

NOTE: The plug (Item 2) [B] and relief valve may have to be removed so that the shuttle spool can be removed from the housing bore.

Install and tighten the plugs.

Install the rear wheels. Lower the loader to the ground.

Raise the operator cab. (See Page 1-9.)

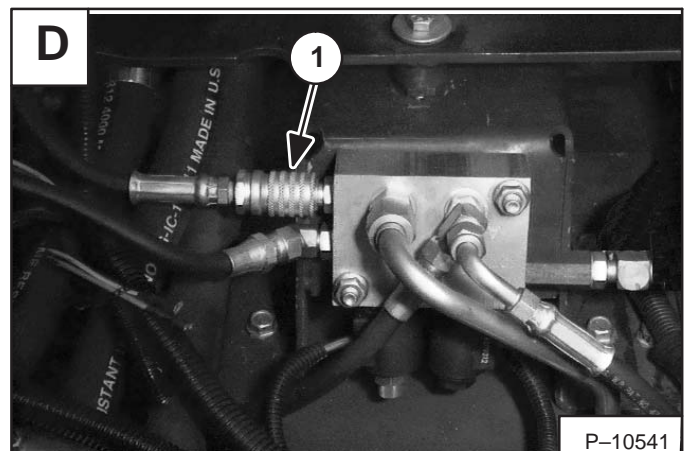
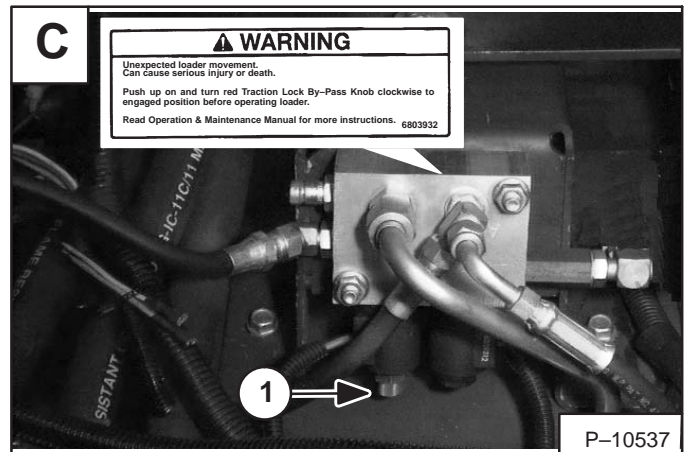
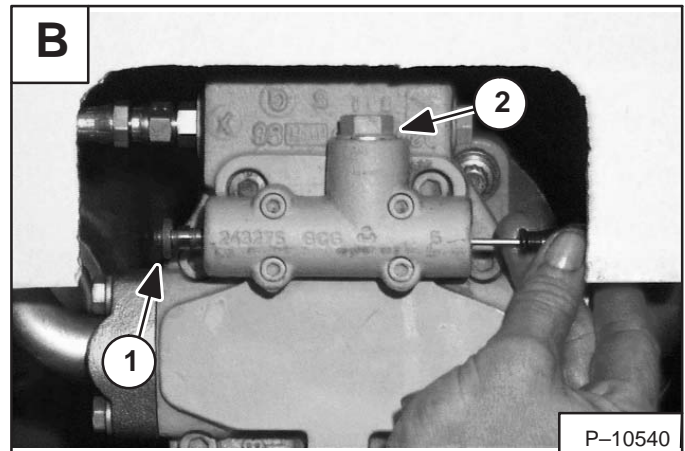
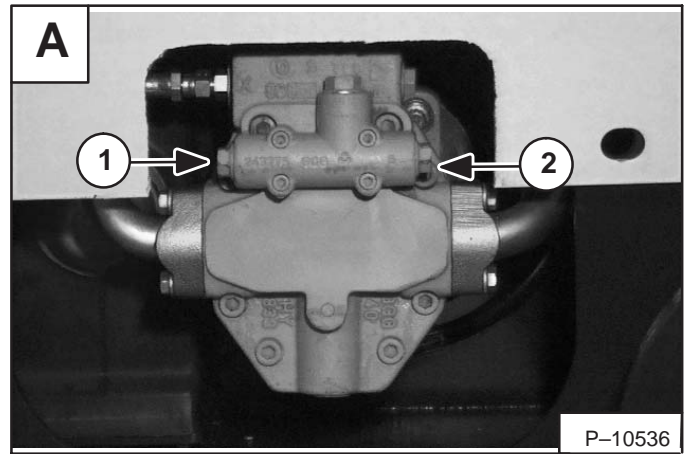
Disengage the parking brake solenoid valve by pushing **UP** on the red Traction Lock By-Pass Knob (Item 1) [C] and turning it **1/4 TURN** counterclockwise. The knob will come down to release the solenoid valve.

Connect a Port-a-Power to the coupler (Item 1) [D] at the brake/two speed block.

Operate the Port-a-Power to approximately 350 PSI (2413 kPa) to release the parking brake.

Lower the operator cab. Move the loader to the desired location.

NOTE: Before using the loader again, disconnect the Port-a-Power, push up and turn the red by-pass knob (Item 1) [C] 1/4 turn to engage the traction lock solenoid. Install the shuttle valve (Item 1) [B] into the hydrostatic motors.



LIFT ARM SUPPORT DEVICE

WARNING

Never work on a machine with the lift arms up unless the lift arms are secured by a lift arm support device. Failure to use an approved lift arm support device can allow the lift arms or attachment to fall and cause injury or death.

W-2059-0991

Engaging The Lift Arm Support Device

Maintenance and service work can be done with the lift arms lowered.

If the lift arms must be raised for service, use the following procedure:

Disconnect the spring (Item 1) [A] from the lift arm support device retaining pin (Item 2) [A]. Hold the support device and remove the retaining pin.

Lower the lift arm support device on top of the lift cylinder. Hook the free end of the spring (Item 1) [B] to the lift arm support device so there will be no interference with the support device engagement.

With the operator in the seat, seat belt fastened and seat bar lowered, start the engine.

Raise the lift arms, until the lift arm support device lowers onto the lift cylinder rod [C].

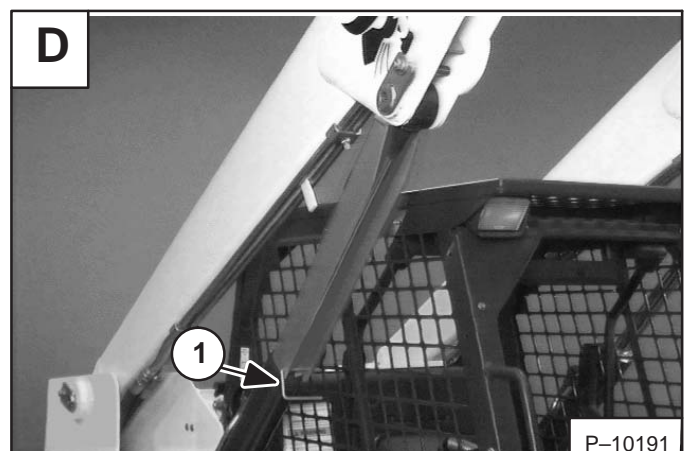
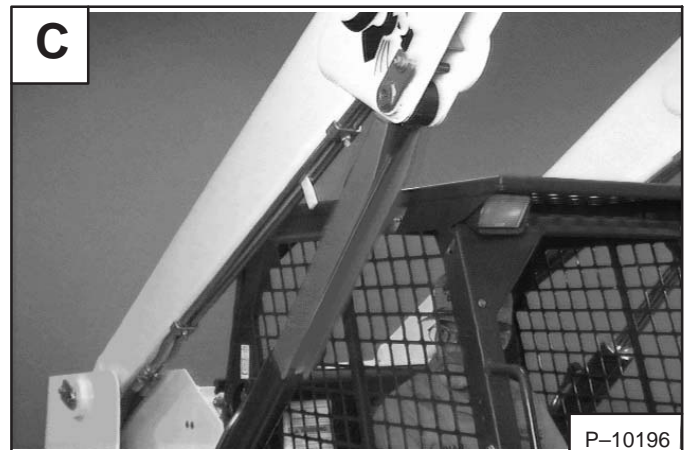
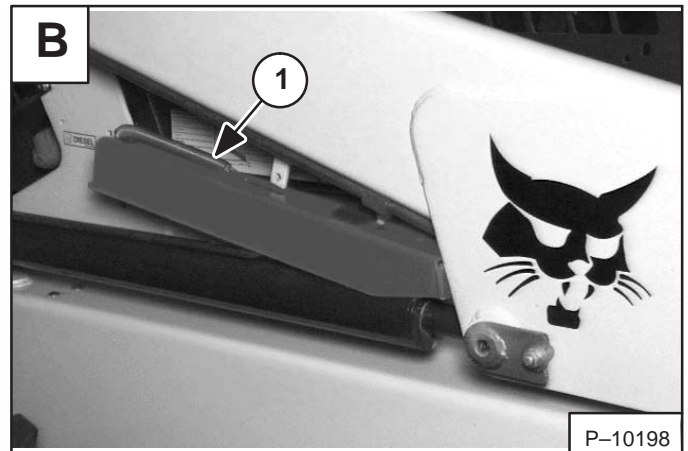
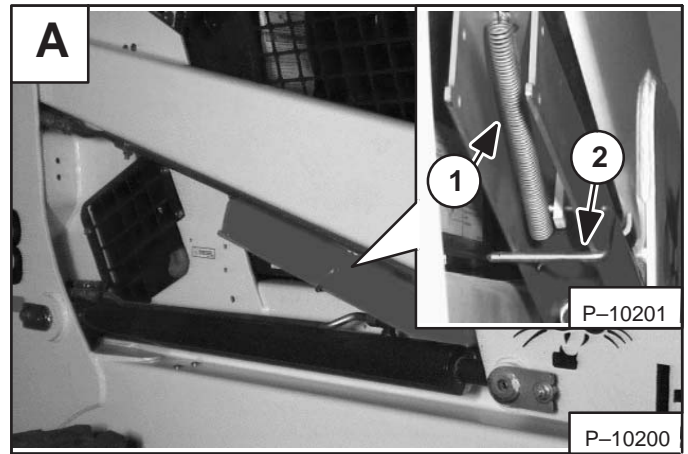
Lower the lift arms slowly until the support device is held between the lift arm and the lift cylinder. Stop the engine. Raise the seat bar and move foot pedals until both pedals lock.

Install the pin (Item 1) [D] into the rear of the lift arm support device below the cylinder rod.

WARNING

Service lift arm support device if damaged or if parts are missing. Using a damaged lift arm support or with missing parts can cause lift arms to drop causing injury or death.

W-2271-1197



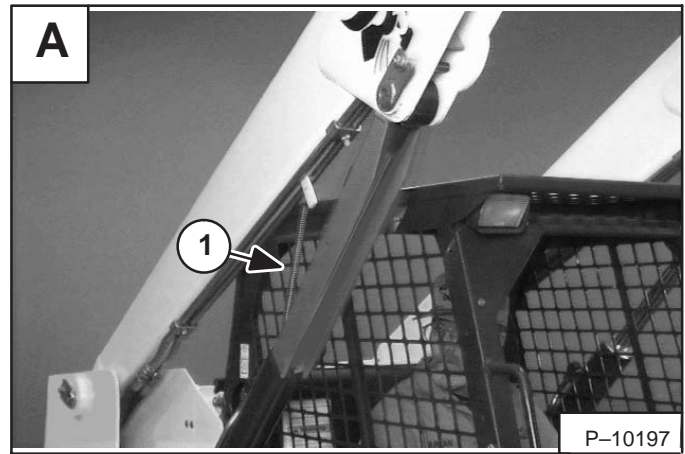
LIFT ARM SUPPORT DEVICE (Cont'd)

Disengaging The Lift Arm Support Device

Remove the pin from the lift arm support device.

Connect the spring (Item 1) **[A]** from the lift arm support device to the bracket below the lift arms.

With the operator in the seat, seat belt fastened and seat bar lowered, start the engine.

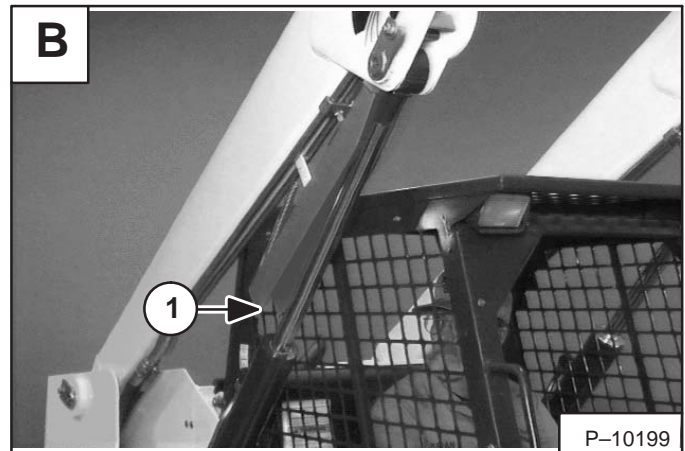


Raise the lift arms a small amount and the spring will lift the support device (Item 1) **[B]** off the lift cylinder rod.

Lower the lift arms. Stop the engine.

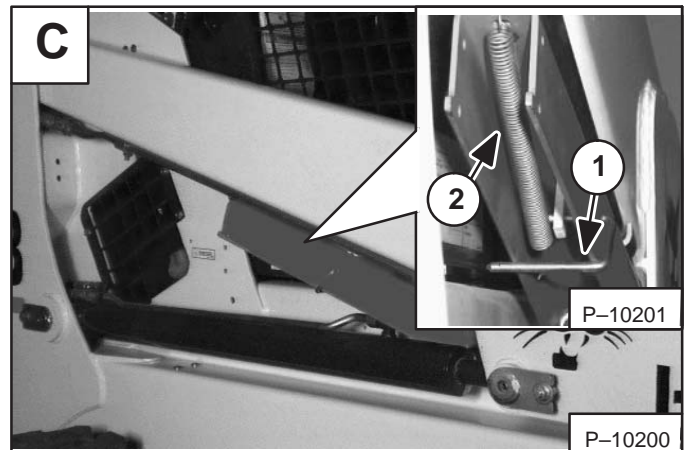
Raise the seat bar and move foot controls until both controls lock.

Disconnect the spring from the bracket.



Raise the support device into storage position and insert pin (Item 1) **[C]** through lift arm support device and bracket.

Connect spring (Item 2) **[C]** to the pin.



OPERATOR CAB

Description

The Bobcat loader has an operator cab (ROPS and FOPS) as standard equipment to protect the operator from rollover and falling objects. Check with your dealer if the operator cab has been damaged. The seat belt must be worn for roll over protection.

ROPS/FOPS – Roll Over Protective Structure per SAE J104 and ISO 3471, and Falling Object Protective Structure per SAE J1043 and ISO 3449, Level I. Level II is available.

Level I – Protection from falling bricks, small concrete blocks and hand tools encountered in operations such as highway maintenance, landscaping, and other construction site services.

Level II – Protection from falling trees, rocks; for machines involved in site clearing, overhead demolition or forestry.

WARNING

Never modify operator cab by welding, grinding, drilling holes or adding attachments unless instructed to do so by Melroe Company. Changes to the cab can cause loss of operator protection from rollover and falling objects, and result in injury or death.

W-2069-1285

Raising The Operator Cab

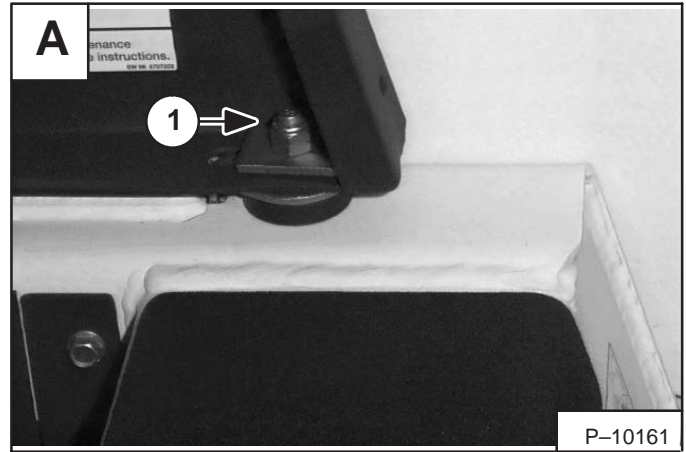
Stop the loader on a level surface. Lower the lift arms.

If the lift arms must be up while raising the operator cab, install the lift arm support device. (See Page 1-7.)

Loosen the nut (Item 1) [A] (both sides) at the front of the operator cab.

Remove the nut and plate (both sides) [B].

Stand on the safety tread. Lift on the grab handles and slowly raise the cab until the latching mechanism engages and the cab is all the way up [C].





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OPERATOR CAB (Cont'd)

Lowering The Operator Cab

NOTE: Make sure the seat bar is fully raised or lowered when lowering the cab.

Pull down on the bottom of the operator cab until it stops at the latching mechanism **[A]**.

Release the latching mechanism (Inset **[A]**) and pull the cab all the way down.



Install the plate and nut (both sides) **[B]**.



Tighten the nuts to 40–50 ft.-lbs. (54–68 Nm) torque **[C]** (both sides).



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