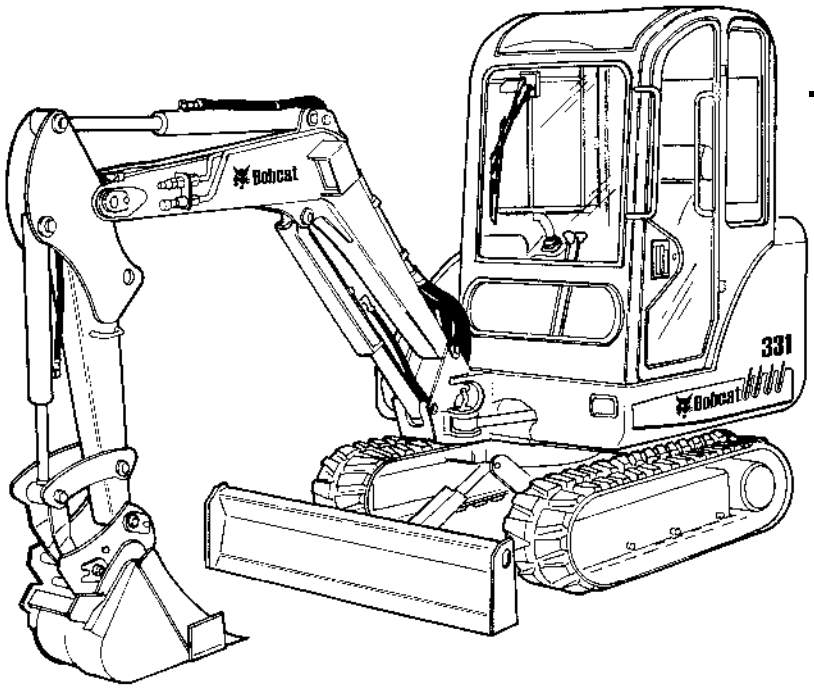
331
331E
334

EN

Bobcat®

Operation & Maintenance Manual

331 - S/N 234311001 & Above
331E - S/N 234411001 & Above
334 - S/N 234511001 & Above
(G Series)



An Ingersoll-Rand business

6902612-EN (01-04) (1)

Printed in Europe

OPERATOR SAFETY WARNING

⚠ WARNING

Operator must be instructed before running the machine. Untrained operators can cause injury or death.

W-2001-1285

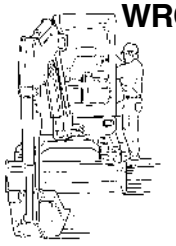
This symbol with a warning statement, means: "Warning, be alert! your safety is involved!" Carefully read the message that follows.

CORRECT

B-10731a

- **Never operate without instructions.**
- **Read machine signs and Operation & Maintenance Manual.**

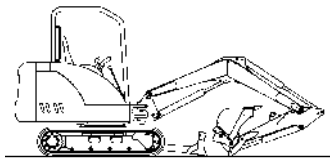
WRONG



B-19961

- **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.**

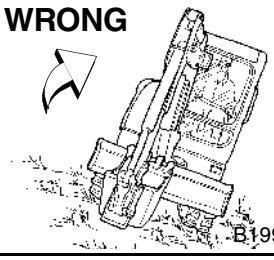
CORRECT



MS-1853

- **Never operate without approved canopy or cab.**
- **Never modify equipment.**
- **Never use attachments not approved by Bobcat Company.**

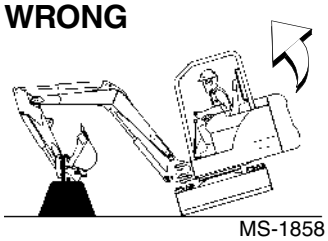
WRONG



B19934

- **Avoid steep areas or banks that could break away.**

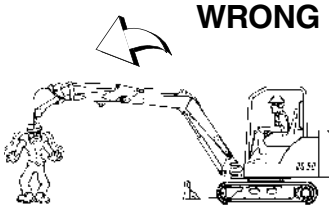
WRONG



MS-1858

- **Use caution to avoid tipping - do not swing heavy load over side of track.**
- **Operate on flat, level ground.**

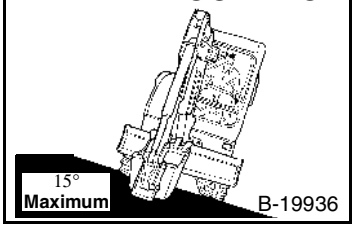
WRONG



MS1859

- **Keep bystanders out of maximum reach area.**
- **Do not travel or turn with bucket extended.**
- **Never carry riders.**

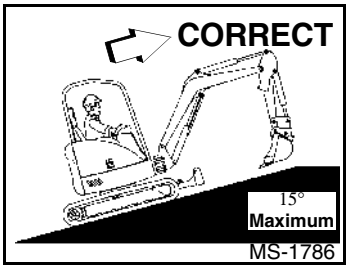
CORRECT



B-19936

- **Never exceed a 15° slope to the side.**

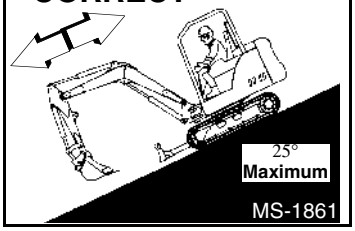
CORRECT



MS-1786

- **Never travel up a slope that exceeds 15°.**

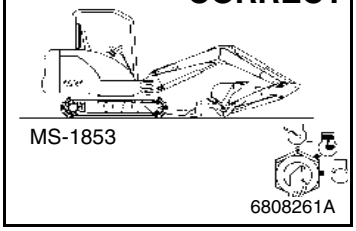
CORRECT



MS-1861

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

CORRECT



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. **Swing Lock**
3. **ROPS/TOPS Canopy or Cab**
4. **Machine Safety Signs**
5. **Safety Tread**
6. **Grab Handles**

OSW24-1003

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PREVENTIVE MAINTENANCE PM-1

SYSTEM SET-UP AND ANALYSIS. SA-1

SPECIFICATIONS SPEC-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 Europe
J. Huysmanslaan 59
B-1651 LOT
Belgium

CE


Bobcat®

FOREWORD

This manual gives the owner/operator necessary operating and preventive maintenance instructions for the Bobcat Excavator.

Read this manual completely and get to know the Bobcat Excavator before operating and servicing it. All references to left or right on the Excavator are given in relation to the operator's left or right hand while in the operator's seat.

For further information, see your Bobcat Excavator dealer. Parts Manuals, Service Manuals and extra Operation & Maintenance Manuals are also available.

BOBCAT COMPANY IS ISO 9001:2000 CERTIFIED V

BOBCAT EXCAVATOR IDENTIFICATION VIII

DELIVERY REPORT VII

FEATURES AND ACCESSORIES IX

REGULAR MAINTENANCE ITEMS V

SERIAL NUMBER LOCATIONS VII


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BOBCAT COMPANY IS ISO 9001:2000 CERTIFIED

ISO 9001:2000 is a set of international standards that control the processes and procedures which we use to design, develop, manufacture, distribute, and service Bobcat products.

British Standards Institute (**BSI**) is the Certified Registrar Bobcat chose to assess the Company's compliance with the ISO 9001:2000 set of standards. 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, such as 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.

REGULAR MAINTENANCE ITEMS

	ENGINE OIL FILTER 6675517		BATTERY 6670251
	FUEL FILTER 6667352		FLUID, Hydraulic/Hydrostatic (15 litres) 6563328
	AIR FILTER, Outer 6666333		RADIATOR CAP 6646678
	AIR FILTER, Inner 6666334		PROPYLENE GLYCOL ANTI-FREEZE, Premixed [-34 F] (-37C) 6724094
	PRIMARY HYDRAULIC FILTER 6661248 CASE DRAIN HYDRAULIC FILTER 6516722		PROPYLENE GLYCOL ANTI-FREEZE, Concentrate 6724354

MOTOR OIL

6667299 SAE 15W40 CE/SG (11 L)	6724558 SAE 15W40 CE/SG (4 L)	6674294 SAE 15W40 CE/SG (9.5 L)
6657301 SAE 10W30 CE/SG (11 L)	6724557 SAE 10W30 CE/SG (4 L)	6674205 SAE 10W30 CE/SG (9.5 L)
6657303 SAE 30W CE/SG (11 L)	6724559 SAE 30W CS/SG (4 L)	6674206 SAE 30W CS/SG (9.5 L)


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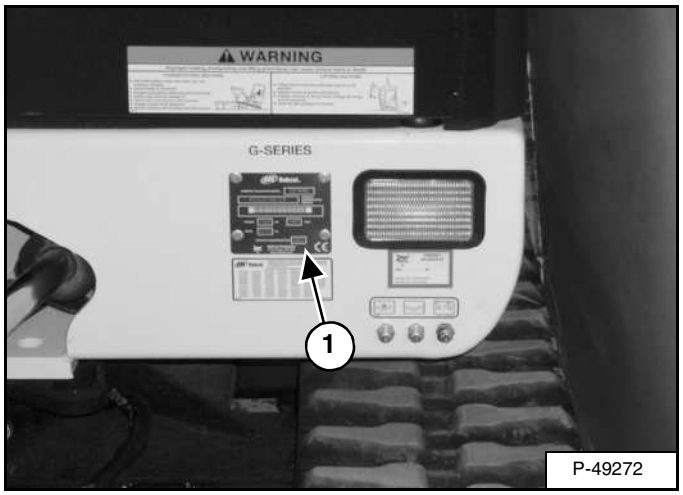
SERIAL NUMBER LOCATIONS

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

Excavator Serial Number

Figure 1



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

Explanation of Excavator Serial Number:

XXXX XXXXX

- XXXXX — Module 2. - Production Sequence (Series)
- XXXX — Module 1. - Model / Engine Combination

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

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

Engine Serial Number

Figure 2

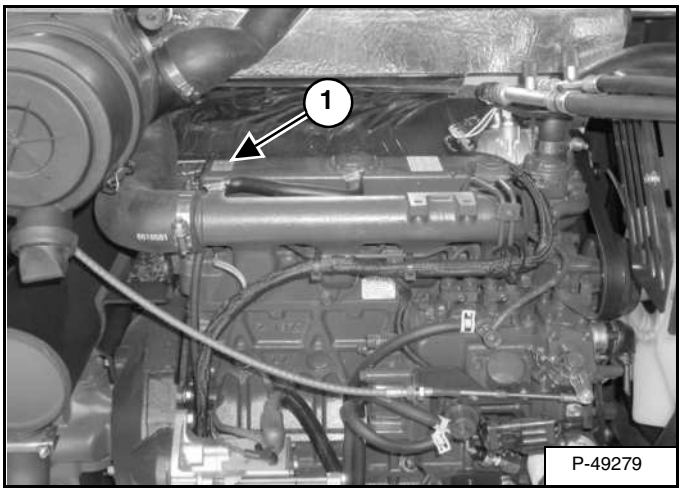
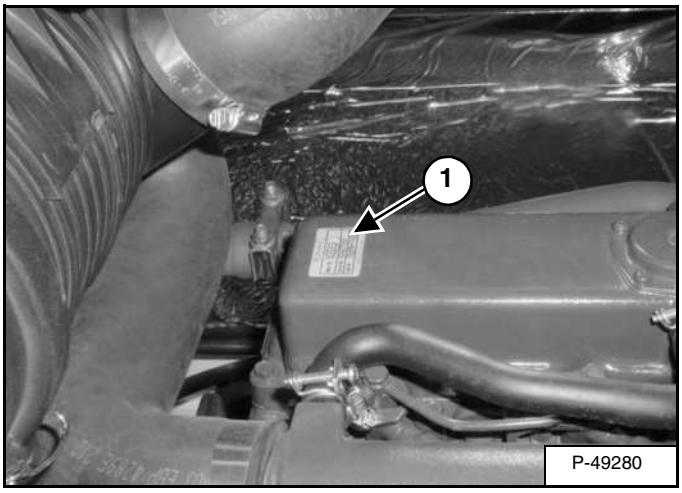


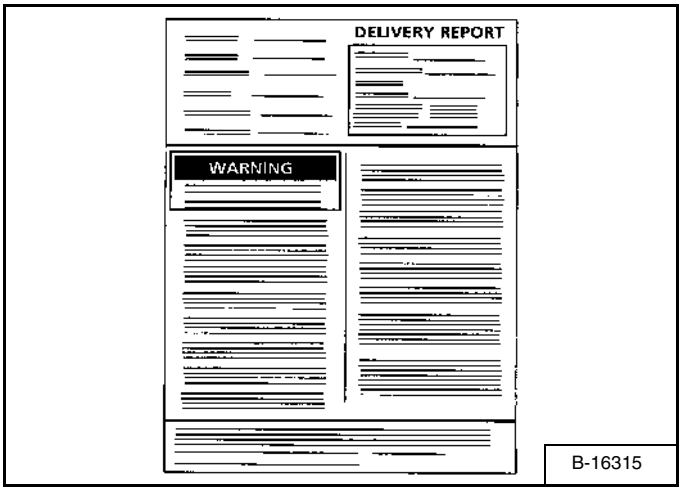
Figure 3



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

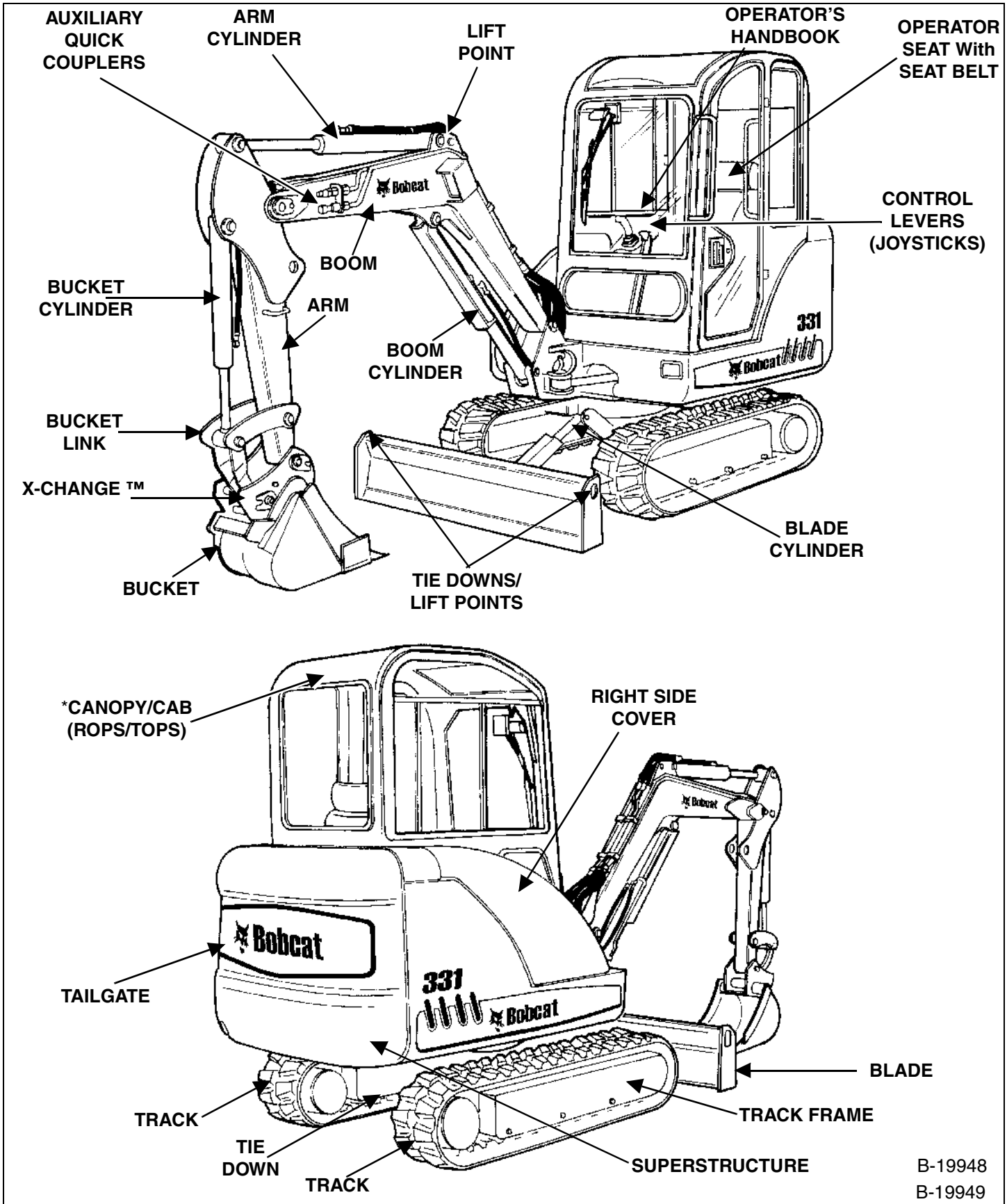
DELIVERY REPORT

Figure 4



The delivery report must be filled in 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 in completely **[Figure 4]**.

BOBCAT EXCAVATOR IDENTIFICATION



B-19948
B-19949

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

FEATURES AND ACCESSORIES

Standard Items

Model 331, 331E & 334 Bobcat Excavators are equipped with the following standard items:

- Canopy with ROPS/TOPS Approval
- 1524 mm Dozer Blade
- 400 mm Rubber Tracks
- Two-Speed Travel
- Auxiliary Hydraulics
- Hydraulic and Travel Control Lock-outs
- Blade Float
- Working Lights - Boom and Frame Mounted
- Engine and Hydraulic system Monitor with Shut Down
- Horn
- Hydraulic Joystick Controls
- Suspension Seat
- Spark Arrester Silencer
- Advanced Diagnostics
- Counterweight (331, 334, 331E)
- Hydraulic Extendable Arm (331E)
- Direct to Tank Auxiliary Hydraulics

Subject to change.

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 With Heater and A.C.
- Enclosed Cab With Heater
- Travel Motion Alarm
- Keyless Start
- Canopy/Cab Mounted Lights
- Catalytic Exhaust Purifier
- Top Guard Kit (FOGS)
- Steel Tracks
- Special Application Cab
- Counterweight (331)
- Long Arm (331)
- Extendable Arm (331, 334)
- X-Change ™

Attachments

These and other attachments are approved for use on this model Bobcat 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.

- Heavy duty trenching bucket
- Trenching buckets
- Grading bucket
- Auger
- Breaker
- Hydraulic Clamp (331, 334)
- 3-Tined Grapple (331, 334)
- Compactor (Arm retracted and pinned 331E)
- Power Tilt (Arm retracted and pinned 331E)
- Ripper
- 130 mm Grading blade
- Hydro tilt
- Cutter crusher (331, 334)

Buckets

Increase the versatility of your Bobcat Excavator with a variety of bucket sizes.

- 305 mm Trenching
- 406 mm Trenching
- 508 mm Trenching
- 610 mm Trenching
- 610 mm Heavy duty trenching
- 760 mm Trenching
- 914 mm Trenching
- 991 mm Grading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SAFETY INSTRUCTIONS

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SAFETY INSTRUCTIONS XIII
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Fire Prevention xv
Safe Operation Is The Operator's Responsibility. xiii


Bobcat®

SAFETY INSTRUCTIONS

Safe Operation Is The Operator's Responsibility

Carefully follow the operating and maintenance instructions in this manual.

The Bobcat Excavator is highly manoeuvrable 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 gases can kill or cause illness, so use the Excavator with adequate ventilation. The Excavator has a spark arrester exhaust system or silencer which is required for operation in certain areas.

The dealer explains the capabilities and restrictions of the Bobcat Excavator and attachments 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 and 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 Excavator-attachment combination.

The following publications and training materials provide information on the safe use and maintenance of the Bobcat Excavator and attachments:

- The Delivery Report is used to assure that complete instructions have been given to the new owner and that the Bobcat Excavator and attachment are in safe operating condition.

- The Operation & Maintenance Manual delivered with the Bobcat Excavator or attachment gives operating information as well as routine maintenance and service procedures. It is a part of the machine and is stored in a container provided inside the cab of the Excavator. Replacement Operation & Maintenance Manuals may be ordered from your Bobcat dealer.

- Machine signs (stickers) instruct on the safe operation and care of your Bobcat Excavator 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 cab of the Excavator. Its brief instructions are convenient to the operator. The Handbook is available from your dealer in an English edition or one of many other languages. See your Bobcat dealer for more information on translated versions.

The 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 should ask the dealer for recommendations on the new use.

SI22-0803

Before Operating the Bobcat Compact Excavator

Safety Alert Symbol

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

WARNING

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

W-2001-0502

IMPORTANT

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

I-2019-0284

WARNING

Warnings on the machine and in the manuals are for your safety. Failure to obey warnings may 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 must not use drugs or alcoholic drinks which impair his alertness or co-ordination while working. An operator who is taking prescription drugs must get medical advice to determine if he 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, and machine signs (transfers).
- Check the rules and regulations at your location. The rules may include your 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.

Know the Work Conditions

- Know the weight of the materials being handled. Avoid exceeding the Rated Lifting 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 needs to know about excessive slopes.
- Know the location of any underground lines.
- Wear tight-fitting clothing. Always wear safety glasses when doing maintenance or service. Safety glasses, hearing protection or special applications kit are required for some work. See your dealer about Bobcat Safety equipment.

SI23-1003

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 arrester exhaust system (if equipped) is designed to control the emission of hot particles from the engine and exhaust system, but the silencer and the exhaust gases are still hot.

- Do not use the machine where exhaust, arcs, sparks or hot components may 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 petrol or diesel fuel for cleaning parts. Use commercial non-flammable solvents.

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

- Always clean the machine, disconnect the battery, and disconnect the wiring from the electronic 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 may be produced.

- Stop the engine and let it cool before refuelling. No smoking!

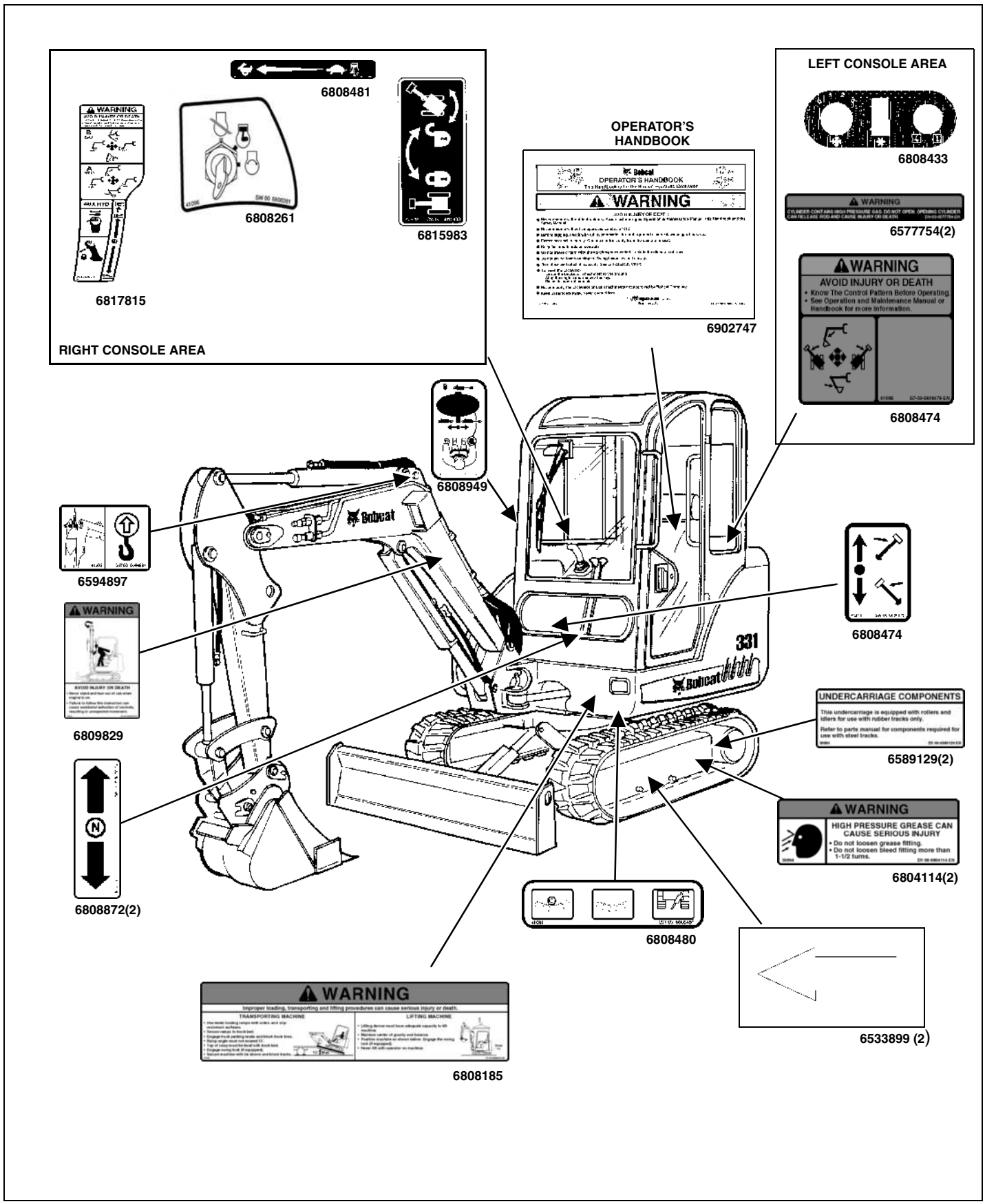
- Use the procedure in the Operation & Maintenance Manual for connecting the battery and for jump-lead starting.

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

SI24-0703

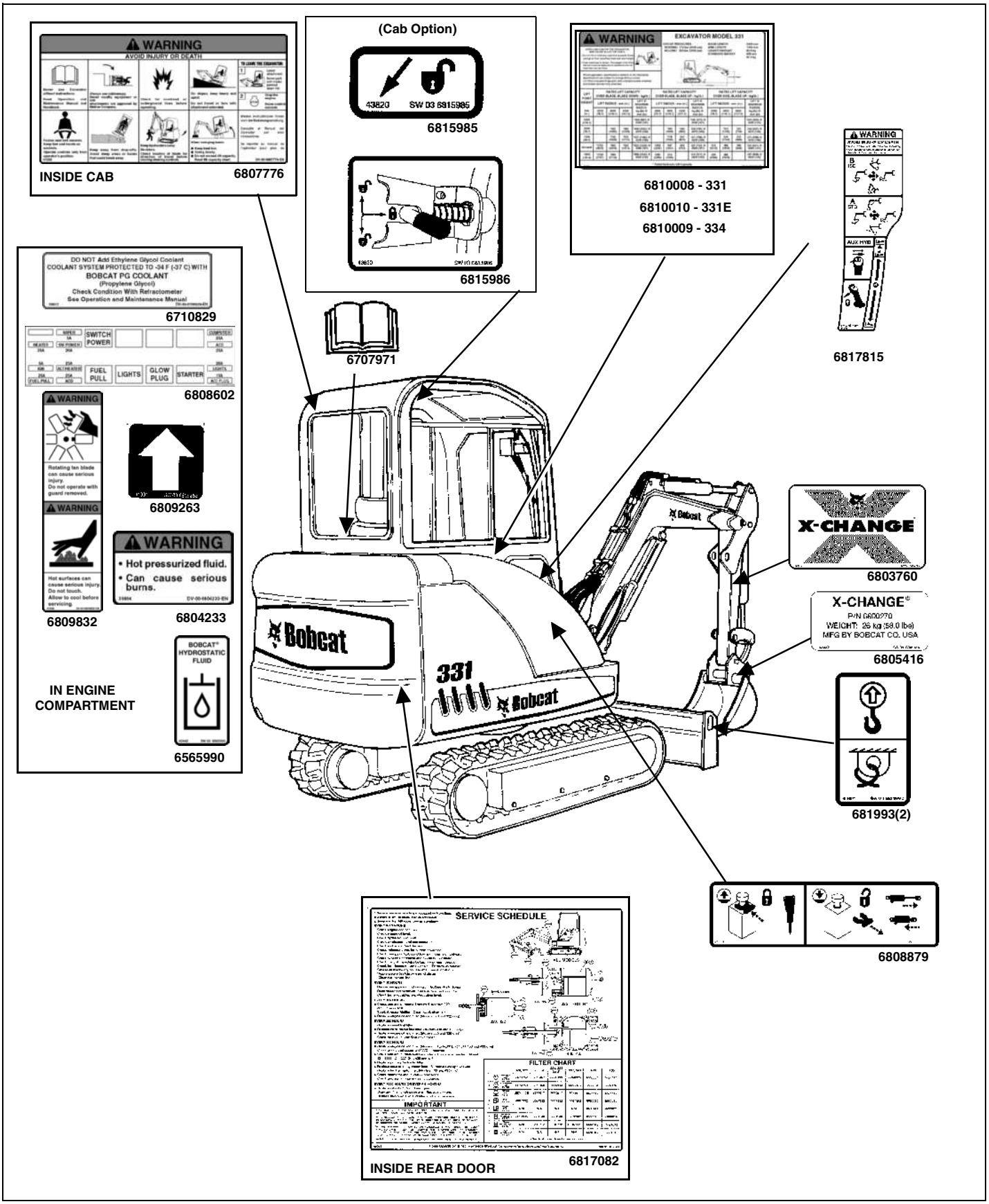
MACHINE SIGNS (TRANSFERS)

Follow the instructions on all the Machine Signs (Transfers) 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.



MACHINE SIGNS (TRANSFERS) (CONT'D)

Follow the instructions on all the Machine Signs (Transfers) 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.




Bobcat®

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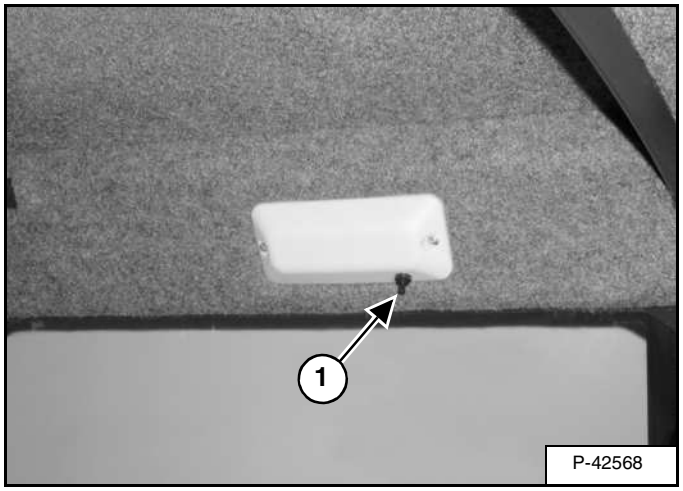
INSTRUMENTS AND CONSOLES

Cab Interior Light (If Equipped)

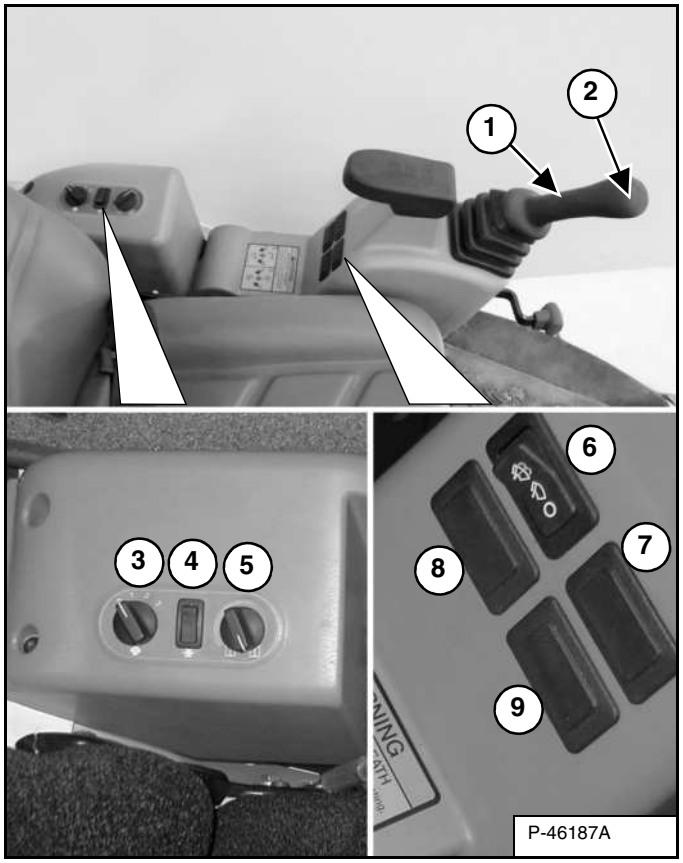
Figure OI-1



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

Left Console

Figure OI-2



Left Control Lever (Joystick) (Item 1) **[Figure OI-2] -** (See HYDRAULIC CONTROLS on Page OI-18).

Horn - (Item 2) **[Figure OI-2]** Press the button on the Control Lever to sound the horn.

Heater/Air Conditioner (with Cab Option Only)

Fan Motor - (Item 3) **[Figure OI-2]** Turn clockwise to increase fan speed; anticlockwise to decrease. There are four positions: OFF - 1 - 2 - 3.

Air Conditioner - (Item 4) **[Figure OI-2]** Press the top of the switch to turn the Air Conditioner ON (light in switch will be ON); press bottom to turn OFF,

Temperature Control - (Item 5) **[Figure OI-2]** Turn clockwise to increase temperature; anticlockwise to decrease.

Switches

Wiper/Washer Switch - (Item 6) **[Figure OI-2]** Press the switch to the left to start the wiper. The switch will stay in this position.

Press to the right to turn the wiper OFF.

Press and hold to the left to turn the washer ON to help clean the window. The switch will return to the ON position when released.

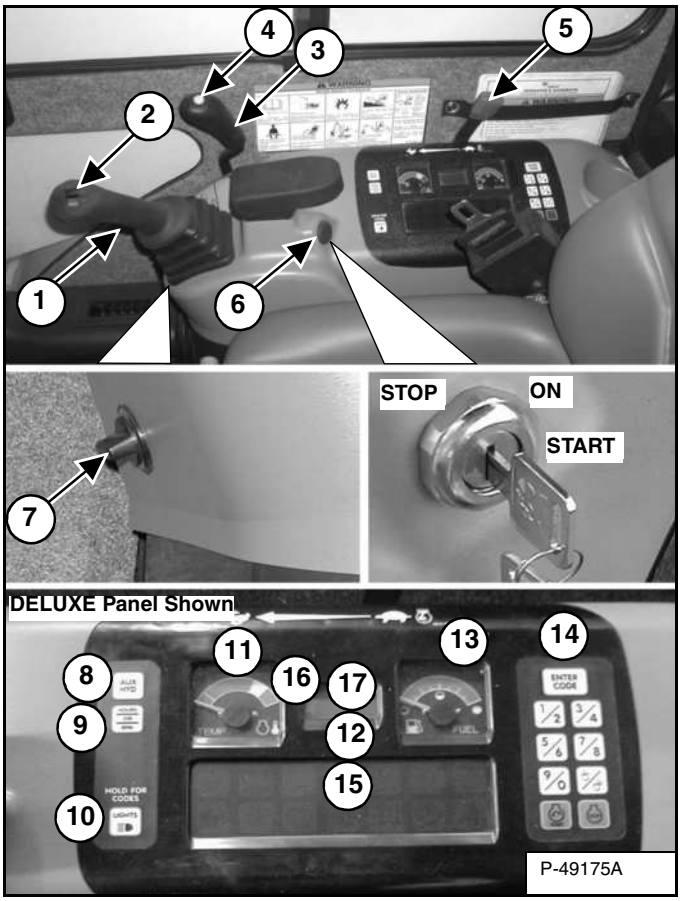
Future Use - (Item 7) **[Figure OI-2]**

Future Use - (Item 8) **[Figure OI-2]**

Future Use - (Item 9) **[Figure OI-2]**

Right Console

Figure OI-3



Right Control Lever (Joystick) - (Item 1) **[Figure OI-3]** (See HYDRAULIC CONTROLS on Page OI-18).

Auxiliary Hydraulics Switch - (Item 2) **[Figure OI-3]** Controls the fluid flow to the auxiliary quick couplers (attachment). (See Auxiliary Hydraulics on Page OI-33).

Blade Control Lever - (Item 3) **[Figure OI-3]** Controls raising and lowering the blade. Pushed all the way forward puts blade in float position. (See BLADE CONTROL LEVER on Page OI-19).

Two-Speed Button - (Item 4) **[Figure OI-3]** Engages and disengages High Range Travel Speed, (See Two-Speed Travel on Page OI-7).

Speed Control Lever - (Item 5) **[Figure OI-3]** Controls the RPM of the engine.

Key Switch (STANDARD Panel Only) - (Item 6) **[Figure OI-3]** Always perform the *PRE-STARTING PROCEDURE*, (See PRE-STARTING PROCEDURE on Page OI-22). Before starting the engine. (See STARTING THE ENGINE on Page OI-24).

STOP - Key switch OFF; engine stopped
ON - Position when the engine is running.
START - Start engine.

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

Auxiliary Power Outlet - (Item 7) **[Figure OI-3]** Provides 12 volt receptacle for accessories.

Auxiliary Hydraulic Button - (Item 8) **[Figure OI-3]** Activates and deactivates auxiliary hydraulic function. (See Auxiliary Hydraulics on Page OI-33).

HOURS/JOB/RPM - (Item 9) **[Figure OI-3]** Press to show HOURS, JOB CLOCK or Engine RPM in LCD (Liquid Crystal Display, Item 12.) **[Figure OI-3]** (See "Password Lock-out Feature" on Page SA-5.)

LIGHTS/HOLD FOR CODES - (Item 10) **[Figure OI-3]** Press once to turn lights ON; press again to turn lights OFF, Press and hold two seconds for display of SERVICE CODES in LCD (Item 12) **[Figure OI-3]**.

TEMPerature - (Item 11) **[Figure OI-3]** Shows the engine coolant temperature.

LCD (Liquid Crystal Display) - (Item 12) **[Figure OI-3]** The LCD is the HOUR METER during normal operation of the Excavator, When preheat is activated (Keyless Start), the LCD will show remaining preheat time. Can also be used to display JOB CLOCK or Engine RPM. (See "Job Clock" on Page SA-5.)

FUEL Gauge - (Item 13) **[Figure OI-3]** Shows the amount of fuel in the tank.

Keyless Start (DELUXE Panel Only) - (Item 14) **[Figure OI-3]** (Always perform the *PRE-STARTING PROCEDURE*, (See PRE-STARTING PROCEDURE on Page OI-22). Before starting the engine. (See STARTING THE ENGINE on Page OI-24).

Function Icons - (Item 15) **[Figure OI-3]** (See Function Icons on Page OI-5).

JOB - (Item 16) **[Figure OI-3]** On when JOB CLOCK is activated.

RPM - (Item 17) **[Figure OI-3]** On when Engine RPM is activated.

Function Icons

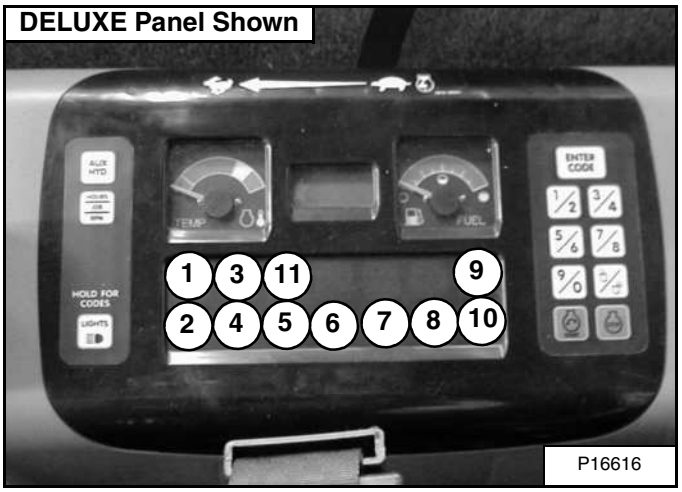
The table below shows the Icons, their function and other important information.

REF.	FUNCTION	ICON/LIGHT	ALARM	CONDITION/ CODE	DESCRIPTION
1	Auxiliary Hydraulics	OFF CONTINUOUS FLASHING	--- --- 3 Beeps	--- --- Error ♦	Auxiliary Hydraulics Button pressed, hydraulic functions available. Error with Auxiliary Hydraulics.
2	Two-Speed Travel	OFF CONTINUOUS FLASHING	--- --- 3 Beeps	--- --- Error ♦	Two-Speed activated, High Range engaged Solenoid Error
3	Hydraulic/ Traction Drive	CONTINUOUS OFF FLASHING FLASHING	--- --- 3 Beeps CONTINUOUS	* --- Error ♦ Error ♦	Left Console down. Hydraulic/Traction Drive functions activated Left Console up. Hydraulic/Traction Drive functions deactivated Error with console sensor or workgroup solenoid Workgroup solenoid not connected
4	Glow Plugs	OFF CONTINUOUS FLASHING	--- --- 3 Beeps	--- Error ♦	Glow Plugs energized * Error with Glow Plugs
5	System Voltage	OFF FLASHING	--- 3Beeps 3 Beeps CONTINUOUS CONTINUOUS	* Error ♦ Warning ♦ Warning ♦ Shutdown ♦	Voltage out of range Voltage low or high Voltage extremely high Voltage extremely low - Engine will stop in 10 seconds.
6	Engine Oil Pressure	OFF CONTINUOUS CONTINUOUS FLASHING	--- 3Beeps 3Beeps CONTINUOUS	* Error ♦ Warning ♦ Shutdown ♦	Engine Oil Pressure sender out of range. Engine Oil level low. Engine Oil pressure very low, Engine will shutdown in 10 seconds.
7	Hydraulic Oil Filter & Temperature	OFF FLASHING CONTINUOUS CONTINUOUS FLASHING	--- 3Beeps 3Beeps 3 Beeps CONTINUOUS	* Warning ♦ Error ♦ Warning ♦ Shutdown ♦	Error with Hydraulic Filter Hydraulic Oil Temperature out of range Hydraulic Filter plugged or temperature high Hydraulic Oil Temp. extremely high - Engine will stop in 10 seconds.
8	General Warning	OFF CONTINUOUS CONTINUOUS FLASHING	--- 3Beeps 3Beeps CONTINUOUS	* Error ♦ Warning ♦ Shutdown ♦	Error with one or more engine, hydraulic, or fuel functions. Low fuel, engine speed high, coolant temperature high Coolant temperature or engine speed extremely high - Engine will stop in 10 seconds.
9	Keypad Unlocked	ON OFF	--- ---	--- ---	Panel is unlocked
10	Seat Belt	ON	---	---	Light stays on for 45 seconds to remind operator to fasten seat belt.
11	Low Fuel	OFF CONTINUOUS	--- 3 Beeps	--- Warning	Light stays on

* This is the normal operating condition.

♦ These functions are monitored and have SERVICE CODES associated with them, See SYSTEM SET-UP & ANALYSIS Page SA-3 for descriptions of SERVICE CODES.

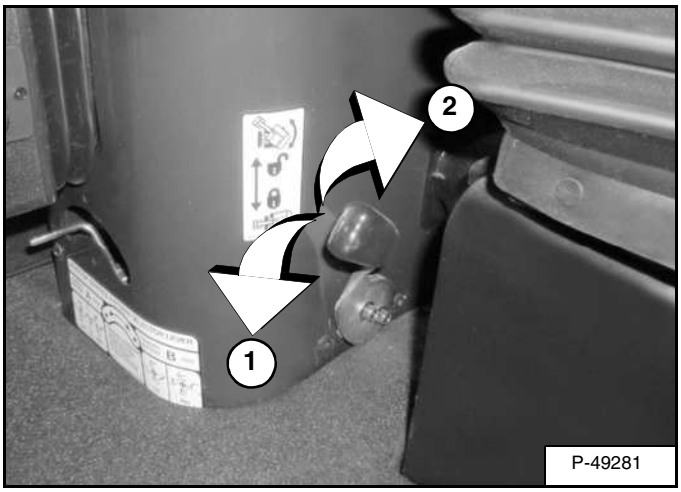
Figure OI-4



The right console contains the instrument panel with Function Icons **[Figure OI-4]**.

Superstructure Slewing Lock

Figure OI-5



Push the lever down (Item 1) **[Figure OI-5]** to engage the superstructure slewing lock.

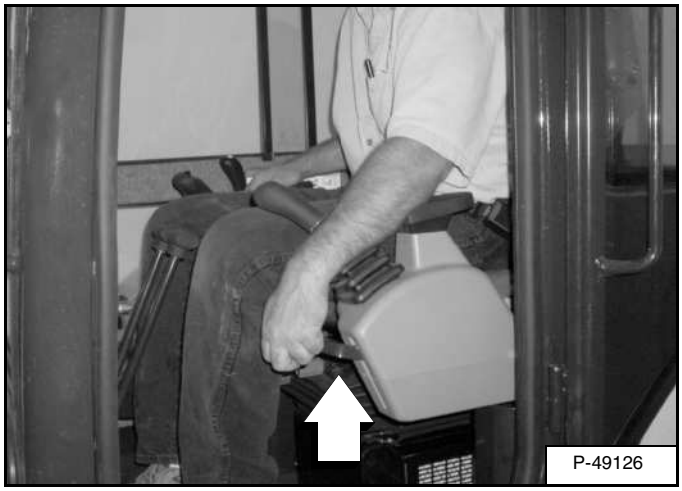
Pull the lever up (Item 2) **[Figure OI-5]** to disengage the superstructure slewing lock.

NOTE: Superstructure must be in the straight forward or straight backward position for superstructure to lock.

Raising And Lowering The Console

Raise the console before exiting the cab.

Figure OI-6



Pull up on the release handle **[Figure OI-6]**. The lifting spring will assist in raising the console.

Lower the console before operating the Excavator.

Push down on the console **[Figure OI-6]** until the latch is engaged.

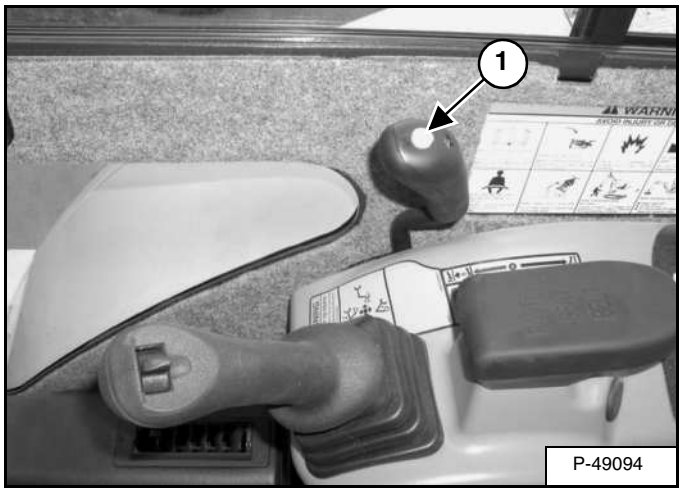
NOTE: When the console is raised, the hydraulic and traction system functions are locked and will not operate.

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

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

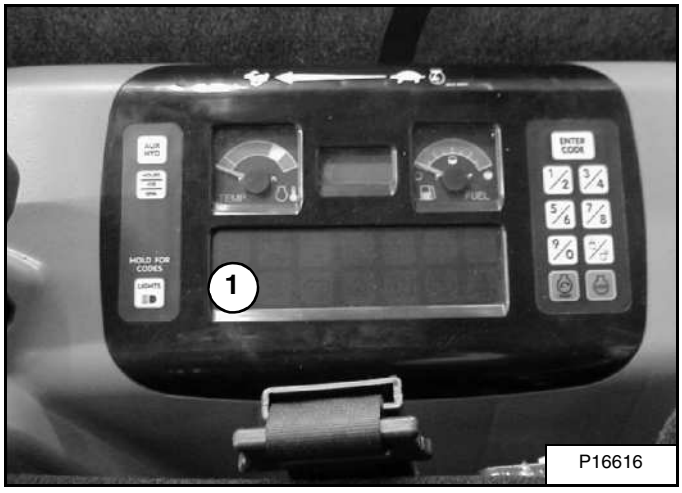
Two-Speed Travel

Figure OI-7



Push the button (Item 1) **[Figure OI-7]** to engage the High Range.

Figure OI-8



When High Range is engaged, the two speed travel icon (Item 1) **[Figure OI-8]** will illuminate.

Press the button again to disengage.

Description

⚠ 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.

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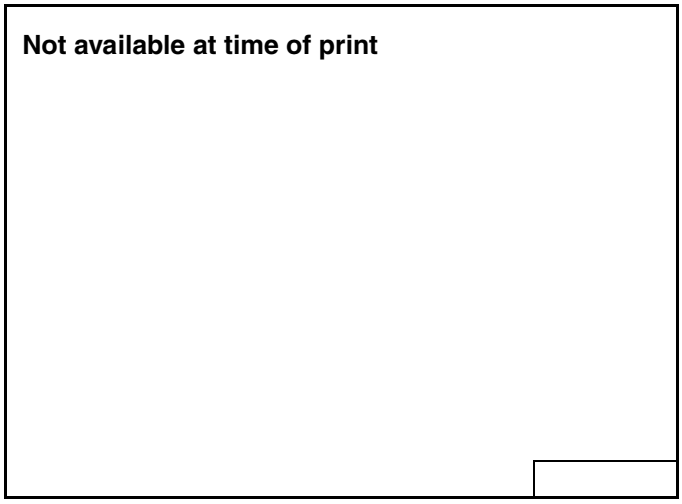
The Excavator has an operator canopy (ROPS/TOPS - Roll Over Protective Structure/Tip Over Protective Structure) as standard equipment. The ROPS/TOPS meets ROPS ISO 3471 and TOPS ISO 12117.

An enclosed cab (ROPS/TOPS) is an Option or may 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.

FALLING OBJECT GUARDS (FOGS)

Figure OI-9



A cab or canopy FOGS (Falling Object Guards) (Item 1) **[Figure OI-9]** is available as a field-installed accessory.

The FOGS provides additional protection from heavier objects falling on the cab/canopy.

For the cab or canopy to meet the FOGS (Falling Object Guards) (ISO 10262-level 1), the Excavator must have the overhead guard (Item 1) **[Figure OI-9]** and Special Application Kit installed.

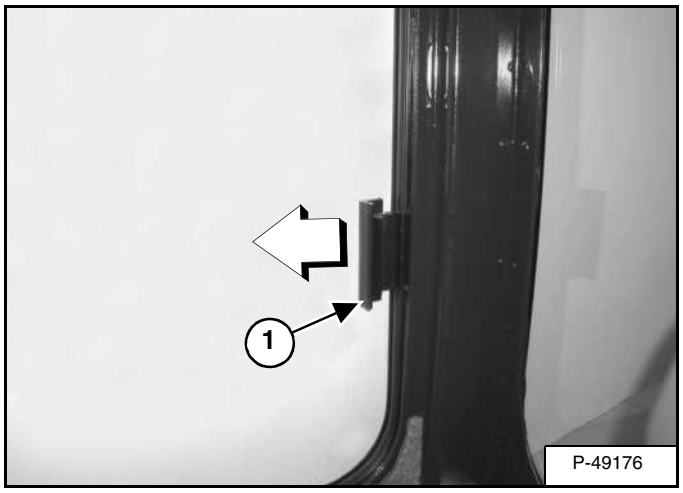
See your Excavator dealer to order these kits.

OPERATOR CAB (ROPS/TOPS)

Emergency Exit

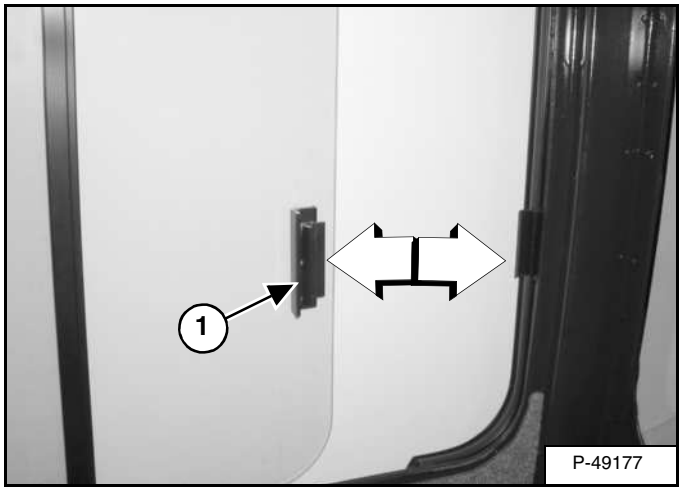
The left door, front window and right rear window provide exits.

Figure OI-10



Pull forward on the latch (Item 1) **[Figure OI-10]**.

Figure OI-11



Pull the latch/handle (Item 1) **[Figure OI-11]** forward to open the window.

Push the handle back to close the window.

Figure OI-12

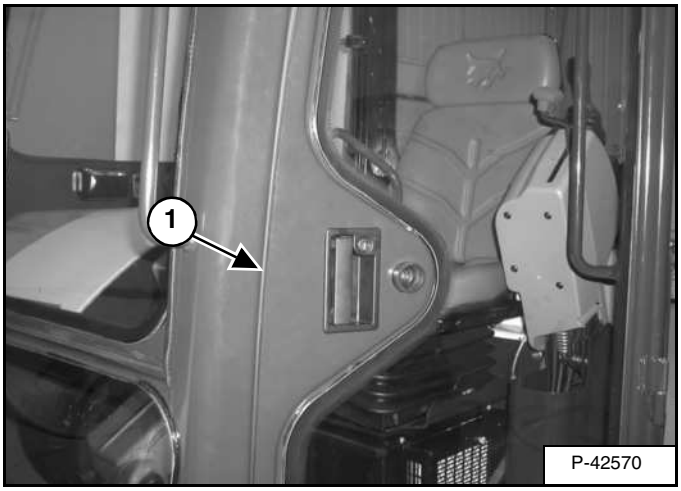
Exit through the window **[Figure OI-12]**

Figure OI-13

Raise the front window and exit through the window **[Figure OI-13]**.

Cab Door

Figure OI-14



The cab door (Item 1) **[Figure OI-14]** can be locked with the same key as the starter switch (if equipped).

Figure OI-15

Push the door all the way open until the latch engages to hold the door in the open position.

Firmly pull the door away from the cab to disengage the latch and close the door **[Figure OI-15]**.

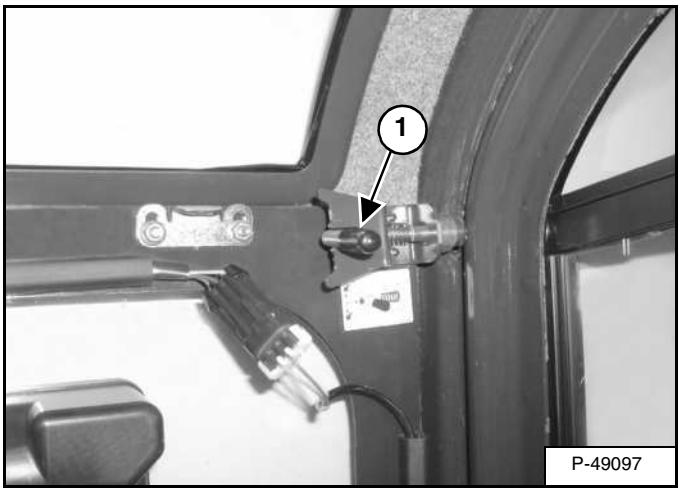
Front Window

Figure OI-16

The front window is equipped with a wiper (Item 1) **[Figure OI-16]** and washer.

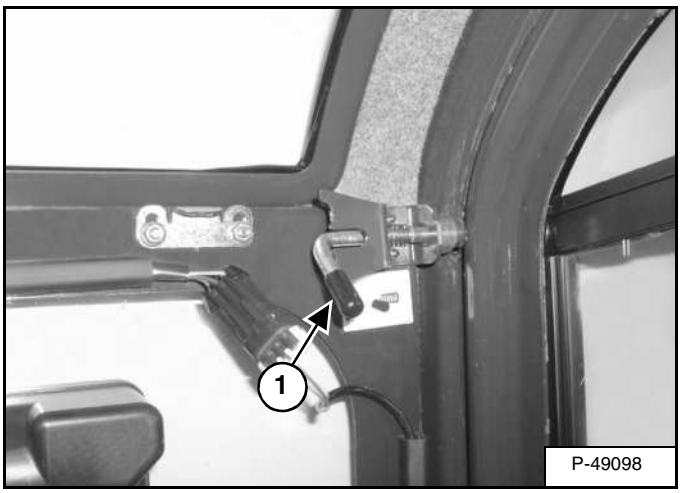
Opening The Front Window

Figure OI-17



Retract the two top window latch pins (Item 1) **[Figure OI-17]**.

Figure OI-18



Turn the two top latches (Item 1) **[Figure OI-18]** to the unlocked position.

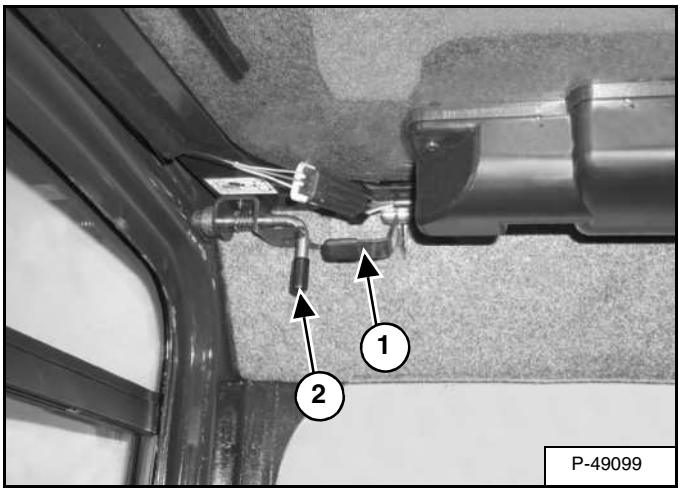
Front Window (Cont'd)

Figure OI-19

Use both window grab handles to pull the top of the window in **[Figure OI-19]**.

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

Figure OI-20



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

Closing The Front Window

Support the window while releasing both window latch pins and placing the pins in the unlocked position **[Figure OI-20]**.

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

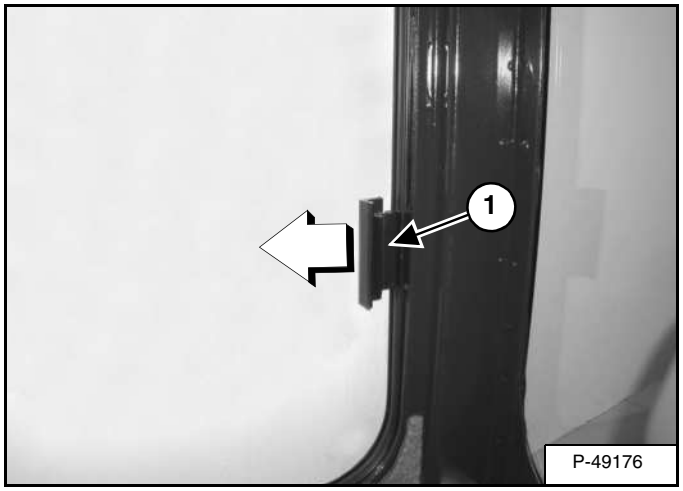
Use both window grab handles to pull the window down **[Figure OI-19]**.

Rotate the top latches (Item 1) **[Figure OI-18 on Page OI-11]** to the locked position (Item 1) **[Figure OI-17 on Page OI-11]**.

Right Side Windows

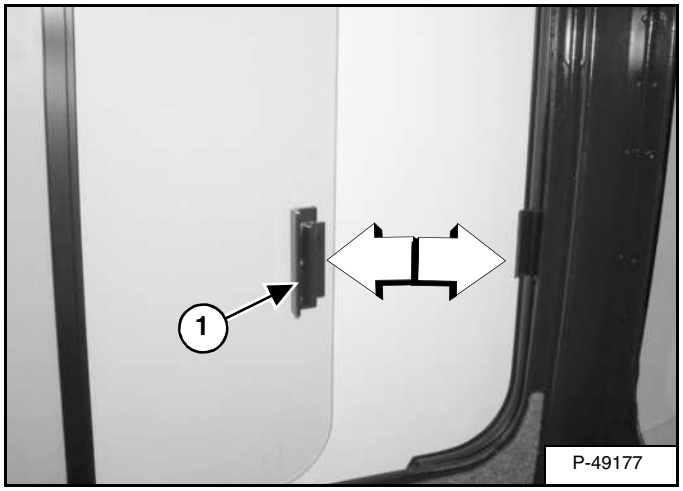
Opening the right rear window

Figure OI-21



Pull out on the latch (Item 1) **[Figure OI-21]**.

Figure OI-22

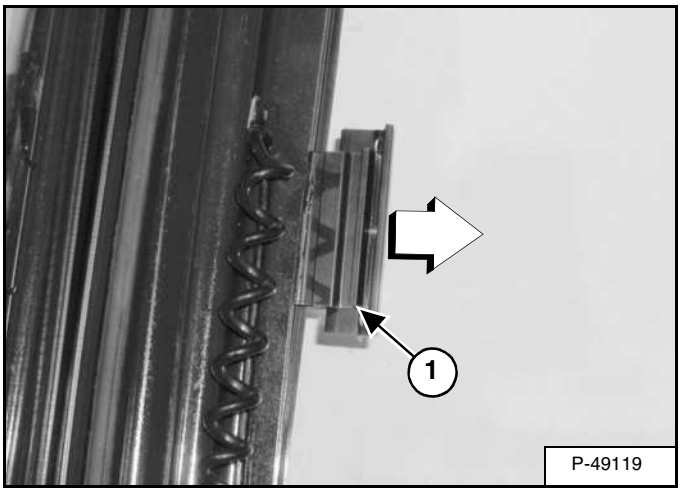


Pull the latch/handle (Item 1) **[Figure OI-22]** forward to open the window.

Push the handle back to close the window.

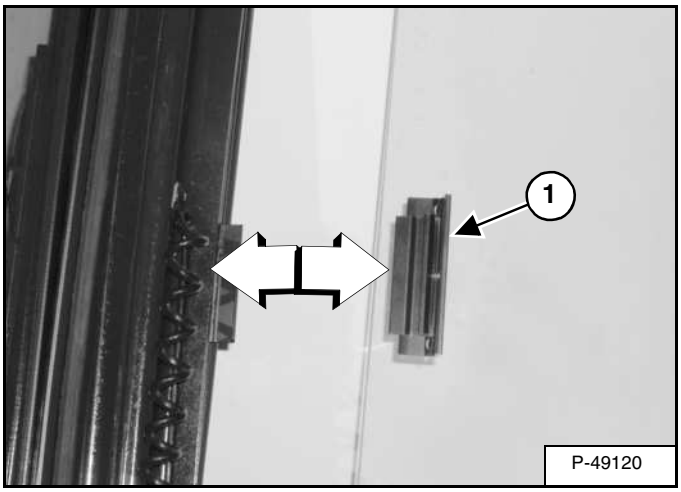
Opening the right front window

Figure OI-23



Pull back on the latch (Item 1) **[Figure OI-23]**.

Figure OI-24



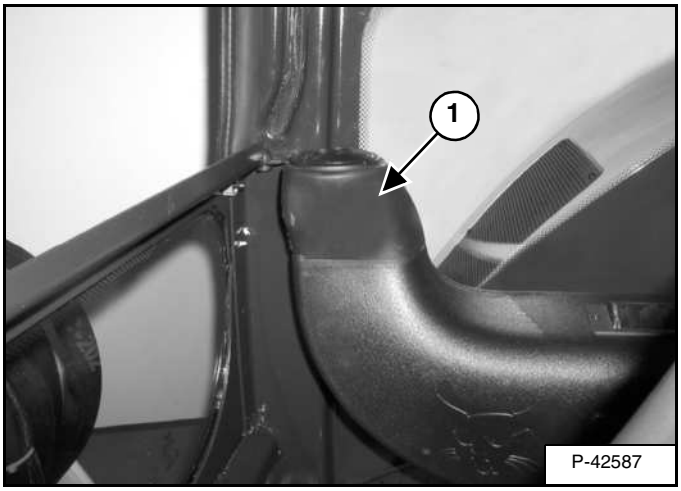
Pull the latch/handle (Item 1) **[Figure OI-24]** back to open the window.

Push the handle forward to close the window.

Heating, Ventilation, and Air Conditioning Duct

There are two HVAC ducts which the operator may install.

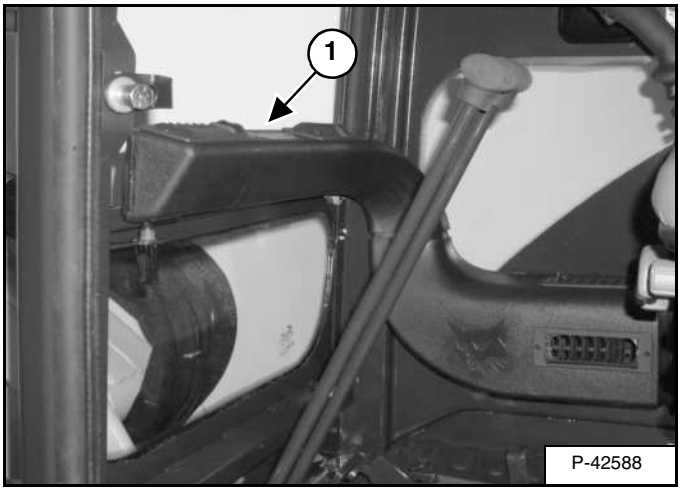
Figure OI-25



The small duct (Item 1) **[Figure OI-25]** is standard for heater use.

NOTE: The air conditioner duct may be ordered and used on heater models.

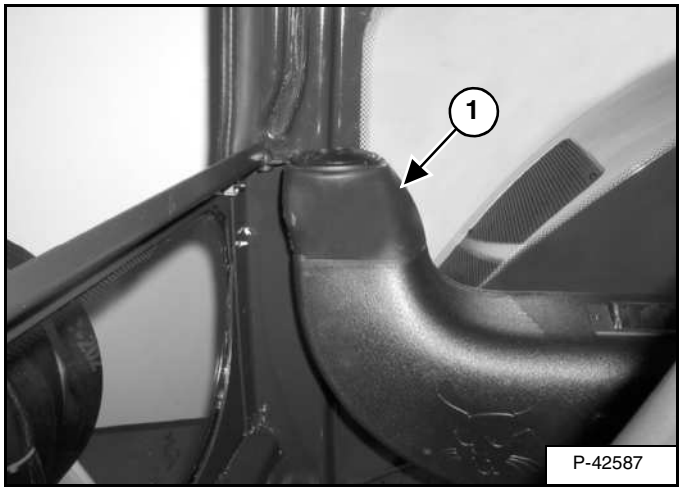
Figure OI-26



The large duct (Item 1) **[Figure OI-26]** is standard for air conditioner use.

NOTE: This duct is removable for improved operator visibility.

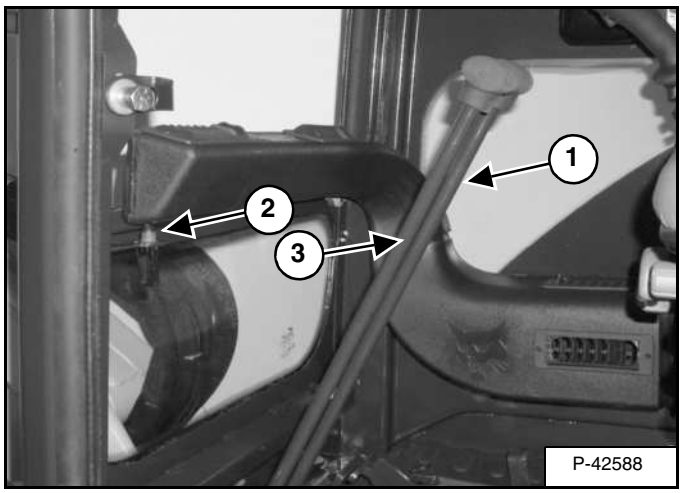
Figure OI-27



Remove the screw and pull straight up to remove the duct (Item 1) **[Figure OI-27]**.

Heating, Ventilation, and Air Conditioning Duct (Cont'd)

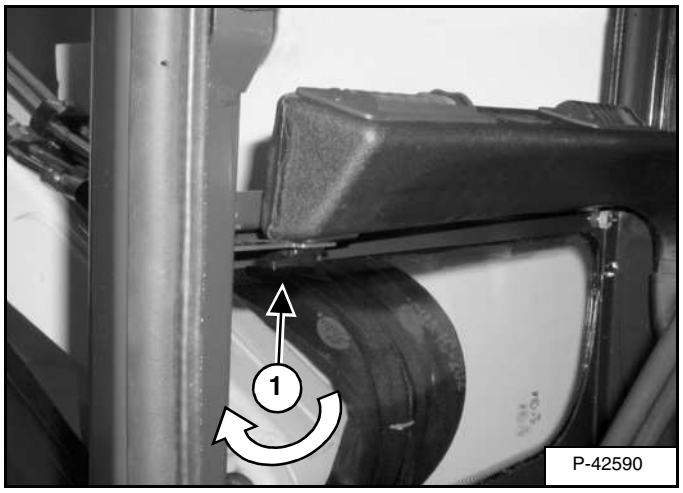
Figure OI-28



Place the air conditioning duct (Item 1) on the housing and over the locking stud (Item 2) **[Figure OI-28]**.

Install the screw (Item 3) **[Figure OI-28]**.

Figure OI-29



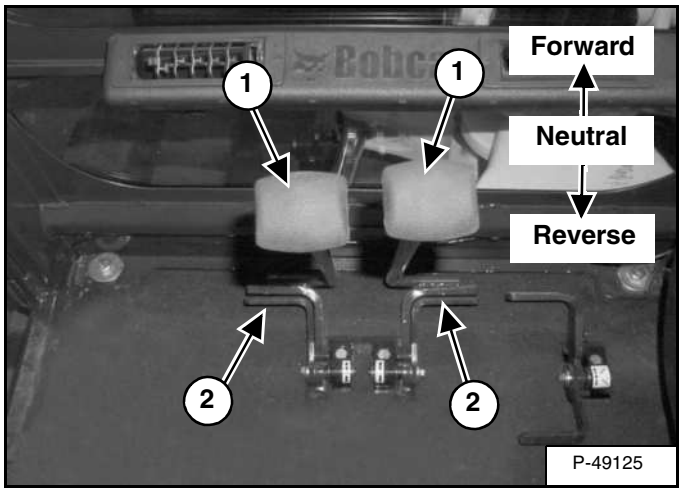
Fully seat the duct and rotate the lock (Item 1) **[Figure OI-29]**.

STEERING LEVERS/FOOT PEDALS

Forward And Reverse Travel

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

Figure OI-30



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-30]** forwards for forward travel; backwards for reverse travel.

* Travel may also be controlled with foot pedals (Item 2) **[Figure OI-30]**. Pivot the heel of the pedals forward for additional space on the floor.

⚠ WARNING

AVOID INJURY OR DEATH

- **Check the blade location before travelling. When the blade is behind you, operate the steering levers/foot pedals in the opposite direction to when the blade is in the front.**
- **Move the steering levers/foot pedals slowly. Abrupt lever motion will cause the machine to jerk.**

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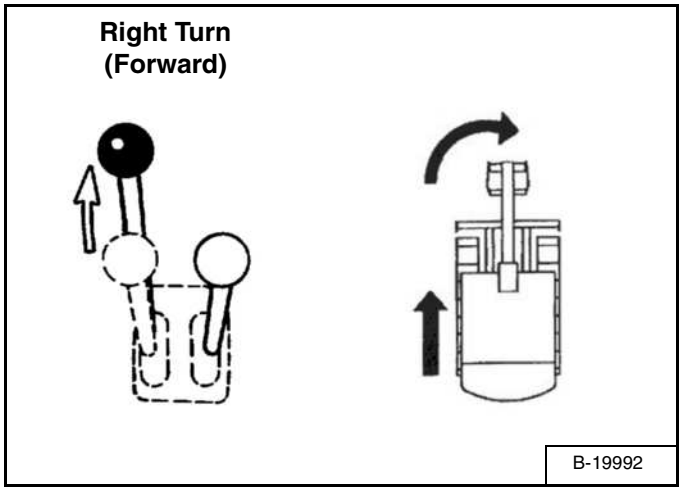
Turning

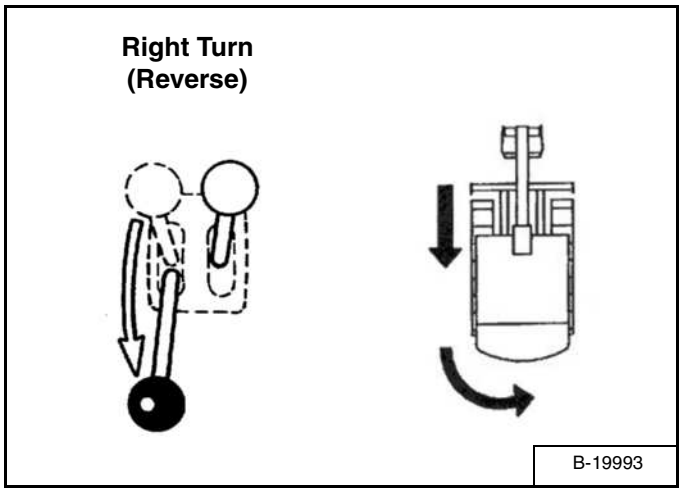
Right Turn

Figure OI-31



Push the left steering lever forwards to turn right **[Figure OI-31]** while travelling forward.

Figure OI-32



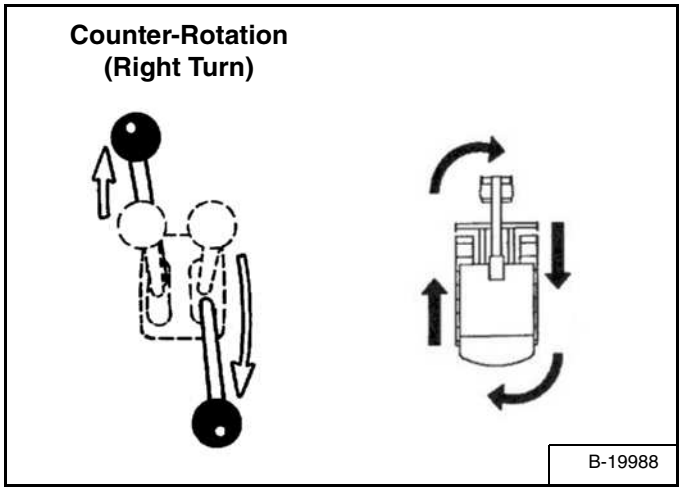
Pull the left steering lever backwards to turn right while travelling backward **[Figure OI-32]**

STEERING LEVERS/FOOT PEDALS (CONT'D)

Turning (Cont'd)

Counter - Rotation Right Turn

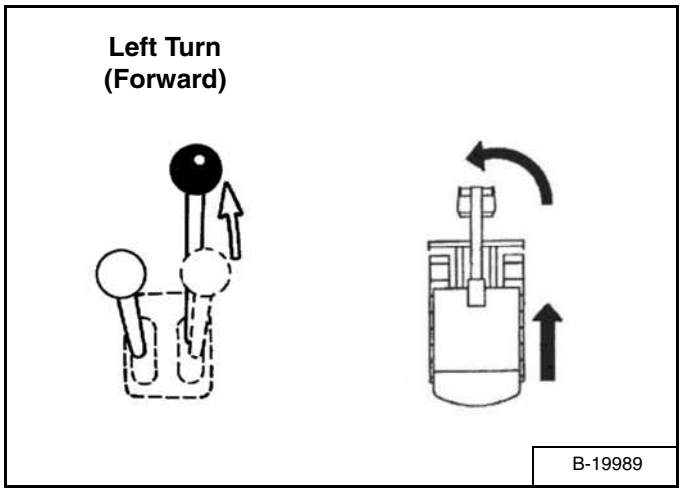
Figure OI-33



Push the left steering lever forwards and pull the right steering lever backwards **[Figure OI-33]**.

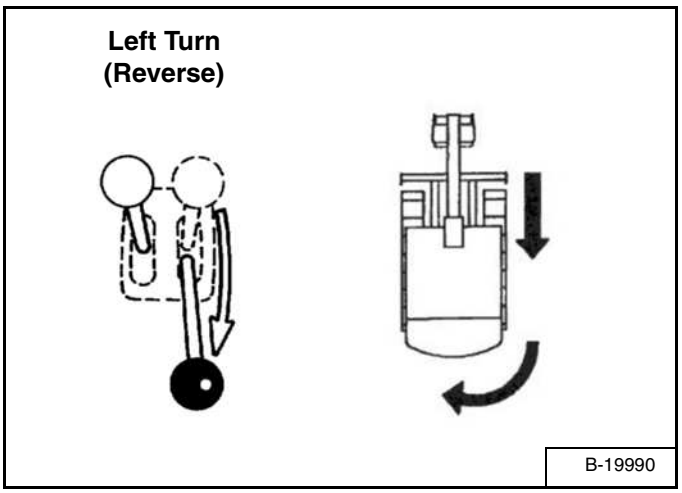
Left Turn

Figure OI-34



Push the right steering lever forwards to turn left while travelling forward **[Figure OI-34]**.

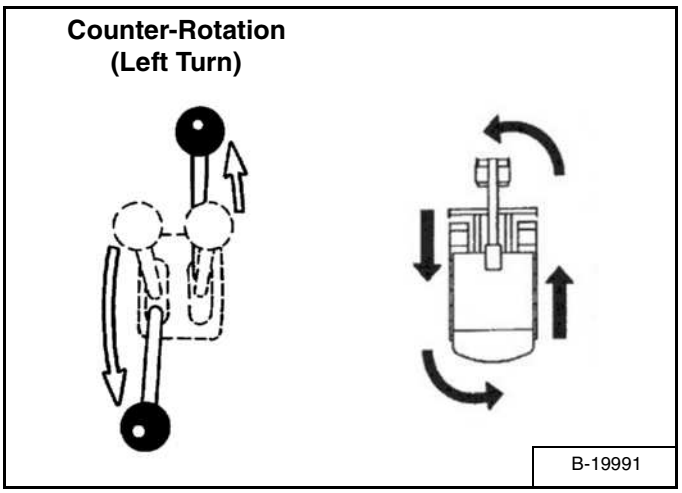
Figure OI-35



Pull the right steering lever backwards to turn left while travelling backward **[Figure OI-35]**.

Counter-Rotation Left Turn

Figure OI-36



Push the right steering lever forwards and pull the left steering lever backwards **[Figure OI-36]**.

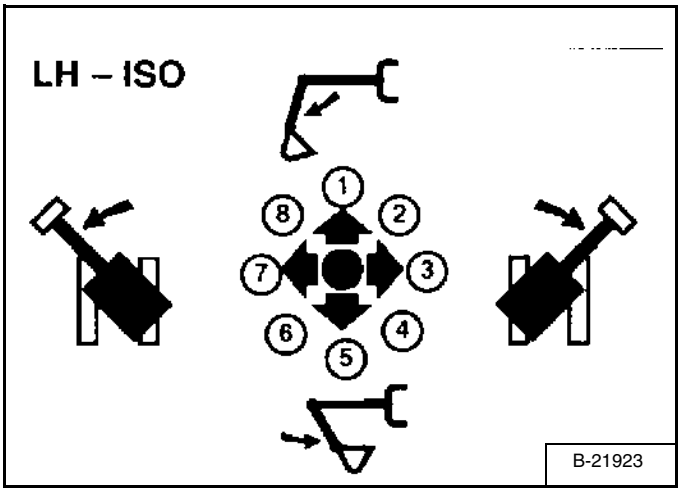
HYDRAULIC CONTROLS

ISO Control Pattern

Left Control Lever

Figure OI-37

Figure OI-38



The work equipment (boom, arm, bucket, and superstructure slew) is operated by using the left and right control levers (joysticks). (See **[Figure OI-37]** & **[Figure OI-38]** and **[Figure OI-39]** & **[Figure OI-40]**)

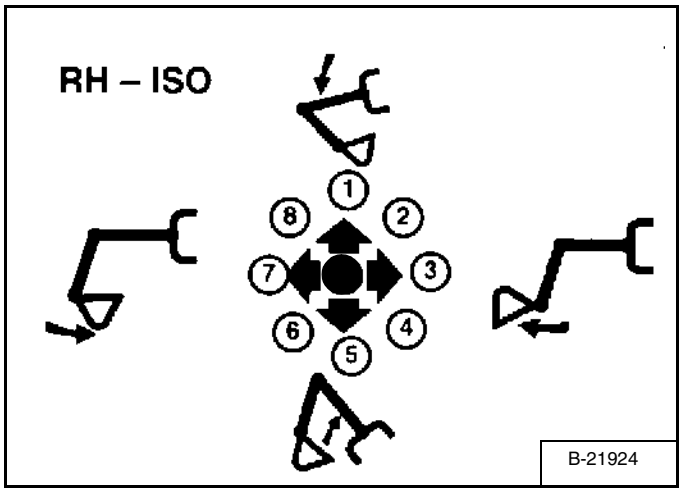
The left lever is used to operate the arm and to slew the superstructure **[Figure OI-37]** & **[Figure OI-38]**.

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.

Right Control Lever

Figure OI-39

Figure OI-40



The right lever is used to operate the boom and bucket **[Figure OI-39]** & **[Figure OI-40]**.

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 and remove the key.**

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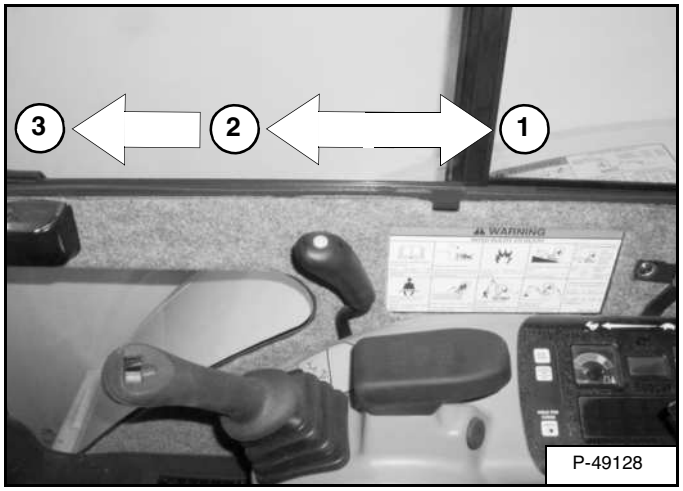
BLADE CONTROL LEVER

Figure OI-41



Pull the lever backwards to raise the blade (Item 1) **[Figure OI-41]**.

Push the lever forwards to lower the blade (Item 2) **[Figure OI-41]**.

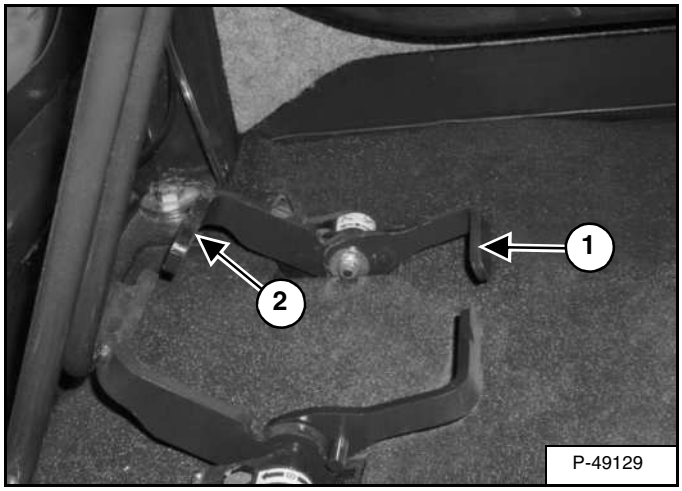
Push the lever (Item 3) **[Figure OI-41]** forwards until the lever is in the locked position to put the blade in the *float* position.

Pull the lever backwards to unlock from the *float* position.

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

BOOM SWING PEDAL

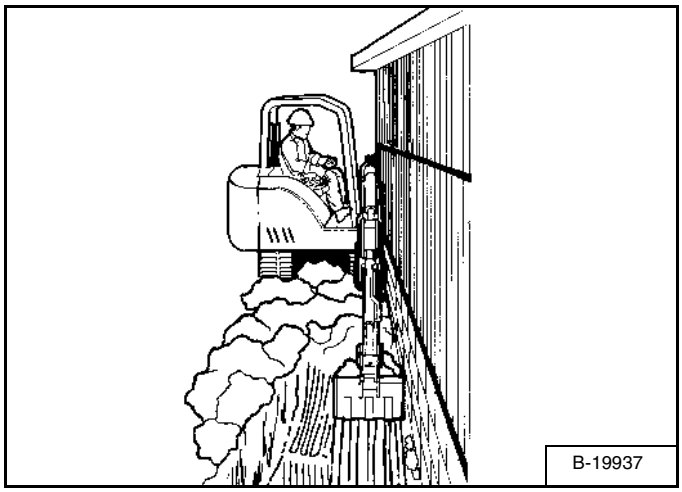
Figure OI-42



Release the pedal lock and pivot the heel of the pedal to the rear (Item 1) **[Figure OI-42]**.

Push the toe of the pedal (Item 2) to swing the boom to the right; push the heel (Item 1) **[Figure OI-42]** to swing the boom to the left.

Figure OI-43



NOTE: The purpose of the boom swing pedal is to offset the boom with respect to the superstructure for digging close to a structure [Figure OI-43].

DAILY INSPECTION

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 (See Service Schedule on Page OI-21). It is located inside the rear door of the Excavator.

Check the following items before each day of operation:

- Operator Canopy or Cab (ROPS/TOPS) and mounting fixings.
- Seat belt and mounting fixings.
- Damaged signs; replace as needed.
- Check control console lock-out.
- Air cleaner and intake hoses/clamps.
- Engine oil level and engine for leaks.
- Hydraulic fluid level and system for leaks.
- Grease all pivot points.
- Cylinder and attachment pivot points.
- Track tension.
- Repair broken and loose parts.

⚠ 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

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. Consult local authority regulations for correct disposal.

Service Schedule

SERVICE SCHEDULE

* 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 extendible arm.
*Clean cab heater filter

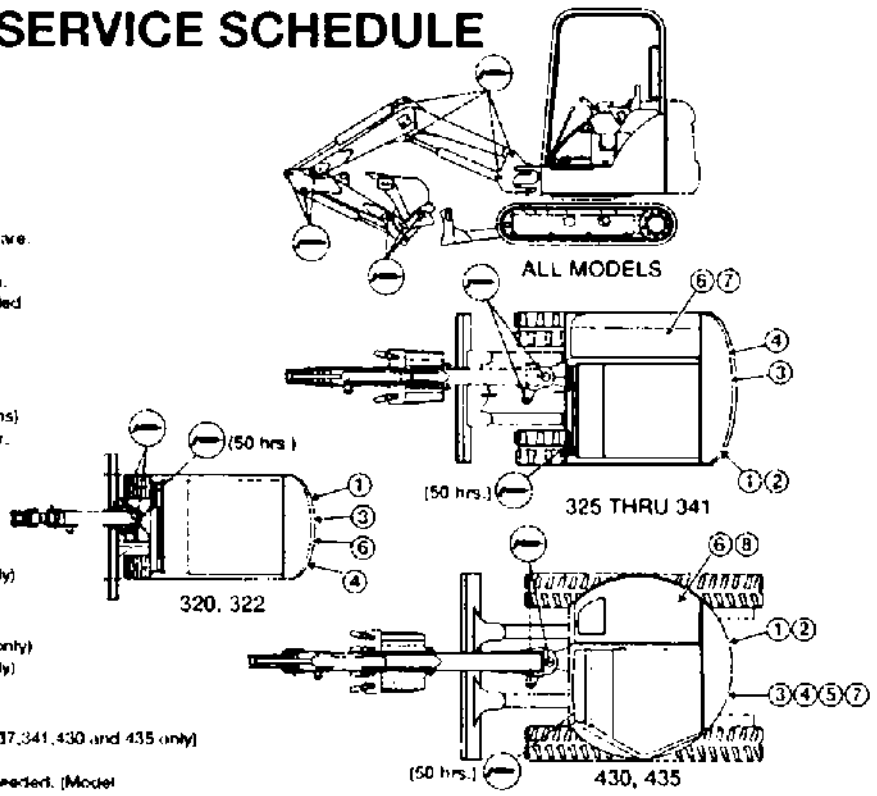
EVERY 50 HOURS
Grease swing pinion and swing circle. (See illustrations)
Drain water and sediment from fuel tank and fuel filter.
Check battery, cables and electrolyte level.

EVERY 100 HOURS
■ Check and adjust belt(s) if required. (Models 320, 322,325 and 328)
Spark Arrestor Muffler - Clean spark chamber.
■ Replace engine oil and filter. (Models 320 and 322 only)

EVERY 250 HOURS
Replace diesel fuel filter.
■ Replace inline diesel fuel filter. (Models 430 and 435 only)
■ Replace engine oil and filter. (Models 325 and 328 only)
Check oil level in both final drive cases.

EVERY 500 HOURS
■ Replace engine oil and filter. (Models 331,334,331E,337,341,430 and 435 only)
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 320 and 322)
Replace fan hydraulic filter. (Models 430 and 435 only)
▲ 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.



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.

FILTER CHART

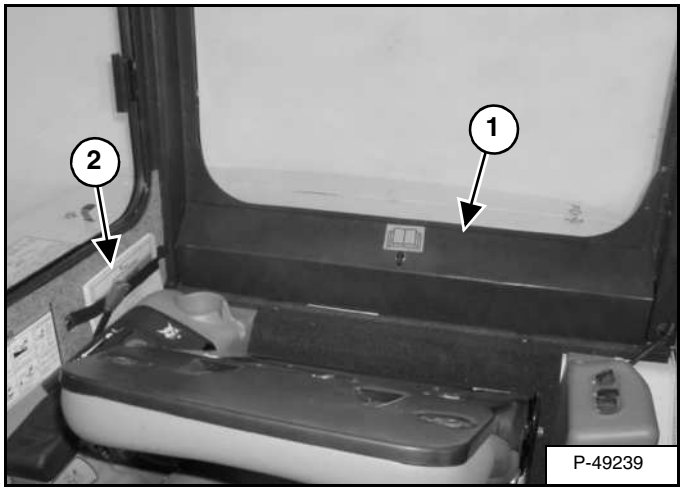
		320, 322	325, 328	331, 334 331E	337, 341	430	435
1	PRIMARY AIR FILTER	6673752	6672467	6666333	6666375	6666333	6666375
2	SECONDARY AIR FILTER	6673753	6672468	6666334	6666376	6666334	6666376
3	ENGINE OIL FILTER	30741138	6675517	6675517	6675517	6675517	6675517
4	FUEL FILTER	6667352	6667352	6667352	6667352	6667352	6667352
5	INLINE FUEL FILTER	N/A	N/A	N/A	N/A	6633977	6633977
6	PRIMARY HYDRAULIC FILTER	6553336	6661248	6661248	6670207	6668819	6668819
7	CASE 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.

59018 • *See Operation & Maintenance Manual for more information and instructions.* SW 03 681 08A

6817082

Figure OI-44

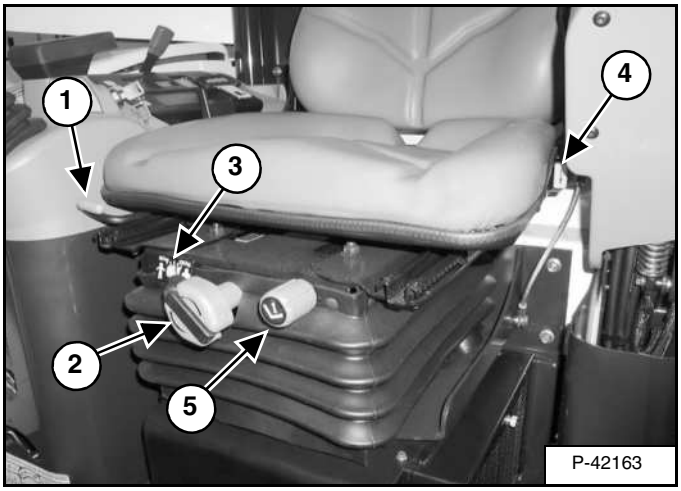


Read and understand the Operation & Maintenance Manual (Item 1) and the Operator's Handbook (Item 2) **[Figure OI-44]** before operating.

Figure OI-45

Use the grab handles, tracks and safety treads to enter the canopy/cab **[Figure OI-45]**.

Figure OI-46



Release the seat lever (Item 1) **[Figure OI-46]** to adjust the seat forwards or backwards.

Turn the handle (Item 2) to change the adjustment for operator weight. Turn the handle until the operator's weight is shown in the window (Item 3) **[Figure OI-46]**.

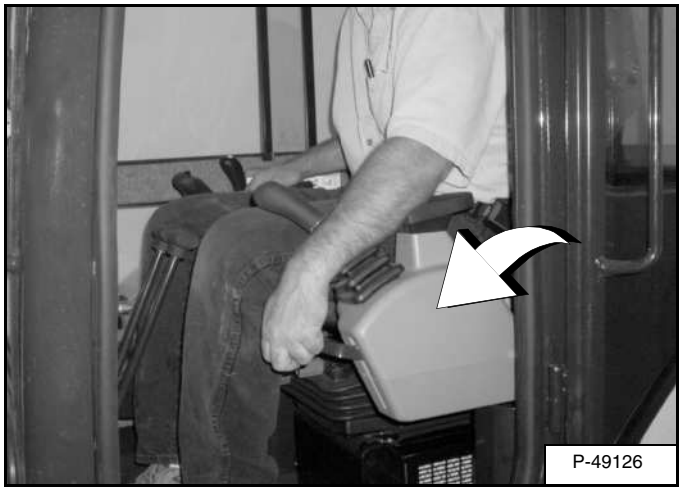
Release the lever (Item 4) **[Figure OI-46]** to change the slope of the seat back.

Sit in the seat and turn the knob (Item 5) **[Figure OI-46]** to adjust the height of the seat.

Figure OI-47

Fasten the seat belt **[Figure OI-47]**.

Figure OI-48



Lower the control console **[Figure OI-48]**.

NOTE: There is a control lock switch in the left console which deactivates the hydraulic control levers (joysticks) and the traction drive system when the control console is raised. The console 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 and traction system when console is raised, see your Bobcat dealer for service.

⚠ WARNING

AVOID INJURY OR DEATH

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

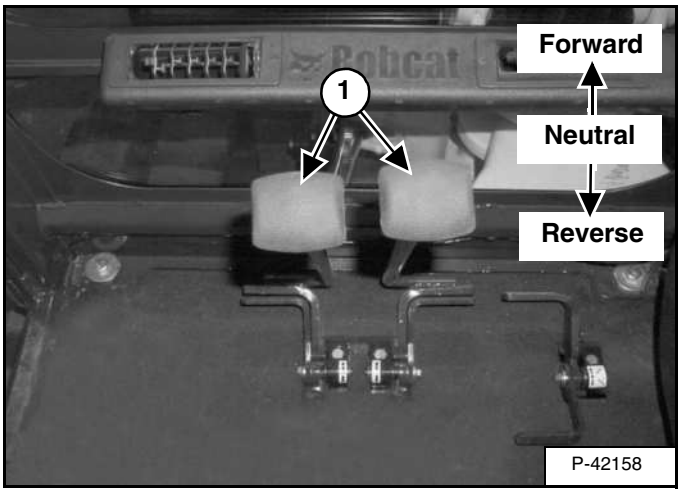
W-2051-1086

⚠ 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 odourless, invisible gases which can kill without warning.

W-2050-1285

Figure OI-49



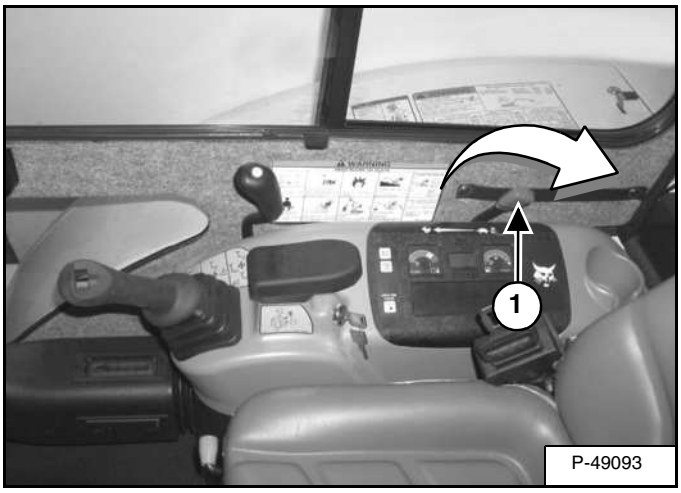
Put control levers (Item 1) **[Figure OI-49]** in the neutral position.

STARTING THE ENGINE

Key Switch

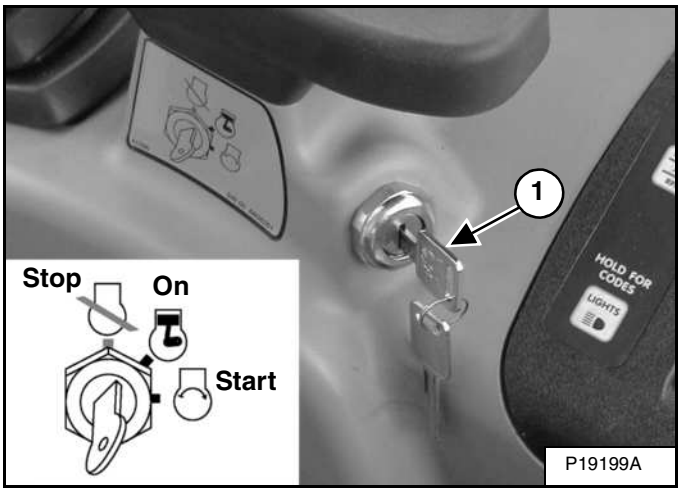
Perform the PRE-STARTING PROCEDURE (See PRE-STARTING PROCEDURE on Page OI-22).

Figure OI-50



Move the engine speed control (Item 1) **[Figure OI-50]** to low idle.

Figure OI-51



Turn the key (Item 1) **[Figure OI-51]** to the ON position. If preheating is required, the glow plugs will automatically cycle and the remaining preheat time (in seconds) will show in the LCD. (Preheat icon will be ON).

Turn the key to START and release the key when the engine starts. It will return to the ON position **[Figure OI-51]**.

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

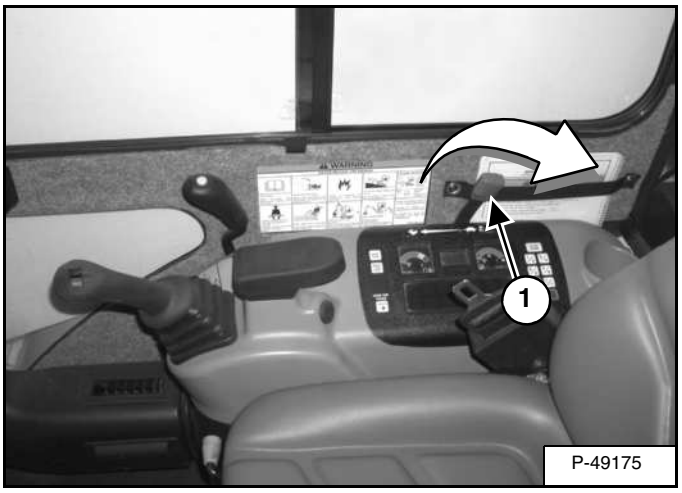
Do not engage the starter for longer than 15 seconds at a time. Longer use can damage the starter by overheating. Allow starter to cool for one minute before using starter again.

I-2034-0700

Keyless Start

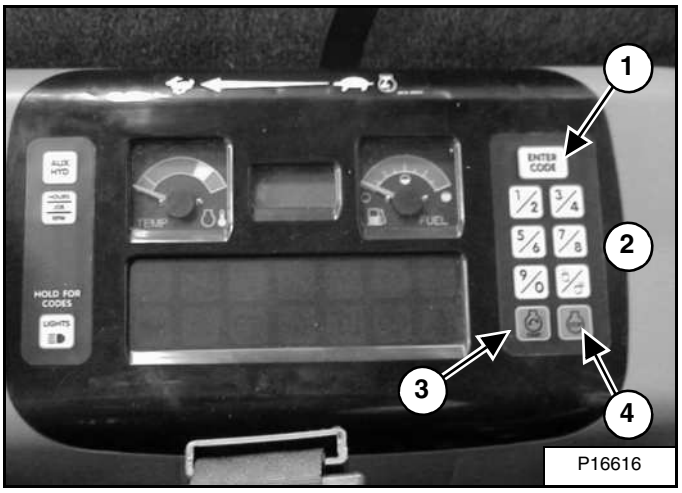
Perform the PRE-STARTING PROCEDURE (See PRE-STARTING PROCEDURE on Page OI-22).

Figure OI-52



Move the engine speed control (Item 1) **[Figure OI-52]** to low idle.

Figure OI-53



Press ENTER CODE Button (Item 1) **[Figure OI-53]**. The display will become lit and there will be two short beeps, CodE will appear on the LCD.

Use the keypad (Item 2) **[Figure OI-53]** to enter the password. For each digit that you enter, a dash will appear on the LCD. (You have 40 seconds to enter the password or the process will abort and you will need to start again.) If the password was entered correctly, there will be one long beep.

NOTE: If the password was incorrect there will be three short beeps and "Error" will appear on the LCD. Press the ENTER CODE Button again and start again. After three failed attempts, you must wait three minutes to try again.

Press the START Button (Item 3) **[Figure OI-53]** and hold it until the engine starts.

IMPORTANT

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

I-2034-0700

Press the STOP button (Item 4) **[Figure OI-53]** to stop the engine.

Stop the engine if the warning lights and alarm do not go OFF.

Check for the cause before starting the engine again.

Password Lock-out Feature

See Password Lock-out Feature. (See "Password Lock-out Feature" on Page SA-5.)

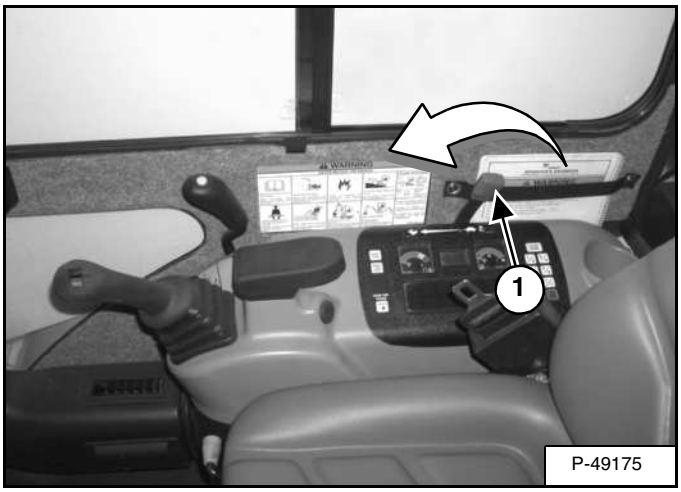
Cold Temperature Starting Procedure

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 "Fluid Specifications" on Page SPEC-18.)
- Make sure the battery is fully charged.
- Install an engine heater.

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-21.)

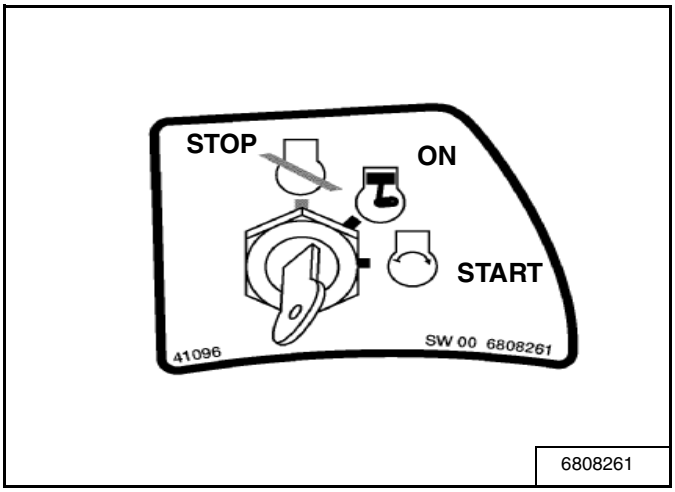
Figure OI-54



Push the speed control lever (Item 1) **[Figure OI-54]** fully forward.

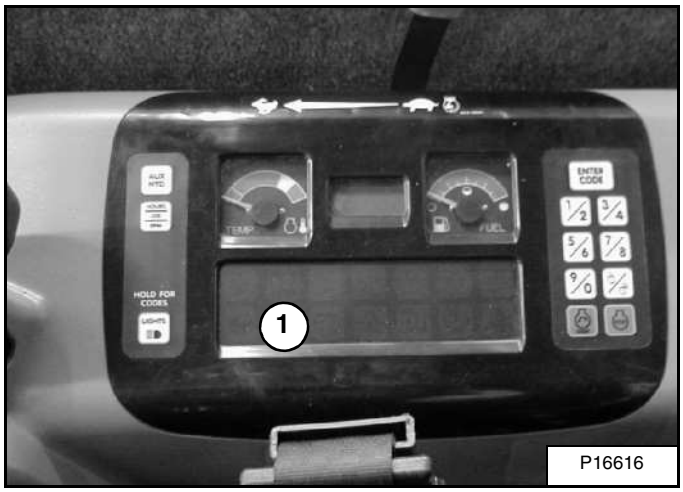
Key Switch (Standard Panel)

Figure OI-55



Turn the key to the ON position **[Figure OI-55]**.

Figure OI-56



The preheat icon (Item 1) **[Figure OI-56]** will come ON. The glow plugs will automatically cycle. When the icon goes off, turn the key to start.

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.

When the engine speed increases, move the speed control lever to idle position until the engine warms up.

Cold Temperature Starting Procedure (Cont'd)

Keyless Start (Deluxe Panel)

Follow STARTING PROCEDURE See "Keyless Start" on Page OI-25.

If the preheat icon comes ON, wait for it to disappear before pressing the START Button **[Figure OI-56 on Page OI-26]**.

The remaining preheat time (in seconds) will count down in the LCD.

IMPORTANT

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

I-2034-0700

IMPORTANT

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

I-2015-0284

⚠ WARNING

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

W-2071-0700

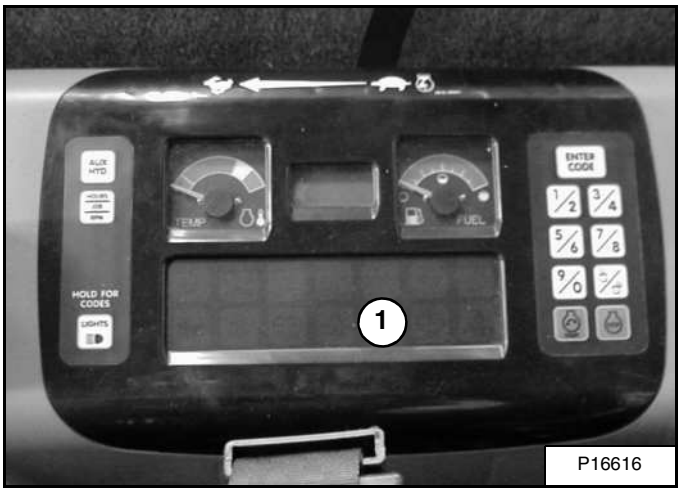
IMPORTANT

When the temperature is below -20°F (-30°C), hydrostatic oil must be warmed before starting. The hydrostatic system will not get enough oil at low temperatures and will be damaged. Park the machine in an area where the temperature will be above 0°F (-18°C) if possible.

I-2007-1285

Let the engine run at least 5 minutes to warm the engine and hydraulic fluid before operating the Excavator.

Figure OI-57



If the Fluid Pressure Icon (Item 1) **[Figure OI-57]** comes ON when operating the Excavator (cold), more warm-up time is needed.

ATTACHMENTS

Using The X-Change™ System

Removing Bucket Or Attachment

The Excavator is equipped with the X-Change™ system. The X-Change™ is used for fast changing of buckets and attachments.

NOTE: Removal and installation of the bucket is shown. The procedure is the same for other attachments. Disconnect any hydraulic lines operated by hydraulic power before removing any attachments (breaker, auger, etc).

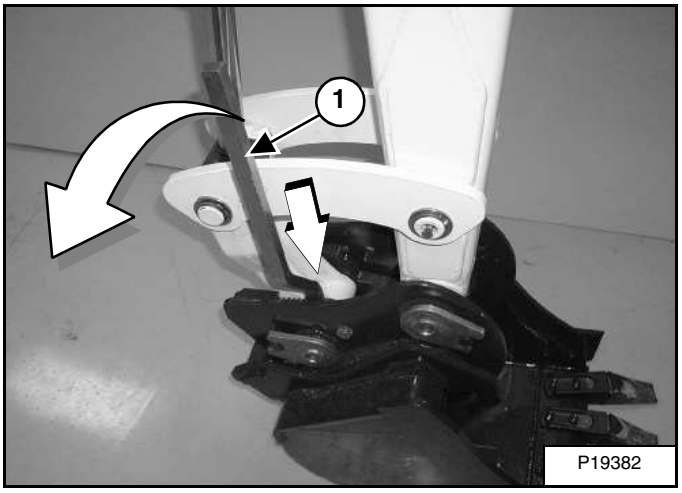
⚠ WARNING

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

Stop the machine on a flat level surface. Put the bucket on the ground.

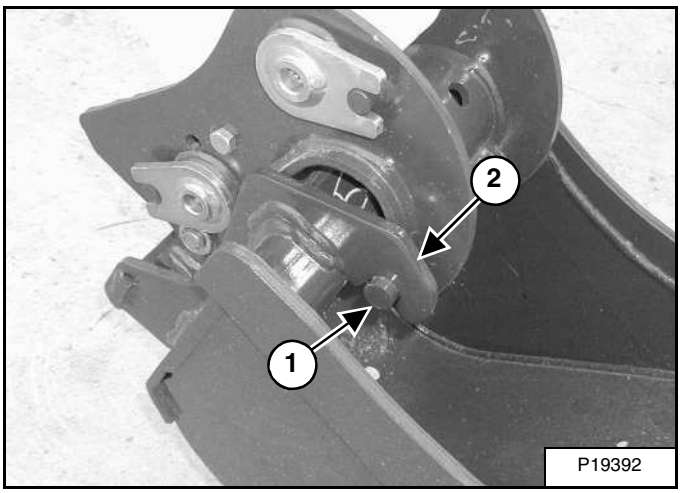
Figure OI-58



Install the X-Change™ tool (Item 1) **[Figure OI-58]** in the latch.

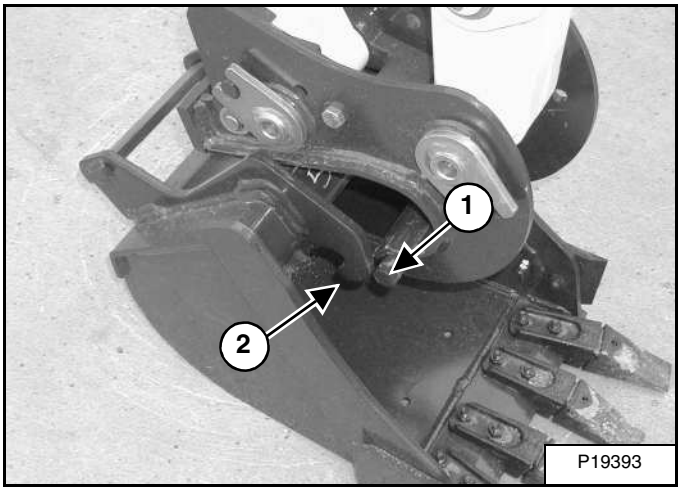
Pull the tool (Item 1) **[Figure OI-58]** to unlock the latch. Remove the tool.

Figure OI-59



Start the engine, lift the boom approximately one foot and extend the bucket cylinder until the X-Change™ pins (Item 1) engage the hooks (Item 2) **[Figure OI-59]** on the bucket.

Figure OI-60



Retract the bucket cylinder and lower the boom and arm until the bucket is on the ground, and the X-Change™ pins (Item 1) are disengaged from the hooks (Item 2) **[Figure OI-60]**.

Move the arm toward the machine until the X-Change™ pins are clear of the bucket.

Using The X-Change™ System (Cont'd)

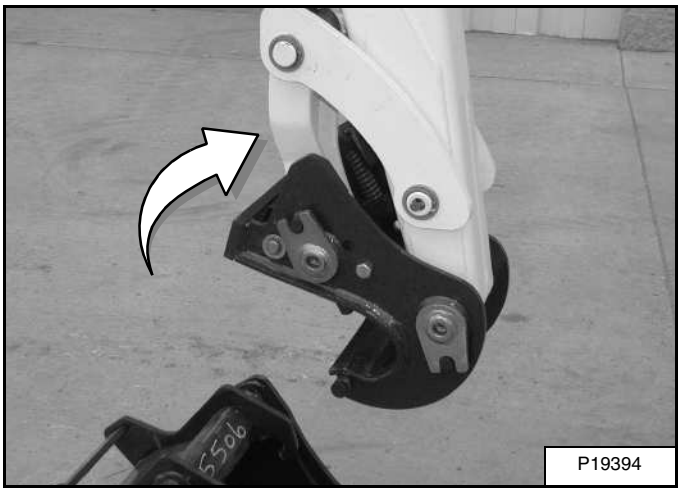
Installing Bucket Or Attachment

⚠ 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

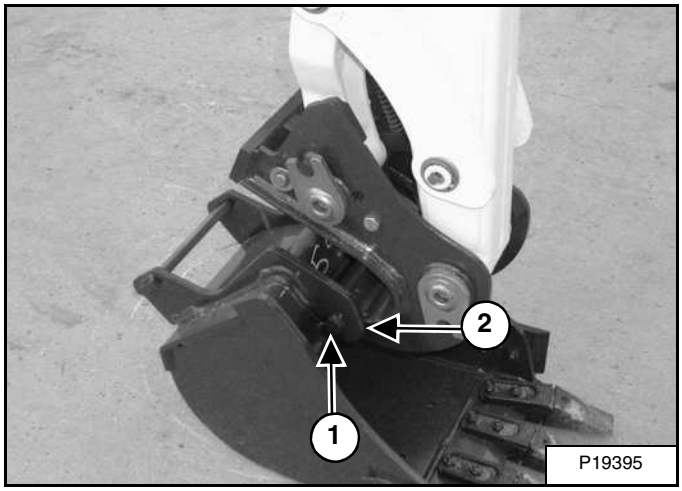
Figure OI-61



Fully retract the bucket cylinder to release the latch on the X-Change**™ [Figure OI-61]**.

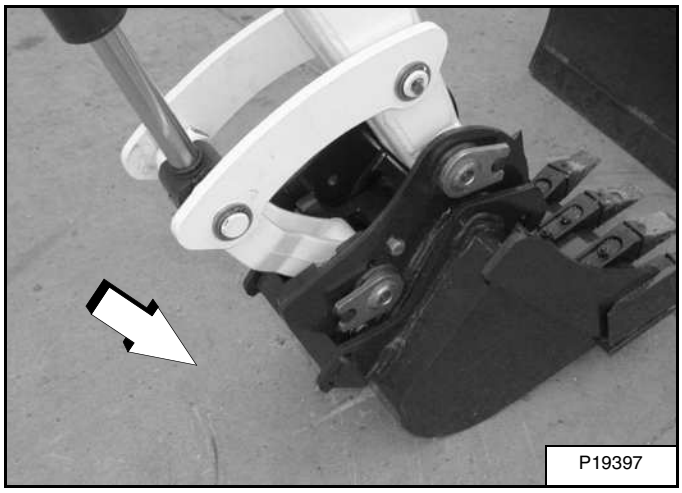
Move the arm toward the bucket.

Figure OI-62



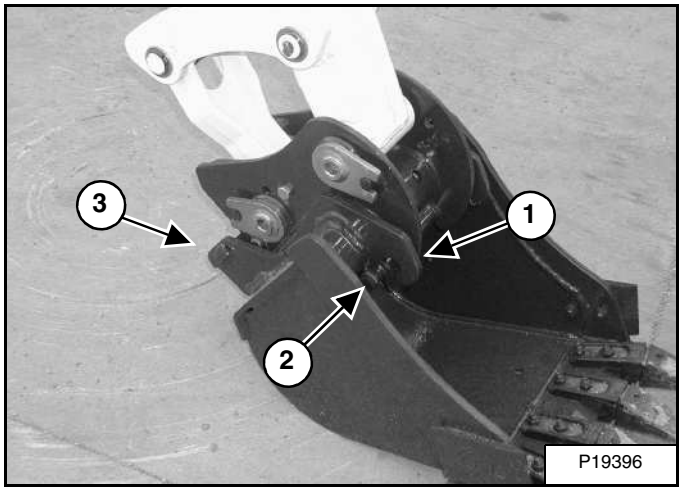
Raise the boom until the pins (Item 1) engage the hooks (Item 2) **[Figure OI-62]** on the bucket.

Figure OI-63



Lift the boom and extend the bucket cylinder until the bucket is in the position shown **[Figure OI-63]**.

Figure OI-64



Lower the boom until the hooks (Item 1) of the bucket disengage the pins (Item 2) of the X-Change**™** and the plate (Item 3) **[Figure OI-64]** engages in the bucket cross member.

⚠ WARNING

Keep all bystanders 6 metres away from equipment when operating. Contact with moving parts, a trench cave-in or flying objects may cause injury or death.

W-2119-0788

After installation of the bucket, lift the boom approximately one metre and fully extend and retract the bucket cylinder to ensure the bucket is securely attached to the X-Change™.

Using The X-Change™ System (Cont'd)

Quick Couplers

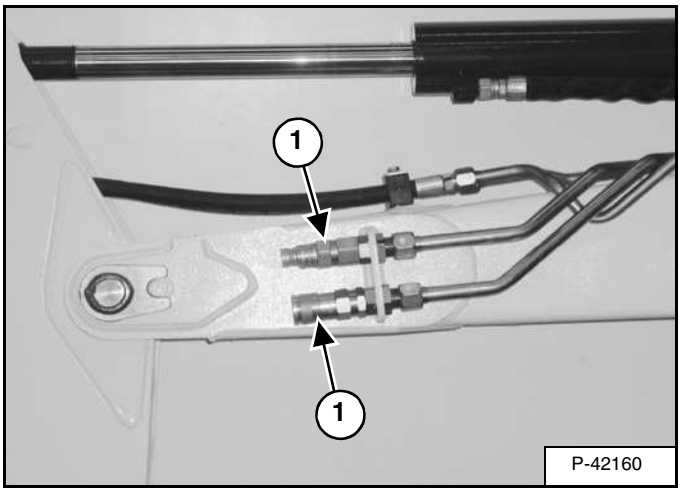
⚠ WARNING

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-65

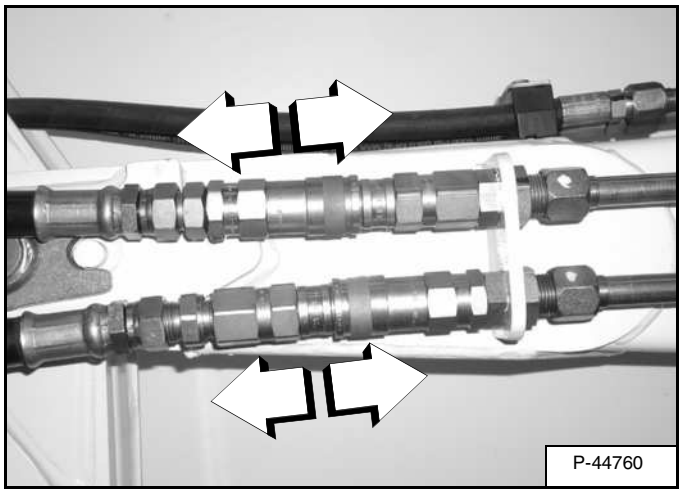


Excavators and attachments have flush faced couplers (Item 1) **[Figure OI-65]**.

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-65]** must be replaced.

Figure OI-66



Install the male coupler into the female coupler **[Figure OI-66]**.

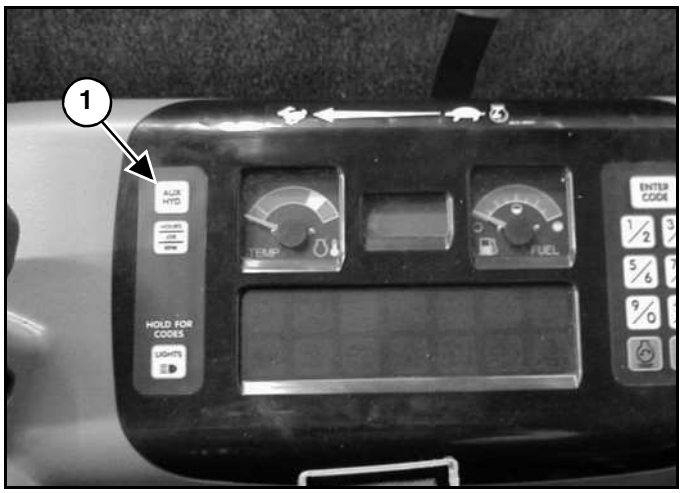
To Disconnect:

Hold the male coupler. Retract the sleeve on the female coupler until the couplers disconnect **[Figure OI-66]**.

Using The X-Change™ System (Cont'd)

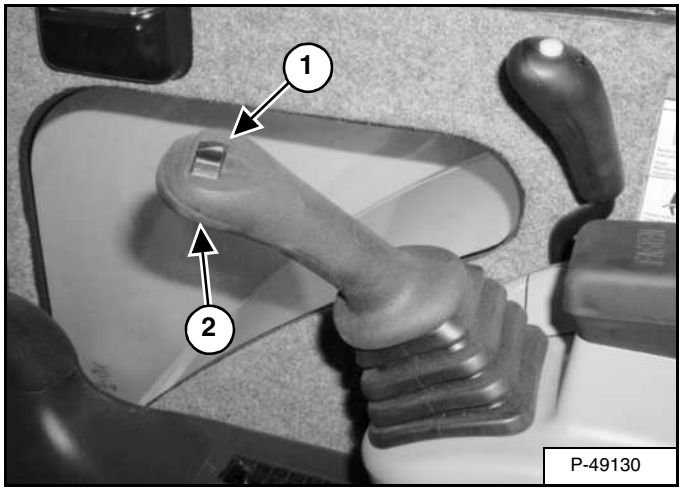
Auxiliary Hydraulics

Figure OI-67



Press the Auxiliary Hydraulics button on the right console (Item 1) **[Figure OI-67]**.

Figure OI-68



Move the switch (Item 1) **[Figure OI-68]** on the right control lever to the right or left to direct fluid flow to an attachment such as a breaker or hydraulic clamp.

Press the switch (Item 2) **[Figure OI-68]** on the front of the handle to provide constant flow to the female coupler.

NOTE: Pressing the switch (Item 1) [Figure OI-68] to the left at the same time as pressing the switch on the front of the handle will provide constant flow to the male coupler.

Press the switch (Item 2) **[Figure OI-68]** a second time to stop auxiliary flow to the quick couplers.

Relieving Hydraulic Pressure

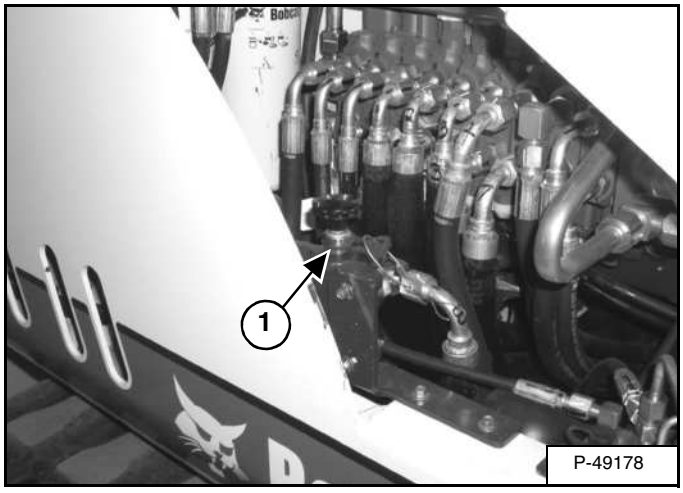
Stop the engine and turn the key to ON (Standard) or press ENTER CODE Button (Deluxe).

Press AUX HYD Button (Item 1) **[Figure OI-67]** and then move the switch (Item 1) **[Figure OI-68]** to the right and left several times.

Return To Tank Valve (If Equipped)

The return to tank valve is located under the right side cover.

Figure OI-69



Remove the spool lock (Item 1) **[Figure OI-69]** and push the spool in to direct auxiliary return hydraulic fluid to the reservoir.

Pull the spool out and install the spool lock (Item 1) **[Figure OI-69]** for two-way hydraulic auxiliary flow operation.

OPERATING PROCEDURE

Lowering The Work Equipment With Engine Stopped

If the engine stops, the work equipment (boom/bucket, attachments) can be lowered to the ground using hydraulic pressure stored 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.

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 with underground utilities.

Lifting A Load

Do not exceed the rated lifting capacity. (See “LIFTing CHART” on Page SPEC-12.)

⚠ WARNING

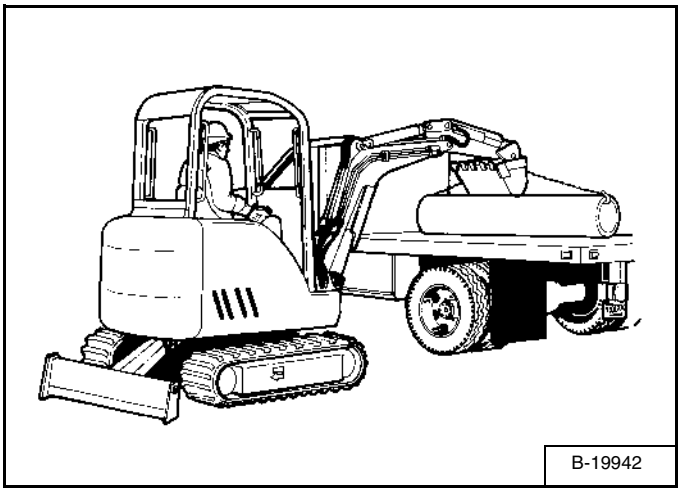
AVOID INJURY OR DEATH
Do not exceed rated lifting capacity. Excessive load may cause tipping or loss of control.

W-2476-1003

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

Wrap the chain assembly around the bucket mounting plate.

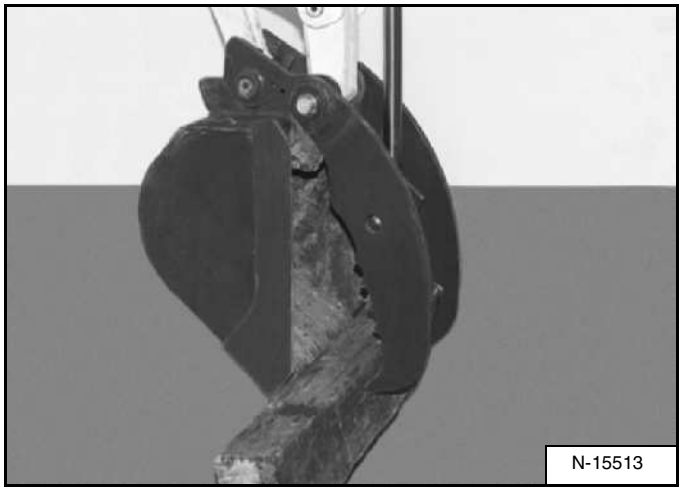
Figure OI-70



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

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

Figure OI-71



The optional lifting clamp attachment gives the Excavator a wider range of use and mobility for debris removal **[Figure OI-71]**.

The lifting clamp cylinder is operated by the auxiliary hydraulic system.

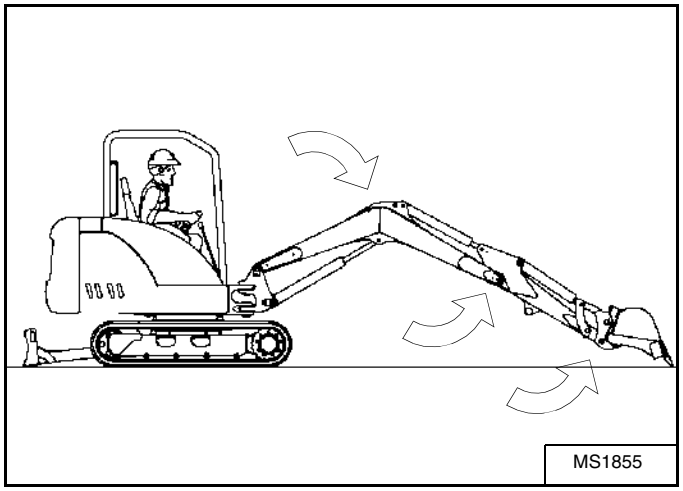
The lifting clamp cylinder must be fully retracted when the machine is being used for excavating.

Lifting capacity is reduced by 122 Kg if the Excavator is equipped with the optional lifting clamp.

Excavating

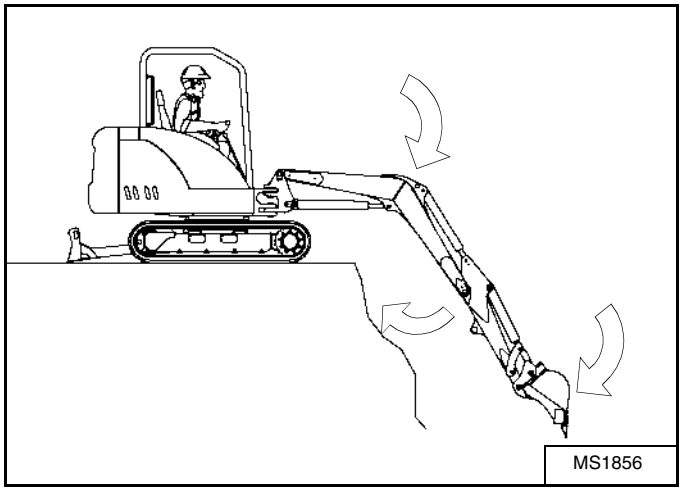
Lower the blade to provide stability.

Figure OI-72



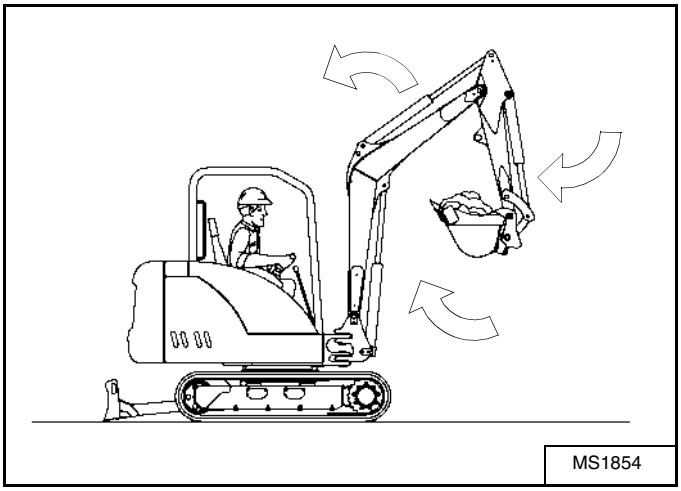
Extend the arm, lower the boom, and open the bucket **[Figure OI-72]**.

Figure OI-73



Retract the arm, while lowering boom and curling the bucket **[Figure OI-73]**.

Figure OI-74



Raise the boom, retract the arm and curl the bucket **[Figure OI-74]**.

Rotate the superstructure.

NOTE: Do not allow the bucket teeth to contact the ground when swinging the superstructure.

⚠ WARNING

Keep all bystanders 6 metres away from equipment when operating. Contact with moving parts, a trench cave-in or flying objects may cause injury or death.

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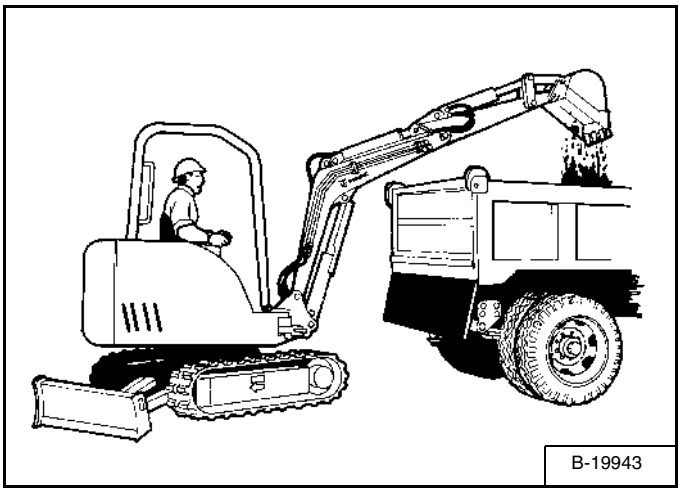
Excavating (Cont'd)

Figure OI-75



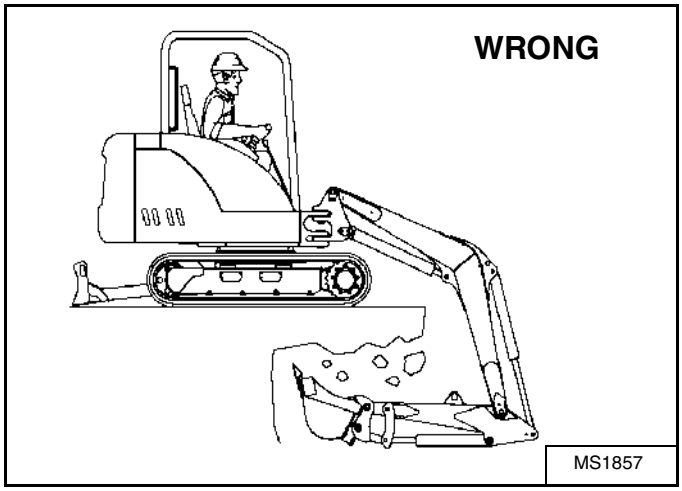
Extend the arm and uncurl the bucket to dump the material into a pile or truck **[Figure OI-75]**.

IMPORTANT

Avoid operating hydraulics over relief pressure as this will overheat hydraulic components.

W-2380-0700

Figure OI-76



Do not dig under the Excavator **[Figure OI-76]**.

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.

Dig only by moving the boom and arm toward the Excavator.

Do not back dig (digging by moving the boom and arm away from the Excavator). Damage to the X-Change™ and attachments may occur.

Boom Swing

Figure OI-77

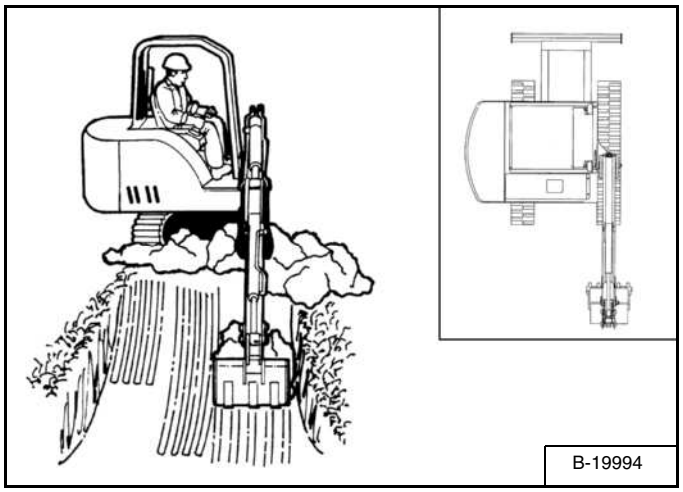


Figure OI-78

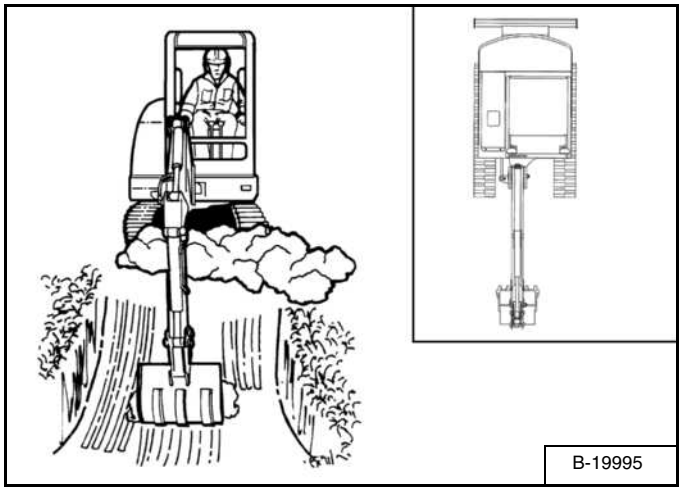
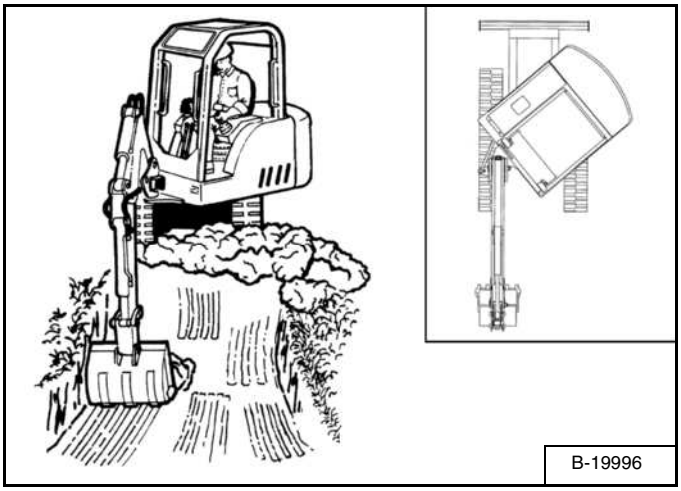
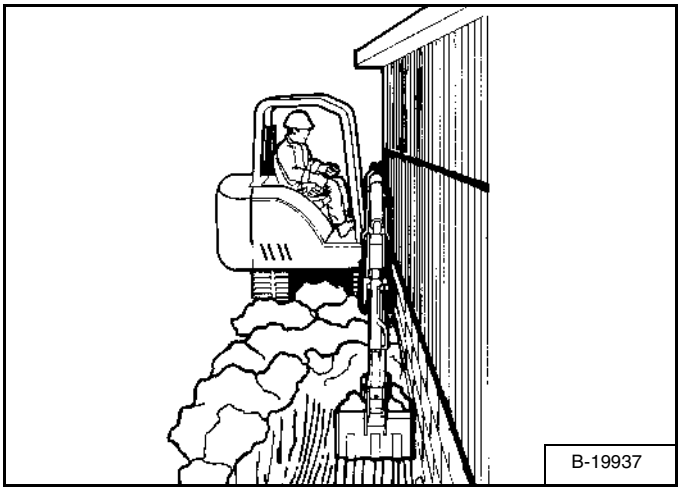


Figure OI-79



Slew the superstructure, swing the boom to the right **[Figure OI-77]**, centre **[Figure OI-78]** and left **[Figure OI-79]** to dig a square hole the width of the machine without repositioning the Excavator.

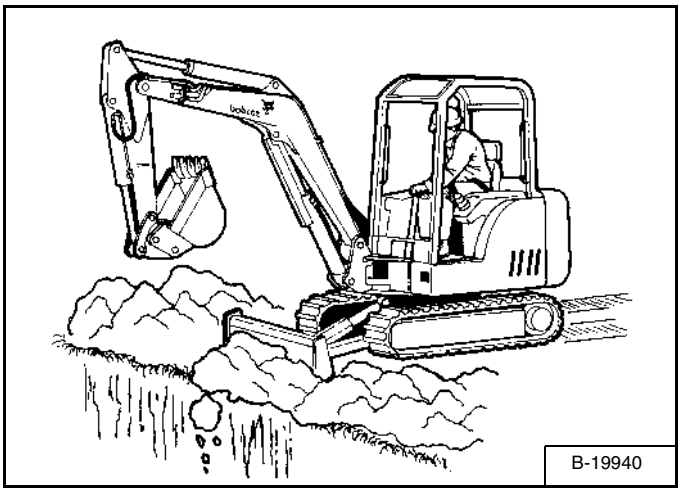
Figure OI-80



The boom swing allows the operator to offset the boom and dig close to buildings and other structures **[Figure OI-80]**.

Backfilling

Figure OI-81



Use the blade to backfill the trench or hole after excavating **[Figure OI-81]**.

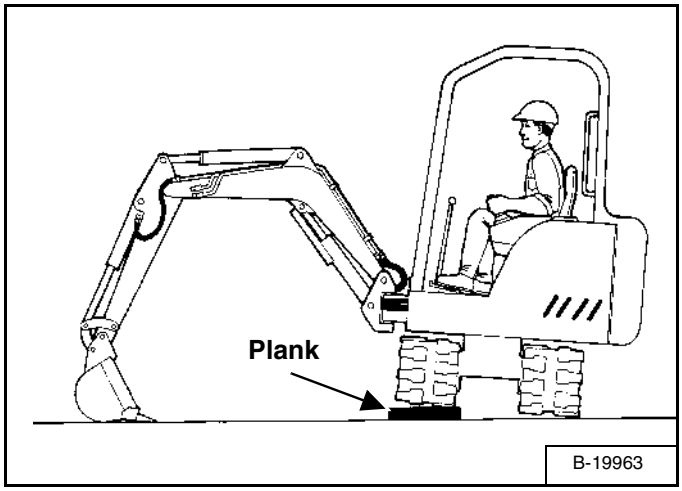
Driving The Excavator

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.

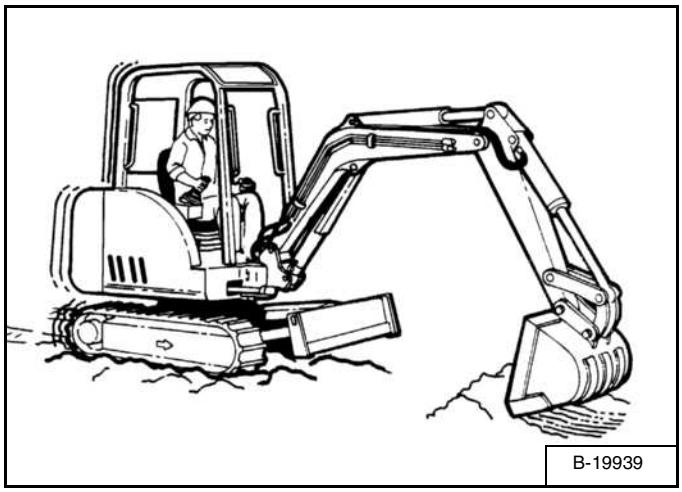
Figure OI-82



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-82]**.

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

Figure OI-83

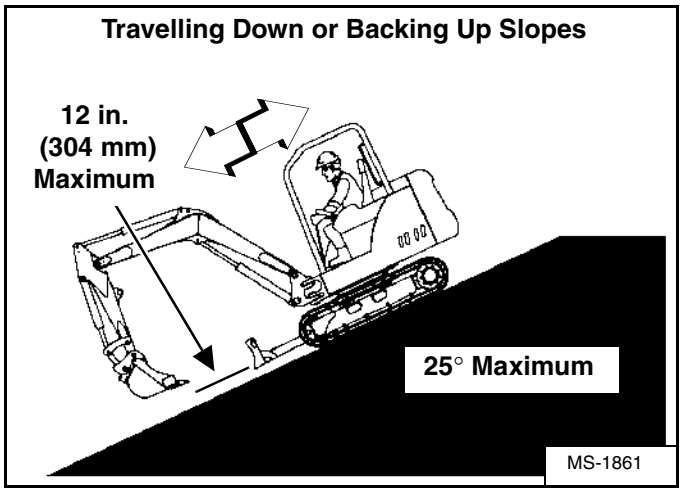


The bucket may also be used to pull the Excavator. Raise the blade, extend the arm and lower the boom. Operate the boom and arm in a digging manner **[Figure OI-83]**.

Operating On Slopes

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

Figure OI-84



When going down slopes that exceed 15 degrees, put the machine in the position shown, and run the engine slowly **[Figure OI-84]**.

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

Avoid travelling 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 may result.

⚠ WARNING

AVOID INJURY OR DEATH

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

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Figure OI-85

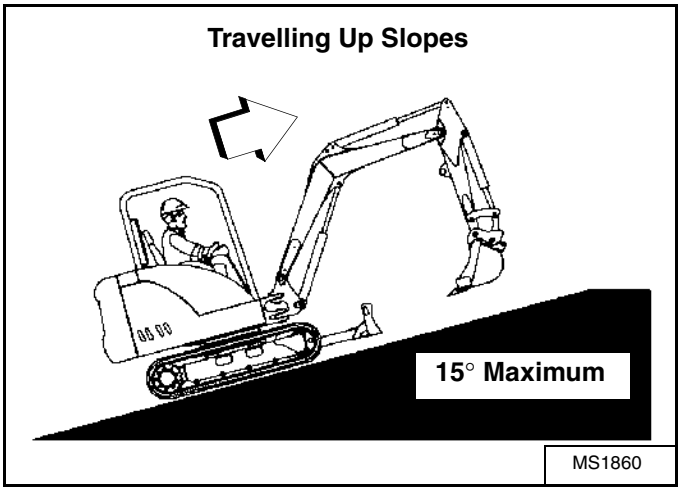
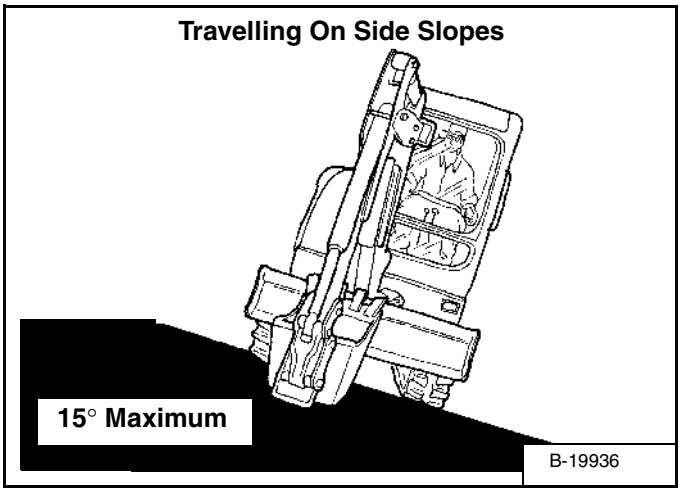


Figure OI-86



When travelling up slopes or on side slopes that are 15 degrees or less, position the machine as shown and run the engine slowly **[Figure OI-85]** & **[Figure OI-86]**.

⚠ WARNING

AVOID INJURY OR DEATH

- **Do not travel across or up slopes which are over 15 degrees to the side or back of machine or 25 degrees to the front. Keep boom centred while travelling.**
- **Keep attachments as low as possible when travelling on slopes or in rough conditions.**

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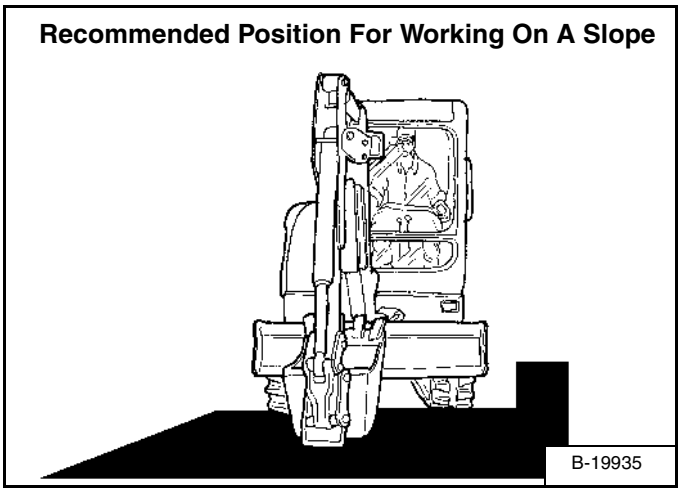
Operating On Slopes (Cont'd)

Figure OI-87



When operating on a slope, level the work area before beginning **[Figure OI-87]**.

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

Do not work on slopes which are over 15 degrees.

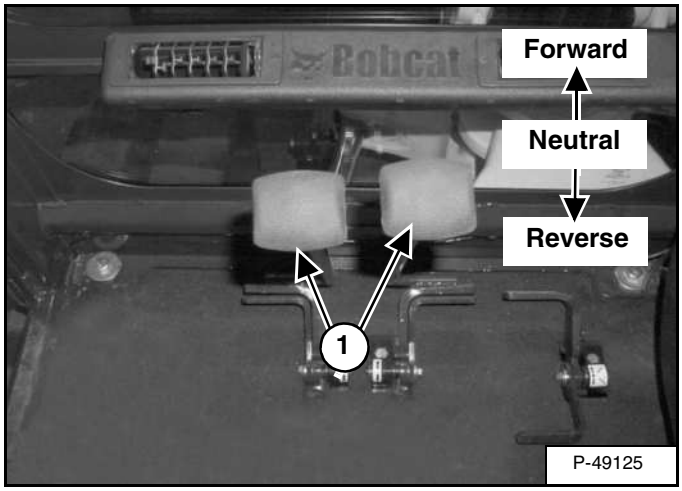
Use a slow work cycle.

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 downhill 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-88



To brake the machine when going down a slope, move the steering levers (Item 1) **[Figure OI-88]** to the NEUTRAL position. This will engage the hydrostatic 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 stored in the accumulator.

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

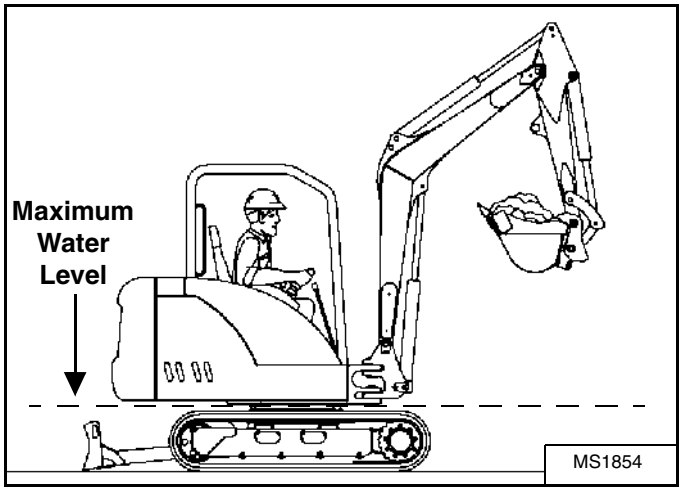
Use the control lever to lower the boom.

Start the engine and resume operation.

Operating 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-89



Do not operate or immerse the Excavator in water higher than the bottom of the swing circle **[Figure OI-89]**.

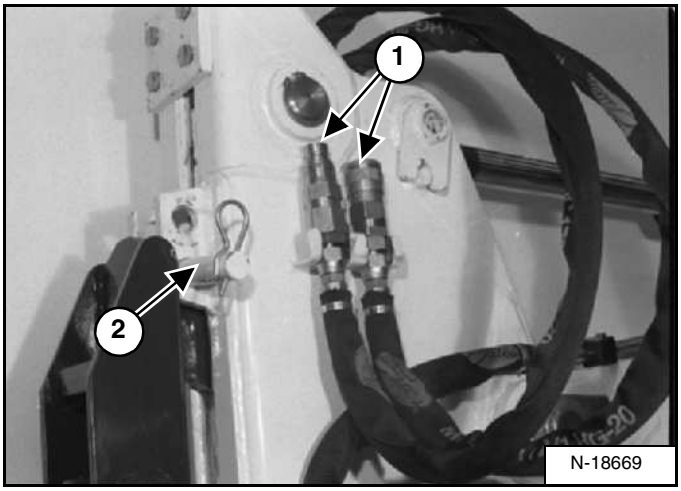
Grease the Excavator when it has been operated or immersed in water for a period of time. Greasing forces the water out of the lubrication areas.

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

Extending The Arm (331E Only)

The arm can be extended to increase the reach of the Excavator.

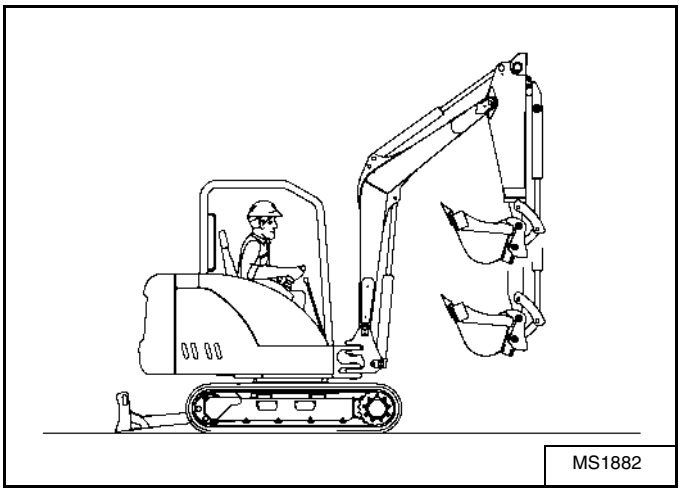
Figure OI-90



Remove quick couplers from the storage position (Item 1) **[Figure OI-90]** and connect to the auxiliary couplers.

Move the lock pin (Item 2) **[Figure OI-90]** to the top holes (storage position).

Figure OI-91



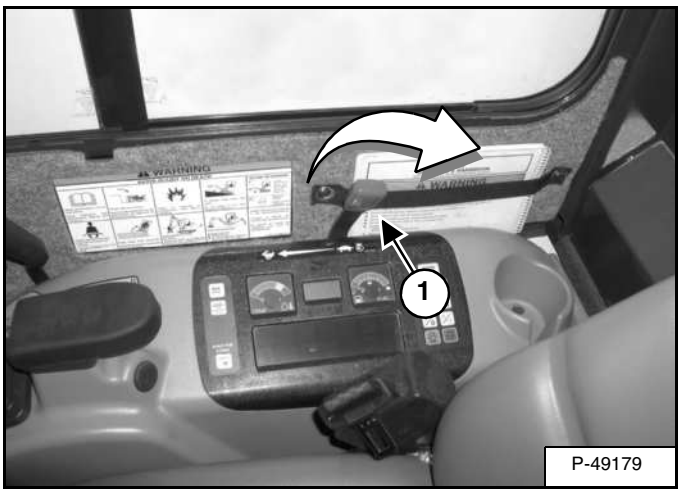
Operate the auxiliary control on the right joystick to extend and retract the arm **[Figure OI-91]**. (See "HYDRAULIC CONTROLS" on Page OI-18.)

NOTE: When transporting the Excavator or when using hydraulically operated attachments, the arm must be locked in the retracted position. Fully retract the arm and install the pin (Item 2) [Figure OI-90] through the lower holes of the bracket. (Be sure the pin goes through the mounting brackets *and* the extendable arm bracket.)

PARKING THE EXCAVATOR

Stop the machine on level ground. Lower the work equipment and the blade to the ground.

Figure OI-92



Move the speed control lever fully backwards (Item 1) **[Figure OI-92]**.

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

Figure OI-93

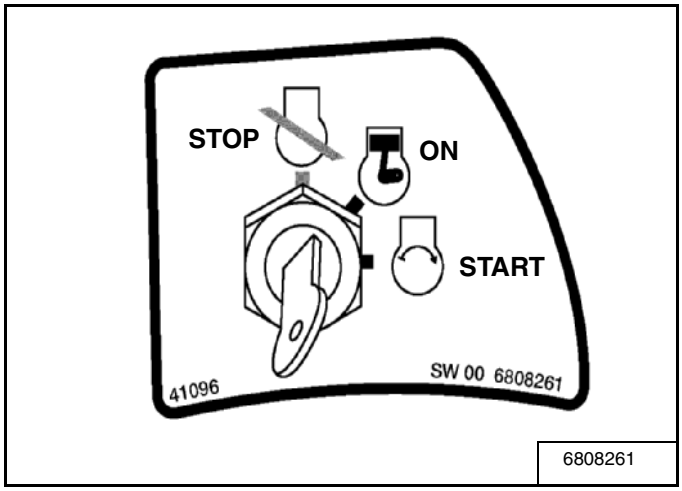
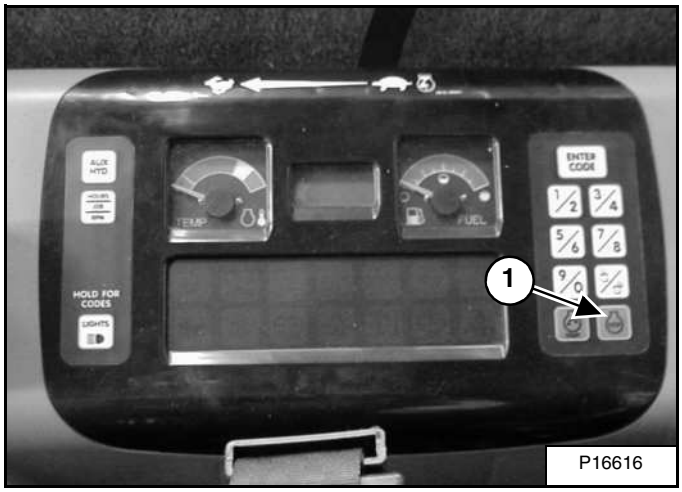


Figure OI-94



Turn the key switch to STOP (Standard Panel) **[Figure OI-93]** or press the STOP Button (Deluxe Panel) (Item 1) **[Figure OI-94]**.

Disconnect the seat belt. Remove the key from the switch to prevent operation of machine by unauthorised personnel. Raise the control console and exit the machine.

TRANSPORTING THE EXCAVATOR

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

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

Align the ramps with the centre 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.

Use ramps 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).

Figure OI-95

Engage the slew lock.

Move the machine forward onto the transport vehicle **[Figure OI-95]**.

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 (if equipped).

Put blocks at the front and rear of the tracks.

Figure OI-96

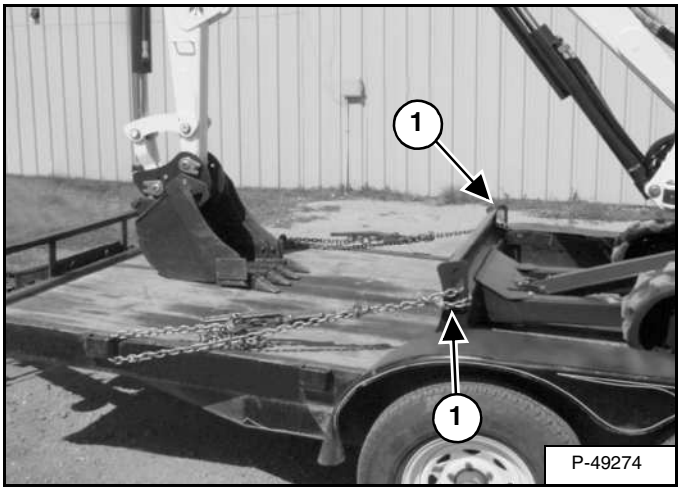
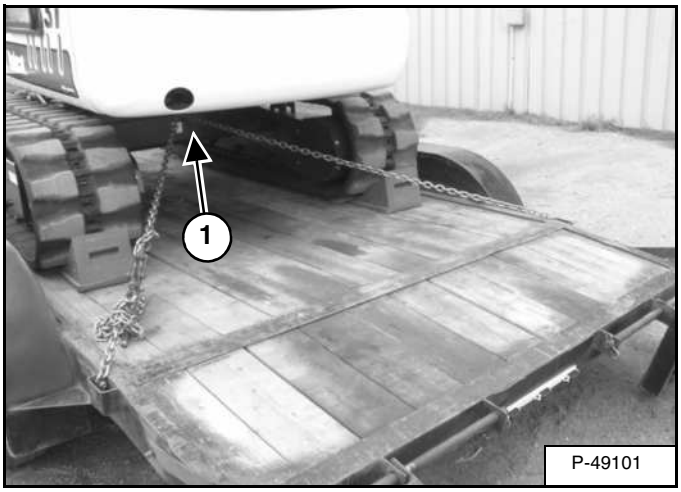


Figure OI-97



Fasten chains to the front corners of the blade (Item 1) **[Figure OI-96]** and to the tie-down loop at the rear of the track frame (Item 1) **[Figure OI-97]** 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. Wooden ramps can break and cause personal injury.

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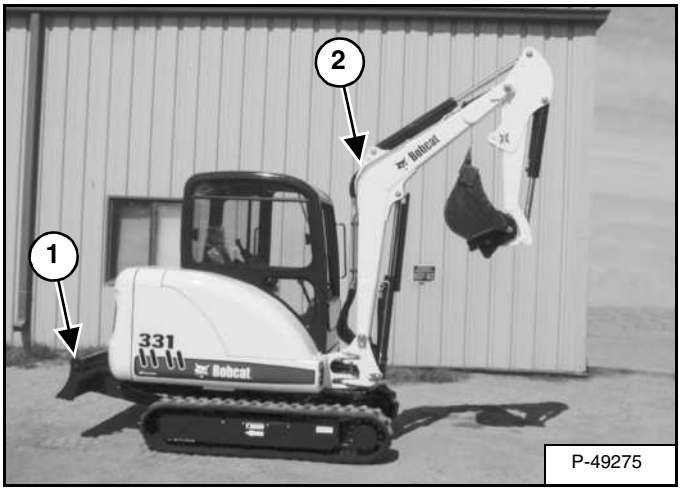
LIFTING THE EXCAVATOR

Figure OI-98



Fully extend the cylinders of the bucket, arm, and boom so that the Excavator is in the position as shown **[Figure OI-98]**.

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 centre of gravity and balance when lifting.**
- **Do not swing boom or superstructure. Engage the swing locking lever.**
- **Never lift with operator on machine.**

W-2202-0595

Figure OI-99

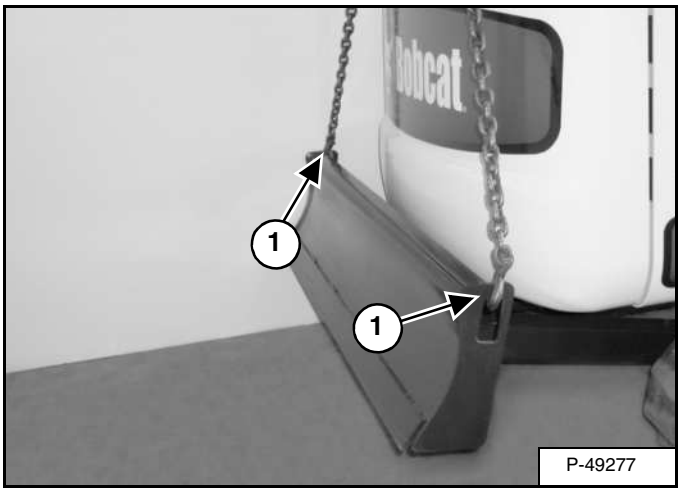
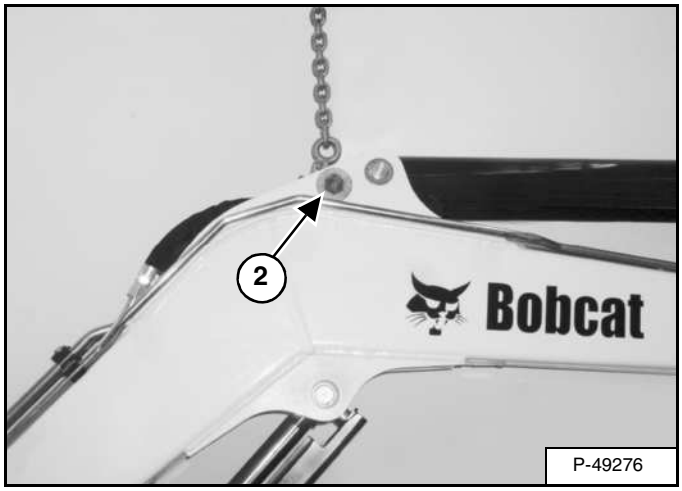


Figure OI-100



Fasten chains to the ends of the blade (Item 1) **[Figure OI-98]** and **[Figure OI-99]** 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.

Install a 25 mm bolt and nut (Grade 5 or 8) through the holes at the boom (Item 2) **[Figure OI-98]** and **[Figure OI-100]**. Fasten a chain from the bolt to the lift fixture.

PREVENTIVE MAINTENANCE

AIR CLEANER PM-8
- Daily Check PM-8
- Replacing The Filters PM-9

COOLING SYSTEM. PM-17
- Checking Coolant Level PM-18
- Cleaning The Cooling System PM-17
- Replacing The Coolant PM-19

ELECTRICAL SYSTEM PM-20
- Description PM-20
- Fuse And Relay Location PM-20
- Removing And Installing The Battery PM-22
- Using A Booster Battery (Jump-Starting) PM-21

ENGINE ACCESSORY DRIVE BELT PM-30
- Belt Adjustment PM-30
- Belt Tension PM-30

ENGINE LUBRICATION SYSTEM. PM-15
- Checking Engine Oil PM-15
- Replacing Oil And Filter PM-16

FUEL SYSTEM PM-12
- Draining The Fuel Tank PM-13
- Filling The Fuel Tank PM-12
- Fuel Filter PM-14
- Fuel Specifications PM-12
- Removing Air From The Fuel System. PM-14
- Removing Water From The Fuel Filter PM-13

HEATER AIR FILTER (WITH CAB OPTION ONLY). PM-11
- Removal And Installation PM-11

HYDRAULIC SYSTEM. PM-23
- Checking And Adding Hydraulic Oil PM-23
- Diagnostic Couplers PM-26
- Replacing The Case Drain Filter PM-25
- Replacing The Hydraulic Filter PM-25
- Replacing The Hydraulic Oil PM-24

LUBRICATION OF THE HYDRAULIC EXCAVATOR PM-33

MAINTENANCE SAFETY PM-3

SEAT BELT PM-10
Inspection And Maintenance PM-10

RIGHT SIDE COVER PM-7
Opening And Closing The Right Side Cover PM-7

SERVICE SCHEDULE PM-5

SPARK ARRESTER SILENCER PM-27

TAILGATE PM-6
Adjusting The Latch PM-6
Adjusting The Bumper PM-6
Opening And Closing The Tailgate PM-6

TRACK TENSION PM-28
Adjustment PM-29

TRAVEL MOTOR PM-31
Checking Oil Level PM-31
Draining The Travel Motor PM-31

X-CHANGE ™ PM-32
Inspection And Maintenance PM-32

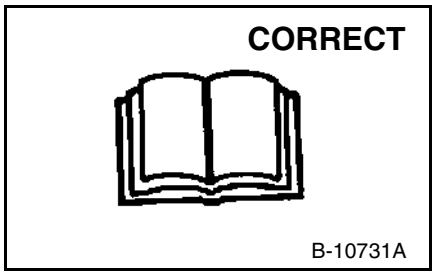
MAINTENANCE SAFETY

⚠ WARNING

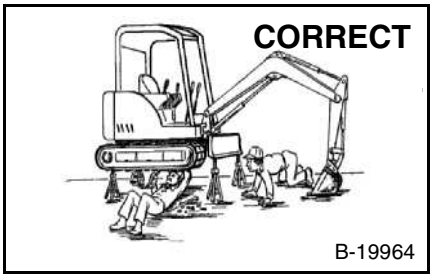
Instructions are necessary before operating or servicing machine. Read and understand the Operation & Maintenance Manual, Operator's Handbook and signs (transfers) on machine. Follow warnings and instructions in the manuals when making repairs, adjustments or servicing. Check for correct function after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

W-2003-0903

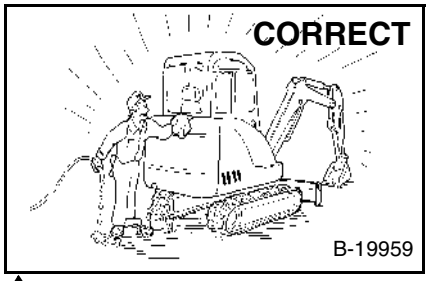
⚠ Safety Alert Symbol: This symbol with a warning statement, means: "Warning, be alert! Your safety is involved!" Carefully read the message that follows.



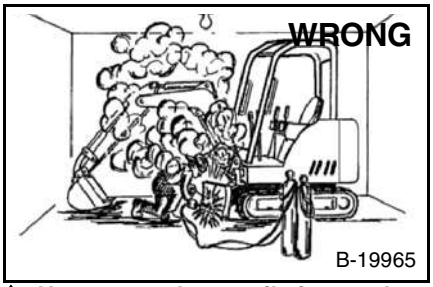
⚠ Never service the Bobcat Compact Excavator without instructions.



⚠ Use the correct procedure to lift and support the Excavator.

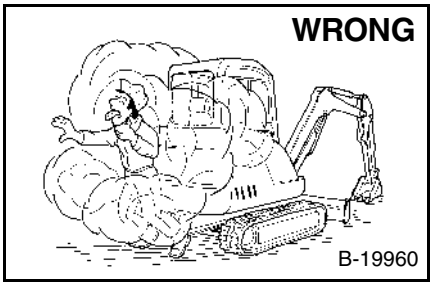


⚠ Cleaning and maintenance are required daily.



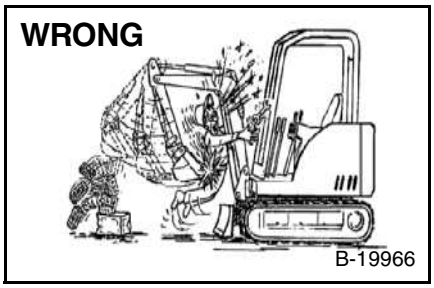
⚠ Have good ventilation when welding or grinding painted parts.

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



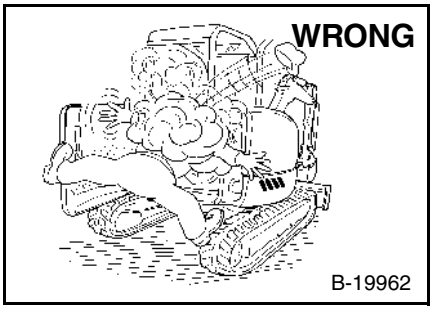
⚠ Vent exhaust to outside when engine must be run for service.

⚠ Exhaust system must be tightly sealed. Exhaust fumes may kill without warning.



⚠ Always lower the bucket and blade to the ground before doing any maintenance.

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

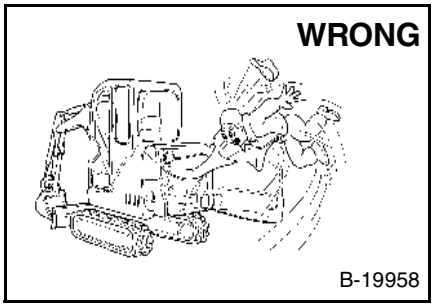


⚠ Stop, cool and clean engine of flammable materials before checking fluids.

⚠ 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.

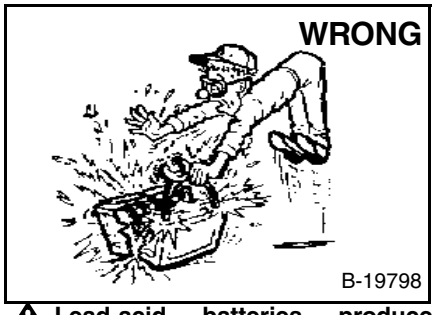
⚠ Never fill fuel tank with engine running, while smoking, or when near open flame.



⚠ Keep body, jewellery 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 protectors approved for type of welding.

⚠ Keep rear door closed except for service. Close and latch door before operating the Excavator.



⚠ 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.

MSW28-1003

Maintenance procedures given in the Operation & Maintenance manual may 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.


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 (transfers) 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, Reservoir Breather Cap	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.						
Operator Canopy/Cab	Check condition. Check mounting hardware.						
Seat Belt	Check condition. Check mounting hardware.						
Safety Signs and Safety Treads	Check for damaged signs (transfers) and safety treads. Replace any signs or safety treads which are damaged or worn.						
Pivot Points	Grease all machinery pivot points.						
Cab Heater Air Filter	Clean the filter as needed.						
Console Lock-out	Check console lock-out for proper operation.						
X-Change ™	Lubricate and inspect for damage or loose parts.						
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.						
Accessory Drive Belt	Check condition of belt and adjust as needed.		●				
Spark Arrester Silencer	Clean the spark chamber.						
Fuel Filter	Replace fuel filter.						
Radiator, Oil Cooler, *A/C	Clean debris from the radiator fins.						
Engine Oil and Filter	Replace oil and filter use CD or better grade oil and Bobcat filter.		●				
Primary Hydraulic Filter	Replace the primary hydraulic filter.			^			
Case Drain Filter	Replace the case drain filter.			^			
Alternator & Starter	Check the alternator and starter connections.						
Engine Valves	Check and adjust the engine valve clearance.						
Engine Cooling System	Drain and flush the cooling system. Replace the coolant.						
Hydraulic System	Replace the hydraulic fluid and filters. Clean the reservoir.						
Travel Motor	Replace the lubricant in both travel motors.						

*** If Fitted**
● Also at *first* 50 Hours
^ Also at *first* 100 Hours
■ Or every 6 months.

TAILGATE

Opening And Closing The Tailgate

WARNING

AVOID INJURY OR DEATH

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

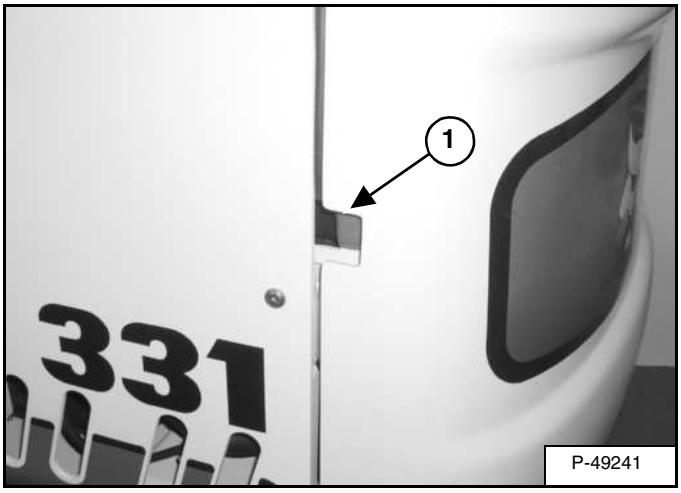
W-2012-0497

WARNING

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

W-2020-1285

Figure PM-1



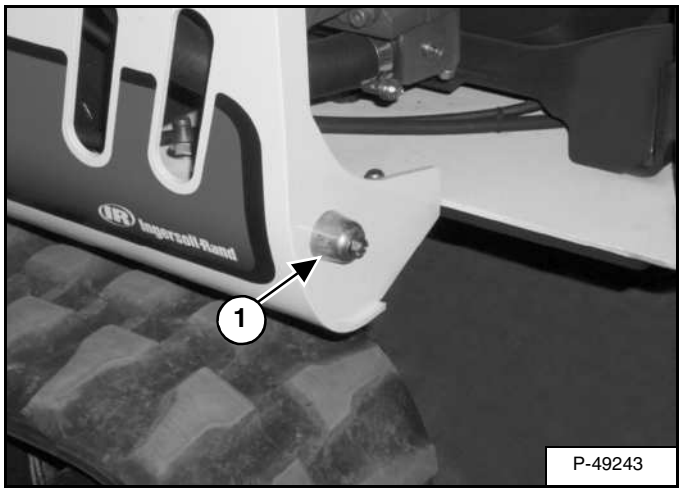
Pull the latch (Item 1) **[Figure PM-1]** and pull the tailgate open.

Push firmly to close the tailgate.

NOTE: The tailgate may be locked using the start key.

Adjusting The Bumper

Figure PM-2

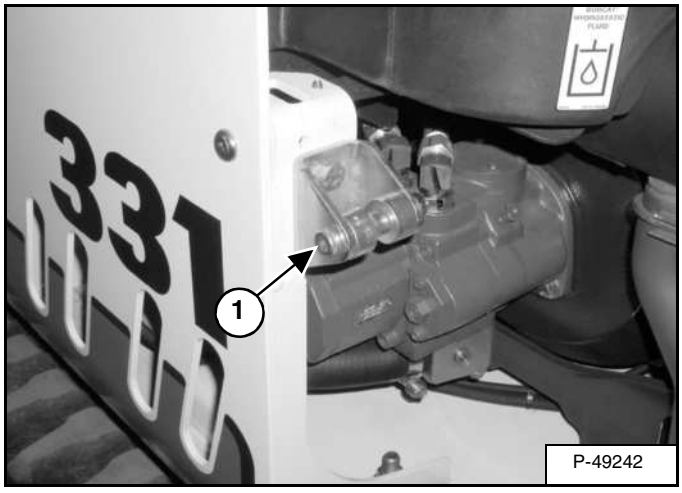


The door bumper (Item 1) **[Figure PM-2]** may be adjusted to align with the tailgate.

Close the tailgate before operating the Excavator.

Adjusting The Latch

Figure PM-3



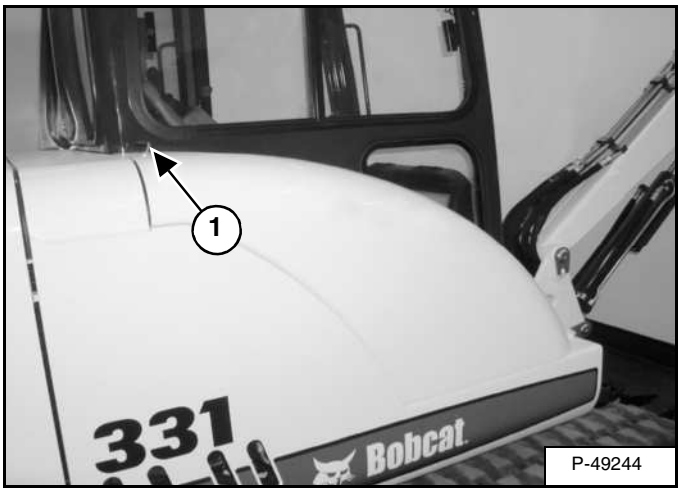
The door catch (Item 1) **[Figure PM-3]** may be adjusted for alignment.

Close the tailgate before operating the Excavator.

RIGHT SIDE COVER

Opening And Closing The Right Side Cover

Figure PM-4



Pull the latch (Item 1) **[Figure PM-4]** and raise the right side cover.

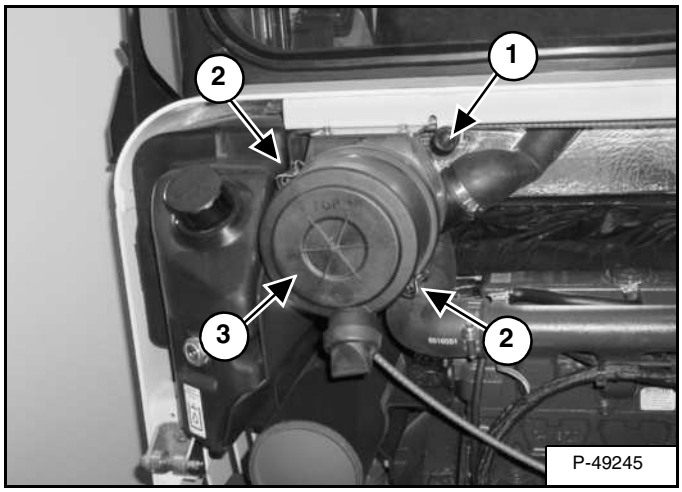
NOTE: The right side cover can be locked using the start key.

AIR CLEANER

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

Daily Check

Figure PM-5



Check the condition indicator (Item 1) **[Figure PM-5]**. If the red ring shows in the condition indicator, the filter needs to be replaced.

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

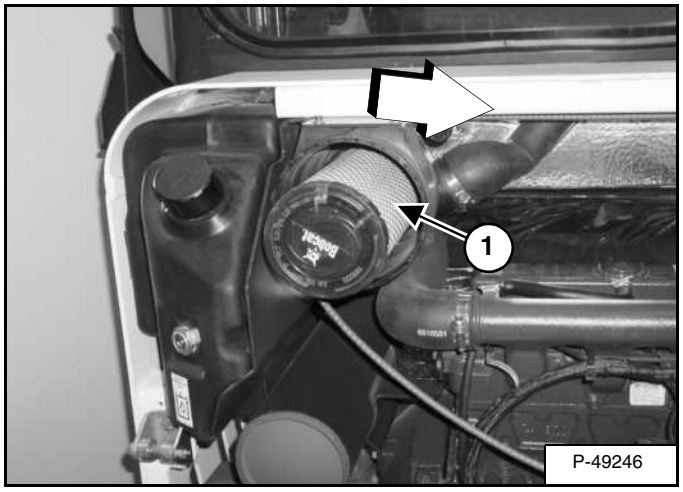
Replacing The Filters

Outer Filter

Release the two fasteners (Item 2) **[Figure PM-5]**.

Remove and clean the dust cup (Item 3) **[Figure PM-5]**.

Figure PM-6



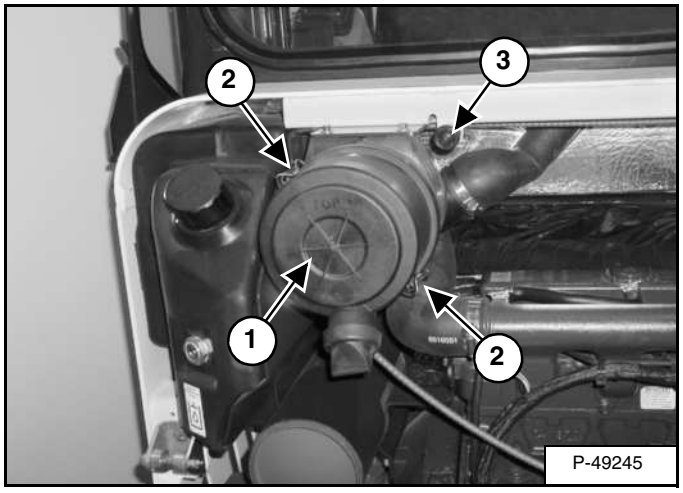
Pull the outer filter (Item 1) **[Figure PM-6]** from the air cleaner housing.

Check the housing for damage.

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

Install a new filter.

Figure PM-7



Install the dust cup (Item 1) and engage the fasteners (Item 2) **[Figure PM-7]**.

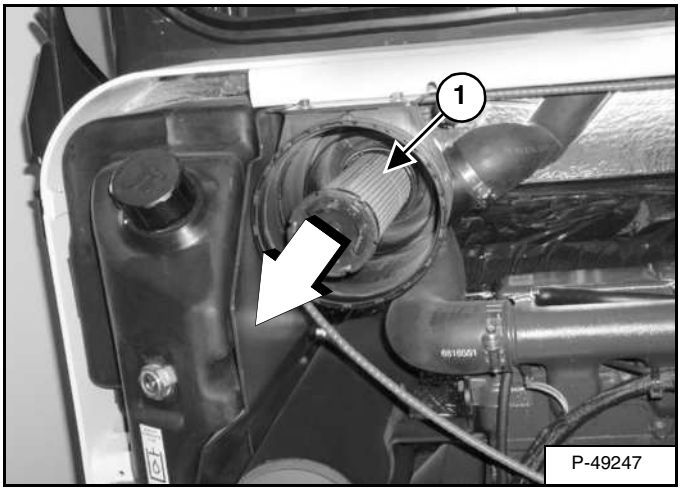
Check the air intake hose and the air cleaner housing for damage. Make sure all connections are tight.

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 3) **[Figure PM-7]** 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.

Figure PM-8



Remove the dust cup, outer filter and inner filter (Item 1) **[Figure PM-8]**.

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

Install the new inner filter.

Install the outer filter and the dust cup.

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

SEAT BELT

Inspection And Maintenance

WARNING

Failure to properly inspect and maintain the seat belt may 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 discoloration 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 fitted), or fixings.

Figure PM-9

The items below are referenced in **[Figure PM-9]**.

1. Check the seat belt webbing. If the system is fitted 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 fitted) 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 colour of the webbing in these areas is extremely faded and / or the webbing is packed with dirt, the webbing strength may have weakened.

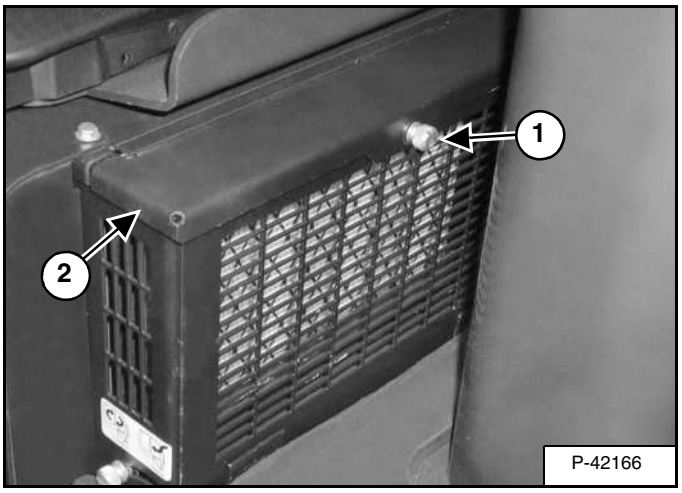
See your Bobcat dealer for approved seat belt system replacement parts for your machine.

HEATER AIR FILTER (WITH CAB OPTION ONLY)

Removal And Installation

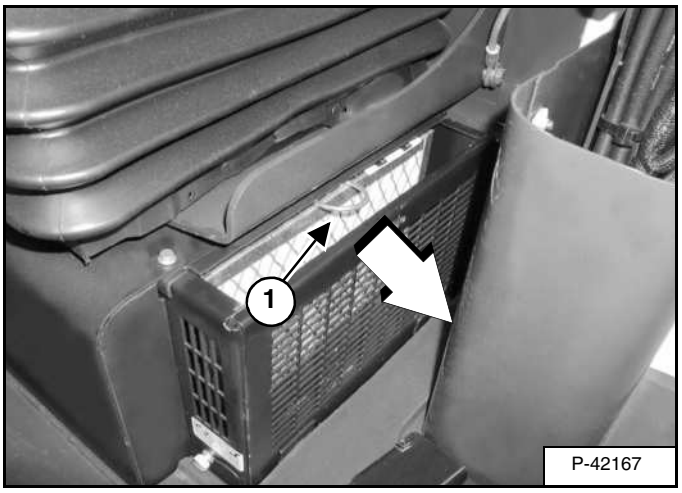
The heater filter must be cleaned regularly. The filter is located at the left of the operator seat.

Figure PM-10



Remove the screw (Item 1) and cover (Item 2) **[Figure PM-10]**.

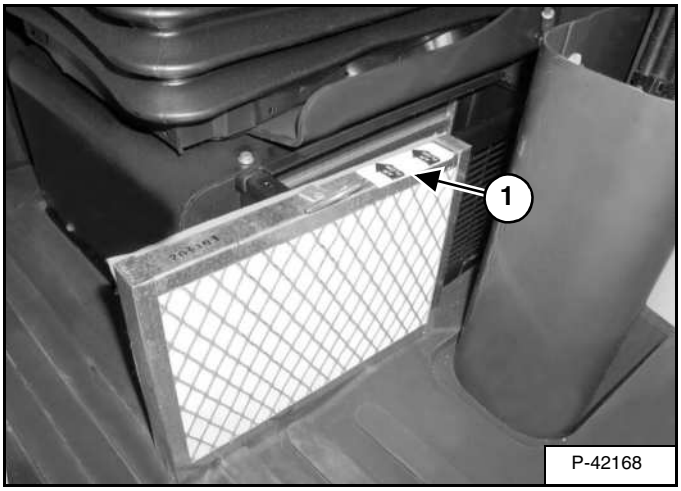
Figure PM-11



Pull the filter (Item 1) **[Figure PM-11]** away and out of the heater/AC housing.

Use low air pressure to clean the filter. Replace the filter when very dirty.

Figure PM-12



Installation: Install the filter with the arrows that indicate air flow direction (Item 1) **[Figure PM-12]** pointing towards the heater/AC housing.

FUEL SYSTEM

Fuel Specifications

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

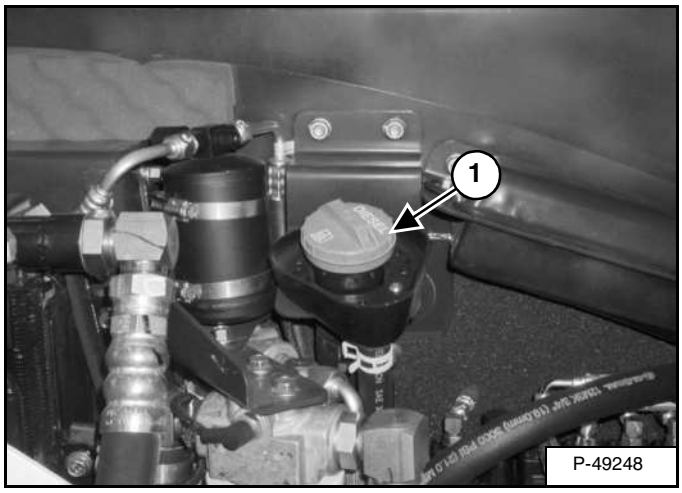
The following is a suggested blending guideline which should prevent fuel gelling problems during freezing temperature

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

See your fuel supplier for local recommendations.

Filling The Fuel Tank

Figure PM-13



Open the right side cover and 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.

Clean up any spilled fuel.

⚠ WARNING

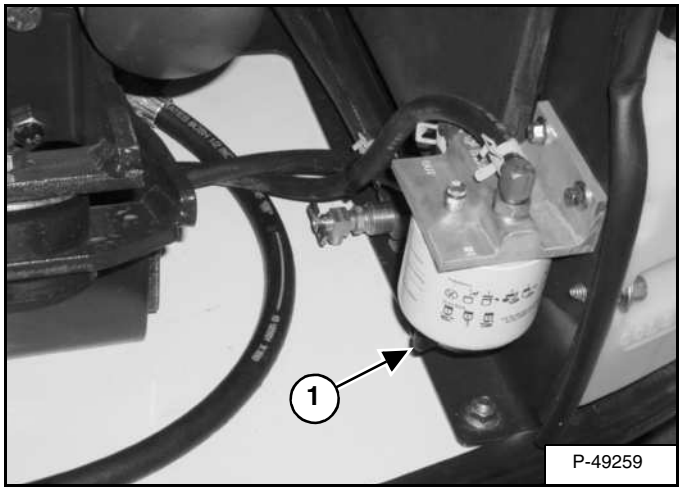
Always clean up spilled fuel or oil. Keep heat, flames, sparks or lighted tobacco away from fuel and oil. Failure to take care around combustibles may cause explosion or fire which can result in injury or death.

W-2103-1285

Removing Water From The Fuel Filter

Open the tailgate.

Figure PM-14



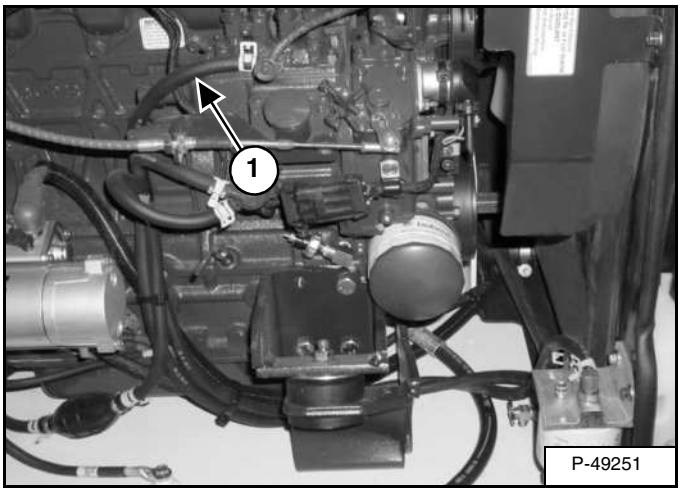
Loosen the drain (Item 1) **[Figure PM-14]** at the bottom of the filter to drain water from the filter.

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

Draining The Fuel Tank

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

Figure PM-15



Remove the hose (Item 1) **[Figure PM-15]** from the fuel injection pump. Route the hose to the bottom of the engine compartment and out through the tailgate.

Drain the fuel into a container.

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

⚠ WARNING

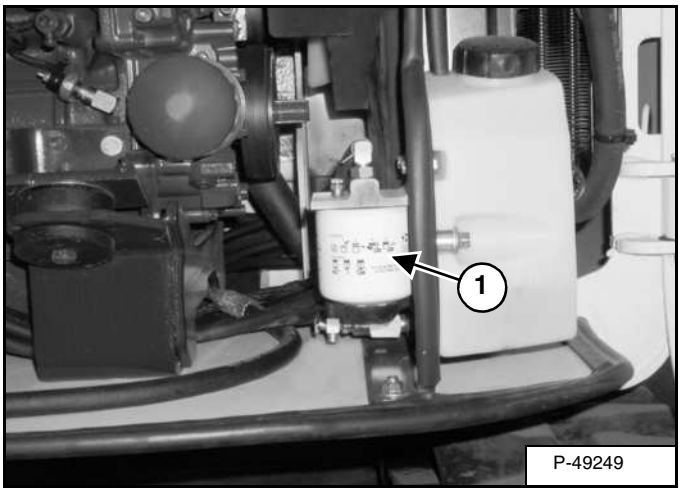
Diesel fuel or hydraulic fluid under pressure can penetrate skin or eyes, causing serious injury or death. Fluid leaks under pressure may not be visible. Use a piece of cardboard or wood to find leaks. Do not use your bare hand. Wear safety goggles. If fluid enters skin or eyes, get immediate medical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

W-2072-0496

Fuel Filter

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

Figure PM-16



Remove the filter (Item 1) **[Figure PM-16]**.

Clean the area around the filter housing.

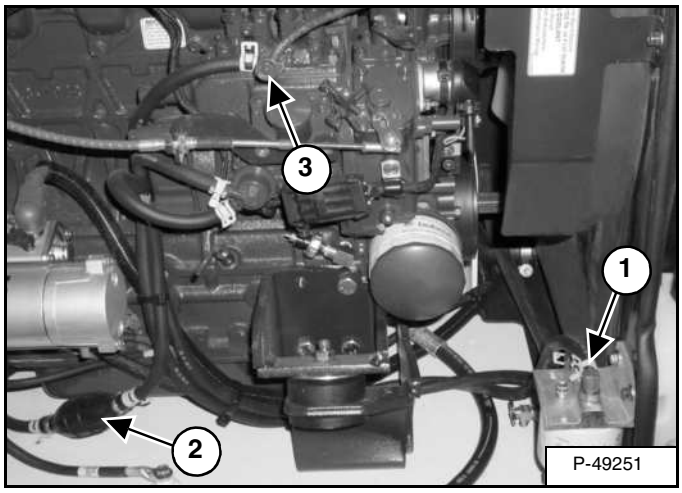
Put oil on the seal of the new filter.

Install the fuel filter, and hand tighten.

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) and 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]**.

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 doctor familiar with this injury.

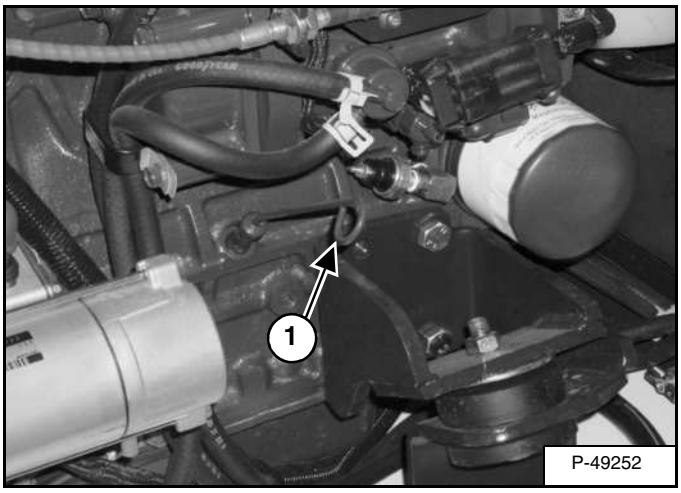
W-2072-0496

ENGINE LUBRICATION SYSTEM

Checking Engine Oil

Check the engine oil after every 8-10 hours of operation and before starting the engine.

Figure PM-18



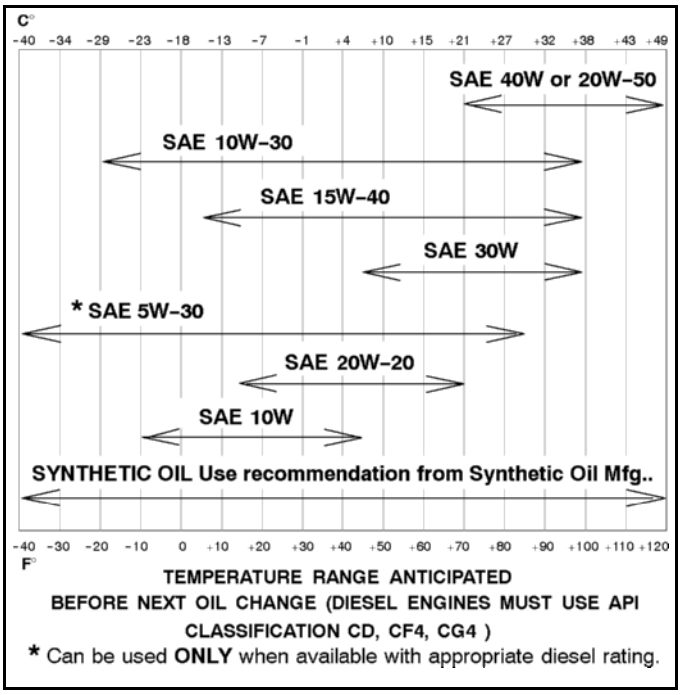
Open the tailgate and remove the dipstick (Item 1) **[Figure PM-18]**.

Keep the oil level between the marks on the dipstick.

Use a good quality motor oil that meets the correct API Service Classification.

Oil Chart

Figure PM-19



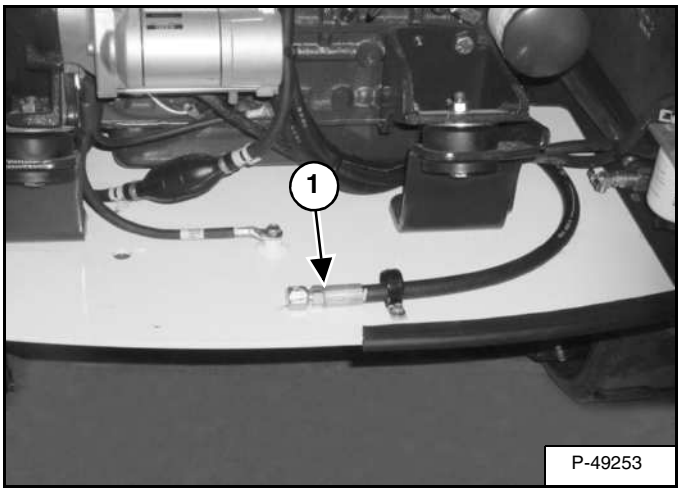
Use a good quality motor oil that meets the correct API Service Classification. See oil chart **[Figure PM-19]**.

Replacing Oil And Filter

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

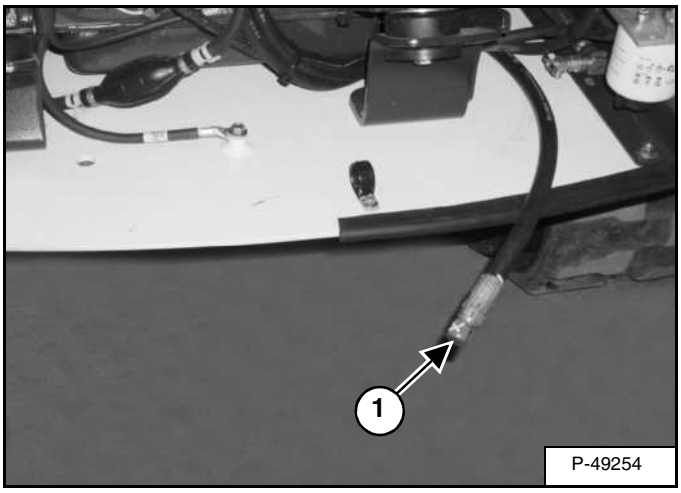
Run the engine until it is at operating temperature. Stop the engine.

Figure PM-20



Remove the drain hose (Item 1) **[Figure PM-20]** from the storage position.

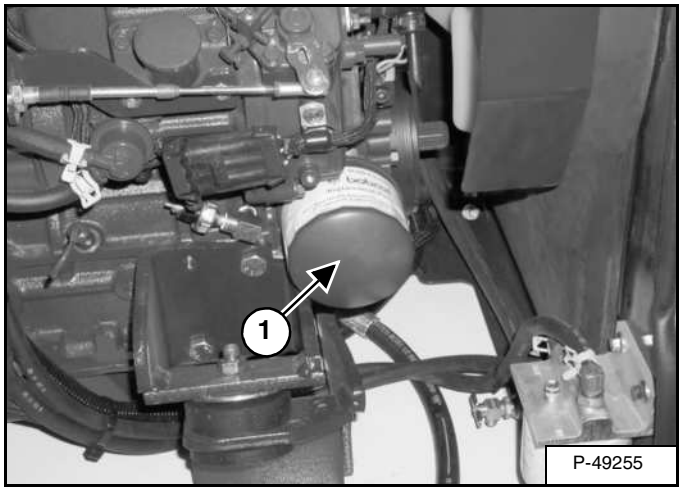
Figure PM-21



Remove the cap (Item 1) **[Figure PM-21]**. Drain the oil into a container.

Recycle or dispose of used oil in an environmentally safe manner.

Figure PM-22

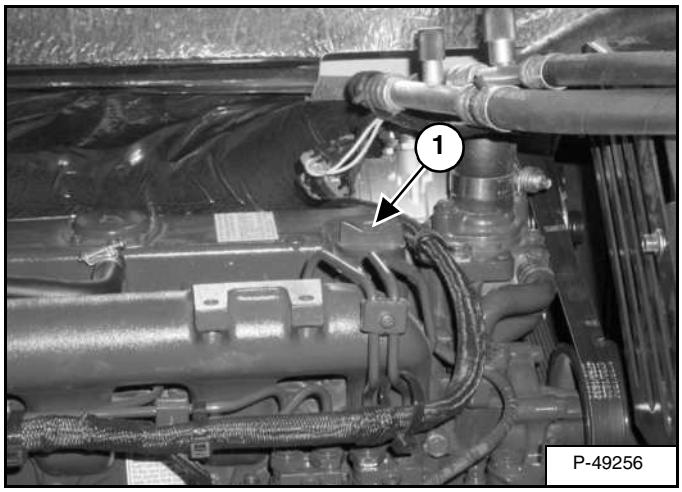


Remove the oil filter (Item 1) **[Figure PM-22]** and clean the filter housing surface.

Use a genuine Bobcat replacement filter. Put clean oil on the filter gasket. Install the filter and hand tighten.

Install and tighten the oil cap.

Figure PM-23



Remove the fill cap (Item 1) **[Figure PM-23]**.

Put oil in the engine. (See "Electrical" on Page SPEC-15.)

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.

COOLING SYSTEM

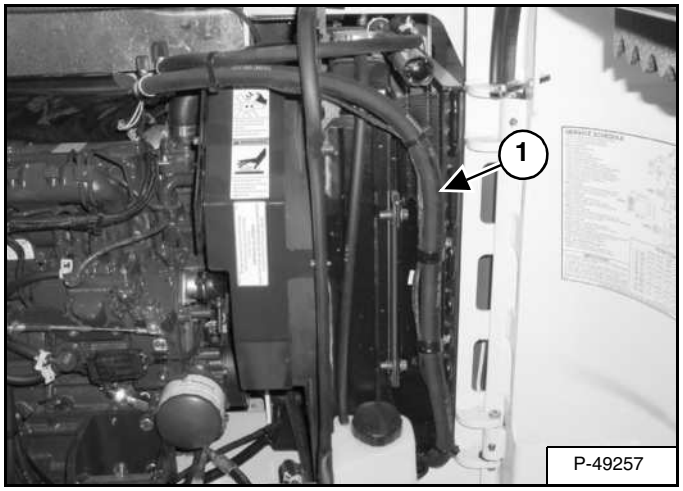
Check the cooling system every day to prevent overheating, loss of performance or engine damage.

Cleaning The Cooling System

NOTE: Allow the cooling system and engine to cool before servicing or cleaning the cooling system.

Open the right side cover.

Figure PM-24



Use air pressure or water pressure to clean the radiator and oil cooler (Item 1) **[Figure PM-24]**. Be careful not to damage fins when cleaning.

Checking Coolant Level

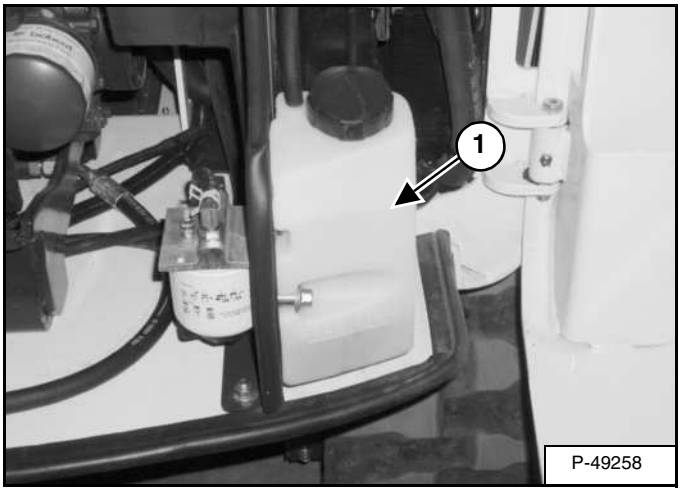
⚠ WARNING

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

W-2070-1285

Open the tailgate.

Figure PM-25



Check the coolant level in the coolant recovery tank (Item 1) **[Figure PM-25]**.

The coolant level must be between the MIN and MAX marks on the coolant recovery tank when the engine is cold.

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

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

⚠ 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

Replacing The Coolant

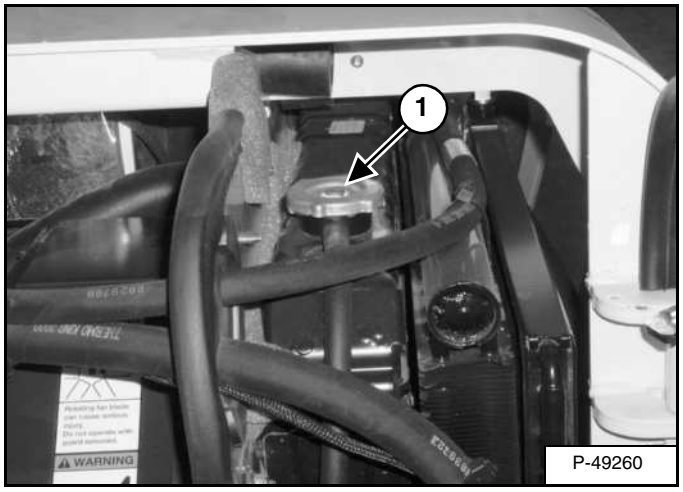
See the SERVICE SCHEDULE (See "SERVICE SCHEDULE" on Page PM-5.) for correct service intervals.

⚠ WARNING

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

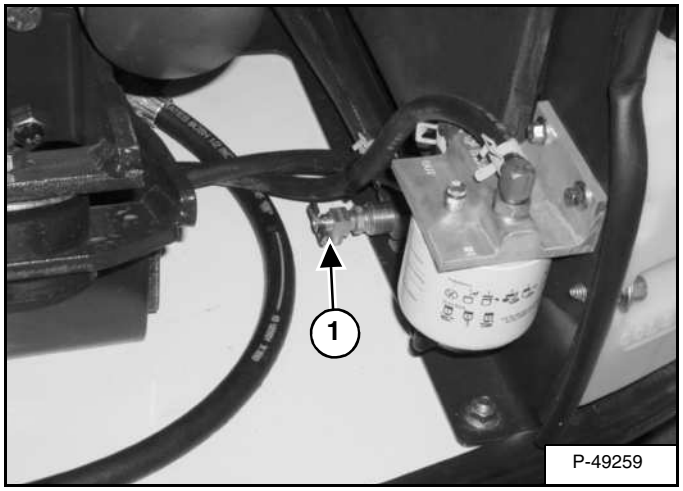
W-2070-1285

Figure PM-26



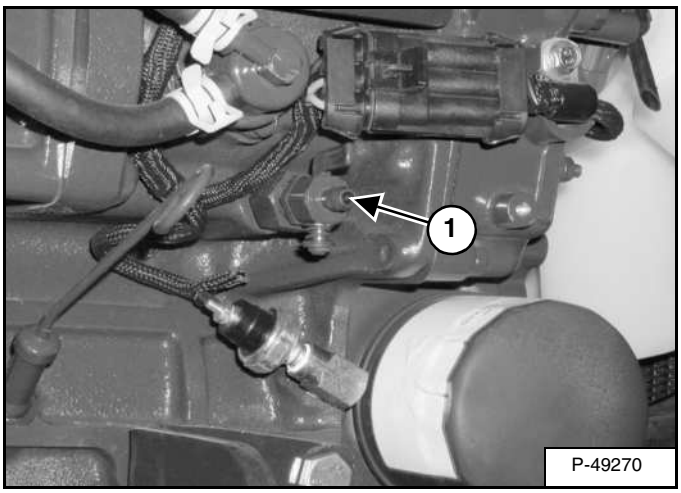
When the engine is cool, loosen and remove the radiator cap (Item 1) **[Figure PM-26]**.

Figure PM-27



Put a hose on the drain valve at the bottom of the radiator. Open the drain valve (Item 1) **[Figure PM-27]** and drain the coolant into a container.

Figure PM-28



Put a hose on the drain valve on the engine block. Open the drain valve (Item 1) **[Figure PM-28]** and drain the coolant into a container.

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

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

Mix the coolant in a separate container. (See "Electrical" on Page SPEC-15.)

NOTE: The cooling system is factory filled with propylene glycol (purple colour). 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.

4.25 L of propylene glycol mixed with 3.8 L of water is the correct mixture of coolant to provide a -34°F (-37°C) freeze protection.

Use a refractometer to check the condition of 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. Be sure the radiator cap is tight.

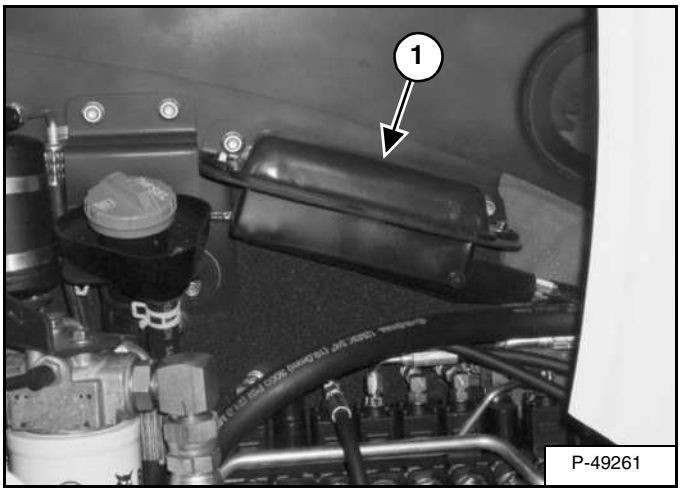
Add coolant to the recovery tank as needed.

Close the tailgate.

ELECTRICAL SYSTEM

Description

Figure PM-29



The Excavator has a 12 volt, negative earth electrical system. The electrical system is protected by fuses located under the right side cover of the Excavator (Item 1) **[Figure PM-29]**. 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.

The battery cables must be clean and tight. Check the electrolyte level in the battery. Add distilled water as needed. Remove acid or corrosion from the battery and cables with a sodium bicarbonate and water solution.

Put Battery Saver P/N 6664458 or grease on the battery terminals and cable ends to prevent corrosion.

⚠ 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.

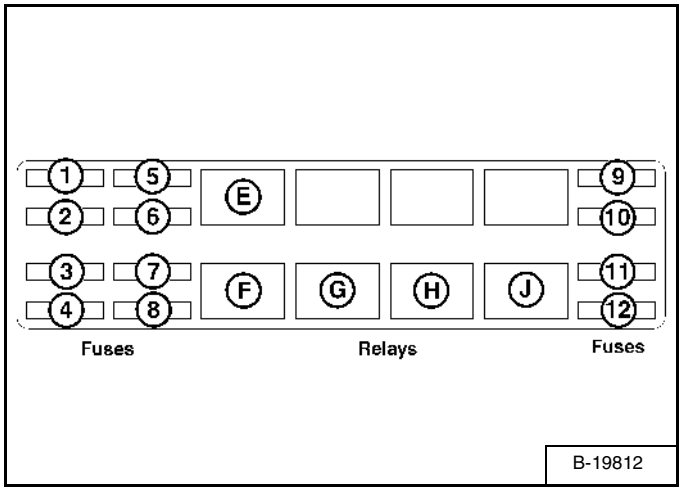
W-2065-1296

Fuse And Relay Location

A notice is inside the cover to show location and amp ratings.

Remove the cover to check or replace the fuses and relays.

Figure PM-30



The location and sizes are shown below and **[Figure PM-30]**.

REF	DESCRIPTION	AMP	REF	DESCRIPTION	AMP
1	*Not Used*	- -	11	Lights	20
2	Heater	25	12	ACC Plug	15
3	Ignition	5			
4	Fuel Solenoid	25			
5	Wiper	5			
6	Switch Power	20			
7	Alternator/ Heater	25			
8	ACD	25			
9	Controller	25			
10	ACD	25			

Always replace fuses using the same type and capacity.

REF	DESCRIPTION
E	Switch Power
F	Fuel Solenoid
G	Lights
H	Glow Plug
J	Starter

Using A Booster Battery (Jump-Starting)

IMPORTANT

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 may burn out the glow plugs.

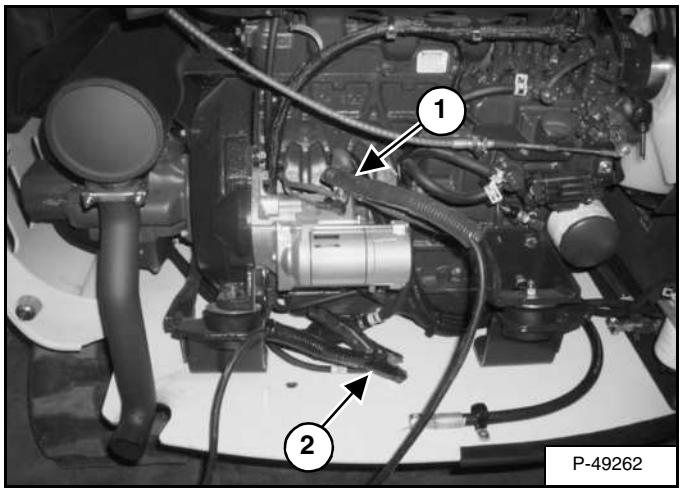
I-2060-0195

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.

Be sure the key switch is OFF. The booster battery must be 12 volt.

Open the tailgate.

Figure PM-31



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-31]** of the Excavator starter.

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 Excavator cable (Item 2) **[Figure PM-31]** where it is fastened to the frame.

NOTE: (See "Cold Temperature Starting Procedure" on Page OI-26.)

Start the engine. After the engine has started, remove the earth (-) cable first (Item 2) **[Figure PM-31]**.

Disconnect the cable from the Excavator starter (Item 1) **[Figure PM-31]**.

⚠ 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

⚠ WARNING

Keep arcs, sparks flames and lighted tobacco away from batteries. When *jumping* from booster battery make final connection (negative) at engine frame.

Do not jump-start or charge a frozen or damaged battery. Warm battery to 60°F (16°C) before connecting to a charger. Unplug charger before connecting or disconnecting cables to battery. Never lean over battery while boosting, testing or charging.

Battery gas can explode and cause serious injury.

W-2066-1296

IMPORTANT

Damage to the alternator may occur if:

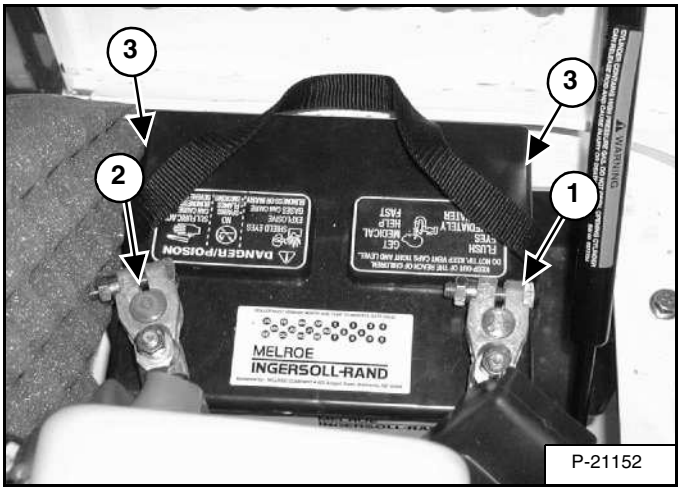
- **Engine is operated with battery cables disconnected.**
- **Battery cables are connected when using a fast charger or when welding on the Excavator. (Remove both cables from the battery.)**
- **Extra battery cables (booster cables) are connected incorrectly.**

I-2222-0903

Removing And Installing The Battery

Open the right side cover.

Figure PM-32



Disconnect the negative (-) cable (Item 1) **[Figure PM-32]** first.

Disconnect the positive (+) cable (Item 2) **[Figure PM-32]**.

Remove the bolts (Item 3) **[Figure PM-32]** and remove the hold-down 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-32]** 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

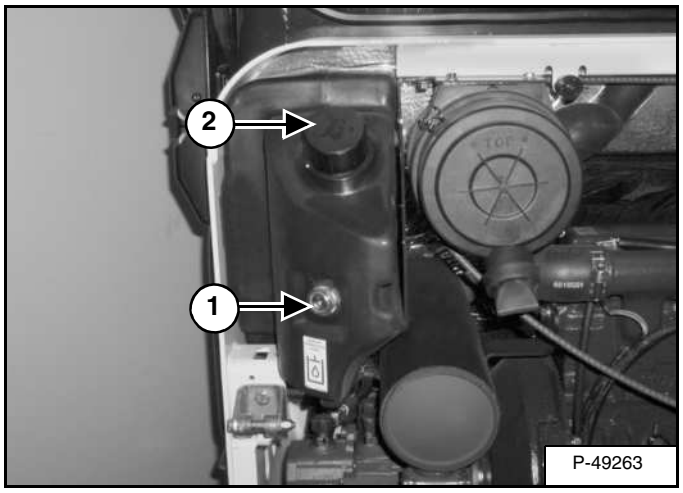
Checking And Adding Hydraulic Oil

Put the machine on a flat level surface.

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

Open the tailgate.

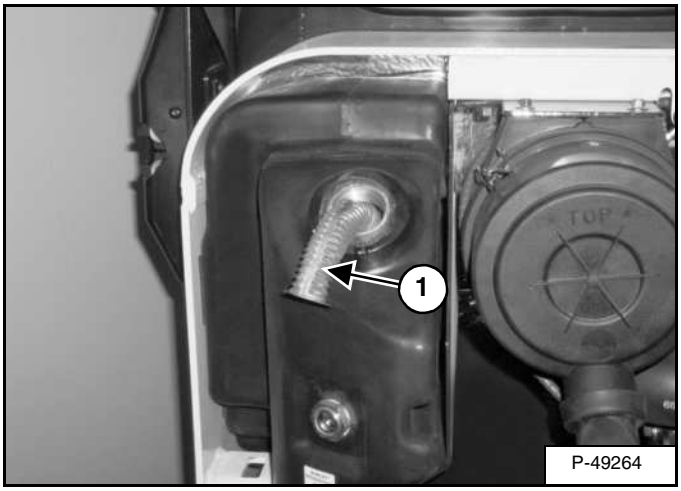
Figure PM-33



Check the hydraulic fluid level: it must be visible in the sight gauge (Item 1) **[Figure PM-33]**.

Clean the surface around the reservoir (breather) cap and remove the cap from the reservoir (Item 2) **[Figure PM-33]**.

Figure PM-34



Check the condition of the fill strainer screen (Item 1) **[Figure PM-34]**. Clean or replace as necessary.

Be sure the screen is installed before adding fluid.

Add the correct fluid to the reservoir until it is visible in the sight gauge. (See “Electrical” on Page SPEC-15.)

Check the cap and clean as necessary. Replace the cap if damaged.

Install the cap.

Close the tailgate.

Replacing The Hydraulic Oil

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

⚠ WARNING

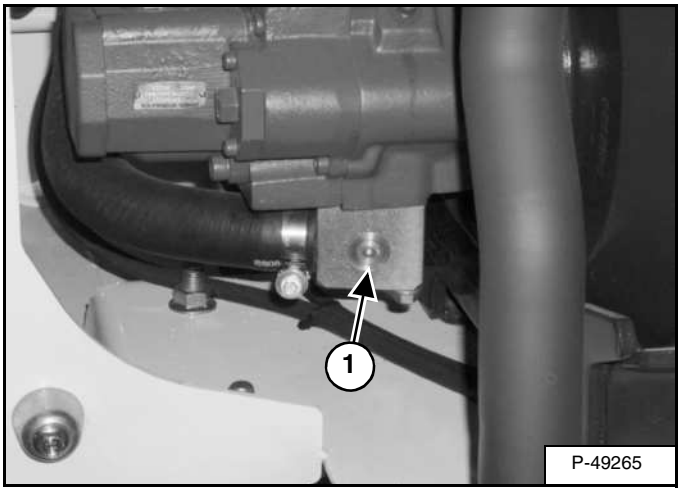
Diesel fuel or hydraulic fluid under pressure can penetrate skin or eyes, causing serious injury or death. Fluid leaks under pressure may not be visible. Use a piece of cardboard or wood to find leaks. Do not use your bare hand. Wear safety goggles. If fluid enters skin or eyes, get immediate medical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

W-2072-0496

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

Open the tailgate.

Figure PM-35



Remove the drain plug (Item 1) **[Figure PM-35]**.

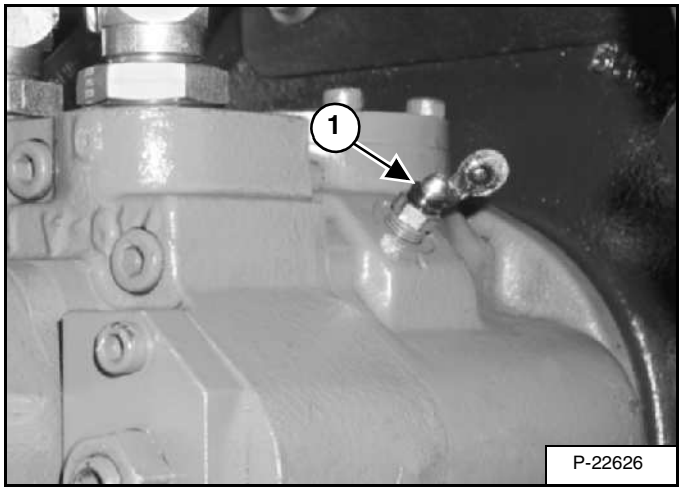
Drain the fluid into a container.

Recycle or dispose of the fluid in an environmentally safe manner.

Install the drain plug (Item 1) **[Figure PM-35]**.

Add fluid to the reservoir. (See "Electrical" on Page SPEC-15.)

Figure PM-36



Open the bleed valve (Item 1) **[Figure PM-36]** on the hydraulic pump. Close the valve after a steady stream of hydraulic fluid free of any air bubbles drains from the valve. Tighten the bleed valve. **DO NOT RUN THE MACHINE WITH THE BLEED VALVE OPEN.**

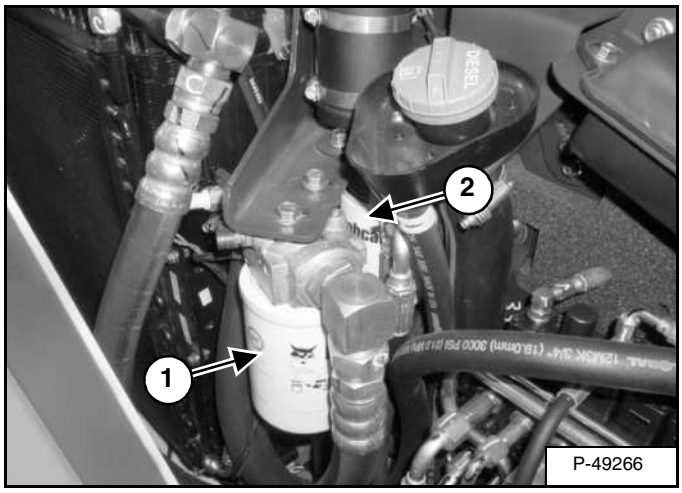
Start the engine and operate the machine through the hydraulic functions. Stop the engine. Check the fluid level and add as needed.

Replacing The Hydraulic Filter

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

Open the right side cover.

Figure PM-37



Remove the hydraulic filter (Item 1) **[Figure PM-37]**.

Clean the housing where the filter gasket makes contact.

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

⚠ WARNING

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

W-2103-1285

Replacing The Case Drain Filter

Open the right side cover.

Remove the filter (Item 2) **[Figure PM-37]**.

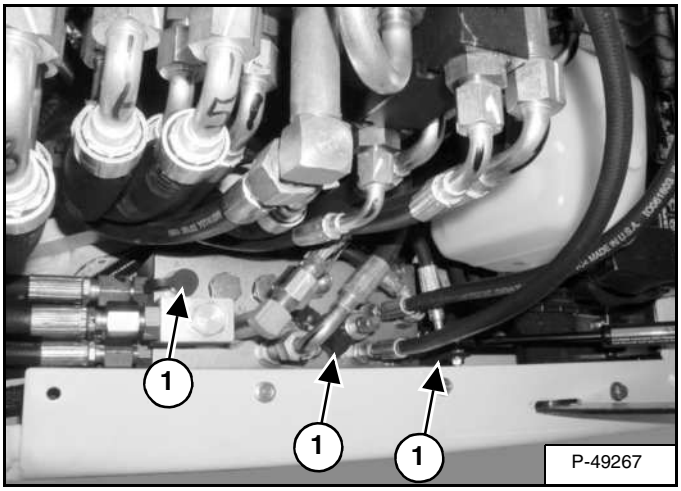
Clean the housing where the filter gasket makes contact.

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

Diagnostic Couplers

Open the right side cover.

Figure PM-38



Diagnostic couplers (Item 1) **[Figure PM-38]** are located on the hydraulic circuitry.

The couplers may be used to check circuit pressures.

SPARK ARRESTER SILENCER

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

Do not operate the Excavator with a defective exhaust system.

IMPORTANT

This Excavator is factory equipped with a US Department of Agriculture Forestry Service approved spark arrester silencer. It is necessary to do maintenance on this spark arrester silencer to keep it in working condition. The spark arrester silencer 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 arrester attached to the exhaust system and maintained in working order.

Refer to local laws and regulations for spark arrester requirements.

I-2061-0195

⚠ WARNING

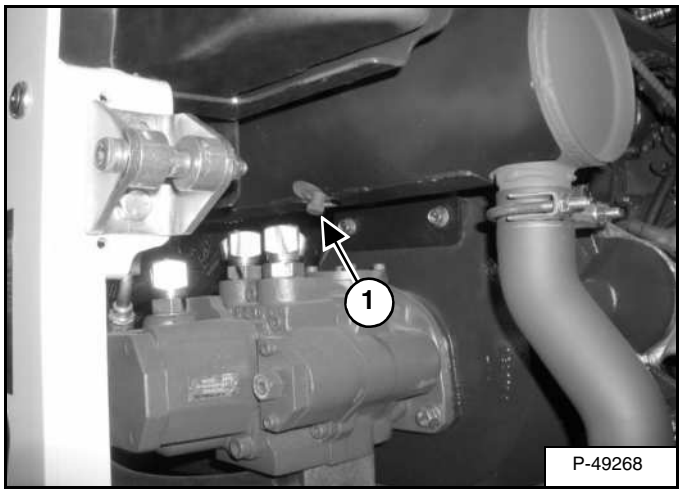
When the engine is running during service, the steering levers must be in neutral.

Failure to do so can cause injury or death.

W-2203-0595

Stop the engine. Open the tailgate.

Figure PM-39



Remove the plug (Item 1) **[Figure PM-39]** from the bottom of the silencer.

Start the engine and run for about 10 seconds while a second person, wearing safety glasses, holds a piece of wood over the outlet of the silencer. The carbon deposits will be forced out of the silencer plug hole (Item 1) **[Figure PM-39]**.

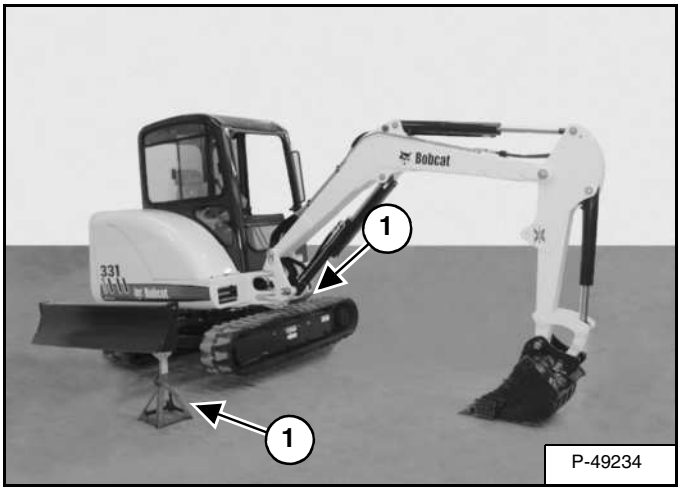
Stop the engine. Install and tighten the plug.

Close the tailgate.

TRACK TENSION

NOTE: The wear of the pins and bushings on the undercarriage will vary with the working conditions and the different types of soil. It is necessary to inspect track tension and maintain the correct tension. *(See 'SERVICE SCHEDULE' on Page PM-5)* **for the correct service interval.**

Figure PM-40



Raise one side of the machine (Approximately 100 mm) using the boom and arm **[Figure PM-40]**.

Raise the blade fully and install jacks under the blade and track frame (Item 1) **[Figure PM-40]**. Lower the boom until all machine weight is on the jacks.

Stop the engine.

⚠ WARNING

AVOID INJURY OR DEATH

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

W-2142-0189

Rubber Track Clearance

Figure PM-41

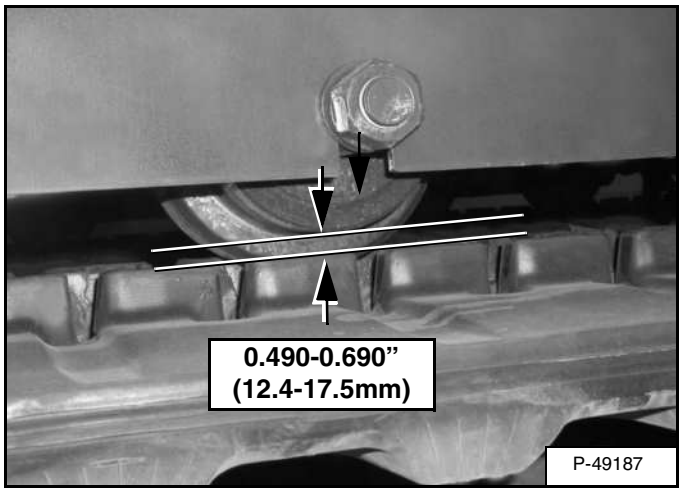
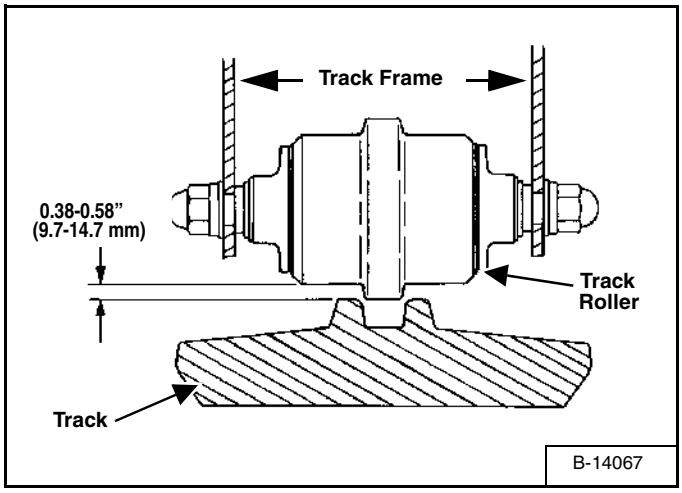


Figure PM-42



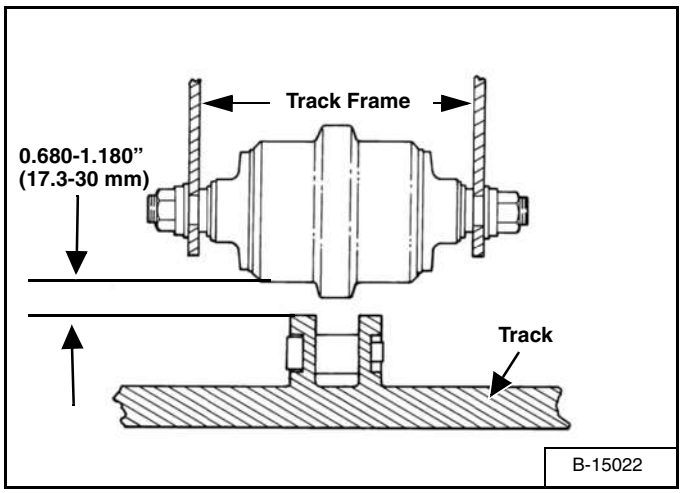
Measure the clearance at the middle track roller. Do not get fingers into pinch points between the track and the track roller. Use a bolt or a dowel of the appropriate size to check the gap between the contact edge of the roller and the top edge of the track guide **[Figure PM-41]** & **[Figure PM-42]**.

Rubber Track Clearance - 9.7-14.7 mm.

TRACK TENSION (CONT'D)

Steel Track Clearance

Figure PM-43

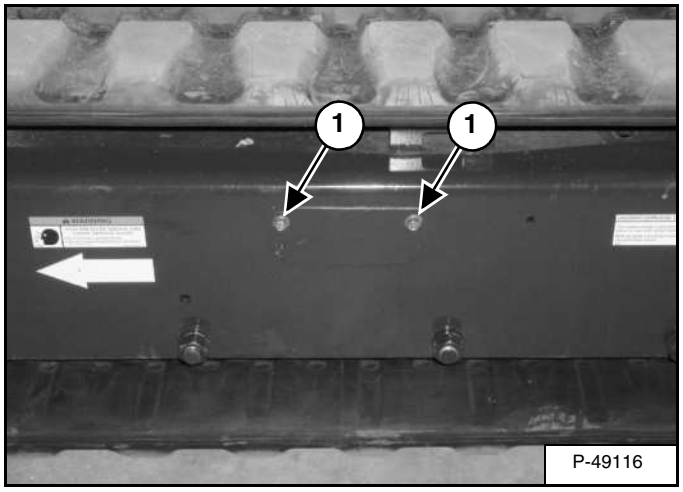


Measure the track clearance at the middle track roller. Do not get fingers into pinch points between the track and the track roller. Us a bolt or dowel of the appropriate size to check the gap between the contact edge of the roller and the top edge of the track guide **[Figure PM-43]**.

Steel Track Clearance - 17.3-30 mm.

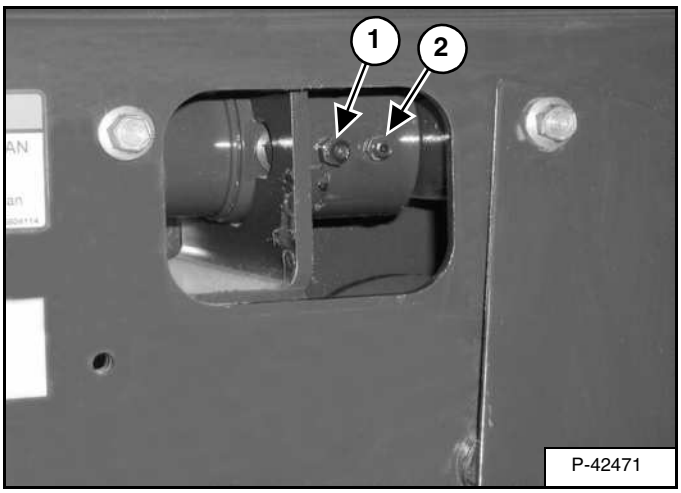
Adjustment

Figure PM-44



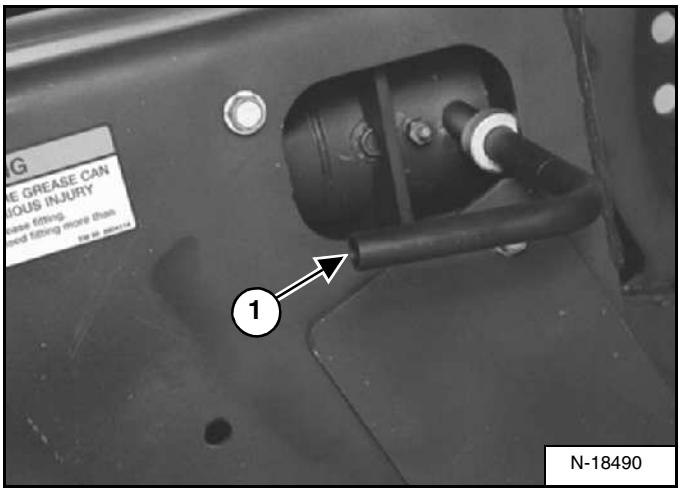
Loosen the two bolts from the cover (Item 1) **[Figure PM-44]**. Pivot the cover downward.

Figure PM-45



Add grease to the fitting (Item 1) **[Figure PM-45]** until the track tension is correct.

Figure PM-46



Use tool MEL1560 (Item 1) **[Figure PM-46]** to loosen the bleed fitting (Item 2) **[Figure PM-45]** to release tension from the track.

NOTE: Do not loosen the grease fitting (Item 1) [Figure PM-45].

Repeat the procedure for the other side.

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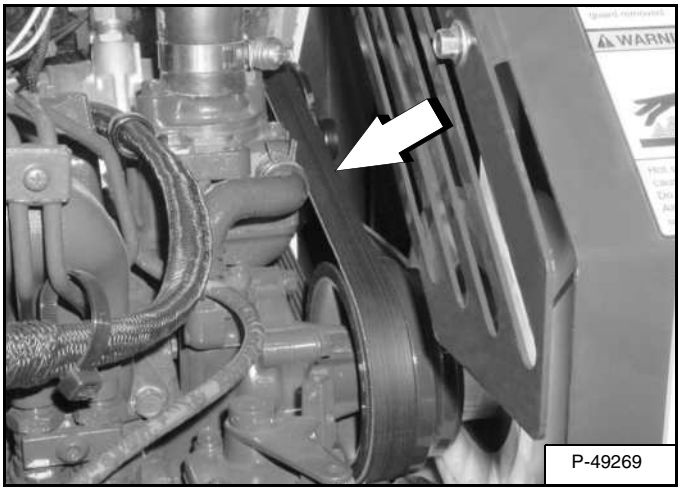
ENGINE ACCESSORY DRIVE BELT

Belt Tension

Open the tailgate.

Figure PM-47



Using a belt tension gauge, measure the belt tension midway between the crankshaft pulley and alternator pulley **[Figure PM-47]**.

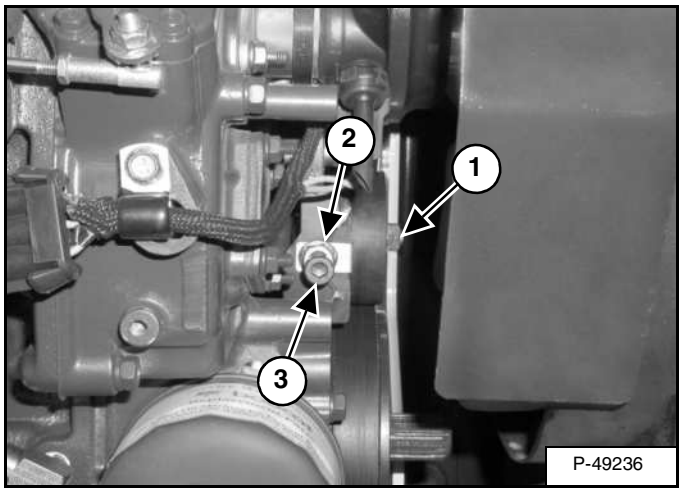
Belt tension is as follows:

New belt 145-155 Nm

Used belt 125-134 Nm

Belt Adjustment

Figure PM-48



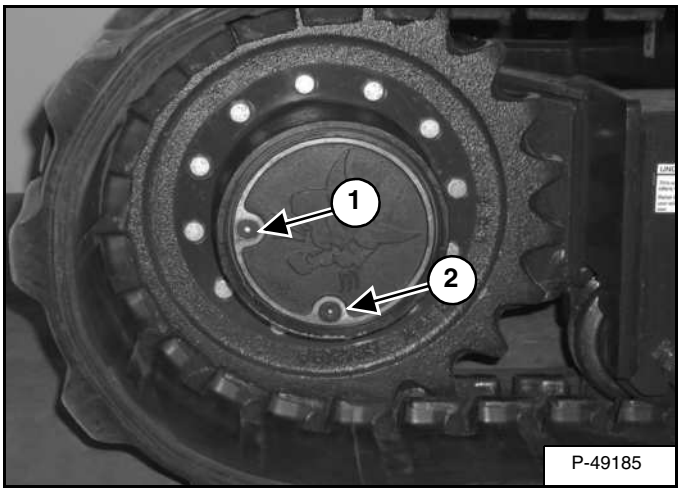
Loosen the nut (Item 1) on the belt idler pulley. Loosen the nut (Item 2) and tighten the bolt (Item 3) **[Figure PM-48]** until the belt tension is correct.

Tighten the nut (Item 1) to 40-50 Nm torque. Tighten the nut (Item 2) **[Figure PM-48]** to 20-25 Nm torque.

TRAVEL MOTOR

Checking Oil Level

Figure PM-49



Park the Excavator on a level surface with the plugs (Item 1 & 2) **[Figure PM-49]** in the position as shown.

Remove the plug (Item 1) **[Figure PM-49]**. The oil level must be at the bottom edge of the hole.

Add lubricant through the hole if the level is low. (See “Electrical” on Page SPEC-15.)

Draining The Travel Motor

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

Park the Excavator on a level surface with plugs (Item 1 & 2) **[Figure PM-49]** in the position shown. Remove both plugs and drain the lubricant into a container.

⚠ WARNING

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

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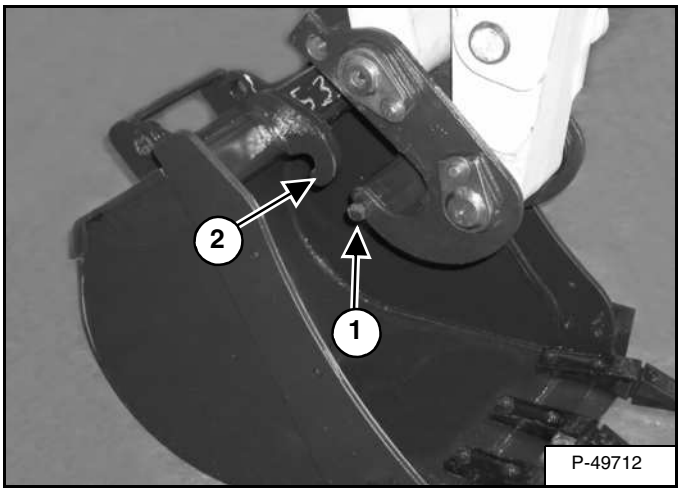
Install the bottom plug (Item 2 **[Figure PM-49]**). Add lubricant through the top plug hole until the lubricant level is at the bottom edge of the hole. (See “Electrical” on Page SPEC-15.)

Install the plug (Item 1) **[Figure PM-49]**.

Inspection And Maintenance

Figure PM-50



Inspect the X-Change for wear or damage. Inspect the X-Change pins (Item 1) and hooks (Item 2) **[Figure PM-50]** (on the attachment) for wear or damage.

Repair or replace damaged parts.

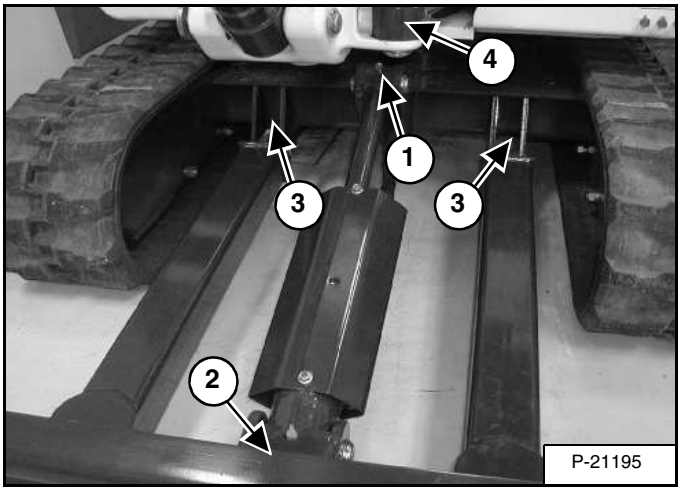
LUBRICATION OF THE HYDRAULIC EXCAVATOR

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

Always use a good quality lithium-based multipurpose grease when lubricating the machine. Apply the lubricant until extra grease shows.

Lubricate the following locations on the Hydraulic Excavator EVERY 8-10 HOURS:

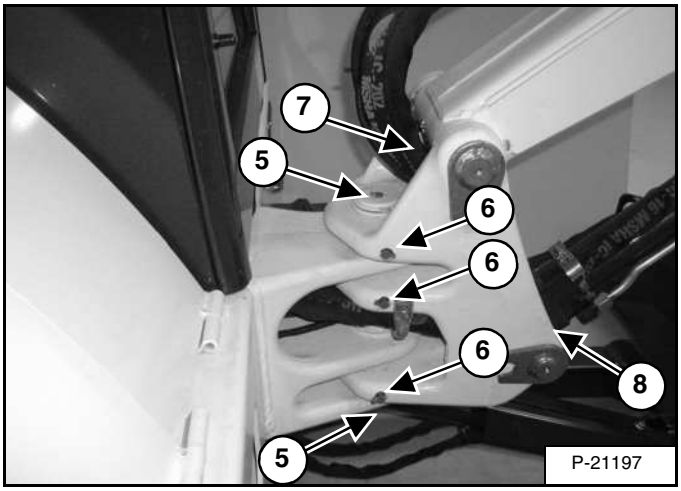
Figure PM-51



Ref Description (No. of Fittings)

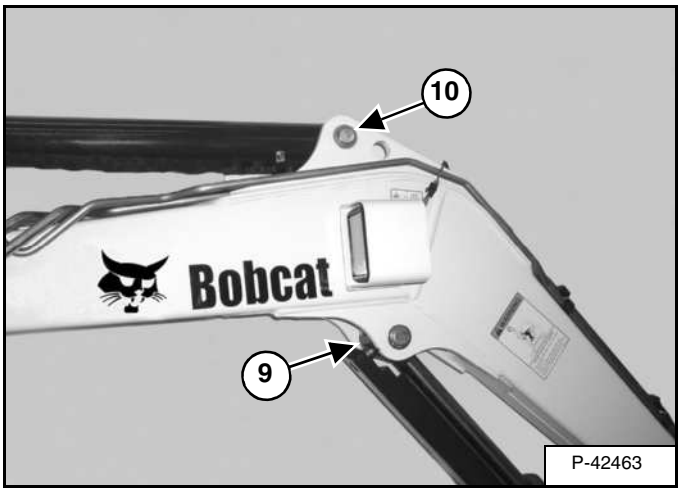
1. Blade Cylinder Rod End (1) **[Figure PM-51]**
2. Blade Cylinder Base End (1) **[Figure PM-51]**
3. Blade Pivots (2) **[Figure PM-51]**
4. Boom Swing Cylinder Rod End (1) **[Figure PM-51]**

Figure PM-52



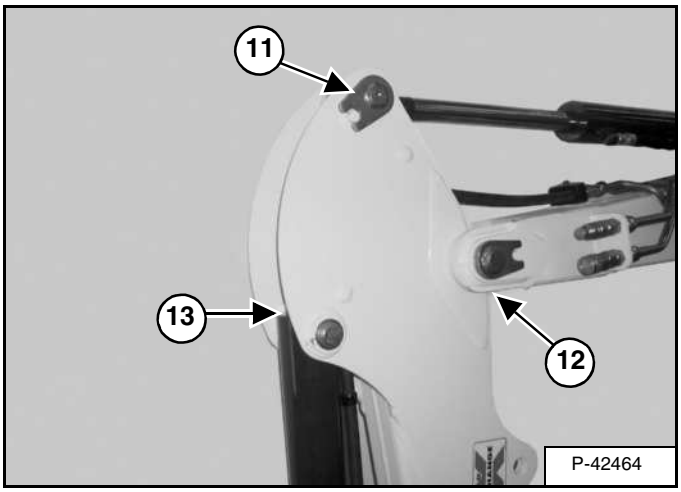
5. Boom Swing Pin (2) **[Figure PM-52]**
6. Boom Swing Pivot (3) **[Figure PM-52]**
7. Boom Pivot (1) **[Figure PM-52]**
8. Boom Cylinder Base End (1) **[Figure PM-52]**

Figure PM-53



9. Boom Cylinder Rod End (1) **[Figure PM-53]**
10. Arm Cylinder Base End (1) **[Figure PM-53]**

Figure PM-54

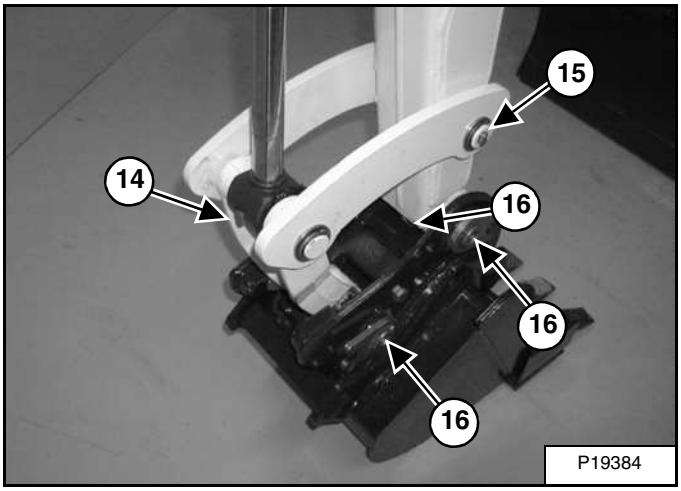


11. Arm Cylinder Rod End (1) **[Figure PM-54]**

12. Arm Pivot (1) **[Figure PM-54]**

13. Bucket Cylinder Base End (1) **[Figure PM-54]**

Figure PM-55

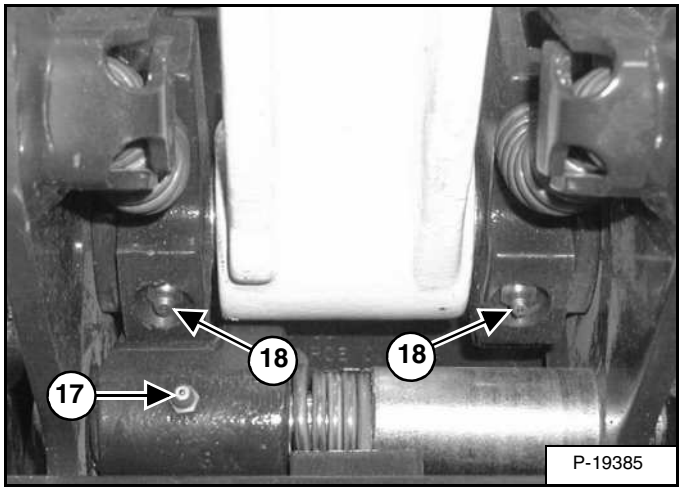


14. Bucket Cylinder Rod End (1) **[Figure PM-55]**

15. Bucket Link Pin (1) **[Figure PM-55]**

16. Bucket Pivot (3) **[Figure PM-55]**

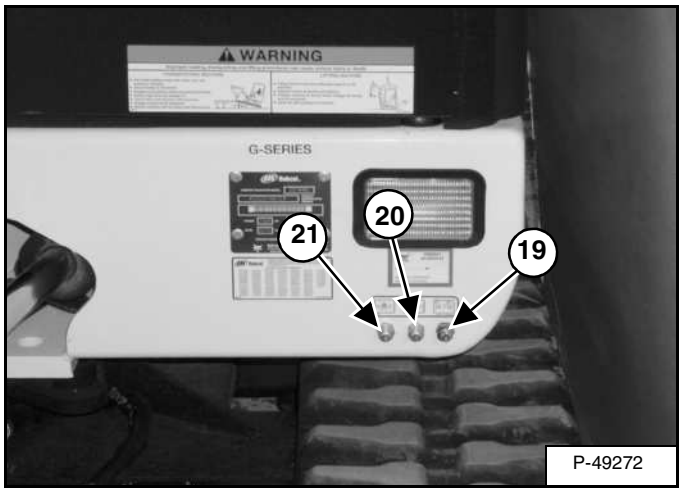
Figure PM-56



17. X-Change Latch (1) **[Figure PM-56]**

18. X-Change Pivot Pin (2) **[Figure PM-56]**

Figure PM-57



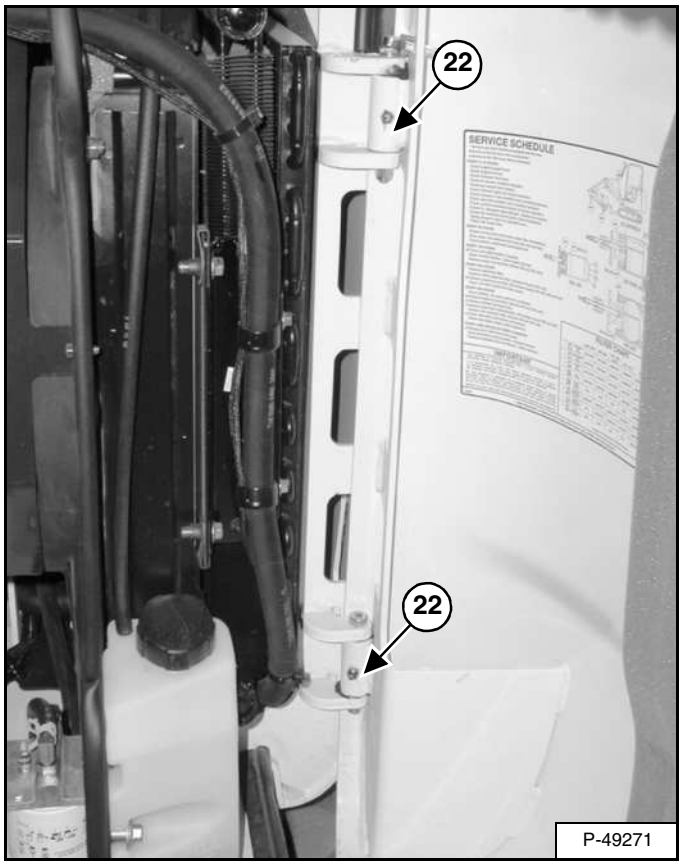
19. Boom Swing Cylinder Base End (1) **[Figure PM-57]**

Lubricate the following locations on the hydraulic Excavator **EVERY 50 HOURS**:

20. Slew Circle (1) **[Figure PM-57]**

21. Slew Pinion (1) **[Figure PM-57]**

Figure PM-58



22. Tailgate Hinge (2) **[Figure PM-58]**.


Bobcat®

SYSTEM SET-UP AND ANALYSIS

DELUXE INSTRUMENT PANEL SET-UP SA-4
- Changing The Operator Password. SA-4
- Passwords SA-4
- Job Clock SA-5
- Password Entry (For Starting and Operating the Machine) . . SA-4
- Password Lock-out Feature SA-5
- RPM. SA-5

DIAGNOSTICS SERVICE CODE SA-3
- Number Codes List SA-3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DIAGNOSTICS SERVICE CODE

Number Codes List

CODE		CODE	
02-16	Hydraulic charge filter not connected	20-02	Two speed output error ON
02-17	Hydraulic charge filter plugged	20-03	Two speed output error OFF
03-09	Battery voltage low	21-02	Glow plug output error ON
03-10	Battery voltage high	21-03	Glow plug output error OFF
03-11	Battery voltage extremely high		
03-14	Battery voltage extremely low	22-02	Starter relay output error ON
03-22	Battery voltage out of range low	22-03	Starter relay output error OFF
04-14	Oil pressure extremely low	26-02	Front base output error ON
04-15	Oil pressure shutdown level	26-03	Front base output error OFF
05-09	Hydraulic charge pressure low	27-02	Front rod output error ON
05-14	Hydraulic charge pressure extremely low	27-03	Front rod output error OFF
05-15	Hydraulic charge pressure shutdown level		
05-21	Hydraulic charge pressure out of range high	28-02	Diverter output error ON
05-22	Hydraulic charge pressure out of range low	28-03	Diverter output error OFF
06-10	Engine speed high	30-28	Watch dog failure
06-11	Engine speed extremely high		
06-15	Engine speed shutdown level	31-28	Recovery mode failure
06-18	Engine speed out of range high		
		33-23	Controller not calibrated
07-10	Hydraulic oil temperature high		
07-11	Hydraulic oil temperature extremely high		
07-15	Hydraulic oil temperature shutdown level	60-21	Sec. aux. thumbswitch out of range high
07-21	Hydraulic oil temperature out of range high	60-22	Sec. aux. thumbswitch out of range low
07-22	Hydraulic oil temperature out of range low	60-23	Sec. aux. thumbswitch not calibrated
08-10	Engine coolant temperature high	62-04	Load moment monitoring in error
08-11	Engine coolant temperature extremely high		
08-15	Engine coolant temperature shutdown level	63-05	Work group/travel console sensor
08-21	Engine coolant temperature out of range high	63-06	Work group/travel console sensor
08-22	Engine coolant temperature out of range low		
		64-05	Switched power/acc. relay short to battery
09-09	Fuel level low	64-06	Switched power/acc. relay short to ground
09-21	Fuel level out of range high	64-07	Switched power/acc. relay open circuit
09-22	Fuel level out of range low		
		65-02	Work group/travel lock-out solenoid error ON
12-21	Primary auxiliary PWM switch out of range high	65-03	Work group/travel lock-out solenoid error OFF
12-22	Primary auxiliary PWM switch out of range low	65-05	Work group/travel lock-out solenoid short to battery
12-23	primary auxiliary PWM switch not calibrated	65-06	Work group/travel lock-out solenoid short to ground
		65-07	Work group/travel lock-out solenoid open circuit
13-05	Fuel shut-off hold solenoid short to battery		
13-06	Fuel shut-off hold solenoid short to ground	66-05	Travel solenoid short to battery
		66-06	Travel solenoid short to ground
14-02	Fuel shut-off hold solenoid short to batter		
14-03	Fuel shut-off hold solenoid short to ground		

DELUXE INSTRUMENT PANEL SET-UP

Passwords

All new machines with Deluxe Instrumentation arrive at Bobcat Dealerships with the panel in locked mode. This means that a password must be used to start the engine.

For security purposes, your dealer may change the password and also set it in the locked mode. Your dealer will provide you with the password.

Master Password:
A permanent, randomly selected password is set at the factory which cannot be changed. This password is used for service by the Bobcat dealer if the Owner Password is not known; or to change the Owner Password.

Owner Password:
There is only one Owner Password (**CodE 0**). It must be used to change the owner or operator passwords. See below for changing the Owner Password.

Operator Password:
There can be up to three operator Passwords (**CodE 1, CodE 2, CodE 3**). See below for changing the Operator Password.

Password Entry (For Starting and Operating the Machine)

Press ENTER CODE button (Item 1). The panel will become lit and there will be two short beeps. **CodE** will appear on the LCD (Item 2) **[Figure SA-1]**.

NOTE: After you press ENTER CODE you have 40 seconds to use the keypad (Item 3) [Figure SA-1] to enter the password. (If more than 40 seconds is used, the process will abort and you will need to start again.

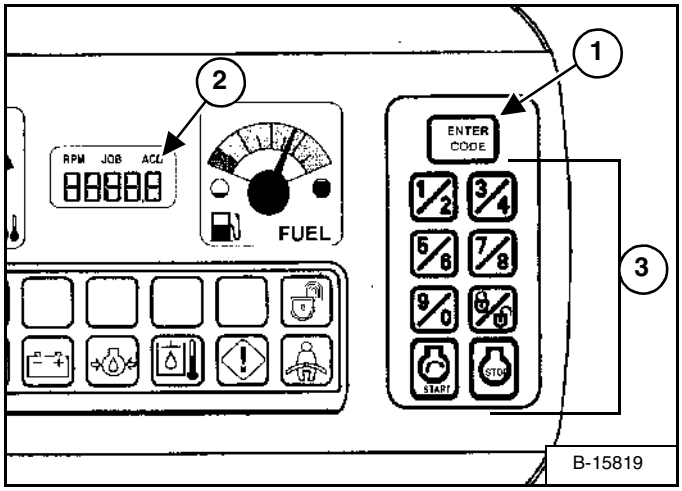
Enter the password. For each digit that you enter, a dash will appear on the LCD. If the password was entered correctly, there will be one long beep.

NOTE: If the password was incorrect there will be three short beeps and *Error* will appear on the LCD. Press the ENTER CODE button again and start again. After three failed attempts, you must wait three minutes to try again.

You are now ready to start and operate the machine.

If you will be changing the operator password, do not start the engine. (See “Changing The Operator Password” on Page SA-4.)

Figure SA-1



Changing The Operator Password

Perform Password Entry at left, but do not start the engine.

Press and hold the ENTER CODE button (Item 1) for three seconds. CodE 1 will appear on the LCD (Item 2) **[Figure SA-1]**.

Press the ENTER CODE button until the desired operator Code (**CodE 1, CodE 2, CodE 3**) appears. You now have 40 seconds to use the keypad (Item 3) **[Figure SA-1]** to enter each digit of a new four digit password.

Enter the new four digit password. After the fourth digit is entered, there will be two short beeps and **rPEAt** will appear.

Re-enter the new four digit password to verify. If the new passwords match, there will be two short beeps, **Code** will appear for 1 second and then the LCD will return to HOUR METER function.

NOTE: If the new passwords do not match, there will be one long beep and Error will appear for 1 second and then the LCD will return to HOUR METER function.

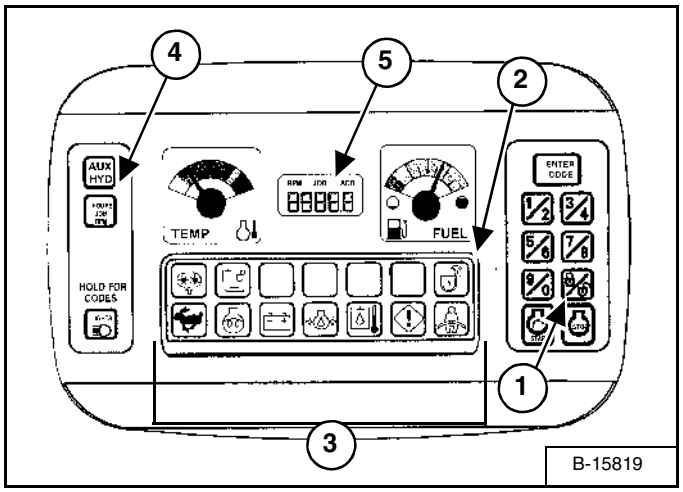
DELUXE INSTRUMENT PANEL SET-UP (CONT'D)

Password Lock-out Feature

This allows the operator to Unlock the password feature so that a password does not need to be used every time you start the engine.

Perform Password Entry (See "Password Entry (For Starting and Operating the Machine)" on Page SA-4.) (the engine can be started or stopped.) The password entry may be performed with the engine off or running.

Figure SA-2



Press the Lock/Unlock button (Item 1) **[Figure SA-2]**. The LCD will continuously alternate from **UnLoc** to **CodE** for 1 second periods.

Perform Password Entry again.

UnLoc will appear in the LCD (Item 5), the Unlocked Icon (Item 2) will appear in the Icon Display Area (Item 3) **[Figure SA-2]** and there will be two short beeps.

To start an Unlocked system, press the ENTER CODE button and press the START button.

When you stop the engine with the system unlocked, you will hear one long beep every 3 seconds for 15 seconds.

To lock the system again, press the Lock/Unlock button (Item 1) **[Figure SA-2]** and enter the password during the 15 second period.

Job Clock

The JOB CLOCK can be set to record accumulated hours for a particular job.

Press and release the HOURS/JOB/RPM button (Item 4) until JOB light is ON at the top, centre of the LCD (Item 5) **[Figure SA-2]**.

While the JOB light is ON, press and hold the HOURS/JOB/RPM button (Item 4) **[Figure SA-2]** until the LCD returns to zero.

This process will clear the accumulated hours and will begin recording JOB CLOCK time again. (This does not affect the HOUR METER, which continues to record the total operating hours of the Excavator.)

Pressing the HOURS/JOB/RPM button again or pressing the START button will return the LCD to HOUR METER function.

RPM

The LCD (Item 5) **[Figure SA-2]** can be set to display engine RPM.

With the engine running, press and release the HOURS/JOB/RPM button (Item 4) until RPM light is ON at the top, centre of the LCD (Item 5) **[Figure SA-2]**.

Engine RPM is now displayed in the LCD.

Press the HOURS/JOB/RPM button (Item 4) **[Figure SA-2]** again the return to HOUR METER function.


Bobcat®

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Dimensions 334 Excavator SPEC-5
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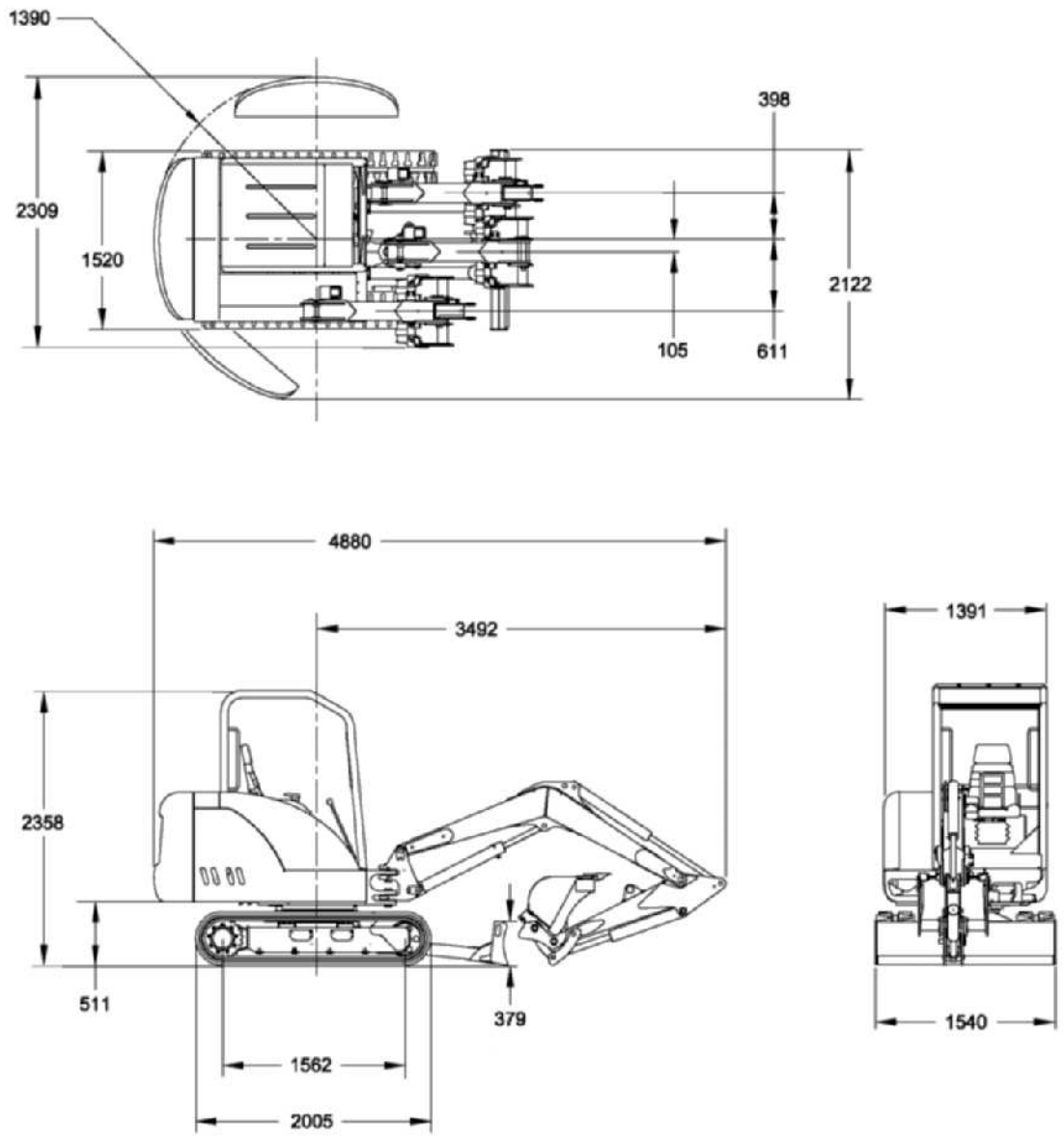
Bobcat®

Dimensions 331 Excavator

- All dimensions in mm.

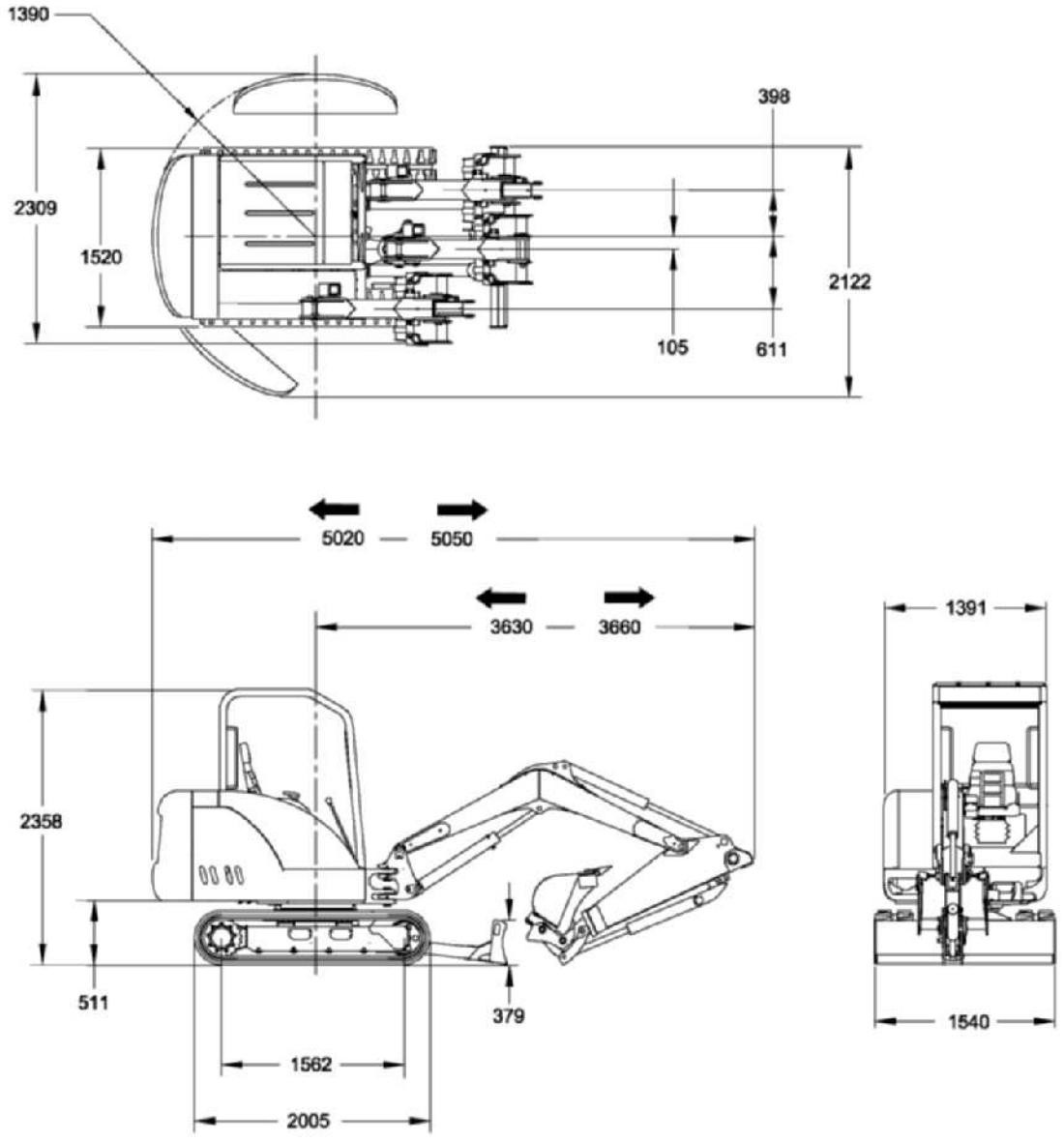


MS1884

SPECIFICATIONS (CONT'D)

Dimensions 331E Excavator

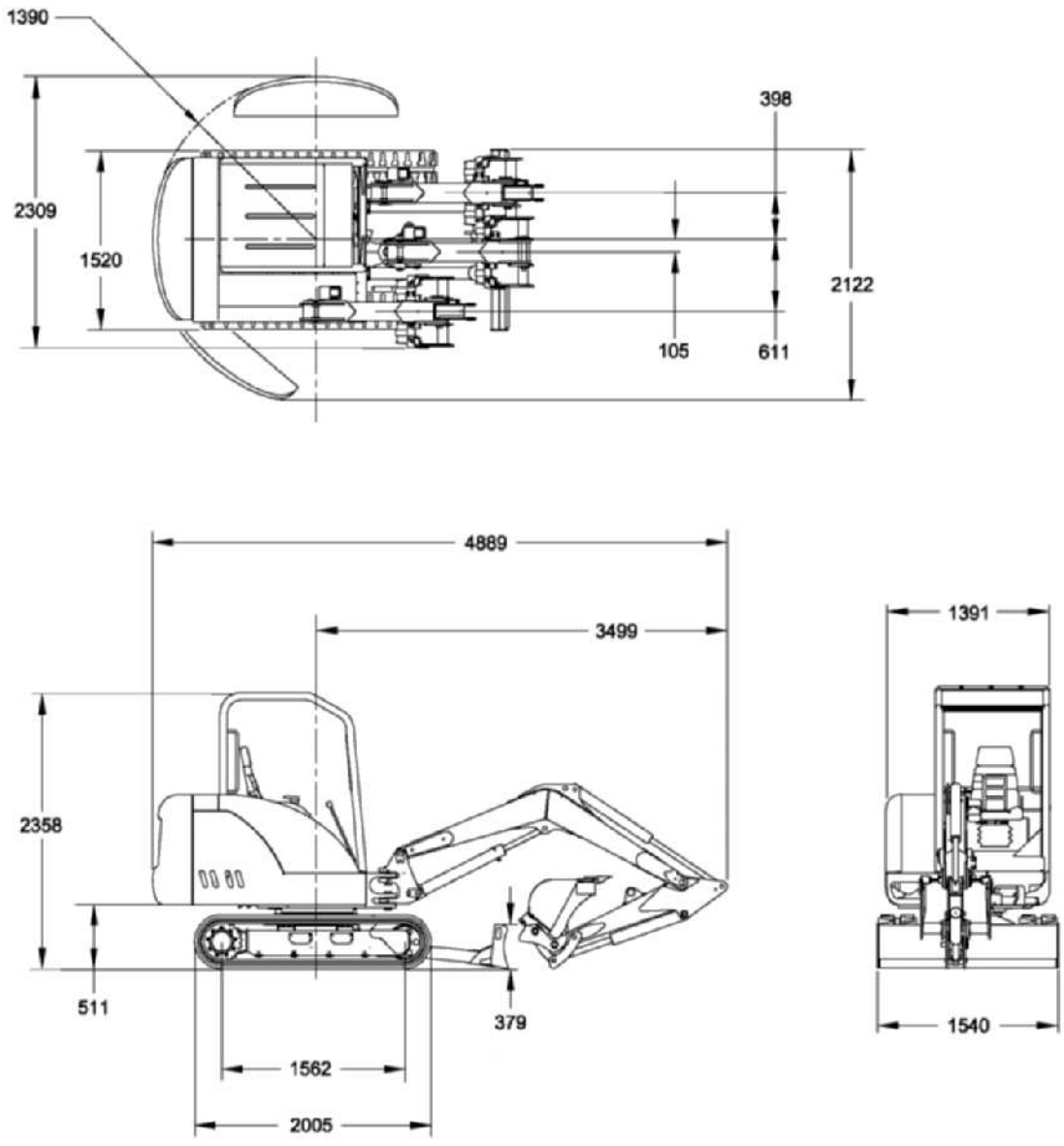
- All dimensions in mm.
- Arrows show dimensions with dipperstick extension extended (←) and retracted (→).



MS1886

Dimensions 334 Excavator

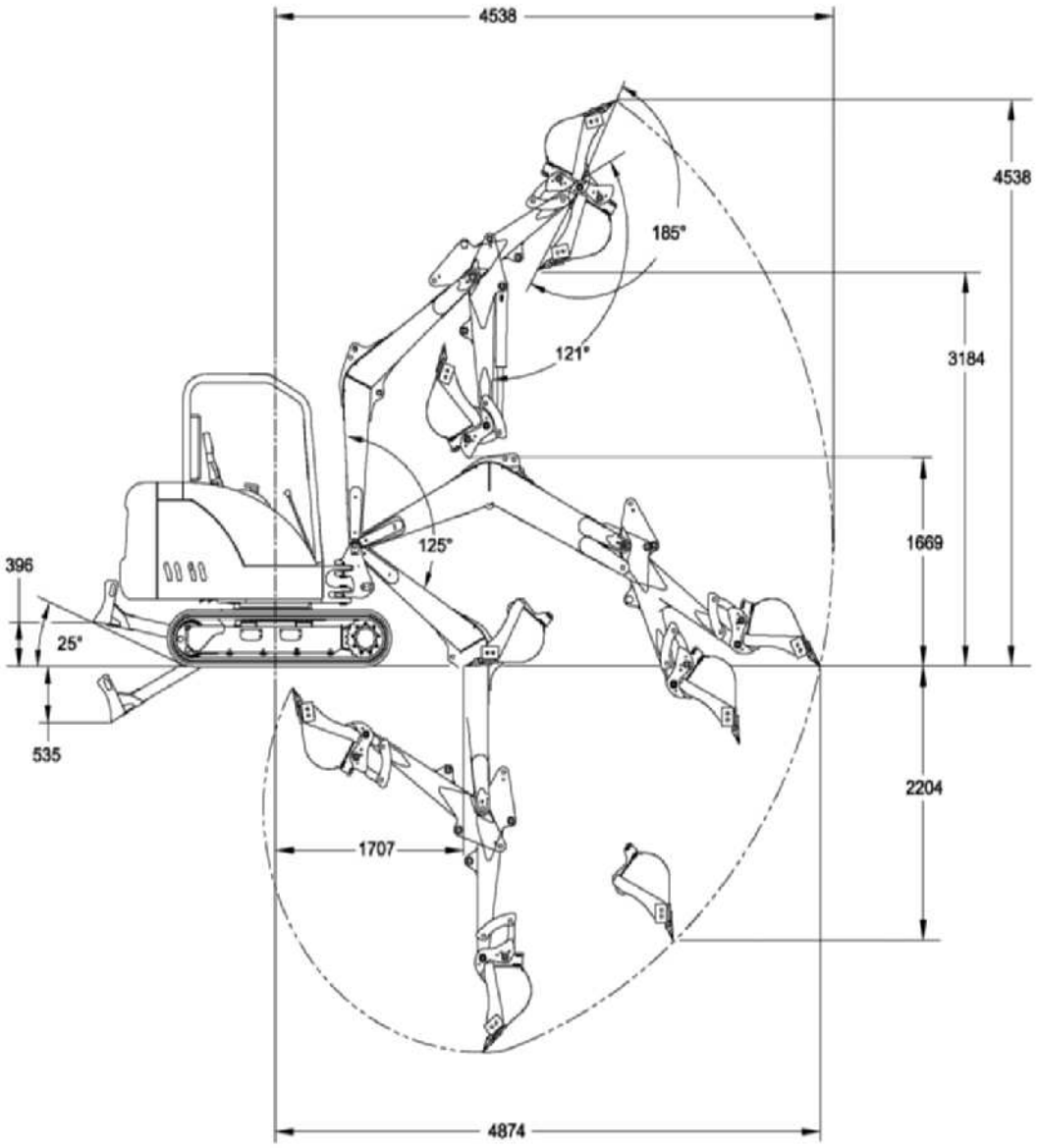
- All dimensions in mm.



MS1885

Working Range 331 Excavator

- All dimensions in mm.

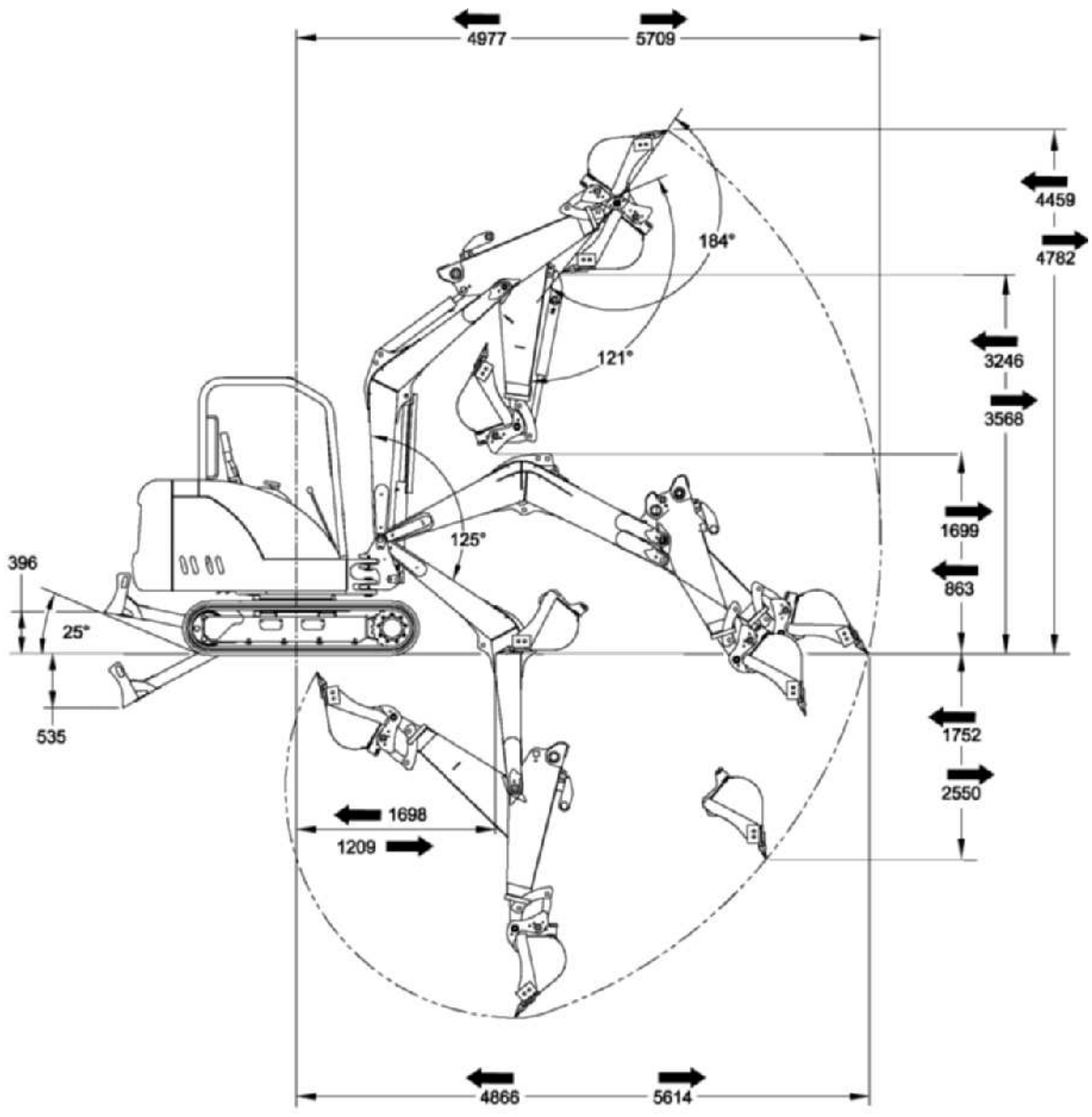


MS1887

SPECIFICATIONS (CONT'D)

Working Range 331E Excavator

- All dimensions in mm.
- Arrows show dimensions with dipperstick extension extended (←) and retracted (→).

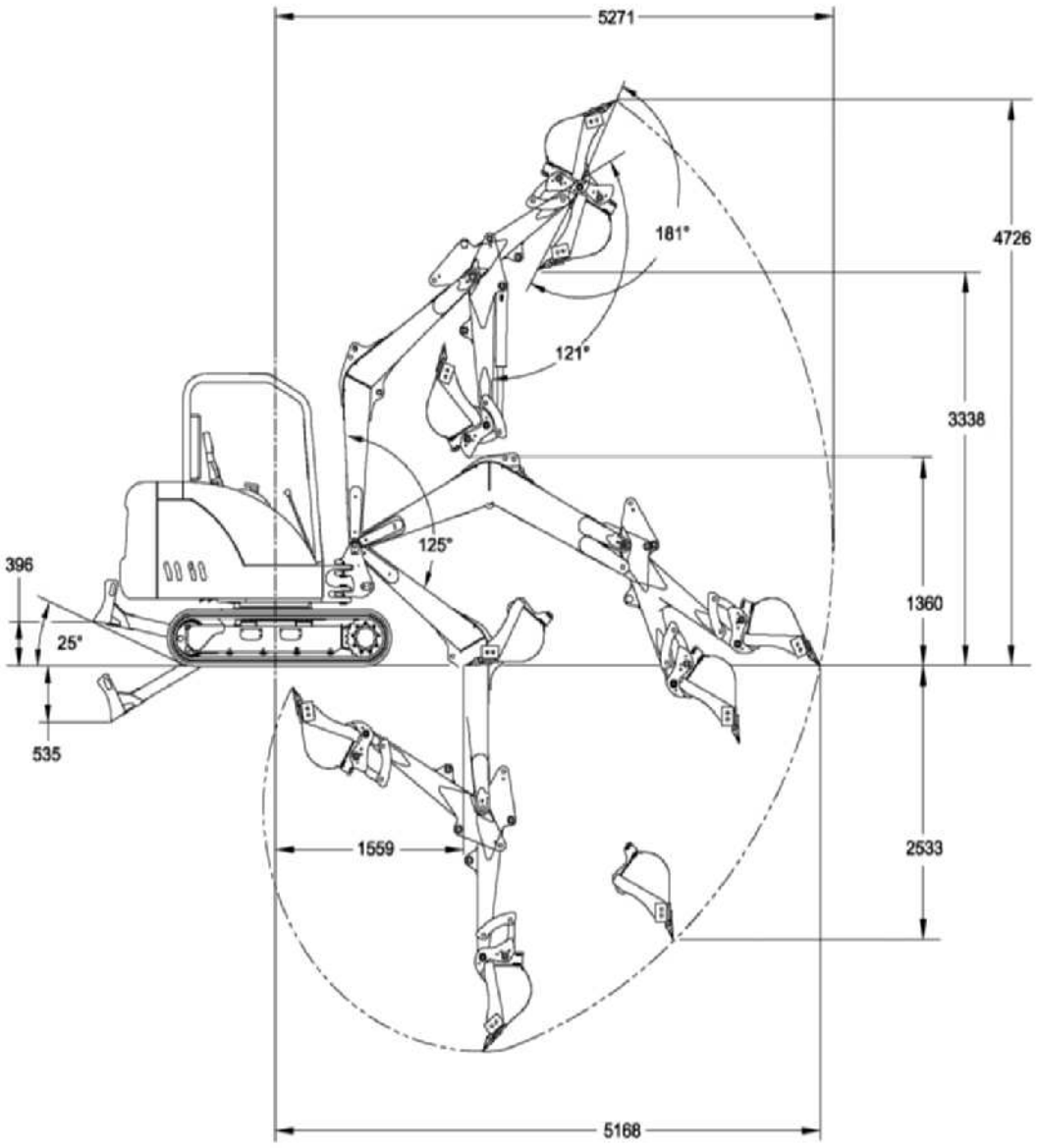


MS1887

SPECIFICATIONS (CONT'D)

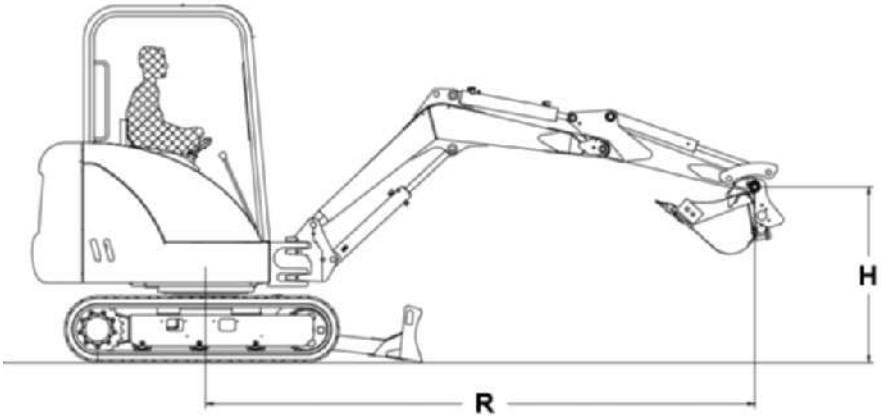
Working Range 334 Excavator

- All dimensions in mm.



MS1887

Lift Capacity 331 Excavator



Note: Lift point is bucket hinge pin with standard bucket attached and bucket cylinder fully extended.

Rated lift capacity over blade, blade down, 235 kg counterweight					
Lift point height [H] (mm)	**Maximum radius [R] (mm)**	**Lift at max. radius (kg)**	**Lift at 2000 mm radius**	**Lift at 3000 mm radius**	**Lift at 4000 mm radius**
3000	3580	414 *			
2000	4070	479 *		499 *	466 *
1000	4230	540 *		754 *	554 *
Ground	4090	610 *	1717 *	941 *	631 *
-1000	3620	703 *	1802 *	983 *	

* Rated hydraulic lift capacity

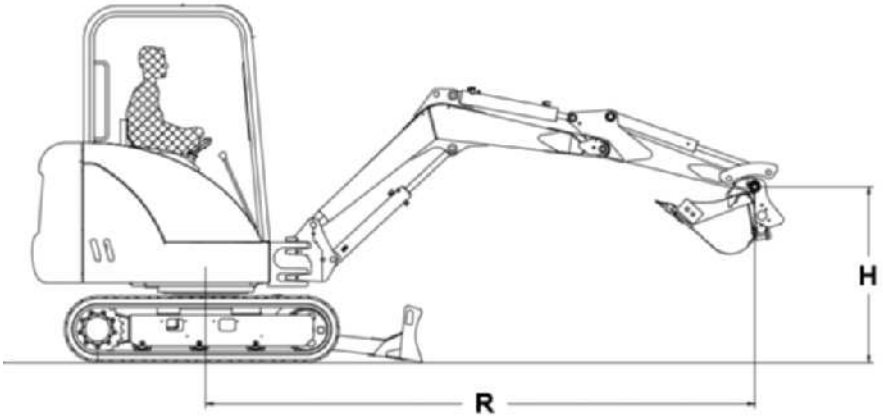
Rated lift capacity over blade, blade up, 235 kg counterweight					
Lift point height [H] (mm)	**Maximum radius [R] (mm)**	**Lift at max. radius (kg)**	**Lift at 2000 mm radius**	**Lift at 3000 mm radius**	**Lift at 4000 mm radius**
3000	3580	400 *			
2000	4070	458 *		487 *	458 *
1000	4230	379		723 *	423
Ground	4090	390	1209	656	408
-1000	3620	485	1241	665	

* Rated hydraulic lift capacity

Rated lift capacity over side, blade up, 235 kg counterweight					
Lift point height [H] (mm)	**Maximum radius [R] (mm)**	**Lift at max. radius (kg)**	**Lift at 2000 mm radius**	**Lift at 3000 mm radius**	**Lift at 4000 mm radius**
3000	3580	400 *			
2000	4070	360		498 *	366
1000	4230	334		570	364
Ground	4090	348	1008	564	357
-1000	3620	423	1056	558	

SPECIFICATIONS (CONT'D)

Lift Capacity 331E Excavator



Note: Lift point is bucket hinge pin with standard bucket attached and bucket cylinder fully extended.

Rated lift capacity over blade, blade down, 235 kg counterweight							
Lift point height [H] (mm)	**Maximum radius, extendible dipperstick retracted [R] (mm)**	**Maximum radius, extendible dipperstick extended [R] (mm)**	**Lift at max. radius, extendible dipperstick retracted (kg)**	**Lift at max. radius, extendible dipperstick extended (kg)**	**Lift at 2000 mm radius**	**Lift at 3000 mm radius**	**Lift at 4000 mm radius**
3000	3570	4430	782 *	491 *			
2000	4060	4820	894 *	596 *		909 *	861 *
1000	4220	4950	1021 *	703 *		1389 *	1024 *
Ground	4080	4840	1148 *	831 *	3556 *	1782 *	1183 *
-1000	3615	4470	1345 *	999 *	3528 *	1810 *	

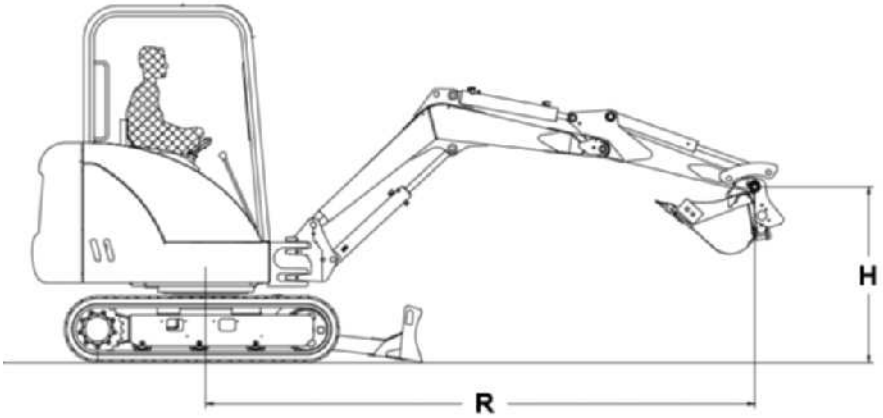
* Rated hydraulic lift capacity

Rated lift capacity over blade, blade up, 235 kg counterweight							
Lift point height [H] (mm)	**Maximum radius, extendible dipperstick retracted [R] (mm)**	**Maximum radius, extendible dipperstick extended [R] (mm)**	**Lift at max. radius, extendible dipperstick retracted (kg)**	**Lift at max. radius, extendible dipperstick extended (kg)**	**Lift at 2000 mm radius**	**Lift at 3000 mm radius**	**Lift at 4000 mm radius**
3000	3570	4430	732 *	481 *			
2000	4060	4820	847 *	572 *		881 *	840 *
1000	4220	4950	686 *	491		1328 *	764
Ground	4080	4840	710 *	513	2327	1136	737
-1000	3615	4470	896 *	599	2458	1196	

* Rated hydraulic lift capacity

Rated lift capacity over side, blade up, 235 kg counterweight							
Lift point height [H] (mm)	**Maximum radius, extendible dipperstick retracted [R] (mm)**	**Maximum radius, extendible dipperstick extended [R] (mm)**	**Lift at max. radius, extendible dipperstick retracted (kg)**	**Lift at max. radius, extendible dipperstick extended (kg)**	**Lift at 2000 mm radius**	**Lift at 3000 mm radius**	**Lift at 4000 mm radius**
3000	3570	4430	774 *	490 *			
2000	4060	4820	658	462		905 *	706
1000	4220	4950	572	415		1086	645
Ground	4080	4840	593	413	1927	978	600
-1000	3615	4470	759	524	2003	971	

Lift Capacity 334 Excavator



Note: Lift point is bucket hinge pin with standard bucket attached and bucket cylinder fully extended.

Rated lift capacity over blade, blade down, 235 kg counterweight					
Lift point height [H] (mm)	**Maximum radius [R] (mm)**	**Lift at max. radius (kg)**	**Lift at 2000 mm radius**	**Lift at 3000 mm radius**	**Lift at 4000 mm radius**
3000	3920	360 *			353 *
2000	4370	414 *			404 *
1000	4510	472 *	1262 *	662 *	499 *
Ground	4390	537 *	1729 *	886 *	612 *
-1000	3960	617 *	1833 *	969 *	

* Rated hydraulic lift capacity

Rated lift capacity over blade, blade up, 235 kg counterweight					
Lift point height [H] (mm)	**Maximum radius [R] (mm)**	**Lift at max. radius (kg)**	**Lift at 2000 mm radius**	**Lift at 3000 mm radius**	**Lift at 4000 mm radius**
3000	3920	348 *			342 *
2000	4370	399 *			387 *
1000	4510	340	1220 *	640 *	428 *
Ground	4390	351	1170	653	415
-1000	3960	414	1276	643	

* Rated hydraulic lift capacity

Rated lift capacity over side, blade up, 235 kg counterweight					
Lift point height [H] (mm)	**Maximum radius [R] (mm)**	**Lift at max. radius (kg)**	**Lift at 2000 mm radius**	**Lift at 3000 mm radius**	**Lift at 4000 mm radius**
3000	3920	358 *			347 *
2000	4370	310 *			401 *
1000	4510	298	1248 *	649 *	357
Ground	4390	298	1041	564	354
-1000	3960	358	1047	548	

Performance 331 Excavator

Digging force, dipperstick (ISO 6015)	18794 N
Digging force, bucket (ISO 6015)	31136 N
Drawbar pull (theoretical at 78.5% efficiency)	31580 N
Ground pressure with ROPS canopy and rubber tracks	29,4 kPa
Ground pressure with ROPS cab and rubber tracks	30,5 kPa
Ground pressure with ROPS canopy and steel tracks	30,0 kPa

Performance 331E Excavator

Digging force, dipperstick, with dipperstick extension fully retracted (ISO 6015)	18794 N
Digging force, dipperstick, with dipperstick extension fully extended (ISO 6015)	11083 N
Digging force, bucket (ISO 6015)	31136 N
Drawbar pull (theoretical at 78.5% efficiency)	31580 N
Ground pressure with rubber tracks	31,6 kPa
Ground pressure with steel tracks	32,3 kPa

Performance 334 Excavator

Digging force, dipperstick (ISO 6015)	15035 N
Digging force, bucket (ISO 6015)	31136 N
Drawbar pull (theoretical at 78.5% efficiency)	31580 N
Ground pressure with rubber tracks	30,8 kPa
Ground pressure with steel tracks	31,3 kPa

Function Time 331 Excavator

Boom raise time	3,9 s
Boom lower time	5,1 s
Bucket curl time	2,6 s
Bucket dump time	1,6 s
Dipperstick retract time	3,1 s
Dipperstick extend time	2,2 s
Boom swing left time	5,7 s
Boom swing right time	5,3 s
Blade raise time	2,8 s
Blade lower time	3,1 s
Slew rate	9,2 RPM

Function Time 331E Excavator

Boom raise time	3,9 s
Boom lower time	5,1 s
Bucket curl time	2,6 s
Bucket dump time	1,6 s
Dipperstick retract time	3,1 s
Dipperstick extend time	2,2 s
Boom swing left time	5,7 s
Boom swing right time	5,3 s
Blade raise time	2,8 s
Blade lower time	3,1 s
Slew rate	9,2 RPM
Extendible dipperstick retraction time	1,4 s
Extendible dipperstick extension time	2,1 s

Function Time 334 Excavator

Boom raise time	3,9 s
Boom lower time	5,1 s
Bucket curl time	2,6 s
Bucket dump time	1,6 s
Dipperstick retract time	3,1 s
Dipperstick extend time	2,2 s
Boom swing left time	5,7 s
Boom swing right time	5,3 s
Blade raise time	2,8 s
Blade lower time	3,1 s
Slew rate	9,2 RPM

Weights 331 Excavator

Operating weight with ROPS canopy, rubber tracks, counterweight, 610 mm bucket	3273 kg
Additional weight for ROPS cab with heater	119 kg
Additional weight for ROPS cab with HVAC	141 kg
Additional weight for steel tracks	72 kg
Reduction for shipping weight	Not available

Weights 331E Excavator

Operating weight with ROPS canopy, rubber tracks, counterweight, 610 mm bucket	3519 kg
Additional weight for ROPS cab with heater	119 kg
Additional weight for ROPS cab with HVAC	141 kg
Additional weight for steel tracks	72 kg
Reduction for shipping weight	Not available

Weights 334 Excavator

Operating weight with ROPS canopy, rubber tracks, counterweight, 610 mm bucket	3433 kg
Additional weight for ROPS cab with heater	119 kg
Additional weight for ROPS cab with HVAC	141 kg
Additional weight for steel tracks	72 kg
Reduction for shipping weight	Not available

Controls

Engine	Hand lever on right-hand side
Starting	Key-type starter switch and shutdown
Blade	Right hand lever
Boom swing	Right foot pedal
Hydraulics	Two joysticks control boom, bucket, dipperstick and upper structure slew
Auxiliary hydraulics	Electric switch in right joystick
Upper structure slew brake	Hydraulic lock on motor
Holding brake for upper structure slew	Pin lock
Steering	Direction and speed controlled by two hand levers or foot pedals

Engine

Make / model	Kubota / V2203-M-D1-E28-BC-4
Fuel	Diesel
Cooling	Liquid
Maximum power at 2400 RPM (SAE Net J1349)	30,3 kW
Maximum governed speed	2620 RPM
Torque at 2400 RPM (SAE Net J1349)	140,3 Nm
Number of cylinders	4
Displacement	2,20 l
Bore	87,0 mm
Stroke	92,4 mm
Lubrication	Pressure system with full-flow filter
Crankcase ventilation	Closed breathing
Air filter	Dual dry replaceable paper cartridge
Ignition	Diesel-compression
Starting aid	Intake air heater

Electrical

Alternator	12 V — 90 A — open frame with internal regulator
Battery	12 V — 530 cold cranking A at -18°C — 75 min reserve capacity at 25 A
Starter	12 V — gear reduction type — 2.0 kW

Hydraulic System

Pump type	Dual-outlet variable displacement piston pump with gear pump
Pump 1 capacity	33,3 l/min at 2400 RPM
Pump 2 and 3 capacity	28,8 l/min at 2400 RPM
System relief pressure for implement circuits	172 Bar
System relief pressure for travel circuits	263 Bar
System relief pressure for slew circuits	117 Bar
System relief pressure for auxiliary circuits	172 Bar
Dipperstick port relief base and rod end	290 Bar
Boom port relief base and rod end	290 Bar
Bucket port relief base and rod end	290 Bar
Main hydraulic filter bypass	3,4 Bar
Case drain bypass	1,4 Bar
Control valve	Ten-spool parallel series
Hydraulic filter	Full-flow replaceable — 3 µm synthetic media element
Fluid lines	SAE standard tubelines, hoses, and fittings

Hydraulic Cylinders

Boom cylinder	Cushion up
Boom cylinder bore	82,6 mm
Boom cylinder rod	44,5 mm
Boom cylinder stroke	637,3 mm
Dipperstick cylinder	Cushion extend
Dipperstick cylinder bore	82,6 mm
Dipperstick cylinder rod	44,5 mm
Dipperstick cylinder stroke	599,9 mm
Bucket cylinder	No cushion
Bucket cylinder bore	82,6 mm
Bucket cylinder rod	50,8 mm
Bucket cylinder stroke	467,1 mm
Boom swing cylinder	Cushion left and right
Boom swing cylinder bore	76,2 mm
Boom swing cylinder rod	38,1 mm
Boom swing cylinder stroke	524,5 mm
Blade cylinder	No cushion
Blade cylinder bore	88,9 mm
Blade cylinder rod	44,5 mm
Blade cylinder stroke	184,9 mm

Drive System

Travel motor	Each track is driven by a hydrostatic axial piston motor
Drive reduction	Two-stage planetary gear reduction 36.4:1

Traction

Track width, rubber, standard	320 mm
Track width, steel, optional	300 mm
Track adjusters	Grease type with shock absorbing recoil springs
Track type, standard	Half-pitch, rubber with 40 shoes
Track type, optional	Steel with 41 shoes
Travel speed, low range	2,1 km/h
Travel speed, high range	5,6 km/h
Undercarriage	Crawler-type tractor design with reinforced box-section track roller frame and sealed track rollers
Number of track rollers per side	4
Gradeability	30°

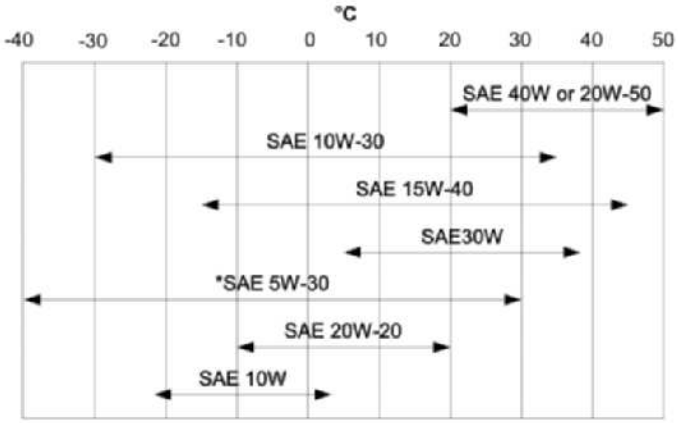
Instrumentation

- Air intake heater indicator
- Auxiliary mode indicator
- Console indicator
- Engine temperature gauge
- Engine/hydraulic service warning indicator
- Fuel gauge
- Hour meter
- Job clock
- Low fuel indicator
- Tachometer
- Two-speed range indicator

Fluid Capacities

Cooling system	17,0 l
Engine lubrication plus oil filter	7,1 l
Fuel reservoir	53,3 l
Hydraulic reservoir	29,5 l
Hydraulic system with bucket and dipper cylinder retracted, bucket on the ground, and blade down	44,0 l
Travel motor (each)	0,5 l

Fluid Specifications

Engine coolant	Polypropylene glycol/water mix (53% – 47%) with freeze protection to -37°C
Engine oil	Oil must meet API Service Classification of CD, CE, CF4, CG4, or better. Recommended SAE viscosity number for anticipated temperature range.  * Can by used only when available with appropriate diesel rating. For synthetic oil use the recommendation from the oil manufacturer.
Hydraulic fluid	Bobcat Fluid (P/N 6563328). If fluid is not available use 10W-30/ 10W Class SE motor oil for temperatures above -18°C or 5W-30 Class SE motor oil for temperatures below -18°C.

Standard Features

- * TOPS/ROPS canopy
- 1450 mm dozer blade
- 320 mm half-pitch rubber track
- Auxiliary hydraulics with Quick Couplers
- Control console locks
- Counterweight
- Engine shutdown system
- Fingertip auxiliary hydraulic control
- Horn
- Hydraulic joystick controls
- Retractable seat belt
- Spark arrester muffler
- Suspension seat with high back
- Two-speed travel
- Vandalism protection
- Warranty: 12 months, 2000 hours
- Working lights

*** Roll Over Protective Structure (ROPS) – Meets requirements of SAE-J1040C**
Tip Over Protective Structure (TOPS) – Meets requirements of ISO/DIS 12117

Options

- 300 mm steel tracks
- AM/FM stereo radio
- Cab enclosure, vinyl
- Cab/canopy light kit
- Catalytic exhaust purifier kit
- Counterweight kit
- FOPS kit
- Keyless start
- Lifting chain kit
- Special applications kit
- TOPS/ROPS cab with heater
- Travel motion alarm
- X-Change™ attachment mounting system

Attachments

- Auger
- Cutter crusher
- Grading bucket
- Grapple, three-tine
- Hydra-Tilt
- Hydraulic breaker
- Hydraulic clamp
- Plate compactor
- Power tilt
- Ripper
- Trenching bucket


Bobcat®

WARRANTY

Bobcat Excavators

Bobcat Europe warrants to its authorised dealer, who in turn, warrants to the original buyer (owner) that each Bobcat excavator will be free from proven defects in material and workmanship for twelve months or 2000 hours after delivery to the original buyer (owner), whichever occurs first.

During the warranty period, the authorised selling Bobcat dealer shall repair or replace, at his option, without charge for parts, labour and travel time of mechanics, any part of the Bobcat product which fails because of defects in material and workmanship. The owner shall provide the authorised dealer with prompt written notice of the defect and allow reasonable time for replacement or repair. Bobcat Europe may, at its option, request failed parts to be returned to the factory Transportation of the Bobcat product to the authorised Bobcat Excavator dealer for warranty work is the responsibility of the owner.

Warranty does not cover replacement of scheduled service items such as oil, filters, tune-up parts, and other high-wear items. The warranty does not cover damages resulting from abuse, accidents, alterations, use of the Bobcat product with any bucket or attachment not approved by Bobcat Europe, air flow obstructions, or failure to maintain or use the Bobcat product according to the instructions applicable to it.

THIS WARRANTY IS IN LIEU OF ALL OTHER WARRANTIES (EXCEPT THOSE OF TITLE), EXPRESSED OR IMPLIED, AND THERE ARE NO WARRANTIES OF MERCHANTABILITY OR FITNESS FOR A PARTICULAR PURPOSE. IN NO EVENT SHALL THE AUTHORISED SELLING DEALER OR BOBCAT EUROPE BE LIABLE FOR DOWNTIME EXPENSES, LOSS OF MACHINE USE OTHER INCIDENTAL, CONSEQUENTIAL OR SPECIAL DAMAGES.

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