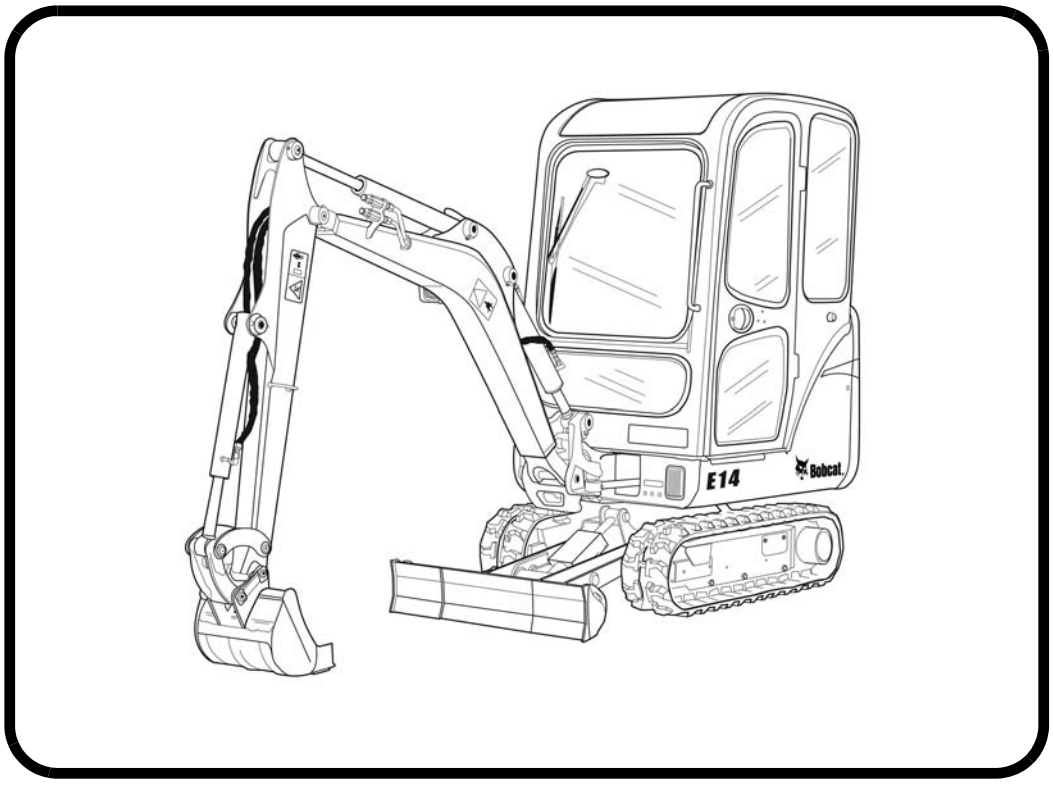
Operation & Maintenance Manual
E14 Compact Excavator

S/N AHNM11001 & Above



6989420-EN (09-09) Revised (5-12) (1)

Printed in BELGIUM
Original Instructions

OPERATOR SAFETY WARNING

WARNING

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

W-2001-0502

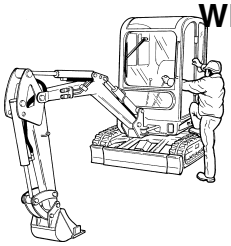
Safety Alert Symbol: **This symbol with a warning statement, means: "Warning, be alert! Your safety is involved!" Carefully read the message that follows.**

CORRECT

P-90216

- **Never operate without instructions.**
- **Read machine signs, Operation & Maintenance Manual, and Operator's Handbook.**

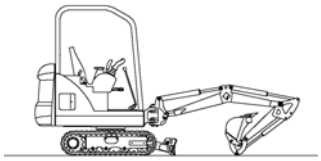
WRONG



B-23379

- **Do not grasp control handles when entering canopy or cab.**
- **Be sure controls are in neutral before starting.**
- **Sound horn and check behind machine before starting.**

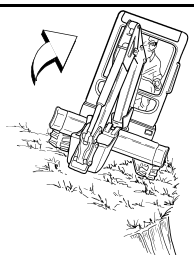
CORRECT



MS-2154

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

WRONG



B-23381

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

WRONG

MS-2148

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

WRONG

MS2156

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

CORRECT

B-23383A

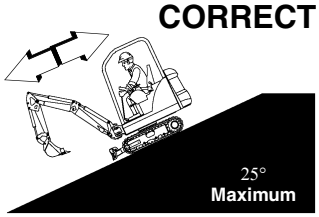
- **Never exceed a 15° slope to the side.**

CORRECT

MS-2158

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

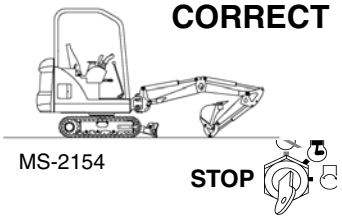
CORRECT



MS-2160

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

CORRECT



6808261A

- **To leave excavator, lower the attachment.**
- **Stop the engine.**

CORRECT

B-21928

- **Fasten seat belt securely.**
- **Operate controls only from operator's seat.**

SAFETY EQUIPMENT

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

OSW26-0609

CONTENTS

REFERENCE INFORMATION

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

Excavator Serial Number _____

Engine Serial Number _____

NOTES:

_____

_____

_____

_____

YOUR BOBCAT DEALER:

_____

ADDRESS:

_____

PHONE:

_____

Bobcat Company Europe
Drève Richelle 167
B-1410 WATERLOO
Belgium

CE

FOREWORD

This Operation & Maintenance Manual was written to give the owner / operator instructions on the safe operation and maintenance of the Bobcat excavator. READ AND UNDERSTAND THIS OPERATION & MAINTENANCE MANUAL BEFORE OPERATING YOUR BOBCAT EXCAVATOR. If you have any questions, see your Bobcat dealer. This manual may illustrate options and accessories not installed on your excavator.

Contents of EC Declaration of Conformity

This information is provided in the operators manual to comply with clause 1.7.4.2(c) of Annex I of Machinery Directive 2006/42/EC.

The official EC Declaration of Conformity is supplied in a separate document.

Manufacturer

Bobcat

Bobcat Company
World Headquarters
250 East Beaton Drive
West Fargo, ND 58078-6000
UNITED STATES OF AMERICA

Technical Documentation
Doosan Benelux SA
Drève Richelle 167
B-1410 Waterloo
BELGIUM

Directive 2000/14/EC: Noise Emission in the Environment by Equipment For Use Outdoors

Notified Body
Technical and Test Institute for Construction
Prague, Czech Republic
Notified Body Number: 1020

EC Certificate No.
1020-090-022395

Conformity Assessment Procedure(s)
2000/14/EC, Annex VIII, Full Quality Assurance

Sound Power Levels [Lw(A)]

Measured Sound Power	**90 dBA**
Guaranteed Sound Power	**91 dBA**

Description of Equipment
Type of Equipment: Excavator
Model Name: E14*A*EM
Model Code: AHNM

Engine Manufacturer: Kubota
Engine Model: D722-E2B-BCZ-5
Engine Power: 10.2 kW @ 2500 RPM

Equipment conforms to CE Directive(s) Listed Below
2006/42/EC: Machinery Directive
2004/108/EC: Electromagnetic Compatibility Directive

Declaration of Conformance
This equipment conforms to the requirements specified in all the EC Directives listed in this declaration.

Effective From:

29 December 2009

BOBCAT COMPANY IS ISO 9001:2000 CERTIFIED

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

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

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

REGULAR MAINTENANCE ITEMS

	ENGINE OIL FILTER (6 Pack) 6671057		PRIMARY HYDRAULIC FILTER 6653336
	FUEL FILTER 6667352		BATTERY 6670251
 	AIR FILTER, Outer 6673752 AIR FILTER, Inner 6673753		HYDRAULIC FILL / BREATHER CAP 6692836

LUBRICANTS AND FLUIDS

The lubricants and fuels described below are standard for operating conditions in European temperate climate areas. Please consult your Bobcat dealer for requirements under other weather conditions

All Bobcat Equipment													Only for TLS, Wheeled EXC and AL		
	ENGINE / LOADER TRANSMISSION				HYDRAULIC/ HYDROSTATIC		ANTIFREEZE COOLANT				AXLE / TRANSMISSION		BRAKE FLUID		
Packaging	Bobcat Engine Power SAE 0W/30	Bobcat Engine Power SAE 10W/30	Bobcat Engine Power SAE 15W/40	Bobcat Engine Power SAE 20W/50	Bobcat Superior SH Hydraulic/Hydrostatic	Bobcat Bio Hydraulic Hydraulic/Hydrostatic	Bobcat PG Coolant Concentrated	Bobcat PG Coolant 4 Seasons	Bobcat EG Coolant Concentrated	Bobcat EG Coolant Premixed	Bobcat Axle / Transmission Oil SAE 85W/90	Bobcat Axle / Transmission Oil ISO 100	Bobcat Brake Fluid LHM	Bobcat Brake Fluid (Roto TLS only)	
Lineart	-35°C +30°C	-25°C +30°C	-20°C +40°C	-15°C +50°C	-35°C +50°C	Environmentally Friendly Biodegradable	Protection -36°C				-12°C +50°C	-20°C +40°C			
5 L Can	6987500A	6904840A	6904841A	6987501A	6904842A	6904843A	6987646A	6904844A	6987596A	6987597A	6987602A	6904845A	6904846A	**6987667A**	
25 L Container	6987500B	6904840B	6904841B	6987501B	6904842B	6904843B	6987646B	6904844B	6987596B	6987597B	6987602B	6904845B		**6987667B**	
209 L Drum	6987500C	6904840C	6904841C	6987501C	6904842C	6904843C	6987646C	6904844C	6987596C	6987597C	6987602C	6904845C		**6987667C**	
1000 L Tank	6987500D	6904840D	6904841D	6987501D	6904842D	6904843D	6987646D	6904844D	6987596D	6987597D	6987602D	6904845D		**6987667D**	

Packaging		
400 gr Grease	Bobcat Multi-Purpose Grease	6903122
	Bobcat Supreme HD Grease	6687884
	Bobcat Extreme HP Grease	6687885

4700300-EN (01-10)

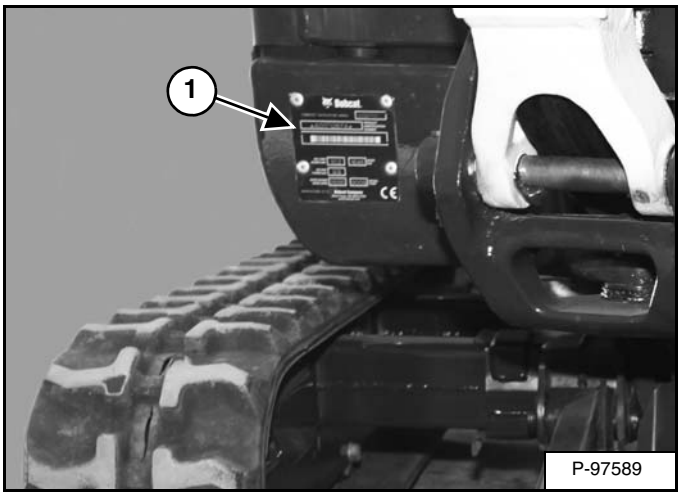
NOTE: Always verify Part Numbers with your Bobcat dealer.

SERIAL NUMBER LOCATIONS

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

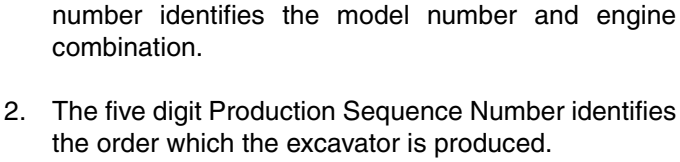
Excavator Serial Number

Figure 1



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

Figure 2



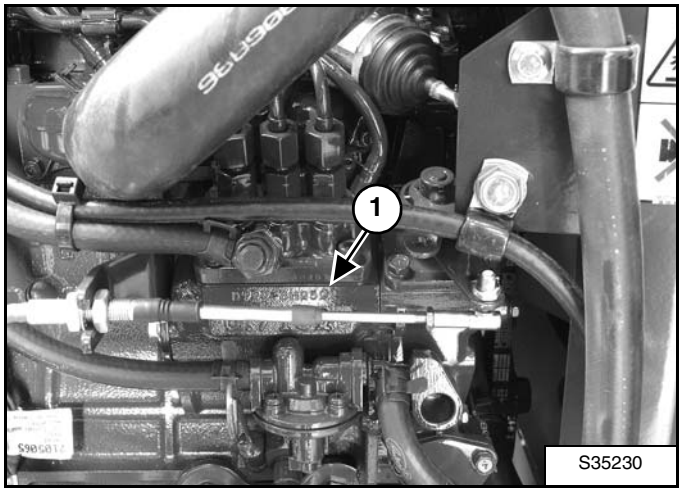
Explanation of excavator Serial Number **[Figure 2]**:

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

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

Engine Serial Number

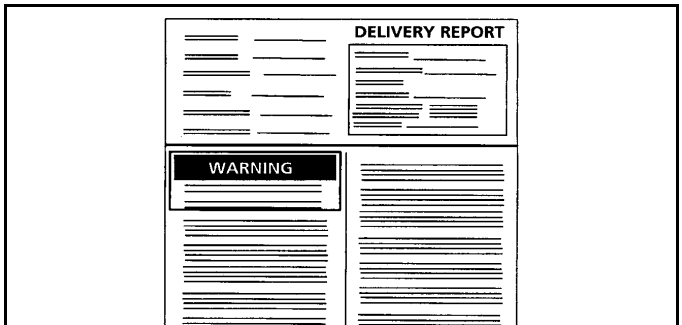
Figure 3



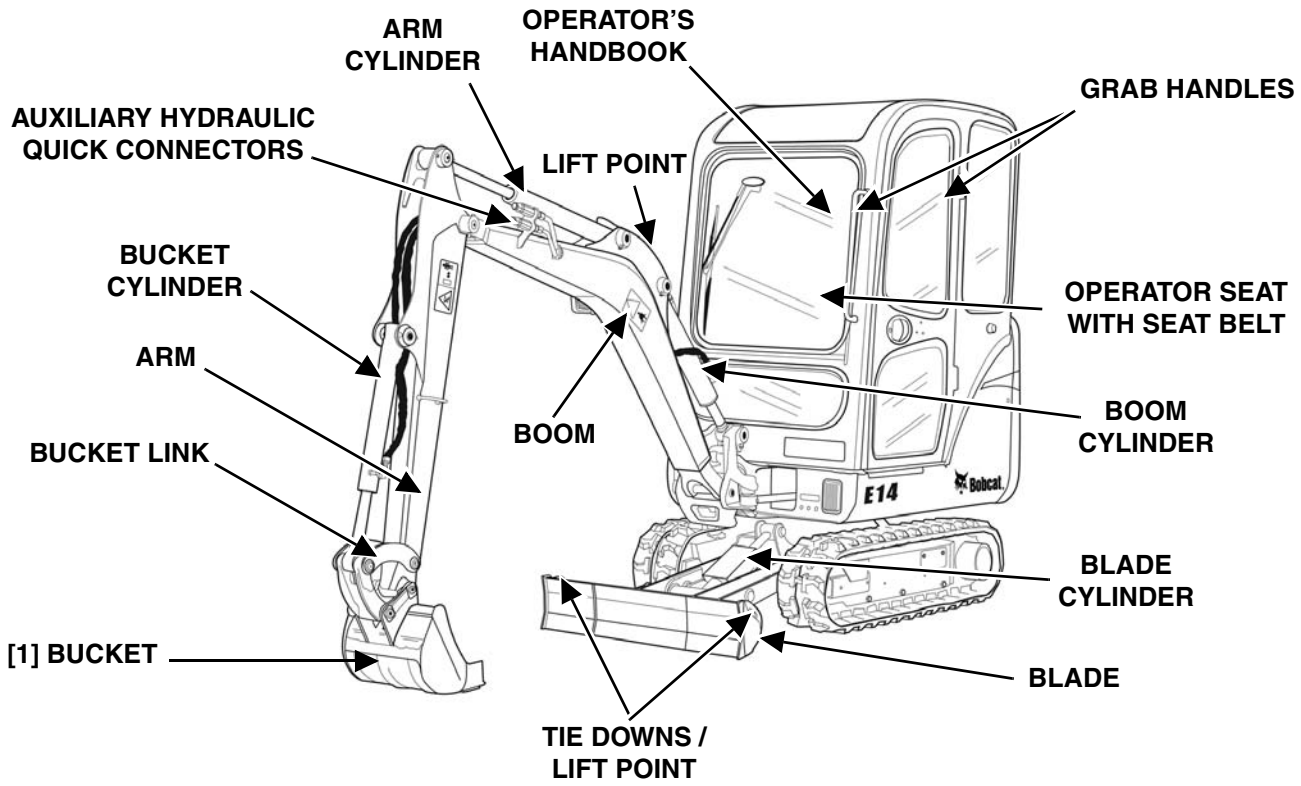
The engine serial number (Item 1) **[Figure 3]** is located on the side of the engine.

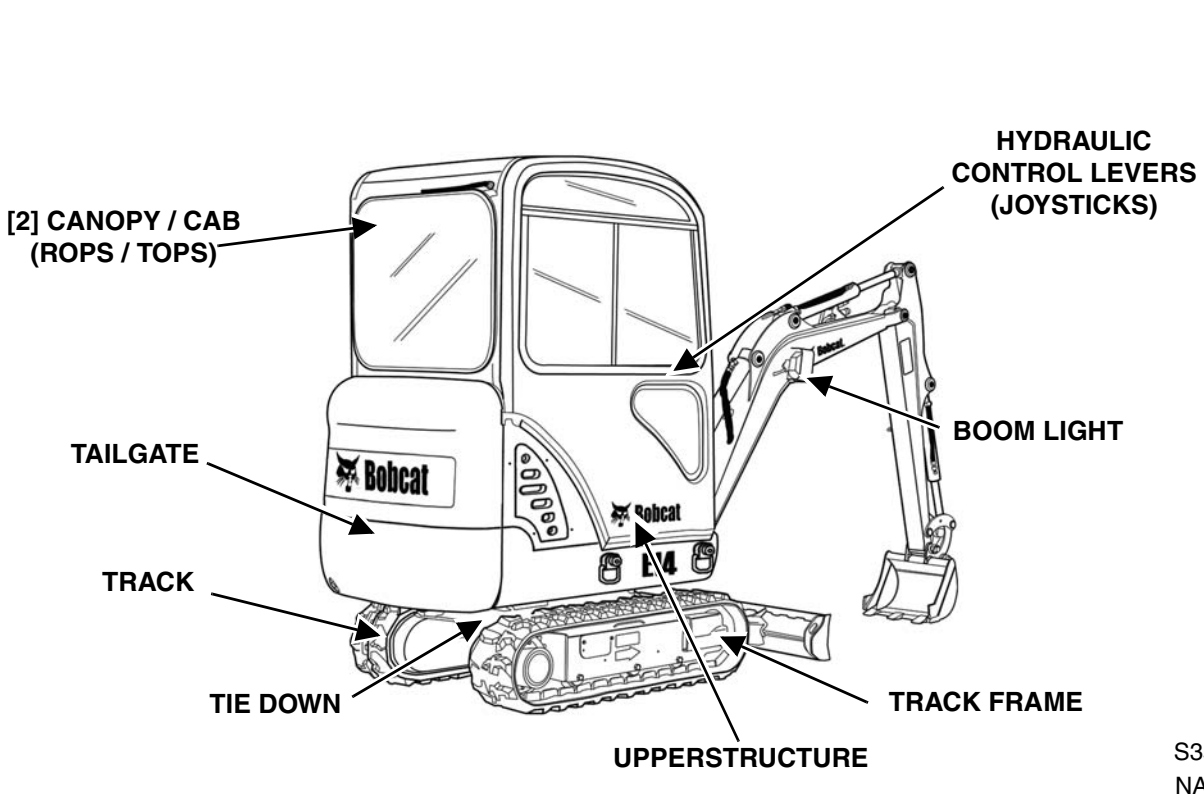
DELIVERY REPORT

Figure 4



The delivery report **[Figure 4]** must be filled out by the dealer and signed by the owner or operator when the Bobcat excavator is delivered. An explanation of the form must be given to the owner. Make sure it is filled out completely.





S35790
NA5805

[1] BUCKET - Several different buckets and other attachments are available from the Bobcat excavator.

[2] ROPS, TOPS - (Roll Over Protective Structure / Tip Over Protective Structure) as standard equipment. The ROPS / TOPS meets ISO 12117-2 and ISO 12117.

FEATURES, ACCESSORIES AND ATTACHMENTS

Standard Items

Model E14 Bobcat excavators are equipped with the following standard items:

- Hydraulic Retractable Undercarriage from 1360 mm to 980 mm
- 980 mm Dozer Blades
- 200 mm Rubber Track
- Doubel Acting Auxiliary Hydraulics with Quick Couplers
- Control Console Locks
- Horn
- Hydraulic Joystick Controls
- Retractable Seat Belt
- Spark Arrester Muffler
- Seat
- TOPS / ROPS Canopy
- Work Lights

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.

- TOPS / ROPS Cab with Cab Heater
- Two Speed Travel
- Keyless Start
- Travel Motion Alarm
- Cab / Canopy Light Kit
- Cab Enclosure, Vinyl
- Catalytic Exhaust Purifier Kit
- Top Guard Kit (FOGS)
- Special Application Kit
- 3 Inch Seat Belt Kit
- Suspension Seat Kit
- Blade Extension Kit
- Radio Kit
- Tie Down Kit
- Air Bleed Kit
- Boom Light Guard Kit
- Blade Pad Kit
- Auxiliary Couplers on Arm Kit

Specifications subject to change without notice and standard items may vary.

Attachments

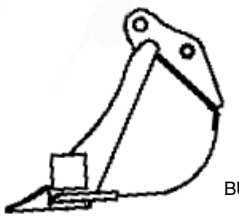
These and other attachments are approved for use on this model Bobcat excavator. Do not use unapproved attachments. Attachments not manufactured by Bobcat may not be approved.

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

See your Bobcat dealer for information about approved attachments and attachment Operation & Maintenance Manuals.

- Auger
- Grading Bucket
- Hydraulic Breaker
- Hydraulic Clamp
- Trenching Bucket

Buckets Available



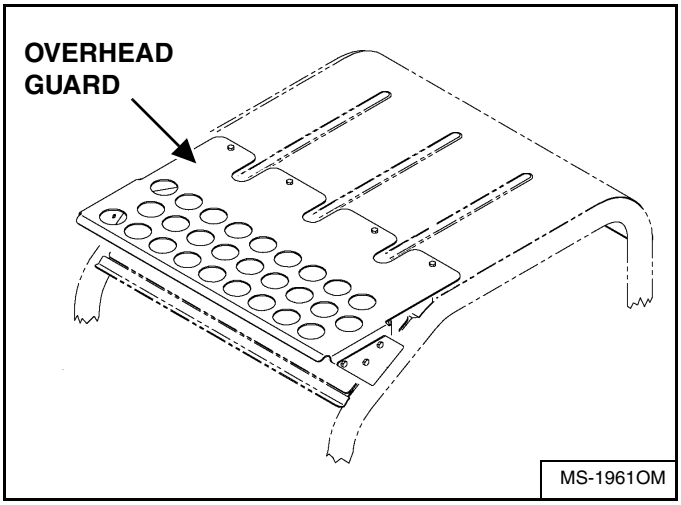
BUCKET

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

- 50 mm
- 230 mm
- 300 mm
- 400 mm
- 450 mm
- 500 mm
- 600 mm
- 800 mm
- 1000 mm

Falling Object Guards (FOGS)

Figure 5



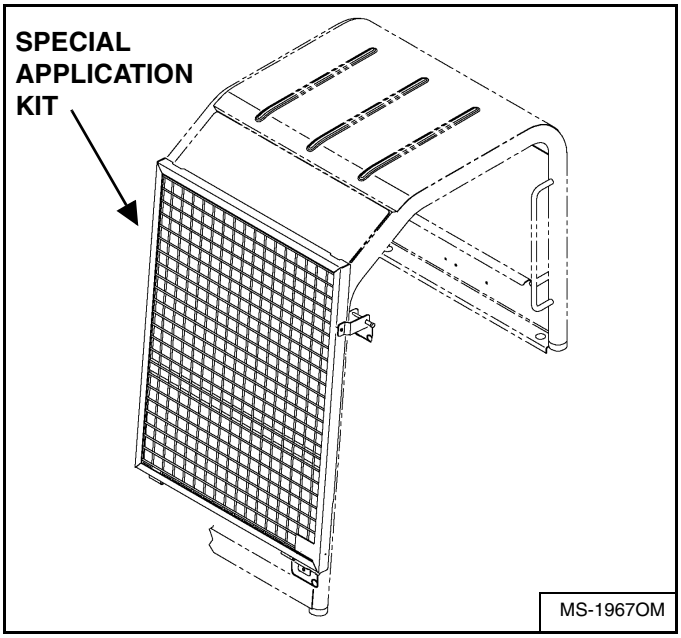
Available for special applications that require protection from smaller objects that can fall on the canopy / cab or restrict material from entering canopy / cab openings **[Figure 5]** and **[Figure 6]**.

The excavator must have the overhead guard **[Figure 5]** installed to meet the top guard requirements in ISO 10262.

See your Bobcat dealer for more information.

Special Applications Kit

Figure 6



The excavator must have the special applications kit **[Figure 6]** installed to meet the front guard requirements in ISO 10262 - level 1.

Kit includes a one piece screen guard.

See your Bobcat Dealer for more information.

Special Applications Kit Inspection And Maintenance

The Special Applications Kit must be regularly inspected and maintained. Inspect the screen for damage. Replace parts as necessary.

SAFETY & TRAINING RESOURCES

SAFETY INSTRUCTIONS

Before Operation

Carefully follow the operating and maintenance instructions in this manual.

The Bobcat excavator is highly maneuverable and compact. It is rugged and useful under a wide variety of conditions. This presents an operator with hazards associated with off motorway, 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 dealer explains the capabilities and restrictions of the Bobcat excavator and attachment for each application. The dealer demonstrates the safe operation according to Bobcat instructional materials, which are also available to operators. The dealer can also identify unsafe modifications or use of unapproved attachments. The attachments and buckets are designed for a Rated Lift Capacity. They are designed for secure fastening to the Bobcat excavator. The user must check with the dealer, or Bobcat literature, to determine safe loads of materials of specified densities for the machine - attachment combination.

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

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

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

- Machine signs (decals) instruct on the safe operation and care of your Bobcat machine or attachment. The signs and their locations are shown in the Operation & Maintenance Manual. Replacement signs are available from your Bobcat dealer.

- An Operator's Handbook is fastened to the operator cab of the excavator. Its brief instructions are convenient to the operator. 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 or she must ask the dealer for recommendations on the new use.

SI EXC EMEA-1009

Safe Operation Is The Operator's Responsibility

Safety Alert Symbol

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

WARNING

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

W-2001-0502

IMPORTANT

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

I-2019-0284

The signal word DANGER on the machine and in the manuals indicates a hazardous situation which, if not avoided, will result in death or serious injury.

D-1002-1107

WARNING

The signal word WARNING on the machine and in the manuals indicates a potentially hazardous situation which, if not avoided, could result in death or serious injury.

W-2044-1107

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

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

Safe Operation Needs A Qualified Operator

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

A Qualified Operator Must Do The Following:

Understand the Written Instructions, Rules and Regulations

- The written instructions from Bobcat Company include the Delivery Report, Operation & Maintenance Manual, Operator's Handbook and machine signs (decals).
- Check the rules and regulations at your location. The rules may include an employer's work safety requirements. For driving on public roads, the machine must be equipped as stipulated by the local regulations authorising operation on public roads in your specific country. Regulations may identify a hazard such as a utility line.

Have Training with Actual Operation

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

Know the Work Conditions

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

SI EXC EMEA-1009

Avoid Silica Dust

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

FIRE PREVENTION

Maintenance

The machine and some attachments have components that are at high temperatures under normal operating conditions. The primary source of high temperatures is the engine and exhaust system. The electrical system, if damaged or incorrectly maintained, can be a source of arcs or sparks.

Flammable debris (leaves, straw, etc.) must be removed regularly. If flammable debris is allowed to accumulate, it can cause a fire hazard. Clean often to avoid this accumulation. Flammable debris in the engine compartment is a potential fire hazard.

The operator's area, engine compartment and engine cooling system must be inspected every day and cleaned if necessary to prevent fire hazards and overheating.

All fuels, most lubricants and some coolants mixtures are flammable. Flammable fluids that are leaking or spilled onto hot surfaces or onto electrical components can cause a fire.

Operation

Do not use the machine where exhaust, arcs, sparks or hot components can contact flammable material, explosive dust or gases.

Electrical

Check all electrical wiring and connections for damage. Keep the battery terminals clean and tight. Repair or replace any damaged part or wires that are loose or frayed.

Battery gas can explode and cause serious injury. Use the procedure in the Operation & Maintenance Manual for connecting the battery and for jump starting. Do not jump start or charge a frozen or damaged battery. Keep any open flames or sparks away from batteries. Do not smoke in battery charging area.

SI EXC EMEA-1009

Hydraulic System

Check hydraulic tubes, hoses and fittings for damage and leakage. Never use open flame or bare skin to check for leaks. Hydraulic tubes and hoses must be properly routed and have adequate support and secure clamps. Tighten or replace any parts that show leakage.

Always clean fluid spills. Do not use petrol or diesel fuel for cleaning parts. Use commercial non-flammable solvents.

Fueling

Stop the engine and let it cool before adding fuel. No smoking! Do not refuel a machine near open flames or sparks. Fill the fuel tank outdoors.

Starting

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

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

Spark Arrester Exhaust System

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

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

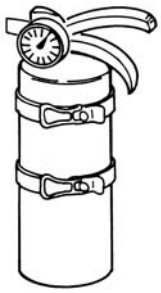
Welding And Grinding

Always clean the machine and attachment, disconnect the battery, and disconnect the wiring from the Bobcat controllers before welding. Cover rubber hoses, battery and all other flammable parts. Keep a fire extinguisher near the machine when welding.

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

Dust generated from repairing non-metallic parts such as hoods, fenders or covers can be flammable or explosive. Repair such components in a well ventilated area away from open flames or sparks.

Fire Extinguishers



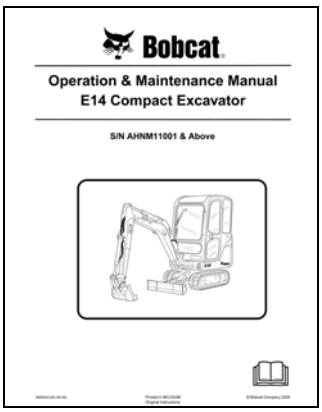
Know where fire extinguishers and first aid kits are located and how to use them. Inspect the fire extinguisher and service the fire extinguisher regularly. Obey the recommendations on the instructions plate.

SI EXC EMEA-1009

PUBLICATIONS AND TRAINING RESOURCES

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

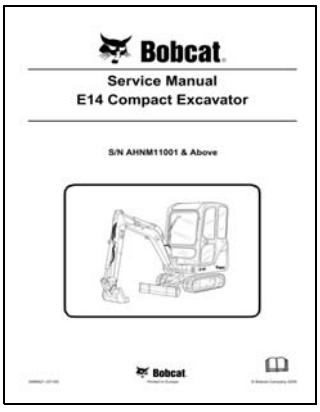
For the latest information on Bobcat products and the Bobcat Company, visit our web site at **www.bobcat.com**; you can also order Operator and Service Training materials online through www.bobcatstore.com



OPERATION & MAINTENANCE MANUAL

6989420

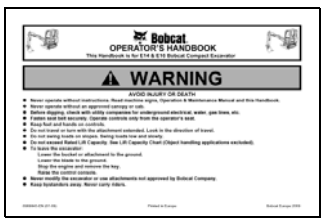
- Complete instructions on the correct operation and the routine maintenance of the Bobcat excavator.



SERVICE MANUAL

6989421

- Complete maintenance instructions for your Bobcat excavator.



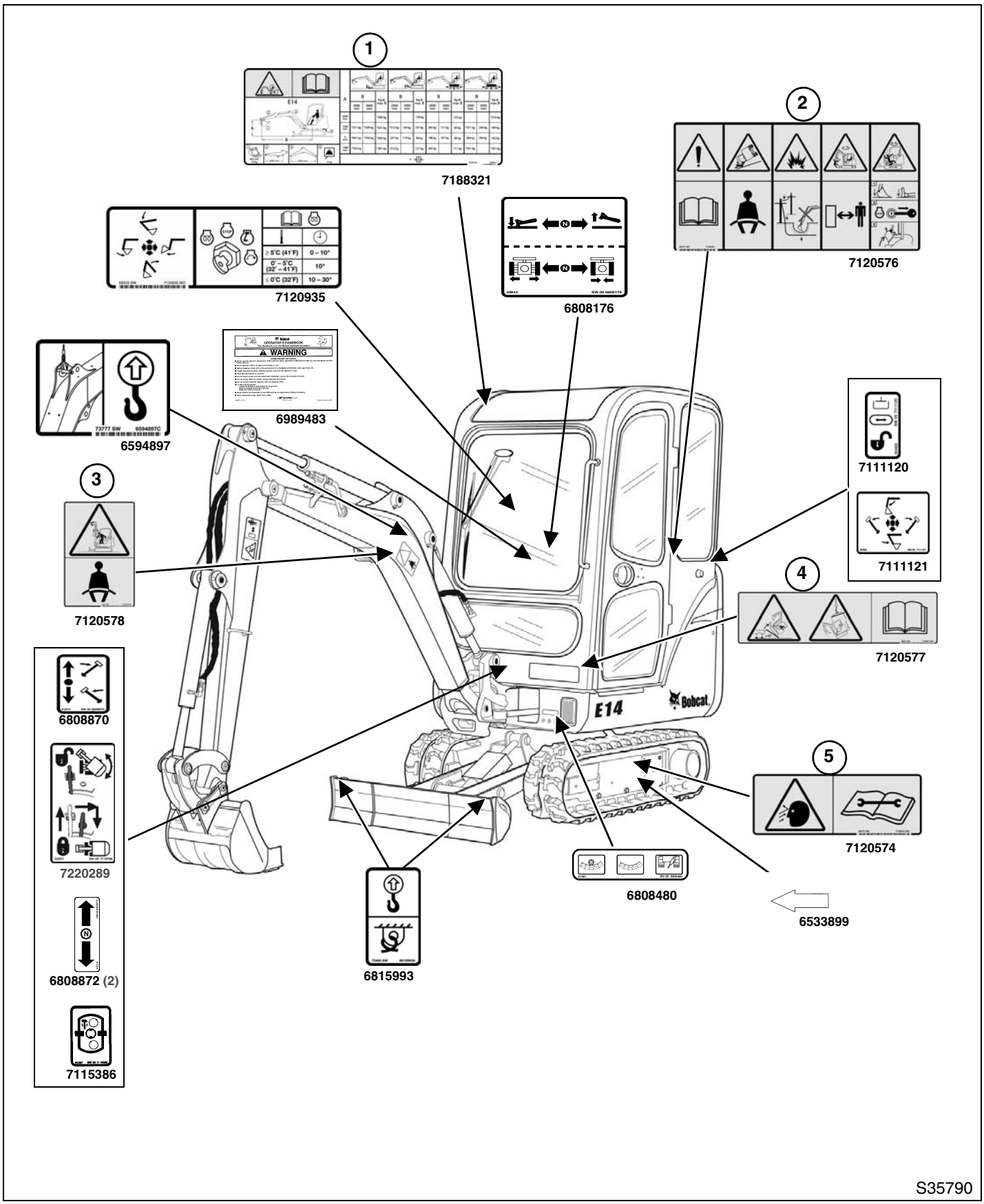
OPERATOR'S HANDBOOK

6989843

Gives basic operation instructions and safety warnings

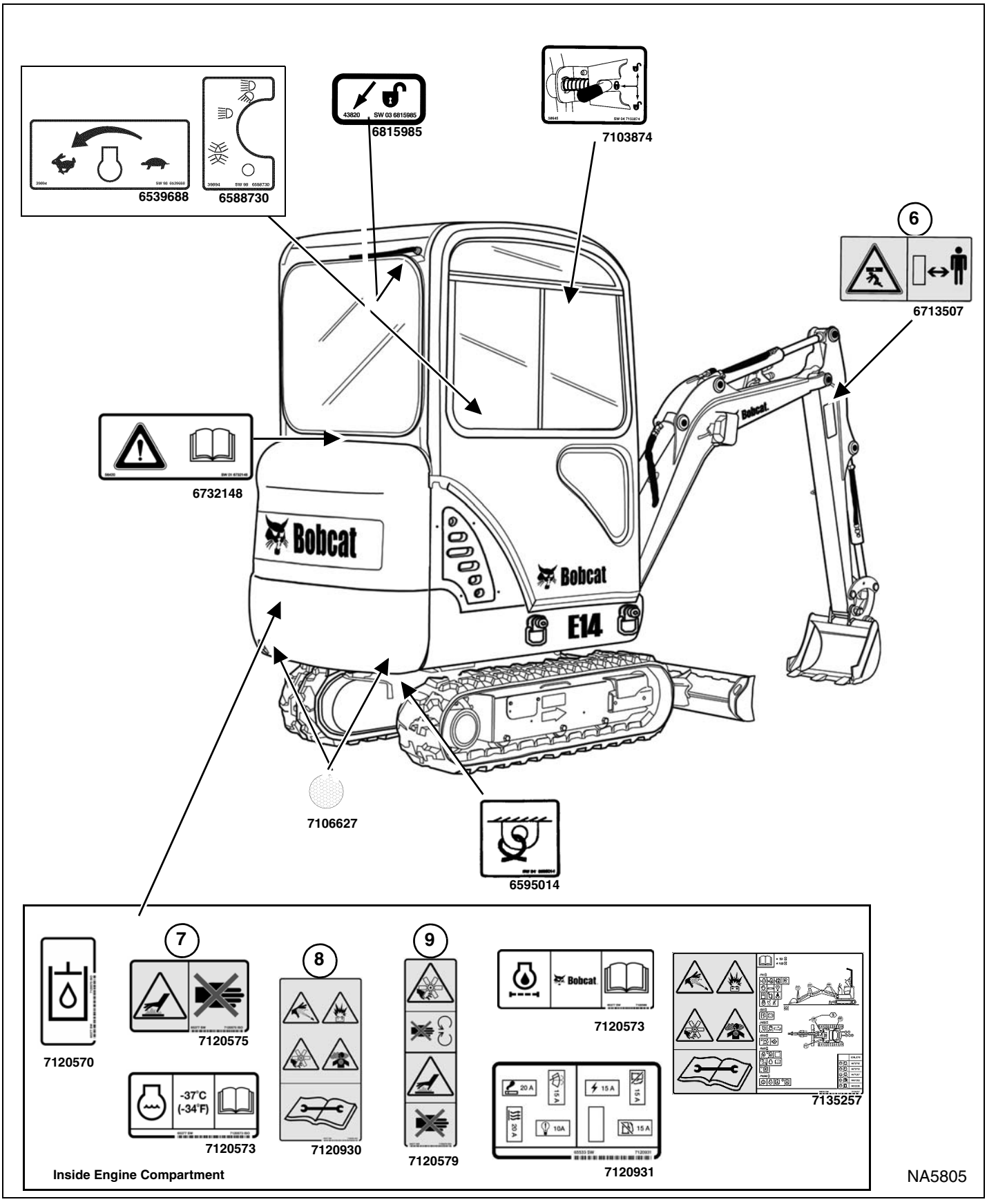
MACHINE SIGNS (DECALS)

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



MACHINE SIGNS (DECALS) (CONT'D)

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

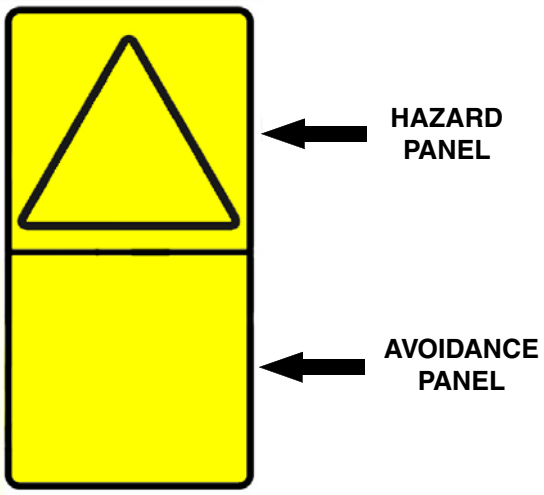


MACHINE SIGNS (DECALS) (CONT'D)

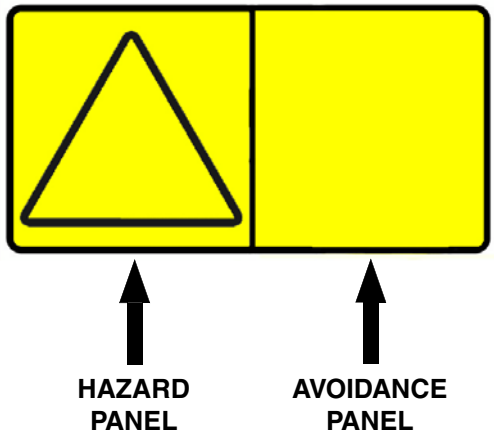
No-Text Safety Signs

Safety signs are used to alert the equipment operator or maintenance person to hazards that may be encountered in the use and maintenance of the equipment. The location and description of the safety signs are detailed in this section. Please become familiarized with all safety signs installed on the Excavator.

Vertical Configuration



Horizontal Configuration



The format consists of the hazard panel(s) and the avoidance panel(s):

Hazard panels depict a potential hazard enclosed in a safety alert triangle.

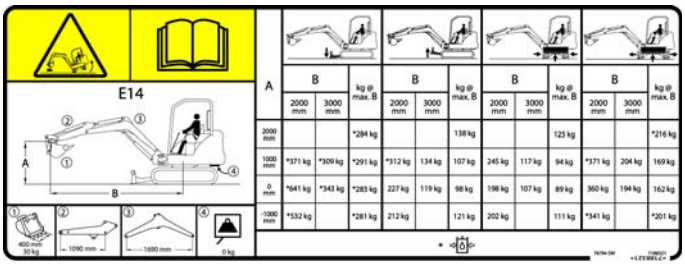
Avoidance panels depict actions required to avoid the hazards.

A safety sign may contain more than one hazard panel and more than one avoidance panel.

NOTE: See the numbered MACHINE SIGNS (DECALS) on Page 22 and MACHINE SIGNS (DECALS) (CONT'D) on Page 23 for the machine location of each corresponding numbered no-text decals as shown below.

1. Lift Capacity (7188321)

This safety sign is located in the operator's area.



WARNING

Overload can tip the excavator and cause serious injury or death.

- **Do not lift or hold any load that exceeds these ratings at their specific 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.**

Read and understand the Operation & Maintenance Manual for more information.

W-2519-0110

2. General Hazard (7120576)

This safety sign is located inside the operator's area on the right side.

WARNING

Failure to obey warning signs and instructions can cause serious injury or death. Never use excavator without instructions. Read and understand the Operation & Maintenance Manual and Handbook.
Keep away from dropoffs, steep areas or banks that could break away.
Explosion or electrocution can occur if machine contacts utility lines or pipes. Check for overhead or underground lines before operating.
Keep bystanders away. No riders. Check location of blade for direction of travel before moving steering controls.
Failure to operate machine from the operator's position can cause serious injury or death.
To Leave Excavator:
1. Lower attachment and blade to ground.
2. Stop engine and remove the key (if equipped).
3. Raise control console.

W-2518-0110

3. Crush Hazard (7120578)

This safety sign is located on both sides of the boom.

WARNING

Never stand and lean out of the cab when the engine is on. Accidental activation of the controls can cause serious injury or death. ALWAYS fasten seat belt securely.

W-2515-0106

4. Transporting And Lifting (7120577)

This safety sign is located on the front of the cab.

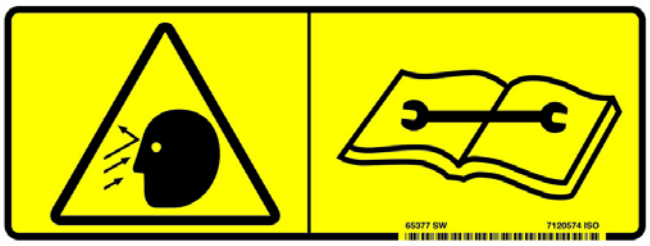
WARNING

Improper loading, transporting and lifting procedures can cause serious injury or death. Read and understand the Operation & Maintenance Manual prior to transporting or lifting the machine.

W-2517-0110

5. Thrown Or Flying Objects (7120574)

This safety sign is located on the outside of both tracks.



⚠ WARNING

High pressure grease can cause serious injury. Do not loosen grease fitting. Do not loosen bleed fitting more than 1 - 1/2 turns.
Read and understand the Operation & Maintenance Manual for more information.

W-2516-0110

6. Crush Hazard (6713507)

This safety sign is located on both sides of the arm.

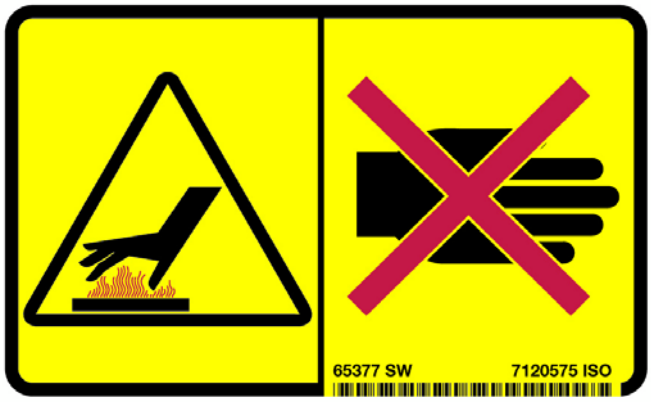
⚠ WARNING

Keep away from the operating machine to avoid serious injury or death.

W-2520-0106

7. Hot Surfaces (7120575)

This safety sign is located in the engine compartment.



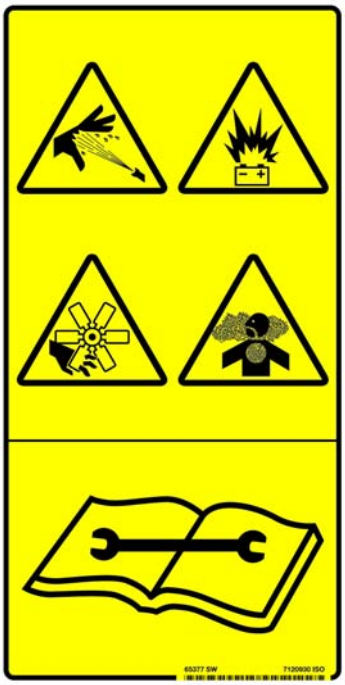
⚠ WARNING

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

W-2070-1203

8. High Pressure, Battery, Rotating Fan and Exhaust Gases (7120930)

This safety sign is located inside the tailgate.



WARNING

Leaking fluids under pressure can enter the skin and cause serious injury or death. Immediate medical attention is required. Wear goggles. Use cardboard to check for leaks.
Battery makes flammable and explosive gas. Keep arcs, sparks, flames and lighted tobacco away. Keep away from electrical contacts
Rotating fan can cause serious injury. Keep away from fan and moving parts. Do not operate with guard removed.
All exhaust gases can kill. Always ventilate.
Read and understand the Operation & Maintenance Manual for more information.

W-2522-0110

9. Hot Surfaces and Rotating Fan (7120579)

This safety sign is located inside the engine compartment.

WARNING

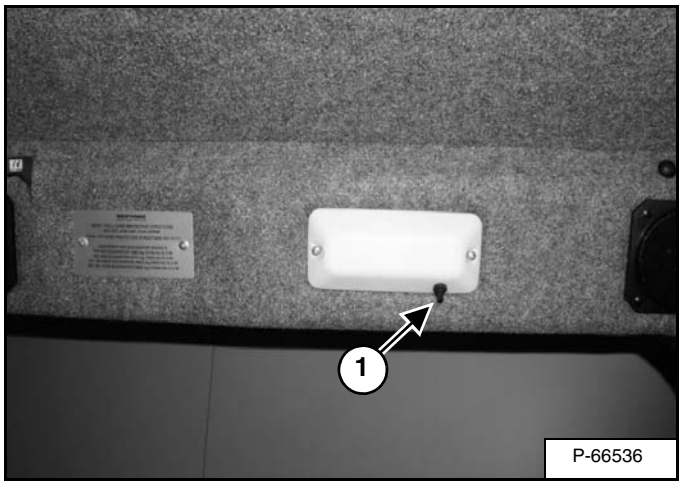
Rotating fan blade can cause serious injury or death. Keep away from fan and moving parts. Do not operate with guard removed.
Hot surfaces can cause injury. Do not touch. Allow to cool before servicing.

W-2521-0106

INSTRUMENTS AND CONSOLES

Cab Interior Light (If Equipped)

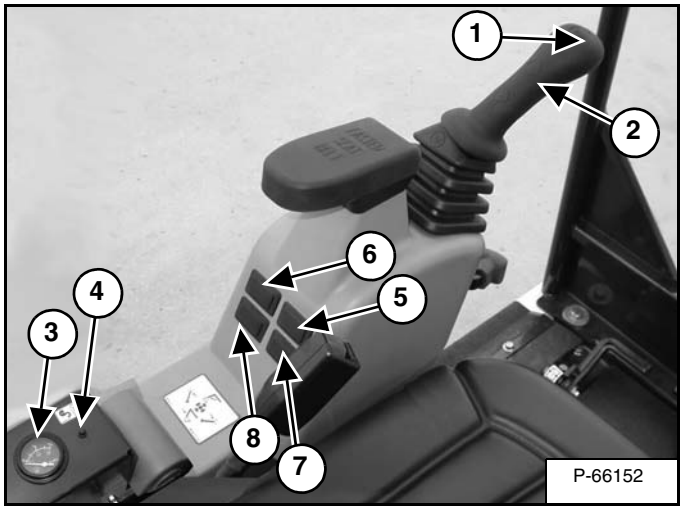
Figure 7



Press the button (Item 1) **[Figure 7]** to turn the light ON. Press again to turn the light OFF.

Left Console

Figure 8

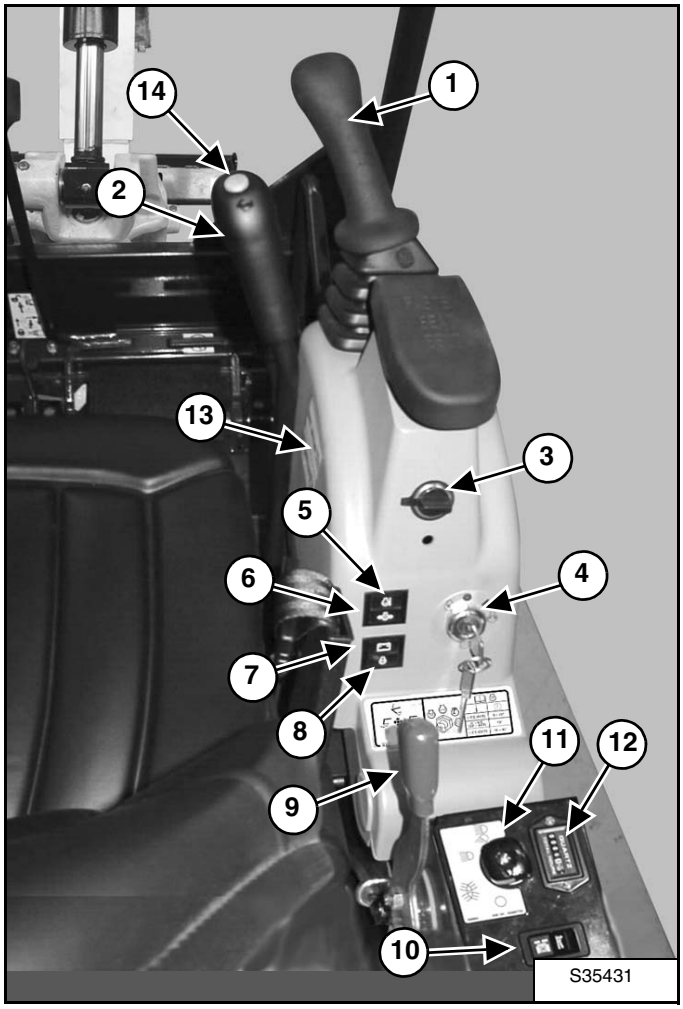


Left Console **[Figure 8]**

REF. NO	DESCRIPTION	FUNCTION / OPERATION
1	Horn	Press button to sound horn.
2	Left Joystick	(See HYDRAULIC CONTROLS on Page 43.)
3	Fuel Gauge	Shows the amount of fuel in the tank.
4	Hydraulic Lockout Indicator	When consoles are down and locked, indicator light will be ON. Hydraulic and traction system controls will operate.
5	Wiper / Washer (If Equipped)	Press left side to turn wiper ON. Press and hold for washer. Press right side to turn OFF.
6	Not Used	- - -
7	Not Used	- - -
8	Beacon (If Equipped)	Press left side of switch to turn beacon ON, right side to turn OFF.

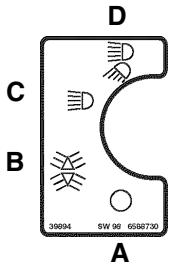
Right Console

Figure 9



Right Console **[Figure 9]**

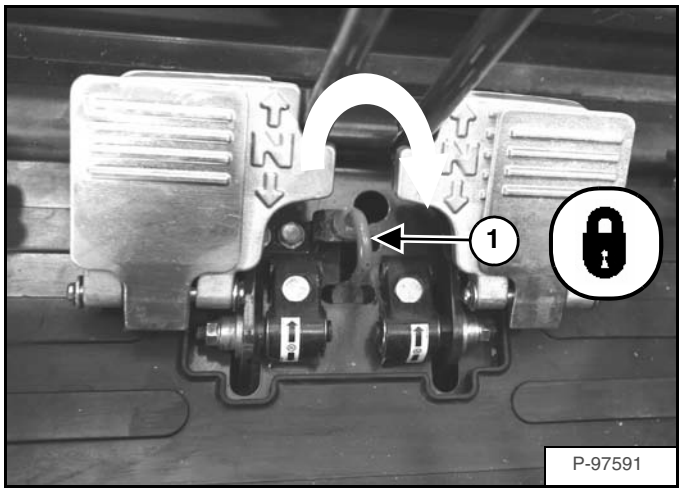
REF.	DESCRIPTION	FUNCTION / OPERATION
1	Right Joystick	(See HYDRAULIC CONTROLS on Page 43.)
2	Blade / Track Expansion Lever	Use with Blade / Track Expansion Switch to raise / lower the blade or expand / retract the tracks.
3	Auxiliary Power Outlet	Provides a 12V receptable for accessories.
4	Key Switch	(See STARTING THE ENGINE on Page 54.)
5	Engine Coolant Temperature Warning Light	Light comes ON when coolant temperature is above allowable range. Alarm also sounds. STOP the engine if light comes ON.
6	Engine Oil Pressure Warning Light	Light comes ON when pressure is below allowable range. Alarm also sounds. STOP the engine if light comes ON.
7	Charging System Light	Light comes ON when the alternator is NOT charging the battery.
8	Preheat Light	Light comes ON when the key is turned to PREHEAT position.
9	Engine Speed Control	Push forwards to increase speed; backwards to decrease.
10	Blade / Track Expansion Switch	Switch functions between raise / lower the blade and track expansion (See BLADE CONTROL LEVER on Page 46.) or (See TRACK FRAME EXPANSION on Page 47.)
11	Light Switch (Work, Strobe, Flasher)	**A.** Light Switch is OFF **B.** Strobe Light or Flasher is ON (If Equipped) **C.** Front Work Lights plus 'B' is ON (If Equipped) **D.** Additional Work Lights plus 'B' and 'C' is ON (If Equipped)
12	Hourmeter	Records the total operating hours of the excavator.
13	Alarm	(Inside right console) Alarm sounds only when key is ON and engine is stopped; also when engine oil pressure is low or coolant temperature is high.
14	2 Speed Button (If Equipped)	Switch between Low-Range and High-Range travel speed. (See Two-Speed Travel on Page 34.)



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

Upperstructure Slew Lock

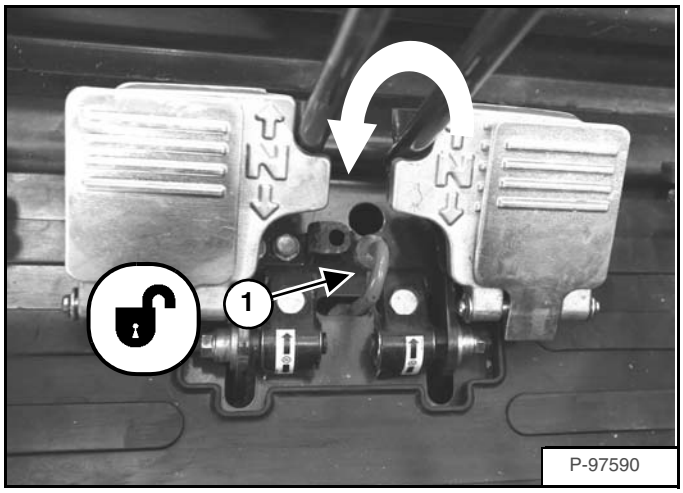
Figure 10



Move the lever (Item 1) **[Figure 10]** *to the right and down* to engage the Upperstructure Slew Lock. When the Slew Lock is engaged (locked), the upperstructure of the excaator is locked to the track frame and will not rotate. The upperstructure must be parallel to the track frame to engage the Slew Lock.

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

Figure 11



Move the lever (Item 1) **[Figure 11]** *up and to the left* to disengage (unlock) the upperstructure from the track frame. Secure the lever in the unlocked position.

⚠ WARNING

AVOID INJURY

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

W-2197-0904

Raising And Lowering The Console

Figure 12

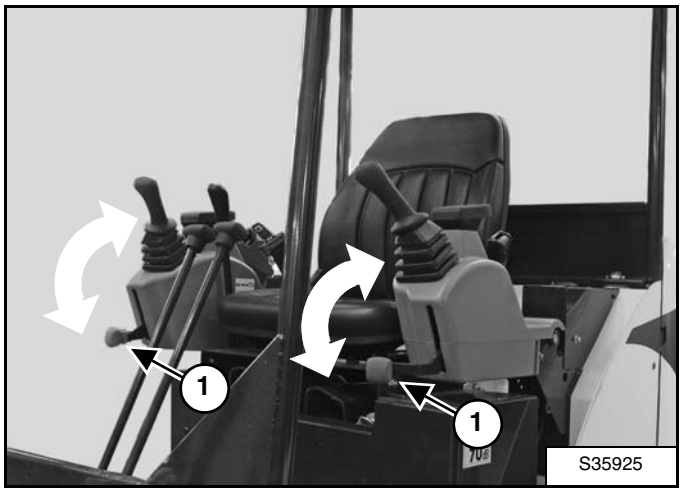
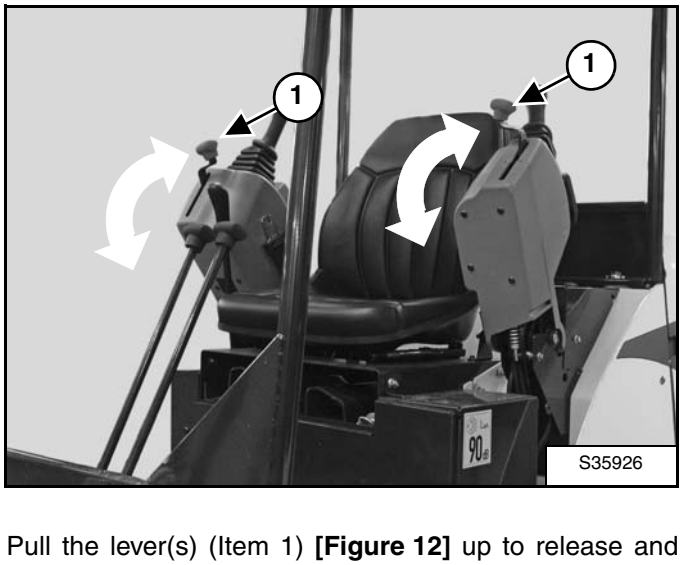


Figure 13



Pull the lever(s) (Item 1) **[Figure 12]** up to release and raise the console(s) to provide entry and exit from the canopy / cab.

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

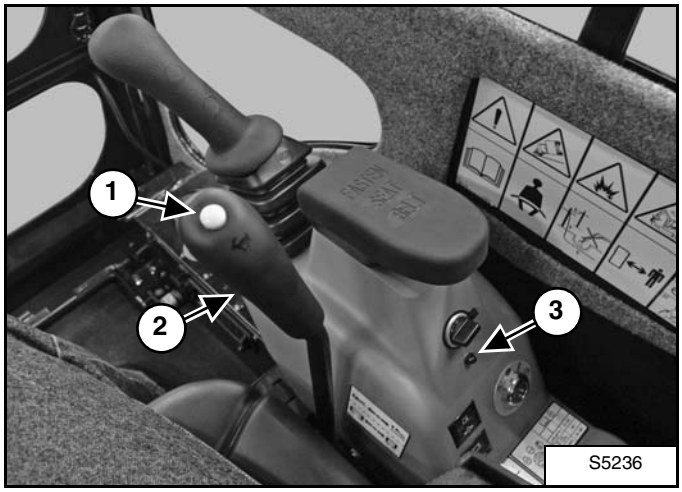
NOTE: If the engine stops, the boom / bucket (attachments) can be lowered to the ground using hydraulic pressure in the accumulator.

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

Lower the console(s) by pushing the lever(s) (Item 1) **[Figure 13]** until latched in the down position.

Two-Speed Travel

Figure 14



Press the button (Item 1) on the blade / track lever (Item 2) to engage the High-Range; press again for Low-Range. The green light (Item 3) **[Figure 14]** will be ON when High-Range is engaged.

OPERATOR CANOPY (ROPS / TOPS)

Description

The Bobcat excavator has an operator canopy (ROPS / TOPS) as standard equipment to protect the operator if the excavator is tipped over. The seat belt must be worn for ROPS / TOPS protection.

Check the ROPS / TOPS canopy, mounting, and hardware for damage. Never modify the ROPS / TOPS canopy. Replace the canopy and hardware if damaged. See your Bobcat dealer for parts.

ROPS / TOPS - Roll-Over Protective Structure per ISO 12117-2, and Tip-Over Protective Structure per ISO 12117.

⚠ WARNING

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

W-2069-0200

OPERATOR CAB (ROPS / TOPS)

Description

The Bobcat excavator has an optional operator cab (ROPS / TOPS) as standard equipment to protect the operator if the excavator is tipped over. The seat belt must be worn for ROPS / TOPS protection.

Check the ROPS / TOPS cab, mounting, and hardware for damage. Never modify the ROPS / TOPS cab. Replace the cab and hardware if damaged. See your Bobcat dealer for parts.

ROPS / TOPS - Roll-Over Protective Structure per ISO 12117-2, and Tip-Over Protective Structure per ISO 12117.

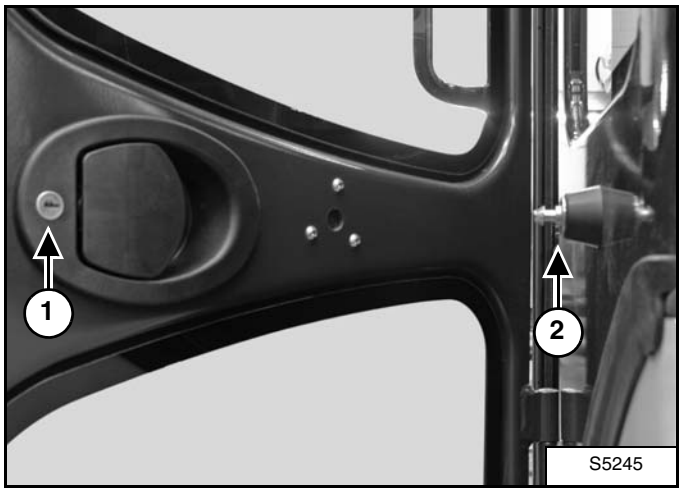
⚠ WARNING

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

W-2069-0200

Cab Door

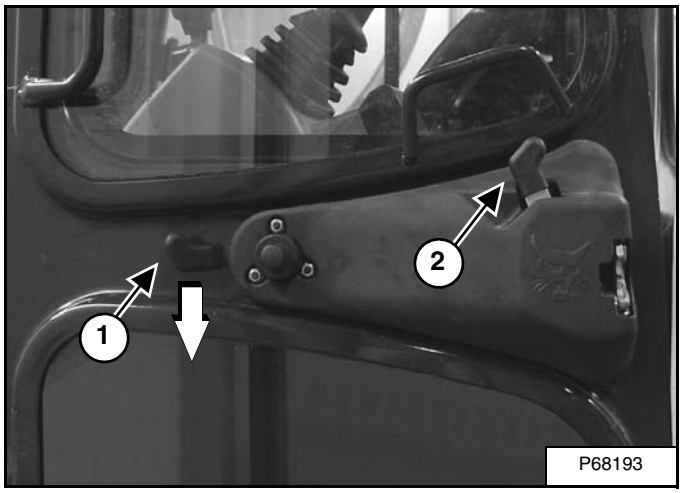
Figure 15



The cab door can be locked (Item 1) **[Figure 15]** with the same key as the starter switch.

Push the door all the way open until the latch (Item 2) **[Figure 15]** engages to hold the door in the open position.

Figure 16



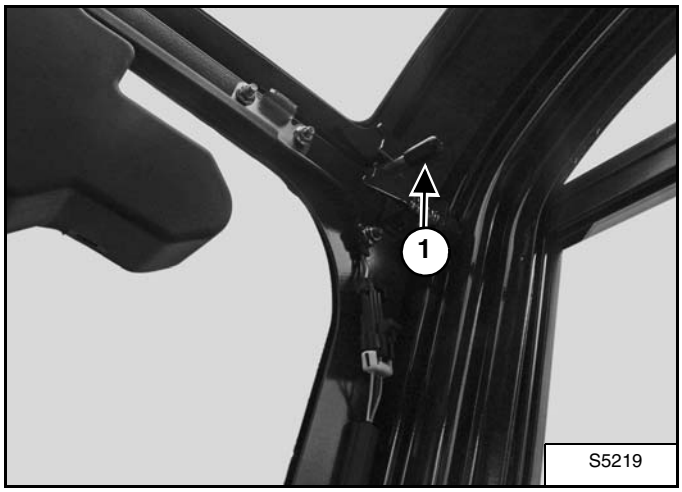
When the door is in the open position, push down on the latch (Item 1) **[Figure 16]** and close the door.

From inside the cab, open the door using the lever (Item 2) **[Figure 16]**.

Front Window

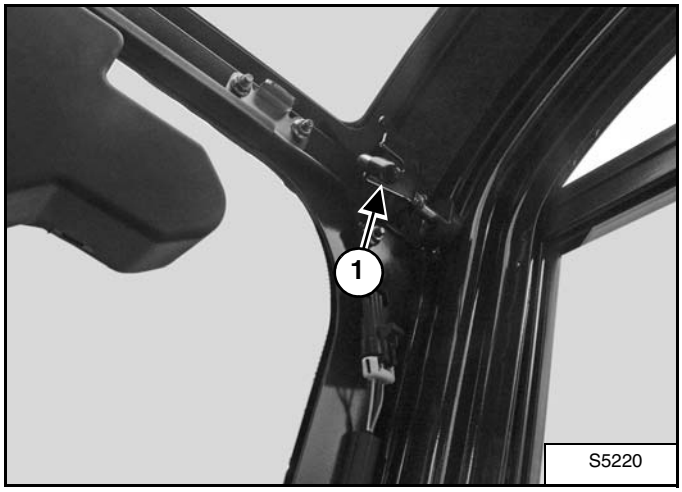
Opening The Front Window

Figure 17



Pull back the top latch pin (Item 1) **[Figure 17]** (both sides).

Figure 18



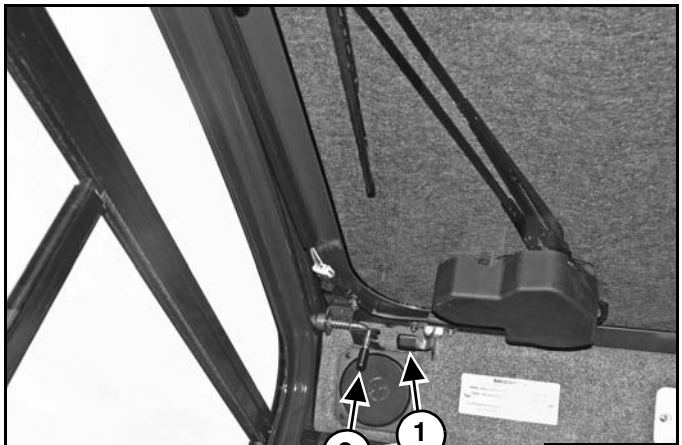
Turn the top latch (Item 1) **[Figure 18]** to the unlocked position (Both sides).

Figure 19

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

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

Figure 20



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

Closing The Front Window

Support the window while releasing the latch pin and placing it in the unlocked position (Both sides) **[Figure 20]**.

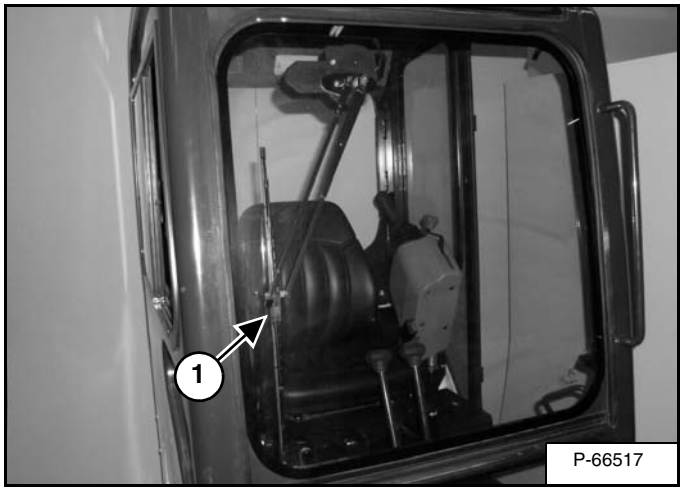
Support the window using the left grab handle and pull down on the latch (Item 1) **[Figure 20]** to release the window.

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

Rotate the top latch (Item 1) **[Figure 18]** to the locked position (Item 1) **[Figure 17]** (Both sides).

Front Wiper

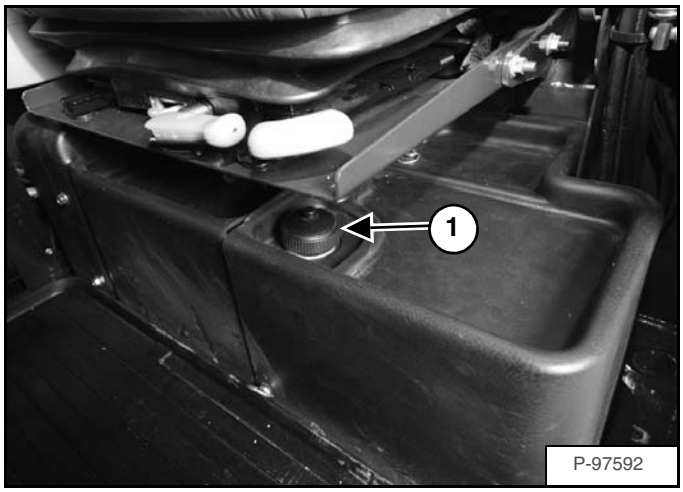
Figure 21



The front window is equipped with a wiper (Item 1) **[Figure 21]** and washer.

Window Washer Reservoir

Figure 22

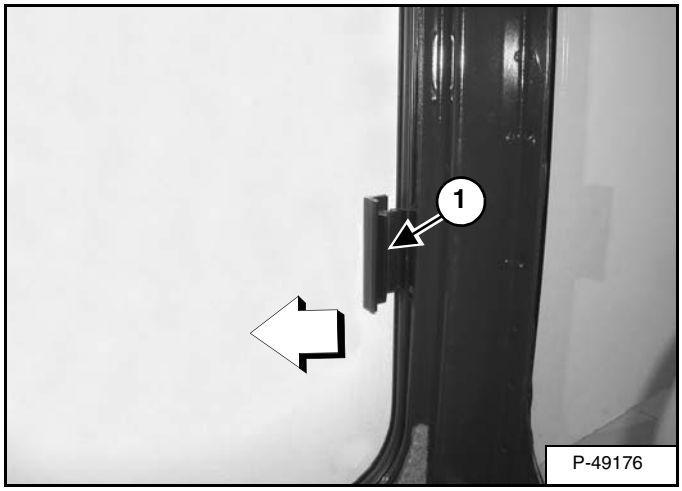


The window washer reservoir (Item 1) **[Figure 22]** is located under the operator's seat.

Right Side Windows

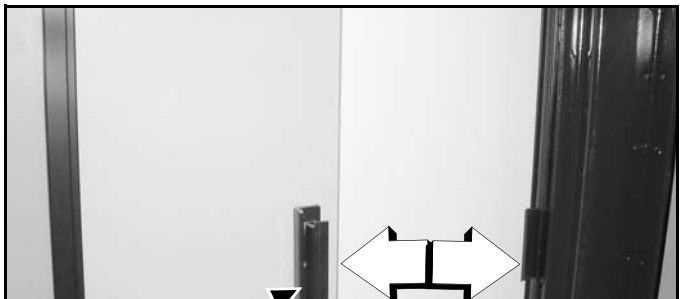
Opening The Right Rear Window

Figure 23



Pull out on the latch (Item 1) **[Figure 23]**.

Figure 24



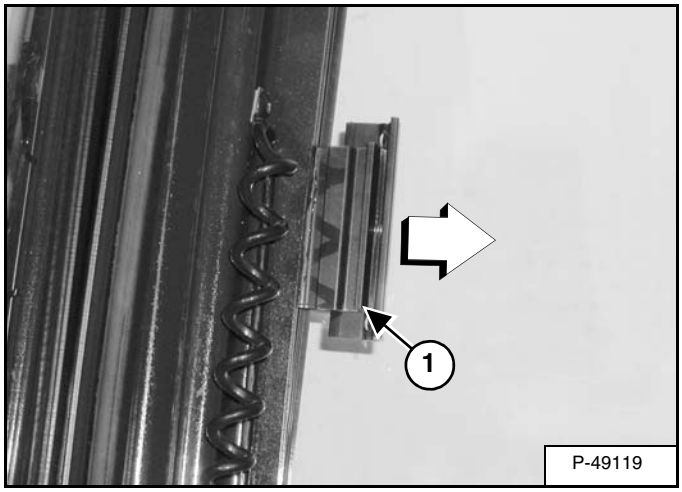
Pull the latch (Item 1) **[Figure 24]** forward to open the window.

Closing The Right Rear Window

Push the latch back to close the window.

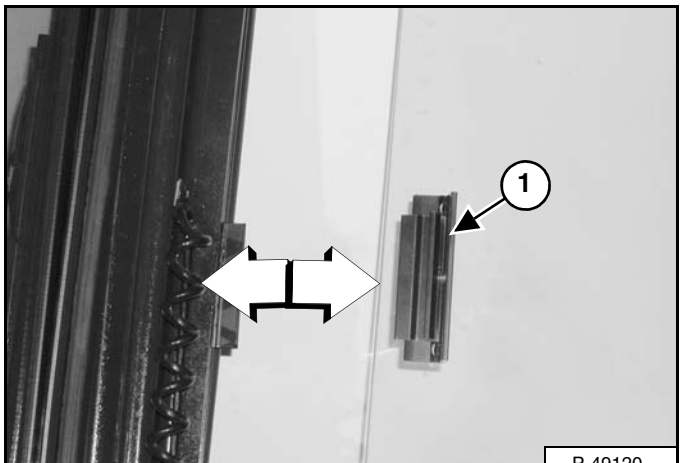
Opening The Right Front Window

Figure 25



Pull out on the latch (Item 1) **[Figure 25]**.

Figure 26



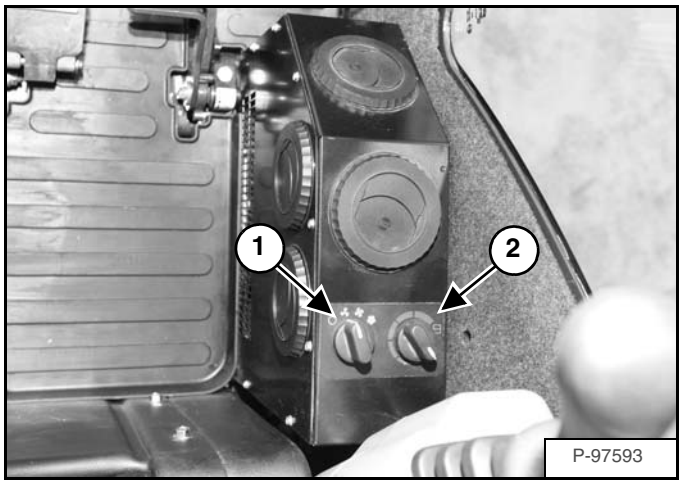
Pull the latch (Item 1) **[Figure 26]** back to open the window.

Closing The Right Front Window

Push the handle forward to close the window.

Heater

Figure 27



Heater **[Figure 27]**

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

EMERGENCY EXIT

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

Right Side Rear Window

Figure 28

Slide the right side rear window to the front of the excavator and exit through the side window **[Figure 28]**.

Front Window

Figure 29

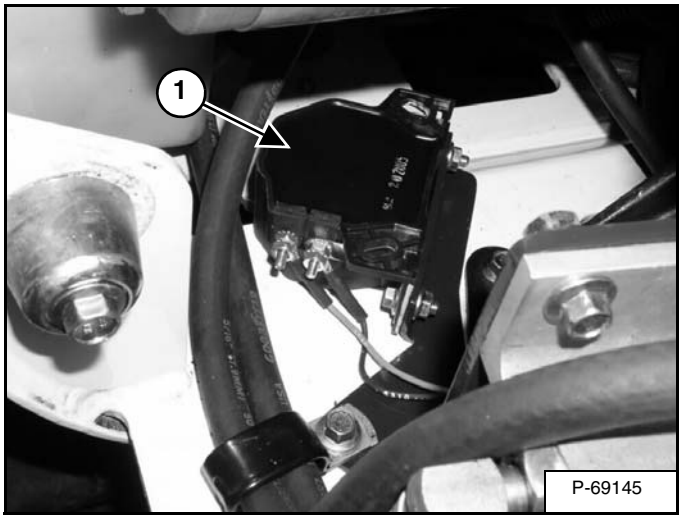
Open the front window and exit **[Figure 29]**.

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

MOTION ALARM SYSTEM (IF EQUIPPED)

Operation

Figure 30



This excavator may be equipped with a motion alarm system. The motion alarm (Item 1) **[Figure 30]** is located inside the rear of the excavator, below the hydraulic pump.

⚠ WARNING

This machine is equipped with a motion alarm.
ALARM MUST SOUND!
when operating forward or backward.

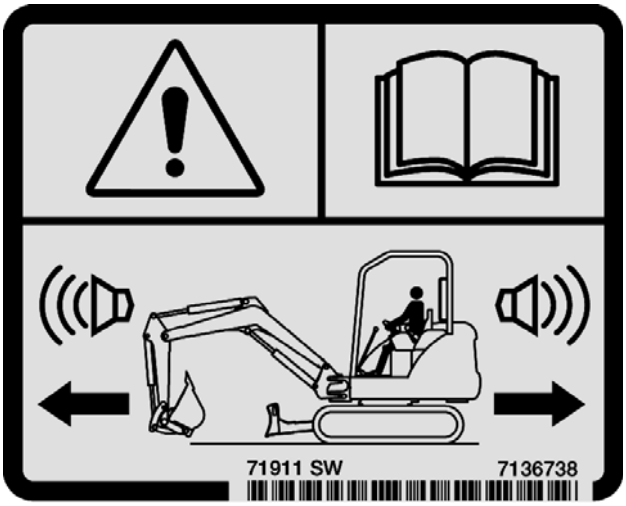
Failure to maintain a clear view in the direction of travel could result in serious injury or death.

The operator is responsible for the safe operation of this machine.

W-2786-0309

The motion alarm will sound when the operator moves the travel control levers (Item 1) **[Figure 31]** in the either the forward or reverse direction.

If alarm does not sound or for adjustment instructions, see inspection and maintenance instructions for the motion alarm system in the preventive maintenance section of this manual. (See MOTION ALARM SYSTEM (IF EQUIPPED) on Page 88.)

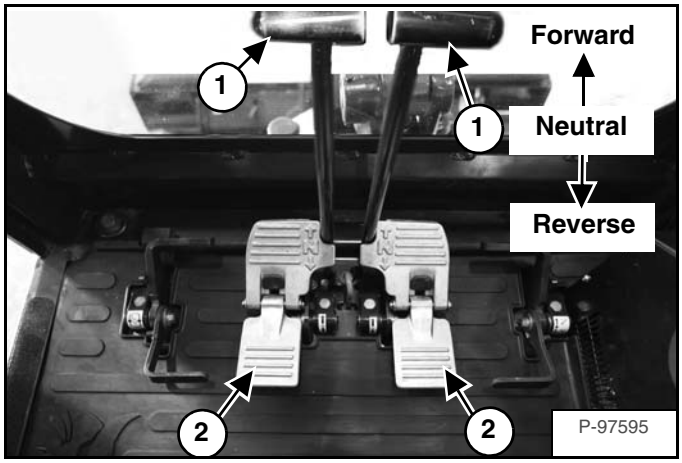


TRAVEL CONTROLS

Forward And Reverse Travel

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

Figure 31



Put the blade so that it is at the front of the machine (as you sit in the operator's seat). Slowly move both steering levers* (Item 1) **[Figure 31]** forward for forward travel; backward for reverse travel.

* Travel can also be controlled with foot pedals (Item 2) **[Figure 31]**. Pivot the heel of the pedals forward for additional space on the floor.

⚠ WARNING

AVOID INJURY OR DEATH

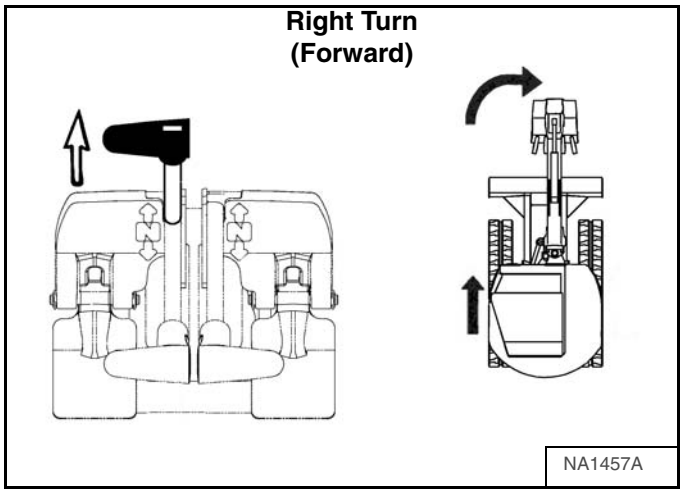
- **Check the blade location before traveling. When the blade is to the rear, operate the steering levers/foot pedals in the opposite direction to when the blade is in the front.**
- **Move the steering levers/foot pedals slowly. Abrupt lever motion will cause the machine to jerk.**

W-2235-0396

Turning

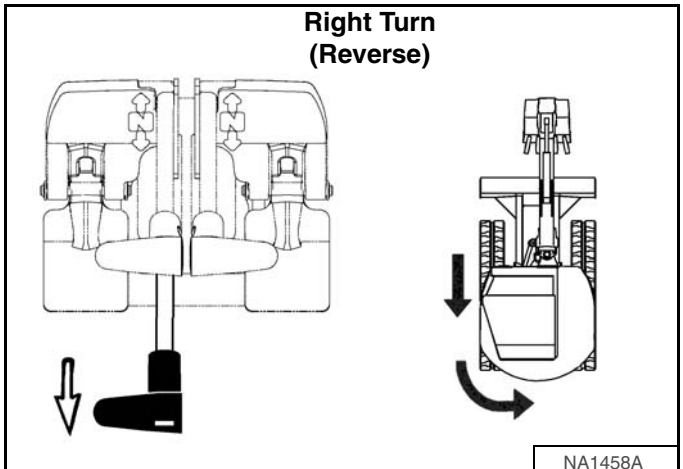
Right Turn

Figure 32



Push the left steering lever forward to turn right **[Figure 32]** while travelling forward.

Figure 33



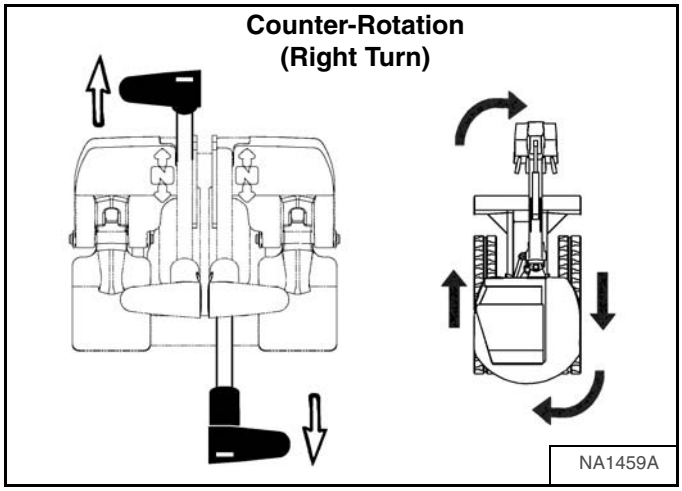
Pull the left steering lever backward to turn right while travelling backward **[Figure 33]**

TRAVEL CONTROLS (CONT'D)

Turning (Cont'd)

Counter-Rotation Right Turn

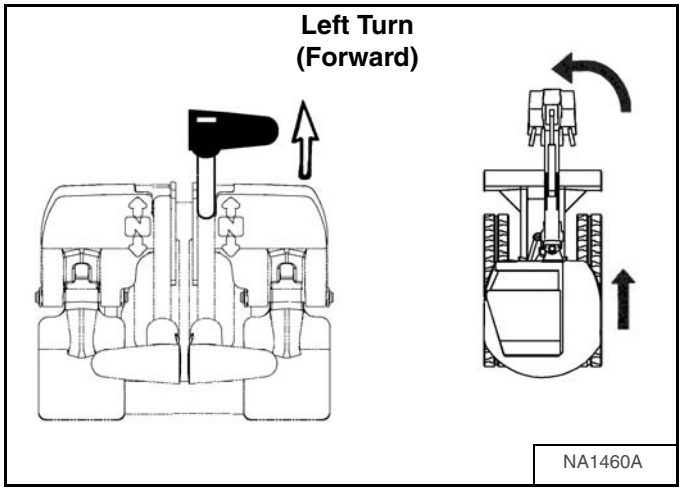
Figure 34



Push the left steering lever forward and pull the right steering lever backward **[Figure 34]**.

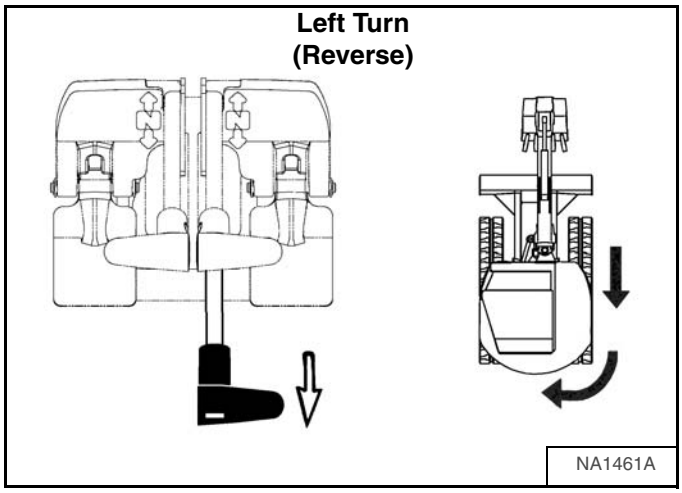
Left Turn

Figure 35



Push the right steering lever forward to turn left while travelling forward **[Figure 35]**.

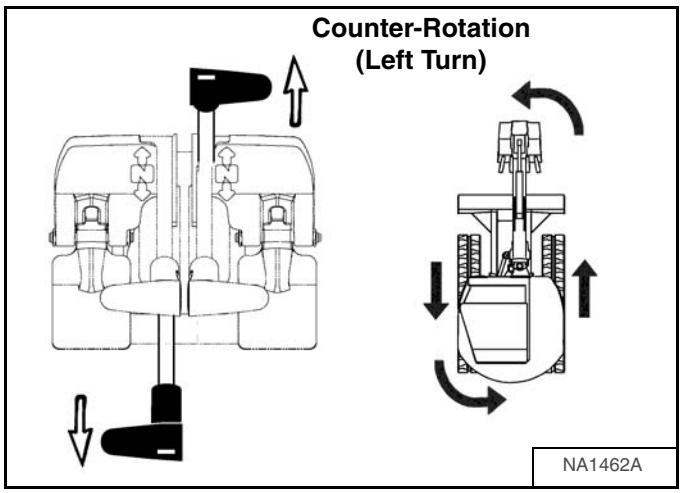
Figure 36



Pull the right steering lever backward to turn left while travelling backward **[Figure 36]**.

Counter-Rotation Left Turn

Figure 37



Push the right steering lever forward and pull the left steering lever backward **[Figure 37]**.

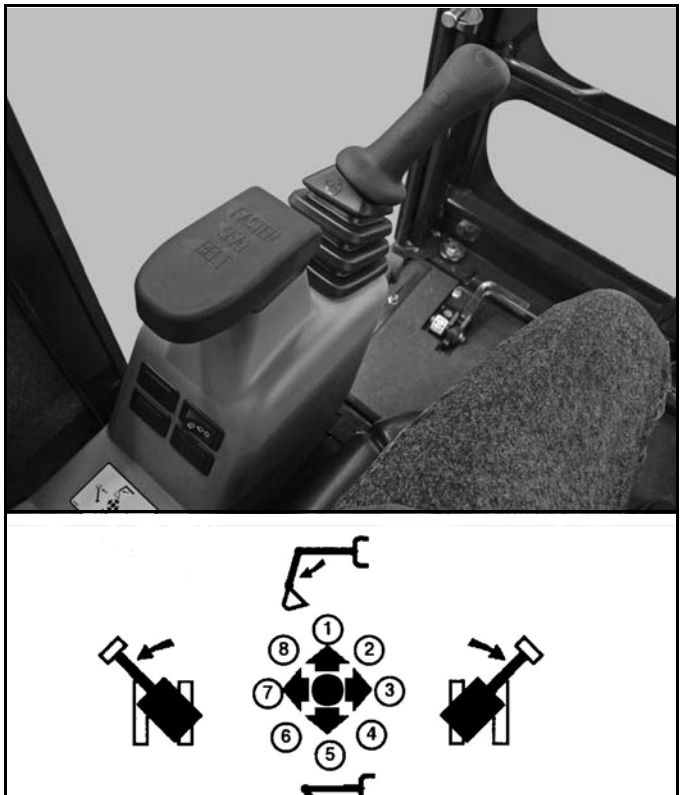
HYDRAULIC CONTROLS

Description

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

Left Control Lever (Joystick)

Figure 38



The left lever (joystick) is used to operate the arm and slew the upperstructure **[Figure 38]**.

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

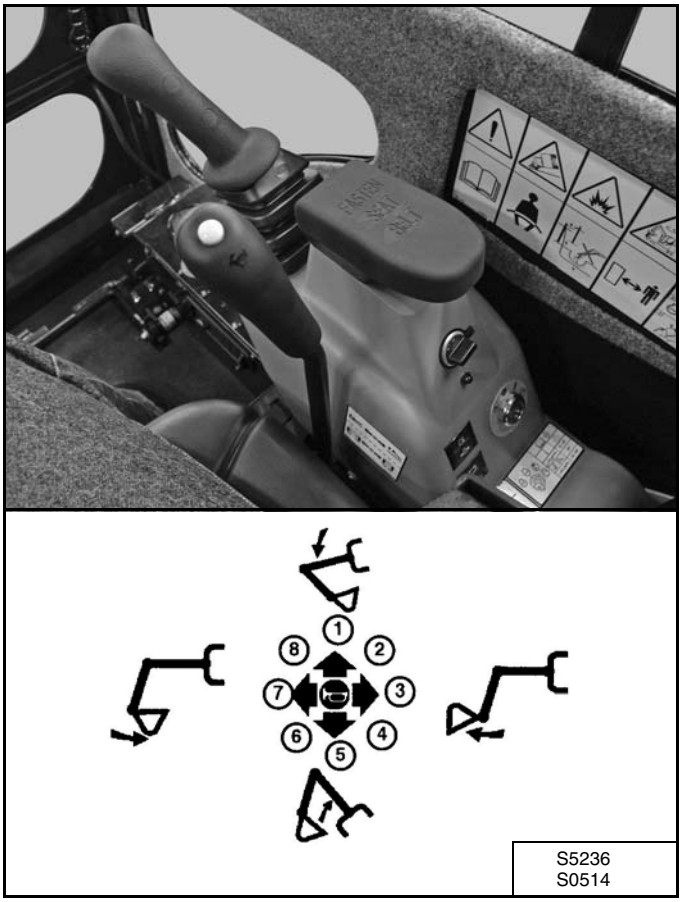
IMPORTANT

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

I-2051-0905

Right Control Lever (Joystick)

Figure 39



The right lever (joystick) is used to operate the boom and bucket **[Figure 39]**.

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.**
- **Raise the control console.**

W-2780-0109

Quick Couplers

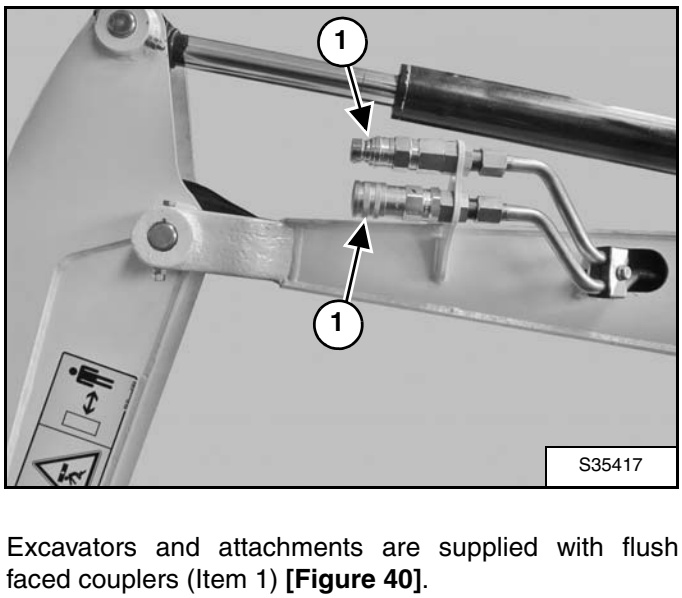
⚠ WARNING

AVOID BURNS

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

W-2220-0396

Figure 40



Excavators and attachments are supplied with flush faced couplers (Item 1) **[Figure 40]**.

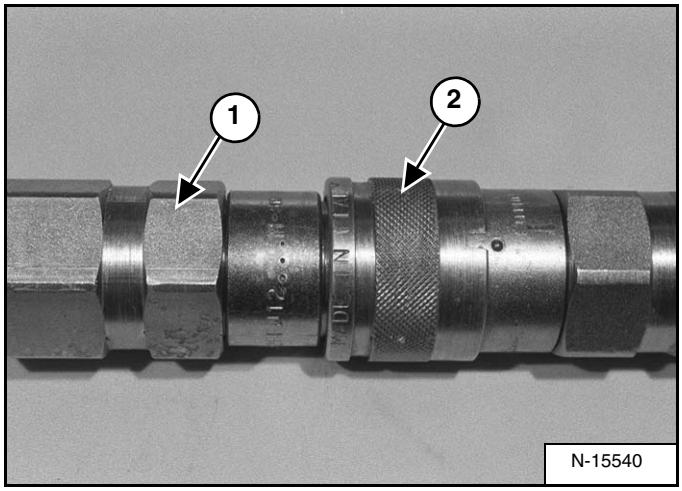
To Connect:

Remove any dirt or debris from the surface of both the male and female couplers, and from the outside diameter of the male coupler. Visually check the couplers for corroding, cracking, damage, or excessive wear, if any of these conditions exist, the coupler(s) (Item 1) **[Figure 40]** must be replaced.

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

To Disconnect:

Figure 41



Hold the male coupler (Item 1). Retract the sleeve (Item 2) **[Figure 41]** on the female coupler until the couplers disconnect.

Auxiliary Hydraulics (If Equipped)

⚠ WARNING

AVOID BURNS

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

W-2220-0396

Figure 42

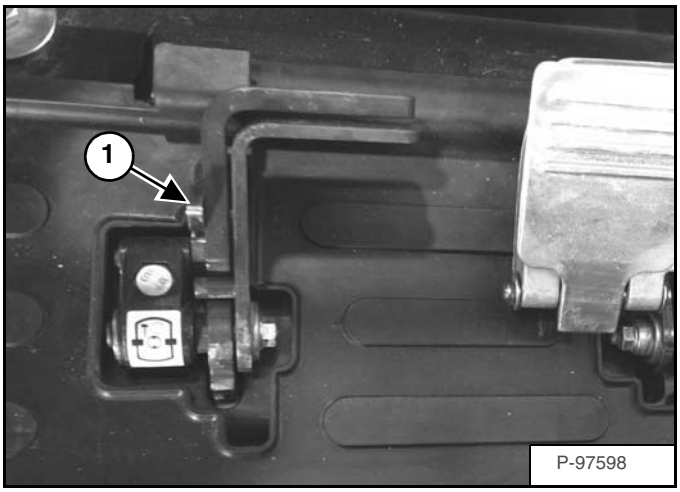
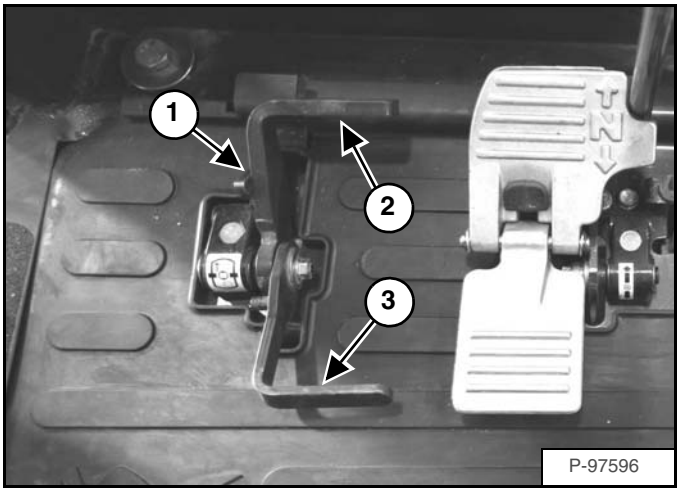


Figure 43



The excavator can be equipped with two-way flow auxiliary hydraulics (either coupler can be pressurised).

The left pedal **[Figure 42]** and **[Figure 43]** controls hydraulic oil flow to attachments (such as a hydraulic breaker) when mounted on the arm.

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

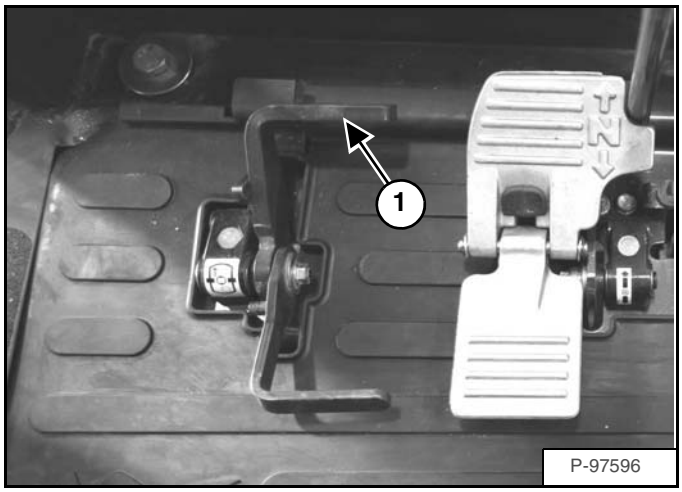
Push the toe of the pedal (Item 2) to activate hydraulic pressure / flow to the female coupler; heel (Item 3) **[Figure 43]** to activate hydraulic pressure / flow to the male coupler.

Relieve Hydraulic Pressure (Excavator And Attachment)

Place the attachment flat on the ground.

Stop the engine.

Figure 44



Excavator:

With the engine off, move the pedal (Item 1) **[Figure 44]** in both directions several times.

Attachments:

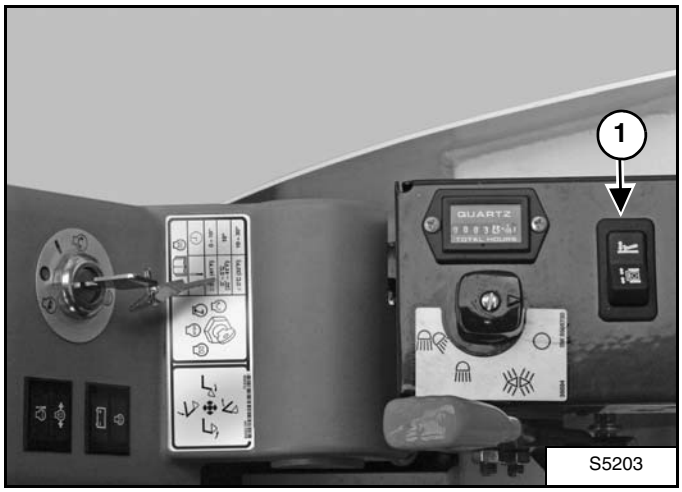
- Follow procedure above to release pressure in excavator.
- Connect male coupler from attachment to female coupler of excavator then repeat procedure above. This will release pressure in the attachment.
- Connect the female coupler from the attachment.

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

BLADE CONTROL LEVER

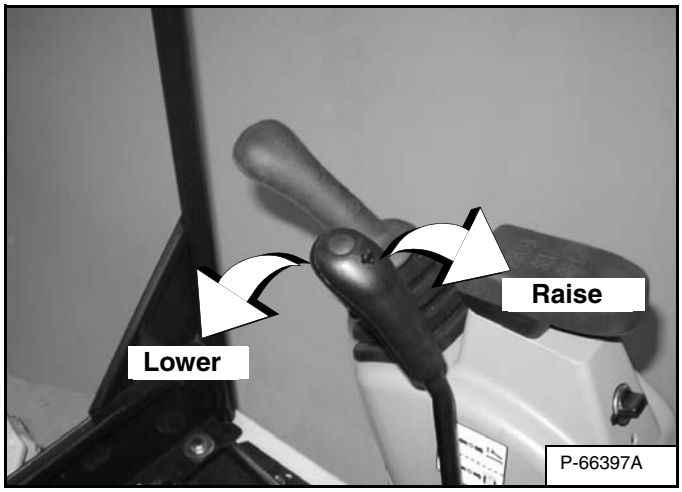
Raising And Lowering Blade

Figure 45



Push the Blade / Track Expansion Switch (Item 1) **[Figure 45]** to the right into the Blade position.

Figure 46



Move the Blade / Track Expansion Lever forward to lower the blade **[Figure 46]**.

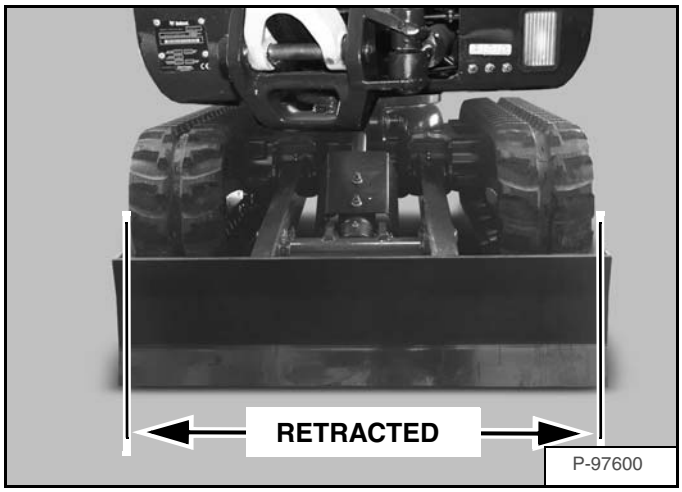
Move the Blade / Track Expansion Lever backward to raise the blade **[Figure 46]**.

NOTE: Keep blade lowered for increased digging performance.

TRACK FRAME EXPANSION

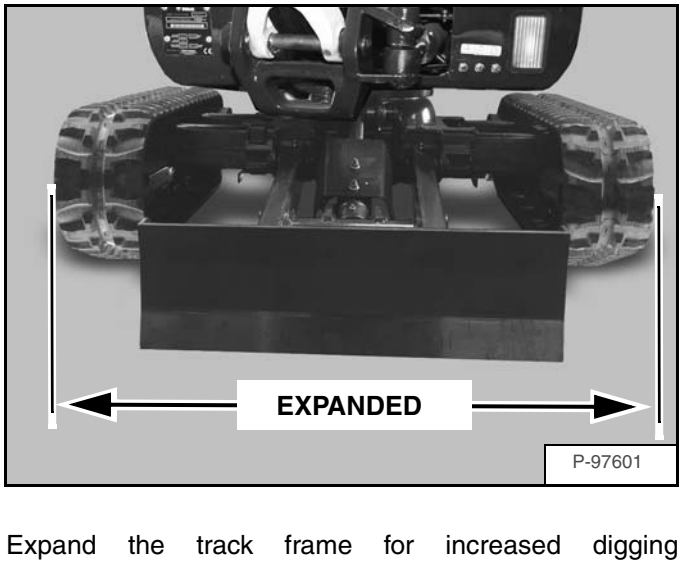
Operation

Figure 47



The excavator can be operated with the track frame retracted for transportation on a trailer or to access narrow areas **[Figure 47]**.

Figure 48



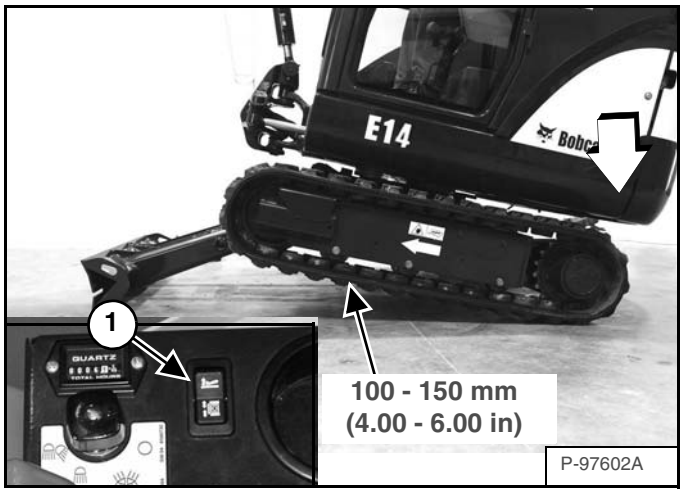
Expand the track frame for increased digging performance **[Figure 48]**.

IMPORTANT

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

I-2193-0599

Figure 49



Put the Blade / Track Expansion Switch (Item 1) **[Figure 49]** to the right in the Blade position.

With the boom and arm positioned over the blade, lower the blade until the track is raised 100 - 150 mm (4.00 - 6.00 in) off the ground **[Figure 49]**.

Rotate the upperstructure 180 degrees.

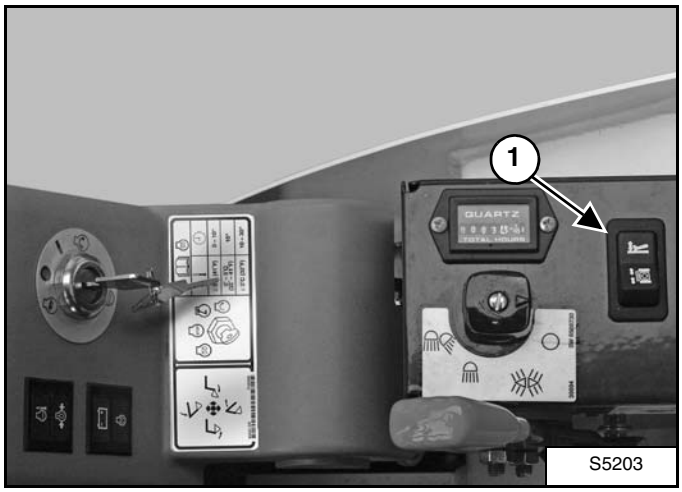
Figure 50

Lower the boom and arm to raise the rear of the excavator until the track is 100 - 150 mm (4.00 - 6.00 in) off the ground **[Figure 50]**.

TRACK FRAME EXPANSION (CONT'D)

Operation (Cont'd)

Figure 51



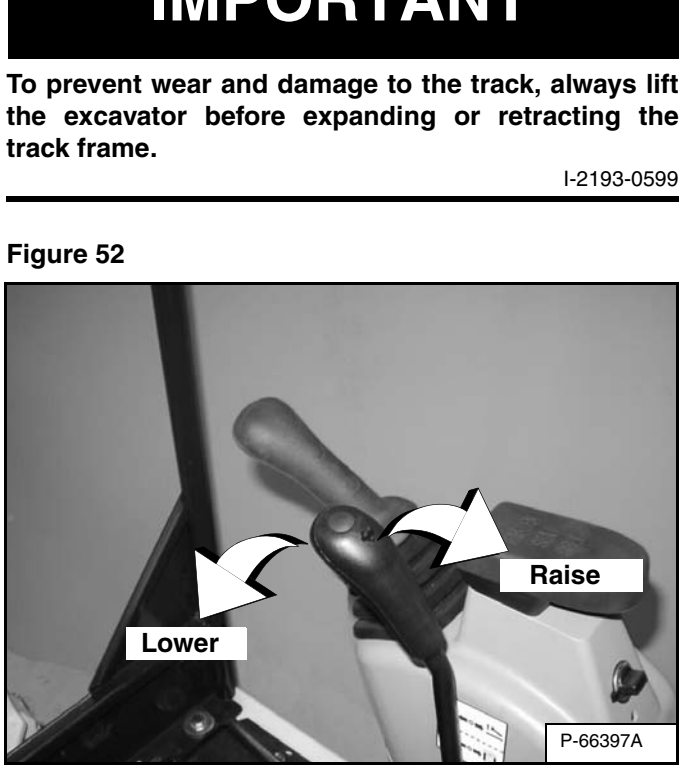
Push the Blade / Track Expansion Switch (Item 1) **[Figure 51]** to the left in the Track Expansion position.

IMPORTANT

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

I-2193-0599

Figure 52

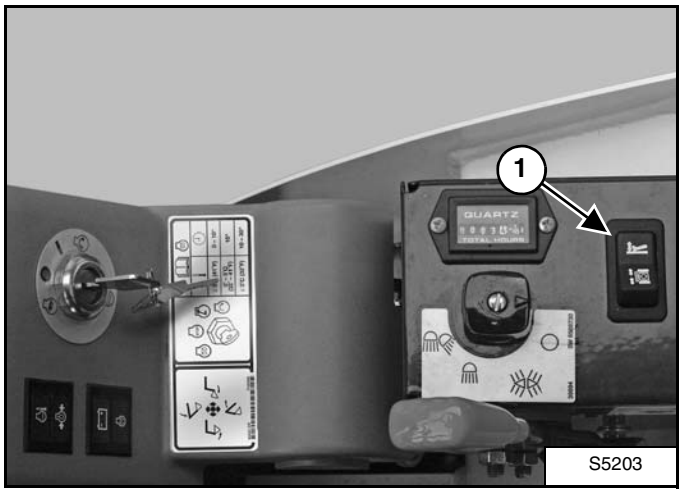


Push the Blade / Track Expansion Lever **[Figure 52]** forward to expand the track frame. Hold the lever forwards until the track frame is fully expanded.

Pull the Blade / Track Expansion Lever **[Figure 52]** back to retract the track frame. Hold the lever back until the track frame is fully retracted.

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

Figure 53



NOTE: Always return the Blade / Track Expansion Switch to the Blade position (Item 1) [Figure 53] during operation so that the track does not move when using the Blade / Track Expansion Lever.

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

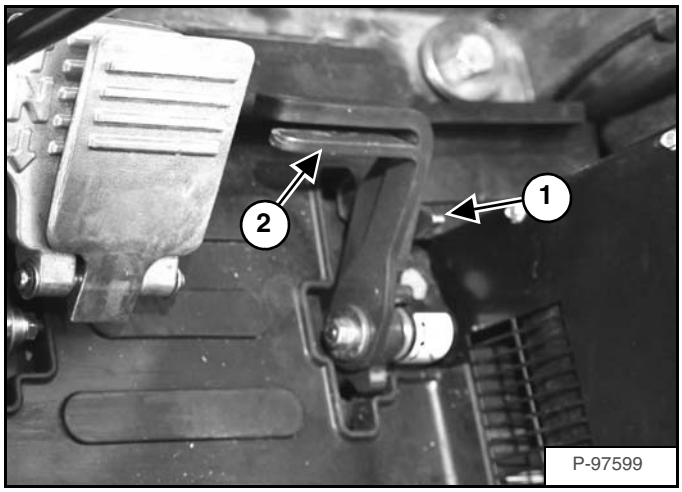
Rotate the upperstructure 180 degrees.

Raise the blade until the track is on the ground.

BOOM SWING

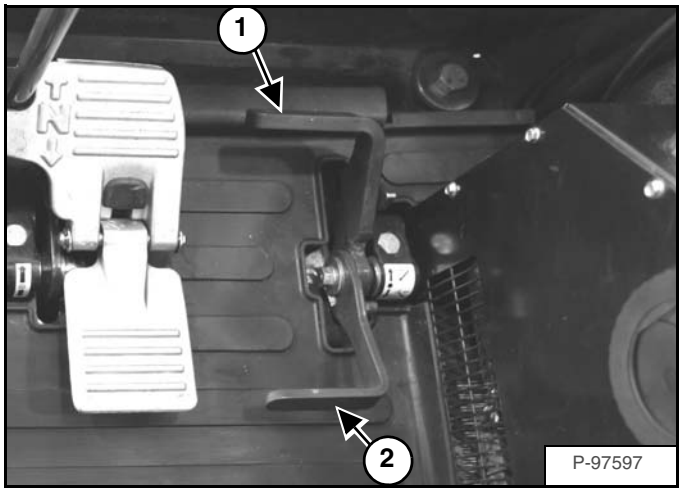
Operation

Figure 54



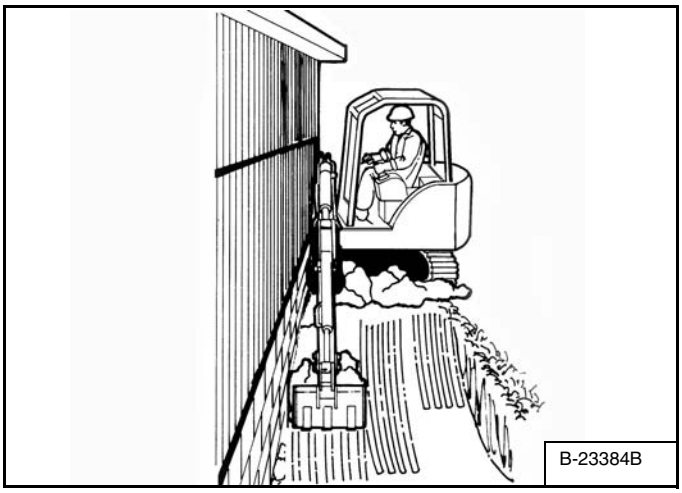
Release the pedal lock (Item 1) and swing the heel (Item 2) **[Figure 54]** on the pedal to the rear.

Figure 55



Push the toe of the pedal (Item 1) to swing the boom to the right; push the heel (Item 2) **[Figure 55]** to swing left.

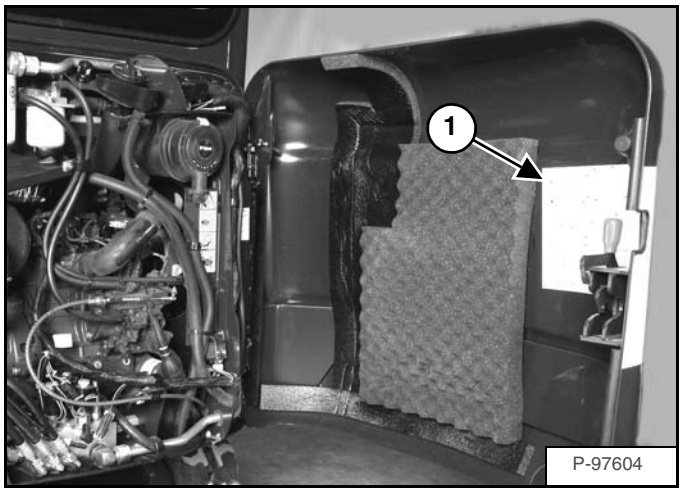
Figure 56



NOTE: The purpose of the boom swing is to offset the boom with respect to the upperstructure for digging close to a structure [Figure 56].

Daily Inspection And Maintenance

Figure 57



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. The decal (Item 1) **[Figure 57]** is located inside the rear door. (See SERVICE SCHEDULE on Page 97.)

Check the following items before each day of operation:

- Engine oil level and engine for leaks.
- Check hydraulic fluid level and system for leaks.
- Air cleaner and intake hoses / clamps.
- Engine coolant level and engine for leaks.
- Operator Canopy or Cab (ROPS / TOPS) and mounting hardware.
- Seat belt and mounting hardware. Replace seat belt if damaged.
- Check control console lockout.
- Check engine area for flammable materials.
- Check the track tension.
- Check for damaged decals, replace as needed.
- Check attachment coupler system (if equipped) for damage or loose parts.
- Check indicator lights for correct operation.
- Clean cab heater filter (if equipped).
- Check front horn and motion alarm (if equipped) for proper function.
- Repair broken and loose parts.
- Check cylinder and attachment pivot points.
- Grease all pivot points.

WARNING

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

W-2001-0502

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

IMPORTANT

PRESSURE WASHING DECALS

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

I-2226-0910

IMPORTANT

This machine is factory equipped with a spark arrester exhaust system.

The spark arrester muffler, if equipped, must be cleaned to keep it in working condition. The spark arrester muffler must be serviced by dumping the spark chamber every 100 hours of operation.

On some models, the turbocharger functions as the spark arrester and must operate correctly for proper spark arrester function.

If this machine is operated on flammable forest, brush, or grass covered land, a spark arrester attached to the exhaust system may be required and must be maintained in working order. Refer to local laws and regulations for spark arrester requirements.

I-2284-EN-0909

Operation & Maintenance Manual And Operator's Handbook (If Equipped) Locations

Figure 58

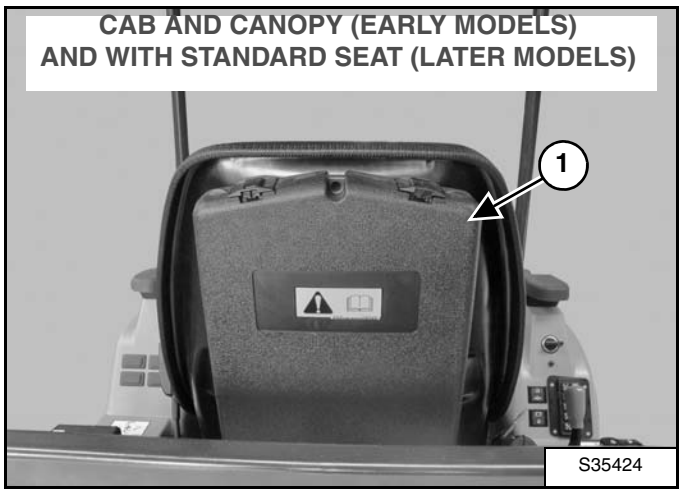


Figure 59

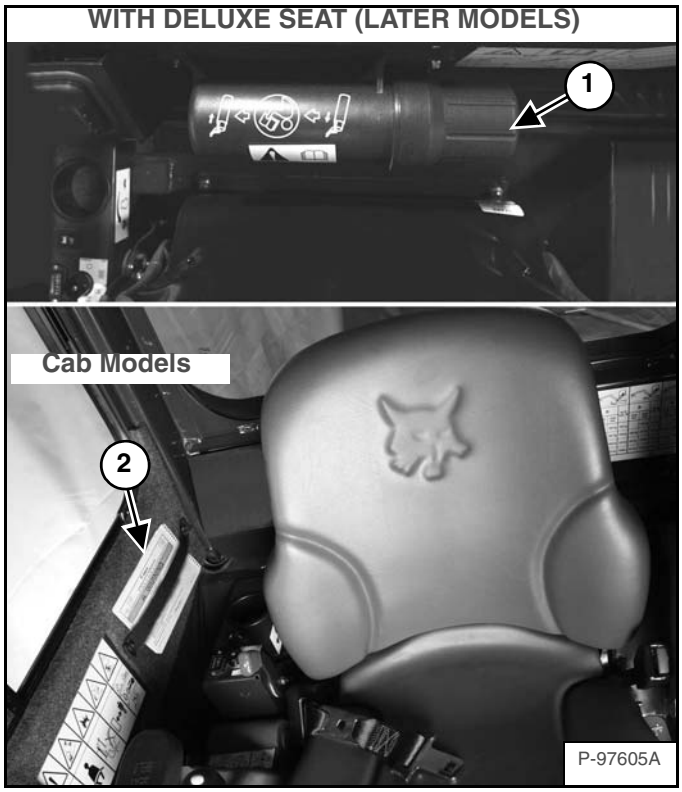
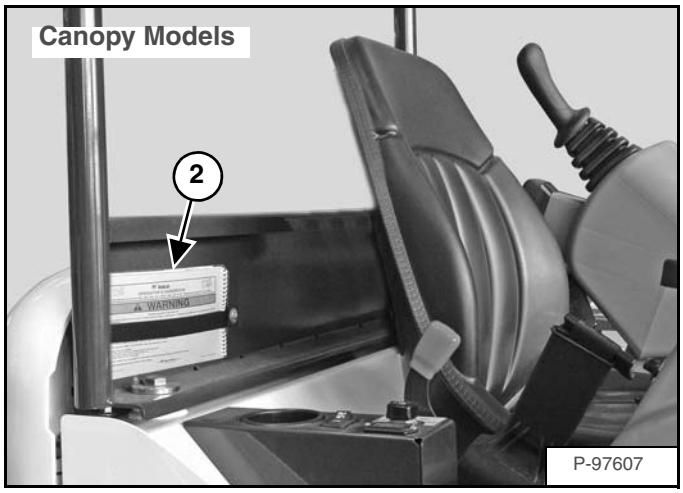


Figure 60



Read and understand the Operation & Maintenance Manual (Item 1) **[Figure 58]** or **[Figure 59]** (located inside the storage container on the back of the operator's seat) and the Operator's Handbook (Item 2) **[Figure 59]** or **[Figure 60]** before operating.

Entering The Excavator

Figure 61

Use the ROPS tube or the grab handles, the tracks and the safety treads to enter the cab or canopy **[Figure 61]**.

⚠ WARNING

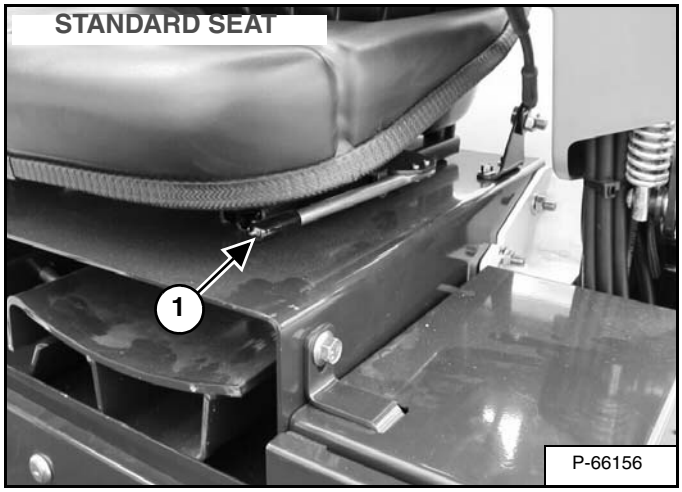
AVOID INJURY OR DEATH

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

W-2003-0807

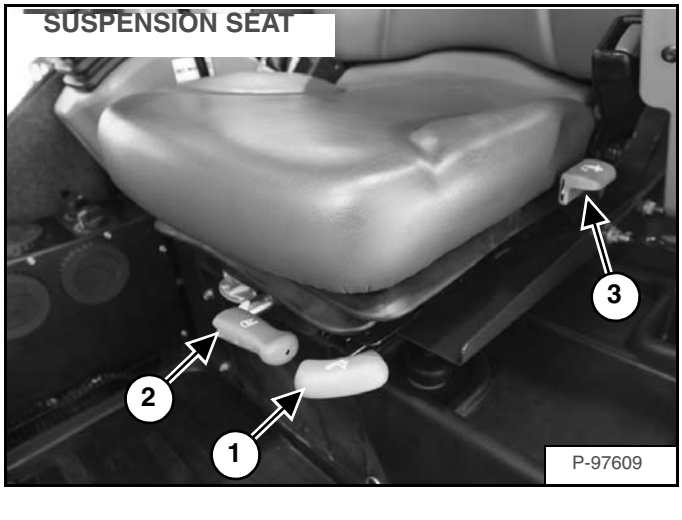
Seat Adjustment

Figure 62



Release the seat lever (Item 1) **[Figure 62]** to adjust the seat forward or back.

Figure 63



Release the seat lever (Item 1) **[Figure 63]** to adjust the seat forward or back.

Rotate the lever (Item 2) **[Figure 63]** to change the adjustment for operator weight.

Adjust the lever (Item 3) **[Figure 63]** to change the incline of the seat back.

Seat Belt

Figure 64

Fasten the seat belt **[Figure 64]**.

Control Console

Figure 65

Lower the control console **[Figure 65]**.

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

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

STARTING THE ENGINE

Key Switch

WARNING

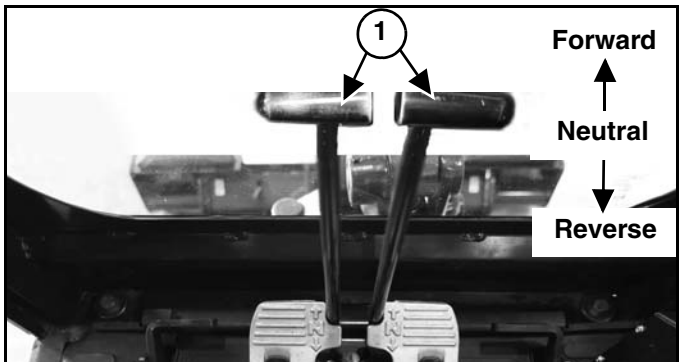
AVOID INJURY OR DEATH

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

W-2135-1108

Perform the PRE-STARTING PROCEDURE. (See PRE-STARTING PROCEDURE on Page 51.)

Figure 66



Put control levers (Item 1) **[Figure 66]** in the neutral position.

Figure 67

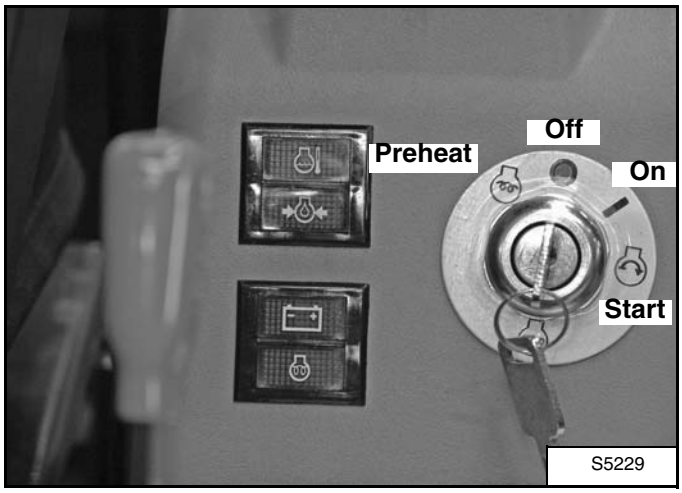
Move the engine speed control to low idle **[Figure 67]**.

IMPORTANT

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

I-2034-0700

Figure 68



Turn the key to PREHEAT position (if required) **[Figure 68]** (See Cold Temperature Starting on Page 56.)

Turn the key to START and release the key when the engine starts. It will return to the ON position **[Figure 68]**.

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.

WARNING

AVOID INJURY OR DEATH

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

W-2050-0807

WARNING

AVOID SERIOUS INJURY OR DEATH

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

W-2051-0212

Keyless

⚠ WARNING

AVOID INJURY OR DEATH

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

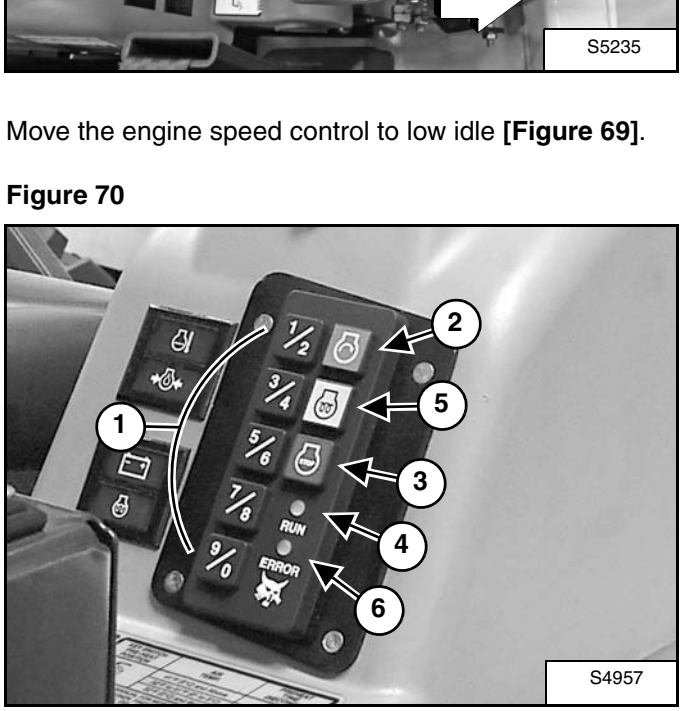
W-2135-1108

Perform the PRE-STARTING PROCEDURE. (See PRE-STARTING PROCEDURE on Page 51.)

Figure 69

Move the engine speed control to low idle **[Figure 69]**.

Figure 70



To start the excavator, the keyless switch module will accept two possible codes. The four digit master code, or the four digit user code (The user code can be changed at any time by the owner).

Enter the master code or the user code on the keyless switch module number pad (Item 1) **[Figure 70]**.

Press the START button (Item 2) to start the engine.

IMPORTANT

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

I-2034-0700

Press the STOP button (Item 3) **[Figure 70]** to stop the engine.

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

Check for the cause before starting the engine again.

If glow plug use is required, enter the master code or the user code. The run light (Item 4) **[Figure 70]** will be illuminated.

Press and hold the glow plug switch (Item 5) for the required time, and then press the start button (Item 2) **[Figure 70]** to start the engine.

Once the code has been entered into the keyless ignition, the run light will be illuminated and the start and glow plug function will be operational until the stop button is pushed.

Entering an incorrect code will cause the error light (Item 6) **[Figure 70]** to flash several times.

Three successive attempts at entering an incorrect user/master code will cause an error condition and a delay of one minute will be required to retry the entry code.

Changing user codes

Included with the kit is a plastic card with the control module master code and serial number. Record the Bobcat Excavator Serial number on this card and store in a secure place.

To change the user code, enter the four digit master code (you now have ten second to start the following and five seconds between each number entry) then press 2. Enter the new four digit user code then press 2. The run light (Item 4) **[Figure 70]** will flash several times then stay on indicating the new usercode has been programmed. Press the stop button (Item 3) **[Figure 70]** and the excavator is now ready for use with the new user code.

Cold Temperature Starting

⚠ WARNING

AVOID INJURY OR DEATH

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

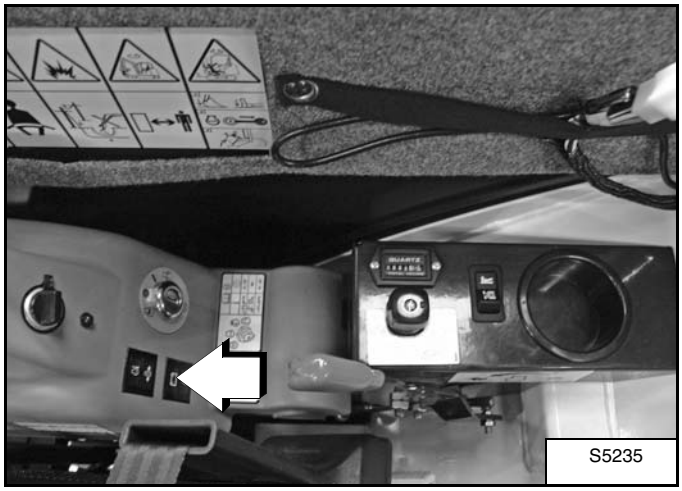
W-2071-0907

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

- Replace the engine oil with the correct type and viscosity for the anticipated starting temperature. (See ENGINE LUBRICATION SYSTEM on Page 97.)
- Make sure the battery is fully charged.
- Install an engine heater.

NOTE: If the battery is discharged (but not frozen) a booster battery can be used to jump start the excavator. (See Using A Booster Battery (Jump Starting) on Page 104.).

Figure 71



Push the speed control lever fully forward **[Figure 71]**.

IMPORTANT

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

I-2034-0700

Figure 72

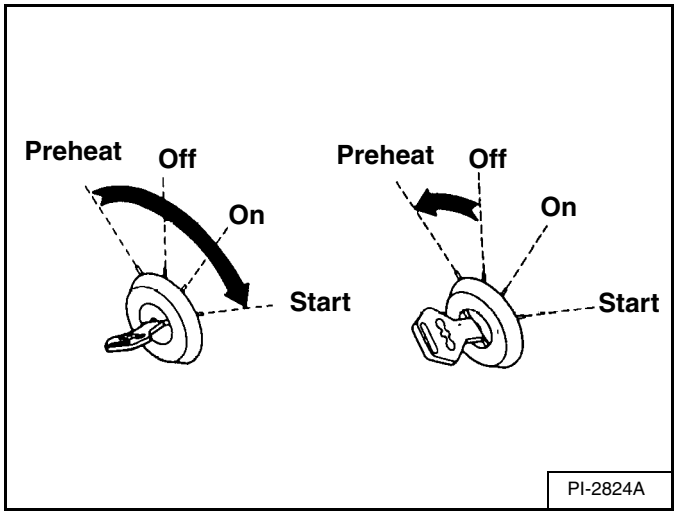


Figure 73

Turn the key to PREHEAT **[Figure 72]**. The light (Item 1) **[Figure 73]** will come ON. Preheat the engine for 15 seconds maximum.

Turn the key to START **[Figure 72]** and release the key when the engine starts. It will return to the ON position.

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

Turn the key switch OFF to stop the engine **[Figure 72]**.

Warming The Hydraulic System

⚠ WARNING

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

W-2381-0211

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

STOPPING THE ENGINE AND LEAVING THE EXCAVATOR

Procedure

Figure 74

Stop the machine on level ground. Lower the work equipment and the blade to the ground **[Figure 74]**.

Figure 75

Move the speed control lever fully backward **[Figure 75]**.

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

Figure 76

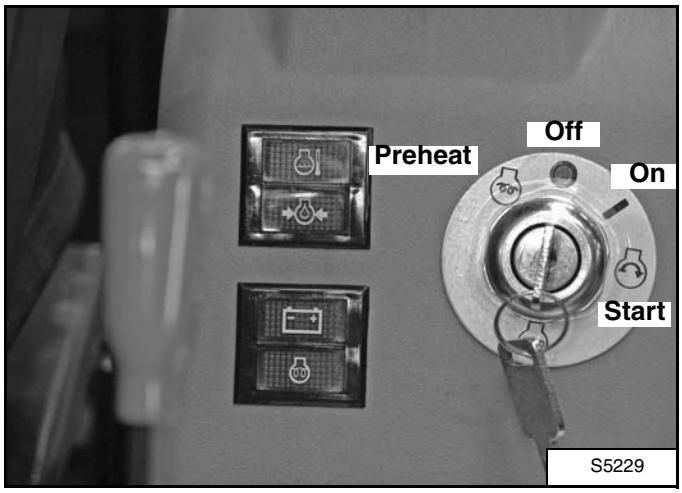
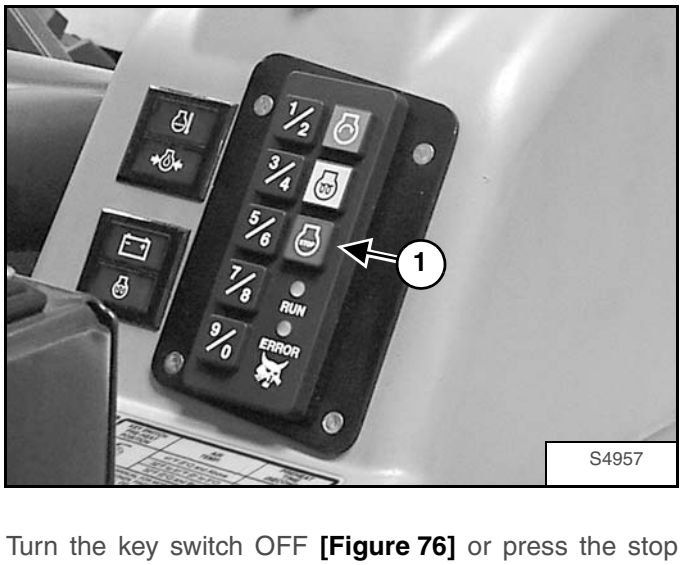


Figure 77



Turn the key switch OFF **[Figure 76]** or press the stop button (Item 1) **[Figure 77]**.

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

Installing And Removing The Attachment (Quick Coupler, Lehnhoff® System)

Installation

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

⚠ WARNING

AVOID INJURY OR DEATH

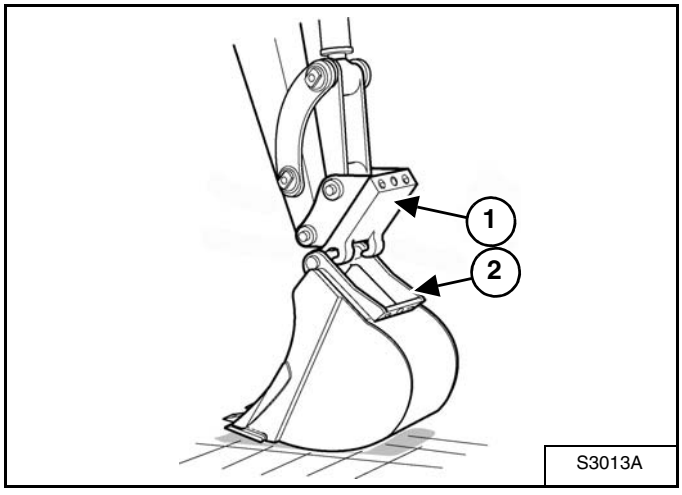
Never use attachments or buckets which are not approved by Bobcat Company. Buckets and attachments for safe loads of specified densities are approved for each model. Unapproved attachments can cause injury or death.

W-2052-0907

Position the excavator so the excavator arm is above the attachment.

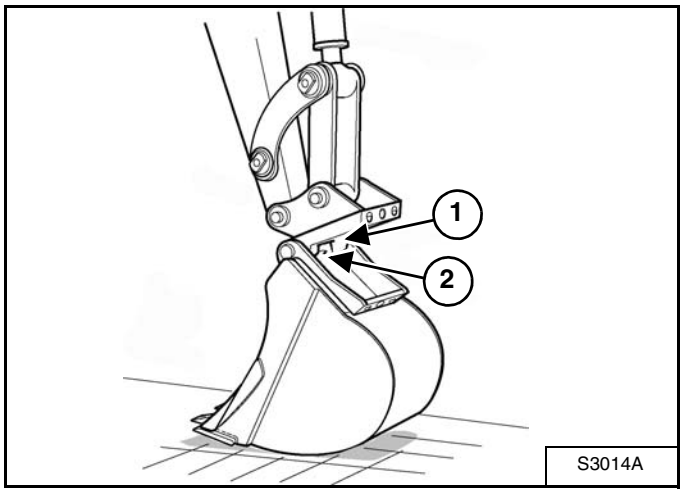
Fully retract the bucket cylinder.

Figure 78



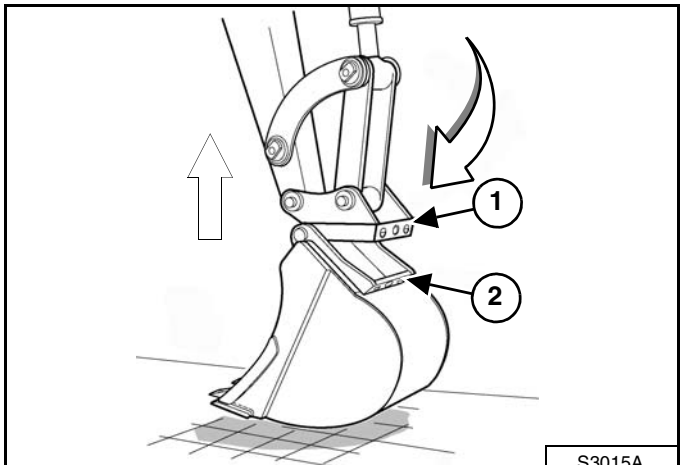
Lower the coupler (Item 1) onto the attachment (Item 2) **[Figure 78]**.

Figure 79



Engage the coupler hooks (Item 1) onto the attachment shaft (Item 2) **[Figure 79]**.

Figure 80

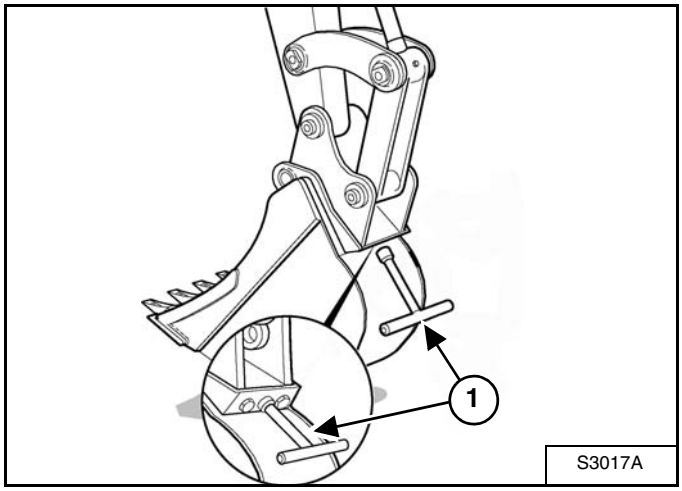


Extend (curl in) the bucket cylinder and slightly raise the boom until the coupler (Item 1) contacts the back of the attachment mount (Item 2) **[Figure 80]**.

Installing And Removing The Attachment ((Quick Coupler, Lehnhoff® System) (Cont'd)

Installation (Cont'd)

Figure 81



Engage the parking brake.

Stop the engine and exit the excavator.

Use the supplied wrench (Item 1) **[Figure 81]** and turn the locking pins clockwise until they are fully engaged.

Removal

Park the excavator on a level surface.

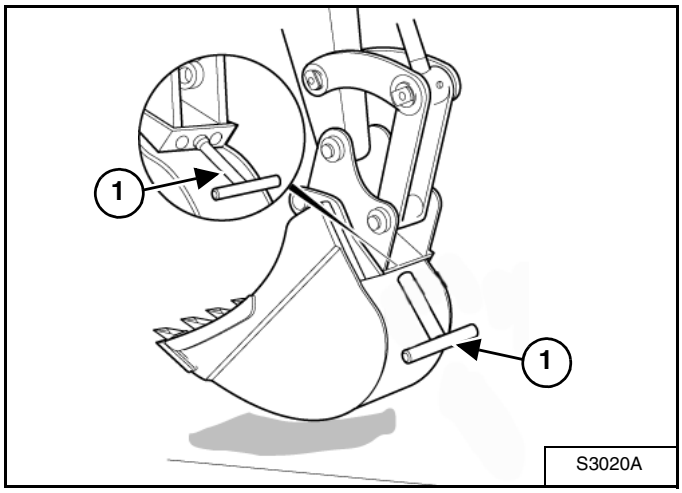
Figure 82

Raise the boom and extend the bucket cylinder until the attachment it is slightly off the ground **[Figure 82]**.

Engage the parking brake.

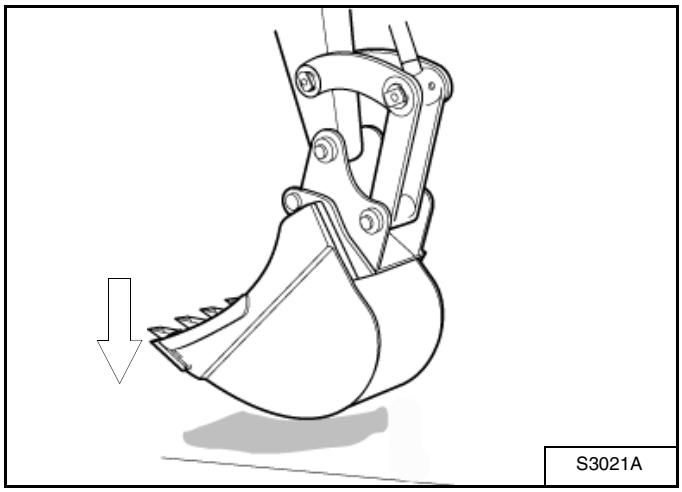
Stop the engine and exit the excavator.

Figure 83



Install the wrench (Item 1) **[Figure 83]** on the locking pins and turn anticlockwise until the locking pins are disengaged.

Figure 84



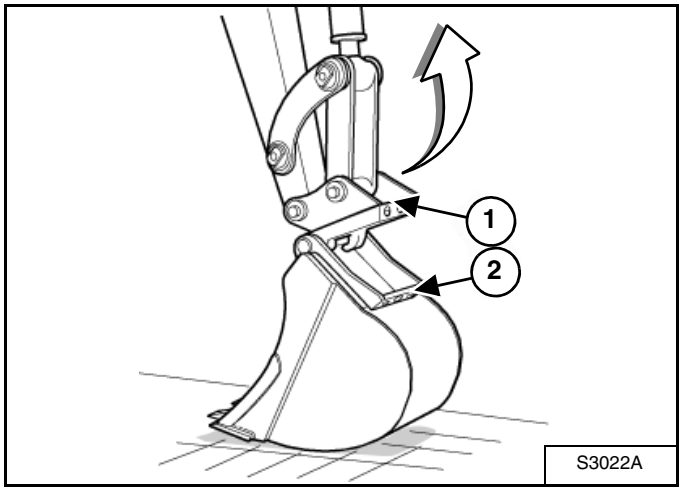
Enter the excavator, fasten the seat belt and start the engine

Lower the attachment until it is on the ground **[Figure 84]**.

Installing And Removing The Attachment (Quick Coupler, Lehnhoff® System) (Cont'd)

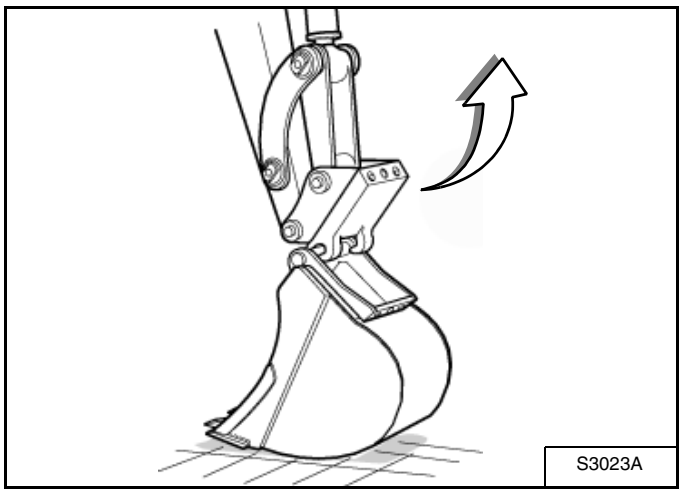
Removal (Cont'd)

Figure 85



Retract the bucket cylinder to rotate the coupler (Item 1) out of the attachment mount (Item 2) **[Figure 85]**.

Figure 86



Move the arm out and raise the boom until the quick coupler is clear of the attachment **[Figure 86]**.

Quick Coupler And Attachment Inspection

Inspect the quick coupler for wear or damage. Inspect the attachment shaft and the quick coupler hooks for wear or damage.

Repair or replace damaged parts.

Installing And Removing The Attachment (Quick Coupler, Klac™ System)

Installation

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

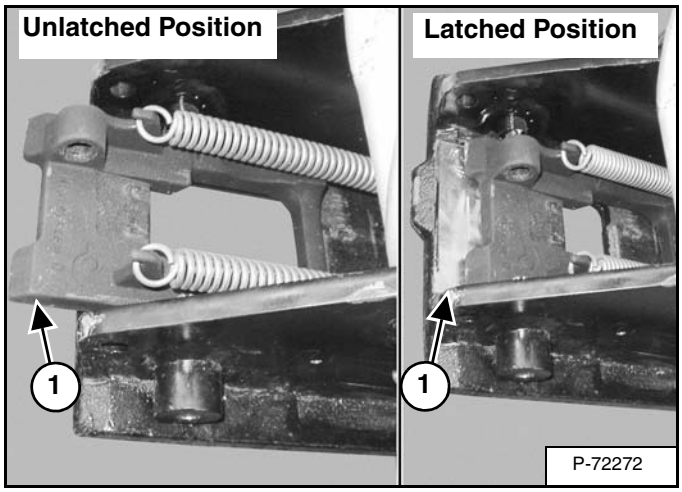
⚠ WARNING

AVOID INJURY OR DEATH

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

W-2052-0907

Figure 87



Fully retract the bucket cylinder.

Stop the engine and exit the excavator.

Inspect the quick coupler to make sure the latch is in the unlatched position (Item 1) **[Figure 87]**.

If in the latched position, see **[Figure 88]** for additional information.

If the latch is in the unlatched position, proceed to **[Figure 89]**.

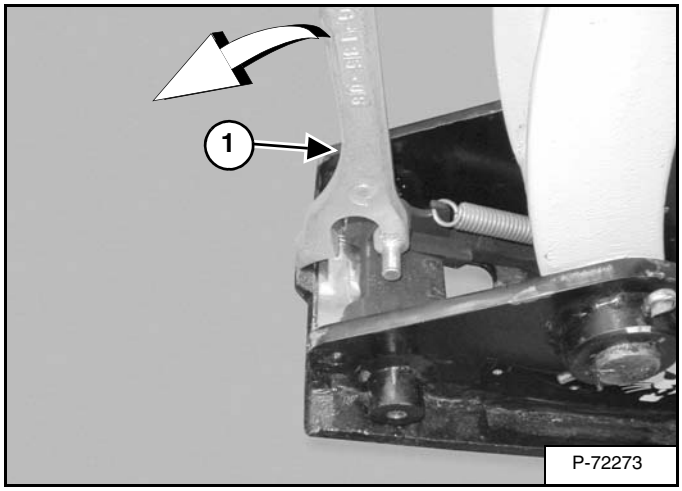
⚠ WARNING

AVOID INJURY

Keep fingers and hands out of pinch points when latching and unlatching the attachment quick coupler.

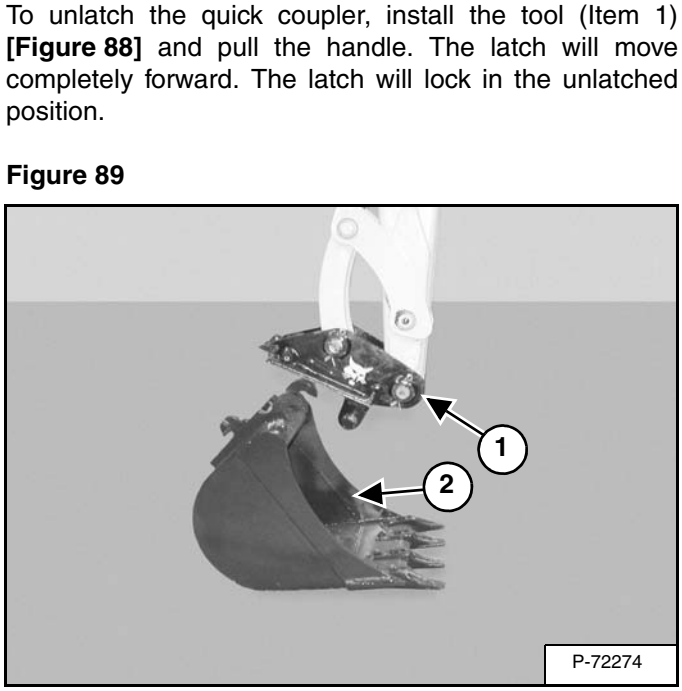
W-2541-1106

Figure 88



To unlatch the quick coupler, install the tool (Item 1) **[Figure 88]** and pull the handle. The latch will move completely forward. The latch will lock in the unlatched position.

Figure 89



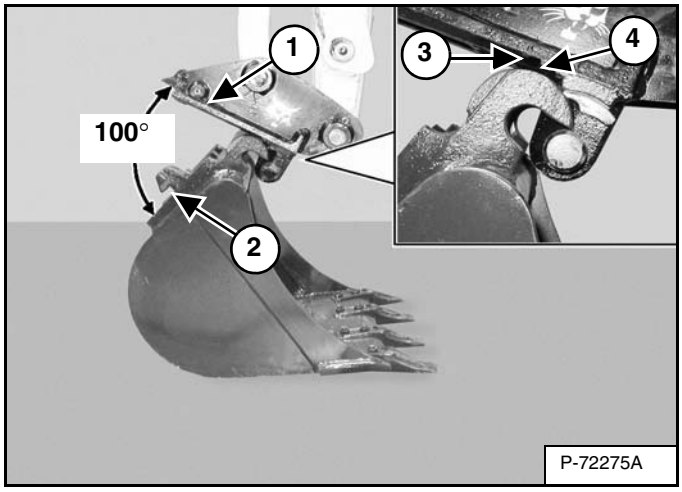
Enter the excavator, fasten the seat belt and start the engine.

Position the quick coupler (Item 1) to the attachment (Item 2) **[Figure 89]**.

Installing And Removing The Attachment (Quick Coupler, Klac™ System) (Cont'd)

Installation (Cont'd)

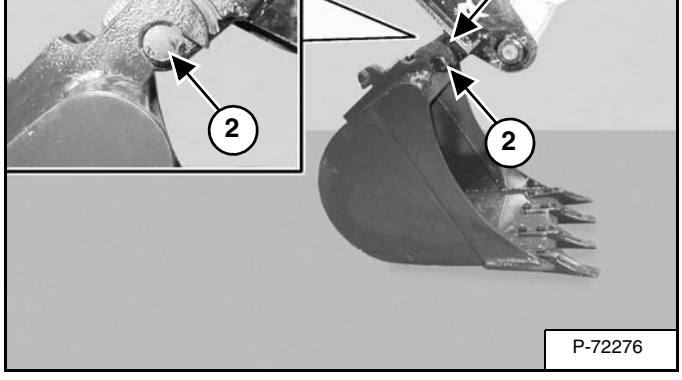
Figure 90



There must be at least 100° between the quick coupler surface (Item 1) and the attachment mounting surface (Item 2) **[Figure 90]**. Extend the arm out to get the required angle for proper installation.

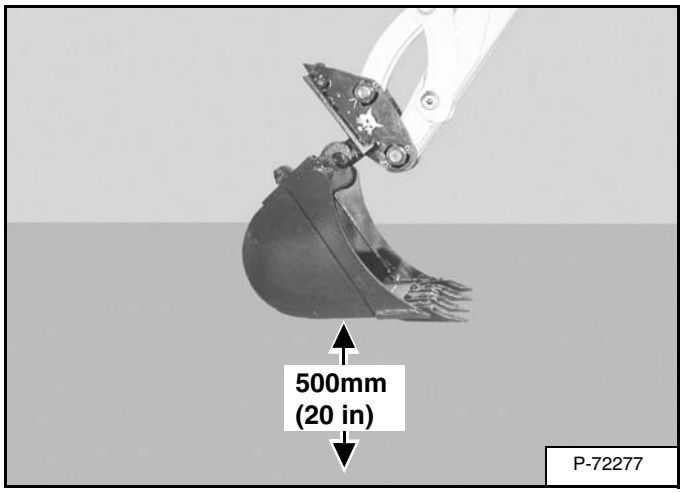
NOTE: There must be proper clearance (100° minimum) between the hook (Item 3) and the quick coupler (Item 4) [Figure 90]. Possible damage to the attachment hooks or the quick coupler could occur without proper clearance.

Figure 91



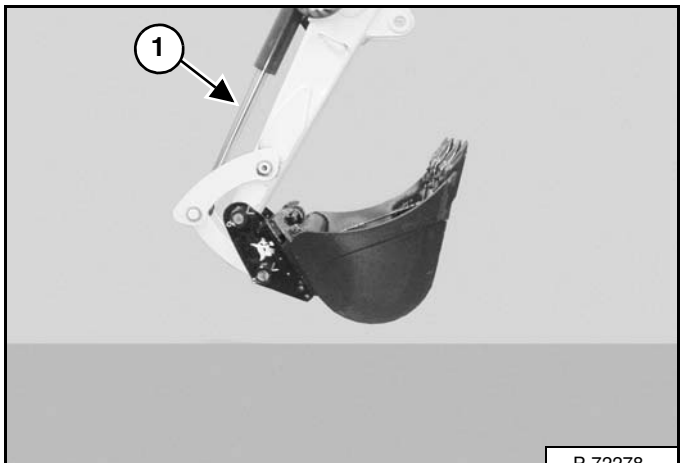
Raise the boom and extend the arm until the hooks of the attachment (Item 1) engage the pins (Item 2) of the quick coupler **[Figure 91]**.

Figure 92



Raise the boom until there is approximately 500 mm (20.0 in) of clearance between the bottom of the attachment and the ground **[Figure 92]**.

Figure 93



Extend the bucket cylinder (Item 1) **[Figure 93]** fully.

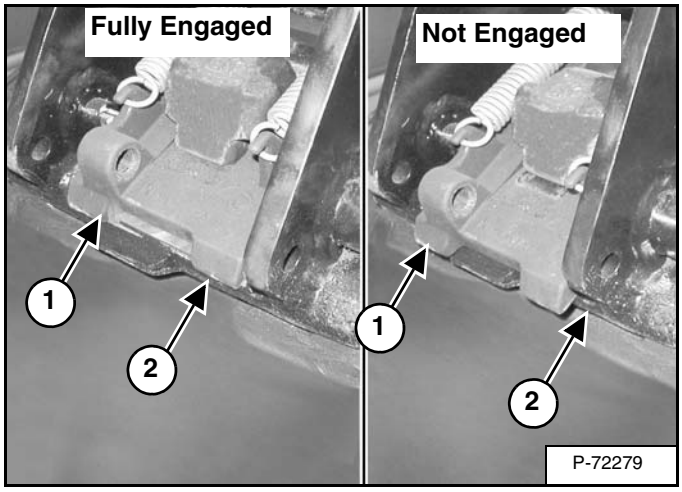
Lower the attachment until it is flat on the ground.

Stop the engine and exit the excavator.

Installing And Removing The Attachment (Quick Coupler, Klac™ System) (Cont'd)

Installation (Cont'd)

Figure 94



Visually inspect the quick coupler latch (Item 1) to the bucket mount (Item 2) **[Figure 94]**. The latch must be fully engaged.

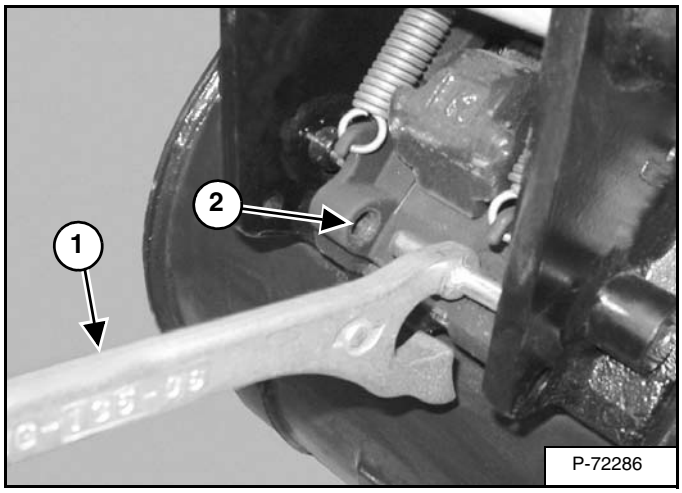
⚠ WARNING

AVOID INJURY

Keep fingers and hands out of pinch points when latching and unlatching the attachment quick coupler.

W-2541-1106

Figure 95



If the latch is not engaged, install the tool (Item 1) in the hole (Item 2) **[Figure 95]** of the quick coupler and push down to unlatch the quick coupler. Remove the tool. Enter the excavator, fasten the seat belt and start the engine. Raise the attachment 500 mm (20.0 in) off of the ground and fully extend the bucket cylinder. Lower the attachment until it is flat on the ground. Stop the engine and exit the excavator.

Again, visually inspect the quick coupler to make sure the latch (Item 1) **[Figure 94]** is fully engaged. If it is not fully engaged, remove the attachment and inspect both the quick coupler and the attachment for damage or debris. (See **[Figure 99]** for *Quick Coupler And Attachment Inspection* information.)

Installing And Removing The Attachment (Quick Coupler, Klac™ System) (Cont'd)

Removal

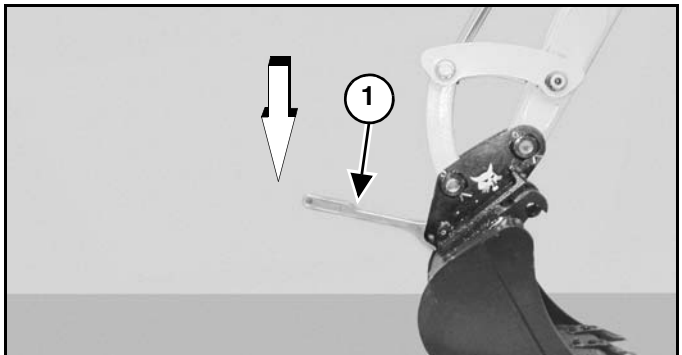
⚠ WARNING

AVOID INJURY

Keep fingers and hands out of pinch points when latching and unlatching the attachment quick coupler.

W-2541-1106

Figure 96



Position the attachment flat on the ground.

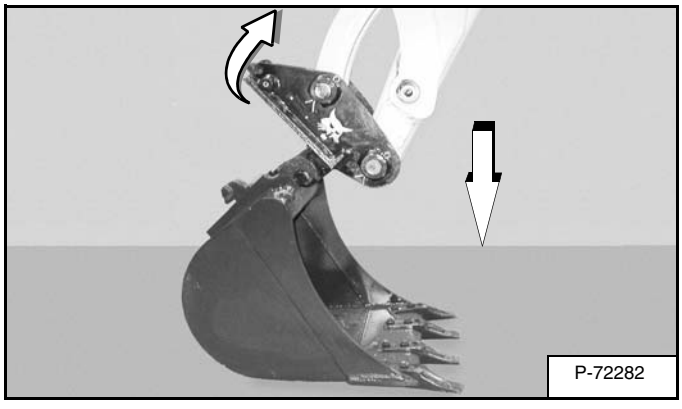
Install the quick coupler tool (Item 1) into the hole (Item 2) **[Figure 95]** in the quick coupler.

Push down on the tool (Item 1) **[Figure 96]** to unlock the latch.

Remove the tool.

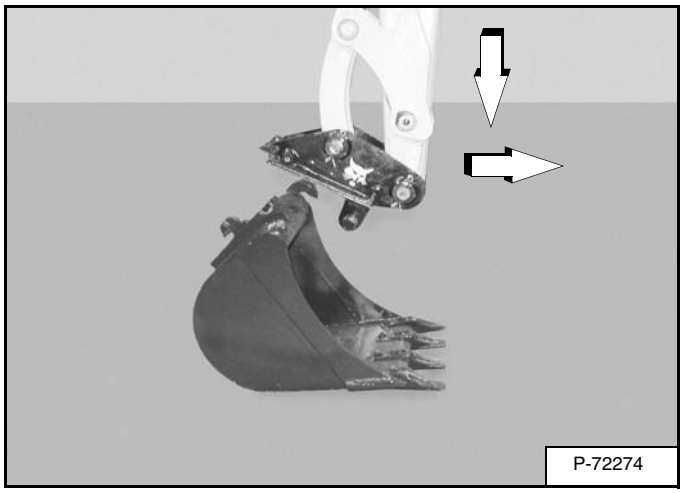
Enter the excavator, fasten the seat belt and start the engine.

Figure 97



Retract the bucket cylinder fully and lower the boom **[Figure 97]** until the attachment is on the ground.

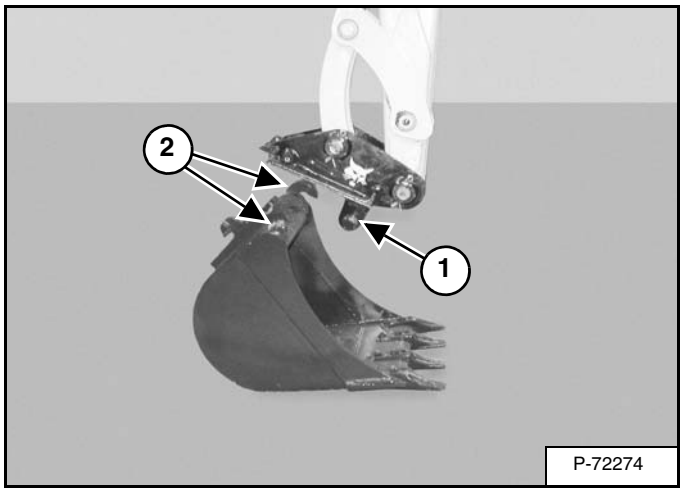
Figure 98



Continue to lower the boom and move the arm toward the excavator until the quick coupler is clear of the attachment **[Figure 98]**.

Quick Coupler And Attachment Inspection

Figure 99



Inspect the quick coupler for wear or damage. Inspect the quick coupler pins (Item 1) and the hooks (Item 2) **[Figure 99]** (on the attachment) for wear or damage.

Repair or replace damaged parts.

Installing And Removing The Attachment (Pin-On Attachment)

Installation

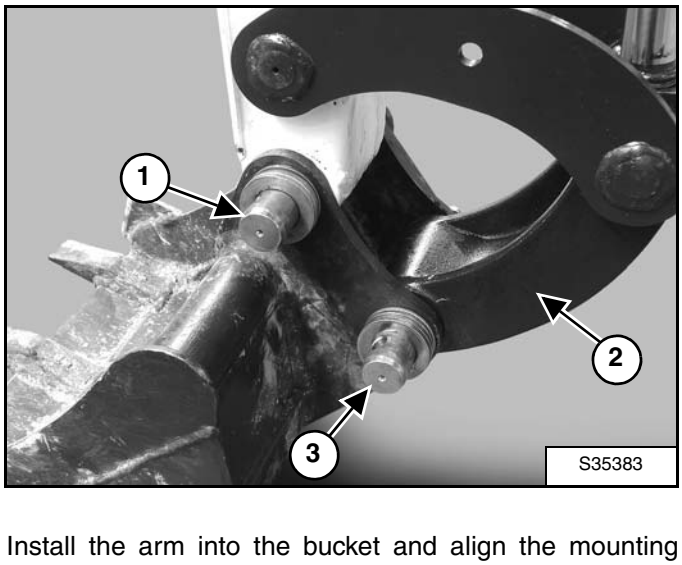
WARNING

AVOID INJURY OR DEATH

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

W-2140-0189

Figure 100

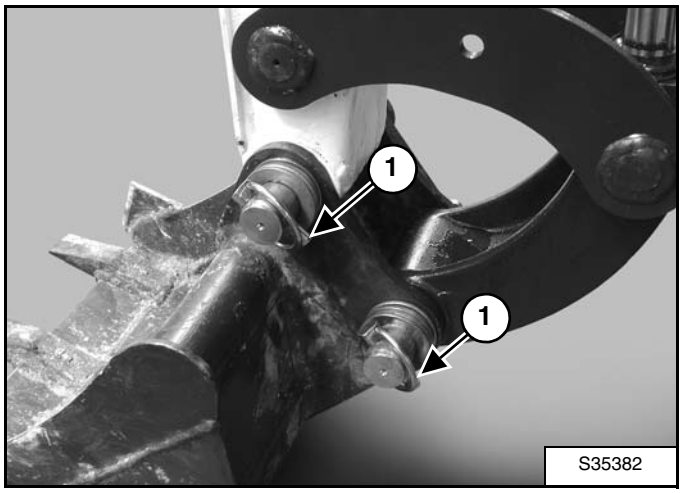


Install the arm into the bucket and align the mounting hole.

Install the pin (Item 1) **[Figure 100]** and washers.

Install the link (Item 2) in the bucket and align the mounting hole. Install the pin (Item 3) **[Figure 100]** and washers

Figure 101



Install the two retainer pins (Item 1) **[Figure 101]**. Install grease in the grease fittings.

Removal

Park the excavator on a flat surface and lower the bucket fully.

Remove the two retainer pins (Item 1) **[Figure 101]**.

Remove the washers and pins (Items 1 and 3) **[Figure 101]**.

Do not damage the dust seals in the arm.

WARNING

AVOID INJURY OR DEATH

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

W-2052-0907

OPERATING PROCEDURE

Inspect The Work Area

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

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

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

Always check ground conditions before starting your work:

- Look for signs of instability such as cracks or settlement.
- Be aware of weather conditions that can affect ground stability.
- Check for adequate traction if working on a slope.

Basic Operating Instructions

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

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

IMPORTANT

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

I-2015-0284

New operators must operate the excavator in an open area without bystanders. Operate the controls until the excavator can be handled at an efficient and safe rate for all conditions of the work area.

Operating Near An Edge Or Water

Keep the excavator as far back from the edge as possible and the excavator tracks perpendicular to the edge so that if the edge collapses, the excavator can be moved back.

Always move the excavator back at any indication the edge may be unstable.

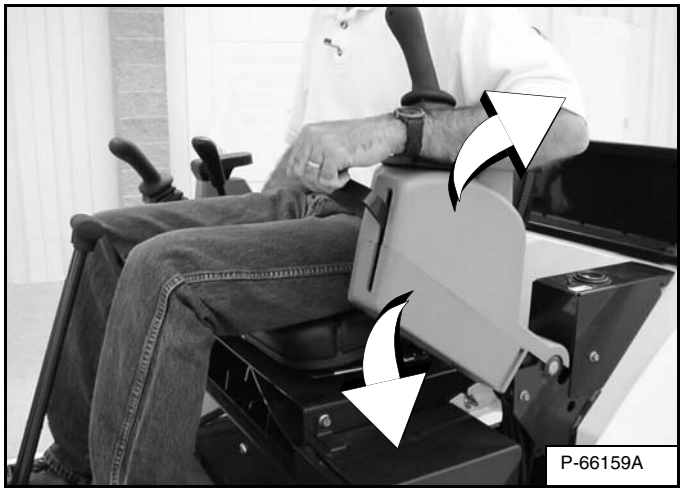
Lowering The Work Equipment (Engine STOPPED)

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

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

Use the control lever to lower the boom.

Figure 102



The joystick lock switch disengages the hydraulic control functions from the joysticks when the console(s) are raised **[Figure 102]**.

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

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

Use the control lever to lower the boom.

Lower the control console to engage the hydraulic control functions of the joysticks **[Figure 102]**.

Lifting A Load

Do not exceed the Rated Lift Capacity.

⚠ WARNING

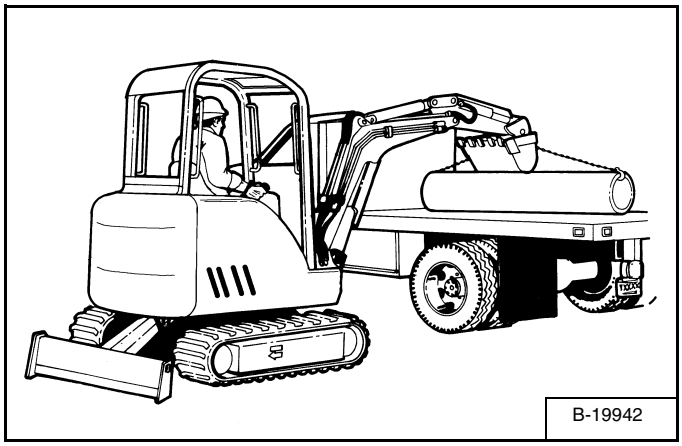
AVOID INJURY OR DEATH
Do not exceed rated lift capacity. Excessive load can cause tipping or loss of control.

W-2374-0500

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

Wrap the chain assembly around the bucket mounting plate.

Figure 103

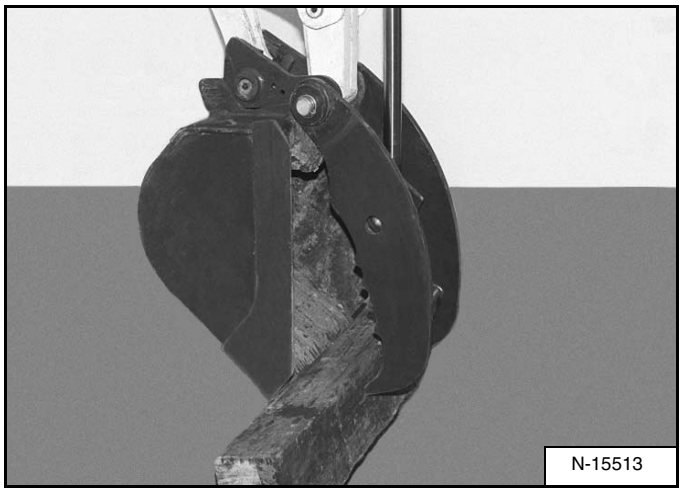


Make sure the load is evenly weighted and centred on the lifting chain, and is secured to prevent the load from shifting **[Figure 103]**.

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

Using The Clamp (If Equipped)

Figure 104



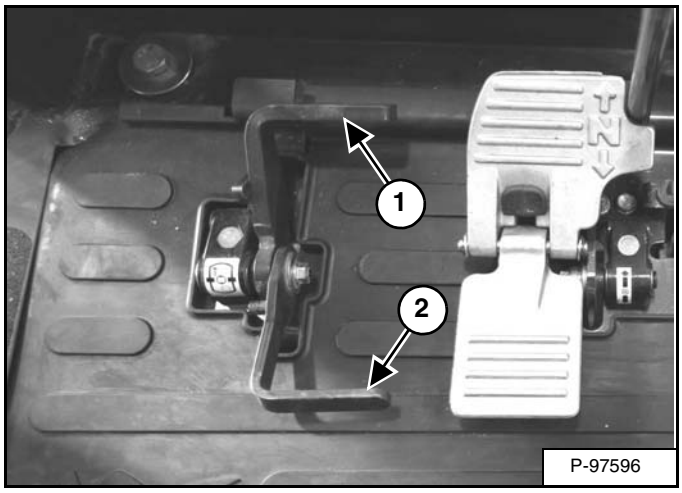
The optional lifting clamp attachment gives the excavator a wider range of use and mobility for debris removal **[Figure 104]**.

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

The lift capacities are reduced by 27,2 Kg (60 lb) if the excavator is equipped with the optional lifting clamp.

When Using The Auxiliary Hydraulics To Activate Clamp

Figure 105

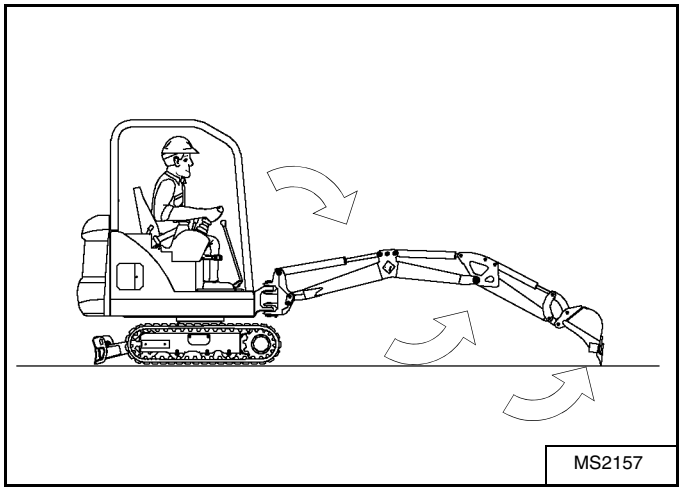


Push the toe of the pedal (Item 1) to activate hydraulic pressure / flow to the female coupler to close the clamp; heel (Item 2) **[Figure 105]** to activate hydraulic pressure / flow to the male coupler to open the clamp. (See Auxiliary Hydraulics (If Equipped) on Page 45.)

Excavating

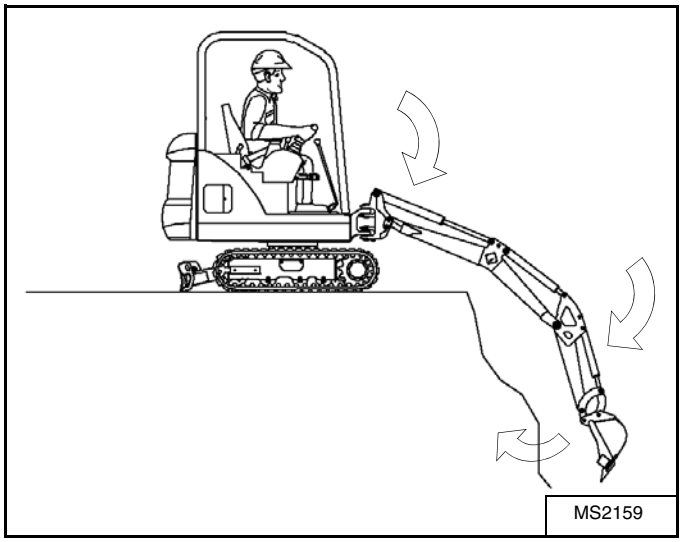
Lower the blade to increase digging performance.

Figure 106



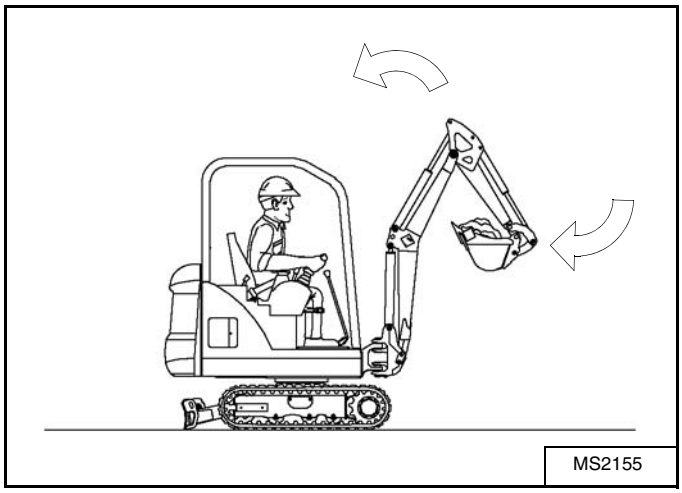
Extend the arm, lower the boom, and open the bucket **[Figure 106]**.

Figure 107



Retract the arm, while lowering boom and curling the bucket **[Figure 107]**.

Figure 108



Raise the boom, retract the arm and curl the bucket **[Figure 108]**.

Rotate the upperstructure.

NOTE: Look in the direction of rotation.

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

⚠ WARNING

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

W-2119-0910

⚠ WARNING

AVOID INJURY OR DEATH

Check area to be excavated for overhead or underground electrical power lines. Keep a safe distance from electrical power lines.

LINE VOLTAGE	MINIMUM APPROACH DISTANCE
50 kV	At least 3 m (10 ft)
230 kV	At least 5 m (17 ft)
740 kV	At least 10 m (33 ft)

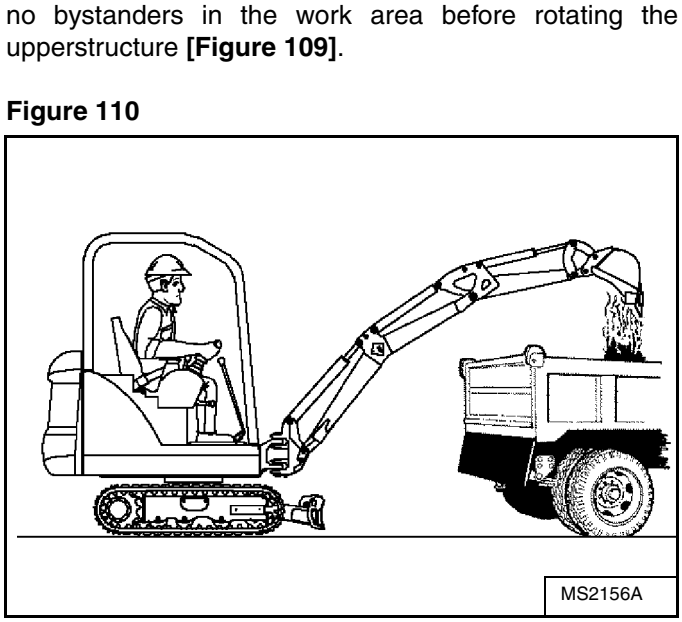
W-2757-0910

Excavating (Cont'd)

Figure 109

Look in the direction of rotation and make sure there are no bystanders in the work area before rotating the upperstructure **[Figure 109]**.

Figure 110



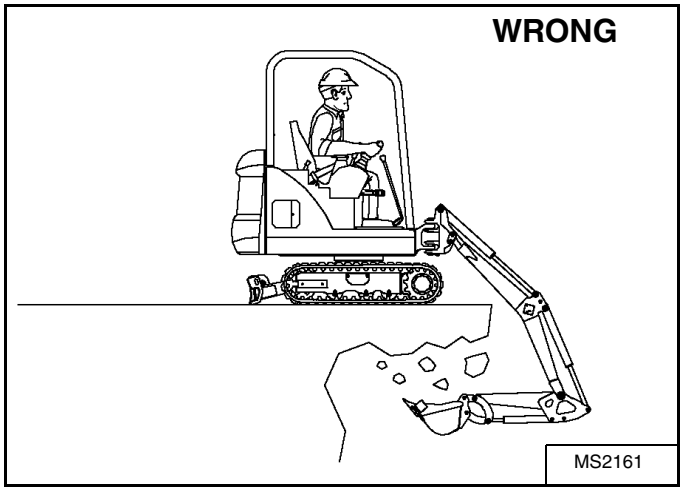
Extend the arm and uncurl the bucket to dump the material into a pile or truck **[Figure 110]**.

IMPORTANT

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

I-2220-0503

Figure 111



Do not dig under the excavator **[Figure 111]**.

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

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

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

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

Boom Swing

Figure 112

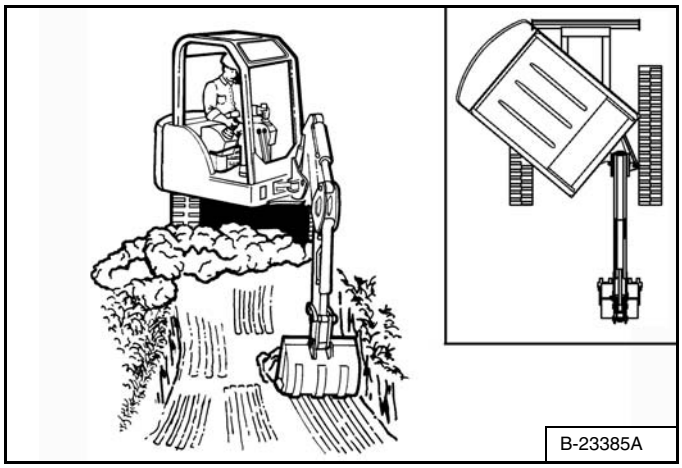


Figure 113

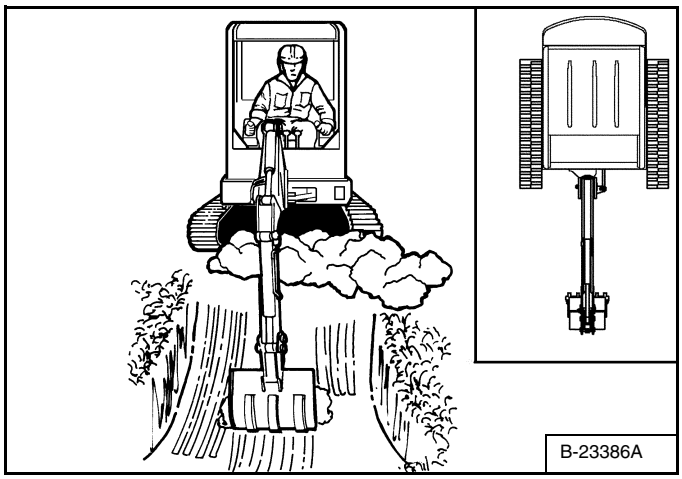
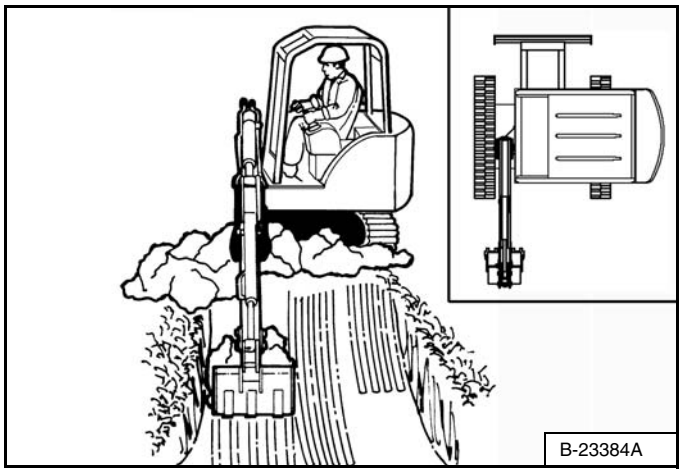
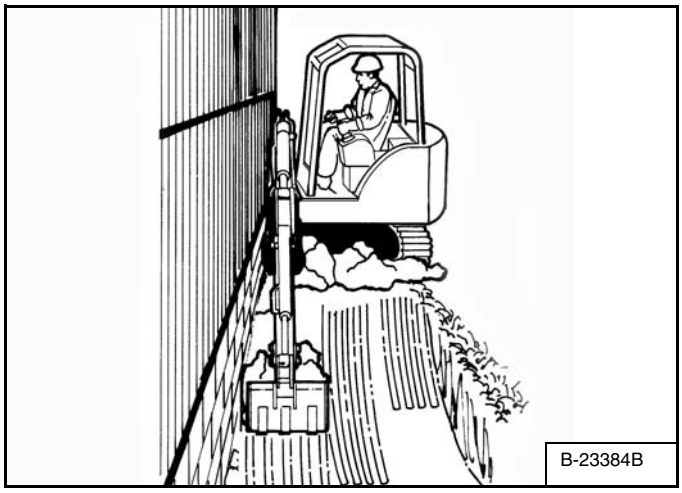


Figure 114



Slew the upperstructure, swing the boom to the right **[Figure 112]**, centre **[Figure 113]** and left **[Figure 114]** to dig a square hole the width of the machine without repositioning the excavator.

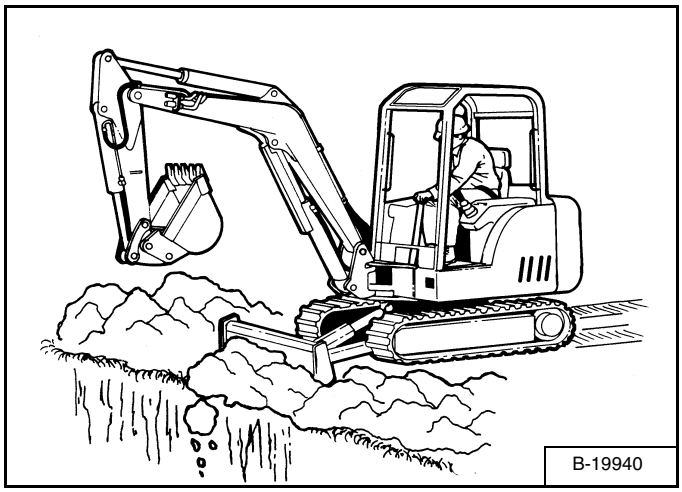
Figure 115



The boom swing allows the operator to offset the boom and dig close to buildings and other structures **[Figure 115]**.

Backfilling

Figure 116



Use the blade to backfill the trench or hole after excavating **[Figure 116]**.

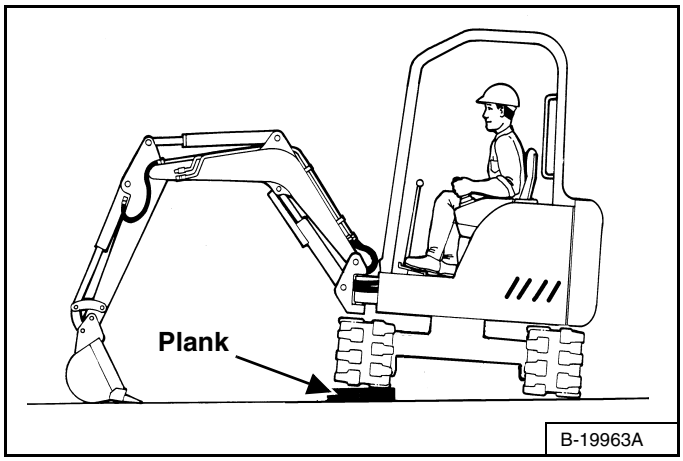
Driving The Excavator

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 117



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 117]**.

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

Figure 118

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 118]**.

Operating On Slopes

WARNING

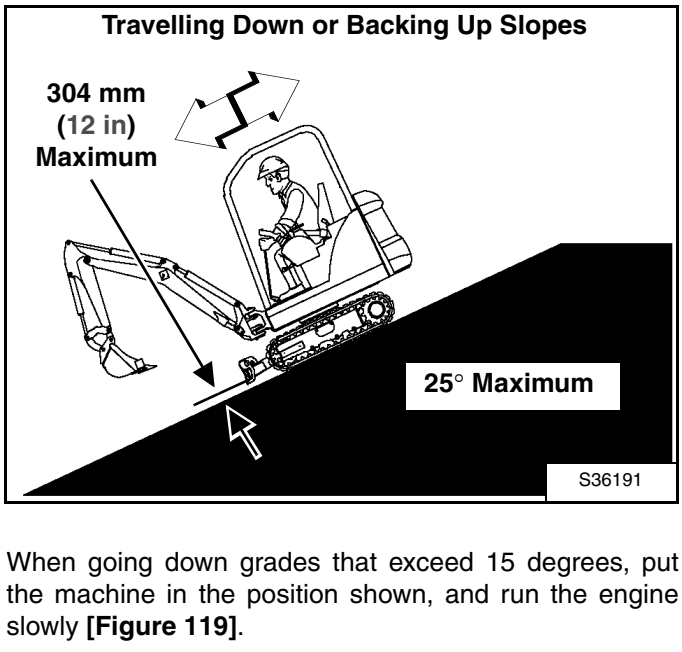
AVOID INJURY OR DEATH

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

W-2497-0304

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

Figure 119



When going down grades that exceed 15 degrees, put the machine in the position shown, and run the engine slowly **[Figure 119]**.

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 centered and attachments as low as possible when traveling on slopes or in rough conditions. Look in the direction of travel.**
- **Always fasten seat belt.**

W-2498-0304

Figure 120

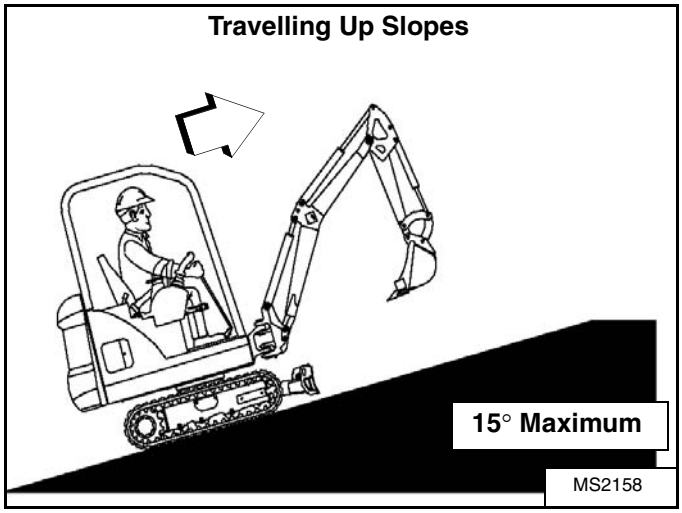
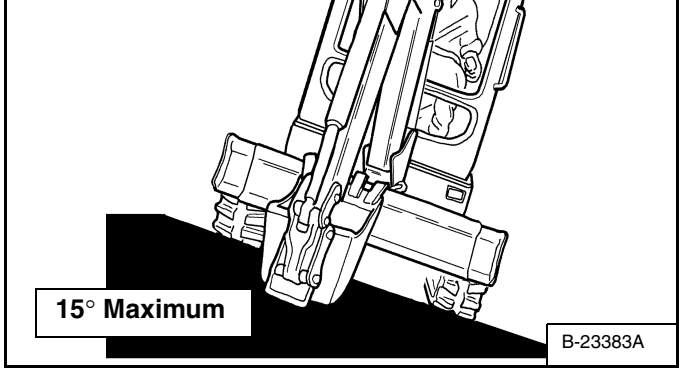


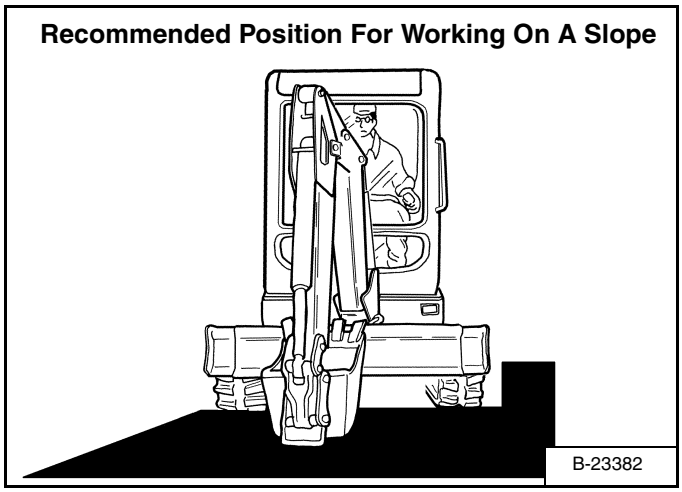
Figure 121



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 120]** and **[Figure 121]**.

Operating On Slopes (Cont'd)

Figure 122



When operating on a slope, level the work area before beginning **[Figure 122]**.

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

Do not work on slopes which are over 15 degrees.

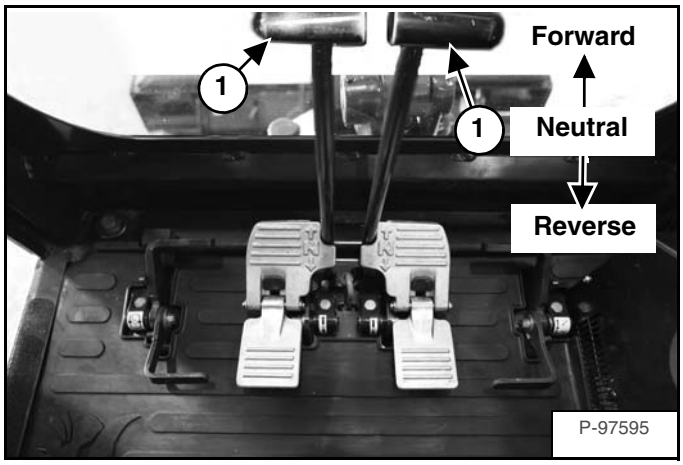
Use a slow work cycle.

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

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

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

Figure 123



To brake the machine when going down a slope, move the steering levers (Item 1) **[Figure 123]** 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 locked down position, and the key switch in the ON position.

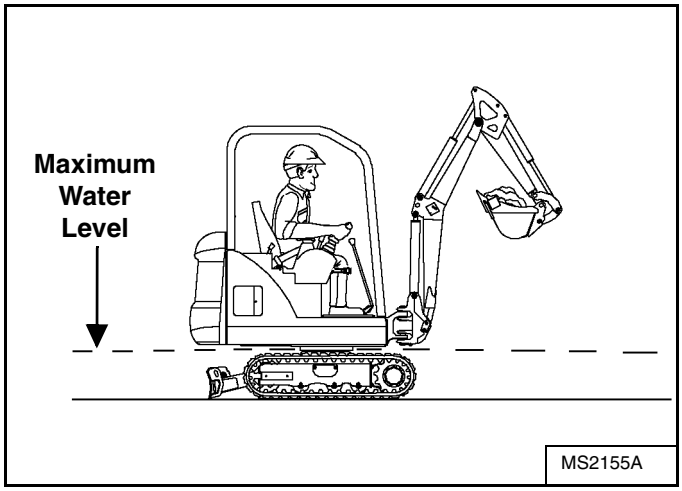
Use the control lever to lower the boom.

Start the engine and resume operation.

Operating In Water

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

Figure 124



Do not operate or immerse the excavator in water higher than the bottom of the swing bearing **[Figure 124]**.

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

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

Avoiding Track Damage

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

TOWING THE EXCAVATOR

Procedure

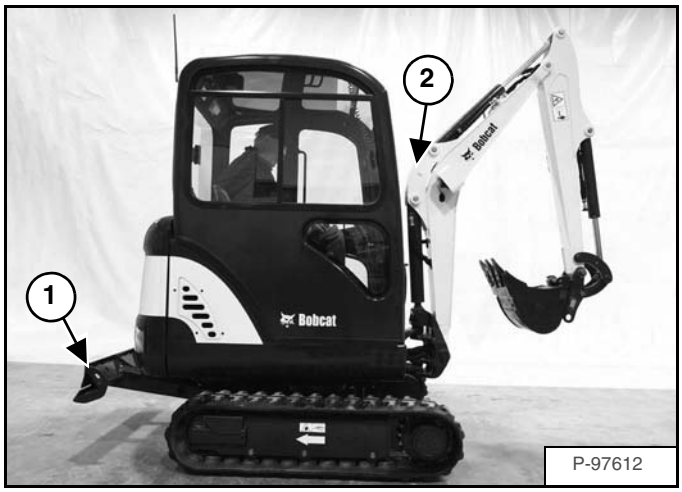
There is not a recommended towing procedure for the excavators.

- The excavator can be lifted onto the transport vehicle.
- The excavator can be skidded a short distance for service (EXAMPLE: Move onto a transport vehicle) without damage to the hydraulic system. (The tracks will not turn.) There might be slight wear to the tracks when the excavator is skidded.
- The towing chain (or cable) must be rated at 1.5 times the weight of the excavator. (See Performance on Page 130.)

LIFTING THE EXCAVATOR

Procedure

Figure 125



Fully extend the cylinders of the bucket and arm, and fully retract boom cylinder so that the excavator is in the position as shown **[Figure 125]**.

Engage the upperstructure slew lock (See Upperstructure Slew Lock on Page 33.)

Raise the blade all the way.

Put all the control levers in neutral.

⚠ WARNING

AVOID INJURY OR DEATH

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

W-2202-EN-0909

Figure 126

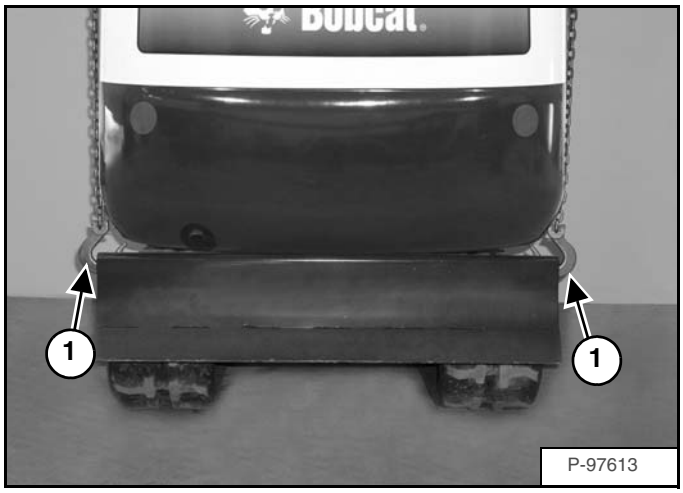
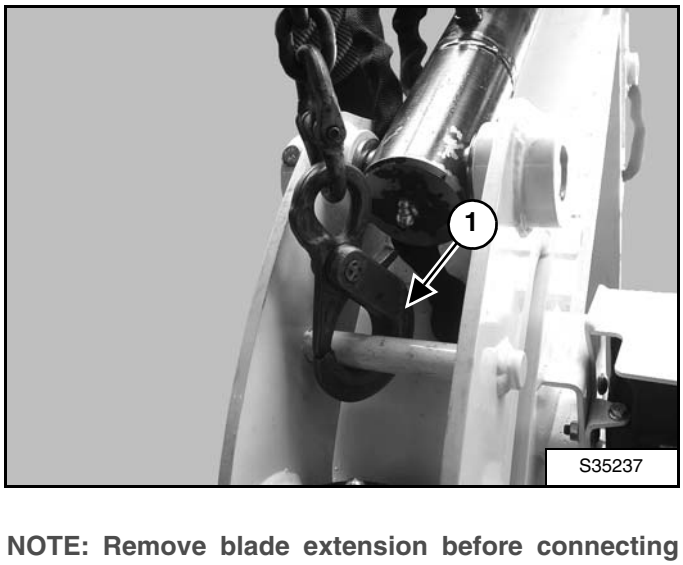


Figure 127



NOTE: Remove blade extension before connecting chains to blade.

Fasten chains to the ends of the blade (Item 1) **[Figure 125]** and **[Figure 126]** and up to a lifting fixture above the canopy / cab. The lifting fixture must extend over the sides of the canopy / cab to prevent the chains from hitting the ROPS / TOPS.

Fasten a chain (Item 1) **[Figure 127]** and (Item 2) **[Figure 125]** from the rod to the lift fixture.

TRANSPORTING THE EXCAVATOR ON A TRAILER

Loading And Unloading

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

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

Retract the track frame if required (See TRACK FRAME EXPANSION on Page 47.)

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 machine to prevent the front of the transport vehicle from raising.

Figure 128

Move the machine forward onto the transport vehicle **[Figure 128]**.

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

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

Stop the engine and remove the key.

Put blocks at the front and rear of the tracks.

Fastening -Track Frame Tie Downs

Figure 129

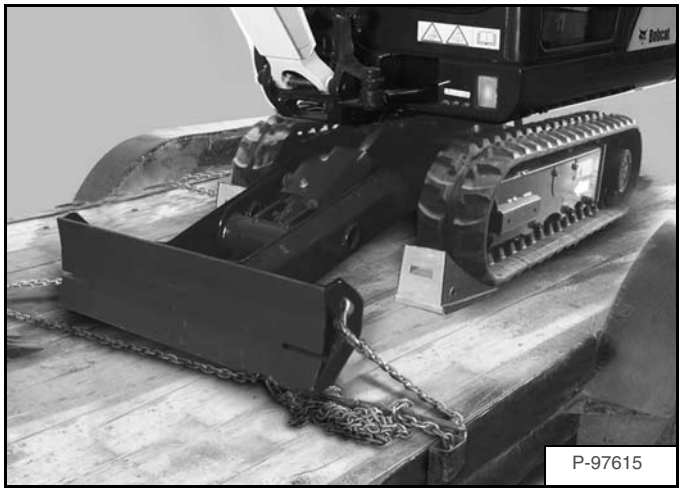


Figure 130

Fasten chains to the front corners of the blade and to the tie down loop at both sides of the track frame **[Figure 129]** and **[Figure 130]** to prevent it from moving when going up or down slopes or during sudden stops.

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

TRANSPORTING THE EXCAVATOR ON A TRAILER (CONT'D)

Fastening -Upperstructure Tie Downs (Optional)

Figure 131

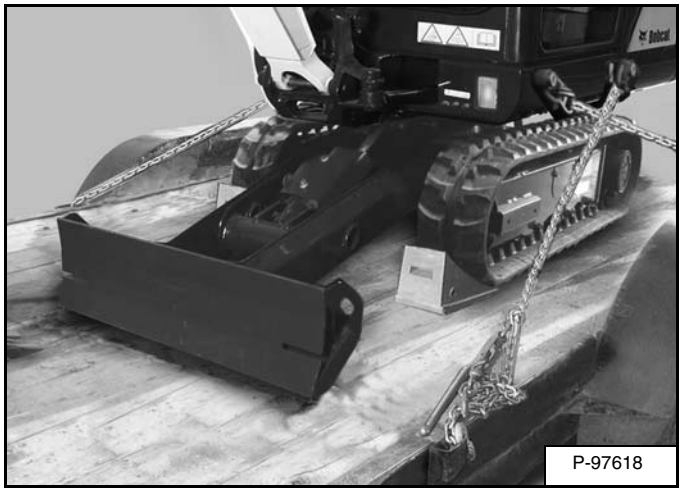
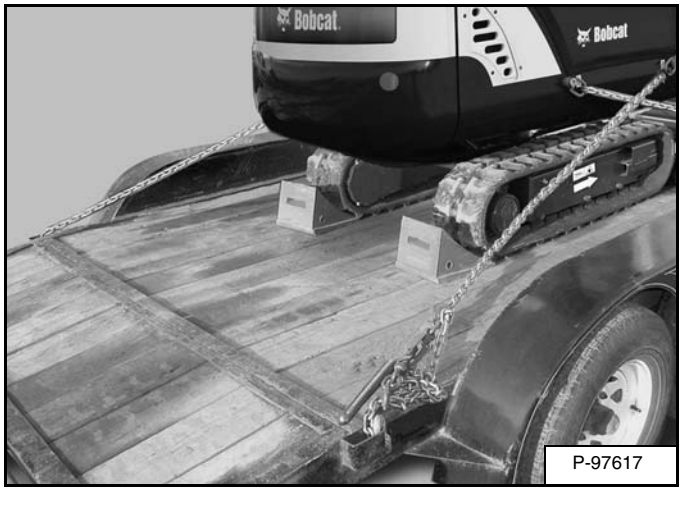


Figure 132

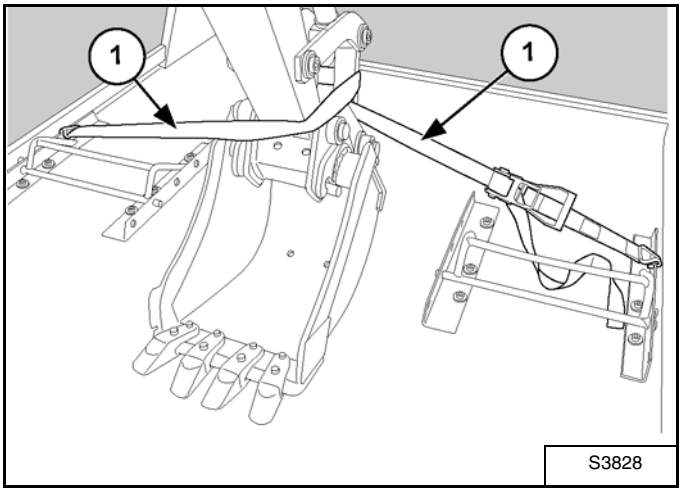


Fasten chains to the four upperstructure tie down links **[Figure 131]** and **[Figure 132]** to the prevent the machine from moving when going up or down slopes or during sudden stops.

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

Fastening Arm - All Models

Figure 133



- When on the transport vehicle, loop the chains through the holes in the mounting frame.
- Loop the chain (Item 1) **[Figure 133]** around the bucket link.

⚠ WARNING

AVOID SERIOUS INJURY OR DEATH

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

W-2058-0807

PREVENTIVE MAINTENANCE

MAINTENANCE SAFETY

WARNING

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

W-2003-0807

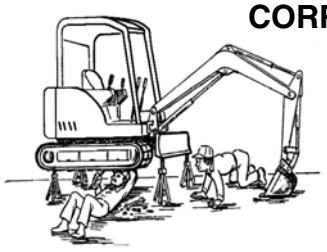
Safety Alert Symbol: This symbol with a warning statement, means: "Warning, be alert! Your safety is involved!" Carefully read the message that follows.

CORRECT

P-90216

Never service the Bobcat Excavator without instructions.

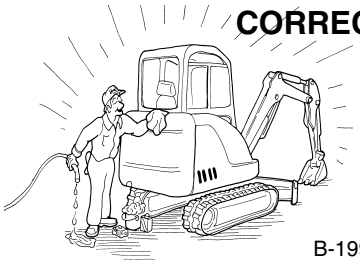
CORRECT



B-19964

Use the correct procedure to lift and support the excavator.

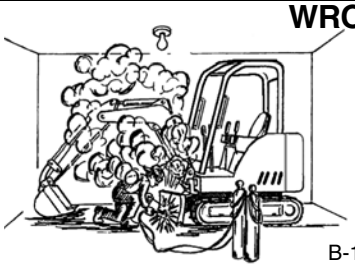
CORRECT



B-19959

Cleaning and maintenance are required daily.

WRONG



B-19965

Have good ventilation when welding or grinding painted parts.

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

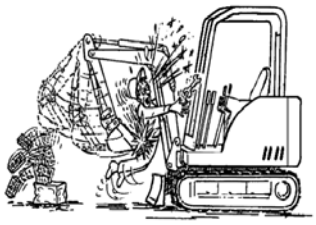
WRONG

B-19960

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

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

WRONG

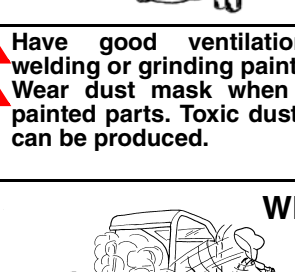


B-19966

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

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

WRONG



B-19962

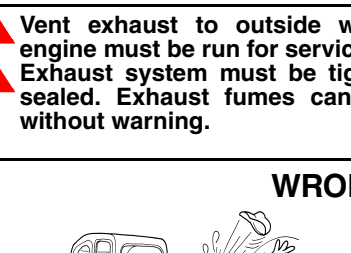
Stop, cool and clean engine of flammable materials before checking fluids.

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

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

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

WRONG



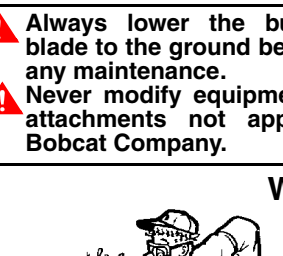
B-19958

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

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

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

WRONG



B-19798

Lead-acid batteries produce flammable and explosive gases.

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

Batteries contain acid which burns eyes or skin on contact.

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

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

MSW28-0409

SERVICE SCHEDULE

Chart

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

⚠ WARNING

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

W-2003-0807

SERVICE SCHEDULE		HOURS					
ITEM	**SERVICE REQUIRED**	**8-10**	**50**	**100**	**250**	**500**	**[5] 1000**
Engine Coolant	Check coolant level. Add premixed coolant as needed.						
Engine Oil	Check the engine oil level and add as needed.						
Hydraulic Fluid, Hoses and Tubelines, Reservoir Breather Cap	Check the hydraulic fluid level and add as needed. Check for damage and leaks. Repair or replace as needed.						
Engine Air Filter and Air System	Check condition indicator and empty dust cup as needed. Check air system for leaks.						
Tracks	Check and adjust track tension as needed.						
Indicators and Lights	Check for correct operation of all indicators and lights.						
Horn	Check for correct operation and repair as needed.						
Operator Canopy/Cab	Check condition. Check mounting hardware.	[1]					
Seat Belt	Check condition. Check mounting hardware.						
Safety Signs (Decals)	Check for damaged signs (decals). Replace any signs that are damaged.						
Pivot Points	Grease all machinery pivot points.						
Cab / Heater Air Filters	Clean the filters as needed.	[1]					
Console Lockout	Check console lockout for proper operation.						
Swing Circle and Pinion	Grease two fittings		[2]				
Fuel Tank & Filter	Drain water and sediment from fuel tank and fuel filter.						
Battery	Check battery, cables, connections and electrolyte level. Add distilled water as needed.						
Alternator / Fan Belt	Check condition of belt and adjust as needed.		[3]				
Spark Arrester Muffler	Clean the spark chamber.						
Fuel Filter	Replace fuel filter.						
Travel Motor	Check oil level in both motors.			[4]			
Engine Oil and Filter	Replace oil and filter.		[3]				
Radiator, Oil Cooler	Clean debris from the radiator fins.						
Hydraulic Filter and Reservoir Breather	Replace the hydraulic filter and reservoir breather.			[4]			
Alternator & Starter	Check the alternator and starter connections.			[4]			
Engine Valves	Check and adjust the engine valve clearance.						
Travel Motor	Replace the lubricant in both travel motors.						
Hydraulic System	Replace the hydraulic fluid and filters. Clean the reservoir.			[4]			
Engine Coolant	Drain and flush the cooling system. Replace the coolant.	Every 2 years					

[1] If Equipped.
[2] Service every 10 hours when operating in water.
[3] Service at the first 50 hours, then as scheduled.
[4] Service at the first 100 hours, then as scheduled.
[5] Or every 12 months.

NOTE: The Inspection Checkbook can be ordered for you by your local dealer. Part number 4420310.

Inspection Checkbook

Regularly scheduled maintenance is essential to continuous operation and operating safety. The life expectancy of your machine depends on proper and meticulous care.

The Inspection Checkbook contains the following information:

- Doosan Benelux S.A. Warranty Conditions
- Protection Plus Extended Warranty Conditions
- General Parts Policy
- General Information
- First Inspection
- Scheduled Services
- Identification
- Authorised Identification
- Lubricants and Fluids Table
- Service Parts Chart

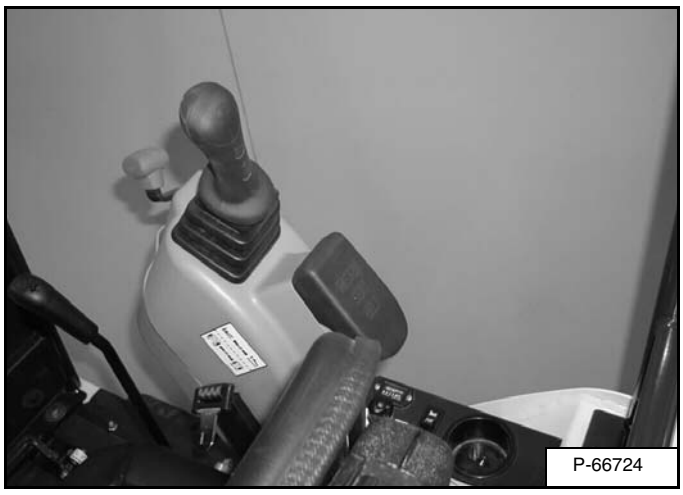
Your local dealer can order the Inspection Checkbook. Part number: 4420310.

CONTROL CONSOLE LOCKOUTS

Inspection And Maintenance

Figure 134

Figure 135



When a console is raised **[Figure 134]** or **[Figure 135]**, the hydraulic control levers (joysticks) and traction system must not function.

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

Raise the left console **[Figure 134]**. (Green light on the console will go off).

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

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

Lower the left console. Raise the right console **[Figure 135]** and repeat the inspection procedure.

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

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

SEAT BELT

Inspection And Maintenance

WARNING

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

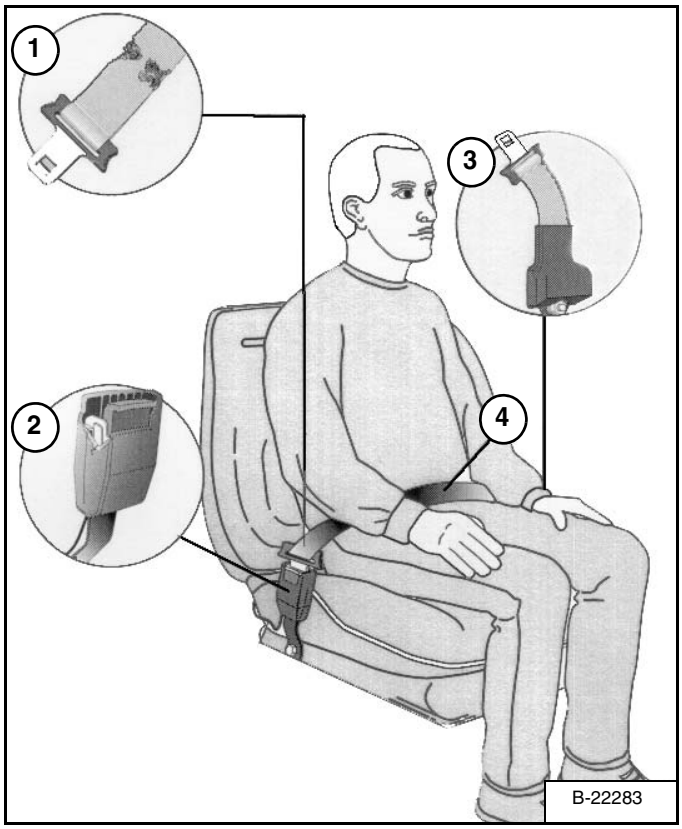
W-2466-0703

Check the seat belt daily for correct function.

Inspect the seat belt system thoroughly at least once each year or more often if the machine is exposed to severe environmental conditions or applications.

Any seat belt system that shows cuts, fraying, extreme or unusual wear, significant discolourations due to ultraviolet UV exposure, dusty / dirty conditions, abrasion to the seat belt webbing, or damage to the buckle, latch plate, retractor (if equipped), hardware or any other obvious problem should be replaced immediately.

Figure 136



The items below are referenced in **[Figure 136]**.

1. Check the webbing. If the system is equipped with a retractor, pull the webbing completely out and inspect the full length of the webbing. Look for cuts, wear, fraying, dirt and stiffness.

2. Check the buckle and latch for correct operation. Make sure latch plate is not excessively worn, deformed or buckle is not damaged or casing broken.

3. Check the retractor web storage device (if equipped) by extending webbing to determine if it looks correct and that it spools out and retracts webbing correctly.

4. Check webbing in areas exposed to ultraviolet (UV) rays from the sun or extreme dust or dirt. If the original colour of the webbing in these areas is extremely faded and / or the webbing is packed with dirt, the webbing strength may have deteriorated.

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

MOTION ALARM SYSTEM (IF EQUIPPED)

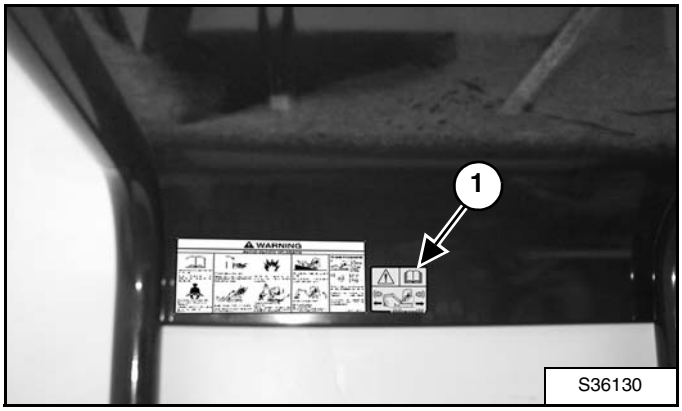
Description

This excavator may be equipped with a motion alarm system. The motion alarm will sound when the operator moves the travel control levers in either the forward or reverse direction. Slight movement of the steering levers in either the forward or reverse direction is required with hydraulic components before the motion alarm will sound.

Inspecting

Figure 137

Figure 138



Inspect for damaged or missing motion alarm decal (Item 1) **[Figure 137]** (cab machine) or (Item 1) **[Figure 138]** (canopy machine). Replace if required.

NOTE: The excavator will need to be moved slightly in both the forward and reverse direction to test the motion alarm. Keep all bystanders away from machine during test.

WARNING

AVOID INJURY OR DEATH

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

W-2050-0807

Sit in the operator's seat and fasten the seat belt. Start the engine. (See PRE-STARTING PROCEDURE on Page 51.)

Move the travel control levers (one lever at a time) in the forward direction. The motion alarm must sound. Move the travel control levers (one lever at a time) in the reverse direction. The motion alarm must sound.

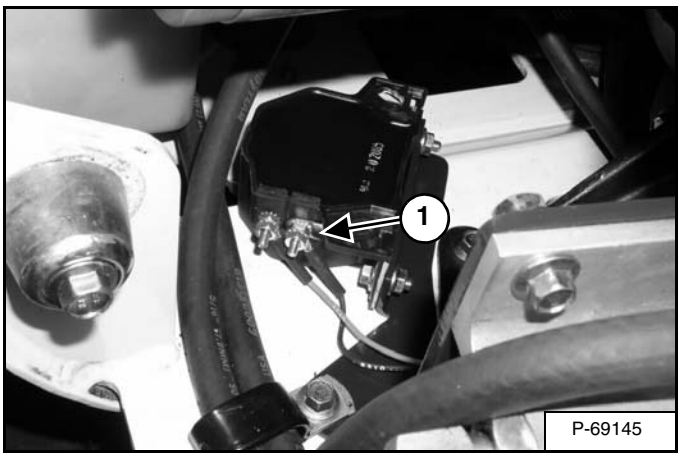
Return both levers to neutral and turn excavator key to OFF position. Exit the excavator. (See STOPPING THE ENGINE AND LEAVING THE EXCAVATOR on Page 58.)

MOTION ALARM SYSTEM (IF EQUIPPED) (CONT'D)

Inspecting (Cont'd)

The motion alarm is located inside the rear of the excavator, below the hydraulic pump.

Figure 139

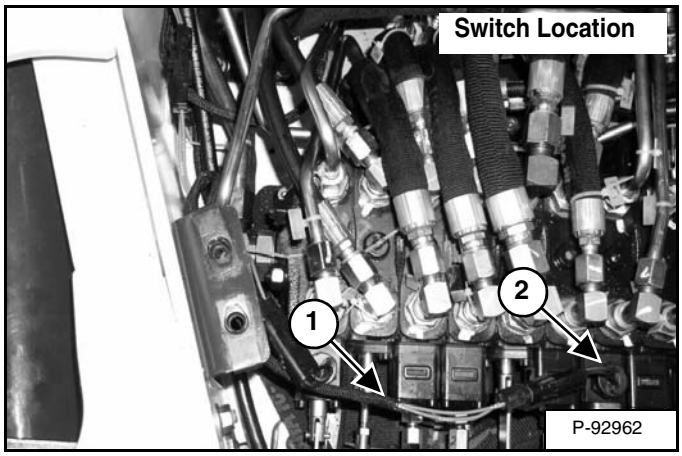


Inspect the motion alarm electrical connections and wire harness (Item 1) **[Figure 139]**, wire harness (Item 1) **[Figure 140]** and motion alarm switch (Item 2) **[Figure 140]** for tightness and damage. Repair or replace any damaged components.

If the motion alarm switch requires adjustment, see the following information.

Adjusting Switch Position

Figure 140



The motion alarm switch (Item 2) **[Figure 140]** is located in the travel control valve located under the floor plate. Remove the floor mat and the floor plate to access the switch.

The switch (Item 2) **[Figure 140]** is non-adjustable. It must be fully installed into the travel control valve housings and tightened. Tighten the switch to 13 - 15 ft.-lb. (18 - 20 N•m).

Inspect the motion alarm system for proper function after switch replacement.

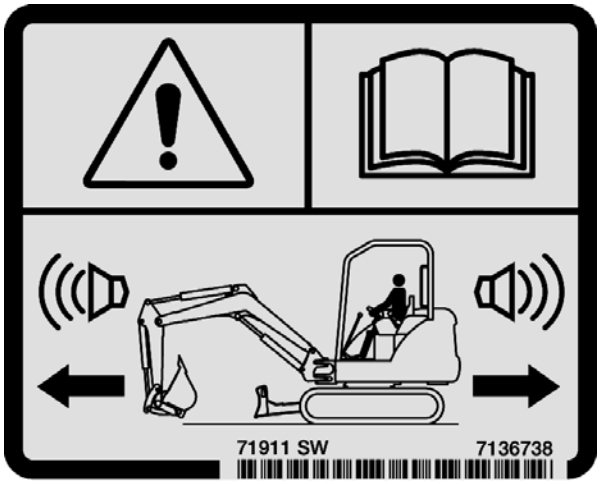
⚠ WARNING

This machine is equipped with a motion alarm.
ALARM MUST SOUND!
when operating forward or backward.

Failure to maintain a clear view in the direction of travel could result in serious injury or death.

The operator is responsible for the safe operation of this machine.

W-2786-0309



TAILGATE

Opening And Closing

WARNING

AVOID INJURY OR DEATH

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

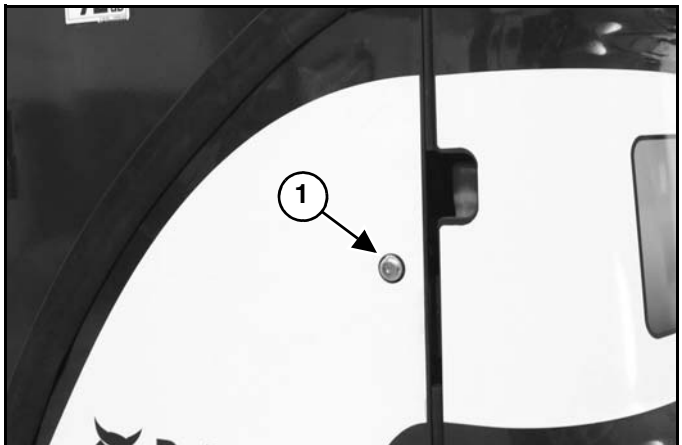
W-2012-0497

WARNING

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

W-2020-1285

Figure 141



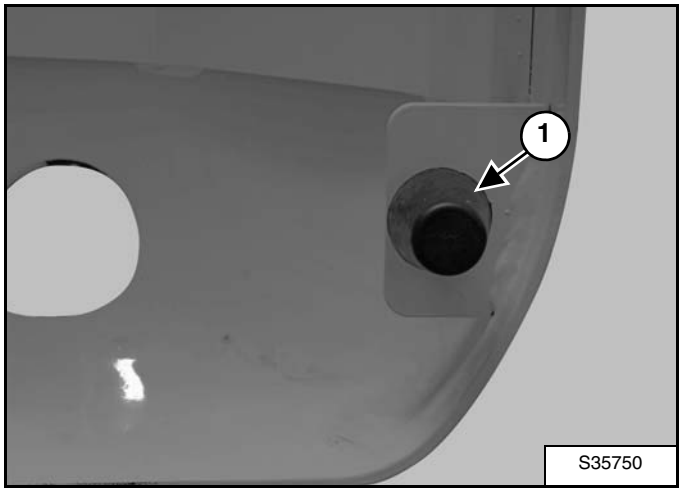
Pull the latch (Item 1) **[Figure 141]** and open the tailgate.

Push firmly to close the tailgate.

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

Adjusting The Bumper

Figure 142

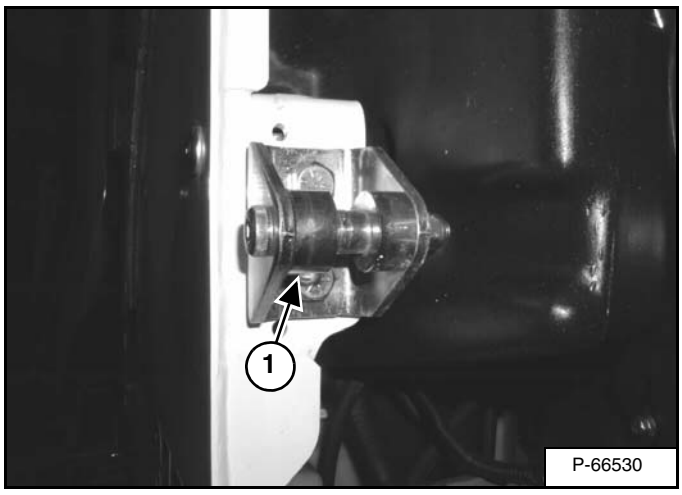


The door bumper (Item 1) **[Figure 142]** can be adjusted for alignment with the tailgate.

Close the tailgate before operating the excavator.

Adjusting The Latch

Figure 143



The tailgate latch (Item 1) **[Figure 143]** can be adjusted by loosening the two bolts, moving the latch, and tightening the two bolts.

Close the tailgate before operating the excavator.

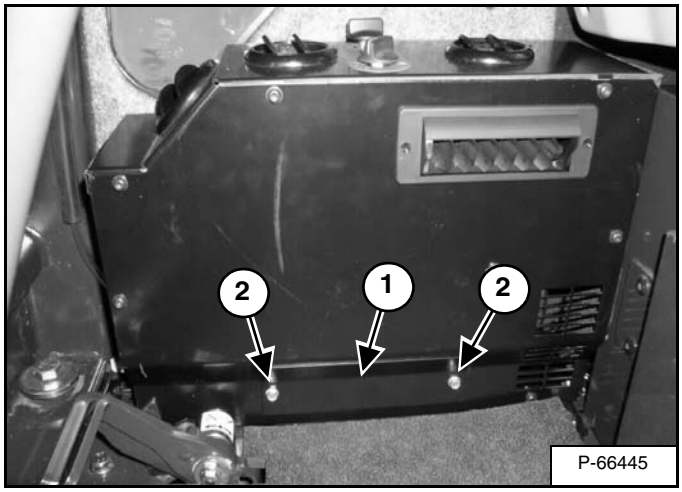
CAB FILTERS

Cleaning And Maintenance (Early Models Only)

The recirculation filter must be cleaned regularly. (See SERVICE SCHEDULE on Page 85.)

The recirculation filter is located to the right of the operator seat.

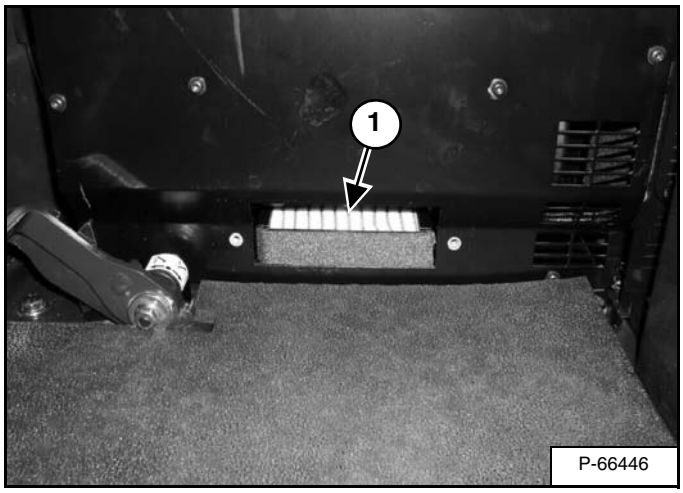
Figure 144



The cab filter is located on the lower side of the heater panel (Item 1) **[Figure 144]**.

Remove the two bolts (Item 2) **[Figure 144]** and remove the panel.

Figure 145



Remove the filter (Item 1) **[Figure 145]**. Shake the filter or use low air pressure to remove debris. Replace the filter after 3 cleanings or if the filter becomes too dirty to clean or damaged.

Reinstall the filter, cover and bolts.

The filter must be cleaned regularly.

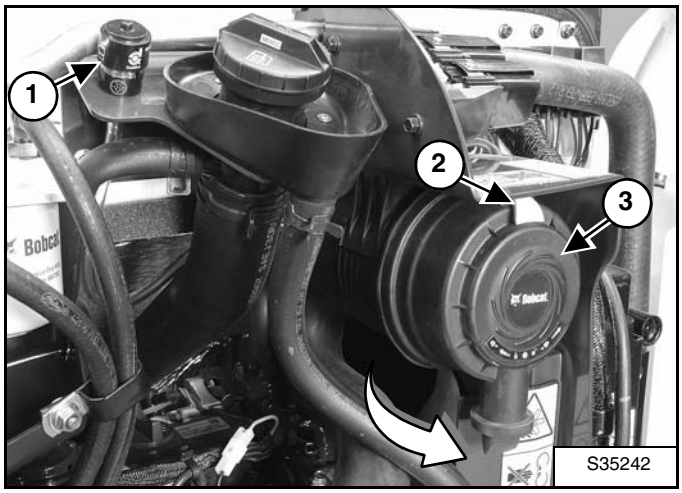
AIR CLEANER SERVICE

See the SERVICE SCHEDULE for the correct service interval. (See SERVICE SCHEDULE on Page 85.)

Daily Check

The air cleaner is located in the engine compartment. Open the tailgate to access the air cleaner for service. (See TAILGATE on Page 90.)

Figure 146



Check the condition indicator (Item 1) **[Figure 146]**. If the red ring shows in the condition indicator, the filter needs to be replaced.

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

Replacing The Filter Elements

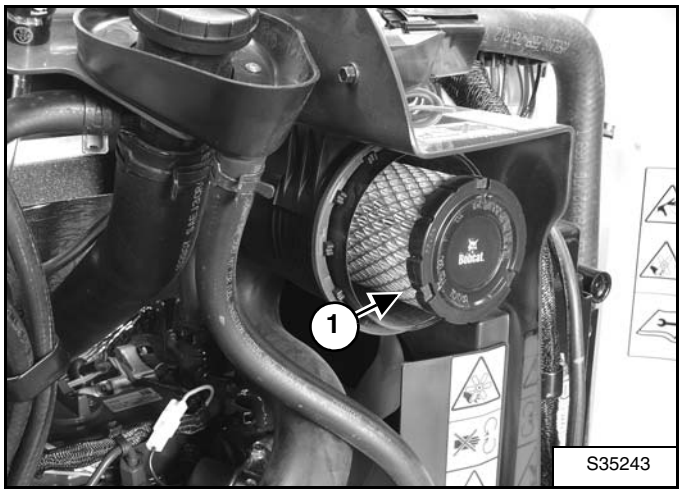
Outer Filter

Pull the locking tab (Item 2) **[Figure 146]**.

Turn the dust cup (Item 3) **[Figure 146]** anticlockwise for about 1/8 turn.

Remove and clean the dust cup.

Figure 147



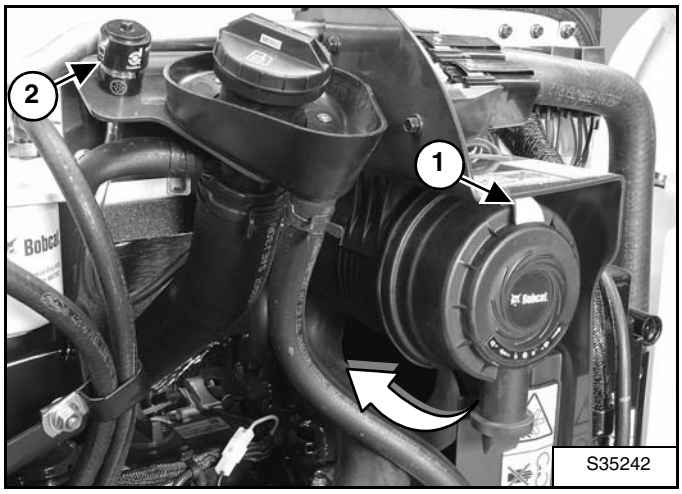
Pull the outer filter (Item 1) **[Figure 147]** from the air cleaner housing.

Check the housing for damage.

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

Replacing The Filter Elements (Cont'd)

Figure 148



Install the dust cup and turn about 1/8 turn clockwise **[Figure 148]**.

Push locking tab in (Item 1) **[Figure 148]**.

After the outer filter has been replaced, press the button (Item 2) **[Figure 148]** on the top of the condition indicator and start the engine. Run at full rpm, then reduce engine speed and stop the engine. If the red ring shows in the condition indicator, replace the inner filter.

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

Inner Filter

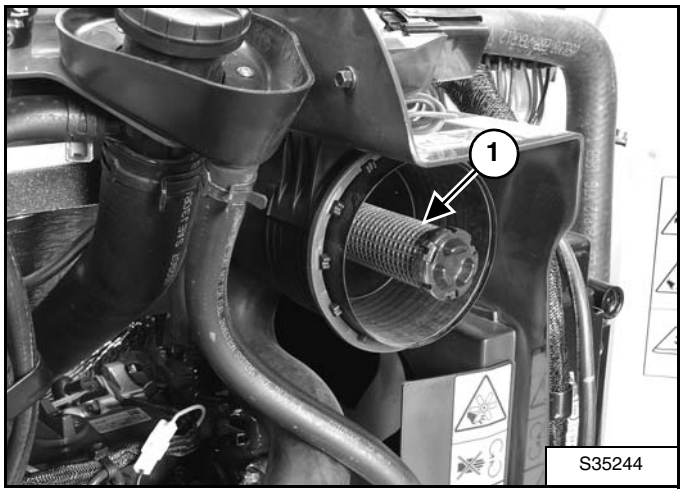
Only replace the inner filter under the following conditions:

- Replace the inner filter every *third* time the outer filter is replaced.
- After the outer filter has been replaced, press the button (Item 2) **[Figure 148]** on the top of the condition indicator. Start the engine. Run the engine at full rpm, then reduce engine speed. Stop the engine. If the red ring shows in the condition indicator, replace the inner filter.

Remove the dust cup, outer filter and inner filter.

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

Figure 149



Remove the dust cup, outer filter and inner filter (Item 1) **[Figure 149]**.

Install the new inner filter (Item 1) **[Figure 149]**.

Install the outer filter and the dust cup.

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

FUEL SYSTEM

Fuel Specifications

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

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

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

At a minimum, low sulfur diesel fuel must be used in this machine. Low sulfur is defined as 500 mg/kg (500 ppm) sulfur maximum.

The following fuels may also be used in this machine:

- Ultra low sulfur diesel fuel. Ultra low sulfur is defined as 15 mg/kg (15 ppm) sulfur maximum.
- Biodiesel blend fuel - Must contain no more than five percent biodiesel mixed with low sulfur or ultra low sulfur petroleum based diesel. This is commonly marketed as B5 blended diesel fuel.

⚠ WARNING

AVOID INJURY OR DEATH

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

W-2063-0807

⚠ WARNING

AVOID INJURY OR DEATH

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

W-2103-0508

Biodiesel Blend Fuel

Biodiesel blend fuel has unique qualities that should be considered before using in this machine:

- Cold weather conditions can lead to plugged fuel system components and hard starting.
- Biodiesel blend fuel is an excellent medium for microbial growth and contamination which can cause corrosion and plugging of fuel system components.
- Use of biodiesel blend fuel may result in premature failure of fuel system components, such as plugged fuel filters and deteriorated fuel lines.
- Shorter maintenance intervals may be required, such as cleaning the fuel system and replacing fuel filters and fuel lines.
- Using biodiesel blended fuels containing more than five percent biodiesel can affect engine life and cause deterioration of hoses, tubelines, injectors, injector pump and seals.

Apply the following guidelines if biodiesel blend fuel is used:

- Ensure the fuel tank is as full as possible at all times to prevent moisture from collecting in the fuel tank.
- Ensure that the fuel tank cap is securely tightened.
- Biodiesel blend fuel can damage painted surfaces, remove all spilled fuel from painted surfaces immediately.
- Drain all water from the fuel filter daily before operating the machine.
- Do not exceed engine oil change interval. Extended oil change intervals can cause engine damage.
- Before vehicle storage; drain the fuel tank, refill with 100% petroleum diesel fuel, add fuel stabilizer and run the engine for at least 30 minutes.

NOTE: Biodiesel blend fuel does not have long term stability and should not be stored for more than three months.

Filling The Fuel Tank

⚠ WARNING

AVOID INJURY OR DEATH

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

W-2063-0807

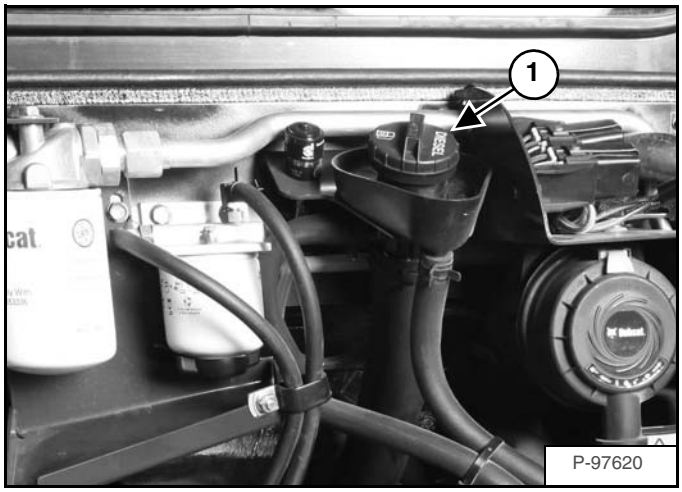
⚠ WARNING

AVOID INJURY OR DEATH

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

W-2103-0508

Figure 150



The fuel cap is located in the engine compartment.

Open the tailgate. (See TAILGATE on Page 90.)

Remove the fuel fill cap (Item 1) **[Figure 150]**.

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

Install and tighten the fuel fill cap.

Clean up any spilled fuel.

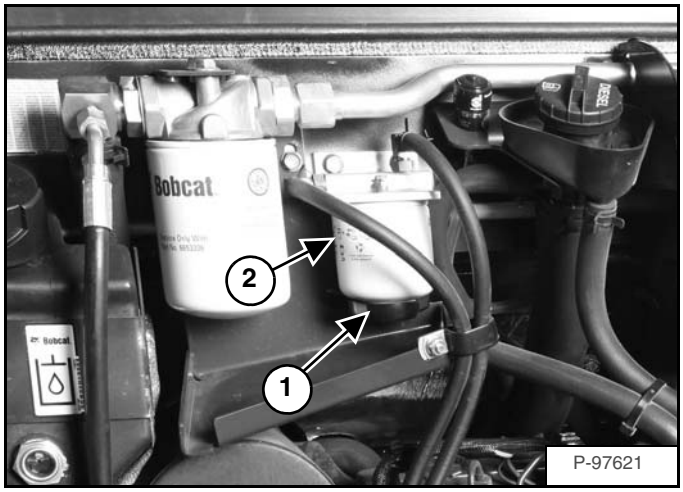
See the SERVICE SCHEDULE for the service interval when to remove water from or replace the fuel filter. (See SERVICE SCHEDULE on Page 85.)

Fuel Filters

Removing Water

Open the tailgate. (See TAILGATE on Page 90.)

Figure 151



Loosen the drain (Item 1) **[Figure 151]** at the bottom of the filter to drain water from the filter into a container.

Clean up any spilled fuel.

Replacing Elements

Remove the filter (Item 2) **[Figure 151]**.

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

Remove the air from the fuel system. (See Removing Air From The Fuel System on Page 96.)

Draining The Fuel Tank

See the SERVICE SCHEDULE for the correct service interval. (See SERVICE SCHEDULE on Page 85.)

Figure 152

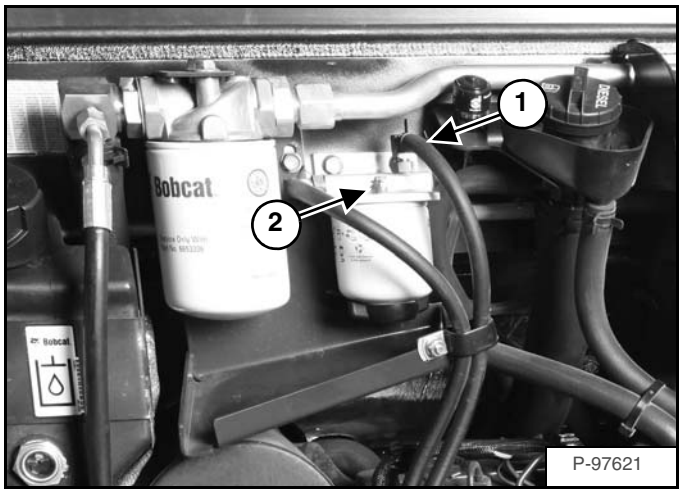
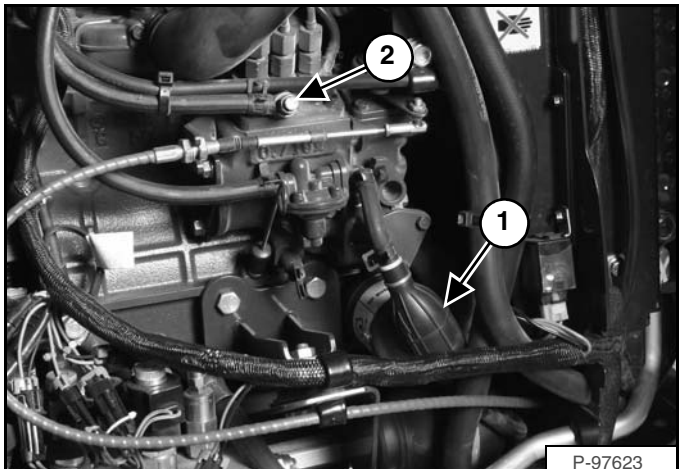


Figure 153



Remove the hose (Item 1) **[Figure 152]** from the fuel filter. Route the hose to a container.

Squeeze the hand pump (priming bulb) (Item 1) **[Figure 153]** to start the fuel siphoning from the fuel tank.

Drain the fuel into the container.

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

Reinstall the hose (Item 1) **[Figure 152]** after the fuel is removed from fuel tank.

⚠ WARNING

AVOID INJURY OR DEATH

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

W-2072-0807

Removing Air From The Fuel System

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

Open the tailgate. (See TAILGATE on Page 90.)

Open the fuel filter vent (Item 2) **[Figure 152]** and operate the hand pump (priming bulb) (Item 1) **[Figure 153]** until the fuel flows from the vent with no air bubbles.

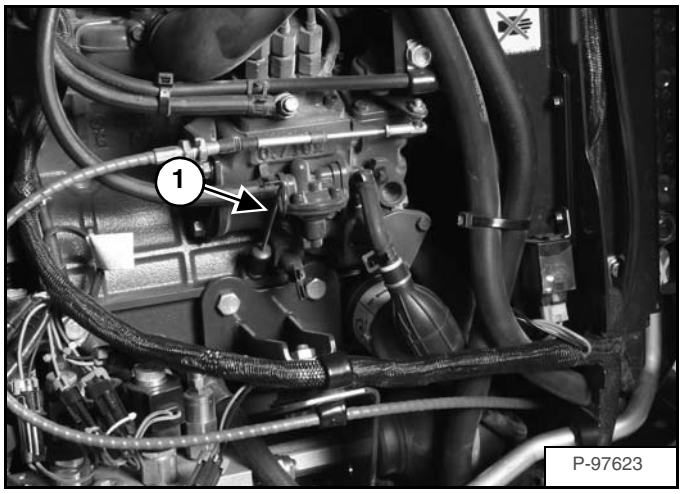
Close the vent (Item 2) **[Figure 152]**.

Start the engine. It may be necessary to open the vent (Item 2) **[Figure 152]** (at the fuel injection pump) briefly until the engine runs smoothly.

Checking And Adding Engine Oil

Check the engine oil after every 8 - 10 hours of operation and before starting the engine. (See SERVICE SCHEDULE on Page 85.)

Figure 154

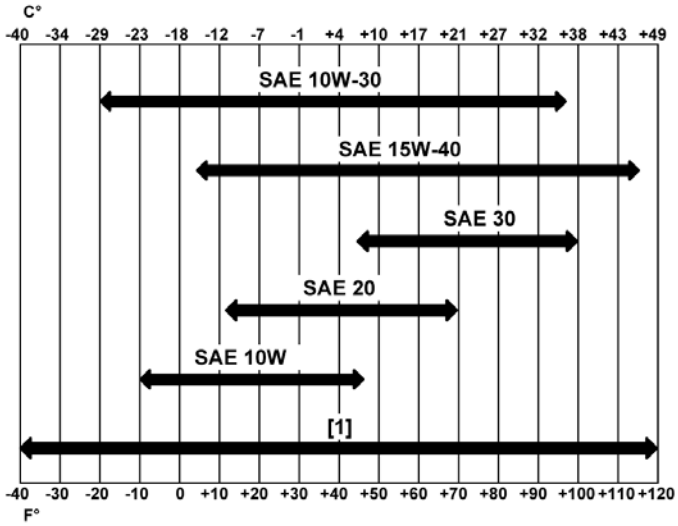


Open the tailgate and remove the dipstick (Item 1) **[Figure 154]**.

Keep the oil level between the marks on the dipstick.

Figure 155

ENGINE OIL
RECOMMENDED SAE VISCOSITY NUMBER (LUBRICATION OILS FOR DIESEL ENGINE CRANKCASE)



TEMPERATURE RANGE ANTICIPATED BEFORE NEXT OIL CHANGE (DIESEL ENGINES MUST USE API CLASSIFICATION CI-4 OR BETTER)

[1] Synthetic Oil - Use recommendation from Synthetic Oil Manufacturer.

Use good quality engine oil that meets API Service Classification of CI-4 or better **[Figure 155]**.

⚠ WARNING

AVOID INJURY OR DEATH

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

W-2103-0508

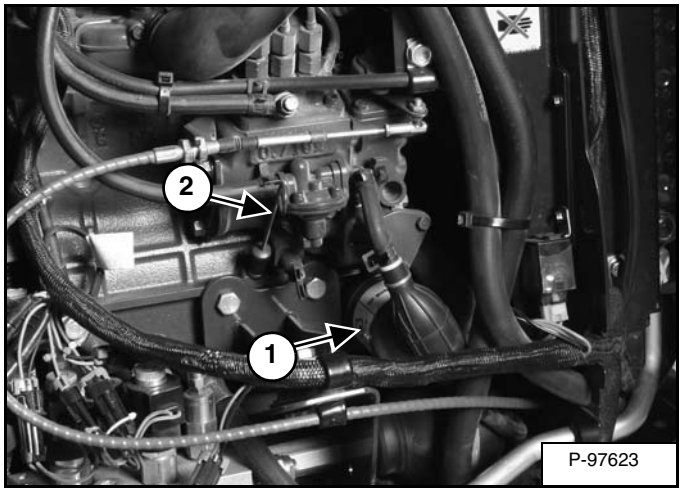
Removing And Replacing Oil And Filter

See the SERVICE SCHEDULE for the service interval for replacing the engine oil and filter. (See SERVICE SCHEDULE on Page 85.)

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

Open the tailgate. (See TAILGATE on Page 90.)

Figure 156



From below the engine, remove the engine oil drain plug. Drain the oil into a container and recycle or dispose of used oil in an environmentally safe manner.

Remove the oil filter (Item 1) **[Figure 156]** and clean the filter housing surface.

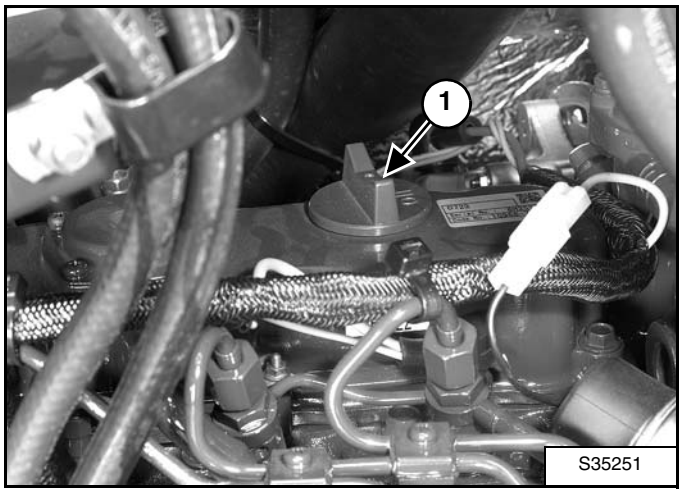
Use a genuine Bobcat filter.

Put clean oil on the filter gasket.

Install the filter and tighten by hand.

Install and tighten the oil drain plug.

Figure 157



Remove the fill cap (Item 1) **[Figure 157]**.

Put oil in the engine. (See ENGINE LUBRICATION SYSTEM on Page 97.)

Install the fill cap (Item 1) **[Figure 157]**.

Start the engine and let it run for several minutes.

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

Add oil as needed if it is not at the top mark on the dipstick (Item 2) **[Figure 156]**.

ENGINE COOLING SYSTEM

Check the cooling system every day to prevent overheating, loss of performance or engine damage. (See SERVICE SCHEDULE on Page 85.)

Cleaning

Open the tailgate. (See TAILGATE on Page 90.)

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

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

Checking Level

⚠ WARNING

AVOID BURNS

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

W-2070-1203

⚠ WARNING

AVOID INJURY OR DEATH

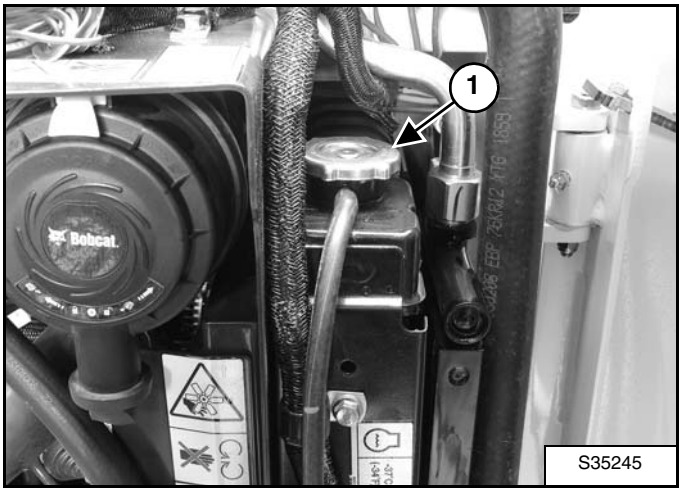
Wear safety glasses to prevent eye injury when any of the following conditions exist:

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

W-2019-0907

Open the tailgate. (See TAILGATE on Page 90.)

Figure 158



When the engine is cool, remove the radiator cap (Item 1) **[Figure 158]**.

The coolant level must be 20 - 25 mm below the filler neck.

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

IMPORTANT

AVOID ENGINE DAMAGE

Always use the correct ratio of water to antifreeze.

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

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

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

I-2124-0497

Removing And Replacing Coolant

See the SERVICE SCHEDULE for correct service intervals. (See SERVICE SCHEDULE on Page 85.)

Stop the engine. Open the tailgate. (See TAILGATE on Page 90.)

⚠ WARNING

AVOID BURNS

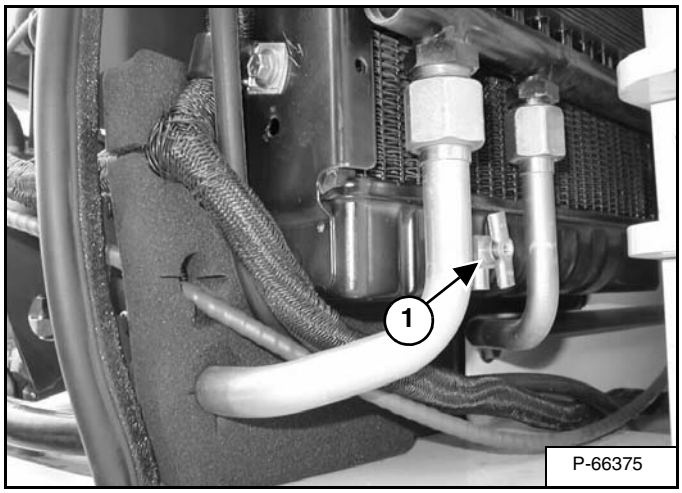
Do not remove radiator cap when the engine is hot. You can be seriously burned.

W-2070-1203

Figure 159

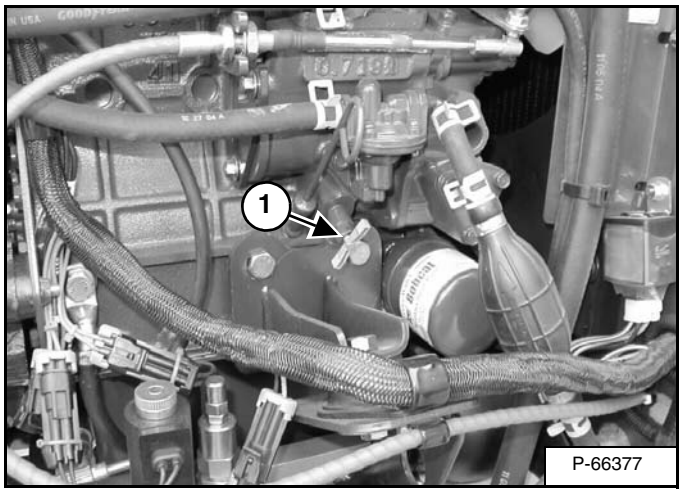
When the engine is cool, loosen and remove the radiator cap (Item 1) **[Figure 159]**.

Figure 160



Put a hose on the drain valve at the bottom of the radiator. Open the drain valve (Item 1) **[Figure 160]** and drain the coolant into a container.

Figure 161



Put a hose on the drain valve on the engine block. Open the drain valve (Item 1) **[Figure 161]** and drain the coolant into a container.

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

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

Mix the coolant in a separate container. (See ENGINE COOLING SYSTEM on Page 99.)

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

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

4.3 liters of propylene glycol mixed with 3.8 liters of water is the correct mixture of coolant to provide a -37°C freeze protection.

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

Add premixed coolant until the level is correct.

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

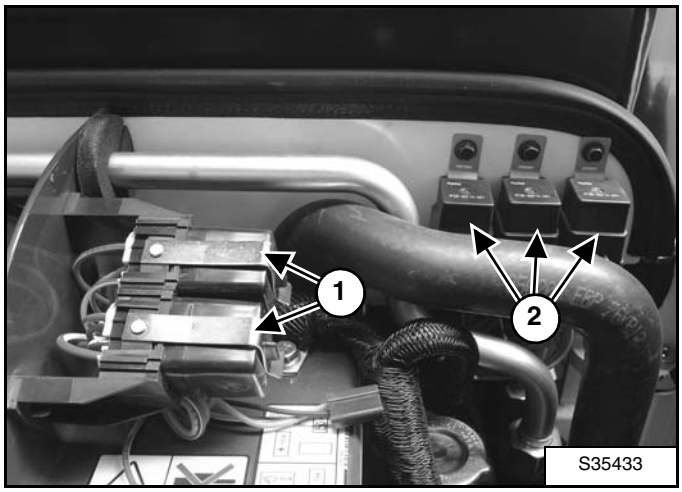
Add coolant to the recovery tank as needed.

Close the tailgate.

ELECTRICAL SYSTEM

Description

Figure 162



The excavator has a 12 volt, negative ground electrical system. The electrical system is controlled by fuses and relays located in the right side of the engine compartment (Items 1 and 2) **[Figure 162]**. The fuses will protect the electrical system when there is an electrical overload. The reason for the overload must be found and corrected before starting the engine again.

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

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

⚠ WARNING

AVOID INJURY OR DEATH

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

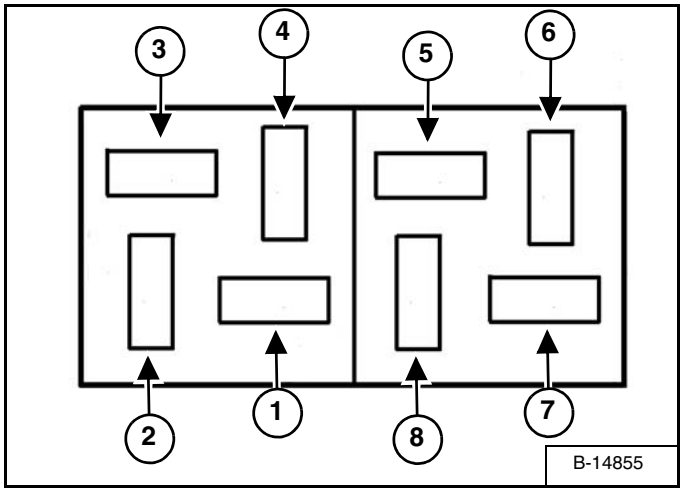
In case of acid contact, wash immediately with water. In case of eye contact get prompt medical attention and wash eye with clean, cool water for at least 15 minutes.

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

W-2065-0807

Fuse And Relay Location / Identification

Figure 163



1. **Instrument** - 10A (SW) Hourmeter, Warning Buzzer and Fuel Gauge Back Light.
2. **Accessory** - 20A (SW) Accessory Connector, Heater and Horn.
3. **Start** - 20A (SW) Key Switch, Unswitched Accessory Connector.
4. **Cab** - 15A (SW) Cab Power, Lights, Wiper and Dome Light.
5. **Power** - 15A (UNSW) Appliance Socket.
6. **Time Power**- 15A (UNSW) Stop Timer Module.
7. **Power** - 15A (SW) Stop Timer Module.
8. **Open** - Not Used **[Figure 163]**.

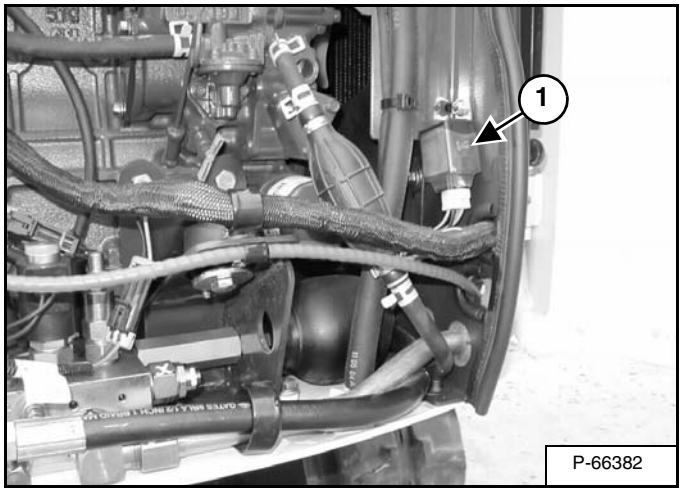
Always replace fuses using the same type and capacity.

The three electrical relays (Item 2) **[Figure 162]** are located in the engine compartment to the right of the fuel fill. The three relays control the starter, glow plugs and switched power circuits.

Fuel Timer And Diode Location / Identification

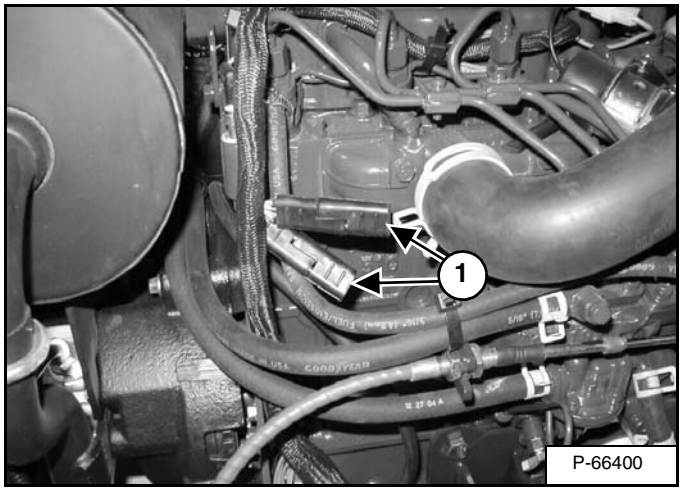
Open the tailgate. (See TAILGATE on Page 90.)

Figure 164



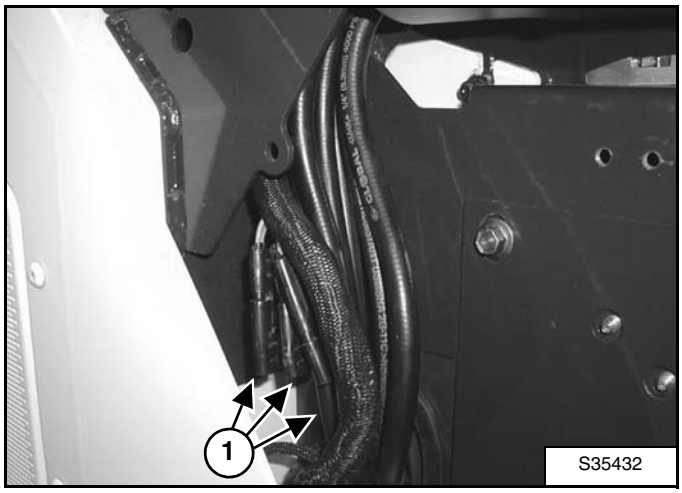
The fuel shut-off timer (Item 1) **[Figure 164]** is located on the right side of the engine compartment.

Figure 165



There are two diodes (Item 1) **[Figure 165]** in the harness to the left of the intake manifold. They are for alternator feedback protection and the glow plug during start function.

Figure 166

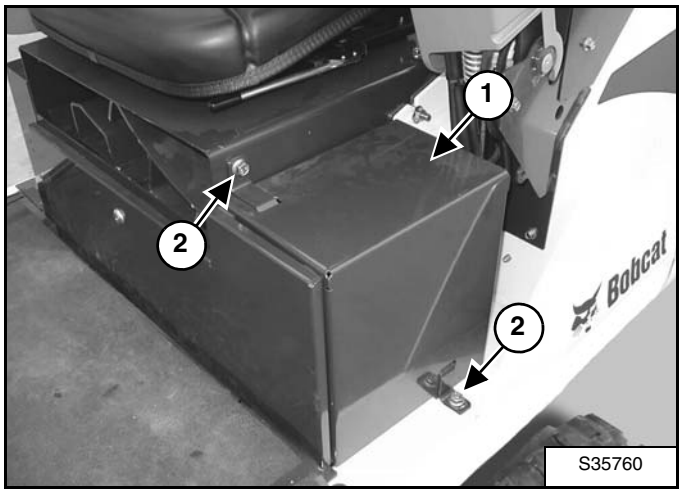


There are three diodes (Item 1) **[Figure 166]** in the harness in the right console. They are used for activating the warning buzzer if the engine oil pressure is low or the coolant temperature is high.

Battery Maintenance

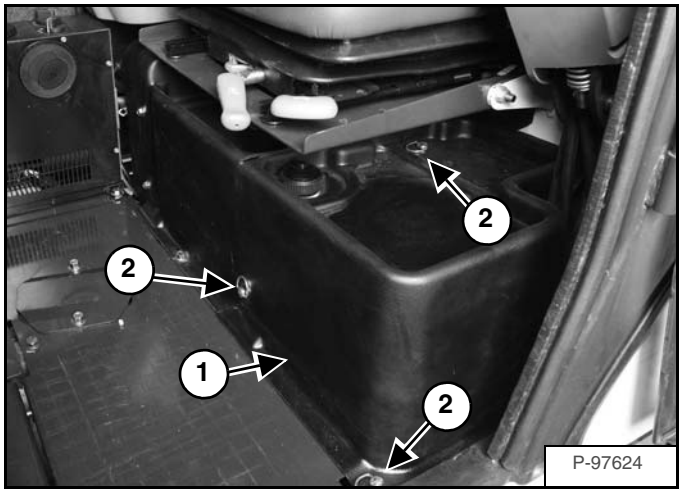
The battery is located under the cover (Item 1) **[Figure 167]** or **[Figure 168]** next to the operator's seat.

Figure 167



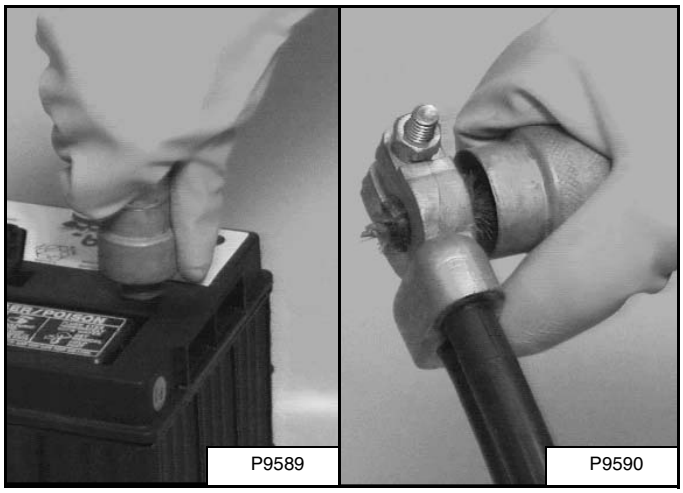
For S/N AHNM11001 - 12018: Remove the two bolts (Item 2) **[Figure 167]** and brackets to open the cover.

Figure 168



For S/N AHNM12019 And Above: Turn the three quarter turn fasteners (Item 2) **[Figure 168]** and remove the cover.

Figure 169



The battery cables must be clean and tight **[Figure 169]**. Remove acid or corrosion from the battery and cables using a sodium bicarbonate and water solution. Cover the battery terminals and cable ends with battery saver grease to prevent corrosion.

Check for broken or loose connections.

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

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

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

⚠ WARNING

AVOID INJURY OR DEATH

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

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

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

W-2065-0807

Using A Booster Battery (Jump Starting)

IMPORTANT

If jump starting the excavator from a second machine:

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

I-2060-0906

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

Engage the upperstructure slew lock. (See Upperstructure Slew Lock on Page 33.) Be sure the key switch is OFF. The booster battery must be 12 volt.

Figure 170

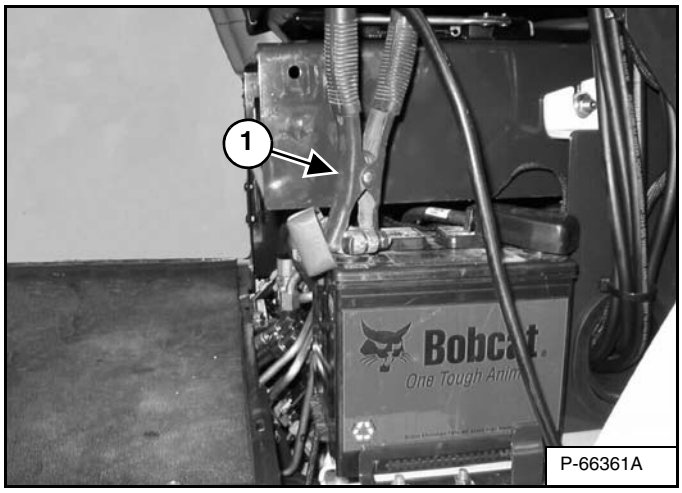
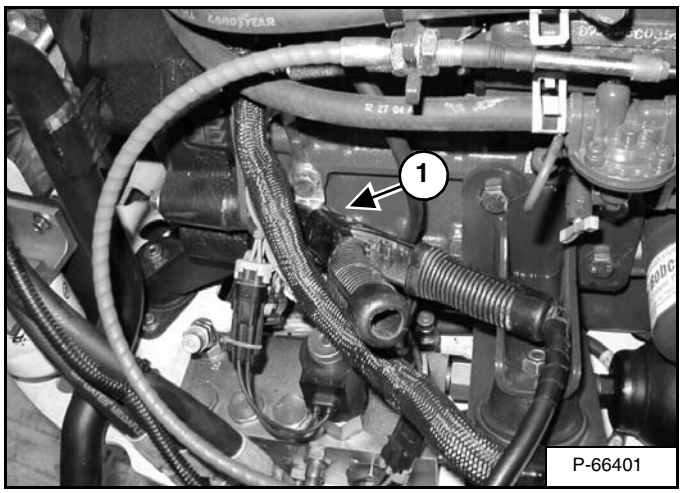


Figure 171



Open the tailgate. (See TAILGATE on Page 90.)

Connect one end of the first cable to the positive (+) terminal of the booster battery. Connect the other end of the same cable to the positive (+) terminal (Item 1) **[Figure 170]** of the excavator starter.

Connect one end of the second cable to the negative (-) terminal of the booster battery. Connect the other end of the same cable to the starter mounting bolt (Item 1) **[Figure 171]**.

Start the engine. After the engine has started, remove the ground (-) cable first (Item 1) **[Figure 171]**.

Disconnect the cable from the excavator starter (Item 1) **[Figure 170]**.

NOTE: See **(See Cold Temperature Starting on Page 56.).**

IMPORTANT

Damage to the alternator can occur if:

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

I-2223-0903

⚠ WARNING

AVOID INJURY OR DEATH

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

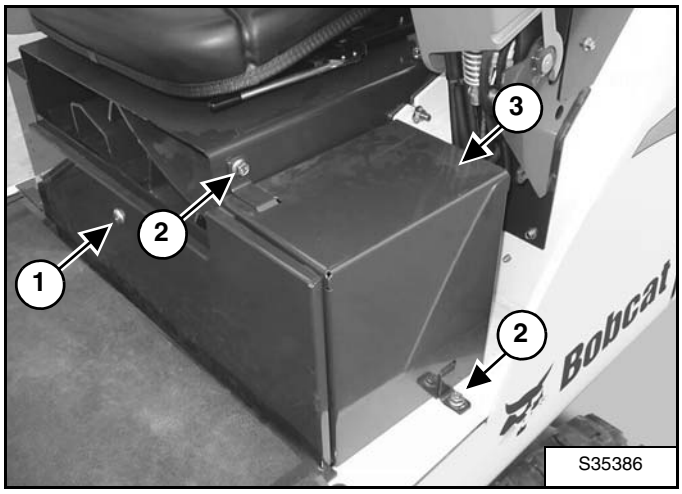
In case of acid contact, wash immediately with water. In case of eye contact get prompt medical attention and wash eye with clean, cool water for at least 15 minutes.

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

W-2065-0807

Removing And Installing The Battery

Figure 172

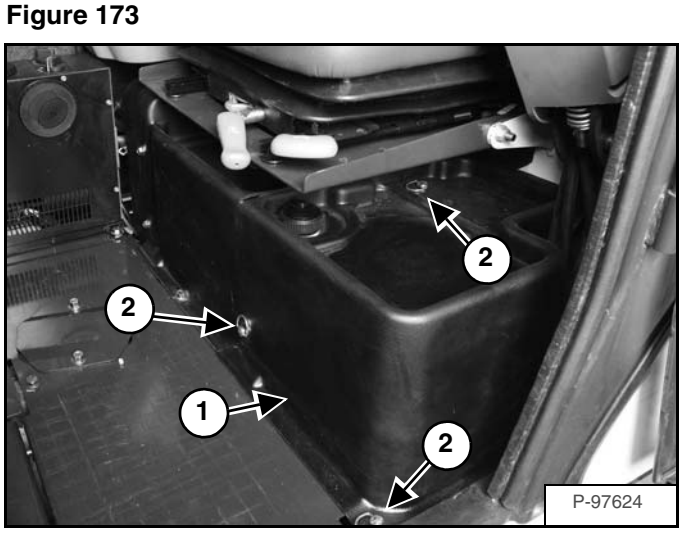


For S/N AHNM11001 - 12018:

Remove the front access cover (Item 1) **[Figure 172]** using the start key.

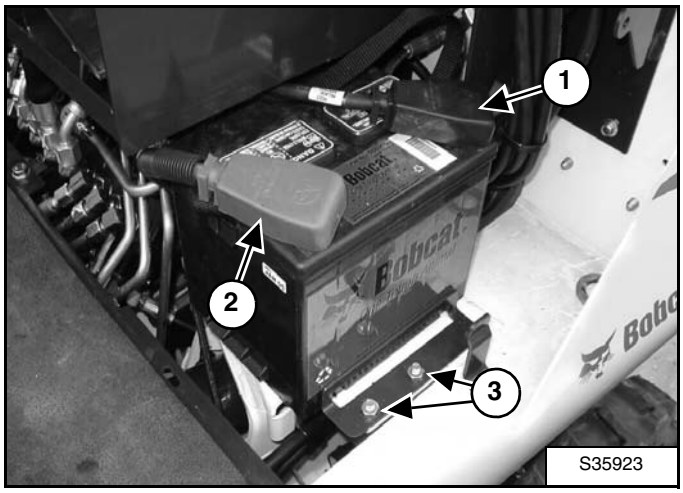
Remove the two bolts (Item 2) and brackets and remove the battery cover (Item 3) **[Figure 172]**.

Figure 173



For S/N AHNM12019 And Above: Turn the three quarter turn fasteners (Item 2) **[Figure 173]** and remove the cover.

Figure 174



Disconnect the negative (-) cable (Item 1) **[Figure 174]** first.

Disconnect the positive (+) cable (Item 2) **[Figure 174]**.

Remove the two bolts (Item 3) **[Figure 174]** and remove the hold down clamp.

Remove the battery.

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

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

Connect the battery cables. Connect the negative (-) cable (Item 1) **[Figure 174]** last to prevent sparks.

⚠ WARNING

AVOID INJURY OR DEATH

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

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

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

W-2065-0807

HYDRAULIC SYSTEM

Checking And Adding Hydraulic Oil

Figure 175

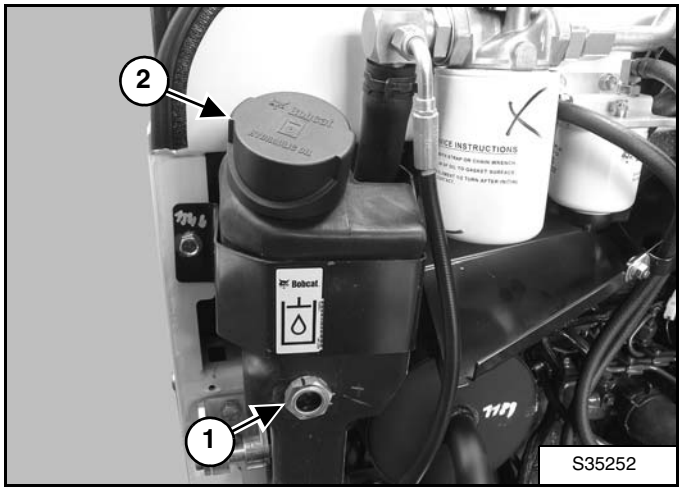
Put the machine on a flat level surface.

Retract the tracks fully.

Extend the arm and retract the bucket cylinders, lower the boom until the bucket is on the ground and lower the blade as shown **[Figure 175]**. Stop the engine.

Open the tailgate. (See TAILGATE on Page 90.)

Figure 176



The fluid must be at the centre of the sight gauge (Item 1) **[Figure 176]**.

Remove the oil fill cap (Item 2) **[Figure 176]**.

⚠ WARNING

AVOID INJURY OR DEATH

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

W-2103-0508

Add the correct fluid to the reservoir until it is visible in the sight gauge (Item 1) **[Figure 176]**.

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

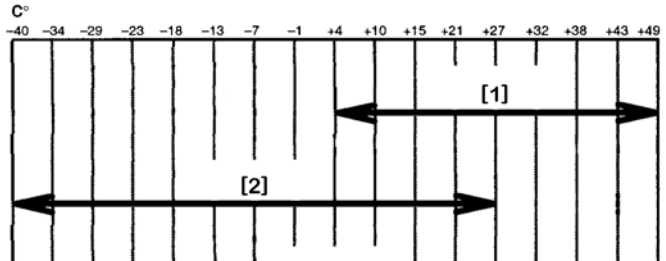
Install the cap.

Close the tailgate.

Hydraulic / Hydrostatic Fluid Chart

Figure 177

HYDRAULIC / HYDROSTATIC FLUID RECOMMENDED ISO VISCOSITY GRADE (VG) AND VISCOSITY INDEX (VI)



TEMPERATURE RANGE ANTICIPATED DURING MACHINE USE

[1] VG 100; Minimum VI 120
[2] VG 46; Minimum VI 140
[3] Synthetic Fluid; VG 46; Minimum VI 150
[4] BOBCAT Hydraulic / Hydrostatic Fluid

Use only recommended fluid in the hydraulic system **[Figure 177]**.

Install the oil fill cap.

Removing And Replacing The Hydraulic Filter

WARNING

AVOID INJURY OR DEATH

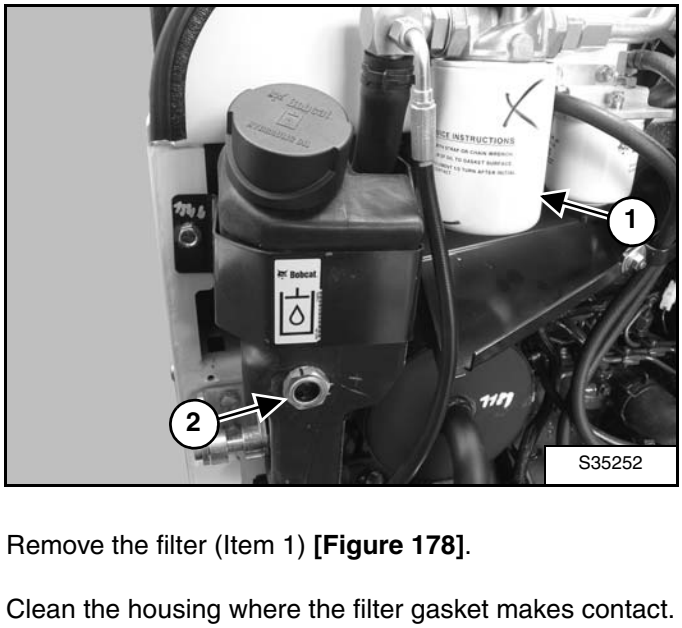
Always clean up spilled fuel or oil. Keep heat, flames, sparks or lighted tobacco away from fuel and oil. Failure to use care around combustibles can cause explosion or fire.

W-2103-0508

See the SERVICE SCHEDULE for the correct service interval. (See SERVICE SCHEDULE on Page 85.)

Open the tailgate. (See TAILGATE on Page 90.)

Figure 178



Remove the filter (Item 1) **[Figure 178]**.

Clean the housing where the filter gasket makes contact.

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

Start the engine. Run excavator through the hydraulic functions. Stop the engine. Check the fluid level at the sight gauge (Item 2) **[Figure 178]** and add as needed. Check the filter area for leaks.

Removing And Replacing The Hydraulic Fluid

See the SERVICE SCHEDULE for the correct service interval. (See SERVICE SCHEDULE on Page 85.)

WARNING

AVOID INJURY OR DEATH

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

W-2072-0807

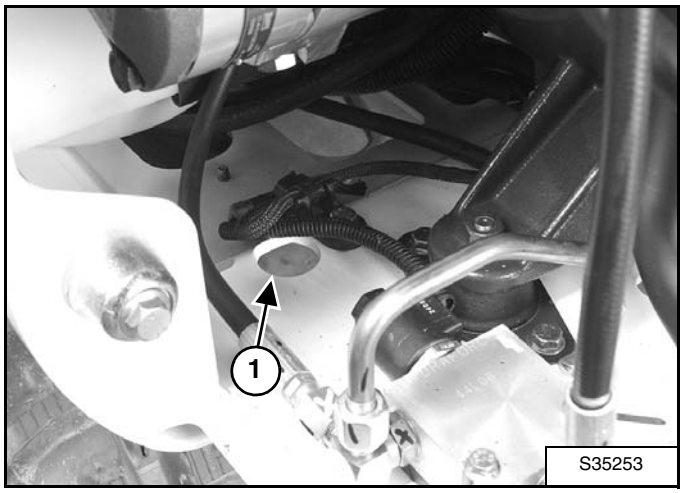
Retract the tracks fully.

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

Open the tailgate. (See TAILGATE on Page 90.)

Remove and replace the hydraulic filter.

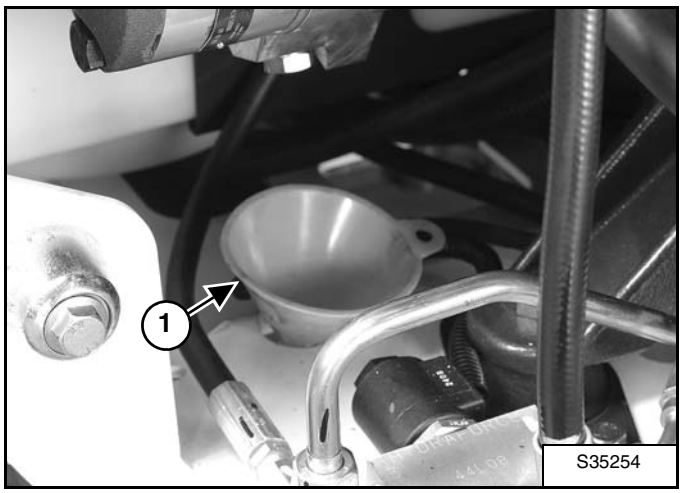
Figure 179



A hole (Item 1) **[Figure 179]** is provided in the housing for ease of draining the hydraulic fluid.

Removing And Replacing The Hydraulic Fluid (Cont'd)

Figure 180

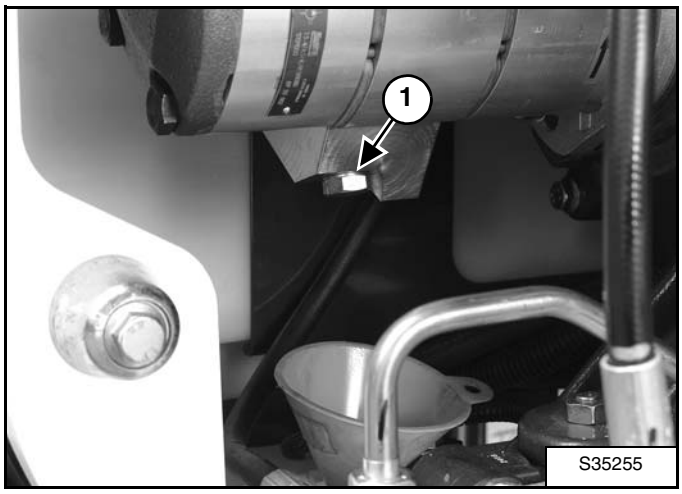


Install a funnel (Item 1) **[Figure 180]** in the hole.

Put a container under the funnel.

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

Figure 181



Remove the drain plug (Item 1) **[Figure 181]** from the pump fitting and drain the hydraulic fluid into the container.

IMPORTANT

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

I-2067-0499

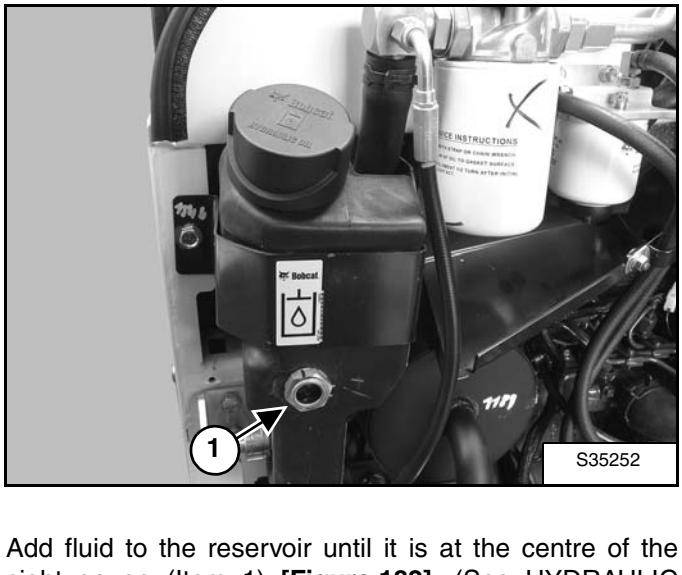
IMPORTANT

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

I-2045-0788

Install the drain plug.

Figure 182



Add fluid to the reservoir until it is at the centre of the sight gauge (Item 1) **[Figure 182]**. (See HYDRAULIC SYSTEM on Page 106.)

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

SPARK ARRESTER MUFFLER

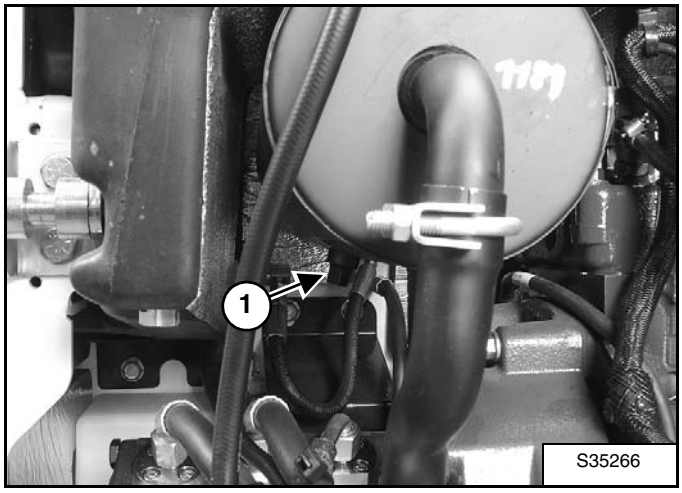
Cleaning Procedure

See the SERVICE SCHEDULE for the correct service interval. (See SERVICE SCHEDULE on Page 85.)

Do not operate the excavator with a defective exhaust system.

Stop the engine. Open the tailgate. (See TAILGATE on Page 90.)

Figure 183



Remove the plug (Item 1) **[Figure 183]** from the bottom of the muffler.

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

Stop the engine. Install and tighten the plug.

Close the tailgate.

WARNING

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

Failure to do so can cause injury or death.

W-2203-0595

WARNING

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

W-2068-1285

WARNING

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

W-2011-1285

WARNING

AVOID INJURY OR DEATH

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

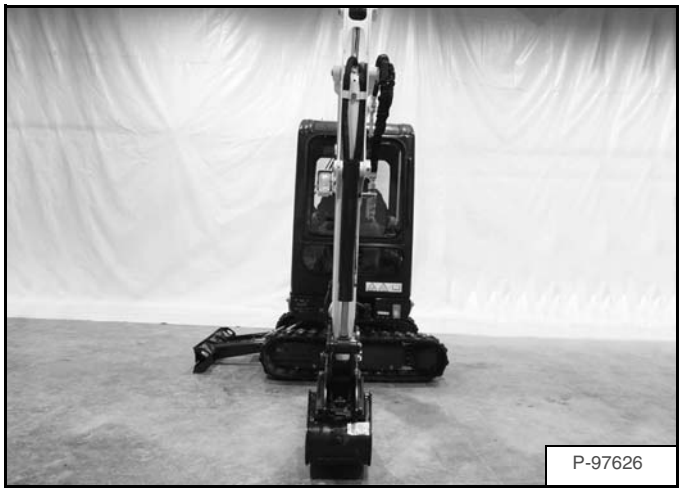
W-2050-0807

TRACK TENSION

NOTE: The wear of undercarriage parts vary with working conditions and types of soil conditions. Maintain the correct track tension by inspecting regularly. (See SERVICE SCHEDULE on Page 85.)

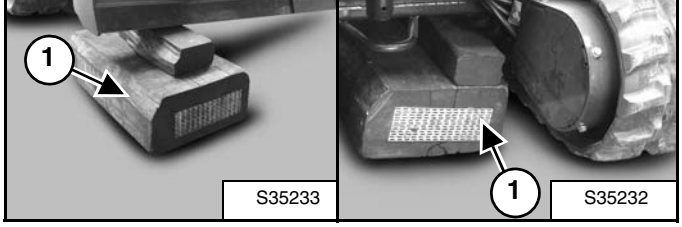
Adjusting

Figure 184



Raise one side of the machine (approximately 102 mm [4.0 in]) using the boom and arm as shown in **[Figure 184]**.

Figure 185



Raise the blade fully and install wooden blocks (Item 1) **[Figure 185]** or jackstands under the blade and the track frame. Lower the machine until all machine weight is on the wooden blocks or jackstands.

Stop the engine.

⚠ WARNING

AVOID INJURY

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

W-2142-0903

Figure 186

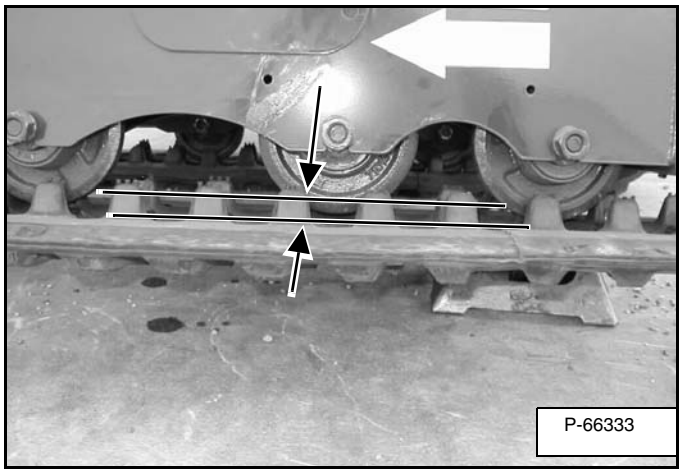
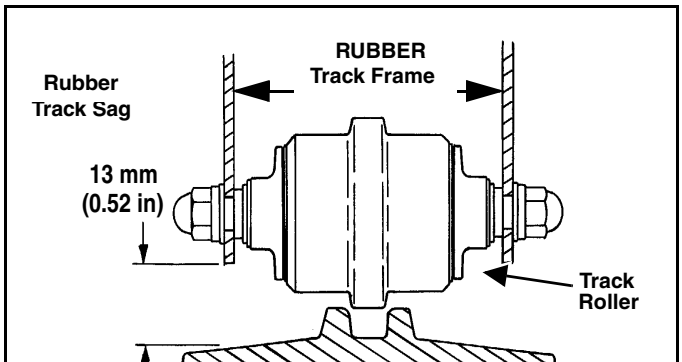


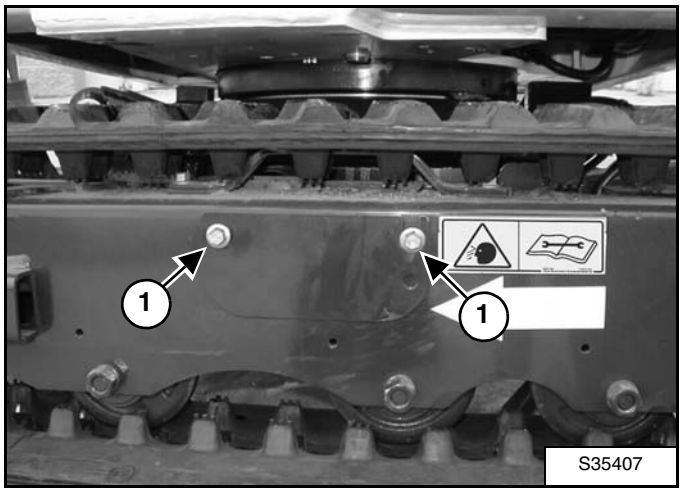
Figure 187



Measure the rubber track sag at the middle track roller **[Figure 186]**. Do not get your fingers into pinch points between the track and the track roller. Use material of appropriate size to check the gap between the contact edge of the roller and top edge of the track guide lug **[Figure 186]** and **[Figure 187]**.

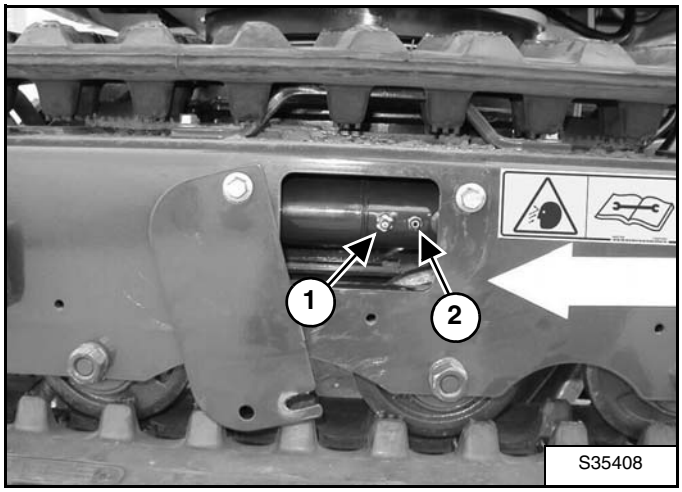
Adjusting (Cont'd)

Figure 188



Loosen the two bolts (Item 1) **[Figure 188]** on the cover. Pivot the cover downward.

Figure 189



Add grease to the fitting (Item 1) **[Figure 189]** until the track tension is correct.

Use tool MEL1560 to loosen the bleed fitting (Item 2) **[Figure 189]** (one turn maximum) to release tension from the track.

Repeat the procedure for the other side.

If the track tension is still loose after adjusting to the mentioned limit, it indicates the track is worn.

⚠ WARNING

AVOID INJURY OR DEATH

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

W-2143-0189

⚠ WARNING

HIGH PRESSURE GREASE CAN CAUSE SERIOUS INJURY

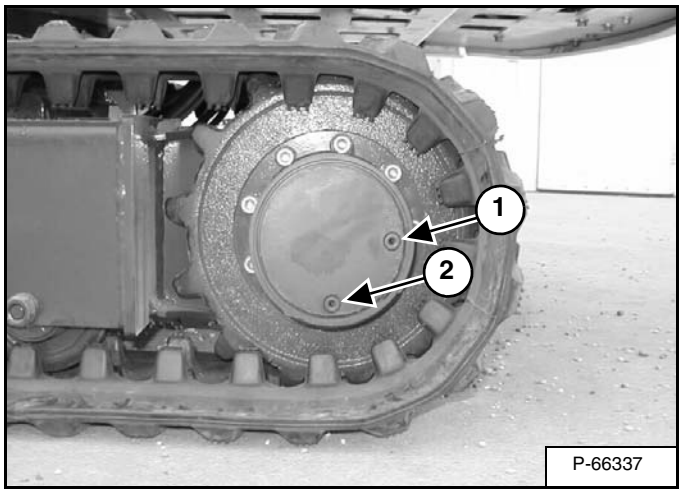
- **Do not loosen grease fitting.**
- **Do not loosen bleed fitting more than 1 - 1/2 turns.**

W-2781-0109

TRAVEL MOTOR

Checking And Adding Oil

Figure 190



Park the excavator on a level surface with the plugs (Items 1 and 2) **[Figure 190]** positioned as shown.

Remove the plug (Item 1) **[Figure 190]**. The lube level must be at the bottom edge of the hole.

Add lubricant (SAE 90W) through the hole if the lube level is low.

Removing And Replacing Oil

See the SERVICE SCHEDULE for the correct service interval. (See SERVICE SCHEDULE on Page 85.)

Park the excavator on a level surface with plugs (Items 1 and 2) **[Figure 190]** positioned as shown.

Remove the bottom plug (Item 2) and top plug (Item 1) **[Figure 190]** and drain into a container. Recycle or dispose of the used lubricant in an environmentally safe manner.

⚠ WARNING

AVOID INJURY OR DEATH

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

W-2103-0508

After all the lubricant is removed, install the bottom plug (Item 2) **[Figure 190]**.

Add 0.5 L of lubricant (SAE 90W) through the top plug hole (Item 1) **[Figure 190]** until the lubricant level is at the bottom edge of the plug hole.

Install and tighten the plug (Item 1) **[Figure 190]**.

Repeat the procedure for the other side.

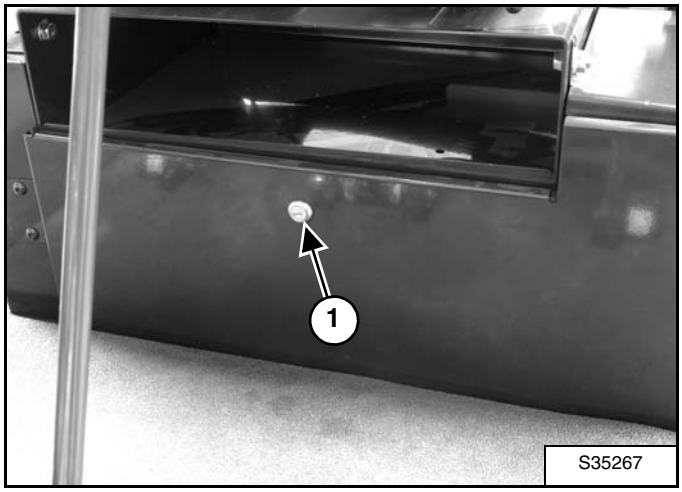
ALTERNATOR BELT

Belt Adjustment (S/N AHNM11001 - 12018)

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

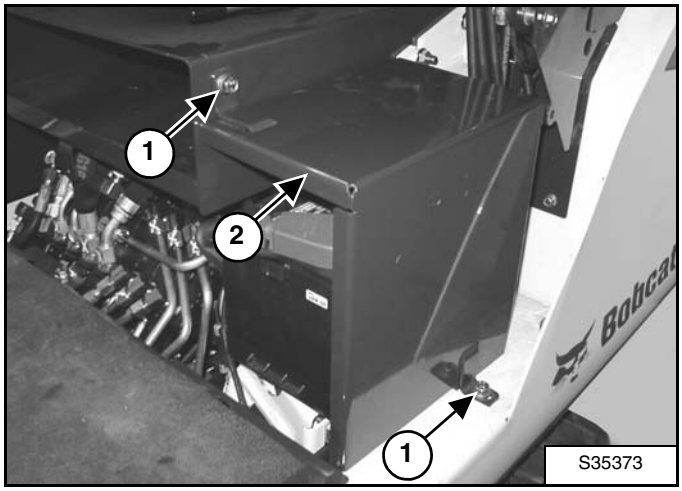
Stop the engine.

Figure 191



Use the start key to remove the access cover (Item 1) **[Figure 191]**.

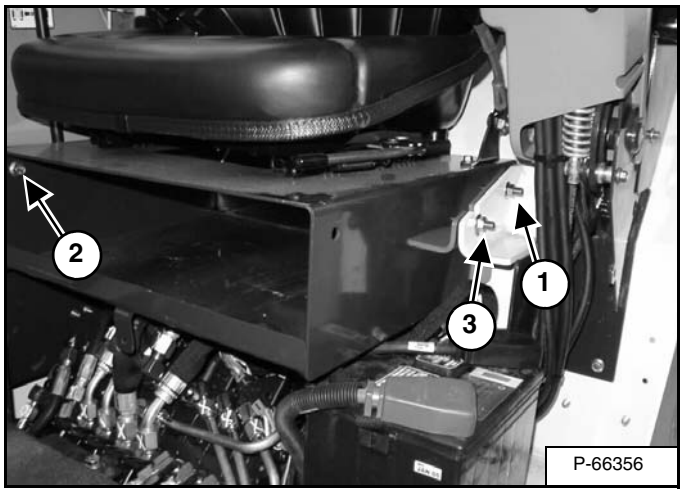
Figure 192



Remove the two bolts (Item 1) **[Figure 192]** and brackets from the battery cover.

Remove the cover (Item 2) **[Figure 192]**.

Figure 193



Remove the two bolts (Item 1) **[Figure 193]** and nuts from both sides of the seat mount.

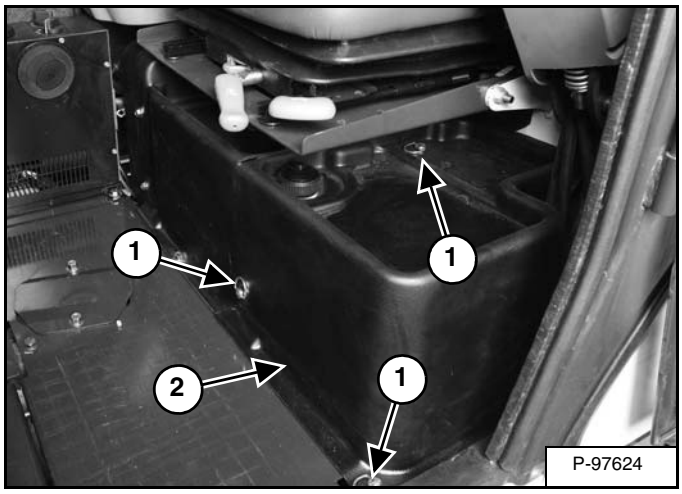
Remove the bolt (Item 2) **[Figure 193]**, nut and bracket from the right side of the seat mount.

Loosen the two bolts (Item 3) **[Figure 193]** and nuts from both sides of the seat mount.

Remove the seat and seat mount.

Belt Adjustment (S/N AHNM12019 & Above)

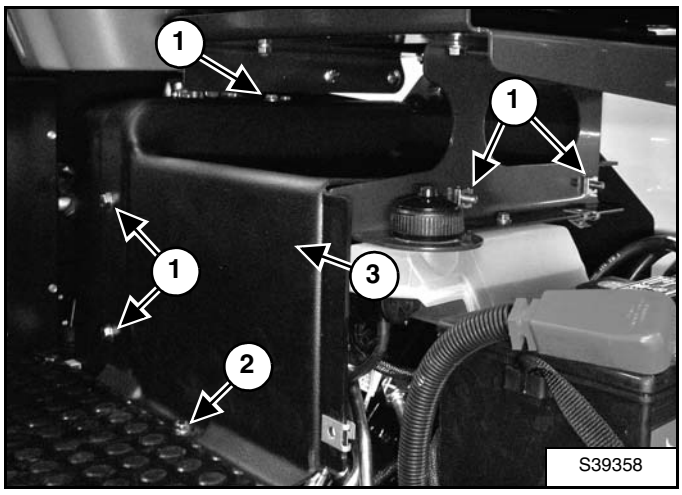
Figure 194



Turn the three quarter turn fasteners (Item 1) **[Figure 191]** and remove the battery cover.

Remove the cover (Item 2) **[Figure 191]**.

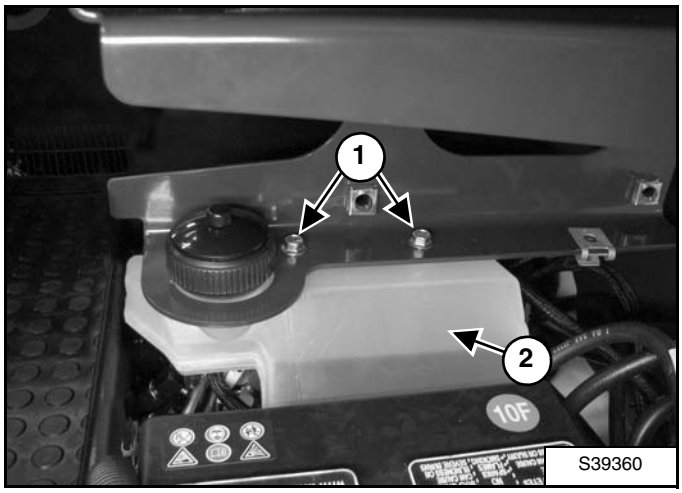
Figure 195



Remove the six bolts (Item 1 and 2) and remove the access cover (Item 3) **[Figure 195]**.

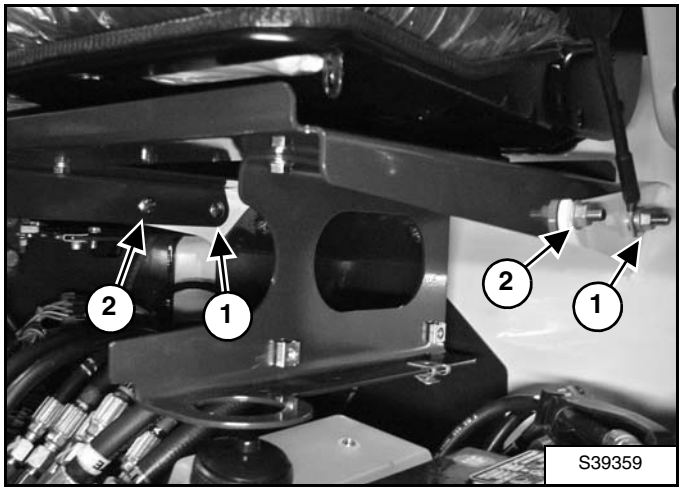
Installation: Tighten bolt (Item 2) **[Figure 195]** to 8 - 10 N•m (71 - 88 in-lb) torque.

Figure 196



Remove the two bolts (Item 1) and lower the washer bottle (Item 2) **[Figure 196]**.

Figure 197



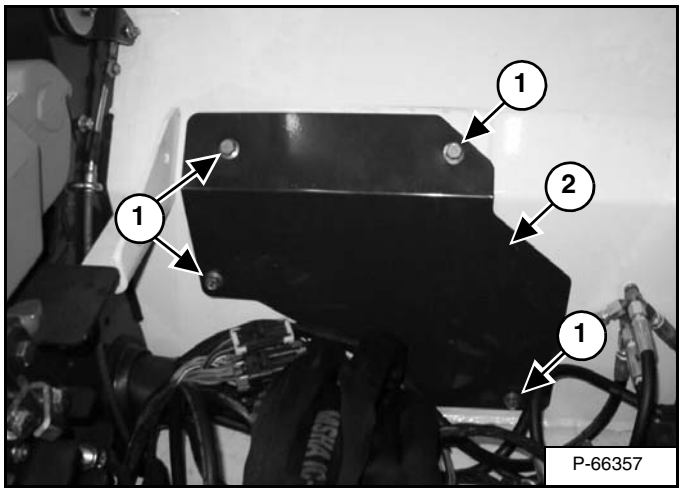
Remove the two bolts (Item 1) **[Figure 197]** and nuts from both sides of the seat mount.

Loosen the two bolts (Item 2) **[Figure 197]** and nuts from both sides of the seat mount.

Remove the seat and seat mount.

Belt Adjustment (All Models)

Figure 198



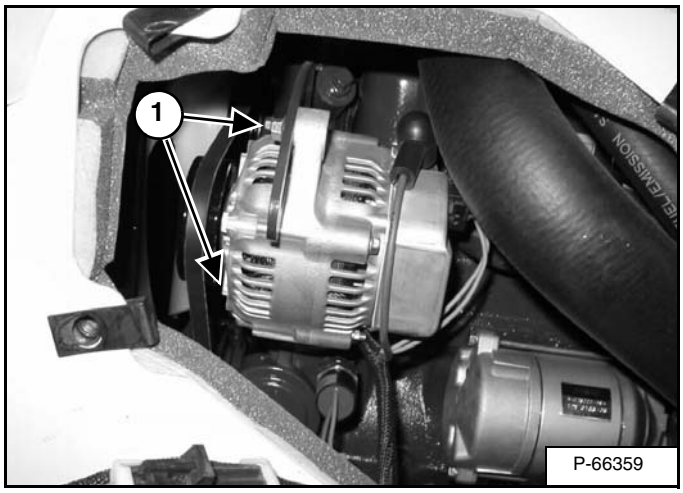
Remove the four bolts (Item 1) and remove the access panel (Item 2) **[Figure 198]**.

NOTE: There are five bolts (Item 1) [Figure 198] on later machines (S/N AHNM12019 & Above).

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

Stop the engine.

Figure 199



Loosen the alternator mounting and adjustment bolts (Item 1) **[Figure 199]**.

If a belt tension tool is available, move the alternator toward the front of the machine until the belt has (New belt = 250 - 267 N [56 - 60 lbf] or used belt = 214 - 231 N [48 - 52 lbf]) tension.

If a belt tension tool is not available, move the alternator towards the front of the machine until the belt has 13 mm (0.50 in) movement at the middle of the belt span with 58 N (13 lbf) of force.

Tighten the mounting and adjustment bolts.

Install the access panel, the seat and seat mount, the battery cover and the access cover.

Belt Replacement

Loosen the alternator mounting and adjustment bolts (Item 1) **[Figure 199]** and loosen the belt fully.

Remove the belt and install a new belt.

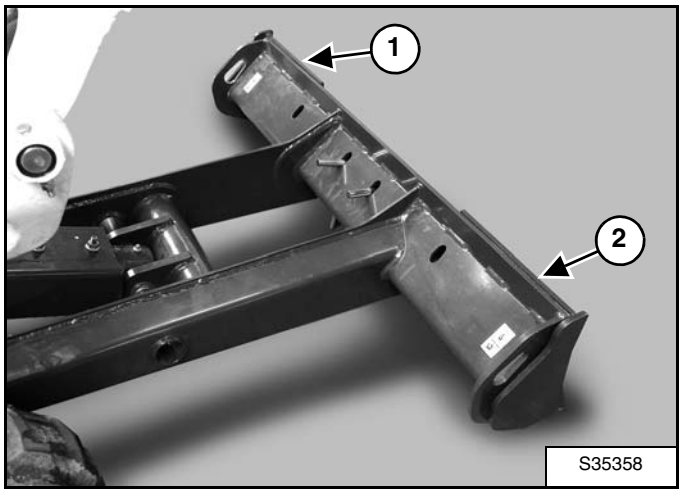
Adjust the belt to the specifications shown above.

BLADE EXTENSION

Description

The blade extensions are used to match the blade width to the track with. Secure the blade extensions in the retracted position when transporting the excavator or when narrow operating width is needed. Under normal operating conditions, the blade width should match the track width.

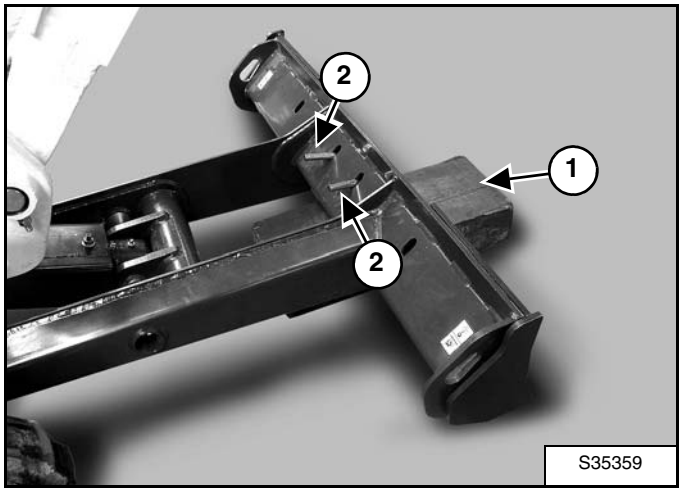
Figure 200



The blade extensions (Items 1 and 2) **[Figure 200]** are located on the blade.

Extension Removal And Installation

Figure 201



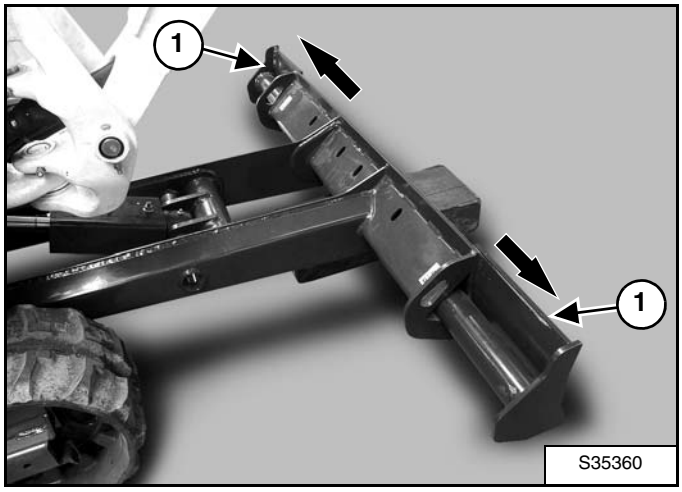
Put a block (Item 1) **[Figure 201]** under the blade.

Fully lower the blade on the block.

Stop the engine.

Remove the pin (Item 2) **[Figure 201]** from the blade extensions.

Figure 202

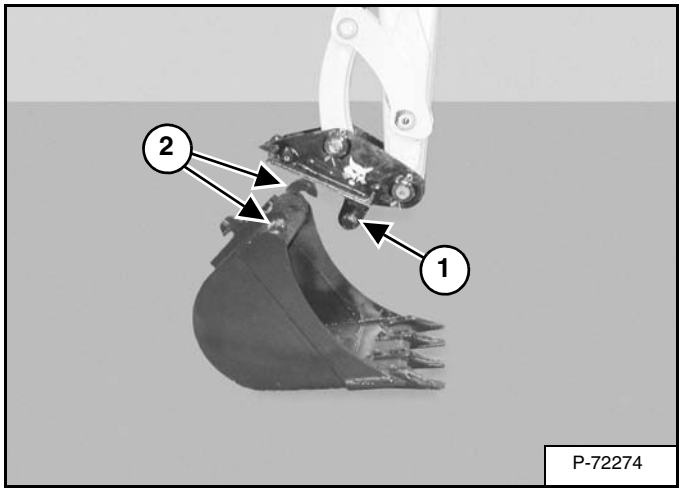


Remove the blade extensions (Item 1) **[Figure 202]** from the blade.

QUICK COUPLER

Quick Coupler And Attachment Inspection And Maintenance

Figure 203



Inspect the quick coupler for wear or damage. Inspect the quick coupler pins (Item 1) and the hooks (Item 2) **[Figure 203]** (on the attachment) for wear or damage

Repair or replace damaged parts.

TRACK ROLLER AND IDLER LUBRICATION

Procedure

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

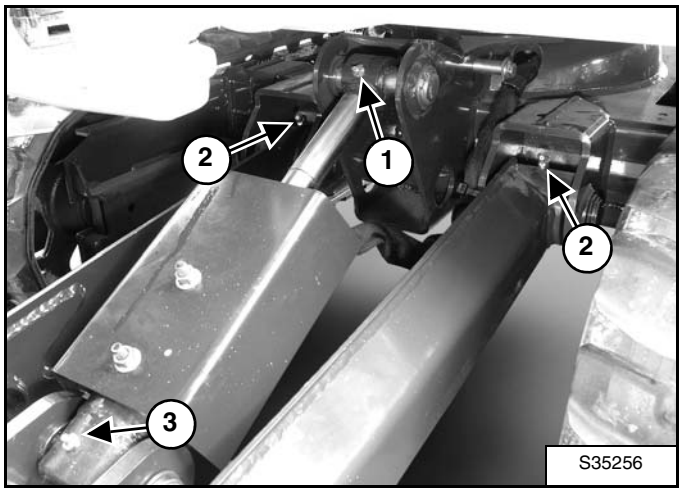
LUBRICATING THE EXCAVATOR

Lubrication Locations

Lubricate the excavator as specified in the SERVICE SCHEDULE for the best performance of the machine. (See SERVICE SCHEDULE on Page 85.)

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

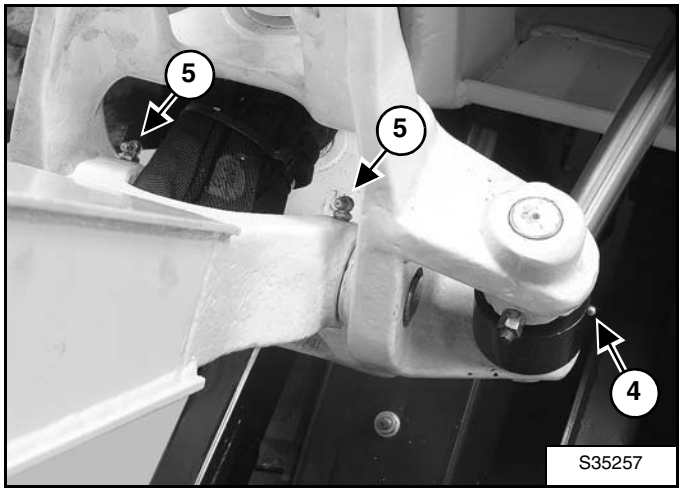
Figure 204



Ref Description (# of Fittings)

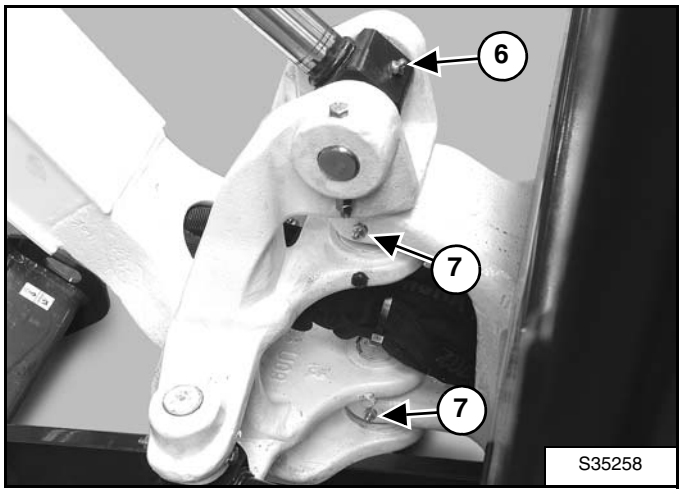
1. Blade Cylinder Rod End, every 8 - 10 hours (1) **[Figure 204]**.
2. Blade Pivots, every 8 - 10 hours (2) **[Figure 204]**.
3. Blade Cylinder Base End, every 8 - 10 hours (1) **[Figure 204]**.

Figure 205



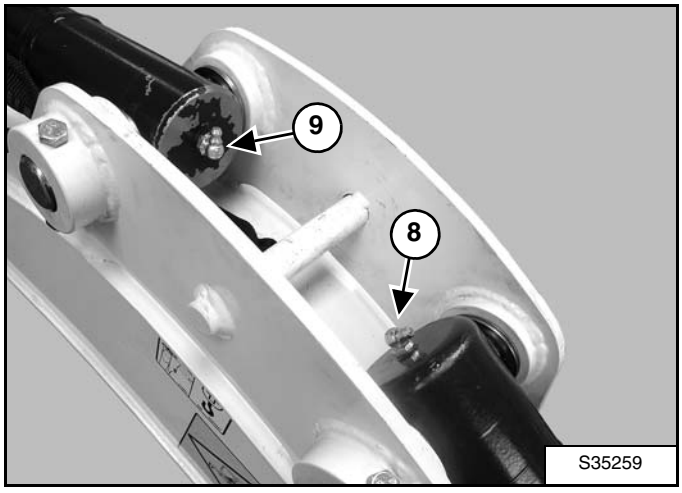
4. Boom Swing Cylinder Rod End, every 8 - 10 hours (1) **[Figure 205]**.
5. Boom Base End, every 8 - 10 hours (2) **[Figure 205]**.

Figure 206



6. Boom Cylinder Base End, every 8 - 10 hours (1) **[Figure 206]**.
7. Boom Swing Pivot, every 8 - 10 hours (2) **[Figure 206]**.

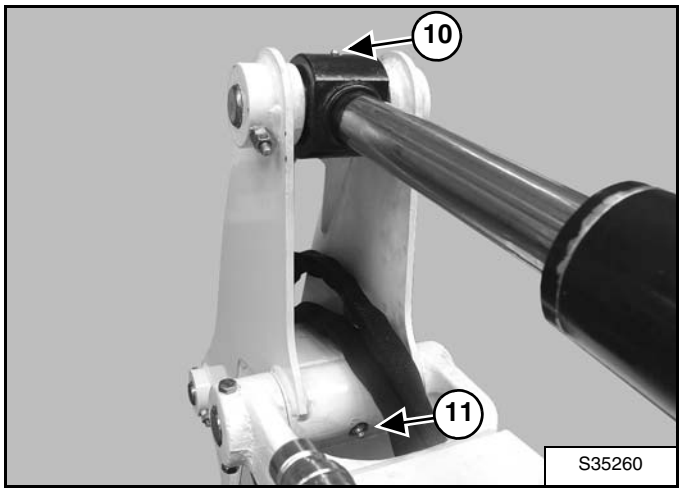
Figure 207



8. Boom Cylinder Rod End, every 8 - 10 hours (1) **[Figure 207]**.
9. Arm Cylinder Base End, every 8 - 10 hours (1) **[Figure 207]**.

Lubrication Locations (Cont'd)

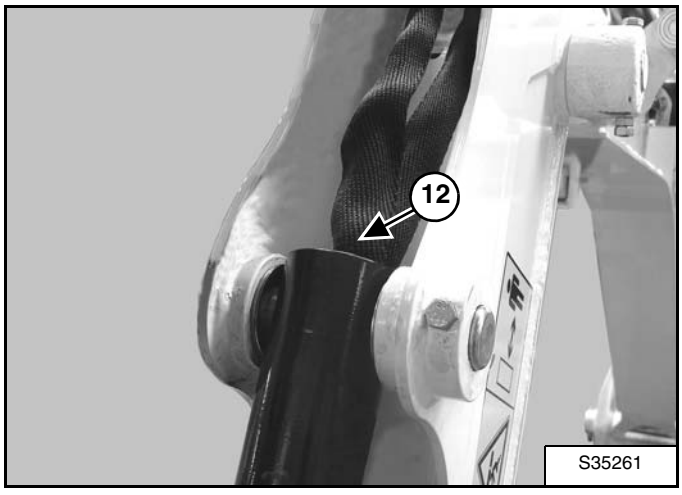
Figure 208



10. Arm Cylinder Rod End, every 8 - 10 hours (1) **[Figure 208]**.

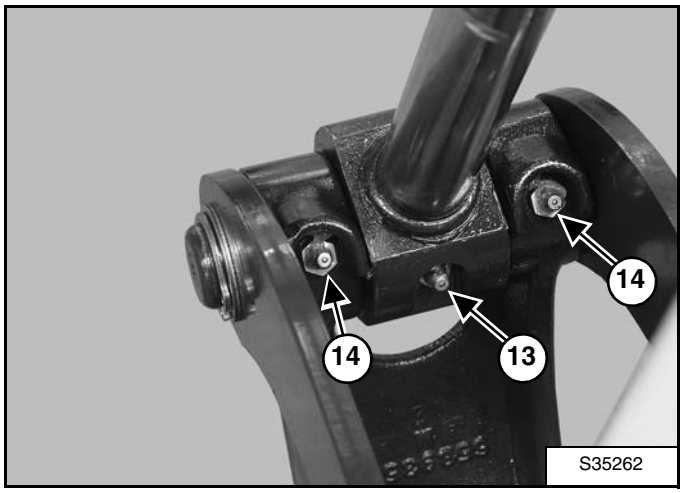
11. Arm Pivot, every 8 - 10 hours (1) **[Figure 208]**.

Figure 209



12. Bucket Cylinder Base End, every 8 - 10 hours (1) **[Figure 209]**.

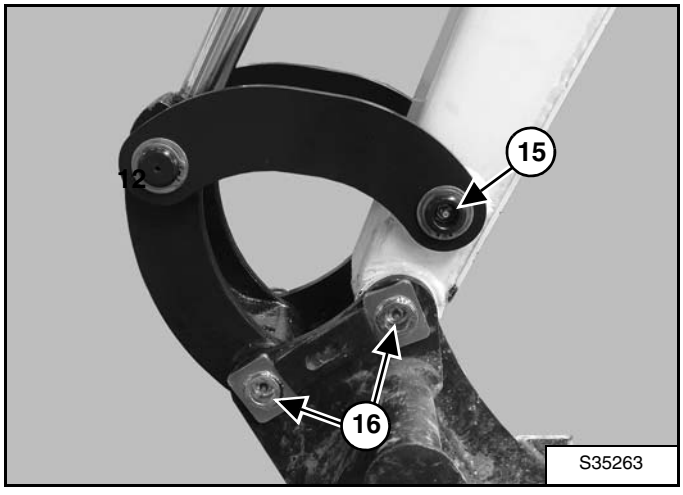
Figure 210



13. Bucket Cylinder Rod End, every 8 -10 hours (1) **[Figure 210]**.

14. Bucket Link Pivots, every 8 - 10 hours (2) **[Figure 210]**.

Figure 211

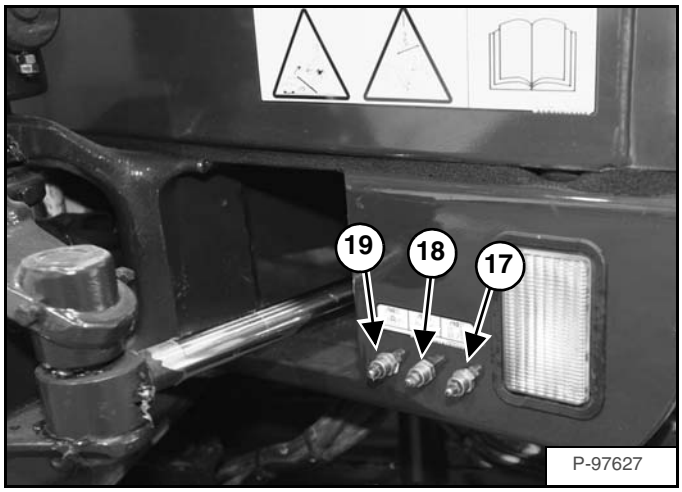


15. Bucket Link Pivot, every 8 - 10 hours (1) **[Figure 211]**.

16. Bucket Pivots, every 8 - 10 hours (2) **[Figure 211]**.

Lubrication Locations (Cont'd)

Figure 212



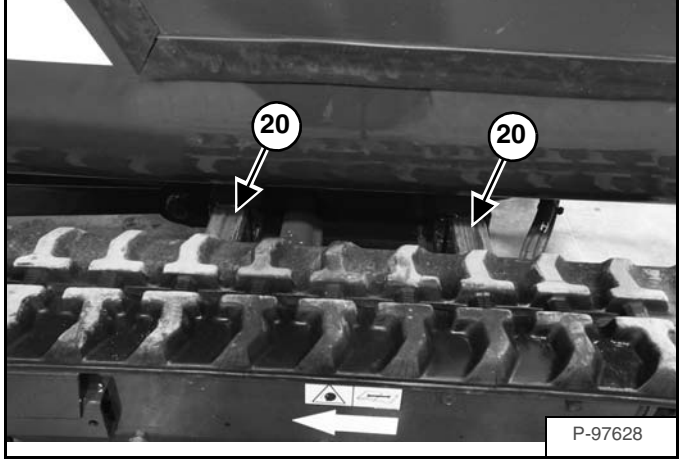
17. Boom Swing Cylinder Base End, every 8 - 10 hours **[Figure 212]**.

18. Swing Circle Bearing, every 50 hours **[Figure 212]**.

19. Swing Circle Pinion, every 50 hours. Pump four times with a grease gun. Rotate the upperstructure 180 degrees and repeat **[Figure 212]**.

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

Figure 213



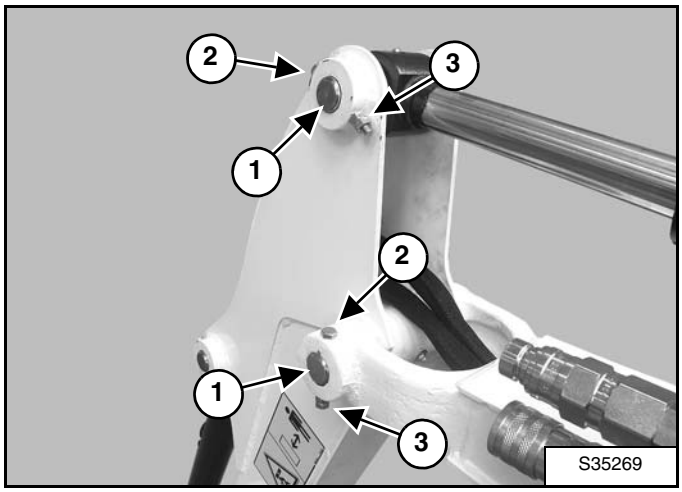
20. Track Expansion Tube, as required **[Figure 213]**.

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

PIVOT PINS

Inspection And Maintenance

Figure 214



The pivots and cylinders (Item 1) have a large pin held in position with a bolt (Item 2) and double nuts (Item 3) **[Figure 214]** securing the pin.

The the two nuts (Item 3) are used as jam nuts to hold the bolt (Item 2) with out tightening the bolt (Item 2) to the pin boss. After the nuts (Item 3) are tightened together, the bolt (Item 2) **[Figure 214]** should be free to spin. See your Bobcat dealer for replacement parts.

EXCAVATOR STORAGE AND RETURN TO SERVICE

Storage

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

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

Return to Service

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

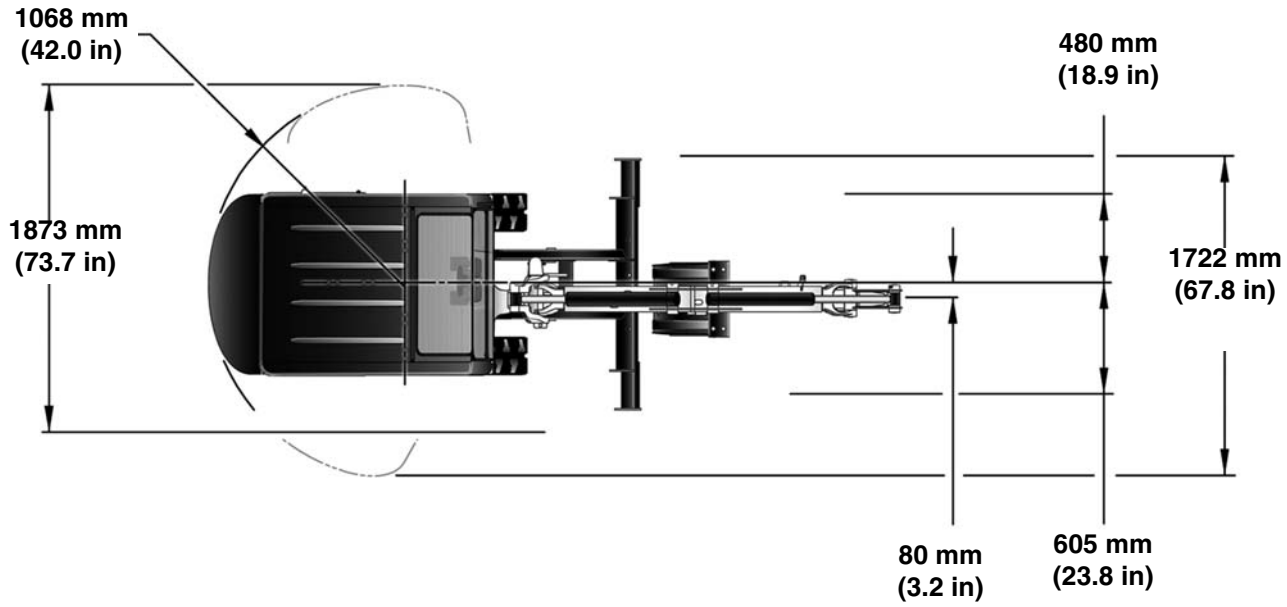
- Check the engine and hydraulic oil levels; check coolant level.
- Install a fully charged battery.
- Remove grease from exposed cylinder rods.
- Check all belt tensions.
- Be sure all shields and guards are in place.
- Lubricate the excavator.
- Remove cover from exhaust pipe opening.
- Start the engine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

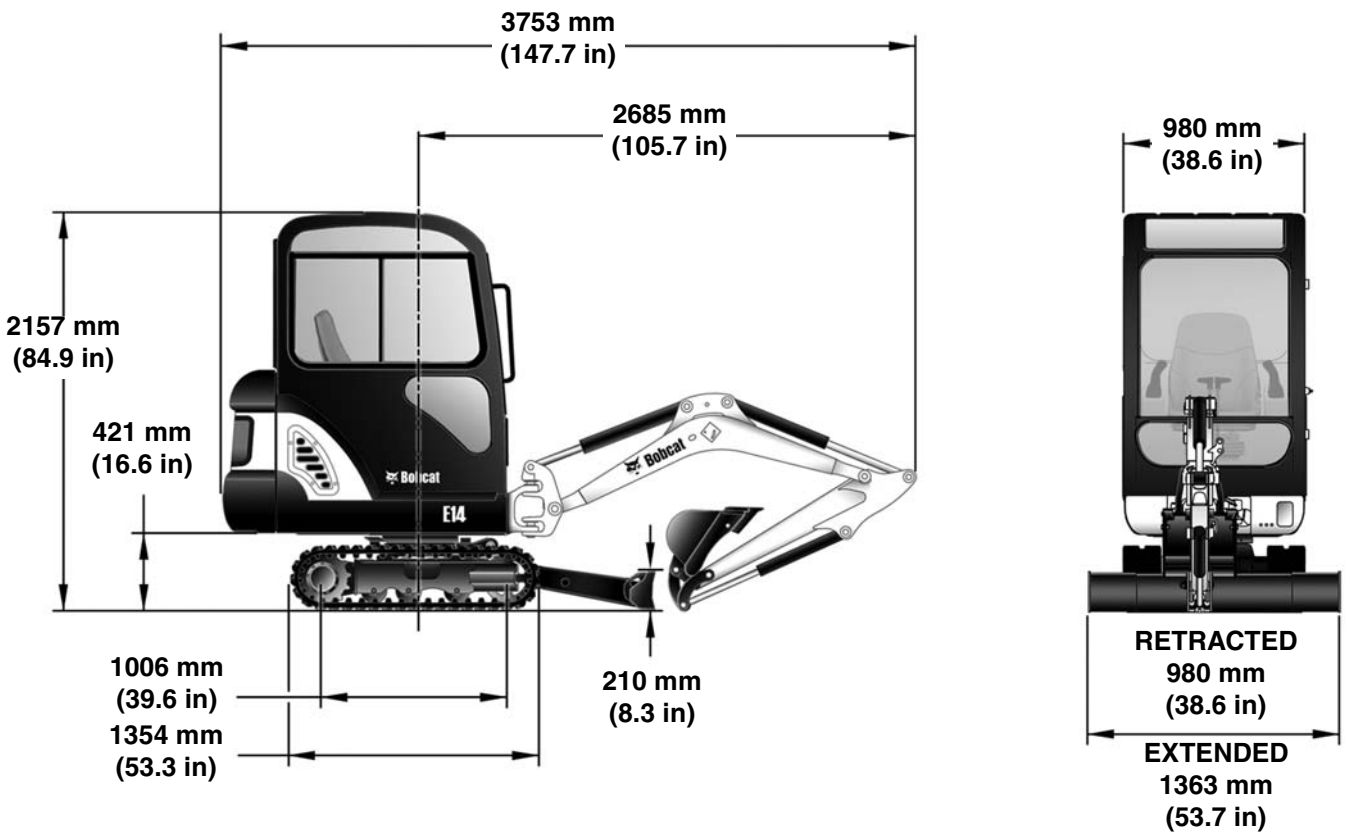
SPECIFICATIONS

EXCAVATOR SPECIFICATIONS

Excavator Machine Dimensions

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



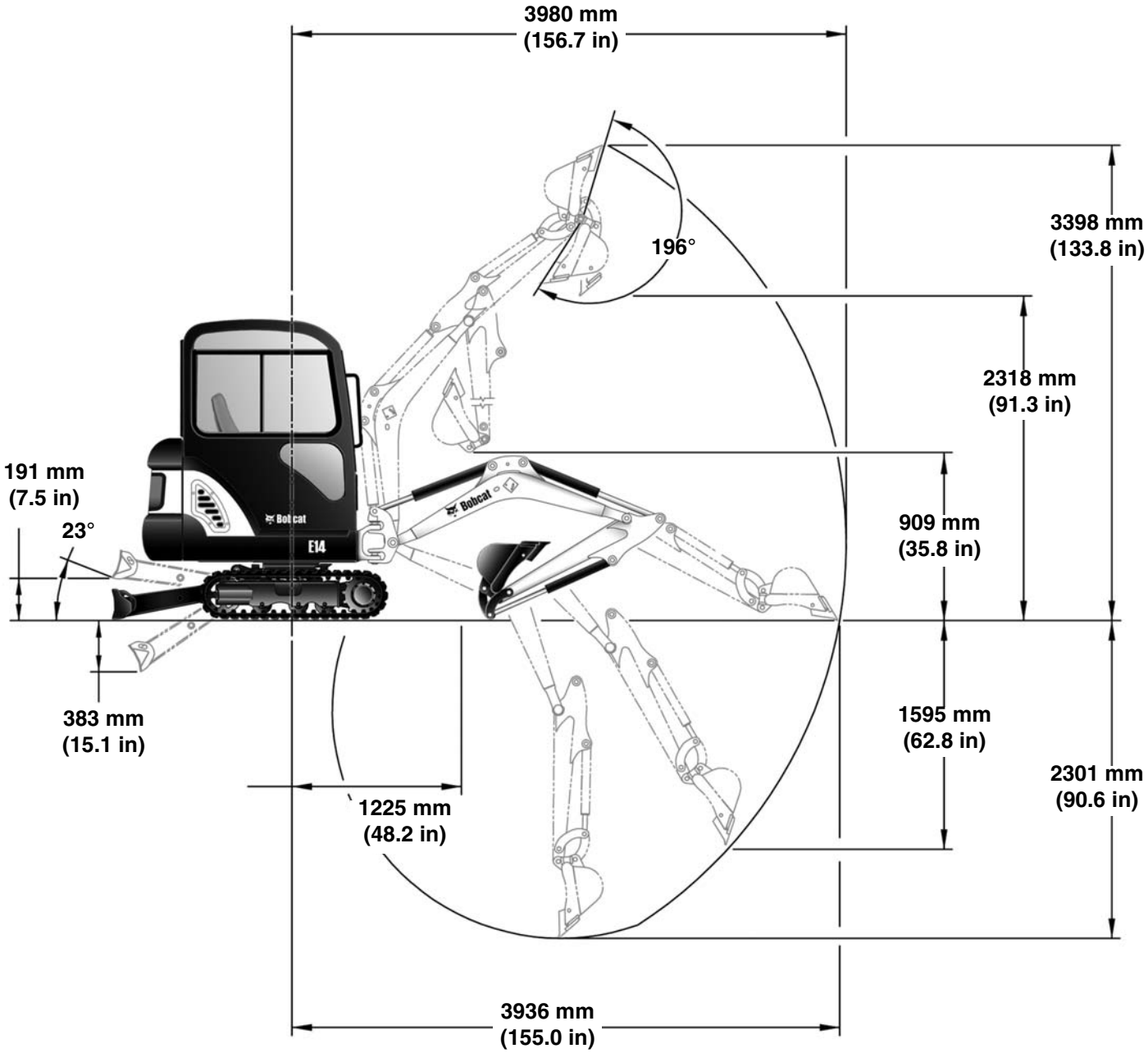


NA5810

EXCAVATOR SPECIFICATIONS (CONT'D)

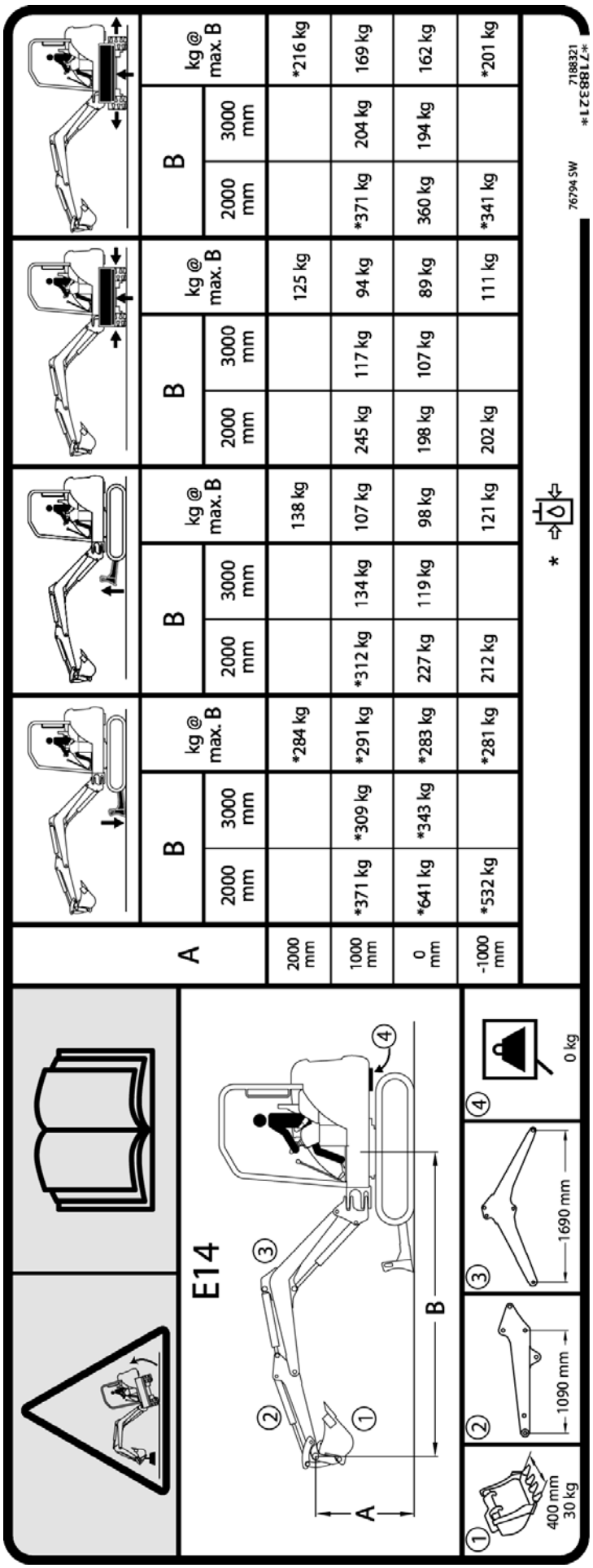
Excavator Machine Dimensions

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



NA5811

Lift Capacity



A	B	kg @ max. B	B	kg @ max. B	B	kg @ max. B	B	kg @ max. B
	2000 mm	3000 mm			2000 mm	3000 mm		
2000 mm		*284 kg		138 kg			125 kg	*216 kg
1000 mm	*371 kg	*309 kg	*291 kg	*312 kg	134 kg	107 kg	245 kg	117 kg	94 kg	*371 kg	204 kg	169 kg
0 mm	*641 kg	*343 kg	*283 kg	227 kg	119 kg	98 kg	198 kg	107 kg	89 kg	360 kg	194 kg	162 kg
-1000 mm	*532 kg		*281 kg	212 kg		121 kg	202 kg		111 kg	*341 kg		*201 kg

EXCAVATOR SPECIFICATIONS (CONT'D)

Performance

Operating weight (canopy w/ rubber tracks, and 408 mm (15.8 in) bucket)	1371 kg (3023 lb)
If equipped with the following, add:	Cab w/Heater, add: 129 kg (284 lb); Blade Extensions add: 8,5 kg (19 lb)
Travel Speed (Low / High) (High Speed is Optional)	1.98 km/h / 3.24 km/h (1.23 mph) / (2.0 mph)
Drawbar Pull (theoretical at 90% efficiency)	20029 N (4503 lbf)
Digging Force (per ISO 6015)	Arm - 8944 N (2011 lbf) Bucket 15358 N (3453 lbf)

Controls

Steering	Two hand levers (optional foot pedals)
Hydraulics	Two hand operated levers (joysticks) control boom, bucket, arm and upperstructure slew
Blade	Hand lever
Two Speed (If Equipped)	Switch on blade lever
Boom Swing	Right foot pedal
Auxiliary Hydraulics	Left foot pedal
Auxiliary Pressure Release	Left foot pedal
Engine	Hand lever on right-hand side, key type start switch
Starting Aid	Glow Plugs - activated by key switch
Brakes Travel Service & Parking Swing Service Holding	 Hydraulic lock in motor circuit Hydraulic lock in motor circuit Pin lock

Engine

Make/Model	Kubota D722-E2B-BCZ-5
Fuel/Cooling	Diesel / Liquid
Horsepower @ 2500 RPM (ISO 9249)	9,9 kW Kw (13.3 hp)
Torque @ 2000 RPM (SAE Net)	42,2 N•m (31.1 ft-lb)
Number Of Cylinders	3
Displacement	0,72 L (43.9 ci)
Bore/Stroke	67 x 68 mm (2.64 x 2.68 in)
Lubrication	Pressure System with Filter
Crankcase Ventilation	Closed Breathing
Air Cleaner	Dry replaceable paper dual cartridge
Ignition	Diesel-Compression
Low Idle Speed	1275 rpm - 1375 rpm
High Idle Speed	2800 rpm
Engine Coolant	Propylene Glycol / water mixture (53% PG / 47% water)

EXCAVATOR SPECIFICATIONS (CONT'D)

Hydraulic System

Pump Type	Three section gear pump
Gear Pump (1) Gear Pump (2 and 3)	10,0 L/min (2.64 U.S. gpm) 11,25L/min (2.90 U.S. gpm)
Auxiliary Flow	32,5 L/min (8.6 U.S. gpm)
Hydraulic Filter	Full flow replaceable
Control Valve	9 spool parallel type open centre
System Relief Pressure	22890 kPa (229 bar) (3320 psi)
Slew Circuit	16550 kPa (166 bar) (2400 psi)
Joystick Control Pressure	3000 kPa (30 bar) (435 psi)
Auxiliary Relief	17000 kPa (170 bar) (2466 psi)
Arm Port Relief: Base And Rod End	24994 kPa (250 bar) (3625 psi)
Boom Port Relief: Base End Boom Port Relief: Rod End	20995 kPa (210 bar) (3045 psi) 24994 kPa (250 bar) (3625 psi)
Bucket Port Relief: Base End And Rod End	24994 kPa (250 bar) (3625 psi)
Blade Port Relief: Base End	29000 kPa (290 bar) (4205psi)
Hydraulic Filter Bypass	172 kPa (1,7 bar) (25 psi)

Hydraulic Cylinders

Cylinder	Bore	Rod	Stroke
Boom (cushion up)	63,5 mm (2.50 in)	38,1 mm (1.50 in)	439 mm (17.3 in)
Arm (cushion both direction)	57,2 mm (2.25 in)	38,1 mm (1.50 in)	420 mm (16.5 in)
Bucket	50,8 mm (2.00 in)	31,8 mm (1.25 in)	385 mm (15.2 in)
Boom Swing (cushion both direction)	69,9 mm (2.75 in)	31,8 mm (1.25 in)	429 mm (16.2 in)
Blade	57,2 mm (2.25 in)	31,8 mm (1.25 in)	108 mm (4.25 in)
Undercarriage	44,5 mm (1.75 in)	25,4 mm (1.00 in)	350 mm (13.8 in)

Hydraulic Cycle Times

Bucket Curl	2,1 Seconds
Bucket Dump	1,3 Seconds
Arm Retract	2,9 Seconds
Arm Extend	1,8 Seconds
Boom Raise	4,6 Seconds
Boom Lower	3,8 Seconds
Boom Swing Left	3,2 Seconds
Boom Swing Right	4,0 Seconds
Blade Raise	1,7 Seconds
Blade Lower	1,8 Seconds
Undercarriage Expand	3,5 Seconds
Undercarriage Retract	3,0 Seconds

EXCAVATOR SPECIFICATIONS (CONT'D)

Electrical

Starting Aid	Intake air heater
Alternator	12 volt, 40 Amp open frame w/ internal regulator
Battery	12 volts - 530 CCA @ -18°C (0°F)
Starter	12 volts; gear reduction 1.4 kw (1.9 hp)
Instrumentation	Fuel gauge, audible alarm, visual warning for engine functions and hourmeter
Lights	37.5 watt (2)

Drive System

Final Drive	Each track is driven by hydrostatic axial piston motor
Type of Reduction	23.0:1 two stage planetary

Slew System

Slew Motor	Axil piston
Slew Circle	Single row shear type ball bearing with internal gear
Slew Speed	10.2 rpm

Undercarriage

Crawler Track Design	Sealed track rollers with boxed section track roller frame, grease type track adjuster with shock absorbing recoil spring
Width of crawler	980 mm (38.6 in)

Tracks

Type	Rubber
Width	200 mm (7.9 in)
Number Of Shoes	Single Assembly
Number of Track Rollers (per side)	3

Ground Pressure

Rubber Tracks	31,0 kPa (0,31 bar) 4.5 psi

Capacities

Fuel Tank	23,7 L (6.3 U.S. gal)
Hydraulic Reservoir Only (Centre of Sight Glass)	1,2 L (3 U.S. gal)
Hydraulic System (with Reservoir)	18,8 L (5.0 U.S. gal)
Cooling System	5.7 L (1.5 U.S. gal)
Engine Oil and Filter	3,5 L (3.75 qt)
Final Drive (each)	0,5 L (0.55 qt)

Fuel Consumption

Fuel Consumption	4,7 L/hr (1.24 gph)
NOTE: The engine fuel consumption chart is to be used as a guideline only. The actual results may vary. Estimated fuel consumption is based on testing by Bobcat Company in high duty cycle digging applications.	

Environmental

	Noise / Vibration Levels	Uncertainties (If Applicable)
Noise level LpA (EU Directive 2000/14/EC)	91 dB(A)	-------
Operator position noise level (Cab) (ISO 6396)	80 dB(A)	+2,5 / -0 dB(A)
Whole body vibration (ISO 2631-1) (limit 0,5 m/s2)	below 0,5 m/s²	-------
Hand-arm vibration (ISO 5349-1) (limit 2,5 m/s2)	below 2,5 m/s²	-------

Temperature Range

Operation and storage	-17° - +43°C (-1.3° - +109.4°F)

WARRANTY

BOBCAT EXCAVATORS

DOOSAN TRADING LIMITED 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 DOOSAN TRADING LIMITED'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. DOOSAN TRADING LIMITED 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.

Service schedules must be adhered to, documented and genuine parts / lubricants must be used. The warranty does not cover oils and lubricants, coolant fluids, filter elements, tune-up parts, bulbs, fuses, ignition system parts (glow plugs, fuel injection pumps, injectors), alternator fan belts, drive belts and other high-wear items. Pins and bushings are considered to be normal consumable items and are not warranted.

The warranty does not cover damages resulting from abuse, accidents, alterations, use of the Bobcat product with any bucket or attachment not approved by Bobcat, air flow obstructions, or failure to maintain or use the Bobcat product according to the instructions applicable to it.

DOOSAN TRADING LIMITED EXCLUDES OTHER CONDITIONS, WARRANTIES OR REPRESENTATIONS OF ALL KINDS, EXPRESSED OR IMPLIED, STATUTORY OR OTHERWISE (EXCEPT THAT OF TITLE) INCLUDING ALL IMPLIED WARRANTIES AND CONDITIONS RELATING TO MERCHANTABILITY, SATISFACTORY QUALITY AND FITNESS FOR A PARTICULAR PURPOSE.

CORRECTIONS BY DOOSAN TRADING LIMITED OF NONCONFORMITIES WHETHER PATENT OR LATENT, IN THE MANNER AND FOR THE TIME PERIOD PROVIDED ABOVE, SHALL CONSTITUTE FULFILMENT OF ALL LIABILITIES OF DOOSAN TRADING LIMITED FOR SUCH NONCONFORMITIES, WHETHER BASED ON CONTRACT, WARRANTY, TORT, NEGLIGENCE, INDEMNITY, STRICT LIABILITY OR OTHERWISE WITH RESPECT TO OR ARISING OUT OF SUCH PRODUCT.

THE REMEDIES OF THE END-USER / OWNER SET FORTH UNDER THE PROVISIONS OF THE WARRANTY OUTLINED ABOVE ARE EXCLUSIVE AND THE TOTAL LIABILITY OF DOOSAN TRADING LIMITED INCLUDING ANY HOLDING, SUBSIDIARY, ASSOCIATED OR AFFILIATED COMPANY OR DISTRIBUTOR WITH RESPECT TO THIS SALE OR THE PRODUCT AND SERVICE FURNISHED HEREUNDER IN CONNECTION WITH THE PERFORMANCE OR BREACH THEREOF, OR FROM DELIVERY, INSTALLATION, REPAIR OR TECHNICAL DIRECTION COVERED BY OR FURNISHED UNDER THIS SALE, WHETHER BASED ON CONTRACT, WARRANTY, TORT, NEGLIGENCE, INDEMNITY, STRICT LIABILITY OR OTHERWISE SHALL NOT EXCEED THE PURCHASE PRICE OF THE PRODUCT UPON WHICH SUCH LIABILITY IS BASED.

DOOSAN TRADING LIMITED INCLUDING ANY HOLDING, SUBSIDIARY, ASSOCIATED OR AFFILIATED COMPANY AND DISTRIBUTOR SHALL IN NO EVENT BE LIABLE TO THE END-USER / OWNER, ANY SUCCESSORS IN INTEREST OR ANY BENEFICIARY OR ASSIGNEE RELATING TO THIS SALE FOR ANY CONSEQUENTIAL, INCIDENTAL, INDIRECT, SPECIAL OR PUNITIVE DAMAGES ARISING OUT OF THIS SALE OR BY ANY BREACH THEREOF, OR ANY DEFECT IN, OR FAILURE OF, OR MALFUNCTION OF THE PRODUCT UNDER THIS SALE, WHETHER BASED UPON LOSS OF USE, LOST PROFITS OR REVENUE, INTEREST, LOST GOODWILL, WORK STOPPAGE, IMPAIRMENT OF OTHER GOODS, LOSS BY REASON OF SHUTDOWN OR NON-OPERATION, INCREASED EXPENSES OF OPERATION OR CLAIMS OF USER OR CUSTOMERS OF THE USER FOR SERVICE INTERRUPTION WHETHER OR NOT SUCH LOSS OR DAMAGE IS BASED ON CONTRACT, WARRANTY, TORT, NEGLIGENCE, INDEMNITY, STRICT LIABILITY OR OTHERWISE.

Bobcat®

4700003-EN (03-09)

Printed in Europe

ALPHABETICAL INDEX