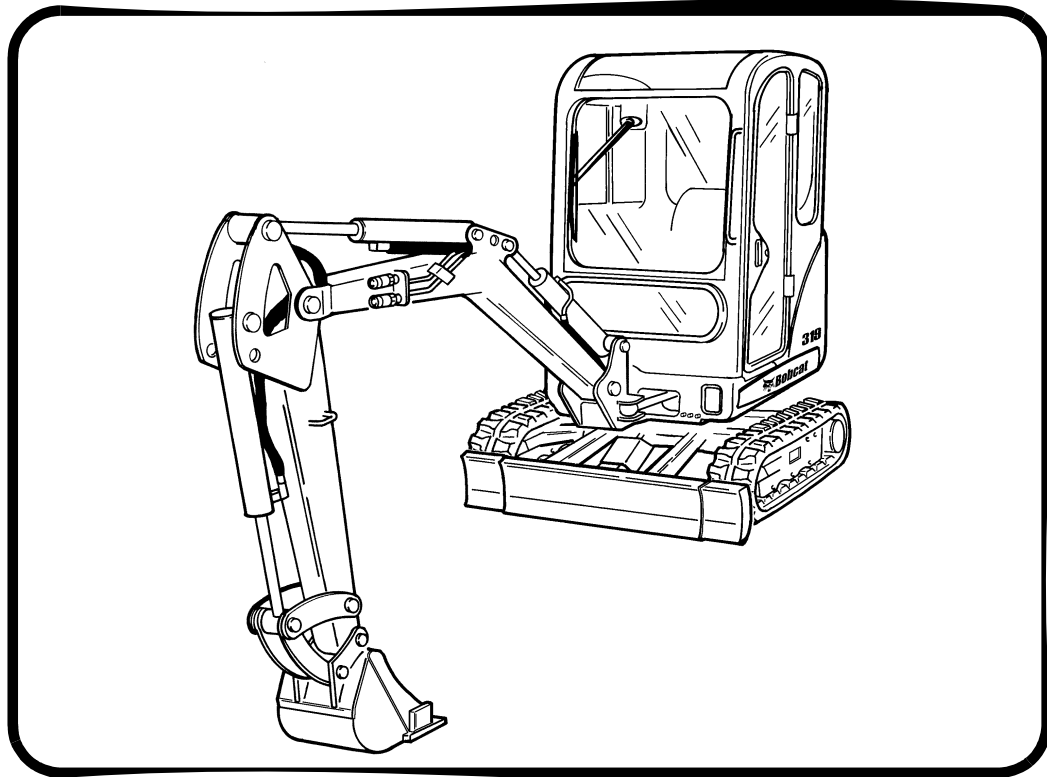




Bobcat®

Operation & Maintenance Manual 319 Compact Excavator

S/N 563311001 & Above



OPERATOR SAFETY WARNING



WARNING

Operator must have instructions before running the machine. Untrained operators can cause injury or death.

W-2001-1285



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-10731A

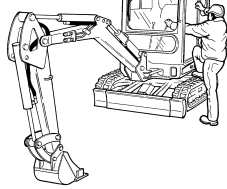


Never operate without instructions.



Read machine signs, and Operation & Maintenance Manual, and Handbook.

WRONG



B-23379



Do not grasp control handles when entering canopy or cab.

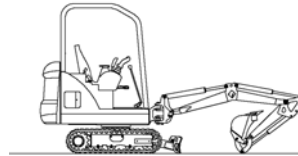


Be sure controls are in neutral before starting.



Sound horn and check behind machine before starting.

CORRECT



MS-2154



Never operate without approved canopy or cab.

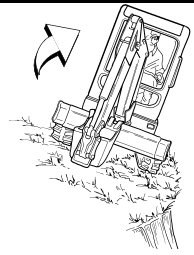


Never modify equipment.



Never use attachments not approved by Bobcat Company.

WRONG



B-23381



Avoid steep areas or banks that could break away.

WRONG



MS-2148

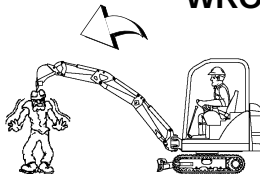


Use caution to avoid tipping - do not swing heavy load over side of track.



Operate on flat, level ground.

WRONG



MS2156



Keep bystanders out of maximum reach area.

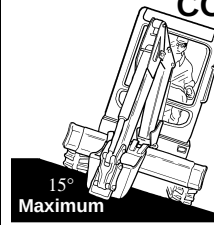


Do not travel or turn with bucket extended.



Never carry riders.

CORRECT



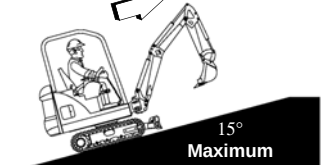
15° Maximum

B-23383A



Never exceed a 15° slope to the side.

CORRECT



15° Maximum

MS-2158



Never travel up a slope that exceeds 15°.

CORRECT



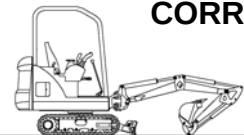
25° Maximum

MS-2160



Never exceed 25° when going down or backing up a slope.

CORRECT



MS-2154

STOP

6808261A



To leave excavator, lower the attachment.



Stop the engine.

CORRECT



B-21928



Fasten seat belt securely.



Operate controls only from operator's seat.

SAFETY EQUIPMENT

1. Seat Belt
2. Slew Lock
3. ROPS/TOPS Canopy or Cab
4. Machine Safety Signs
5. Safety Tread
6. Grab Handles



CONTENTS

FOREWORD	III
SAFETY & TRAINING RESOURCES	XI
OPERATING INSTRUCTIONS	OI-1
PREVENTIVE MAINTENANCE	PM-1
MACHINE SIGN TRANSLATIONS.....	MST-1
SPECIFICATIONS	SPEC-1
WARRANTY.....	WARRANTY-1
ALPHABETICAL INDEX.....	INDEX-1

REFERENCE INFORMATION

Write the correct information for YOUR excavator in the spaces below. Always use these numbers when referring to your Bobcat Excavator.

Bobcat Excavator
Serial Number

Engine Serial Number

NOTES

YOUR BOBCAT EXCAVATOR DEALER:

ADDRESS:

PHONE:

Bobcat Company
P.O. Box 128
Gwinner, ND 58040-0128

Bobcat Company Europe
J. Huysmanslaan 59
B-1651 LOT
Belgium

FOREWORD

**SAFETY &
TRAINING
RESOURCES**

**OPERATING
INSTRUCTIONS
(OI)**

**PREVENTIVE
MAINTENANCE
(PM)**

**MACHINE SIGN
TRANSLATIONS
(MST)**

**SPECIFICATIONS
(SPEC)**

WARRANTY

**ALPHABETICAL
INDEX**



Bobcat®

FOREWORD

FOREWORD

This Operation & Maintenance Manual was written to give the owner/operator instructions on the safe operation and maintenance of the Bobcat Excavator. READ AND UNDERSTAND THIS OPERATION & MAINTENANCE MANUAL BEFORE OPERATING YOUR MACHINE. If you have any questions, see your Bobcat dealer.

BOBCAT COMPANY IS ISO 9001:2000 CERTIFIED	V
DELIVERY REPORT	VII
EXCAVATOR IDENTIFICATION	VIII
FEATURES, ACCESSORIES AND ATTACHMENTS	IX
Attachments	IX
Buckets Available	IX
Falling Object Guards (FOGS)	X
Options and Accessories	IX
Special Applications Kit	X
Special Applications Kit Inspection And Maintenance	X
Standard Items	IX
REGULAR MAINTENANCE ITEMS	V
SERIAL NUMBER LOCATIONS	VII
Engine Serial Number	VII
Excavator Serial Number	VII



Bobcat®

BOBCAT COMPANY IS ISO 9001:2000 CERTIFIED



ISO 9001:2000 is an international standard that controls the processes and procedures which we use to design, develop, manufacture and distribute Bobcat products.

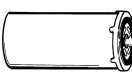
British Standards Institute (**BSI**) is the Certified Registrar Bobcat Company chose to assess the Company's compliance with the ISO 9001:2000 standard. The BSI registration certifies that the two Bobcat manufacturing plants and the Bobcat corporate offices (Gwinner, Bismarck & West Fargo) in North Dakota are in compliance with ISO 9001:2000. Only certified assessors, like BSI, can grant registrations.

ISO 9001:2000 means that as a company we say what we do and do what we say. In other words, we have established procedures and policies, and we provide evidence that the procedures and policies are followed.

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.

REGULAR MAINTENANCE ITEMS

	ENGINE OIL FILTER (6 Pack) 6671057		BATTERY 6670251
	FUEL FILTER 6667352		FLUID, Hydraulic / Hydrostatic 6903117 - (2.5 Gal.) 6903118 - (5 Gal.) 6903119 - (55 Gal.)
	AIR FILTER, Outer 6673752		RADIATOR CAP 05-6723
	AIR FILTER, Inner 6673753		PROPYLENE GLYCOL ANTI-FREEZE, Premixed [-34° F (-37°C)] 6724094
	PRIMARY HYDRAULIC FILTER 6653336		PROPYLENE GLYCOL ANTI-FREEZE, Concentrate 6724354
MOTOR OIL 6903105 SAE 15W/40 CE/SG (12 qt.) 6903106 SAE 15W/40 CE/SG (1 Gal.) 6903113 SAE 15W/40 CE/SG (2.5 Gal.) 6903107 SAE 10W/30 CE/SG (12 qt.) 6903108 SAE 10W/30 CE/SG (1 Gal.) 6903112 SAE 10W/30 CE/SG (2.5 Gal.)		6903109 SAE 30W CE/SG (12 qt.) 6903110 SAE 30W CE/SG (1 Gal.) 6903111 SAE 30W CE/SG (2.5 Gal.)	

NOTE: Always verify Part Numbers with your Bobcat dealer.



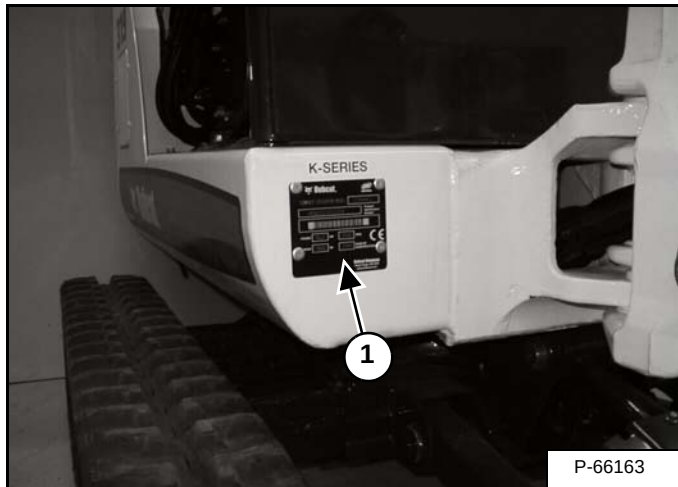
Bobcat®

SERIAL NUMBER LOCATIONS

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

Excavator Serial Number

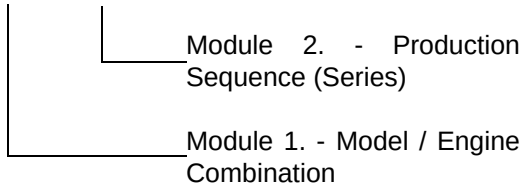
Figure 1



The excavator serial number plate (Item 1) [Figure 1] is located on the front right hand corner of the frame.

Explanation of Excavator Serial Number:

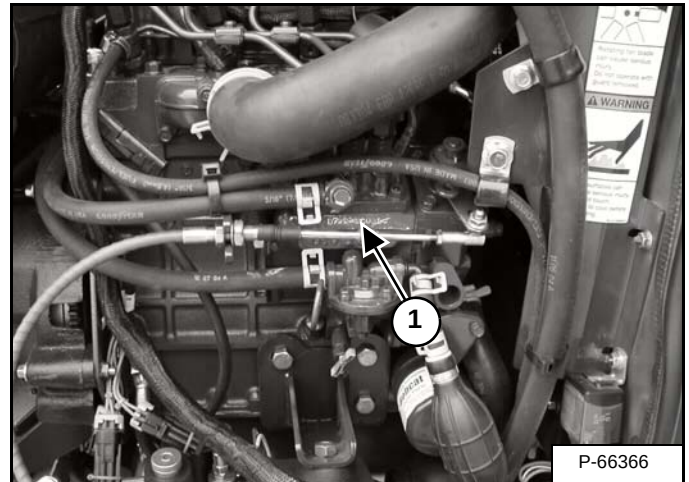
XXXX XXXXX



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 excavator is produced.

Engine Serial Number

Figure 2



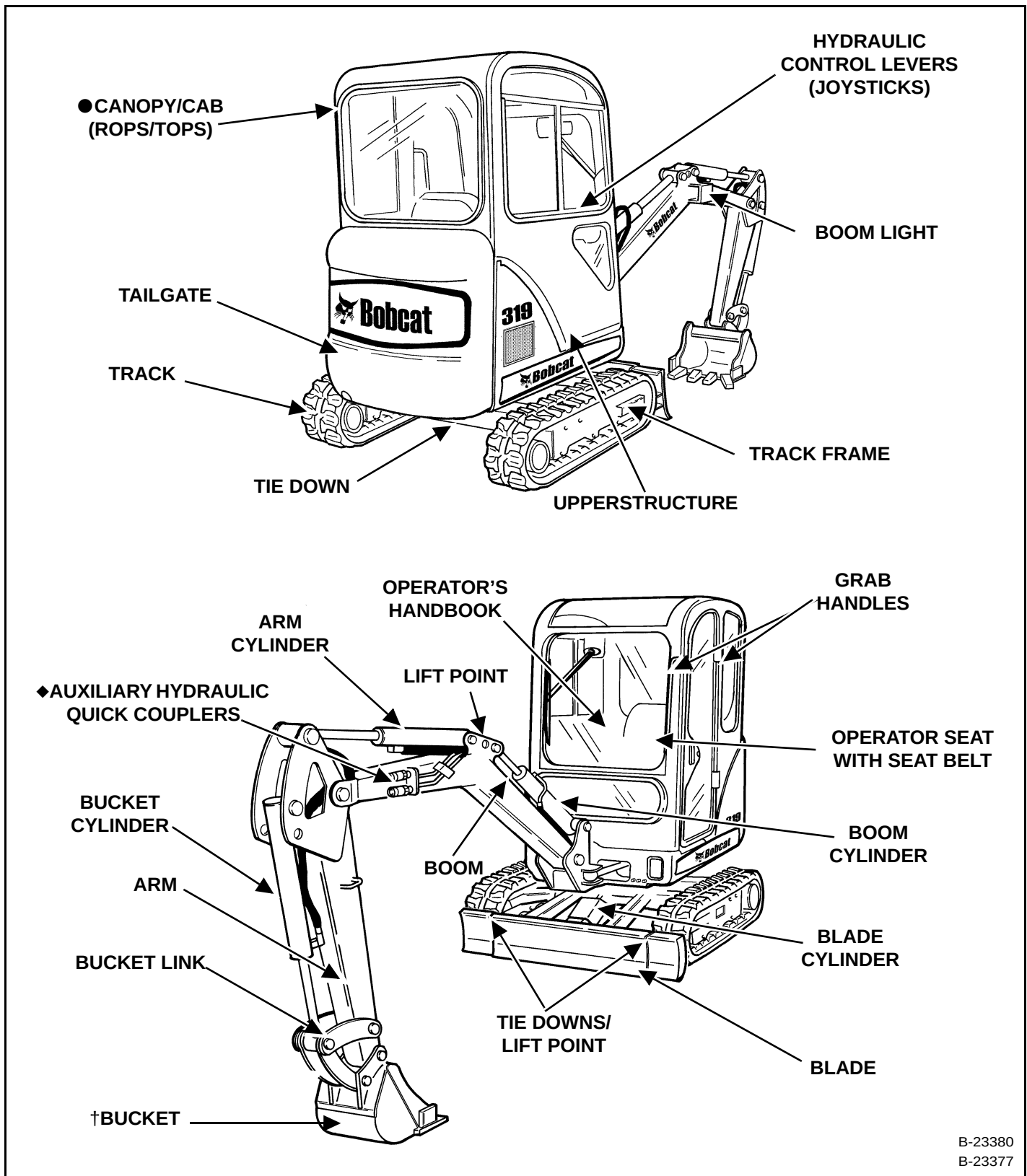
The engine serial number (Item 1) [Figure 2] is located on the side of the engine.

DELIVERY REPORT

Figure 3

The delivery report must be filled out by the dealer and signed by the owner or operator when the Bobcat Excavator is delivered. An explanation of the form must be given to the owner. Make sure it is filled out completely [Figure 3].

EXCAVATOR IDENTIFICATION



◆ OPTIONAL OR FIELD ACCESSORY (Not Standard Equipment)

† BUCKET - Several different buckets and other attachments are available from the Bobcat Loader.

● ROPS, TOPS - (Roll Over Protective Structure / Tip Over Protective Structure) as standard equipment. The ROPS/TOPS meets SAE J1040, ISO 3471 and ISO 12117.

FEATURES, ACCESSORIES AND ATTACHMENTS

Standard Items

Model 319 Bobcat Excavators are equipped with the following standard items:

- Canopy with ROPS/TOPS Approval
- 38.6 inch (980 mm) Dozer Blade
- Two 7.5 inch (192 mm) Blade Extensions
- 7.87 inch (200 mm) Rubber Tracks
- Hydraulic and Travel Control Lockouts
- Hydraulically Retractable Undercarriage (from 52.4 - 38.6 inch [1330 - 980 mm])
- Work Lights - Boom and Upperstructure Mounted
- Horn
- Hydraulic Control Levers (Joysticks)
- Spark Arrestor Muffler

Options and Accessories

Below is a list of some equipment available from your Bobcat Excavator dealer as Dealer and/or Factory Installed Accessories and Factory Installed Options. See your Bobcat dealer for other available options, accessories and attachments.

- Enclosed Cab And Heater
- Motion Alarm
- Auxiliary Hydraulics
- Catalytic Exhaust Purifier
- Overhead Guard Kit
- Special Applications Kit
- Rental Investment Protection System (RIPS)
- Engine block heater
- Long Arm
- Radio
- Beacon
- Strobe
- Right Hand Entry Kit
- 3 in. Seat Belt

Specifications subject to change without notice

Attachments

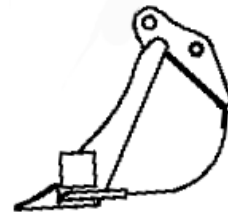
These and other attachments are approved for use on this model excavator. Do not use unapproved attachments. Attachments not manufactured by Bobcat may not be approved.

The versatile Bobcat Excavator quickly turns into a multi-job machine with a variety of attachments.

See your Bobcat dealer for more details on these and other attachments and field accessories.

- Trenching bucket
- Grading bucket
- Auger
- Breaker

Buckets Available



BUCKET

Many bucket styles, widths and different capacities are available for a variety of different applications. See your Bobcat dealer for the correct bucket for your Bobcat Excavator and application.

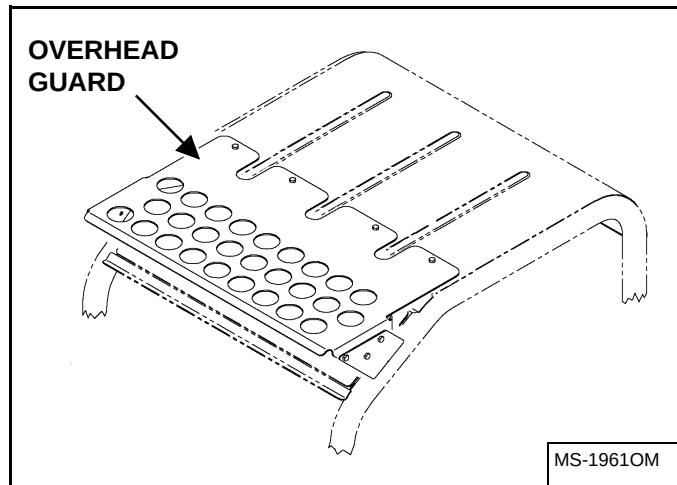
- 12 inch (300 mm) Trenching
- 16 inch (400 mm) Trenching
- 20 inch (500 mm) Trenching
- 39 inch (1000 mm) Grading

FEATURES, ACCESSORIES AND ATTACHMENTS (CONT'D)

Falling Object Guards (FOGS)

The FOGS provides additional protection from smaller objects which can fall on the canopy or cab.

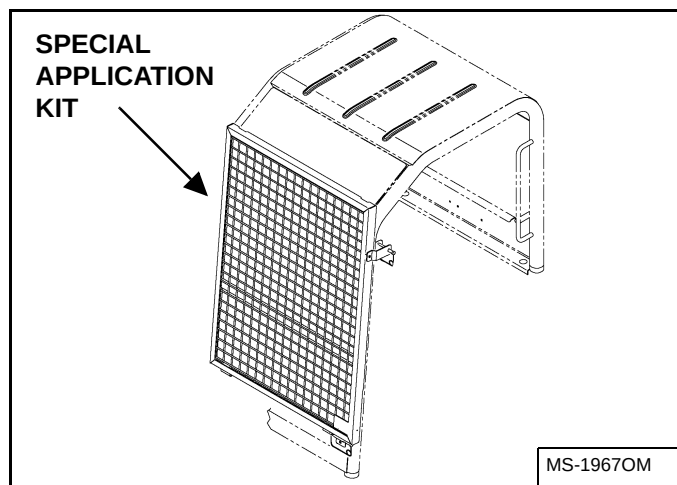
For the canopy or cab to meet the FOGS (ISO 10262 - level 1), the excavator must have the overhead guard *and* the Special Applications Kit installed.



Special Applications Kit

The Special Applications Kit can be installed when certain attachments are used on the excavator to restrict material from entering the canopy or cab openings.

The Special Applications Kit includes a upper and lower screen guard.



SAFETY & TRAINING RESOURCES

MACHINE SIGNS (DECALS)	XVI
PUBLICATIONS AND TRAINING RESOURCES	XVIII
SAFETY INSTRUCTIONS	XIII
Before Operation	XIII
Fire Prevention.	XV
Safe Operation Is The Operator's Responsibility.	XIV
Safe Operation Needs A Qualified Operator	XIV

SAFETY & TRAINING RESOURCES



Bobcat®

SAFETY INSTRUCTIONS

Before Operation

Carefully follow the operating and maintenance instructions in this manual.

The Bobcat Excavator is highly maneuverable and compact. It is rugged and useful under a wide variety of conditions. This presents an operator with hazards associated with off highway, rough terrain applications, common with Bobcat Excavator usage.

The Bobcat Excavator has an internal combustion engine with resultant heat and exhaust. All exhaust gasses can kill or cause illness so use the Excavator with adequate ventilation.

The dealer explains the capabilities and restrictions of the Bobcat Excavator and attachment for each application. The dealer demonstrates the safe operation according to Bobcat instructional materials, which are also available to operators. The dealer can also identify unsafe modifications or use of unapproved attachments. The attachments and buckets are designed for a Rated Lift Capacity. They are designed for secure fastening to the Bobcat Excavator. The user must check with the dealer, or Bobcat literature, to determine safe loads of materials of specified densities for the machine - attachment combination.

The following publications and training materials 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 and attachment is in safe operating condition.
- The Operation & Maintenance Manual delivered with the machine or attachment gives 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 is fastened to the operator cab of the Excavator. 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 Compact Excavator Operating Training Course is available through your Bobcat dealer. This course is intended to provide rules and practices of correct operation of the Bobcat Excavator. The course is available in English and Spanish versions.
- Service Safety Training Courses are available from your Bobcat dealer. They provide information for safe and correct service procedures.
- See the PUBLICATIONS AND TRAINING RESOURCES Page in this manual or your Bobcat dealer for Service and Parts Manuals, printed materials, videos, or training courses available. Also check the Bobcat web site **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.



Call Before You Dig
1-888-258-0808

When you call, you will be directed to a location in your state/city for information about buried lines (telephone, cable TV, water, sewer, gas, etc.)

SI EXC-0805

SAFETY INSTRUCTIONS (CONT'D)

Safe Operation Is The Operator's Responsibility



Operator must have instructions before running the machine. Untrained operators can cause injury or death.

W-2001-1285



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

I-2019-0284



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

W-2044-1285

The Bobcat Excavator and attachment must be in good operating condition before use.

Check all of the items on the Bobcat Service Schedule Decal under the 8-10 hour column or as shown in the Operation & Maintenance Manual.

Safe Operation Needs A Qualified Operator

For an operator to be qualified, he or she must not use drugs or alcoholic drinks which impair alertness or coordination while working. An operator who is taking prescription drugs must get medical advice to determine if he or she can safely operate a machine.

A Qualified Operator Must Do The Following:

Understand the Written Instructions, Rules and Regulations

- The written instructions from Bobcat Company include the Delivery Report, Operation & Maintenance Manual, Operator's Handbook, Safety Manual and machine signs (decals).
- Check the rules and regulations at your location. The rules may include an employer's work safety requirements. Regulations may apply to local driving requirements or use of a Slow Moving Vehicle (SMV) emblem. Regulations may identify a hazard such as a utility line.

Have Training with Actual Operation

- Operator training must consist of a demonstration and verbal instruction. This training is given by your Bobcat dealer before the product is delivered.
- The new operator must start in an area without bystanders and use all the controls until he or she can operate the machine and attachment safely under all conditions of the work area. Always fasten seat belt before operating.
- Operator Training Courses are available from your Bobcat dealer in English and Spanish. They provide information for safe and efficient equipment operation. Safety videos are also available.
- Service Safety Training Courses are available from your Bobcat dealer. They provide information for safe and correct service procedures.

Know the Work Conditions

- Know the weight of the materials being handled. Avoid exceeding the Rated Lift Capacity of the machine. Material which is very dense will be heavier than the same volume of less dense material. Reduce the size of load if handling dense material.
- The operator must know any prohibited uses or work areas, for example, he or she needs to know about excessive slopes.
- Know the location of any underground lines. Call local utilities or the TOLL FREE phone number found in the **Before Operation** Section of this manual.
- Wear tight fitting clothing. Always wear safety glasses when doing maintenance or service. Safety glasses, hearing protection or Special Applications Kits are required for some work. See your Bobcat dealer about Bobcat Safety Equipment for your model.

SI EXC-0805

SAFETY INSTRUCTIONS (CONT'D)

Fire Prevention

The machines 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.

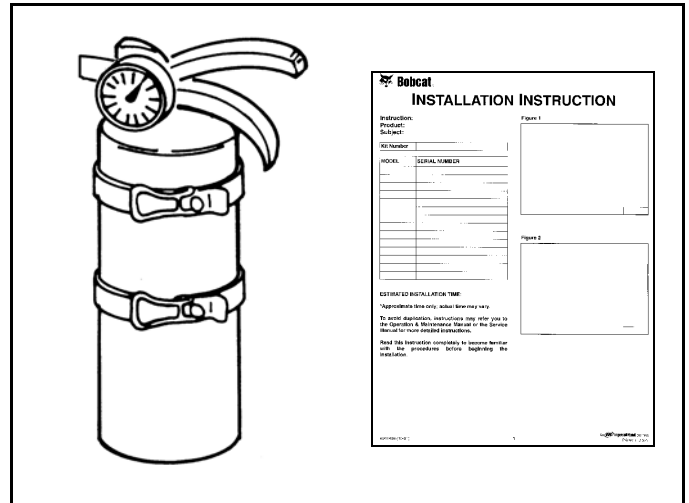
The spark arrestor exhaust system is designed to control the emission of hot particles from the engine and exhaust system, but the muffler and the exhaust gases are still hot.

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

Manual for connecting the battery and for jump starting.

- Use the procedure in the Operation & Maintenance Manual for cleaning the spark arrestor muffler (if equipped).

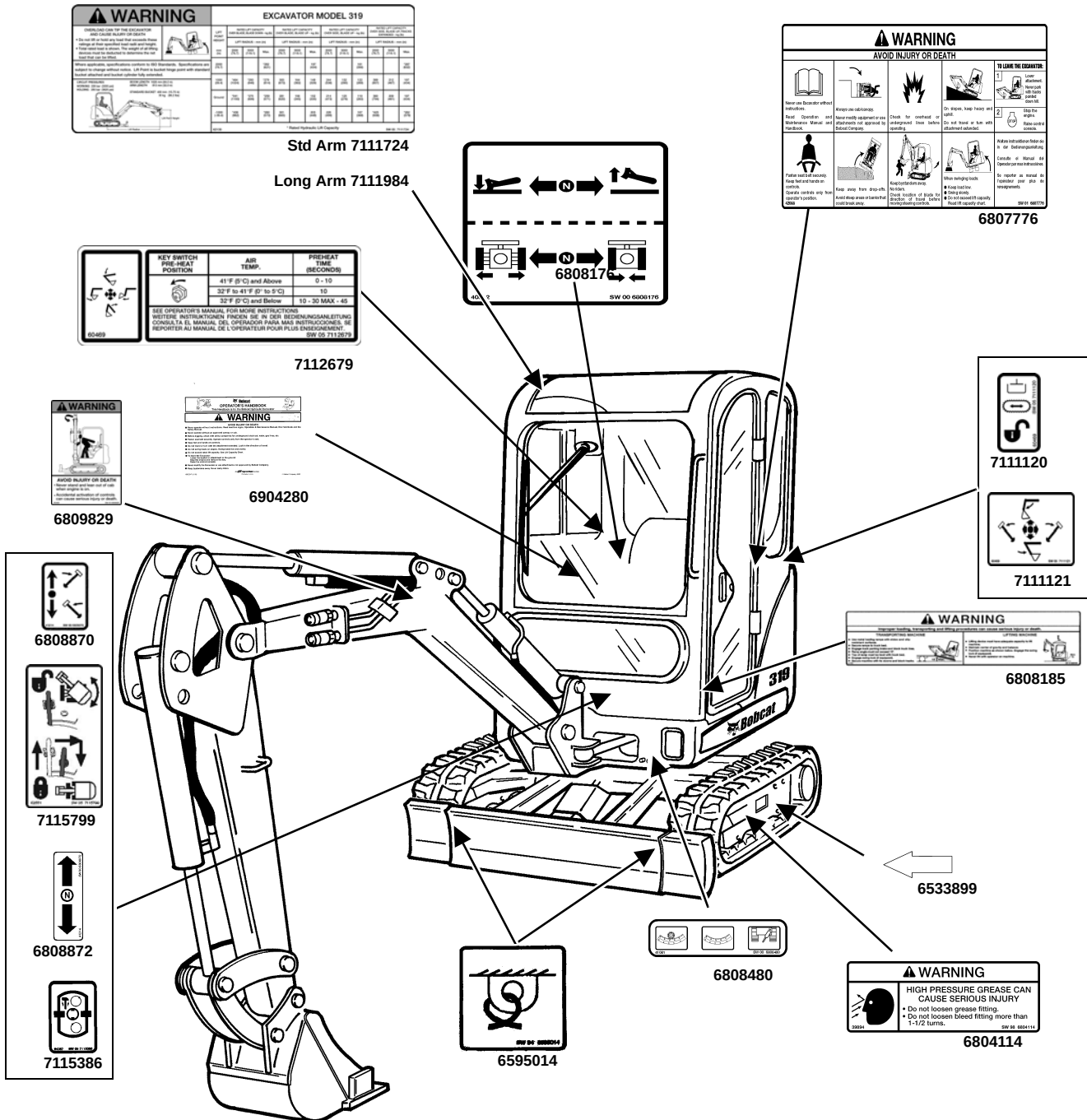
Figure 1



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

MACHINE SIGNS (DECALS)

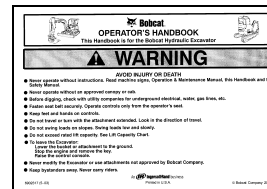
Follow the instructions on all the Machine Signs (Decals) that are on the excavator. Replace any damaged machine signs and be sure they are in the correct locations. Machine signs are available from your Bobcat Excavator dealer.



PUBLICATIONS AND TRAINING RESOURCES

The following publications are also available for your Bobcat excavator. You can order them from your Bobcat dealer.

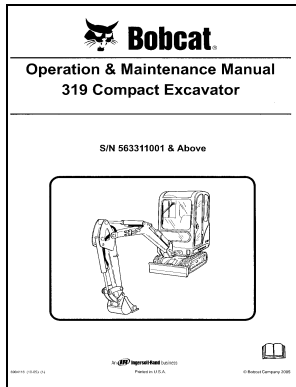
For the latest information on Bobcat products and the Bobcat Company, visit our web site at **www.bobcat.com**; you can also order Operator and Service Training materials online through **www.bobcatstore.com**



OPERATOR'S HANDBOOK

6904280

Gives basic operation instructions and safety warnings



OPERATION & MAINTENANCE MANUAL

6904116

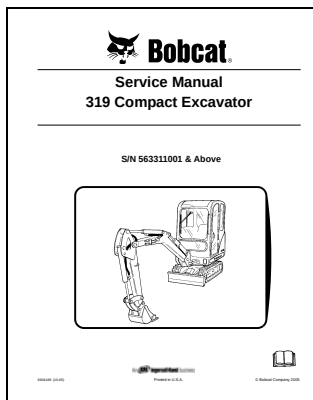
Complete instructions on the correct operation and the routine maintenance of the Bobcat Excavator



COMPACT EXCAVATOR OPERATOR TRAINING COURSE

6903186

Introduces operator to step-by-step basics of Compact Excavator operation. Also available in Spanish P/N 6903228



SERVICE MANUAL

6904188

Complete maintenance instructions for your Bobcat Excavator



EXCAVATOR SERVICE SAFETY COURSE

6900916

Introduces Service Technicians to step-by-step basics of proper and safe excavator maintenance and servicing procedures



SAFETY MANUAL

6901951

Provide basic safety procedures and warnings for your Bobcat Excavator. Also available in Spanish 6901951AR



OPERATOR SAFETY VIDEO

6903181

Provides basic safety instructions

OPERATING INSTRUCTIONS

ATTACHMENTS	OI-31
Installing And Removing The Attachment	OI-31
BLADE CONTROL LEVER	OI-17
Operation	OI-17
BOOM SWING PEDAL	OI-20
Operation	OI-20
DAILY INSPECTION	OI-21
Daily Inspection And Maintenance	OI-22
HYDRAULIC CONTROLS	OI-14
Auxiliary Hydraulics (If Equipped)	OI-16
ISO Control Lever	OI-14
Relieve Hydraulic Pressure (Excavator And Attachment)	OI-16
Right Control Lever (Joystick)	OI-14
Quick Couplers	OI-15
INSTRUMENTS AND CONSOLES	OI-3
Cab Interior Light (If Equipped)	OI-3
Heater (If Equipped)	OI-3
Left Console	OI-3
Raising And Lowering The Console(s)	OI-6
Right Console	OI-4
Upperstructure Slew Lock	OI-5
LIFTING THE EXCAVATOR	OI-40
Procedure	OI-40
OPERATOR CANOPY (ROPS / TOPS)	OI-7
OPERATOR CAB (ROPS / TOPS)	OI-7
Cab Door	OI-7
Front Window	OI-8
Front Wiper	OI-9
Heater	OI-11
Right Side Window	OI-10
Window Washer Reservoir	OI-9

OPERATING INSTRUCTIONS (OI)

Continued On Next Page

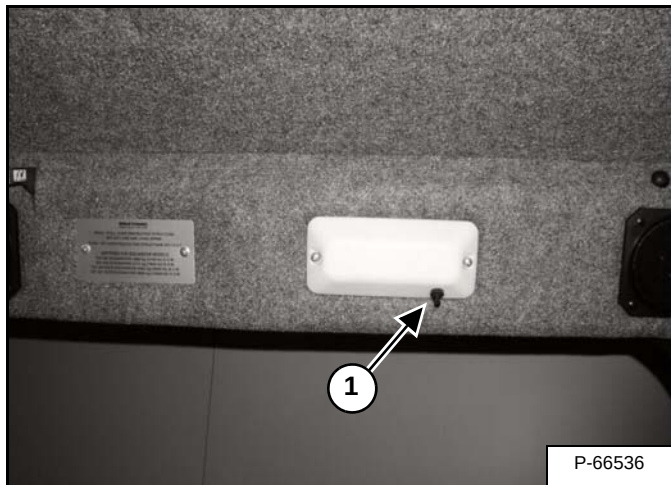
OPERATING INSTRUCTIONS (CONT'D)

OPERATING PROCEDURE	OI-32
Avoiding Track Damage	OI-39
Backfilling	OI-36
Boom Swing	OI-35
Driving The Excavator	OI-36
Excavating	OI-33
Inspect The Work Area	OI-32
Lifting A Load	OI-33
Operating On Public Roads	OI-32
Operating On Slopes	OI-37
Operating In Water	OI-39
 PRE-STARTING PROCEDURE	 OI-23
Control Console	OI-25
Entering The Excavator	OI-24
Seat Adjustment	OI-24
Seat Belt Adjustment	OI-24
Operation & Maintenance Manual And Operator's Handbook Locations	OI-23
 STARTING THE ENGINE	 OI-26
Cold Temperature Starting	OI-27
Key Switch	OI-26
Warming The Hydraulic System	OI-28
 STOPPING THE ENGINE AND LEAVING THE EXCAVATOR	 OI-29
Procedure	OI-29
Emergency Exits	OI-30
 TOWING THE EXCAVATOR	 OI-39
Procedure	OI-39
 TRACK FRAME EXPANSION	 OI-18
Operation	OI-18
 TRANSPORTING THE EXCAVATOR ON A TRAILER	 OI-41
Loading And Unloading	OI-41
Fastening	OI-41
 TRAVEL CONTROLS	 OI-12
Description	OI-12
Forward And Reverse	OI-12
Turning	OI-12

INSTRUMENTS AND CONSOLES

Cab Interior Light (If Equipped)

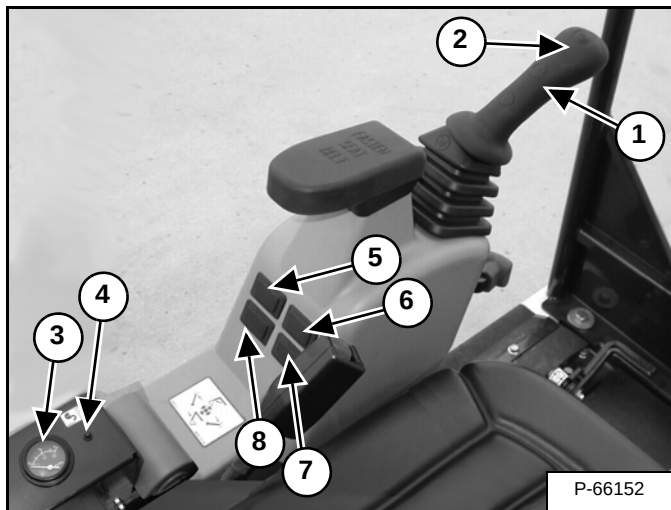
Figure OI-1



Press the button (Item 1) **[Figure OI-1]** to turn the light ON. Press again to turn light OFF.

Left Console

Figure OI-2

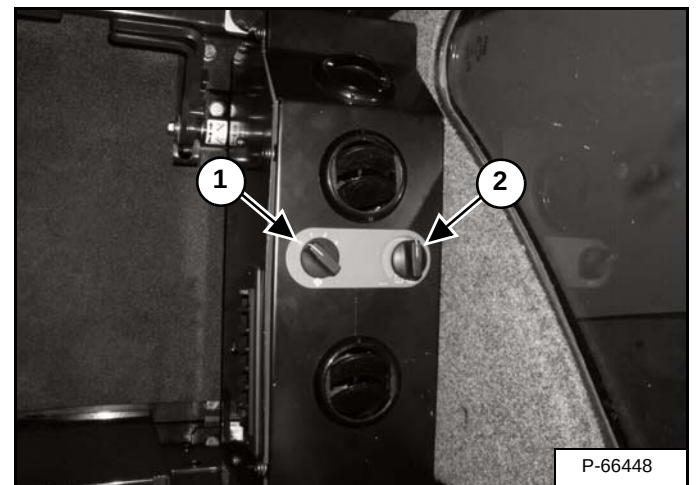


Left Console **[Figure OI-2]**

REF. NO.	DESCRIPTION	FUNCTION/OPERATION
1	Horn	Press button to sound horn.
2	Left Joystick	(See HYDRAULIC CONTROLS on Page OI-14)
3	Fuel Gauge	Shows the amount of fuel in the tank.
4	Hydraulic Lockout Indicator	When consoles are down and locked, indicator light will be ON. Hydraulic and traction system controls will operate.
5	Wiper / Washer (If Equipped)	Press left side to turn wiper ON. Press and hold for washer. Press right side to turn OFF.
6	Not Used	- - -
7	Not Used	- - -
8	Beacon (If Equipped)	Press left side of switch to turn beacon ON, right side to turn OFF.

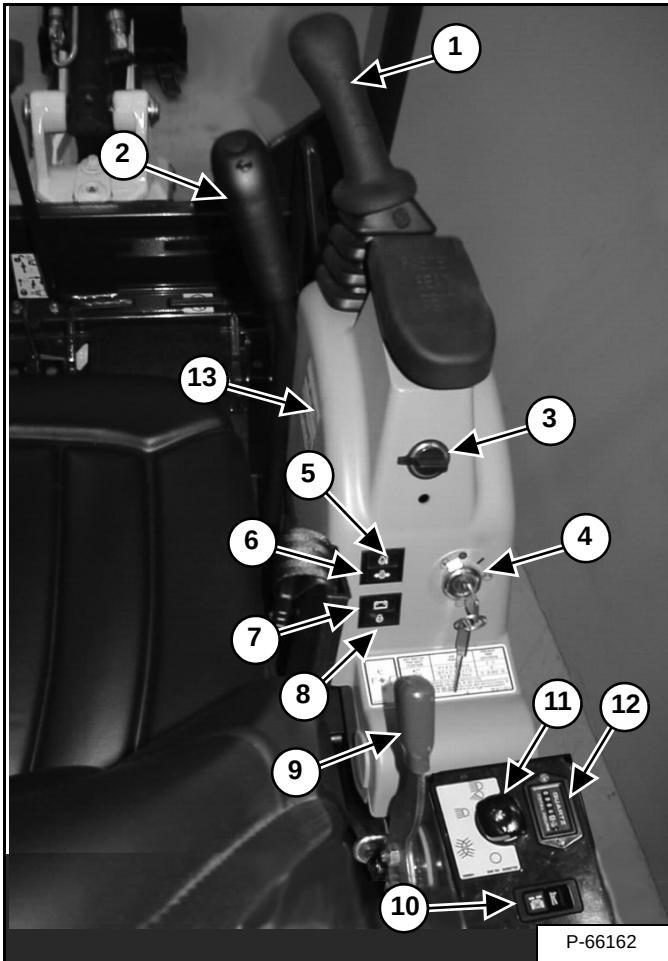
Heater (If Equipped)

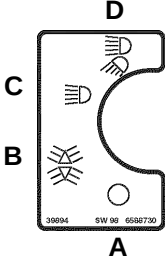
Figure OI-3



Heater **[Figure OI-3]**

REF. NO.	DESCRIPTION	FUNCTION/OPERATION
1	Fan Motor Switch	Turn clockwise to increase fan speed; counterclockwise to decrease.
2	Temperature Control	Turn clockwise to increase temperature; counterclockwise to decrease.

INSTRUMENTS AND CONSOLES (CONT'D)**Right Console****Figure OI-4****Right Console [Figure OI-4]**

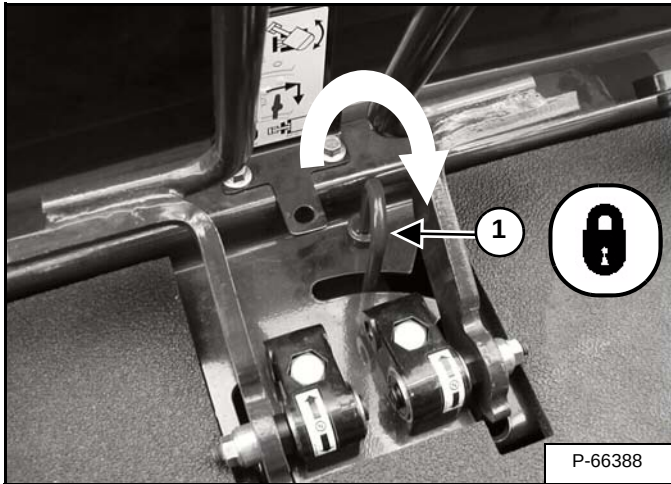
REF. NO.	DESCRIPTION	FUNCTION/OPERATION
1	Right Joystick	(See HYDRAULIC CONTROLS on Page OI-15)
2	Blade / Track Expansion Lever	Use with Blade/Track Expansion Switch to raise/lower the blade or expand/retract the tracks.
3	Auxiliary Power Outlet	Provides a 12V receptacle for accessories
4	Key Switch	(See STARTING THE ENGINE on Page OI-28.)
5	Engine Coolant Temperature Warning Light	Light comes ON when coolant temperature is above allowable range. Alarm also sounds. STOP the engine if light comes ON.
6	Engine Oil Pressure Warning Light	Light comes ON when pressure is below allowable range. Alarm also sounds. STOP the engine if light comes ON.
7	Charging System Light	Light comes ON when the alternator is NOT charging the battery.
8	Preheat Light	Light comes ON when key is turned to PREHEAT position.
9	Engine Speed Control	Push forward to increase speed; backward to decrease.
10	Blade / Track Expansion Switch	Switch functions between raise/lower the blade and track expansion. (See BLADE CONTROL LEVER on Page OI-17) or (See TRACK FRAME EXPANSION on Page OI-18)
11	Light Switch (Work, Strobe, Flasher)	A. Light Switch is OFF B. Strobe Light or Flasher is ON (If Equipped) C. Front Work Lights plus 'B' is ON (If Equipped) D. Additional Work Lights plus 'B' and 'C' is ON (If Equipped) 
12	Hourmeter	Records the total operating hours of the excavator
13	Alarm	(Inside right console) Alarm sounds when key is ON and engine is stopped; also when engine oil pressure is low or coolant temperature is high.

NOTE: Always turn key switch and all accessories to OFF position after the engine is stopped. The battery will discharge if the key is left ON. Alarm will sound if the key is in the ON position with the engine stopped.

INSTRUMENTS AND CONSOLES (CONT'D)

Upperstructure Slew Lock

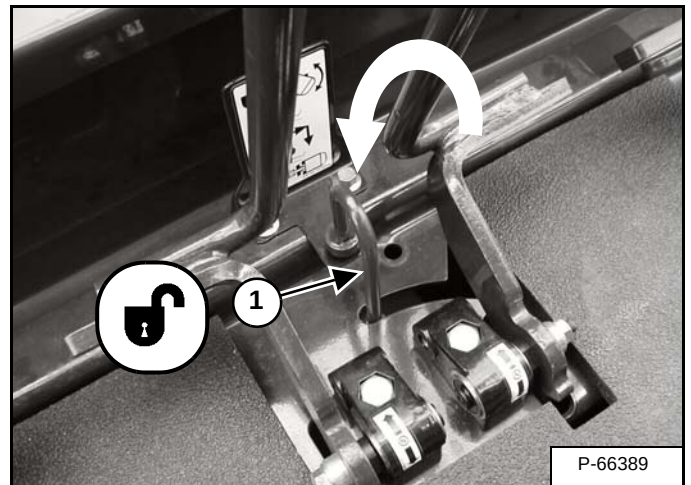
Figure OI-5



Move the lever (Item 1) **[Figure OI-5]** *to the right and down* to engage the Upperstructure Slew Lock. When the Slew Lock is engaged (locked), the upperstructure of the excavator is locked to the track frame and will not rotate. The upperstructure must be parallel to the track frame to engage the Slew Lock.

NOTE: The upperstructure must be in the straight forward or straight rearward position for the upperstructure to lock.

Figure OI-6



Move the lever (Item 1) **[Figure OI-6]** *up and to the left* to disengage (unlocked) the upperstructure from the track frame. Secure the lever in the unlocked position.

WARNING

AVOID INJURY

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

W-2197-0904

INSTRUMENTS AND CONSOLES (CONT'D)

Raising And Lowering The Console(s)

Figure OI-7

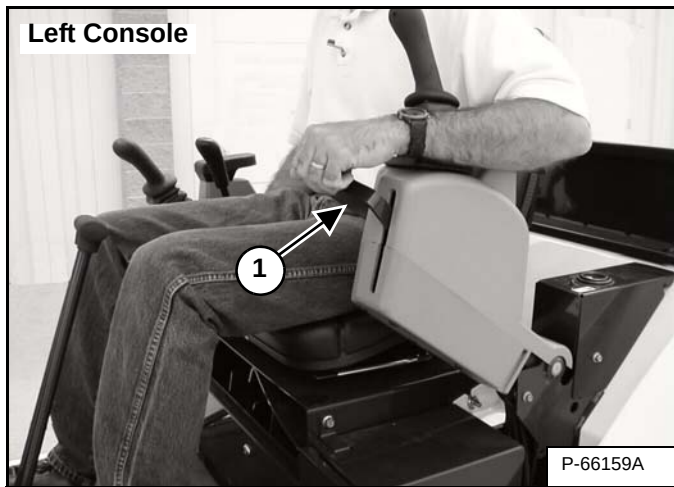
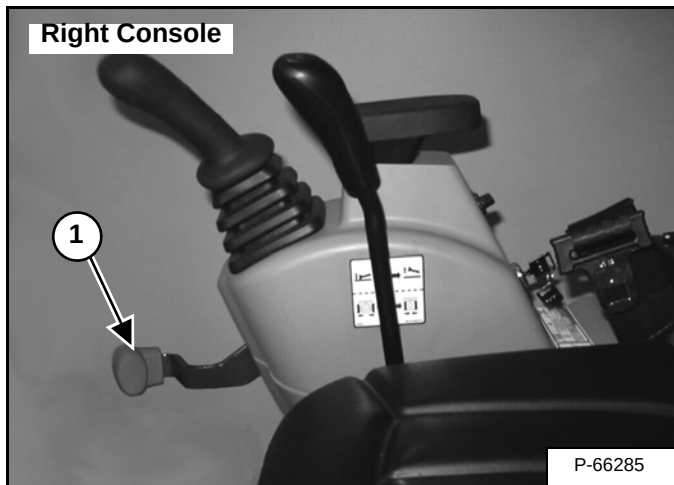


Figure OI-8



NOTE: The right console latch is used on canopy machines only. It is necessary to install the right console latch when removing a cab and replacing it with a canopy.

Pull the lever(s) (Item 1) [Figure OI-7] & [Figure OI-8] backward to release and raise the console(s) to provide entry and exit from the canopy/cab.

When either console is raised, the hydraulic control levers (joysticks) and traction system will not function.

NOTE: If the engine stops, the boom/bucket (attachments) can be lowered to the ground using hydraulic pressure in the accumulator.

The control console(s) must be in the locked down position, and the key switch in the ON position.

Lower the console(s) [Figure OI-7] & [Figure OI-8] until latched in the down position.

OPERATOR CANOPY (ROPS / TOPS)

Description

The excavator has an operator canopy (ROPS/TOPS) (Roll Over Protective Structure/Tip Over Protective Structure) as standard equipment. The ROPS/TOPS meets SAE J1040, ISO 3471 and ISO 12117.

Both the cab and canopy provide operator protection if the excavator is tipped over. The seat belt must be worn for ROPS /TOPS protection.

WARNING

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

W-2069-1299

OPERATOR CAB (ROPS / TOPS)

Description

The excavator has an optional operator cab (ROPS/TOPS) (Roll Over Protective Structure/Tip Over Protective Structure). The ROPS/TOPS meets SAE J1040, ISO 3471 and ISO 12117.

An enclosed cab (ROPS/TOPS) is an Option or can be installed as a Field Accessory.

Both the cab and canopy provide operator protection if the excavator is tipped over. The seat belt must be worn for ROPS /TOPS protection.

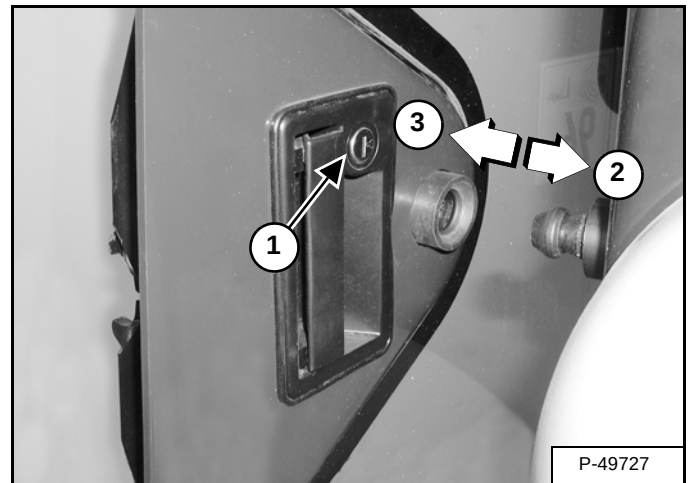
WARNING

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

W-2069-1299

Cab Door

Figure OI-9



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

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

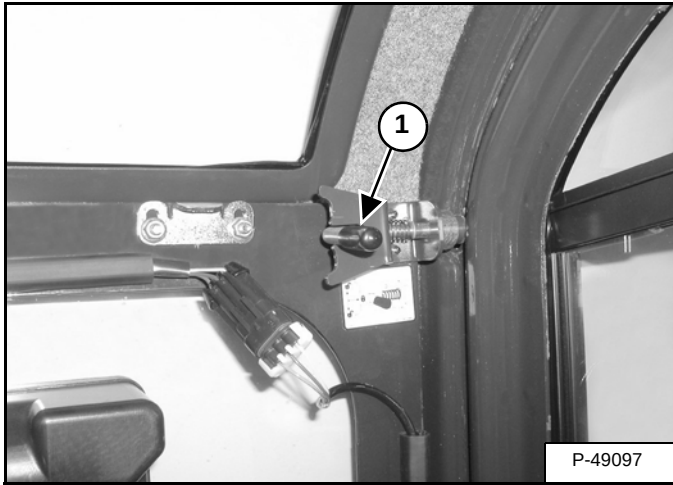
Pull the door away from the cab (Item 3) [Figure OI-9] to disengage the latch and close the door.

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

Front Window

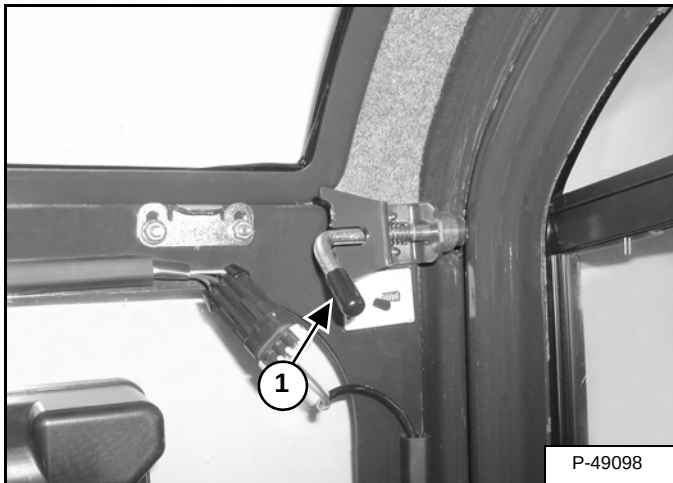
Opening The Front Window

Figure OI-10



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

Figure OI-11



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

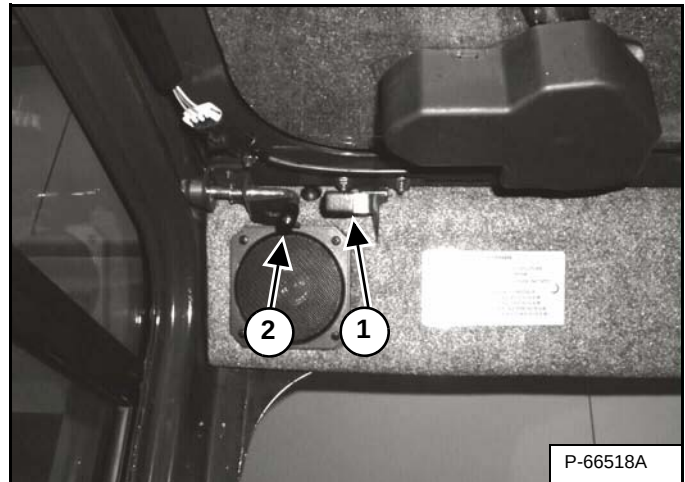
Figure OI-12



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

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

Figure OI-13



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

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

Front Window (Cont'd)

Closing The Front Window

Support the window while releasing both window latch pins and placing the pins in the unlocked position [Figure OI-13 on Page OI-8].

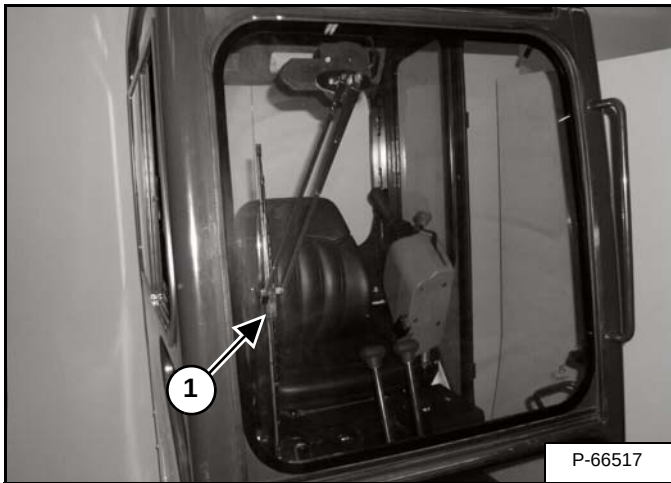
Support the window using the left grab handle and pull down on the latch (Item 1) [Figure OI-13 on Page OI-8] to release the window.

Use both window grab handles to pull the window down [Figure OI-12 on Page OI-8].

Rotate the top latches (Item 1) [Figure OI-11 on Page OI-8] to the locked position (Item 1) [Figure OI-10 on Page OI-8].

Front Wiper

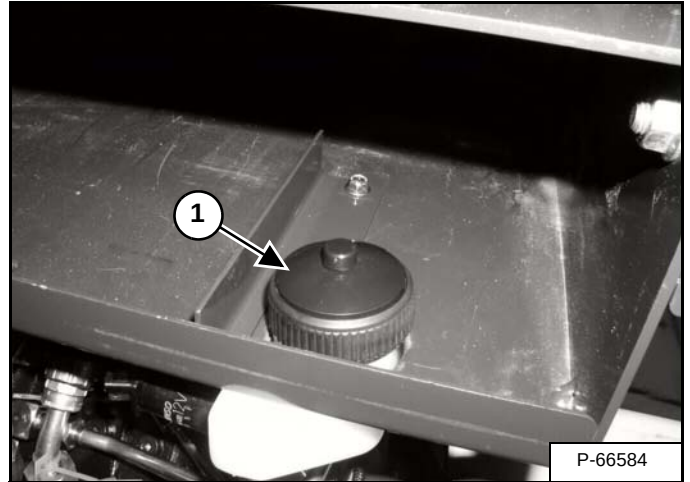
Figure OI-14



The front window is equipped with a wiper (Item 1) [Figure OI-14] and washer.

Window Washer Reservoir

Figure OI-15



The window washer reservoir (Item 1) [Figure OI-15] is located under the operator seat.

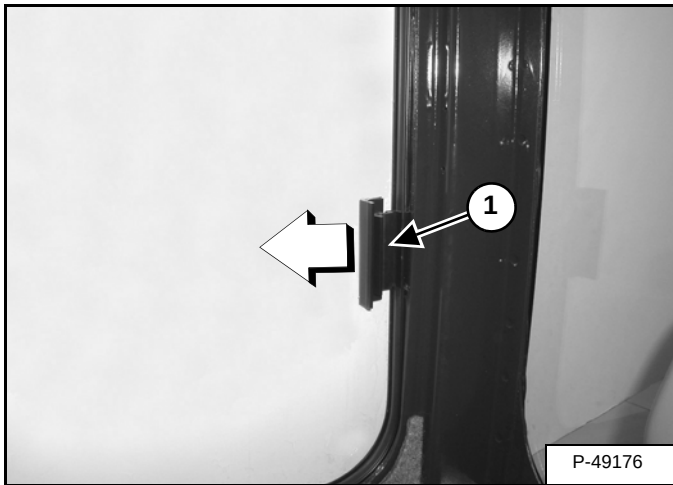
OPERATOR CAB (ROPS/TOPS) (CONT'D)

Opening the right front window

Right Side Window

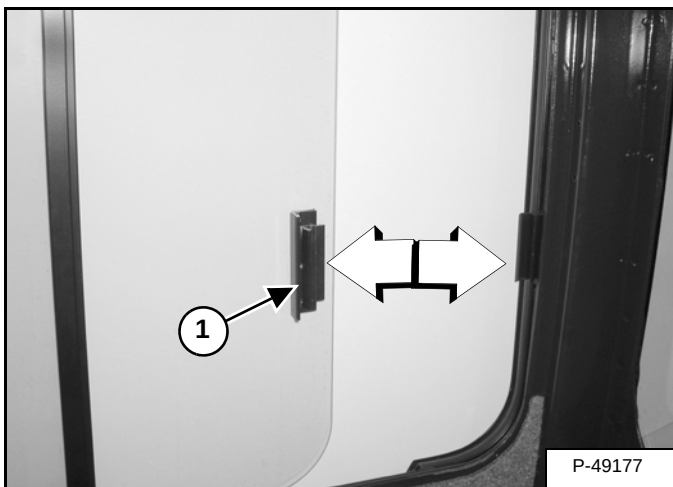
Opening the right rear window

Figure OI-16



Pull forward on the latch / handle (Item 1) [Figure OI-16].

Figure OI-17

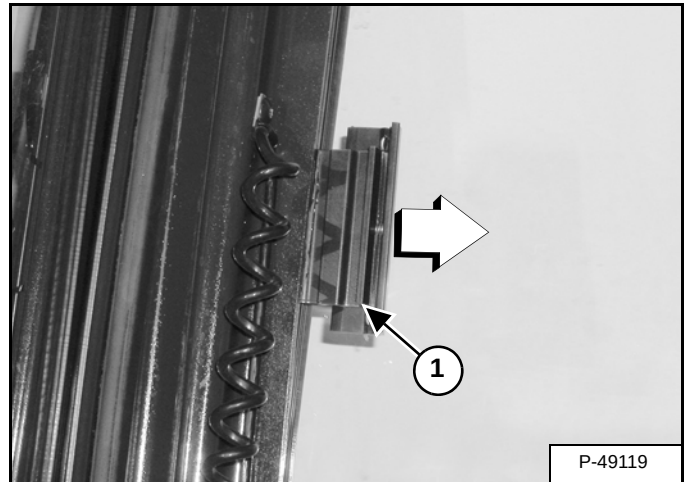


Pull the latch / handle (Item 1) [Figure OI-17] forward to open the window.

Closing the right rear window

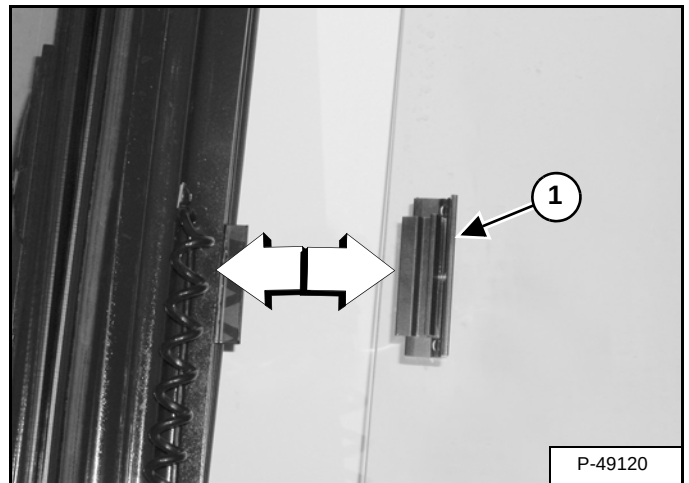
Push the handle back to close the window.

Figure OI-18



Pull back on the latch / handle (Item 1) [Figure OI-18].

Figure OI-19



Pull the latch / handle (Item 1) [Figure OI-19] back to open the window.

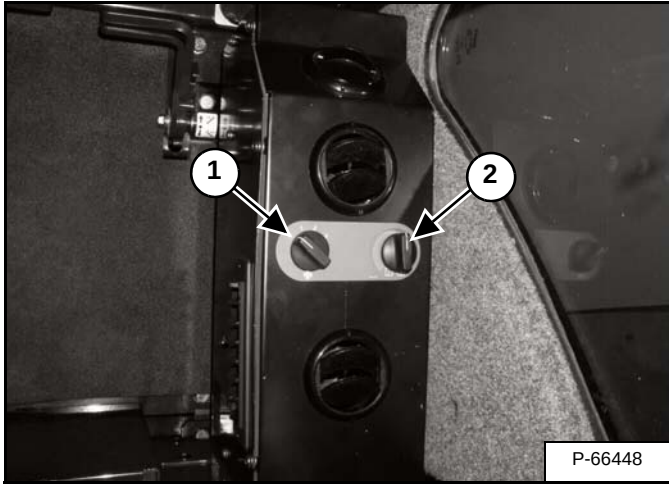
Closing the right front window

Push the handle forward to close the window.

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

Heater

Figure OI-20



The optional cab is equipped with a heater.

Fan Switch (Item 1) [Figure OI-20] - Turn clockwise to increase fan speed; counterclockwise to decrease. There are four positions; OFF - LO - MED - HI.

Temperature Control (Item 2) [Figure OI-20] - Turn clockwise to increase temperature; counterclockwise to decrease.

TRAVEL CONTROLS

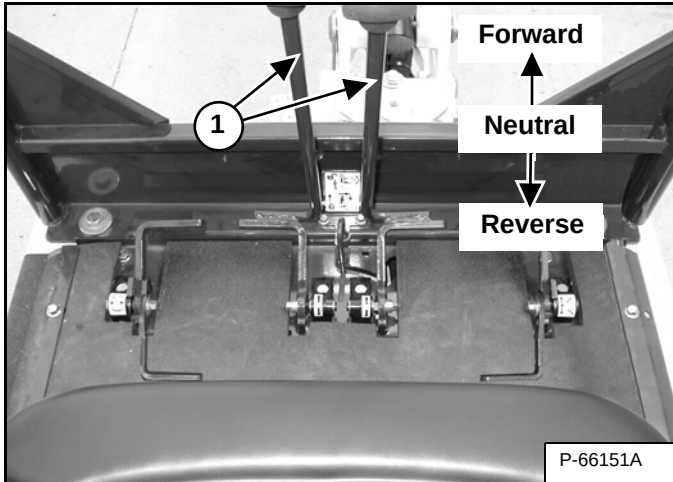
Description

The travel control levers control the movement of the excavator.

Forward And Reverse

NOTE: The following procedures describe forward, reverse, left & right as seated in the operator's seat.

Figure OI-21



Put the blade so that it is at the front of the machine (as you sit in the operator's seat). Slowly move both steering levers (Item 1) [Figure OI-21] forward for forward travel; backward for reverse travel.



WARNING

AVOID INJURY OR DEATH

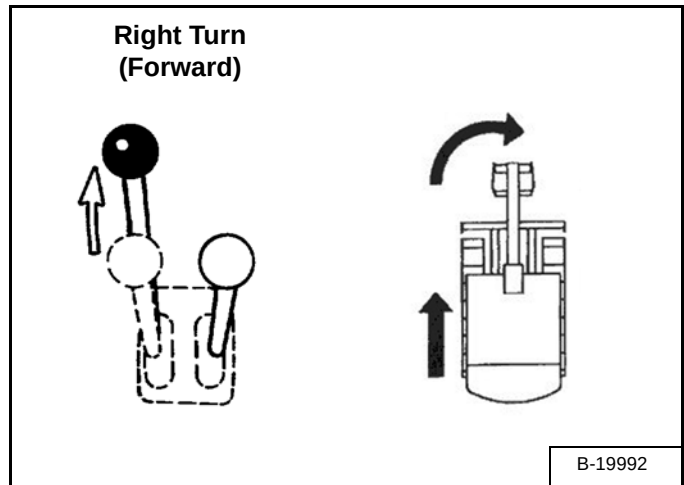
- Check the blade location before traveling. When the blade is to the rear, operate the steering levers in the opposite direction to when the blade is in the front.
- Move the steering levers slowly. Abrupt lever motion will cause the machine to jerk.

W-2631-0805

Turning

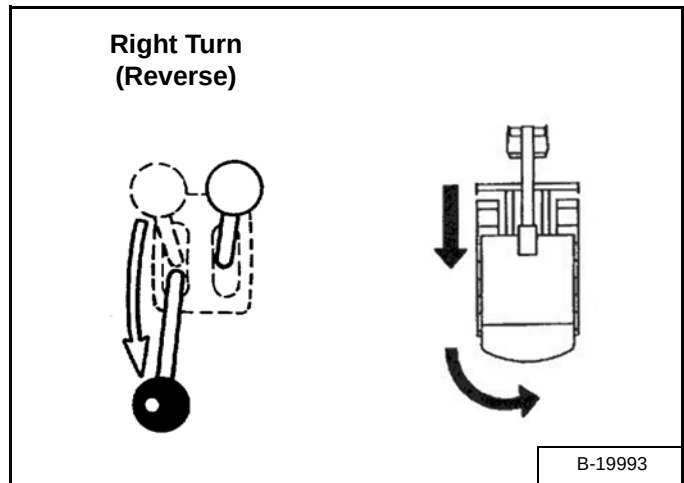
Right Turn

Figure OI-22



Push the left steering lever forward to turn right [Figure OI-22] while traveling forward.

Figure OI-23



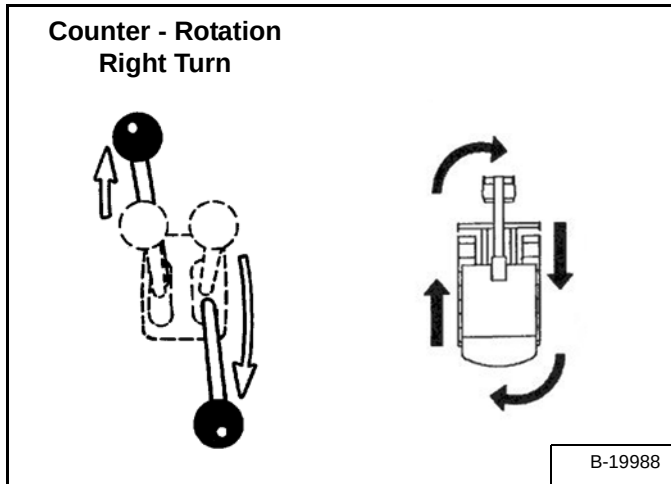
Pull the left steering lever backward to turn right [Figure OI-23] while traveling backward.

TRAVEL CONTROLS (CONT'D)

Turning (Cont'd)

Counter - Rotation Right Turn

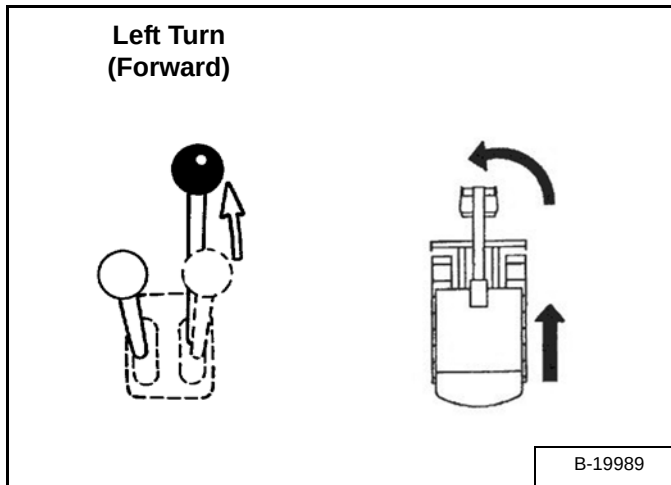
Figure OI-24



Push the left steering lever forward and pull the right steering lever backward [Figure OI-24].

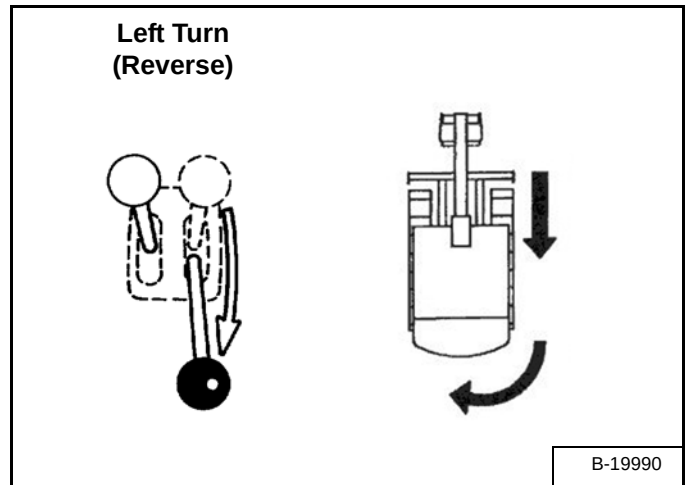
Left Turn

Figure OI-25



Push the right steering lever forward to turn left [Figure OI-25] while traveling forward.

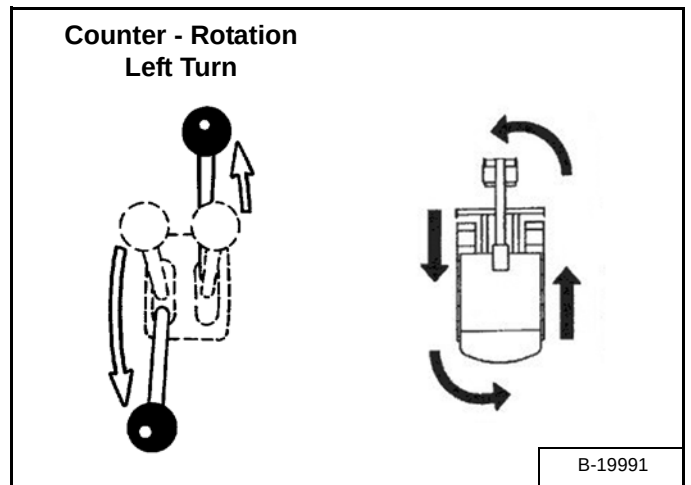
Figure OI-26



Pull the right steering lever backward to turn left while traveling backward [Figure OI-26].

Counter - Rotation Left Turn

Figure OI-27



Push the right steering lever forward and pull the left steering lever backward [Figure OI-27].

HYDRAULIC CONTROLS

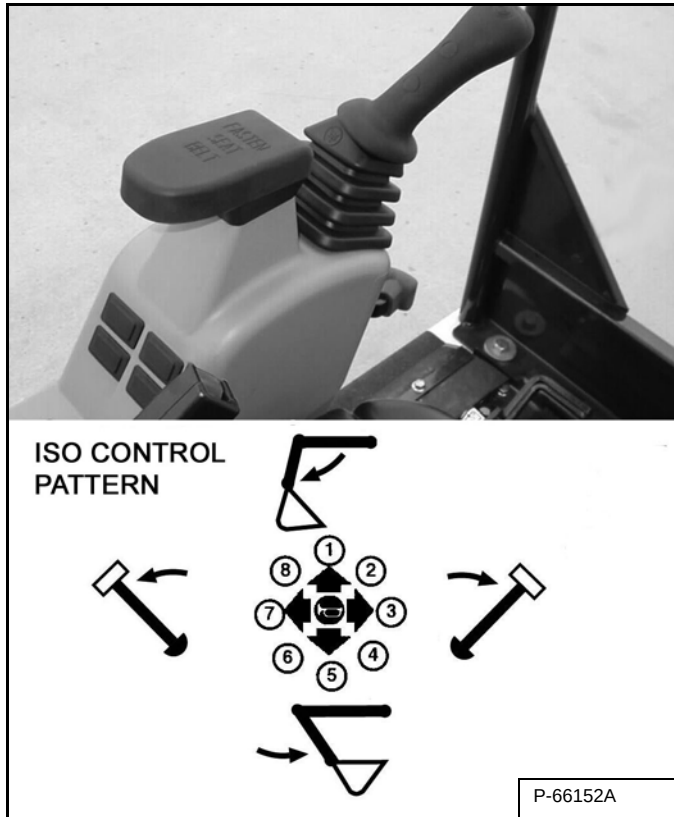
Description

The work equipment (boom, arm, bucket, and upperstructure slew) is operated by using the left and right control levers (joysticks) [Figure OI-28] & [Figure OI-29].

ISO Control Lever

Left Control Lever (Joystick)

Figure OI-28



The left lever (joystick) is used to operate the arm and slew the upperstructure [Figure OI-28].

1. Arm out.
2. Arm out and slew right.
3. Slew right.
4. Arm in and slew right.
5. Arm in.
6. Arm in and slew left.
7. Slew left.
8. Arm out and slew left.

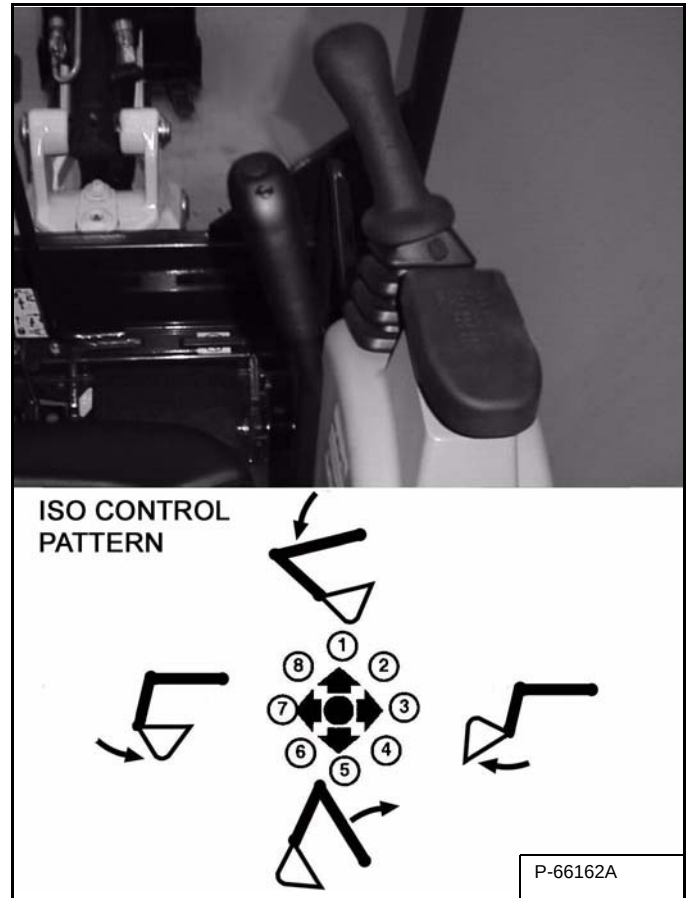
IMPORTANT

Before slewing the upperstructure, make sure the slew lock is disengaged.

I-2051-0905

Right Control Lever (Joystick)

Figure OI-29



The right lever (joystick) is used to operate the boom and bucket [Figure OI-29].

1. Boom lower.
2. Boom lower and bucket dump.
3. Bucket dump.
4. Boom raise and bucket dump.
5. Boom raise.
6. Boom raise and bucket curl.
7. Bucket curl.
8. Boom lower and bucket curl.

! WARNING

AVOID INJURY OR DEATH

Before leaving the machine:

- Lower the work equipment to the ground.
- Lower the blade to the ground.
- Stop the engine & remove the key.

W-2196-0595

HYDRAULIC CONTROLS (CONT'D)

Quick Couplers

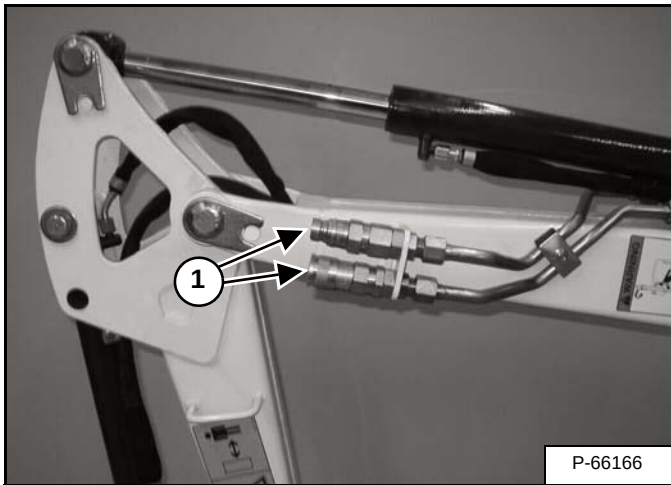
! WARNING

AVOID BURNS

Hydraulic fluid, tubes, fittings and quick couplers can get hot when running machine and attachments. Be careful when connecting and disconnecting quick couplers.

W-2220-0396

Figure OI-30



Excavators and attachments have flush faced couplers (Item 1) [Figure OI-30].

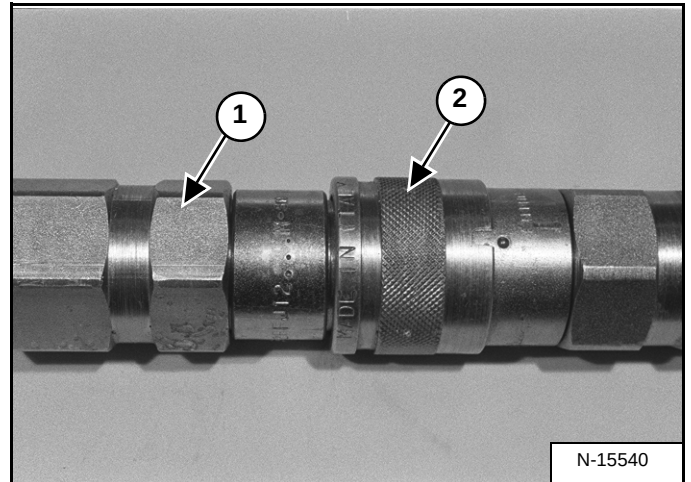
To Connect:

Remove any dirt or debris from the surface of both the male and female couplers, and from the outside diameter of the male coupler. Visually check the couplers for corroding, cracking, damage, or excessive wear, if any of these conditions exist, the coupler(s) (Item 1) [Figure OI-30] must be replaced.

Install the male coupler into the female coupler. Full connection is made when the ball release sleeve slides forward on the female coupler.

To Disconnect:

Figure OI-31



Hold the male coupler (Item 1). Retract the sleeve (Item 2) [Figure OI-31] on the female coupler until the couplers disconnect.

HYDRAULIC CONTROLS (CONT'D)

Auxiliary Hydraulics (IF Equipped)

! WARNING

AVOID BURNS

Hydraulic fluid, tubes, fittings and quick couplers can get hot when running machine and attachments. Be careful when connecting and disconnecting quick couplers.

W-2220-0396

Figure OI-32

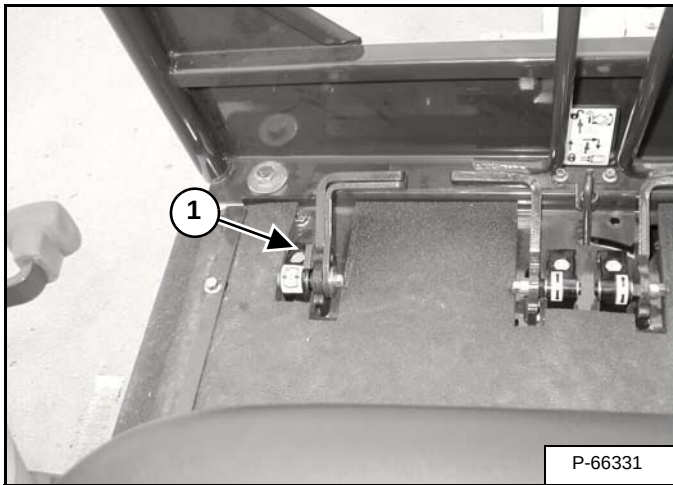
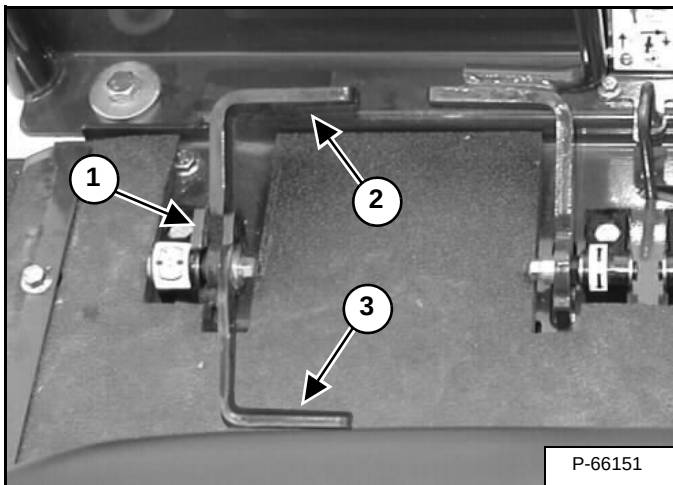


Figure OI-33



The left pedal [Figure OI-32] & [Figure OI-33] controls hydraulic oil flow to attachments (such as a hydraulic breaker) when mounted on the arm.

Release the pedal lock (Item 1) [Figure OI-32] and pivot the heel of the pedal to the rear.

The excavator is equipped with 2-way flow auxiliary hydraulics (either coupler can be pressurized).

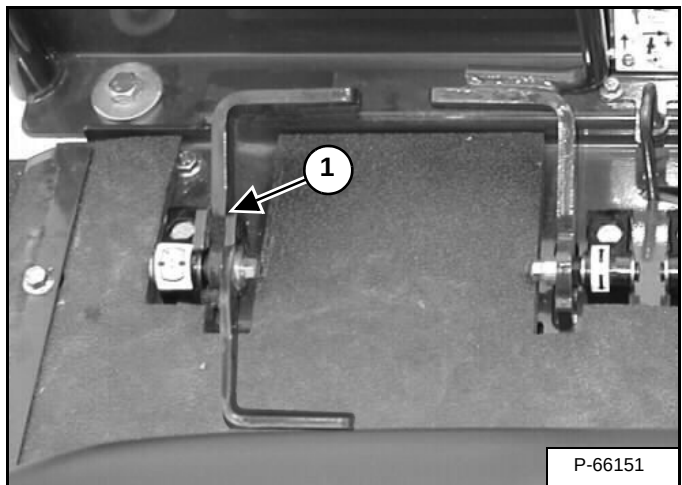
Push the toe of the pedal (Item 2) to activate hydraulic pressure / flow to the female coupler; heel (Item 3) [Figure OI-33] to activate hydraulic pressure / flow to the male coupler.

Relieve Hydraulic Pressure (Excavator And Attachment)

Put the attachment flat on the ground.

Stop the engine.

Figure OI-34



Excavator:

With the engine off, move the pedal (Item 1) [Figure OI-34] in both directions several times

Attachments:

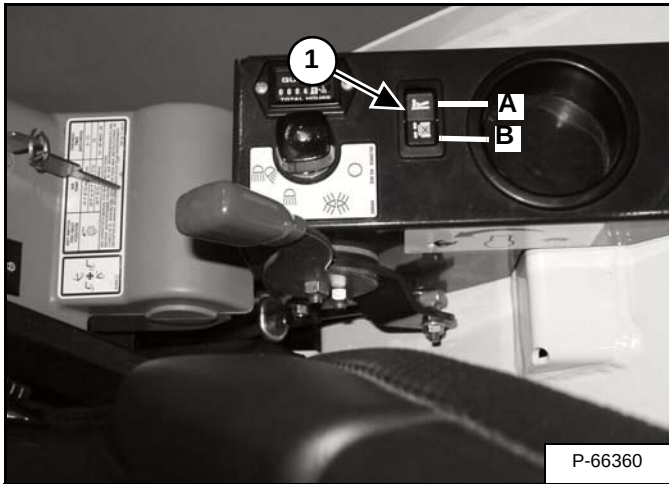
- Follow procedure above to release pressure in excavator.
- Connect male coupler from attachment to female coupler of excavator then repeat procedure above. This will release pressure in the attachment.
- Connect the female coupler from the attachment.

Hydraulic pressure in the auxiliary hydraulic system can make it difficult to engage quick couplers to an attachment.

BLADE CONTROL LEVER

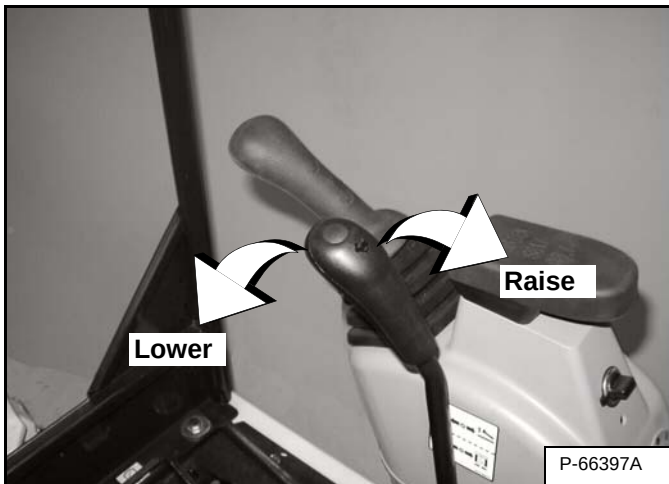
Operation

Figure OI-35



Push the Blade / Track Expansion Switch (Item 1) [Figure OI-35] to the Blade position, "A".

Figure OI-36



Move the Blade / Track Expansion Lever forward to lower the blade [Figure OI-36].

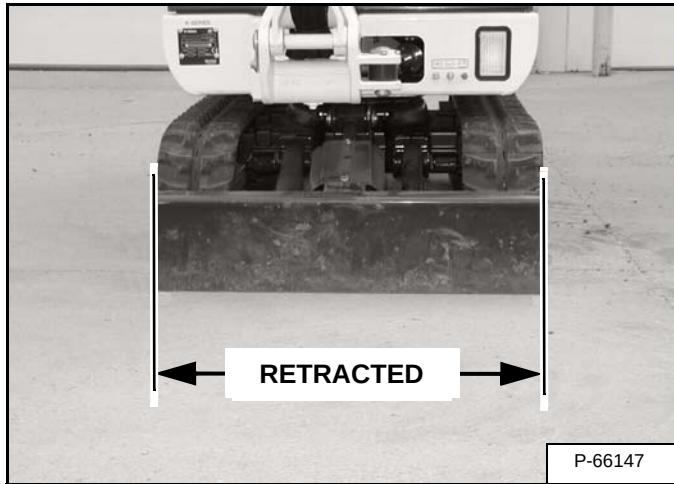
Move the Blade / Track Expansion Lever backward to raise the blade [Figure OI-36].

NOTE: Keep the blade lowered when digging to help stabilize machine.

TRACK FRAME EXPANSION

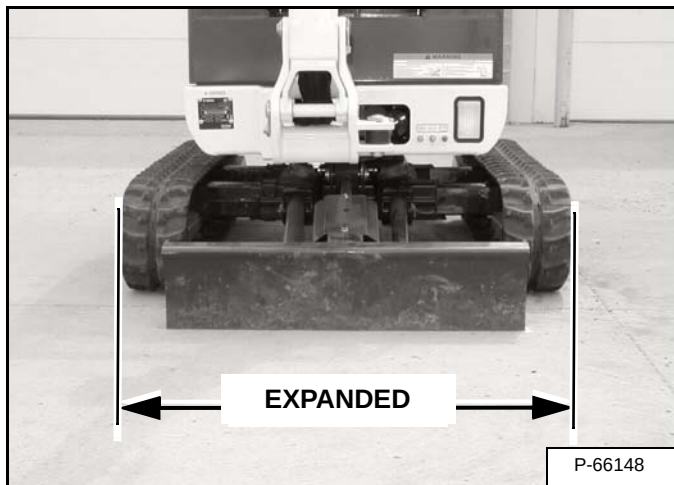
Operation

Figure OI-37



The excavator can be operated with the track frame retracted for transport on a trailer or to access narrow areas [Figure OI-37].

Figure OI-38



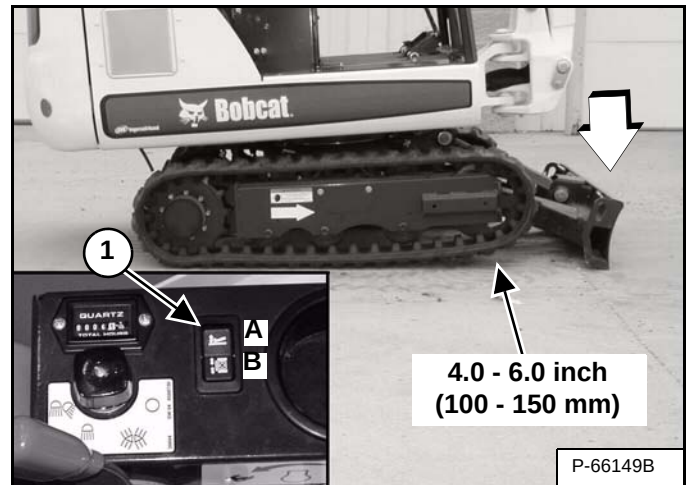
Expand the track frame for increased digging performance [Figure OI-38].

IMPORTANT

To prevent wear and damage to the track, always lift the excavator before expanding or retracting the track frame.

I-2193-0599

Figure OI-39

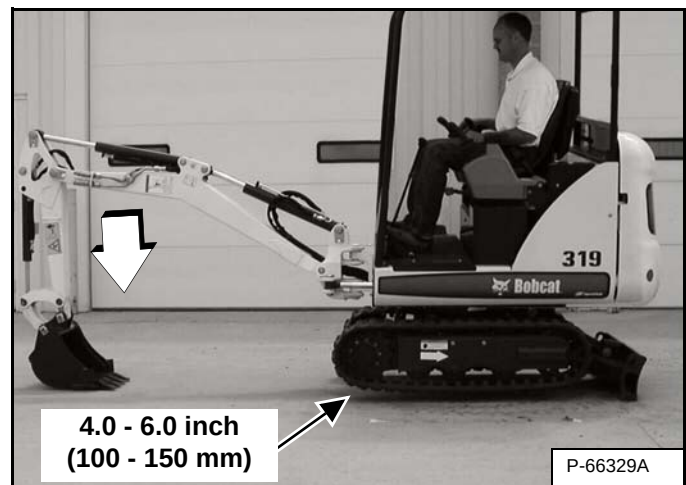


Push the Blade / Track Expansion switch (Item 1) [Figure OI-39] to the Blade position, "A".

With the boom and arm positioned over the blade, lower the blade until the track is raised 4.0 - 6.0 inches (100 - 150 mm) off the ground [Figure OI-39].

Rotate the upperstructure 180 degrees.

Figure OI-40

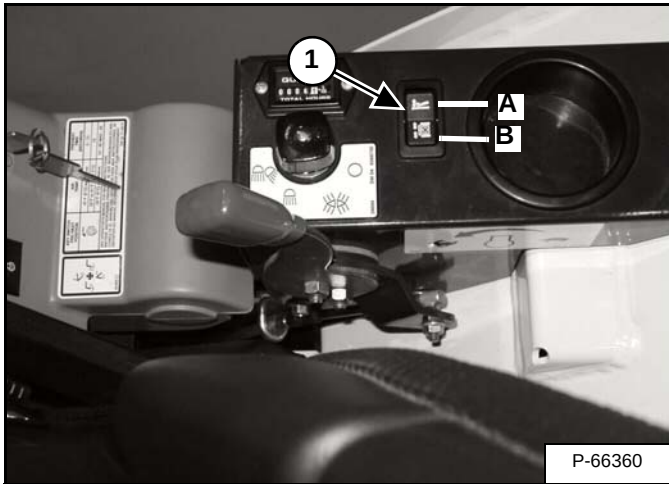


Lower the boom and arm to raise the rear of the excavator until the track is 4.0 - 6.0 inches (100 - 150 mm) off the ground [Figure OI-40].

TRACK FRAME EXPANSION (CONT'D)

Operation (Cont'd)

Figure OI-41



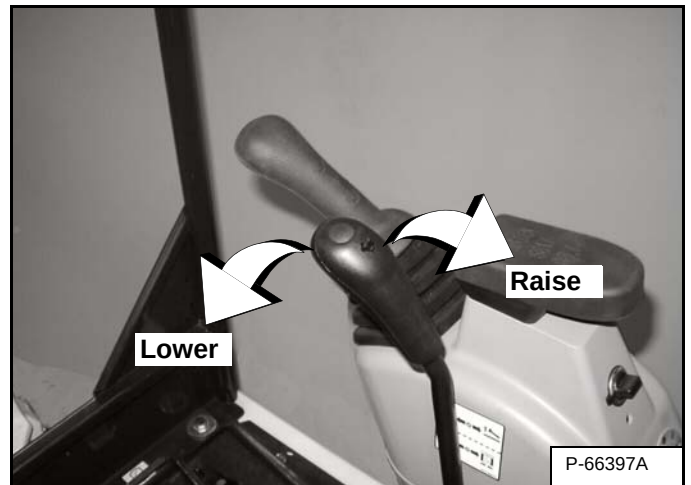
Push the Blade / Track Expansion switch (Item 1) [Figure OI-41] to the Track Expansion position, "B".

IMPORTANT

To prevent wear and damage to the track, always lift the excavator before expanding or retracting the track frame.

I-2193-0599

Figure OI-42

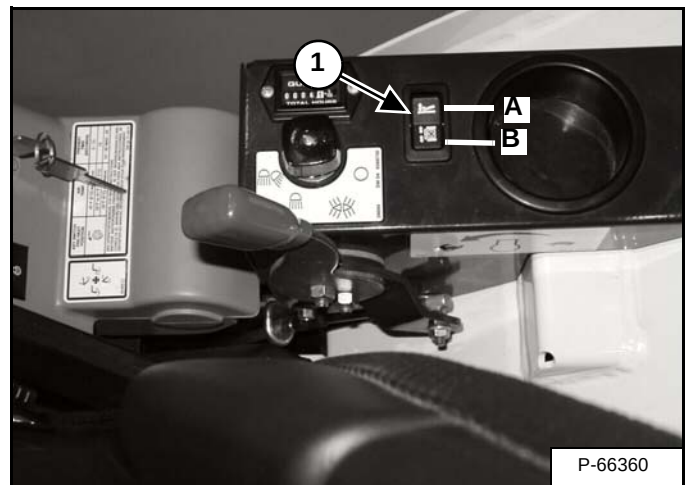


Push the Blade / Track Expansion lever [Figure OI-42] forward to expand the track frame. Hold the lever forward until the track frame is fully expanded.

Pull the Blade / Track Expansion lever [Figure OI-42] back to retract the track frame. Hold the lever back until the track frame is fully retracted.

The track frame must be either in the fully expanded or fully retracted position when in use.

Figure OI-43



NOTE: Always return the Blade / Track Expansion switch to the Blade position "A" (Item 1) [Figure OI-43] during operation so that the track does not move when using the blade lever.

Raise the boom and arm to lower the rear of the excavator to the ground.

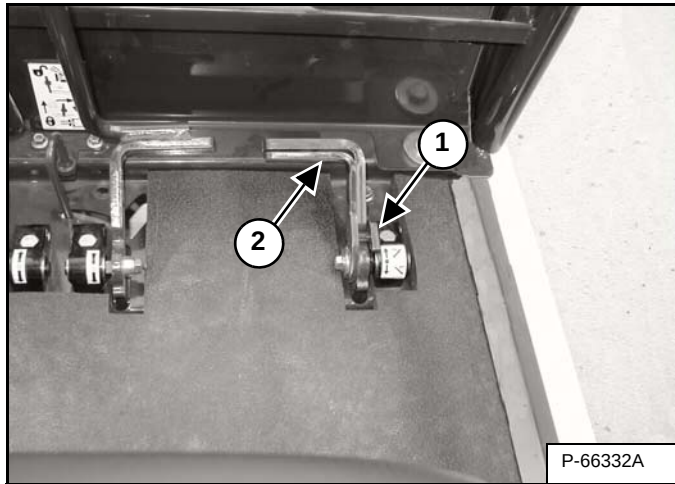
Rotate the upperstructure 180 degrees.

Raise the blade until the track is on the ground.

BOOM SWING PEDAL

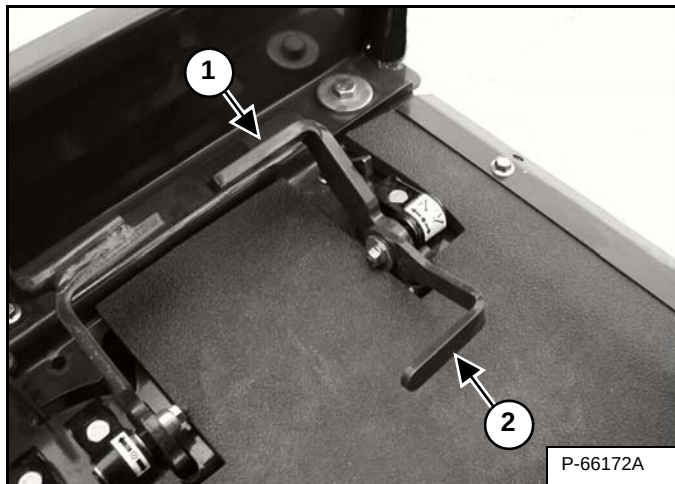
Operation

Figure OI-44



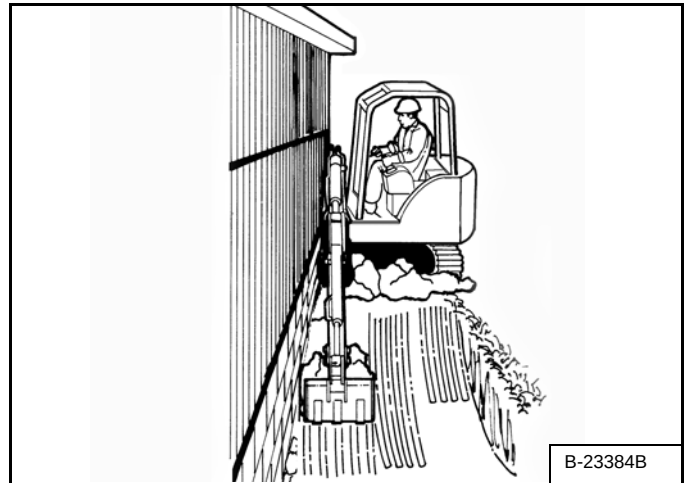
Release the pedal lock (Item 1) and pivot the heel (Item 2) [Figure OI-44] of the pedal to the rear.

Figure OI-45



Push the toe of the pedal (Item 1) to swing the boom to the right; push the heel (Item 2) [Figure OI-45] to swing left.

Figure OI-46



NOTE: The purpose of the boom swing pedal is to offset the boom with respect to the upperstructure for digging close to a structure [Figure OI-46].

DAILY INSPECTION**Figure OI-47**

* Service only when machine is equipped with this item.

■ Service at first 50 hours, then as scheduled.

▲ Service at first 100 hours, then as scheduled.

EVERY 8-10 HOURS

- Check engine coolant level.
- Check engine oil level.
- Check hydraulic fluid level.
- Check air cleaner condition indicator.
- Check and adjust track tension.
- Check indicator lights for correct operation.
- Check canopy or *cab condition and mounting hardware.
- Check seat belt condition and mounting hardware.
- Check control console(s) lockout for proper operation.
- Check for damaged signs (decals) - Replace as needed.
- Grease all machinery pivot points. (See illustrations)
- *Apply grease to slide on extendable arm.
- *Clean cab heater filter.

EVERY 50 HOURS

- Grease swing pinion and swing circle. (See illustrations)
- Drain water and sediment from fuel tank and fuel filter.
- Check battery, cables and electrolyte level.

EVERY 100 HOURS

- Check and adjust belt(s) if required. (Models 319, 320, 323, 325 and 328)
- Spark Arrestor Muffler - Clean spark chamber.
- Replace engine oil and filter. (Model 320)

EVERY 250 HOURS

- Replace diesel fuel filter.
- Replace inline diesel fuel filter. (Models 430 and 435)
- Replace engine oil and filter. (Models 325 and 328)
- Check oil level in both final drive cases.

EVERY 500 HOURS

- Replace engine oil and filter. (Models 319, 323, 331, 331E, 334, 337, 341, 430 and 435)
- Clean radiator, oil cooler and *A/C condenser.
- ▲ Check and adjust drive belts and idlers. Replace as needed. (Model 331, 331E, 334, 337, 341, 430 and 435)
- ▲ Replace primary hydraulic filter.
- ▲ Replace case drain hydraulic filter. (All models except 319, 320 and 323)
- Replace fan hydraulic filter. (Models 430 and 435)
- ▲ Check alternator and starter connections.
- Check and adjust engine valve clearance.

EVERY 1000 HOURS OR EVERY 6 MONTHS

- ▲ Replace oil in both final drive cases.
- Drain and flush cooling system - Replace coolant.
- Replace hydraulic fluid and filter(s) - Clean reservoir.

SERVICE SCHEDULE

ALL MODELS

(50 hrs.)
319, 320, 323

(50 hrs.)
325 THRU 341

(50 hrs.)
430, 435

		319, 320, 323	325, 328	331, 334 331E	337, 341	430	435
1.	PRIMARY AIR FILTER	6673752	6672467	6666333	6666375	6666333	6666375
2.	SECONDARY AIR FILTER	6673753	6672468	6666334	6666376	6666334	6666376
3.	ENGINE OIL FILTER	6671057	6675517	6675517	6675517	6675517	6675517
4.	FUEL FILTER	6667352	6667352	6667352	6667352	6667352	6667352
5.	INLINE FUEL FILTER	N/A	N/A	N/A	N/A	6633977	6633977
6.	PRIMARY HYDRAULIC FILTER	6653336	6661248	6661248	6670207	6668819	6668819
7.	DRAIN HYDRAULIC FILTER	N/A	6516722	6516722	6516722	6681012	6681012
8.	FAN HYDRAULIC FILTER	N/A	N/A	N/A	N/A	6681012	6681012

* See illustrations above for filter locations.

IMPORTANT

THIS MACHINE IS FACTORY EQUIPPED WITH A U.S.D.A. FORESTRY SERVICE APPROVED SPARK ARRESTOR MUFFLER.

IT IS NECESSARY TO CLEAN THIS SPARK ARRESTOR MUFFLER TO KEEP IT IN WORKING CONDITION. THE SPARK ARRESTOR MUFFLER MUST BE SERVICED BY DUMPING THE SPARK CHAMBER EVERY 100 HOURS OF OPERATION.

[IF THIS MACHINE IS OPERATED ON FLAMMABLE FOREST, BRUSH OR GRASS COVERED LAND, IT MUST BE EQUIPPED WITH A SPARK ARRESTOR ATTACHED TO THE EXHAUST SYSTEM AND MAINTAINED IN WORKING ORDER. FAILURE TO DO SO WILL BE IN VIOLATION OF CALIFORNIA STATE LAW, SECTION 4442. PRC. REFER TO LOCAL LAWS AND REGULATIONS FOR SPARK ARRESTOR REQUIREMENTS.]

65141
• See Operation & Maintenance Manual for more information and instructions.
SW 05 7111723

7111723

DAILY INSPECTION (CONT'D)

Daily Inspection And Maintenance

Maintenance work must be done at regular intervals. Failure to do so will result in excessive wear and early failures. The Service Schedule **[Figure OI-47]** is a guide for correct maintenance of the Bobcat Excavator. It is located inside the tailgate of the excavator and also in this manual.

Check the following items before each day of operation:

- Engine oil level and for engine leaks
- Hydraulic fluid level and system for leaks
- Engine Air Filter, Check Air System for Damage or Leaks
- Engine Coolant Level, Check System for Damage or Leaks
- Operator Canopy or Cab (ROPS/TOPS) and mounting hardware
- Seat Belt and mounting hardware
- Check control console lockout(s)
- Clean engine area of any flammable material
- Track Tension
- Fuel Filter, Remove Trapped Water
- Loose or Broken Parts, Repair or replace as necessary
- Safety Treads and Safety Signs (Decals), Replace as necessary
- Cylinder and attachment pivot points
- Grease all pivot points



WARNING

Operator must have instructions before operating the machine. Untrained operators can cause injury or death.

W-2001-0502

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

IMPORTANT

PRESSURE WASHING DECALS

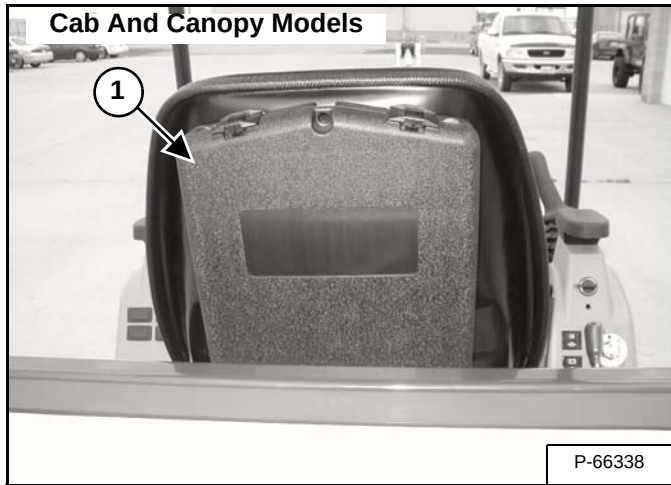
- **Never direct the stream at a low angle toward the decal that could damage the decal causing it to peel from the surface.**
- **Direct the stream at a 90 degree angle and at least 12 inches (300 mm) from the decal. Wash from the center of the decal toward the edges.**

I-2226-0104

PRE-STARTING PROCEDURE

Operation & Maintenance Manual And Operator's Handbook Locations

Figure OI-48



Read and understand the Operation & Maintenance Manual that is stored in the container (Item 1) [Figure OI-48] (located on the back of the operator seat) and the Operator's Handbook (Item 1) [Figure OI-49] or [Figure OI-50] (located at the right rear corner of the canopy or right rear side of the cab) before operating.

Figure OI-49

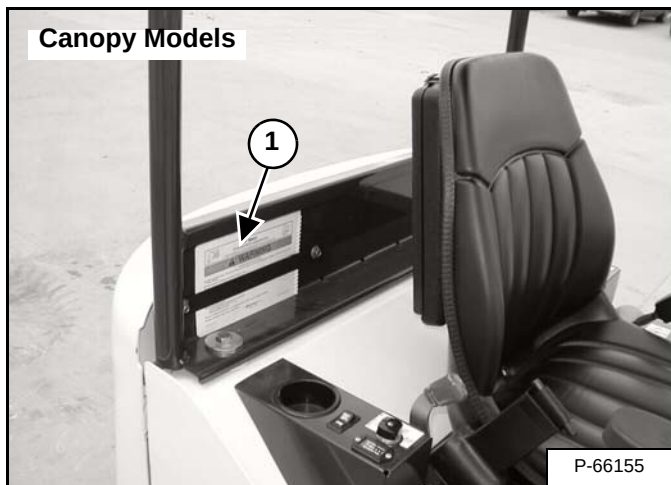


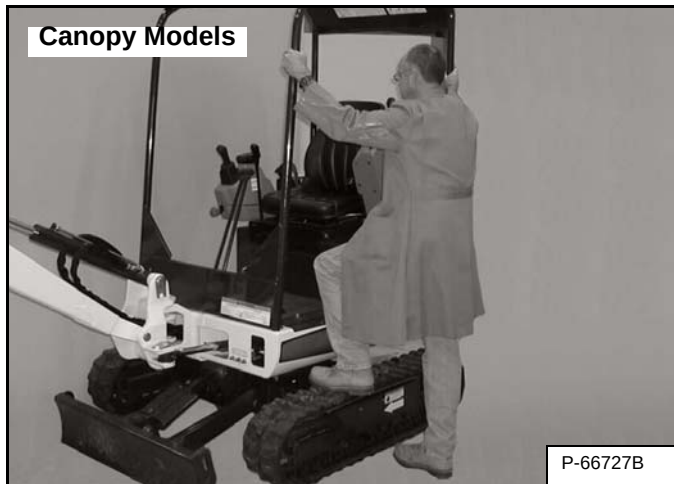
Figure OI-50



PRE-STARTING PROCEDURE (CONT'D)

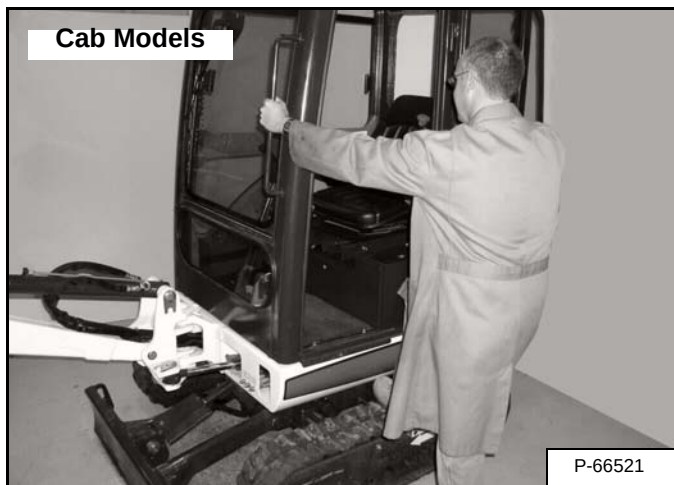
Entering The Excavator

Figure OI-51



Use the ROPS tubes, the tracks and the safety treads to enter and exit the canopy [Figure OI-51].

Figure OI-52



Use the grab handles, the tracks and the safety treads to enter and exit the cab [Figure OI-52].

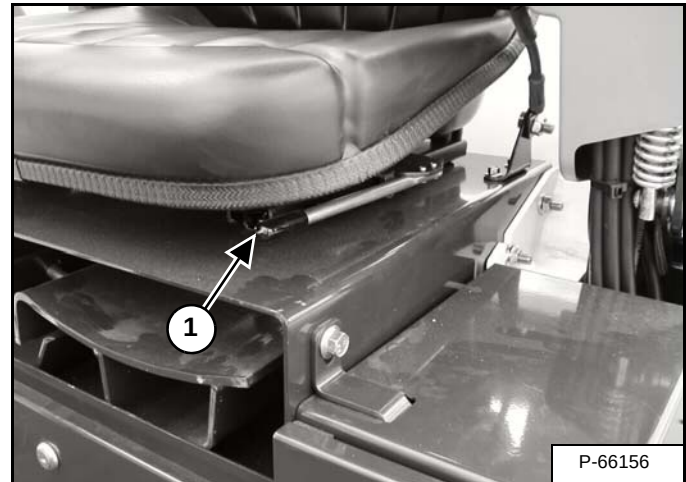
WARNING

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

Seat Adjustment

Figure OI-53



Release the seat lever (Item 1) [Figure OI-53] to adjust the seat forward or backward to a comfortable operation.

Seat Belt Adjustment

Figure OI-54



Fasten the seat belt [Figure OI-54].

PRE-STARTING PROCEDURE (CONT'D)

Control Console

Figure OI-55



Lower the control console(s) [Figure OI-55].

NOTE: The console(s) must be in the locked down position for the hydraulic control levers (joysticks) and traction system to operate.

NOTE: If the control lock switch does not deactivate the control levers (joysticks) when console is raised, see your Bobcat dealer for service.

STARTING THE ENGINE

Key Switch

! WARNING

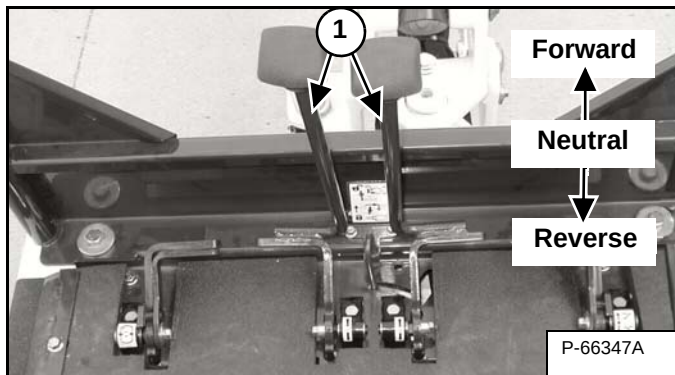
AVOID INJURY OR DEATH

- Fasten seat belt, start and operate only from the operator seat.
- Never wear loose clothing when working near machine.

W-2135-1188

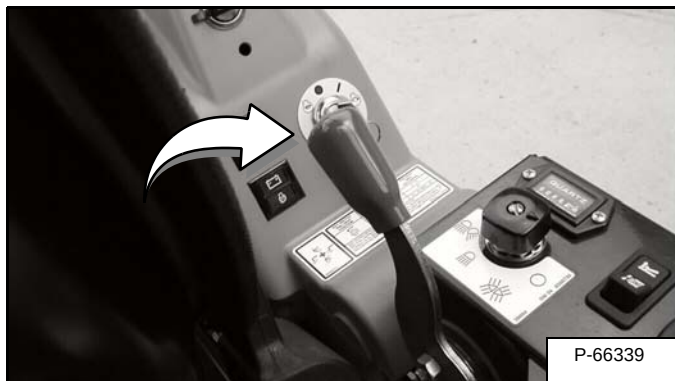
Perform the PRE-STARTING PROCEDURE. (See PRE-STARTING PROCEDURE on Page OI-23)

Figure OI-56



Put control levers (Item 1) [Figure OI-56] in the neutral position.

Figure OI-57



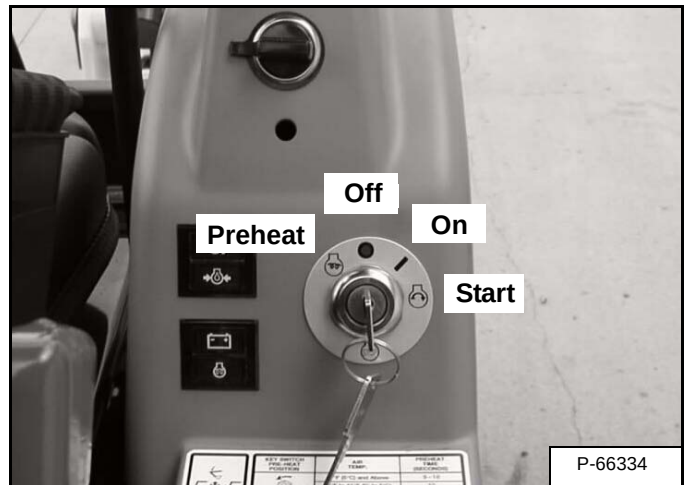
Move the engine speed control to low idle [Figure OI-57].

! WARNING

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

W-2050-1285

Figure OI-58



Turn the key to PREHEAT position (if required). (See Cold Temperature Starting on Page OI-27)

Turn the key to START [Figure OI-58] and release the key when the engine starts. It will return to the ON position.

Stop the engine if the warning lights and alarm do not go OFF. Check for the cause before starting the engine again.

Turn the key switch OFF to stop the engine.

IMPORTANT

Do not engage the starter for longer than 15 seconds at a time. Longer use can damage the starter by overheating. Allow starter to cool for one minute before using starter again.

I-2034-0700

! WARNING

AVOID INJURY OR DEATH

- Engines can have hot parts and hot exhaust gas. Keep flammable material away.
- Do not use machines in atmosphere containing explosive gas.

W-2051-1086

STARTING THE ENGINE (CONT'D)

Cold Temperature Starting

! WARNING

Do not use ether with glow plug (preheat) systems. Explosion can result which can cause injury, death, or severe engine damage.

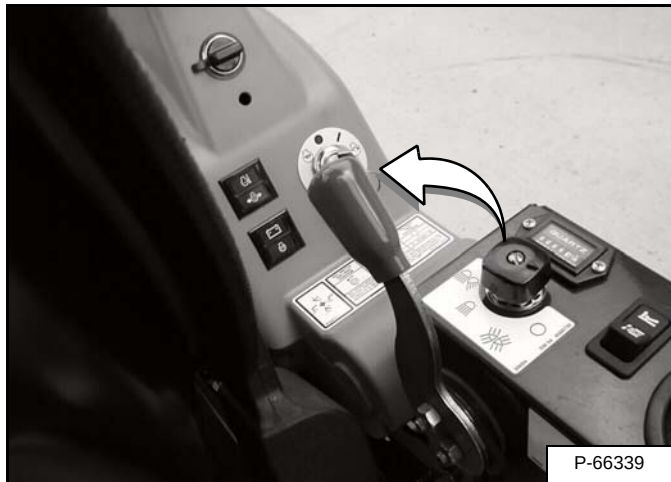
W-2071-0903

If the temperature is below freezing, perform the following to make starting the engine easier:

- Replace the engine oil with the correct type and viscosity for the anticipated starting temperature. (See ENGINE LUBRICATION SYSTEM on Page PM-15)
- Make sure the battery is fully charged:
- Install an engine heater, available from your Bobcat Loader dealer.

NOTE: If the battery is discharged (but not frozen) a booster battery can be used to jump start the excavator. (See Using A Booster Battery (Jump Starting) on Page PM-23)

Figure OI-59



P-66339

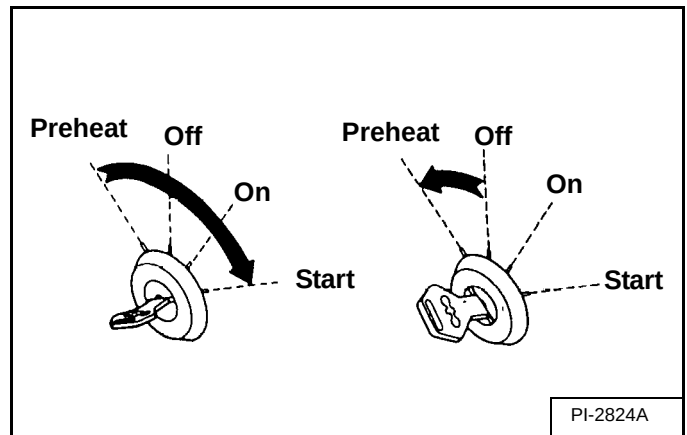
Push the speed control lever fully forward [Figure OI-59].

IMPORTANT

Do not engage the starter for longer than 15 seconds at a time. Longer use can damage the starter by overheating. Allow starter to cool for one minute before using starter again.

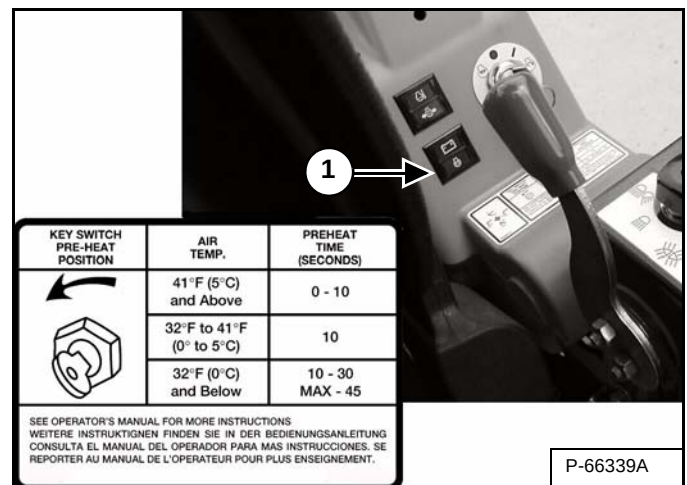
I-2034-0700

Figure OI-60



PI-2824A

Figure OI-61



P-66339A

Turn the key to PREHEAT [Figure OI-60]. The light (Item 1) [Figure OI-61] will come ON. Preheat the engine for 15 seconds maximum.

Turn the key to START [Figure OI-60] and release the key when the engine starts. It will return to the ON position.

When the engine speed increases, move the speed control lever to the low idle position.

Turn the key switch OFF to stop the engine [Figure OI-60].

STARTING THE ENGINE (CONT'D)

Warming The Hydraulic System



WARNING

During cold weather 32°F (0°C) and below, do not operate machine until the engine has run for at least five (5) minutes at less than half throttle. This warm-up period is necessary. Do not operate controls during warm-up period. When temperatures are below -20°F (30°C), the hydraulic oil must be heated or kept warm. The hydraulic system will not get enough oil at low temperatures. Park the machine in an area where the temperature will be above 0°F (-18°C), is possible.

W-2381-0700

Let the engine run for a minimum of 5 minutes to warm the engine and the hydraulic fluid before operating the excavator.

STOPPING THE ENGINE AND LEAVING THE EXCAVATOR

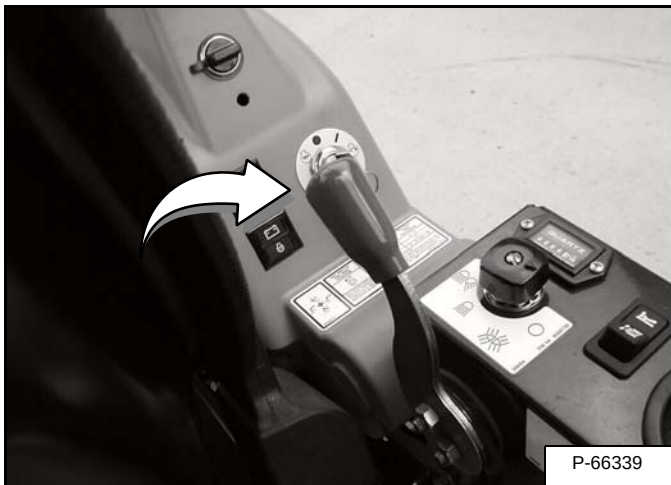
Procedure

Figure OI-62



Stop the machine on level ground. Lower the work equipment and the blade to the ground **[Figure OI-62]**.

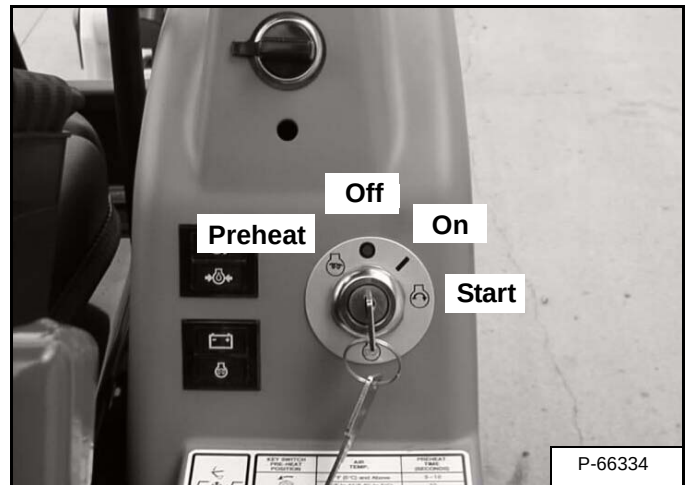
Figure OI-63



Move the speed control lever fully backward **[Figure OI-63]**.

Run the engine at idle speed for approximately 5 minutes to allow it to cool.

Figure OI-64



Turn the key switch OFF **[Figure OI-64]**.

Disconnect the seat belt.

Remove the key from the switch to prevent operation of machine by unauthorized personnel.

Exit machine.

STOPPING THE ENGINE AND LEAVING THE EXCAVATOR (CONT'D)

Emergency Exits

The right side rear window and the front window provide exits.

Right Side Rear Window

Figure OI-65



Slide the right side rear window to the front of the excavator and exit through the side window **[Figure OI-65]**.

Front Window

Figure OI-66



Open the front window and exit **[Figure OI-66]**.

NOTE: If the excavator has a Special Applications Kit installed, the front window is NOT an emergency exit.

ATTACHMENTS

Installing And Removing The Attachment

! WARNING

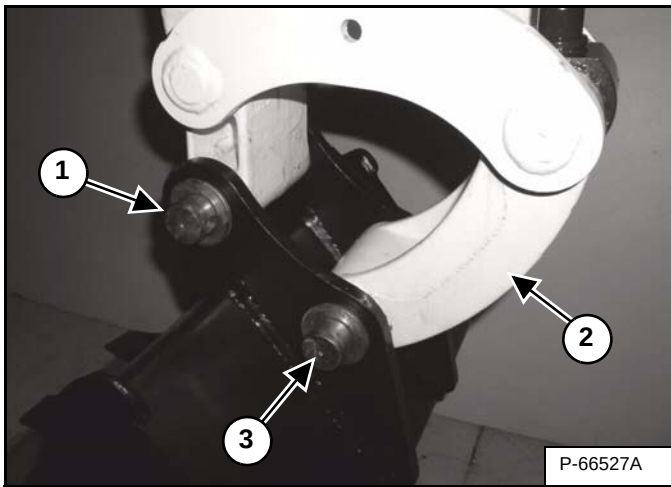
AVOID INJURY OR DEATH

Stop the machine on a firm flat surface. When removing or installing attachments (such as a bucket), always have a second person in the operator's seat, give clear signals and work carefully.

W-2140-0189

Installation

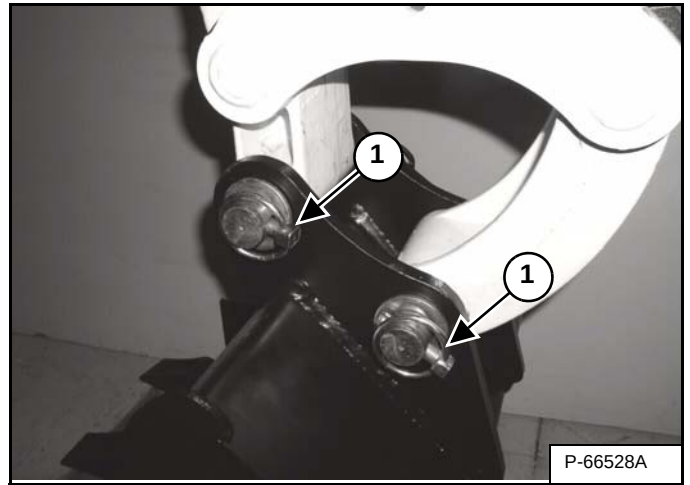
Figure OI-67



Install the arm into the bucket, align the hole, install the pivot pin and washer (Item 1) [Figure OI-67].

Install the link (Item 2) into the bucket, align the hole, install the pivot pin and washer (Item 3) [Figure OI-67].

Figure OI-68



Install the fasteners (Item 1) [Figure OI-68]. Add grease to the pivot.

Removal

Park the excavator on a flat surface and put the bucket on the ground.

Remove the fasteners (Item 1) [Figure OI-68].

Remove the washers and the pivot pins (Item 1 and 3) [Figure OI-67].

Do not damage the dust seals in the arm.

! WARNING

Never use attachments or buckets which are not approved by Bobcat Company. Buckets and attachments for safe loads of specified densities are approved for each model. Unapproved attachments can cause injury or death.

W-2052-0500

OPERATING PROCEDURE

Inspect The Work Area

Before beginning operation, inspect the work area for unsafe conditions.

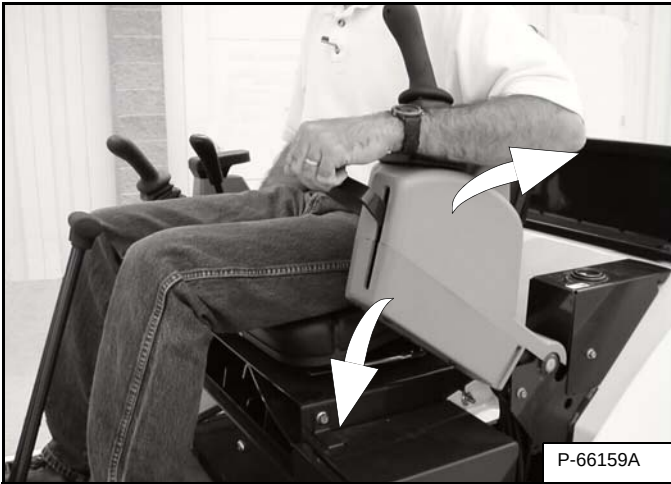
Look for sharp drop-offs or rough terrain. Have underground utility lines (gas, water, sewer, irrigation, etc.) located and marked.

Remove objects or other construction material that could damage the excavator or cause personal injury.

Lowering The Work Equipment (Engine STOPPED)

The hydraulic control levers control the movement of the boom, arm, bucket and upperstructure slew functions.

Figure OI-69



The joystick lock switch disengages the hydraulic control functions from the joysticks when the console(s) are raised [Figure OI-69].

NOTE: If the engine stops, the boom/bucket (attachments) can be lowered to the ground using hydraulic pressure in the accumulator.

The control console(s) must be in the locked down position, and the key switch in the ON position.

Use the control lever to lower the boom.

Lower the control console(s) to engage the hydraulic control functions of the joysticks [Figure OI-69].

Operating On Public Roads

When operating on a public road or highway, always follow local regulations. For example: A slow moving vehicle (SMV) sign, or direction signals may be required.

Check with utility companies for underground electrical, water, gas lines, etc. Work slowly in areas of underground utilities.

Run the engine at low idle speed to warm the engine and hydraulic system before operating the excavator.

IMPORTANT

Machines warmed up with moderate engine speed and light load have longer life.

I-2015-0284

OPERATING PROCEDURE (CONT'D)

Lifting A Load

Do not exceed the Rated Lift Capacity. (See LIFT CHART - STANDARD ARM (7111724) on Page MST-4) or (See LIFT CHART - LONG ARM (7111984) on Page MST-6)

! WARNING

AVOID INJURY OR DEATH

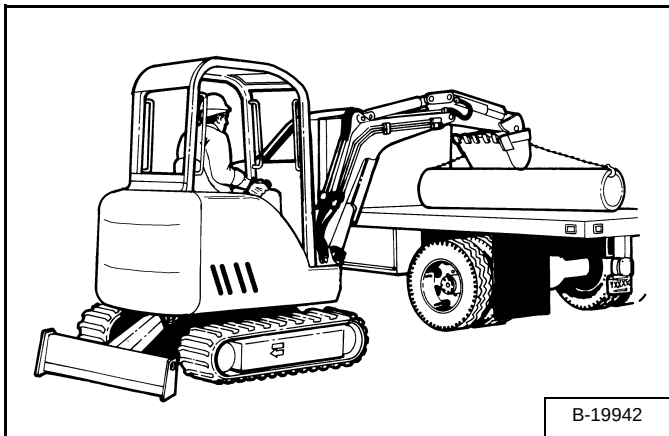
Do not exceed rated lift capacity. Excessive load can cause tipping or loss of control.

W-2374-0500

Extend the bucket cylinder completely and lower the boom to the ground. Stop the engine.

Wrap the chain assembly around the bucket mounting plate.

Figure OI-70



Make sure the load is evenly weighted and centered on the lifting chain, and is secured to prevent the load from shifting [Figure OI-70].

Lift and position the load. Once the load is in position and tension is removed from the lift chain (secondary lift system), remove the secondary lift system.

! WARNING

AVOID INJURY OR DEATH

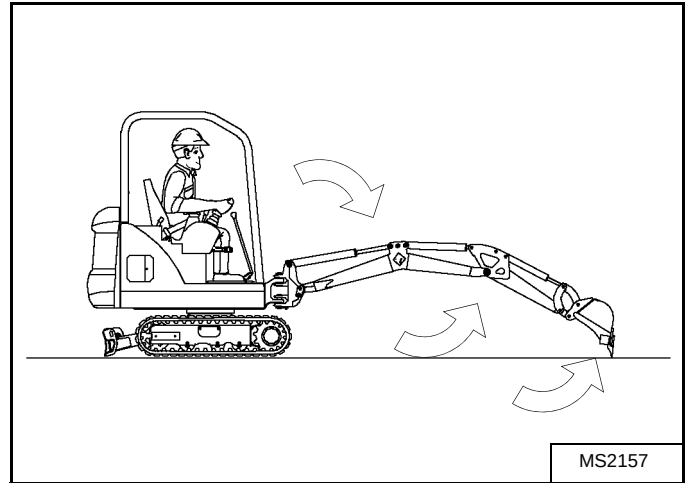
Check area to be excavated for overhead or underground lines such as electrical, gas, oil, water, etc. CALL 1-888-258-0808 and consult local utilities before digging. Extreme caution must be used in areas where utility lines are present.

W-2116-0903

Excavating

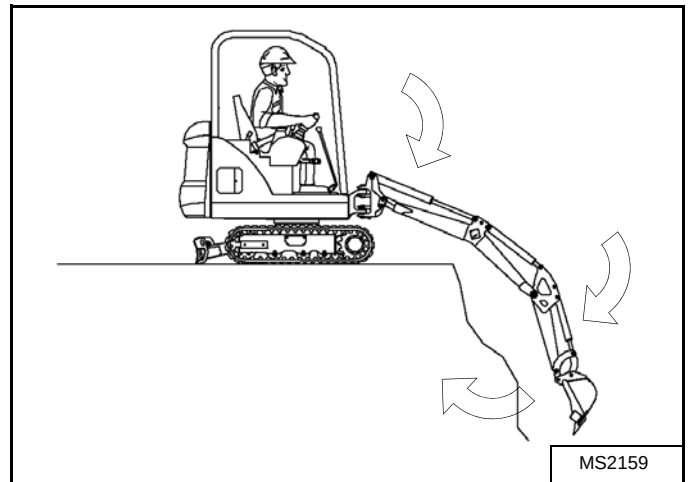
Lower the blade to provide stability.

Figure OI-71



Extend the arm, lower the boom, and open the bucket [Figure OI-71].

Figure OI-72

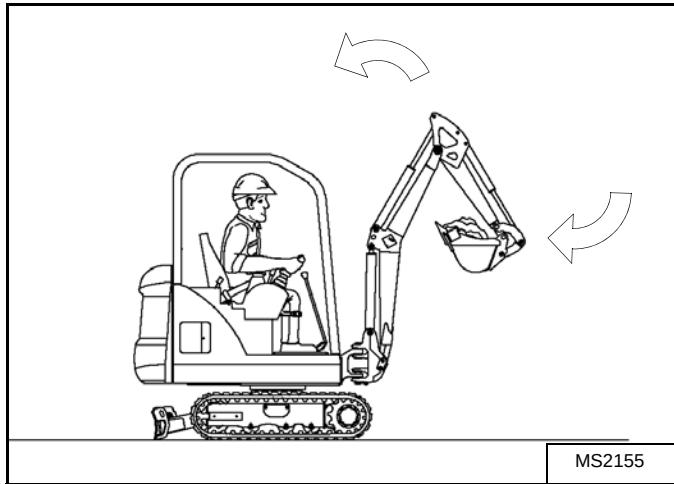


Retract the arm, while lowering boom and curling the bucket [Figure OI-72].

OPERATING PROCEDURE (CONT'D)

Excavating (Cont'd)

Figure OI-73



Raise the boom, retract the arm and curl the bucket [Figure OI-73].

Rotate the upperstructure. (See Upperstructure Slew Lock on Page OI-5)

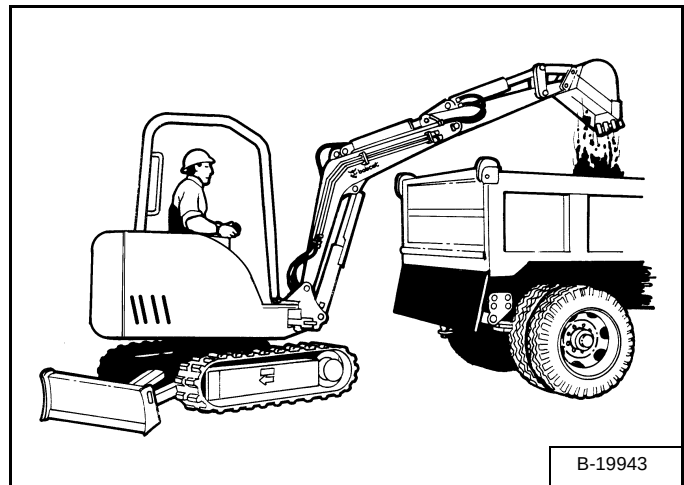
NOTE: Do not allow the bucket teeth to contact the ground when slewing the upperstructure.

WARNING

Keep all bystanders 20 feet (6 m) away from equipment when operating. Contact with moving parts, a trench cave-in or flying objects can cause injury or death.

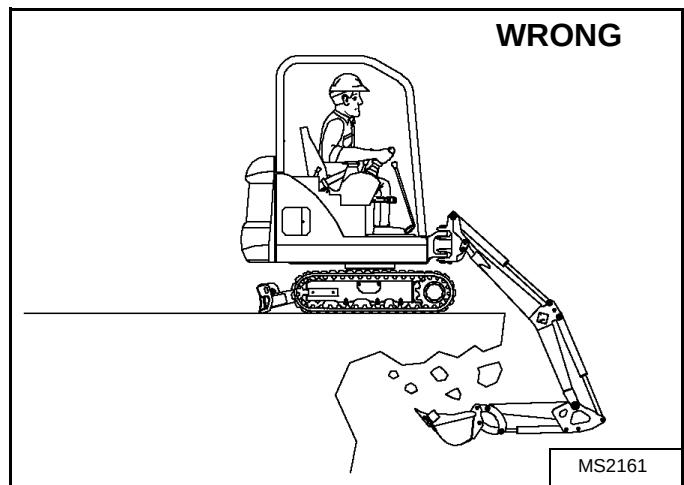
W-2119-0788

Figure OI-74



Extend the arm and uncurl the bucket to dump the material into a pile or truck [Figure OI-74].

Figure OI-75



Do not dig under the excavator [Figure OI-75].

Do not use the bucket as a breaker or pile driver. It is better to excavate hard or rocky ground after breaking it with other equipment. This will reduce damage to the excavator.

Do not move the excavator while the bucket is in the ground.

OPERATING PROCEDURE (CONT'D)

Boom Swing

Figure OI-76

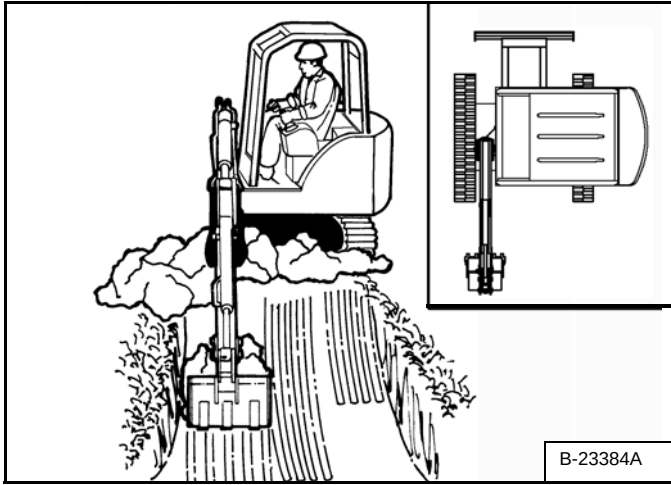


Figure OI-77

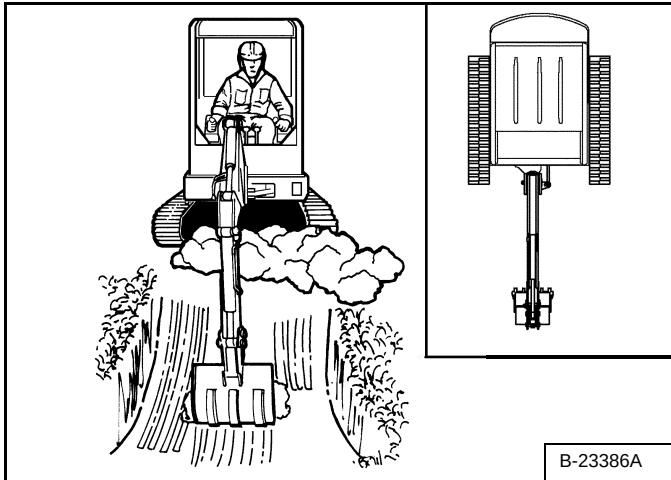
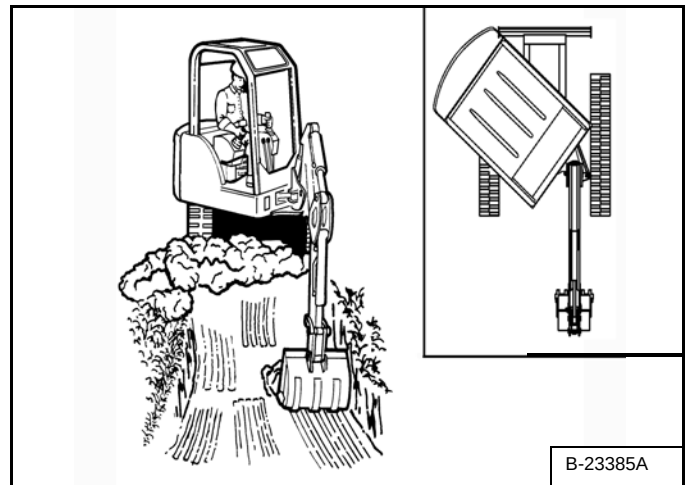
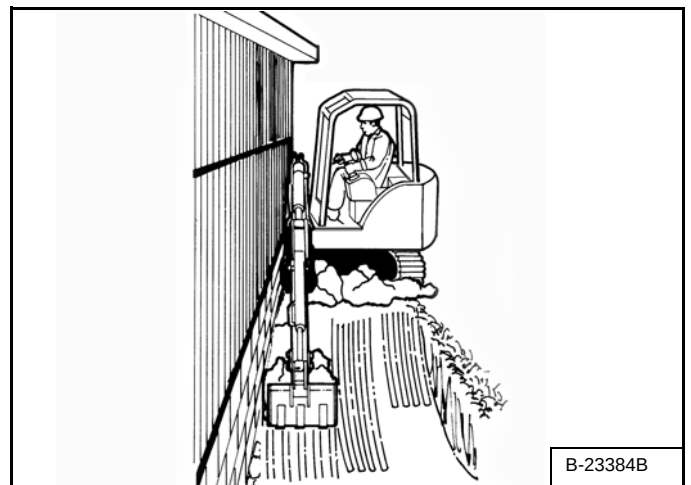


Figure OI-78



Slew the upperstructure, offset the boom to the left [Figure OI-76], center [Figure OI-77] and right [Figure OI-78] to dig a square hole the width of the machine without repositioning the excavator.

Figure OI-79

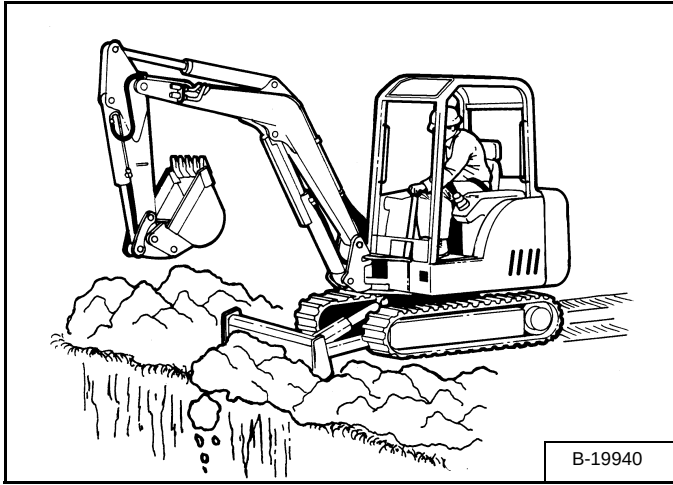


The boom offset allows the operator to dig close to buildings and other structures [Figure OI-79].

OPERATING PROCEDURE (CONT'D)

Backfilling

Figure OI-80



Use the blade to backfill the trench or hole after excavating **[Figure OI-80]**.

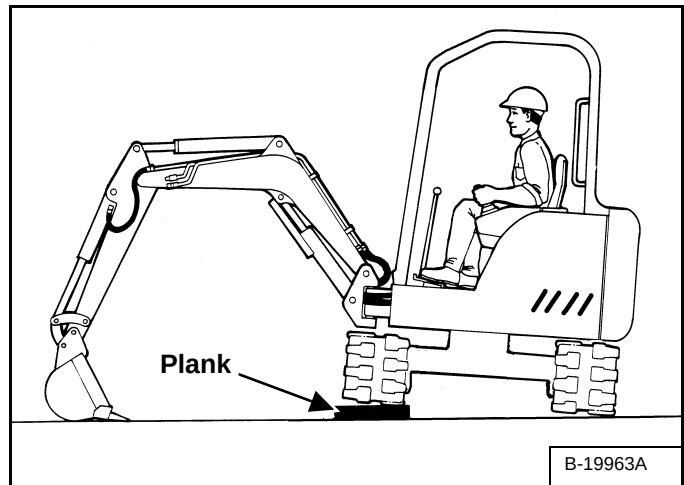
Driving The Excavator

When operating on uneven ground, operate as slow as possible and avoid sudden changes in direction.

Avoid traveling over objects such as rocks, trees, stumps, etc.

When working on wet or soft ground, put planks on the ground to provide a solid base to travel on and prevent the excavator from getting stuck.

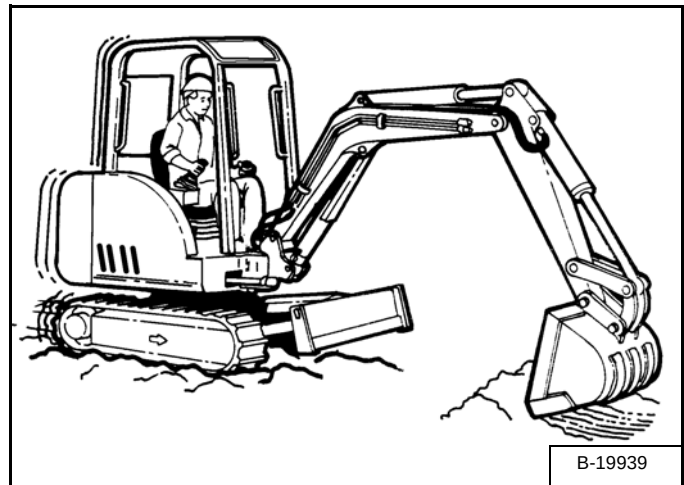
Figure OI-81



If one or both tracks have become stuck in soft or wet ground, raise one track at a time by turning the upperstructure and pushing the bucket against the ground **[Figure OI-81]**.

Put planks under the tracks and drive the excavator to dry ground.

Figure OI-82



The bucket may also be used to pull the excavator. Raise the blade, extend the arm and lower the boom. Operate the boom and arm in a digging manner **[Figure OI-82]**.

OPERATING PROCEDURE (CONT'D)

Operating On Slopes

! WARNING

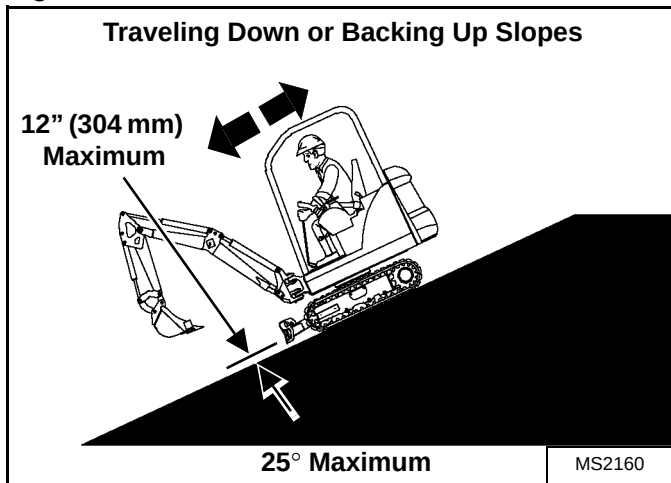
AVOID INJURY OR DEATH

- Do not travel across or up slopes that are over 15 degrees.
- Do not travel down or back up slopes that exceed 25 degrees.
- Look in the direction of travel.

W-2497-0304

When going down a slope, control the speed with the steering levers and the speed control lever.

Figure OI-83



When traveling down or backing up grades that exceed 15 degrees, put the machine in the position shown, and run the engine slowly [Figure OI-83].

Operate as slow as possible and avoid sudden changes in lever direction.

Avoid traveling over objects such as rocks, trees, stumps, etc.

Stop the machine before moving the upper equipment controls. Never allow the blade to strike a solid object. Damage to the blade or hydraulic cylinder can result.

! WARNING

AVOID INJURY OR DEATH

- Avoid steep areas or banks that could break away.
- Keep boom centered and attachments as low as possible when traveling on slopes or in rough conditions. Look in the direction of travel.
- Always fasten seat belt.

W-2498-0304

Figure OI-84

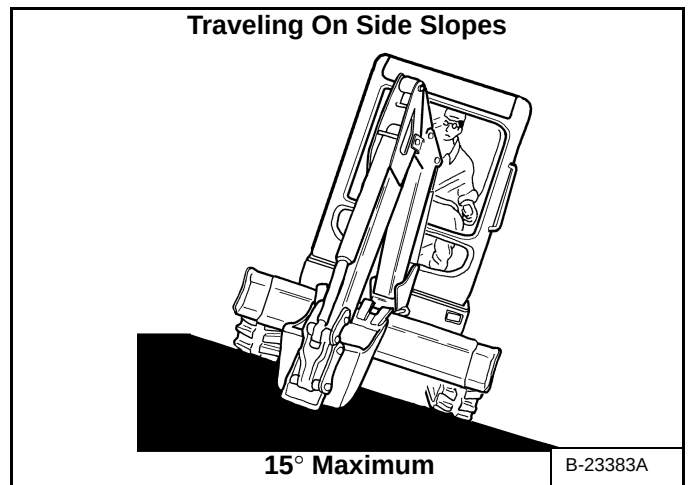
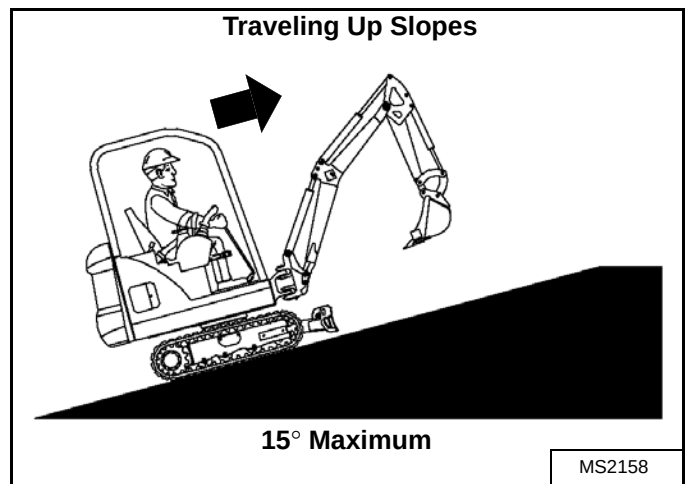


Figure OI-85

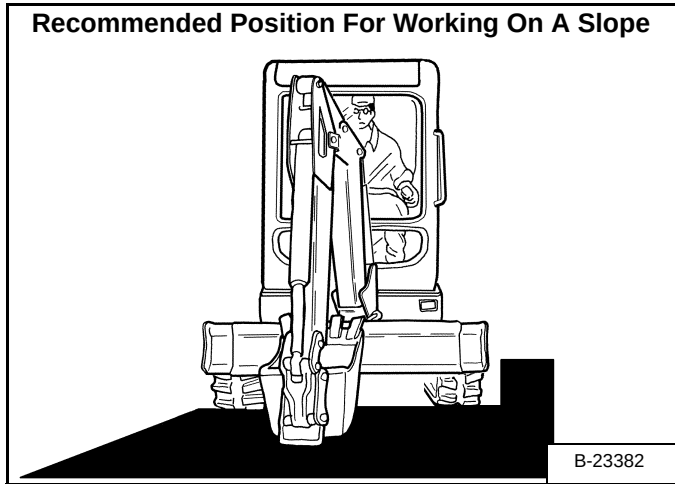


When traveling up slopes or on side slopes that are 15 degrees or less, position the machine as shown and run the engine slow [Figure OI-84] & [Figure OI-85].

OPERATING PROCEDURE (CONT'D)

Operating On Slopes (Cont'd)

Figure OI-86



When operating on a slope, level the work area before beginning [Figure OI-86].

If this is not possible, the following procedures should be used:

Do not work on slopes which are over 15 degrees.

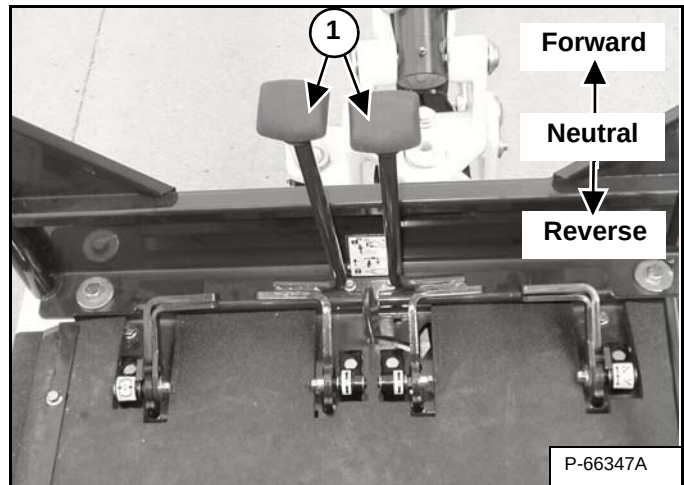
Use a slow work cycle.

Avoid working with the tracks across the slope. This will reduce stability and increase the tendency for the machine to slide. Position the excavator with the blade downhill and lowered.

Avoid swinging or extending the bucket more than necessary in a down hill direction. When you must swing the bucket downhill, keep the arm low and skid the bucket downhill.

When working with the bucket on the uphill side, keep the bucket as close to the ground as possible. Dump the spoil far enough away from the trench or hole to prevent the possibility of a cave in.

Figure OI-87



To brake the machine when going down a slope, move the steering levers (Item 1) [Figure OI-87] to the **NEUTRAL** position. This will engage the hydraulic braking.

When the engine stops on a slope, move the steering levers to the neutral position. Lower the boom/bucket to the ground.

NOTE: If the engine stops, the boom/bucket (attachments) can be lowered to the ground using hydraulic pressure in the accumulator.

The console must be in the locked down position, and the key switch in the ON position.

Use the control lever to lower the boom.

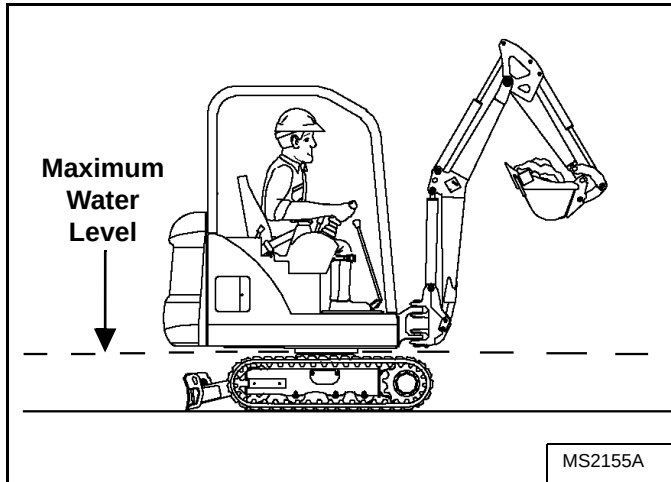
Start the engine and resume operation.

OPERATING PROCEDURE (CONT'D)

Operating In Water

Mud and water should be removed from the machine before parking. In freezing temperatures, park the machine on boards or concrete to prevent the track or undercarriage from freezing to the ground and preventing machine movement.

Figure OI-88



Do not operate or immerse the excavator in water higher than the bottom of the swing bearing [Figure OI-88].

Grease the excavator when it has been operated or immersed in water for a period of time. Greasing forces the water out of the lubrication areas.

Water must be removed from the cylinder rods. If water freezes to the cylinder rod, the cylinder seals can be damaged when the rod is retracted.

Avoiding Track Damage

Mud and water should be removed from the machine before parking. In freezing temperatures, park the machine on boards or concrete to prevent the track or undercarriage from freezing to the ground and preventing machine movement.

TOWING THE EXCAVATOR

Procedure

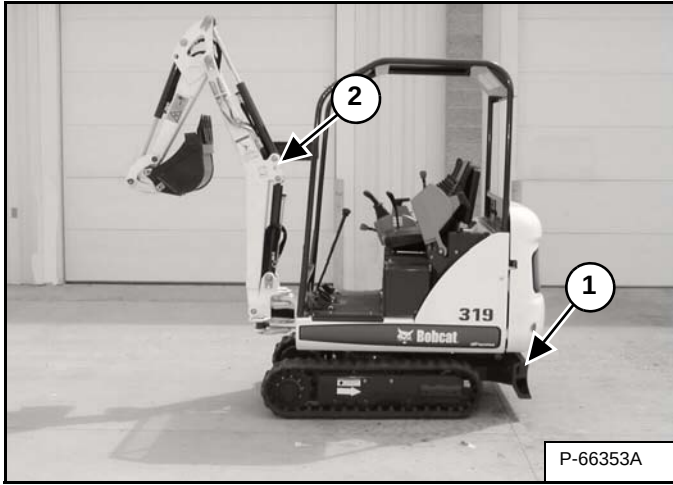
There is not a recommended towing procedure for the excavators.

- The excavator can be lifted onto the transport vehicle.
- The excavator can be skidded a short distance move for service (EXAMPLE: Move onto a transport vehicle) without damage to the hydraulic system. (The tracks will not turn.) There might be slight wear to the tracks when the excavator is skidded.
- The towing chain (or cable) must be rated at 1 & 1/2 times the weight of the excavator. (See Performance on Page SPEC-5)

LIFTING THE EXCAVATOR

Procedure

Figure OI-89



Fully extend the bucket and arm cylinders, and fully retract the boom cylinder so that the excavator is in the position shown [Figure OI-89].

Engage the upperstructure slew lock. (See Upperstructure Slew Lock on Page OI-5)

Raise the blade all the way.

Put all the control levers in neutral.

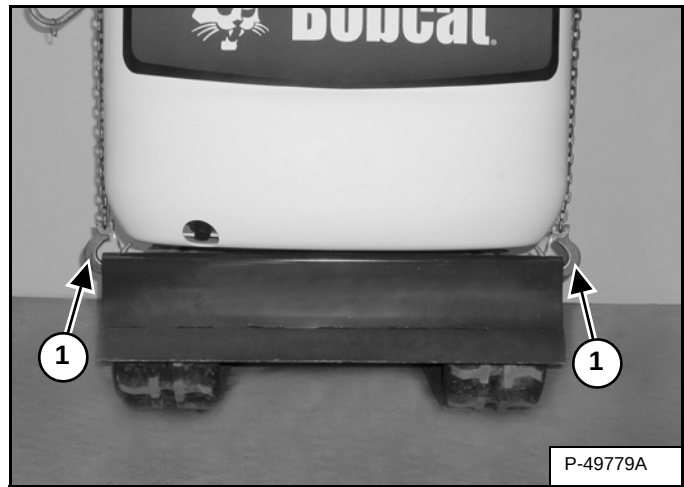
WARNING

AVOID INJURY OR DEATH

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

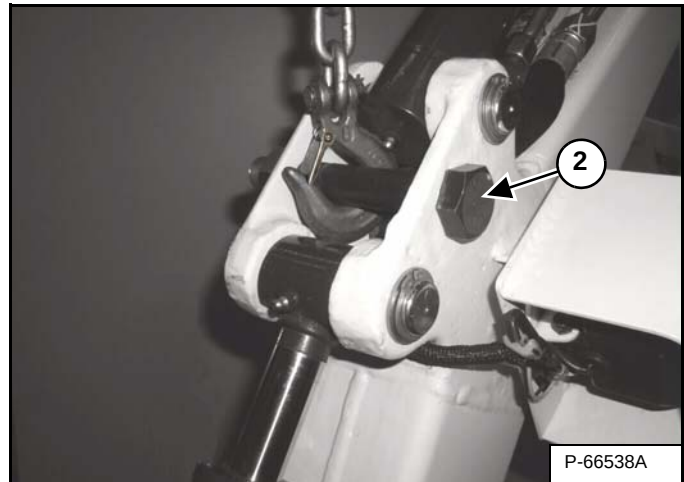
W-2202-0595

Figure OI-90



Fasten chains to the ends of the blade (Item 1) [Figure OI-89] and [Figure OI-90] and up to a lifting fixture above the canopy/cab. The lifting fixture must extend over the sides of the canopy/cab to prevent the chains from hitting the ROPS/TOPS.

Figure OI-91



Install a one inch (25 mm) bolt and nut (Grade 5 or 8) through the holes at the boom (Item 2) [Figure OI-89] and [Figure OI-91]. Fasten a chain from the bolt to the lift fixture.

TRANSPORTING THE EXCAVATOR ON A TRAILER

Loading And Unloading

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

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

Remove the blade extensions (If equipped). (See **BLADE EXTENSION** on Page PM-34)

Retract the track frame if required. (See **TRACK FRAME EXPANSION** on Page OI-18)

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

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

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

Determine the direction of the track movement before moving the machine (blade forward). Engage the upperstructure slew lock (See **Upperstructure Slew Lock** on Page OI-5)

Figure OI-92



Move the machine forward onto the transport vehicle **[Figure OI-92]**.

Do not change direction of the machine while it is on the ramps.

Lower the boom, arm, bucket and blade to the transport vehicle.

Stop the engine and remove the key.

Put blocks under the front and rear of the tracks.

Fastening

Figure OI-93



Figure OI-94



Fasten chains to the front corners of the blade and to the tie down loop at the rear **[Figure OI-93]** & **[Figure OI-94]** to prevent it from moving when going up or down slopes, or during sudden stops.

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

WARNING

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

W-2058-0494



PREVENTIVE MAINTENANCE

AIR CLEANER SERVICE	PM-10
Daily Check	PM-10
Replacing Filter Elements	PM-10
ALTERNATOR BELT	PM-32
Belt Adjustment	PM-32
BLADE EXTENSION	PM-34
Description	PM-34
Installing And Removing	PM-34
CAB FILTERS	PM-9
Cleaning And Maintenance	PM-9
CONTROL CONSOLE LOCKOUTS	PM-6
Inspection And Maintenance	PM-6
ENGINE COOLING SYSTEM	PM-17
Cleaning	PM-17
Checking Level	PM-17
Removing And Replacing Coolant	PM-18
ELECTRICAL SYSTEM	PM-20
Description	PM-20
Battery Maintenance	PM-22
Fuse And Relay Location / Identification	PM-20
Fuel Timer And Diode Location / Identification	PM-21
Removing And Installing Battery	PM-24
Using A Booster Battery (Jump Starting)	PM-23
ENGINE LUBRICATION SYSTEM	PM-15
Checking And Adding Engine Oil	PM-15
Engine Oil Chart	PM-15
Removing And Replacing Oil And Filter	PM-16
EXCAVATOR STORAGE AND RETURN TO SERVICE	PM-39
Return to Service	PM-39
Storage	PM-39

PREVENTIVE MAINTENANCE (PM)

Continued On Next Page

PREVENTIVE MAINTENANCE (CONT'D)

FUEL SYSTEM	PM-12
Draining The Fuel Tank	PM-13
Filling The Fuel Tank	PM-12
Fuel Filters	PM-13
Fuel Specifications	PM-12
Replacing Elements	PM-13
Removing Air From The Fuel System	PM-14
HYDRAULIC SYSTEM	PM-25
Checking And Adding Fluid	PM-25
Hydraulic Fluid Chart	PM-25
Removing And Replacing Hydraulic Filter	PM-26
Removing And Replacing Hydraulic Fluid	PM-26
LUBRICATING THE EXCAVATOR	PM-35
Lubrication Locations	PM-35
MAINTENANCE SAFETY	PM-3
SEAT BELT	PM-7
Inspection And Maintenance	PM-7
SERVICE SCHEDULE	PM-5
Chart	PM-5
SPARK ARRESTOR MUFFLER	PM-28
Cleaning Procedure	PM-28
TAILGATE	PM-8
Adjusting The Bumper	PM-8
Adjusting The Latch	PM-8
Opening And Closing	PM-8
TRACK TENSION	PM-29
Adjusting	PM-29
TRACK ROLLER AND IDLER LUBRICATION	PM-35
Procedure	PM-35
TRAVEL MOTOR	PM-31
Checking And Adding Oil	PM-31
Removing And Replacing Oil	PM-31

MAINTENANCE SAFETY



WARNING

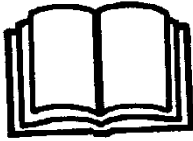
Instructions are necessary before operating or servicing machine. Read and understand the Operation & Maintenance Manual, Operator's Handbook and signs (decals) on machine. Follow warnings and instructions in the manuals when making repairs, adjustments or servicing. Check for correct function after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

CORRECT



B-10731A

- ⚠ Never service the Bobcat Compact Excavator without instructions.

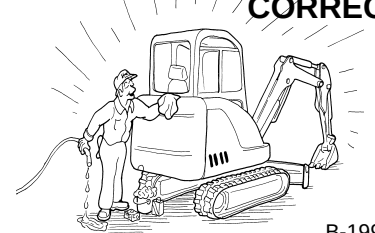
CORRECT



B-19964

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

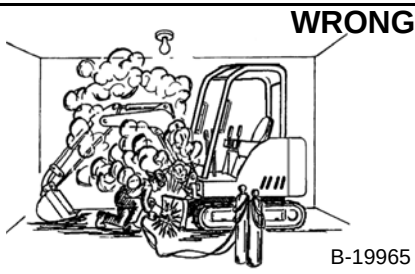
CORRECT



B-19959

- ⚠ Cleaning and maintenance are required daily.

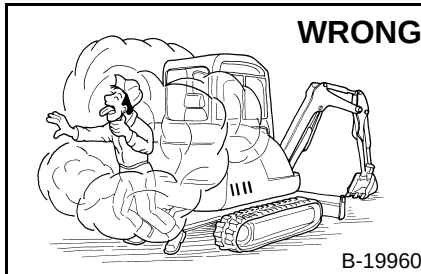
WRONG



B-19965

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

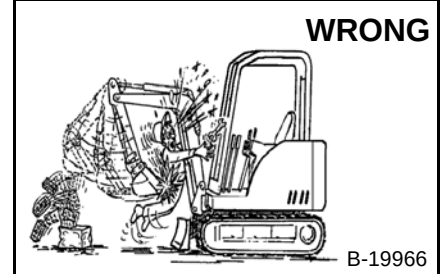
WRONG



B-19960

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

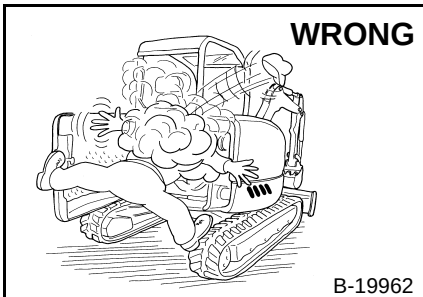
WRONG



B-19966

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

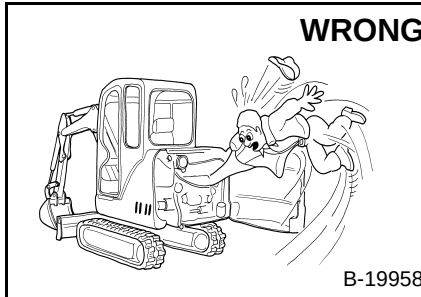
WRONG



B-19962

- ⚠ Stop, cool and clean engine of flammable materials before checking fluids.
- ⚠ Never service or adjust machine with the engine running unless instructed to do so in the manual.
- ⚠ Avoid contact with leaking hydraulic fluid or diesel fuel under pressure. It can penetrate the skin or eyes.
- ⚠ Never fill fuel tank with engine running, while smoking, or when near open flame.

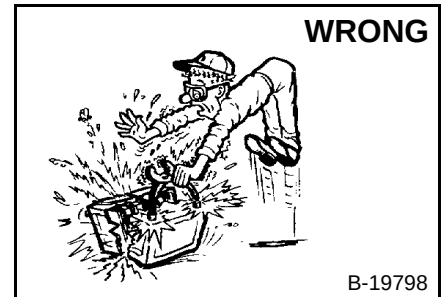
WRONG



B-19958

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

WRONG



B-19798

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

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

MSW28-0805



Bobcat®

SERVICE SCHEDULE

Chart

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



WARNING

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

W-2003-0903

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

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

CONTROL CONSOLE LOCKOUTS

Inspection And Maintenance

Figure PM-1



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

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

Figure PM-2



When either console is raised **[Figure PM-1]** & **[Figure PM-2]**, the hydraulic control levers (joysticks) and traction system must not function.

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

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

Move the joystick control levers. There should be no movement of the boom, arm, slew or bucket.

Move the steering control levers. There should be no movement of the excavator tracks.

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

SEAT BELT

Inspection And Maintenance

WARNING

Failure to properly inspect and maintain the seat belt can cause lack of operator restraint resulting in serious injury or death.

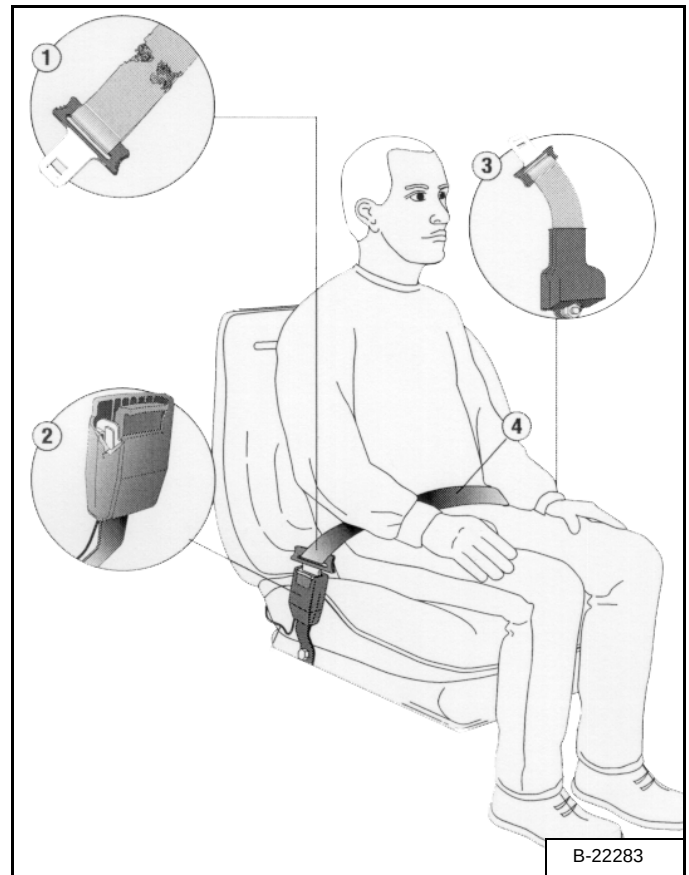
W-2466-0703

Check the seat belt daily for correct function.

Inspect the seat belt system thoroughly yearly or more often if the machine is exposed to severe environmental conditions or applications.

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

Figure PM-3



The items below are referenced in **[Figure PM-3]**.

1. Check the seat belt webbing. If the system is equipped with a retractor, pull the webbing completely out and inspect the full length of the webbing. Look for cuts, wear, fraying, dirt and stiffness.
2. Check the buckle and latch for proper function. Make sure latch plate is not excessively worn, deformed or buckle is not damaged.
3. Check the retractor web storage device (if equipped) by extending the seat belt webbing to determine if it extends and retracts the webbing correctly.
4. Check webbing in areas exposed to ultraviolet (UV) rays from the sun or extreme dust or dirt. If the original color of the webbing in these areas is extremely faded and / or the webbing is packed with dirt, the webbing strength may have weakened.

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

TAILGATE

Opening And Closing

! WARNING

AVOID INJURY OR DEATH

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

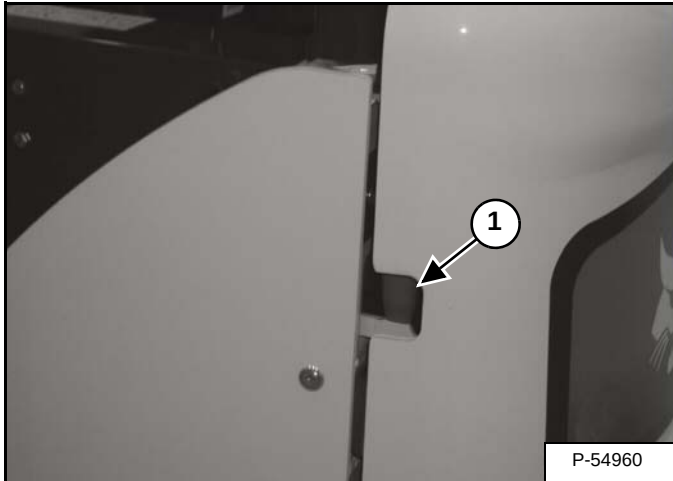
W-2012-0497

! WARNING

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

W-2020-1285

Figure PM-4



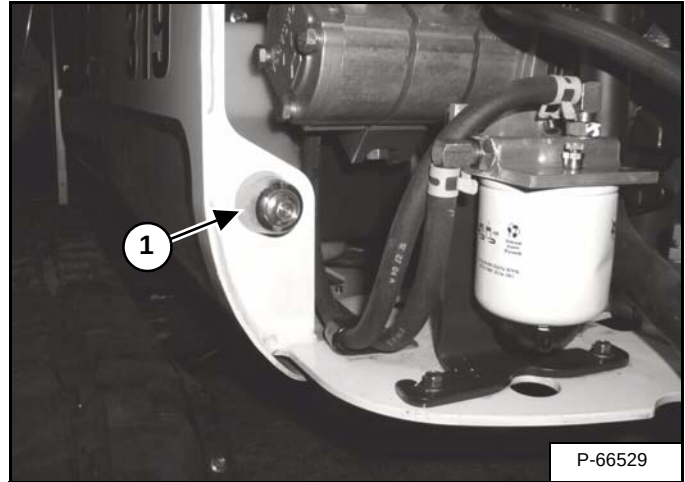
Release the latch (Item 1) [Figure PM-4] and pull the tailgate open.

Push firmly to close the tailgate.

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

Adjusting The Bumper

Figure PM-5

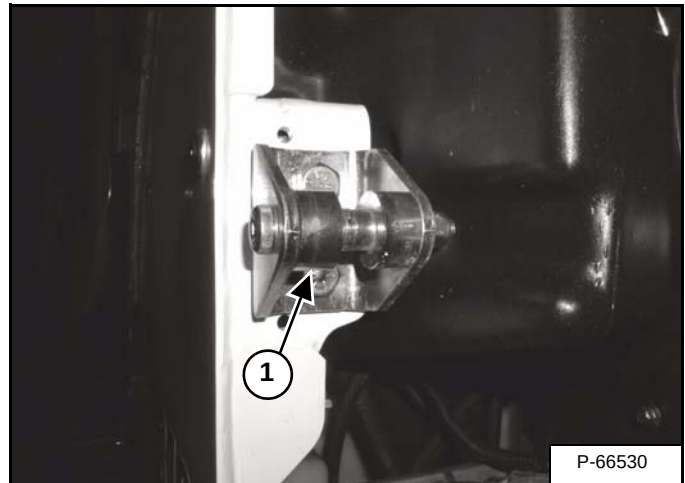


The door bumper (Item 1) [Figure PM-5] can be adjusted for alignment with the tailgate.

Close the tailgate before operating the excavator.

Adjusting The Latch

Figure PM-6



The door latch (Item 1) [Figure PM-6] can be adjusted by loosening the two bolts, moving the latch, and tightening the two bolts.

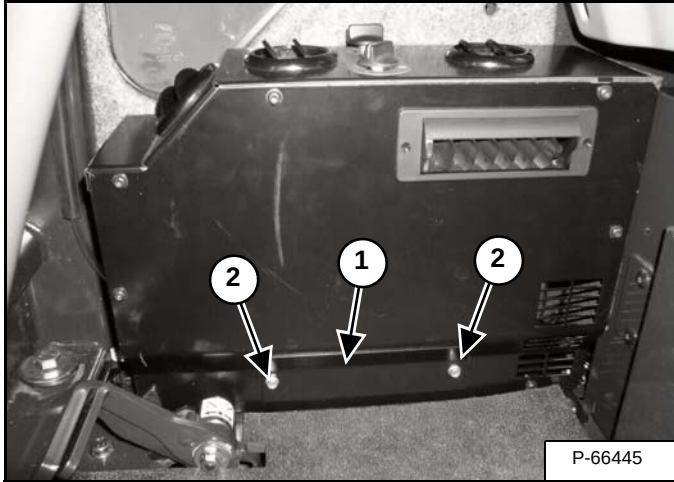
Close the tailgate before operating the excavator.

CAB FILTERS

Cleaning And Maintenance

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

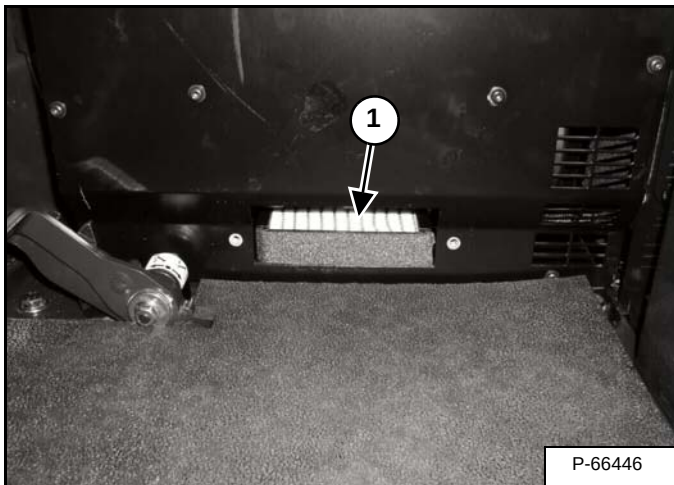
Figure PM-7



The cab filter is located on the lower side of the heater panel (Item 1) **[Figure PM-7]**.

Remove the 2 bolts (Item 2) **[Figure PM-7]** and remove the panel.

Figure PM-8



Remove the filter (Item 1) **[Figure PM-8]**. Shake the filter or use low air pressure to remove debris. Replace the filter after 3 cleanings or if the filter becomes too dirty to clean or damaged.

Reinstall the filter, cover and bolts.

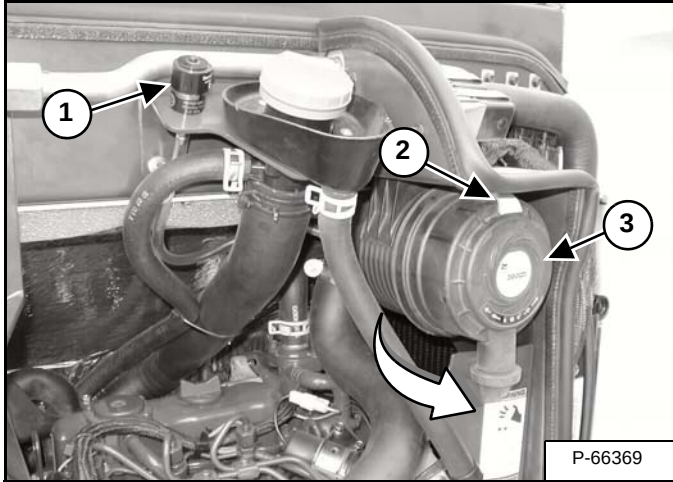
The filter must be cleaned regularly.

AIR CLEANER SERVICE

See the SERVICE SCHEDULE for the correct service interval. (See SERVICE SCHEDULE on Page PM-5)

Daily Check

Figure PM-9



Check the condition indicator (Item 1) **[Figure PM-9]**. If the red ring shows in the condition indicator, the filter needs to be replaced.

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

Replacing Filter Elements

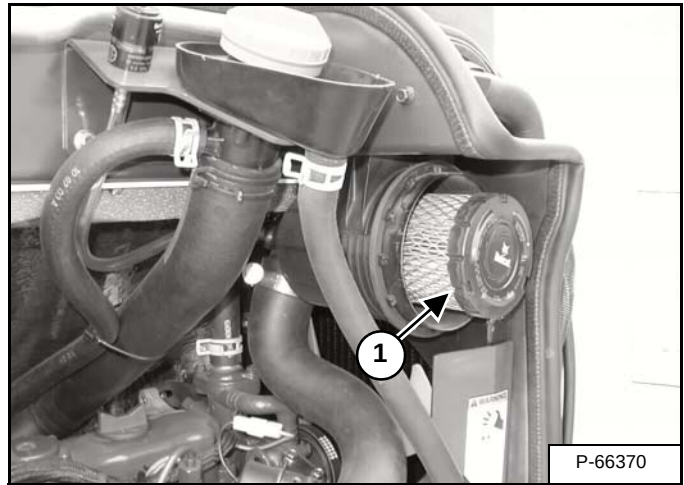
Outer Filter

Pull the locking tab (Item 2) **[Figure PM-9]**.

Turn the dust cup (Item 3) **[Figure PM-9]** counter-clockwise about 1/8 turn.

Remove and clean the dust cup.

Figure PM-10



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

Check the housing for damage.

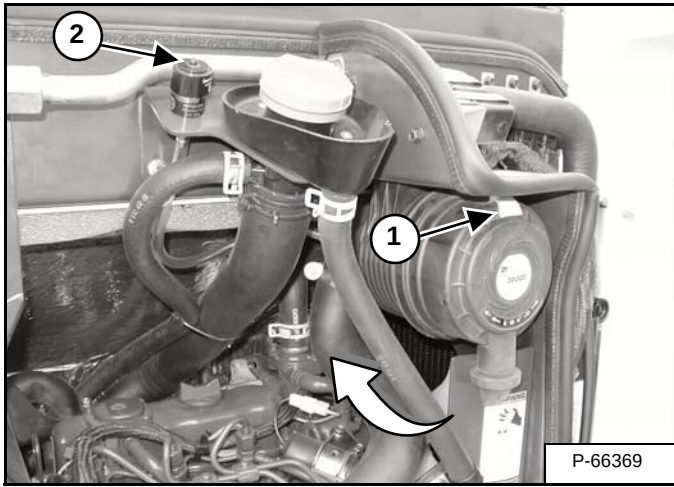
Clean the housing and the seal surface. DO NOT use compressed air.

Install a new outer filter.

AIR CLEANER (CONT'D)

Replacing Filter Elements (Cont'd)

Figure PM-11



Install the dust cup and turn about 1/8 turn clockwise [Figure PM-11].

Push locking tab in (Item 1) [Figure PM-11].

After the outer filter has been replaced, press the button (Item 2) [Figure PM-11] on the top of the condition indicator and start the engine. Run at full RPM, then reduce engine speed and stop the engine. If the red ring shows in the condition indicator, replace the inner filter.

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

Inner Filter

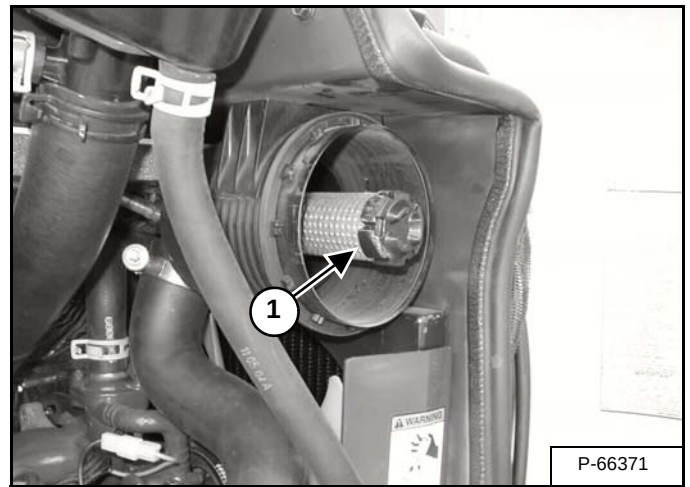
Only replace the inner filter under the following conditions:

- Replace the inner filter every *third* time the outer filter is replaced.
- After the outer filter has been replaced, press the button (Item 2) [Figure PM-11] on the top of the condition indicator and start the engine. Run at full RPM, then reduce engine speed and stop the engine. If the red ring shows in the condition indicator, replace the inner filter.

Remove the dust cup, outer filter and inner filter.

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

Figure PM-12



Install the new inner filter (Item 1) [Figure PM-12].

Install the outer filter and the dust cup.

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

FUEL SYSTEM

Fuel Specifications

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

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

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

Contact your fuel supplier for local recommendations.



WARNING

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

W-2063-0887



WARNING

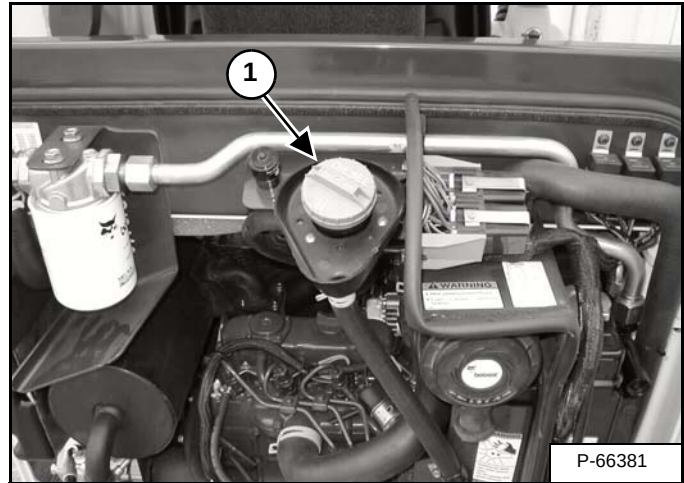
Always clean up spilled fuel or oil. Keep heat, flames, sparks or lighted tobacco away from fuel and oil. Failure to use care around combustibles can cause explosion or fire which can result in injury or death.

W-2103-1285

Filling The Fuel Tank

Open the tailgate.

Figure PM-13



Remove the fuel fill cap (Item 1) [Figure PM-13].

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

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

See the SERVICE SCHEDULE for the service interval when to remove water from or replace the fuel filter.(See SERVICE SCHEDULE on Page PM-5)

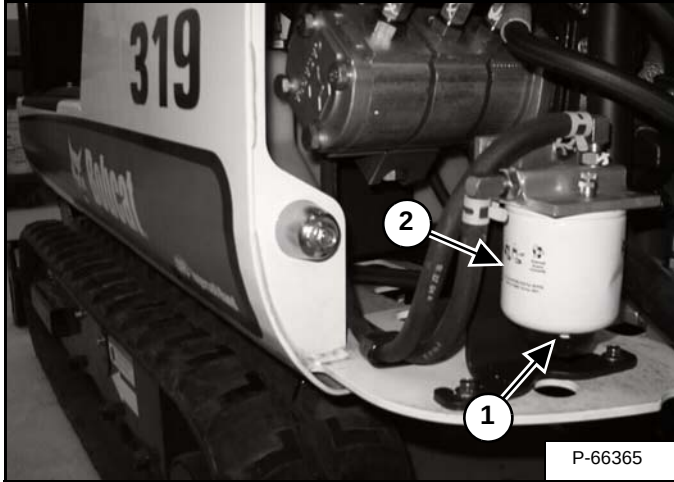
FUEL SYSTEM (CONT'D)

Fuel Filters

Removing Water

Open the tailgate.

Figure PM-14



Loosen the drain (Item 1) **[Figure PM-14]** at the bottom of the filter to drain water from the filter.

Replacing Elements

Remove the filter (Item 2) **[Figure PM-14]**.

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

Remove the air from the fuel system. (See Removing Air From The Fuel System on Page PM-14)

Draining The Fuel Tank

See the SERVICE SCHEDULE for the correct service interval. (See SERVICE SCHEDULE on Page PM-5)

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

Figure PM-15

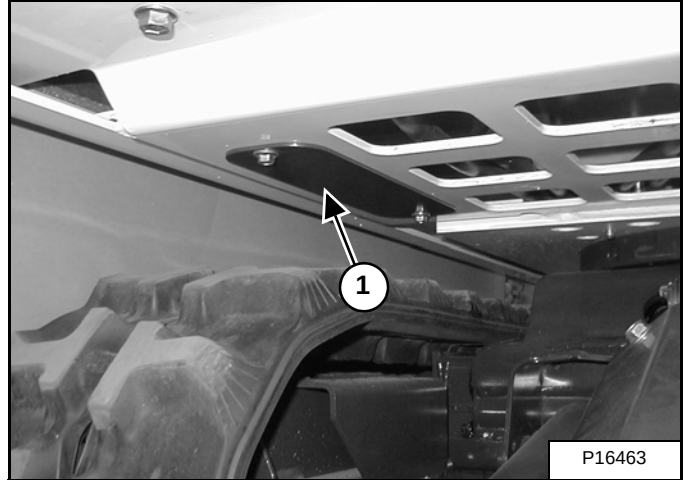
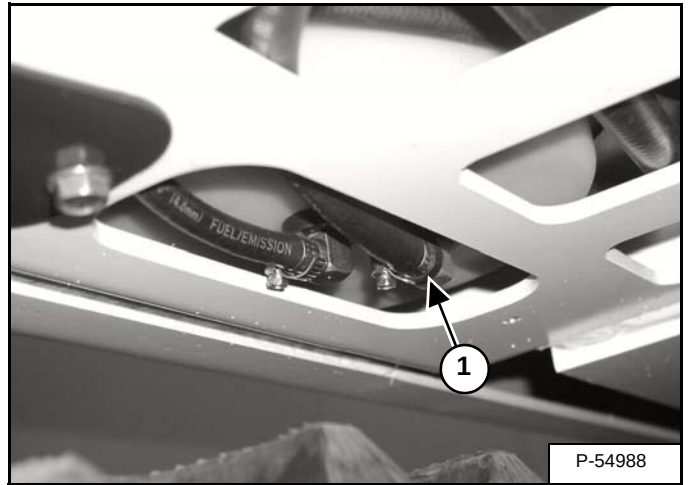


Figure PM-16



Remove the access panel (Item 1) **[Figure PM-15]** on the bottom of the engine compartment. Loosen the clamp (Item 1) **[Figure PM-16]** and disconnect the fuel hose.

Drain the fuel into a container.

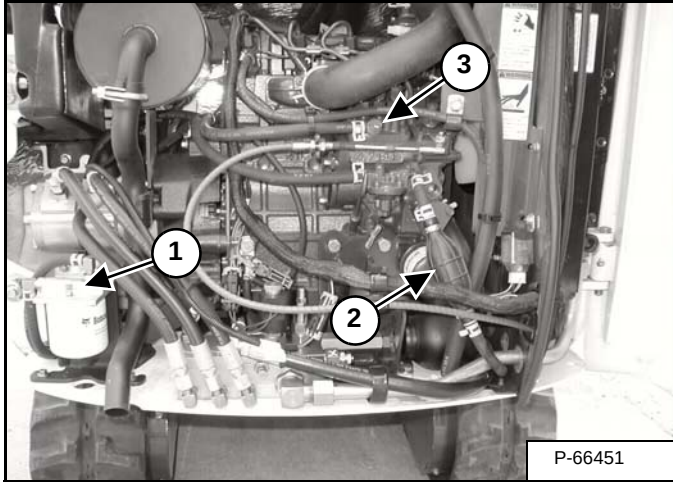
Reuse, recycle or dispose of fuel in an environmentally safe manner.

FUEL SYSTEM (CONT'D)

Removing Air From The Fuel System

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

Figure PM-17



Open the fuel filter vent (Item 1) **[Figure PM-17]**.

Operate the hand pump (priming bulb) (Item 2) **[Figure PM-17]** until the fuel flows from the vent with no air bubbles.

Close the vent (Item 1) **[Figure PM-17]** on the fuel filter housing.

Start the engine. It may be necessary to open the vent (Item 3) **[Figure PM-17]** (at the fuel injection pump) briefly until the engine runs smoothly.



WARNING

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

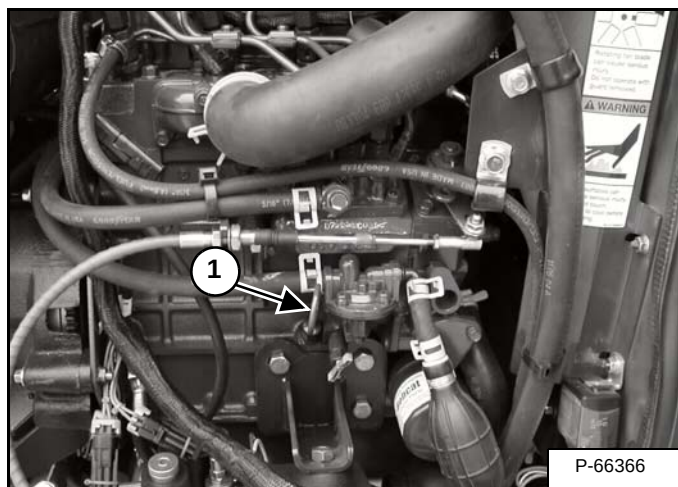
W-2072-0496

ENGINE LUBRICATION SYSTEM

Checking And Adding Engine Oil

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

Figure PM-18

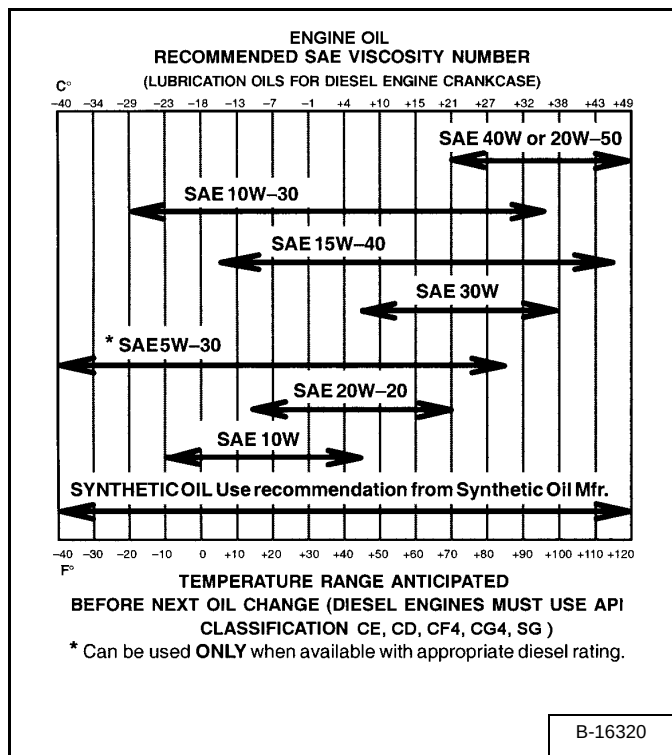


Open the tailgate and remove the dipstick (Item 1) [Figure PM-18].

Keep the oil level between the marks on the dipstick.

Engine Oil Chart

Figure PM-19



Use a good quality motor oil that meets the correct API Service Classification **[Figure PM-19]**.

Install the dipstick and close the tailgate.

ENGINE LUBRICATION SYSTEM (CONT'D)

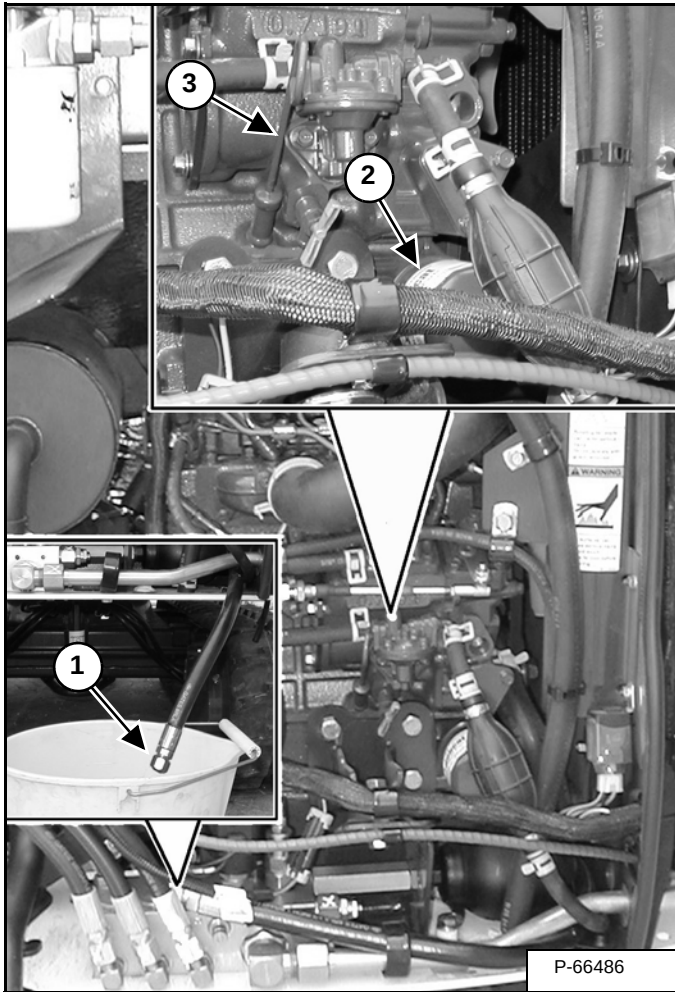
Removing And Replacing Oil And Filter

See the SERVICE SCHEDULE for the service interval for replacing the engine oil and filter. (See SERVICE SCHEDULE on Page PM-5)

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

Open the tailgate.

Figure PM-20



Remove the engine oil drain plug (Item 1) [Figure PM-20]. Drain the oil into a container and recycle or dispose of used oil in an environmentally safe manner.

Remove the oil filter (Item 2) [Figure PM-20] and clean the filter housing surface.

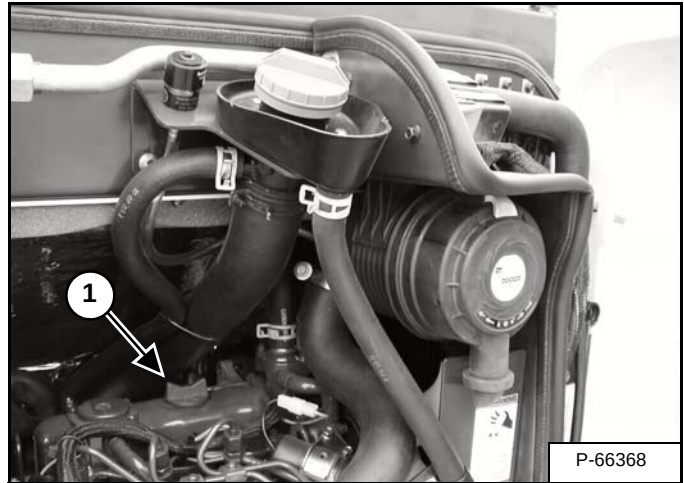
Use a genuine Bobcat filter.

Put clean oil on the filter gasket.

Install the filter and hand tighten.

Install and tighten the oil drain plug.

Figure PM-21



Remove the fill cap (Item 1) [Figure PM-21].

Put in 3.75 qt. (3,5 L) of oil into the engine.

Use a good quality motor oil that meets the correct API Service Classification [Figure PM-19].

Install the fill cap.

Start the engine and let it run for several minutes.

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

Add oil as needed if it is not at the top mark on the dipstick (Item 3) [Figure PM-20].

ENGINE COOLING SYSTEM

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

Cleaning

Open the tailgate.

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

Checking Level

WARNING

AVOID BURNS

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

W-2070-1003

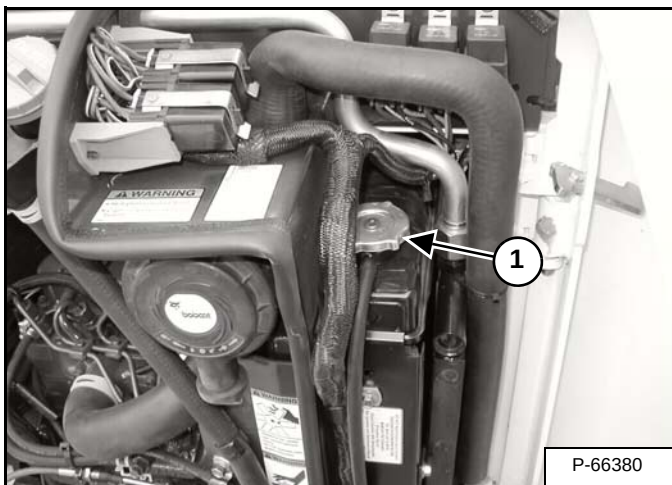
WARNING

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

Figure PM-22



When the engine is cool, remove the radiator cap (Item 1) [Figure PM-22].

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

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

IMPORTANT

AVOID ENGINE DAMAGE

Always use the correct ratio of water to antifreeze.

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

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

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

I-2124-0497

ENGINE COOLING SYSTEM (CONT'D)

Removing And Replacing Coolant

See the SERVICE SCHEDULE for correct service intervals. (See SERVICE SCHEDULE on Page PM-5)

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



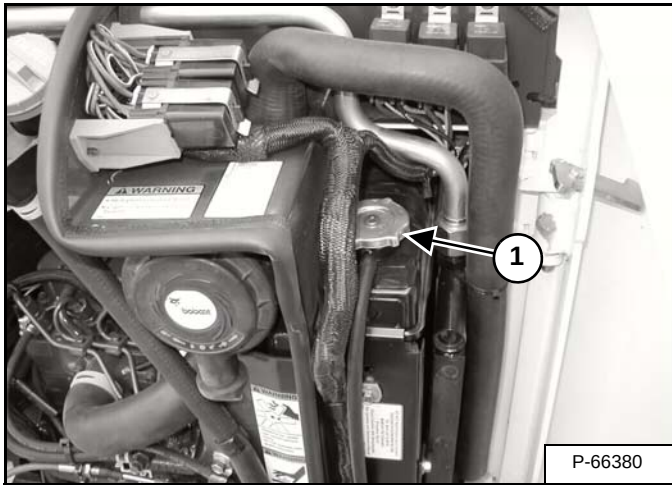
WARNING

AVOID BURNS

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

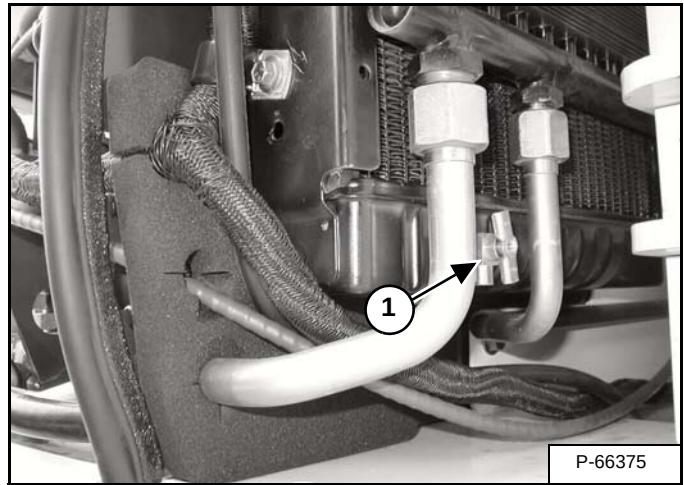
W-2070-1003

Figure PM-23



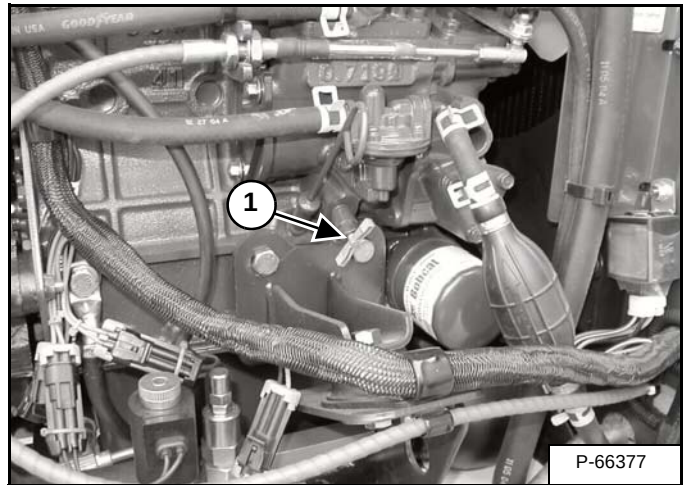
When the engine is cool, loosen and remove the radiator cap (Item 1) [Figure PM-23].

Figure PM-24



Open the drain valve (Item 1) [Figure PM-24] at the bottom of the radiator and drain the coolant into a container.

Figure PM-25



Open the drain valve (Item 1) [Figure PM-25] on the engine block and drain the coolant into a container.

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

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

ENGINE COOLING SYSTEM (CONT'D)

Removing And Replacing Coolant (Cont'd)

Mix the coolant in a separate container.

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

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

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

IMPORTANT

AVOID ENGINE DAMAGE

Always use the correct ratio of water to antifreeze.

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

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

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

I-2124-0497

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

Add premixed coolant until the level is correct.

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

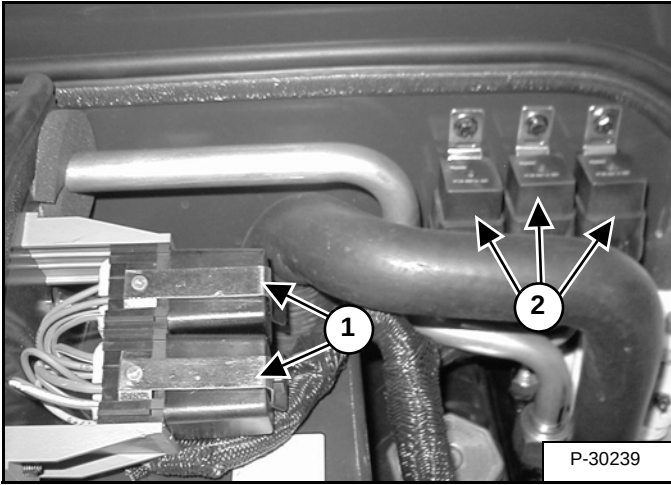
Add coolant to the recovery tank as needed.

Close the tailgate.

ELECTRICAL SYSTEM

Description

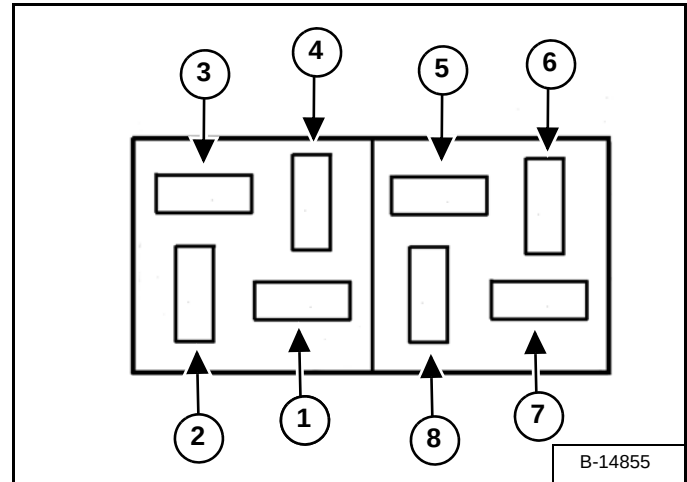
Figure PM-26



The excavator has a 12 volt, negative ground electrical system. The electrical system is controlled by fuses and relays located in the right side of the engine compartment (Items 1 & 2) [Figure PM-26]. The fuses will protect the electrical system when there is an electrical overload. The reason for the overload must be found before starting the engine again.

Fuse And Relay Location / Identification

Figure PM-27



1. **Instrument** - 10A (SW) Hourmeter, Warning Buzzer & Fuel Gauge Back Light
2. **Accessory** - 20A (SW) Accessory Connector, Heater & Horn
3. **Start** - 20A (SW) Key Switch, Unswitched Accessory Connector
4. **Cab** - 15A (SW) Cab Power, Lights, Wiper & Dome Light
5. **Power** - 15A (UNSW) Appliance Socket
6. **Timer Power** - 15A (UNSW) Stop Timer Module
7. **Power** - 15A (SW) Stop Timer Module
8. **Open** - Not Used [Figure PM-27]

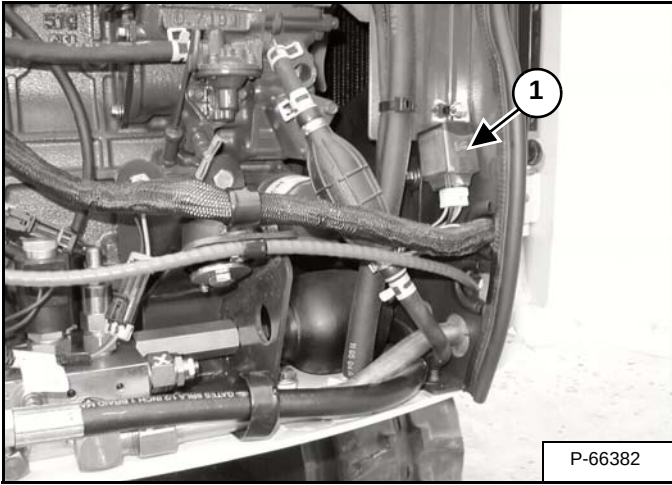
Always replace fuses using the same type and capacity.

The three electrical relays (Item 2) [Figure PM-26] are located in the engine compartment to the right of the fuel fill. The three relays control the starter, glow plugs and switched power circuits.

ELECTRICAL SYSTEM (CONT'D)

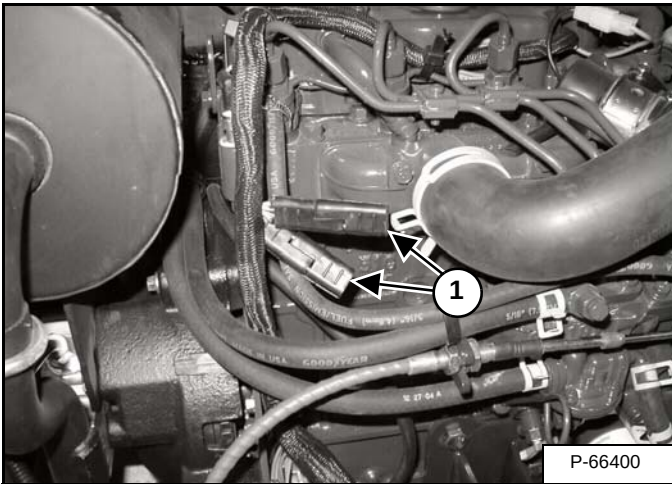
Fuel Timer And Diode Location / Identification

Figure PM-28



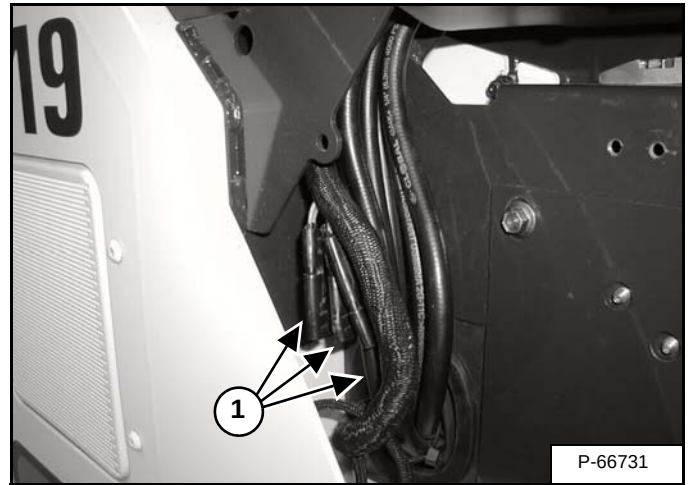
The fuel shutoff timer (Item 1) [Figure PM-28] is located on the right side of the engine compartment.

Figure PM-29



There are 2 diodes (Item 1) [Figure PM-30] in the harness to the left of the intake manifold. They are for alternator feedback protection and the glow plug during start function.

Figure PM-30

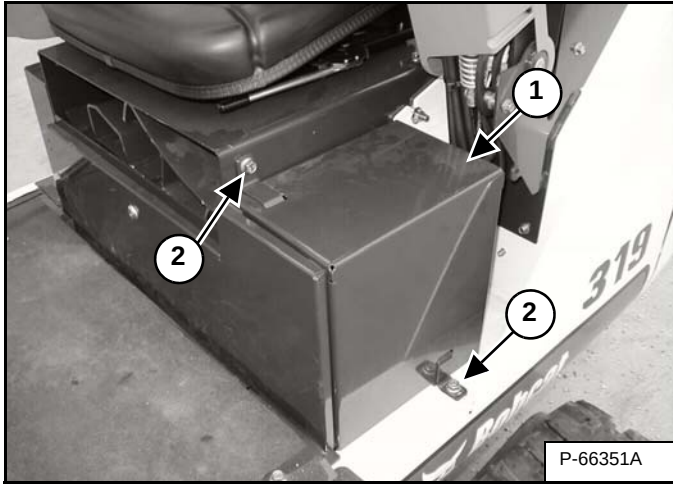


There are 3 diodes (Item 1) [Figure PM-30] in the harness in the right console. They are used for activating the warning buzzer if the engine oil pressure is low or the coolant temperature is high.

ELECTRICAL SYSTEM (CONT'D)

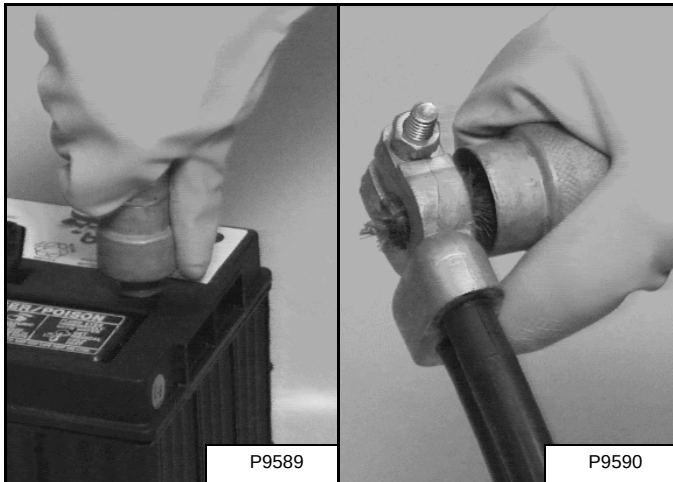
Battery Maintenance

Figure PM-31



The battery is located under the cover (Item 1) next to the operator's seat. Remove the 2 bolts (Item 2) [Figure PM-31] and brackets to open the cover.

Figure PM-32



The battery cables must be clean and tight [Figure PM-32]. Remove acid or corrosion from the battery and cables using a sodium bicarbonate and water solution. Cover the battery terminals and cable ends with battery saver grease to prevent corrosion.

Check for broken or loose connections.

If the battery cables are removed for any reason, disconnect the negative (-) cable first. When installing the battery cables, make the last connection the negative (-) cable to the battery.

The original equipment battery is maintenance free. If a replacement battery is installed, check the electrolyte level in the battery.

If the electrolyte level is lower than 0.50 inch (13 mm) above the plates, add distilled water only.

WARNING

Batteries contain acid which burns eyes and skin on contact. Wear goggles, protective clothing and rubber gloves to keep acid off body.

In case of acid contact, wash immediately with water. In case of eye contact get prompt medical attention and wash eye with clean, cool water for at least 15 minutes.

If electrolyte is taken internally drink large quantities of water or milk! DO NOT induce vomiting. Get prompt medical attention.

W-2065-1296

ELECTRICAL SYSTEM (CONT'D)

Using A Booster Battery (Jump Starting)

IMPORTANT

If jump starting the excavator from a second machine:

When jump starting the excavator from a battery installed in a second machine. Make sure the second machine is NOT running while using the glow plugs. High voltage spikes from a running machine can burn out the glow plugs.

I-2060-0195

If it is necessary to use a booster battery to start the engine. BE CAREFUL! There must be one person in the operator's seat and one person to connect and disconnect the battery cables.

Engage the upperstructure slew lock. Be sure the key switch is OFF. The booster battery must be 12 volt.

Figure PM-33

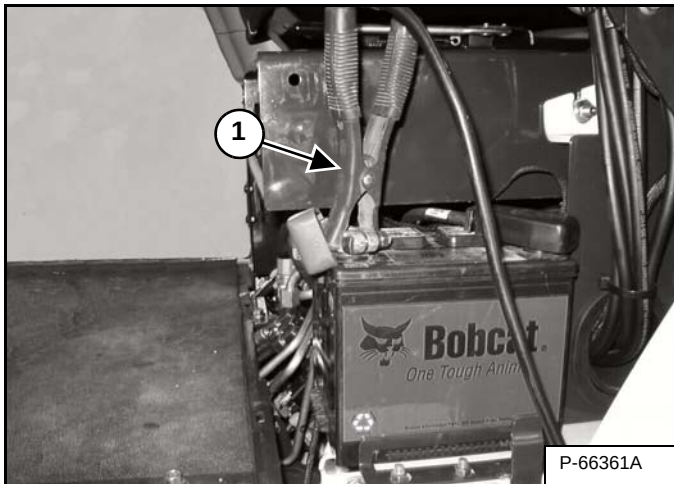
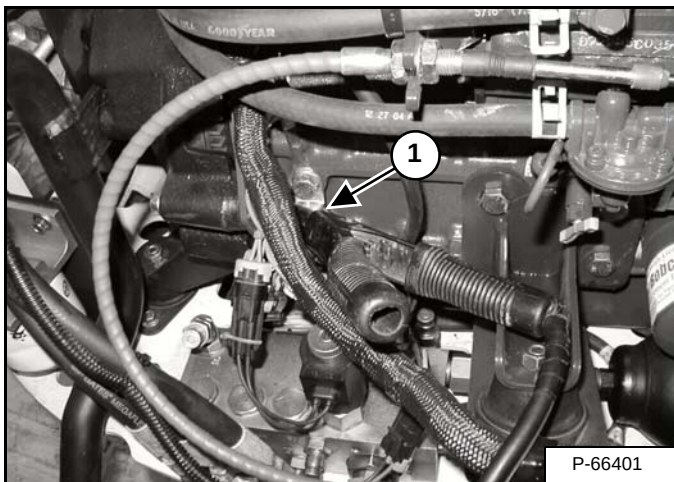


Figure PM-34



Open the tailgate.

Connect one end of the first cable to the positive (+) terminal of the booster battery. Connect the other end of the same cable to the positive (+) terminal (Item 1) [Figure PM-33] on the excavator battery.

Connect one end of the second cable to the negative (-) terminal of the booster battery. Connect the other end of the same cable to the negative cable (Item 2) [Figure PM-34] on the excavator engine.

NOTE: (See Cold Temperature Starting on Page PM-27)

IMPORTANT

Damage to the alternator can occur if:

- Engine is operated with battery cables disconnected.
- Battery cables are connected when using a fast charger or when welding on the excavator. (Remove both cables from the battery.)
- Extra battery cables (booster cables) are connected wrong.

I-2222-0903

Start the engine. After the engine has started, remove the negative (-) cable first (Item 1) [Figure PM-34].

Disconnect the cable from the battery (Item 1) [Figure PM-35].

! WARNING

Batteries contain acid which burns eyes and skin on contact. Wear goggles, protective clothing and rubber gloves to keep acid off body.

In case of acid contact, wash immediately with water. In case of eye contact get prompt medical attention and wash eye with clean, cool water for at least 15 minutes.

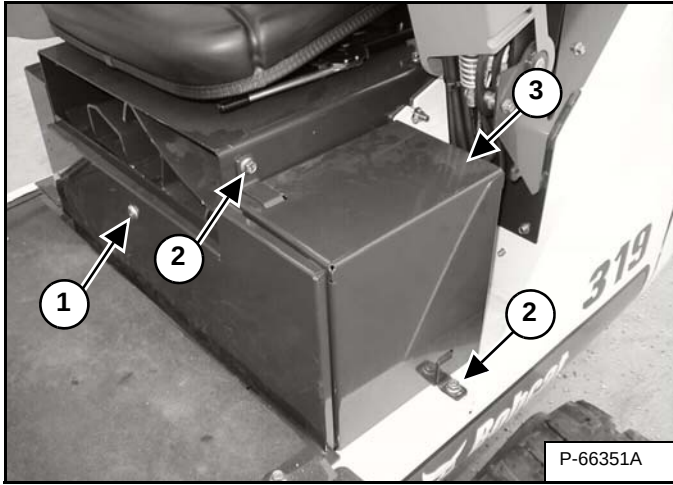
If electrolyte is taken internally drink large quantities of water or milk! DO NOT induce vomiting. Get prompt medical attention.

W-2065-1296

ELECTRICAL SYSTEM (CONT'D)

Removing And Installing Battery

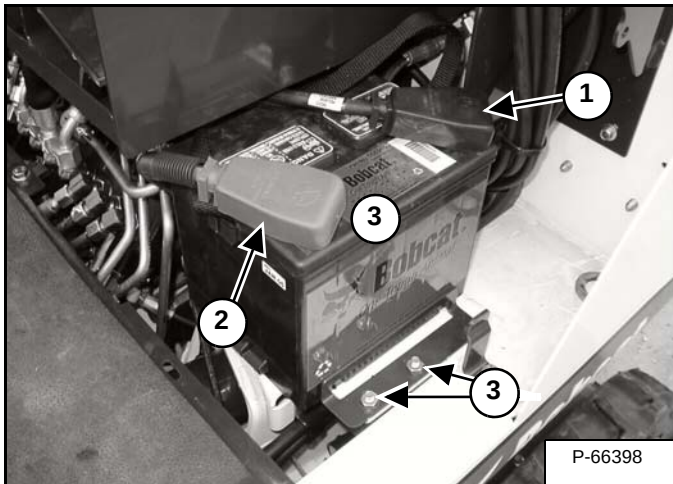
Figure PM-35



Remove the front access cover (Item 1) [Figure PM-35] using the start key.

Remove the 2 bolts (Item 2) and brackets and remove the battery cover (Item 3) [Figure PM-35].

Figure PM-36



Disconnect the negative (-) cable (Item 1) [Figure PM-36] first.

Disconnect the positive (+) cable (Item 2) [Figure PM-36].

Remove the 2 bolts (Item 3) [Figure PM-36] from the hold down clamp and remove the clamp.

Remove the battery.

Always clean the terminals and the cable ends, even when installing a new battery.

Install the battery. Install the hold down clamp and tighten the bolts.

Connect the battery cables. Connect the negative (-) cable (Item 1) [Figure PM-36] last to prevent sparks.

WARNING

Batteries contain acid which burns eyes and skin on contact. Wear goggles, protective clothing and rubber gloves to keep acid off body.

In case of acid contact, wash immediately with water. In case of eye contact get prompt medical attention and wash eye with clean, cool water for at least 15 minutes.

If electrolyte is taken internally drink large quantities of water or milk! DO NOT induce vomiting. Get prompt medical attention.

W-2065-1296

HYDRAULIC SYSTEM

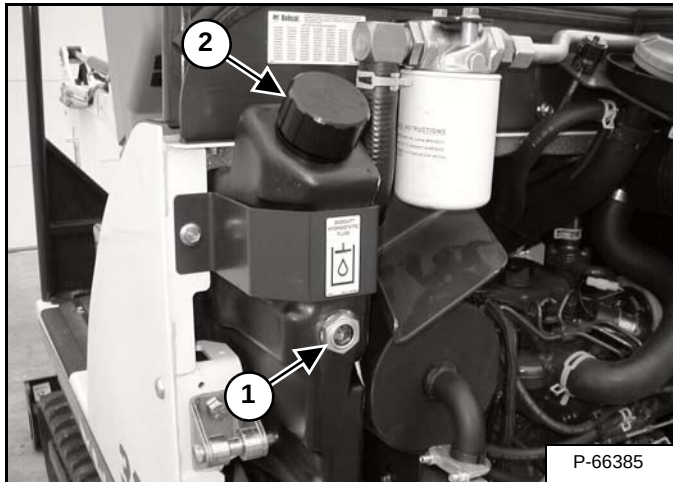
Checking And Adding Fluid

Put the machine on a level surface.

Retract the tracks fully.

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

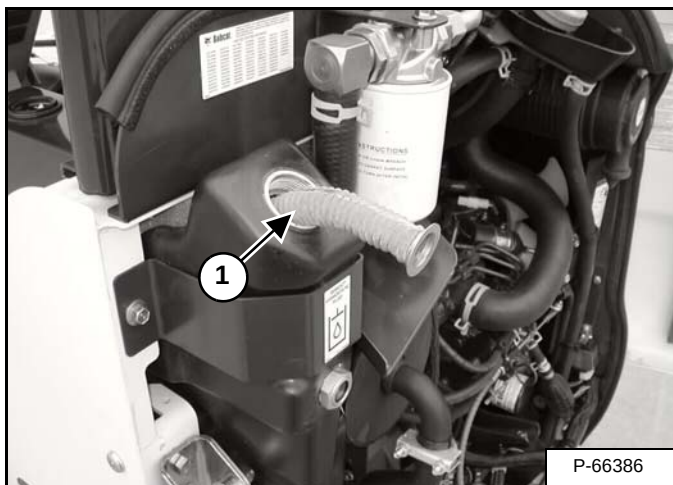
Figure PM-37



Open the tailgate. The fluid must be at the center of the sight gauge (Item 1) [Figure PM-37].

Remove oil fill cap (Item 2) [Figure PM-37].

Figure PM-38



Check the condition of the screen (Item 1) [Figure PM-38] in the fill neck of the reservoir. The screen must be installed in fill neck when adding oil.

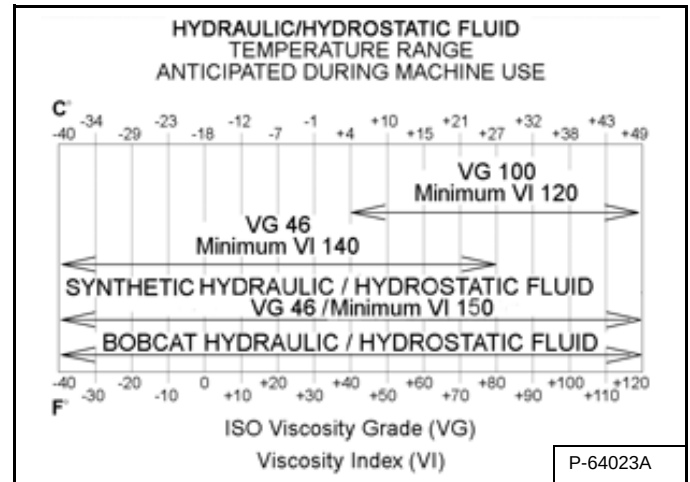
WARNING

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

W-2103-1285

Hydraulic Fluid Chart

Figure PM-39



Use the correct hydraulic fluid shown in chart [Figure PM-39].

Add hydraulic fluid as needed to bring the level to the center of sight gauge (Item 1) [Figure PM-37].

Install the oil fill cap.

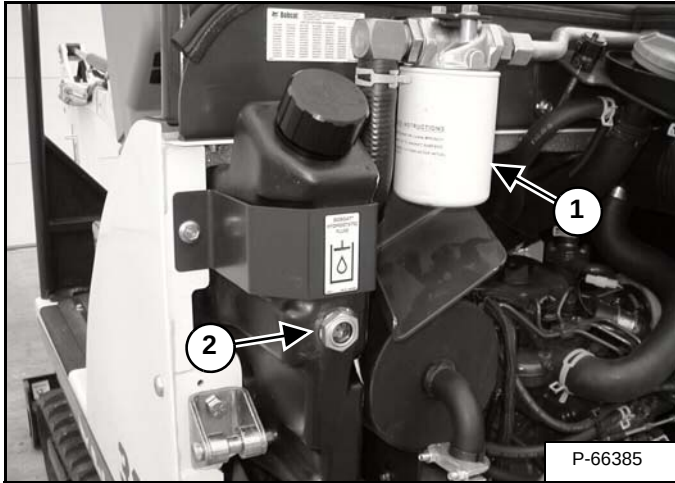
HYDRAULIC SYSTEM (CONT'D)

Removing And Replacing Hydraulic Filter

See the SERVICE SCHEDULE for the correct service interval. (See SERVICE SCHEDULE on Page PM-5)

Open the tailgate.

Figure PM-40



Remove the filter (Item 1) [Figure PM-40].

Clean the housing where the filter gasket makes contact.

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

Start the engine. Run the excavator through the hydraulic functions. Stop the engine. Check the fluid level at the sight gauge (Item 2) [Figure PM-40] and add as needed. Check the filter area for leaks.

Removing And Replacing Hydraulic Fluid

See the SERVICE SCHEDULE for the correct service interval. (See SERVICE SCHEDULE on Page PM-5)

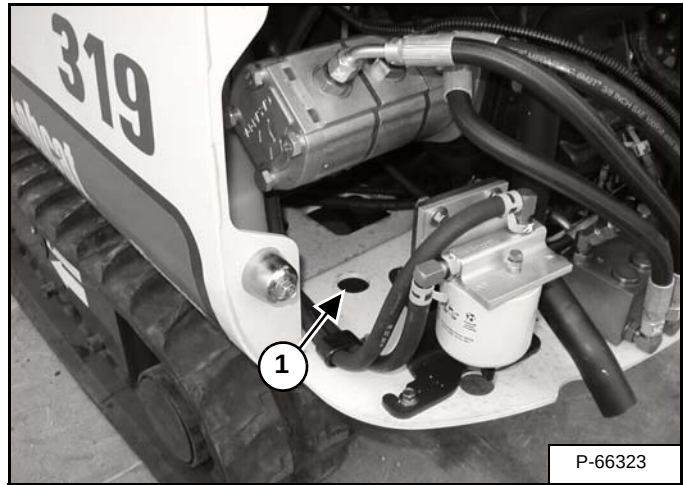
Retract the tracks fully.

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

Open the tailgate.

Remove and replace the hydraulic filter.

Figure PM-41



A hole (Item 1) [Figure PM-41] is provided in the housing for ease of draining the hydraulic fluid.

Figure PM-42



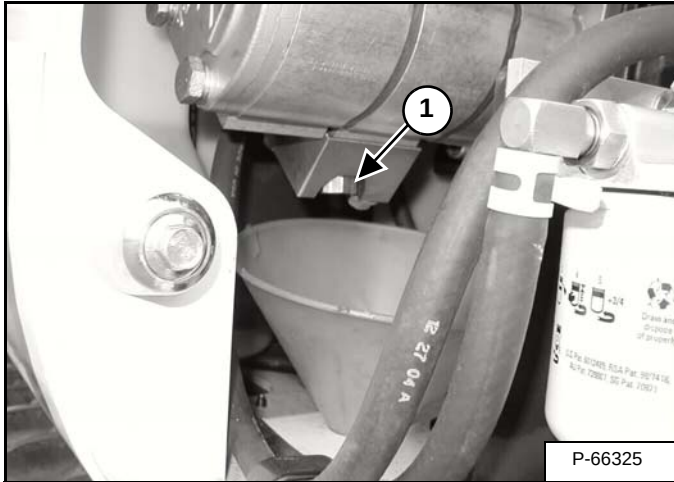
Install a funnel (Item 1) [Figure PM-42] in the hole.

Place a container under the funnel.

HYDRAULIC SYSTEM (CONT'D)

Removing And Replacing Hydraulic Fluid (Cont'd)

Figure PM-43



Remove the drain plug (Item 1) [Figure PM-43] from the pump fitting and drain the hydraulic fluid into the container.

IMPORTANT

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

I-2067-0499

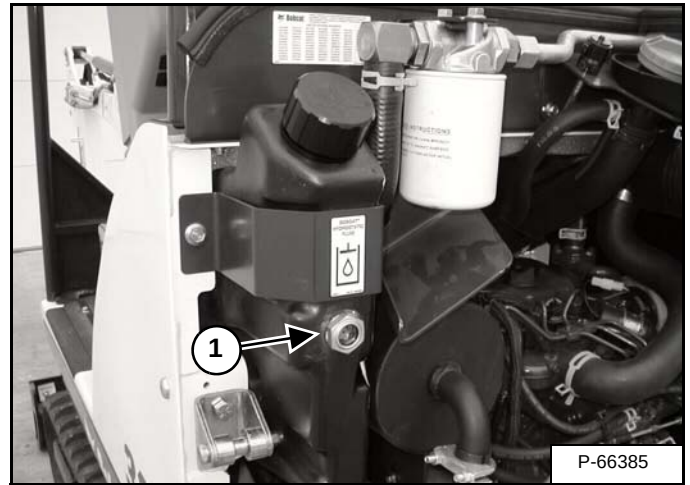
IMPORTANT

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

I-2045-0788

Install the drain plug.

Figure PM-44



Add fluid to the reservoir until it is at the center of the sight gauge (Item 1) [Figure PM-44]. (See HYDRAULIC SYSTEM on Page PM-25)

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

SPARK ARRESTOR MUFFLER

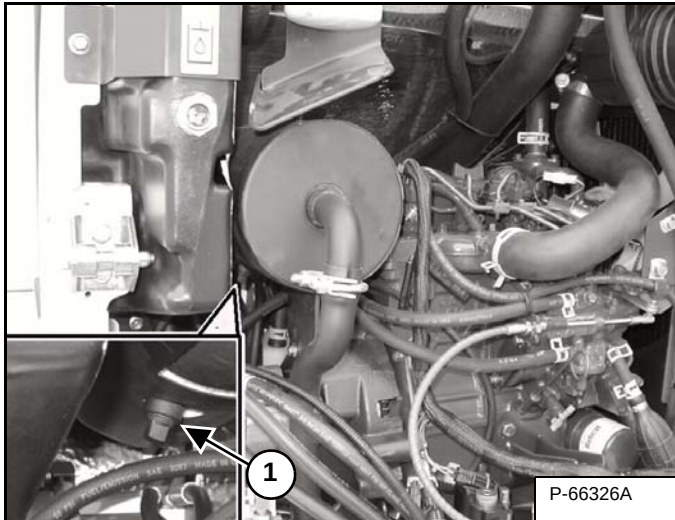
Cleaning Procedure

See the SERVICE SCHEDULE for the correct service interval. (See SERVICE SCHEDULE on Page PM-5)

Do not operate the excavator with a defective exhaust system.

Stop the engine. Open the tailgate.

Figure PM-45



Remove the plug (Item 1) [Figure PM-45] from the bottom of the muffler.

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

Stop the engine. Install and tighten the plug.

Close the tailgate.

WARNING

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

W-2050-1285

WARNING

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

W-2011-1285

WARNING

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

W-2068-1285

WARNING

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

Failure to do so can cause injury or death.

W-2203-0595

TRACK TENSION

NOTE: The wear of undercarriage parts vary with working conditions and types of soil conditions. Maintain the correct track tension by inspecting regularly. (See **SERVICE SCHEDULE** on Page PM-5) for the correct service interval.

Adjusting

Figure PM-46



Raise one side of the machine (approximately four inches) using the boom and arm as shown in [Figure PM-46].

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

Stop the engine.



WARNING

AVOID INJURY

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

W-2142-0903

Figure PM-47

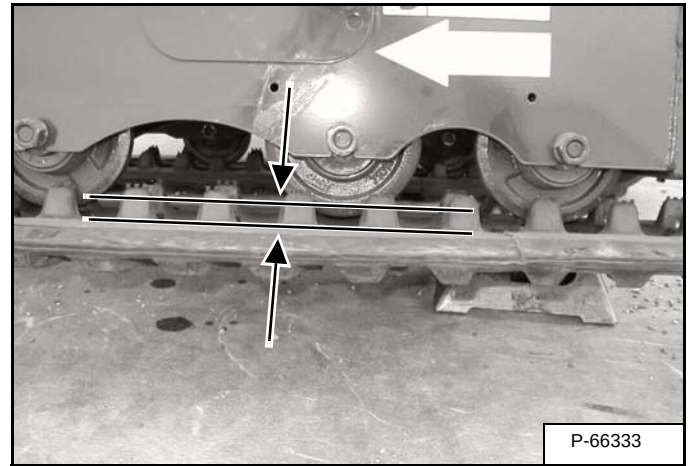
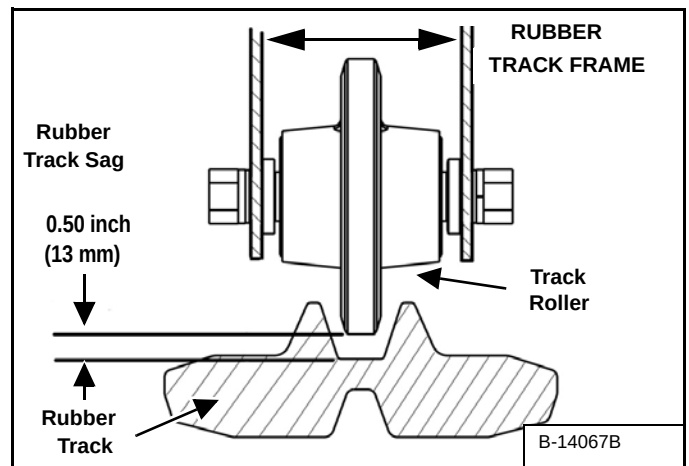


Figure PM-48

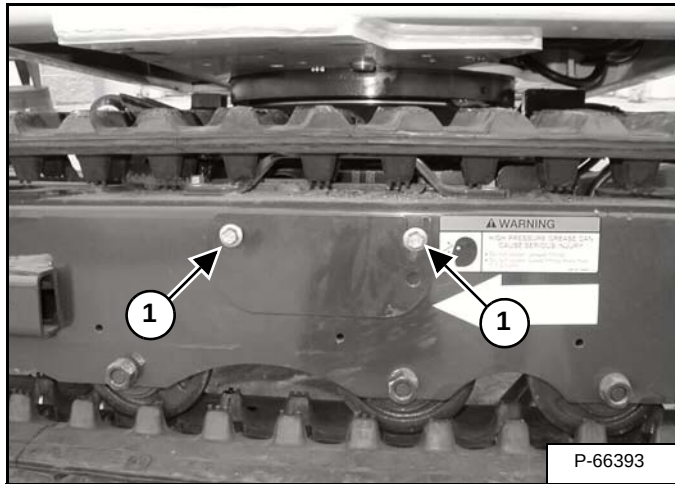


Measure the rubber track sag at the middle track roller [Figure PM-47]. Do not get your fingers into pinch points between the track and the track roller. Use material of appropriate size to check the gap between the contact edge of the roller and top edge of the track guide lug [Figure PM-47] & [Figure PM-48].

TRACK TENSION (CONT'D)

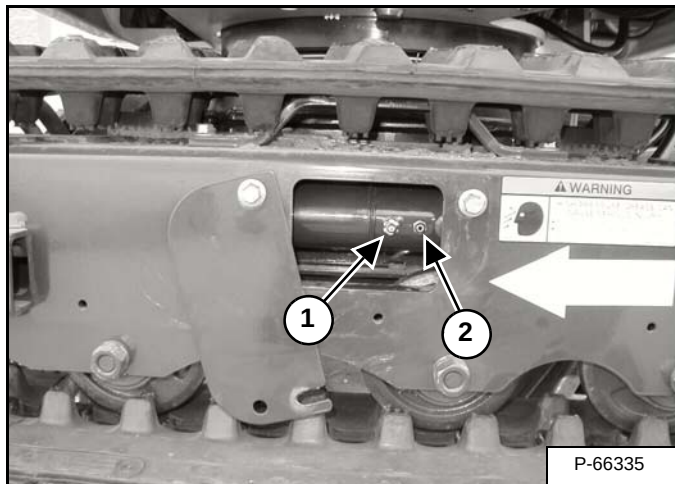
Adjusting (Cont'd)

Figure PM-49



Loosen its two bolts (Item 1) [Figure PM-49] from the cover. Pivot the cover downward.

Figure PM-50



Add grease to the fitting (Item 1) [Figure PM-50] until the track tension is correct.

If tension is too tight, loosen the bleed screw (Item 2) [Figure PM-50] (1 turn maximum) and let grease flow out of the bleed screw. When tension is correct, tighten the bleed screw.

Repeat the procedure for the other side.

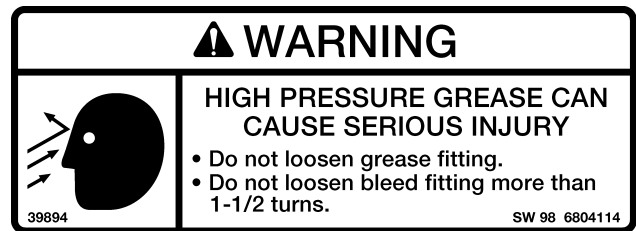
If the track tension is still loose after adjusting to the mentioned limit, it indicates the track is worn. See your dealer for repairs.

WARNING

AVOID INJURY OR DEATH

Do not loosen the grease fitting more than one complete rotation. Also, be careful not to loosen any part other than the grease fitting. If the grease fitting or any part is loosened too much, it can fly off under high pressure. If the grease does not ooze smoothly, try moving the machine back and forth for a short distance.

W-2143-0189

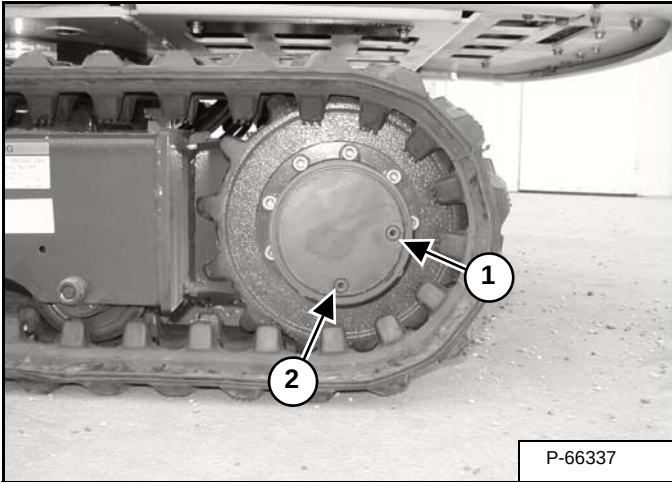


6804114

TRAVEL MOTOR

Checking And Adding Oil

Figure PM-51



Put the machine on a level surface with the plugs positioned as shown (Items 1 & 2) **[Figure PM-51]**.

Remove the plug (Item 1) **[Figure PM-51]**. The oil level should be at the bottom edge of the plug hole.

Add SAE-90W gear lube through the hole if the oil level is below the hole (each motor).

Install and tighten both plugs.

Repeat the procedure for the other side.

Removing And Replacing Oil

(See SERVICE SCHEDULE on Page PM-5) for the correct service interval.

Put the machine on a level surface with the plugs positioned as shown (Items 1 & 2) **[Figure PM-51]**.

Remove the bottom plug (Item 2) and top plug (Item 1) **[Figure PM-51]** and drain into a container. Recycle or dispose of the used lubricant in an environmentally safe manner.

After all the gear lube is removed, install plug (Item 2) **[Figure PM-51]**.

Add 0.53 qt. (0,5 L) of SAE-90W gear lube to the plug hole (Item 1) **[Figure PM-51]** until the gear lube level is at the bottom edge of the plug hole (each motor).

Install and tighten the plug.

Repeat the procedure for the other side.

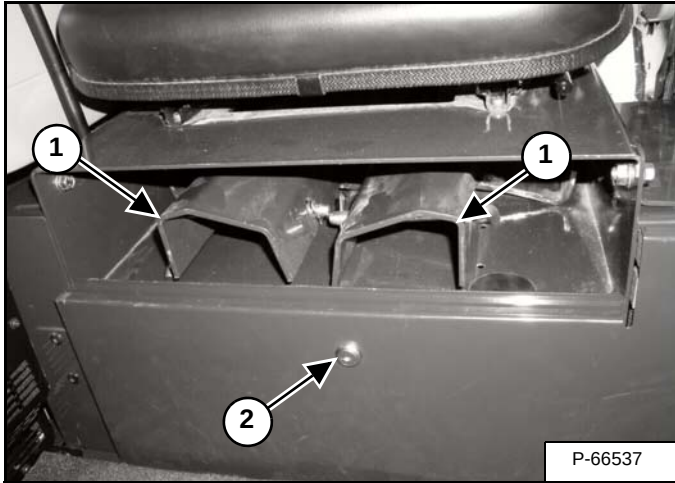
ALTERNATOR BELT

Belt Adjustment

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

Stop the engine.

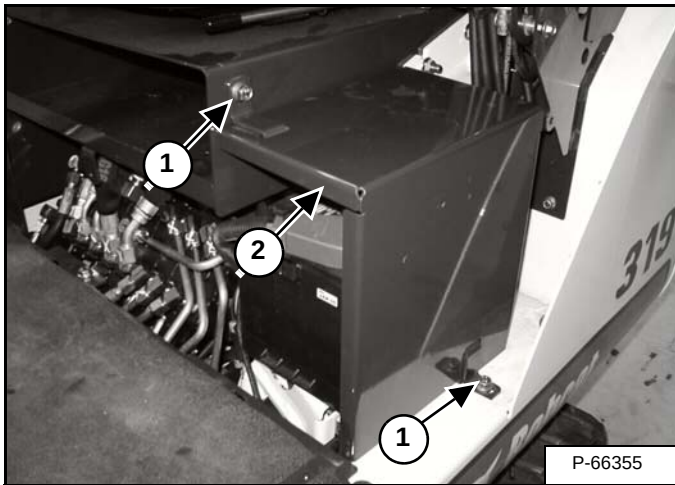
Figure PM-52



Remove the 2 blade extensions (Item 1) [Figure PM-52] from the storage compartment.

Use the start key to remove the access cover (Item 2) [Figure PM-52].

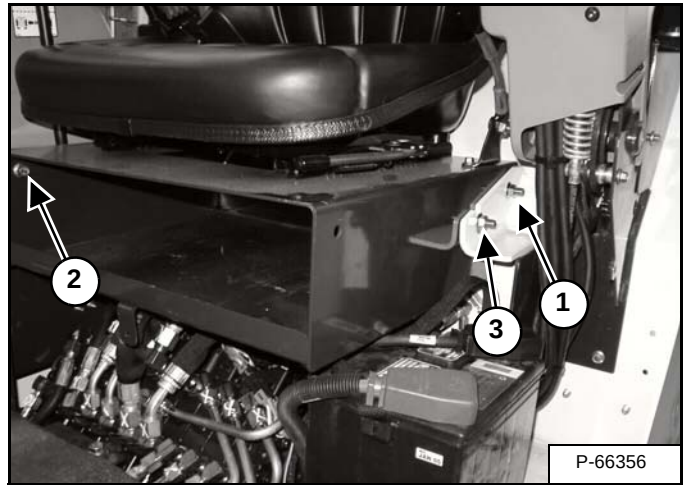
Figure PM-53



Remove the 2 bolts (Item 1) [Figure PM-53] and brackets from the battery cover.

Remove the cover (Item 2) [Figure PM-53].

Figure PM-54



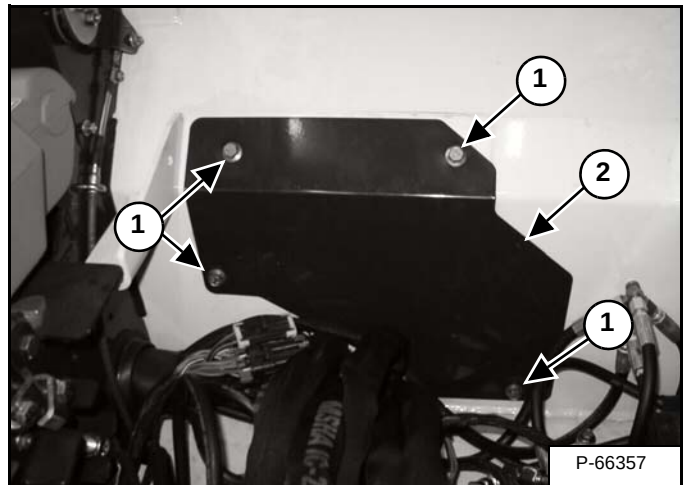
Remove the 2 bolts (Item 1) [Figure PM-54] and nuts from both sides of the seat mount.

Remove the bolt (Item 2) [Figure PM-54], nut and bracket from the right side of the seat mount.

Loosen the 2 bolts (Item 3) [Figure PM-54] and nuts from both sides of the seat mount.

Remove the seat and seat mount.

Figure PM-55

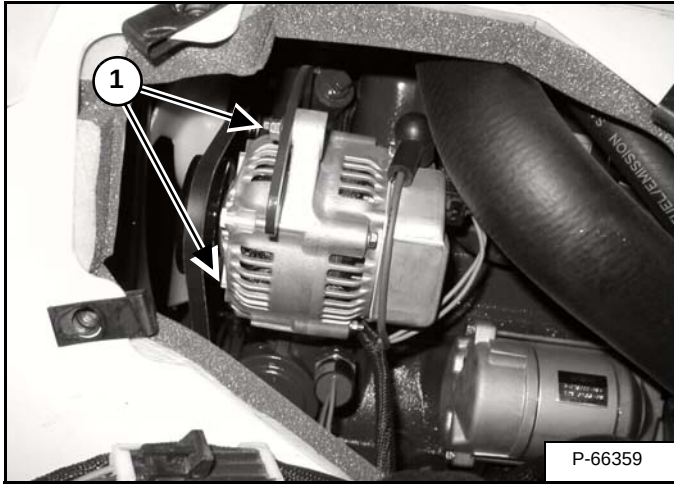


Remove the 4 bolts (Item 1) and remove the access panel (Item 2) [Figure PM-55].

ALTERNATOR BELT (CONT'D)

Belt Adjustment (Cont'd)

Figure PM-56



Loosen the alternator mounting and adjustment bolts (Item 1) [Figure PM-56].

If a belt tension tool is available, move the alternator toward the front of the machine [Figure PM-56] until the belt has (New belt = 56 - 60 lbf. or Used belt = 48 - 52 lbf.) tension.

If a belt tension tool is not available, move the alternator toward the front of the machine [Figure PM-56] until the belt has 0.50 inch (13 mm) movement at the middle of the belt span with 13 lb. (58 N) of force.

Tighten the mounting and adjustment bolts.

Install the access panel, the seat and seat mount, the battery cover, the access cover and the 2 blade extensions.

Belt Replacement

(See ALTERNATOR BELT on Page PM-32) for removal of components to access the alternator belt.

Loosen the alternator mounting and adjustment bolts (Item 1) [Figure PM-56] and loosen the belt all the way.

Remove the belt and install a new belt.

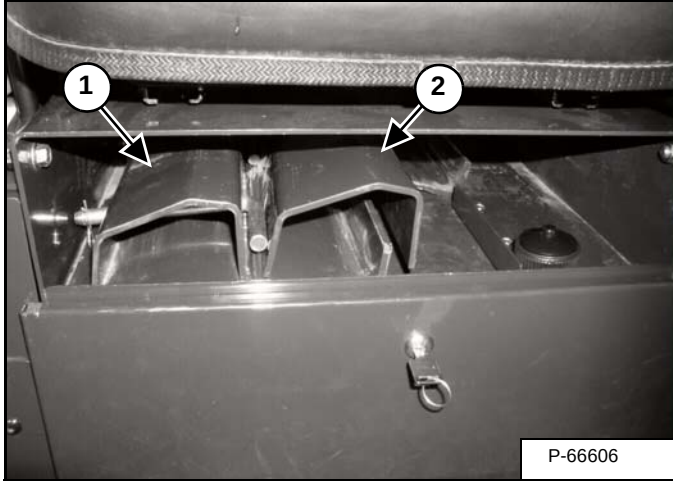
Adjust the belt as shown above.

BLADE EXTENSION

Description

The blade extensions are used to match the track width to the blade width. Remove the blade extensions when transporting the excavator or when a narrow operating width is needed. Under normal operating conditions, the blade width should match the track width.

Figure PM-57

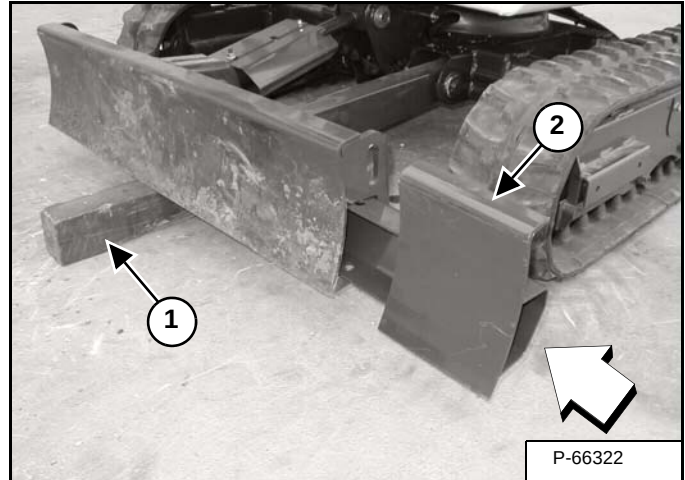


The blade extensions (Item 1 and 2) [Figure PM-57] are stored under the operator seat.

NOTE: The blade extensions needed to be installed under the operator seat as shown for cab models. Both mounting pins must be installed in the left blade extension (Item 1) [Figure PM-57]. If the blade extensions are installed differently, breakage to the water bottle and cap could result.

Installing And Removing

Figure PM-58



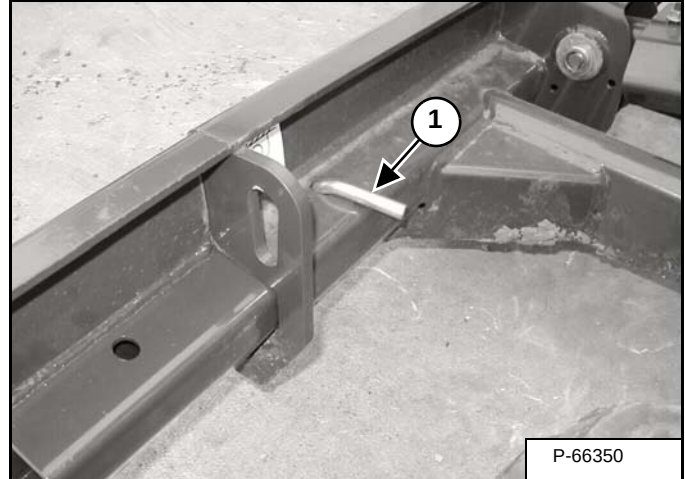
Put a block (Item 1) [Figure PM-58] under the blade.

Fully lower the blade to the block.

Stop the engine.

Slide the extension (Item 2) [Figure PM-58] into the blade frame (both sides).

Figure PM-59



Install the pin (Item 1) [Figure PM-59] and spring clip (both sides).

Remove the blade extensions when transporting the excavator or when a narrow operating width is needed. Under normal operating conditions, the blade width should match the track width.

TRACK ROLLER AND IDLER LUBRICATION

Procedure

The track rollers and idlers require no maintenance. The bearings are a sealed design.

LUBRICATING THE EXCAVATOR

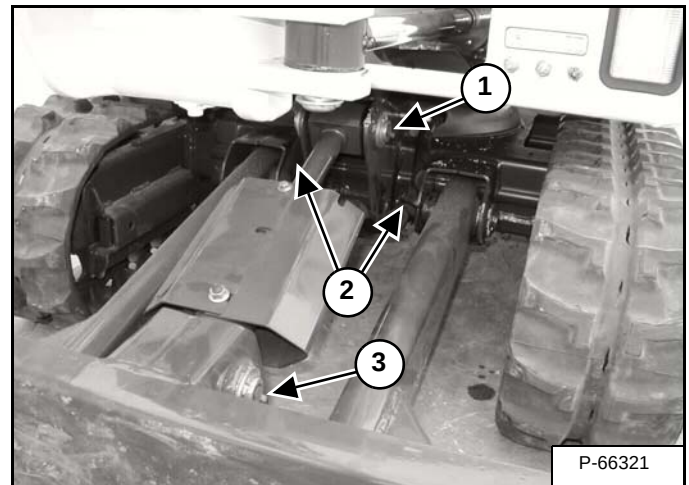
Lubrication Locations

Lubricate the excavator as specified in the SERVICE SCHEDULE for the best performance of the machine. (See SERVICE SCHEDULE on Page PM-5)

Record the operating hours each time you lubricate the excavator.

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

Figure PM-60



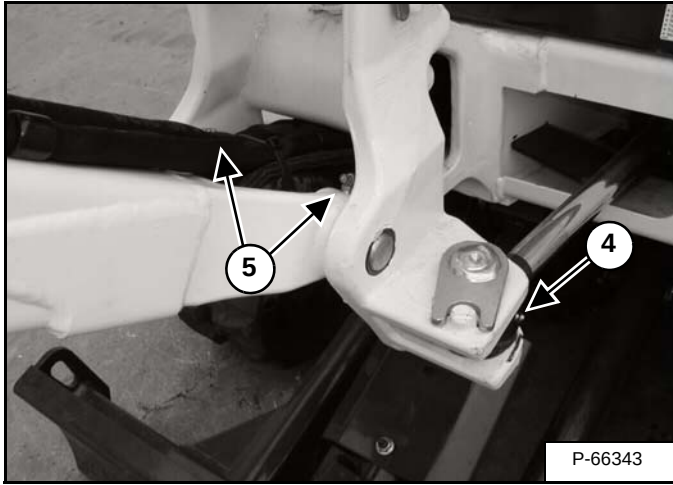
Ref Description (# of Fittings)

1. Blade Cylinder-Rod End, every 8 - 10 hours (1) [Figure PM-60]
2. Blade Pivots, every 8 - 10 hours (2) [Figure PM-60]
3. Blade Cylinder-Base End, every 8 - 10 hours (1) [Figure PM-60]

LUBRICATING THE EXCAVATOR (CONT'D)

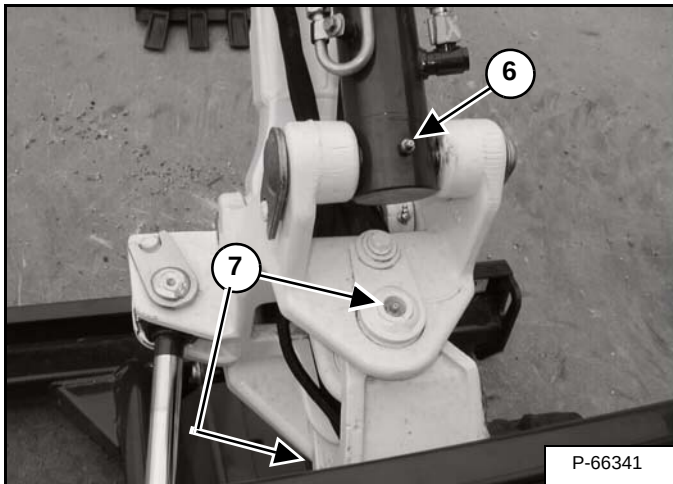
Lubrication Locations (Cont'd)

Figure PM-61



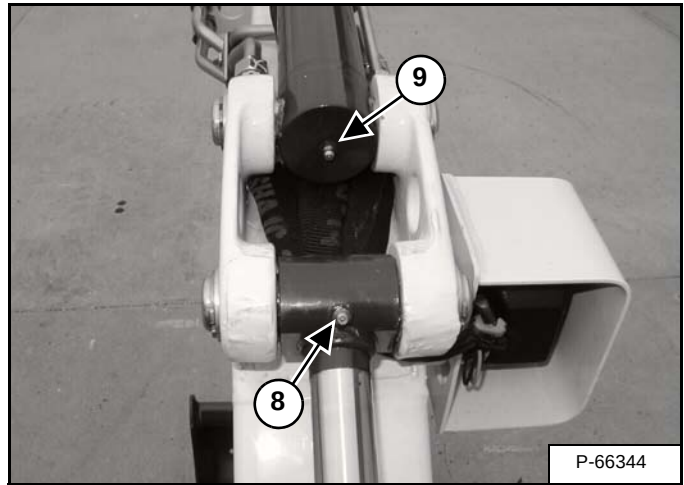
- 4. Boom Swing Cylinder-Rod End, every 8 - 10 hours (1) **[Figure PM-61]**
- 5. Boom Base End, every 8 - 10 hours (2) **[Figure PM-61]**

Figure PM-62



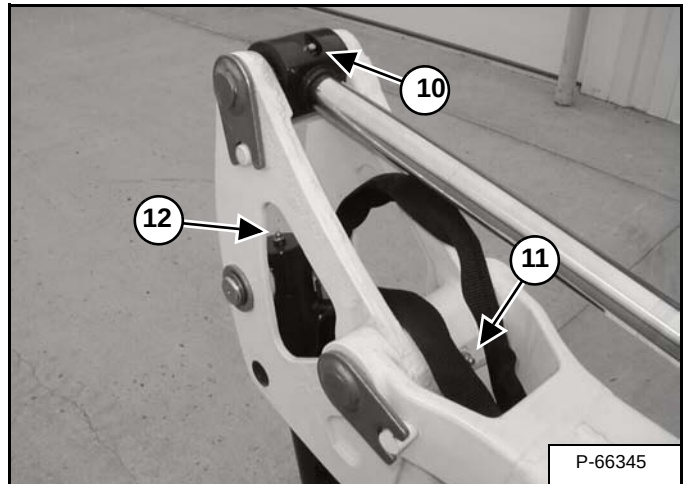
- 6. Boom Cylinder - Base End, every 8 - 10 hours (1) **[Figure PM-62]**
- 7. Boom Swing Pivot, every 8 - 10 hours (2 - on top and bottom swing pin) **[Figure PM-62]**

Figure PM-63



- 8. Boom Cylinder - Rod End, every 8 - 10 hours (1) **[Figure PM-63]**
- 9. Arm Cylinder - Base End, every 8 - 10 hours (1) **[Figure PM-63]**

Figure PM-64

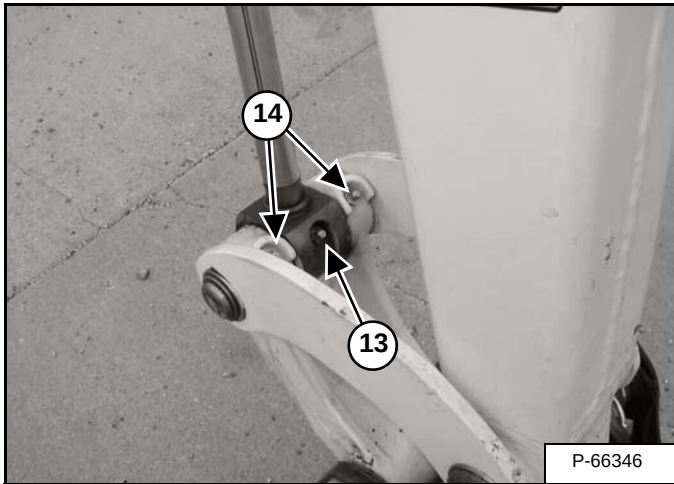


- 10. Arm Cylinder - Rod End, every 8 - 10 hours (1) **[Figure PM-64]**
- 11. Arm Pivot, every 8 - 10 hours (1) **[Figure PM-64]**
- 12. Bucket Cylinder - Base End, every 8 - 10 hours (1) **[Figure PM-64]**

LUBRICATING THE EXCAVATOR (CONT'D)

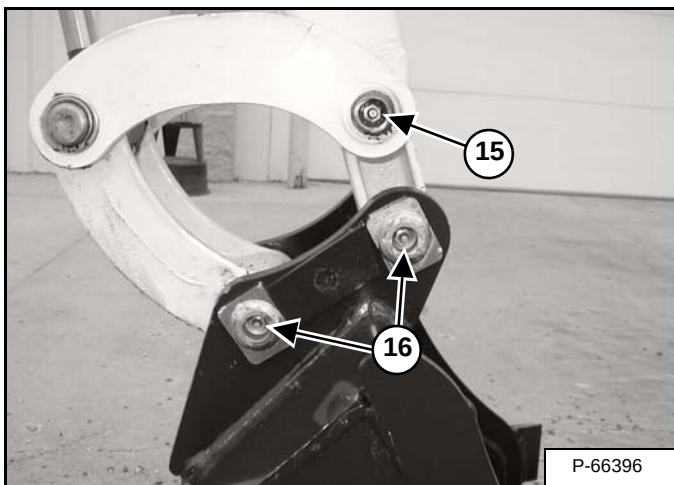
Lubrication Locations (Cont'd)

Figure PM-65



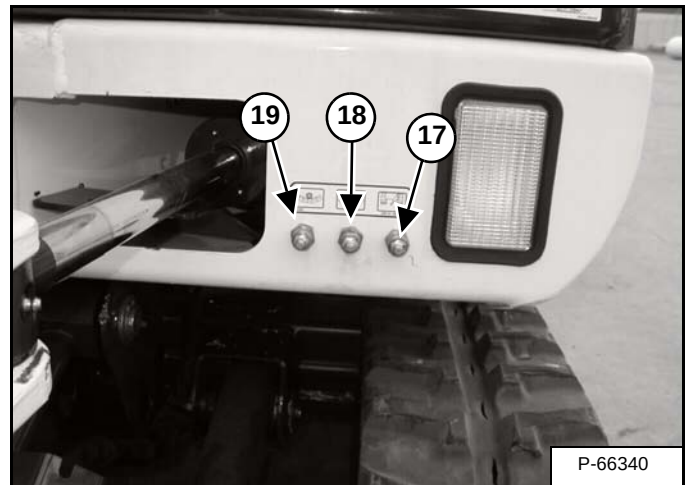
- 13. Bucket Cylinder - Rod End, every 8 - 10 hours (1) [Figure PM-65]
- 14. Bucket Link Pivots, every 8 - 10 hours (2) [Figure PM-65]

Figure PM-66



- 15. Bucket Link Pivot, every 8 - 10 hours (1) [Figure PM-66]
- 16. Bucket Pivots, every 8 - 10 hours (2) [Figure PM-66]

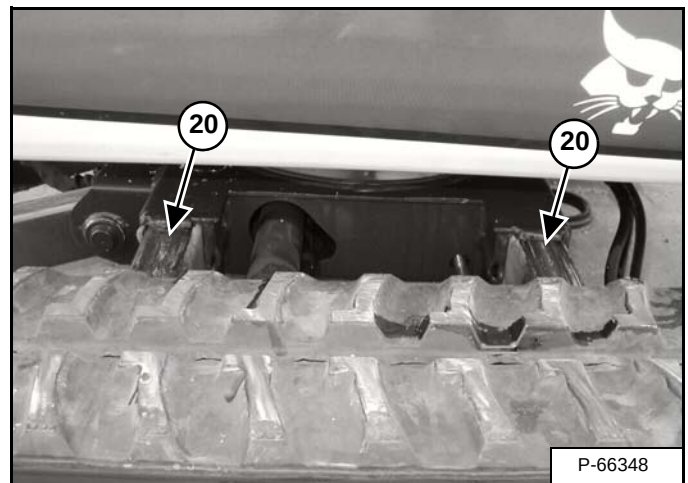
Figure PM-67



- 17. Boom Swing Cylinder-Base End every 8 - 10 hours [Figure PM-67]
- 18. Swing Circle Bearing, every 50 hours [Figure PM-67]
- 19. Swing Circle Pinion, every 50 hours. Pump 4 times with a grease gun. Rotate the upperstructure 180° and repeat. [Figure PM-67]

NOTE: Do not over-grease the swing circle; damage to the seal could result. Pump 4 - 5 times with a grease gun. Rotate the upperstructure 90° and repeat three more times.

Figure PM-68



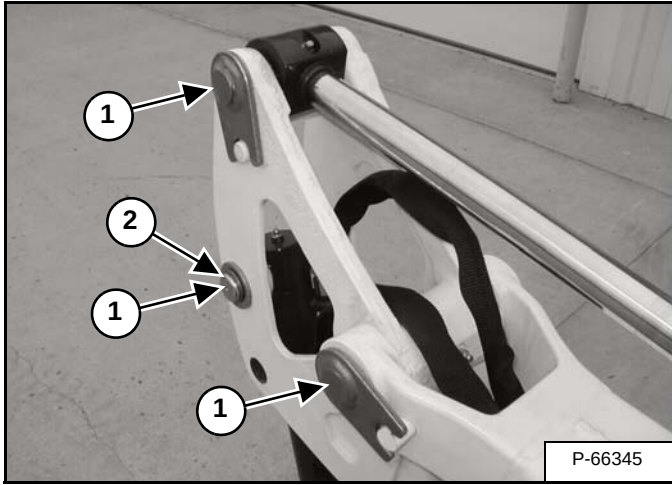
- 20. Track Expansion Tube, as required [Figure PM-68].

NOTE: Spread lubriplate gearshield extra heavy grease evenly on wear surfaces on both sides of excavator as required.

PIVOT PINS

Inspection And Maintenance

Figure PM-69



The boom, arm and cylinders pivots (Item 1) have a large pin held in position with a snap ring (Item 2) [Figure PM-69].

Check that the snap rings are securely inserted into the grooves on the pins and that the snap rings are not damage. See your Bobcat dealer for replacement parts.

EXCAVATOR STORAGE AND RETURN TO SERVICE

Storage

Sometimes it may be necessary to store your Bobcat Excavator for an extend period of time. Below is a list of items to perform before storage.

- Thoroughly clean the excavator including the engine compartment.
- Lubricate the excavator.
- Replace worn or damaged parts.
- Drive the excavator onto planks in a dry protected shelter.
- Lower the boom fully with the bucket flat on the ground.
- Put grease on any exposed cylinder rods.
- Put fuel stabilizer in the fuel tank and run the engine a few minutes to circulate the stabilizer to the pump and fuel injectors.
- Drain and flush the cooling system. Refill with premixed coolant.
- Replace all fluids and filters (engine, hydraulic).
- Replace all filters (i.e.: air cleaner, heater, etc.).
- Put all controls in neutral position.
- Remove the battery. Be sure the electrolyte level is correct then charge the battery. Store it in a cool dry place above freezing temperatures and charge it periodically during storage.
- Cover the exhaust pipe opening.
- Tag the machine to indicate that it is in storage condition.

Return to Service

After the Bobcat Excavator has been in storage, it is necessary to follow a list of items to return the excavator to service.

- Check the engine and hydraulic oil levels; check coolant level.
- Install a fully charged battery.
- Remove grease from exposed cylinder rods.
- Check all belt tensions.
- Be sure all shields and guards are in place.
- Lubricate the excavator.
- Remove cover from exhaust pipe opening.
- Start the engine and let run for a few minutes while observing the instrument panels and systems for correct operation.
- Drive the excavator off of the planks.
- Operate machine, check for correct function.
- Stop the engine and check for leaks. Repair as needed.



Bobcat®

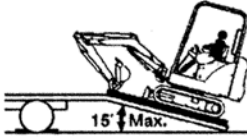
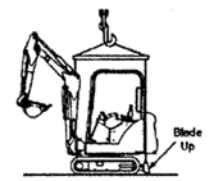
MACHINE SIGN TRANSLATIONS

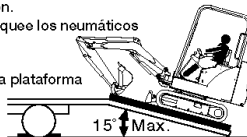
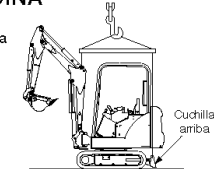
LIFT CHART - LONG ARM (7111984)	MST-6
LIFT CHART - STANDARD ARM (7111724).....	MST-4
SERVICE SCHEDULE (7111723).....	MST-8
WARNING (6808185)	MST-3
WARNING (6807776)	MST-11
WARNING (6809829)	MST-14
WARNING (6815915)	MST-15
WARNING (6804114)	MST-16
WARNING (6804233).....	MST-16
WARNING (6809832)	MST-16
WARNING (7112679).....	MST-17
WARNING (6810004)	MST-17

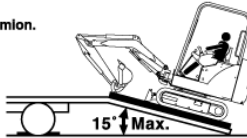
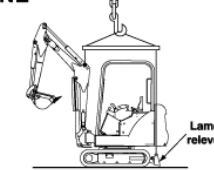
MACHINE SIGN TRANSLATIONS (MST)



WARNING (6808185)

WARNING	
Improper loading, transporting and lifting procedures can cause serious injury or death.	
TRANSPORTING MACHINE - Use metal loading ramps with sides and slip resistant surfaces. - Secure ramps to truck bed. - Engage truck parking brake and block truck tires. - Ramp angle must not exceed 15°. - Top of ramp must be level with truck bed. - Engage swing lock (if equipped). - Secure machine with tie downs and block tracks. 	LIFTING MACHINE - Lifting device must have adequate capacity to lift machine. - Maintain center of gravity and balance. - Position machine as shown below. Engage the swing lock (if equipped). - Never lift with operator on machine. 

ADVERTENCIA	
Ejecutar procedimientos de carga, transporte y elevación no adecuados puede causar lesiones serias o accidentes fatales.	
TRANSPORTE DE LA MÁQUINA - Utilice rampas de carga metálicas con costados y superficies antideslizantes. - Asegure las rampas a la plataforma de apoyo del camión. - Enganche el freno de estacionamiento del camión y bloquee los neumáticos del mismo. - El ángulo de la rampa no debe exceder los 15°. - La parte superior de la rampa debe estar nivelada con la plataforma de apoyo del camión. - Enganche el seguro de giro (si viene equipado). - Asegure la máquina con amarres y bloquee las orugas. 	ELEVACIÓN DE LA MÁQUINA - El dispositivo de elevación debe tener la capacidad adecuada para elevar la máquina. - Mantenga el centro de gravedad y balance. - Posicione la máquina como se muestra. - Enganche el seguro de giro (si viene equipado). - Jamás eleve con un operador en la máquina. 

AVERTISSEMENT	
Le non respect des procédures de chargement, de transport et de levage peut causer des blessures graves, voire mortelles.	
TRANSPORT DE LA MACHINE Utilisez des rampes en acier avec rebords et revêtements anti-dérapants. Attachez les rampes au plancher de la remorque. Serrez le frein de stationnement et bloquez les roues du camion. L'inclinaison de la rampe ne doit pas dépasser 15°. L'extrémité de la rampe doit se trouver dans l'alignement du plancher de la remorque. Engagez l'axe de verrouillage de l'orientation. Attachez la machine avec des chaînes et bloquez les chenilles. 	LEVAGE DE LA MACHINE - Le dispositif de levage doit être capable de supporter le poids de la machine. - Maintenez le centre de gravité et l'équilibre pendant l'opération. - Positionnez la machine comme indiqué. Engagez l'axe de verrouillage de l'orientation. - Ne levez jamais la pelle quand l'opérateur s'y trouve. 

LIFT CHART - STANDARD ARM (7111724)

WARNING

OVERLOAD CAN TIP THE EXCAVATOR AND CAUSE INJURY OR DEATH

- Do not lift or hold any load that exceeds these ratings at their specified load radii and height.
- Total rated load is shown. The weight of all lifting devices must be deducted to determine the net load that can be lifted.

Where applicable, specifications conform to ISO Standards. Specifications are subject to change without notice. Lift Point is bucket hinge point with standard bucket attached and bucket cylinder fully extended.

CIRCUIT PRESSURES

WORKING 228 bar (3300 psi)
HOLDING 250 bar (3625 psi)

BOOM LENGTH 1626 mm (64.0 in)
ARM LENGTH 813 mm (32.0 in)

STANDARD BUCKET 400 mm (15.75 in)
30 kg (66.4 lbs)

EXCAVATOR MODEL 319

LIFT POINT HEIGHT	RATED LIFT CAPACITY OVER BLADE, BLADE DOWN - kg (lb)			RATED LIFT CAPACITY OVER BLADE, BLADE UP - kg (lb)			RATED LIFT CAPACITY OVER SIDE, BLADE UP - kg (lb)			RATED LIFT CAPACITY OVER SIDE, BLADE UP, TRACKS EXPANDED - kg (lb)		
	LIFT RADIUS - mm (in)			LIFT RADIUS - mm (in)			LIFT RADIUS - mm (in)			LIFT RADIUS - mm (in)		
mm (in)	2000 (78.7)	3000 (118.1)	Max.	2000 (78.7)	3000 (118.1)	Max.	2000 (78.7)	3000 (118.1)	Max.	2000 (78.7)	3000 (118.1)	Max.
2000 (78.7)			*285 (629)			181 (399)			146 (321)			*279 (615)
1000 (39.4)	*473 (1042)	*292 (644)	*275 (606)	288 (634)	151 (332)	141 (310)	229 (505)	125 (276)	116 (255)	380 (837)	196 (433)	182 (401)
Ground	*536 (1182)	*274 (605)	*249 (548)	261 (576)	151 (332)	142 (312)	213 (469)	120 (265)	108 (237)	351 (773)	198 (436)	181 (398)
-1000 (-39.4)	*377 (831)		*229 (505)	268 (590)		194 (428)	214 (471)		150 (331)	*372 (821)		*231 (510)

60469

* Rated Hydraulic Lift Capacity

SW 05 7111724

N/A

LIFT CHART - STANDARD ARM (7111984) (CONT'D)

N/A

LIFT CHART - LONG ARM (7111984)

[illegible]

N/A

LIFT CHART - LONG ARM (7111984) (CONT'D)

N/A

SERVICE SCHEDULE (7111723)

* Service only when machine is equipped with this item.

■ Service at first 50 hours, then as scheduled.

▲ Service at first 100 hours, then as scheduled.

EVERY 8-10 HOURS

- Check engine coolant level.
- Check engine oil level.
- Check hydraulic fluid level.
- Check air cleaner condition indicator.
- Check and adjust track tension.
- Check indicator lights for correct operation.
- Check canopy or *cab condition and mounting hardware.
- Check seat belt condition and mounting hardware.
- Check control console(s) lockout for proper operation.
- Check for damaged signs (decals) - Replace as needed.
- Grease all machinery pivot points. (See illustrations)
- *Apply grease to slide on extendable arm.
- *Clean cab heater filter.

EVERY 50 HOURS

- Grease swing pinion and swing circle. (See illustrations)
- Drain water and sediment from fuel tank and fuel filter.
- Check battery, cables and electrolyte level.

EVERY 100 HOURS

- Check and adjust belt(s) if required. (Models 319, 320, 323, 325 and 328)
- Spark Arrestor Muffler - Clean spark chamber.
- Replace engine oil and filter. (Model 320)

EVERY 250 HOURS

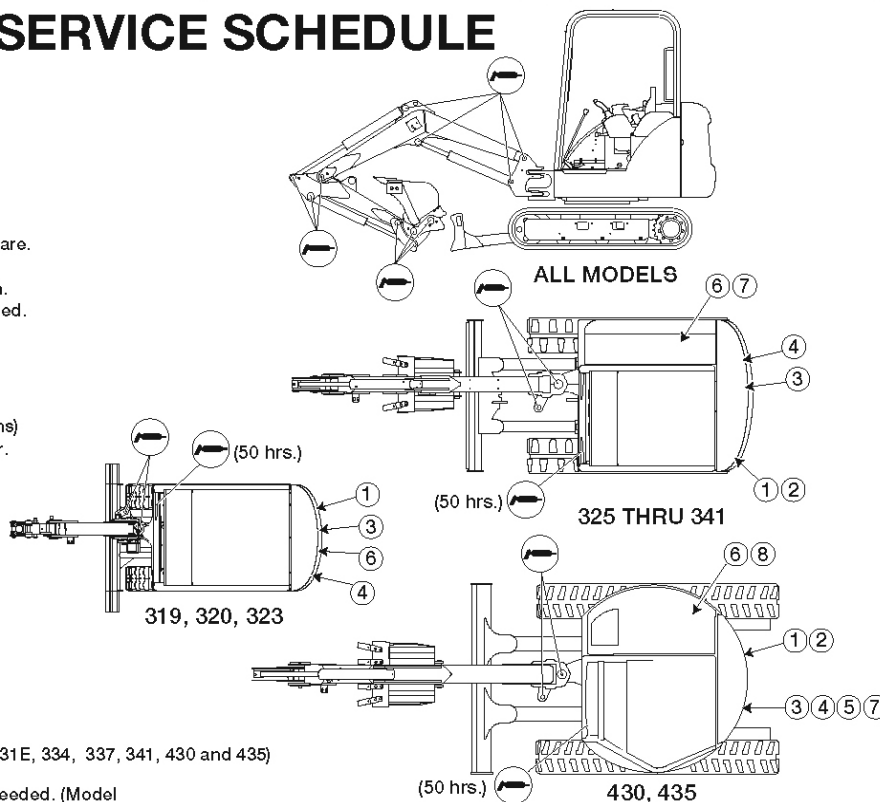
- Replace diesel fuel filter.
- Replace inline diesel fuel filter. (Models 430 and 435)
- Replace engine oil and filter. (Models 325 and 328)
- Check oil level in both final drive cases.

EVERY 500 HOURS

- Replace engine oil and filter. (Models 319, 323, 331, 331E, 334, 337, 341, 430 and 435)
- Clean radiator, oil cooler and *A/C condenser.
- ▲ Check and adjust drive belts and idlers. Replace as needed. (Model 331, 331E, 334, 337, 341, 430 and 435)
- ▲ Replace primary hydraulic filter.
- ▲ Replace case drain hydraulic filter. (All models except 319, 320 and 323)
- Replace fan hydraulic filter. (Models 430 and 435)
- ▲ Check alternator and starter connections.
- Check and adjust engine valve clearance.

EVERY 1000 HOURS OR EVERY 6 MONTHS

- ▲ Replace oil in both final drive cases.
- Drain and flush cooling system - Replace coolant.
- Replace hydraulic fluid and filter(s) - Clean reservoir.

SERVICE SCHEDULE**FILTER CHART**

	319, 320, 323	325, 328	331, 334 331E	337, 341	430	435
1. PRIMARY AIR FILTER	6673752	6672467	6666333	6666375	6666333	6666375
2. SECONDARY AIR FILTER	6673753	6672468	6666334	6666376	6666334	6666376
3. ENGINE OIL FILTER	6671057	6675517	6675517	6675517	6675517	6675517
4. FUEL FILTER	6667352	6667352	6667352	6667352	6667352	6667352
5. INLINE FUEL FILTER	N/A	N/A	N/A	N/A	6633977	6633977
6. PRIMARY HYDRAULIC FILTER	6653336	6661248	6661248	6670207	6668819	6668819
7. DRAIN HYDRAULIC FILTER	N/A	6516722	6516722	6516722	6681012	6681012
8. FAN HYDRAULIC FILTER	N/A	N/A	N/A	N/A	6681012	6681012

* See illustrations above for filter locations.

IMPORTANT

THIS MACHINE IS FACTORY EQUIPPED WITH A U.S.D.A. FORESTRY SERVICE APPROVED SPARK ARRESTOR MUFFLER.

IT IS NECESSARY TO CLEAN THIS SPARK ARRESTOR MUFFLER TO KEEP IT IN WORKING CONDITION. THE SPARK ARRESTOR MUFFLER MUST BE SERVICED BY DUMPING THE SPARK CHAMBER EVERY 100 HOURS OF OPERATION.

[IF THIS MACHINE IS OPERATED ON FLAMMABLE FOREST, BRUSH OR GRASS COVERED LAND, IT MUST BE EQUIPPED WITH A SPARK ARRESTOR ATTACHED TO THE EXHAUST SYSTEM AND MAINTAINED IN WORKING ORDER. FAILURE TO DO SO WILL BE IN VIOLATION OF CALIFORNIA STATE LAW, SECTION 4442. PRC.]

REFER TO LOCAL LAWS AND REGULATIONS FOR SPARK ARRESTOR REQUIREMENTS.

SERVICE SCHEDULE (7111723) (CONT'D)

N/A

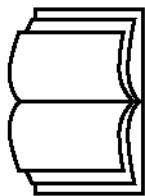
SERVICE SCHEDULE (7111723) (CONT'D)

N/A

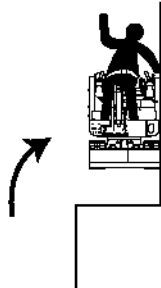
WARNING (6807776)

⚠ WARNING

AVOID INJURY OR DEATH



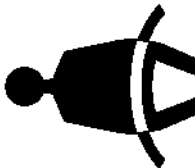
Never use Excavator without instructions.
Read Operation and Maintenance Manual and Handbook.



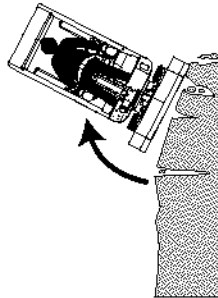
Always use cab/canopy.
Never modify equipment or use attachments not approved by Bobcat Company.



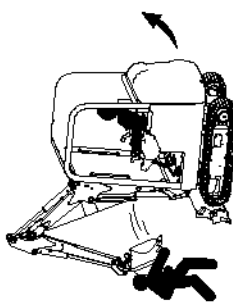
Check for overhead or underground lines before operating.



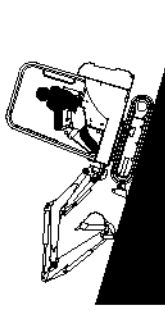
Fasten seat belt securely.
Keep feet and hands on controls.
Operate controls only from operator's position.
42088



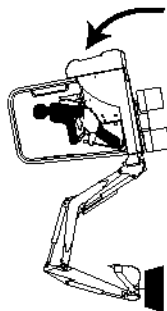
Keep away from drop-offs.
Avoid steep areas or banks that could break away.



Keep bystanders away.
No riders.
Check location of blade for direction of travel before moving steering controls.

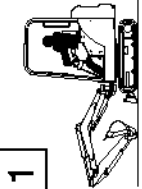


On slopes, keep heavy end uphill.
Do not travel or turn with attachment extended.



When swinging loads:
● Keep load low.
● Swing slowly.
● Do not exceed lift capacity.
Read lift capacity chart.

TO LEAVE THE EXCAVATOR:



1 Lower attachment.
Never park with tracks pointed down hill.



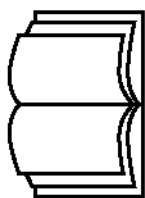
2 Stop the engine.
Raise control console.

Weitere Instruktionen finden sie in der Bedienungsanleitung.
Consulte el Manual del Operador por mas instrucciones.
Se reporter au manuel de l'opérateur pour plus de renseignements.

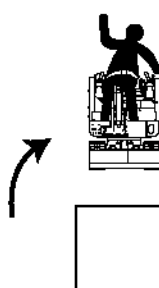
SW 01 6807776

! ADVERTENCIA

EVITE LESIONES OR ACCIDENTES FATALES



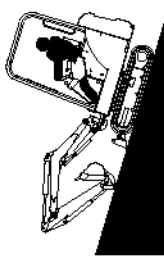
Jamás utilice la Excavadora sin leer las instrucciones previamente.
Lea el Manual de operación y mantenimiento y el Manual del Operador.



Utilice siempre la cabina/cubierta.
Jamás modifique los equipos o utilice implementos no aprobados por Bobcat Company.



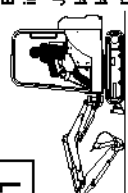
Verifique la presencia de líneas aéreas y subterráneas antes de operar.



En pendiente, mantenga el extremo pesado cuesta arriba.

ANTES DE BAJARSE DE LA EXCAVADORA:

1



Baje el implemento.
Jamás estacione la unidad con las orugas mirando cuesta abajo.

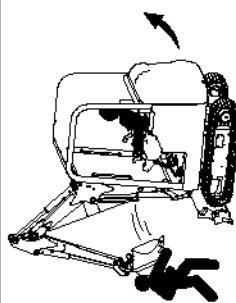
2



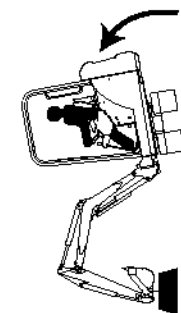
Detenga el motor.
Levante la consola de control.



Abrochese el cinturón de seguridad con firmeza.
Mantenga los pies y las manos en los controles.
Opere los controles solamente desde el asiento del operador.



Mantenga a los espectadores alejados. No lleve pasajeros.
Revise la ubicación de la cuchilla para la dirección del desplazamiento antes de mover los controles de dirección.



Cuando gire cargas:

- Mantenga la carga abajo.
- Gire lentamente.
- No exceda la capacidad de elevación. Lea la tabla de capacidad de elevación.

Weitere instruktionen finden sie in der Bedienungsanleitung.

Consulte el Manual del operador para obtener mayores instrucciones.

Se reporter au manuel de l'opérateur pour plus de renseignements.

SW 01 6807776 AR

42088

WARNING (6807776) (CONT'D)

⚠ AVERTISSEMENT

EVITER LES BLESSURES OU LA MORT



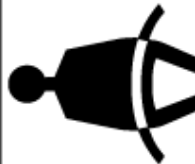
N'utilisez jamais la pelle sans instructions. Lisez le Manuel de l'Opérateur et d'Entretien ainsi que le Guide de l'Opérateur.



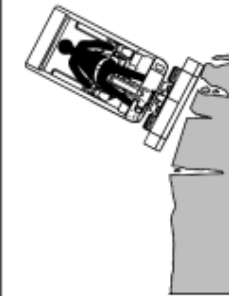
Utilisez toujours une cabine/canopy. Ne modifiez jamais l'équipement et ne rajoutez pas d'accessoires non approuvés par Bobcat.



Vérifiez la présence de lignes aériennes ou de conduites souterraines.



Bouclez soigneusement la ceinture de sécurité. N'actionnez les commandes qu'à partir du siège de l'opérateur.



Évitez les endroits escarpés ou les surfaces instables.



Éloignez les spectateurs. Ne prenez pas de passagers. Vérifiez la position de la lame avant de déplacer les commandes de translation.



En pente, maintenez le côté lourd vers le haut. Ne déplacez pas et ne tournez pas la machine avec l'accessoire en extension.



Tenez la charge vers le bas. Tournez lentement. Ne dépassez pas la capacité de levage (voyez le tableau).

AVANT DE QUITTER LA PELLE :

1



Abaissez l'accessoire. Ne stationnez jamais chenilles vers le bas.

2



Arrêtez le moteur. Relevez la console de commande.

Weitere instruktionen finden sie in der Bedienungsanleitung.
Consulte el Manual del Operador par mas instrucciones.
Voir Manuel de l'Opérateur et d'Entretien pour plus de renseignements.

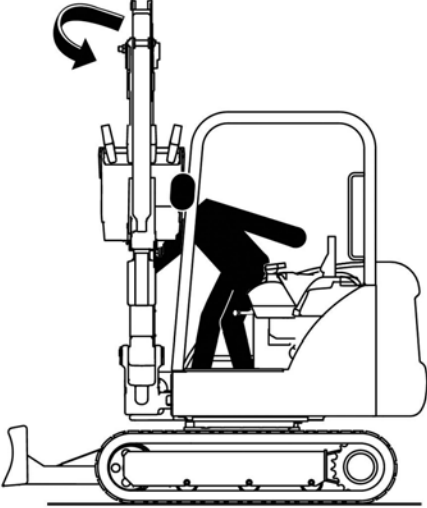
DV-00-6807776-FR

41256

WARNING (6809829)



WARNING



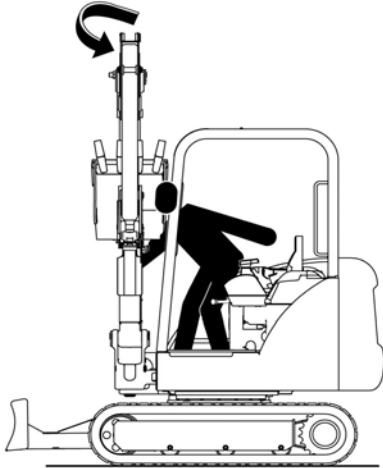
AVOID INJURY OR DEATH

- Never stand and lean out of cab when engine is on.
- Accidental activation of controls can cause serious injury or death.

60469SW 05 6809829



ADVERTENCIA



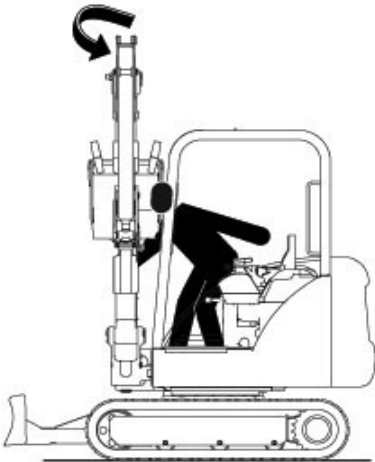
EVITE LESIONES O ACCIDENTES FATALES

- Jamás se pare o recueste fuera de la cabina cuando el motor está encendido.
- No seguir esta instrucción puede provocar la activación accidental de los controles, resultando en un movimiento inesperado de la máquina.

41848SW 04 6809829 AR



AVERTISSEMENT



DANGER DE MORT

- Ne vous mettez pas debout et ne vous penchez pas à l'extérieur de la cabine quand le moteur est en marche.
- En cas de négligence, vous pouvez activer les commandes et entraîner un mouvement accidentel.

41848DV-00-6809829-FR

**AVERTISSEMENT****POUR EVITER DES BLESSURES GRAVES, VOIRE MORTELLES**

- Maintenir les capots fermés à l'exception des opérations d'entretien
- Eloigner tout matériau inflammable du moteur
- Eloigner le corps, les objets et les vêtements flottants des contacts électriques, pièces en mouvement, pièces chaudes et de l'échappement
- Ne pas utiliser la machine dans un lieu présentant des poussières ou gaz explosifs ou avec des matériaux inflammables à proximité de l'échappement
- Tous les gaz d'échappement sont mortels. Aérer le local
- Ne jamais utiliser d'éther ou de fluide de démarrage avec un moteur diesel mais uniquement les dispositifs d'aide au démarrage approuvés par le fabricant du moteur.
- Les fuites de liquide sous haute pression peuvent pénétrer sous la peau et provoquer des blessures graves. Consulter immédiatement un médecin. Porter des lunettes de sécurité. Vérifier les fuites avec un morceau de carton.
- L'électrolyte des batteries provoque des blessures graves. Porter des lunettes de sécurité. En cas de projection d'électrolyte dans les yeux, sur la peau ou les vêtements, rincer et consulter un médecin.
- Les batteries dégagent des gaz inflammables et explosifs. Eviter de produire des arcs électriques et des étincelles ou d'approcher des flammes nues et de fumer à proximité des batteries.
- Pour démarrer avec des câbles volants, brancher le câble négatif sur le bâti de la machine en dernier (jamais sur la batterie). Après démarrage, débrancher le câble négatif en premier.

43594

VM-03-6815915-FR

**ADVERTENCIA****EVITE LESIONES O ACCIDENTES FATALES**

- Mantenga la tapa cerrada excepto para dar servicio.
- Mantenga el motor libre de material inflamable.
- Mantenga el cuerpo, objetos sueltos y prendas alejados de contactos eléctricos, partes móviles y el escape.
- No use la máquina en espacios con polvo o gases explosivos, o con material inflamable cerca del escape.
- Todos los gases de escape pueden matar. Ventile siempre.
- Jamás use ter o fluido de arranque en motores diesel. Use solo ayudas de arranque aprobados por el fabricante del motor.
- Los fluidos bajo presión que se fugan pueden penetrar la piel y provocar lesiones graves. Atención médica inmediata es requerida. Porte lentes de seguridad. Use cartón para verificar la presencia de fugas.
- El ácido de batería causa quemaduras graves. Porte lentes de seguridad. Si el ácido hace contacto con ojos, piel o ropa, purgue y busque atención médica.
- La batería produce gas inflamable y explosivo. Mantenga arcos, chispas, llamas y tabaco encendido alejados.
- Para arrancar en puente, conecte el cable negativo en el bastidor de la máquina de timo (jamás en la batería). Después del arranque en puente, retire primero las conexiones negativas en el marco.

43594

SW-03-6815915-AR

**WARNING****AVOID INJURY OR DEATH**

- Keep cover closed except for service.
- Keep engine clean of flammable material.
- Keep body, loose objects and clothing away from electrical contacts, moving parts, hot parts and exhaust.
- Do not use machine in space with explosive dust or gases or with flammable material near exhaust.
- All exhaust gases can kill. Always ventilate.
- Never use ether or starting fluid on diesel engine. Use only starting aids as approved by engine manufacturer.
- Leaking fluids under pressure can enter skin and cause serious injury. Immediate medical attention is required. Wear goggles. Use cardboard to check for leaks.
- Battery acid causes severe burns. Wear goggles. If acid contacts eyes, skin or clothing, flush and get medical attention.
- Battery makes flammable and explosive gas. Keep arcs, sparks, flames and lighted tobacco away.
- For jump start, connect negative cable to the machine frame last (never at the battery). After jump start, remove negative connections at the frame first.

43594

SW-03-6815915

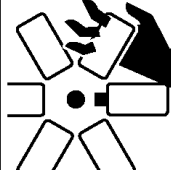
WARNING (6804114)

⚠ WARNING	
	HIGH PRESSURE GREASE CAN CAUSE SERIOUS INJURY • Do not loosen grease fitting. • Do not loosen bleed fitting more than 1-1/2 turns.
	39894 SW 98 6804114

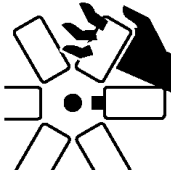
⚠ ADVERTENCIA	
	LA GRASA A ALTA PRESIÓN PUEDE CAUSAR LESIONES GRAVES • No afloje la grasea. • No afloje el drenaje de la grasea en más de 1-1/2 vueltas.
	39894 SW 01 6804114 AR

⚠ AVERTISSEMENT	
	LA GRAISSE SOUS HAUTE PRESSION PEUT CAUSER DES BLESSURES GRAVES • Ne desserrez pas le graisseur. • Ne desserrez pas le purgeur de plus de 1-1/2 tour.
	39894 DV-99-6804114-FR

WARNING (6809832)

⚠ WARNING


Rotating fan blade can cause serious injury.
Do not operate with guard removed.

⚠ ADVERTENCIA


Rotar la cuchilla del ventilador puede causar lesiones serias.
No opere la máquina sin el protector colocado.

⚠ AVERTISSEMENT


Risque de blessures graves. Ne touchez pas les pales du ventilateur en mouvement.
Laissez les protections en place.

⚠ WARNING


Hot surfaces can cause serious injury.
Do not touch.
Allow to cool before servicing.

⚠ ADVERTENCIA


Las superficies calientes pueden causar lesiones serias.
No las toque.
Permita que se enfrien antes de realizar un mantenimiento.

⚠ AVERTISSEMENT


Risque de blessures graves. Ne touchez pas les surfaces brûlantes.
Laissez refroidir avant toute intervention

WARNING (6804233)

⚠ WARNING	
• Hot pressurized fluid. • Can cause serious burns.	
39894	SW 98 6804233

⚠ ADVERTENCIA	
• Fluido presurizado caliente. • Puede provocar quemaduras graves.	
39894	SW 01 6804233 AR

⚠ AVERTISSEMENT	
• Liquide chaud sous pression. • Risque de graves brûlures.	
39894	DV-99-6804233-FR

WARNING (7112679)



60469

KEY SWITCH PRE-HEAT POSITION	AIR TEMP.	PREHEAT TIME (SECONDS)
	41°F (5°C) and Above	0 - 10
	32°F to 41°F (0° to 5°C)	10
	32°F (0°C) and Below	10 - 30 MAX - 45

SEE OPERATOR'S MANUAL FOR MORE INSTRUCTIONS
 WEITERE INSTRUKTIONEN FINDEN SIE IN DER BEDIENUNGSANLEITUNG
 CONSULTA EL MANUAL DEL OPERADOR PARA MAS INSTRUCCIONES. SE
 REPORTER AU MANUAL DE L'OPERATEUR POUR PLUS ENSEIGNEMENT.
 SW 05 7112679

N/A

N/A

WARNING (6810004)

⚠

WARNING

This vehicle is equipped with a motion alarm.

ALARM MUST SOUND

when operating forward or backward. Operator must make certain alarm is working before operating the vehicle.

Always look in the direction of travel.

41909
SW00 6810004

N/A

N/A



Bobcat®

SPECIFICATIONS

319 EXCAVATOR SPECIFICATIONS	SPEC-3
Capacities	SPEC-7
Controls	SPEC-5
Dimensions	SPEC-3
Engine	SPEC-5
Electrical	SPEC-6
Ground Pressure	SPEC-7
Hydraulic Cycle Times	SPEC-6
Hydraulic Cylinders	SPEC-6
Hydraulic System	SPEC-6
Performance	SPEC-5
Slew System	SPEC-7
Tracks	SPEC-7
Undercarriage	SPEC-7

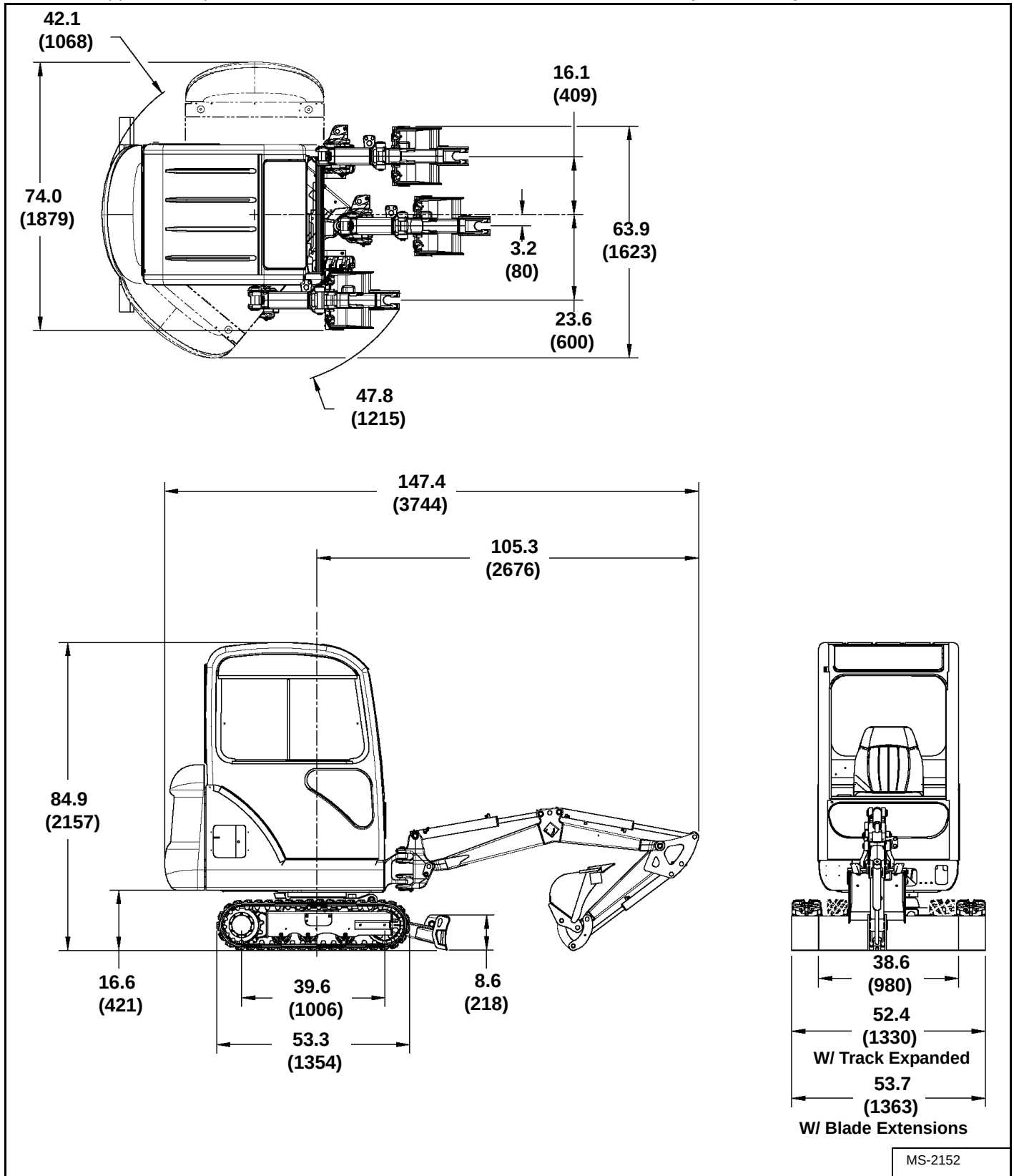
**SPECIFICATIONS
(SPEC)**



319 EXCAVATOR SPECIFICATIONS

Dimensions

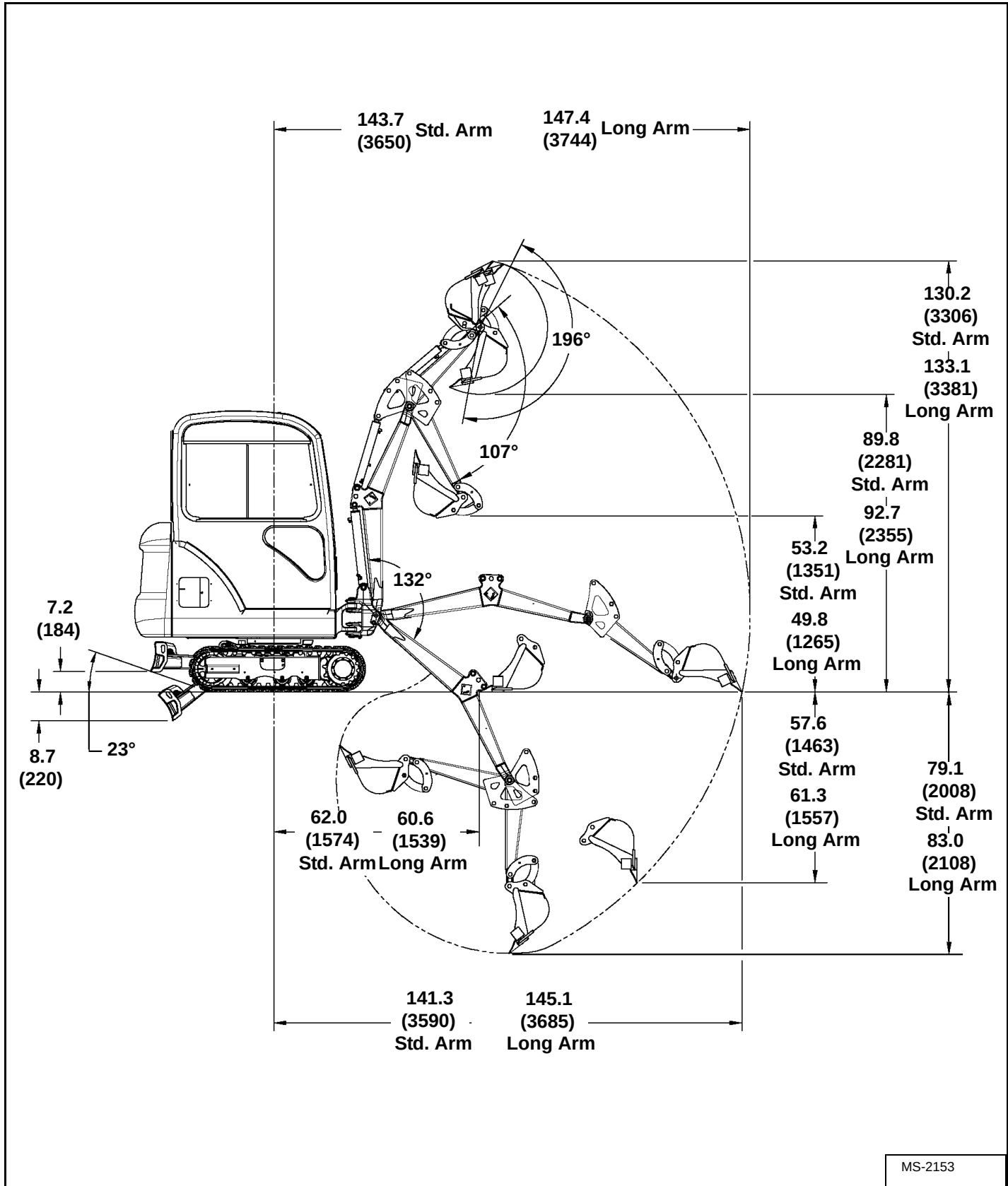
- All dimensions are shown in inches. Respective metric dimensions are given in millimeters enclosed by parentheses.
- Where applicable, specification conform to SAE or ISO standards and are subject to change without notice.



319 EXCAVATOR SPECIFICATIONS (CONT'D)

Dimensions (Cont'd)

- All dimensions are shown in inches. Respective metric dimensions are given in millimeters enclosed by parentheses.
- Where applicable, specification conform to SAE or ISO standards and are subject to change without notice.



319 EXCAVATOR SPECIFICATIONS (CONT'D)

Performance

Operating weight (Canopy w/ 16 inch Bucket & Rubber Tracks)	2803 lb. (1271 kg)
Operating weight (Cab w/ 16 inch Bucket & Rubber Tracks)	3087 lb. (1400 kg)
Travel Speed	1.04 mph (1,66 km/hr.)
Digging Force (per ISO 6015) Arm Bucket	2070 lbf. (9208 N) 2772 lbf. (12330 N)
Boom Swing (Offset)	Left 90° Right 50°

Controls

Steering	Two hand levers
Hydraulics	Two hand operated levers (joysticks) control boom, bucket, arm and upperstructure slew
Auxiliary Hydraulics (Optional)	Controlled by foot pedal
Auxiliary Pressure Release	Controlled by foot pedal
Engine	Hand Lever engine speed, key type start switch
Starting Aid	Glow Plugs - activated by key switch
Brakes Travel Service & Parking Swing Service Holding	Hydraulic lock in motor circuit Hydraulic lock on motor Locking Pin

Engine

Make/Model	Kubota D722-E2B
Fuel/Cooling	Diesel/Liquid (Antifreeze mixture)
Horsepower (SAE Net)	13.3 HP (9,9 kW) @ 2500 RPM
Torque @ 2000 RPM (SAE Net)	31.1 lbf.-ft. (42.2 N•m)
Number Of Cylinders	Three
Displacement	43.9 cu. in. (0,72 L)
Bore / Stroke	2.64 in. / 2.68 in. (67 / 68 mm)
Lubrication	Pressure System with Filter
Crankcase Ventilation	Closed Breather
Air Cleaner	Dual dry replaceable paper cartridges
Ignition	Diesel Compression
Low Idle	1125 - 1225 RPM
High Idle	2635 - 2665 RPM
Engine Coolant	Propylene Glycol / water mixture (53% PG / 47% water)

319 EXCAVATOR SPECIFICATIONS (CONT'D)

Hydraulic System

Pump Type	Engine driven, gear type
Pump Capacity	Three @ 2.64 GPM (10,0 L/min.) @ 2500 RPM
Auxiliary Flow	7.9 GPM (30,0 L/min.) @ 2500 RPM
Hydraulic Filter	Full flow replaceable, 3 micron synthetic media element
Control Valve	9 Spool, Parallel Type Open Center
Fluid Type	Bobcat Fluid, Hydraulic/Hydrostatic 6903117 - (2.5 Gal.) 6903118 - (5 Gal.) 6903119 - (55 Gal.)
System Relief Pressure Travel Circuits Slew Circuit Boom, Arm, Bucket, Blade, Boom Swing, Auxiliary Hydraulics Joystick Control Pressure	3300 PSI (228 bar) 1975-2075 PSI (136-140 bar) 3300 PSI (228 bar) 435 PSI (30,0 bar)
Arm Port Relief Base End Rod End	3625 PSI (250 bar) 3625 PSI (250 bar)
Boom Port Relief Base Rod End	3046 PSI (210 bar) 3625 PSI (250 bar)
Bucket Port Relief Base End Rod End	3625 PSI (250 bar) 3625 PSI (250 bar)
Main Hydraulic Filter Bypass	25 PSI (1,7 bar)

Hydraulic Cylinders

	Bore	Rod	Stroke
Boom (Cushioned - Boom Up)	2.25 (57,2 mm)	1.25 (31,8 mm)	16.95 (430,5 mm)
Arm	2.00 (50,8 mm)	1.25 (31,8 mm)	15.36 (390,1 mm)
Bucket	1.75 (44,5 mm)	1.00 (25,4 mm)	15.16 (385,1 mm)
Blade	2.00 (50,8 mm)	1.25 (31,8 mm)	3.81 (96,8 mm)
Boom Swing (Cushioned - Both Directions)	2.75 (69,85 mm)	1.25 (31,8 mm)	16,19 (429,3 mm)
Undercarriage	1.75 (44,5 mm)	1.00 (25,4 mm)	13,78 (350,0 mm)

Hydraulic Cycle Times

Boom	Raise 4.4 Seconds	Lower 3.9 Seconds
Arm	Retract 2.4 Seconds	Extend 1.9 Seconds
Bucket	Curl 2.0 Seconds	Dump 1.6 Seconds
Blade	Raise 1.5 Seconds	Lower 1.5 Seconds
Boom Swing	Left 3.6 Seconds	Right 4.1 Seconds
Undercarriage	Expand 3.7 Seconds	Retract 3.1 Seconds

Electrical

Starting Aid	Glow Plugs
Alternator	12 volts, 40 amps, open, negative ground
Battery	12 volts - 530 CCA @ 0° F (-18° C)
Starter	12 volts; gear reduction 3.87 HP (1.4 kW)
Instrumentation	Fuel gauge, audible alarm, visual warning for engine functions and hourmeter

319 EXCAVATOR SPECIFICATIONS (CONT'D)**Drive System**

Final Drive	Each track is independently driven by an Axial Piston Motor
Type of Reduction	Two-stage planetary gear reduction

Slew System

Slew Motor	Orbit Motor
Slew Circle	Single row shear type ball bearing with internal gear
Slew Speed	11 RPM

Undercarriage

Crawler Track Design	Sealed track rollers with boxed section track, Roller frame, Grease type track adjuster
Width of crawler	Retracted; 38.6 in. (980 mm) Extended; 52.4 in. (1330 mm)

Capacities

Fuel Tank	6.3 Gal. (23,8 L)
Hydraulic Reservoir	6.8 qt. (6,4 L)
Cooling System	6.0 qt. (5,7 L)
Engine Oil and Filter	3.75 qt. (3,5 L)
Final Drive (each)	0.53 qt. (0,5 L)

Tracks

Type	Rubber
Width	7.87 in. (200 mm)
Number Of Shoes	Single Assembly
Number of Track Rollers (per side)	3

Ground Pressure

Rubber Tracks (per SAE J1309)	4.24 PSI (0,29 bar)
-------------------------------	---------------------



WARRANTY

WARRANTY.....WARRANTY-3

WARRANTY



Bobcat®

WARRANTY

Bobcat Excavators

Bobcat Company warrants to its authorized dealers and authorized dealers of Bobcat Equipment Ltd., who in turn warrant to the owner, that each new Bobcat Excavator will be free from proven defects in material and workmanship with respect to (i) all components of the product except as otherwise specified herein for twelve (12) months, (ii) tracks for twelve (12) months on a prorated basis based on the remaining depth of the track at the time any defect is discovered, and (iii) Bobcat brand batteries, for an additional twelve (12) months after the initial twelve month warranty period, provided that Bobcat Company shall only reimburse a fixed portion of the cost of replacing the battery during such additional twelve months. The foregoing time periods shall all commence after delivery by the authorized Bobcat dealer to the original buyer.

During the warranty period, the authorized Bobcat dealer shall repair or replace, at Bobcat Company's option, without charge for parts and labor, any part of the Bobcat product except as otherwise specified herein which fails because of defects in material or workmanship. The owner shall provide the authorized Bobcat dealer with prompt written notice of the defect and allow reasonable time for repair or replacement. Bobcat Company may, at its option, require failed parts to be returned to the factory. Travel time of mechanics and transportation of the Bobcat product to the authorized Bobcat dealer for warranty work are the responsibility of the owner. The remedies provided in this warranty are exclusive.

This warranty does not apply to diesel engine fuel injection pumps and injectors. The owner shall rely solely on the warranty, if any, of the respective manufacturers thereof. This warranty does not cover replacement of scheduled service items such as oil, filters, tune-up parts, and other high-wear items. This warranty does not cover damages resulting from abuse, accidents, alterations, use of the Bobcat product with any accessory or attachment not approved by Bobcat Company, air flow obstructions, or failure to maintain or use the Bobcat product according to the instructions applicable to it.

THIS WARRANTY IS EXCLUSIVE AND IN LIEU OF ALL OTHER WARRANTIES AND CONDITIONS, EXCEPT THE WARRANTY OF TITLE. BOBCAT COMPANY DISCLAIMS ALL OTHER WARRANTIES AND CONDITIONS, EXPRESS OR IMPLIED, INCLUDING ANY IMPLIED WARRANTIES OR CONDITIONS OF MERCHANTABILITY OR FITNESS FOR A PARTICULAR PURPOSE. IN NO EVENT SHALL BOBCAT COMPANY OR THE AUTHORIZED BOBCAT DEALER BE LIABLE FOR ANY SPECIAL, INCIDENTAL, INDIRECT OR CONSEQUENTIAL DAMAGES, WHATSOEVER, INCLUDING, BUT NOT LIMITED TO, LOSS OR INTERRUPTION OF BUSINESS, LOST PROFITS, OR LOSS OF MACHINE USE, WHETHER BASED ON CONTRACT, WARRANTY, TORT, NEGLIGENCE, STRICT LIABILITY, STATUTE OR OTHERWISE, EVEN IF BOBCAT COMPANY OR THE AUTHORIZED BOBCAT DEALER HAS BEEN ADVISED OF THE POSSIBILITY OF SUCH DAMAGES. THE TOTAL LIABILITY OF BOBCAT COMPANY AND THE AUTHORIZED BOBCAT DEALERS WITH RESPECT TO THE PRODUCT AND SERVICES FURNISHED HEREUNDER SHALL NOT EXCEED THE PURCHASE PRICE OF THE PRODUCT UPON WHICH SUCH LIABILITY IS BASED.





ALPHABETICAL INDEX

AIR CLEANER SERVICE.....	PM-10
ALTERNATOR BELT	PM-32
ATTACHMENTS.....	OI-31
BLADE CONTROL LEVER	OI-17
BLADE EXTENSION.....	PM-34
BOBCAT COMPANY IS ISO 9001:2000 CERTIFIED	V
BOOM SWING PEDAL	OI-20
CAB FILTERS	PM-9
CONTROL CONSOLE LOCKOUTS	PM-6
DAILY INSPECTION	OI-21
DELIVERY REPORT.....	VII
ELECTRICAL SYSTEM	PM-20
ENGINE LUBRICATION SYSTEM.....	PM-15
ENGINE COOLING SYSTEM	PM-17
EXCAVATOR IDENTIFICATION.....	VIII
EXCAVATOR STORAGE AND RETURN TO SERVICE	PM-39
FUEL SYSTEM	PM-12
HYDRAULIC CONTROLS.....	OI-14
HYDRAULIC SYSTEM.....	PM-25
INSTRUMENTS AND CONSOLES.....	OI-3
LIFTING THE EXCAVATOR	OI-40
LUBRICATING THE EXCAVATOR.....	PM-35
OPERATOR CAB (ROPS / TOPS).....	OI-7
OPERATOR CANOPY (ROPS / TOPS).....	OI-7
OPERATING PROCEDURE	OI-32
PIVOT PINS	PM-38
PRE-STARTING PROCEDURE.....	OI-23
REGULAR MAINTENANCE ITEMS.....	V

ALPHABETICAL INDEX

Continued On Next Page

ALPHABETICAL INDEX (CONT'D)

SEAT BELT.....	PM-7
SERIAL NUMBER LOCATIONS	VII
SERVICE SCHEDULE	PM-5
SPARK ARRESTOR MUFFLER.....	PM-28
STOPPING THE ENGINE AND LEAVING THE EXCAVATOR	OI-29
TAILGATE.....	PM-8
TOWING THE EXCAVATOR	OI-39
TRACK FRAME EXPANSION	OI-18
TRACK TENSION	PM-29
TRACK ROLLER AND IDLER LUBRICATION.....	PM-35
TRANSPORTING THE EXCAVATOR ON A TRAILER	OI-41
TRAVEL CONTROLS.....	OI-12
TRAVEL MOTOR	PM-31
WARRANTY	WARRANTY-3