EN

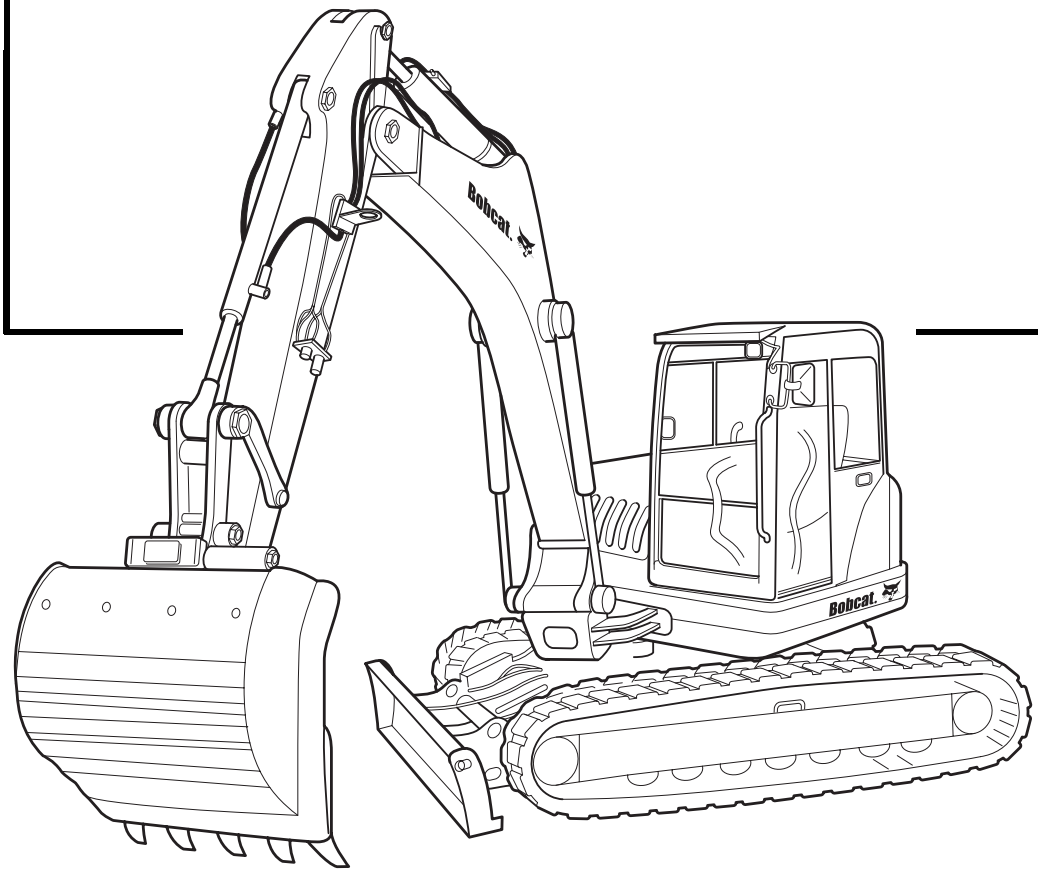
444

Excavator

Bobcat

Operation and Maintenance Manual

S/N 5322 11001
& Above



4900041-EN (09-06)

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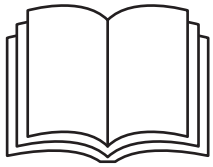
Printed in Europe

OPERATOR SAFETY WARNINGS

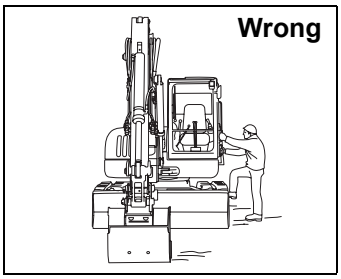
⚠ WARNING

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



⚠ **Never operate without instructions.**
Read machine signs and operation & Maintenance Manual.

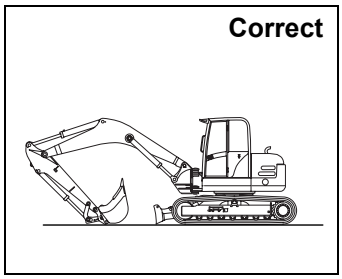
⚠	**This symbol with a warning statement, means: "Warning, be alert! your safety is involved!" Carefully read the message that follows.**



⚠ **Do not grasp control handles when entering canopy or cab.**

Be sure controls are in neutral before starting.

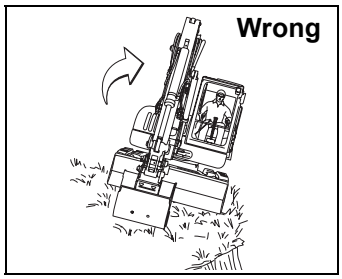
Sound horn and check behind machine before starting.



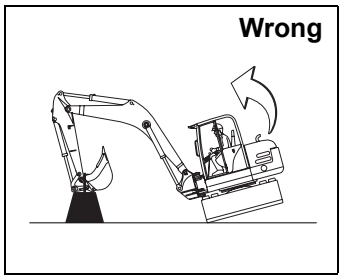
⚠ **Never operate without approved canopy or cab.**

Never modify equipment.

Never use attachments not approved by Bobcat Company.

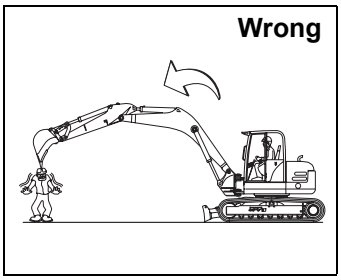


⚠ **Avoid steep areas or banks that could break away.**



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

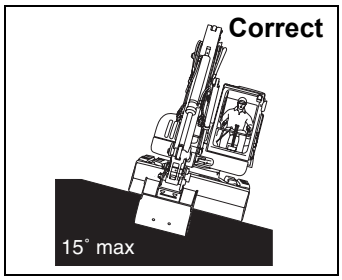
Operate on flat, level ground.



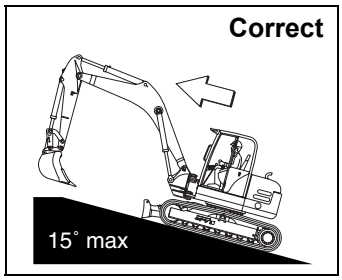
⚠ **Keep bystanders out of maximum reach area.**

Do not travel or turn with bucket extended.

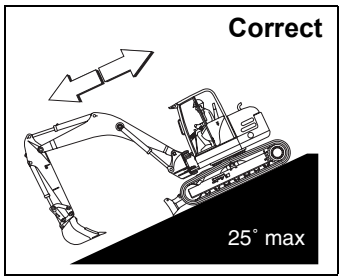
Never carry riders.



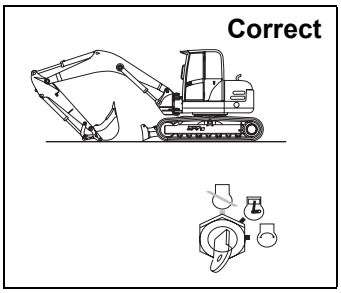
⚠ **Never exceed a 15° slope to the side.**



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

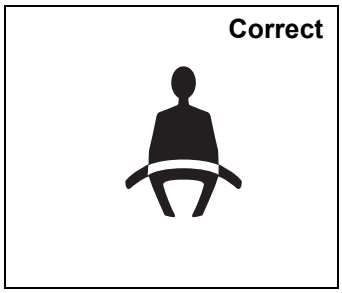


⚠ **Never exceed 25° when going down or backing up a slope.**



⚠ **To leave the excavator, lower the attachment.**

Stop the engine.



⚠ **Fasten seat belt securely.**

Operate controls only from operator's seat.

⚠ **SAFETY EQUIPMENT**

1. Seat Belt
2. Swing Lock
3. Machine Safety Signs
4. Safety Tread
5. Grab Handles

CONTENTS

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	

CE

Bobcat Europe
J. Huysmanslaan 59
B-1651 LOT
Belgium


Bobcat

FOREWORD

IMPORTANT

This Operation & Maintenance Manual was written to give the owner/operator instructions on the safe operation and maintenance of the Bobcat excavator.

READ AND UNDERSTAND THIS OPERATION & MAINTENANCE MANUAL BEFORE OPERATING YOUR Bobcat excavator. If you have any questions, see your Bobcat dealer.

Read this manual completely and 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.

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.

Items needed for regular maintenance

Description	Code
Engine oil filter	5 411 656 298
Fuel filter	5 411 656 493
Fuel pre-filter	
Primary air filter	5 501 660 922
Secondary air filter	5 501 660 924
Hydraulic oil filter (return filter)	5 380 658 088
Hydraulic ventilation filter	5 501 655 650
Cab ventilation filter	5 501 661 034
Fan / fuel pump belt	5 411 656 409
Alternator belt	5 411 657 636
Air conditioning belt	5 411 656 922
Cab ventilation dust filter	5 501 661 034
Engine oil	SAE 15W40 CE/SG (19 L)
Hydraulic oil	4 314 005 775
Grease for lubricating points	Multi purpose, lithium-soap based grease (K2K-30 / DIN 51825)

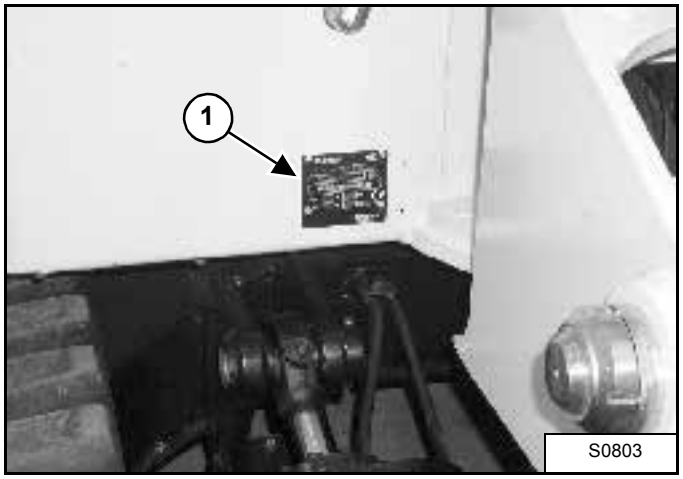
Serial number locations

Bobcat excavator serial number

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.

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

Figure 1



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

XXXX XXXXX

Module 2. - Production Sequence (Series)

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 loader is produced.

Engine Serial Number

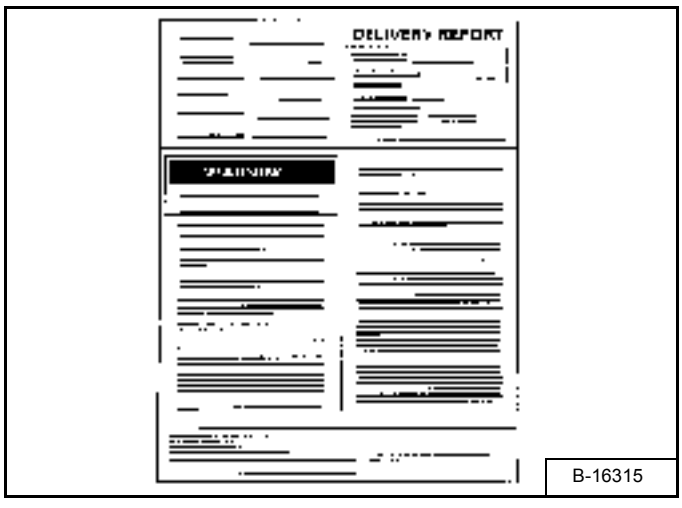
The engine serial number is located on the engine in the location shown in **[Figure 2]**.

Figure 2

Delivery report

The Delivery Report items must be explained to the owner/operator by the dealer. The dealer is to fill in the form and the owner/operator signs the form to indicate his understanding **[Figure 3]**.

Figure 3

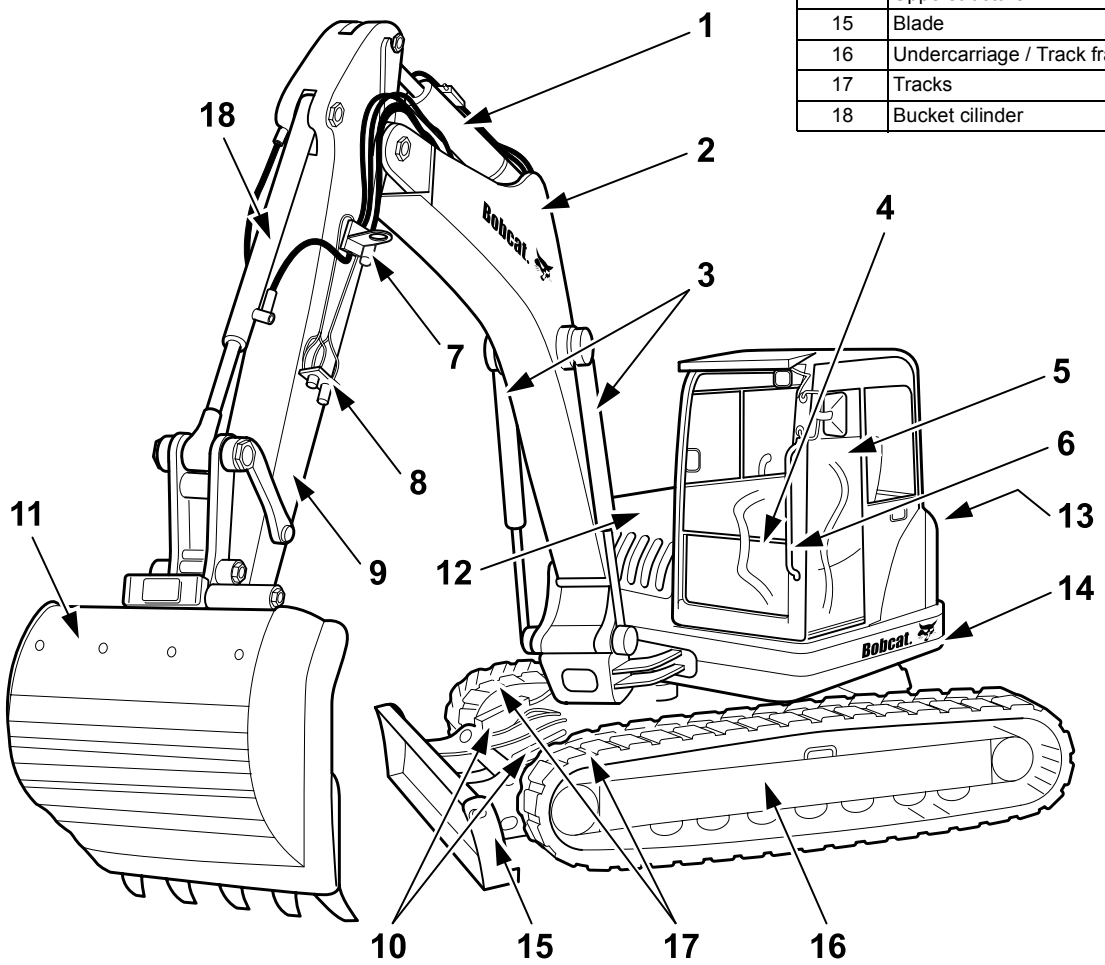


Bobcat excavator identification

Excavator 444

Figure 4

Ref	Description
1	Arm cylinder
2	Boom
3	Boom cilinders
4	Operator handbooks
5	Operator seat with seat belt
6	Grab handle
7	Return to tank coupler
8	Auxiliary couplers (on both sides)
9	Arm
10	Blade cilinders
11	Bucket
12	Right side cover
13	Rear cover
14	Upperstructure
15	Blade
16	Undercarriage / Track frame
17	Tracks
18	Bucket cilinder



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Features and accessories

Standard items

Model 444 Bobcat excavators are equipped with the following standard items:

- 2500 mm dozer bladel
- 500 mm rubber or steel tracks
- Adjustable suspension seat
- Auxiliary hydraulics
- Boom anti-drop valve
- Control console locks
- Cupholder
- 2000 mm dipperstick
- Enclosed cab* with heater
- Electrical disconnect
- Horn
- Hydraulic joystick controls
- Seat belt
- Two-speed travel
- Working lights
- Warranty: 12 months, 2000 hours

*** Tip Over Protective Structure (TOPS) - Meets requirements of ISO/DIS 12117**

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.

Options

- 500 or 800 mm steel tracks
- Air conditioning
- Air-cushioned operator's seat
- Articulated boom
- Dipperstick
- Dipperstick hose rupture safety valve
- Dozer blade float position
- Keyless ignition
- Independent diesel heating
- Electric refuelling pump
- Bucket rod with crane hook
- Secondary auxiliary hydraulic circuit
- Travel motion alarm
- MS08 quick-change attachment mounting system
- Special paint
- Yellow rotating beacon

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.

- Ejector bucket
- Grading bucket
- Ripping tooth
- Rotating clamshell bucket
- Tilt bucket
- Trenching bucket


Bobcat

SAFETY INSTRUCTIONS

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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 (decals) 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.

SI22-0603

Before operating the Bobcat excavator

WARNING

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

WARNING

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

IMPORTANT

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

WARNING

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

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

Check all the items on the Bobcat SERVICING Schedule Sticker 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/she must not use drugs or alcoholic drinks which impair his/her alertness or co-ordination while working. An operator who is taking prescription drugs should seek medical advice to determine if he/she can safely operate a machine.

A qualified operator must do the following

Understand the written instructions, rules and regulations

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

Have training with actual operation

- Operator training must consist of a demonstration and verbal instruction. This training is given by your Bobcat dealer before the product is delivered.
- The new operator must start in an area without bystanders and use all the controls until he can operate the machine and attachment safely under all conditions of the work area. Always fasten seat belt before operating.

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.

Fire prevention

The machines and some attachments have components which 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 be 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 fitted) 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 an 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 starting with jump leads.
- Know where fire extinguishers and first aid kits are located and how to use them. Fire extinguishers are available from your Bobcat dealer.

OPERATING INSTRUCTIONS

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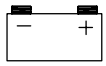
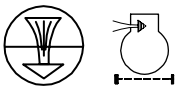
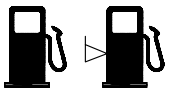
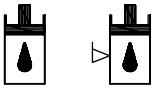
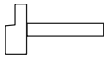
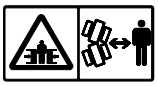
Pictograms

The following table explains the meaning of the pictograms which may be attached to your machine:

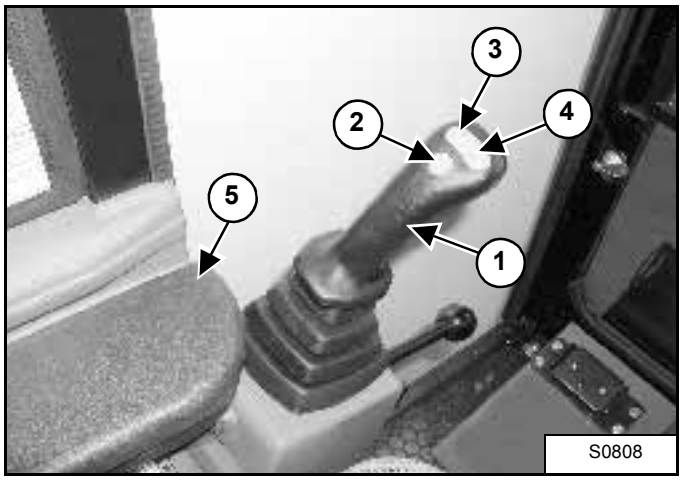
	Battery charge indicator
	Pre-heating
	Engine oil pressure
	Coolant temperature
	Air filter
	Fuel Fuel level
	Fan Heater / Ventilation
	Windshield wash/ wipe system
	Horn
	Travel motion alarm
	Hydraulic oil Hydraulic oil level
	Hydraulic oil filter clogging indicator
	Operational status Operating hours
	Working floodlights
	Rotating beacon
	Overload warning device

	Travel speed, fast
	Travel speed, slow
	Dozer blade float position
	Hydraulic rock breaker
	Changeover “ISO – SAE” control
	Lashing points
	Suspension points for loading by crane
	First-aid kit
	Fire extinguisher
	Danger of crushing
	Danger of injury
	Observe notes in Operating Instructions
	Grease gun Lubricating point

Controls and instrumentation

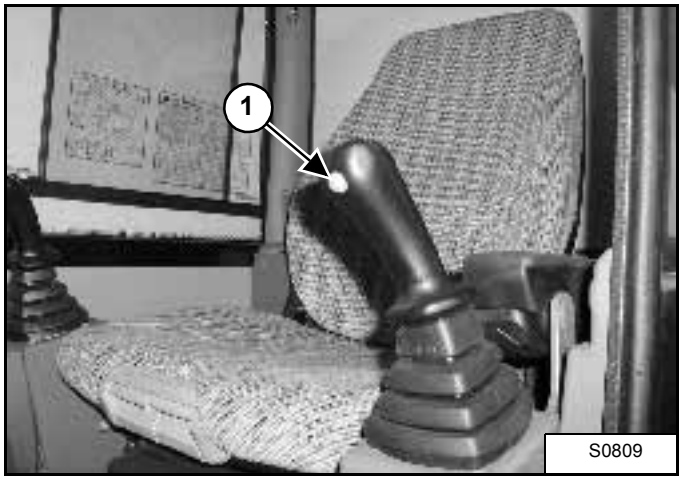
Left control lever

Figure 5



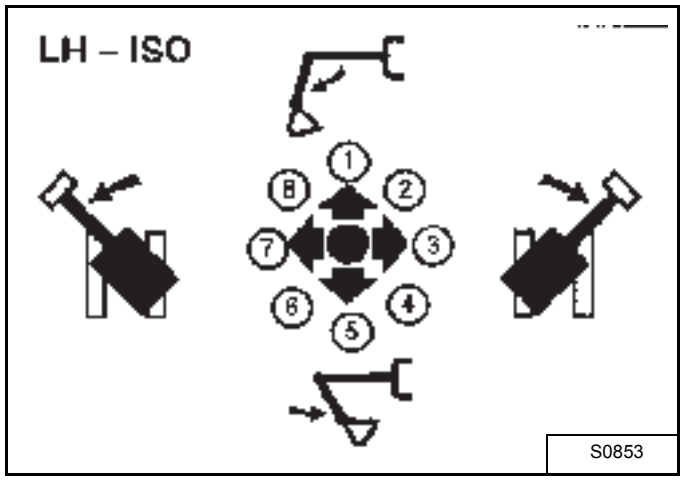
Reference	Description	Function
1	**Left control lever (Joystick)**	See below for left lever function.
2	**Upperstructure slew brake button**	When slewing the upperstructure while working on a slope, push and hold the slew brake button until the slew circuit is engaged. Release the button when the upperstructure starts to slew. This will prevent the upperstructure from drifting when the slew circuit is first engaged.
3	**The switches (3 & 4) are used for hydraulic powered attachments (such as a clamshell bucket).**	Push and hold the switch to provide hydraulic flow to the quick couplers. Release the switch to stop hydraulic flow. Note: This switch is inoperable when the hydraulic breaker operation switch is activated.
4		Push and hold the switch to reverse the direction of flow to the quick couplers. Release the switch to stop hydraulic flow.
5	**Arm Rest**	(Adjustable)

Figure 6



Reference	Description	Function
1	**Holding Brake Push Button**	Holding brake for uppercarriage slewing motion

Figure 7



The work equipment (boom, arm, bucket, and upperstructure slew) is operated by using the left and right control levers (joysticks).

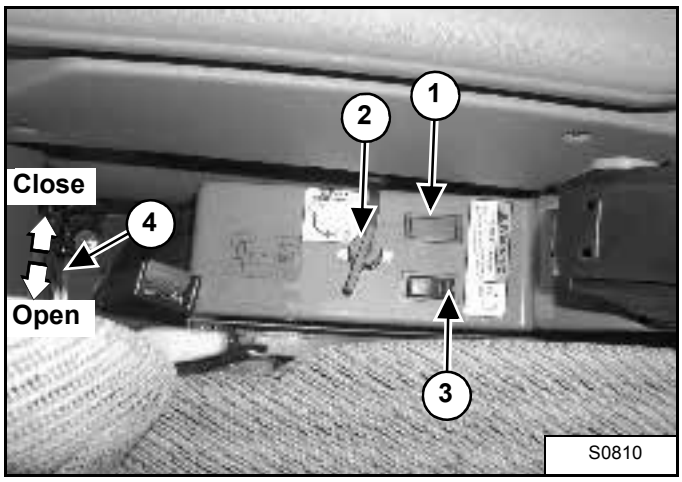
The left lever is used to operate the arm and to slew the upperstructure

Functions **[Figure 7]**:

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

Left console

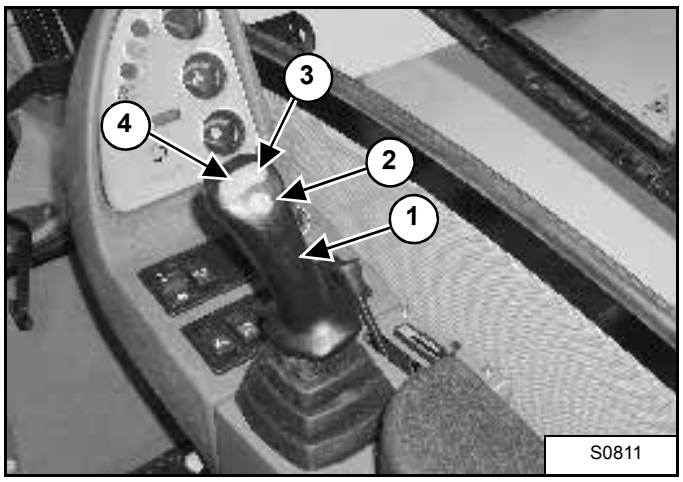
Figure 8



Reference	Description	Function
1	**Changeover ISO / SAE-control Switch (Optional)**	-
2	**Battery Disconnect Switch**	Turn the key 1/4 turn counterclockwise and remove the key to disconnect the battery from the electrical system. Install the key and turn 1/4 turn clockwise to connect the battery to the electrical system.
4	**Fresh Air/Recirculation Lever**	Open the aspirating holes for fresh air. Close the aspiration holes to recirculate the cab air.

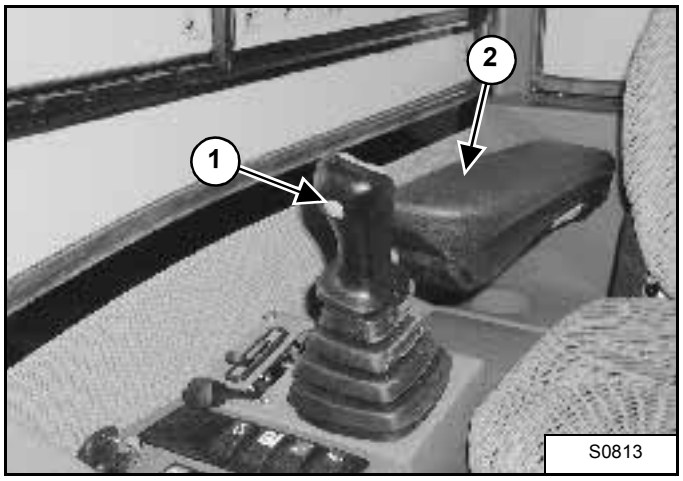
Right control lever

Figure 9



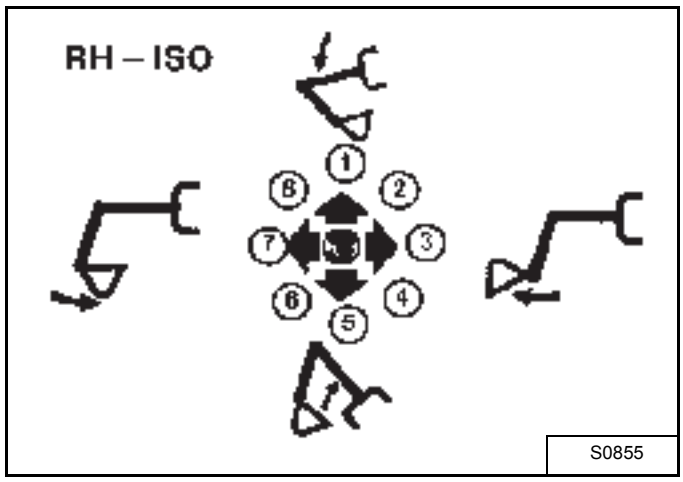
Reference	Description	Function
1	**Right Control Lever (Joystick)**	See below for right lever function.
2	**Horn**	Press the button on the control lever to sound the horn.
3 & 4	**Momentary Hydraulic Switch**	Additional control circuit - Grab/rock breaker

Figure 10



Reference	Description	Function
1	**Switch**	Future Use
2	**Arm Rest (Adjustable)**	-

Figure 11



The right lever is used to operate the boom and bucket.

Functions **[Figure 11]**:

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

WARNING

AVOID INJURY OR DEATH

Before leaving the machine:

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

Right console

Figure 12

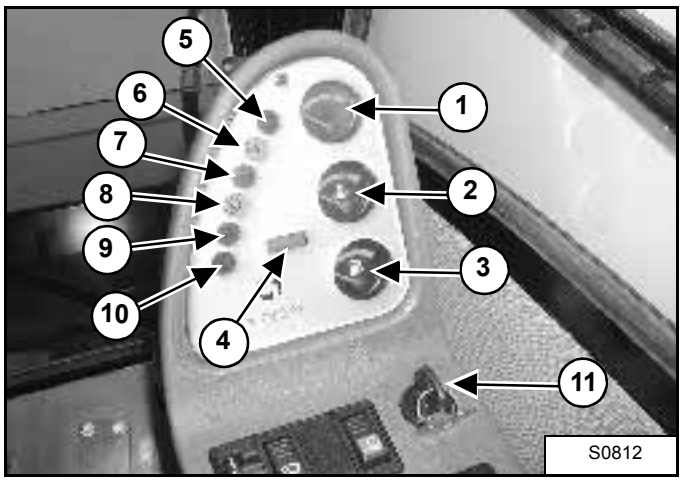
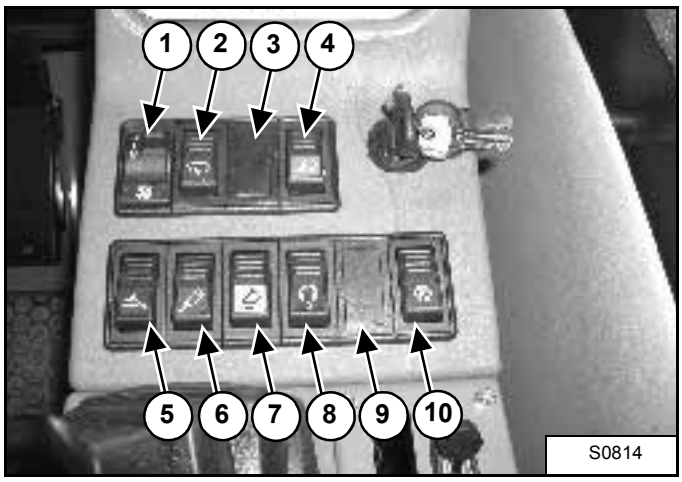


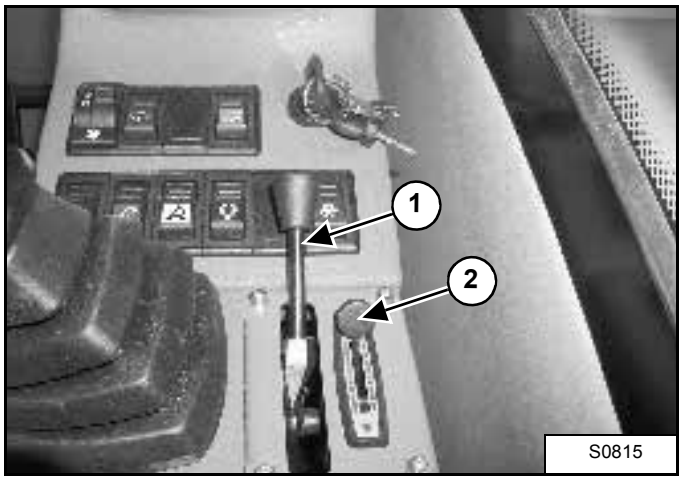
Figure 13



Reference	Description	Function
1	**Boom Load Indicator**	Shows load on boom cylinder circuit when lifting.
2	**Engine Temperature Gauge**	Shows the engine coolant temperature.
3	**Fuel Gauge**	Shows the amount of fuel in the tank.
4	**Hourmeter**	Displays the total operating hours on the Excavator.
5	**Battery Charge Indicator**	Light will illuminate when the voltage is out of range.
6	**Glow Plugs/Manifold Heater**	Light will illuminate when the glow plugs/manifold heater is energized.
7	**Engine Oil Pressure Indicator**	Light will illuminate when the engine oil pressure is low.
8	**Air Filter Indicator**	Light will illuminate when the air flow becomes restricted.
9	**Hydraulic Oil Filter Clogging Indicator**	Light will illuminate when the hydraulic oil filter is becoming clogged.
10	**Hydraulic Oil Level Indicator**	Light will illuminate when the hydraulic oil level in the tank is low.
11	**Start/Run Switch**	Starts and stops the Excavator engine.

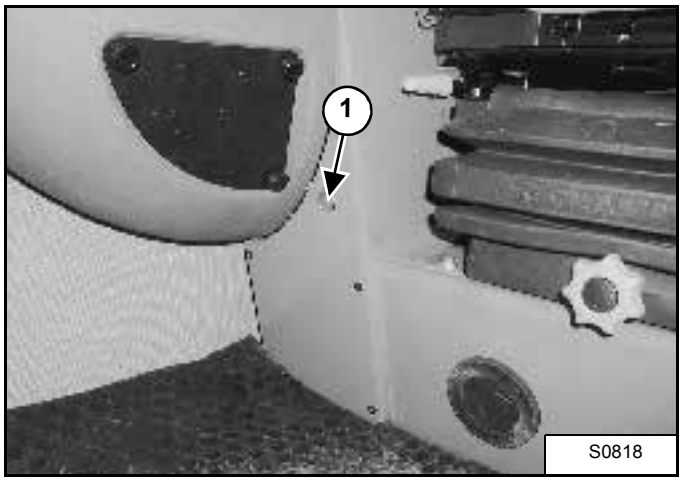
Reference	Description	Function
1	**Heater/AC Fan Switch**	Three speed fan motor control.
2	**Wiper/Washer Switch**	Starts and stops the wiper motor. Press and hold the bottom of the switch to activate the washer.
3	**Rotating Beacon (If equipped)**	-
4	**Light Switch**	Press the switch to turn on the cab/ boom work light.
5	**Two Speed Travel Control Switch**	Engages and disengages high range travel speed. (The switch will be illuminated in high range.)
6	**Auxiliary Hydraulic Mode Switch**	Press this switch when using the hydraulic breaker. (The switch will be illuminated.)
7	**Float Switch**	Press this switch to put the blade in the float position. (The switch will be illuminated.)
8	**Overload Warning Switch**	Press this switch to engage the overload warning alarm. (The switch will be illuminated.) The warning alarm will sound when the boom/arm/ bucket functions are being overloaded.
9	**Motion Alarm (If equipped)**	-
10	**Air Conditioning Switch (If equipped)**	Turns on and off the air conditioning (optional).

Figure 14



Reference	Description	Function
1	**Engine Speed Control Lever (throttle)**	Controls the RPM of the engine. Push the lever forward for low speed. Pull the lever back to increase engine speed.
2	**Temperature Control Lever**	Push the lever forward to increase the cab temperatures; backward to decrease temperature.

Figure 15



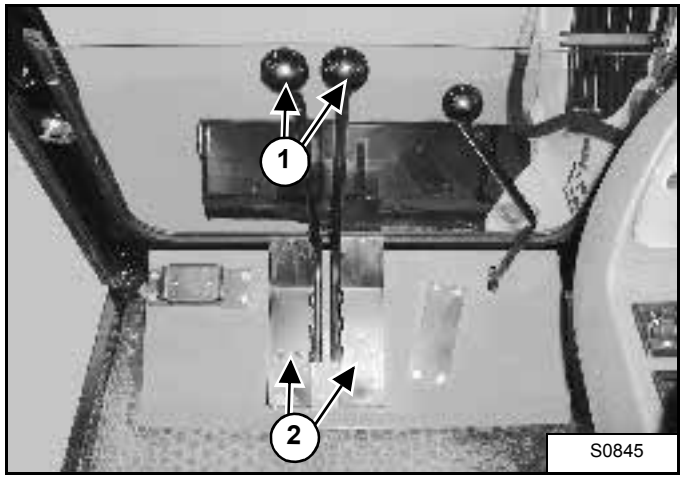
Reference	Description	Function
1	**Auxiliary Power Outlet**	-

Steering levers / foot pedals

Forward and reverse travel

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

Figure 16



Reference	Description	Function
1	**Steering levers**	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* forward for forward travel; backward for reverse travel.*
2	**Foot pedals**	Steering can also be controlled with foot pedals

WARNING

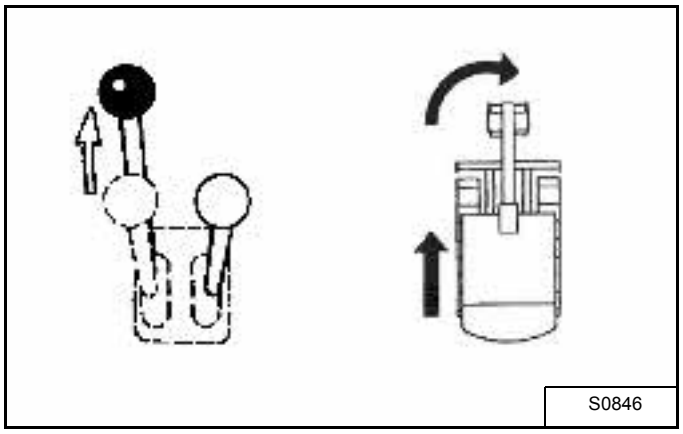
AVOID INJURY OR DEATH

- **Check the blade location before travelling. When the blade is to the rear, 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.**

Turning

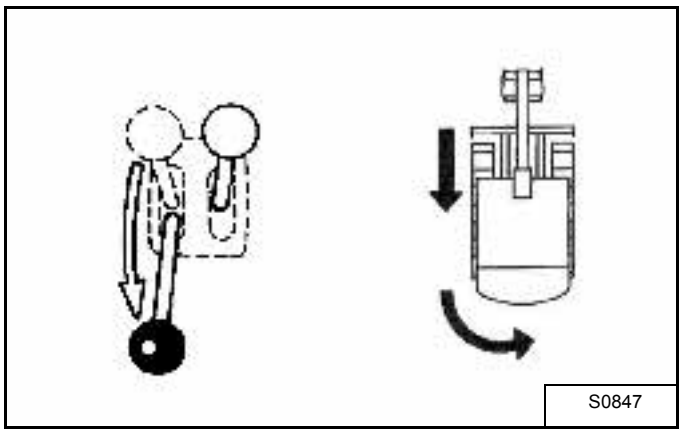
Right Turn

Figure 17



Push the left steering lever forward to turn right **[Figure 17]** while travelling forward.

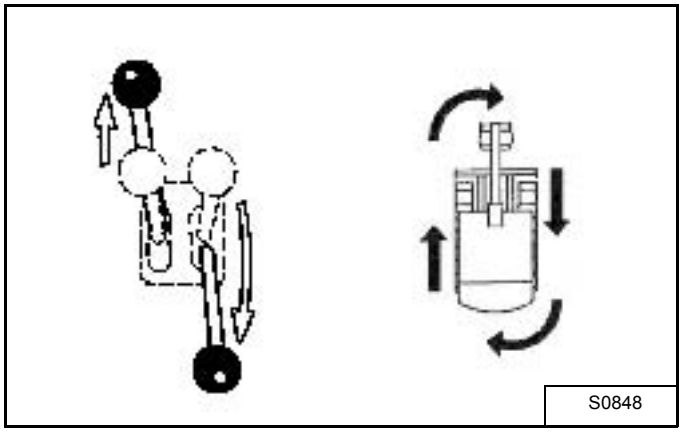
Figure 18



Pull the left steering lever backward to turn right **[Figure 18]** while travelling backward.

Counter-Rotation Right Turn

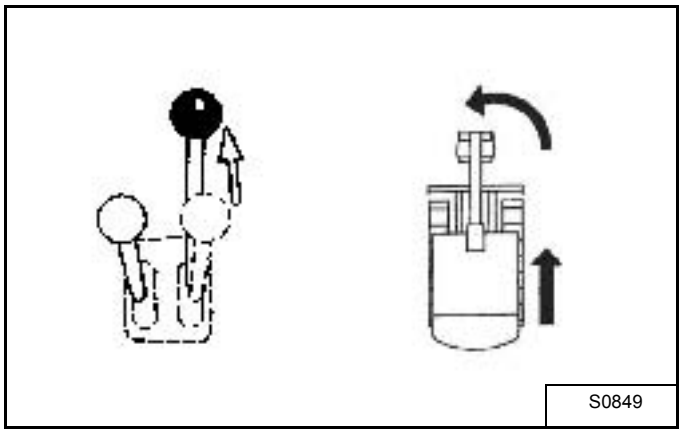
Figure 19



Push the left steering lever forward and pull the right steering lever backward **[Figure 19]**.

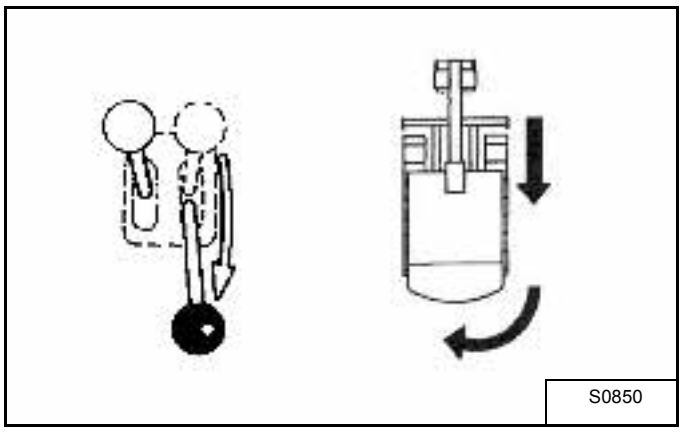
Left turn

Figure 20



Push the right steering lever forward to turn left while travelling forward **[Figure 20]**.

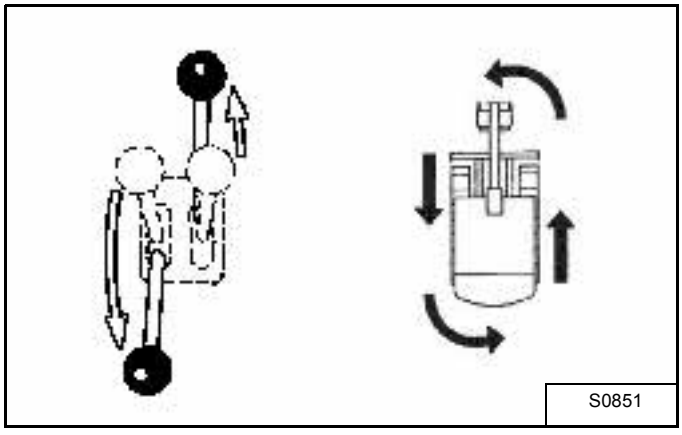
Figure 21



Pull the right steering lever backward to turn left while travelling backward **[Figure 21]**.

Counter-Rotation Left Turn

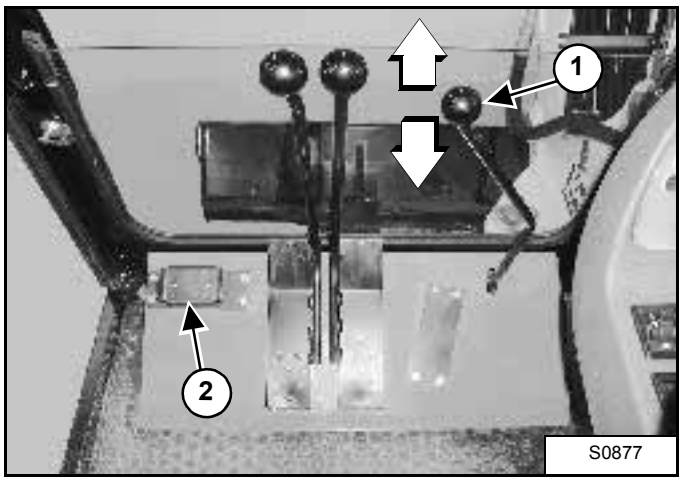
Figure 22



Push the right steering lever forward and pull the left steering lever backward **[Figure 22]**.

Blade control lever

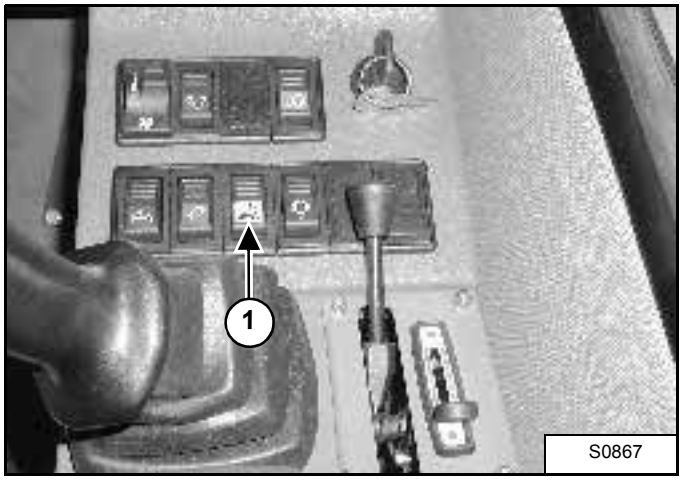
Figure 23



Reference	Description	Function
1	**Lever**	Push the lever forward to lower the blade. Pull the lever backward to raise the blade.

Note: Keep the blade lowered when digging to help stabilize the Excavator.

Figure 24

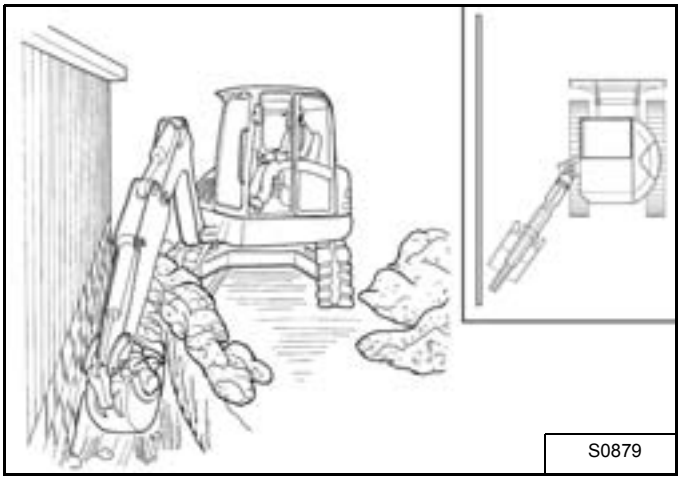


Reference	Description	Function
1	**Switch**	Push the switch to put the blade in the float position (the switch will be illuminated).

Boom swing pedal

Reference	Description	Function
2 **[Figure 23]**	**Pedal**	Push the left side of the pedal to swing the boom to the left. Push the right side of the pedal to swing the boom to the right.

Figure 25



Note: The purpose of the boom swing pedal is to offset the boom with respect to the upperstructure for digging close to a structure **[Figure 25]**.

Operator cab

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 may cause loss of operator protection from rollover and falling objects, and result in injury or death.

Entering And Exiting The Excavator

Figure 26

Use the grab handles and track to enter and exit the Excavator **[Figure 26]**.

Raising and lowering the left console

Figure 27

Raise the console before exiting the cab. Pull up on the handle **[Figure 27]**. The lift spring will assist in raising the console.

Lower the console before operating the Excavator. Push down on the handle until the console is in the down position.

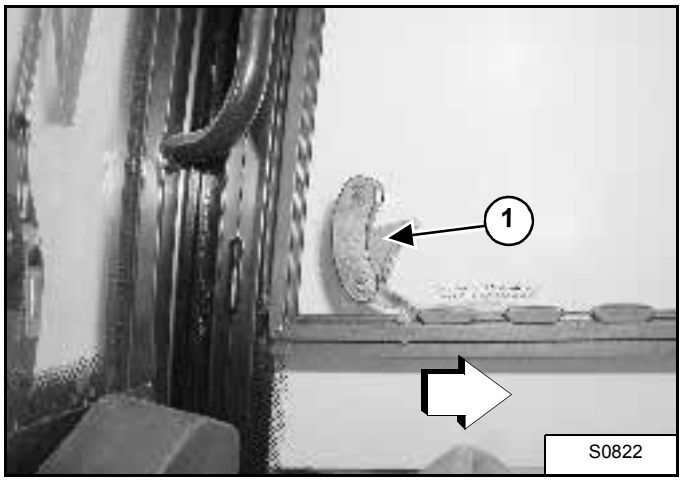
Note: When the console is raised, the hydraulic and traction systems are locked and will not operate.

Emergency exits

The left door, right side window and front window provide emergency exits.

Right side window

Figure 28



Reference	Description	Function
1	**Window latch**	Press it together and slide the window to the rear of the Excavator.

Figure 29

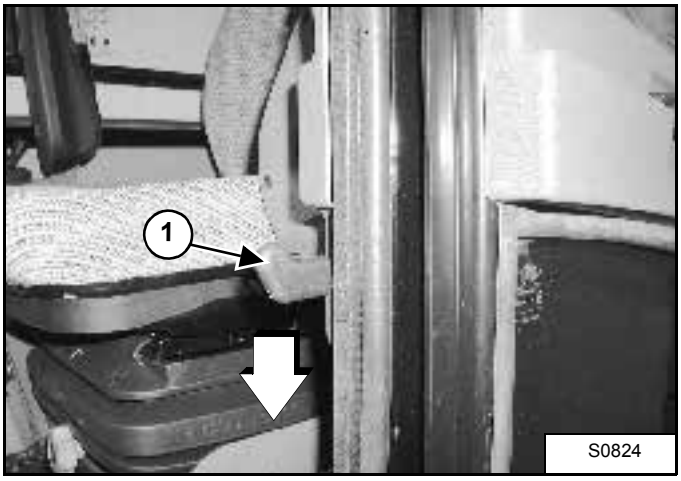
Exit through the window **[Figure 29]**.

Cab door

The start key can be used to lock the cab door.

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

Figure 30



Reference	Description	Function
1	**Latch**	Pull down to release the door.

Front window

Figure 31

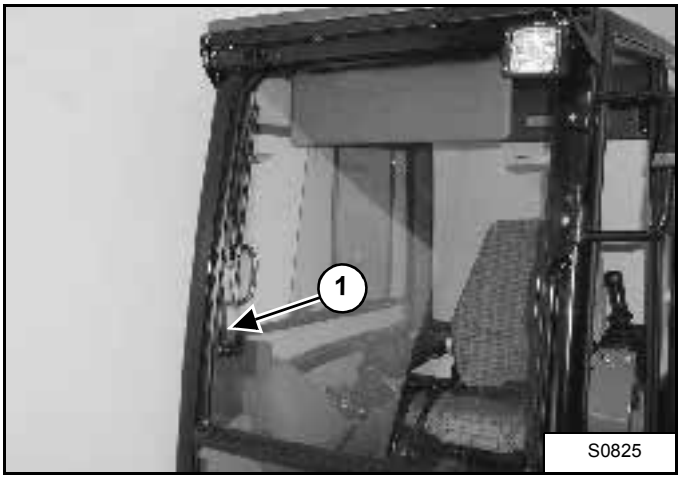
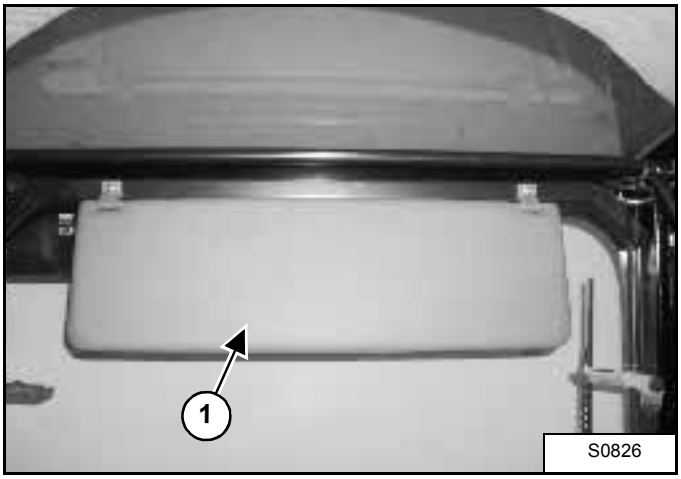


Figure 32

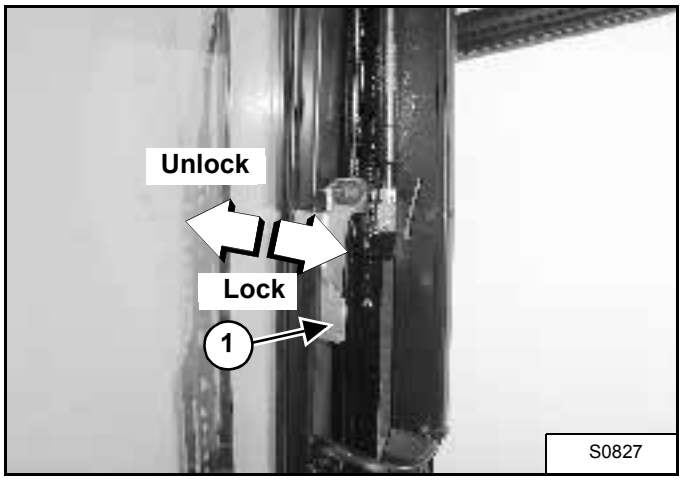


Reference	Description	Function
1	**The front window**	The front window is equipped with a wiper and moveable sunvisor.

Opening The Front Window (emergency exit)

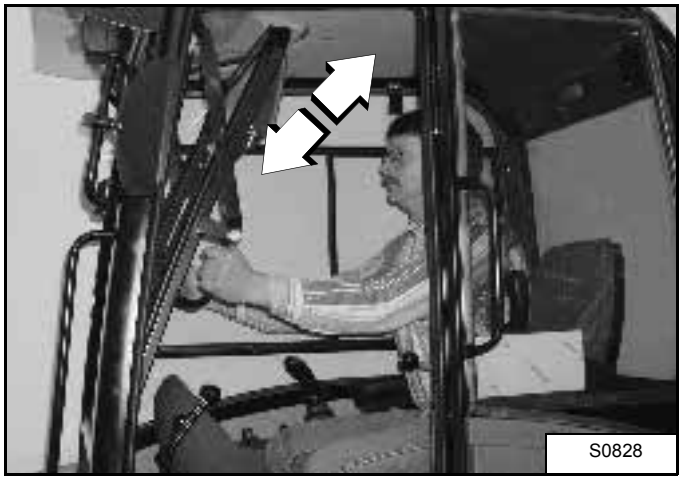
Note: The right hand latch is shown. The procedure is the same for both latches.

Figure 33



Reference	Description	Function
1	**Latches**	Turn the two latches to the unlocked position.

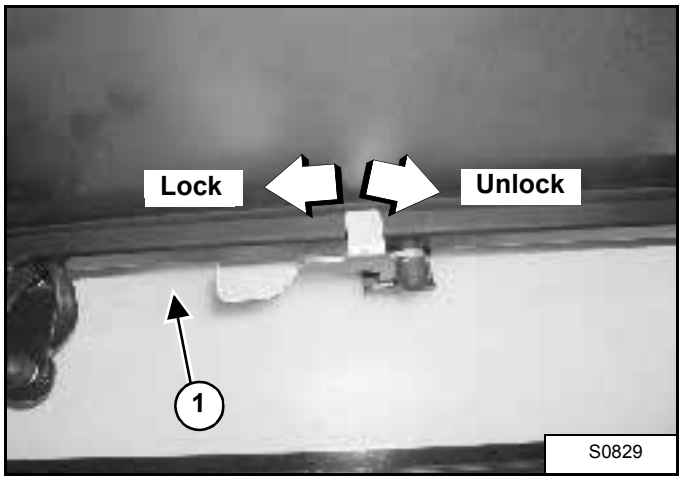
Figure 34



Use both window grab handles to pull the top of the window in **[Figure 34]**.

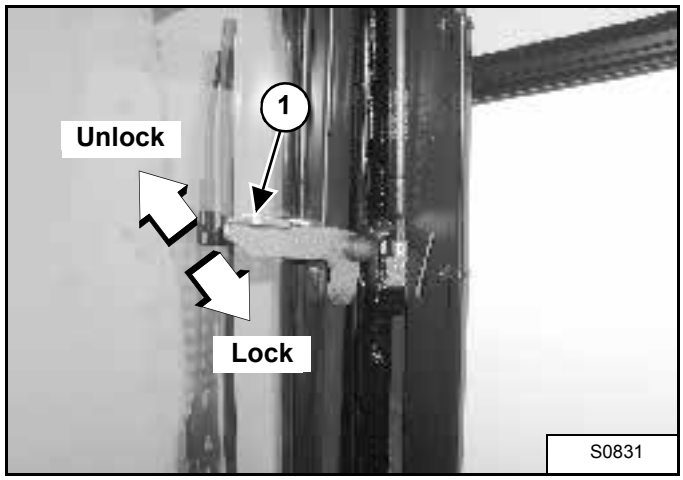
Continue moving the window in and up over the operator's head.

Figure 35



Reference	Description	Function
1	**The front window**	The front window is equipped with a wiper and moveable sunvisor.

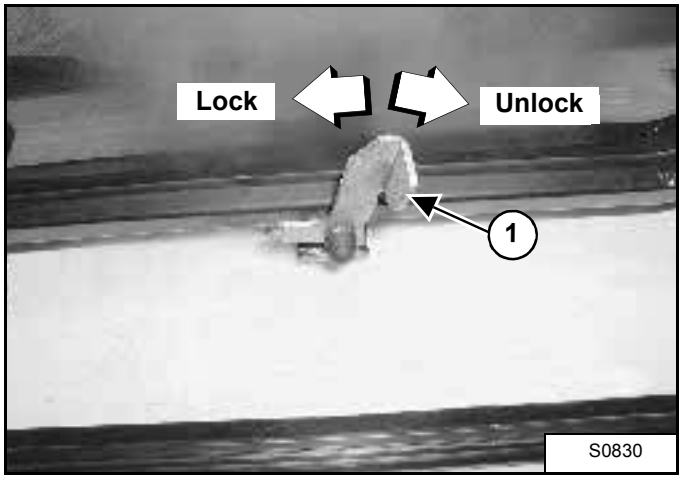
Figure 37



Reference	Description	Function
1	**Latches**	Rotate the two latches to the locked position.

Closing The Front Window (emergency exit)

Figure 36

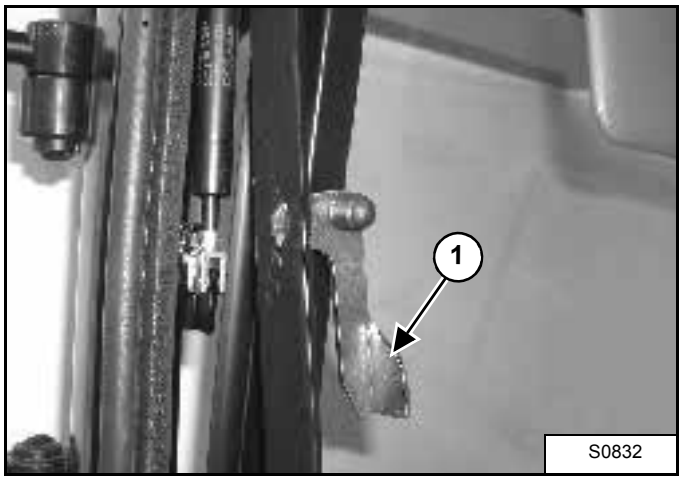


Reference	Description	Function
1	**Latches**	Rotate the two latches to the unlocked position. Use both window grab handles to pull the window down

Front window ventilation

The front window may be opened approximately 181 mm.

Figure 38



Reference	Description	Function
1	**Locks**	Pull back on the window until the locks engage the slots in the window hinge.

Top window

Sun shade

The top window is equipped with a retractable sun shade.

Figure 39

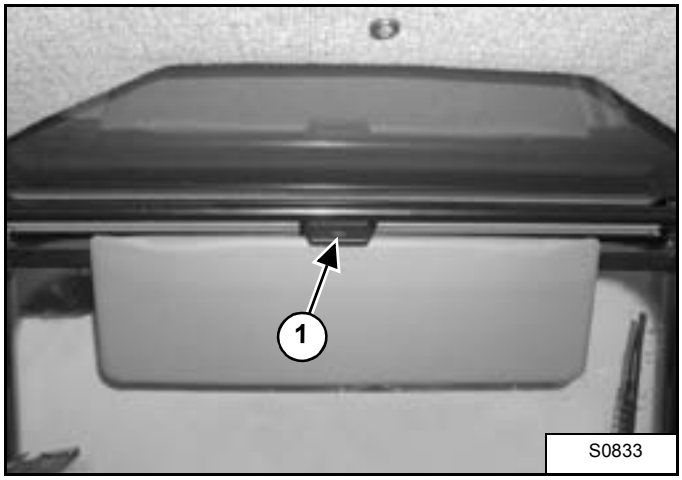
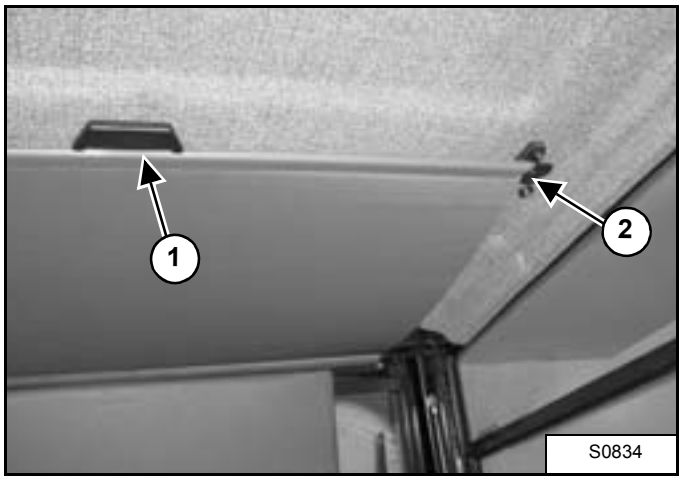


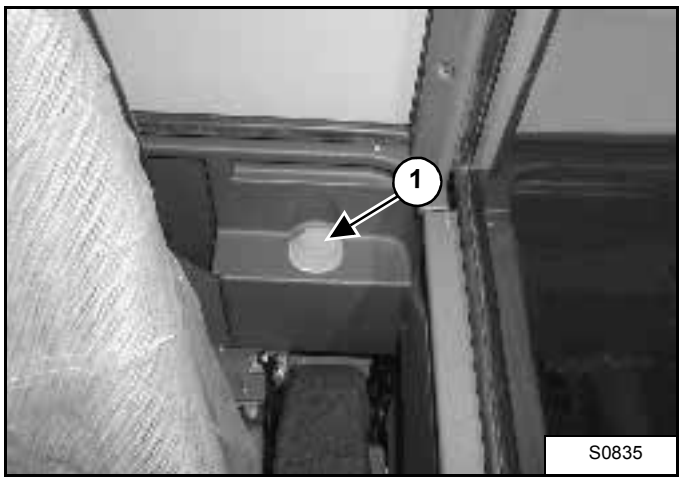
Figure 40



Reference	Description	Function
1	**Handle**	To extend the shade, pull the handle towards the rear of the Excavator.
2	**Right bracket**	Engage the ends of the shade in the left and right brackets. Hold the handle and allow the shade to slowly retract to the stored position.

Wiper/washer fluid reservoir

Figure 41



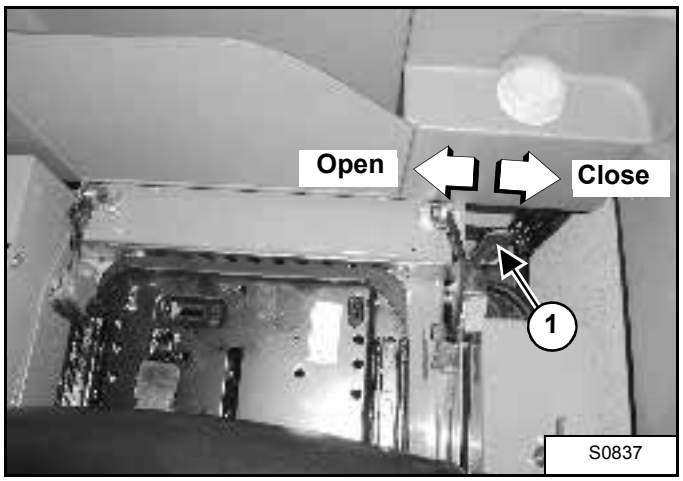
Reference	Description	Function
1	**Reservoir**	The reservoir is located behind the operators seat on the left side of the Excavator. Use an antifreeze washer solution in freezing temperatures.

Heating, air conditioning (option) and ventilation

Cab fresh air vent

The cab fresh air vent is located behind the operators seat.

Figure 42



Reference	Description	Function
1	**Lever**	Move the lever to the right to close the vent. Move the lever to the left to open the vent.

Vents

Figure 43

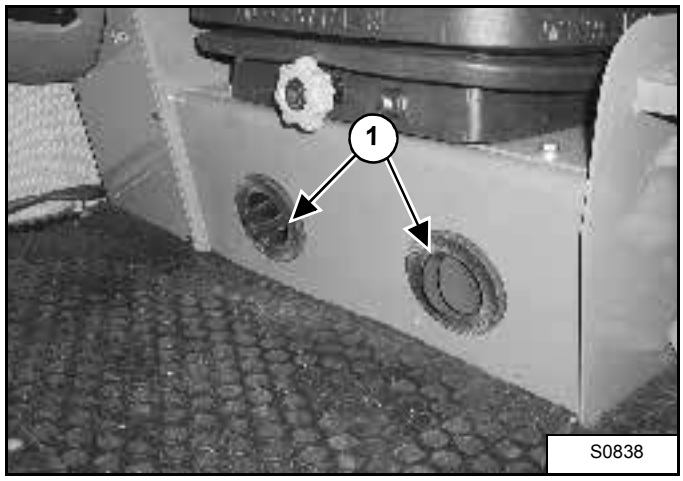


Figure 44

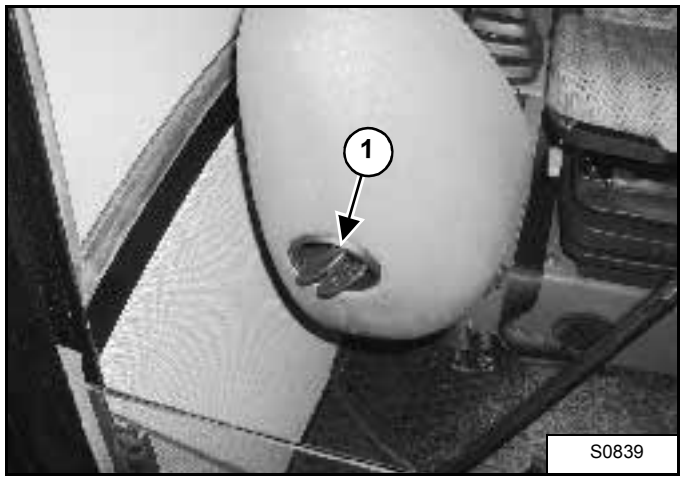
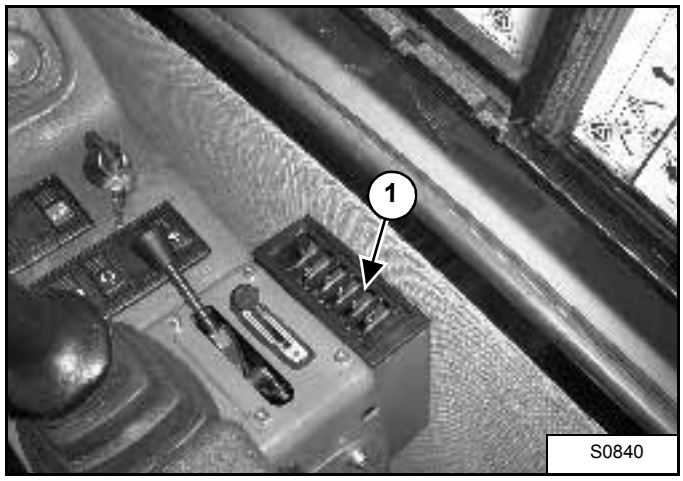


Figure 45



Reference	Description	Function
1	**Heat and air conditioning vents**	There are four heat and air conditioning vents. Turn the vents to direct air as desired.

Changing work attachments

General

Various working attachments are available to achieve maximum utilization of the machine for a variety of applications.

The machine is equipped with a quick-attach system to shorten the time it would take to install attachments.

When mounting a clamshell grab, rotatable ditch-cleaning bucket or a hydraulic rock breaker, an additional control circuit is required. Additionally, an open return (return line directly to tank) may be required when operating the hydraulic rock breaker.

WARNING

When the attachments have been removed, they must be secured against tilting and overturning to avoid possible injuries to persons.

IMPORTANT

The system must be relieved of pressure before hydraulic connections are disconnected.

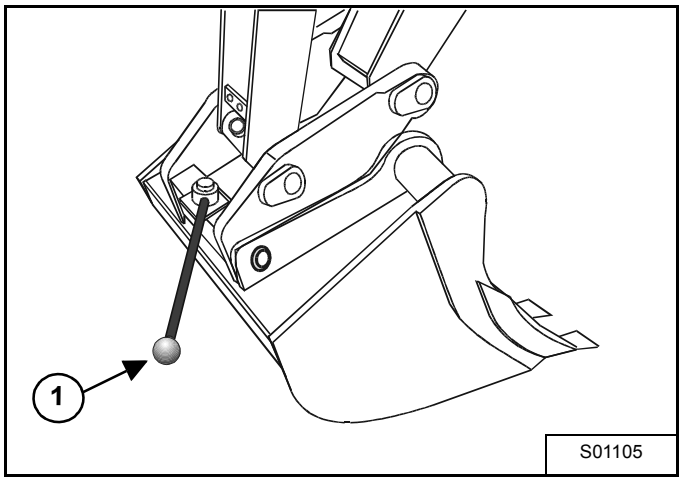
Procedure for changing work attachments

IMPORTANT

In the case of a hydraulically controlled attachment, first of all the hydraulic connection must be disconnected (after relieving pressure).

For replacement, the work attachment must be lowered to the ground and positioned so that it cannot tilt.

Figure 46



The quick-mount hitch is then opened with the control rod until the locking bolts are completely retracted.

Check the function of the quick-mount hitch lock and grease the bolts if necessary.

Attach another work attachment and close the quick-mount hitch until the locking bolts are completely extended and the lock is in place.

The control rod must be kept in the drivers's cab.

Clamshell grab bucket

Attaching the clamshell grab bucket

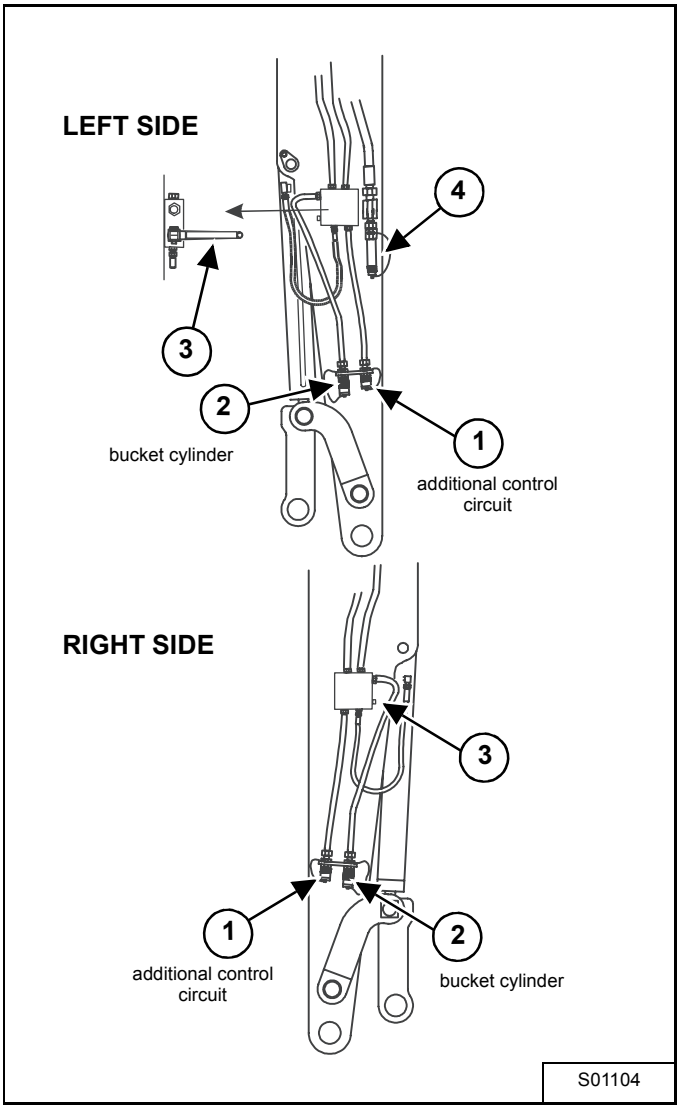
Figure 47

When the grab is operated, the change-over switch must be in position “Rock breaker OFF” (see **[Figure 25]**)

Ensure that the indicator lamp in the switch is OFF.

Attach the clamshell grab and close the quick mount hitch.

Figure 48



Retract the bucket cylinder piston rod completely.

Turn the diverter valves **clockwise** on both sides (position 3 on **[Figure 48]**) to direct hydraulic flow to the auxiliary quick couplers for clamshell open/close functions bucket.

WARNING

Whilst assembling and using a clamshell grab with the quick-attach system, the bucket cylinder piston rod must be fully retracted.

IMPORTANT

Remove any dirt or debris from the surface of both the male and female couplers. Visually check the couplers for corroding, cracking, damage, or excessive wear. If any of these conditions exist, the coupler(s) must be replaced. Remove the protective caps

Connect the swivel motor to the couplings (position 1 on **[Figure 48]**). Thread the couplers from the attachment to the couplers on the Excavator. Tighten the couplers until fully seated.

Connect the “open / close” function to the couplings (position 2 on **[Figure 48]**).Thread the couplers from the attachment to the couplers on the Excavator. Tighten the couplers until fully seated.

Thread the protective caps together.

Note: When the grab has been dismantled, re-open the diverter valves (position 3 on **[Figure 48]**) and Install the protective caps on the 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.

Operating the clamshell grab bucket

WARNING

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

Figure 49

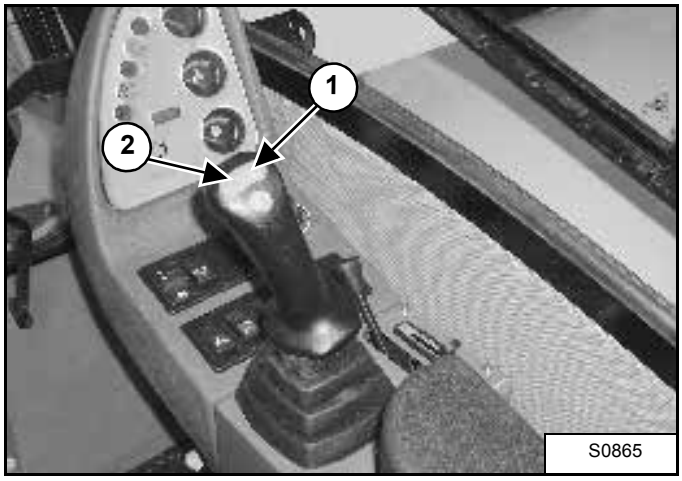
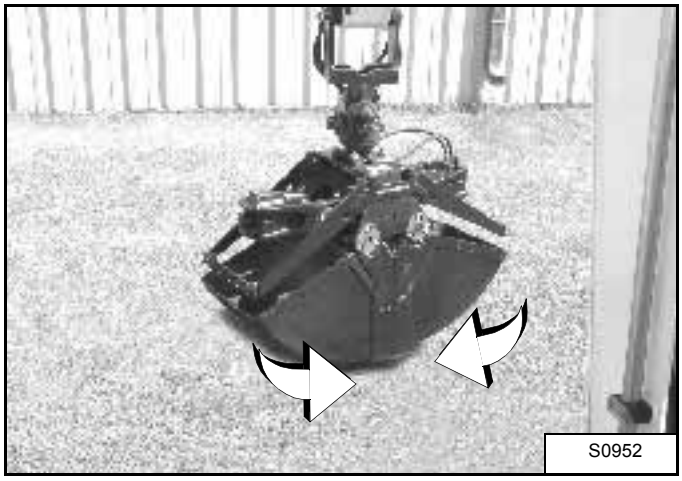
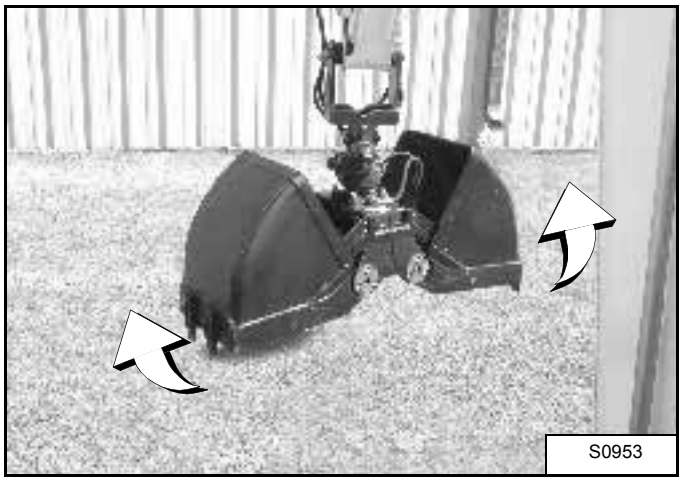


Figure 50



Move the right joystick to the left (1) **[Figure 49]** to close the clamshell **[Figure 50]**.

Figure 51



Move the right joystick to the right (2) **[Figure 49]** to open the clamshell **[Figure 51]**.

Figure 52

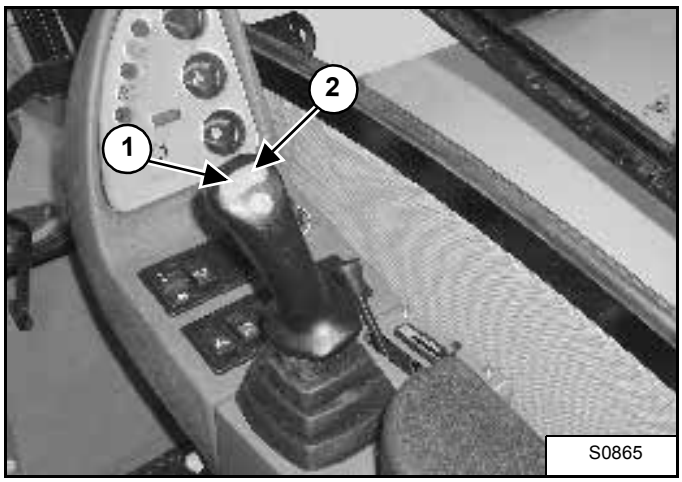


Figure 53

Push and hold the switch (1) **[Figure 52]** to rotate the bucket in the counter clockwise direction **[Figure 53]**.

Push and hold the switch (2) **[Figure 52]** to rotate the bucket in the clockwise direction **[Figure 53]**.

Attaching the rock breaker

WARNING

Before mounting an unapproved rock beater, it is essential to consult your dealer.

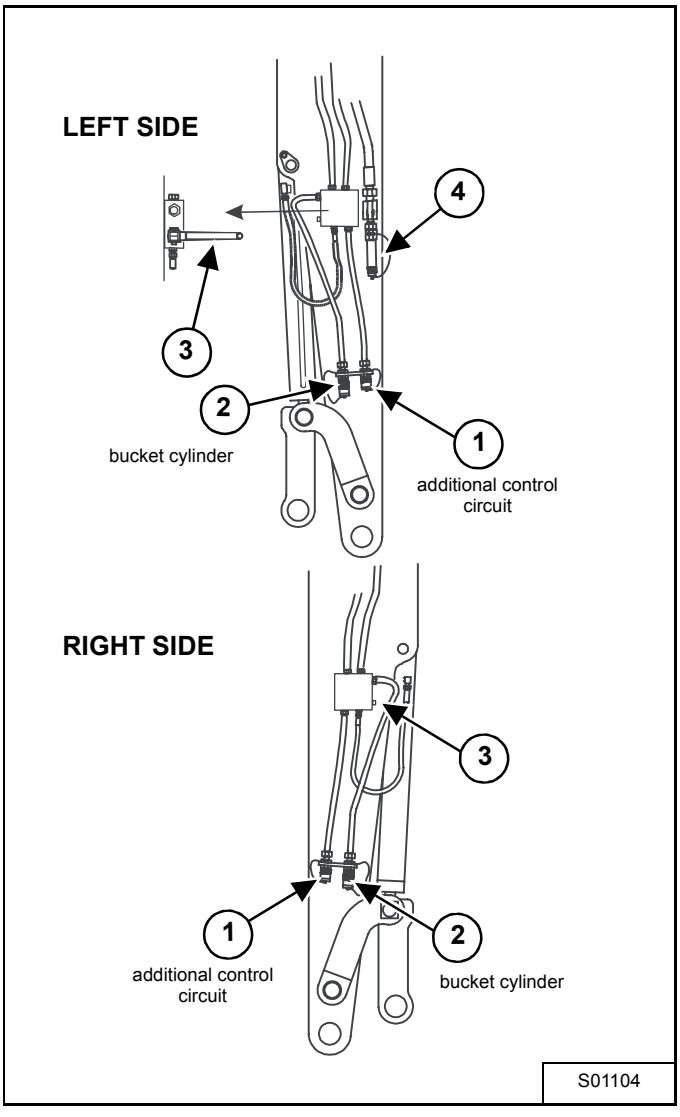
IMPORTANT

The mounting and operating instructions of the hydraulic rock breaker manufacturer must be observed.

The hydraulic circuit of the rock breaker must be secured according to the instructions of the hydraulic rock breaker manufacturer.

Standard protection: 4351 psi/ 300 BAR

Figure 54

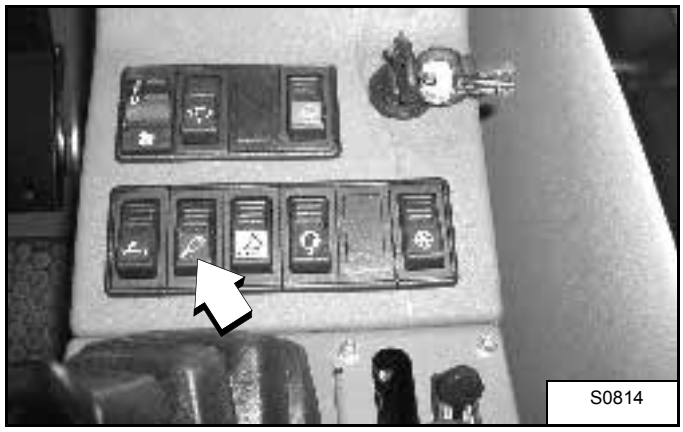


The hydraulic rock breaker is mechanically attached in the same manner as a bucket attachment.

The hydraulic pressure supply for the rock breaker is connected to the lines of the additional control circuit (position 1 on **[Figure 48]**) by a hose coupling.

OPTION: The hydraulic pressure supply for rock breakers of foreign brand is connected to a line of the additional control circuit and the return via the open return line connection.

Figure 55

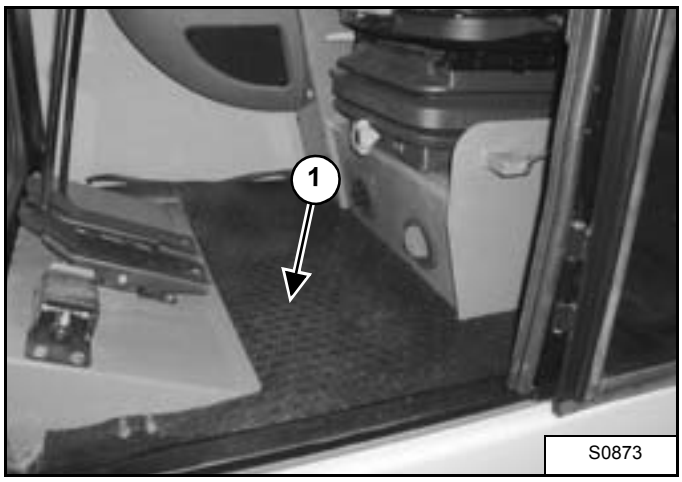


Set the change-over switch (see figure **[Figure 55]**) to “Rock breaker operation”.

Auxiliary hydraulic flow adjustment

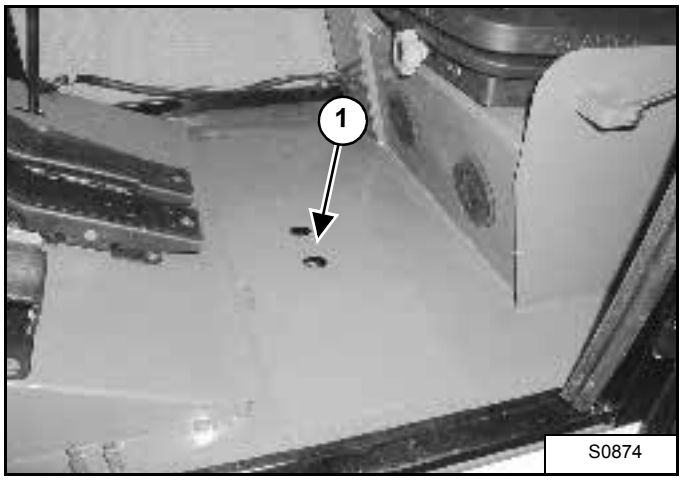
The auxiliary hydraulic flow can be increased or decreased.

Figure 56



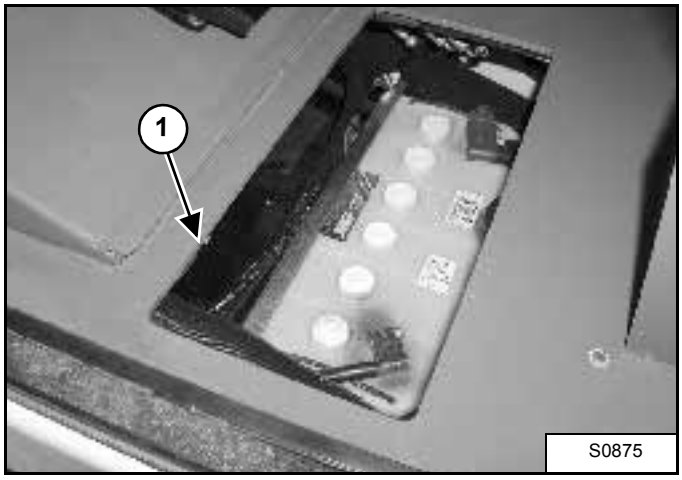
Reference	Description	Function
1	**Floormat**	Pull up on and remove the floormat.

Figure 57



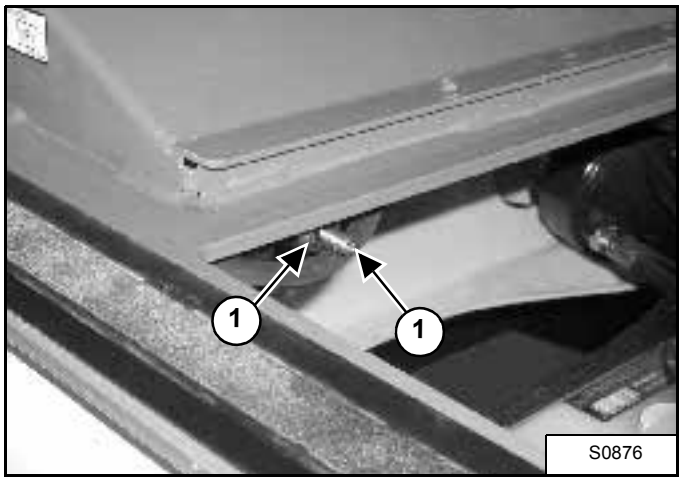
Reference	Description	Function
1	**Battery compartment cover**	Remove the battery compartment cover.

Figure 58



Reference	Description	Function
1	**Control valve**	The auxiliary hydraulic flow control valve is located under the cab floor.

Figure 59



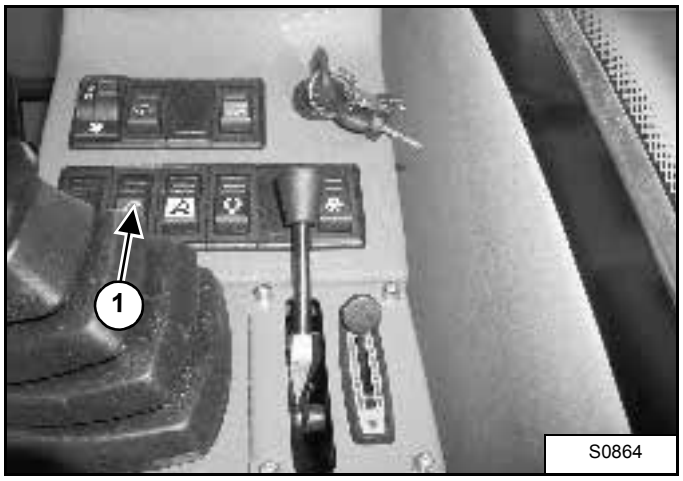
Reference	Description	Function
1	**Nut**	Loosen the nut and turn the adjustment screw in to increase auxiliary hydraulic flow. Tighten the nut after the flow adjustment has been made.

Note: Maximum Flow – 100 LPM
Minimum Flow – 0 LPM

Relieving hydraulic pressure

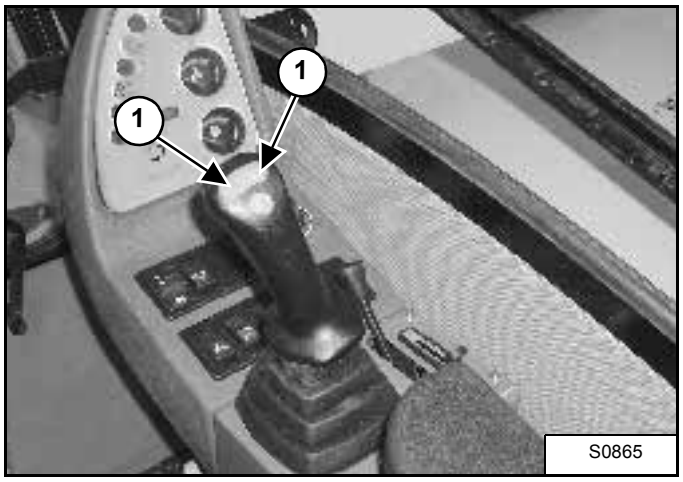
Stop the engine and turn the key to the RUN position.

Figure 60



Reference	Description	Function
1	**hydraulic breaker switch**	Press the hydraulic breaker switch OFF. The light is not illuminated.

Figure 61



Reference	Description	Function
1	**Switches**	Press the switches (1) on the right control lever several times to relieve the hydraulic pressure. Turn the key to the OFF position.

Daily inspection

Check the following items before each day of operation:

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. It is located inside the rear door of the Excavator and also in the MACHINE SIGN TRANSLATION SECTION.

- Operator Cab and mounting hardware.
- Seat belt and mounting hardware.
- Damaged decals, replace as needed.
- Check control console lockout.
- Air cleaner and intake hoses.
- Engine oil level and for engine leaks.
- Hydraulic fluid level and system for leaks.
- Grease all pivot points.
- Cylinder and attachment pivot points.
- Track tension.
- Repair broken and loose parts.

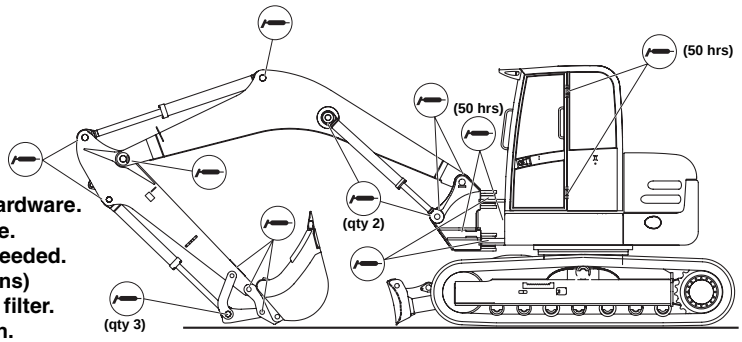
WARNING

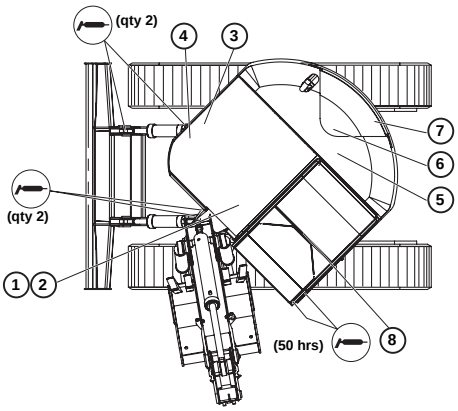
Instructions are necessary before operating or servicing machine. Read and understand the Operation & Maintenance Manual, Handbook and signs (decals) on machine. Follow warnings and instructions in the manuals when making repairs, adjustments or servicing. Check for correct function after adjustments,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

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

Figure 62

SERVICE SCHEDULE





EVERY 8-10 HOURS
- Check engine coolant level.
- Check engine oil level.
- Check hydraulic fluid level.
- 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 for damaged signs (decals) - Replace as needed.
- Grease all machinery pivot points. (See illustrations)
- Drain water and sediment from fuel tank and fuel filter.
- Check control console lockout for proper operation.
- Check for leaks and or tightness of pipes, hoses, control unit, hydraulic pumps, cylinders, etc.

EVERY 50 HOURS
- Grease swing pinion, swing circle and door hinges.
- Check battery, cables and electrolyte level.

EVERY 100 HOURS
- ■ Check and adjust belt(s) if required.

EVERY 250 HOURS
- Check oil level in both final drive cases.
- ▲ Clean radiator, oil cooler, *A/C condenser and clean / replace cab ventilation filter.

EVERY 500 HOURS
- ▲ Replace hydraulic filter.
- Check alternator and starter connections.
- Replace diesel fuel filter and prefilter.
- ▲ Check air intake.
- ■ Replace engine oil and filter.

EVERY 1000 HOURS OR EVERY 6 MONTHS
- Check and adjust engine valve clearance.
- ▲ Replace oil in both final drive cases.
- Drain and flush cooling system - Replace coolant.
- Replace hydraulic fluid and filter(s) - Clean reservoir.

* 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.

IMPORTANT

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

THE SPARK ARRESTOR MUFFLER, IF EQUIPPED, MUST BE CLEANED TO KEEP IT IN WORKING CONDITION. THE SPARK ARRESTOR MUFFLER MUST BE SERVICED BY DUMPING THE SPARK CHAMBER EVERY 100 HOURS OF OPERATION.

ON SOME MODELS, THE TURBOCHARGER FUNCTIONS AS THE SPARK ARRESTOR AND MUST OPERATE CORRECTLY FOR PROPER SPARK ARRESTOR FUNCTION.

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.

SEE THE OPERATION AND MAINTENANCE MANUAL FOR MORE INSTRUCTIONS.

FILTER CHART

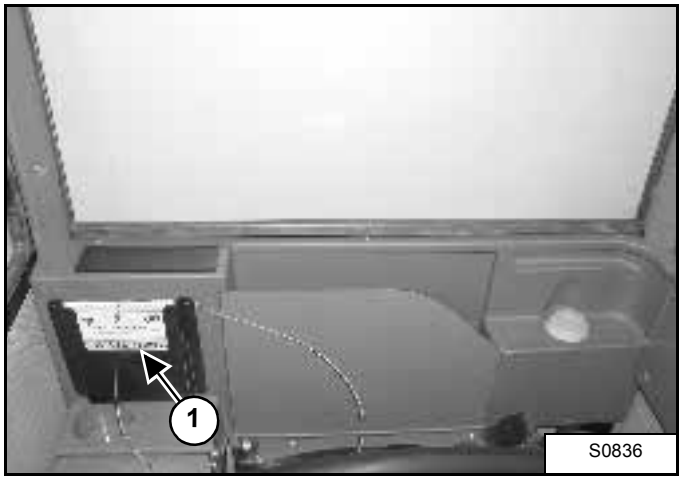
1.	PRIMARY AIR FILTER	5501660922
2.	SECONDARY AIR FILTER	5501660924
3.	ENGINE OIL FILTER	5411656298
4.	FUEL FILTER	5411656493
5.	FUEL PRE FILTER	5445100004
6.	HYDRAULIC VENTILATION FILTER	5501655650
7.	HYDRAULIC INSERT FILTER	5380658088
8.	CAB VENTILATION FILTER	5501661034

• See illustrations above for filter locations.

• See Operation & Maintenance Manual for more information and instructions. G7-05-4800158-EN

Pre-starting procedure

Figure 63

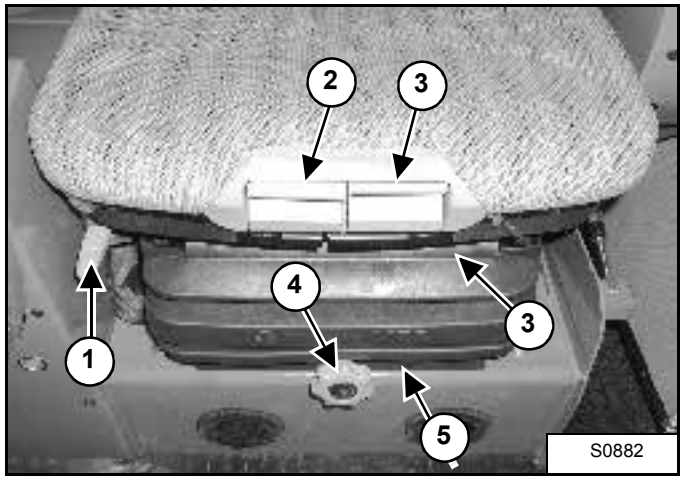


Reference	Description	Function
1	**Operator's Handbook**	Read and understand the Operation & Maintenance Manual and the Operator's Handbook before operating.

Figure 64

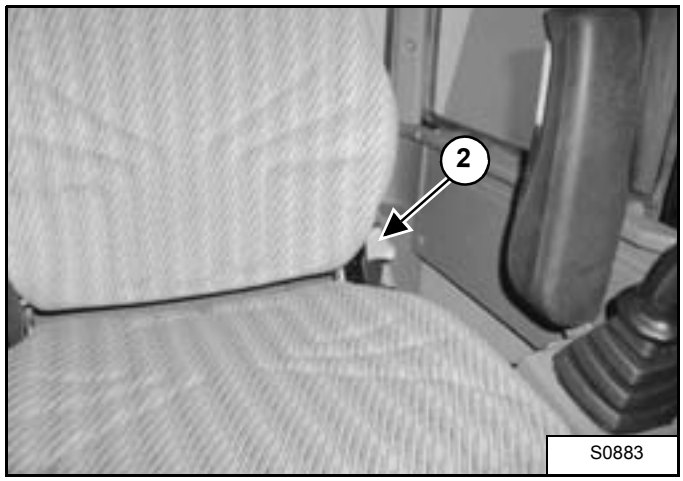
Use the grab handles and the tracks to enter the Excavator **[Figure 25]**.

Figure 65



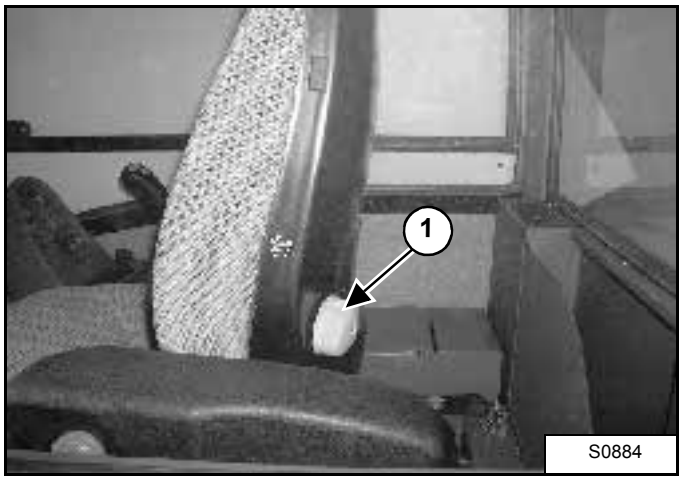
Reference	Description	Function
1	**Lever**	Pull up on the lever to adjust the seat forward or backward.
2	**Lever**	Pull up on the to adjust the bottom of the seat forward or backward.
3	**Lever**	Pull up on the lever to adjust the incline of the seat bottom.
4	**Knob**	Turn the adjustment knob until the operators weight is shown in the window. The seat is adjustable from 50 Kg to 130 Kg.
5	**Window**	

Figure 66



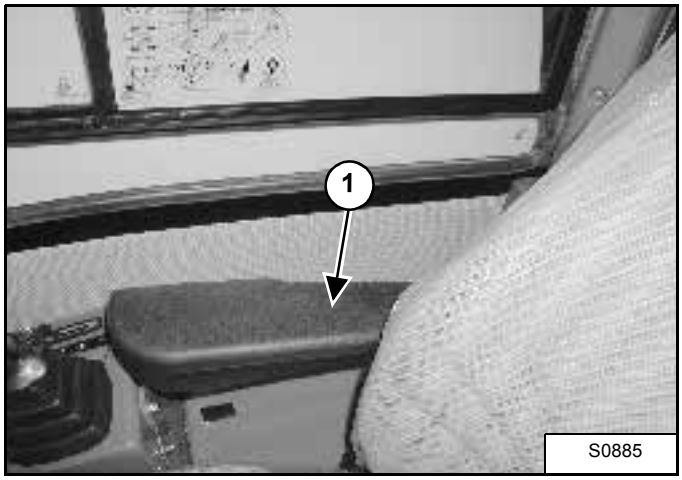
Reference	Description	Function
1	**Lever**	Pull up on the lever to change the incline of the seat back.

Figure 67



Reference	Description	Function
1	**Knob**	Turn the adjustment knob to adjust the lumbar support in the seat back.

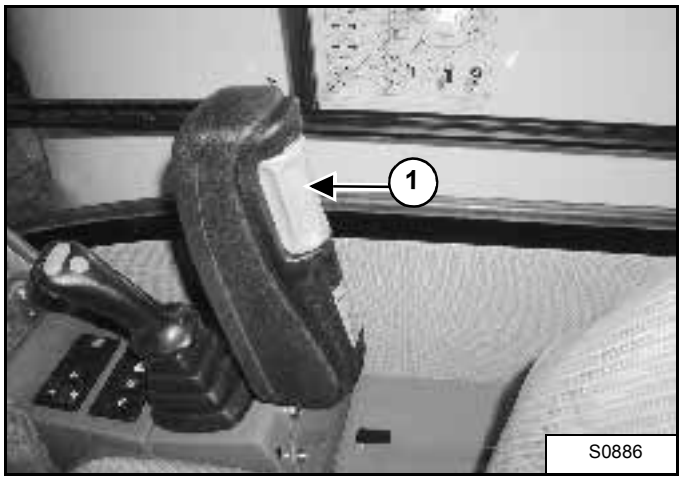
Figure 68



Reference	Description	Function
1	**Arm rest**	Raise the arm rest.

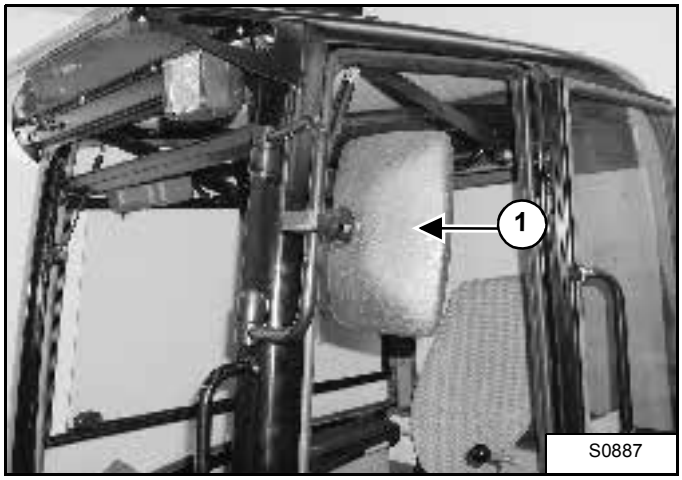
Note: The right armrest is shown. The procedure is the same for the left arm rest.

Figure 69



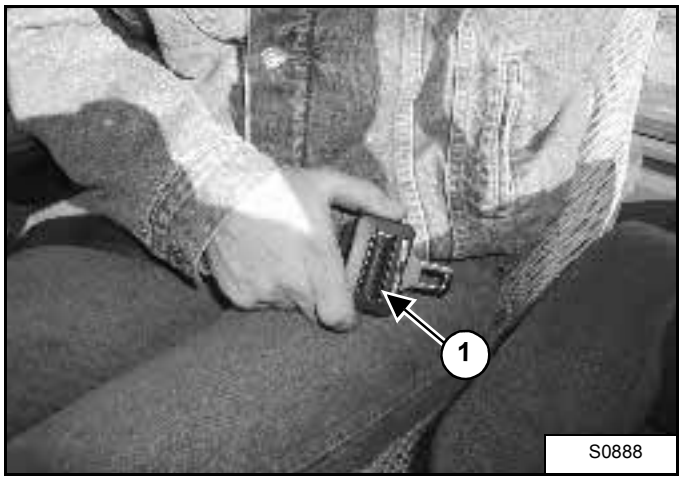
Reference	Description	Function
1	**Wheel**	Rotate the adjustment wheel to raise or lower the armrests.

Figure 70



Reference	Description	Function
1	**Mirror**	Adjust the mirror for a clear view to the rear of the Excavator from the operator's seat.

Figure 71



Reference	Description	Function
1	**Seat belt**	Fasten the seat belt.

Figure 72

Lower the control console **[Figure 72]**.

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 in the raised position. The console must be in the 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 the traction system when console is raised, see your Bobcat dealer for service.

Starting the engine

Key switch

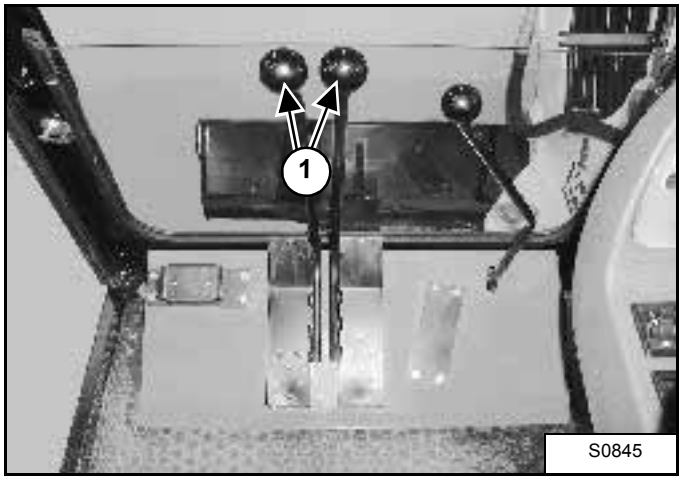
Perform the “Pre-starting procedure” on page 28.

WARNING

AVOID INJURY OR DEATH

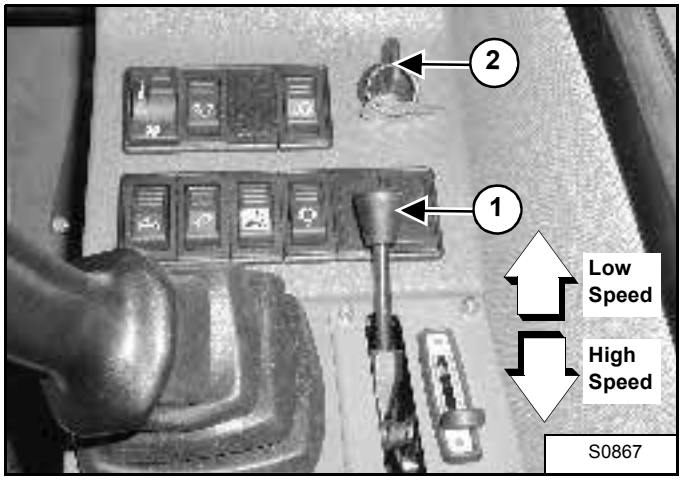
- **Fasten seat belt, start and operate only from the operator seat.**
- **Never wear loose clothing when working near machine.**

Figure 73



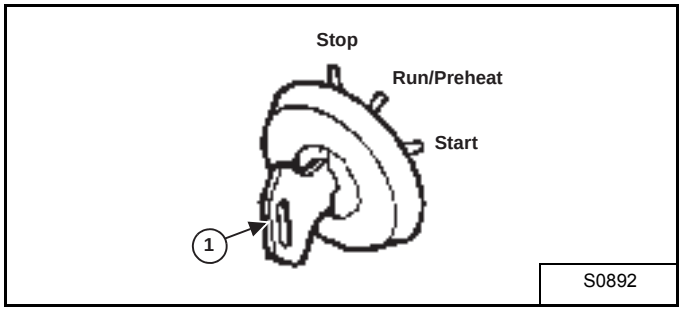
Reference	Description	Function
1	**Levers**	Put the control levers in the neutral position.

Figure 74



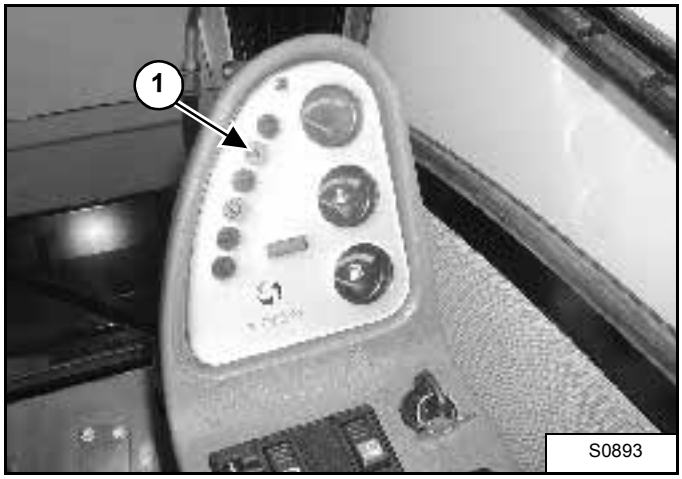
Reference	Description	Function
1	**Engine speed control**	Move the engine speed control fully forward to the low speed position.

Figure 75



Reference	Description	Function
1	**Key**	Turn the key (1) **[Figure 75]** to the RUN/PREHEAT position.

Figure 76



Reference	Description	Function
1	**Glow plug light**	The glow plug light will be illuminated, showing the glow plugs are on. Wait for the light to go off. When the glow plug light goes out, turn the key to the start position and release the key when the engine starts.The key will return to the run position. Stop the engine if the warning lights and alarm do not go off. Check for the cause before starting the engine again. Turn the key switch OFF to stop the engine.

IMPORTANT

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

Cold temperature starting procedure

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

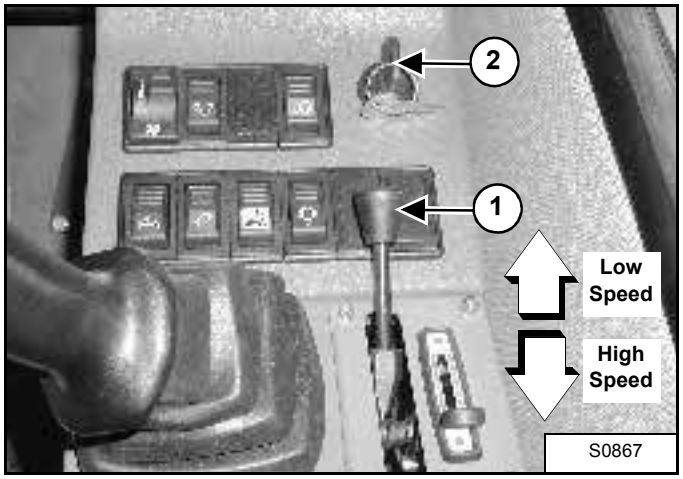
Replace the engine oil with the correct type and viscosity or the anticipated starting temperature. (“Fluid Specifications” on page 91.)

Make sure the battery if fully charged.

Note: If the battery is discharged (but not frozen) a booster battery can be used to jump start the Excavator. (“Using A Booster Battery (Jump Starting)” on page 60.)

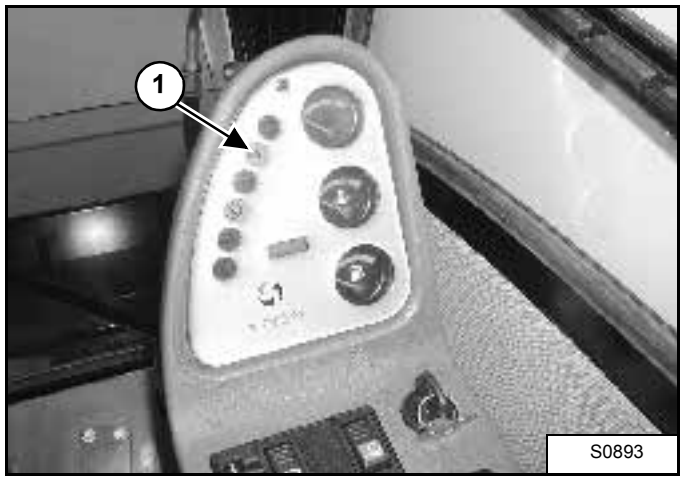
Install an engine heater.

Figure 77



Reference	Description	Function
1	**Speed control lever**	Move the speed control lever back to the high speed position.
2	**Key**	Turn the key to the RUN / PREHEAT position.

Figure 78



Reference	Description	Function
1	**Glow plug/manifold heat light**	The glow plug/manifold heat light will be illuminated showing the glow plugs are on. Wait for the light to go off. When the light goes out, turn the key to the start position and release the key when the engine starts. The key will return to the run position. When the engine speed increases, move the speed control lever to the low speed position until the engine warms up. 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.

IMPORTANT

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

IMPORTANT

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

Operating procedure

Rated Operating Capacity

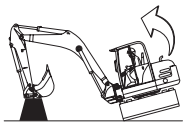
The capacity of the excavator changes as the boom/arm is raised or extended.
The Rated Operating Capacity table below (see also “Rated Operating Capacity” on page 86) shows the capacity of the machine at different load positions.

Figure 79

WARNING

OVERLOAD CAN TIP THE EXCAVATOR AND CAUSE INJURY OR DEATH

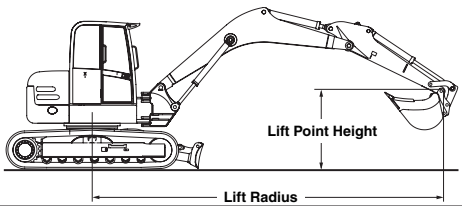
- Do not lift or hold any load that exceeds these ratings at their specified load radii and height.
- Total rated load is shown. The weight of all lifting devices must be deducted to determine the net load that can be lifted.



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

EXCAVATOR MODEL 444

CIRCUIT PRESSURES		BOOM LENGTH	3750 mm
WORKING	360 bar	ARM LENGTH	2000 mm
HOLDING	380 bar	RUBBER TRACKS	500 mm



LIFT POINT HEIGHT	RATED LIFT CAPACITY OVER BLADE, BLADE DOWN - kg				RATED LIFT CAPACITY OVER BLADE, BLADE UP - kg				RATED LIFT CAPACITY OVER SIDE, BLADE UP - kg			
	LIFT RADIUS - mm				LIFT RADIUS - mm				LIFT RADIUS - mm			
mm	3200	4000	5000	6000	3200	4000	5000	6000	3200	4000	5000	6000
3000	4800	3580	3020	2680	3150	3530	2320	2030	-	3280	2260	1690
1500	7190	5320	3900	3250	4660	3530	2600	1980	3830	2070	2070	1620
Ground	7300	5910	4530	2870	4700	3210	2410	1140	3920	2590	1950	1480
-500	6840	5370	4400	3690	4450	3260	2340	1770	3620	2610	1910	1500

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Operating on public roads

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

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

Lifting a load

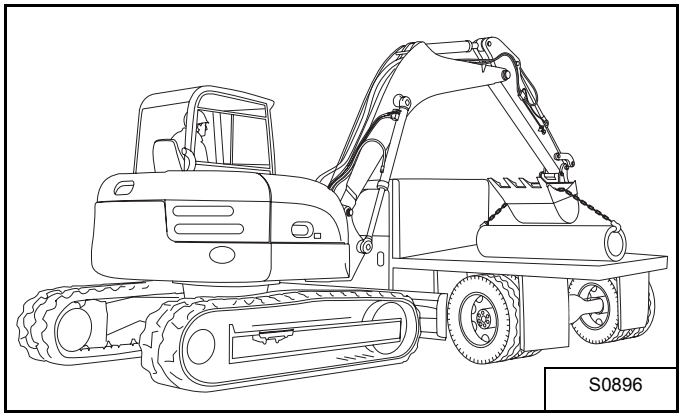
WARNING

AVOID INJURY OR DEATH

DO NOT exceed rated operating capacity. Excessive load can cause tipping or loss of control.

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 80



Make sure the load is evenly weighted and centered on the lifting chain, and is secured to prevent the load from shifting **[Figure 80]**.

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

WARNING

AVOID INJURY OR DEATH

Check area to be dug for overhead or underground lines such as electrical, gas, oil, water, etc. CALL1-888-258-0808 and consult local utilities before digging. Extreme caution must be used in areas where lines are present.

WARNING

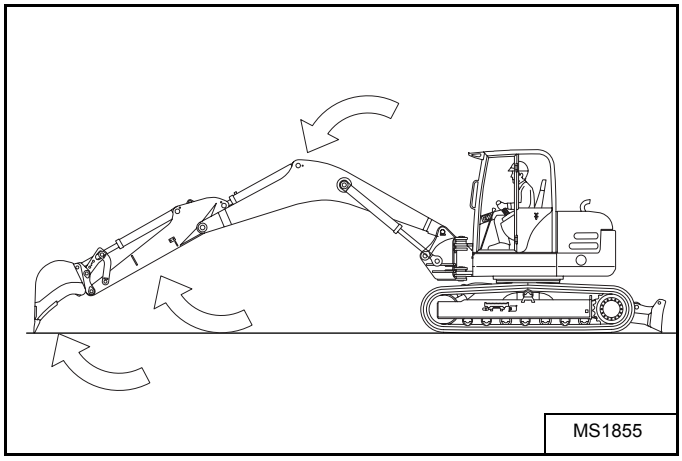
AVOID INJURY OR DEATH

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

Excavating

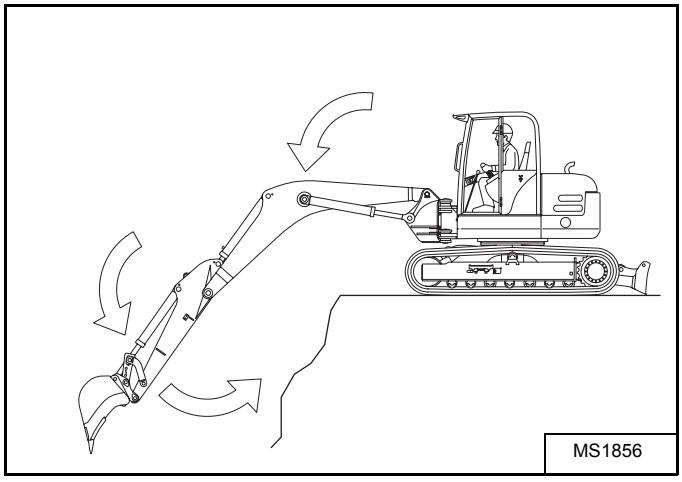
Lower the blade to provide stability.

Figure 81



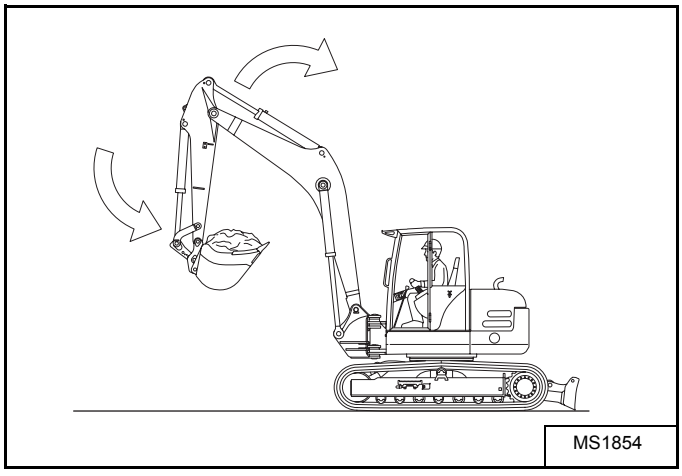
Extend the arm, lower the boom and open the bucket **[Figure 81]**.

Figure 82



Retract the arm, while lowering boom and curling the bucket **[Figure 82]**.

Figure 83

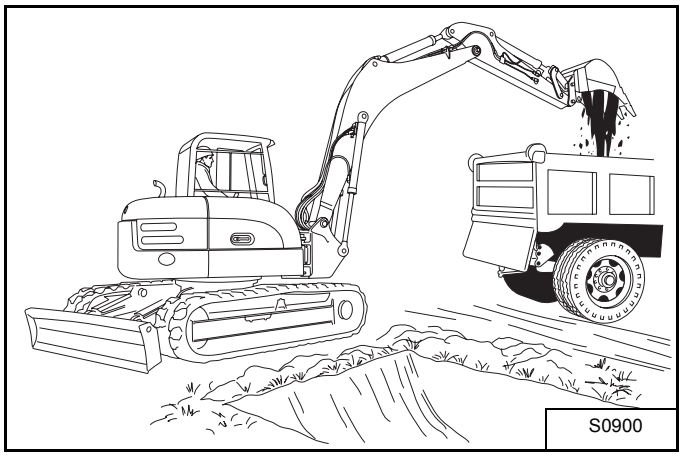


Raise the boom, retract the arm and curl the bucket **[Figure 83]**.

Rotate the upperstructure.

Note: Do not allow the bucket teeth to contact the ground when swinging the upperstructure.

Figure 84

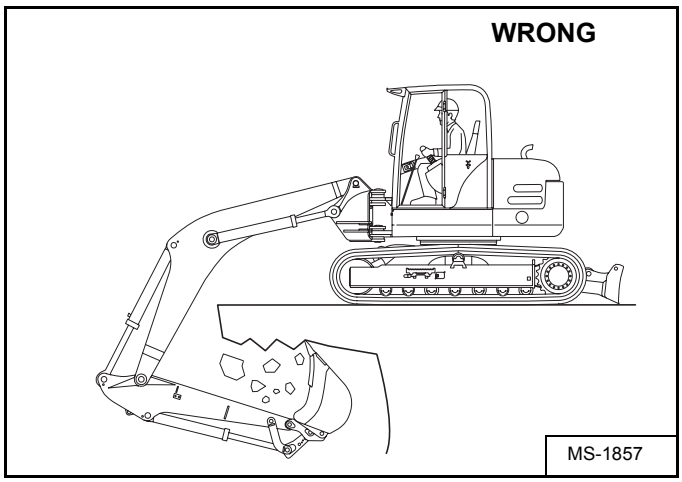


Extend the arm and uncurl the bucket to dump the material into a pile or truck **[Figure 84]**.

IMPORTANT

Avoid operating hydraulics over relief pressure. Failure to do so will overheat hydraulic components.

Figure 85



Do not dig under the Excavator **[Figure 85]**.

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 attachments may occur.

Boom offset

Figure 86

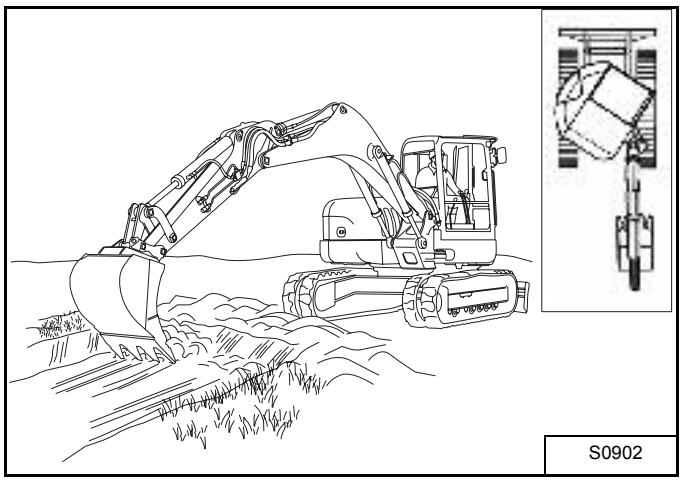


Figure 87

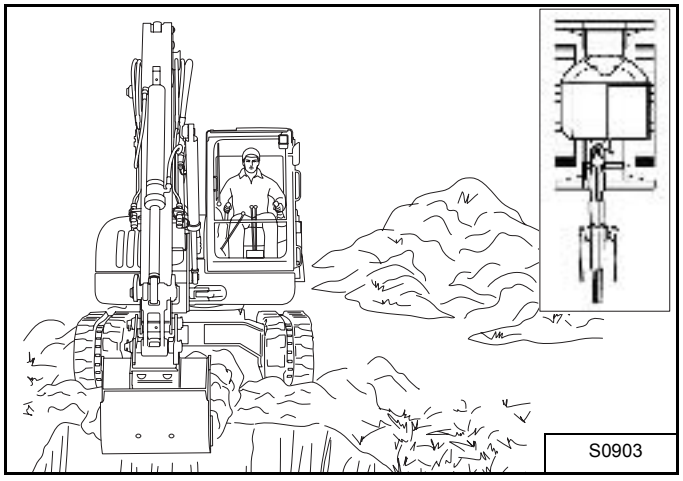
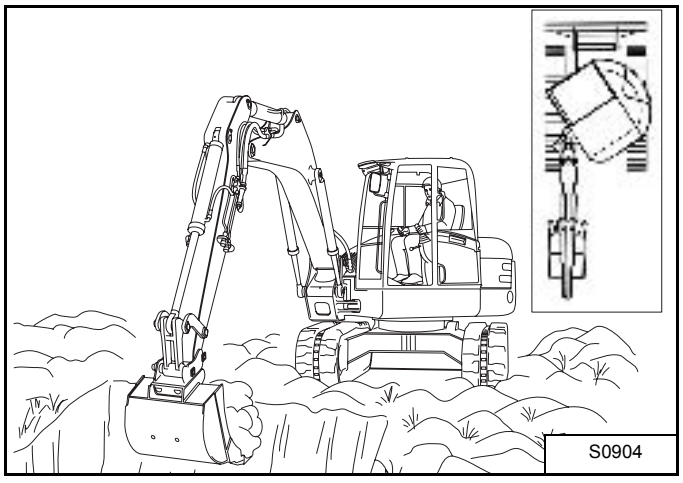
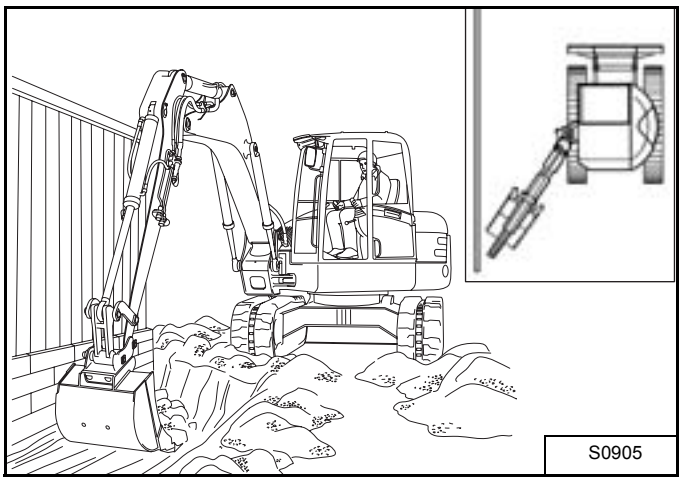


Figure 88



Swing the upperstructure, offset the boom to the right **[Figure 86]**, centre **[Figure 87]**, and left **[Figure 88]** to dig a square hole the width of the machine without repositioning the Excavator.

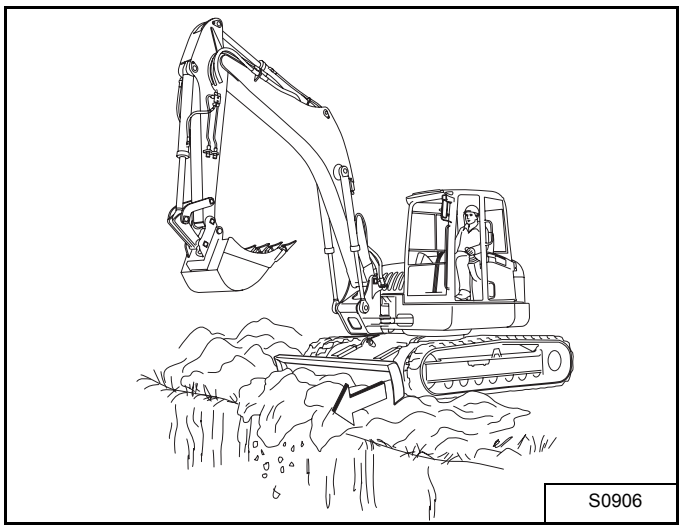
Figure 89



The boom offset allows the operator to dig close to buildings and other structures **[Figure 89]**.

Backfilling

Figure 90



Use the blade to backfill the trench or hole after excavating **[Figure 90]**.

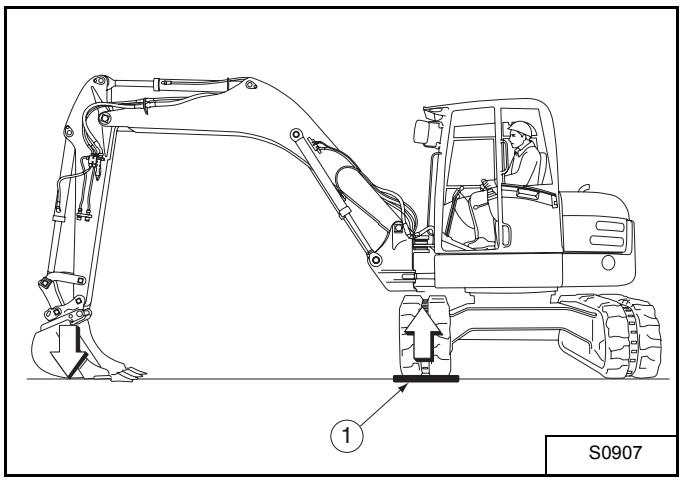
Driving the excavator

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

Avoid travelling 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.

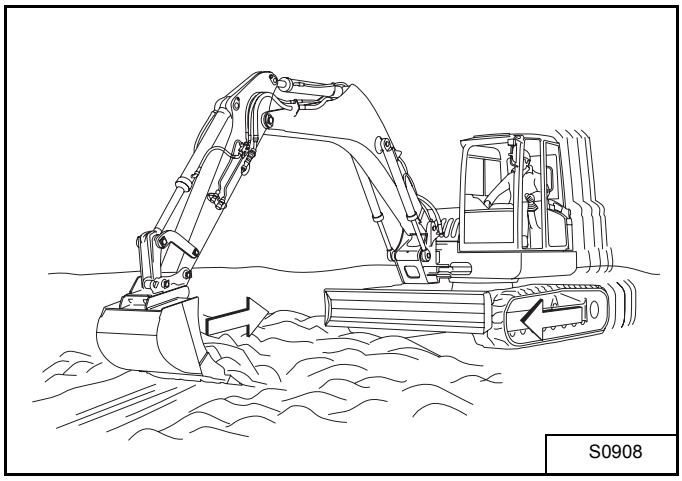
Figure 91



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 91]**.

Put planks under the tracks (1) **[Figure 91]** and drive the Excavator to dry ground.

Figure 92



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 91]**.

Operating on slopes

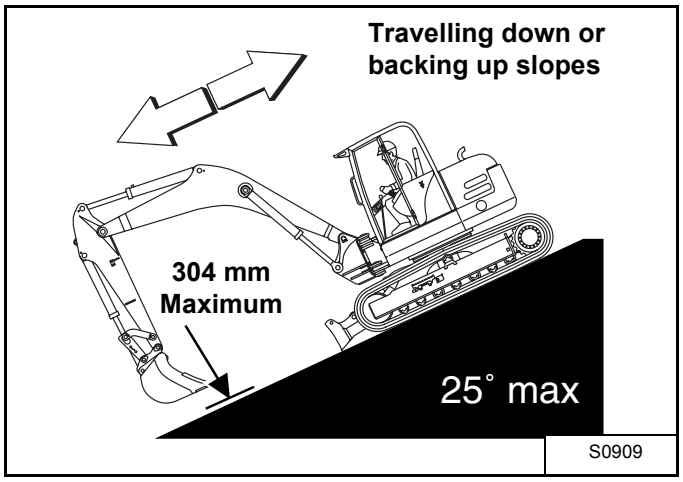
WARNING

AVOID INJURY OR DEATH

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

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

Figure 93



When going down grades that exceed 15 degrees, put the machine in the position shown, and run the engine slowly **[Figure 93]**.

Operate as slow 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 can result.

WARNING

AVOID INJURY OR DEATH

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

Figure 94

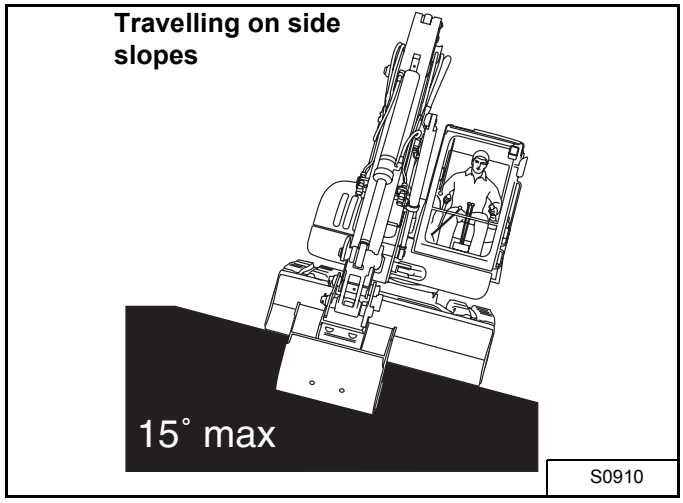
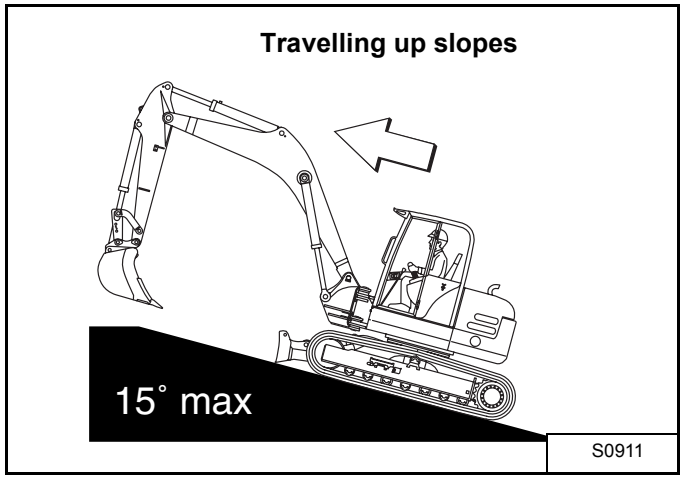


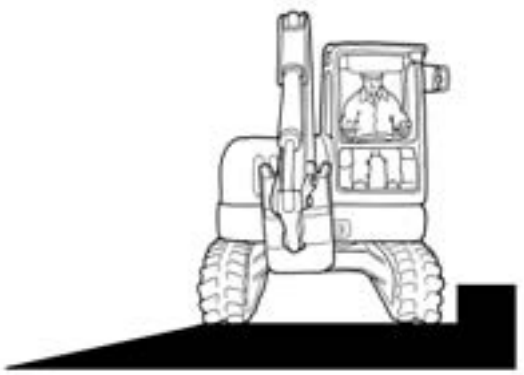
Figure 95



When travelling up slopes or on side slopes that are 15 degrees or less, position the machine as shown and run the engine slow **[Figure 94]** & **[Figure 95]**.

Figure 96

Recommended position for working on a slope



S0912

When operating on a slope, level a work area **[Figure 96]** before beginning.

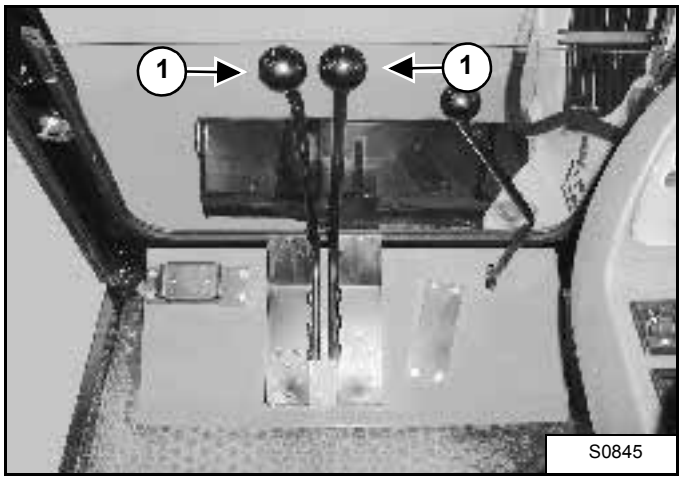
If this is not possible, the following procedures should be used:

Do not work on slopes which are over 15 degrees.

Use a slow work cycle. Avoid working with the tracks across the slope. This will reduce stability and increase the tendency for the machine to slide.Position the Excavator with the blade downhill and lowered. Avoid swinging or extending the bucket more than necessary in a down hill direction. When you must swing the bucket downhill, keep the arm low and skid the bucket downhill.

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

Figure 97



S0845

Reference	Description	Function
1	**Steering levers**	To brake the machine when going down a slope, move the steering levers 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.

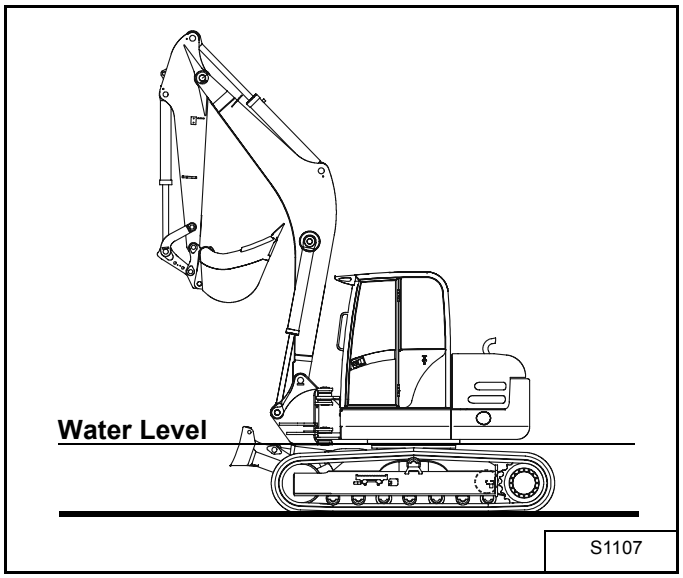
Note: If the engine stops, the boom/bucket (attachments) can be lowered to the ground using hydraulic pressure which is stored in the accumulator. The console must be in the down position, and the key switch in the ON position. Use the control lever to lower the boom.

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 98



Do not operate or immerse the Excavator in water higher than the bottom of the swing circle **[Figure 98]**.

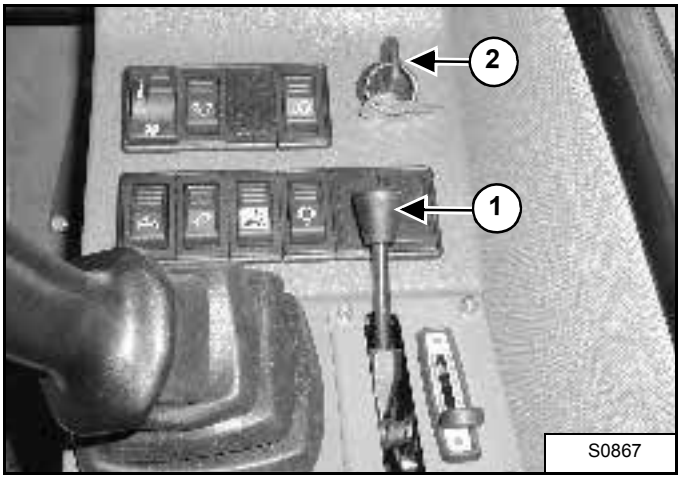
Grease the Excavator when it has been operated or immersed in water for a period of time. Greasing forces the water out of the lubrication areas.

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

Parking the excavator

Stop the machine on level ground. Lower the work equipment and the blade to the ground.Run the engine at idle speed for about 5 minutes to allow it to cool.

Figure 99



Reference	Description	Function
1	**Speed control lever**	Move the speed control lever fully forward to the low engine speed position.
2	**Key switch**	Turn the key switch to STOP.

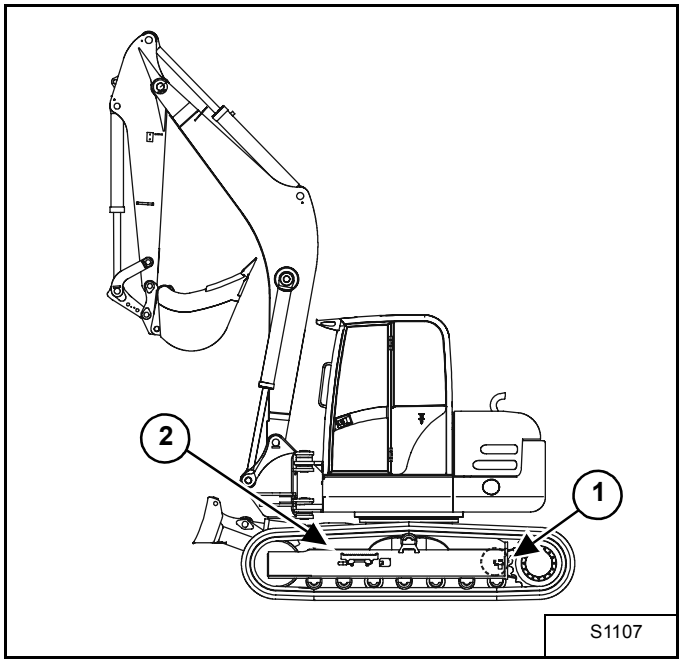
Disconnect the seat belt. Remove the key from the switch to prevent operation of machine by unauthorized personnel. Raise the control console and exit the machine.

Recovery and transport of the machine

Recovery of the machine

In order to recover the machine, the following tow fixing points are present:

Figure 100



Reference	Description
1	**Lugs on chassis (crawler frame, rear)**
2	**Towing hitch on chassis (crawler frame, front)**
3	**Towing lug - rear centre of chassis**

Lifting the machine

WARNING

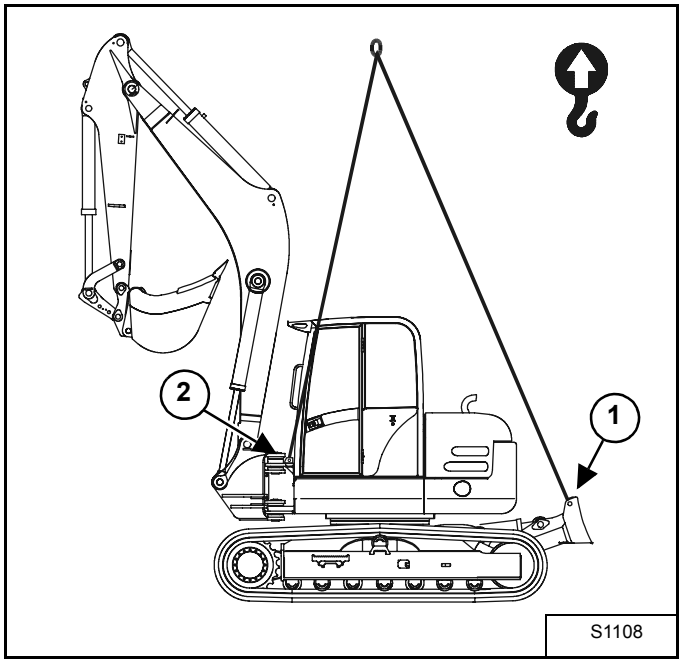
AVOID INJURY OR DEATH

- **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 upperstructure.**
- **Never lift with operator on machine.**

To load the excavator onto a flat bed trailer, etc., the following activities must be carried out:

- Empty and fold in the bucket.
- Position the work equipment straight ahead.
- Slew the uppercarriage in such a way that the work equipment is in “straight ahead” position, as opposed to the dozer blade.
- Completely raise the boom.
- Retract the dipperstick.
- Switch off the engine.
- Dismount from the excavator and close the doors.
- Attach the excavator to the 3-point hoisting appliance at the points illustrated (**[Figure 101]**) in the correct manner.

Figure 101



Reference	Description	Function
1	**Blade**	Fasten chains to the ends of the blade and up to a lifting fixture above the cab. The lifting fixture must extend over the sides of the cab to prevent the chains from hitting the cab.
2	**Towing eye**	Fasten a chain to the towing eye and up to a lifting fixture.

Transport of the machine

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).

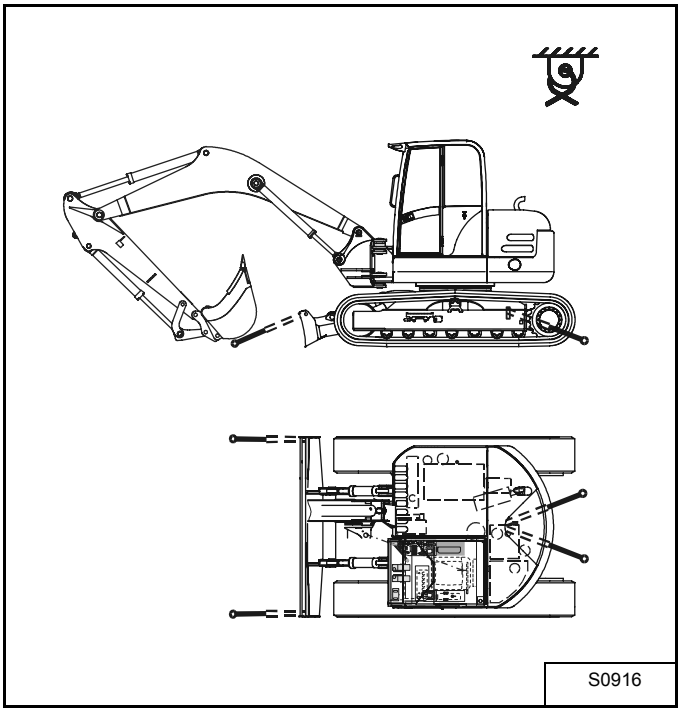
During transport on a flat bed trailer, by rail, etc., the machine must be properly lashed at the marked points and secured with chocks.
To do so, lower the dozer blade and rest the work equipment on the ground.

Put blocks at the front and rear of the tracks.

WARNING

Be aware of the total transport height!
Risk of accident when driving in tunnels, under bridges, etc.!

Figure 102



PREVENTIVE MAINTENANCE

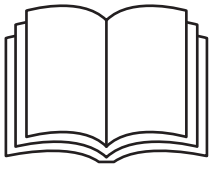
Table of contents

Maintenance safety

WARNING

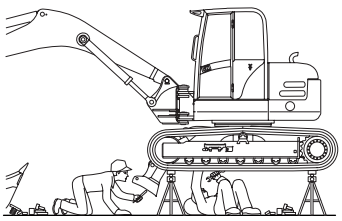
Instructions are necessary before operating or servicing machine. Read and understand the Operation & Maintenance Manual, Operator's Handbook and signs (decals) on machine. Follow warnings and instructions in the manuals when making repairs, adjustments or servicing. Check for correct function after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

Correct



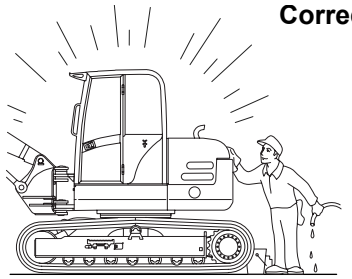
Never service the Bobcat Compact Excavator without instructions.

Correct



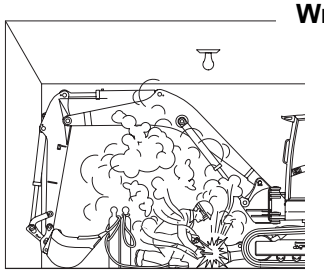
Use the correct procedure to lift and support the excavator.

Correct



Cleaning and maintenance are required daily.

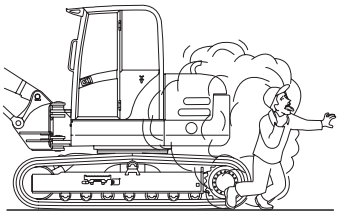
Wrong



Have good ventilation when welding or grinding painted parts.

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

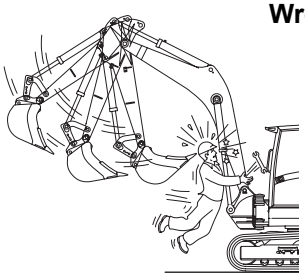
Wrong



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

Exhaust system must be tightly sealed. Exhaust fumes can kill without warning.

Wrong



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

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

Wrong

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

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

Avoid contact with leaking hydraulic fluid or diesel fuel under pressure. It can penetrate the skin or eyes.

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

Wrong

Keep body, jewelry and clothing away from moving parts, electrical contact, hot parts and exhaust.

Wear eye protection to guard from battery acid, compressed springs, fluids under pressure and flying debris when engines are running or tools are used. Use eye protections approved for type of welding.

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

Wrong

Lead-acid batteries produce flammable and explosive gases.

Keep arcs, sparks, flames and lighted tobacco away from batteries.

Batteries contain acid which burns eyes or skin on contact.

Wear protective clothing. If acid contacts body, flush well with water. For eye contact flush well and get immediate medical attention.

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

Servicing schedule

Chart

Maintenance work must be done at regular intervals. Failure to do so will result in excessive wear and early failures. The servicing 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, Handbook and signs (stickers) 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 may cause injury or death.

SERVICING 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 and Reservoir Breather Cap	Check the hydraulic fluid level and add as needed. Check for damage and leaks. Repair or replace as needed.						
Tracks Tension	Check and adjust track tension as needed.						
Indicators and Lights	Check for correct operation of all indicators and lights.						
Operator Canopy/Cab	Check cab/canopy condition and hardware.						
Seat Belt	Check condition. Check mounting fixings.						
Safety Signs and Safety Treads	Check for damaged signs (stickers) and safety treads. Replace any signs or safety treads that are damaged or worn.						
Pivot Points	Grease all machinery pivot points.						
Fuel Tank & Filter	Drain water and sediment from fuel tank and fuel filter.						
Control Console	Check control console lockout for proper operation.						
Swing Circle & Pinion	Grease swing circle and swing pinion.						
Door Hinges	Grease door hinges.						
Battery	Check battery, cables, connections and electrolyte level. Add distilled water as needed.						
Belts	Check and adjust bolts.		(*)				
Travel Motor	Check lubricant level in both travel motors.						
Hydraulic Oil Cooler, *Engine Oil Cooler, *Radiator, A/C Condenser and Cab Ventilation Filter	Clean radiator/oil cooler fins. Clean A/C condenser. Clean/replace cab filter.			(**)			
Hydraulic Filter	Replace the filter.			(**)			
Engine Oil & Filter	Replace engine oil and filter.			(**)			
Air Filter Intake	Check/clean air filter intake						
Alternator & Starter	Check alternator and starter connections.						
Fuel Filters	Replace diesel fuel pre-filter and filter.						
Engine Valves	Check and adjust engine valve clearance.						
Travel Motors	Replace oil in both travel motors.			(**)			
Engine Cooling System	Drain and flush cooling system. Replace coolant. (Watercooled engines only.)						
Hydraulic System	Replace hydraulic fluid and filter. Clean reservoir.						

(*) Also at first 50 hours
(**) Also at first 100 Hours
(***) Or every 6 months.

Rear cover

Opening and closing the rear cover

WARNING

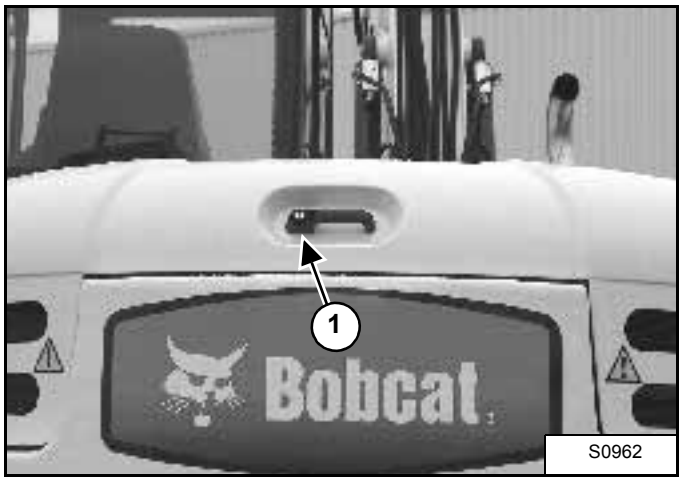
AVOID INJURY OR DEATH

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

WARNING

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

Figure 103



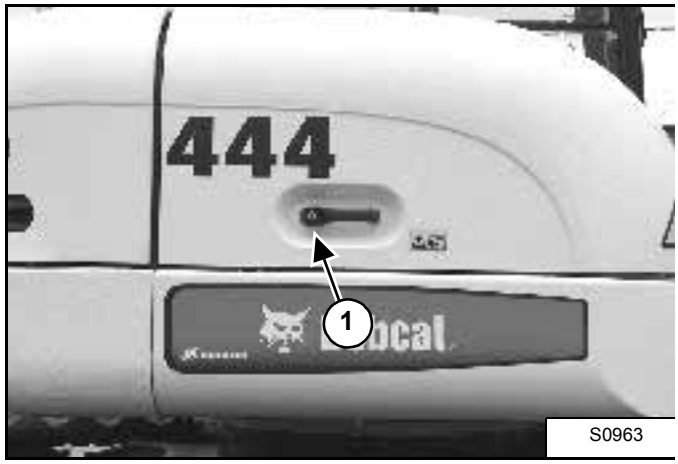
1. Push the latch (1) and raise the rear cover.
2. Lower the rear cover and push down firmly to close the rear cover.

Note: The start key can be used to lock the rear cover.

Right side cover

Opening And Closing The Right Side Cover

Figure 104



1. Push the latch (1) and raise the right side cover.
2. Lower the right side cover and push down firmly to close the rear cover.

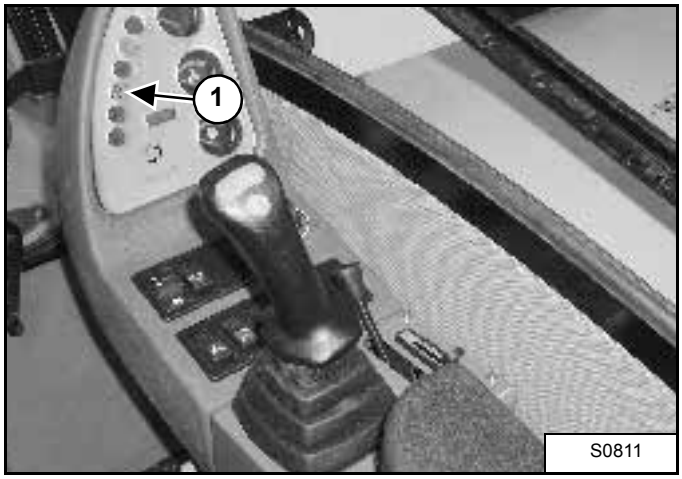
Note: The start key can be used to lock the right side cover.

Air cleaner

Daily check

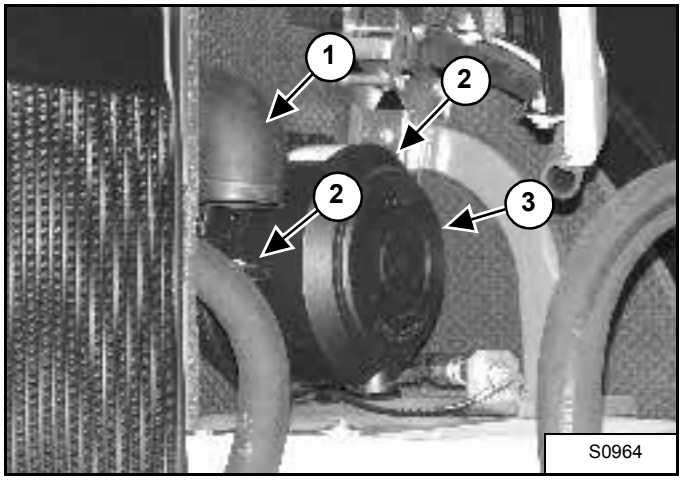
See (“Servicing schedule” on page 46 for the correct service interval.)

Figure 105



Reference	Description	Function
1	**Air filter condition indicator**	If the air filter condition indicator is illuminated, the outer filter element needs to be replaced. Replace the inner filter every third time the outer filter is replaced.

Figure 106



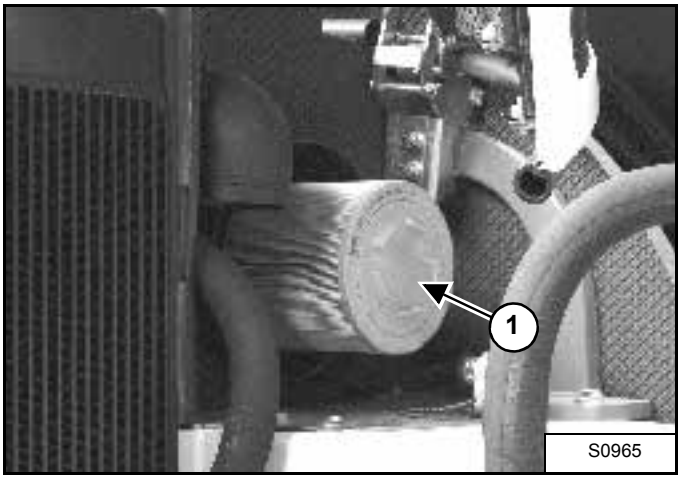
1. Open the right side cover to inspect the air intake (1) for damage or restrictions.

Replacing the filters

Outer filter

2. Unlatch the air filter cover latches (2) **[Figure 106]**.
3. Remove the air filter cover (2) **[Figure 106]**.

Figure 107



4. Remove the outer filter (1).
5. Check the housing for damage.
6. Clean the housing and seal surface. Do not use compressed air.
7. Install the outer filter.
8. Install the cover.

Inner Filter

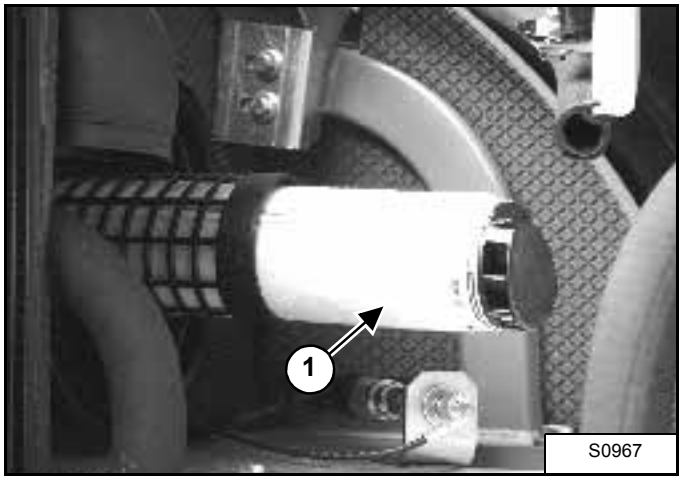
Replace the inner filter every third time the outer filter has been replaced.

Replace the inner filter after the outer filter has been replaced and the air filter indicator is still illuminated.

Remove the air cleaner cover and outer filter.

1. Pry up on the ends of the air filter (1).
2. Pull the air filter (2) out of the housing.
3. Discard the inner air filter after it has been removed.
4. Do not clean or reuse the filter. Make sure all sealing surfaces are free of dirt and debris.

Figure 108



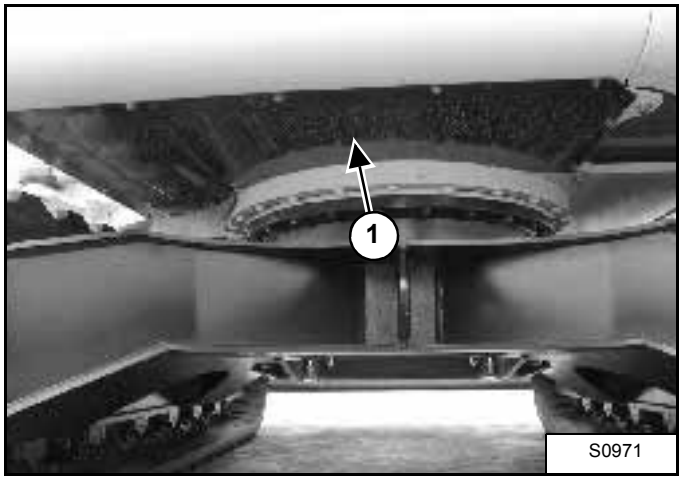
5. Install the new inner filter (1). Install the, outer filter and air cleaner cover.

Fresh Air Filter

Figure 109

Position the Excavator as shown **[Figure 109]**.

Figure 110

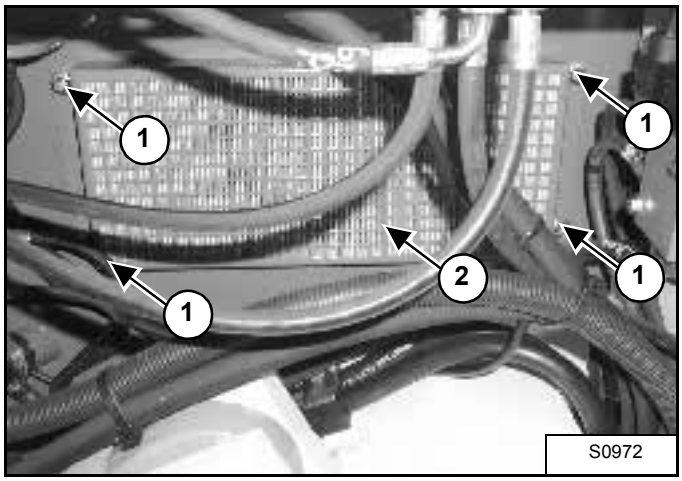


1. Remove the eleven bolts and washers of the cover plate (1) **[Figure 110]**.

Installation*: Tighten the bolts to 24-26 Nm torque.*

2. Remove the cover (1).

Figure 111



3. Remove the four bolts (1).
4. Remove the filter (2).

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. (°C)	No. 2	No. 1
-9°C 5+(15°)	100%	0%
Down to -29°C (-20°C)	50%	50%
Below -29°C (-20°C)	0%	100%

Note: See your fuel supplier for local recommendations.

WARNING

Stop and cool the engine before refuelling. NO SMOKING! Failure to obey warnings may cause an explosion or fire.

WARNING

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

Filling the fuel tank

1. Open the rear cover and remove the fuel fill cap

Note: The fuel fill cap can be locked. Use the fuel fillcap key to lock and unlock the cap.

Figure 112

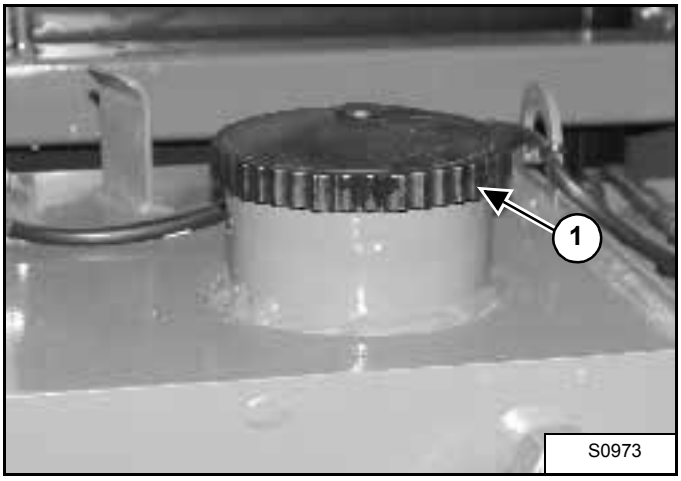
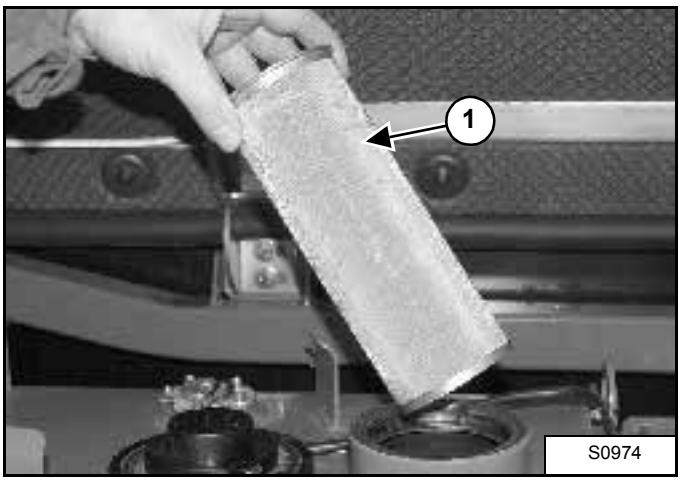


Figure 113



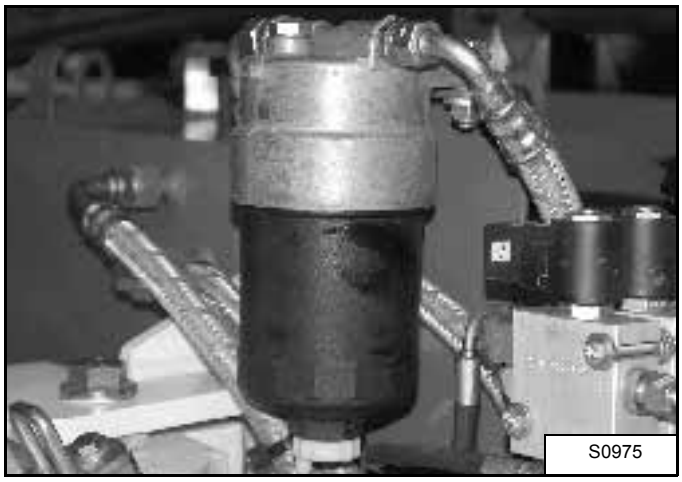
2. Check the condition of the fill strainer screen (1). Clean or replace as necessary.
3. Use a clean, approved safety container to add fuel. Refuel only in an area that has a free movement of air and no flames or sparks. **NO SMOKING!**
4. Install and tighten the fuel fill cap.
5. Close the tailgate.

Note: See “Servicing schedule” on page 46 for the correct service interval when to remove water from or replace the fuel filter.

Removing Water From The Pre-Filter

1. Open the tailgate.
2. Loosen the drain (1) at the bottom of the filter to drain water from the filter.

Figure 114



WARNING

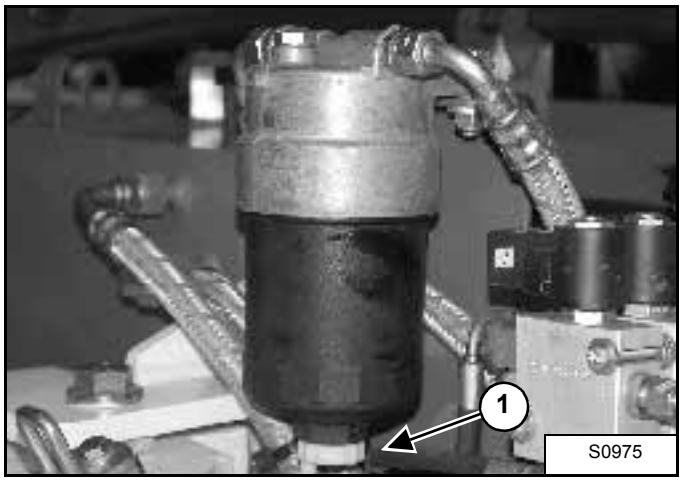
Always clean up spilled fuel or oil. Keep heat, flames, sparks or lighted tobacco away from fuel and oil. Failure to use care around combustibles can cause explosion or fire which can result in injury or death.

Pre-Filter Removal

Note: See Service Schedule for the service interval when to replace the fuel pre-filter. (See “Servicing schedule” on page 46.)

Clean the area around the fuel pre-filter housing.

Figure 115

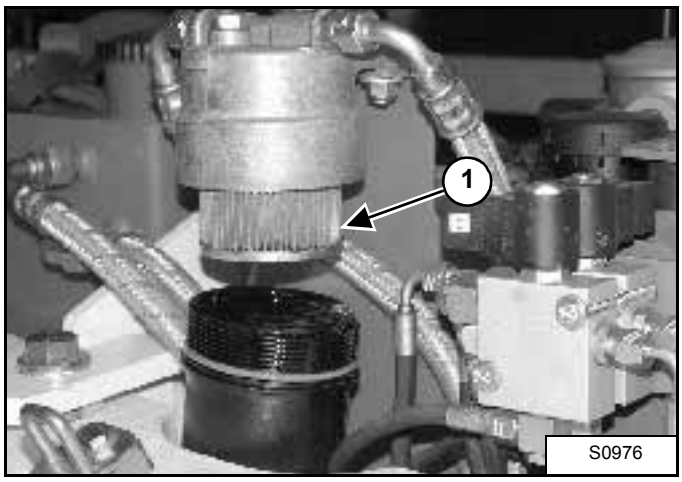


1. Loosen the drain (1) at the bottom of the filter housing and drain the fuel out of the housing.

WARNING

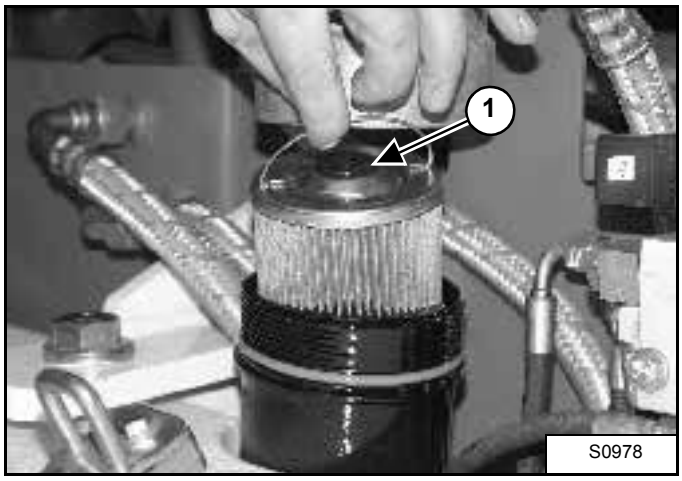
Diesel fuel or hydraulic fluid under pressure can penetrate skin or eyes, causing serious injury or death. Fluid leaks under pressure may not be visible. Use a piece of cardboard or wood to find leaks. Donot use your bare hand. Wear safety goggles. If fluid enters skin or eyes, get immediate medical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

Figure 116



2. Unscrew the filter housing (1).

Figure 117

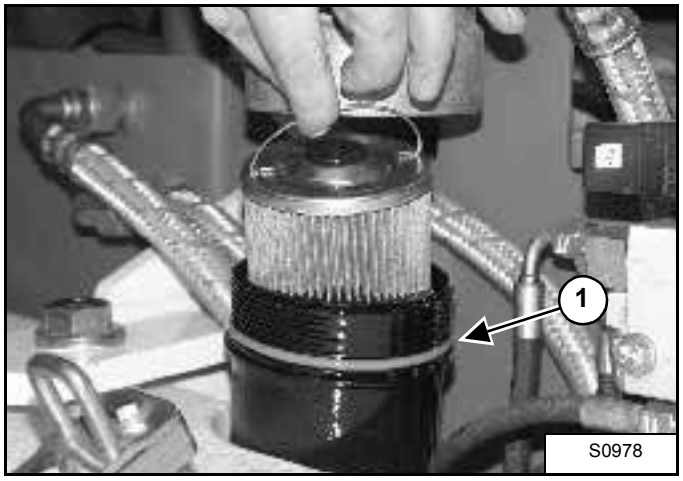


3. Remove the filter (1) from the filter housing.

Pre-Filter Installation

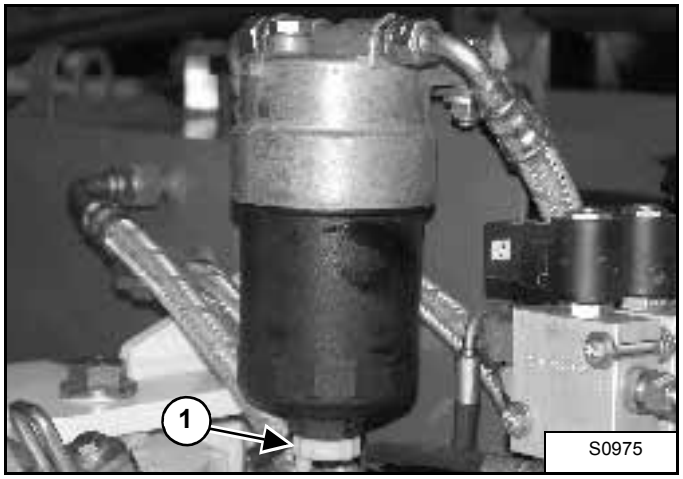
1. Clean the filter housing in clean solvent and dry with compressed air.
2. Check the condition of the O-ring (1) **[Figure 118]** and replace if required.

Figure 118



3. Install the filter in the housing **[Figure 118]**.

Figure 119

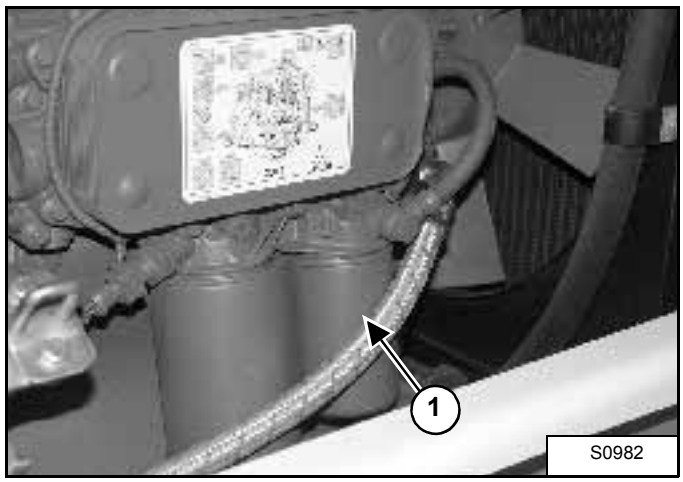


4. Close the drain (1) on the bottom of the filter housing.

Fuel Filter Removal And Installation

Note: See Service Schedule for the service interval when to replace the fuel filter. (See “Servicing schedule” on page 46.)

Figure 120



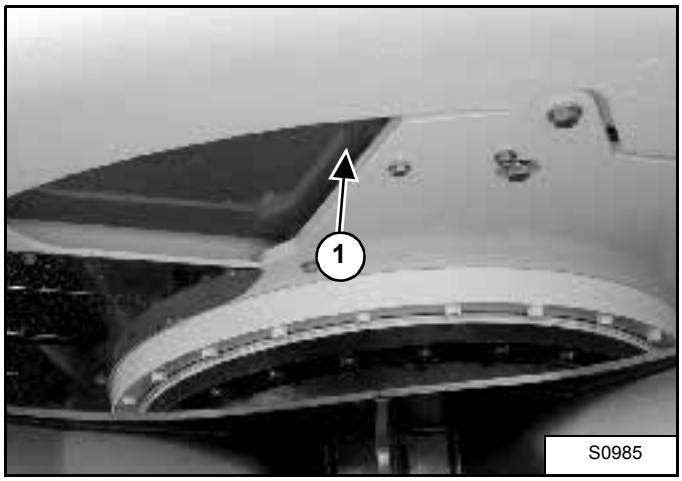
1. Remove the filter (1).
2. Put clean oil on the seal of the new filter.
3. Install the filter and hand tighten.

Draining The Fuel Tank

Figure 121

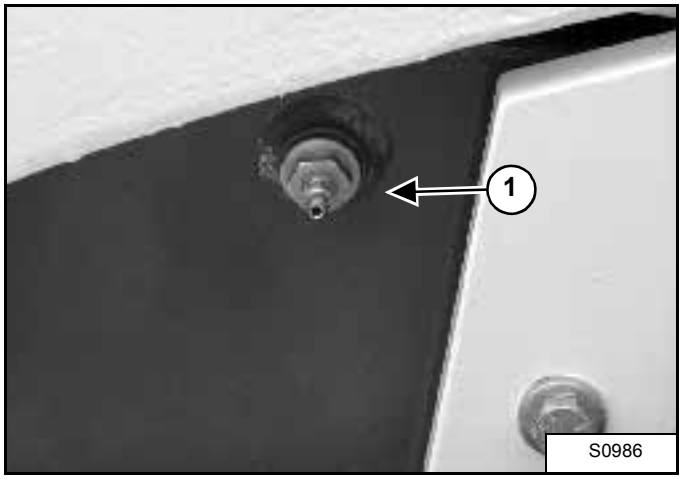
Position the Excavator as shown **[Figure 121]**.

Figure 122



1. Remove the cap (1) from the drain.

Figure 123



2. Open the drain (1) and drain the fuel into a container.

WARNING

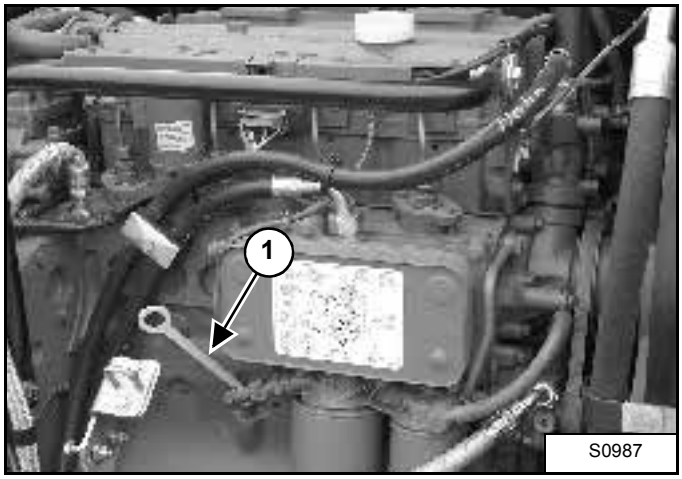
Always clean up spilled fuel or oil. Keep heat, flames, sparks or lighted tobacco away from fuel and oil. Failure to use care around combustibles can cause explosion or fire which can result in injury or death.

Engine lubrication system

Checking engine oil

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

Figure 124

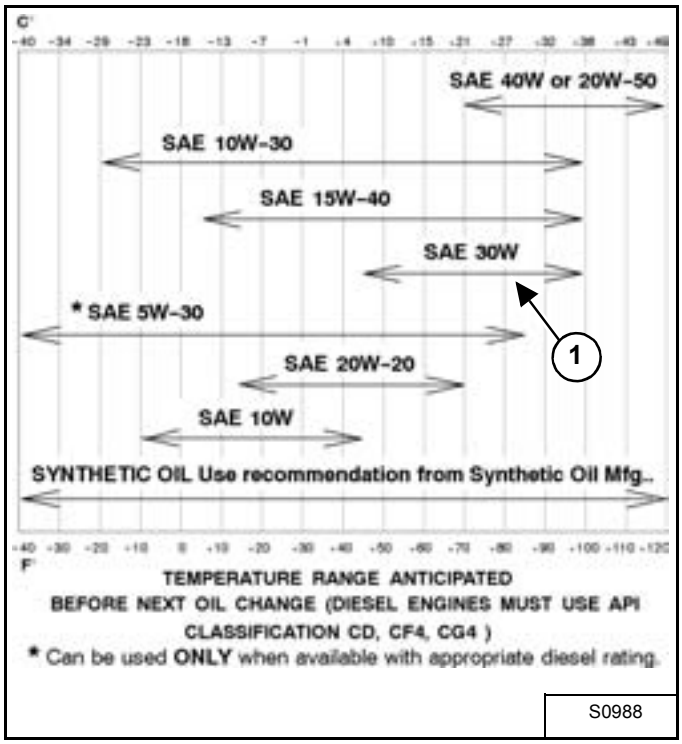


2. Open the right side cover and remove the dipstick (1).

3. Keep the oil level between the marks on the dipstick.

Oil Chart

Figure 125



Use a good quality motor oil that meets the correct API Service Classification. See oil chart **[Figure 125]**.

Replacing Oil And Filter

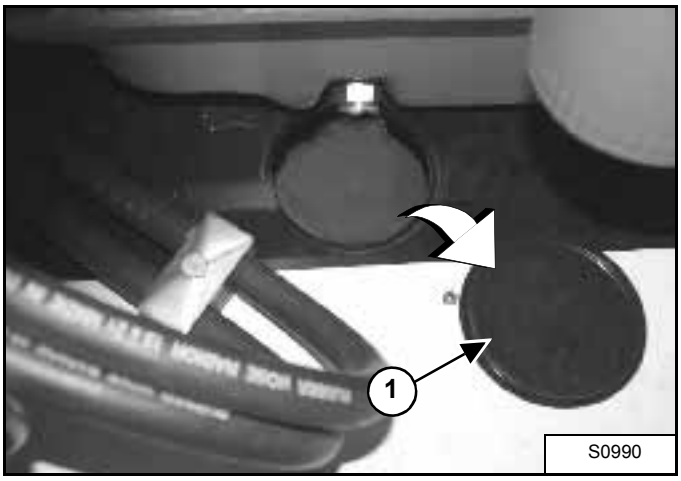
Note: See Service Schedule for the service interval for replacing the engine oil and filter. (See “Servicing schedule” on page 46.)

Figure 126

Rotate the upperstructure so the right side is positioned between the tracks **[Figure 126]**. Run the engine until it is at operating temperature. Stop the engine.

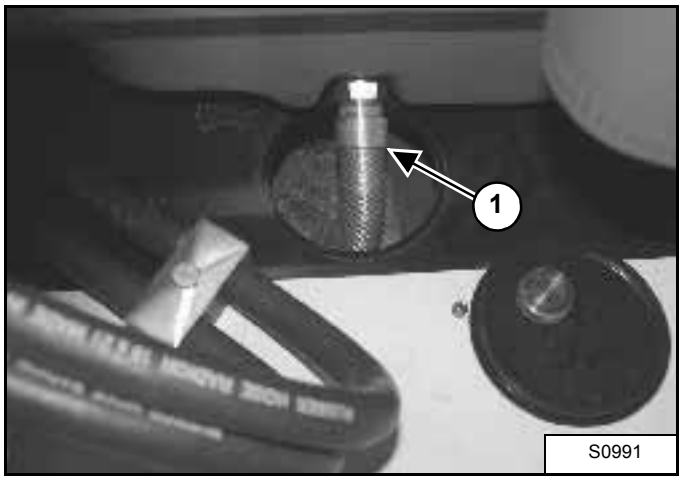
Open the right side cover.

Figure 127



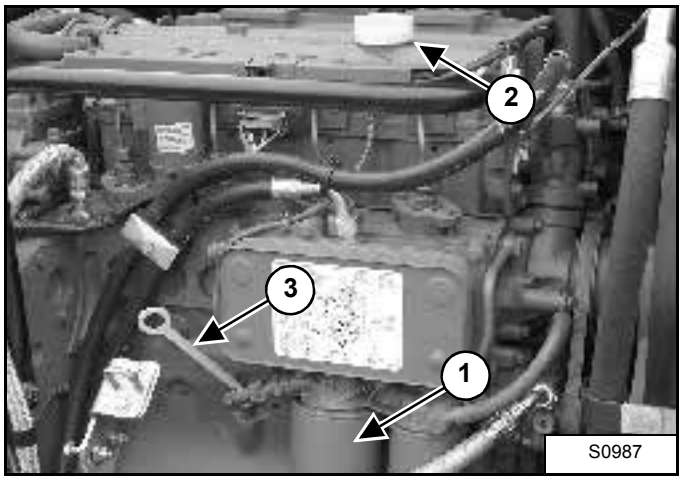
1. Remove the cap (1).

Figure 128



1. Install the drain hose (1) on the oil pan.
2. Tighten the hose until oil starts to drain from the oil pan.
3. Drain the oil in a container.
4. Recycle or dispose of used oil in an environmentally safe manner.

Figure 129



5. Remove the oil filter (1) and clean the filter housing surface.
6. Use a genuine Bobcat replacement oil filter.
7. Put clean engine oil on the filter gasket. Install the filter and hand tighten.
8. Remove the drain hose and install the cap on the oil pan after the oil has been completely drained.
9. Remove the fill cap (2).
10. Put oil in the engine. (See Fluid Specifications on p. 91)
11. Install the fill cap.
12. Start the engine and let it run for several minutes. Stop the engine. Check for leaks at the oil filter. Check the oil level on the dipstick (3).
13. Add oil as needed if it is not at the top mark on the dipstick.

Cooling system

Cleaning The Cooling System

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

Open the right side cover.

Use air pressure or water pressure to clean the radiator/oil cooler. Be careful not to damage the fins when cleaning.

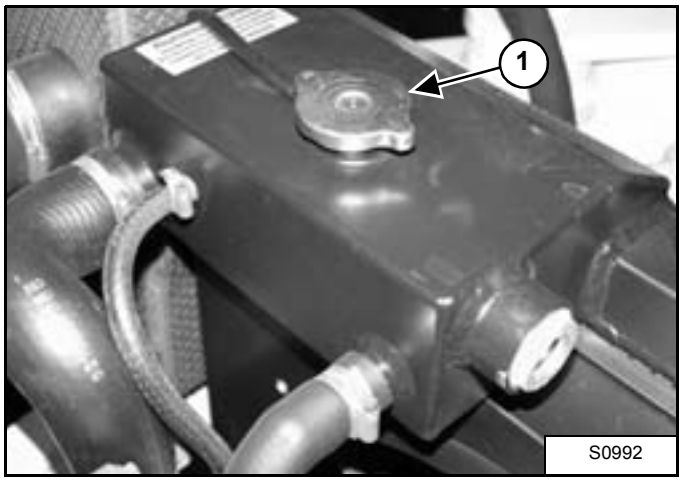
Checking Coolant Level

WARNING

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

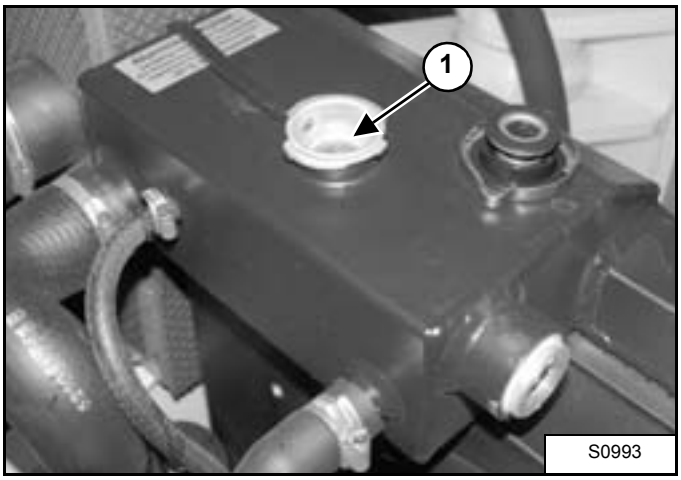
Open the right side cover.

Figure 130



1. Check the coolant level in the surge tank (1).

Figure 131



2. The surge tank (1) must be half full when the engine is cold.

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.

WARNING

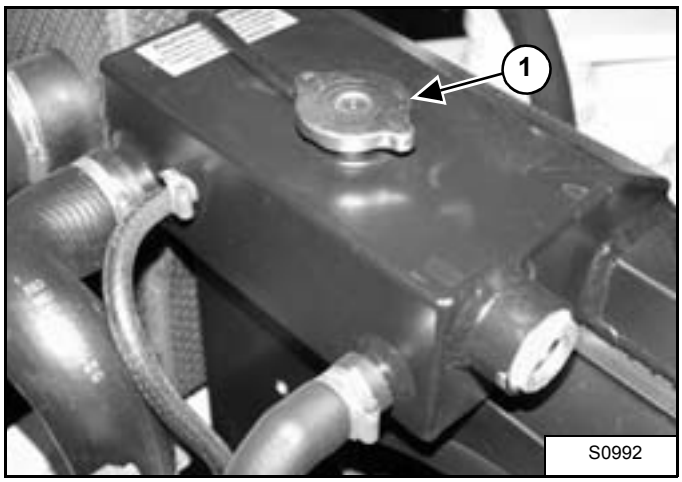
Wear safety glasses to prevent eye injury when any of the following conditions exist:

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

Replacing The Coolant

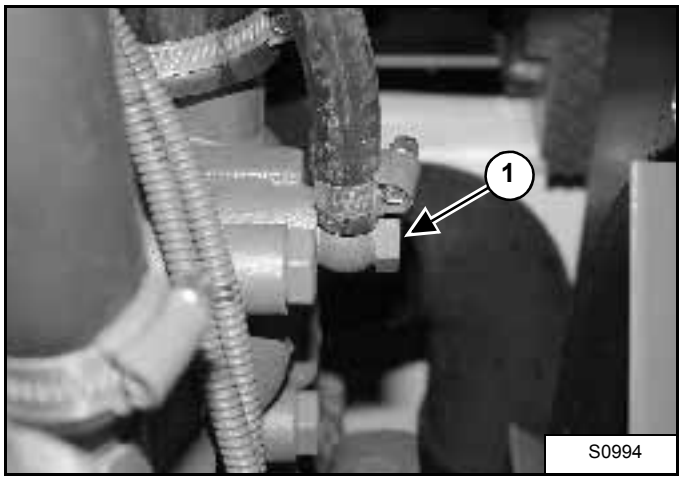
Note: See Service Schedule for the correct service interval to replace the coolant. (See “Servicing schedule” on page 46.)

Figure 132



1. When the engine is cool, loosen and remove the radiatorcap (1).

Figure 133

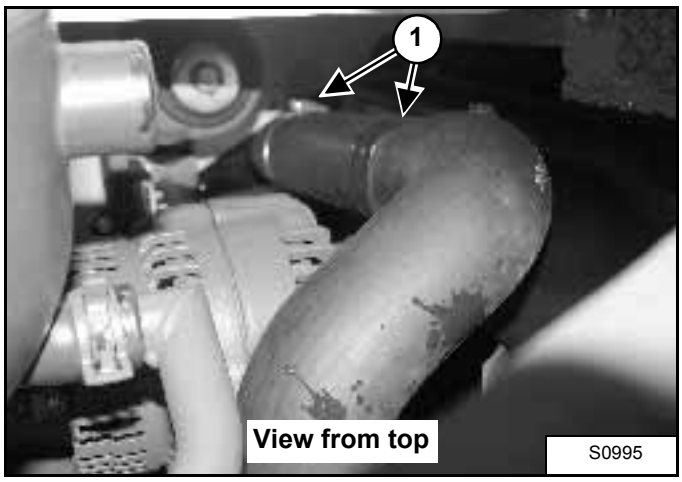


2. Remove the plug (1) from the back side of the engine block.

Note: The plug is located next to the alternator mount bracket.

Drain the coolant from the engine.

Figure 134



3. Remove the lower radiator hose (1).
4. Drain the coolant from the engine.
5. After the coolant is removed, install the plug (1) and lower radiator hose (1).
6. Recycle or dispose of the used coolant in an environmentally safe manner.
7. Mix the coolant in a separate container.

Note: The Excavator is factory filled with ethylene glycol coolant.

8. Add premixed coolant, 50% water and 50% ethylene glycol to the reservoir if the coolant level is low.
9. 3,8 L of ethylene glycol mixed with 3,8 L of water is the correct mixture of coolant to provide a -37°C (-34°F) freeze protection.
10. Use a refractometer to check the condition of ethylene glycol in your cooling system.
11. Fill the radiator with the premixed coolant. Install the radiator cap.
12. Run the engine until it is at operating temperature.
13. Stop the engine.
14. Check the coolant level (COLD) in the surge tank when cool.
15. Add coolant to the tank as needed.

Electrical system

Description

The Excavator has a 12 volt, negative ground electricalsystem. The electrical system is protected by fuses located in the right console and beside the battery **[Figure 135]** & **[Figure 136]**. 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.

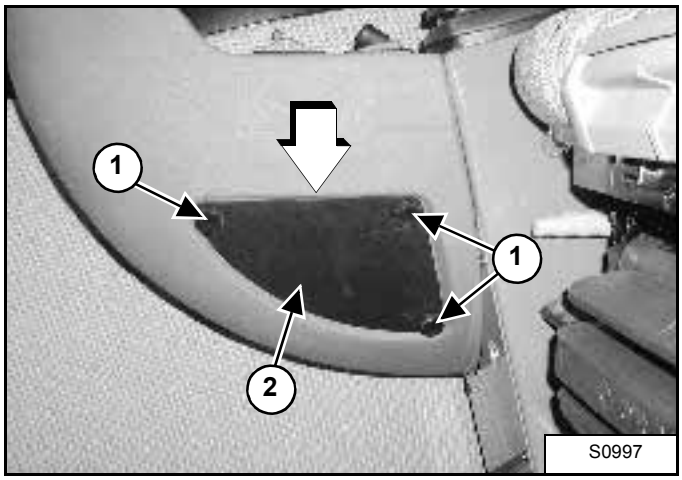
The battery cables must be clean and tight. Check the electrolyte level in the battery. Add distilled water as needed. Remove acid or corrosion from the battery and cables with a sodium bicarbonate and water solution.

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

WARNING

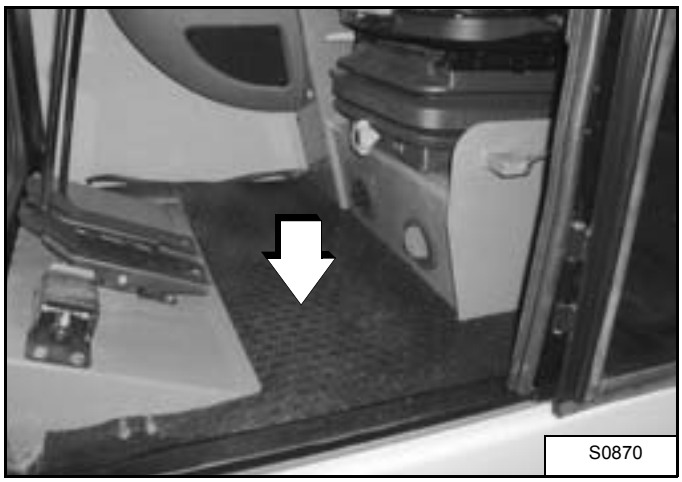
Batteries contain acid which burns eyes and skin on contact. Wear goggles, protective clothing and rubber gloves to keep acid off body. In case of acid contact, wash immediately with water. In case of eye contact get prompt medical attention and wash eye with clean, cool water for at least 15 minutes. If electrolyte is taken internally drink large quantities of water or milk! DO NOT induce vomiting. Get prompt medical attention.

Figure 135



1. To check or replace the fuses in the right console, remove the three screws (1).
2. Remove the cover (2).

Figure 136



Fuse And Relay Location

Figure 137

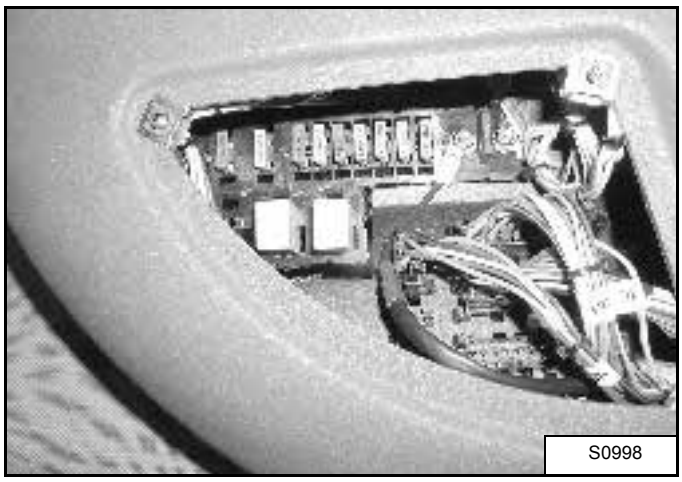
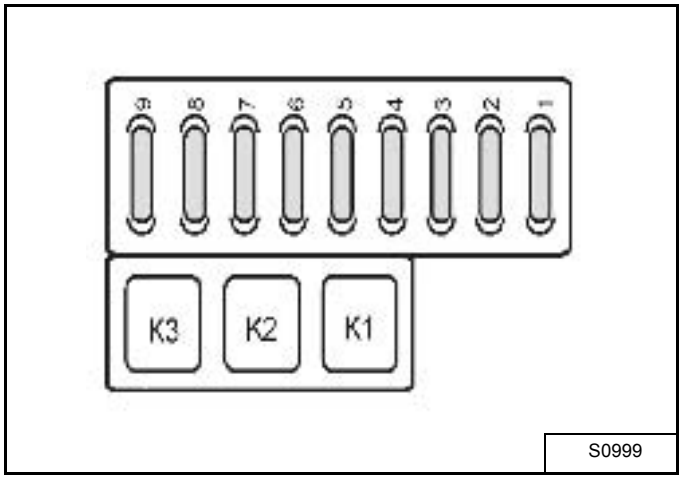


Figure 138

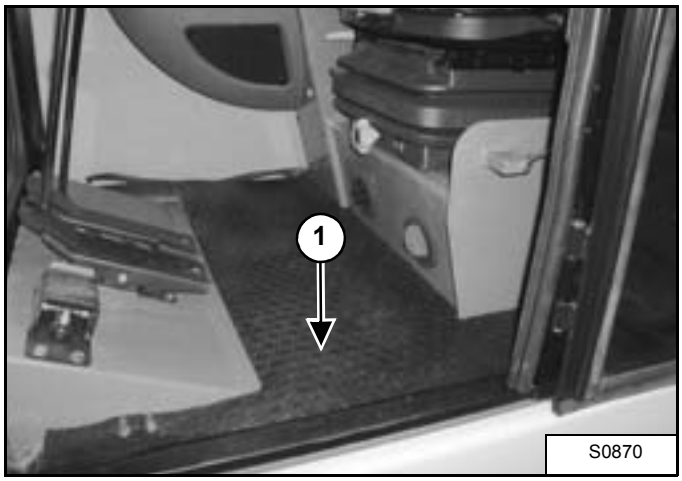


The location and sizes are shown below and **[Figure 137]** & **[Figure 138]**.

Reference	Description	Amperage
1	Interior light, radio	5
2	Auxiliary power outle	20
3	Front lights	15
4	Rear work lights	15
5	Horn	10
6	Heater fan motor	15
7	Wiper/Washer	10
8	Control module signal input	5
9	Optional work lights and heating	
K1	Front work lights	relay
K2	Rear work light	relay
K3	Air Conditioner	relay

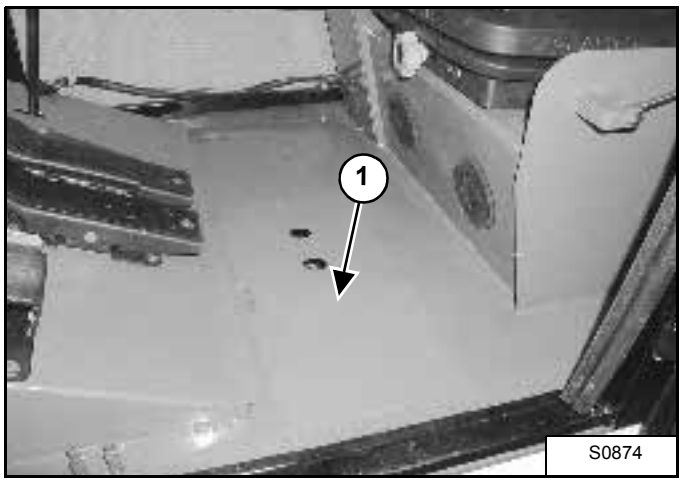
Always replace fuses with the same type and capacity.

Figure 139



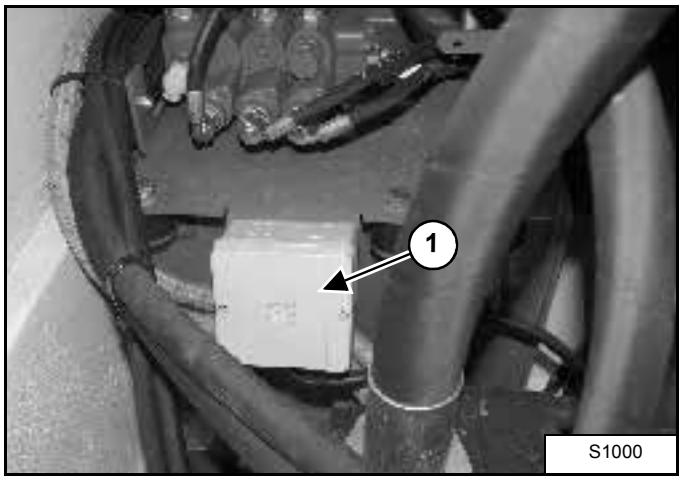
1. To check or replace fuses beside the battery, pull up on and remove the floor mat (1).

Figure 140



2. Remove the battery compartment cover (1).

Figure 141



1. Remove the cover (1) for access to the fuses.

Reference	Description	Amperage
1 (FA)	Main fuse	30
2 (FB)	Pre-Heat	60
3 (KO1)	Pre-Heat	relay

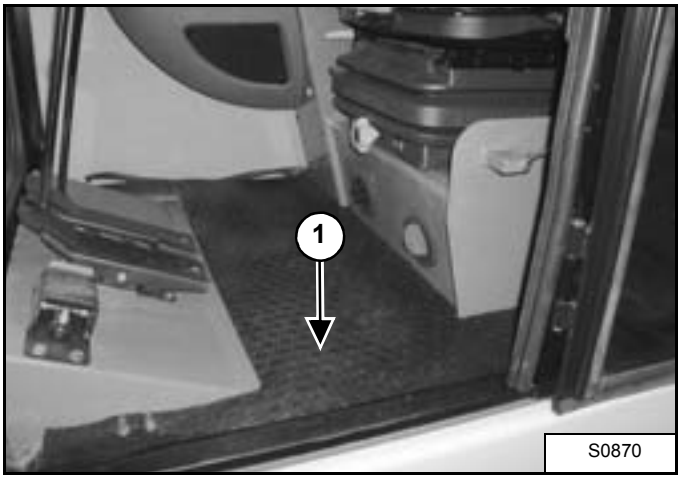
Always replace fuses with the same type and capacity.

Using A Booster Battery (Jump Starting)

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.

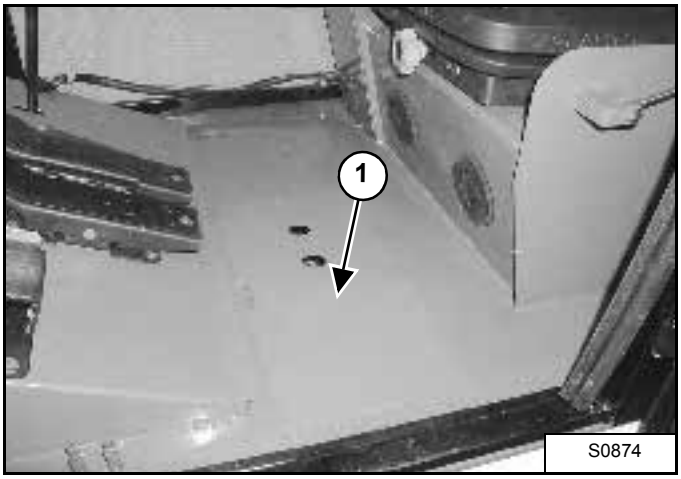
Be sure the key switch is OFF. The booster battery must be 12 volt.

Figure 142



2. Pull up on and remove the floor mat (1).

Figure 143



3. Remove the battery compartment cover (1).

WARNING

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

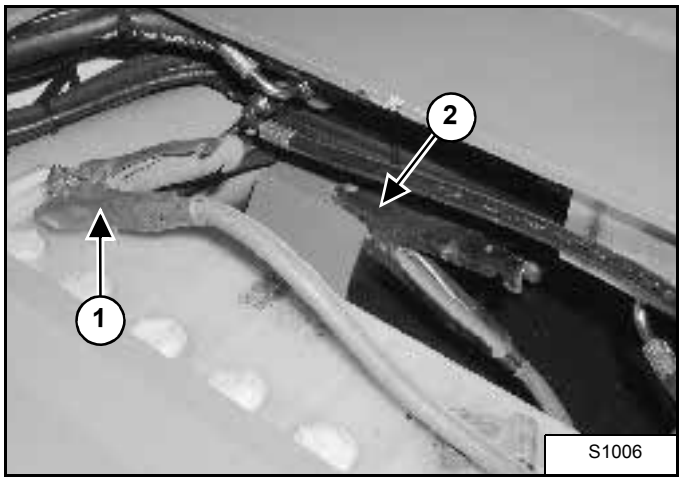
In case of acid contact, wash immediately with water. In case of eye contact get prompt medical attention and wash eye with clean, cool water for at least 15 minutes.

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

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 16°C (60°F) 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.

Figure 144



1. Connect one end of the first cable to the positive (+) terminal of the booster battery. Connect the other end ofthe same cable to the positive (+) terminal (1) of the Excavator battery.
2. Connect the end of the second cable to the negative (-) terminal of the booster battery. Connect the other end ofthe same cable to the Excavator frame (2) (away from the battery).

Note: See “Cold temperature starting procedure” on page 32.

3. Start the engine. After the engine has started, remove the ground (-) cable first (2).
4. Disconnect the cable from the Excavator battery (1).

WARNING

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

WARNING

Damage to the alternator can occur if:

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

Removing And Installing The Battery

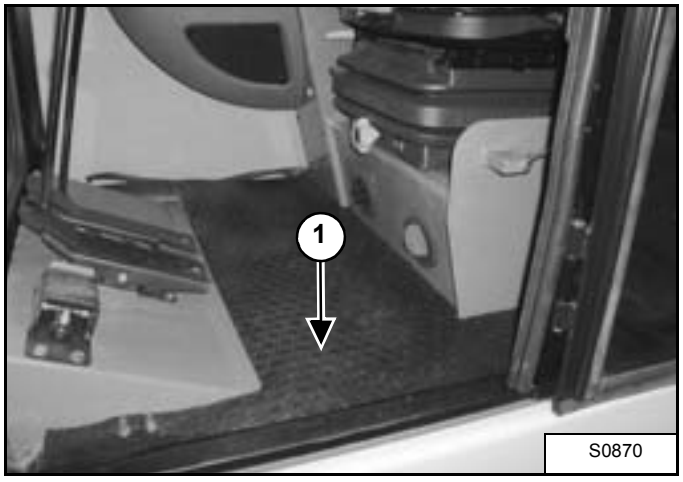
WARNING

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.

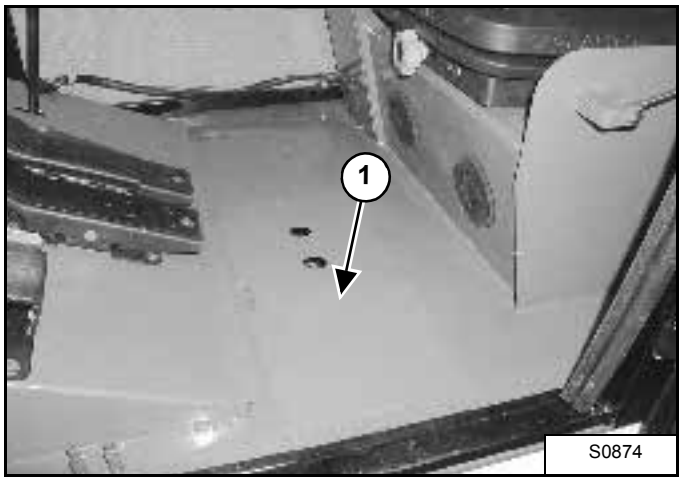
If electrolyte is taken internally drink large quantities of water or milk! DO NOT induce vomiting. Get-prompt medical attention.

Figure 145



1. Pull up on and remove the floormat (1).

Figure 146

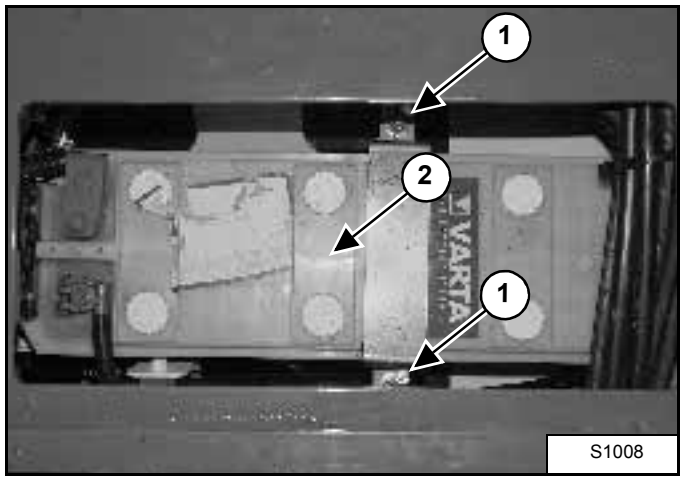


2. Remove the battery compartment cover (1).

3. Disconnect the negative (-) cable (1) first.

4. Disconnect the positive (+) cable (2).

Figure 147



5. Remove the nuts (1) and remove the hold down clamp (2).

6. Remove the battery.

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

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

9. Connect the battery cables. Connect the negative (-) cable (1) last to prevent sparks.

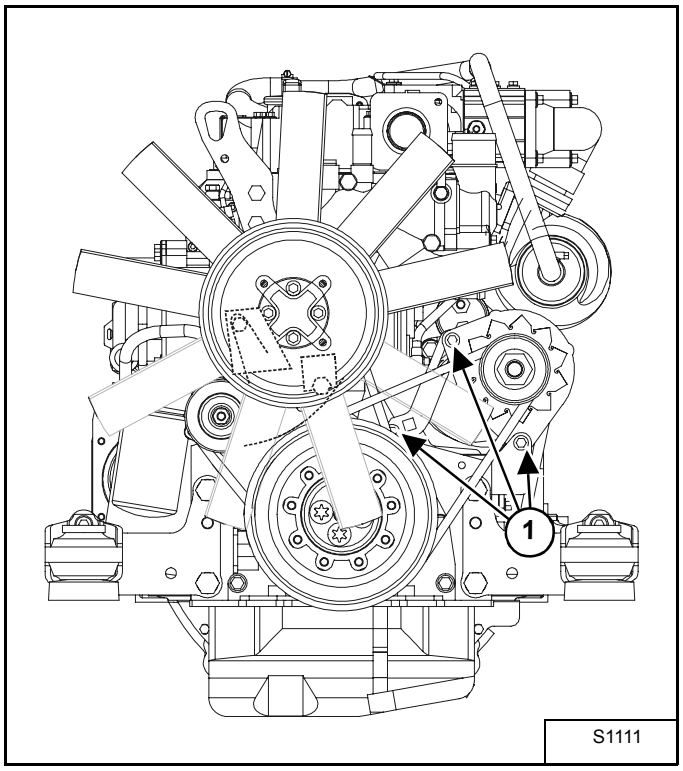
Alternator belt

Adjusting Belt Tension

Check the alternator belt deflection at the mid span of the belt between the crankshaft pulley and alternator pulley.

Apply approximately 45 mm force to the belt. The belt should deflect 10 mm.

Figure 148

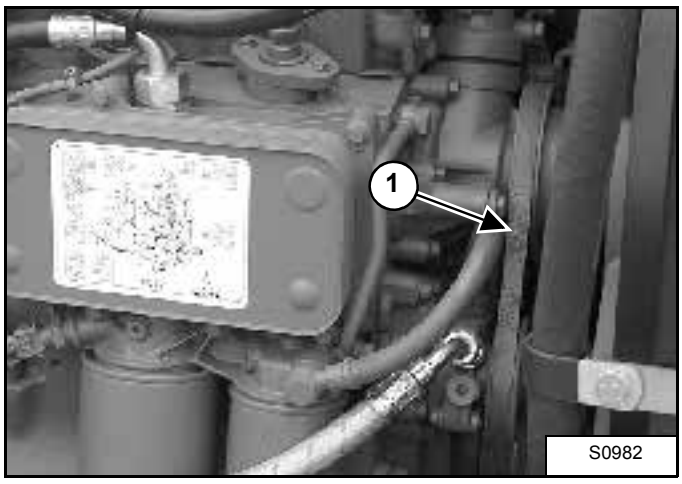


1. Loosen the three alternator bolts (1) **[Figure 148]** and rotate the alternator until the belt is correctly tensioned.
2. Tighten the bolts.

Fan / Fuel pump belt

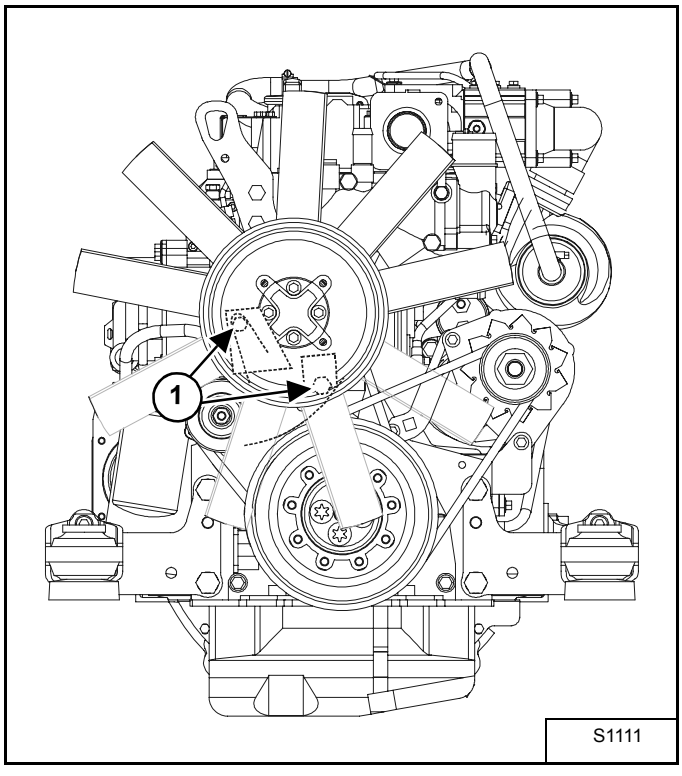
Adjusting Belt Tension

Figure 149



1. Check the fan/fuel pump belt deflection mid span of the belt between the crankshaft pulley and the fuel pump pulley (1).
2. Apply approximately 45 N of force to the belt. The belt should deflect 10 mm.

Figure 150

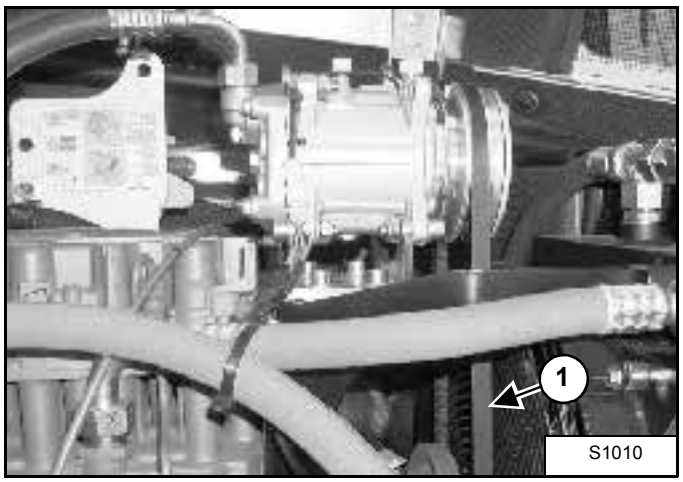


3. Loosen the two bolts (1) on the fuel pump mount. Rotate the fuel pump until the belt is correctly tensioned.
4. Tighten the bolts.

Air conditioning compressor belt

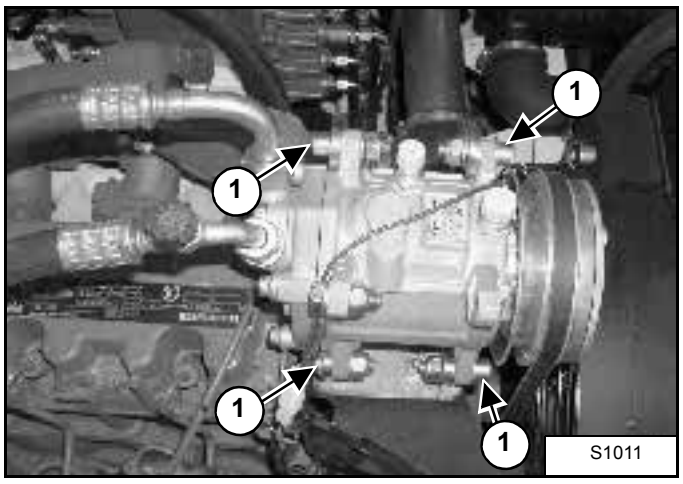
Adjusting Belt Tension

Figure 151



1. Check the air conditioning compressor belt deflection mid span of the belt between the crankshaft pulley and the compressor pulley (1).
2. Apply approximately 45 mm force to the belt. The belt should deflect 10 mm.

Figure 152

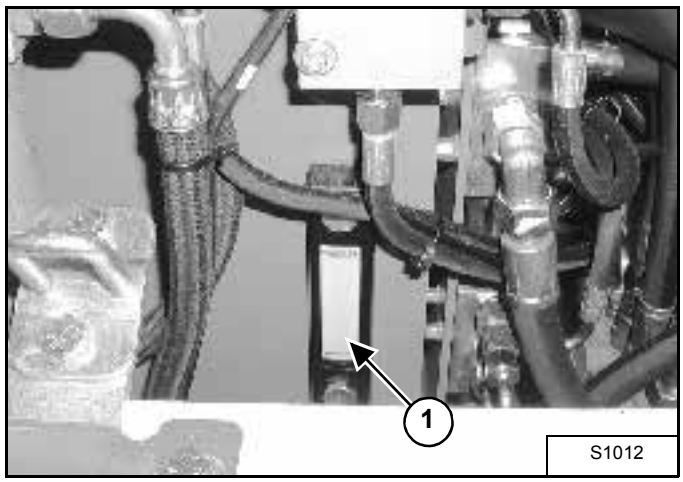


3. Loosen the bolts (1) and rotate the compressor until the belt is correctly tensioned.
4. Tighten the bolts.

Hydraulic system

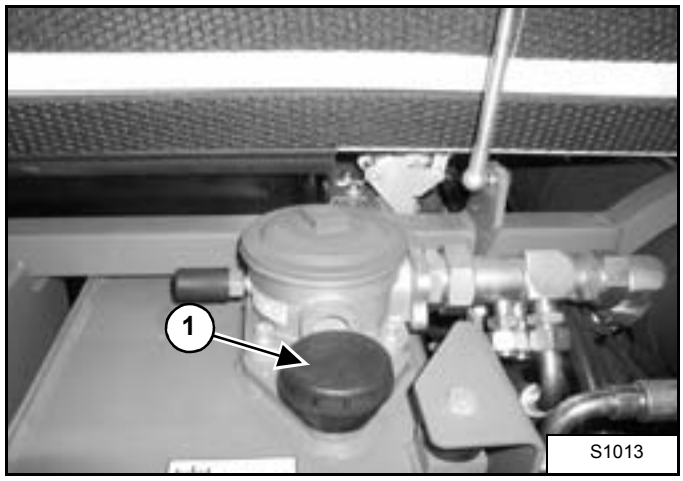
Checking And Adding Hydraulic Oil

Figure 153



1. Check the hydraulic fluid level, it must be visible in the sight gauge (1).

Figure 154



2. Clean the surface around the reservoir (breather) cap and remove the cap from the reservoir (1).
3. Add the correct oil to the reservoir until it is visible in the sight gauge. (See Fluid Specifications on p. 91.)
4. Check the breather cap and clean as necessary. Replace the cap if damaged.
5. Install the reservoir cap.
6. Close the rear cover.

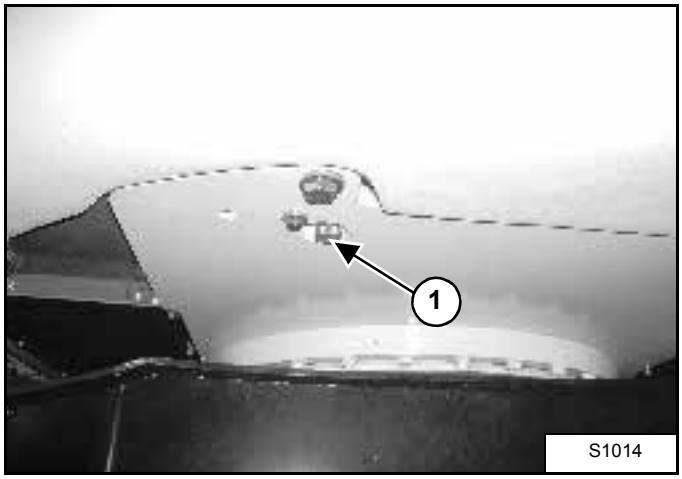
Replacing The Hydraulic Oil

See Service Schedule for the correct service interval. (See “Servicing schedule” on page 46.)

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

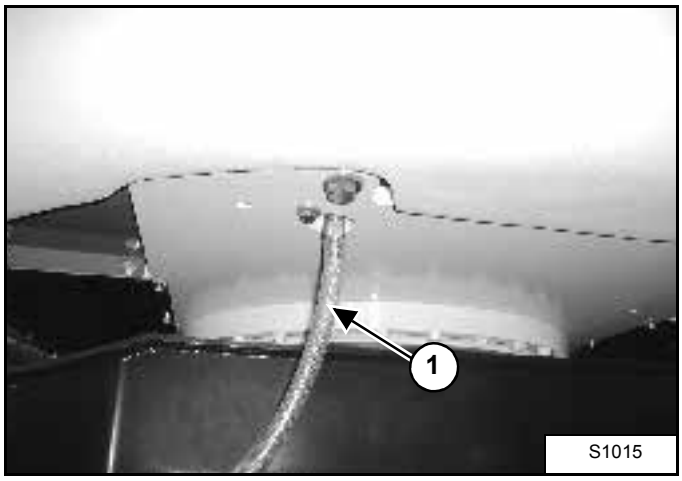
Open the rear cover.

Figure 155



1. Remove the cap (1) from the hydraulic reservoir drain.

Figure 156



2. Install the drain hose (1) on the hydraulic reservoir. Tighten the hose until oil starts to drain from the reservoir.
3. Drain the fluid into a container.
4. Recycle or dispose of the fluid in an environmentally safe manner.
5. Remove the drain hose and install the cap on the hydraulic reservoir.
6. Add fluid to the reservoir. (See Fluid Specifications on p. 91.)
7. Run the machine through the hydraulic functions. Stop the engine. Check the fluid level and add as needed.

WARNING

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

WARNING

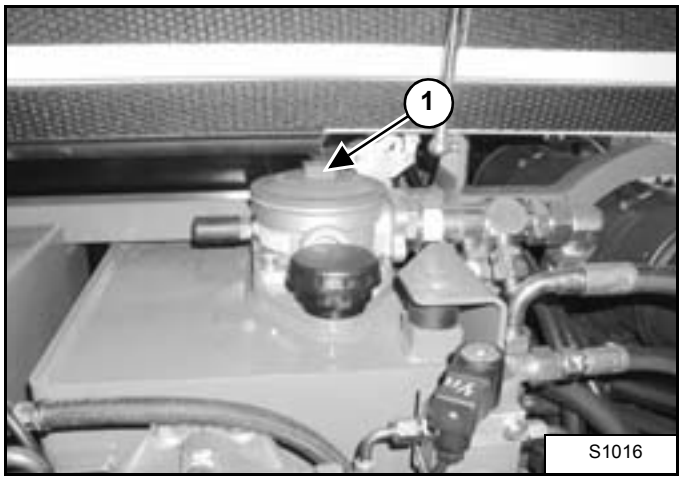
Diesel fuel or hydraulic fluid under pressure can penetrate skin or eyes, causing serious injury or death. Fluid leaks under pressure may not be visible. Use a piece of cardboard or wood to find leaks. Do not use your bare hand. Wear safety goggles. If fluid enters skin or eyes, get immediate medical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

Hydraulic Filter Removal

See Service Schedule for the correct service interval. (See “Servicing schedule” on page 46.)

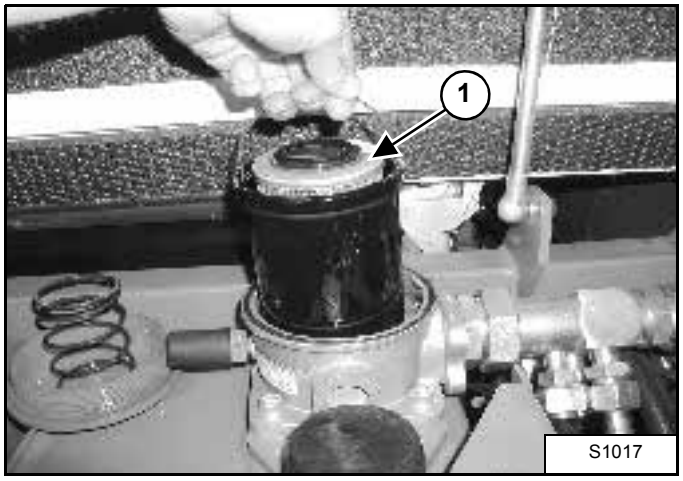
Open the rear cover.

Figure 157



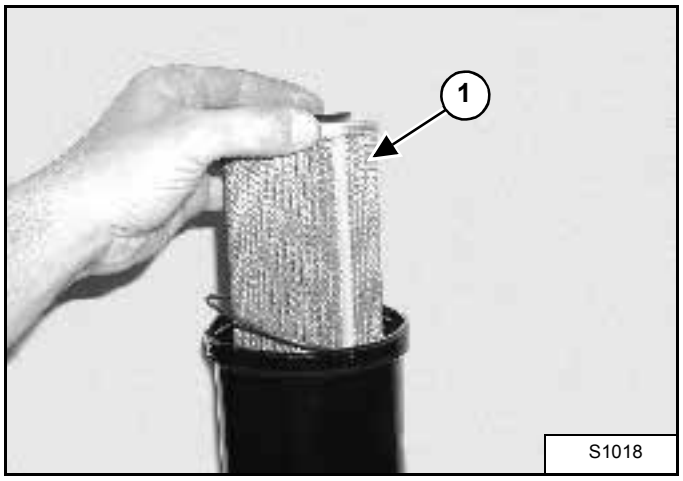
1. Remove the filter cover (1) and spring.

Figure 158



2. Remove the filter and filter bowl (1).

Figure 159

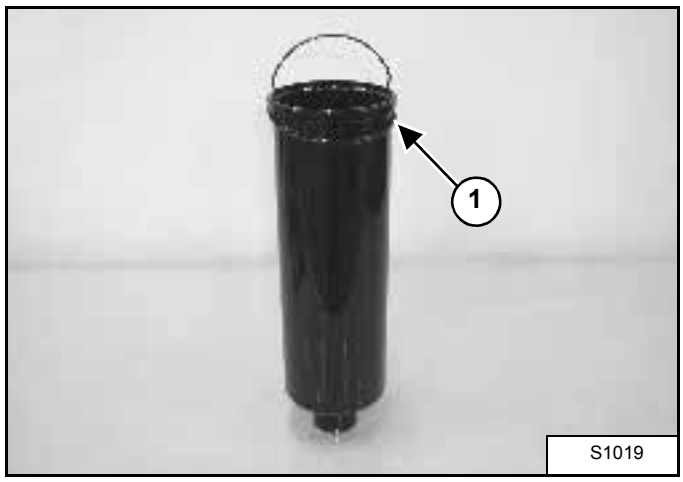


3. Remove the filter (1) from the filter bowl.

Hydraulic Filter Installation

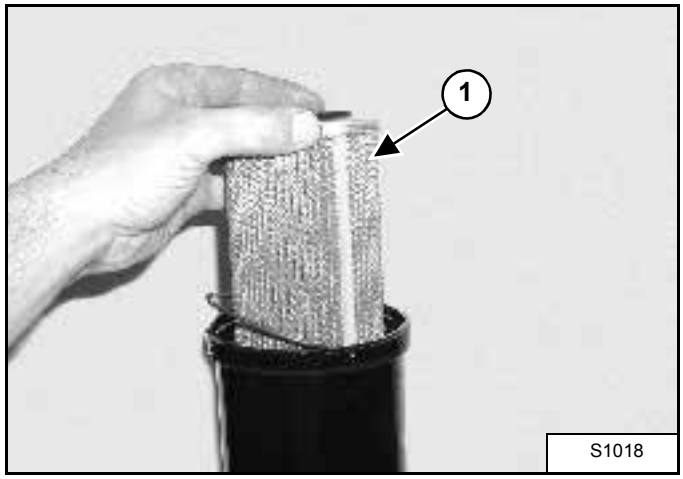
Clean the filter bowl in clean solvent and dry with compressed air.

Figure 160



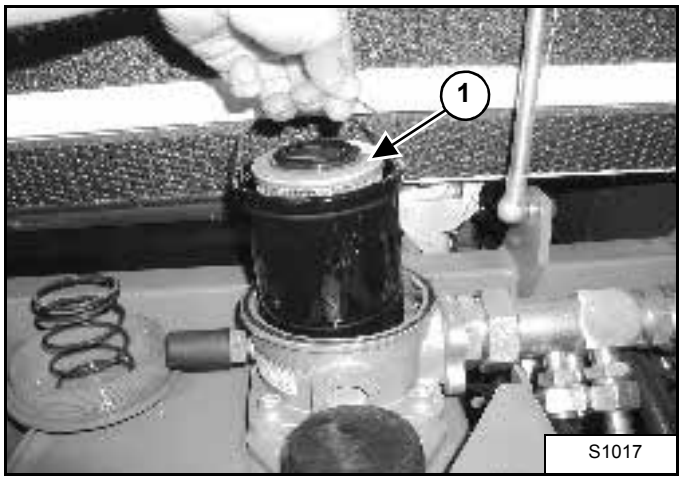
1. Inspect the O-rings (1) on the outside and inside bottom of the filter bowl. Replace the O-rings if damaged.

Figure 161



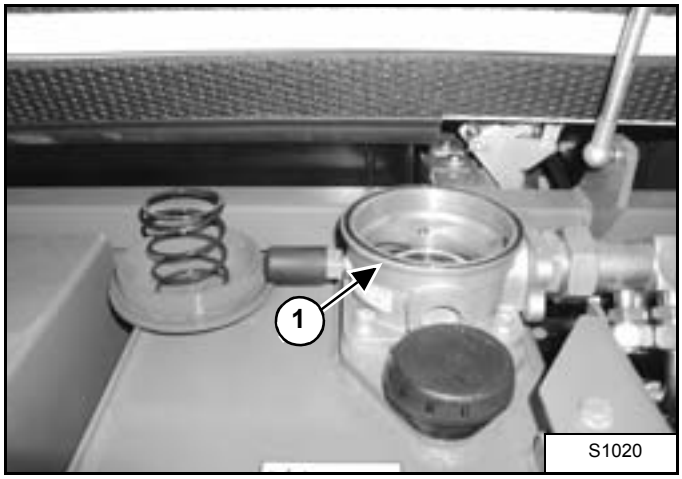
2. Install a new filter (1) in the filter bowl.

Figure 162



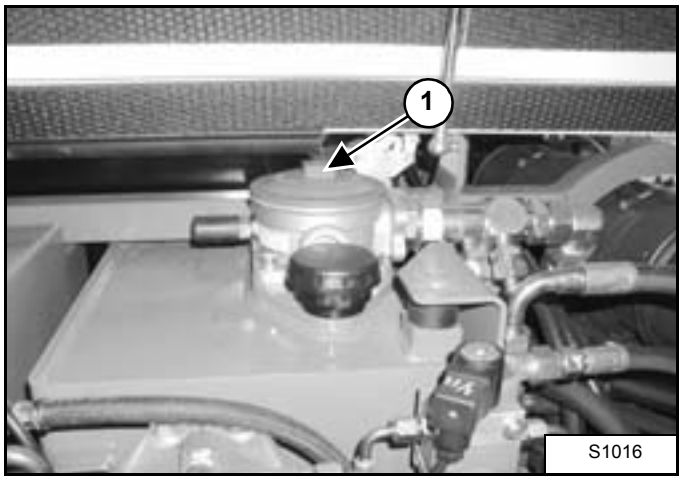
3. Install the filter and filter bowl (1).

Figure 163



4. Inspect the O-ring (1). Replace if damaged.

Figure 164



5. Install the spring and cover (1).

Diagnostic Couplers

Open the rear cover and right side cover.

Figure 165

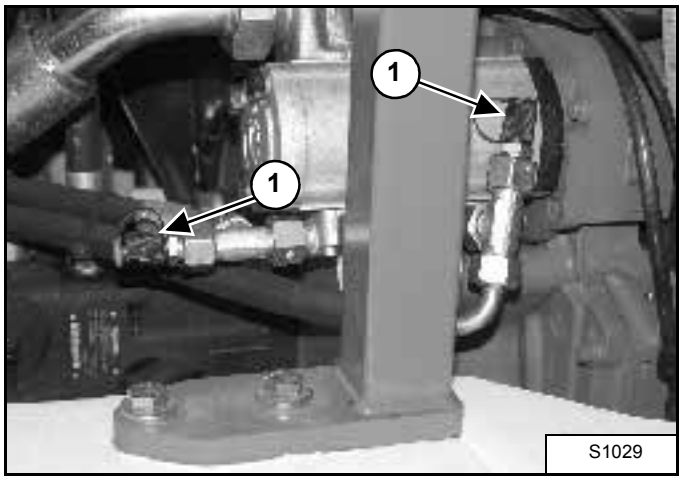


Figure 166

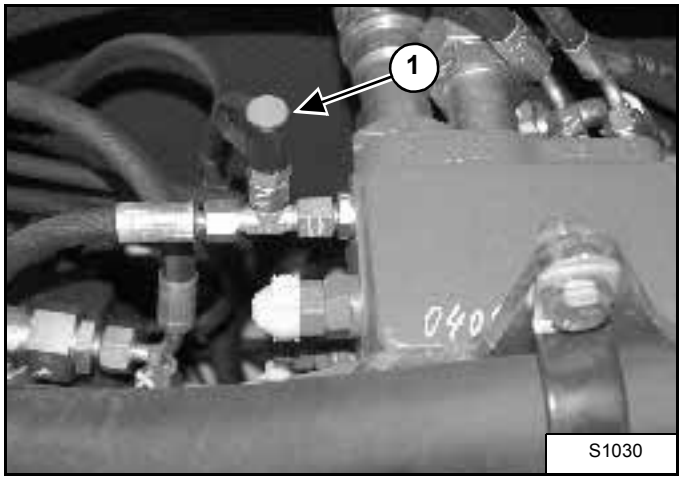
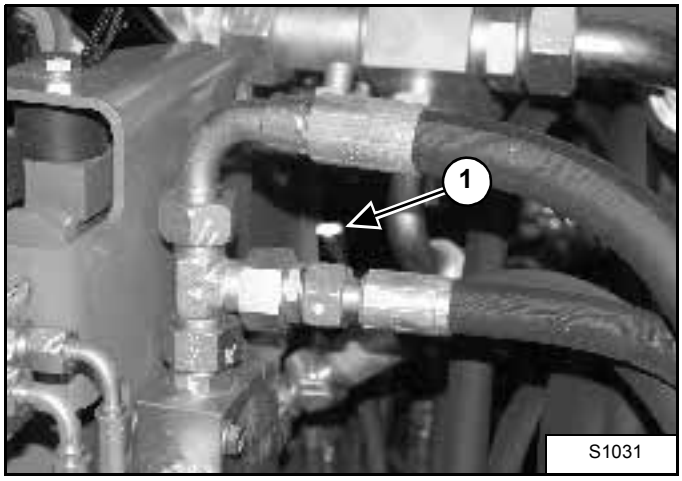


Figure 167



1. The four diagnostic couplers (1) **[Figure 165]**, **[Figure 166]** & **[Figure 167]** are located on the hydraulic circuitry.

The couplers can be used to check circuit pressures. (Refer to the Service Manual.)

Track tension

Rubber Track Clearance

Note: The wear of the pins and bushings on the undercarriage vary with the working conditions and the different types of soil conditions. It is necessary to inspect track tension and maintain the correct tension. See “Servicing schedule” on page 46 for the correct service interval.

Note: On new Excavators or on Excavators with new rubber tracks installed, check and adjust as needed the rubber track clearance two to three times on the first day of operation.

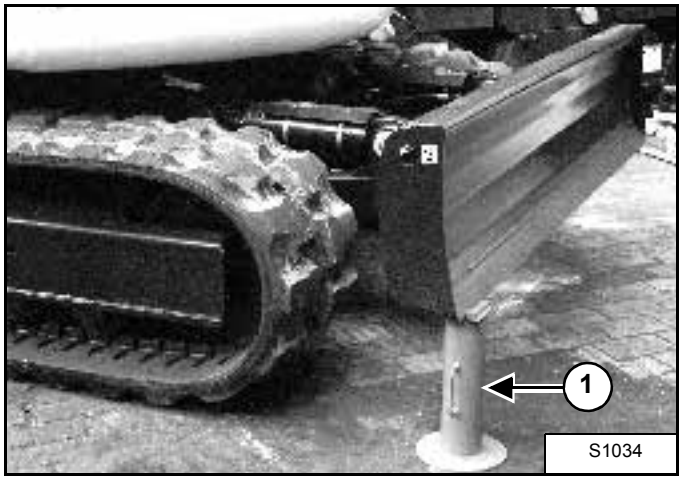
WARNING

AVOID INJURY

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

Raise one side of the machine (approximately fourinches) using the boom and arm.

Figure 168



1. Raise the blade fully and install jackstands (1) **[Figure 168]** & **[Figure 169]** under the blade and track frame. Lower the boom until all machine weight is on the jackstands.
2. Stop the engine.

Figure 169

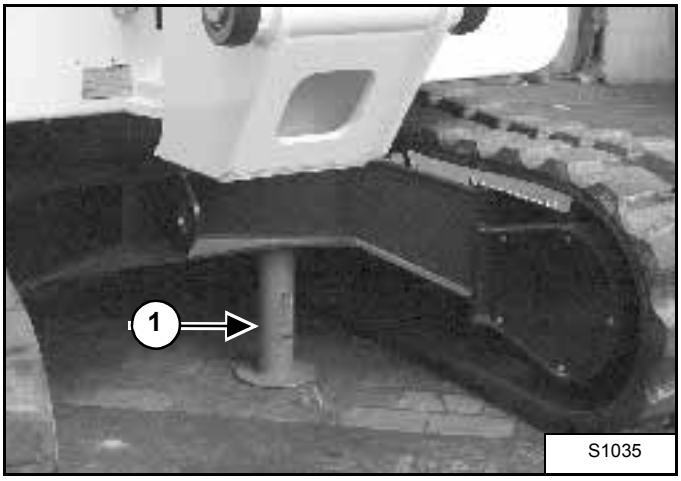
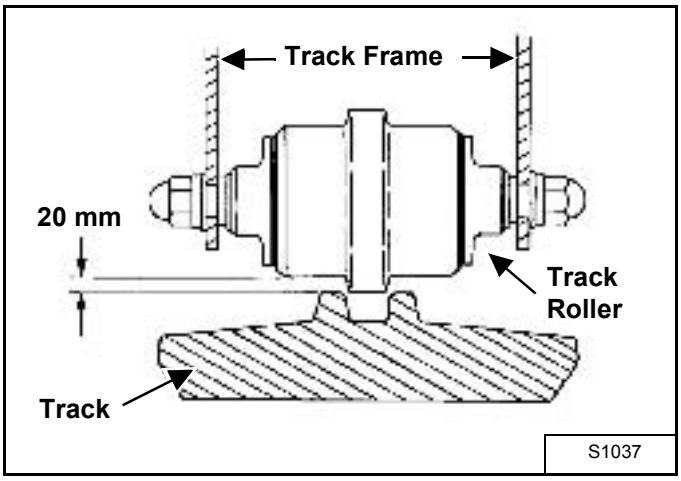


Figure 170



3. Measure the track sag **at the fourth roller** (= middle of the track). Do not get fingers in pinch points between the track and track roller. Use 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 lug **[Figure 170]**.
4. Rubber track clearance 20 mm.

Steel Track Clearance

Note: The wear of the pins and bushings on the undercarriage vary with the working conditions and the different types of soil conditions. It is necessary to inspect track tension and maintain the correct tension. See “Servicing schedule” on page 46 for the correct service interval.

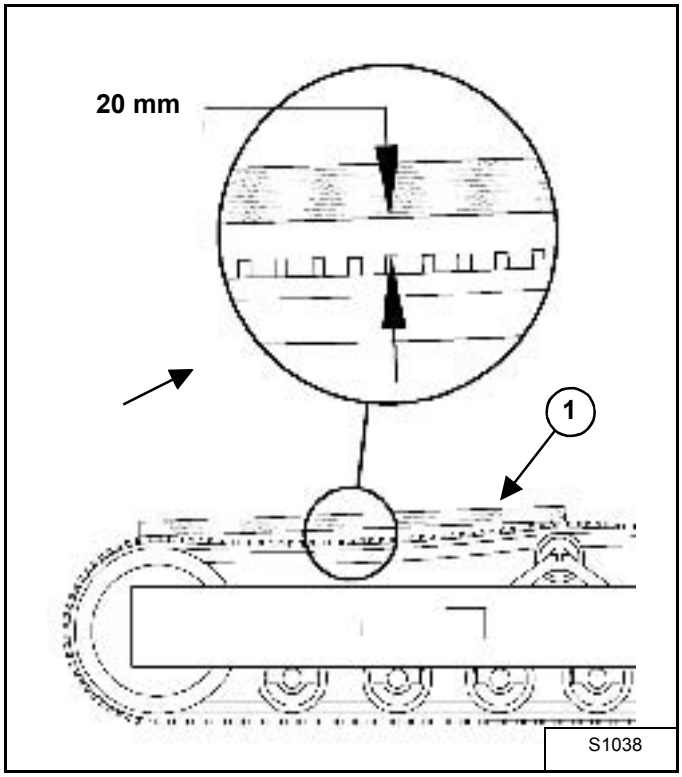
Note: On new Excavators or on Excavators with new steel tracks installed, check and adjust as needed the steel track clearance two to three times on the first day of operation.

WARNING

AVOID INJURY

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

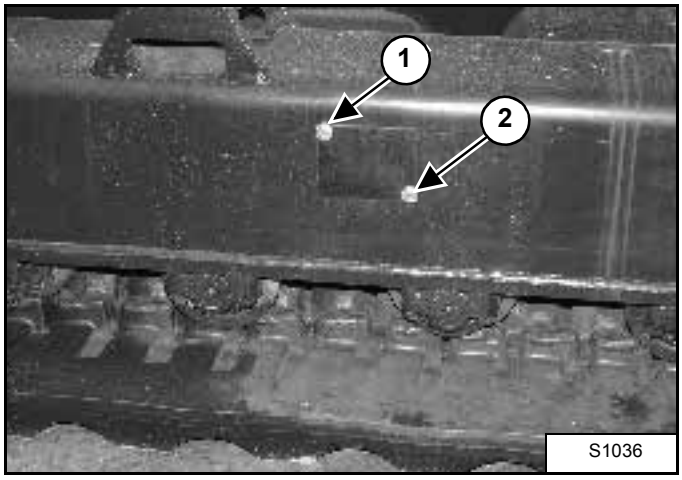
Figure 171



1. Park the Excavator on a flat and level surface.
2. Put a straight edge (1) on the top of the track surface between the rear sprocket and the top idler wheel. Measure between the top of the track and the bottom of the straight edge.
3. Steel track clearance 20 mm.

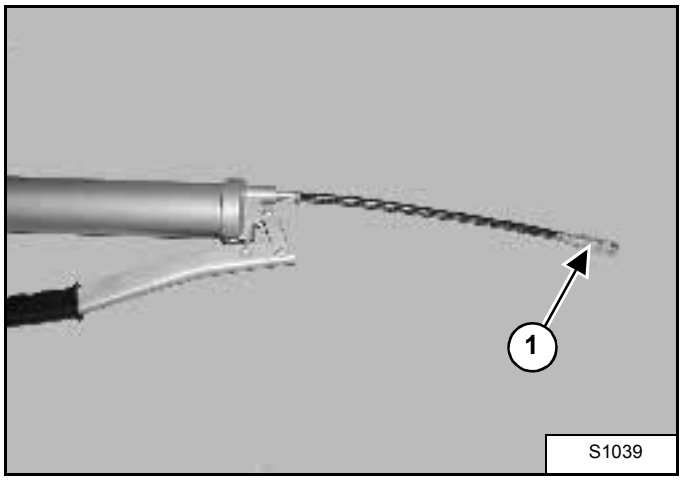
Adjustment

Figure 172



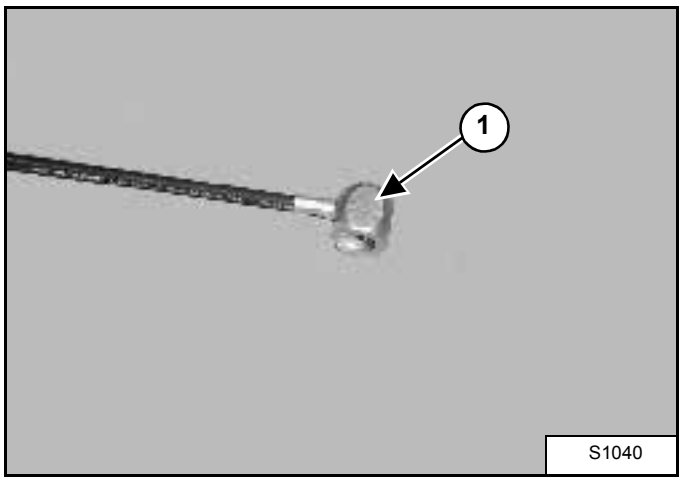
1. Loosen the top bolt (1).
2. Remove the bottom bolt and washer (2).
3. Pivot the cover out of the way.

Figure 173



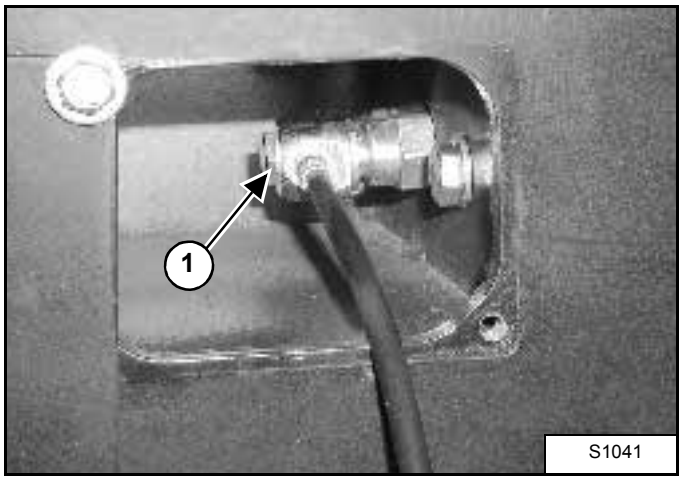
4. Remove the grease fitting adapter (1) from the end of a grease gun.

Figure 174



5. Install the track tensioning adapter (1) on the end of a grease gun.

Figure 175



6. Install the adapter (1) on the track tensioner.

Figure 176

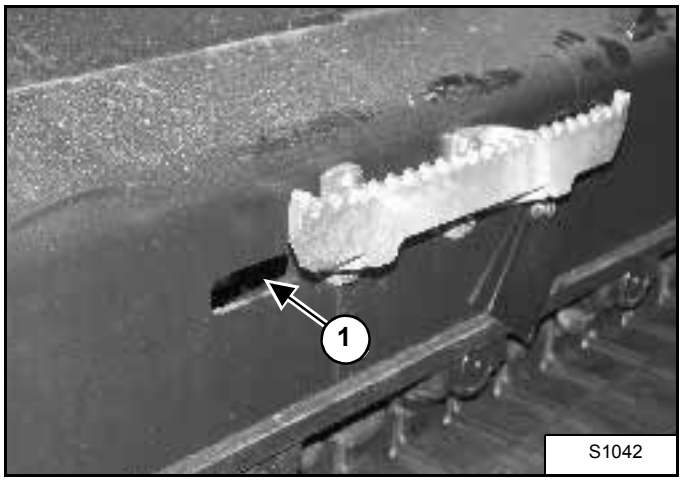
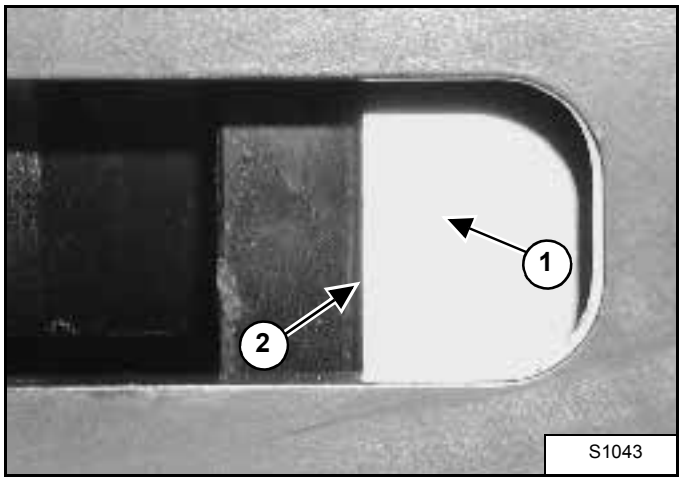
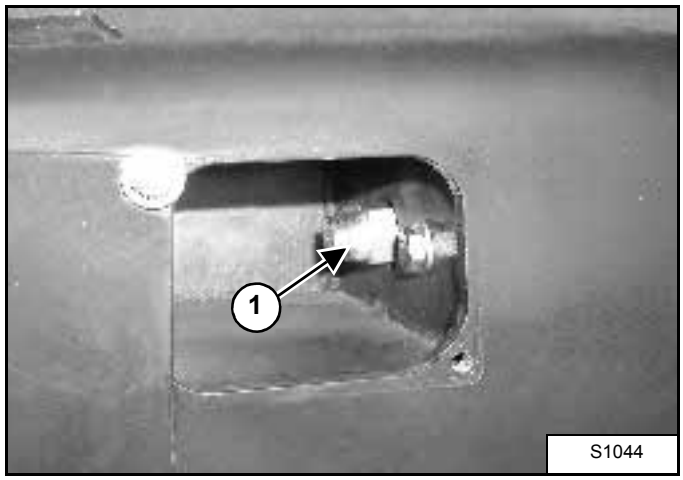


Figure 177



7. Add grease to the track tensioner until the track tension indicator (1) is flush with the cylinder edge (2) **[Figure 176]** & **[Figure 177]**.

Figure 178



8. To release track tension, loosen the tensioner (1). Do not remove the tensioner.

Note: Do not remove the tensioner (1) **[Figure 178]** unless pressure is released.

After track tension has been released, remove all grease from the tensioner area.

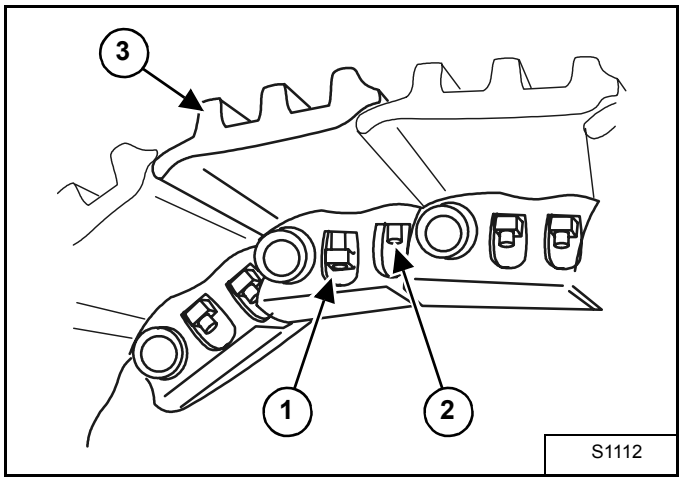
Repeat the procedure for the other track.

Track shoes (steel track)

Damaged track shoes have to be replaced immediately.

Replacement

Figure 179



- Remove the four hexagon bolts (1) **[Figure 179]**.
- Take the square (2) **[Figure 179]**.
- Remove the track shoe (3) **[Figure 179]**.
- Mount the new track shoe.

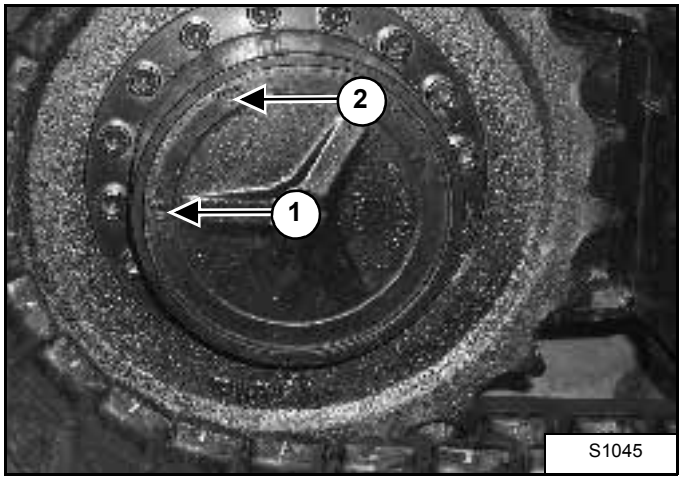
Note: Observe the mounting position!

- Fasten the track shoe using new bolts and nuts.
- Tightening torque: 370 +/- 20 Nm

Travel motor

Checking Oil Level

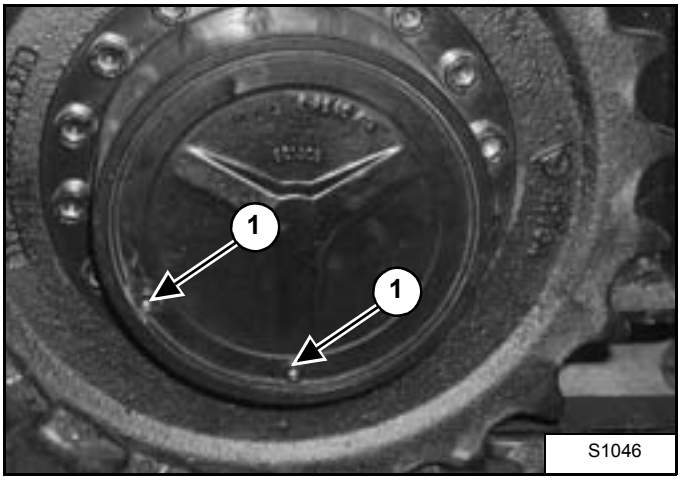
Figure 180



1. Put the machine on a level surface with the plugs positioned as shown (1 & 2).
2. Remove the plug (1). The oil level should beat the bottom edge of the plug hole.
3. Remove the plug (2) and add gear lube through the hole if the oil level is below the hole (1). (See Fluid Specifications on p. 91.)
4. Install both plugs.
5. Repeat the procedure for the other side.

Draining The Travel Motor

Figure 181



1. Put the machine on a level surface with the plugs positioned as shown (1 & 2).
2. Remove both plugs (1 & 2) and drain into a container. Recycle or dispose of the fluid in an environmentally safe manner.
3. After all the gear lube is removed, rotate the track motor to the position shown.
4. Add gear lube to the plug hole (2) until the gear lube level is at the bottom edge of the plug hole (1). Install and tighten the plugs.
5. Repeat the procedure for the other side.

Lubrication of the hydraulic excavator

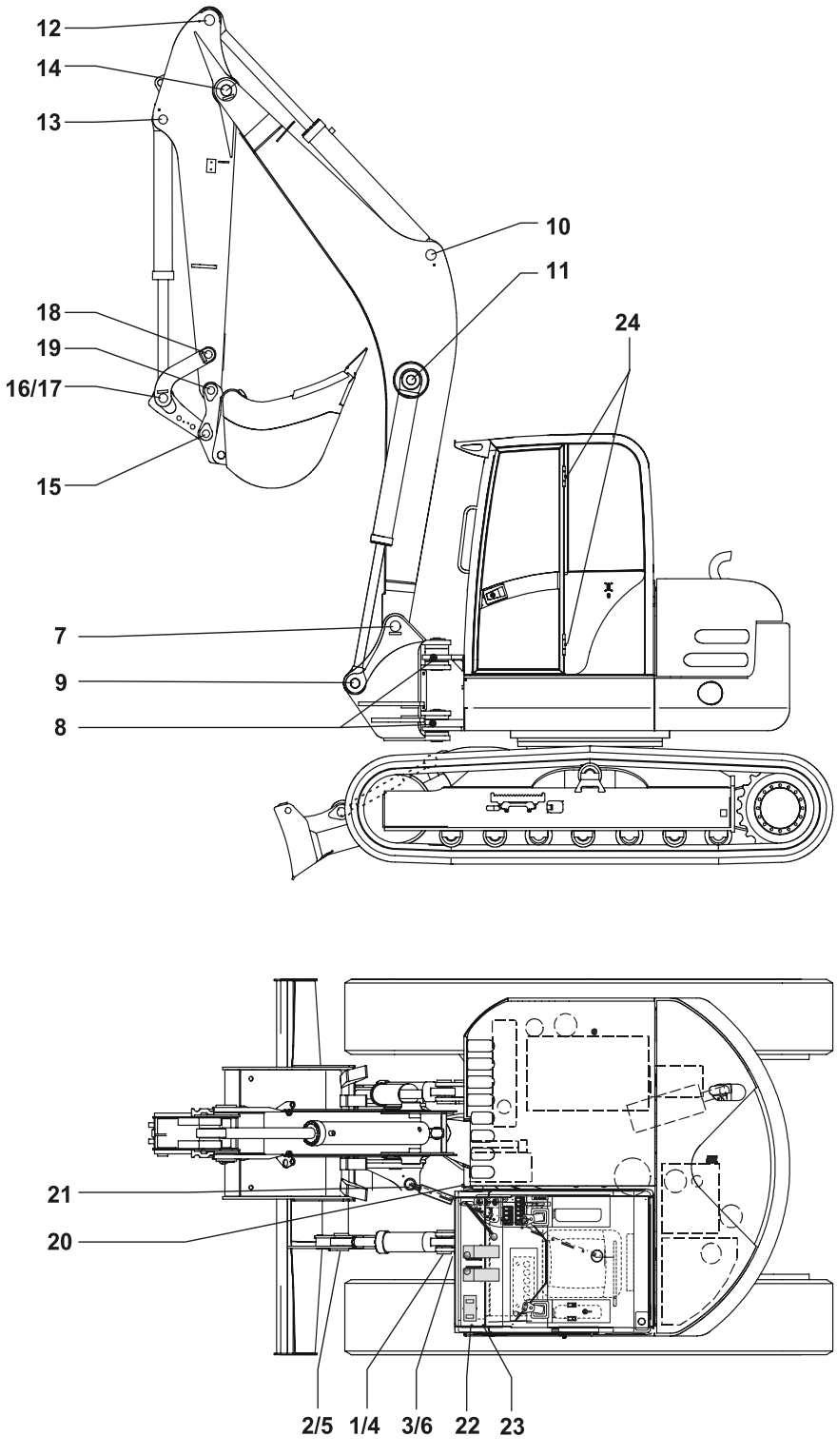
Lubricate the Hydraulic Excavator. See Service Schedule for the best performance of the machine. (See “Servicing schedule” on page 46.)
Always use a good quality lithium based multipurpose grease when lubricating the machine. Apply the lubricant until extra grease shows.

WARNING

Replace damaged grease nipples immediately and check if grease passes through!

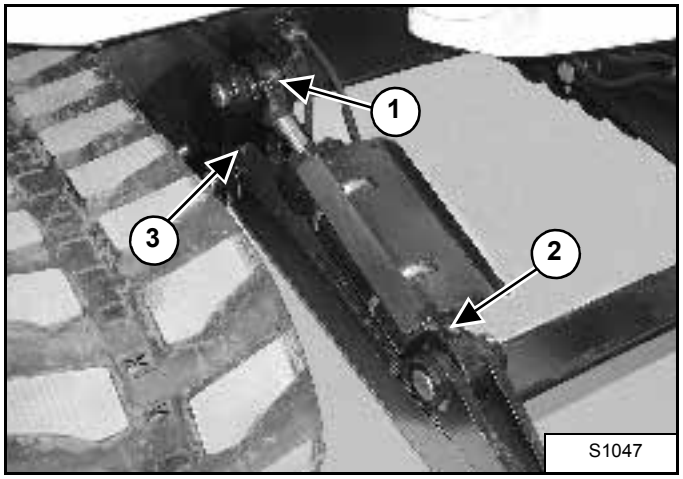
Overview of lubricating points

Figure 182



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

Figure 183



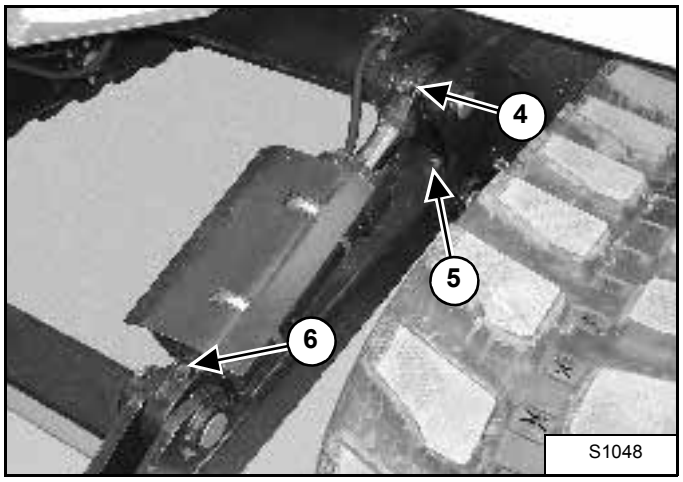
Ref. Description (# of Fittings)

1. Right blade cylinder rod end (1).

2. Right blade cylinder base end (1).

3. Right side blade pivot (1).

Figure 184

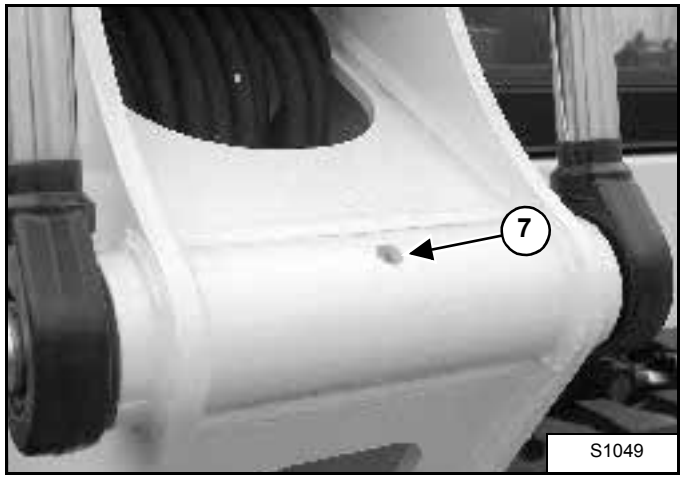


4. Left blade cylinder rod end (1).

5. Left blade cylinder base end (1).

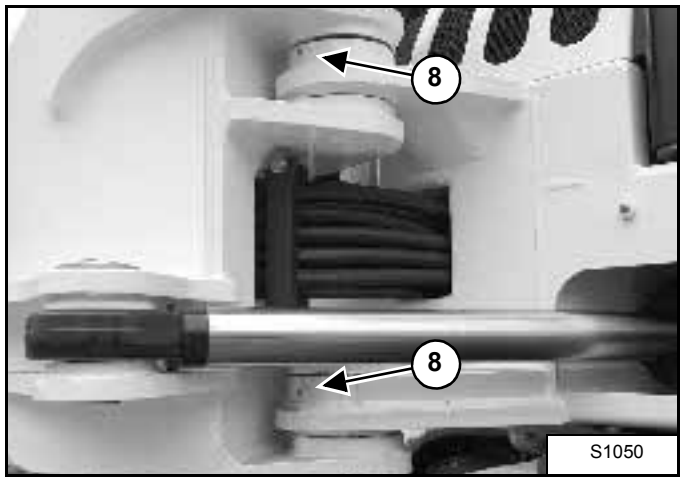
6. Left side blade pivot (1).

Figure 185



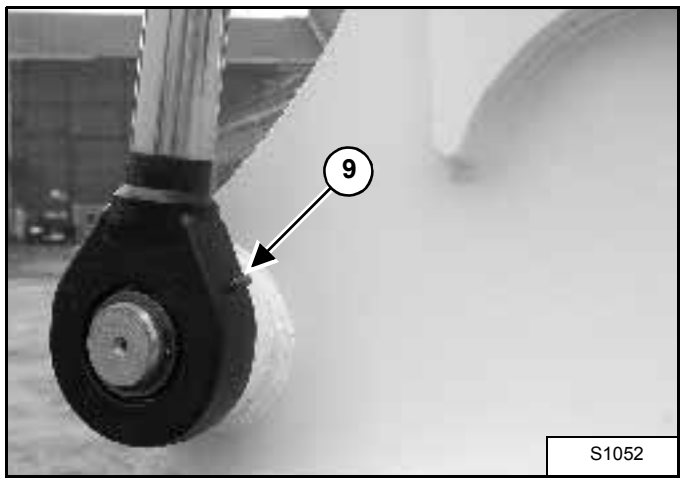
7. Boom pivot (1).

Figure 186



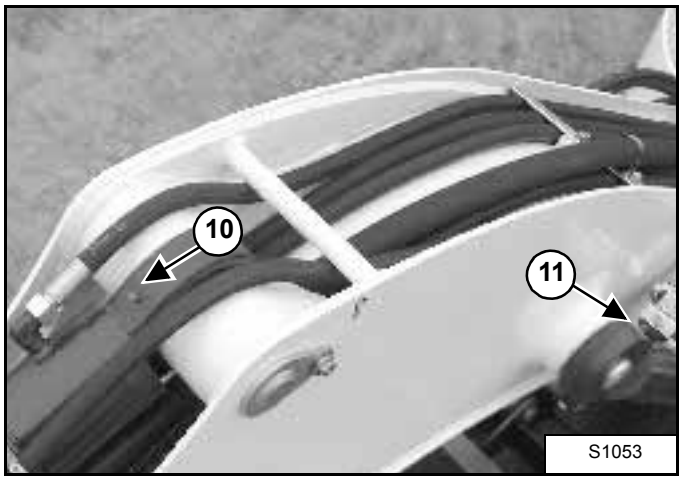
8. Boom swing pivot (2).

Figure 187



9. Boom cylinder rod end (2).

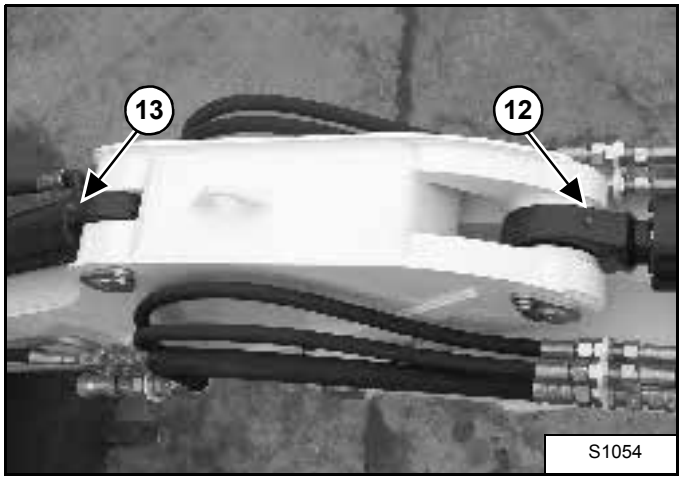
Figure 188



10. Boom cylinder base end (1).

11. Arm cylinder base end (2).

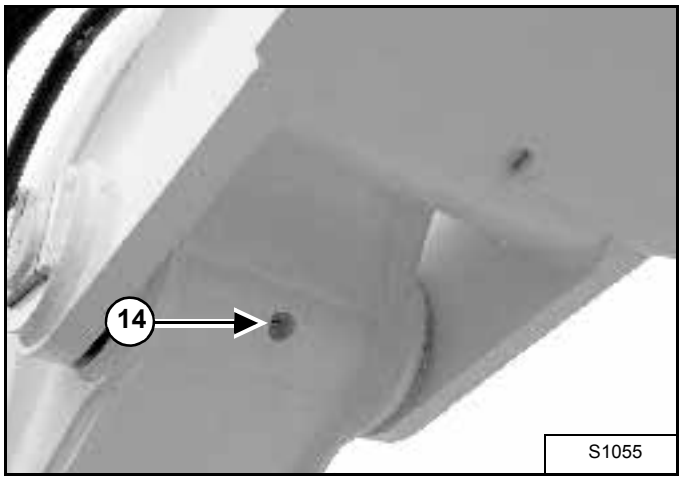
Figure 189



12. Arm cylinder rod end (1).

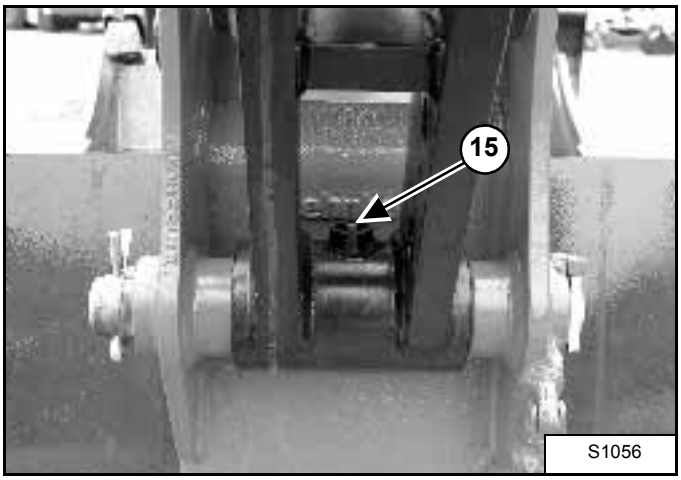
13. Bucket cylinder base end (1).

Figure 190



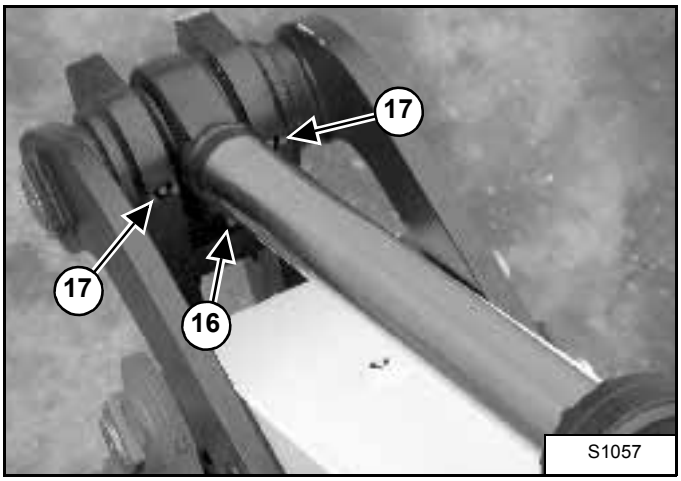
14. Arm pivot (1).

Figure 191



15. Lower bucket link pivot (1).

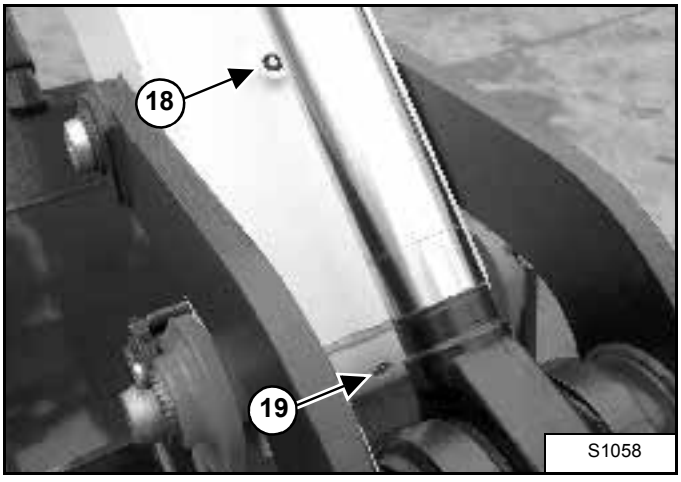
Figure 192



16. Bucket cylinder rod end (1).

17. Bucket link pivot (2).

Figure 193

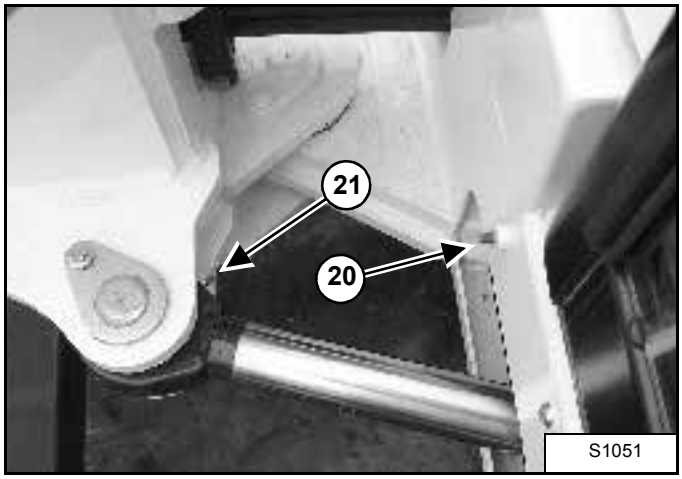


18. Bucket link pivot (1).

19. Bucket pivot (1).

Lubricate the following locations on the Hydraulic Excavator EVERY 50 HOURS:

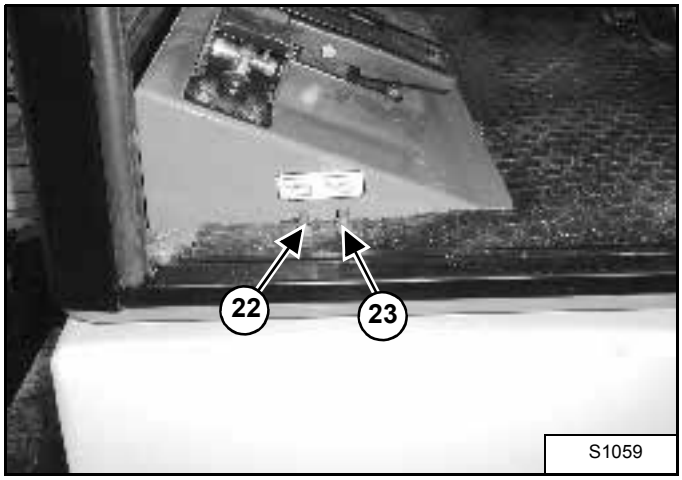
Figure 194



20. Boom swing cylinder base end (1).

21. Boom swing cylinder rod end (1).

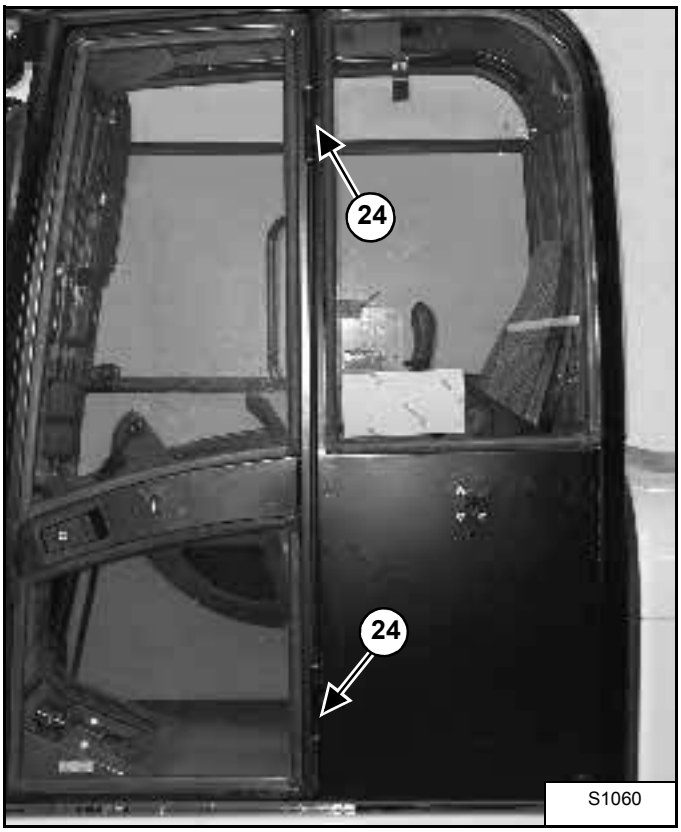
Figure 195



22. Lubrication of the swing toothing (1).

23. Lubrication of the swing bearing (1).

Figure 196



24. Door hinges (2).

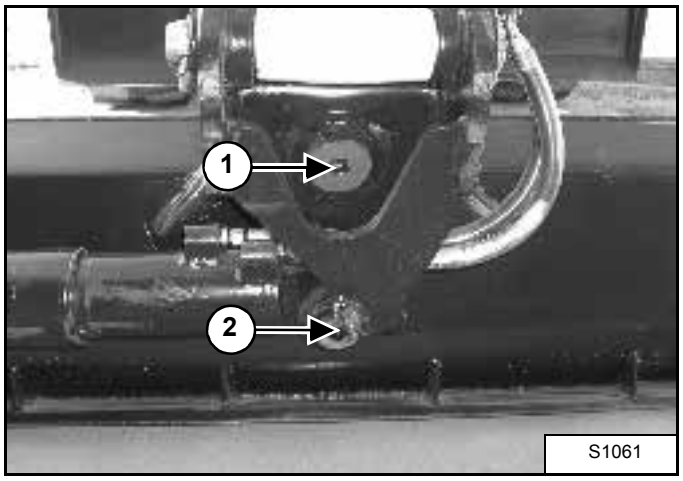
Lubrication of attachments

Swing Bucket Lubrication

Always use a good quality Lithium based multipurpose grease when lubricating the attachment. Apply the lubricant until extra grease shows.

Lubricate the following locations EVERY 8-10 HOURS:

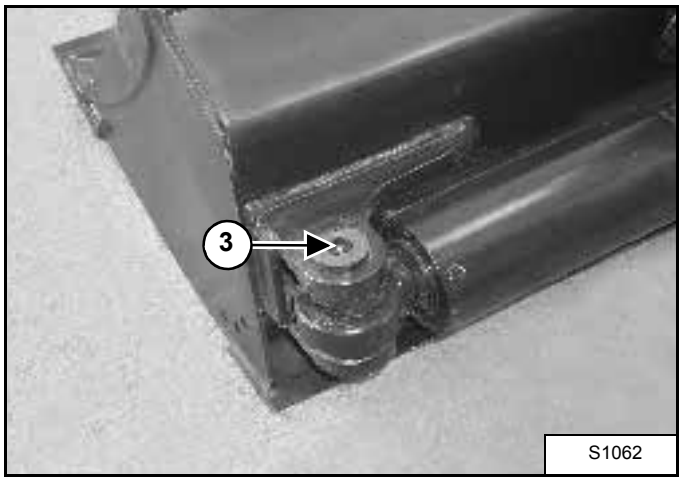
Figure 197



1. Bucket pivot (1).

2. Cylinder base end (1).

Figure 198

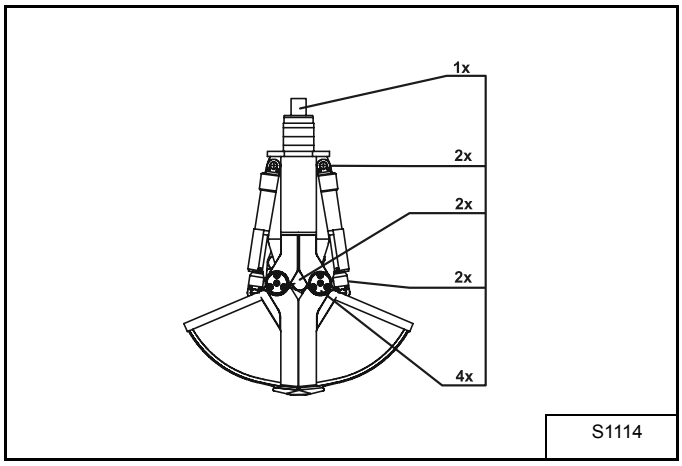


3. Cylinder rod end (1).

Clamshell Bucket Lubrication

Overview

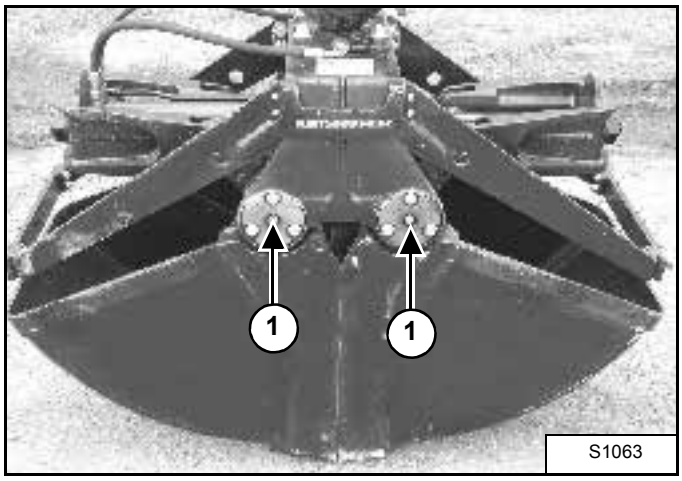
Figure 199



Always use a good quality Lithium based multipurpose grease when lubricating the attachment. Apply the lubricant until extra grease shows.

Lubricate the following locations EVERY 8-10 HOURS:

Figure 200



1. Bucket pivot points (4).

Figure 201

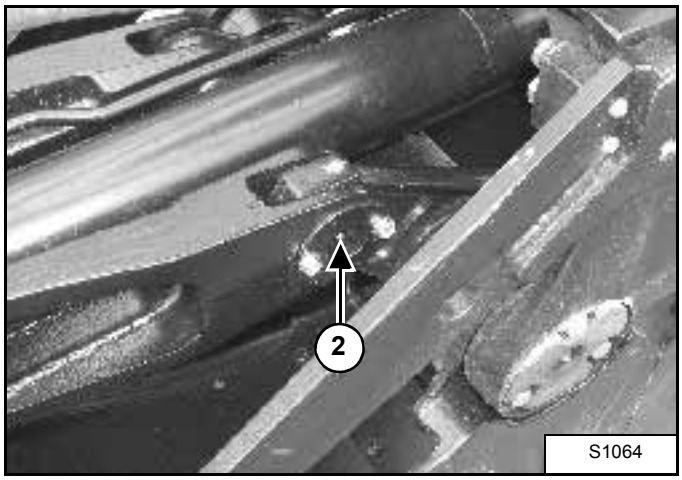
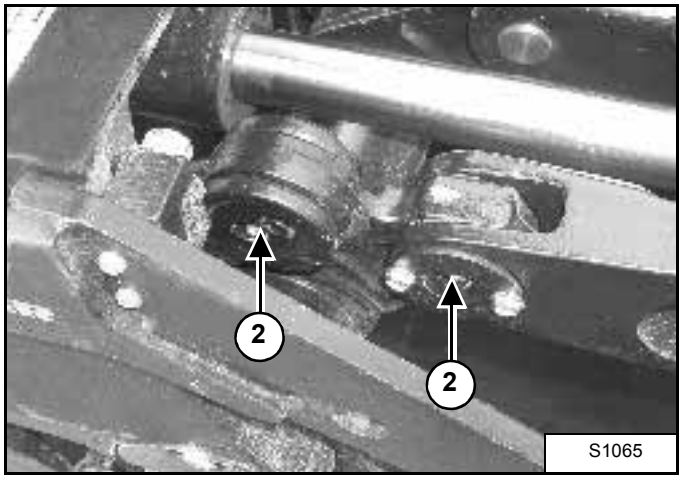


Figure 202



2. Cylinder link pivots (5) **[Figure 201]** & **[Figure 202]**.

SPECIFICATIONS

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Bobcat

Specifications

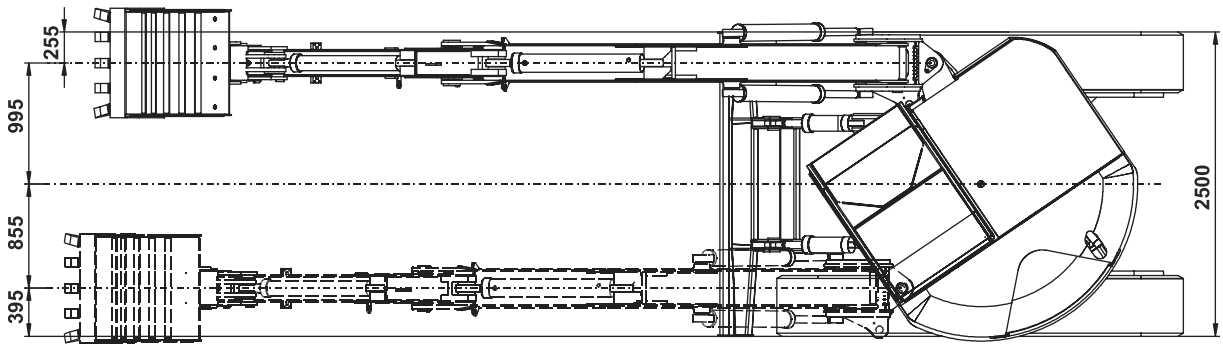
Excavator Machine Dimensions

Blade height	480 mm
Ground clearance	420 mm
Ground line to top of engine cover	1765 mm
Length of track on ground	2628 mm
Machine centre line to blade	1953 mm
Overall length of track assembly	3345 mm
Overall length in travel position	4680 mm
Blade width	2500 mm
Height	2870 mm
Machine centre line to working equipment centre line, left-hand rotation	995 mm
Machine centre line to working equipment centre line, right-hand rotation	855 mm
Minimum turning radius	2620 mm
Swing clearance, rear (zero tail swing)	1370 mm

Note: All dimensions are shown in millimeters. Respective metric dimensions are given in millimeters enclosed by parentheses.

Note: Where applicable, specification conform to SAE or ISO standards and are subject to change without notice.

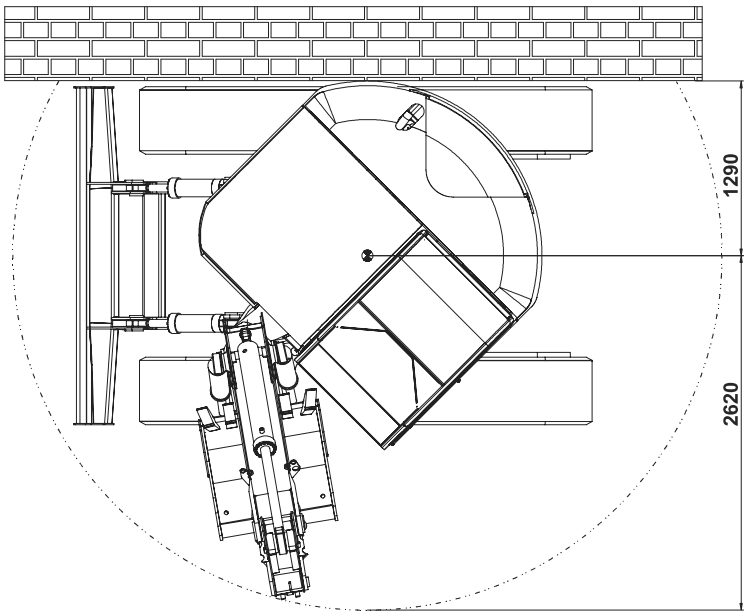
Figure 203



EXCAVATION WITHIN THE ENTIRE WIDTH OF THE MACHINE

S1117

Figure 204



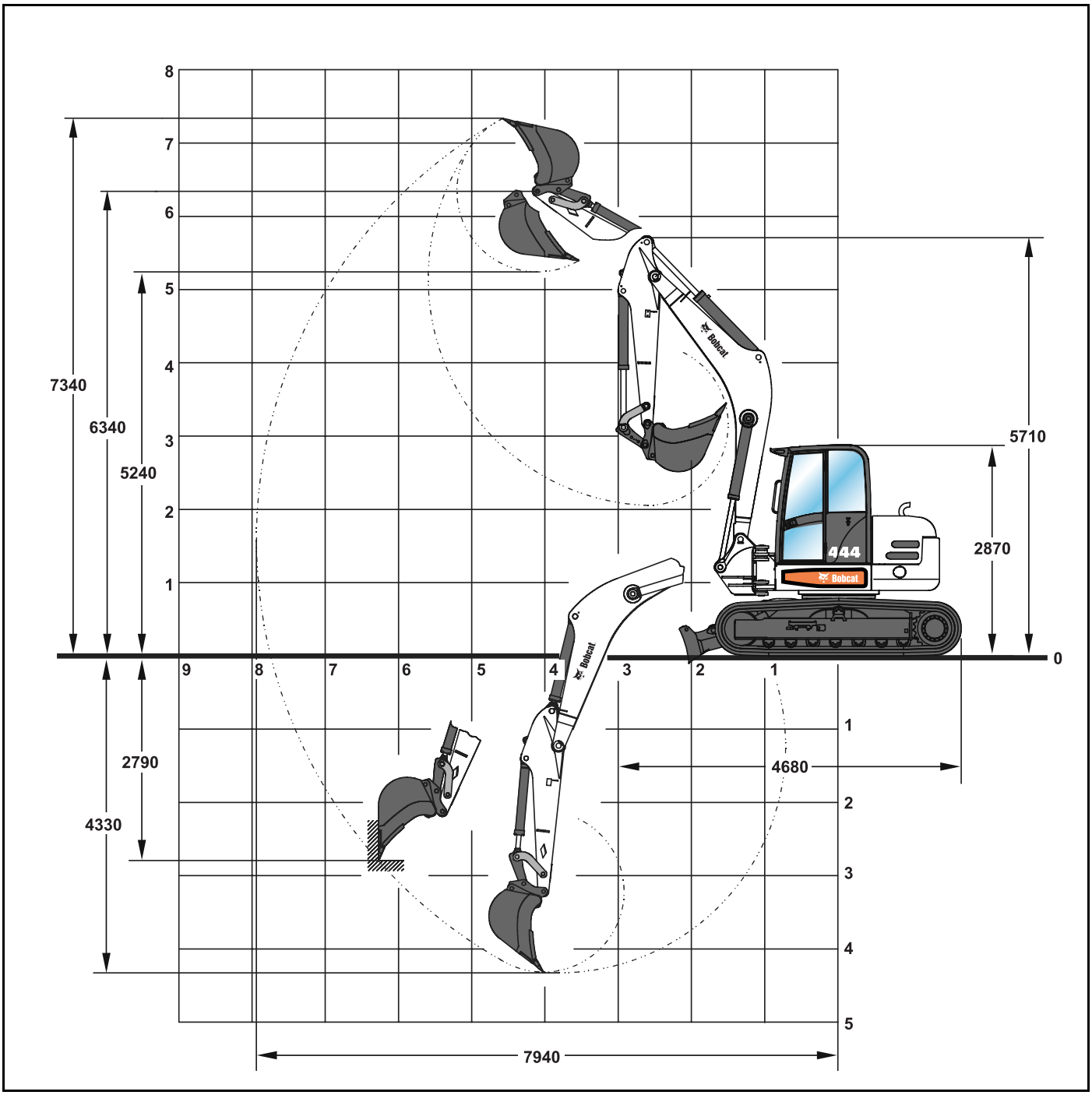
SLEW CIRCLE

S1116

Working diagrams

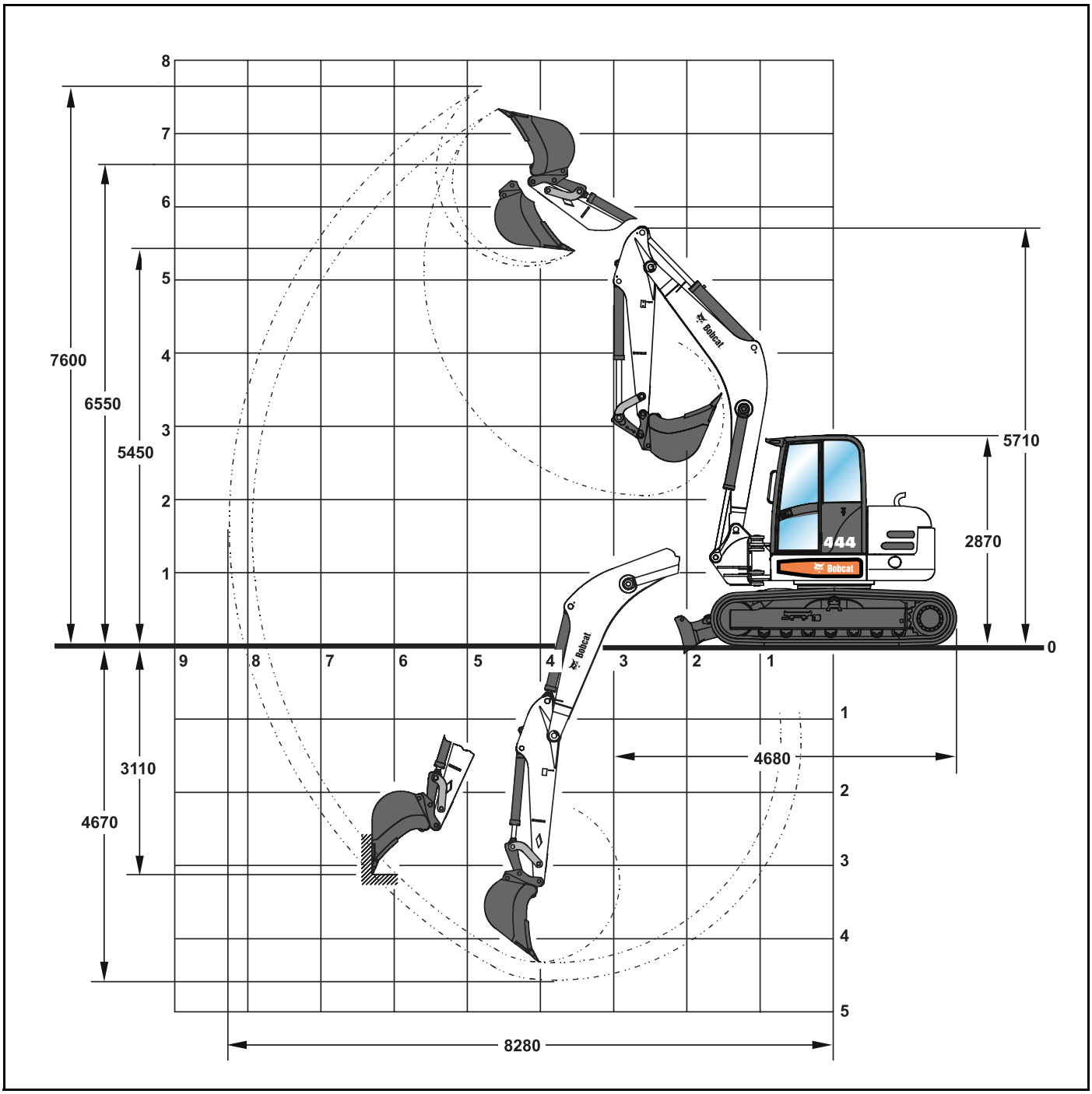
Standard boom and standard dipperstick

Figure 205



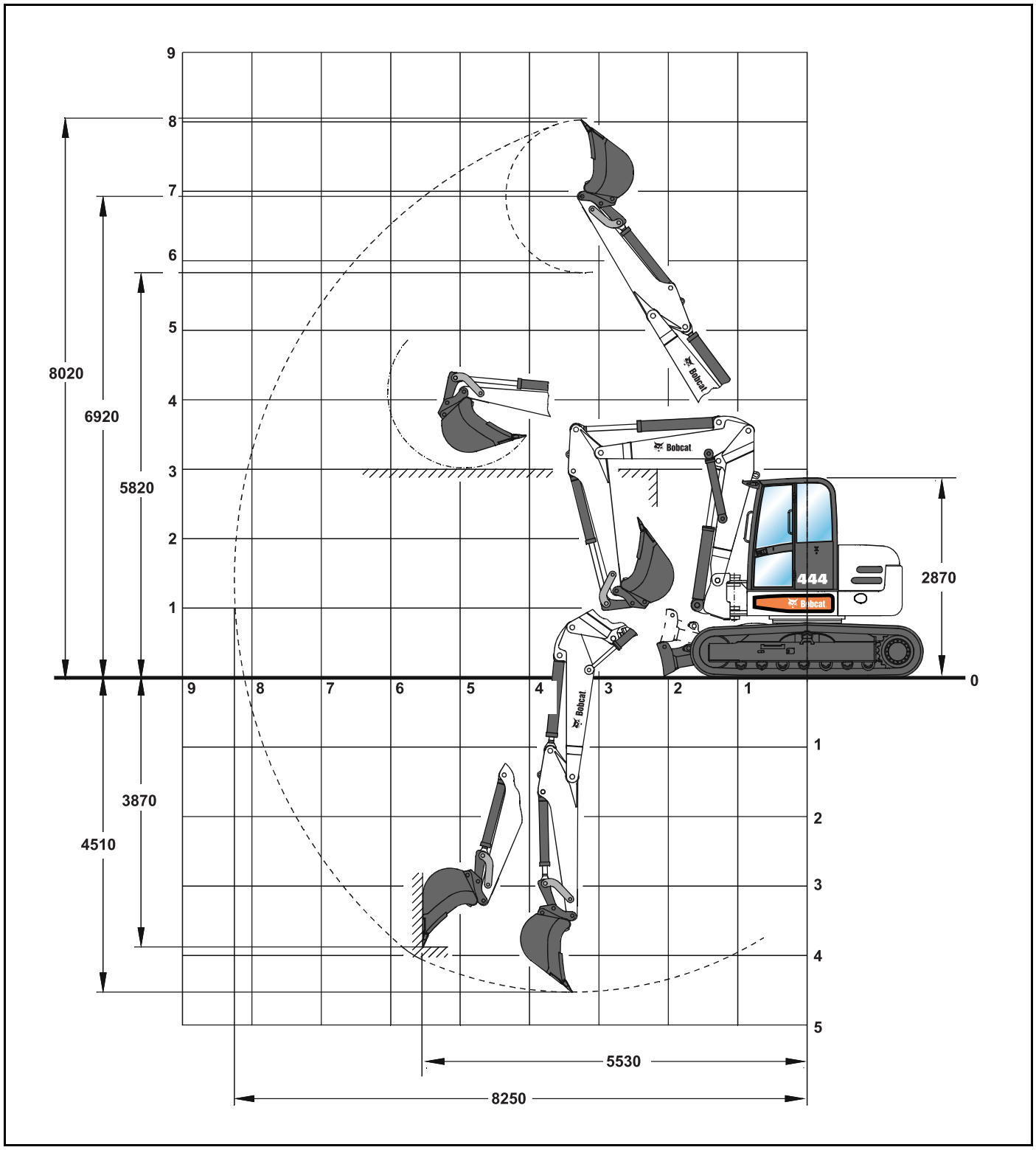
Standard boom and long dipperstick (option)

Figure 206



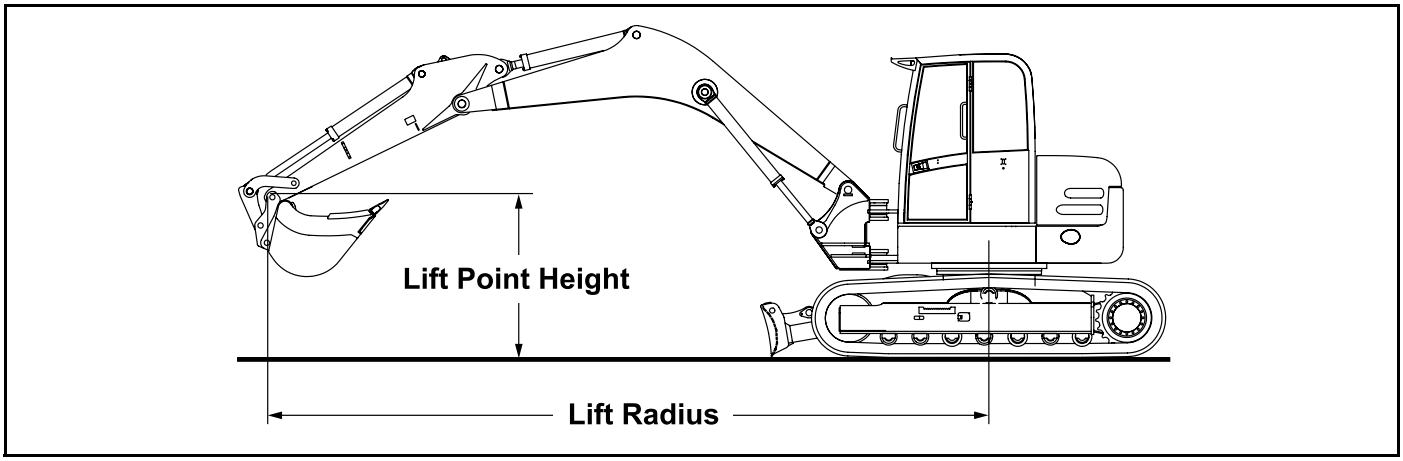
Articulated boom (option) and standard dipperstick

Figure 207



Rated Operating Capacity

Figure 208



Note: Lift point is bucket hinge pin with standard bucket attached and bucket cylinder fully extended. Rated lift capacity over blade, blade down.

Along undercarriage, supported by dozer blade

Lift point height (mm)	Lift at 3200 mm radius [kg]	Lift at 4000 mm radius [kg]	Lift at 5000 mm radius [kg]	Lift at 6000 mm radius [kg]	Lift at max (6600 mm) radius [kg]
3000	4800	3580	3020	2780	2680
1500	7190	5320	3900	3250	2930
Ground	7300	5910	4530	2870	3200
-500	6840	5370	4400	3690	3370

Along undercarriage, moving

Lift point height (mm)	Lift at 3200 mm radius [kg]	Lift at 4000 mm radius [kg]	Lift at 5000 mm radius [kg]	Lift at 6000 mm radius [kg]	Lift at max (6600 mm) radius [kg]
3000	3150	3530	2320	2030	1370
1500	4660	3530	2600	1980	1650
Ground	4700	3210	2410	1140	1640
-500	4450	3260	2340	1770	1570

Across undercarriage, supported by dozer blade

Lift point height (mm)	Lift at 3200 mm radius [kg]	Lift at 4000 mm radius [kg]	Lift at 5000 mm radius [kg]	Lift at 6000 mm radius [kg]	Lift at max (6600 mm) radius [kg]
3000	2060	3360	2280	1700	1480
1500	3900	2840	2030	1600	1360
Ground	4020	2650	1980	1510	1320
-500	3670	2740	1950	1520	1370

Across undercarriage, moving

Lift point height (mm)	Lift at 3200 mm radius [kg]	Lift at 4000 mm radius [kg]	Lift at 5000 mm radius [kg]	Lift at 6000 mm radius [kg]	Lift at max (6600 mm) radius [kg]
3000	-	3280	2260	1690	1460
1500	3830	2070	2070	1620	1330
Ground	3920	2590	1950	1480	1300
-500	3620	2610	1910	1500	1340

Performance

Reference	Value
Digging force, dipperstick (ISO 6015)	N
Digging force, bucket (ISO 6015)	N
Drawbar pull (theoretical at 90% efficiency)	N
Ground pressure with rubber tracks	kPa

Function Time

Reference	Value
Boom raise time	5.4 s
Boom lower time	4.7 s
Bucket curl time	2.4 s
Bucket dump time	3.3 s
Dipperstick retract time	4.4 s
Dipperstick extend time	4.3 s
Boom swing left time	8.2 s
Boom swing right time	6.2 s
Blade raise time	4.1 s
Blade lower time	5.2 s
Slew rate	9.0 RPM

Weights

Reference	Value
Operating weight with ROPS cab , rubber tracks, standard bucket (SAE J732)	12500 kg
Additional weight for 500 mm steel tracks	+ 300 kg
Additional weight for 800 mm steel tracks	+ 910 kg
Additional weight for long dipperstick	+ 70 kg
Additional weight for articulated boom	+ 300 kg
Reduction for shipping weight	- 267 kg

Engine

Reference	Value
Make/model	Deutz/BF-4M-2012/COM /EPA 2 (turbo)
Fuel	Diesel
Cooling	Liquid
Maximum power at 2100 RPM (DIN 70020)	69.0 kW
Maximum governed speed	2100 RPM
Maximum torque at 1400 - 1600 RPM (SAE Net)	385 Nm
Number of cylinders	4
Displacement	4038 cm^3
Bore	94 mm
Stroke	115 mm
Lubrication	Pressure system with filter
Crankcase ventilation	Closed breathing
Air filter	Dry replaceable cartridge with safety element
Ignition	Diesel-compression
Starting aid	Intake air heater

Electrical system

Reference	Value
Alternator	12 V - 55 A - open frame with internal regulator
Battery	12 V - 600 cold cranking A at -18°C – 105 min reserve capacity
Starter	12 V - gear reduction type - 3.1 kW

Hydraulic system

Reference	Value
Pump type	One engine-driven piston pump and two engine-driven gear pumps
Piston pump capacity	158 l/min (350 bar max)
Gear pump capacity	41.4 l/min + 36 l/min (230 bar max)
System relief pressure for implement and travel circuits	350 Bar
System relief pressure for slew, blade and offset circuits	230 Bar
System relief pressure for auxiliary circuits	280 Bar
Control valve	Nine-spool
Hydraulic filter	Full-flow replaceable - 3 µm synthetic media element
Fluid lines	SAE standard tubelines, hoses, and fittings
Auxiliary flow	100 l/min
Hydraulic oil cooler	Thermostatically controlled. Range 50-45°C

Hydraulic Cylinders

Reference	Value
Boom cylinder	Cushion up and down
Boom cylinder bore	95 mm
Boom cylinder rod	60 mm
Boom cylinder stroke	800 mm
Dipperstick cylinder	Cushion retract and extend
Dipperstick cylinder bore	115.0 mm
Dipperstick cylinder rod	70.0 mm
Dipperstick cylinder stroke	850.0 mm
Bucket cylinder	Bucket curl
Bucket cylinder bore	105.0 mm
Bucket cylinder rod	70.0 mm
Bucket cylinder stroke	765.0 mm
Boom swing cylinder	Cushion left and right
Boom swing cylinder bore	115.0 mm
Boom swing cylinder rod	70.0 mm
Boom swing cylinder stroke	670.0 mm
Blade cylinder	No cushion
Blade cylinder bore	110.0 mm
Blade cylinder rod	60.0 mm
Blade cylinder stroke	235.0 mm

Slew System

Reference	Value
Boom swing, left	63°
Boom swing, right	65°
Slew circle	Single row shear-type ball bearings with internal gear
Slew angle	360°
Slew speed	0 - 9 rpm
Slew drive	Axial piston motor with spring applied disk brake

Drive System

Reference	Value
Travel motor	Each track is driven by a hydrostatic axial piston motor
Drive reduction	Two-stage planetary gear reduction

Traction

Reference	Value
Track width	500 mm (steel & rubber) / 800 mm (optional steel track)
Track adjusters	Grease type with shock absorbing recoil springs
Track type	Half-pitch, rubber
Track type	Steel, triple grouser shoe

Reference	Value
Travel speed, low range	2.7 km/h
Travel speed, high range	5.4 km/h
Undercarriage	Crawler-type tractor design with reinforced box-section track roller frame and sealed track rollers
Number of track rollers per side	1 top, 7 bottom
Gradeability	30°

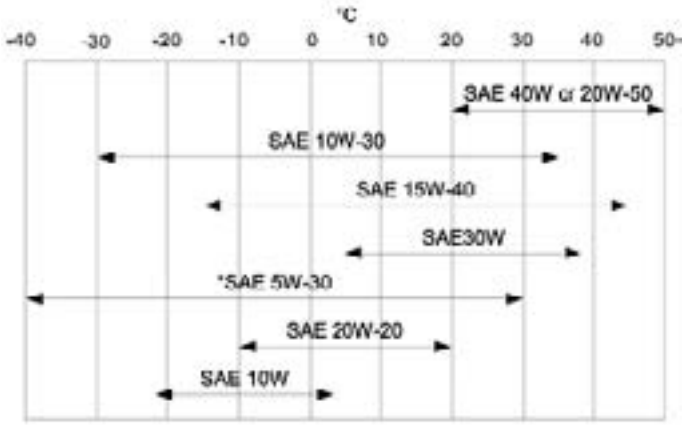
Brakes

Reference	Value
Parking brake	Spring applied, hydraulically released, multi-disk brake
Slew brake	Spring applied, hydraulically released, multi-disk brake
Travel brake	Spring applied, hydraulically released, multi-disk brake

Fluid Capacities

Reference	Value
Cooling system	12.0 l
Engine lubrication plus oil filter	10.0 l
Fuel reservoir	190.0 l
Hydraulic reservoir	140.0 l
Hydraulic system with bucket and dipper cylinder retracted, bucket on the ground, and blade down	140.0 l
Travel motor (each)	1.8 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.

Controls

Engine	Hand lever on right-hand side
Starting	Push button
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 lock for holding and service	Automatically applied slew brake integrated in slew motor
Steering	Direction and speed controlled by two pilot-operated hand levers or foot pedals

Instrumentation

- Air filter restriction indicator
- Air intake heater indicator
- Boom cylinder load gauge
- Charging system indicator
- Engine oil pressure indicator
- Engine temperature gauge
- Fuel gauge
- Hour meter
- Hydraulic fluid level indicator
- Hydraulic system indicator

Serviceability

Access is available to the following through the reartailgate or side access hood:

- Air cleaner with indicator
- Battery
- Cooling system (engine oil and hydraulic oil coolers)for cleaning
- Control valve
- Engine oil and fuel filters
- Engine oil level
- Fuel filler
- Hydraulic valve bank
- Starter
- Sight gauges for hydraulic level

Tailgate and access cover have locks for vandal-proofing. Easy access to all grease points. Central grease point for swing bearing, swing pinion, and offset cylinder.

Environmental

Noise level LpA (EU Directive 2000/14/EC)	79 dB(A)
Noise level LWA (EU Directive 2000/14/EC)	101 dB(A)
Whole body vibration (ISO 2631-1)	0.5 m/s²
Hand/arm vibration (ISO 5349-1)	2.5 m/s²

Safety

Retractable seat belt, standard	Should always be worn when operating the excavator
Operator cab, standard	Closed cab with heater. Meets ISO 12117 for Tip Over Protective Structure (TOPS). An optional top Falling Object Protective Structure (FOPS) meeting ISO 10262 Level 2* is available.
Grab handles, standard	Should always be used when entering/exiting excavator.
Front working lights, standard	Use for indoor and low light operation.
Control lockout, standard	Operator console locks out work group and travel functions when in the upright position.
Upper carriage slew lock, standard	An automatic disk brake locks the upper structure to the undercarriage for transport.
Travel motion alarm, optional	For use when required
Operator's handbook, standard	Weather-resistant operator handbook attached to the inside of the cab, providing operational instructions and warnings decals with pictorials and international symbols.

* Level II - Acceptance is intended for protection from falling trees or rocks for machines involved in site clearing, overhead demolition, or forestry.

WARRANTY

BOBCAT EXCAVATORS

INGERSOLL RAND INTERNATIONAL warrants to its authorised dealers who in turn warrant to the end-user/owner, that each new Bobcat excavator will be free from proven defects in material and workmanship for twelve months from the date of delivery to the end-user/owner or 2000 hours of machine usage, whichever occurs first, with the exception of tracks which are covered for the same initial period on a pro-rated basis based on the remaining depth of the track at the time any defect is discovered,

During the warranty period, the authorised selling Bobcat dealer shall repair or replace, at INGERSOLL RAND INTERNATIONAL's 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 end-user/owner shall provide the authorised dealer with prompt written notice of the defect and allow reasonable time for replacement or repair. INGERSOLL RAND INTERNATIONAL 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 end-user/owner.

The 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 INGERSOLL RAND INTERNATIONAL, air flow obstructions, or failure to maintain or use the Bobcat product according to the instructions applicable to it.

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